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Data Sheet

General Availability

CypherPlug

Miniature Network Security Device

- End-to-end static transport mode IPSEC encryption
- Part of RAD's Smart SFP portfolio
- Designed for seamless protection enhancement of any existing SFP-based network device
- Wire-speed encryption (1000 Mbps)
- Low OpEx due to decreased power consumption, space and installation costs compared to other solutions
- Plug-and-play solution

RAD's CypherPlug® is a miniature IP-level network security device that encrypts traffic over any IP network.

CypherPlug's innovative design breaks through the barriers of cost and complexity for customers who seek to add a higher level of security to their networks.

CypherPlug is an SFP sleeve form factor, capable of hosting any standard MSA compatible 100M or 1GE SFPs. CypherPlug transparently envelops a large variety of SFPs, enabling full reuse of customer equipment and seamless deployment over multiple access infrastructure types, such as short-haul and long-haul fiber connections, bidirectional single-fiber links, and copper lines.

The SFP sleeve is easily pluggable into standard MSA compatible SFP ports of switches, routers, DSLAMs and mobile base stations, eliminating the use of external power and reducing space and cabling expenses.

CypherPlug's functionality is based on a powerful FPGA that enables easy customization to additional or different customer requirements.

MARKET SEGMENTS AND APPLICATIONS

As an important part of the toolkit offered by RAD's Smart SFP portfolio, CypherPlug is the perfect solution for customer networks seeking to enhance secure connectivity without replacing existing gear.

CypherPlug supports end-to-end static IPsec in transport mode for highly secured enterprise customers such as government, critical infrastructure, and military sectors.

ETHERNET

CypherPlug can be configured as an FE or GbE compatible device. The GbE option supports auto-negotiation.

SECURITY

CypherPlug aims to create protected separated groups and prevent and block any possibility of traffic access between the different groups by means of Transport IPsec (IPv4). CypherPlug uses GCM which a block cipher mode of operation providing both confidentiality and data origin authentication. AES-GCM-ESP uses a 128-bit key (AES-GCM-128) for both confidentiality (encryption) and data origin authentication as per RFC-4106. Packets that fail ESP-ICV authentication (16-byte key) are dropped.

CypherPlug supports Point-to-Point as well as Multipoint to Multipoint secure applications.

MANAGEMENT AND SECURITY

CypherPlug configuration and software download are performed only via SFP-CA.2. The configuration cannot be changed via the hosting device or using inband management.

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CypherPlug

Miniature Network Security Device

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Specifications

ETHERNET INTERFACES

Type	SFP-based, MSA-compliant edge connectors
Rate	100/1000 Mbps
Autonegotiation	Configurable for 1000 Mbps
Compliance	IEEE 802.3
Max. Frame Size	9,600 bytes

MANAGEMENT

SW Download	via boot menu driven screens
	via CLI
Configuration	CLI only

SECURITY

Encryption	AES-GCM-128
Type	IPv4 only
IPsec encapsulation	RFC-4106: The use of Galois/Counter Mode (GCM) in IPsec Encapsulating Security Payload (ESP)
	RFC-4303: IP Encapsulating Security Payload (ESP)
	Transport mode IPsec
	Static IPsec
Traffic Handling	Encrypt/Pass/Drop function configurable for each frame type

