# DIVISION 28 23 23 VAADT/VAADR14130WDM – FIBER OPTIC TRANSMITTER AND RECEIVER ENGINEERING SPECIFICATIONS

**PART 1 - GENERAL**

* 1. SUMMARY

A. Fiber Optic 10 Bit Digitally Encoded Video Transmitter/Data Transceiver/Stereo Audio Transmitter and Video Receiver/Data Transceiver/Stereo Audio Receiver

* 1. SECTION INCLUDES

1. VAADT/VAADR14130WDM Fiber Optic 10

Bit Digitally Encoded Video Transmitter/Data Transceiver/20 Bit Digitally Encoded Stereo Audio TX and Video Receiver/Data Transceiver/Stereo Audio Receiver – Standalone

1. VAADT/VDAAR14130WDM-R3 Fiber Optic

10 Bit Digitally Encoded Video Transmitter/Data Transceiver/20 Bit Digitally

Encoded Stereo Audio and Video Receiver/Data

Transceiver/Stereo Audio Receiver - Rack Mount

* 1. REFERENCES

1. Underwriters Laboratory (UL)
2. Underwriters Laboratory Canada (ULC)
3. European Union Compliance (CE)
   1. SYSTEM DESCRIPTION
4. Performance Requirements: Provide a 10 Bit Digitally Encoded Video Transmitter/Data

Transceiver/20 Bit Digitally Encoded Stereo

Audio Transmitter and Video Receiver/Data Transceiver/Stereo Audio Receiver.

* 1. The system shall utilize 1300/1550nm optics capable of digital video, stereo audio and

data transmission on one single mode optical fiber. (VAADT/VAADR14130WDM)

* 1. SUBMITTALS

1. Product Data: Manufacturer’s printed product data sheet for each type of Transmitter/Receiver

specified.

1. Detail Drawings: Electrical and optical connect drawings. Product mounting template.
2. Manufacturer’s Installation and Operating Manual: Printed installation and operating

information for each type of Transmitter/Receiver specified.

1. Test Reports: Manufacturer’s Printed Test Report via a Tektronics VM700A Video Test

Generator verifying product performance meets or exceeds the specified product performance

referenced in Part 2.

1. Warranty: Manufacturer’s Printed Warranty
   1. DELIVERY, STORAGE AND HANDLING
2. Deliver materials in unopened factory packaging with Manufacturer’s bar coding to the job site.
3. Inspect product upon delivery to assure that

specified products have been received.

1. Store in original packaging in a climate controlled environment. Storage Temperature not to exceed: -40˚ C to +85˚ C
   1. PROJECT/SITE CONDITIONS
2. Temperature Requirements: Products shall operate in an environment with an ambient temperature range of –40˚ C to +74˚ C without the assistance of fan-forced cooling.
3. Humidity Requirements: Products shall operate in an environment with relative humidity of 0% to 95% (non-condensing). If product is installed in condensation conditions, unit shall have conformal coating applied to the printed circuit board.
   1. WARRANTY

A. Standard International Fiber Systems Comprehensive Lifetime Warranty: IFS

warrants the product to be free of factory defects

under manufacture’s Lifetime Warranty as submitted under article 1.05 (E)

# PART 2 - PRODUCTS

* 1. MANUFACTURER

1. Acceptable Manufacturer: International Fiber Systems, Inc.; 16 Commerce Road, Newtown,

CT 06470 USA; Telephone: 203-426-1180; Fax

203-426-3326; Email: sales@ifs.com; Internet:

[www.ifs.com](http://www.ifs.com/)

1. Substitutions: Not Permitted
2. All fiber optic modules shall be supplied from a single manufacturer.
   1. MANUFACTURED UNITS
3. Model Number Descriptions: Reference Table A: Product Number Descriptions
4. Model Compatibility Chart: Reference Table B: Product Compatibility Chart
   1. GENERAL SPECIFICATIONS

A. The 10 Bit Digitally Encoded Video Transmitter/Data Transceiver/20 Bit Stereo

Audio Transmitter and Video Receiver/Data

Transceiver/Stereo Audio Receiver system shall be an IFS VAADT/VAADR14130WDM

module. The module shall use state – of – the – art 10- bit digital encoding and decoding for true

broadcast quality video transmission that exceeds the requirements of EIA RS-250C for

short haul video transmission. The module shall be capable of transmitting and receiving full

color video in real time in NTSC, PAL or SECAM formats. The module shall be

compatible RS-232, RS-422 and 2 and 4-wire RS-485. The module shall be transparent to data

protocols used by various manufacturers, providing for universal compatibility should

future system expansion or changes be required. The module shall use state – of – the – art 20-bit

digital encoding and decoding for the transmission of stereo audio. The module shall

utilize an integrated WDM for increased stability and reliability of system performance. The

module shall require no in-field electrical or

optical adjustments or in-line attenuators to ease installation. The module shall provide power, optical carrier detect / Link – lock, video input sync presence, video output sync presence, video input overload, video output overload, data transmit, data receive, audio input level for each channel indicating LED’s for monitoring proper system operation. The modules shall provide automatic re-settable solid-state current limiters and independent voltage regulators on each module to reduce the chance of a single point failure of the system. The module shall be hot swappable in a rack mount system to reduce complete system shut down during maintenance or repair. The module shall have an MTBF of

