# Quick Note 057

Configure a TransPort router as a modem and a Device Server in modem emulation to act as a PSTN line replacement solution

**21 September 2017**

# Contents

# 1 INTRODUCTION

## 1.1 Introduction

Service providers have been slowly decommissioning PSTN (Public Switched Telephone Network) lines in exchange to xDSL lines. For most customers and applications, this has no impact and the transition to IP is easy but in certain cases, when working with older equipment that is communicating directly to a modem the transition would involve costs. The serial port of a Digi TransPorter WR router can be configured to act as a Modem to be installed on remote site and provide WAN connectivity if necessary. This can then be combined with a Digi Serial Server on the Central Office that can be configured to emulate modem responses to a serial device and seamlessly sends and receives data over an Ethernet network instead of PSTN. The advantage for the user is the ability to retain legacy hardware and software application without modification and use a less expensive Ethernet network in place of public telephone lines. This allow for a transparent, faster and more cost effective solution than replacing the existing hardware.
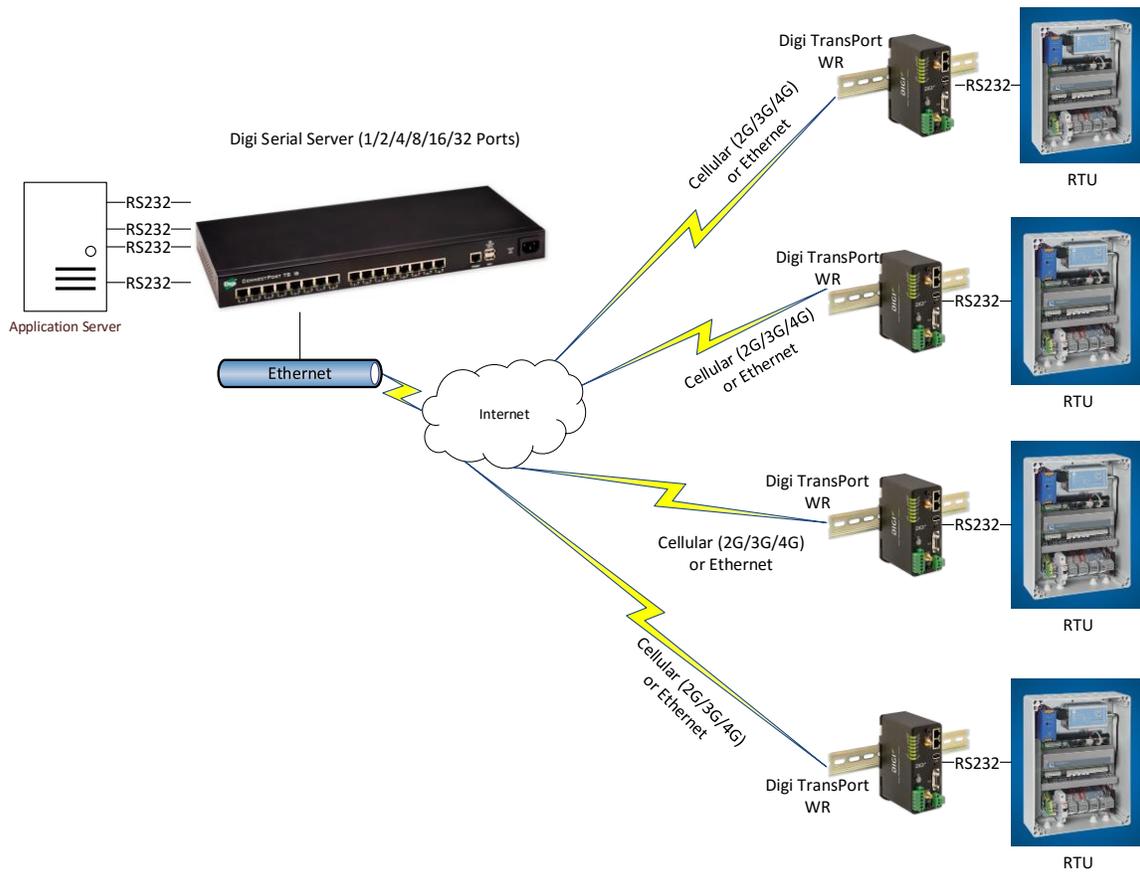
## 1.2 Outline

This guide details the steps involved in configuring a serial server in modem emulation mode at a central site and TransPort WR routers using Rate Adaption on remote sites to act as a complete PSTN line replacement solution. This will allow an application and equipment to communicate transparently via AT commands as if they were connected to serial modems and send this traffic through IP.