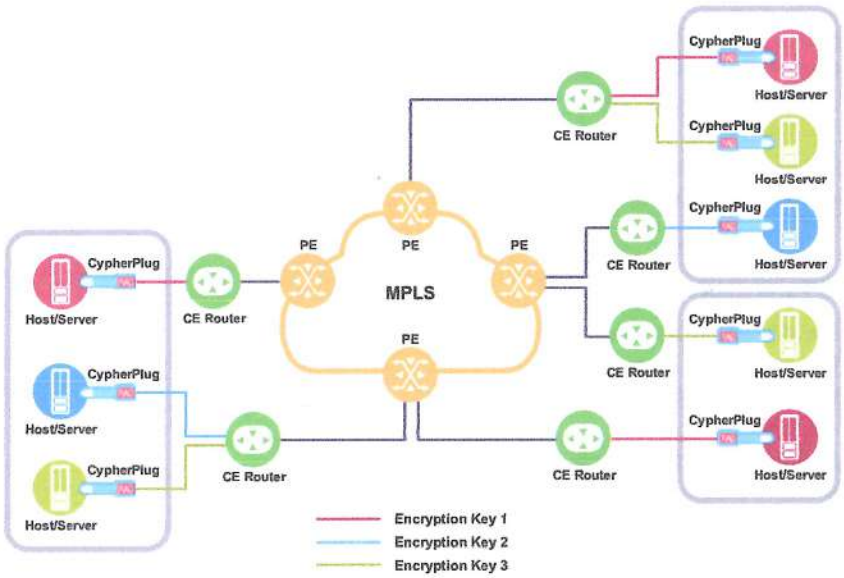

Figure 1. Encrypted Traffic over IP Network

CypherPlug

Miniature Network Security Device

Data Sheet

GENERAL

Environment

Operating Temperature	-20 to 85°C (-4 to 185°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Relative Humidity	Up to 90%, non-condensing

Power

Power Supply	Receives power from host device
Power Consumption	1.2W without SFP

Physical

Height	12.7 mm (0.50 in)
Width	14.3 mm (0.56 in)
Depth	81.1 mm (3.19 in)
Extending from chassis	37.3mm (1.47 in)
Weight	30.0 g (1.0 oz)

Ordering

RECOMMENDED CONFIGURATION

CYPHERPLUG/GE/IPSEC

Miniature network security device

SPECIAL CONFIGURATIONS

Please contact your local RAD partner for configuration options.

OPTIONAL ACCESSORIES

SFP-CA.2

Adapter for connecting CypherPlug to a PC

Transceivers

For the list of available transceivers, see the **Pluggable Transceivers data sheet** at **www.rad.com**

***Note:** It is strongly recommended to order this device with **original** RAD SFPs **installed**. This will ensure that prior to shipping, RAD has performed comprehensive functional quality tests on the entire assembled unit, including the SFP devices. RAD cannot guarantee full compliance to product specifications for units using non-RAD SFPs.*

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Supplement

General Availability

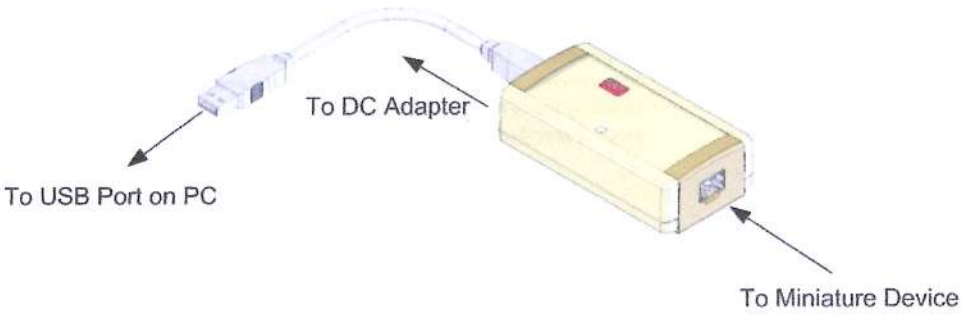
SFP-CA.2

Configuration Tool for Smart SFPs

SFP-CA.2 is an adapter that is used for configuration of miniature devices such as smart SFPs and MiNID. You can perform the following operations with the miniature device connected to your PC via the SFP-CA.2 unit:

- Assign a new IP address to the smart SFP/MiNID device (see Section 0)
- Configure the smart SFP/MiNID device (see Section 0)
- Download new software to the smart SFP/MiNID device (see Section 0)

This figure Illustrates the SFP-CA.2 unit and its connections.



