

TDC



Theater Deployable Communications

Baseline Requirements Document

Laser Module

LM (v2)

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1.0 SCOPE

This requirements document establishes the performance, manufacture and test requirements for the TDC ICAP Laser Module v2.

2.0 APPLICABLE DOCUMENTS

To the extent specified herein, the following documents of latest current issue on the date of this Baseline Requirements Document form part of this BRD.

Table 1 - Standards and Applicable Documents

Document Number	Title
EIA/TIA-232-E Jul-91	Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange (Rates to 20kbps)
EIA 530 Jun-92	High Speed 25-Position Interface for Data Terminal Equipment and Data Circuit-Terminating and Data Circuit-Terminating Equipment. (Mar 87)
ANSI T1.601-1992	American National Standard for Telecommunications - Minimal Set of Bearer Services for the ISDN U Interface
ANSI T1.603-1990	American National Standard for Telecommunications - Minimal Set of Bearer Services for the ISDN Primary Rate Interface
EIA Standard RS-470	Telephone Instruments with Loop Signaling for Voiced Applications
ISO/IEC 8802-3 1996 ANSI/IEEE Std 802.3 1996	Information Technology- Local Metropolitan Area Networks-- Part3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specification. (Documents are one in the same; from IEEE, ANSI, ISO and IEC)
MIL-STD-810F	Environmental Test Methods
SupraConnect 155MR	LSA Photonics SupraConnect High Performance Laser Communications System Users Manual
24001096-000	DNE TAC- Tactical ATM Concentrators Operation and Installation Guide
24001099-000	DNE TAC-Tactical ATM Concentrators Diagnostics Guide
24001100-000	DNE TAC- Tactical ATM Concentrators Software Configuration Guide
24001106-000	DNE TAC- Tactical ATM Concentrators Documentation & MIB CD
S.I. Tech Inc.	S.I. Tech Inc. Bit-Driver Operating Instructions 2890 T-1/2891 E-1 to Fiber Bit-Driver
	TDC Standards Document

3.0 REQUIREMENTS

3.1 Module Definition

The Laser Module v2 (LM v2) provides one 100 Mbps Ethernet and up to four DS1 wireless transmission links between ICAP modules. The Lasers are optimized to operate over a distance of 1 mile. Filters are included to allow operation over shorter ranges (less than $1/8$ mile, $1/8 - 1/4$ mile, $1/4 - 1/2$ mile, $1/2 - 3/4$, $3/4 - 1$ mile). Two of the DS1 inputs can be connected to a fiber optic modem for transmission across the TDC ICAP Switched Circuit Network (SCN) fiber backbone. LAN interfaces are provided to accept both 10 Mbps and 100 Mbps Ethernet. An ATM multiplexer that provides 155 Mbps output to the Laser multiplexes Ethernet and DS1 signals across the link.

- Datagram Switched Network Functions
 - Transport of Ethernet traffic
 - Connectivity via 100BaseFX/100BaseTX/10BaseFL
 - Local and remote configuration management
- Switched Circuit Network (SCN) Functions
 - Transport of trunks for SCN backbone
 - Connectivity via copper and fiber SCN DS1 connections
 - Local and remote configuration management

A functional block diagram of the LM v2 is shown in Figure 1.

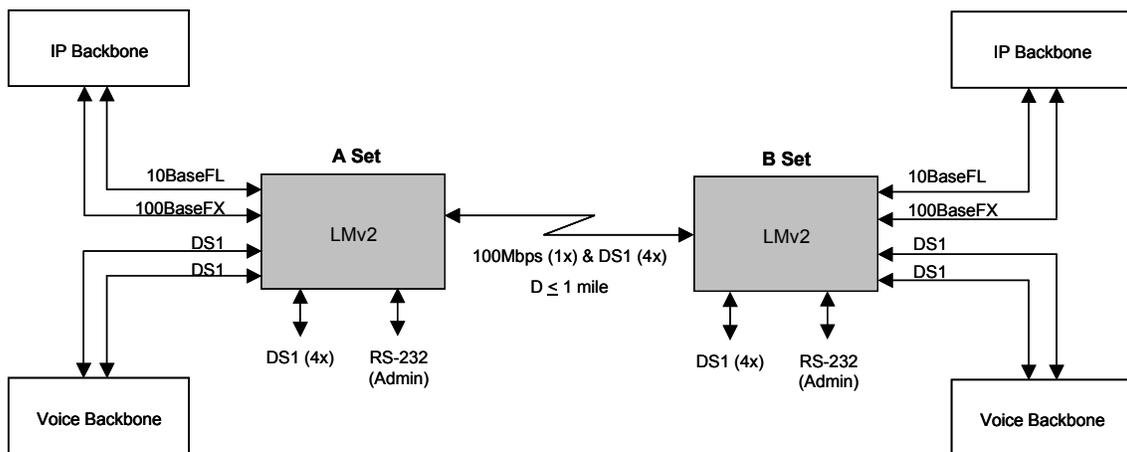


Figure 1 - LM v2 Application in TDC ICAP

3.2 Performance Requirements

3.2.1 Electrical Interface Requirements (External)

Access to the LM v2 is through the module's Distribution Frame (DF). The DF must be manually patched to the ATM Multiplexer to provide the required connections. The input power connection is at the power conditioner. The access ports on the DFs include the number and type of external interfaces presented in Table 2.

