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EMERSON  
LABVIEW  
COMMUNITY

# Community Training Initiative

**Anyone can learn LabVIEW Anywhere!**

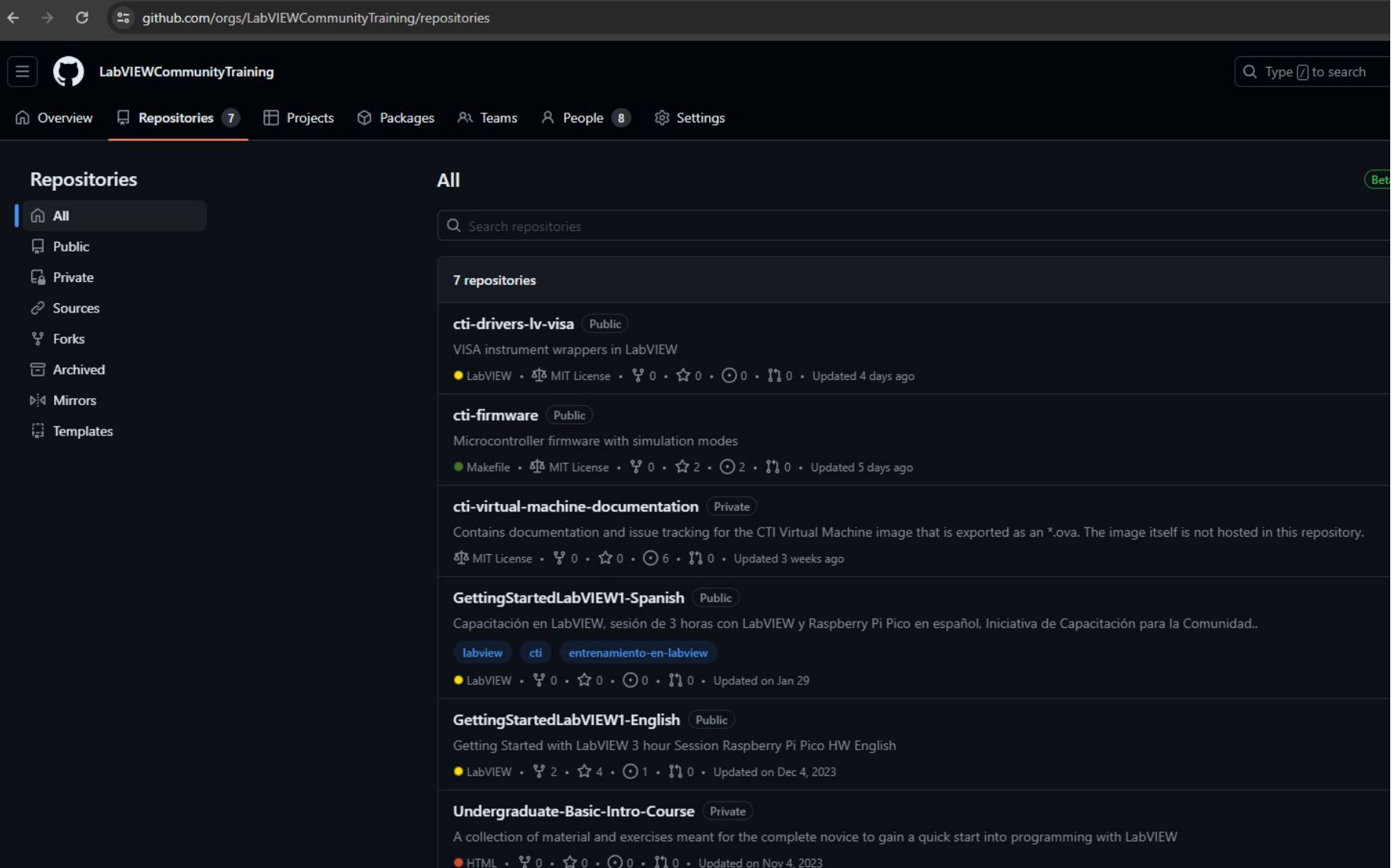
Presented by Nancy Henson, Steve Watts & Derrick Bommarito

# Community Training Initiative (CTI)

## Enabling Community Training

CTI is a community driven effort to make it affordable and easy to create, provide, and receive LabVIEW training:

- 100% open source
- Based on affordable hardware
- Simulators for when HW is not available
- Virtual machine image to easily use provided material
- Introductory lessons
- Community provided translations



