

General description

The PeekyPokey is a multipurpose USB attached IO and virtual COM port communications board for interfacing with various other electronic devices from a PC (Windows, Linux or Mac¹).



PeekyPokey revision 2.2 board

The board comes with an extensive API (application programmer's interface) software in the form of a .NET assembly which can be used with any .NET language including C# and VB.NET. The board and accompanying software enables control and interfacing of all kinds of external hardware like relays, servos, ICs, microcontrollers, LCD displays and serial enabled devices in general to name just a few².

In a typical scenario, application code running on a PC uses the PeekyPokey board to interface with external electronics through USB (2.0 full speed).

The software API uses a standard USB HID interface to control the IO while the virtual COM port (USB CDC) can be used simultaneously in combination or independently.

Features

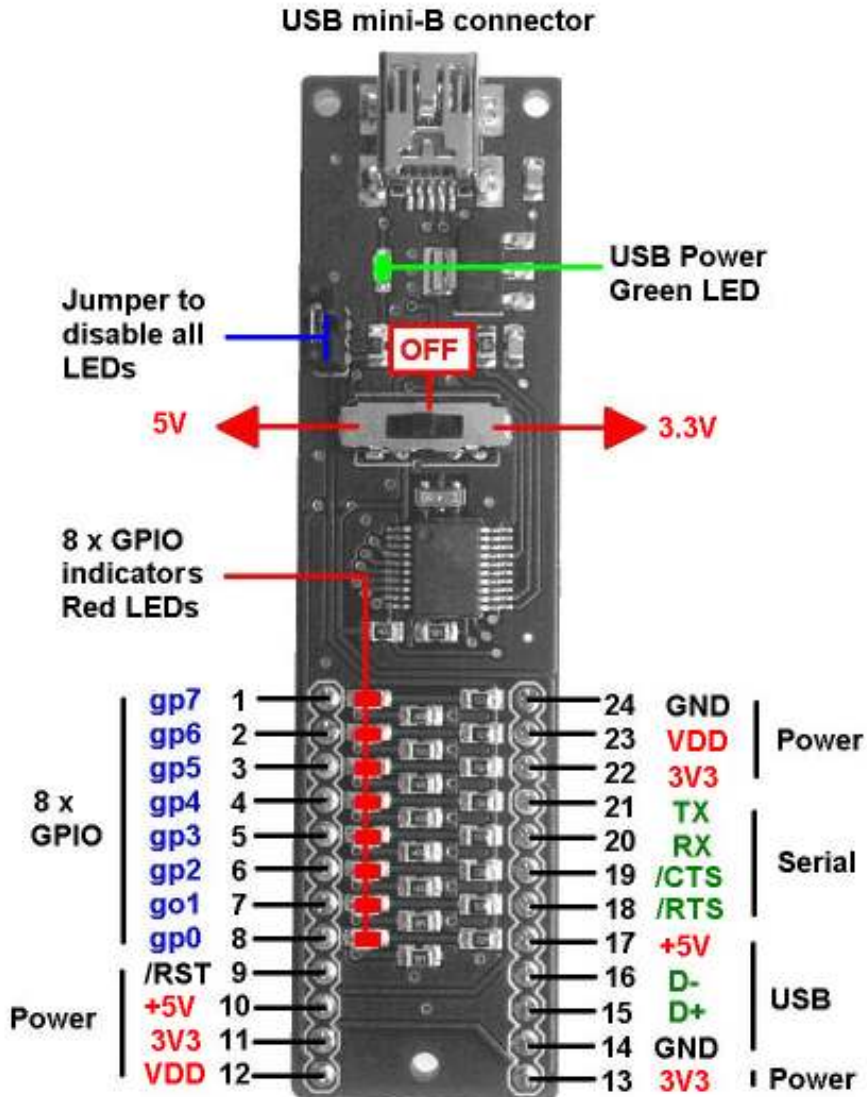
- 300 – 921 600 bps buffered serial port (TTL UART) with h/w flow control appearing as a virtual COM port on host PC
- 8 general purpose digital inputs/outputs (GPIO), each with indicator LED and 100k pull-down resistor and available to host PC as a HID class device
- Configurable serial TX/RX LEDs
- Selectable Vdd and logic levels: 5V or 3.3V
- Switched Vdd and fixed 5V/3.3V power sources
- USB bus powered with indicator LED
- USB signals broken out (useful with an enclosure)
- Standard 0.6" DIP-24 socket footprint
- Feature rich MS .NET API library (C# or VB.NET)
- Built-in EEPROM for storing power-on configurations

¹ The Software API is currently only available for Windows PCs running versions XP (sp3+), 2000, Vista, 7 and 8. The board is supposedly compatible with Linux and Mac PCs but this has not yet been verified.

