Single-Slot RF Module

Dual-Band Dual-Slot RF Module

HDM RF Module

Legacy Dual-Slot 40W RF Module

This installation guide provides the information you need to install TE Connectivity FlexWave Prism RF Modules into a Prism Remote Unit (PRU).

Installation instructions are provided for the following Prism Remote Unit RF Modules:

- Single-Bay RF Modules, which includes the HDM and TDD RF Modules
- Dual-Bay RF Modules
    - Dual-Band RF Modules
    - Legacy 40W RF Modules.

TABLE OF CONTENTS

DOCUMENT OVERVIEW

Table 1 lists the RF Modules that this installation guide supports.

Table 1. *FlexWave Prism RF Modules Supported in this Installation Guide*

Catalog Number	Description
High-Density Module (HDM); Single Bay	
F W P - L 4 M T 0 0 0 M O D	20W 700 lABC Module, MIMO HDM, Single Bay
F W P - L 4 M T U 4 M M O D	20W 700 lABC/700uC, Dual, Single Bay
F W P - U 4 M T 0 0 0 M O D	20W 700 uC Module, MIMO HDM, Single Bay
F W P - 4 4 M T 0 0 0 M O D	20W 800 MIMO, Single Bay, with two External Filters
F W P - 4 4 1 T 8 4 1 M O D	20W 800 SMR/ 1900 PCS, Dual RF Module
F W P - C 4 M T 0 0 0 M O D	20W 850 Cell/1900 PCS, Dual, Single Bay
F W P - B 4 M T 0 0 0 M O D	20W 850 DUAL, MIMO, Single Bay
F W P - 8 4 M T 0 0 0 M O D	20W 1900 PCS Dual MIMO, Single Bay
F W P - 8 4 M T A 4 M M O D	20W 1900/2100 Dual, Single Bay
F W P - W 4 M T 0 0 0 M O D	20W 2300 WCS FDD, MIMO HDM, Single Bay
F W P - A 4 1 6 0 0 0 M O D	20W AWS Module, Non-Diversity, HDM, Single Bay
F W P - A 4 M T 0 0 0 M O D	20W AWS Band 4 MIMO HDM, Single Bay
F W P - 8 4 1 6 0 0 0 M O D	20W PCS Module, Non-Diversity, HDM, Single Bay
F W P - B 4 1 0 0 0 0 M O D	20W Wideband Cell Module, Non-Diversity
F W P - T 4 M T 0 0 0 M O D - L	Dual 20W 2500 TDD, MIMO, Single Bay
F W P - A 8 1 T 0 0 0 M O D	40W AWS Band 4 SISO HDM, Single Bay
F W P - 8 8 1 T 0 0 0 M O D	40W PCS Band 2 & 25 SISO HDM, Single Bay
F W P - B 8 1 0 1 0 0 M O D	40W Wideband Cell Module, Non-Diversity, Single Bay
Single SuperDART; Single Bay	
F W P - I 2 1 0 0 0 0 M O D	6.5W 800 APAC Module, Non-Diversity, Classic (Extended 1 MHz)
F W P - 6 2 1 6 0 0 0 M O D	10W 900 EGSM, Non-Diversity, Single SuperDART
F W P - K 2 1 6 0 0 0 M O D	10W 900 P-GSM Module, Non-Diversity, Single SuperDART
F W P - F 2 1 6 0 0 0 M O D	10W APAC EGSM Module, Single SuperDART
F W P - 7 4 1 6 0 0 0 M O D	20W 1800 GSM, Non-Diversity, Single SuperDART
F W P - 9 4 1 6 D 0 0 M O D	20W 2100 UMTS Module, DIV Ready, Single SuperDART
F W P - 9 4 1 6 0 0 0 M O D	20W 2100 UMTS, Non-Diversity, Single SuperDART
F W P - L 4 1 6 0 0 0 M O D	20W 700 Lower ABC Module, Non-Diversity, Single SuperDART
F W P - U 4 1 6 0 0 0 M O D	20W 700 LTE, UPPER C, SISO, Single SuperDART
F W P - U 8 1 6 1 0 0 M O D	40W 700 Upper C Module, Non-Diversity, Single SuperDART, Single Bay
Dual SuperDART; Single Bay	
F W P - 7 4 1 S 0 0 0 M O D	20W 1800 GSM, Non-Diversity, DL SuperDART
F W P - A 4 1 S 0 0 0 M O D	20W AWS 2100 12S
F W P - 8 4 1 S 0 0 0 M O D	20W PCS 1900 12S
F W P - 9 4 1 S 0 0 0 M O D	20W, UMTS 2100, Non-Diversity, DL SuperDART

Table 1. *FlexWave Prism RF Modules Supported in this Installation Guide (Cont.)*

Catalog Number	Description
Two Single SuperDARTs; Diversity; Single Bay	
F W P - 6 2 2 6 0 0 0 M O D	10W 900 EGSM, Diversity, Single SuperDART
F W P - K 2 2 6 0 0 0 M O D	10W 900 P-GSM Module, Diversity, Single SuperDART
F W P - 7 4 2 6 0 0 0 M O D	20W 1800 GSM, Diversity, Single SuperDART
F W P - 9 4 2 6 0 0 0 M O D	20W, 2100 UMTS, Diversity, Single SuperDART
F W P - A 4 2 6 0 0 0 M O D	20W AWS Module, Diversity, Single SuperDART
F W P - 8 4 2 6 0 0 0 M O D	20W PCS Module, Diversity, Single SuperDART
Classic DART; Single Bay	
F W P - 4 2 1 0 0 0 0 M O D	6.5W 800 SMR Module, Non-Diversity, Classic
F W P - 8 4 2 0 0 0 0 M O D	20W 1900 PCS Diversity
F W P - 8 4 1 0 0 0 0 M O D	20W 1900 PCS Non-Diversity
F W P - A 4 2 0 0 0 0 M O D	20W 2100 AWS Diversity
F W P - A 4 1 0 0 0 0 M O D	20W 2100 AWS Non-Diversity
F W P - B 4 2 0 0 0 0 M O D	20W Wideband Cell Module, Diversity, Classic
F W P - J 4 1 0 D 0 0 M O D	20W 850 Cell (870-890) Module, Diversity Ready, Classic
Classic DART; Two-Bay	
F W P - 8 8 1 0 0 0 0 M O D	40W PCS Module, Non-Diversity, Classic, Dual-Bay
F W P - A 8 1 0 0 0 0 M O D	40W AWS Module, Non-Diversity, Classic, Dual-Bay
Dual Classic DART; Two-Bay	
F W P - D 2 1 0 0 0 0 M O D	6.5W 800/900 ESMR Module, Non-Diversity, Classic

The RF Modules listed in Table 1 are compatible only with the Remote Units listed in Table 2.

Table 2. *Supported FlexWave Prism Remote Unit Chassis*

Catalog Number	Description
F P 1 - X X X X X X X X X X X R U	Single-Bay Prism Remote
F P 2 - X X X X X X X X X X X R U	Dual-Bay Prism Remote
F P 3 - X X X X X X X X X X X R U	Tri-Bay Prism Remote
F P 4 - X X X X X X X X X X X R U	Quad-Bay Prism Remote

Revision History

Issue	Document Date	Technical Updates
1	April 2012	Original
2	February 2013	Changed Prism Remote Unit model names from Single-/Dual-/Tri-/Quad-**Band** to Single-/Dual-/Tri-/Quad-**Bay**.
3	May 2013	Added "Understanding RF Cable Rules" on page 18.
4	October 2013	Added the 20W AWS Band 4 MIMO HDM, 40W AWS Band 4 SISO HDM and 40W PCS Band 25 SISO HDM RF Modules.
5	January 2014	Added FWP-84MT000MOD and FWP-L4MTU4MMOD RF Modules, and added Table 12 on page 39.
6	August 2014	Added FWP-B4MT000MOD, FWP-44MT000MOD, and FWP-84MTA4MMOD RF Modules; added the external FlexWave Notch Filter (FWP-SPRINTFILTER), see "FlexWave Notch Filter (FWP-SPRINTFILTER)" on page 47.
7	December 2014	Added caution about potential temporary loss of RF for HDM RF Modules after closing the chassis door.
8	September 2015	Adds support for FWP-W4MT000MOD and FWP-T4MT000MOD-L; adds "Close the Remote Unit Door and Solar Shield" on page 46.