>100,000 hours and operate in an environment of

–40˚ C to +74˚ C and relative humidity between 0% to 95% (non-condensing). The module shall be UL and ULC listed and CE marked. The circuit board shall be UL 94 flame rated and meet all PCI standards. All PC boards shall be designated with part number, PC board number and show appropriate revision number. Housing shall be of all metal construction. All LED indicators and both electrical and mechanical connections shall be identified with silk-screened labels. The module shall have a lifetime warranty to reduce system life cycle cost in an event of a module failure.

* 1. VIDEO SPECIFICATIONS

1. Input Video: 1 volt pk-pk (75 ohms)
2. Bandwidth: 5 Hz – 10 MHz
3. Differential Gain: < 2 %
4. Differential Phase: <0.7 °
5. Tilt: <1%
6. Signal/Noise Ratio: 67dB @ maximum optical loss budget

**2.04(A)** DATA SPECIFICATIONS

1. Data Interface: RS-232, RS-422, 2 and 4-wire RS-485 with tri-state
2. Data Format: NRZ, NRZI, Manchester, Bi- phase
3. Data Rate: DC – 100 Kbps (NRZ)
4. Bit Error Rate (BER): < 1 in 10-9 @ maximum optical loss budget
5. Operating Mode: Simplex or Full Duplex

**2.04(B)** AUDIO SPECIFICATIONS

1. Number of Bits: 20
2. Sampling Rate: 52.3 KHz
3. Bandwidth: 20 Hz to 18 KHz @ -1 dB
4. Signal – to – Noise – Ratio (SNR): 87 dB min.
5. Total Harmonic Distortion: 0.01% 0 dB output level
6. Channel Crosstalk: -100 dB @ 1 KHz
7. Balanced or Unbalanced, 600 Ohm
   1. OPTICAL SPECIFICATIONS
8. IFS Model Number VAADT/VAADR14130WDM
   1. Optical Fiber: 9/125 micron single-mode
   2. Number of Fibers Required: 1
   3. Optical Wavelength: 1300/1550nm
   4. Optical Power Budget: 23 dB
   5. Optical Attenuation: No manual adjustments required
   6. STATUS INDICATORS
9. Power: On/Red – Off/Off
10. Optical Carrier Detect: Optical Carrier Active/Yellow – No Optical Carrier/Off
11. Video Input Sync Presence: Video Input Sync Present/Green – Video Input Sync Not

Present/Off

1. Video Output Sync Presence: Video Output Sync Present/Green – Video Output Sync Not

Present/Off

1. Video Input Overload: Video Input Overload/Green – No Video Input Overload/Off
2. Video Output Overload: Video Output Overload/Green – No Video Output

Overload/Off

1. Data Transmit: Transmit Data/Green – No Data Transmit/Off
2. Data Receive: Receive Data/Yellow – No Data

Received/Off

1. Audio Transmit: Transmit Audio/Green – No Audio Transmit/Off
2. Audio Receive: Receive Audio/Yellow – No

Audio Received/Off

* 1. CONNECTORS

1. Optical: ST, SC and FC optional
2. Power and Audio: Terminal Block with Screw Clamps
3. Data: Terminal Block with Screw Clamps or

DB-25S (optional)

1. Video: BNC (Gold Plated Center-PIN)
   1. ELECTRICAL SPECIFICATIONS
2. Power: 12VDC @500 mA
3. Rack: From Rack
4. Current Protection: Automatic re-settable solid- state current limiters
5. Voltage Regulation: Solid-state, Independent on

each board

1. Circuit Board: UL 94 flame rated and meets all PCI standards.
2. Rack mount Card: Shall be hot-swappable with

IFS Model Number R3 (EIA 19” card cage)

* 1. MECHANICAL SPECIFICATIONS

1. Surface Mount Dimensions: 7.1” x 4.0” x 2.0”

(17.8 cm x 10.2 cm x 5.1 cm)

1. Rack Mount Dimensions: 7.7” x 5.0” x 2.0”

(19.6 cm x 12.7 cm x 5.1 cm)

1. Number of Rack Slots: 2
2. Finish: Module shall be constructed of a metal enclosure with a powder coat finish model

Number F63B12 with all connections and

indicators silk-screened directly on unit. Rack mount units shall be constructed of anodized aluminum.

1. Weight: <2.0 lbs./1.0kg
   1. ENVIRONMENTAL SPECIFICATIONS
2. MTBF: >100,000 Hours
3. Operating Temp: –40˚ C to +74˚ C
4. Storage Temp: -40˚ C to +85˚ C
5. Relative Humidity: 0% to 95% (non- condensing). If product is installed under condensation conditions, unit shall have conformal coating applied to the printed circuit board. (Add –C to model number for conformal coated printed circuit board)
   1. REGULATORY AGENCIES/APPROVALS AND LISTINGS
6. Underwriters Laboratory (UL) Listing Number:

I.T.E. 6D16

1. Underwriters Laboratory Canada (ULC) Listing Number: I.T.E. 6D16
2. UL 94-flame rated PCB board: 94VO

D.