The screenshot shows the GitHub interface for the organization 'LabVIEWCommunityTraining'. The 'Repositories' tab is active, displaying a list of 7 repositories. The repositories listed are:

- cti-drivers-lv-visa** (Public): VISA instrument wrappers in LabVIEW. Updated 4 days ago.
- cti-firmware** (Public): Microcontroller firmware with simulation modes. Updated 5 days ago.
- cti-virtual-machine-documentation** (Private): Contains documentation and issue tracking for the CTI Virtual Machine image. Updated 3 weeks ago.
- GettingStartedLabVIEW1-Spanish** (Public): Capacitación en LabVIEW, sesión de 3 horas con LabVIEW y Raspberry Pi Pico en español. Updated on Jan 29.
- GettingStartedLabVIEW1-English** (Public): Getting Started with LabVIEW 3 hour Session Raspberry Pi Pico HW English. Updated on Dec 4, 2023.
- Undergraduate-Basic-Intro-Course** (Private): A collection of material and exercises meant for the complete novice to gain a quick start into programming with LabVIEW. Updated on Nov 4, 2023.

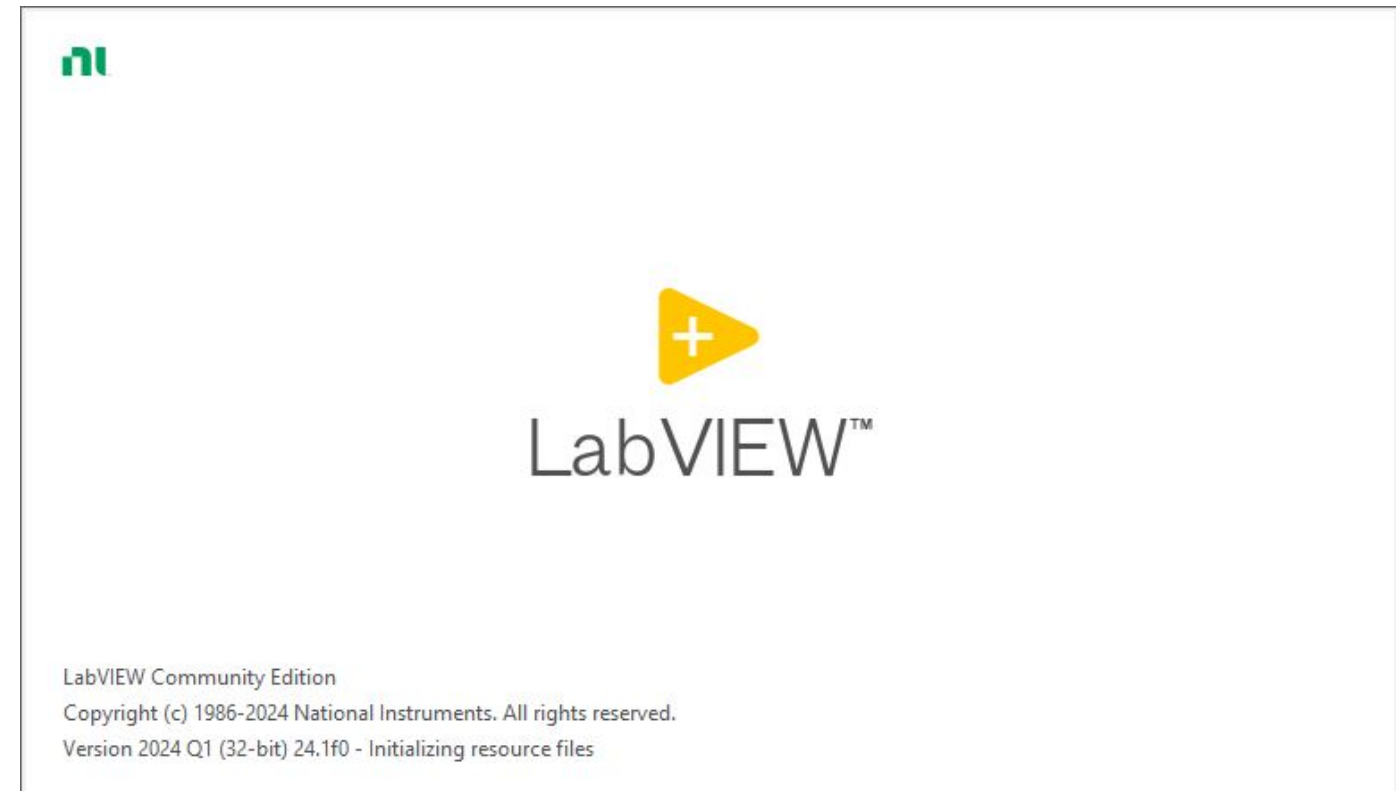
# Why?