Document Cautions and Notes

Two types of messages, identified below, appear in the text:

CAUTION! **Cautions indicate operations or steps that could cause personal injury, induce a safety problem in a managed device, destroy or corrupt information, or interrupt or stop services.**

NOTE: **Notes contain information about special circumstances.**

Abbreviations Used in this Guide

CDRH	Center for Diseases and Radiological Health	MHz	Megahertz
cm	Centimeter	MIMO	Multiple-Input Multiple-Output
DART	Digital/Analog Radio Transceiver	MOD	Module
dB	Decibel	PA	Power Amplifier
dBm	Decibel-milliwatts	PRIM	Primary
DCS	Distributed Call Signaling	PRU	Prism Remote Unit
DD	Digital Dividend	PWR	Power
DIV	Diversity	REV	Reverse
DPM	Digital Processing Module	RF	Radio Frequency
EMC	Electromagnetic Compatibility	Rx	Receive
ESD	Electro-Static Discharge	SDART	Super Digital/Analog Radio Transceiver
EU	European Union	SeRF	Serialized RF
FCC	Federal Communications Commission	SFP	Small Form-Factor Pluggable
FDA	Food and Drug Administration	TDD	Time-Division Duplex
FRU	Fullband Remote Unit	TIM	Thermal-Interface Material
FWD	Forward	Tx	Transmit
HDM	High Density Module	UL	Underwriters' Laboratories, Inc.
HMFOC	Hardened Multi-Fiber Optic Connector	UMTS	Universal Mobile Telecommunications System
IC	Industry Canada	W	Watt
LED	Light-Emitting Diode	WCS	Wireless Communications Services
LVDS	Low-Voltage Differential Signaling		

OVERVIEW OF RF MODULES FOR PRISM REMOTE UNITS

Figure 1 illustrates the Prism Remote Unit (PRU), which controls RF emissions, interfaces with the FlexWave Prism Host Unit.
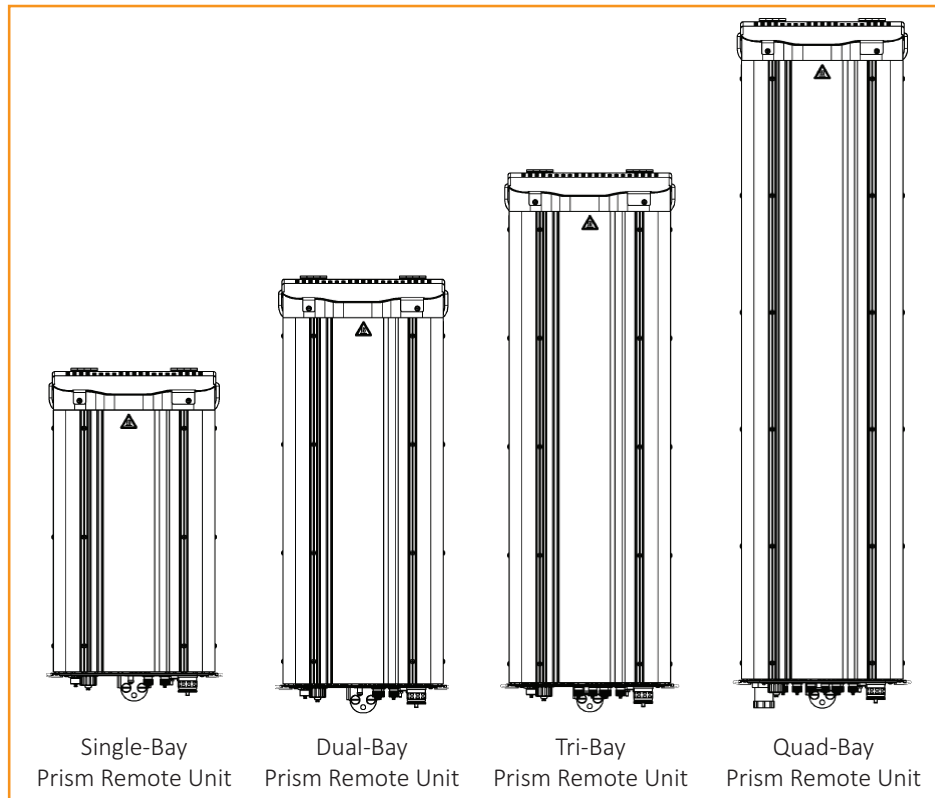

| Single-Bay Prism Remote Unit | Dual-Bay Prism Remote Unit | Tri-Bay Prism Remote Unit | Quad-Bay Prism Remote Unit |

Figure 1. Prism Remote Units (PRUs)

Depending on the Prism Remote Unit model, a PRU enclosure can have from one to four RF Module bays and can support up to four RF Modules, as indicated by the model name. That is, the Single-Bay PRU has one RF Module bay and can only support one RF Module, and the Quad-Bay PRU has four RF Module bays and can support up to four RF Modules.

The function of the Remote Unit RF Modules on the Forward Path is to:

- convert the digitized RF transported from the Host to Analog RF
- amplify the Analog RF signal
- provide signal filtering.

The function of the Remote Unit RF Modules on the Reverse Path is to:

- convert the Analog RF from the handset to Digital RF for transport to the Host
- amplify the Digital RF signal
- provide signal filtering.

NOTE: The RF Modules are field replaceable, but cannot be serviced in the field.

RF Module Digital/Analog Radio Transceivers

Each RF Module can support any of the following Digital/Analog Radio Transceiver (DART) combinations:

- one Classic DART or one Single SuperDART
- two Classic DARTs (i.e., the 6.5W 800/900 ESMR Module, Non-Diversity, Classic)
- two Classic DARTs—Diversity
- two Single SuperDARTs—Diversity
- one Dual SuperDART
- one or two sets of Tx and Rx Boards (HDM).

Each RF Module will have up to two 6-timeslot DARTs or one 12-timeslot DART per RF Module.

The DART type determines the maximum number of links, where there can be up to eight Classic DARTs or Single SuperDARTs that support 39 MHz each, or up to 4 Dual SuperDARTs that support up to 75MHz each.

Prism supports the DART Module types listed below.

- Classic DARTs are 6-timeslot DARTs that support up to 35 MHz contiguous bandwidth (see Table 3 on page 7).
- Single SuperDARTs are 6-timeslot DARTs that support two non-contiguous bands in the entire frequency range of the DART, but cannot exceed 39 MHz total RF bandwidth (see Table 4 on page 8).
- Dual SuperDARTs are 12-timeslot DARTs that support up to 60-75 MHz (see Table 5 on page 8)

NOTE: **Industry Canada PCS 20 dB nominal bandwidth is less than 61.5 MHz.**

NOTE: **Industry Canada AWS 20 dB nominal bandwidth is less than 47.2 MHz**

Table 3. *Single-Position Classic DARTs*

DART Module Type	Maximum Bandwidth (MHz)	Maximum Fiber Slots
800 APAC iDEN Classic	19	3
800 SMR Classic	7*	3
850 Cell Classic	25	4
900 SMR Classic	5	1
* Classic Prism RF Modules and Spectrum RAU support 18 MHz; Prism HDM 800 only supports 7 MHz, per Sprint direction.		