The communication in this example can be established from both sides. The Application Server will open one available serial port on the multi-port serial server to establish communication to one of the remote TransPort WR devices but alternatively, one of the TransPort WR devices can establish the communication to the multi-port serial server. Both examples will be described.

## 1.3 Assumptions

This guide has been written for use by technically competent personnel with a good understanding of the communications technologies used in the product and of the requirements for their specific application.

This quick note applies only to:

**Model:** ConnectPort TS, ConnectPort LTS, PortServer TS, One SP

**Model:** TransPort WR44,41,31,21

## 1.4 Corrections

Requests for corrections or amendments to this documentation are welcome and should be addressed to: tech.support@digi.com

Requests for new quick notes can be sent to the same address.

## 1.5 Version

| Version Number | Status |
|---|---|
| 1.0 | Completed 20.09.2017 |

## 2   SERVER SIDE CONFIGURATION

### 2.1   Configure the multi-port serial server for modem emulation
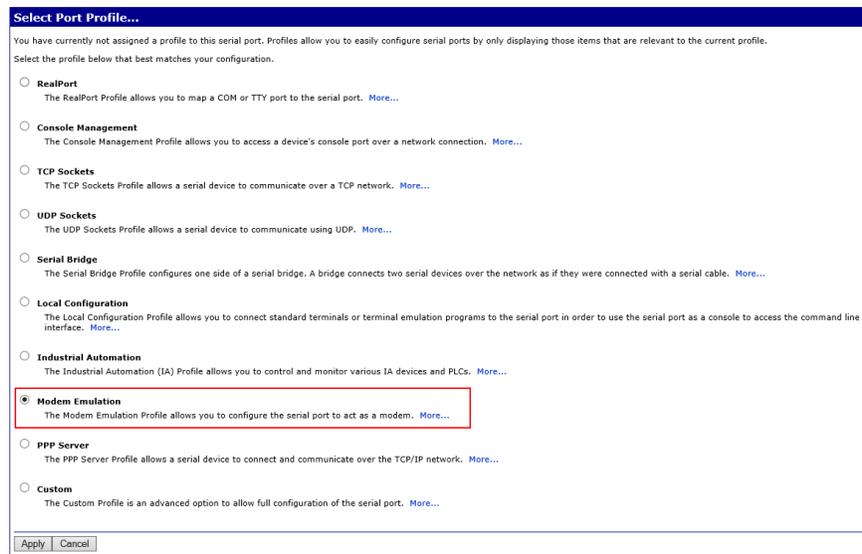
### 2.1.1   Configure Serial Ports profile

In this example, a ConnectPort TS with 16 ports will be used.

Open a web browser to the IP address of the ConnectPort TS.

Navigate to **Configuration – Serial Ports >**

Select Port 1 and chose the **Modem Emulation** profile:



If the serial port was already configured for another profile, click on **Change Profile** instead:



Click **Apply**

## 2.1.2 Configure Serial Ports settings

By default, the serial port settings will be configured for the following:

| Parameter | Setting |
|---|---|
| Baud Rate | 9600 |
| Data Bits | 8 |
| Parity | None |
| Stop Bits | 1 |
| Flow Control | None |

**Please note:** These settings must match the one set on the serial equipment.

To change these settings, navigate to **Configuration – Serial Ports > Serial Port 1 > Basic Serial Settings**

This configuration example will use the following settings:
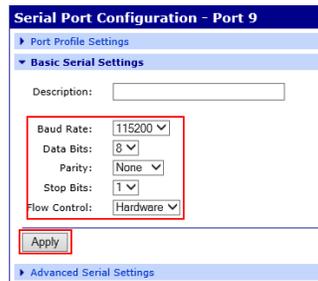


| Parameter | Setting |
|---|---|
| Baud Rate | 115200 |
| Data Bits | 8 |
| Parity | None |
| Stop Bits | 1 |
| Flow Control | Hardware (RTS/CTS) |

