# Cisco 860 and 880 Series Integrated Services Routers

## Product Overview and Positioning

**Q.** What are the Cisco® 860 and 880 Series Integrated Services Routers (ISRs)?

**A.** The Cisco 860 and 880 Series Integrated Services Routers are fixed-configuration routers that provide collaborative business solutions for secure voice and data communication to small businesses and enterprise teleworkers. These routers complement the current Cisco 800 Series ISR portfolio by supporting advanced technologies such as IEEE 802.11n, unified wireless network architecture, third-generation (3G) wireless WAN (WWAN), and voice. Refer to the Cisco 860 and 880 Series data sheets to learn more about the advanced technologies that these platforms support.

**Q.** What is the difference between the Cisco 860 and 880 Series Integrated Services Routers?

**A.** The Cisco 880 Series supports advanced security, voice, wireless LAN (WLAN), and WWAN (3G, 3.5G, and 3.7G), quality of service (QoS), and high-availability features. It also provides a 2-port Power over Ethernet (PoE) option and higher performance required to support the advanced features.

**Q.** What is the difference between the new Cisco 860 and 880 Series and the Cisco 850 and 870 Series ISRs?

**A.** The Cisco 860 and 880 Series routers complement the Cisco 850 and 870 Series by adding support for new technologies such as 3G WWAN, voice, and 802.11n WLAN to the Cisco 800 Series portfolio.

**Q.** Can I continue to use and order the Cisco 850 and 870 Series?

**A.** All of the Cisco 850 and 870 Series routers are at end-of-sale status except the Cisco 877-M-K9 (part number CISCO877-M-K9).

## Hardware Features

**Q.** What are the hardware options for the Cisco 860 and 880 Series routers?

**A.** The Cisco 860 and 880 Series routers are fixed-configuration integrated services routers. The routers offer numerous hardware options on WAN and LAN interfaces, and they offer voice capabilities. You should carefully consider the requirements for these options to support a network deployment before you place an order. For details about hardware options for each model, refer to the Cisco 860 and 880 Series data sheets.

**Q.** Are there any hardware upgrade options?

**A.** No. The Cisco 860 and 880 Series routers are fixed-configuration integrated services routers that do not have hardware upgrade options (except for memory). You must decide the hardware configuration of the router by selecting the desirable product number when you order.

**Q.** Is memory upgradable?

**A.** An appropriate amount of router flash memory has been integrated for the different Cisco 860 and 880 Series hardware models, and it is not upgradable. DRAM is upgradable on the Cisco 880 Series only. Refer to the Cisco 860 and 880 Series data sheets for default memory configurations and upgrade options.

**Q.** What is the universal-serial-bus (USB) port used for?

**A.** A single USB 1.1 port is available on the Cisco 880 Series only. This port enables important security and provisioning capabilities, including secure device authentication, storage of removable credentials for establishing secure VPN connections, secure distribution of configuration files, bulk flash-memory storage for files and configuration, and booting from the USB. The Cisco 880 Series supports two types of USB devices: USB flash memory and USB eToken. For a list of supported USB flash-memory and eToken devices, refer to http://www.cisco.com/en/US/prod/collateral/modules/ps6247/product_data_sheet0900aecd80232473.html.

**Q.** What is the purpose of the Reset button?

**A.** The Reset button is used to restore the router to the default factory settings if pressed within 5 seconds of router power up. Here is how it works:

- The router will not react to the Reset button if it is pressed 5 seconds or more after power up.

- When the Reset button is pressed within 5 seconds of bootup and there is no valid xxx.cfg file in the flash memory, the router boots up with the factory defaults stored in nonvolatile RAM (NVRAM).

- When the Reset button is pressed within 5 seconds of boot up and there is a valid xxx.cfg file in the flash memory, the router boots up with the xxx.cfg file and avoids the startup-config file in NVRAM. The xxx.cfg default configuration file in flash memory also replaces the startup-config file in NVRAM.

**Q.** What is the function of the virtual auxiliary port?

**A.** On the Cisco 860 and 880 Series, the console port supports modem control signals. When an external modem is connected to this port, you can use this interface for out-of-band remote management of the router or as a backup WAN interface. An optional RJ-45 to DB-25 male straight-through cable is available to connect modems to this port. A limited set of modems and terminal adapters has been tested, but you can use any Hayes-compatible modem or terminal adapter to connect to this port. The console port behaves like a standard Cisco auxiliary (AUX) port if configured as such and can provide bit rates up to 115.2 kbps.

**Q.** What locking cables do you recommend for use with the security cable lock?

**A.** We recommend that you use a locking cable that is consistent with the design and dimension of the CODi COBALT Flex-Head Desktop Solution, model number A02022 (http://www.codidirect.com/store/product.html?product_id=235&type=2). If you are considering the use of a Kensington lock, please test it to make sure it meets your requirements before making a volume purchase of the specific locking cables. We have periodically discovered some inconsistencies in the dimensions of Kensington locks.

**Q.** What are the differences between the Cisco 881W and C881W platforms?

**A.** Please refer to Table 1 for the differences between the two platforms.

**Table 1.** CISCO881W and C881W Comparison

| Model | Fan Configuration | Power over Ethernet (PoE) Configuration | Memory Configuration | Antenna Configuration |
|---|---|---|---|---|
| CISCO881W | One fan | 2-port PoE support, through separate PoE power adaptor<br>Field-upgradable option | Default: 256 MB<br>Maximum: 768 MB | External |
| C881W | Fanless | 2-port PoE support; no separate PoE adaptor needed<br>Factory option only | Default: 512 MB<br>Maximum: 512 MB | Embedded |

**Q.** Are fans installed on the Cisco 860 and 880 Series routers?

**A.** Please refer to Table 2 for the Cisco 860 and 880 Series fan configuration.

**Table 2.**     Cisco 860 and 880 Series Fan Configuration

| Model | Fan Configuration |
|---|---|
| CISCO866VAE and CISCO867VAE | Fanless |
| CISCO861W and CISCO867W | One fan |
| CISCO881, CISCO887, CISCO887V, CISCO888, and CISCO888E | One fan |
| CISCO886VA and CISCO887VA | One fan |
| C881W, C886VA-W, C887VA-W, and C887VAM-W | Fanless |
| CISCO881W, CISCO886W, CISCO887W, CISCO887VW, CISCO888W, and CISCO888EW | One fan |
| C881SRST and C888SRST | One fan |
| C881SRSTW and C888SRSTW | Two fans |

## Software Features

**Q.** Which Cisco IOS® Software releases do the Cisco 860 and 880 Series support?

**A.** The Cisco 860 and 880 Series routers support Cisco IOS Software Release 12.4(20)T and later. The C881W, C886VA-W, C887VA-W, and C887VAM-W platforms are available with Cisco IOS Software Release 15.1(4)M. The Cisco 860VAE Series routers support Cisco IOS Software Release 15.2(2)T or 15.1(4)M2 and later. The C880G Series routers support Cisco IOS Software Release 15.1(4)M and later. Please check the data sheets for the Cisco IOS Software release required for a specific part number.

