

\*\*\*\*\*Draft\*\*\*\*\*

Testing paho.mqtt.c with Ultibo with Raspberry Pi O/S and Ultibo  
09/21/23

\*\*\*\*\*Draft\*\*\*\*\*

Steps to install paho MQTT client

09/17/23

<https://bytesofgigabytes.com/raspberrypi/mqtt-c-client-raspberry-pi/>

```
devel@pi4-50:~ $ git clone https://github.com/develone/paho.mqtt.c.git
```

```
Cloning into 'paho.mqtt.c'...
```

```
remote: Enumerating objects: 12427, done.
```

```
remote: Counting objects: 100% (2392/2392), done.
```

```
remote: Compressing objects: 100% (634/634), done.
```

```
remote: Total 12427 (delta 1816), reused 2213 (delta 1701), pack-reused 10035
```

```
Receiving objects: 100% (12427/12427), 9.66 MiB | 10.55 MiB/s, done.
```

```
Resolving deltas: 100% (8929/8929), done.
```

```
devel@pi4-50:~ $ cd paho.mqtt.c/
```

```
devel@pi4-50:~/paho.mqtt.c $ make
```

```
mkdir -p build/output/samples
```

```
mkdir -p build/output/test
```

```
echo OSTYPE is Linux
```

```
OSTYPE is Linux
```

```
mkdir -p build
```

```
sed -e "s/@CLIENT_VERSION@/1.3.12/g" -e "s/@BUILD_TIMESTAMP@/Sun 17 Sep 2023  
06:50:42 AM MDT/g" src/VersionInfo.h.in > build/VersionInfo.h
```

```
cc -g -fPIC -D_GNU_SOURCE -Os -Wall -fvisibility=hidden -Ibuild -
```

```
DPAHO_MQTT_EXPORTS=1 -o build/output/libpaho-mqtt3c.so.1.3 src/Base64.c src/Clients.c
```

```
src/Heap.c src/LinkedList.c src/Log.c src/Messages.c src/MQTTClient.c src/MQTTPacket.c
```

```
src/MQTTPacketOut.c src/MQTTPersistence.c src/MQTTPersistenceDefault.c
```

```
src/MQTTProperties.c src/MQTTProtocolClient.c src/MQTTProtocolOut.c
```

```
src/MQTTReasonCodes.c src/MQTTTime.c src/OsWrapper.c src/Proxy.c src/SHA1.c
```

```
src/SocketBuffer.c src/Socket.c src/StackTrace.c src/Thread.c src/Tree.c src/utf-8.c src/WebSocket.c
```

```
-shared -Wl,-init,MQTTClient_init -Wl,--start-group -pthread -lanl -Wl,--end-group -Wl,-
```

```
soname,libpaho-mqtt3c.so.1
```

```
ln -s libpaho-mqtt3c.so.1.3 build/output/libpaho-mqtt3c.so.1
```

```
ln -s libpaho-mqtt3c.so.1 build/output/libpaho-mqtt3c.so
```

```
cc -g -fPIC -D_GNU_SOURCE -Os -Wall -fvisibility=hidden -Ibuild -
```

```
DPAHO_MQTT_EXPORTS=1 -o build/output/libpaho-mqtt3cs.so.1.3 src/Base64.c src/Clients.c
```

```
src/Heap.c src/LinkedList.c src/Log.c src/Messages.c src/MQTTClient.c src/MQTTPacket.c
```

```
src/MQTTPacketOut.c src/MQTTPersistence.c src/MQTTPersistenceDefault.c
```

```
src/MQTTProperties.c src/MQTTProtocolClient.c src/MQTTProtocolOut.c
```

```
src/MQTTReasonCodes.c src/MQTTTime.c src/OsWrapper.c src/Proxy.c src/SHA1.c
```

```
src/SocketBuffer.c src/Socket.c src/SSLSocket.c src/StackTrace.c src/Thread.c src/Tree.c src/utf-8.c
```

```
src/WebSocket.c -DOPENSSL -shared -Wl,--start-group -pthread -lanl -ldl -lssl -lcrypto -Wl,--end-
```

```
group -Wl,-init,MQTTClient_init -Wl,-soname,libpaho-mqtt3cs.so.1 -Wl,-no-whole-archive
```

```
ln -s libpaho-mqtt3cs.so.1.3 build/output/libpaho-mqtt3cs.so.1
```

```
ln -s libpaho-mqtt3cs.so.1 build/output/libpaho-mqtt3cs.so
```

```
cc -g -fPIC -D_GNU_SOURCE -Os -Wall -fvisibility=hidden -Ibuild -
```

```
DPAHO_MQTT_EXPORTS=1 -o build/output/libpaho-mqtt3a.so.1.3 src/Base64.c src/Clients.c
```

```
src/Heap.c src/LinkedList.c src/Log.c src/Messages.c src/MQTTAsync.c src/MQTTAsyncUtils.c
```

```

src/MQTTTPacket.c src/MQTTTPacketOut.c src/MQTTTPersistence.c src/MQTTTPersistenceDefault.c
src/MQTTTProperties.c src/MQTTTProtocolClient.c src/MQTTTProtocolOut.c
src/MQTTTReasonCodes.c src/MQTTTTime.c src/OsWrapper.c src/Proxy.c src/SHA1.c
src/SocketBuffer.c src/Socket.c src/StackTrace.c src/Thread.c src/Tree.c src/utf-8.c src/WebSocket.c
-shared -Wl,-init,MQTTAsync_init -Wl,--start-group -pthread -lanl -Wl,--end-group -Wl,-