Click **Apply**

## 2.1.3 Copy configuration to all ports

If all ports will be used for Modem Emulation, in order to copy the configuration of 1 port, navigate to **Configuration – Serial Ports,** next to **Port 1** click **Copy**, check all the ports and click **Apply**
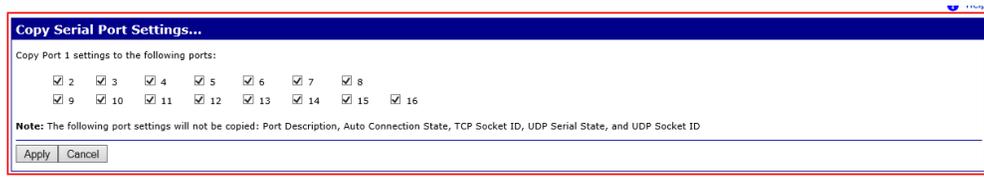
# 3   REMOTE SITE CONFIGURATION

## 3.1   TransPort WR Configuration

The TransPort serial port must be configured to answer and act as a "modem". This is done as follows.

Access the CLI (Command Line Interface) – this can be achieved:

- Through the serial port @115200 bps
- Via a telnet or SSH connection
- Via the "execute a command" page of the web user interface.

Issue the following to configure the Rate Adaptation instance 0 to Serial Port 0:

```
bind adapt 0 asy 0
```

Enable rate adaptation and configure the router to listen on a TCP Port number. In this example, **3000** will be used.

```
adapt 0 sockmode 1
adapt 0 lip_port 3000
```

This last part can also be configured via the web interface if needed under **Configuration – Network > Interfaces > Serial > Rate Adaptation > Rate Adaptation 0**



The router is now configured and will answer to incoming calls.

Configuration for Remote to Server communication (inverted) can be seen in

## 4 SERVER TO REMOTE CONNECTION

In this example, the Server will initiate the connection to the remote site.

An example of the connection command is:

```
ATDT 1.2.3.4:3000
```

**The IP address will be the IP address of the WAN interface of the TransPort router.**

Upon establishing a successful TCP connection, a CONNECT message is sent to the serial port and only then does the Digi serial server switch from AT command mode to data mode. After the CONNECT is received, the transmission of data begins. Using the modem escape sequence or dropping DTR on either side terminates the connection.

Open one of the serial port of the server using the previously configured serial settings: (**115200,8N1,HW**)

In this example, a terminal application to simulate the server and the equipment such as PuTTy will be used.

Establish the connection to the remote site:

```
atdt 192.168.1.21:3000
CONNECT 115200
```
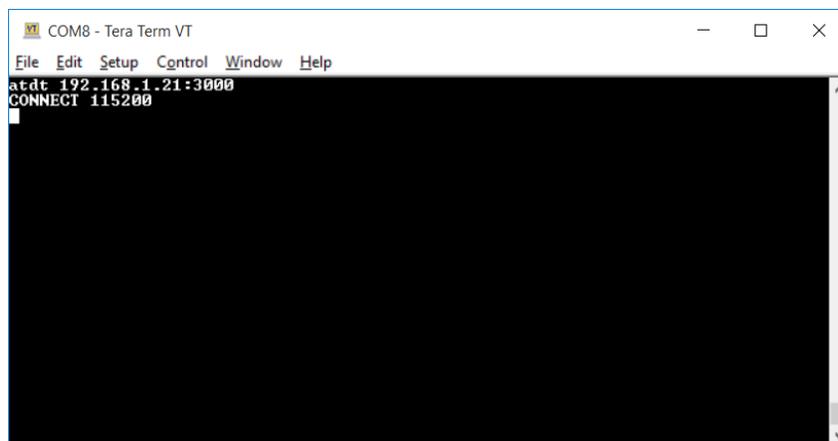
The Remote site is ringing, issue **ata** to answer:
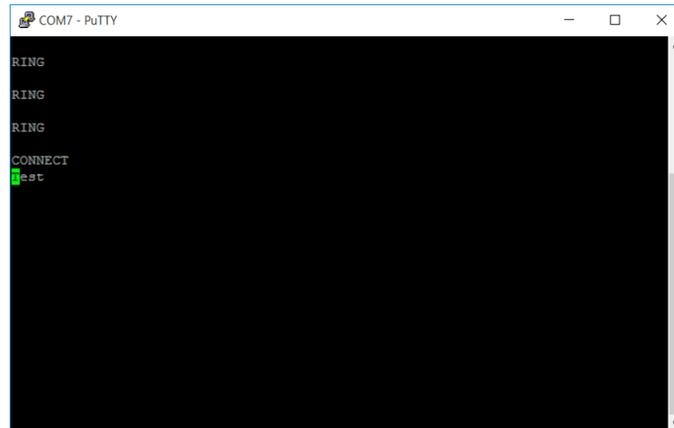
```
RING

RING

RING
ata
CONNECT 115200
```



