Compatible Systems − CSU/DSU and Modem Issues: Frequently Asked Questions

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Questions

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I'm an ISP that runs Linux 1.2.13 as the termserver and the 900i as the router. My PPP users cannot upload to an FTP site; download works fine. PPP users that run FTP servers say nobody can download from them. SLIP users do not have this problem. This PPP problem only seems to happen when it deals with Internet users and sites. Local dial−up users can upload/download to any other dial−up user. Only binary files are affected but text files are fine.
There does not seem to be any dialing that takes place. Here is the router log:`WAN: chat log 2d 30 39 37 33 0d 0d 0a 4e 4f 20 44 49 41 4c 20 −0973...NO DIAL WAN: chat log 54 4f 4e 45 0d 0a TONE.. Begin Script Send atdt 9−703−749−0973`
I tried to set up a dedicated line to a local ISP with a RAD ASM−20 and a MicroRouter 900i. The WAN port is already in sync mode. The ASM−20 only supports 32K, 48K, 64K and 128K. How do I set the baud rate of the router to 64K since that is the speed of

Introduction

This document answers frequently asked questions about compatible systems − CSU/DSU and modem issues.

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Q. I have run into a problem with the Adtran DSU 5600 on Frame Relay links.

A. Revs A and B of this model do not work for Frame Relay − there is a problem with scrambled data. The unit must be upgraded to Rev C by either the addition of a Rev C ROM or a replacement of the unit. Look at the sticker on the ROM inside the unit to check the Rev. If the unit is already at Rev C, the DIP switch setting for Scrambler must be DISABLED.

Consult Adtran Technical Support at 800−726−8663.

Q. The description of the switch settings in the Adtran DSU 5600 manual does not match the sticker on the bottom of the unit.

A. There are three different ROM versions of the DSU 5600. The manuals for the unit can or cannot match the version. In order to be sure, the unit can be taken apart and the ROM version checked.

ROM version 9200.0781A

This unit is a 56K only unit. It cannot be used on a 64K Frame Relay network. The sticker on the bottom must be used to set the switches.

```
1 2 3 4 5 6 7 8 U U U D D D U D
```

ROM version 9200.0781C

These units can be set for either 56K or 64K. They need to be set to not use scrambled signals. The first 4 switches need to be set like this example.

```
1 2 3 4 5 6 7 8 U D D D
```

Consult Adtran Technical Support at 800−726−8663.

Q. Can I run 56K RS−232 with a General Datacomm 500F AXR CSU/DSU?

A. The General Datacomm 500F AXR CSU/DSU has both a V.35 and RS−232 connector. As per the Technical Support of the GDC, the RS−232 port can only be used on 19.2 and slower lines. The V.35 can be used at 56K and 64K. The RS−232 port cannot handle a 56K line. If customers need this capability, they should get a 500C UXR.

Consult General Datacomm Technical Support at 800−243−1030.

Q. What serial interface does an AT&T Paradyne use?

A. Paradyne CSUs currently have RS−232, RS−530 and V.35 interfaces. Older models only had an RS−530 interface. Patton Electronics sells an RS−530 to V.35 converter cable, model 2014 for $119.

Consult Patton Electronics Technical Support at 301−975−1007.

Q. I cannot find a V.35 cable to go from the RS−232 port on the back of your 900i to a V.35 connector on a CSU/DSU. What are some possible solutions?

A. In addition to a V.35 cable, you also need an interface converter to convert the V.35 signals (+5V TTL level − differential) to RS−232 (+/− 12V single ended).

- Patton Electronics 2020F−M RS−232 to V.35 interface converter retails at $295, but you can probably get an RS−232 model CSU/DSU for that price or less.
- BAT Electronics makes a CSU/DSU called the 56EZ with an RS−232 connector. If you have a BAT SU−56 DSU, you can trade it in on an EZ for less than the cost of a new cable and interface converter.
- Replace your CSU/DSU with another CSU/DSU with an RS−232 interface, rather than a V.35 interface, such as those made by Adtran, Motorola, ATL, etc.

Q. I have a dial−up connection between two Compatible Systems routers. I established the connections on baud rate 9600 in synchronous operation. When I increase the modem rate to 28800, a ping results in the statement *network unreachable−dest. unreachable*. Do I have to tell the routers about the new baud rate in the synchronous operation?

A. Our routers in synchronous mode typically get the TX clock from the synchronous device. This can be a synchronous modem, but usually it is a CSU/DSU for leased line operation.

In asynchronous mode, our routers can use any of the standard asynchronous frequencies: 9600, 19200, 38400, 57600 or 115200.

The 28800 designation on your modem is the rate at which the modem communicates with the other modem. The DTE speed (serial port) is independent of the modem speed and is typically set to four times the modem speed. This is so the modem can do compression and keep the data pipeline filled with data.

