



TECHNICAL SUPPORT NOTE

Configuring PRI to Feature Group D

Introduction

The Adtran Atlas 550 and 800 series products support both Primary Rate ISDN (PRI) and T1 Robbed Bit Signaling (RBS) services. PRI provides up to 23 bearer (B) channels and one signaling channel (D channel). The ATLAS T1/PRI interface uses a standard RJ-48C connector. T1 connections provide up to 24 DS0 channels and use the RBS scheme to pass call signaling status information. The Atlas can be used to connect PRI circuits to Customer Premise Equipment (CPE) such as PBXs, Key Systems, Video Conferencing Systems, or FAX servers that only have T1 interfaces or require costly upgrades for PRI connections.

In switching applications, the ATLAS uses a simple configuration scheme known as the **Dial Plan**. There are two parts to the **Dial Plan: Network Term** and **User Term**. Typically, the **Network Term** will be the service line provided by the Telco or the line that interfaces with the public network. The **User Term** is most often the interface used to connect other customer premise equipment to the Atlas.

This guide will walk you through configuring the Atlas for PRI to Feature Group D signaling. This guide should be used when the Atlas is terminating a PRI from a telephone company and providing a Feature Group D T1 RBS connection to a CPE device. Feature Group D allows for Calling Party (ANI) and Called Party (DNIS) information to be sent to the CPE device. This is a common application to devices such as alarm receivers. The ANI and DNIS information is sent via DTMF tones.

Before You Begin

Before you begin configuration of the Adtran Atlas, you need some basic information.

1. Information needed from the PRI service provider:
 - a. Switch Type of the PRI line (Ex: National ISDN, DMS-100, 5ESS, or 4ESS)
 - b. Number of B channels in service and on which DS0s the B-channels reside (Note: D-channel MUST be on DS0 24)
 - c. Phone number(s) assigned to the PRI line
 - d. Number of digits being provided (Usually 4)
2. Information needed from the end user/customer:
 - a. Number of digits to be transferred to the end user equipment.
 - b. Ensure that they are looking for Feature Group D Signaling
 1. Feature Group D Signaling is similar to E&M Wink except for the fact that after receiving the Wink from the CPE device, the Atlas will transmit *ANI*DNIS* as DTMF tones.

Configuration of the ATLAS

We will first configure the PRI from the Carrier and then the T1 to the CPE. This guide assumes that you are using slots Network 1 and Network 2 for the configuration. You will need to change the

Slot/Port if you are using different slots and ports for your PRI/T1 connections.

Configuring the PRI

The PRI is configured in the **Network Term** portion of the **Dial Plan**.

Figure 1 shows an overview of the Network Term menu:

```

vlab.adtran.com - PuTTY
ATLAS 550/Dial Plan/Network Term
Network Term # Slot/Svc Port/PEP Sig Out#Accept Out#Rej Ifce Config
User Term 1 N1) T1/PRI-1 1) T1/PRI PRI [$] [+] [+]
Global Param

SYS: OK NETWK1:ONLN NETWK2:ONLN 1: -- 2:ONLN 3:TEST 4:ALRM
Terminations of connections to the network ^Z=help 15:57

```

Figure 1

1. Select the appropriate Slot and Port in the first two columns of the Network Term entry.
2. Leave Sig set to PRI (the default)
3. Hit <Enter> on the Out#Accept field. You will typically enter in '\$' for the Accept Number, which represents 'all calls'. Figure 2 shows the Out#Accept menu:

```
vlab.adtran.com - PuTTY
ATLAS 550/Dial Plan/Network Term[1]/Outgoing Number Accept List
Outgoing Number Accept List # Src ID Accept Number Search Data 64K Data
Outgoing Number Reject List 1 0 $ Primary Enabled Enab
Interface Configuration
Substitution Template

SYS: OK NETWK1:ONLN NETWK2:ONLN 1: -- 2:ONLN 3:TEST 4:ALRM
^Z=help 15:54
```