NI has given us a fantastic opportunity with the release of LabVIEW Community Edition.

Recently it has had its licensing clarified to be usable for all non-commercial activities including usage by students and for training outside of a commercial environment.

The NI courses are not readily available to everyone and getting started with a standard environment and hardware can still be a hurdle to get over.

The Hobbyist Toolkit (LabVIEW support on Raspberry Pis, Beaglebone Blacks, and APIs for Arduino / other MCUs) has not had new targets added to it since release.



# What?

Materials on github - fully open-source with MIT license

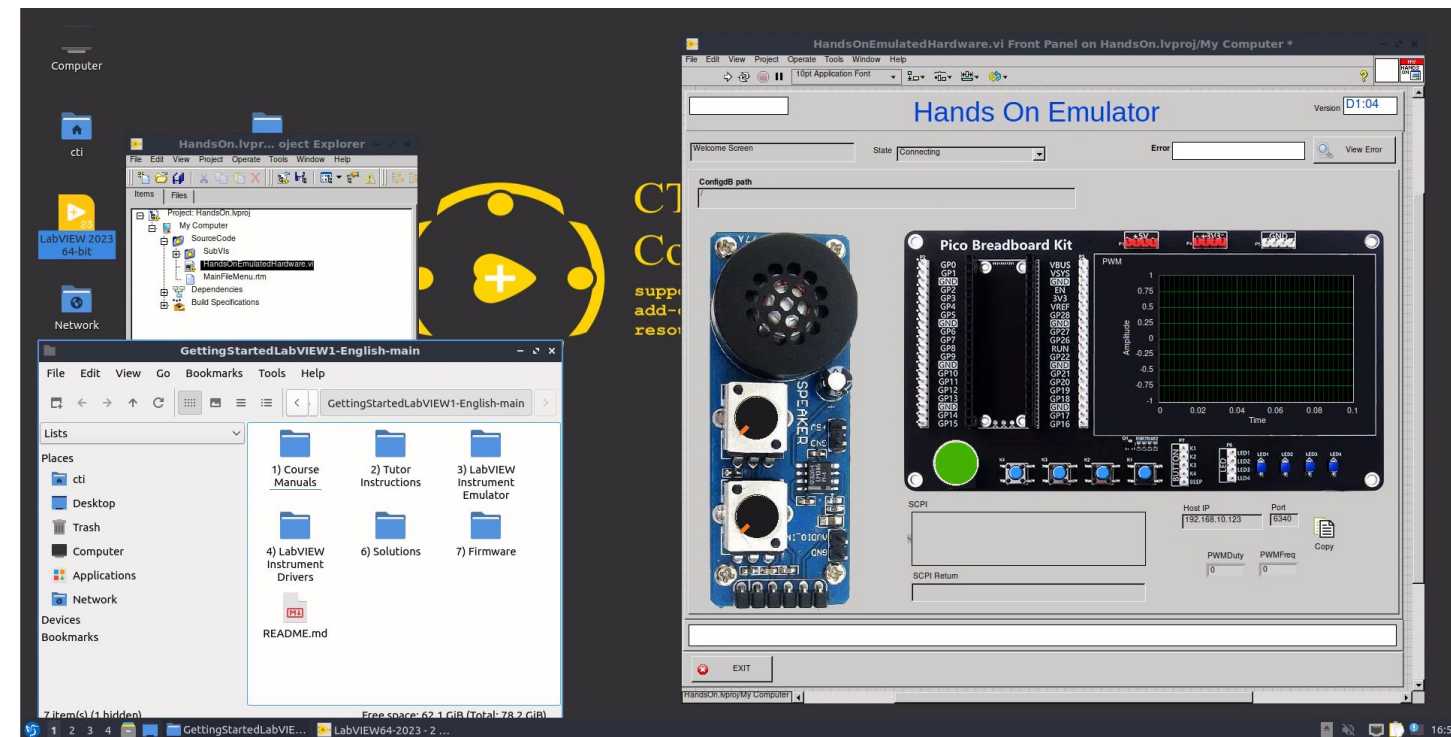
OVA -

[https://en.wikipedia.org/wiki/Open\\_Virtualization\\_Format](https://en.wikipedia.org/wiki/Open_Virtualization_Format)

Can be installed VirtualBox, VMWare or KVM.