The connection is now established and data can be sent.

*Please Note*: *it is possible to configure the remote site to auto answer. For this, open CLI (see section 3.1) to the TransPort Router and issue the following:*

```
at\port=0
ats0=1
```

**ATH** can be used to disconnect the call.

# 5   REMOTE TO SERVER CONNECTION

In this example, the Remote site will initiate the connection to the Server. This is possible if the Server has an accessible IP address from the remote sites such as Public WAN IP, VPN between each remote sites and the Server, Private network from the provider etc.

When using a Digi serial server in Modem Emulation mode, the TCP listening port number is 5000x where x is the port number. In the case of this example, the server site is using a multi-port serial server, a ConnectPort TS 16. The listening port for Serial Port 1 will be **50001,** for Serial Port 2 will be **50002,** etc..

For TransPort WR routers, an extra configuration setup is required (on each remote sites) to tell the router where to establish the connection.

Upon establishing a successful TCP connection, a CONNECT message is sent to the serial port and only then does the Digi serial server switch from AT command mode to data mode. After the CONNECT is received, the transmission of data begins. Using the modem escape sequence or dropping DTR on either side terminates the connection.

In this test, a remote site will establish a connection to the serial port 1 on the server site.

Open the Command Line Interface (see section 3.1) to the TransPort Router and issue the following:

```
adapt 0 ip_port 50001
adapt 0 ip_addr 192.168.1.118
```

This can also be done via web interface under **Configuration – Network > Interfaces > Serial > Rate Adaptation > Rate Adaptation 0**

Open the serial port on the remote site using the previously configured serial settings:
(**115200,8N1,HW**)

In this example, a terminal application to simulate the server and the equipment, such as PuTTy will be used.

Establish the connection to the server site, port 1:

```
atdt 12345
CONNECT 115200
```
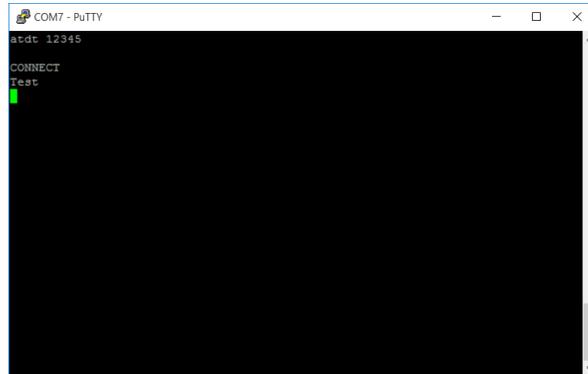


*Please Note*: *The TransPort is configured to establish the connection to the IP Address and Port. Therefore, any numbers can be used after ATDT and will have no impact.*

The Server site is ringing, issue **ata** to answer:
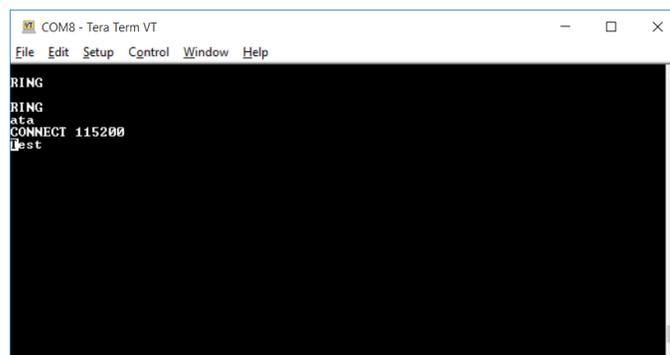
```
RING

RING

RING
ata
CONNECT 115200
```



The connection is now established and data can be sent.