Figure 2

4. Arrow back out to the Network Term menu and go over to the Ifce Config column and hit <Enter>. Figure 3 is a screen shot of the menu and a brief description of each of the fields follows:

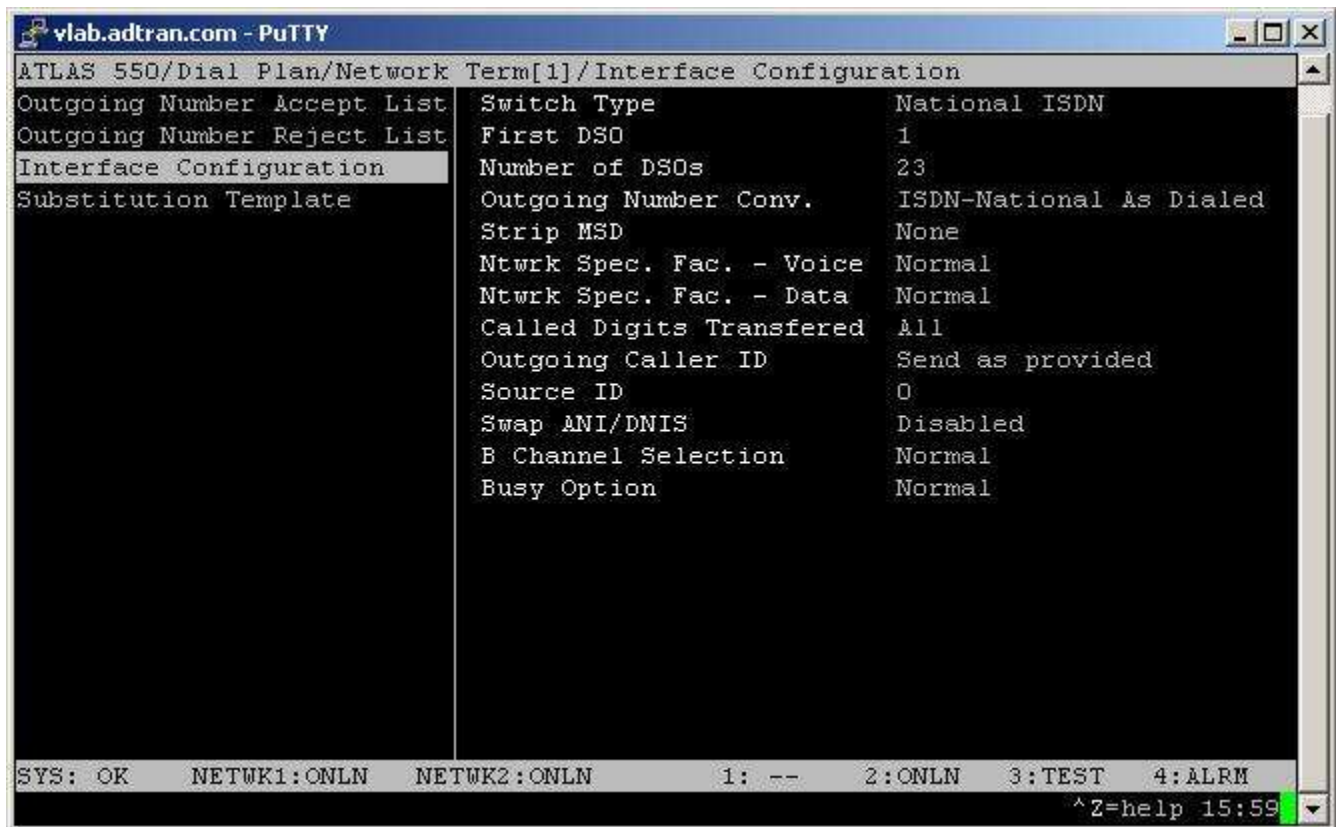


Figure 3

- a. Switch Type – This is the Switch Type that the carrier is supplying you. The possible options are National ISDN, Lucent 5E, Northern DMS 100, and AT&T 4ESS (National ISDN is normally used)
- b. First DSO – This needs to be the number of the first B-channel that is going to be in use (Usually 1)
- c. Number of DSOs – This is used to specify the number of DSOs to use including the first DSO (Usually 23 for a full PRI)
- d. Outgoing Number Conversion – This is used by the Atlas to format certain Setup message Information Elements when outbound calls are made on the PRI. Hitting the Ctrl key and the 'A' key at the same time will give you a brief description of each. ISDN-National As Dialed and As Dialed are the two most commonly used.
- e. Strip MSD – This field is rarely used but can be utilized to strip the Most Significant Digit(s) from an outbound call (Almost always set to None)
- f. Network Specific Facility – Voice/Data – These should be set to Normal unless the carrier explicitly requests that a Network Specific Facility be used
- g. Called Digits Transferred – Set to All to pass all digits to the Central Office
