jmPulse GUI Module

This is a graphical user interface for jmCLIG firmware module jmPulse.c

The firmware module must be compiled and loaded into the chip before using the graphical user interface.

The firmware can be used with a standard communication application, like HyperTerminal, but jmPulse is more user friendly and limit access only to pins on MBED prototyping board (DIP5 to DIP30 and LED1 to LED4).

This module can start up to 8 different processes for generating Pulses and software PWM on MBED DIP pins and LED1 to LED4.

This module automatically sets the pin as output pin and writes continually to output pin if PWM button is hit. There is no need to configure output pin direction before using it.

Hitting Off/On/Toggle buttons will stop the pulses to a known state. Each action button sends a message to the chip and the chip after taking action, reports the status of the process.

⚠ Care should be taken when you turn a microcontroller pin into an output pin. You should make sure that nothing is wired to that pin that can make a short circuit to ground or a short circuit to the supply. Beware of pins previously used as input, because these are potential short circuit hazards if external hardware is still connected to those pins.

Start jmPulse GUI Module from jmSerialCom
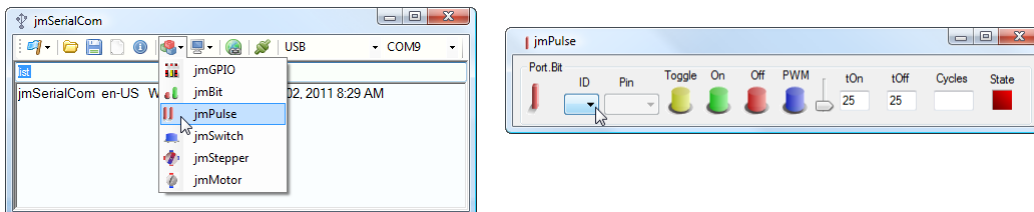
How to

You first select a process ID, the control will send a message asking a report for that process ID from the chip. If this process is initialized, the control will be updated with the pin wired to that process and the state LED icon will show the status of that process.
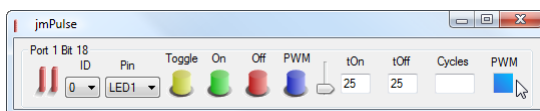
If the process is not initialized, no pin will be selected and no State LED icon will be shown.

You initialize or change the waveform generated by selecting a Pin and hitting PWM button. It will generate a continuous output waveform of 25 units high and 25 units low because by default, tOn and tOff values are 25. You can change these values and hit PWM button again.

When a button is hit, a command is sent to the chip, the chip runs the command and returns a message to update the GUI. The State indicator to the right turns into different colors to indicate different output conditions.

- ▪ Light Green for steady high output level
- ▪ Dark Green for steady low output level
- ▪ ▪ Flashing Blue for PWM output

If you hit On/Off/Toggle buttons, the PWM process is stopped and the chip reports the process state to update the GUI state indicator and animation.

tOn, tOff and Cycles

tOn, tOff and Cycles editing boxes can modify the generated waveform.

An empty Cycles editing box value or a value of 65535 sets up a continuous waveform. Other values of Cycles will generate a waveform for that duration of cycles.

tOn, and tOff values are limited to 1..255. Low values generate fast waveforms, big values generate slower waveform. You create led flashers with big values of tOn and tOff. You create light dimmers with low values of tOn and tOff.

The slider is provided as a control to change tOn and tOff on the fly. The values of tOn and tOff for this slider are limited to 1..20. If you connect a LED to this control, it will act as a led dimmer. (Also act as a speed controller for a DC motor)

Each slider action sends a message to the chip, the chip will also return a message for each change. You will see these messages in jmSerialCom text zone.

Processes

Up to 8 different processes can be activated at the same time.

You can assign different processes to the same output, this will produce a mix of actions. The faster process will have more control over the output pin.
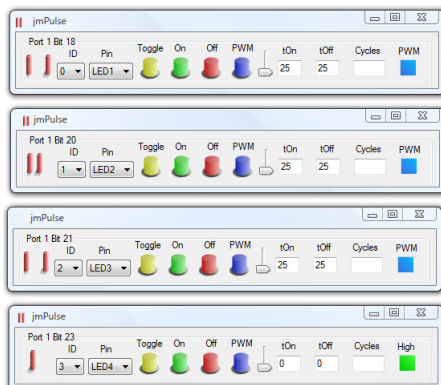
The same process can't be assigned to different outputs. You have to used different processes for different outputs in that version of the firmware.

These pictures represent 4 started processes.

Killing a Process

When you start a continuous jmPulse process in the chip, if you close the GUI control, the process continue to run in the chip.

You kill a process by hitting the Off button for that process.

Running Process ?

Processes can be running on your chip when you start a jmPulse GUI.

When you select an ID for that control, the control query the chip for that process ID and the chip will return the status of that process.

- If the process is not initialized, no pin will be selected and no State LED icon will be shown.
- if a process is assigned to that ID, the State indicator will show the status the process is in and the output pin connected to that process. tOn, tOff and Cycles values are not reported back only status and associated pin.

Changing Process

You can always overwrite a process by giving it new values.

Animation

This GUI control simulates a flashing blue LED and runs a generating pulse animation when a process is generating pulses at the output pin. This animation is controlled by chip reports and if you disconnect the chip while the GUI control is still running it won't be updated anymore.

Starting Sequence

Always connect your chip first, then start jmSerialCom. This way auto connect feature of jmSerialCom will automatically connect to the chip if you use the same USB slut. Changing USB slot changes Virtual Com Port Number (Windows way of doing).

Stopping Sequence

You can choose to kill or not a process before closing your GUI controls. Closing jmSerialCom closes all other controls. If the chip is still powered, all started non killed processes will continue to live in the chip.

jmPulse GUI communicates with on chip state machine pulse controllers.

Editing process values

- Select a controller ID.
- Select a PIN
- Edit on time value
- Edit off time value
- Edit cycles value

Edit Cycles value if you want a fixed amount of pulses. A value of 65535 or no Cycles value will generate continuous pulses.

Buttons

PWM start generating pulses.

Off stop pulses and puts the output in low level.

ON stop pulses and sets output to high level.

Toggle stop pulses and toggles output level.

Slider

The slider changes tOn et tOff values more rapidly than edit boxes. On and OFF values for the slider are limited to (0..20). Edit Boxes can vary values from 1 to 255.
Slider act as an intensity controller when a LED is connected to the PIN.
Slider act as a speed controller when a DC motor is connected to the PIN.
You can use up and down arrow keys to move the slider more precisely.
You can use wheel mouse as well to vary the slider.

Status LED and Pulse Animation

A status LED provides output pin state when output is not in pulse mode. Animation is provided to show that the controller is in pulse mode.