Table 4. *Single-Position SuperDARTs*[(1)]

DART Name	Used in…		Maximum Frequency Span (MHz)	Maximum Bandwidth (MHz)	Maximum Fiber Slots
	Host Units	HEUs			
1800 GSM SGL SuperDART	Yes	No	75	39	6
1900 PCS SGL SuperDART	Yes	Yes	70	39	6
2100 AWS SGL SuperDART	Yes	Yes	45	39	6
2100 UMTS SGL SuperDART	Yes	No	60	39	6
700 IABC SGL SuperDART	Yes	Yes	18	18	3
700 uC SGL SuperDART	Yes	Yes	10	10	2
900 EGSM SGL SuperDART	Yes	No	35	35	6

(1)   When using a Host Unit with both a SeRF II and System Board II or III, the bandwidths and fiber for the following Single SuperDARTs can be greater than 6 fiber slots, for full-band capability, when used in Host Unit Slots 1 and 3:
- 1800 GSM SGL SuperDART
- 1900 PCS SGL SuperDART
- 2100 AWS SGL SuperDART
- 2100 UMTS SGL SuperDART

This requires 12 fiber slots when full-band passband is selected for these Single SuperDARTs in Host Unit DART positions 1 and 3.

Table 5. *Dual-Position SuperDARTs*

DART Module Type	Maximum Bandwidth (MHz)	Maximum Fiber Slots
1800 GSM DL SuperDART	75	12
1900 PCS DL SuperDART	70	12
2100 AWS DL SuperDART	45	8
2100 UMTS DL SuperDART	60	12

RF Module Types

The Remote Unit RF Modules are available in the following formats, and as described in the following sections:

Single- and Dual-Bay RF Modules with Classic or SuperDARTs

Figure 2 shows examples of Single- and Dual-Bay RF Modules, both of which have two DARTs.

Single-Bay RF Modules have the following elements:

- one or two DARTs
- one Duplexer that comprises
  - one Low Noise Amplifier (LNA)
  - one Power Detector (PD)
- one Linear Power Amplifier (LPA)
- one Remote DART Interface (RDI) board.

Dual-Band Dual-Bay RF Modules have the following elements:

- two DARTs
- two Duplexers, each of which comprises
  - one Low Noise Amplifier (LNA)
  - one Power Detector (PD)
- one Linear Power Amplifier (LPA)
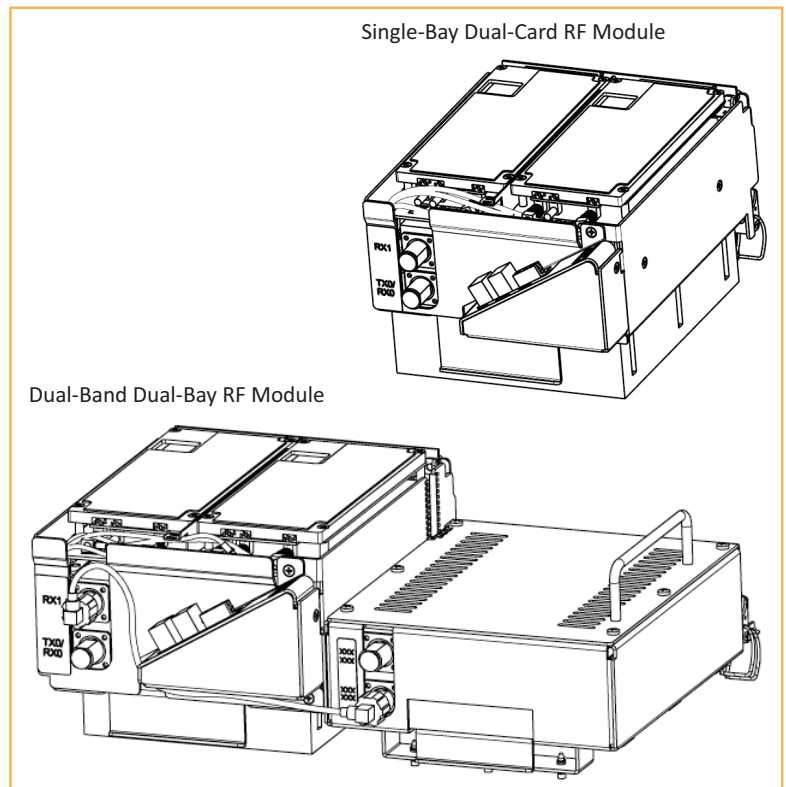- one Remote DART Interface (RDI) board.

Figure 2. Single- and Dual-Bay RF Modules

HDM RF Modules

High-Density Module (HDM) RF Modules (Figure 3) are designed to provide the ability to deploy either a two 20W Multiple Input Multiple Output (MIMO) paths of the same band, known as a MIMO RF Module; two 20W Single Input Single Output (SISO) with two different bands, known as dual RF Module; or a single 40W Single Input Single Output (SISO) RF Module within a single-bay of a PRU. An HDM RF Module does the following:

• interfaces with one Host DART-either Classic or SuperDART, or one CDIU

• supports two non-contiguous RF slices up to 39 MHz total bandwidth in a Dual or MIMO configuration

• supports full bandwidth in a SISO configuration, up to 75 MHz

• supports 20W per band/Path in a Dual/MIMO RF Module

• supports up to 40W RF output power in a SISO RF Module.

The components of a PRU HDM RF Module are dependent on the module type, as listed in Table 6.

Table 6. *Components of PRU HDM RF Modules*

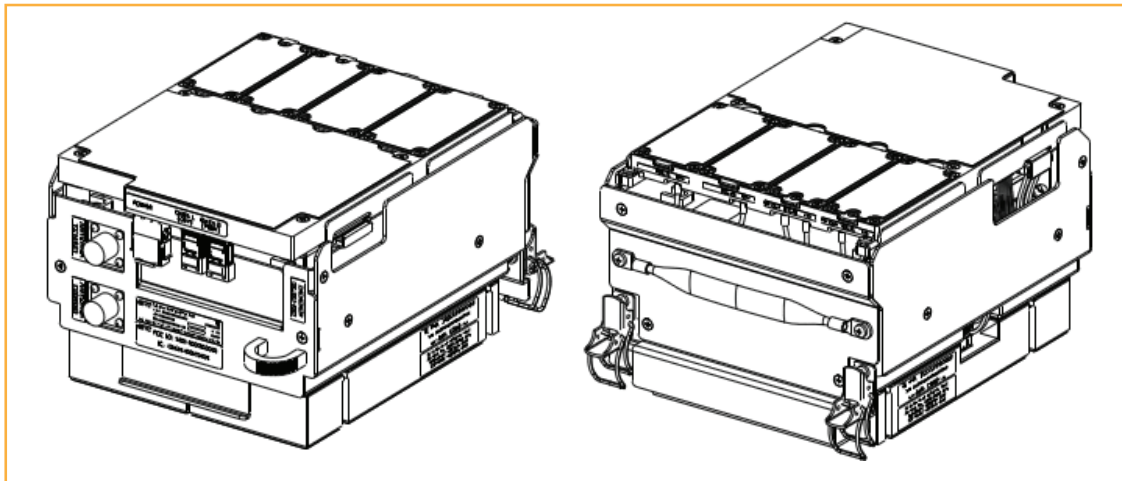| RF Module Type	DPM	LPA	Duplexer	LNA	Power Detector	Rx Card	Tx Card
SISO	1	1	1	1	1	1	1
MIMO/Dual Band Module	1	2	2	2	2	2	2

Figure 3. HDM RF Modules

Legacy Dual-Bay 40W RF Modules

The Legacy Dual-Bay 40W RF Module (Figure 5) is designed for AWS and PCS frequencies and is supported only by Classic DARTs. The Legacy Dual-Bay 40W RF Module comprises:

- one Classic DART
- one Duplexer that comprises
    – one Low Noise Amplifier (LNA)
    – one Power Detector (PD)
- two Power Amplifiers (PAs)
- one Remote DART Interface (RDI) board.