**Q.** What Cisco IOS Software image and feature sets do you offer for the Cisco 860 and 880 Series?

**A.** The Cisco 860 and 880 Series routers support universal images and two feature sets. A universal image includes all features supported by a given platform. The active feature set is enabled with the Cisco IOS Software Activation feature.

The Cisco 860 and 880 Series ISRs support the following universal images:

- c860-universalk9-mz: Universal image for the Cisco 860 Series

- c880data-universalk9-mz: Universal image for the Cisco 880 Series data-only models (C881G, C886VAG, C887VAG, C887VAMG, and C888EG)

- c880voice-universalk9-mz: Universal image for the Cisco 880 Series voice models

- c800-universalk9-mz: Universal image for the C881W, C886VA-W, C887VA-W, and C887VAM-W models

The Cisco 860 and 880 Series routers using the Cisco IOS Software Activation feature support the following feature sets:

- Advanced Security: Cisco 860 and 880 Series

- Advanced IP Services: Cisco 880 Series only

**Q.** What is the Cisco IOS Software Activation feature?

**A.** Software activation authorizes and enables use of a Cisco software feature or feature sets. A special file contained in the device, called a license file, is examined by Cisco software when the device is powered on. Based on the license file installed, Cisco software enables the appropriate feature sets.

**Q.** What features require a software license and activation on the Cisco 860 and 880 Series?

**A.** The default feature set for the Cisco 860 and 880 Series is Advanced Security, with the exception of the Cisco 880 Survivable Remote Site Telephony (SRST) Series and Cisco 880 3G platforms. The default feature set for the Cisco 880 SRST Series and Cisco 880 3G platforms is Advanced IP Services. Cisco manufacturing installs the appropriate license file on the platform to support the default feature set. An upgrade to the Advanced IP Services feature set on the Cisco 880 Series (non-SRST and non-3G models) requires a software license and activation. The subscription-based content-filtering feature, Secure Sockets Layer VPN (SSL VPN), and intrusion prevention system (IPS) each requires a separate license.

Refer to the Cisco 800 Series Software Licensing white paper and Cisco 860 and 880 Series Software Activation Q&A for more information.

**Q.** Does the Cisco 860 and 880 Series Advanced Security feature set offer the same features as the Advanced Security feature set supported by the Cisco 1800, 2800, and 3800 Series ISRs?

**A.** The Advanced Security feature set supported by the Cisco 860 and 880 Series does not include features such as Dynamic Multipoint VPN (DMVPN), Group Encrypted Transport VPN, IPS, and content filtering, which are available with the Advanced Security feature set of the Cisco 1800, 2800, and 3800 Series. Refer to the Cisco 860 and 880 Series data sheet for the list of features available for each feature set.

**Q.** Can I boot a Cisco IOS Software image and Cisco IOS Software configuration file from the USB flash memory installed on a Cisco 880 Series?

**A.** During the router reload process, the Cisco 880 Series automatically searches for a bootable Cisco IOS Software image on the USB flash memory if no bootable image is available on the onboard flash memory. A Cisco IOS Software configuration file can be booted from the USB flash memory only if the Cisco IOS Software command **boot config usbflash0:** is part of the router startup configuration stored in NVRAM.

**Q.** Do the Cisco 860 and 880 Series routers support Metro Ethernet deployments?

**A.** Metro Ethernet features and deployments are supported by the Cisco 880 Series only.

**Q.** What web-based or GUI tool is available for the Cisco 860 and 880 Series?

**A.** You can configure and manage the Cisco 860 and 880 Series with Cisco Configuration Professional.

**Q.** Does Cisco Security Manager support the Cisco 860 and 880 Series?

**A.** Cisco Security Manager Version 3.2.1 supports the Cisco 881 and 888 platforms. A later release of Cisco Security Manager will support the Cisco 860 Series.

**Q.** How is factory default configuration restored on the Cisco 860 and 880 Series?

**A.** You can restore factory default configurations of the Cisco 860 and 880 Series by using the Cisco Configuration Professional application or by using the Reset button on the platform. Refer to the question "What is the purpose of the Reset button?" in the "Hardware Features" section on restoring factory default configurations with this button.

**Q.** Do the Cisco 860 and 880 Series support any out-of-band management capabilities?

**A.** The Cisco 860 and 880 Series routers support out-of-band management capabilities using the virtual auxiliary port with an external modem connected to it or using the ISDN S/T interface on the DSL models.

**Q.** Do the Cisco 860 and 880 Series routers support dial backup?

**A.** The Cisco 880 Series routers support dial backup with 3G, ISDN, and an external analog modem using the auxiliary port. The Cisco 860 Series routers support dial backup with an external analog modem using the auxiliary port. There is no integrated analog modem option for these platforms.

**Q.** Can I use the ISDN interface on the Cisco 880 Series DSL models as a primary interface?

**A.** Yes. You can use the ISDN S/T interface on the Cisco 880 Series DSL models as a primary interface with the default software feature set.

## Security Features

**Q.** Is hardware-based encryption available on the Cisco 860 and 880 Series?

**A.** Yes. Hardware-assisted IP Security (IPsec) Triple Data Encryption Standard (3DES) and Advanced Encryption Standard (AES) encryption is available on both the Cisco 860 and 880 Series; 128-, 192-, and 256-bit keys are supported for AES.

**Q.** Is hardware-based SSL VPN available on the Cisco 860 and 880 Series?

**A.** SSL VPN is supported on the Cisco 880 Series with the default Advanced Security feature set; it is software-based.

