Cisco Multimode VDSL2 and ADSL2/2+ High-Speed WAN Interface Card

Cisco® Integrated Services Routers Generation 2 (ISR G2) routers offer a wide variety of WAN connectivity modules to accommodate a wide range of application needs in customer network deployments. The Cisco Multimode VDSL2 and ADSL2/2+ Enhanced High-Speed WAN Interface Card (VDSL2 and ADSL2/2+ EHWIC) supports DSL multimode, including very high speed DSL (VDSL2) and asymmetric DSL (ADSL2/2+) over plain old telephone service (POTS) or an integrated services digital network (ISDN). VDSL2 and ADSL2/A2+ are supported on a single WAN interface and thus this card provides a secure, cost-effective solution for a wide range of customers ranging from teleworkers and small businesses to large enterprise branch offices.

Product Overview

The Cisco Multimode VDSL2 and ADSL2/2+ EHWIC (EHWIC-VA-DSL) provides 1-port multimode VDSL2 and ADSL2/2+ WAN connectivity (Figure 1). In combination with the Cisco 1921 and 1941 Integrated Services Routers (ISRs) and Cisco 2900, 3900, and 3900E Series ISRs, this EHWIC provides high-speed digital data transmission between customer premises equipment (CPE) and the central office (DSL access multiplexer [DSLAM]), usually located on the telephone company premises. This capability enables service providers and resellers to offer additional services such as business-class security; voice, video, and data; differentiated classes of service (QoSs); and managed network access with Cisco IOS® Software over existing telephony infrastructure. These value-added features, along with the flexible manageability and reliability of Cisco IOS Software, provide the mission-critical networking features that businesses expect.

With Cisco IOS 15.1(3)T/15.1(4)M and later releases, the 1-port multimode VDSL2 and ADSL2/2+ EHWIC is supported on the following Cisco ISR G2 routers: Cisco 1861E, 1921,1941, 2901, 2911, 2921, 2951, 3925, 3945, 3925E, and 3945E ISRs. The Cisco 1861E ISR is supported starting with Cisco IOS Software Release 15.1(4)M.

Figure 1.   Single-Port EHWIC Supports VDSL2 and ADSL2/2+ for WAN Connectivity
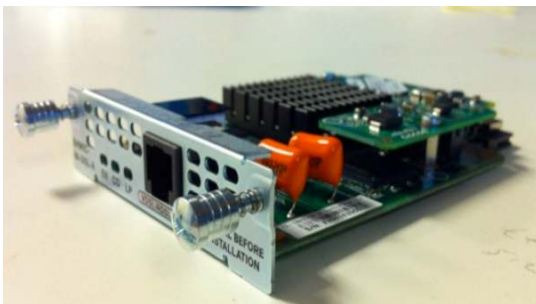
DSL Specifications

Tables 1 through 4 list the DSL feature specifications and DSLAM interoperability support for the Cisco Multimode VDSL2 and ADSL2/2+ EHWIC WAN card. For more information and details about DSLAM and WAN card interoperability, please refer to the following document: [Cisco ISR and ISR G2 xDSL Interoperability](). Table 5 lists the product dimensions.

Table 1. DSL Features Specifications

DSL Specifications	

Multimode DSL (VDSL2 and ADSL2/2+)	• Broadcom chipset
	• One RJ-11 VDSL2 interface
	• Dying gasp
	• IEEE 802.1q VLAN tagging
	• Independent DSL firmware loading
	VDSL2:
	• ITU G.993.2 (VDSL2)
	• 997 and 998 band plans
	• VDSL2 profiles: 8a, 8b, 8c, 8d, 12a, 12b, and 17a
	• U0 band support (25 to 276 kHz)
	• Ethernet packet transfer mode (PTM) based only on IEEE 802.3ah 64/65 octet encapsulation
	• Support for double-ended line testing (DELT) diagnostics mode
	• DSL Forum TR-067 compliance
	• Support for downstream speeds up to 100 Mbps in Ethernet PTM and up to 50 Mbps upstream
	ADSL2/2+:
	• ADSL over POTS with Annex A and Annex B ITU G. 992.1 (ADSL), G.992.3 (ADSL2), and G.992.5 (ADSL2+)
	• ADSL over POTS with Annex M (extended upstream bandwidth) G.992.3 (ADSL2) and G.992.5 (ADSL2+)
	  ○ Cisco Multimode VDSL2 and ADSL2/2+ EHWIC (EHWIC-VA-DSL-M) is optimized for power spectrum density (PSD) mask EU-64 M9
	  ○ Cisco Multimode VDSL2 and ADSL2/2+ EHWIC (EHWIC-VA-DSL-M) supports UK Annex M
	• G.994.1 ITU G.hs
	• Reach-extended ADSL2 (G.922.3) Annex L for increased performance on loop lengths greater than 16,000 feet from central office
	• T1.413 ANSI ADSL DMT issue 2 compliance
	• DSL Forum TR-067, and TR-100 conformity
	• Impulse noise protection (INP) and extended INP
	• Downstream power backoff (DPBO)
	• Asynchronous transfer mode (ATM) only