NOTE: **This manual describes how to install the PCS 1900 and AWS 2100 Non-Diversity RF Modules.**
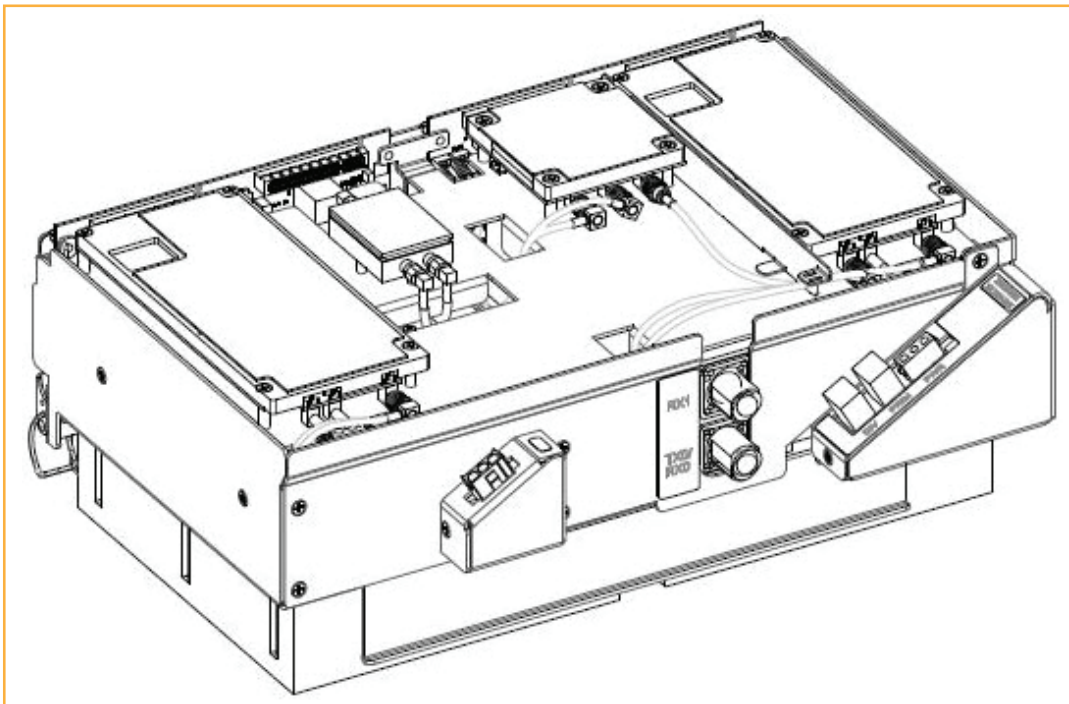

Figure 4. Legacy Dual-Bay 40W RF Module

RF Module Components

Figure 5 shows typical RF Module components, using the Single-Bay RF Module as an example.
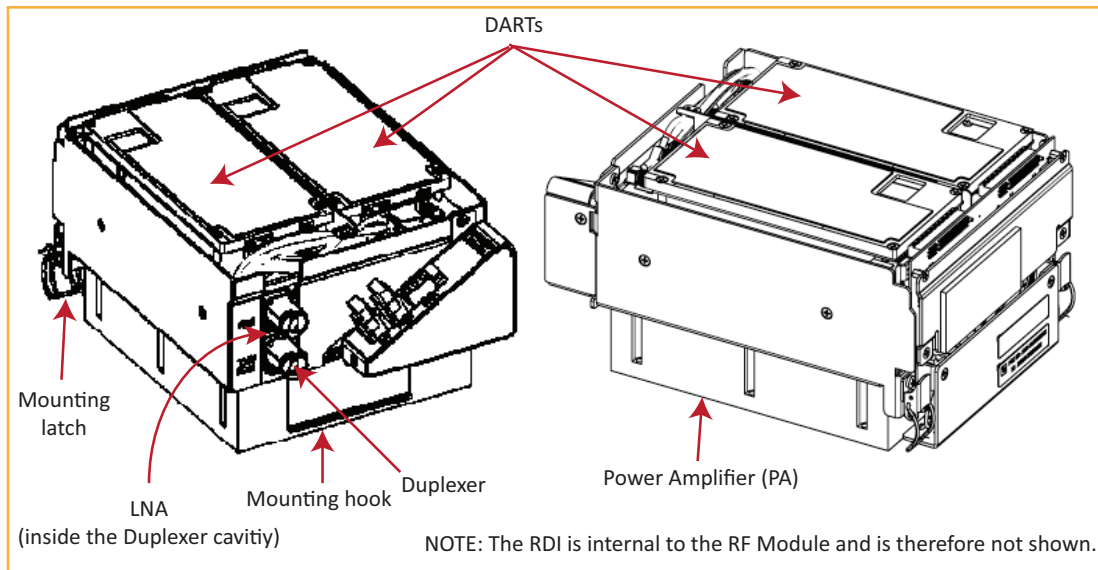

Figure 5. Single-Bay RF Module Components

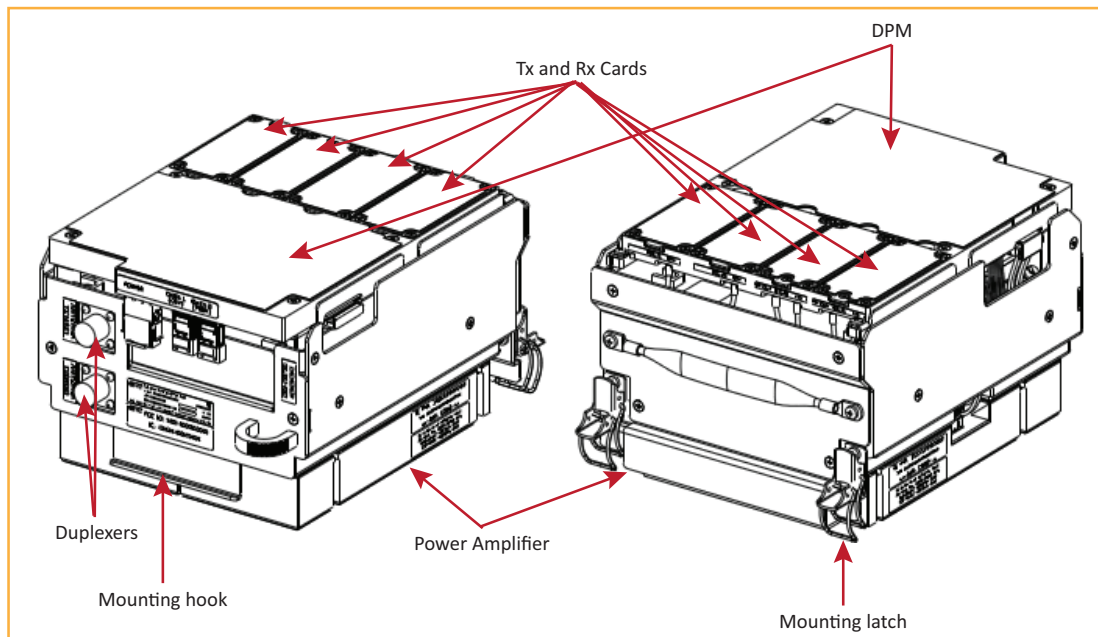Figure 6 shows the components of an HDM RF Module.