**Q.** Does SSL VPN require a license to use?

**A.** SSL VPN is supported by the default Advanced Security feature set on the Cisco 880 Series routers. A separate SSL VPN license is required to use this feature. The part number for the Cisco 880 Series SSL VPN license is FL-SSLVPN10-K9. This part number should be used only with Cisco IOS Software Release 15.0(1)M or later, and the presence of this license will be checked by the Cisco IOS Software.

**Q.** What is the license with part number FL-WEBVPN-10-K9 used for?

**A.** The license with part number FL-WEBVPN-10-K9 was the SSL VPN license for the Cisco 880 Series platforms using Release 12.4T-based Cisco IOS Software releases. The presence of this license is not checked by the Release 12.4T-based Cisco IOS Software releases, but this license is required for the SSL VPN feature. The license with this part number will not work with Cisco IOS Software Release 15.0(1)M or later.

**Q.** What should I do if I have the SSL VPN license with part number FL-WEBVPN-10-K9 and I need to upgrade my Software to a Release 15.0-based Cisco IOS Software?

**A.** If you purchased the license with part number FL-WEBVPN-10-K9 while using the Release 12.4T-based Cisco IOS Software release for the Cisco 880 Series, you can convert the license to the new FL-SSLVPN10-K9 part number at the License Migration Portal if you decide to upgrade the Cisco IOS Software to a Release 15.0-based release.

**Q.** How many IPsec tunnels do the Cisco 860 and 880 Series support?

**A.** The Cisco 860 Series supports 5 IPsec tunnels, and the Cisco 880 Series supports 20 IPsec tunnels.

**Q.** What advanced security features do the Cisco 860 and 880 Series support?

**A.** With the Advanced Security feature set, Cisco 860 Series routers support basic security features such as site-to-site VPN, Easy VPN, and application inspection and control with Cisco IOS Firewall. With the Advanced IP Services feature set, the Cisco 880 Series routers also support advanced security features such as DMVPN, Group Encrypted Transport VPN, IPS, and subscription-based content filtering.

**Q.** What subscription-based content-filtering feature is introduced with the Cisco 880 Series?

**A.** Cisco IOS Content Filtering on Cisco ISRs offers category-based URL blocking; keyword blocking; and protection against adware, malware, and spyware by restricting access to websites based on their reputation rating. This solution is a subscription-based hosted solution and it integrates closely with Cisco IOS Software for a better user experience.

For more information about this feature, refer to the Cisco IOS Content Filtering data sheet and Q&A at http://www.cisco.com/go/ioscontentfiltering.

## 3G Features

**Q.** What kind of 3G modem is integrated with the Cisco 880 Series routers?

**A.** When ordered with the 3G part number, the Cisco 880 Series is bundled with a modem branded by Cisco and supplied by Sierra Wireless: AC597E 3G modem for the Code Division Multiple Access (CDMA) network or AC880E 3G modem for the Global System for Mobile Communications (GSM) network.

**Q.** Can I use my own 3G modem for the Cisco 880 Series 3G interface?

**A.** The 3G modems will be bundled with the Cisco 880 Series 3G routers. Cisco will not support any other modems not bundled with the platforms.

**Q.** Can I use the 3G interface as a primary interface?

**A.** You can use the 3G interface of the Cisco 880 Series routers as a primary interface to provide WAN connectivity for remote sites and temporary locations.

For more information about 3G support for the Cisco 880 Series, refer to the Cisco 880 Series 3G data sheet and Q&A.

## Wireless LAN Features

**Q.** Which WLAN standards do the Cisco 860 and 880 Series routers support?

**A.** The Cisco 860 and 880 Series routers support 2.4-GHz 802.11b/g/n.

**Q.** What is the difference between the Cisco 860 and 880 Series Integrated Access Point and the Cisco 850 and 870 Series Integrated Access Point?

**A.** The integrated access point on the Cisco 860 and 880 Series is Wi-Fi 802.11n Draft 2.0 certified. The Cisco 880 Series offers both the autonomous and unified options, so you can deploy it as a standalone access point or as part of a Cisco Unified Wireless Network. (The Cisco 860 Series supports autonomous mode only.) The access-point software on the Cisco 860 and 880 Series is independent of the platform software and offers feature parity with the software supporting Cisco Aironet® 1250 Series Access Points.

**Q.** Can the integrated access point on the Cisco 860 and 880 Series be managed by a wireless LAN controller?

**A.** The Cisco 880 Series can be managed by a wireless LAN controller when running in the unified mode. The Advanced IP Services feature set is required for unified-mode support. The Cisco 860 Series does not support this feature.

For more information about the Cisco 860 and 880 Series Integrated Access Points, refer to the Cisco 860 and 880 Series Integrated Access Point Q&A.

## Voice Features

**Q.** What voice options do the Cisco 860 and 880 Series routers offer?

**A.** Voice support is available only on the Cisco 880 Series voice models. Please refer to Table 2 of the Cisco 880 Series data sheet for the available models and supported hardware configurations. The Cisco 860 Series does not offer voice support.

**Q.** Is Cisco Unified Communications Manager Express supported on the Cisco 880 Series voice models?

**A.** Cisco Unified Communications Manager Express is supported on the Cisco 881V and 887VA-V platforms with a 5-user Cisco Unified Communications Manager Express (Cisco Unified CME)/Cisco Unified Survivable Remote Site Telephony (Cisco Unified SRST) license upgrade. The Cisco 880 Series SRST models have SRST support only.

**Q.** Which version of Cisco Unified Communications Manager Express is supported?

**A.** Version 8.6 or later.

**Q.** Which versions of Cisco Unified SRST do the Cisco 880 SRST Series routers support?

**A.** Cisco Unified SRST Version 7.0 or later.

**Q.** Can these voice models be used as a voice gateway?

**A.** Yes. The Cisco 880 SRST Series is supported by Cisco Unified CME Version 6.1(3), 7.0(2), or 7.1(3) when used as a gateway. The Cisco 880V Series requires Version 8.6.

**Q.** Can I add voice support to a Cisco 880 Series data model?

**A.** You must order a voice model for Cisco Unified CME and Cisco Unified SRST support, as well as foreign exchange station (FXS), foreign exchange office (FXO), and voice Basic Rate Interface (BRI) connectivities. With a Cisco 880 Series data-only model, you can connect IP phones to the integrated switch ports to register with a centrally located Cisco Unified Communications Manager. No failover support with SRST on a data-only model is planned.