*Please Note*: *it is possible to configure the server site to auto answer. For this, issue: **ats0=1** on the ConnectPort TS port that requires auto-answering*

**ATH** can be used to disconnect the call.

# 6   NOTES

A list of available AT commands supported by Digi Serial Servers can be found in the user guide on our support web site: http://www.digi.com/support

# 7 CONFIGURATION FILE

## 7.1 ConnectPort TS 16 (Server site)

Below are the CLI commands used to configure the device via CLI in this example.

```
set profile port=1-16 profile=modem_emulation
set serial port=1-16 baudrate=115200 databits=8 stopbits=1 parity=none
flowcontrole=hardware
```

## 7.2 TransPort WR (Remote site)

Below is the configuration used on the TransPort for this example.

```
eth 0 IPaddr "192.168.1.21"
eth 0 gateway "192.168.1.254"
addp 0 enable ON
lapb 0 ans OFF
lapb 0 tinact 120
lapb 1 tinact 120
lapb 3 dtemode 0
lapb 4 dtemode 0
lapb 5 dtemode 0
lapb 6 dtemode 0
bind ADAPT 0 ASY 0
adapt 0 sockmode 1
adapt 0 ip_addr "192.168.1.118"
adapt 0 ip_port 50001
adapt 0 lip_port 3000
ip 0 cidr ON
def_route 0 ll_ent "ppp"
def_route 0 ll_add 1
def_route 1 ll_ent "ETH"
dhcp 0 IPrange 101
dhcp 0 respdelms 500
dhcp 0 mask "255.255.255.0"
dhcp 0 gateway "192.168.1.21"
dhcp 0 DNS "192.168.1.21"
sntp 0 server "time.etherios.com"
ppp 0 timeout 300
ppp 1 name "W-WAN (HSPA 3G)"
ppp 1 phonenum "*98*1#"
ppp 1 IPaddr "0.0.0.0"
ppp 1 timeout 0
ppp 1 do_nat 2
ppp 1 use_modem 1
ppp 1 aodion 1
ppp 1 autoassert 1
ppp 1 r_chap OFF
ppp 3 defpak 16
ppp 4 defpak 16
passthru 0 http ON
```

```
web 0 prelogin_info ON
ftpcli 0 hostname "ftp1.digi.com"
ftpcli 0 directory "support/firmware/transport/radio_module_firmware/he910d"
modemcc 0 info_asy_add 3
modemcc 0 init_str "+CGQREQ=1"
modemcc 0 init_str1 "+CGQMIN=1"
modemcc 0 apn ""
modemcc 0 epin ""
modemcc 0 link_retries 10
modemcc 0 stat_retries 30
modemcc 0 sms_interval 1
modemcc 0 sms_access 1
modemcc 0 sms_concat 0
modemcc 0 init_str_2 "+CGQREQ=1"
modemcc 0 init_str1_2 "+CGQMIN=1"
modemcc 0 apn_2 "Your.APN.goes.here"
modemcc 0 link_retries_2 10
modemcc 0 stat_retries_2 30
modemcc 0 sms_access_2 1
modemcc 0 sms_concat_2 0
ana 0 anon ON
ana 0 l2on OFF
ana 0 l3on OFF
ana 0 xoton OFF
ana 0 lapdon 0
ana 0 asyon 1
ana 0 lapbon 0
ana 0 logsize 45
cmd 0 unitid "ss%s>"
cmd 0 cmdnua "99"
cmd 0 hostname "digi.router"
cmd 0 asyled_mode 2
cmd 0 tremto 1200
cmd 0 rcihttp ON
user 0 access 0
user 1 name "username"
user 1 epassword "KD5lSVJDVVg="
user 1 access 0
user 2 access 0
user 3 access 0
user 4 access 0
user 5 access 0
user 6 access 0
user 7 access 0
user 8 access 0
user 9 access 0
local 0 transaccess 2
sslsvr 0 certfile "cert01.pem"
sslsvr 0 keyfile "privrsa.pem"
ssh 0 hostkey1 "privSSH.pem"
ssh 0 nb_listen 5
ssh 0 v1 OFF
```