soname,libpaho-mqtt3a.so.1
ln -s libpaho-mqtt3a.so.1.3 build/output/libpaho-mqtt3a.so.1
ln -s libpaho-mqtt3a.so.1 build/output/libpaho-mqtt3a.so
cc -g -fPIC -D_GNU_SOURCE -Os -Wall -fvisibility=hidden -Ibuild -
DPAHO_MQTT_EXPORTS=1 -o build/output/libpaho-mqtt3as.so.1.3 src/Base64.c src/Clients.c
src/Heap.c src/LinkedList.c src/Log.c src/Messages.c src/MQTTAsync.c src/MQTTAsyncUtils.c
src/MQTTTPacket.c src/MQTTTPacketOut.c src/MQTTTPersistence.c src/MQTTTPersistenceDefault.c
src/MQTTTProperties.c src/MQTTTProtocolClient.c src/MQTTTProtocolOut.c
src/MQTTTReasonCodes.c src/MQTTTTime.c src/OsWrapper.c src/Proxy.c src/SHA1.c
src/SocketBuffer.c src/Socket.c src/SSLSocket.c src/StackTrace.c src/Thread.c src/Tree.c src/utf-8.c
src/WebSocket.c -DOPENSSL -shared -Wl,--start-group -pthread -lanl -ldl -lssl -lcrypto -Wl,--end-
group -Wl,-init,MQTTAsync_init -Wl,-soname,libpaho-mqtt3as.so.1 -Wl,-no-whole-archive
ln -s libpaho-mqtt3as.so.1.3 build/output/libpaho-mqtt3as.so.1
ln -s libpaho-mqtt3as.so.1 build/output/libpaho-mqtt3as.so
cc -I src -Wl,--start-group -pthread -lanl -Wl,--end-group -L build/output -o
build/output/paho_c_version -lpaho-mqtt3a src/MQTTVersion.c -ldl
cc -o build/output/samples/MQTTClient_publish src/samples/MQTTClient_publish.c -lpaho-
mqtt3cs -I src -Wl,--start-group -pthread -lanl -lssl -lcrypto -Wl,--end-group -L build/output
cc -o build/output/samples/MQTTClient_publish_async src/samples/MQTTClient_publish_async.c
-lpaho-mqtt3cs -I src -Wl,--start-group -pthread -lanl -lssl -lcrypto -Wl,--end-group -L build/output
cc -o build/output/samples/MQTTClient_subscribe src/samples/MQTTClient_subscribe.c -lpaho-
mqtt3cs -I src -Wl,--start-group -pthread -lanl -lssl -lcrypto -Wl,--end-group -L build/output
cc -o build/output/samples/paho_cs_pub src/samples/paho_cs_pub.c -lpaho-mqtt3cs -I src -Wl,--
start-group -pthread -lanl -lssl -lcrypto -Wl,--end-group -L build/output src/samples/pubsub_opts.c
cc -o build/output/samples/paho_cs_sub src/samples/paho_cs_sub.c -lpaho-mqtt3cs -I src -Wl,--
start-group -pthread -lanl -lssl -lcrypto -Wl,--end-group -L build/output src/samples/pubsub_opts.c
cc -o build/output/samples/MQTTAsync_subscribe src/samples/MQTTAsync_subscribe.c -lpaho-
mqtt3as -I src -Wl,--start-group -pthread -lanl -lssl -lcrypto -Wl,--end-group -L build/output
cc -o build/output/samples/MQTTAsync_publish src/samples/MQTTAsync_publish.c -lpaho-
mqtt3as -I src -Wl,--start-group -pthread -lanl -lssl -lcrypto -Wl,--end-group -L build/output
cc -o build/output/samples/paho_c_pub src/samples/paho_c_pub.c -lpaho-mqtt3as -I src -Wl,--
start-group -pthread -lanl -lssl -lcrypto -Wl,--end-group -L build/output src/samples/pubsub_opts.c
cc -o build/output/samples/paho_c_sub src/samples/paho_c_sub.c -lpaho-mqtt3as -I src -Wl,--start-
group -pthread -lanl -lssl -lcrypto -Wl,--end-group -L build/output src/samples/pubsub_opts.c
cc -DNOSTACKTRACE -DNOLOG_MESSAGES src/Thread.c -g -o build/output/test/test1
src/./test/test1.c -lpaho-mqtt3c -I src -Wl,--start-group -pthread -lanl -Wl,--end-group -L
build/output
cc -DNOSTACKTRACE -DNOLOG_MESSAGES src/Thread.c -g -o build/output/test/test15
src/./test/test15.c -lpaho-mqtt3c -I src -Wl,--start-group -pthread -lanl -Wl,--end-group -L
build/output
cc -DNOSTACKTRACE -DNOLOG_MESSAGES src/Thread.c -g -o build/output/test/test2
src/./test/test2.c -lpaho-mqtt3c -I src -Wl,--start-group -pthread -lanl -Wl,--end-group -L
build/output
cc -DNOSTACKTRACE -DNOLOG_MESSAGES src/Thread.c -g -o
build/output/test/sync_client_test src/./test/sync_client_test.c -lpaho-mqtt3c -I src -Wl,--start-group
-pthread -lanl -Wl,--end-group -L build/output