For more information about voice feature support for the Cisco 880V Series and 880 SRST Series, please refer to the Cisco 880 Series data sheet, Cisco Unified CME data sheet, and Cisco Unified SRST data sheet.

**Q.** Which Cisco IOS Software release was the Cisco 880V first shipped on?

**A.** The C880V models C881-V-K9, C887VA-V-K9, and C887VA-V-W-E-K9 were shipped with Cisco IOS Software Release 15.2(2)T.

**Q.** Do the Cisco 880V Routers have any voice hardware?

**A.** Yes, they have an internal packet voice DSP module 2-16 (PVDM2-16).

## DSL Features

**Q.** Which DSL technologies do the Cisco 860 and 880 Series routers support?

**A.** The Cisco 860 and 880 Series platforms support the DSL technologies listed in Table 3.

**Table 3.** DSL Technologies Supported by the Cisco 860 and 880 Series

| Model | DSL Technology | Minimum Cisco IOS Software Release Requirement |
|---|---|---|
| Cisco 867 | Asymmetric DSL 2 (ADSL2) and ADSL2+ over basic telephone service (Annex A) | 12.4(22)YB3 or 15.0(1)M |
| Cisco 886 | ADSL2/2+ over ISDN (Annex B) | 12.4(22)YB3 or 15.0(1)M |

| Model | DSL Technology | Minimum Cisco IOS Software Release Requirement |
|---|---|---|
| Cisco 866VAE | Cisco 866VAE router with VDSL2/ADSL2+ over ISDN | 15.2.(2)T or 15.1(4)M2 |
| Cisco 867VAE | Cisco 867VAE router with VDSL2/ADSL2+ over POTS | 15.2.(2)T or 15.1(4)M2 |
| Cisco 886VA | Multimode VDSL2 and ADSL2 and 2+ over ISDN | 15.1(2)T |
| C886VAG | Multi-Mode VDSL2/ADSL2+ over ISDN | 15.1(4)M |
| Cisco 887 | ADSL2/2+ over POTS (Annex A) | 12.4(22)YB3 or 15.0(1)M |
| Cisco 887M | ADSL2/2+ over POTS (Annex M) | 12.4(22)YB3 or 15.0(1)M |
| Cisco 887V | Very-high-bit-rate DSL 2 (VDSL2) over POTS | 12.4(22)YB1, 12.4(24)T, or 15.0(1)M |
| Cisco 887VW, Cisco 887VG, and Cisco 887VGW | VDSL2 over POTS, with 802.11n and 3G | 15.0(1)M |
| Cisco 887VA | Multimode VDSL2 and ADSL2 and 2+ over POTS (Annex A) | 15.1(2)T |
| C887VAG | Multi-Mode VDSL2/ADSL2+ over POTS | 15.1(4)M |
| Cisco 887VA-M | Multimode VDSL2 and ADSL2 and 2+ over POTS (Annex M) | 15.1(2)T |
| C887VAMG | Multi-Mode VDSL2 and ADSL2/2+ over POTS Annex M | 15.1(4)M |
| Cisco 888 | G.SHDSL, ATM mode | 12.4(20)T or 15.0(1)M |
| Cisco 888E | G.SHDSL, Ethernet in the First Mile (EFM) mode | 15.1(1)T |
| C888EA | Multimode 4- pair G.SHDSL Router | 15.2.(2)T |
| C888EG | G.SHDSL w/EFM (non-U.S.) 3.7G HSPA+ R7 w/SMS/GPS | 15.1(4)M |

**Q.** What is VDSL2?

**A.** Very-high-bit-rate DSL 2 (VDSL2) is an access technology that exploits the existing infrastructure of copper wires that were originally deployed for basic telephone services. You can deploy it from central offices, from fiber-fed cabinets located near the customer premises, or within buildings.

The newest and most advanced standard of DSL broadband wireline communications, VDSL2 is designed to support the wide deployment of services such as voice, video, data, high-definition television (HDTV), and interactive gaming. It has been standardized as ITU G.993.2.

**Q.** What do Annex A and Annex B mean for VDSL2?

**A.** For ADSL, ITU G.992.1 Annex A refers to ADSL over basic telephone service, and ITU G.992.1 Annex B refers to ADSL over ISDN. For VDSL2, Annex A specifies band plans for the North American region and enables VDSL2 deployment with traditional basic telephony or in an all-digital mode. Annex B specifies band plans for Europe and enables VDSL2 deployment with underlying basic telephone and ISDN services.

**Q.** Does the Cisco 887V platform support both Annex A and Annex B?

**A.** The Cisco 887V platform supports Annex A and Annex B with band plans 997 and 998. Only VDSL2 over basic telephone service is supported.

**Q.** Does the Cisco 887V platform also support ADSL, ADSL2, and ADSL2+?

**A.** The Cisco 887V platform supports only VDSL2 technology.

**Q.** Does the Cisco 887V platform support both ATM and Ethernet Packet Transport Mode (PTM)?

**A.** The platform supports only PTM.

**Q.** What is the maximum data rate that the Cisco 887V can support?

**A.** Please refer to Table 4 for the profiles that the Cisco 887V supports and the maximum data rate achievable by each profile. VDSL2 profiles are defined to help simplify network equipment configuration tasks for different regional deployment architectures such as central office, remote DSL access multiplexers (DSLAMs), digital loop carriers, and multiple-dwelling units. The actual data rate negotiated during the line training process depends on the profiles supported by the DSLAM, the distance of the customer premises equipment (CPE) from the central office where the DSLAM is located, noise conditions, and other parameters associated with line quality.

**Table 4.**     Profiles Supported by the Cisco 887V Platform

| Profile | 8a | 8b | 8c | 8d | 12a | 12b | 17a |
|---|---|---|---|---|---|---|---|
| Maximum data rate (upstream and downstream) | 65 Mbps | 65 Mbps | 65 Mbps | 65 Mbps | 90 Mbps | 90 Mbps | 150 Mbps |

**Q.** Will the Cisco 860 and 880 Series DSL models work with any DSLAM?

**A.** Refer to the DSLAM interoperability document for a list of supported DSLAMs.

**Q.** What is Annex M?

**A.** Annex M is an enhancement of the G.992.3 standard that doubles the upstream bandwidth by "borrowing" 32 additional tones from the downstream frequency range. This feature enables service providers to provision symmetric data rates for ADSL2 and ADSL2+ services with data rates up to 2 Mbps. The achievable upstream rates are a function of loop length and specific DSLAM Annex M implementation.