Table 2. VDSL2 over ISDN DSLAM Interoperability for Cisco Multimode VDSL2 and ADSL2/2+ EHWIC (EHWIC-VA-DSL-A, EHWIC-VA-DSL-B, and EHWIC-VA-DSL-M)

DSLAM	VDSL2 over ISDN and Basic Telephone Service Line-Card Chipset
ZTE 9806	Broadcom
Alcatel ISAM 7302	Ikanos
Alcatel ISAM 7302	Conexant
Huawei 5603	Broadcom

Table 3. ADSL over ISDN DSLAM Interoperability for Cisco Multimode VDSL2 and ADSL2/2+ EHWIC (EHWIC-VA-DSL-B)

DSLAM	ADSL2/2+ over ISDN Line-Card Chipset
Alcatel ASAM7300	Broadcom
ECI Hi-Focus 480	Infineon
Ericsson ECN320	Broadcom
Siemens HiX 5300	Infineon

Table 4. ADSL over POTS DSLAM Interoperability for Cisco Multimode VDSL2 and ADSL2/2+ EHWICs (EHWIC-VA-DSL-A and EHWIC-VA-DSL-M)

DSLAM	ADSL2/2+ over Basic Telephone Service Line-Card Chipset
Alcatel ASAM7300	Broadcom
Alcatel ISAM 7302	Broadcom
Ericsson EDA2.1	Broadcom
ECI Hi-Focus 480	Infineon
Fujitsu FDX Hub 1000	Infineon
Fujitsu FDX Hub 1000	Texas Instruments
Huawei MA5600	Conexant
Lucent Stinger	Conexant
Nokia D500	Globespan

Table 5. Cisco Multimode DSL (VDSL2 and ADSL2/2+) EHWIC Dimensions and Weight

	EHWIC-VA-DSL
Width	3.08 in. (7.82 cm)
Height	0.766 in. (1.91 cm)
Depth	4.388 in. (11.08 cm)
Weight	0.20 lb (91g)

Applications

Business-Class DSL with WAN Backup

The Cisco 1900, 2900, and 3900 Series ISRs offer multiple WAN slots. These routers can be configured with an EHWIC-VA-DSL card for primary WAN access, providing redundancy for mission-critical applications. The WAN flexibility in these platforms enables the EHWIC-VA-DSL card to be swapped for any applicable HWIC or EHWIC, depending on business need.

Banking Application

In this scenario, a bank branch office uses the Cisco 2911 with an EHWIC-VA-DSL card and ISDN Basic Rate Interface (BRI) WAN interface card (WIC) to provide primary and backup WAN access. In addition, the 8-port asynchronous and synchronous HWIC (HWIC-8A/S) can be used as a communication interface for ATM machines. This scenario uses the versatility of the Cisco 2911 to enable banking databases to synchronize ATM transactions without any interruption of WAN access, and it provides redundancy for other mission-critical applications.

Business-Class Security

The Cisco 1900, 2900, and 3900 Series routers with the EHWIC-VA-DSL card can be optimized for Internet security with the Cisco IOS Firewall, supporting stateful-inspection-firewall and intrusion-prevention-system features. With an always-on DSL connection, Internet security is crucial to protecting corporate resources from malicious network attacks. You can enable these features on the modular routers by purchasing the optional Cisco IOS Software with the Advanced Security or later feature set.

