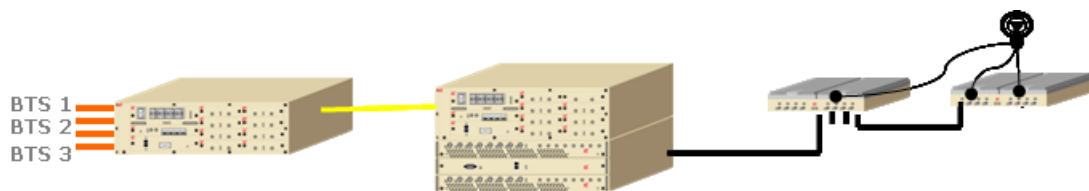




ADC Spectrum 7.0

Installation Guide

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Screenshots in User Documentation

Due to concurrent development of this documentation, artwork, and the FlexWave URH EMS product, there may be some minor discrepancies between screenshots contained in this documentation and those actually displayed in the FlexWave URH EMS. These discrepancies will generally be few and minor and should not affect your understanding of FlexWave URH EMS.



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PREFACE

This manual provides basic installation instructions for a ADC® Spectrum 7.0 system.

Revision History

Initial release.

Document Cautions and Notes

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

CAUTION! Caution text indicates 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: Note text contains information about special circumstances.

General Safety Precautions

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! 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.

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 Remote may be hot. Use caution during servicing.

Standards Certification

FCC: This equipment complies with the applicable sections of Title 47 CFR Part 15 (Host unit), Part 22 (800 MHz Cellular), Part 24 (1900 MHz - PCS), Part 90 (800/900 - SMR), and Part 27 (700 MHz, 2100 MHz - AWS).

IC: This equipment complies with the applicable sections of RSS-131. The term "IC:" before the radio certification number only signifies that Industry Canada Technical Specifications were met.

The Manufacturer's rated output power of this equipment is for single carrier operation. For situations when multiple carrier signals are present, the rating would have to be reduced by 3.5 dB, especially where the output signal is re-radiated and can cause interference to adjacent band users. This power reduction is to be by means of input power or gain reduction and not by an attenuator at the output of the device.

NOTE: To comply with Maximum Permissible Exposure (MPE) requirements, the maximum composite output from the antenna cannot exceed 1000 Watts ERP (Cellular and SMR), the antenna cannot exceed 1640 Watts EIRP (PCS), and the antenna must be permanently installed in a fixed location that provides at least 6 meters (20 feet) of separation from all persons.

NOTE: The U.S. Federal Communications Commission (FCC) has developed guidelines for evaluation of human exposure to RF emissions. The guidelines incorporate limits for Maximum Permissible Exposure (MPE) for power density of transmitter operating at frequencies between 300 kHz and 100 GHz. Limits have been set for portable, mobile, and fixed equipment. ADC products fall in the category of fixed equipment; products intended to be permanently secured and exposures are evaluated for distances greater than 20cm (7-7/8"). Portable devices fall into exposures of less than 20cm, where SAR evaluations are used.

Antenna gain is restricted to 1.5 W ERP (2.49 W EIRP) in order to satisfy RF exposure compliance requirements. If higher than 1.5 W ERP, routine MPE evaluation is needed. The antennas should be installed to provide at least 20cm from all persons to satisfy MPE requirements of FCC Part 2, 2.1091.

UL/CUL: This will be installed in a restricted access location. This equipment complies, per UL and CUL 50, Standard for Enclosures for Electrical Equipment.

FDA/CDRH: This equipment uses a Class 1 LASER according to FDA/CDRH Rules. This product conforms to all applicable standards of 21 CFR Part 1040.

Caution: Modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

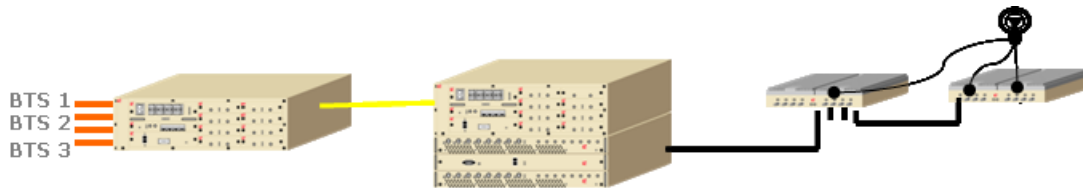
INTRODUCTION

InterReach Spectrum is an addition to the InterReach family of Distributed Antenna Systems. It offers a flexible multi-operator/multi-protocol single platform system supporting up to 8 Radio Frequency (RF) bands.