**Q.** What does the term "mask" imply in Annex M?

**A.** The mask refers to the submode power-spectral-density (PSD) mask applicable for Annex M. Service providers use the mask to minimize the cross-talk between adjacent pairs to an acceptable level. G.992.3 specifies the masks, as shown in Table 5.

**Table 5.**     Annex M Masks

| Upstream Mask Number | Designator | Cutoff Frequency f1 (kHz) | Upstream Tones | Downstream Tones |
|---|---|---|---|---|
| 1 | EU-32 | 138.00 | 6-32 | 58-255 |
| 2 | EU-36 | 155.25 | 6-36 | 58-255 |
| 3 | EU-40 | 172.50 | 6-40 | 58-255 |
| 4 | EU-44 | 189.75 | 6-44 | 58-255 |
| 5 | EU-48 | 207.00 | 6-48 | 58-255 |
| 6 | EU-52 | 224.25 | 6-52 | 58-255 |
| 7 | EU-56 | 241.50 | 6-56 | 58-255 |
| 8 | EU-60 | 258.75 | 6-60 | 61-255 |
| 9 | EU-64 | 276.00 | 6-64 | 65-255 |

**Q.** What mask does the Cisco 887M support?

**A.** The Cisco 887M is optimized for Mask M 9. It can operate in other masks, but the performance may be lower than that of a CPE that is optimized for that mask.

**Q.** Does the Cisco 887M support the PSD mask required to comply with the Annex M standards in the United Kingdom?

**A.** With ADSL firmware Version 4.0.17, the Cisco 887M supports United Kingdom Annex M only with Huawei 5300 DSLAM and its Cisco Unified Expert Advisor Database (EADB) line card.

**Q.** What is INP?

**A.** INP stands for Impulse Noise Protection. Support for INP allows the CPE to provide error-correction capability for impulse noise. The unit for this parameter is in number of symbols. Support for up to 16 symbols is provided by an amendment to the original G.992.5 standard; it is referred to as **extended INP function** (G992.5-addemdum II edited in May 2005). Support for optional INP capability of at least 16 Discrete Multi-Tone (DMT) symbols (INP = 16) protects against impulse noise of up to 4 milliseconds. Increasing the INP also increases the latency.

**Q.** Do the Cisco 860 and 880 Series support extended INP functions?

**A.** Extended INP is supported on the Cisco 867, 887, and 887M platforms.

**Q.** What is the difference between the Cisco 888, 888E, and 888EA?

**A.** The Cisco 888 supports G.SHDSL WAN in ATM mode. The Cisco 888E supports G.SHDSL WAN with IEEE 802.3ah EFM. In addition, the Cisco 888E platform supports annex F&G over a single copper pair and EFM bonding. The C888EA supports multimode G.SHDSL port, 4 pair with EFM and ATM mode with the same G.SHDSL feature parity as the Cisco Multimode Symmetric High-Bit-Rate DSL High-Speed WAN Interface Card for the Cisco Integrated Services Routers Generation 2 (ISR G2) modular platforms. The DSL chipset is based on the Socrates-4e chipset from Lantiq.

**Q.** Is Annex F&G supported by the Cisco 888 platform?

**A.** Annex F&G (2-wire only) is supported by the Cisco 888 platform starting with Cisco IOS Software Release 15.1(2)T2.

**Q.** What is EFM?

**A.** Ethernet in the First Mile (EFM), also known as IEEE 802.3ah, is a collection of protocols specified in IEEE 802.3 that define Ethernet in the access networks; that is, first or last mile.

**Q.** What is EFM bonding?

**A.** EFM bonding based on IEEE 802.3ah is the method for bonding of multiple DSL lines (pairs) for Ethernet transport to achieve higher data rates.

**Q.** What is the maximum data rate available with the Cisco 888E?

**A.** The Cisco 888E can support up to 22.784 Mbps of data rate using EFM bonding over 4 pairs (4 x 5696 kbps). The actual data rate negotiated during the line training process depends on the profiles supported by the DSLAM, the distance of the CPE from the central office where the DSLAM is located, noise conditions, and other parameters associated with line quality.

**Q.** Does the Cisco 888E support both ATM and EFM?

**A.** No. The Cisco 888E supports only EFM, and the Cisco 888 supports only ATM. The C888EA is required to support both ATM and EFM.

For more information about DSL specifications, refer to the Cisco 880 Series data sheets.

**Q.** Can DSL modem firmware be upgraded on the Cisco 860 and 880 Series?

**A.** DSL modem firmware can be independently upgraded on the ADSL, VDSL2, and Cisco 888E platforms. DSL modem firmware for the Cisco 888 platforms is embedded in the Cisco IOS Software, hence upgrading the modem firmware on these models requires a Cisco IOS Software upgrade.

**Q.** Can the same firmware be applied to both the ADSL-only Cisco 887 and VDSL2-only Cisco 887V platforms?

**A.** Firmware for ADSL and VDSL2 platforms is different. Please check the Readme file for the firmware revision to identify the platforms supported by a particular release.

**Q.** What are the new Cisco 880VA Series DSL routers?

**A.** The Cisco 880VA Series routers are additions to the Cisco 880 Series ISR G2 product portfolio of fixed-configuration routers that provide collaborative business solutions for secure voice and data communication to small businesses and enterprise teleworkers. They complement the current Cisco 880 Series ISR portfolio by supporting multimode VDSL2 and ADSL2+ DSL technologies. Refer to the Cisco 880VA Series data sheet and Q&A to learn more about the advanced technologies that these platforms support.

## Switch Features

**Q.** What are the differences between the Cisco 860 and 880 Series with integrated switches and the Cisco 850 and 870 Series with integrated switches?

**A.** The following features have been added to the Cisco 860 and 880 Series with integrated switches:

- Dynamic and static port security
- Secure MAC addresses
- MAC filtering
- Two-VLAN support for the Cisco 860 Series and eight-VLAN support for the Cisco 880 Series with all feature sets

Refer to the Cisco 860 and 880 Series data sheets for the availability of these features per feature set.