- h. Outgoing Caller ID – This can be used to override Caller ID information on outbound calls (Setting to Send As Provided will send the Caller ID information supplied by the PBX in the call setup process out to the carrier)
- i. Source ID – This can be used to further restrict/fine tune Switchboard behavior (This setting is rarely changed)
- j. Swap ANI/DNIS – This option will cause the Switchboard to use the Calling Party Number (ANI) to route the call rather than the Called Party Number (DNIS) on an inbound call (This setting is almost never enabled except in certain circumstances).
- k. B Channel Selection – This option determines how the Switchboard uses B

Channels for outbound Call Routing. Setting to Normal will always start with the highest available channel and work down. Setting to Circular will start with the highest channel and works its way down contiguously until it gets to channel 1 and then start over again. (Usually set to Normal to avoid glare issues with the Central Office)

- I. Busy Option – Not applicable to this configuration

Configuring the T1 Feature Group D Connection

The T1 is configured in the **User Term** portion of the **Dial Plan**.

Figure 4 shows an overview of the User Term menu:

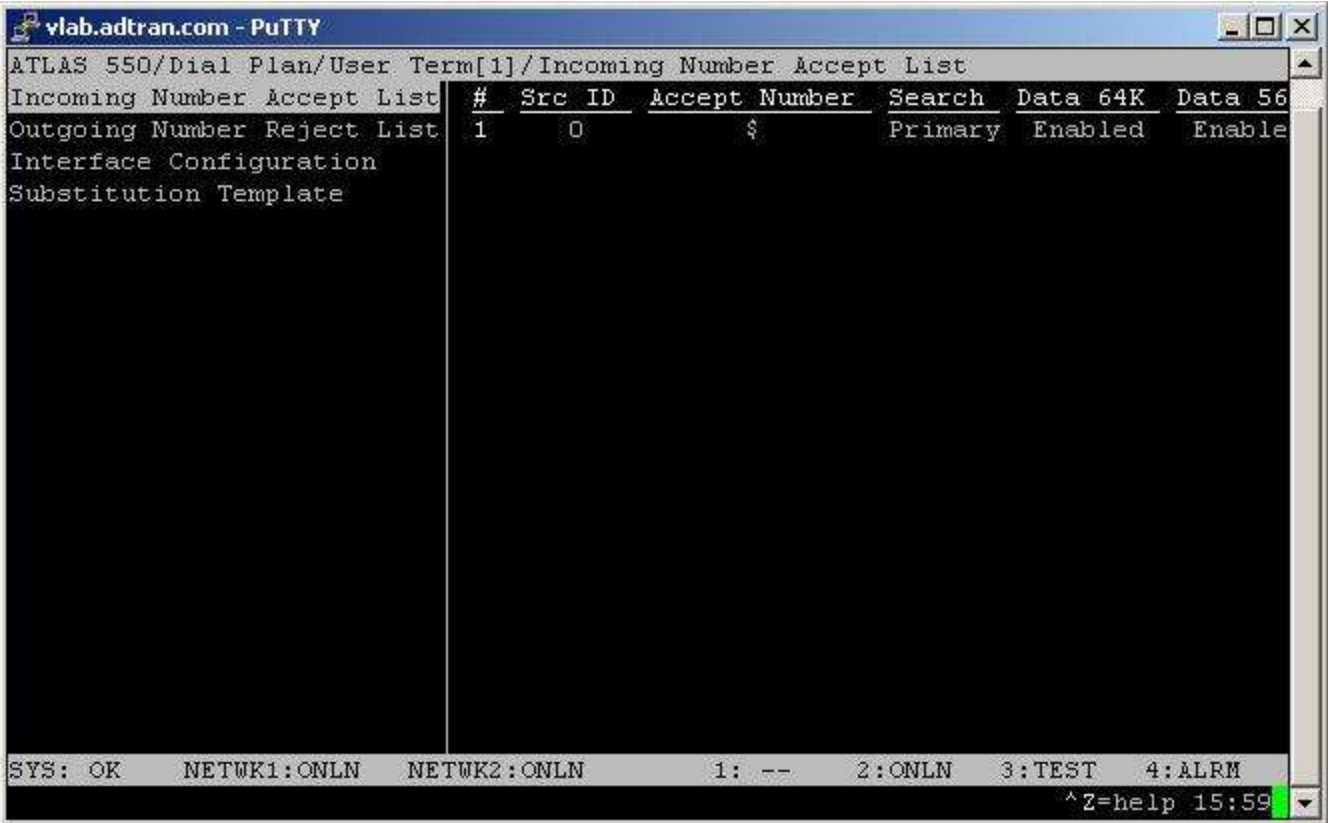
Network Term	#	Slot/Svc	Port/PEP	Sig	In#Accept	Out#Rej	Ifce Config
User Term	1	N2) T1/PRI-1	1) T1/PRI	RBS	[\$]	[+]	[1stDSO=1]
Global Param							

