Timeout Programming

Last updated 6/10/21

Timeout Programming

- Timeout Operation
  - Nucleo-L476RG has 12 timers
  - It's not clear how many of these can be used in our implementation
  - The Timeout uses ISRs
    - All usual ISR rules apply
  - Timeout runs once

Timeout Programming

- Timeout Connections
  - There are no connections enabled in the Mbed system

Timeout Programming

- Timeout Class

Public Member Functions	
template<typename F >	
MBED_FORCEINLINE void	attach (F &&func, float t) Deprecated
	Attach a function to be called by the Ticker, specifying the interval in seconds. More...
void	attach (Callback< void()> func, std::chrono::microseconds t) Use 10us, 10ms, 10s not 10, 10000, ...
	Attach a function to be called by the Ticker, specifying the interval in microseconds. More...
void	attach_us (Callback< void()> func, us_timestamp_t t) Deprecated
	Attach a function to be called by the Ticker, specifying the interval in microseconds. More...
void	detach ()
	Detach the function. More...

Timeout Programming

- Constructors - template

Public Member Functions
template<typename F >

```
// Create Timeout object
Timeout TO_1;
```

Timeout Programming

- Member Functions (Methods)

MBED_FORCEINLINE void	attach (F &&func, float t) Deprecated
	Attach a function to be called by the Ticker, specifying the interval in seconds. More...
void	attach (Callback< void()> func, std::chrono::microseconds t) Use 10us, 10ms, 10s not 10, 10000, ...
	Attach a function to be called by the Ticker, specifying the interval in microseconds. More...
void	attach_us (Callback< void()> func, us_timestamp_t t) Deprecated
	Attach a function to be called by the Ticker, specifying the interval in microseconds. More...
void	detach ()
	Detach the function. More...

```
// Attach the function to call when the timeout count is reached
TO_1.attach(&my_to, 1000us);
```

Timeout Programming

- Simple example
  - Setup a simple timeout

```
////////////////////////////////////
//
// timeout_class_ex_1 project
//
// created 6/4/21 by tj
// rev 0
//
////////////////////////////////////
//
// Timeout example file for class
//
// shows basic timeout operation
//
////////////////////////////////////

#include "mbed.h"
#include <stdio.h>

// function prototypes (actually an ISR)
void my_to(void);

// Global HARDWARE Objects
// Create digital output to drive with the timeout (ISR)
DigitalOut Out_dig(D4);
// Create Timeout object
Timeout TO_1;

int main(void){
    setbuf(stdout, NULL);   // disable buffering

    // splash
    printf("\n\ntimeout_class_ex_1 - example for EE2905\n");
    printf("Using Mbed OS version %d.%d.%d\n\n",
           MBED_MAJOR_VERSION, MBED_MINOR_VERSION, MBED_PATCH_VERSION);

    // toggle the output for a reference
    Out_dig = 1;
    wait_us(200);
    Out_dig = 0;
    wait_us(200);

   // toggle the output just prior to starting the timeout object
    Out_dig = 1;

    // Attach the function to call when the timeout count is reached
    TO_1.attach(&my_to, 1000us);
```

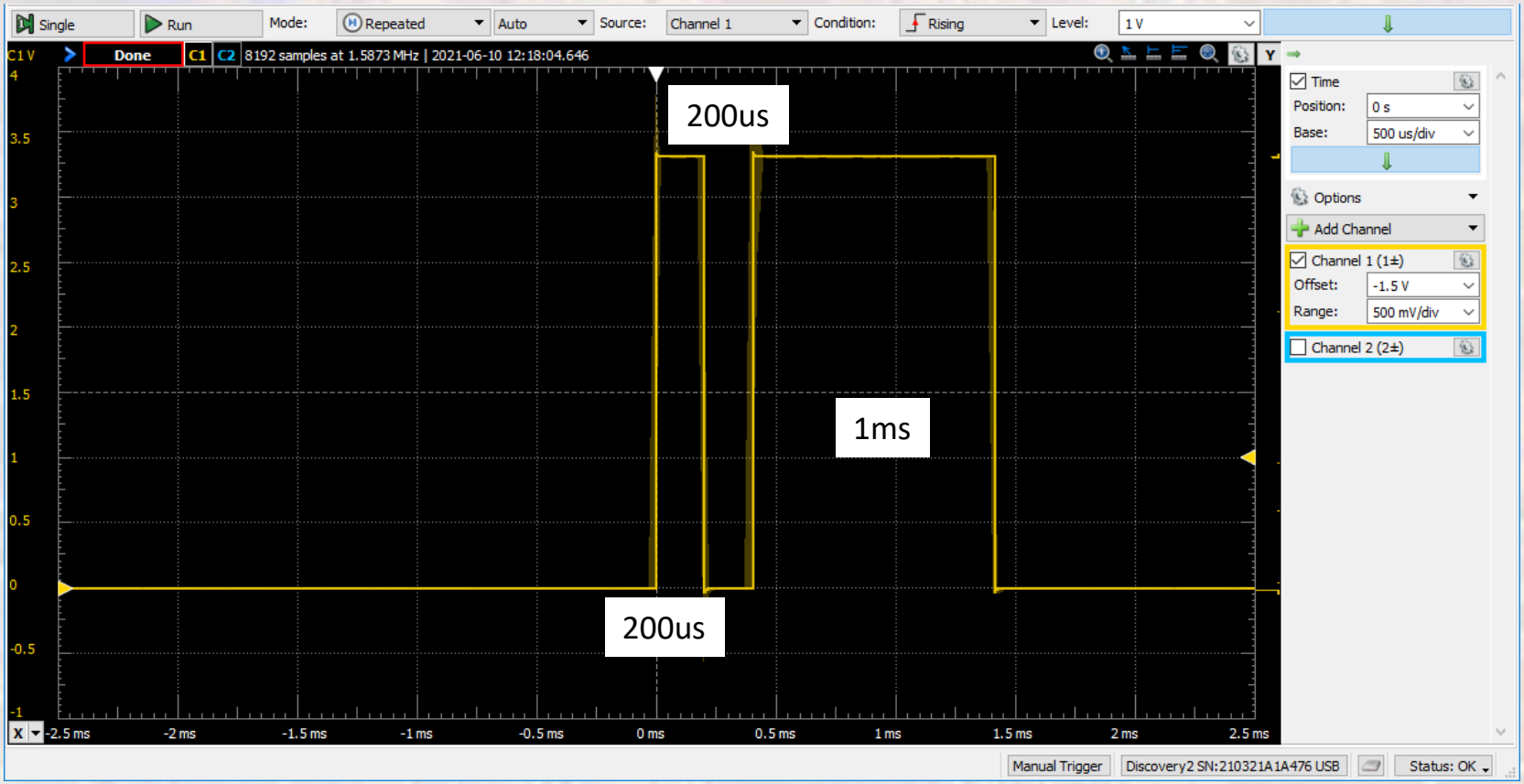
```
    // create a wait loop
    while(1){
        wait_us(10000);
    }// end while

    return 0;
}// end main
```

```
void my_to(void){
    Out_dig = !Out_dig;
}// end my_tick
```

Timeout Programming

- Simple example
  - Setup a simple timeout



Timeout Programming

- Limitations summary
  - Minimum measurable timer tick is 1us