**Q.** Is Power over Ethernet (PoE) supported on the switch ports?

**A.** Yes, IEEE 802.3af and two optional Cisco compliant PoE ports are available on the Cisco 880 Series routers only. With this option, PoE will be available on Fast Ethernet 0 and Fast Ethernet 1 interfaces. The Cisco 880 Series does not support PoE on all four port switches.

**Q.** Does the Cisco 880 Series support Cisco Enhanced PoE?

**A.** Cisco Enhanced PoE is an extension of the 802.3af standard, delivering between 15.4 and 20W per port. The Cisco 880 Series does not support Cisco Enhanced PoE, which is required by the Cisco Aironet 1250 Series Access Points and similar devices.

**Q.** What are the differences between PoE support on the Cisco 881W and C881W?

**A.** Please refer to the "Power over Ethernet Configuration" column in Table 1.

**Q.** What IEEE 802.1x features do the Cisco 860 and 880 Series integrated switch ports support?

**A.** Support for 802.1x features is available for the integrated switch ports on the Cisco 880 Series routers only. Standard 802.1x feature support on the Cisco 880 Series is compatible with the support for the Cisco 870 Series today as documented at:
http://www.cisco.com/en/US/prod/collateral/routers/ps5853/prod_white_paper0900aecd806c6d65.html with the following exceptions:

- Standard 802.1x single-host mode is supported on the Cisco 880 Series.
- Standard 802.1x port security will work for the Cisco 1800 Series as described at the URL given.

## Cisco 860 and 880 Migration

**Q.** Which Cisco 881 Series routers have reached end-of-sale status, and what are their replacements?

**A.** Please refer to Table 6 for Cisco 881 Series routers that have reached end-of-sale status and their replacements.

**Table 6.** End of Sale for Cisco 881 Series Routers

| End-of-Sale Product Part Number | Product Description | Replacement Product Part Number | Replacement Product Description |
|---|---|---|---|
| CISCO881G-G-K9 | 881G FE Sec Router with Adv IP Serv, 3G Global GSM/HSPA | C881G+7-K9 | WAN FE (non-US) 3.7G HSPA+ R7 w/SMS/GPS (MC8705) |
| CISCO881G-K9 | Cisco 881G Ethernet Sec Router w/3G B/U | C881G+7-K9 | WAN FE (non-US) 3.7G HSPA+ R7 w/SMS/GPS (MC8705) |
| CISCO881G-S-K9 | 881G FE Sec Router bundle with Adv IP Serv, 3G Sprint | C881G-S-K9 | C881 3G Sprint EV-DO Rev A/0/1xRTT 800/1900MHz w/SMS/GPS |
| CISCO881G-V-K9 | 881G FE Sec Router bundle with Adv IP Serv, 3G Verizon | C881G-V-K9 | C881 3G Verizon EV-DO Rev A/0/1xRTT 800/1900MHz w/SMS/GPS |
| CISCO881W-GN-A-K9 | Cisco 881 Ethernet Sec Router 802.11n FCC Comp | C881W-A-K9 | Cisco 881 Eth Sec Router with 802.11n FCC Compliant |
| CISCO881W-GN-E-K9 | Cisco 881 Ethernet Sec Router 802.11n ETSI Comp | C881W-E-K9 | Cisco 881 Eth Sec Router with 802.11n ETSI Compliant |
| CISCO881W-GN-P-K9 | Cisco 881 Ethernet Sec Router 802.11n Japan Comp | C881W-P-K9 | Cisco 881 Eth Sec Router with 802.11n Japan Compliant -?? Not in DCT |

**Q.** Which Cisco 886 Series routers have reached end-of-sale status, and what are their replacements?

**A.** Please refer to Table 7 for Cisco 886 Series routers that have reached end-of-sale status and their replacements.

**Table 7.** End of Sale for Cisco 886 Series Routers

| End-of-Sale Product Part Number | Product Description | Replacement Product Part Number | Replacement Product Description |
|---|---|---|---|
| CISCO886-K9 | Cisco 886 ADSL2/2+ AnnexB Router | CISCO886VA-K9 | Cisco 886 VDSL/ADSL over ISDN Multi-mode Router |
| CISCO886-SEC-K9 | Cisco 886 ADSL2/2+ AnnexB Sec Router w/Adv IP | CISCO886VA-SEC-K9 | Cisco 886 VDSL/ADSL over ISDN Multi-mode Router w/Adv IP |
| CISCO886G-K9 | 886G ADSL2/2+ AnnexB Sec Router w/Adv IP, 3G Global GSM/HSPA | Check announcement for detailed information on replacing this product. | |
| CISCO886GW-GN-E-K9 | Cisco 886 ADSL2/2+ Annex B Router w/3G 802.11n ETSI | Check announcement for detailed information on replacing this product. | |
| CISCO886W-GN-E-K9 | Cisco 886 ADSL2/2+ Annex B Router w/802.11n ETSI Comp | Check announcement for detailed information on replacing this product. | |

**Q.** Which Cisco 887 Series routers have reached end-of-sale status, and what are their replacements?

**A.** Please refer to Table 8 for Cisco 887 Series routers that have reached end-of-sale status and their replacements.

**Table 8.**     End of Sale for Cisco 887 Series Routers

| End-of-Sale Product Part Number | Product Description | Replacement Product Part Number | Replacement Product Description |
|---|---|---|---|
| CISCO887-K9 | Cisco 887 ADSL2/2+ Annex A Router | CISCO887VA-K9 | Cisco 887 VDSL/ADSL over POTS Multi-mode Router |
| CISCO887-SEC-K9 | Cisco 887 ADSL2/2+ Annex A Sec Router w/Adv IP | CISCO887VA-SEC-K9 | Cisco 887 VDSL/ADSL over POTS Multi-mode Router w/Adv IP |
| CISCO887G-K9 | 887G ADSL2/2+ AnnexA Sec Router w/Ad.IP, 3G Global GSM/HSPA | C887VAG+7-K9 | VDSL2/ADSL2+ over POTS (non-US) 3.7G HSPA+ R7 w/SMS/GPS |
| CISCO887GW-GN-A-K9 | Cisco 887 ADSL2/2+ Annex A Router w/3G 802.11n FCC Comp | Check announcement for detailed information on replacing this product. | |
| CISCO887GW-GN-E-K9 | Cisco 887 ADSL2/2+ Annex A Router w/3G 802.11n ETSI Comp | Check announcement for detailed information on replacing this product. | |
| CISCO887MW-GN-E-K9 | Cisco 887 ADSL2/2+ Annex M Router 802.11n ETSI Comp | Check announcement for detailed information on replacing this product. | C887VA-M-W-E-K9 ?? |
| CISCO887W-GN-A-K9 | Cisco 887 ADSL2/2+ Annex A Router 802.11n FCC Comp | Check announcement for detailed information on replacing this product. | C887VA-W-A-K9 ?? |
| CISCO887W-GN-E-K9 | Cisco 887 ADSL2/2+ Annex A Router 802.11n ETSI Comp | Check announcement for detailed information on replacing this product. | C887VA-W-E-K9 ?? |