Figure 6. HDM RF Module Components

Linear Power Amplifiers

The Linear Power Amplifier (LPA) is a high quality broadband RF amplifier used for achieving Prism product-rated power for the Remote Unit Tx forward path RF. The PAs are pass-band specific, with the maximum composite Tx power levels listed in Table 7 for Single-Card, Dual-Card, and HDM RF Modules and Table 8 on page 13 for Legacy Dual-Bay 40W RF Modules.

The LPA is housed within the RF Module, and is not field serviceable.

Table 7.   *LPA Maximum Composite Tx Power Levels for Single-Card, Dual-Card, and HDM RF Modules*

Passband	Maximum dBm	Watts	Bandwidth (MHz) supported across entire spectrum				
			HDM		Single Super DART	Classic DART	Dual SuperDART
			Dual/MIMO	SISO			
AWS 2100	43	20	39	45	39	NA	45
	46	40	NA	45	39	NA	45
Cellular 850	43	20	25	25	NA	25	NA
	46	40	25	25	NA	25	NA
EGSM 900	40	10	35	35	35	NA	NA
DCS 1800	42	15.8	39	75	39	NA	75
LTE 700 Lower ABC	43	20	18	18	18	NA	NA
LTE 700 Upper C	43	20	10	10	10	NA	NA
	46	40	10	10	10	NA	NA
PCS 1900	43	20	39	70	39	NA	70
	46	40	39	70	39	NA	70
PGSM 900	40	10	25	25	25	NA	NA
SMR 800	43	20	7	7	NA	7	NA
SMR 900	38	6.5	NA	NA	NA	5	NA
UMTS 2100	42	15.8	39	60	39	NA	60
2300 WCS	43	20	10	10	10	NA	NA

Table 8.   *LPA Maximum Composite Tx Power Levels for Legacy Dual-Bay 40W RF Modules*

Passband	Maximum dBm	Watts	Bandwidth (MHz) supported across entire spectrum Classic DART
PCS 1900	+46	40	35
AWS 2100	+46	40	35

NOTE: **Industry Canada 20 dB Pass Band Model Number FWP-C4MT000MOD Cellular 850 MHz = 26.3 MHz and the PCS 1900 = 66.8 MHz.**

Duplexer and Low Noise Amplifier

The RF Module provides the Remote Unit with an internal Duplexer that is optimized to provide the desired RF band-pass filtering and in-band equipment isolation between FWD and REV paths. The Duplexer provides the filtering necessary to the transmit and receive paths to and from the connected antenna.

The Duplexer for the Single- and Dual-Bay RF Modules and the Legacy Dual-Bay 40W RF Modules contains up to two REV path Low Noise Amplifiers (LNA for PRI and/or SEC reverse paths).

The Duplexer for an HDM RF Module does not have a Low Noise Amplifier.

Duplexers are not field serviceable.

Digital Processing Module

The Digital Processing Module (DPM) is found only in the HDM RF Modules. The DPM provides the primary processing and logic functions for the HDM RF Module. It also provides the primary power interface for the HDM RF Module, and conversion of the native 28 Vdc voltage to lower voltages as necessary for functionality.

The DPM has a Transmit (Tx) Board and a Receive (Rx) Board:

- Tx Board—provides band specific filtering for the intended Transmit path.
- Rx Board—provides band specific filtering for the intended Receive path.

Cables

Always provided at each RF Module shelf are five cables:

- two High-Speed Data Cables, which in this document are referred to as LVDS (Low-Voltage Differential Signaling) cables
- two RF Cables (TX0/RX0) and (TX1/RX1)
- one Power (PWR) Cable.

The RF Module cables that are pre-installed in the PRU connect to the corresponding connectors on the RF Module. The RF Module cables correlate to the antenna connectors on the bottom of the Remote Unit chassis.

-

RF GROUP ASSIGNMENTS FOR PRU RF MODULE BAYS

A PRU comprises from one to four RF Module bays. Figure 7 illustrates the numbering of RF Module bays and DARTs.

Quad-Bay Remote Unit with Single-Card RF Modules

DART 7 — Bay D
DART 8

DART 5 — Bay C
DART 6

DART 3 — Bay B
DART 4

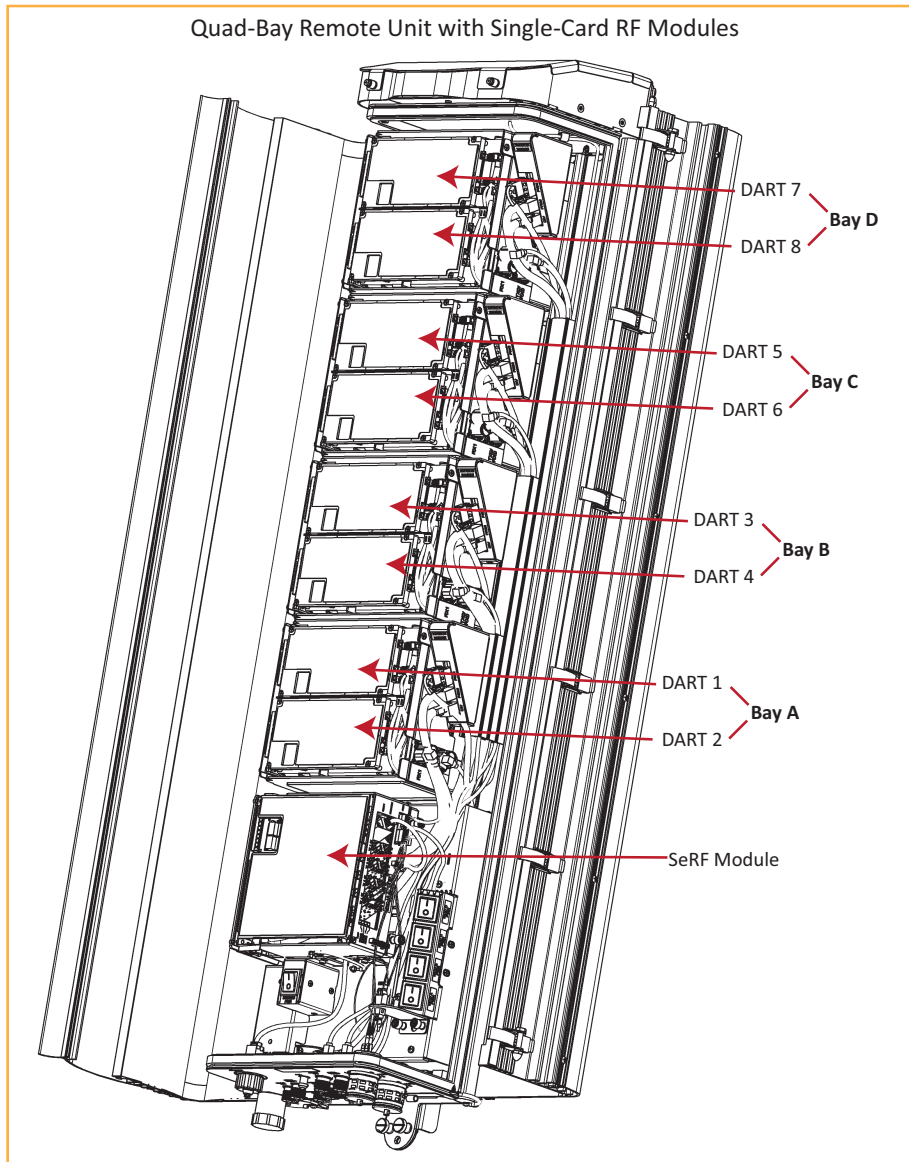DART 1 — Bay A
DART 2

SeRF Module

Figure 7. RF Modules Bays in a PRU

Table 9 lists how the FlexWave Prism EMS references the RF group assignments and corresponding components of each RF Module.