```

```

cc -DNOSTACKTRACE -DNOLOG_MESSAGES src/Thread.c -g -o
build/output/test/test_mqtt4sync src/../test/test_mqtt4sync.c -lpaho-mqtt3c -I src -Wl,--start-group -
pthread -lanl -Wl,--end-group -L build/output
cc -DNOSTACKTRACE -DNOLOG_MESSAGES src/Thread.c -g -o build/output/test/test10
src/../test/test10.c -lpaho-mqtt3c -I src -Wl,--start-group -pthread -lanl -Wl,--end-group -L
build/output
cc -g -o build/output/test/test3 src/../test/test3.c -lpaho-mqtt3cs -I src -Wl,--start-group -pthread -
lanl -lssl -lcrypto -Wl,--end-group -L build/output
cc -g -o build/output/test/test4 src/../test/test4.c -lpaho-mqtt3a -I src -Wl,--start-group -pthread -lanl
-Wl,--end-group -L build/output
cc -g -o build/output/test/test45 src/../test/test45.c -lpaho-mqtt3a -I src -Wl,--start-group -pthread -
lanl -Wl,--end-group -L build/output
cc -g -o build/output/test/test6 src/../test/test6.c -lpaho-mqtt3a -I src -Wl,--start-group -pthread -lanl
-Wl,--end-group -L build/output
cc -g -o build/output/test/test9 src/../test/test9.c -lpaho-mqtt3a -I src -Wl,--start-group -pthread -lanl
-Wl,--end-group -L build/output
cc -g -o build/output/test/test95 src/../test/test95.c -lpaho-mqtt3a -I src -Wl,--start-group -pthread -
lanl -Wl,--end-group -L build/output
cc -g -o build/output/test/test_mqtt4async src/../test/test_mqtt4async.c -lpaho-mqtt3a -I src -Wl,--
start-group -pthread -lanl -Wl,--end-group -L build/output
cc -g -o build/output/test/test11 src/../test/test11.c -lpaho-mqtt3a -I src -Wl,--start-group -pthread -
lanl -Wl,--end-group -L build/output
cc -g -o build/output/test/test5 src/../test/test5.c -lpaho-mqtt3as -I src -Wl,--start-group -pthread -
lanl -lssl -lcrypto -Wl,--end-group -L build/output