**Q.**   Which Cisco 888 Series routers have reached end-of-sale status, and what are their replacements?

**A.**   Please refer to Table 9 for Cisco 888 Series routers that have reached end-of-sale status and their replacements.

**Table 9.**     End of Sale for Cisco 886 Series Routers

| End-of-Sale Product Part Number | Product Description | Replacement Product Part Number | Replacement Product Description |
|---|---|---|---|
| CISCO888G-K9 | Cisco 888 G.SHDSL Sec Router w/3G B/U | C888EG+7-K9 | G.SHDSL w/EFM (non-US) 3.7G HSPA+ R7 w/SMS/GPS |
| CISCO887M-K9 | Cisco 887 ADSL2/2+ Annex M Router | CISCO887VA-M-K9 | Cisco 887 VDSL/ADSL Annex M over POTS Multi-mode Router |

**Q.**   What is the platform power consumption for the C881W, C886W, and C887W?

**A.**   Please refer to Table 10 for platform power consumptions for the C881W, C886W, and C887W.

**Table 10.**     C881W, C886W, and C887W Platform Power Consumption

| Product Part Number | Power consumption without PoE | Power Consumption with PoE |
|---|---|---|
| C881W | 12W | 48W |
| C886W | 22W | 58W |
| C887W | 22W | 58W |

**Q.**   What is the performance with services for Cisco 860 and 880 Series ISRs?

**A.**   The performance with services for Cisco 860 Series ISRs is 4 Mbps, and the performance with services for Cisco 880 Series ISRs is 8 Mbps.

**Q.** What are the default memory and memory upgrade options for Cisco 860VAE, C880W, and C880G Series ISRs?

**A.** Please refer to Table 11 for default memory and memory upgrade options for Cisco 860VAE, 880W, and 880G Series ISRs.

**Table 11.** Default Memory and Memory Upgrade Options for Cisco 860VAE, 880W, and 880G

| Product Part Number | Default Memory DRAM | Memory Upgrade Option |
|---|---|---|
| CISCO860VAE | 256 MB | None |
| C880W | 512 MB | None |
| C880G | 512 MB | 1 GB (max) |

**Q.** What PoE daughter card does the C880 ISR use?

**A.** The C880 ISR uses a 30W 2-port PoE daughter card that is directly powered from the 12-VDC power supply of the host motherboard. It replaces the 4-port daughter card formerly used on Cisco 880 Series routers, which required a separate external -48-VDC power supply. No separate external -48-VDC power supply is required on C880 Series routers.

**Q.** How many PoE ports are supported on C880W Series ISRs?

**A.** C880W Series ISRs support 2 ports with PoE on Fast Ethernet 0 and Fast Ethernet 1. They are 802.3af-complaint, and they support 15.4W per port.

**Q.** Can I use the PoE daughter card from Cisco 880 Series ISRs on the C880W Series ISRs?

**A.** The PoE daughter card used on Cisco 880 Series routers cannot be used on C880W routers. Even though they have the same connector to the motherboard, they have different power specifications. The PoE daughter card used on Cisco 880 Series routers requires a separate external -48-VDC power supply, whereas the PoE daughter card on the C880W takes power directly from the motherboard, and no separate external power supply is required.

**Q.** Do the Cisco 860VAE, C880W, and C880G Series ISRs support Cisco Virtual Office?

**A.** Cisco Virtual Office is supported on C880W and C880G Series ISRs. The license with part number CVO800-CFG is required during the ordering process. Cisco 860VAE Series routers do not support Cisco Virtual Office at this time.

**Q.** Do Cisco 860VAE, C880W, and C880G Series ISRs support Cisco Wide Area Application Service Express (Cisco WAAS Express)?

**A.** Please refer to Table 12 for Cisco WAAS Express support on Cisco 860VAE, C880W, and C880G Series routers.

**Table 12.** Cisco WAAS Express Support on Cisco 860VAE, 880W, and 880G Routers

| Product Part Number | Cisco WAAS Express Optimized Bandwidth | Maximum TCP Connections | Cisco WAAS Express Features |
|---|---|---|---|
| CISCO860VAE | Not supported | - | - |
| C880W | 1.5 Mbps | 30 | Lite feature (No DRE, CIFS, SSL, or HTTPS) |
| C880G | 1.5 Mbps | 75 | Full featured |

**Q.** Do Cisco 860VAE, C880W, and C880G Series ISRs support Cisco ScanSafe?

**A.** Cisco 860VAE, C880W, and C880G Series ISRs support the Cisco ScanSafe connector in any universal Cisco IOS Software images with security feature set (SEC) licenses. The connector securely redirects HTTP and Secure HTTP (HTTPS) traffic. There is no need for client or agent software to be installed on each laptop or desktop, so any routers anywhere in your network can act as a secure managed cloud security gateway. Cisco ScanSafe allows easy deployment with no additional hardware and can integrate into any proxy server configuration.