Table 9. *Remote Unit RF Group Assignments (from Top/Down)*

| Physical RF Bay | DART Number | LNA Number | | LPA Number for Single LPA | LPA Number for Dual LPAs | Power Detector Number for Single PD | Power Detector Number for Dual PDs |
		Primary	Diversity				
D	8		8	7	8	7	8
	7	7			7		7
C	6		6	5	6	5	6
	5	5			5		5
B	4		4	3	4	3	4
	3	3			3		3
A	2		2	1	2	1	2
	1	1			1		1
NOTE: For software releases prior to 7.3, the LPAs were labeled as **1**, **2**, **3**, and **4**.							

NOTE: **For Classic dual position 40W RF Modules only: in a dual LPA system, the Configure Remote Forward Gain page shows two values for the LPA status, one for each LPA. Changing the LPA Mode or resetting the LPA applies to both LPAs at the same time.**

CAUTION! **Should your system experience an LPA problem, refer to Table 9 to ensure that you apply new settings or troubleshoot the correct RF Module.**

The Legacy Dual-Bay 40W RF Module occupies two bays in a PRU. Figure 8 shows the main components in a PRU enclosure, with a Legacy 40W RF Module occupying Bays A and B. The controlling DART will always be in the upper bay (B or D), and the second LPA is always in the lower bay (A or C).
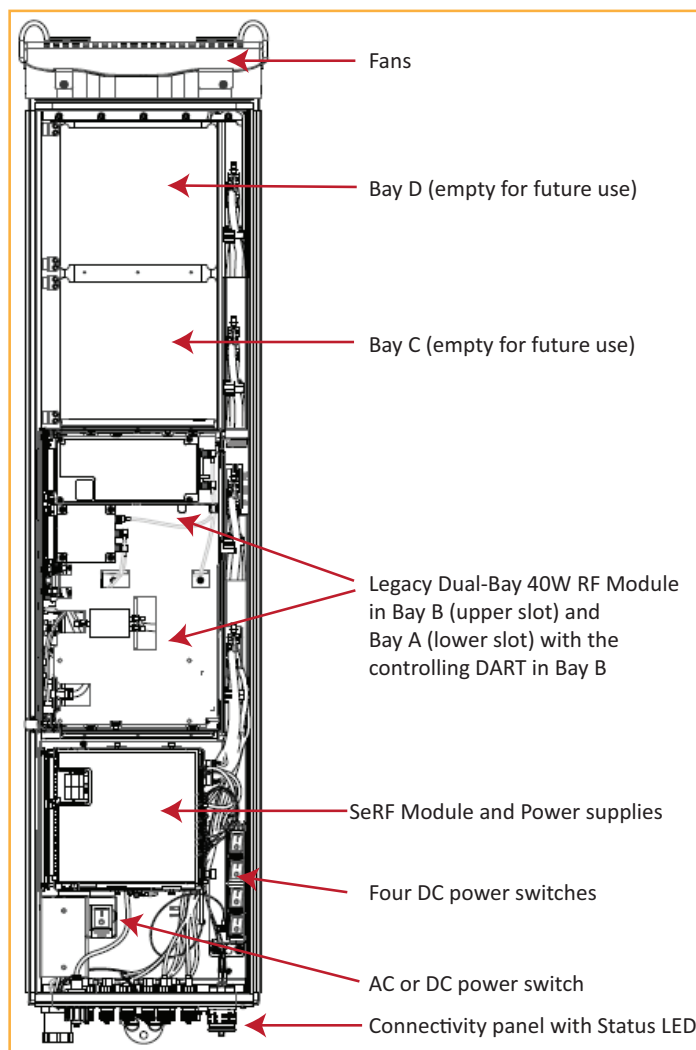
Figure 8. Legacy Dual-Bay 40W RF Module in a Quad-Bay PRU

NOTE: If a Legacy Dual-Bay 40W RF Module AWS 2100 and a Legacy Dual-Bay 40W RF Module PCS 1900 are both installed in a Quad-Bay PRU, it is recommended that the PCS 1900 be installed in upper-most bay, and the AWS 2100 be installed in the lower-most bay.

NOTE: To accommodate two-bay modules, you need to remove a module bay shelf as described in "Dual-Bay Modules Only—Remove the Module Bay Shelf" on page 25.

UNDERSTANDING RF CABLE RULES

- When installing a Diversity, MIMO or Dual-Band RF Module, both RF cables labeled MOD N TX0/RX0 and MOD N TX1/RX1 shall be connected to the N-Style connections of the RF Module. Note that older labeling schemes used "PRI" and "DIV". To match old labeling schemes to current labeling:

Old Label	New Label
PRI	TX0/RX0
DIV	TX1/RX1

- When installing a Non-Diversity or SISO RF Module, or an SMR 800/900 Dual-Band Dual-Bay RF Module:
    - The MOD N TX0/RX0 cable shall be connected to the single available N-Style RF Connection of the RF Module.
    - The MOD N TX1/RX1 cable shall be constrained to the existing cables using a tie wrap or similarly accepted fastener so it cannot be pinched or prevent the Remote Unit door from closing. Do not cut or attempt to otherwise remove this RF Cable.

- RF cables are hand-formable; however, cables must adhere to a minimum bend radius of 1-inch from the outlet of the integrated cable guide to the respective N-Style RF connection on the RF Module.

RF Module Cables and Supported Bay Use for Single-Card, Dual-Card, and HDM RF Modules

The RF cable and connector labels correspond to the RF Module bays in the Remote Unit chassis, where **MOD A** is the bottom bay and **MOD D** is the top bay.

- The cables and connectors have corresponding labels as shown in Table 10 for Single-Card, Dual-Card, and HDM RF Modules. For Dual-Bay installations, the RF cables and connectors are labeled as **MOD N TX0/RX0** and **MOD N TX1/RX1**, where **N** refers to the top bay of the double-bay installation. For example:
    - For a Dual-Bay installation in a Quad-Bay chassis in which the RF Module is installed in the Bay D and Bay C combination, the RF cables and connectors are labeled as **MOD D TX0/RX0** and **MOD D TX1/RX1**.
    - For a Dual-Bay installation in a Tri-Bay chassis in which the RF Module is installed in the Bay B and Bay A combination, the RF cables and connectors are labeled as **MOD B TX0/RX0** and **MOD B TX1/RX1**.

- Table 10 also shows which RF Module type can be installed in which PRU bay or bay combination.

- The Single-Bay chassis is not included in Table 10.