Note *All SFP-CA.2 modules have the same MAC address (00-00-E8-00-00-01).*

For SFP-CA.2 to work, you must use one of the following supported operating systems:

- Windows XP
- Windows 7
- Windows 8
- Windows 8.1
- Windows 10

Note *Both 32 bit and 64 bit operating systems are supported.*

You must perform the following before you can use SFP-CA.2:

1. Install SFP-CA.2 driver (see **Installing Driver for SFP-CA.2**)
2. Configure PC network parameters for communication with SFP-CA.2 (see **Configuring PC Network Parameters for Communication with SFP-CA.2**)
3. Configure HyperTerminal parameters (only required for downloading software to the miniature device) (see **Configuring HyperTerminal Parameters**).

INSTALLING DRIVER FOR SFP-CA.2

Before you can use SFP-CA.2, you must install its driver.

➤ **To install the SFP-CA.2 driver:**

1. Click the SFP-CA.2 driver links below:

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- **USB UART drivers**
- **USB Ethernet drivers**

2. Log in to the site.

   A dialog box is displayed requesting to save the file.

3. Click **Save**.
4. Open the **.zip** file to install the driver.

   The SFP-CA.2 driver is installed in the background. No further action is required to install the driver.

CONFIGURING PC NETWORK PARAMETERS FOR COMMUNICATION WITH SFP-CA.2

You must configure the relevant network parameters of your PC to establish a communication link with SFP-CA.2 and the smart SFP/MiNID device.

Note — *Before performing this procedure, ensure that you have installed the SFP-CA.2 driver, as described in **Installing Driver for SFP-CA.2**.*

➤ **To configure your PC for communication with SFP-CA.2 and smart SFP/MiNID device:**

1. Connect power to the SFP-CA.2 unit with smart SFP/MiNID plugged in.

   The **RDY** LED on SFP-CA.2 lights up. The smart SFP DIP switch must be in DB INIT\CONFIG or NORMAL mode.

2. Plug the USB connector of SFP-CA.2 into a USB port on your PC.

   New Hardware is Detected notice appears. SFP-CA.2 is identified as a new network.

3. Navigate to **My Network Places(WinXP)/Network and Sharing Center(Win7/Win8)**.

   A new network connection appears in the list of network connections.

   The dialog box closes and your settings are applied.

4. Type in the network properties.
5. In the **Internet Protocol (TCP/IP)** field, configure **the IP address,** subnet mask and default gateway:
   - **IP Address:** 192.168.205.20
   - **Subnet Mask:** 255.255.255.0
   - **Default Gateway:** 192.168.205.1
6. Click **OK**.
7. Close **My Network Places**.

   The PC communication link with SFP-CA.2 and the miniature device is ready.

CONFIGURING HYPERTERMINAL PARAMETERS

You must establish a HyperTerminal connection, including configuring the serial (COM) port, in order to use the HyperTerminal application to download software to the smart SFP/MiNID device.

Note
- *Before performing this procedure, ensure that you have installed the SFP-CA.2 driver and configured the PC network parameters, as described in **Installing Driver for SFP-CA.2** and **Configuring PC Network Parameters for Communication with SFP-CA.2**.*
- *Do not connect the smart SFP/MiNID device to SFP-CA.2 during this procedure.*

➤ **To configure the HyperTerminal parameters:**

1. If the SFP-CA.2 unit is not connected to your PC, connect power to SFP-CA.2 and plug the USB connector of SFP-CA.2 into a USB port on your PC.
2. Open the HyperTerminal application.

   The **Connection Description** dialog box for a new connection appears.

3. Specify a name for the HyperTerminal connection, and click **OK**.

   The **Connect To** dialog box appears.

4. Choose a virtual COM port, for example **COM8**, and click **OK**.

The COM Properties dialog box appears.

5. Specify the settings as listed below and then click **OK**.
   - Bits Per Second: 115200
   - Data Bits: 8
   - Parity: None
   - Stop Bits: 1
   - Flow Control: None.
6. Click **Properties**.