SYS: OK NETWK1:ONLN NETWK2:ONLN 1: -- 2:ONLN 3:TEST 4:ALRM

Termination of connections to user equipment ^Z=help 15:59

Figure 4

1. Select the appropriate Slot and Port in the first two columns of the Network Term entry.
2. Set the Sig column to 'RBS'
3. Hit <Enter> on the In#Accept field. You will typically enter in '\$' for the Accept Number, which represents 'all calls'. Figure 5 shows the In#Accept menu:



The screenshot shows a PuTTY terminal window titled 'vlab.adtran.com - PuTTY'. The terminal displays a configuration menu for 'Incoming Number Accept List'. The menu options are: 'Incoming Number Accept List', 'Outgoing Number Reject List', 'Interface Configuration', and 'Substitution Template'. A table is displayed with the following data:

Incoming Number Accept List	#	Src ID	Accept Number	Search	Data 64K	Data 56
Outgoing Number Reject List	1	0	\$	Primary	Enabled	Enable

Below the table, the terminal shows the following status information: 'SYS: OK', 'NETWK1:ONLN', 'NETWK2:ONLN', '1: --', '2:ONLN', '3:TEST', '4:ALRM'. The bottom right corner of the terminal shows '^Z=help 15:59'.

Figure 5

4. Arrow back out to the User Term menu and go over to the Ifce Config column and hit <Enter>. Figure 6 is a screen shot of the menu and a brief description of each of the fields follows:

```

vlab.adtran.com - PuTTY
ATLAS 550/Dial Plan/User Term[1]/Interface Configuration
Incoming Number Accept List  First DSO          1
Outgoing Number Reject List Number of DSOs     24
Interface Configuration     DSOs Available    !!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Substitution Template       Signaling Method   Feature Group D
                             FGD Tx Sequence   ANI/DNIS
                             FGD Rx Sequence   ANI/DNIS
                             Wink After ANI/DNIS Disabled
                             Direct Inward Dialing Enabled
                             DID Digits Transferred 4
                             Strip MSD           None
                             Source ID           0
                             DSO Selection       Normal
SYS: OK  NETWK1:ONLN  NETWK2:ONLN  1: --  2:ONLN  3:TEST  4:ALRM
^Z=help 16:00