Linux can be freely distributed with LabVIEW Community Edition and drivers pre-installed.

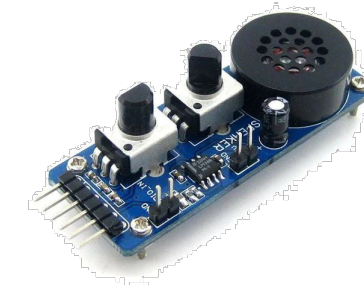
Raspberry Pi Pico W can be had for \$6 (\$7 if you don't like soldering headers) - We created a VISA overlay to allow industry standard drivers to be created for Hands-on



# What?

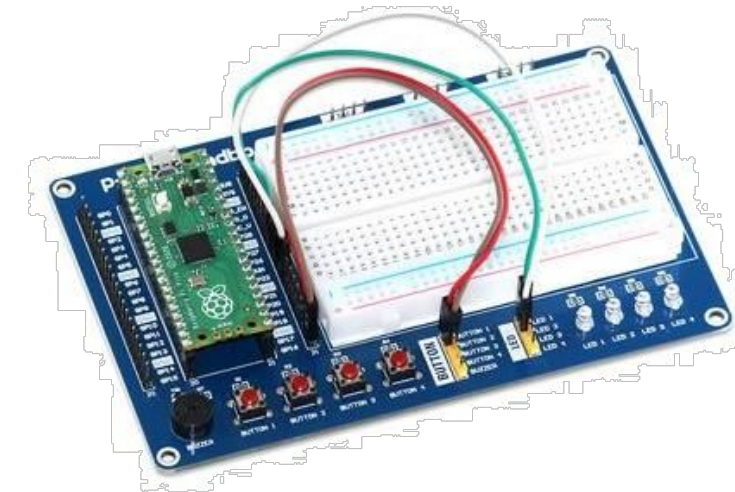
## Waveshare Analog Test Board

- <https://www.waveshare.com/analog-test-board.htm>
- <https://thepihut.com/products/analog-test-board>



