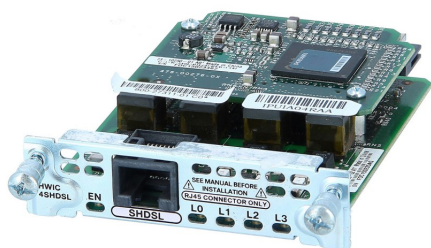# Cisco HWIC-4SHDSL Datasheet

Cisco HWIC-4SHDSL 4-pair G.shdsl HWIC with IMA support

HWIC-4SHDSL

Cisco HWIC-4SHDSL 4-pair G.shdsl HWIC with IMA support

The 2-pair (HWIC-2SHDSL) and 4-pair (HWIC-4SHDSL) symmetric high-bit-rate DSL high-speed WAN interface cards (HWICs) provide G.SHDSL connectivity to a Wide Area Network (Figures 1 and 2). The 4-pair symmetric G.SHDSL HWIC provides two ports of 4-wire or four ports of 2-wire connectivity options, whereas the 2-pair G.SHDSL HWIC provides two ports of 2-wire or one port of 4-wire connectivity options. The 4-pair symmetric G.SHDSL HWIC also allows bonding single or dual-pair G.SHDSL ports up to a single 8-wire interface with increased bandwidth by using Inverse Multiplexing over ATM (IMA) or data interleaving with M-pair mode. These cards are supported in all integrated services routers that have HWIC slots.

The 2-pair and 4-pair G.SHDSL HWICs supersede the existing G.SHDSL WAN Interface Card (part number WIC-1SHDSL-V3), which is a WIC-based G.SHDSL solution. The two new G.SHDSL HWICs provide higher performance and increased reach when compared to the G.SHDSL WIC. Table 1 compares the three interface cards.

G.SHDSL technology offers customers high-speed, symmetrical WAN connectivity at a lower monthly cost than traditional WAN circuits. The 2- and 4-pair G.SHDSL HWICs together with Cisco integrated services routers provide businesses the necessary bandwidth for critical traffic such as voice and video conferencing, and enable customers to save money by integrating voice and data traffic on the same WAN link. Service providers can increase subscriber revenue by bundling services and offering differentiated service levels through service-level agreements.

The first standardized multirate symmetric DSL, G.SHDSL has been an accepted worldwide technology standard based on ITU recommendation G.991.2. G.SHDSL is designed to transport rate-adaptive symmetrical data across a single copper pair at data rates up to 2.304 Mbps for a single pair or up to 4.608 Mbps over two pairs. Later enhancements

(Annexes F and G) to the G.991.2 specification allow for increased performance up to 5.696 Mbps over a single copper pair. IMA technology allows the 4-pair G.SHDSL HWIC to offer data rates up to 2.304 Mbps per pair and up to 9.2 Mbps over four pairs. These rates cover applications traditionally served by HDSL, SDSL, T1, E1, and services beyond E1. Refer to Table 2 for the data rates supported by the 2- and 4-pair G.SHDSL HWICs (HWIC-2SHDSL and HWIC-4SHDSL) under different configurations.

Feature Summary

- Based on ITU Recommendation G.991.2

- Offers symmetrical WAN speeds up to 2.304 Mbps over a single copper pair and up to 4.608 Mbps over two copper pairs using ITU-T G.991.2 Annex A and Annex B

- Offers symmetrical WAN speeds from 768 kbps to 5.696 Mbps over a single copper pair and from 1.536 to 11.392 Mbps over two copper pairs using ITU-T G.991.2 Annex F and Annex G

- Offers symmetrical WAN speeds of 2.304 Mbps per pair up to 9.2 Mbps over four pairs on the 4-pair HWIC (part number HWIC-4SHDSL) by bonding with IMA Version 1.1

- Provides M-pair bonding on the 4-pair HWIC (HWIC-4SHDSL) using Annex F and Annex G with symmetrical WAN speeds of 768 kbps to 5.696 Mbps per pair for M = 2 and 768 kbps to 4.096 Mbps per pair for M = 3 and M = 4

- Supports Wetting Current (Section A.5.3.3 of G.991.2)

- Supports G.SHDSL Annex A (U.S. signaling) and Annex B (European signaling)

- Supports "Dying Gasp" on HWIC-2SHDSL; uses power status bit (section 7.1.2.5.3 of G.991.2) for signaling

- Offers ability to configure multiple G.SHDSL HWICs per Cisco 1841, 2800, and 3800 Router chassis

- Provides toll-quality voice over data through ATM Adaptation Layer 5 (AAL5) and voice over IP (VoIP) on the Cisco 1841 ISR and the Cisco 2800 and 3800 Series ISRs; note that embedded voice services with digital signal processors, voice and fax modules are supported only on the Cisco 2800 and 3800 Series ISRs.