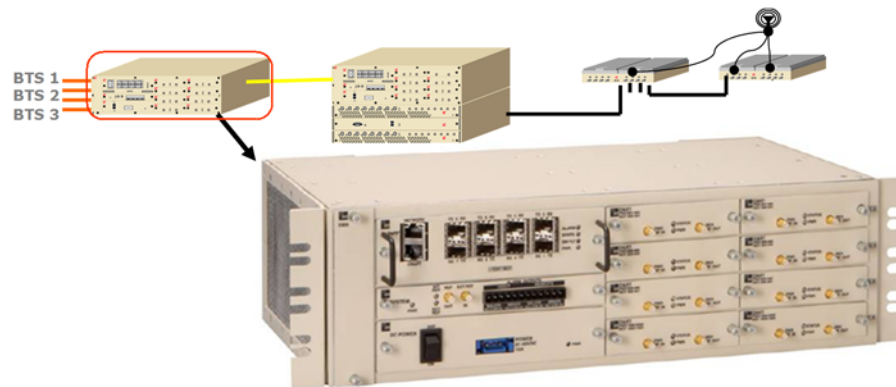
InterReach Spectrum has a Host Unit, an Expansion Unit (comprised of a DART Remote Module (DRU), IF Expansion Module (IFEU), and Power Supply), and Remote Amplifiers Units (RAUs). The Host, DRU and IFEU are intended for telecom closet indoor use. The RAU is intended to be installed above a false ceiling in an environmentally controlled office.

The standard configuration is:

- one Host Unit
- up to sixteen Expansion Units
- with each IFEU in the Expansion Unit supporting up to eight Main RAUs (one per IFEU FWD/REV F connector paired ports).



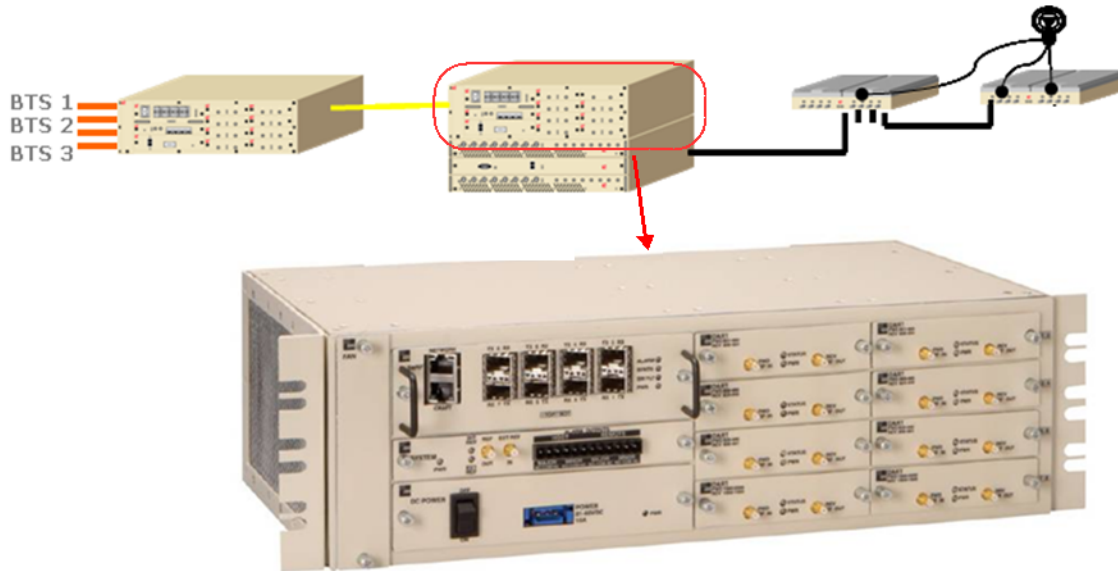
Host Unit



The Host Unit is installed into a 19-inch, rack-mounted chassis, that is 9-inches deep and can hold up to three Host Units. Each Host Unit can have up to eight hot swappable plug in cards. Host Unit components are as follows:

- One SeRF board with eight SFP connectors, that go to the DART Remote Unit SFPs
- Two Ethernet connections for Craft and Network access
- One System board with an Alarm connector
- One DCV Power board
- Eight RF DART modules for Wireless Operator RF input from BTS or BDA
- Replaceable Fans for cooling