   The **Connection Properties** dialog box appears.
7. Select the Settings tab and under **Emulation**, choose **VT100**, and then click **OK**.

   The COM port configuration is complete, and the HyperTerminal connection is ready for use.
8. Close the HyperTerminal application.

ASSIGNING A NEW IP ADDRESS TO SMART SFPS/MINID

You can configure the smart SFP/MiNID via SFP-CA.2, including assigning it a new IP address.

Note — *Before performing this procedure, ensure that you have installed the SFP-CA.2 driver and configured the PC network parameters, as described in **Installing Driver for SFP-CA.2** and **Configuring PC Network Parameters for Communication with SFP-CA.2**.*

➤ **To assign a new IP address to smart SFP/MiNID:**

1. Select Configuration operation mode in the smart SFP/MiNID by setting its DIP switches as needed. Refer to the smart SFP/MiNID documentation for details on setting the operation mode.
2. If the SFP-CA.2 unit is not connected to your PC, connect power to SFP-CA.2 and plug the USB connector of SFP-CA.2 into a USB port on your PC.
3. Plug the smart SFP/MiNID into the SFP socket on the opposite side of the SFP-CA.2 unit.

   The smart SFP/MiNID is ready for configuration.
4. Open the Web browser on your PC and type **http://192.168.205.1** into the Web browser's address field.

   The Opening screen appears.
5. Click **Login**.

   The Login screen appears.
6. Enter the default user name **su** and the default password **1234** for Superuser access, and then click **Submit**.

   A menu appears to the left and you are able to configure smart SFP/MiNID.
7. Use the menus of the smart SFP/MINID to assign a new IP address. You may continue specifying additional parameters or connect to the smart SFP/MiNID from any PC on your network at a later stage, using the newly assigned IP address.

Note — *When Configuration mode is selected in smart SFP/MiNID via the DIP switches, the miniature device responds to only the default IP address 192.168.205.1, even if the device's IP address has been changed.*

DOWNLOADING SOFTWARE TO SMART SFP/MINID

You can upgrade the smart SFP/MiNID software by downloading software via SFP-CA.2. The HyperTerminal application is used for the software download.

Note — *Before performing this procedure, ensure that you have installed the SFP-CA.2 driver, configured the PC network parameters, and configured the HyperTerminal parameters, as described in **Installing Driver for SFP-CA.2**, **Configuring PC Network Parameters for Communication with SFP-CA.2**, and **Configuring HyperTerminal Parameters**.*

SFP-CA.2

Configuration Tool for Smart SFPs

➤ **To download software to smart SFP/MiNID:**

1. Verify that the upgrade image file is accessible from your PC.
2. Select SW Download (SW DNLD) mode in the smart SFP/MiNID by setting its DIP switches as needed. Refer to the smart SFP/MiNID documentation for details on setting the operation mode.
3. If the SFP-CA.2 unit is not connected to your PC, connect power to SFP-CA.2 and plug the USB connector of SFP-CA.2 into a USB port on your PC.
4. Plug the miniature device into the SFP socket on the SFP-CA.2 unit.
5. Open the HyperTerminal application and load the HyperTerminal connection that you established previously (refer to **Configuring HyperTerminal Parameters**).
6. Follow the smart SFP/MiNID device procedure for downloading software. Refer to the smart SFP/MiNID documentation for details.

REMOVING SMART SFP/MINID AND SFP-CA.2 FROM PC

➤ **To remove smart SFP/MiNID and SFP-CA.2 from the PC:**

1. Close all relevant management applications.
2. On your operation system, allocate the remove hardware icon.
3. Select the required USB port from the listed devices and click **Stop**.

Note	*If you disconnect the smart SFP/MiNID and/or SFP-CA.2 before releasing it as described, your PC may stop responding.*

4. Push the release button at the front of the smart SFP/MiNID device to disconnect it from SFP-CA.2.
5. Remove the smart SFP/MiNID from the SFP socket on SFP-CA.2.
6. Disconnect SFP-CA.2 from the PC and from the power.

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