## Pico Breadboard Kit

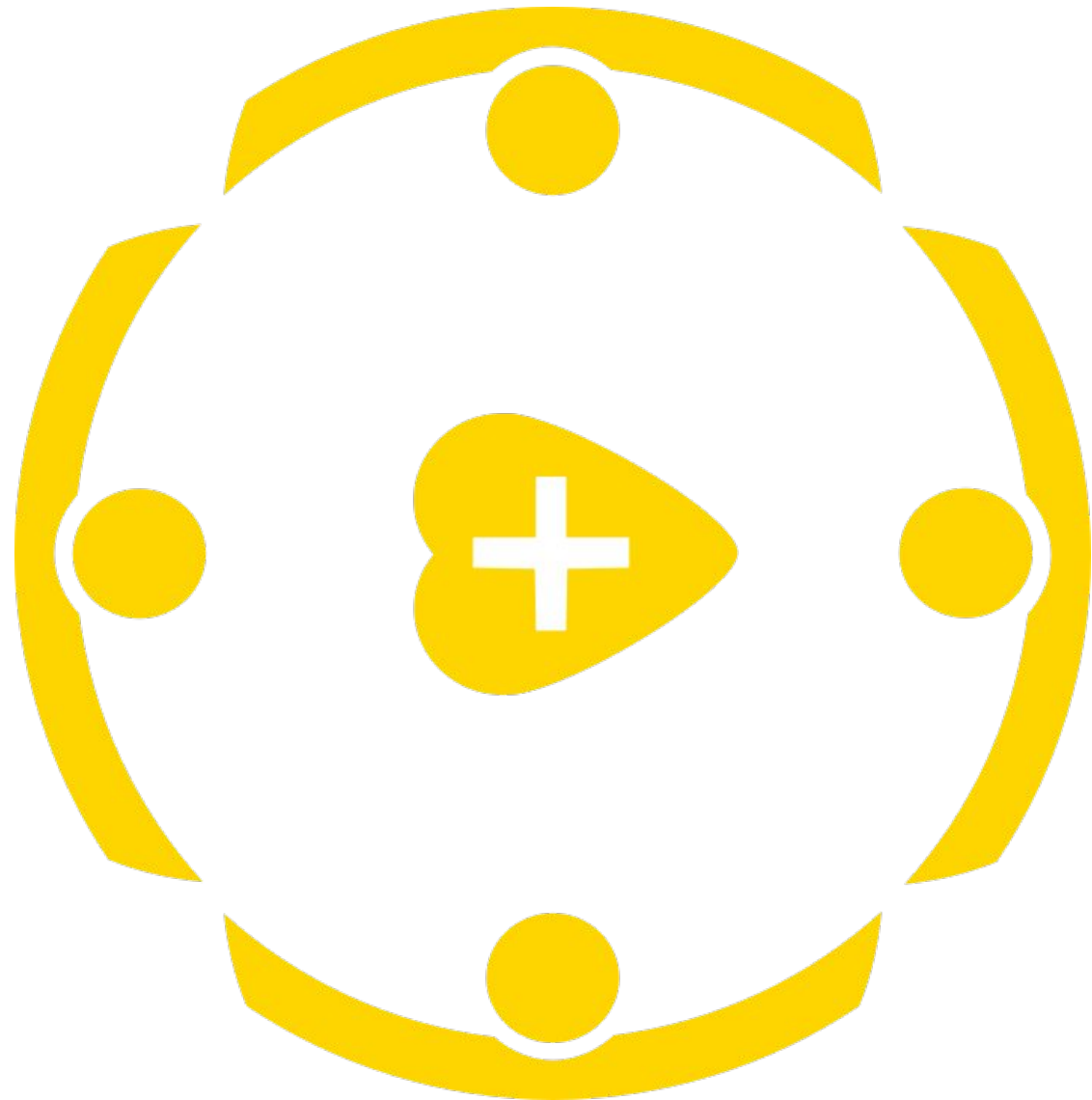
- <https://www.pishop.us/product/pico-breadboard-kit/>
- <https://thepihut.com/products/breadboard-kit-for-raspberry-pi-pico>
- <https://www.digikey.com/en/products/detail/sb-components-ltd/SKU20843/16836965>



## Raspberry Pi Pico W

- <https://www.digikey.com/en/products/detail/raspberry-pi/SC0918/16608263>

# Goals



1. Provide a framework for newcomers to LabVIEW to gain experience with LabVIEW development, interacting with hardware, and controlling their own electronics projects.
2. Provide a hardware platform that is usable all the way from training, to hobbyist usage of LabVIEW, to professional projects.
3. Enable community provided training for little-to-no cost to the trainer.
4. Encourage open-sourcing of training materials to help the whole community.

# DISCORD

Discord is where the maintainers discuss future plans, hardware support, virtual machine updates, and lesson plans.

Joining the Discord is not necessary to utilize the material but is where all conversations happen.



<https://discord.gg/gebRc8A695>

# GITHUB

Everything is 100% open source on Github.

Customize, extend, translate

- Embedded Firmware
- LV Drivers
- Lesson HW Drivers / Emulator
- Lessons
- Documentation
- Device Manager (Soon™)



