

Analysis report document

1. Problem description

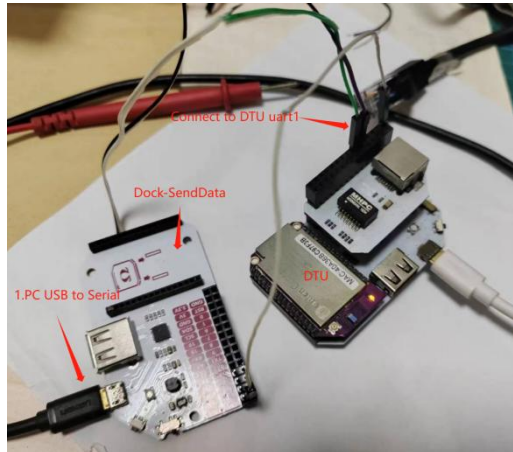
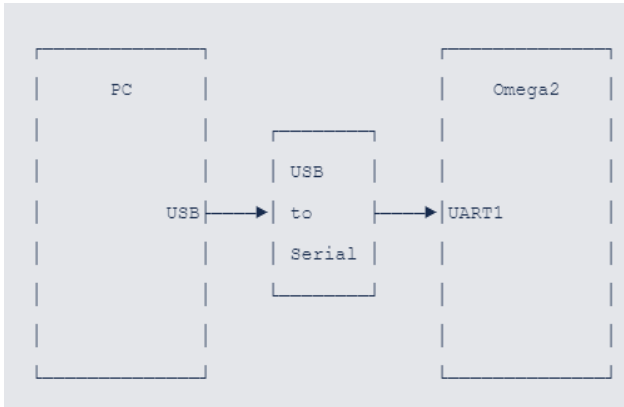
There's a customer reporting issues with serial transmissions on UART1 when the Omega's network is restarted.

2. Build testing environment

Here i used two expansion dock (USB to Serial) to build the testing environment.

Dock-SendData: Send data to DTU(Omega2).

DTU :receive data from Dock-SendData.



3. TestFlow

1) Sending device.

Using "TestUart.exe" Tool to send data from pc to DTU's uart1(ttyS1).

Test CMD : TestUart.exe [COM]:[Baudrate],n,8,1

Example : TestUart.exe COM4:9600,n,8,1

 TestUart.exe	2023/10/23
 TestUart.lpi	2023/10/23
 TestUart.lpr	2023/10/23
 TestUart.lps	2023/10/23

```
D:\TestUart>TestUart.exe COM4:9600,n,8,1
Rs232 test: COM4:9600,n,8,1
Press ESC to stop, G to start transmit.
[G] Pressed. Now transmission starts.
^G
```

When it show "Press ESC to sop,G to start transmit", just enter "G", it will send the data to uart1.

2) Receiving device

Type A. Using customer's receive script ——testserial

Test CMD : ./testserial

```
WHAT WILL YOU INVENT? /_/_/
-----
i@-ware: 0.3.4 b257
-----
root@Omega-4127:/#
root@Omega-4127:/#
root@Omega-4127:/#
root@Omega-4127:/# cd etc/
root@Omega-4127:/etc# ./testserial
cts 0
dsr 0
rng 0
dcd 0
rx 0
tx 0
frame 0
overrun 0
parity 0
brk 0
buf_overrun 0
```

During the receiving time, you can pull out or insert a the ethernet cable. After a few moments, Using “Ctrl + C” to stop the DTU receiving the uart data.

```

root@Omega-4127:~#
root@Omega-4127:~# cd etc/
root@Omega-4127:/etc# ./testserial
cts 0
dsr 0
rng 0
dcd 0
rx 0
tx 0
frame 0
overrun 0
parity 0
brk 0
buf_overrun 0
[ 48.218210] random: crng init done
[ 48.489802] br-wlan: port 1(ra0) entered blocking state
[ 48.495186] br-wlan: port 1(ra0) entered disabled state
[ 48.500852] device ra0 entered promiscuous mode
[ 48.505695] br-wlan: port 1(ra0) entered blocking state
[ 48.510998] br-wlan: port 1(ra0) entered forwarding state
[ 48.518587] IPv6: ADDRCONF(NETDEV_CHANGE): br-wlan: link becomes ready
ACcts 0
dsr 0
rng 0
dcd 0
rx 391732
tx 1
frame 0
overrun 0
parity 0
brk 0
buf_overrun 0
Total received: 391732
root@Omega-4127:/etc#

```

Type B. Using onion’s Python receive script ——rcv_serial.py

Test CMD : python rec_serial.py

```

root@Omega-4127:~# cd etc/
root@Omega-4127:/etc#
root@Omega-4127:/etc#
root@Omega-4127:/etc# python recv_serial.py
Reading data from /dev/ttyS1. Press Ctrl+C to exit.
Received data: ~ 000000
Received data: 000000000000 !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO PQR
Received data: 000000000000 !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO PQR
Received data: 000000000000 !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO PQR
Received data: 000000000000 !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO PQR
Received data: 000000000000 !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO PQR
Received data: 000000000000 !"#%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO PQR

```

4. Problem confirmation

1) Type A TEST

Test 01: Baudrate :9600

Operation: Start received script , After a few moments, stop the received script. During the testing, we don’t change the ethernet state.

