



## DESCRIPTION

The IFS series D9100 consists of fully-digital transceiver units designed for implementing simplex or full-duplex RS-232 drop-and-repeat poll-and-respond traffic signalization/communications data networks utilizing two optical fibers. These environmentally-hardened units are ideal for use in unconditioned out-of-plant or roadside installations and the master-configured transceiver unit may be located anywhere within the network, making this equipment ideal for applications involving on-street master controllers with upstream and downstream communications requirements. The D9100 series may be used in a conventional single-master/multiple local network architecture, or in a dual-master/bus multiple local configuration for higher levels of communications reliability. Manually resettable anti-streaming is included for unparalleled network protection. Optional battery back-up capability provides the highest level of network reliability in the event of a loss of local 115 VAC prime operating power, and maintains continuous communications channel operation. Plug-and-play design ensures ease of installation and no electrical or optical adjustments are ever required. LED indicators are provided for rapidly ascertaining equipment operating status, and these units are available in either stand-alone or rack-mount configurations.

## APPLICATION EXAMPLES

- ITS Traffic Signalization Networks
- Access Control Systems
- Building Automation and Environmental Control Systems
- Computer/Data Equipment
- Fire & Alarm Systems

## FEATURES

- Meets EIA RS-232C/D Specifications (Simplex or Duplex)
- NTCIP Compatible
- Tested and Certified by an Independent Testing Laboratory for Full Compliance with the Environmental Requirements (Ambient Operating Temperature, Mechanical Shock, Vibration, Humidity with Condensation, High-Line/Low-Line Voltage Conditions and Transient Voltage Protection) of NEMA TS-1/TS-2 and the Caltrans Specification for Traffic Signal Control Equipment.
- Robust Design Assures Extremely High Reliability In Unconditioned Roadside Environments
- User-Selectable Local, Master or Bus operation and DTE or DCE Interface Ensured Ease of Installation and Maximum Versatility
- Supports Request to Send (RTS) and Clear to Send (CTS) Signals
- RJ-45 expansion port provides network branching capability by electrically linking colocated transceiver units
- Solid-State Current Limiters on all Power Lines Provide Equipment Protection
- Optional Internal Battery Back-up Provides a Minimum of 12 Hours Operating Time in the Event of Loss of 115 VAC Prime Operating Power, and Maintains Continuous Channel Communications.
- Supports Single and Dual-Master/ Bus Traffic Signal Controller Communication System Architectures
- Wide Optical Dynamic Range: Optical Attenuators are Never Required
- User-Configurable Optical & Electrical Anti-Streaming Provides Network Protection Against Faulty Streaming Controller Operation
- Comprehensive Lifetime Warranty

Available at: **www.ifs.com**

- A & E Specifications, (CSI)
- AutoCAD Drawings
- Operation Manuals
- Technical Bulletins

## ORDERING INFORMATION

	PART NUMBER	DESCRIPTION	FIBERS REQUIRED	OPTICAL PWR BUDGET	MAX. DISTANCE*
<b>MULTIMODE 62.5/125μm**</b>	D9110	Repeater (850 nm, LED)	2 In/2 Out	14 dB	2.5 miles (4 km)
	D9120	Repeater (1310 nm, LED)	2 In/2 Out	14 dB	8 miles (14 km)
<b>SINGLEMODE 9/125μm</b>	D9130	Repeater (1310 nm, Laser)	2 In/2 Out	23 dB	43 miles (69 km)
<b>ACCESSORIES♦</b>	PS-12VDC 12 Volt DC Plug-in Power Supply (Included) PS-12VDC-230 12 Volt DC Plug-in Power Supply, 230 VAC Input (Included if specified at time of order)				
<b>OPTIONS</b>	Add '-R3' to Model Number for R3 Rack Mount (Requires R3 Rack purchased separately) Add '-SC' to Model Number for SC Optical Connector (For Single mode Equipment Only) Add '-FC' to Model Number for FC Optical Connector (For Single mode equipment only) Add '-C' for Conformally Coated Printed Circuit Boards Add '-B' Suffix for NIMH Battery Back-Up Option				

\* Optical transmission distance is limited to optical loss of the fiber and any additional loss introduced by connectors, splices and patch panels.