**Q.** What are the maximum-transmission-unit (MTU) sizes for different DSL interfaces on Cisco 860 and 880 Series ISRs?

**A.** Please refer to Table 13 for MTU sizes for different DSL interfaces on Cisco 860VAE and 880 Series ISRs.

**Table 13.** MTU Sizes for Different DSL Interfaces on Cisco 860VAE and 880 Series Routers

| Product Part Number | MTU for ATM Mode (bytes) | MTU for PTM Mode (bytes) | MTU for ATM or EFM Mode (bytes) |
|---|---|---|---|
| CISCO860VAE | 2038 | 2038 | - |
| CISCO887VA/CISCO886VA C887VA/C886VA | 1530 | 1600 | - |
| C888EA | - | - | 1940 |

**Q.** What are the MTU sizes for different Ethernet interfaces on Cisco 880 Series ISRs?

**A.** Please refer to Table 14 for MTU sizes for different Ethernet interfaces on Cisco 860VAE and 880 Series ISRs.

**Table 14.** MTU Sizes for Different Ethernet Interfaces on Cisco 860VAE and 880 Series Routers

| Product Part Number | MTU for Fast Ethernet Layer 2 Ports (bytes) | MTU for Gigabit Ethernet Layer 2 Ports (bytes) | MTU for Fast Ethernet or Gigabit Ethernet Layer 3 Ports (bytes) |
|---|---|---|---|
| CISCO860VAE | 1518 | 1518 | 4075 |
| CISCO880 series/C880 series | 1600 | - | 9216 |

**Q.** What new 3G plus DSL models are available in C880 Series ISRs?

**A.** Four new 3G plus DSL models are available: C886VAG, C887VAG, C887VAMG, and C888EG. Please refer to the data sheet "Cisco 880G Series Integrated Services Router with Embedded 3.7G" for more details.

**Q.** What cellular modems are integrated in the C880G Series ISRs?

**A.** There are two different types of carriers. One type supports third-generation Partner Project (3GPP) HSPA+, HSPA, Universal Mobile Telecommunications Service (UMTS), Enhanced Data rates for Global Evolution (EDGE), and General Packet Radio Service (GPRS), and the other supports 3GPP2 EVDO RevA/Rev0 and 1xRTT. Two cellular modems support 3GPP2: MC8705 and MC8795V, and one cellular modem supports 3GPP2: MC5728V. Please refer to the Cisco 880G Integrated Services Router Q&A for more details.

**Q.** What is the cellular modem form factor in C880G Series ISRs?

**A.** The external 3G ExpressCard socket on Cisco 880G Series routers has been replaced by an internal PCIe mini-card slot on C880G Series routers. The external ExpressCard modems, therefore, have been replaced by the internal PCIe mini-card cellular modems.

**Q.** What is the function of the mini-USB port in C880G Series ISRs?

**A.** C880G Series routers have a mini-USB type B port that enables the modem to be connected to a PC and run PC-based modem provisioning and the carrier customization tool.

**Q.** Do the C880G Series ISRs support the Diagnostic Monitoring (DM) port?

**A.** C880G Series routers have removed the Diagnostic Monitoring port from the chassis front faceplate. The remote Diagnostic Monitoring function is required to collect the modem Diagnostic Monitoring log.

**Q.** Do the C880G Series ISRs support the National Marine Electronics Association (NMEA)?

**A.** C880G Series routers support NMEA. A virtual serial port is implemented to export NMEA format GPS data to external NEMA 2.0-compliant user applications. Please refer to the Cisco 819 Series Integrated Service Router Q&A for more details.

**Q.** How do I configure NMEA on C880G Series ISRs?

**A.** To enable NMEA GPS data streaming, C880G Series routers have introduced two new command-line interfaces (CLIs): **cdma|gsm gps modem standalone** and **cdma|gsm gps nmea**. A virtual serial port has been implemented in the Cisco IOS Software to export NMEA-formatted GPS data. If end users connect the router to a Microsoft Windows-based PC through an Ethernet connection COM port emulation software is required on the PC side to emulate the COM port over the Ethernet link.

**Q.** What NMEA sentences do the C880G Series ISRs support?

**A.** C880G cellular modems support the following NMEA sentences: GGA, GSA, GSV, RMC, and VTG.

**Q.** How many SIM card slots do the C880G Series ISRs support?

**A.** C880G Series routers support two SIM card slots, which allow cellular modem failover to the secondary SIM card to continue service when the modem loses services to the primary SIM card. Please refer to the Cisco 819 Integrated Service Router Q&A and "Configuring Cisco EHWIC and 880G for 3.7G (HSPA+)/3.5G (HSPA)" for more information about how to use and configure dual-SIM.

**Q.** Is dual-SIM supported on CDMA 3GPP2 based C880G Series ISRs?

**A.** C880G CDMA 3GPP2 Series routers do not support the SIM card; therefore, the dual-SIM feature is not supported on these routers.

**Q.** How do I send, display, delete, and archive SMS on C880G Series ISRs?

**A.** C880G Series routers have an SMS function that enables the routers to send and receive SMS messages. This feature also enables the routers to save and store the SMS messages in an FTP server. SMS is enabled by default. You can send, display, delete, and archive SMS through the router CLI. Please refer to "Configuring Cisco EHWIC and 880G for 3.7G (HSPA+)/3.5G (HSPA)" for more information.

**Q.** Is encapsulation ppp supported by C880G Plus 7 Series ISRs?

**A.** No. C880G Plus 7 Series routers support **encapsulation slip** by default. Please refer to "Configuring Cisco EHWIC and 880G for 3.7G (HSPA+)/3.5G (HSPA)" for more information about how to configure the C880G Plus 7 cellular interface.

**Q.** What is Direct IP on C880G Plus 7 Series ISRs?

**A.** C880G Series routers are integrated with a Sierra Wireless MC8705 cellular modem that is running under Direct IP mode to maintain HSPA+ data throughput. Direct IP is a Sierra Wireless proprietary framing protocol used to transfer data between the host platform and the modem. Direct IP framed data have a dedicated USB connection, meaning the host can still send AT commands after the direct IP data session is established. Cisco IOS Software sets encapsulation to SLIP based on the data link protocol between the host and the modem.

**Q.** What WLAN antenna options are available for C880W Series ISRs?

**A.** All C880W Series routers embed three dual-band 2.4- or 5-GHz Planar inverted-F antenna (PIFA)-type omnidirectional antennae. External swivel-mount dipole antennae are no longer used. Antennae are attached to the cover of the chassis and covered by the front bezel, and U.FL-type RF connectors attach to the radio.

**Q.** Do the Cisco 880 WLAN Series routers have removable WLAN antennae?

**A.** Only Cisco 881 WLAN Series routers have removable swivel-mount dipole antennae. Other products in these routers have captive default dipole antennae. Removal of them and support for other types of external WLAN antenna is not supported by Cisco.