```

```

devel@pi4-50:~/paho.mqtt.c $ sudo make install
mkdir -p build/output/samples
mkdir -p build/output/test
echo OSTYPE is Linux
OSTYPE is Linux
mkdir -p /usr/local/include
install -m 644 build/output/libpaho-mqtt3c.so.1.3 /usr/local/lib
install -m 644 build/output/libpaho-mqtt3cs.so.1.3 /usr/local/lib
install -m 644 build/output/libpaho-mqtt3a.so.1.3 /usr/local/lib
install -m 644 build/output/libpaho-mqtt3as.so.1.3 /usr/local/lib
install build/output/paho_c_version /usr/local/bin
install build/output/samples/paho_c_pub /usr/local/bin
install build/output/samples/paho_c_sub /usr/local/bin
install build/output/samples/paho_cs_pub /usr/local/bin
install build/output/samples/paho_cs_sub /usr/local/bin
/sbin/ldconfig /usr/local/lib
ln -s libpaho-mqtt3c.so.1 /usr/local/lib/libpaho-mqtt3c.so
ln -s libpaho-mqtt3cs.so.1 /usr/local/lib/libpaho-mqtt3cs.so
ln -s libpaho-mqtt3a.so.1 /usr/local/lib/libpaho-mqtt3a.so
ln -s libpaho-mqtt3as.so.1 /usr/local/lib/libpaho-mqtt3as.so
install -m 644 src/MQTTAsync.h /usr/local/include
install -m 644 src/MQTTClient.h /usr/local/include
install -m 644 src/MQTTClientPersistence.h /usr/local/include
install -m 644 src/MQTTProperties.h /usr/local/include
install -m 644 src/MQTTReasonCodes.h /usr/local/include
install -m 644 src/MQTTSubscribeOpts.h /usr/local/include

```

```
install -m 644 src/MQTTExportDeclarations.h /usr/local/include
install -m 644 doc/man/man1/paho_c_pub.1 /usr/local/share/man/man1
install -m 644 doc/man/man1/paho_c_sub.1 /usr/local/share/man/man1
install -m 644 doc/man/man1/paho_cs_pub.1 /usr/local/share/man/man1
install -m 644 doc/man/man1/paho_cs_sub.1 /usr/local/share/man/man1
```

```
devel@pi4-50:~/paho.mqtt.c $ ls /usr/local/bin/
geek-timer.sh paho_c_pub paho_cs_pub paho_cs_sub paho_c_sub paho_c_version
```

```
devel@pi4-50:~ $ paho_c_sub -t 'pico/status' -u 'testuser' -P 'password123' -h 'pi4-37'
T = 31.82 C 0x26c batt = 0.50 remote5
T = 29.01 C 0x050 batt = 0.06 remote3
T = 31.82 C 0x26c batt = 0.50 remote5
T = 29.01 C 0x04f batt = 0.06 remote3
T = 31.82 C 0x26c batt = 0.50 remote5
T = 29.01 C 0x04f batt = 0.06 remote3
T = 31.82 C 0x26c batt = 0.50 remote5
T = 29.01 C 0x04f batt = 0.06 remote3
```

These 2 cmds required a modification to /etc/mosquitto/mosquitto.conf

needed to edit /etc/mosquitto/mosquitto.conf

line 522

allow\_anonymous false -> allow\_anonymous true

```
cc MQTTClient_subscribe.c -o MQTTSUB -lpaho-mqtt3c
```

```
cc MQTTClient_publish.c -o MQTT PUB -lpaho-mqtt3c
```