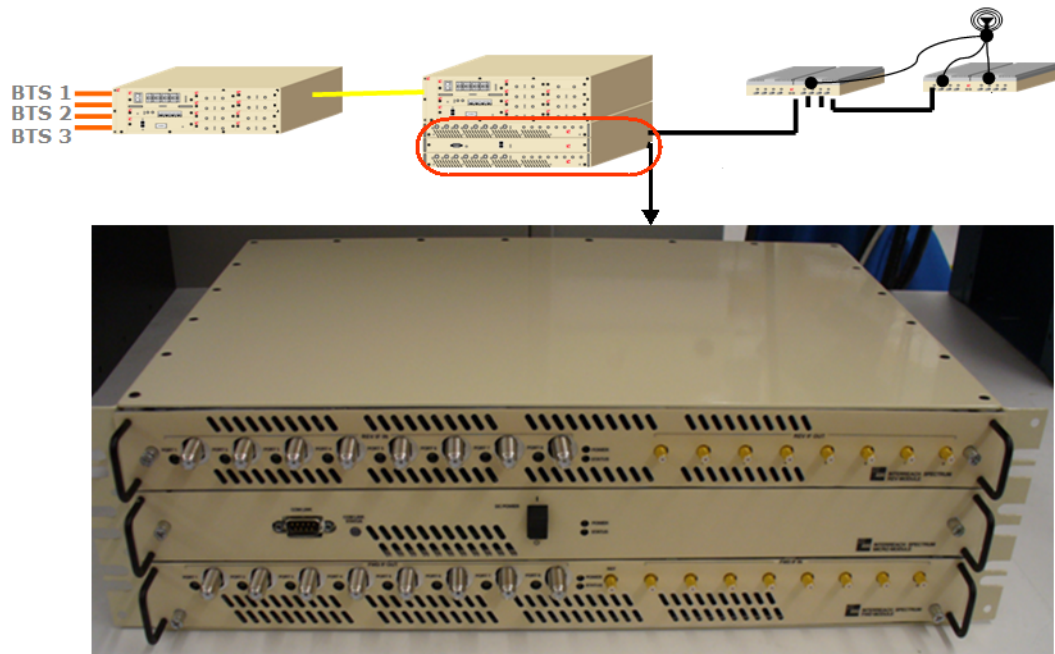
DART Remote Unit



The DART Remote Unit (DRU) is installed into a 19-inch, rack-mounted chassis, that is 9-inches deep and can have up to eight hot swappable plug in cards. DRU components are as follows:

- One SeRF board with eight SFP connectors, that go to the Host Unit SFPs
- Two Ethernet connections for Craft and Network access
- One System board with an Alarm connector
- One DCV Power board
- Eight RF DART boards with eight QMA connector IF inputs and eight QMA connector IF outputs to the IF Expansion Unit (IFEU)
- Replaceable Fans for cooling