Table 10. *Supported Bay Use and RF Antenna Labels for Single-Card, Dual-Card, and HDM RF Modules (From Top of Remote Unit Chassis Down)*

	Supported Bay Configurations for Single-Bay RF Modules	Supported Bay Combinations for Dual-Bay RF Modules			RF Module Cable, RF Module Connector, and Remote Antenna Connector Label	Function
		Supported Bays in Dual-Bay Chassis	Supported Bays in Tri-Bay Chassis	Supported Bays in Quad-Bay Chassis		
Bay D	MOD D	N/A	N/A	MOD D	Mod D TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module D
					Mod D TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module D
Bay C	MOD C	N/A	MOD C		Mod C TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module C
					Mod C TX1/RX1	Diversity receive/Path 2 for Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module C
Bay B	MOD B	MOD B	MOD B	MOD B	Mod B TX0/RX0	Transmit RF power and primary/Path 1receive to/from the antenna for RF Module B
					Mod B TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module B
Bay A	MOD A				Mod A TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module A
					Mod A TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module A

RF Module Cables and Supported Bay Installations for Legacy Dual-Bay 40W RF Modules

The cables and connectors have corresponding labels as shown in Table 11 for Legacy Dual-Bay 40W RF Modules. Table 11 also shows which RF Module type can be installed in which PRU bay(s) when a 40W Dual-Bay RF Module is part of the RF Module mix in a PRU chassis. The Single-Bay chassis is not included in Table 11.

For Dual-Bay installations, the RF cables and connectors are labeled as **MOD N TX0/RX0** and **MOD N TX1/RX1**, where **N** refers to the top bay of the double-bay installation. For example:

- For a Dual-Bay installation in a Quad-Bay chassis in which the RF Module is installed in the Bay D and Bay C combination, the RF cables and connectors are labeled as **MOD D TX0/RX0** and **MOD D TX1/RX1**.

- For a Dual-Bay installation in a Tri-Bay chassis in which the RF Module is installed in the Bay C and Bay B combination, the RF cables and connectors are labeled as **MOD C TX0/RX0** and **MOD C TX1/RX1**.

Table 11. *Supported Bay Assignments and RF Antenna Labels for Legacy Dual-Bay 40W RF Modules (From Top of Remote Unit Chassis Down)*

	Supported Bay Combinations for Legacy 40W Dual-Bay RF Modules					RF Module Cable, RF Module Connector, and Remote Antenna Connector Label	Function
	Dual-Bay	Tri-Bay	Tri-Bay	Quad-Bay			
Bay D	N/A	N/A	N/A	MOD D	MOD C	Mod D TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module D
						Mod D TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module D
Bay C	N/A	MOD C	MOD C		MOD C	Mod C TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module C
						Mod C TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module C
Bay B	MOD B	MOD B		MOD B	MOD B	Mod B TX0/RX0	Transmit RF power and primary/Path 1receive to/from the antenna for RF Module B
						Mod B TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module B
Bay A	MOD B	MOD B	MOD A	MOD B	MOD A	Mod A TX0/RX0	Transmit RF power and primary/Path 1 receive to/from the antenna for RF Module A
						Mod A TX1/RX1	Transmit RF power and secondary/Path 2 receive to/from the antenna for RF Module A

Note: For Dual Module installations the center module shelf needs to be removed; see "Dual-Bay Modules Only—Remove the Module Bay Shelf" on page 25.

Note: Install the Legacy Dual-Bay 40W RF Module in the lower-most bay in the chassis. If, however, if two Legacy Dual-Bay 40W RF Modules are present, install the 2100 Module in the lower-most Bay and the 1900 Module in the upper-most Bay.

INSTALL THE RF MODULE(S)

The following sections guide you through the installation of an RF Module into a Remote Unit chassis. The process to install the four different types of RF Modules is basically the same; however, differences are noted and should be followed.

NOTE: In the following steps, the RF cables and connectors are referred to as MOD N TX0/RX0 and as MOD N TX1/RX1 where N equals A, B, C, or D.

NOTE: When installing RF Modules, populate the RF Modules from highest frequency band to lowest within the Remote Unit chassis. Likewise for power output, populate from the bottom bay to the top; higher output to lower output. That is, for a deployment with 2100 40W, 1900 40W, 850 20W and 700 20W MIMO, install the RF Modules as follows:

- 2100 40W RF Module in Bay A
- 1900 40W RF Module in Bay B
- 850 20W RF Module in Bay C
- 700 20W MIMO RF Module in Bay D.

Safety Precautions

CAUTION! This is restricted access equipment and only qualified service personnel should service and operate this equipment using appropriate tools.

CAUTION! Wet conditions increase the potential for receiving an electrical shock when installing or using electrically-powered equipment. To prevent electrical shock, never install or use electrical equipment in a wet location or during a lightning storm.

CAUTION! Always allow sufficient fiber length to permit routing of patch cords and pigtails without severe bends. Fiber optic patch cords or pigtails may be permanently damaged if bent or curved to a radius of less than 2 inches (5.1 cm).

CAUTION! Exterior surfaces of the Prism Remote Unit may be hot. Use caution during servicing.

CAUTION! Service personnel must confirm that the perimeter gasket and door-to-door gaskets are in place when closing the Remote Unit doors after servicing.

CAUTION! This equipment uses a Class 1 Laser according to FDA/CDRH rules. Laser radiation can seriously damage the retina of the eye. Do not look into the ends of any optical fiber. Do not look directly into the optical transceiver of any digital unit or exposure to laser radiation may result. An optical power meter should be used to verify active fibers. A protective cap or hood MUST be immediately placed over any radiating transceiver or optical fiber connector to avoid the potential of dangerous amounts of radiation exposure. This practice also prevents dirt particles from entering the adapter or connector.

CAUTION! This system is an RF Transmitter and continuously emits RF energy. Maintain 3 foot (91.4 cm) minimum clearance from the antenna while the system is operating. Wherever possible, shut down the RAN before servicing the antenna.

Guard against Damage from Electro-Static Discharge

CAUTION! Electro-Static Discharge (ESD) can damage electronic components. To prevent ESD damage, always wear an ESD wrist strap when working with a Prism Remote Unit or when handling any of its components—including the RF Modules. Connect the ground wire on the ESD wrist strap to an earth ground source before touching the Prism Remote Unit or any of its components. Wear the wrist strap the entire time that you work with the Prism Remote Unit and its components.

CAUTION! Place Prism RF Modules in anti-static packing material when transporting or storing them.

Unpack and Inspect the RF Module

1   Inspect the exterior of the shipping container(s) for evidence of rough handling that may have damaged the components in the container.

2   Unpack each container while carefully checking the contents for damage and verify with the packing slip.

3   If damage is found or parts are missing, file a claim with the commercial carrier and notify TE Customer Service (see "Contacting TE Connectivity" on page 52). Save the damaged cartons for inspection by the carrier.

4   Save all shipping containers for use if the equipment requires shipment at a future date.

CAUTION! Handle the RF Module with care during installation. Be especially careful to not damage the thermal-interface material (TIM), which is attached to the LPA, DARTs, and/or Motherboard with TX/RX boards. If the TIM is damaged, the LPA can overheat. Before installing the RF Module, check to see if the heatsink material is gouged or cracked. If the TIM is damaged, do not install the RF Module and contact TE Connectivity for assistance (see "Contacting TE Connectivity" on page 52 for contact information).

CAUTION! If the thermal-interface material is damaged, the installation and use of the RF Module may void the warranty of the RF Module.

Remove Release Liners from the RF Module

NOTE: **Release Liners are present on front and back of new modules.**

1   Open the Remote Unit enclosure.

2   Remove release liners, if present, from the thermal pads on the RF Module prior to installing the module into the Remote Unit chassis.

CAUTION!   The thermal pads are very sensitive to mishandling—do not nick, scratch, or ding them.

For Single- and Dual-Bay RF Modules, the thermal pads are located as listed below and as shown in Figure 9, which shows a Legacy Dual-Bay 40W RF Module.

