

AR7 ADSL CPE Software

AR7 ADSL Feature Control API Application Note



Important Notice: The products and services of Texas Instruments and its subsidiaries described herein are sold subject to our standard terms and conditions of sale. Customers are advised to obtain the most current and complete information about TI products and services before placing orders. TI assumes no liability for applications assistance, customer's applications or product designs, software performance, or infringement of patents. The publication of information regarding any other company's products or services does not constitute our approval, warranty or endorsement thereof.

Copyright © 2003-2005 Texas Instruments Incorporated.

Texas Instruments Incorporated
San Jose, CA

IMPORTANT NOTICE

Texas Instruments (TI) reserves the right to make changes to its products or to discontinue any semiconductor product or service without notice, and advises its customers to obtain the latest version of relevant information to verify, before placing orders, that the information being relied on is current and complete.

TI warrants performance of its semiconductor products and related software to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

Certain applications using semiconductor products may involve potential risks of death, personal injury, or severe property or environmental damage ("Critical Applications").

TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, INTENDED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT APPLICATIONS, DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS.

Inclusion of TI products in such applications is understood to be fully at the risk of the customer. Use of TI products in such applications requires the written approval of an appropriate TI officer. Questions concerning potential risk applications should be directed to TI through a local SC sales office.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards should be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or services described herein. Nor does TI warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used.

- 1 INTRODUCTION1**
- 1.1 REFERENCES..... 1
- 1.2 GLOSSARY..... 1
- 2 OVERVIEW1**
- 3 DESCRIPTION OF DSL FEATURE CONTROL BIT-FIELDS.....2**
- 4 USING THE FEATURE CONTROL API WITH NSP 3.6.0C.....3**
- 4.1 USING MONTA VISTA© TOOL CHAIN.....3
- 4.2 NOT USING MONTA VISTA© TOOL CHAIN3
- 5 EXAMPLES.....4**
- APPENDIX A USING TELNET TO INITIALIZE BOOTLOADER ENVIRONMENT VARIABLES5**

Revision History

Revision	Date	Description	Author
0.1	2/28/2005	First draft	TI
0.5	3/13/2005	Final draft for review	TI
1.0	3.16.05	First release version with reformat and edits	TI
1.1	3.18.05	Minor edits	TI
1.2	4.6.05	Added new bitfield in environment variable	TI
1.3	5.25.05	Added new bitfields in environment variable that controls SafeMode and control of upstream rates against ADI-based CO's	TI
1.4	8.3.05	Added new bitfields in environment variable that improve ADSL2+ downstream rate for Ohio chipset and control of connection when out-of-band RFI noise is exist.	TI

1 Introduction

This document describes the use of a mechanism to facilitate control of specific DSL PHY features using environment variables. This document is of relevance if you are using NSP version 3.6.0C and plan to upgrade to AR7 datapump version D4.0 which is the first datapump version to incorporate this functionality. Texas Instruments, as part of its interoperability strategy, will continue to expand its interoperability portfolio, some of which will be controlled via the mechanism documented herein.

Customers are advised to use the latest version of this application note with datapump releases beginning with D4.0.

1.1 References

[1] *Linux NSP Build and Configuration Guide, Release 3.6.0C NSP [Document number NSP-001357, Revision F]*

1.2 Glossary

PSP Platform Support Package
NSP Network Support Package

2 Overview

Desired DSL features can be controlled via bootloader environment variables using the syntax:

```
“DSL_FEATURE_CNTL_<n> <32-bit mask in Hex>”
```

where, <n>=0 or 1

As an example,

```
setenv DSL_FEATURE_CNTL_0 0x000200AC  
setenv DSL_FEATURE_CNTL_1 0x00F200F1
```

The features controlled by this mechanism are defined in Table 1.

3 Description of DSL Feature Control bit-fields

Beginning with AR7 datapump version D4.0, the features described in Table 1 will be controlled via pre-defined bit-fields in DSL_FEATURE_CNTL environment variables.