You must use Hardware Flow Control for speeds above 9600 baud in async mode. In sync mode, there is no flow control.

Q. I have a dial−up connection and have set the baud rate on my Compatible Systems router to 28800. Why does the throughput seem slower than I expected?

A. You go through a 28.8K modem. In order to allow for compression, you must set the modem speed to 115200 and turn on Hardware Flow Control for your router. This gives you the maximum data rate between the router and the modem.

Q. I have tried to configure the RS−232 port of our router for dedicated line operation with sync CSU. I found this problem report in the router log: `WAN: wan device checkout WAN: tx test failed WAN: wan device checkout bad, delay 30 secs`

A. This means that the router does not get the sync clock from the CSU or the phone line to enable it to transmit characters. This can be the result of a bad cable, a bad phone line, or the router port is set for async. If these check out OK, it is also possible that the CSU itself is bad.

Q. I have MR1000Rs in a dial−up connection with US Robotics Sportster modems. The call is initiated from one end, and the other end fails to answer. I checked both modems and routers to make sure they were set up to allow dial−in.

A. This is an issue unrelated to the routers. Use the DIP switch on the USR Sportster modem to set Auto Answer on both modems. The MicroRouter sends a string to enable auto answer on the modem, but, if the modem is unstable or gets reset, they do not answer. If you set the DIP switch, it ensures that the modem answers all inbound calls.

Q. Why does the router not re−establish the connection after my ISP or leased line comes back up, after a failure? The only way to get around the problem is to power cycle the router.

A. In the dedicated mode, if the connection goes down (either the leased line or the other router), we have no way to know this since dedicated sync connections do not use the carrier detect signal line. This is not a problem. Since we do not take down the PPP (either LCP or IPCP), the connection is fine once re−established. If the other side knows that it has been down and restarts the PPP negotiation with a configure request, the router gladly negotiates PPP again, and everything is fine.

Investigate the use of LCP echo packets. The router periodically sends an LCP echo request packet. If the router does not receive an LCP echo reply, it thinks the link is down and re−negotiates PPP. It continues to try (since it is dedicated) until it establishes a connection.

Q. These gray cables seem to cause a problem with my CSU/DSU. I attempted to run sync to a new 900i, but the router log says "tx test failed."

A. This error generally means that the router cannot communicate with the DSU. Check the cable connection. The grey cable has a locking mini DIN−8 connector. You must pull back on the gray barrel while you insert it into the female connector on the back of the router. When

you release the barrel, it snaps back and locks the connector in place.

Also verify that both the router and the DSU are set for synchronous operation.

Q. What is the difference between RJ48 and RJ45?

- RJ48 has a keyed connector and a notched jack.
- RJ45 does not have a key or a notch.
- Both have 8 pins.

Although an RJ45 connector fits an RJ48 jack, the key on an RJ48 connector does not allow it to plug into an RJ45 jack.

Q. I cannot get PPP to negotiate between a router set to async at a baud rate of 115200 and Hardware Flow Control on when it connects with a 3Com ISDN Impact modem. This is what is reported in the router log: `WAN: scr(lcp) id xx WAN: timeout(lcp) WAN: scr(lcp) id xx WAN: timeout(lcp).`

A. scr(lcp) is a send config request from the router to the other side. lcp (link control protocol) is the lowest layer of PPP, and it must be established before any of the other layers, such as TCP/IP (ipcp). The router sends the configure request but does not receive an answer back from the other side, either a rcX (receive config Ack or Nack) or an rcr (receive config. request). It times out after four seconds. After it tries ten times, it disconnects and tries to connect again.

The router sends its data to start the PPP negotiations, but is does not receive a response from the other side. Look at the log from the other router to see if it sees this config request (probably not). Suspect the ISDN line. Is the 3Com set for "DCD follows state of connection"? It needs to be set for asynchronous operation.

Q. I'm an ISP that runs Linux 1.2.13 as the termserver and the 900i as the router. My PPP users cannot upload to an FTP site; download works fine. PPP users that run FTP servers say nobody can download from them. SLIP users do not have this problem. This PPP problem only seems to happen when it deals with Internet users and sites. Local dial−up users can upload/download to any other dial−up user. Only binary files are affected but text files are fine.

A. It sounds like this can be a Maximum Receive Unit (MRU) problem. The MRU for PPP is 1500 bytes as specified in RFC1661. If another one of your routers or PPP clients sends packets larger than this, the 900i or any other Compatible Systems router does not accept them.

If you run async, make sure that you use Hardware Flow Control for the WAN port.