* 1. ACCESSORIES

1. Card Cage: IFS Model Number R3 (EIA 19” card cage) shall be available to house and power rack mount modules.
2. Blank Panels: IFS Model Number R3-BP shall be available to cover unused rack slots.

# PART 3 - EXECUTION

* 1. EXAMINATION

1. Inspect modules before installation.
2. Modules shall be free of any cosmetic defects or damage.
3. All optical connectors shall be covered with dust caps and remain on the module until installing

cable connectors to module.

1. Shipping box shall include the module, power supply and operations manual.
   1. PREPARATION
2. Standalone Module (Surface Mount)
   1. Shall be mounted on a properly prepared surface adequate for the size and weight of

module. The placement of the unit shall

allow provision for cable installation and maintenance as indicated on the approved detail drawings and in compliance with the IFS mounting template and installation manual.

1. Rack Mount Module (19” Rack)
   1. Shall be installed in the IFS Model Number R3 card cage. Ensure the card cage is installed in a standard EIA 19” (482.6 mm) rack or wall standoff bracket adequate for the size and weight of the card cage. The placement of the unit shall allow provision for cable installation and maintenance as indicated on the approved detail drawings and in compliance with the IFS installation manual.
2. Optical Fibers
   1. Caution: NEVER look into the end of an active optical fiber when using laser light

output. Eye damage can occur. Wear eye

protection when cleaving, terminating, and splicing fiber.

* 1. The number and type (multimode or single- mode) of optical fiber shall meet the requirements of the IFS model number in article 2.05 used in the installation.
  2. All optical fiber cables shall be properly installed and terminated with the mating optical connectors as submitted in article

2.07 (A).

* 1. The optical link shall be tested with either a power meter, at a minimum, or OTDR to ensure the link budget (overall path loss) plus an added 3dB of optical safety margin does not exceed the optical power budget as submitted in article 2.05.
  2. All optical connectors on cable shall be cleaned in compliance to optical connector manufactures specifications and covered with dust caps until connection to the fiber optic module.
  3. INSTALLATION

A. General: Locate fiber optic modules as indicated on the approved detail drawings and install module in compliance with the IFS installation and operations manual.

* 1. TESTING

1. Testing the Fiber Optic Video Link.
   1. Verify that the coax and optic fibers are properly connected.
   2. Make sure that power is applied to all fiber optic modules, camera, and video monitor or

other equipment used in the system.

* 1. The carrier detect indicator LED should be lit confirming a presence of a video signal.
  2. Successful video link operation should be

visible at this point as witnessed by a good quality video picture on the monitor. Testing the Fiber Optic Video Link.

1. Testing the Fiber Optic Data Link.
   1. Verify that the data leads and optical fibers are properly connected.
   2. Make sure that power is applied to all fiber optic modules, controllers, and receiver

drivers or other equipment used in the system.

* 1. Successful data link operation should be confirmed at this point by using the

controller to pan, tilt, and zoom the camera or communicate with other equipment.

1. Testing the Fiber Optic Audio Link.
2. Verify that the audio leads and optical fibers are properly connected.
3. Make sure that power is applied to all fiber

optic modules, controllers, and receiver drivers or other equipment used in the system.

Successful audio link operation should be confirmed at this point .

* 1. CLEANING

1. Follow all instructions for proper use of solvents and adhesives used for termination and splicing.
2. At completion of the installation, dispose of all fiber scraps properly.

# MANUFACTURED UNITS REFERENCE TABLES

Table A: Product Number Descriptions

|  |  |  |
| --- | --- | --- |
| **VAADT14130WDM** | **DESCRIPTION** | **MAX. DISTANCE\*** |
| VAADT14130WDM | SM Video / Data / Audio / Audio – 1300 <> Data  – 1550, 1 Fiber | 43 Miles (69KM) |
| VAADT14130WDM-R3 | SM Video / Data / Audio / Audio – 1300 <> Data  – 1550, 1 Fiber, Rack Mount | 43 Miles (69KM) |

\* Maximum distance is limited to optical loss of the fiber and any additional loss by connectors, splices and patch

panels.

|  |  |
| --- | --- |
| **VAADR14130WDM** | **DESCRIPTION** |
| VAADR14130WDM | SM Video / Data / Audio / Audio – 1300 <>  Data – 1550, 1 Fiber |
| VAADR14130WDM-R3 | SM Video / Data / Audio / Audio– 1300 <> Data  – 1550, 1 Fiber |

Table B: Product Compatibility Chart

# TRANSCEIVER COMPATIBLE TRANSCEIVER

VAADT14130WDM VAADR14130WDM, VAADR14130WDM-R3

VAADT14130WDM-R3 VAADR14130WDM, VAADR14130WDM-R3

# END OF SECTION