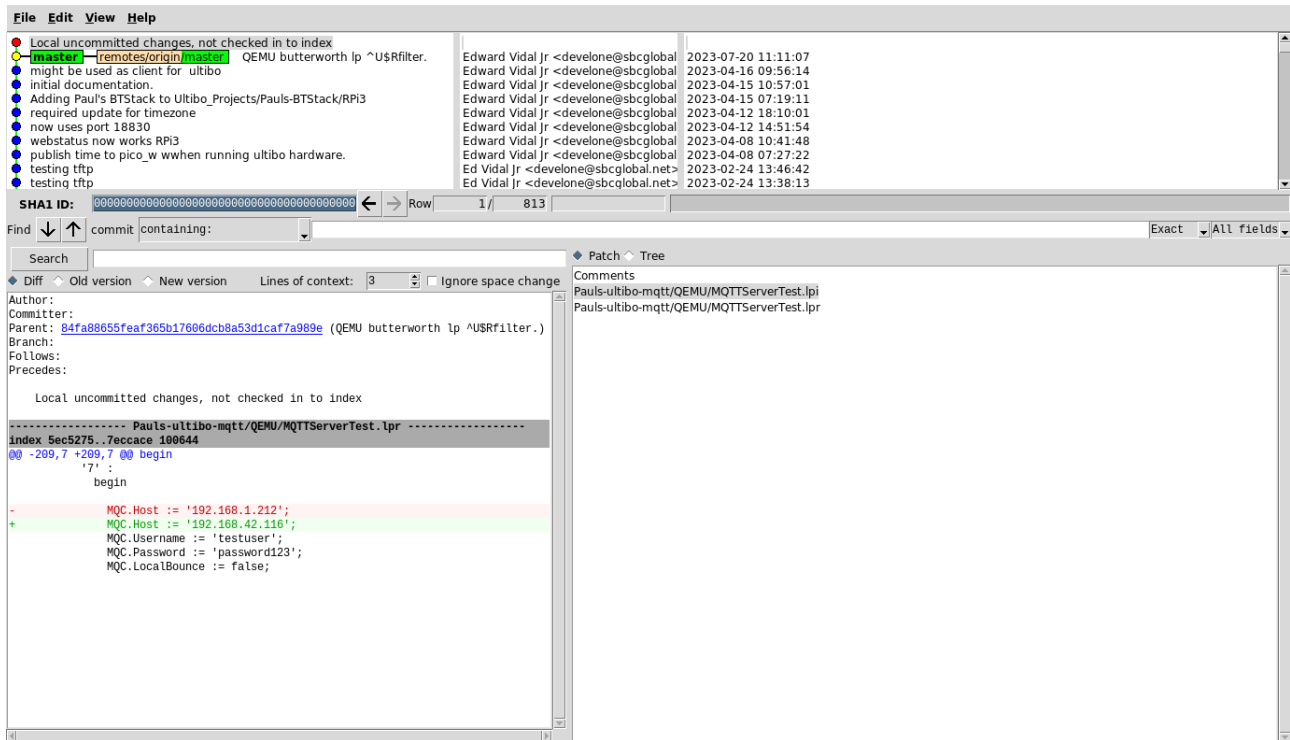
```
devel@pi4-30:~/paho.mqtt.c/src/samples $ paho_c_pub -t "MQTT Examples" -u 'testuser' -P
'password123' -m 'hello-world' -h 'pi4-37'
devel@pi4-30:~/paho.mqtt.c/src/samples $ paho_c_pub -t "MQTT Examples" -u 'testuser' -P
'password123' -m 'hello-world temp pi4-30' -h 'pi4-37'
devel@pi4-30:~/paho.mqtt.c/src/samples $ paho_c_sub -t "MQTT Examples" -u 'testuser' -P
'password123' -h 'pi4-37'
hello-world
hello-world
hello-world
hello-world this is a test
```

Make the following change to

```
devel@pi4-20:~/Ultibo_Projects/Pauls-ultibo-mqtt/QEMU $ git diff
diff --git a/Pauls-ultibo-mqtt/QEMU/MQTTServerTest.lpr
b/Pauls-ultibo-mqtt/QEMU/MQTTServerTest.lpr
index 5ec5275..7eccace 100644
--- a/Pauls-ultibo-mqtt/QEMU/MQTTServerTest.lpr
+++ b/Pauls-ultibo-mqtt/QEMU/MQTTServerTest.lpr
@@ -209,7 +209,7 @@ begin
```