- Offers extensive ATM class-of-service (CoS) and IP quality-of-service (QoS) support

- Sustains up to 8 permanent virtual circuits (PVCs) per HWIC

- Provides single RJ-11 connector on 2-pair HWIC (HWIC-2SHDSL) and single RJ-45 connector on 4-pair HWIC (HWIC-4SHDSL)

System Requirements

- The 2- and 4-pair G.SHDSL HWICs are supported on all modular Cisco Integrated Services Routers: the Cisco 1841, 2801, 2811, 2821, 2851, 3825, and 3845.

- The 2- and 4-pair G.SHDSL HWICs are supported in all Cisco IOS® Software feature sets.

- The routers listed previously need to run Cisco IOS Software Special Release 12.4(11)XJ to support the 2- and 4-pair G.SHDSL HWICs. They will also be supported on the Cisco IOS Software Release 12.4(6th)T and later.

- The system requires no additional flash or DRAM memory other than the specified minimum memory for the previously mentioned Cisco IOS Software releases.

- The 2- and 4-pair G.SHDSL HWICs can be inserted into any HWIC slot in the integrated services routers.

Cisco Integrated Services Router with G.SHDSL HWIC Applications

Business-Class DSL with Backup WAN

The Cisco Integrated Services Routers with the 2-pair and 4-pair G.SHDSL HWICs provide a business-class DSL solution for WAN access along with the option of a backup WAN interface (asymmetric DSL [ADSL] and ADSL2+, ISDN Basic Rate Interface [BRI], T1/E1, analog modem, cable modem, etc.) for mission-critical applications. The IMA feature offered on the 4-pair symmetric G.SHDSL HWIC allows service providers to bond two or more pairs of G.SHDSL links to offer differentiated bandwidth based on service-level agreements.

Business-Class Security

The Cisco 1841 Integrated Services Router and the Cisco 2800 and 3800 Series of Integrated Services Routers with the G.SHDSL HWICs can be optimized for Internet security with the Cisco IOS Firewall supporting stateful inspection firewall and intrusion prevention system features. These platforms can also be optimized for VPNs, which allow secure use of 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), Advanced Encryption Standard (AES), and Secure Sockets Layer VPN (SSL VPN). Encryption features can be enabled on the routers with the Advanced Security or any higher feature set of the Cisco IOS Software.

Differentiated Service Offerings through IP and ATM QoS

Using Cisco QoS features including Class-Based Weighted Fair Queuing (CBWFQ), Low-Latency Queuing (LLQ), Weighted Random Early Detection (WRED), etc., the Cisco 1841 Integrated Services Router and the Cisco 2800 and 3800 Series of Integrated Services Routers with G.SHDSL HWICs help service providers and resellers offer services that can differentiate bandwidth based on a specific application or a specific user.

In addition to IP QoS features, the Cisco 1841, 2800, and 3800 Series of Integrated Services Routers with the G.SHDSL HWICs map IP QoS to ATM CoS features, including support for constant bit rate (CBR), Variable Bit Rate non-realtime (VBR-nrt), Variable Bit Rate realtime (VBR-rt), Unspecified Bit Rate (UBR), and UBR+. These features help service providers manage their core ATM network infrastructures to deliver scalable, cost-effective services with QoS guarantees to their customers. Per-virtual-circuit traffic shaping and queuing allows further optimization of the existing bandwidth between customers and various services.

Table 3 later in this document gives a summary of the ATM features, including QoS and traffic management capabilities supported on the G.SHDSL HWICs.

Converged Platform for Small to Medium-Sized Business and Enterprise Branch Applications

The Cisco 1841, 2800, and 3800 Series of Integrated Services Router platforms with the G.SHDSL HWICs provide customers with a choice of converged platforms that offer best-of-class data, security, WAN access, and voice services in a single system. The Cisco 2800 and 3800 Series Routers embed voice functions directly inside the router ,enabling customers to deploy voice services by installing digital signal processors (DSPs) and advanced integration modules (AIMs) for IP telephony conferencing, voice gateways, and Cisco Unity ® Express voicemail and automated attendant. For call processing, customers can enable the Cisco Call Manager Express solution as part of Cisco IOS Software and reconfigure the same software to support Cisco Survivable Remote Site Telephony (SRST) for centralized call processing

with Cisco CallManager. Such an integrated solution rapidly enables service deployment, increases efficiency of network operations, and provides opportunities to protect, grow, and optimize the business.

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