<https://github.com/orgs/LabVIEWCommunityTraining/repositories>



# Pi Pico W

LVTTL (3.3V) Signalling

USB device interface

2x UART

2x I2C

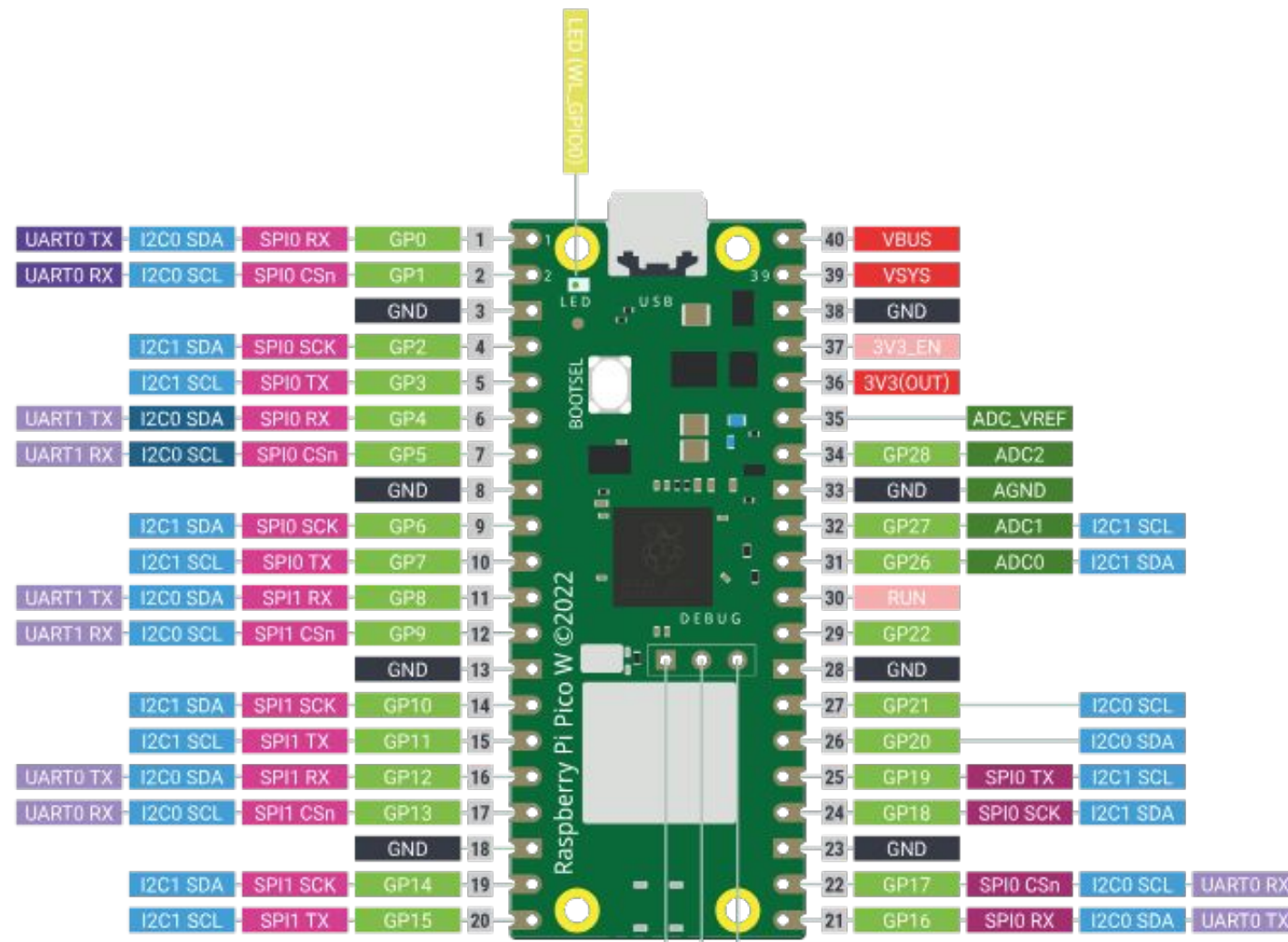
2x SPI

29x GPIO

3x Analog In

WiFi

Bluetooth



RP2040

Red	Power
Black	Ground
Purple	UART / UART (default)
Light Green	GPIO, PIO, and PWM
Dark Green	ADC
Pink	SPI / SPI (default)
Blue	I2C / I2C (default)
Light Pink	System Control
Orange	Debugging

Infinion 43439

Yellow	GPIO
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Dual core Cortex-M0+