- one large pad on the back surface of each Linear Power Amplifier (LPA)

- up to two on the front surface (DARTs)

- one on the left side for the (RDI)

- one on the vector modulator board
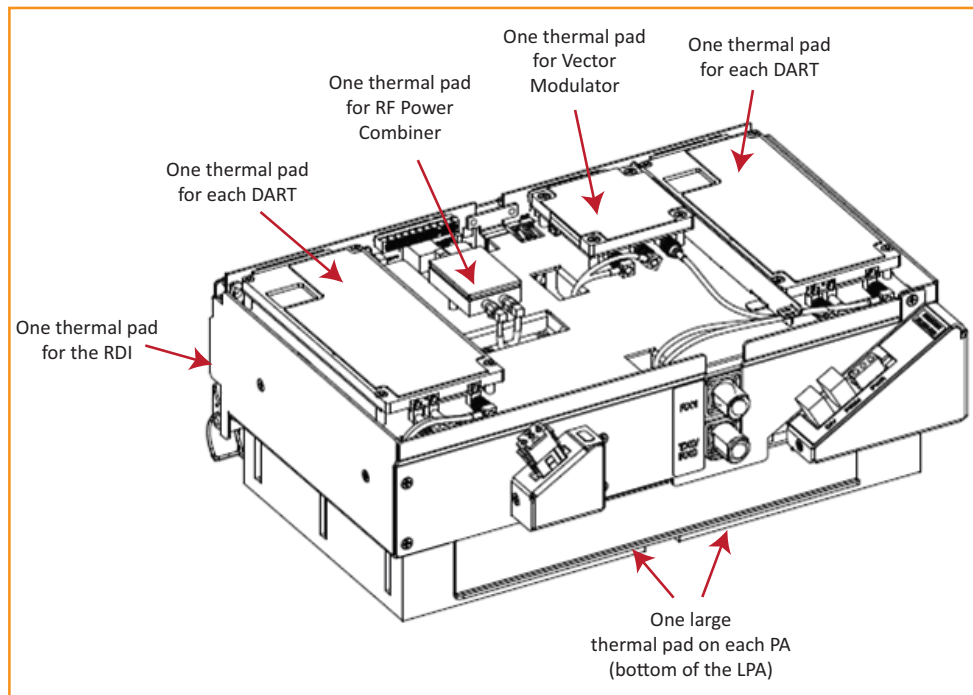
- one on the RF power combiner.

Figure 9. Thermal Pads on a Legacy Dual-Bay 40W RF Module

For HDM RF Modules, the thermal pads are located as listed below and as shown in Figure 10.

- one pad for each Rx and Tx board

- one large pad over the DPM

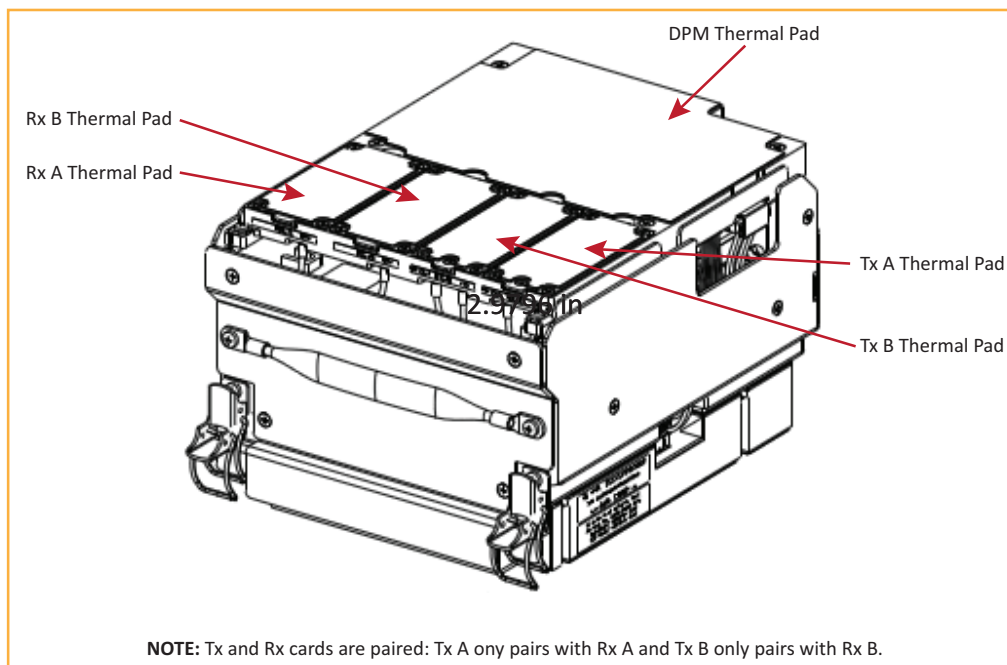- one for each Power Amplifier (PA), which is on the bottom of the HDM RF Module.

DPM Thermal Pad

Rx B Thermal Pad

Rx A Thermal Pad

Tx A Thermal Pad

Tx B Thermal Pad

2.97 in

NOTE: Tx and Rx cards are paired: Tx A ony pairs with Rx A and Tx B only pairs with Rx B.

Figure 10. Thermal Pads on an HDM RF Module

Check the DC Power Switch for the Module Bay

Ensure that the DC power switch that corresponds to the bay(s) in which the RF Module is to be installed is in the Off position (see graphic to the right).

DC Power switch for Bay D

DC Power switch for Bay C

DC Power switch for Bay B

DC Power switch for Bay A
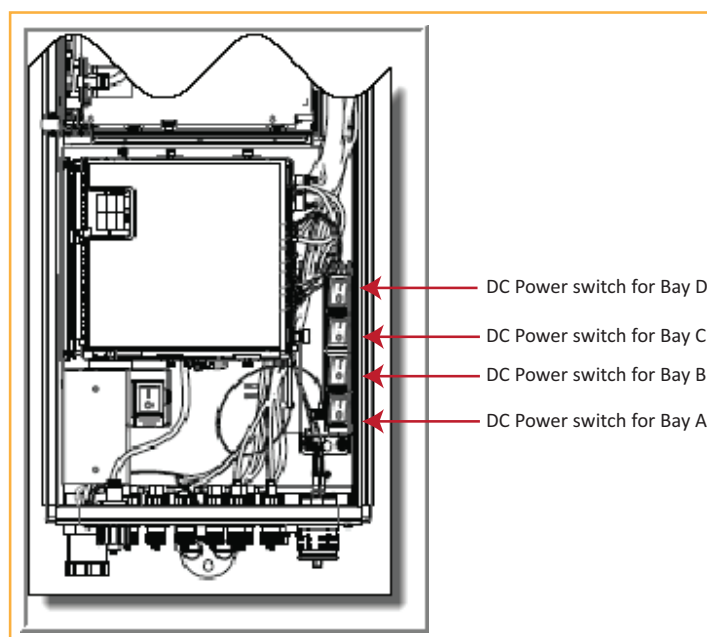
Dual-Bay Modules Only—Remove the Module Bay Shelf

1 FOR DUAL-BAY RF MODULES ONLY.

If you are installing a Dual-Bay RF Module, you must remove a module bay shelf from the PRU chassis to accommodate the module's size. (For further information, see Table 10 on page 19.)

Remove the shelf as appropriate for the RF Module:

- When installing in the A and B Bays, remove the Module B Bay Shelf.

- When installing in the C and D Bays, remove Module D Bay Shelf.

To remove a Module Bay Shelf:

a Use a 9/64" Allen™ wrench to remove the three screws that attach the module shelf to the PRU chassis, as shown in the following graphic.

b Discard or store the module shelf and fasteners.

Remove Module D Shelf for Dual-Band Dual-Slot RF Modules

Use 9/64" Allen Wrench to remove the three module-shelf screws

Remove Module B Shelf for Dual-Slot 40W RF Modules