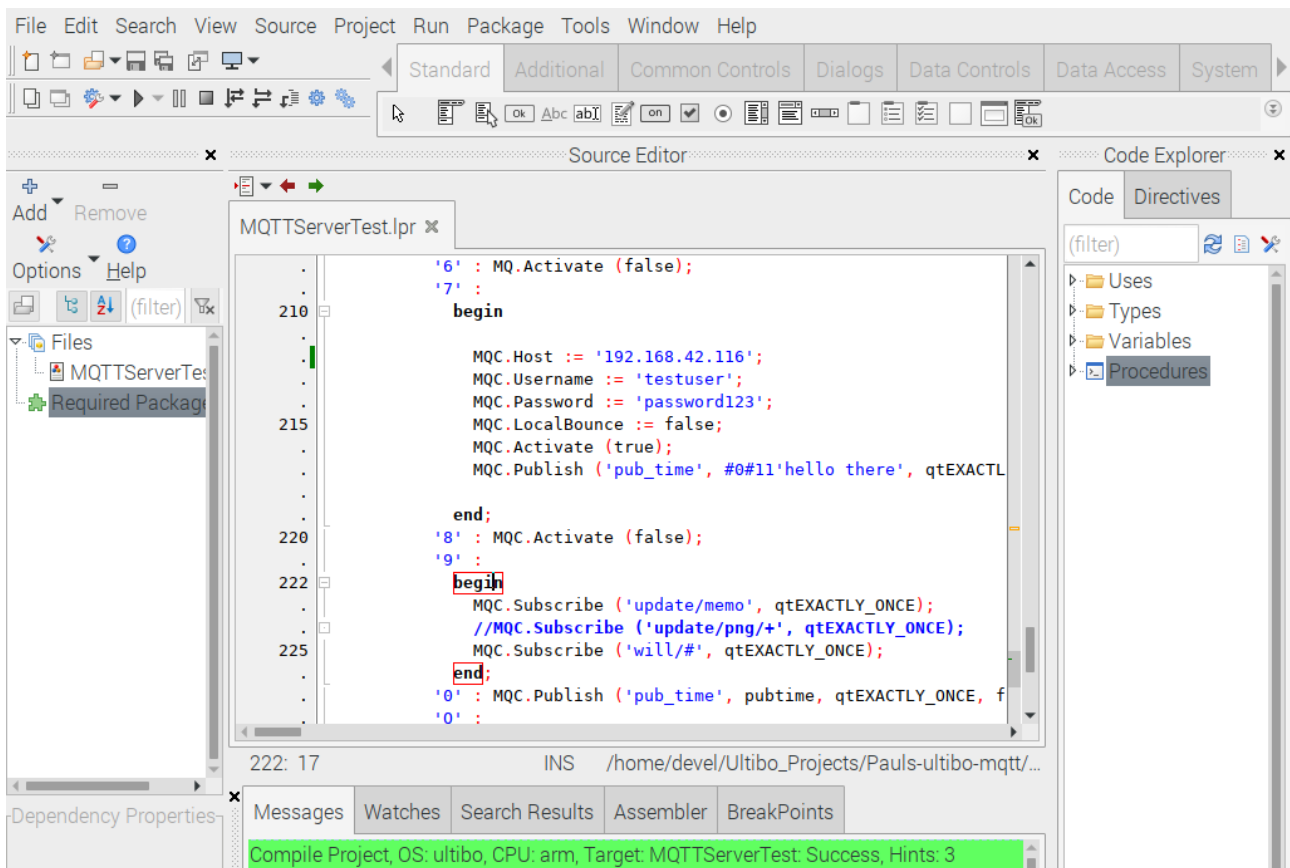
'7' :  
begin

- MQC.Host := '192.168.1.212';  
+ MQC.Host := '192.168.42.116';  
MQC.Username := 'testuser';  
MQC.Password := 'password123';  
MQC.LocalBounce := false;



XX

Compile the using Lazarus IDE (Ultibo Edition)



```
#!/bin/bash
```

```
qemu-system-arm -machine versatilepb -cpu cortex-a8 -kernel kernel.bin \
-net
user,hostfwd=tcp::5080-:80,hostfwd=tcp::5023-:23,hostfwd=tcp::18830-:18830,hostfwd=udp::5069
-:69,hostfwd=tcp::6050-:5050 -net nic \
-drive file=disk.img,if=sd,format=raw
```

```
devel@pi4-20:~/Ultibo_Projects/Pauls-ultibo-mqtt/QEMU $ ./startqemu.sh
```

Ultibo Core (Release: Beetroot Version: 2.5.123 Date: 23 August 2022)

TFTP : Usage tftp -i 10.0.2.15 put kernel7.img  
TFTP : Messages active.