These platforms can also be optimized for VPN to secure the Internet for communications with the same policies and levels of security and performance as a private network. VPNs provide security through encryption tunneling, and the Cisco routers support hardware-based Triple Data Encryption Standard (3DES), IP Security (IPsec), and Advanced Encryption Standard (AES).These advanced encryption features can be enabled on Cisco ISRs by purchasing an optional Cisco IOS Software Advanced Security feature license.

Application-Aware Networking with IP Quality of Service

Using Cisco quality-of-service (QoS) features, including Class-Based Weighted Fair Queuing (CBWFQ), Low-Latency Queuing (LLQ), Weighted Random Early Detection (WRED), etc., Cisco 1900, 2900, and 3900 Series routers with the Cisco Multimode VDSL2 and ADSL2/2+ EHWIC can help service providers and resellers offer services that can differentiate bandwidth based on the specific application or specific user. For example, network administrators can give traffic from a customer order entry priority over regular internal network traffic.

Performance

VDSL2 and ADSL2/2+ performance is a function of many variables, including the DSLAM line card, DSLAM software version, VDSL profile and band plan, line-noise conditions, and loop length, and other environmental factors.

Software Support

The 1-port Cisco Multimode VDSL2 and ADSL2/2+ EHWIC is supported on Cisco IOS Software Release 15.1(3)T. 15.1.4(M) and later releases on Cisco 1921, 1941, 2901, 2911, 2921, 2951, 3925, 3945, 3925E, and 3945E ISRs. The Cisco 1861E is supported starting with Cisco IOS Software Release 15.1(4)M.

The VDSL2 and ADSL2/2+ features are supported with the IP Base technology package license for the Cisco 1861E[*], 1921, and 1941 ISRs and the Cisco 2900 and 3900 Series routers.

Platform Support

Multimode DSL (VDSL2 and ADSL2/2+) EHWICs are supported only in the onboard EHWIC slots of the modular ISR G2 platforms. Table 6 provides platform support details.

Table 6.   Platform Support and Maximum Number of EHWICs per Platform

HWIC-1VDSL	Maximum Number of HWICs
Cisco 1861E	1
Cisco 1921, 1941, and 2901	2[*]
Cisco 2911, 2921, 2951, 3925, 3945, 3925E, and 3945Eb	4[*]

[*] Multiple-EHWIC-VA-DSL support per platform starts with Cisco IOS Software Release 15.1(4)M.

Product Number and Ordering Information

Table 7 gives ordering information for the Cisco Multimode VDSL2 and ADSL2/2+ EHWIC over ISDN and basic telephone service.

Table 7.   Multimode DSL (VDSL2 and ADSL2/2+) Ordering Information

Product Number	Description
EHWIC-VA-DSL-A	1-port VDSL2/ADSL2+ EHWIC over POTS
EHWIC-VA-DSL-B	1-port VDSL2/ADSL2+ EHWIC over ISDN

Product Number	Description
EHWIC-VA-DSL-M	1-port VDSL2/ADSL2+ EHWIC over POTS with Annex M
EHWIC-VA-DSL-A=	1-port VDSL2/ADSL2+ EHWIC over POTS spare
EHWIC-VA-DSL-B=	1-port VDSL2/ADSL2+ EHWIC over ISDN spare
EHWIC-VA-DSL-M=	1-port VDSL2/ADSL2+ EHWIC over POTS with Annex M spare

Cable Information

The straight-through cable is the default cable; it is included in the HWIC package. To accommodate external splitters, a crossover cable may be required; this can be ordered separately (part number CAB-ADSL-RJ11X=).

Cisco 1900, 2900, 3900, and 3900E Series Regulatory Approvals

When installed in the Cisco 1861E, 1900, 2900, and 3900 Series routers, the VDSL2 HWIC does not change the router standards (regulatory compliance, safety, EMC, and telecom).

Refer to the platform-specific links for regulatory compliance, safety, EMC, and telecom standards:

- For Cisco 1921 and 1941 Series ISRs: http://www.cisco.com/go/1900
- For Cisco 2900 Series ISRs: http://www.cisco.com/go/2900
- For Cisco 3900E Series ISRs: http://www.cisco.com/go/3900

For More Information

See the Cisco Multimode VDSL2 and ADSL2/2+ EHWIC Q&A at
http://www.cisco.com/en/US/prod/collateral/routers/ps10536/qa_c67-644632.html.