Distance can also be limited by fiber bandwidth. \*\* For 50/125 Fiber, subtract 4 dB from Optical Power Budget.

♦ All accessories are third party manufactured.

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With Offices in Asia Pacific ■ Australia ■ Europe ■ Latin America

## SPECIFICATIONS

### DATA

Data Interface: RS-232 C/D, RS-422  
Data Rate: DC to 100 kbps  
Bit Error Rate: <1 in 10<sup>9</sup> @ Maximum Optical Loss Budget  
Anti-Streaming Time-out: 4, 8, 16, 32, 64 Seconds, or Infinity (disabled)

Operating Mode: Asynchronous, Simplex or Full-Duplex

### WAVELENGTH

850 or 1310 nm, Multimode  
1310 nm, Singlemode

### NUMBER OF FIBERS

2 In/2 Out

### CONNECTORS

Power: Terminal Plug with Screw Clamps  
Data: Type DB-25S  
Optical: Type ST, SC or FC (see ordering information)

### OPTICAL EMITTER

850 or 1310 nm, Multimode: LED  
1310 nm, Single mode: Laser Diode

### LED INDICATORS

1. Transmit Data, Optical Channel 1 (TD 1)
2. Receive Data, Optical Channel 1 (RD-1)
3. Transmit Data, Optical Channel 2 (TD-2)
4. Receive Data, Optical Channel 2 (RD-2)
5. Power On (PWR)
6. Fault /Antistreaming Activated
7. Request to Send (RTS)
8. Clear to Send (CTS)

## ELECTRICAL & MECHANICAL

Power: 12 VDC @ 250 mA  
Surface Mount: From Rack  
Rack: 1 (2 slots required for units with '-B' battery back-up option.)  
Number of Rack Slots: Automatic Resettable Solid-State Current Limiters  
Current Protection: Meets IPC Standard  
Circuit Board: 7.0 x 4.9 x 1.0 in., 17.8 x 12.5 x 2.5 cm.  
Size (in./ cm.) (LxWxH): 7.7 x 5.0 x 1.0 in., 19.6 x 12.7 x 2.5 cm.  
Surface Mount: 2" or 5 cm with "-B" Battery Option  
Rack Mount: < 2 lbs./0.9 kg  
Shipping Weight:

## ENVIRONMENTAL

MTBF: > 100,000 hours  
Operating Temp: -40° C to +74° C, ambient  
Storage Temp: -40° C to +85° C, ambient  
Relative Humidity: 0% to 95% (non-condensing)†

## BATTERY BACK-UP OPTION▲

Internal, Rechargeable Nickel Metal Hydride (NIMH) Battery  
Operating Period: 12 hours, minimum

†May be extended to condensation conditions by adding suffix '-C' to model number for conformal coating.

▲ Add suffix '-B' to model number for Battery Backup

## AGENCY COMPLIANCE

**FCC** PART 15 COMPLIANT   
**MADE IN THE USA**

**GSA**  
Federal Supply Schedule  
Contract No. GS-07F-0049M

Complies with FDA Performance Standard for Laser Products, Title 21, Code of Federal Regulations, Subchapter J

## OPTICAL POWER BUDGET

FIBER	WAVELENGTH	TRANSCEIVER			OPTICAL PWR BUDGET	MAX. DISTANCE*
		MODEL	OUTPUT PWR	SENSITIVITY		
Multimode 62.5/125µm**	850 nm	D9110	25 µw (-16 dBm)	1 µw (-30 dBm)	14 dB	2.5 miles (4 km)
	1310 nm	D9120	25 µw (-16 dBm)			8 miles (14 km)
Singlemode 9/125µm		D9130	200 µw (-7 dBm)		23 dB	43 miles (69 km)

\* Optical transmission distance is limited to optical loss of the fiber and any additional loss introduced by connectors, splices and patch panels. Distance can also be limited by fiber bandwidth. \*\* For 50/125 Fiber, subtract 4 dB from Optical Power Budget.

## SYSTEM DESIGN