Timezone is Mountain Standard Time  
The date and time is 2023-09-21-16-04-02  
MQTT Client & Server Tester.

Ultibo Core (Release: Beetroot Version: 2.5.123 Date: 23 August 2022)

Init to Connecting.  
Connecting to 192.168.42.116 on Port 18830  
Connecting to Connected.  
Connected to Closed.  
Closed to Connecting.  
Connecting to 192.168.42.116 on Port 18830  
Connecting to Connected.

TFTP : Usage tftp -i 10.0.2.15 put kernel7.img  
TFTP : Messages active.

Timezone is Mountain Standard Time  
The date and time is 2023-09-21-16-04-02  
MQTT Client & Server Tester.

Depress 5  
Depress 7



Ultibo Core (Release: Beetroot Version: 2.5.123 Date: 23 August 2022)

```
Init to Connecting.  
Connecting to 192.168.42.116 on Port 18830  
Connecting to Connected.  
Connected to Closed.  
Closed to Connecting.  
Connecting to 192.168.42.116 on Port 18830  
Connecting to Closed.  
Closed to Connecting.  
Connecting to 192.168.42.116 on Port 18830  
Connecting to Closed.  
timer 3 triggered  
Closed to Connecting.  
Connecting to 192.168.42.116 on Port 18830  
Connecting to Connected.  
Thread Created  
Connect  
  Check User testuser pass password123  
Clean NO  
Accepted. Is Broker NO  
Connection ACCEPTED  
Thread Created  
Connect  
  Check User testuser pass password123  
Clean YES  
Accepted. Is Broker NO  
  Subscription "pub_time" @ AT_MOST_ONCE  
Subscriptions changed...
```

```
TFTP : Usage tftp -i 10.0.2.15 put kernel7.img  
TFTP : Messages active.
```

```
Timezone is Mountain Standard Time  
The date and time is 2023-09-21-16-08-39  
MQTT Client & Server Tester.
```

```
devel@pi4-20:~ $ paho_c_sub -t 'pub_time' -u 'testuser' -P 'password123' -h '192.168.42.116' -p  
'18830  
Depress 0
```

Ultibo Core (Release: Beetroot Version: 2.5.123 Date: 23 August 2022)

```
Init to Connecting.
Connecting to 192.168.42.116 on Port 18830
Connecting to Connected.
Connected to Closed.
Closed to Connecting.
Connecting to 192.168.42.116 on Port 18830
Connecting to Closed.
Closed to Connecting.
Connecting to 192.168.42.116 on Port 18830
Connecting to Closed.
timer 3 triggered
Closed to Connecting.
Connecting to 192.168.42.116 on Port 18830
Connecting to Connected.
Thread Created
Connect
  Check User testuser pass password123
Clean NO
Accepted. Is Broker NO
Connection ACCEPTED
Thread Created
Connect
  Check User testuser pass password123
Clean YES
Accepted. Is Broker NO
  Subscription "pub_time" @ AT_MOST_ONCE
Subscriptions changed...
Message 2 created.
CID18830 Message 2 stored and idle.
REC Message 2 recorded.
CID18830 REL Message 2 publishing @ EXACTLY_ONCE
Publishing -- Was Retained NO
Publishing to Client paho-c-sub "pub_time"
CID18830 REL Message 2 removed from storage.
COMP Message 2 disposed of.
```

```
TFTP : Usage tftp -i 10.0.2.15 put kernel7.img
TFTP : Messages active.
```

```
Timezone is Mountain Standard Time
The date and time is 2023-09-21-16-08-39
MQTT Client & Server Tester.
```

```
devel@pi4-20:~ $ paho_c_sub -t 'pub_time' -u 'testuser' -P 'password123' -h '192.168.42.116' -p '18830'
2023-09-21-16-08-39
```