Test result: Data reception is normal.

```

testserial testserial-9600
root@Omega-4127:/etc# ./testserial-9600
cts 0
dsr 0
rng 0
dcd 0
rx 0
tx 0
frame 0
overrun 0
parity 0
brk 0
buf_overrun 0
ACcts 0
dsr 0
rng 0
dcd 0
rx 4176
tx 1
frame 0
overrun 0
parity 0
brk 0
buf_overrun 0
Total received: 4176
root@Omega-4127:/etc#
root@Omega-4127:/etc#

```

```

D:\TestUart>TestUart.exe COM4:9600,n,8,1
Rs232 test: COM4:9600,n,8,1
Press ESC to stop, G to start transmit.
[G] Pressed. Now transmission starts.
^C

```

Test 02: Baudrate :9600

Operation: Start received script , After a few moments, stop the received script.During the testing,**we change the ethernet state by pulling out or inserting a the ethernet cable.**

Test result: Data reception is normal.

```

root@Omega-4127:/etc#
root@Omega-4127:/etc# ./testserial-9600
cts 0
dsr 0
rng 0
dcd 0
rx 10192
tx 2
frame 0
overrun 0
parity 0
brk 0
buf_overrun 0
[ 377.673232] rt3050-esw 10110000.esw: link changed 0x00
[ 382.401424] rt3050-esw 10110000.esw: link changed 0x01
[ 385.430033] rt3050-esw 10110000.esw: link changed 0x00
[ 389.659540] rt3050-esw 10110000.esw: link changed 0x01
^Ccts 0
dsr 0
rng 0
dcd 0
rx 32773
tx 3
frame 0
overrun 0
parity 0
brk 0
buf_overrun 0
Total received: 22581
root@Omega-4127:/etc#
D:\TestUart>TestUart.exe COM4:9600,n,8,1
Rs232 test: COM4:9600,n,8,1
Press ESC to stop, G to start transmit.
[G] Pressed. Now transmission starts.
^C
    
```

Test 03: Baudrate :460800

Operation: Start received script , After a few moments, stop the received script.During the testing,**we change the ethernet state by pulling out or inserting a the ethernet cable.**

Test result: Data reception is **abnormal**,the value of overrun will increase when the ethernet state changed.

```

D:\TestUart>TestUart.exe COM4:460800,n,8,1
Rs232 test: COM4:460800,n,8,1
Press ESC to stop, G to start transmit.
[G] Pressed. Now transmission starts.
^C
Total Received: 109570
root@Omega-4127:/etc#
root@Omega-4127:/etc# ./testserial
cts 0
dsr 0
rng 0
dcd 0
rx 1331382
tx 20
frame 10
overrun 1
parity 0
brk 0
buf_overrun 0
Receive error: expected 96 received 0
Receive error: expected 1 received 208
[ 490.123925] rt3050-esw 10110000.esw: link changed 0x01
Receive error: expected 166 received 0
Receive error: expected 1 received 166
Receive error: expected 188 received 155
[ 495.864083] rt3050-esw 10110000.esw: link changed 0x00
Receive error: expected 132 received 0
Receive error: expected 1 received 132
Receive error: expected 154 received 127
^Ccts 0
dsr 0
rng 0
dcd 0
rx 2049689
tx 21
frame 11
overrun 3
parity 0
brk 0
buf_overrun 0
Total received: 718308
root@Omega-4127:/etc#
Onion Omega
WHAT WILL YOU INVENT?
i@-ware: 0.3.4 b257
-----
root@Omega-4127:/#
root@Omega-4127:/#
root@Omega-4127:/#
root@Omega-4127:/# cd etc/
root@Omega-4127:/etc# ./testserial
cts 0
dsr 0
rng 0
dcd 0
rx 0
tx 0
frame 0
overrun 0
parity 0
brk 0
buf_overrun 0
[ 80.063090] random: crng init done
[ 90.719031] rt3050-esw 10110000.esw: link changed 0x00
Receive error: expected 156 received 0
Receive error: expected 1 received 156
Receive error: expected 178 received 158
^Ccts 0
dsr 0
rng 0
dcd 0
rx 777584
tx 1
frame 0
overrun 1
parity 0
brk 0
buf_overrun 0
Total received: 777585
root@Omega-4127:/etc#
    
```

Analysis results 1 : When we used customer’s testserial, the uart data will be lost when the ethernet state changed.