IF Expansion Unit

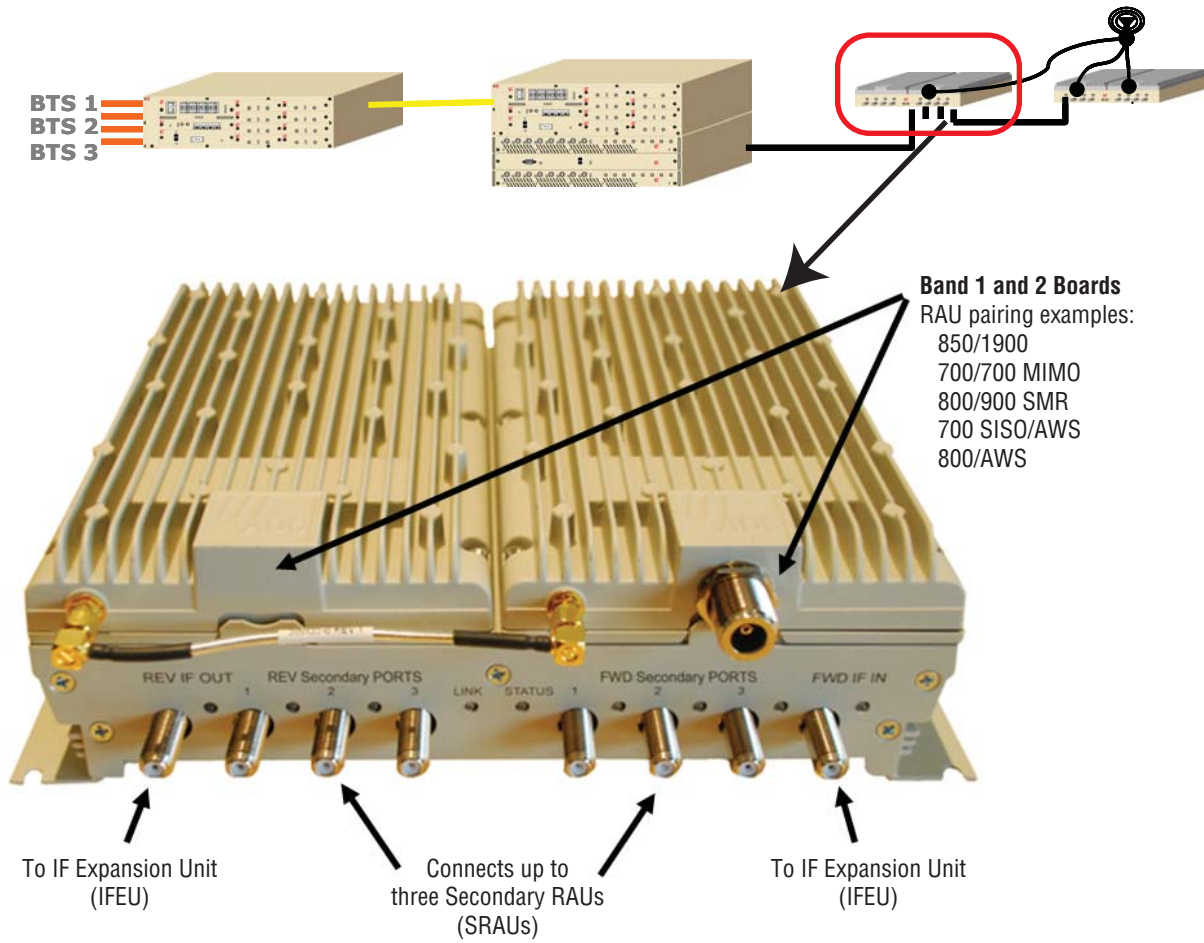


The IF Expansion Unit (IFEU) is installed into a 19-inch, rack-mounted chassis, that is 15-inches deep with three plug-in cards. IFEU components are as follows:

- One Reverse Link Module with
 - eight F connectors that go to the RAUs
 - eight QMA connectors that go to the DRU
- One DL PCBA with
 - eight F connectors that go to the RAUs
 - eight QMA connectors that go to the DRU
- One Micro controller board
- One DC/DC board
- Backplane
- Replaceable Fans for cooling