² Some applications require a few external parts which are not included.

Board layout and pin assignment

The board is powered from USB host (5V) and has an on-board 3.3V regulator. A triple throw switch is used to select supply voltage 5V ← OFF → 3.3V which also controls the logic level of all digital pins.



Pin#	Name	Description	Pin#	Name	Description
1	gp7	GPIO	24	GND	Ground
2	gp6	GPIO	23	VDD	5V or 3.3V
3	gp5	GPIO	22	3V3	Fixed 3.3V
4	gp4	GPIO	21	TX	Serial output
5	gp3	GPIO	20	RX	Serial input
6	gp2	GPIO	19	/CTS	Clear to send
7	gp1	GPIO	18	/RTS	Request to send
8	gp0	GPIO	17	+5V	Fixed 5V
9	/RST	Reset, active low	16	D-	USB D-
10	+5V	Fixed 5V	15	D+	USB D+
11	3V3	Fixed 3.3V	14	GND	Ground
12	VDD	5V or 3.3V	13	3V3	Fixed 3.3V

Applications

Among other things, PeekyPokey can be used with various external ICs, microcontrollers, circuits, serial enabled devices and electronics in general for performing the following tasks:

- Evaluation, exploration and emulation
- Prototyping and experimentation
- Home automation
- Programming and debugging
- Automated testing and verification
- Breadboard power supply
- Educational tool within the field of digital electronics

Examples of applications using PeekyPokey and the API

Below is small list of things that is possible using PeekyPokey and its ever growing software API. Please note that some of the listings below will require external parts not included.

- Examine logical signals over time using a simple logic analyzer
- Create Windows forms applications using the API controls
- Control relays and solid state switches
- Talk to any serial enabled device
- Control up to five RC servos simultaneously
- Interface with a selection of common ICs
- Control an HD44780 LCD display
- Implement a Media Remote Control for your PC
- Use the integrated web server for remote interfacing
- Do home automation with scheduled events
- Use a smart phone for wireless interfacing
- Build a MIDI interface for your PC
- Drive a stepper motor controller
- Interface with an RFID reader module
- Use a game pad to interface external hardware
- Extend the API with your own software and libraries

The PeekyPokey software API is developed in object oriented C# and many of the available classes can be extended through inheriting or extension. The API is event driven and a software developer does not necessarily need to poll for changes on digital inputs.

The API contains multiple Windows forms controls that implement indicators (virtual LEDs) and buttons that can be mapped directly to IO pins. The software also contains tools for pin configuration and a simplified logical analyzer³.