DSL_FEATURE_CNTL_<n> environment variables	Bit-field	Definition and description
DSL_FEATURE_CNTL_0	0	0 = The CPE is allowed to retrain and connect in T1.413 mode against a Globespan Rev 2 CO (default) 1 = Force the CPE to train in G.992.1 mode against a Globespan Rev 2 CO.
	1	0 = Disabled (default) 1 = Enable upstream CRC reduction feature against ADI CO on short loops. This bit should be enabled when deploying at CANTV
	2	0 = Disabled (default) 1 = Enable T1413 activation on longer loops. This bit should be enabled when deploying at Qwest or Turkey Telecom
	3	0 = Disabled (default) 1 = Enable higher upstream data rates on Qwest bridge tap loops against Alcatel CO. This bit should be enabled when deploying at Qwest.
	4	0 = Disabled (default) 1 = Enable upstream high BER fix when deploying at Alcatel Shanghai Bell.
	5	0 = Disabled (default) 1 = Enable fixes for Bell Canada double bridge tap loops. This bit should be enabled when deploying in Bell Canada
	6	0 = Disabled (default) 1 = Enable fixes for Belgacom under noise conditions unique to Belgacom
	7	0 = Disabled (default) 1 = Enable fixes for Cincinnati Bell. See Note 1. This bit should be enabled when deploying in Cincinnati Bell
	8	0 = Disabled (default) 1 = Enable fixes for France Telecom. This bit should be enabled when deploying in France Telecom. See Note 1.
	9	0 = Disabled (default) 1 = Enable fixes for Qwest upstream rate qualification requirements. This bit should be enabled when deploying at Qwest if there is a requirement to support upstream rates beyond the default of 896kbps.
	10	0 = Allows the CPE to fall back to ADSL1 (Safe Mode) if the CO does not respond to ADSL2/2+ CLR correctly during G.hs (Default). 1 = Disables Safe Mode (i.e. the CPE is not allowed to fall back to ADSL1) during G.hs
	11	0 = Disable upstream rate fix if the CO uses ADI chipset Anaconda, 930 or 918. Stability is improved at the expense of lower upstream rates (Default). 1 = Enable upstream rate fix if the CO uses ADI chipset Anaconda, 930 or 918. Please use discretion when enabling this bit as upstream rates will improve but at the expense of (reduced) upstream stability.

	12	0 = Disabled (default) 1 = Enable improving ADSL2+ data rate for 7200 chipset (Ohio) by enable HYBRID4 in RxPath. This bit should be enabled only if the 7200 board has an AFE with the proper HYBRID4 modifications. Enable this bit on non-7200 chipset has no effect.
	13	0 = Disabled (default) 1 = Enable fix when connection can not be established due to existence of out-of-band RFI noise. The analog equalizer will be forced flat, this helps prevent boost in the higher end of the downstream spectrum, which is contaminated with aliased RF. Please use discretion when enabling this bit. If there is no out-of-band RFI present, it can cause degradation of downstream rate.
	31:14	Reserved
DSL_FEATURE_CNTL_1	31:0	Reserved

Table 1 DSL Feature Control bit-field definition

Note 1: The API bits for Cincinnati Bell and France Telecom should not be turned on at the same time.

4 Using the Feature Control API with NSP 3.6.0C

If you wish to avail of the feature control API and are currently using TI's NSP version 3.6.0C, TI will ship a new ATM driver object file (tiatm.o). The following sections explain the proper sequence of operations to use this new ATM driver object file. Please note that this functionality will only work if you are using datapump version D4.0 or beyond.

The sequence described in the next few sections assumes that you are building an NSP image for PSP boot and that the root NSP directory is <nsp>.

4.1 Using Monta Vista® tool chain

Step 1:

Build the entire NSP 3.6.0C image as described in [2]. Ensure that the "no_tools_build" step has completed.