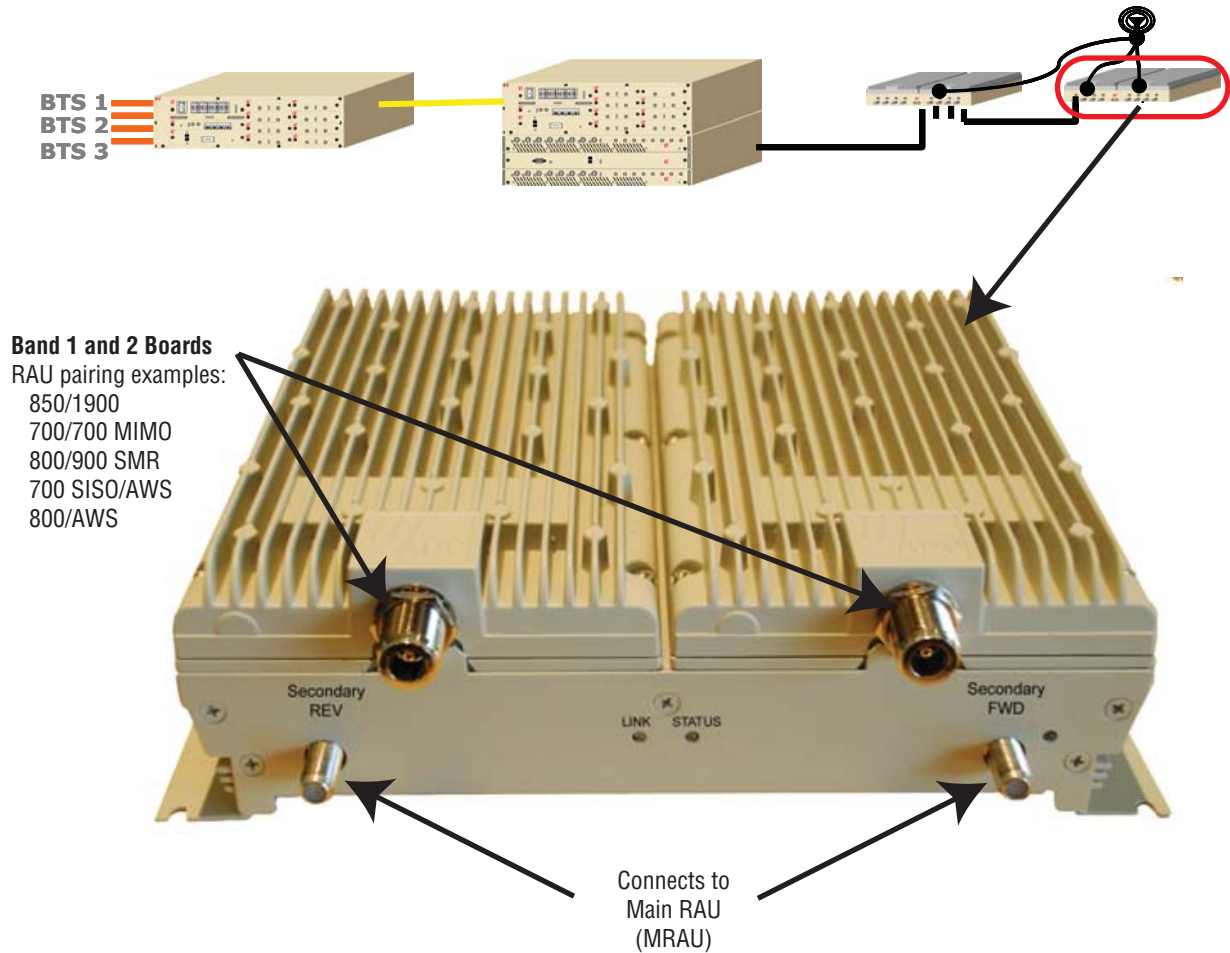
Main Remote Access Unit

The Main Remote Access Unit (MRAU) design allows for easier Band 1 and Band 2 Mix-and-Matching per country and/or market needs. MRAU components are as shown in the following figure.



Secondary Remote Access Unit

The Secondary Remote Access Unit (SRAU) design allows for easier Band 1 and Band 2 Mix-and-Matching per country and/or market needs. SRAU components are as shown in the following figure.



Omni Antenna

The Omni Antenna (4214-M727) supports the following:

- Port 1
 - 698-806 MHz (700 LTE)
 - 1710-2170 MHz (AWS)
- Port 2
 - 806-941 MHz (Cellular/SMR)
 - 1850-1990 MHz (PCS)
- Port 3
 - 2500-2700 MHz (WiMAX)

The Omni Antenna (see figure below) is a round radome with the following specifications:

- 8.5-inch diameter
- 1.65-inch height
- 72-inch pigtailed cables that are plenum-rated cables with N (male) connectors



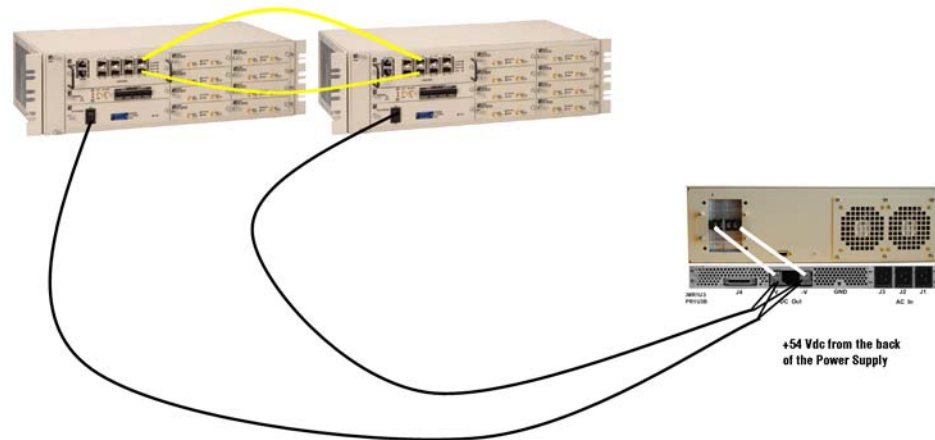
NOTE: Two antennas per RAU is required for MIMO performance.

