


## FORAX-DAS RF-over-Fiber Distributed Antenna System (DAS) (Repeater / Base Station Modular System)


**FORAX-DAS** (“distributed antenna system”) connects multiple repeaters or base stations to distant distributed antenna systems (DAS). **FORAX-DAS** offers a high performance alternative to conventional systems using bi-directional amplifiers, affording great flexibility in antenna location plus opto-isolation for all the User’s radios. Multiple DAS can be located up to 10 km from the repeaters/base station.

A **FORAX-DAS** RF-over-fiber system can connect up to 12 radios to as many as 12 DAS. Each radio is connected to each DAS using up to three Quad-Radio Interface Modules (Q-RIM), up to six dual-channel Optical Interface Modules (OIM), and up to 12 Antenna Interface Modules (AIM). At the radio site, Q-RIMs are mounted in a 19-inch rack mount chassis and connected by short coaxial cables to each radio’s antenna port. The OIMs are also supplied in a 19-in rack mount chassis. At the antenna site, AIMs are supplied in form factors including 19-inch rack mount chassis, wall- or ceiling-mounted enclosures, or NEMA enclosures, connected to each DAS with coaxial cable(s).


**Customer Radios (up to 12)**  
Each half- or full-duplex radio’s antenna port(s) is connected via coaxial cable(s) to a Q-RIM




**Radio Interface Chassis (RIC) with up to three Quad-Radio Interface Modules (Q-RIM)**  
Quad-Radio Interface Modules (Q-RIM) handle up to 12 repeaters or base stations with active or passive splitter/combiner



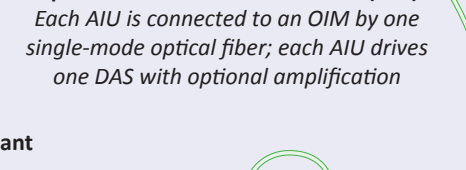
**Optical Interface Chassis (OIC) with up to six dual-channel Optical Interface Modules (OIM)**  
Optical Interface Modules (OIM) connect up to 12 remote DAS using one fiber per AIU



**Up to 12 Distributed Antenna Systems (DAS)**  
Each DAS is implemented using a site-specific combination of distributed antenna (i.e., “leaky coax”) and/or discrete antennas



**Up to 12 Antenna Interface Units (AIU)**  
Each AIU is connected to an OIM by one single-mode optical fiber; each AIU drives one DAS with optional amplification



**Customer Optical Fiber Plant**

- < 5 dB optical loss
- < -50 dB optical reflectance
- Other specifications by special order

**FORAX-DAS** functions as a long, loss-free link between the radio and the antenna. System limitations and installation difficulties associated with coaxial cable are overcome by the simplicity and performance of RF-over-fiber connections. **FORAX-DAS** provides:

Feature	Benefit
<b>Long Connections</b>	» Radio and its antenna can be located up to 10 km apart using single mode fiber
<b>EMP/EMI Immunity</b>	» Lightning, electromagnetic pulses, or RF interference cannot propagate over, or influence the signals on, optical fiber cables » Radio equipment is opto-isolated from antenna
<b>Easy Routing</b>	» RF signals are carried on lightweight, flexible, rugged, optical cables » Multiple radios can be carried on a single fiber optic cable
<b>All frequencies, all modulations</b>	» Geographic diversity in RF signal routing becomes easy » FORAX-DAS modules can cover 30-2000 MHz » FORAX-DAS modules handle all modulations including P25 LMR/Public Safety, VHF/UHF LOS, Wireless Intercom, AM, FM, SINCGARS, SRW, WNW, ANW2, EPLRS, UHF TACSAT, GPS

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## FORAX-DAS RF-over-Fiber Distributed Antenna System (DAS) (Repeater / Base Station Modular System)

RF Link Parameters		RF Performance	
Link gain	Varies with application		
Noise figure (NF)	+9 dB typical		
1-dB compression point	-20 dBm		
Third-order intercept point (IIP3)	-10 dBm (with 30-m of fiber)		
Spur-free dynamic range (SFDR)	+103 dBm/Hz (with 30-m of fiber)		
Product Characteristics		Radio Interface Unit (RIU)	Antenna Interface Unit (AIU)
Half-Duplex RX/TX Switching Time <i>OPTION: Full-Duplex or Simplex link</i>	Supports all public safety trunking and tactical radio systems		
Optical loss budget	< 5 dB (Higher optical loss budgets available)		
Nominal Input Power	+ 27 dBm (other values available)		
Input P1 dB	+38 dBm (other values available)		
Input 2-tone IP3	+48 dBm (other values available)		
AIM TX power into DAS			Varies with application
Minimum Signal (50 dB C/No @ Radio)			-80 dBm typical
Receive Input P1 dB			+7 dBm
Receive Input 2-tone IP3			+17 dBm
Minimum Antenna Return Loss			15 dB
User Interface	Monitor LEDs: » Laser operation (end-to-end) » TX RF operation » Command link fault	Monitor LEDs: » Power	
Packaging <i>OPTION: Weather-tight enclosures with tactical fiber optic cables for field use in all environments</i>	» Up to 12 radios and up to 12 DAS » Up to three (3) Quad-RIMs in RIC » Up to six (6) OIMs in OIC with two hot-swappable, redundant power supplies. » All RIC/OIC intra- and inter-chassis cables supplied by Syntonics	19-in Rack-mount, wall/pole/pad-mount, or NEMA enclosures available	
Installation Notes	User's facility supplies AC power and fiber optic (FO) connection from OIC to AIU.	User's facility supplies AC power and fiber optic (FO) connection from RIU to AIU.	
Fiber optic connector type	SC/APC (other types available)		
RF connector type	N-type female (other types available) for radio and antenna links		
Power	Universal AC: 90-250 Vac, 50-400 Hz, single phase; UPS optional		
Operating temperature	-10 C to +60 C	-10 C to +60 C	
Storage temperature	-40 C to +80 C	-40 C to +80 C	
<b>Syntonics will be pleased to quote custom configurations, frequencies, power supplies, and other application-specific revisions.</b>			