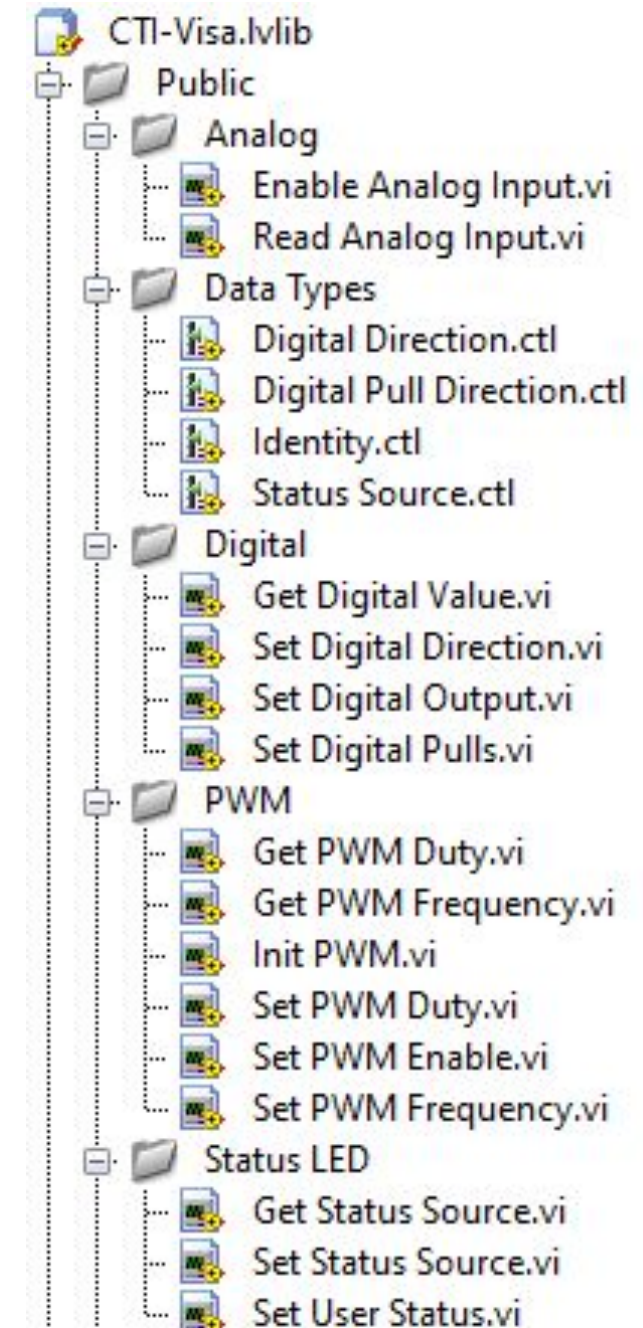
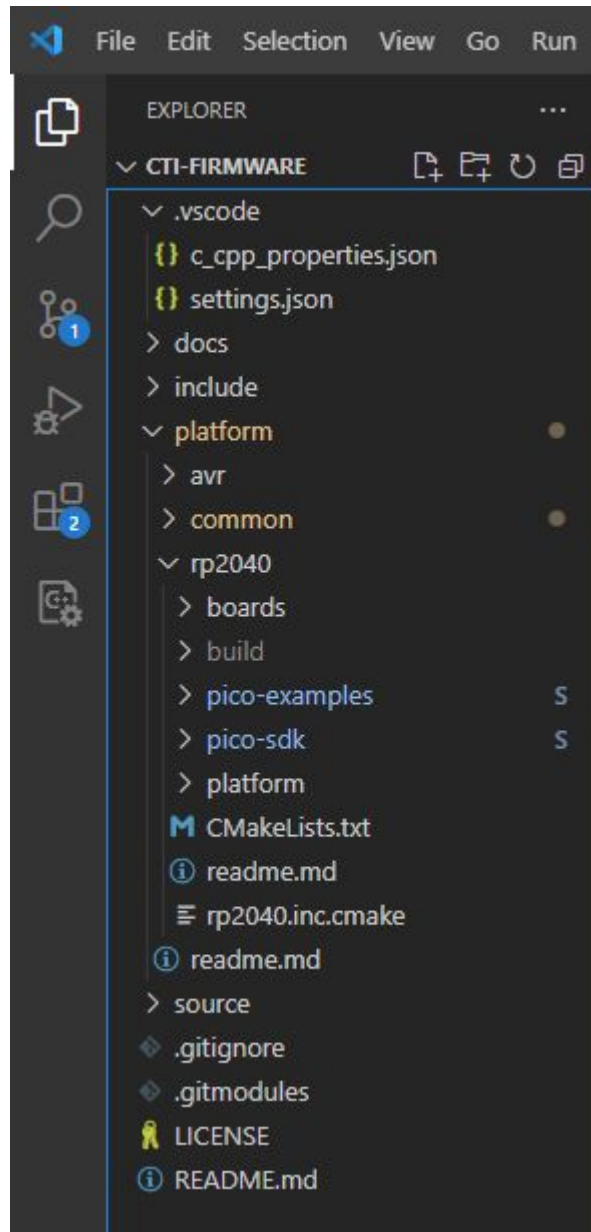
Up to 133MHz