INSTALLATION

Follow the steps in the order in which they are presented.

- 1 Connect the Host single-mode fiber SFPs (1-4) to the DART Remote Unit SFPs (5-8):
 - HU SFP 1 to DRU SFP 5
 - HU SFP 2 to DRU SFP 6
 - HU SFP 3 to DRU SFP 7
 - HU SFP 4 to DRU SFP 8
- 2 Connect the provided Vdc power cables to the +V and -V power-supply terminals.

CAUTION! The Power Supply requires 2-20amp 120VAC outlets.



- 3 Connect IF DART QMA cables to IFEU:
 - a Connect QMA cable from all IF DART FWD OUT connectors to any IFEU FWD Module IF IN connector.
 - b Connect QMA cable from all IF DART REV IN connector to any IFEU REV Module IF OUT connector.



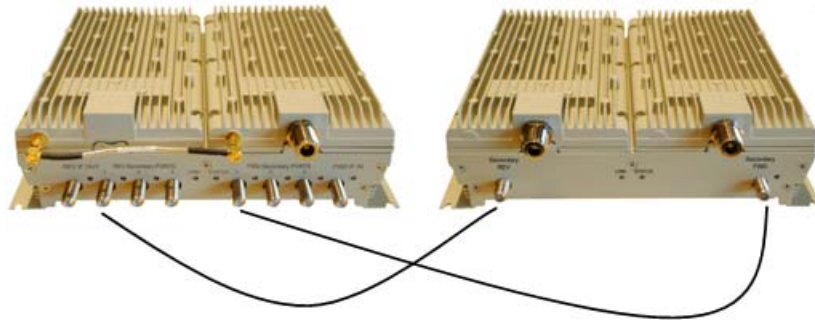
- 4 Connect F connector CATV cable from IFEU FWD Module Port IF OUT to MRAU FWD IF IN F connector.



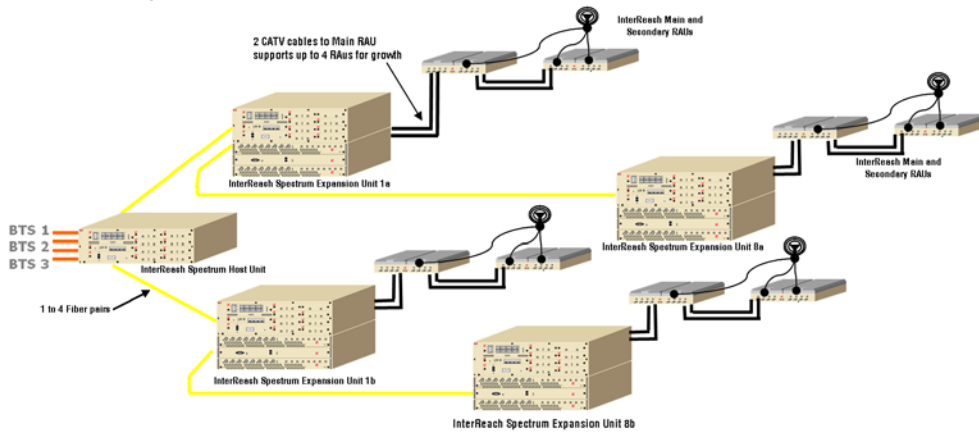
- 5 Connect F connector CATV cable from IFEU REV Module Port IF IN to MRAU REV IF OUT F connector.



