# Division 27 50 00 AT/AR1000 SERIES – FIBER OPTIC TRANSMITTER AND RECEIVER ENGINEERING SPECIFICATIONS

**PART 1 - GENERAL**

* 1. SUMMARY

A. Fiber Optic Audio Transmitter and Receiver

* 1. SECTION INCLUDES

1. AT/AR1000 Series Audio Transmitter and Receiver – Standalone
2. AT/AR1000-R3 Series Audio Transmitter and Receiver - Rack Mount
   1. REFERENCES
3. Underwriters Laboratory (UL)
4. Underwriters Laboratory Canada (ULC)
5. European Union Compliance (CE)
   1. SYSTEM DESCRIPTION
6. Performance Requirements: Provide an audio transmitter and receiver system.
   1. The system shall utilize 850nm optics

capable of transmitting and receiving audio on one multimode optical fiber. (AT/AR1000)

* 1. The system shall utilize 1300nm optics capable of transmitting and receiving audio

on one multimode optical fiber.

(AT1020/AR1030)

* 1. The system shall utilize 1300nm optics capable of transmitting and receiving audio

on one single mode optical fiber.

(AT1025/AR1030)

* 1. SUBMITTALS

1. Product Data: Manufacturer’s printed product Audio sheet for each type of Transmitter/Receiver specified.
2. Detail Drawings: Electrical and optical connect drawings. Product mounting template.
3. Manufacturer’s Installation and Operating

Manual: Printed installation and operating information for each type of Transmitter/Receiver specified.

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

1. 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.
2. 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 audio transmitter and receiver system shall be an IFS AT/AR1000 series module. The

module shall require no in-field electrical or

optical adjustments or in-line attenuators to ease installation. The module shall provide power and carrier status 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 IPC 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. AUDIO SPECIFICATIONS

1. Input/Output Signal: 2.2 volts peak – to - peak
2. Input/Output Impedance: 600 ohms (single ended or differential)
3. Bandwidth: 20 Hz – 20 KHz
4. Total Harmonic Distortion: <1.0%
   1. OPTICAL SPECIFICATIONS
5. IFS Model Number AT/AR1000
   1. Optical Fiber: 62.5/125 micron multimode
   2. Number of Fibers Required: 1
   3. Optical Wavelength: 850nm
   4. Optical Emitter Type: 850nm LED
   5. Transmitter Output Power: 20µw (-17 dB)
   6. Optical Detector Type: 850nm PIN DIODE
   7. Receiver Sensitivity: 0.5µw (-33 dB)
   8. Optical Power Budget: 16 dB
   9. Optical Attenuation: No manual adjustments required
6. IFS Model Number AT1020/AR1030
   1. Optical Fiber: 62.5/125 micron multimode
   2. Number of Fibers Required: 1
   3. Optical Wavelength: 1300nm
   4. Optical Emitter Type: 1300nm LED
   5. Transmitter Output Power: 20µw (-17 dB)
   6. Optical Detector Type: 1300nm PIN DIODE
   7. Receiver Sensitivity: 0.5µw (-33 dB)
   8. Optical Power Budget: 16 dB
   9. Optical Attenuation: No manual adjustments required
7. IFS Model Number AT1025/AR1030
   1. Optical Fiber: 9/125 micron single-mode
   2. Number of Fibers Required: 1
   3. Optical Wavelength: 1300nm
   4. Optical Emitter Type: 1300nm LED
   5. Transmitter Output Power: 25µw (-16 dB)
   6. Optical Detector Type: 1300nm PIN DIODE
   7. Receiver Sensitivity: 0.5µw (-33 dB)
   8. Optical Power Budget: 17 dB
   9. Optical Attenuation: No manual adjustments required
   10. STATUS INDICATORS
8. Power: On/Red – Off/Off
9. Carrier: Carrier Detect/Yellow – No Carrier/Off
   1. CONNECTORS
10. Optical: ST
11. Power and Audio: Terminal Block with Screw

Clamps

* 1. ELECTRICAL SPECIFICATIONS

1. Power: 24VAC CT
2. Current Protection: Automatic re-settable solid- state current limiters
3. Voltage Regulation: Solid-state, Independent on

each board

1. Circuit Board: UL 94 flame rated and meet all IPC 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 4.9” x 1.0”

(18.0 cm x 12.45 x 2.54 cm)

1. Rack Mount Dimensions: 7.7” x 5.0” x 1.0”

(19.56 cm x 12.7 cm x 2.54 cm)

1. Number of Rack Slots: 1
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

1. 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
3. Conformity for Europe (CE)
   1. ACCESSORIES
4. Card Cage: IFS Model Number R3 (EIA 19” card cage) shall be available to house and power

rack mount modules.

1. 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.
3. 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.

1. 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.
   2. 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.

* 1. 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.

* 1. 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.

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

optic modules, audio amplifiers, pre- amplifiers and any other equipment used in the system.

* 1. Successful audio link operation should be confirmed at this point.
  2. 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

# MAX. DISTANCE\*

|  |  |
| --- | --- |
| **AT1000 SERIES** | **DESCRIPTION** |
| AT1000 | MM Audio – 850 > Audio, 1 Fiber |
| AT1000-R3 | MM Audio – 850 > Audio, 1 Fiber, Rack Mount |
| AT1020 | MM Audio – 1300 > Audio, 1 Fiber |
| AT1020-R3 | MM Audio – 1300 > Audio, 1 Fiber, Rack Mount |
| AT1025 | SM Audio – 1300 > Audio, 1 Fiber |
| AT1025-R3 | SM Audio – 1300 > Audio, 1 Fiber, Rack Mount |

2.8 Miles (4.5KM)

2.8 Miles (4.5KM)

10 Miles (16KM)

10 Miles (16KM)

30 Miles (49KM)

30 Miles (49KM)

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

# AR1000 SERIES DESCRIPTION

AR1000 MM Audio – 850 > Audio, 1 Fiber

AR1000-R3 MM Audio – 850 > Audio, 1 Fiber, Rack Mount

AR1030 MM/SM Audio – 1300 > Audio, 1 Fiber

AR1030-R3 MM/SM Audio – 1300 > Audio, 1 Fiber, Rack Mount

Table B: Product Compatibility Chart

|  |  |  |
| --- | --- | --- |
|  | **TRANSMITTER** | **COMPATIBLE RECEIVER** |
| AT1000 |  | AR1000, AR1000-R3 |
| AT1000-R3 |  | AR1000, AR1000-R3 |
| AT1020 |  | AR1030, AR1030-R3 |
| AT1020-R3 |  | AR1030, AR1030-R3 |
| AT1025 |  | AR1030, AR1030-R3 |
| AT1025-R3 |  | AR1030, AR1030-R3 |

# END OF SECTION