```

Figure 6

- a. First DSO – This needs to be the number of the first B-channel that is going to be in use (Usually 1)
- b. Number of DSOs – This is used to specify the number of DSOs to use including the first DSO (Usually 24 for a full T1)
- c. Signaling Method – Will need to be set to ‘Feature Group D’ for this application
- d. FGD Tx/Rx Sequence – These options specify the DTMF tones Transmitted (Tx) on an inbound call to the CPE and Received (Rx) on an outbound call from the CPE. Options are Disabled (which doesn’t send anything), ANI/DNIS (which sends a pattern of *ANI*DNIS*), DNIS (which sends *DNIS*), and ANI (which sends *ANI*). Normally these are both set to ANI/DNIS. If the PBX is only expecting *ANI*DNIS* and is only going to transmit the DNIS information on an outbound call, set the Rx Sequence to just DNIS. If only inbound calls are going to be made, then the Rx Sequence option is not applicable.
- e. Wink After ANI/DNIS – This can be enabled if the CPE device requires a wink after the Atlas receives the *ANI*DNIS* pattern on an outbound call (Normally this is disabled).
- f. Direct Inward Dialing – This option should be Enabled to allow the transmission of DNIS digits to the CPE on an inbound call.
- g. DID Digits Transferred – This option allows you to specify how many DNIS digits will be sent to the CPE device. This should correspond to how many digits the carrier is supplying you with on the PRI (usually 4).
- h. Strip MSD – This field is rarely used but can be utilized to strip the Most Significant Digit(s) from an inbound call to the CPE device (Almost always set to None)
- i. Source ID – This can be used to further restrict/fine tune Switchboard behavior (This setting is rarely changed)

- j. DSO Selection – This option determines how the Switchboard selects DSOs on this interface during Call Routing. The Normal (default) setting means that calls being delivered to this interface will be put on the lowest available channel. The Circular setting will cause the call to be routed out contiguous DSOs starting with DSO 1 and working up. The Aligned setting cannot be used in this application

Configuring the Primary Timing Source

The primary timing source will most likely need to be set to the module terminating the PRI from the carrier (in this scenario, Network 1). To configure this, go to the System Config menu and press <Enter> on the Primary Timing Source selection (Internal by default) and navigate to the Network 1 entry as shown in Figure 7:

```

vlab.adtran.com - PuTTY
ATLAS 550/System Config/Primary Timing Source
System Info      Primary Timing Source  T1/PRI          Slot:Ntw1 Port:1 T1/PRI-
System Status    Backup Timing Source   INTERNAL
System Config    ADLP Address           9999
System Utility   Session Timeout        0
Modules          Max Telnet Sessions    12
Packet Manager   E
Router           C
Dedicated Maps   S
Circuit Status   E
Dial Plan        S
                 R
                 A
                 L
                 B
                 A
                 Alarm Relay Threshold Major
T1/PRI          Slot:Ntw1 Port:1 T1/PRI-1
System timing source
^Z=help 16:06

```

Figure 7

Physical Wiring

The PRI from the carrier should be plugged into the Network 1 module using a standard straight-through Cat-5 cable. One of the gray cables that come with the Atlas will work for this. The T1 to the CPE device will most likely need to be a T1 Cross-over cable. It will need to be plugged into the Network 2 module. One of the red cables that come with the Atlas will work for this. The pin out for this cable is Pin 1 to Pin 4 and Pin 2 to Pin 5 and vice versa on the other end.

After connecting all the wires and configuring the Atlas, there should be no alarms on the front of the unit. If there are, then these will need to be looked at in the Modules menu. If there are no alarms and calls are not routing, then further debugging will be needed to find out the cause of the problem.

If you experience any problems using your ADTRAN product, please contact [ADTRAN Technical Support](#).

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