Step 2:

Replace the old ATM driver object file (found under <nsp>\src\kernel\linux-2.4.17_mvl21\drivers\atm\ (tiatm.o) with the new ATM driver object file (tiatm.o).

Step 3:

Re-create the file-system and the NSP image by running 'make filesystem'

4.2 Not using Monta Vista® tool chain

You will use the no_tools_build script to build an NSP image.

Step 1:

Build the entire NSP 3.6.0C image as described in [2].

Step 2:

Replace the old ATM driver object file (found under `<nsp>/no_tools/filesystem/lib/modules/2.4.17_mvl21-malta-mips_fp_le/kernel/drivers/atm/tiatm.o`) with the new ATM driver object file (tiatm.o).

Step 3:

Re-create the NSP image by running `'no_tools_build'` shell script again.

5 Examples

1. To disable the CPE from training in G.992.1 mode against a Globespan Revision 2 DSLAM, use the following command:

```
setenv DSL_FEATURE_CNTL_0 0x00000001
```

2. To enable a mode to reduce upstream CRC's against ADI-based DSLAM's at short loops, use the following command:

```
setenv DSL_FEATURE_CNTL_0 0x00000002
```

3. To disable the CPE from training in G.992.1 mode against a Globespan Revision 2 DSLAM and to enable a mode to reduce upstream CRC's against ADI-based DSLAM's at short loops, use the following command:

```
setenv DSL_FEATURE_CNTL_0 0x00000003
```

Appendix A Using Telnet to initialize bootloader environment variables

This section explains the use of Telnet to set bootloader (PSP Boot or ADAM2) environment variables, DSL_FEATURE_CNTL_0 and DSL_FEATURE_CNTL_1. Please note that Telnet is only available when NSP is running.

The screen-shot at the end of this section is intended to capture the commands issued in the instructions below.

Step 1:

Telnet into IP address **192.168.1.1** with the following information:

login = **root**

Password = **Admin**

Step 2:

If your hardware returns a prompt of “cli>”, type “shell” to enter the shell. A shell prompt will be displayed with “#”.

Step 3:

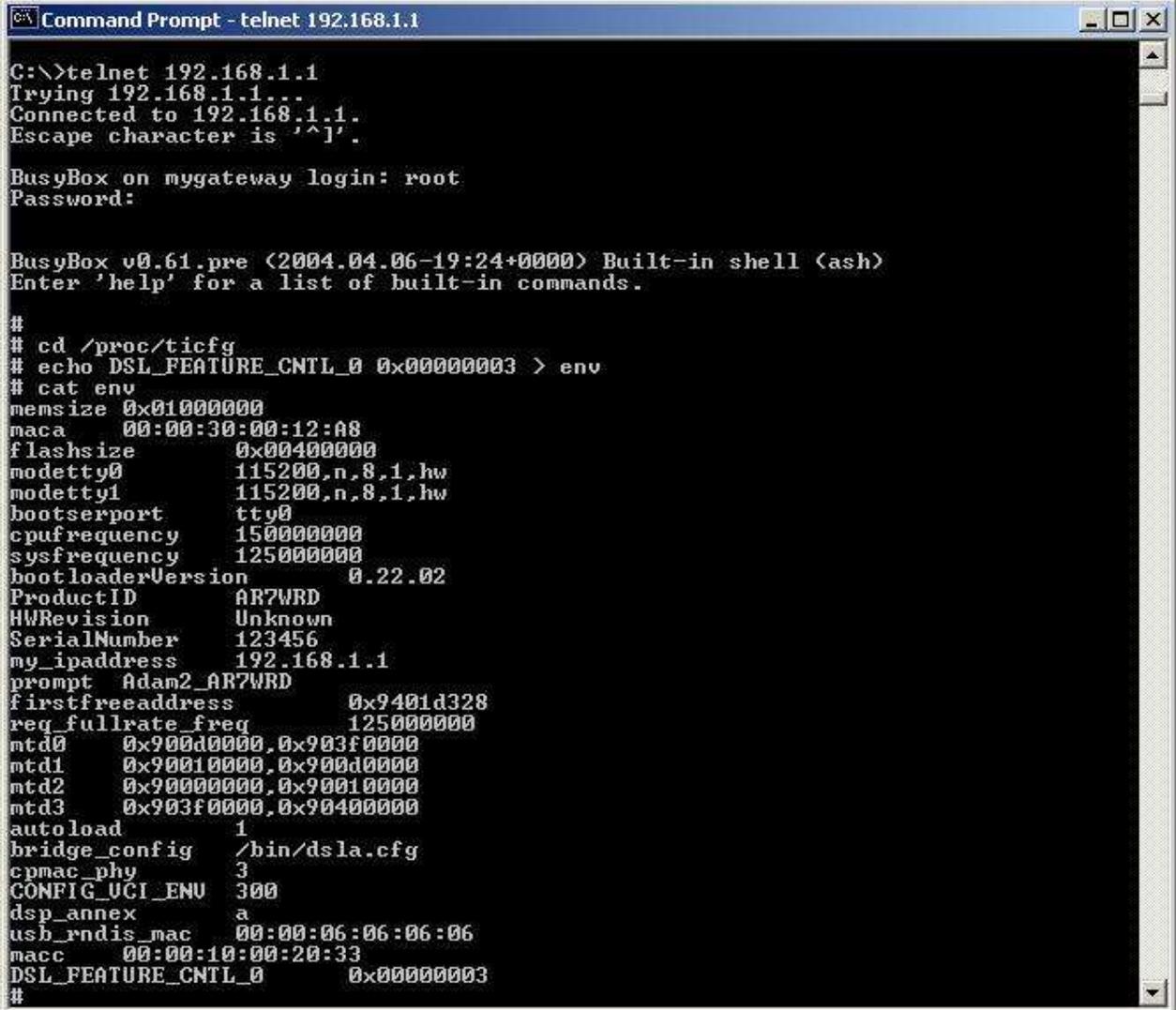
Use the echo command to set DSL_FEATURE_CNTL_<n> environment variables through the proc file system. The commands will resemble the following sequence:

```
#  
# cd /proc/ticfg  
# echo DSL_FEATURE_CNTL_0 0x00000003 > env
```

Step 4:

This is an optional step and should be used to display the current bootloader environment variable setting.

```
#  
# cat env
```



```
Command Prompt - telnet 192.168.1.1
C:\>telnet 192.168.1.1
Trying 192.168.1.1...
Connected to 192.168.1.1.
Escape character is '^I'.

BusyBox on mygateway login: root
Password:

BusyBox v0.61.pre (2004.04.06-19:24+0000) Built-in shell (ash)
Enter 'help' for a list of built-in commands.

#
# cd /proc/ticfg
# echo DSL_FEATURE_CNTL_0 0x00000003 > env
# cat env
memsize 0x01000000
maca 00:00:30:00:12:A8
flashsize 0x00400000
modetty0 115200,n,8,1,hw
modetty1 115200,n,8,1,hw
bootserport tty0
cpufrequency 150000000
sysfrequency 125000000
bootloaderVersion 0.22.02
ProductID AR7WRD
HWRevision Unknown
SerialNumber 123456
my_ipaddress 192.168.1.1
prompt Adam2_AR7WRD
firstfreeaddress 0x9401d328
req_fullrate_freq 125000000
mtd0 0x900d0000,0x903f0000
mtd1 0x90010000,0x900d0000
mtd2 0x90000000,0x90010000
mtd3 0x903f0000,0x90400000
autoload 1
bridge_config /bin/dsla.cfg
cpmac_phy 3
CONFIG_UCI_ENVU 300
dsp_annex a
usb_rndis_mac 00:00:06:06:06:06
macc 00:00:10:00:20:33
DSL_FEATURE_CNTL_0 0x00000003
#
```