Q. There does not seem to be any dialing that takes place. Here is the router log:`WAN: chat log 2d 30 39 37 33 0d 0d 0a 4e 4f 20 44 49 41 4c 20 −0973...NO DIAL WAN: chat log 54 4f 4e 45 0d 0a TONE.. Begin Script Send atdt 9−703−749−0973`

A. The modem does not get a dial tone from the phone line. Try this in your chat script:

```
send atdt 9,1−703−749−0973
```

The comma causes a pause while the PBX switches to an outside line.

Q. I tried to set up a dedicated line to a local ISP with a RAD ASM−20 and a MicroRouter 900i. The WAN port is already in sync mode. The ASM−20 only supports 32K, 48K, 64K and 128K. How do I set the baud rate of the router to 64K since that is the speed of the CSU/DSU?

A. The router receives the clock from the CSU/DSU. Based on that clock, we transmit data. We do not need to know the speed.

Q. Is it possible to do a loopback test with a Compatible Systems router?

A. Routers do not typically do loopbacks. That is a CSU/DSU function, but if the CSU/DSU has a DTE loopback mode and can pass the clocking off of the line (or provide their own), you can view the router log and see if the router gets back what it sends.

Set the log level to **Debug** since this provides you with the most information.

There is a way you can tell whether packets make a round trip between two routers. Bring up the router log at your end and watch it as the modem or CSU at the other end is set to loop packets back to you. You see this:

```
Notice +0.1: Wan1: scr(lcp) id 128
(Send Configure Request, id 128)
Info +0.2: mru=1724
magic=0xb8442f28
pfc
acfc
```

It is followed by this:

```
Notice +0.1: Wan1: rcr(lcp) id 128
(Receive Configure Request, same id)
Info +0.2: mru=1724
magic loopback=0xb8442f28
pfc
acfc
```

This is the same packet you sent that is looped back to you. Your router sees this and inserts the word "loopback" after "magic."

If the loopback worked correctly, the "magic loopback" hexadecimal number is the same as the packet that went out.

If the loopback did not work, you see this:

```
Notice +3.97: Wan1: timeout(lcp)
```

This means that the modem or CSU at the other end did not receive and loop the packet.

Q. What does this log information mean?Info +2303.0: WAN1: chat expect timeout Info +1.5: WAN1: chat send'+++\c' Info +2.0: WAN1: chat send 'ath' Info +0.5: WAN1: chat expect 'OK' Debug +30.0: WAN1: chat log ef ff cf ff cf ff Info +0.0: WAN1: chat expect timeout

A. The "ef ff cf ff cf ff" looks to be a baud rate mismatch. Most modern modems auto−sense the DTE speed and use that to communicate with the router. Try to cycle power on the modem. In order to test, set the baud rate of the router to 9600 or 19200. If you are able to connect at these baud rates, you must check the configuration and settings of the modem.

Set the WAN hardware setting of the router to asynchronous, 115200 baud, and Hardware Flow Control. Set your modems to asynchronous. Do the modems auto−sense for the DTE (the WAN/serial interface of the router) speed? For proper results, you must always use the WAN cable that was supplied with your Compatible Systems router.

Q. What dies the router do to the modem when I first power it on in ASYNC AT dialing mode? Should I put a command or initialization string in the chat script?

A. Compatible routers automatically send a number of AT commands to the modem upon bootup in order to get the modem set up properly for the link. You do need to watch out for DIP switches.

```
ath − Making sure the modem is not on the phone line (hang up)
atv1 − Return verbal result codes (as opposed to numerical result codes)
at2=43 − Set escape character to '+' (used for hanging up)
ats12=50 − Set escape guard time to 1 second (used for hanging up)
at&d0 − Ignore DTR
ate1 − Turn local echo on (so we can see the commands typed)
atq0 − Report status messages
at&c1 − Begin testing of DCD (carrier detect) [normal dcd]
at&c0 − Testing Contiunued [force dcd]
at&c1 − Testing done and final setting [normal dcd]
ats0=1 − Set auto answer ring count to 1 if dial−in is enabled
```

Should I put a command or initialization string in the chat script? In general, no. The only case you might do this is if your modem does not save settings. Some command strings introduced in the chat script can modify the settings of the modem to a point where the router either dislikes the configuration or is confused about it. One of the worst commands to enter is one that resets the modem to factory defaults such as "at&f". Many modems do things like toggle the dcd (carrier detect), which cause the router to be confused as to whether it is online or not. If possible on your modem, save any settings that you want into the Flash ROM of the modem and leave any initialization strings out of the chat script.

DIP switches are another matter. They often override the AT commands and cause problems on the router. Here is how most DIP switches are set so as not to interfere with the router/modem communication:

```
DTR Normal
Verbal Result Codes
Display Result Codes
Echo Offline Commands
Auto Answer On Ring
Normal Carrier Detect
```

```
Display All Result Codes
Enable AT Command Set
Disconnect With +++
Load &F0 Settings
```

Related Information

- **Technical Support & Documentation − Cisco Systems**

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