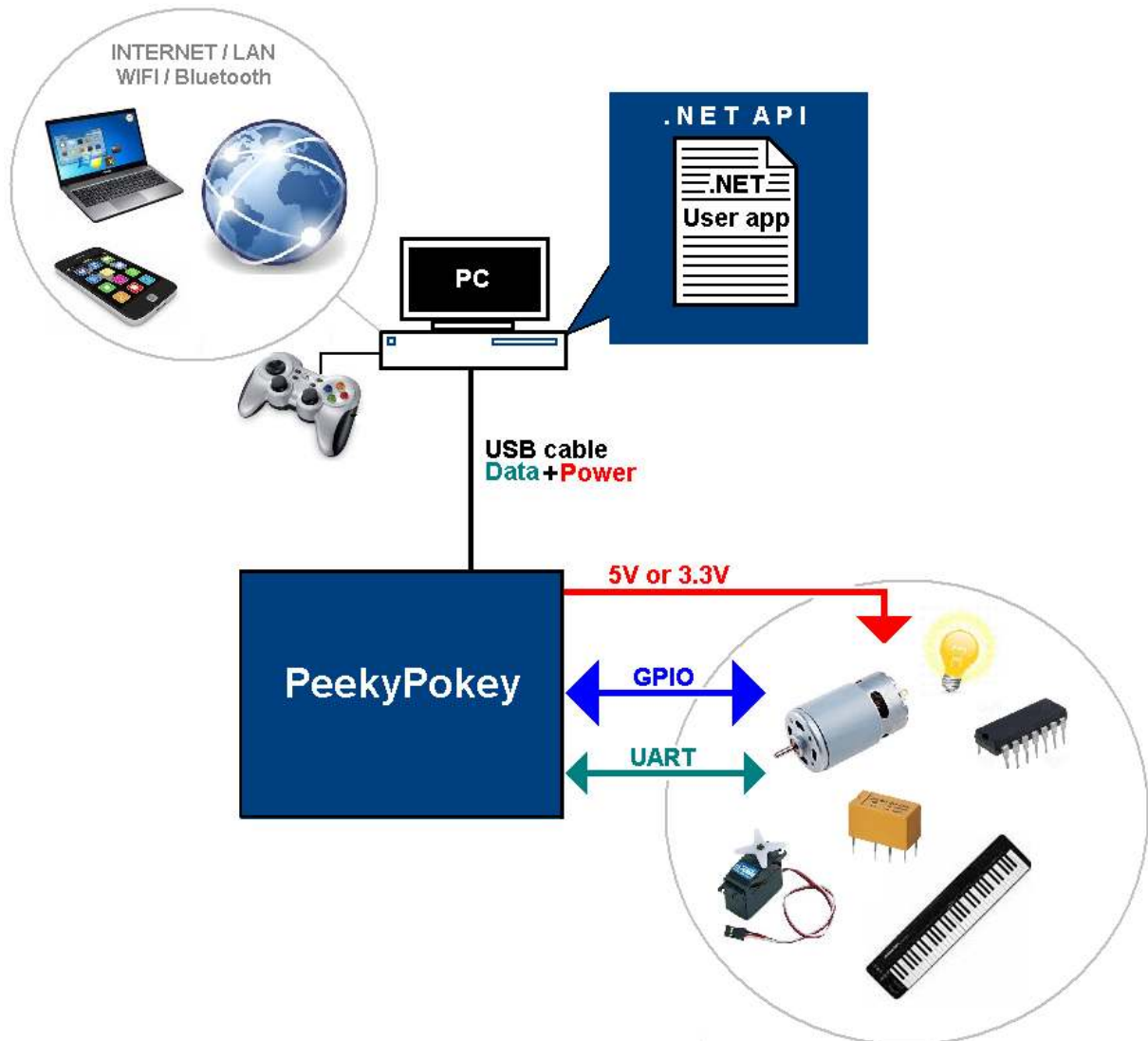
Programming is done using *Microsoft Visual Studio Express* (free) or commercial versions in any .NET enabled language such as C# and VB.NET. Please visit www.PeekyPokey.org for the latest software version and information on how to get started.

³ Suitable for signals resulting from human interaction (not for fast hardware generated signals). Typical API latency for interrupts and IO toggling is one millisecond.

Block diagram

The image below depicts the different blocks that would be involved in typical scenarios where a PC uses PeekyPokey to interact with one or more external hardware items.

As shown, the PC can in turn interface with any other device that can be connected to a PC, either wired such as a gamepad for example or wirelessly such as a laptop or smart phone.



Please refer to www.PeekyPokey.org for user manual, guide to getting started, example schematics, inspirational demos and more.

The items depicted in the above image are for reference only and some of them would require additional parts in order for PeekyPokey to interface with them.

Electrical data and ratings

Entity	Min	Typ	Max	Unit
Current sourced by any IO pin			25	mA
Current sunk by any IO pin			25	mA
Total current sourced by all IO pins taken together			90	mA
Total current sunk by all IO pins taken together			90	mA
Total current supplied by VDD, +5V and 3V3 taken together			500*	mA
Total current going out of GND			500*	mA
Working temperature	-40	20	85	Celsius degrees

*) Depends on USB host ratings (which is usually 500 mA in conformance to USB specifications)

Dimensions (approx)

Length: 80 mm

Width: 20 mm

Height: 20 mm (including bottom headers and top jumper)

Weight: 20 g

Holes: 2 mm (diameter)