Test 05: Baudrate :460800

Operation: Start received script , After a few moments, stop the received script.During the testing,**we change the ethernet state by pulling out or inserting a the ethernet cable.**

Test result: The displayed data is garbled and cannot be determined whether it is correct

```

ser.close()

if __name__ == "__main__":
    serial_port = '/dev/ttyS1'
    # change the baudrate variable below to set baudrate
    baudrate = 460800

    # Call the function to read data from the serial port
    read_serial_data(serial_port, baudrate)

```

```

D:\TestUart>TestUart.exe COM4:460800,n,8,1

Rs232 test: COM4:460800,n,8,1
Press ESC to stop, G to start transmit.
[G] Pressed. Now transmission starts.
^C

```

```

Received data: 01234500000`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 0123456789; <=>?@ABCDEFGHIJKLMNopqrstuvwxyz{|}~ 00000
Received data: 0000006089; <=>?@ABCDEFGHIJKLMnopqrstuvwxyz{|}~ 00000
Received data: 0123456789; =>`abcdefghijklmnopqrstuvwxyz{|}~ 00000
[ 3634.445658] rt3050-esw 10110000.esw: link changed 0x01
Received data: 00000000000=`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 00000000000`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 0123456789;=>`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 0123456789; <=>?@ABCDEFGHIJKLMnopqrstuvwxyz{|}~ 00000
Received data: 00204060000`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 0123456709;`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 00000000090=>?@ABCDEFGHIJKLMnopqrstuvwxyz{|}~ 00000
Received data: 0000000089; <=>?@ABCDEFGHIJKLMnopqrstuvwxyz{|}~ 00000
Received data: 01234007000`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 01030567800=`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 00000000000`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 00000000000`ABCDEFGHIJKLMNopqrstuvwxyz{|}~ 00000
Received data: 0123456789;>`AbcdeFghIjKlMnOpqrstuVwxyz{|}~ 00000
Received data: 0123056789; <=?`ABCDefghIjKlMnopqrstuvwxyz{|}~ 00000
[ 3635.669464] rt3050-esw 10110000.esw: link changed 0x00
Received data: 0123456789; <=>?@ABCDEFGHIJKLMNopqrstuvwxyz{|}~ 00000
Received data: 0000050700; <=>?@ABCDEFGHIJKLMNopqrstuvwxyz{|}~ 00000
Received data: 00000000000; <=>?@ABCDEFGHIJKLMNopqrstuvwxyz{|}~ 00000
Received data: 0000050780; <=>?@ABCDEFGHIJKLMnopqrstuvwxyz{|}~ 00000
Received data: 0123456789;=?`abcdefghijklmnopqrstuvwxyz{|}~ 00000
Received data: 00000000000`abcdefghijklmnopqrstuVwxyz{|}~ 00000
Received data: 00000000000`ABCDEFGHIJKLMNopqrstuvwxyz{|}~ 00000
Received data: 0103006089; <=>?@ABCDEFGHIJKLMNopqrstuvwxyz{|}~ 00000
Received data: 01234560890;`abcdefghijklmnopqrstuVwxyz{|}~ 00000
Received data: 00000000800; <=>?@ABCDEFGHIJKLMnopqrstuvwxyz{|}~ 00000
Received data: 00000000000>`AbcdeFghIjKlMnOpqrstuVwxyz{|}~ 00000
Received data: 00000000000`abcdeFghIjKlMnOpqrstuVwxyz{|}~ 00000
Received data: 0123456789; <=>`abcdefghijklmnopqrstuVwxyz{|}~ 00000
Received data: 00000000000;>@ABCDEFGHIJKLMnopqrstuvwxyz{|}~ 00000
Received data: 0123456709; <=>?@ABCDEFGHIJKLMnopqrstuvwxyz{|}~ 00000
Received data: 0123456780;=?`abcdeFghIjKlMnopqrstuVwxyz{|}~ 00000
Received data: 0000000080;=>?@ABCDEFGHIJKLMNopqrstuvwxyz{|}~ 00000
Received data: 01234060000`abcdefghijklmnopqrstuVwxyz{|}~ 00000
Received data: 01030000000`abcdefghijklmnopqrstuVwxyz{|}~ 00000
Received data: 01234567890`abcdefghijklmnopqrstuVwxyz{|}~ 00000
Received data: 01234560000`abcdefghijklmnopqrstuVwxyz{|}~ 00000

```

Analysis results 2 : When we used Onion's test script, at the baudrate 9600/115200/230400,the uart data reception is normal when the ethernet state changed.

5. Analysis results

- 1) The hardware of uart1 port is normal.
- 2) By comparing test scripts, first we can know that there are some issue of the customer's testserial program.