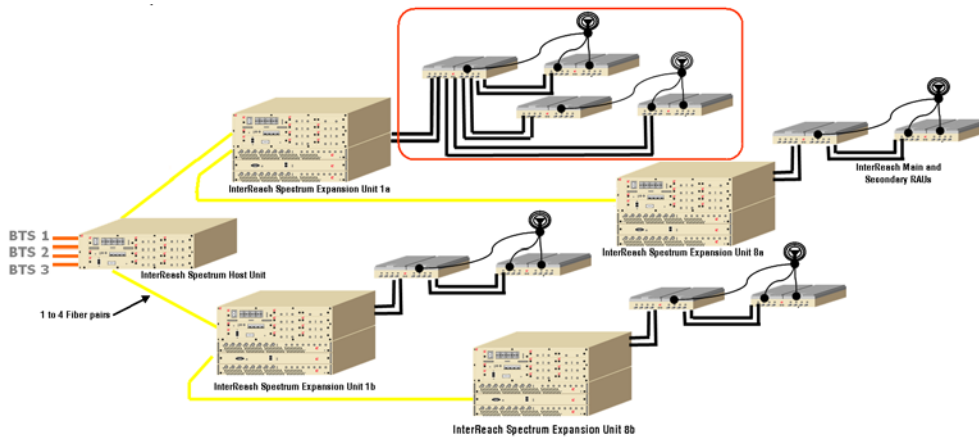
- 6 Connect MRAU and SRAU F FWD and REV connectors:
 - a Connect F connector CATV jumper cable from MRAU FWD Secondary F connector to SRAU Secondary FWD F connector.
 - b Connect F connector CATV jumper cable from MRAU REV Secondary F connector to SRAU Secondary REV F connector.



CASCADING



You add bands by inserting DART cards and CATV jumper between the Main and new Secondary RAUs, as shown below. 1 to 16 cascaded Expansion Units support up to 128 RAU locations.



SPECIFICATIONS

RF Specification

Supported Frequency Blocks	2 per Remote Antenna Unit; 1-8 per Host Unit
Bandwidth	1.5 to 75 MHz non-contiguous
Frequency Band Supported	850 Cellular, 1900 PCS, 700 2100 AWS (Future Release) E-SMR 800/900 (Future Release)

Propagation Delay

System Delay	<12 microseconds
Delay Management Digital	(Manual or Automatic)

Noise Figure

Noise Figure	<12 dB
Input IP3	>-10 dBm

Optical Specifications

Optical Budget	10 dB (Standard); 26 dB (Optional)
Digital Transport Rate	3.072 Gbps

Output Power

Output Power per Band	26 dBm 850MHz Cell 26 dBm 1900MHz PCS 26 dBm 700MHz LTE 26 dBm 2100MHz AWS (future)
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Remote Access Unit

Operating Temp	-25°C to +50°C
Storage Temperature	-40°C to +70°C
Humidity	10% to 90% non-condensing
Dimensions	10.67" x 8.25" x 3.00"
Weight	7.49 Pounds

Host Unit and Dart Remote Unit

Mounting	19- and 23-inch rack
Dimensions (Rack mountable)	5.25" x 19.00" x 19.00"
Weight	<25 Pounds

Host Unit and DART Remote Unit Power Requirements

Power Source	21 to 60 VDC floating
Battery Backup	UPS

IF Expansion Unit

Mounting	19- and 23-inch rack
Dimensions (Rack mountable)	5.25" x 17.11" x 11.93"
Weight	<19.5 Pounds

IF Expansion Unit Power Requirements

Power Source	+51 to +57 VDC
Battery Backup	UPS

Remote Access Unit

Operating Temp	-25°C to +50°C
Storage Temperature	-40°C to +70°C
Humidity	10% to 90% non-condensing
Dimensions	11.50" x 9.00" x 3.50"
Weight	7.49 Pounds

Remote Access Unit Power Requirements

Power Source	54 VDC (from IFEU)
--------------	--------------------

Element Management

Embedded EMS	Yes
SNMP Based Management	Yes

CONTACTING ADC



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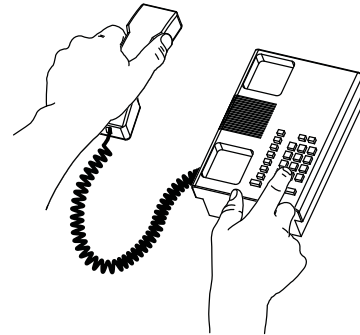
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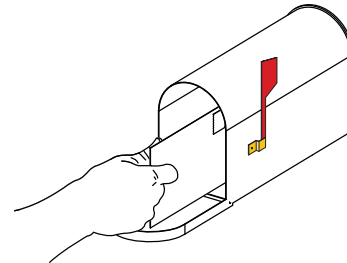
13944-Q

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ADC Telecommunications, INC
PO Box 1101,
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ADC European Customer Service, INC
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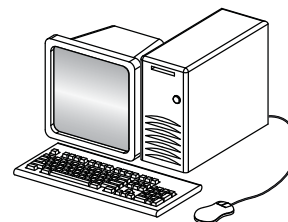
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