264kB SRAM

2MB Flash Memory

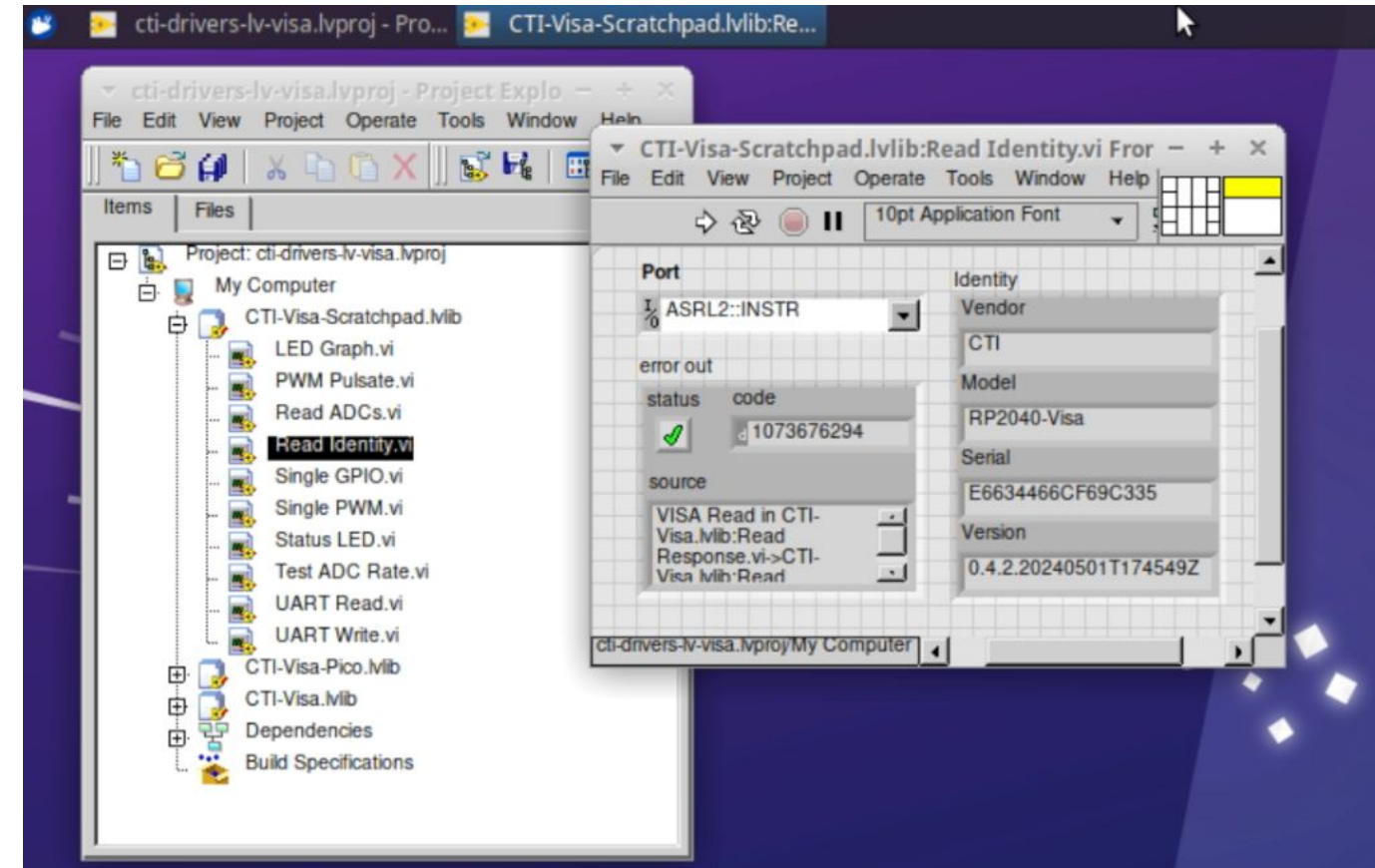
## From the Ground Up

- Pi Pico Firmware
- LabVIEW VISA Drivers
- Training Hardware Drivers
- HW Emulator



## The Future

- WiFi connectivity for Pico, work “untethered”!
- Additional targets - Arduino, ESP32
- DAQmx style API
- More emulator capabilities
- Dedicated Getting Started Window and project integration\*
- Device and firmware manager software
- Engage the community for more lessons, firmware, and ideas development



# DEMO and Q&A Time!