Table 2 - LM v2 External Interface Characteristics

Signal Name	Quantity	Connector	Input/ Output	Primary Interface	Electrical Characteristics
Module prime power	1	IEC 320-C20 Receptacle	I	Local power source	100 - 240 VAC, 47 - 63 Hz
Laser transceiver power supply	1	Commercial power receptacle	I	Local power source	120/240 VAC \pm 10%, 47/63 Hz
IP 10BaseT/100BaseTX	3	RJ45	I/O	IP Backbone	IEEE Std 802.3
100BaseFX	1 pair	ST (Fiber Optic)	I/O	IP Backbone	IEEE Std 802.3
10BaseFL	1 pair	ST (Fiber Optic)	I/O	IP Backbone	IEEE Std 802.3
DS1	2 pair	ST (Fiber Optic) RJ45	I/O	Module SCN inter-connections	ANSI T1.603-1990;
OC-3	1 pair	ST (Fiber Optic)	I/O	Laser	Not Applicable
Admin	1	DB 9F	I/O	Local administrator – I/O DF	EIA RS-232

3.2.1.1 Module Prime Power

The Laser Module v2 is designed to operate from 100 - 240 VAC, 47 - 63 Hz, single phase, three-wire power. The maximum current does not exceed 5 amperes at 120 VAC or 2.5 amperes at 230 VAC. The LM v2 includes an internal power conditioner to minimize line variation and transients. The prime power connector is an IEC 320-C20 receptacle. Separate breakers are provided on the power conditioner for each prime component.

3.2.1.2 Laser Transceiver Power Supply

The Laser transceiver power supply designed to operate from 120/240 VAC \pm 10%, 47/63 Hz, single phase, three-wire power. The maximum current does not exceed 5 amperes at 120 VAC or 2.5 amperes at 230 VAC. The laser transceiver power supply is an outdoor power supply that converts 110/220 AC power to the DC power input required for the laser transceiver. The prime power connector is a marine grade commercial receptacle.

3.2.1.3 IP 10BaseT/100BaseTX

The 10BaseT/100BaseTX input ports are in accordance with the eight wire ANSI/IEEE Std 802.3 10BaseT/100BaseTX Standards. The three connectors are RJ 45 Modular Jacks. Pin assignments are as shown in Table 3.

Table 3 - IP 10BaseT/100BaseTX

Pin	Signal	Pin	Signal	Pin	Signal
1	TP0+	4	TP2+	7	TP3+
2	TP0-	5	TP2-	8	TP3-
3	TP1+	6	TP1-		

3.2.1.4 100BaseFX

The 100BaseFX Datagram Switched Network Backbone is a fiber optic multi-mode connection. The fiber optic connectors are ST jacks (transmit and receive).

3.2.1.5 10BaseFL

The 10BaseFL Datagram Switched Network Backbone is a fiber optic multi-mode connection. The fiber optic connectors are ST jacks (transmit and receive).

3.2.1.6 DS1

The SCN Backbone signals are 1.544 Mbps serial data formatted as ISDN-PRI trunks. There are two fiber optic multi-mode ST jacks (transmit and receive) from the distribution panel and two RJ45 connections direct from the equipment. There are two TX/RX connector pairs.

3.2.1.7 OC-3

Connectivity between the baseband equipment and the Laser is established with fiber optic multi-mode ST terminated cable (transmit and receive).

3.2.1.8 Admin

The ATM Mux administration port is in accordance with the DB 9 RS-232 standards using the VT100 Emulator (9600 bps, No Parity, 8 Data Bits, 1 Stop Bit). The Admin connector is a DB-9F with pin assignments as shown in the Table 4.

Table 4 - Admin

Pin	Signal	Pin	Signal	Pin	Signal
1	Data Carrier Detect	4	Data Terminal Ready	7	Request to Send
2	Received Data	5	Signal Ground	8	Clear to Send
3	Transmitted Data	6	Data Set Ready	9	Ring Indicator

3.2.2 Electrical Interface (Internal)

This documentation shows the internal wiring of the major module components and the details of each major cable assembly internal to the module distribution frame. This information is found in Paragraph 6.3.

3.2.3 Functional Requirements

3.2.3.1 Basic Configuration

The LM v2 provides high-speed line of sight transmission of TDC voice and data by wireless means. Inputs are two DS1 fiber optic inputs, 10baseFL, and 100baseFX. Additionally, two copper based DS1 ports are available directly off of the ATM gateway multiplexer.

3.2.3.1.1 IP Backbone Connectivity

The 100BaseFX and 10BaseFL fiber optic multi-mode ports are provided at the I/O Distribution Frame. These ports provide connectivity to the Datagram Switched Network backbone and interconnections to other TDC modules that are within fiber distance.

3.2.3.1.2 IP Administration

The IP functions of the LM v2 are manageable via an external PC computer connected to the Admin connector at the module's I/O DF. Management of the following functions is provided:

- a) Configuration
- b) Status
- c) Control

Management can also be accomplished via SNMP and Web interfaces in band over the Ethernet ports.

3.2.3.1.3 SCN Connectivity

Four ISDN-PRI trunk connections to the TDC ICAP SCN backbone are provided using two fiber-mode ST jacks at the Distribution Frame and two RJ45 connections direct from the front of the equipment. These ports provide connectivity to the Datagram Switched Network backbone and interconnections to other TDC modules that are within fiber distance.

3.2.3.1.4 SCN Administration

The SCN functions of the LM v2 are manageable via an external PC computer interconnected to the Admin connector at the module's I/O DF. Management of the following functions is provided:

- a) Configuration

- b) Status
- c) Control

Management can also be accomplished via SNMP and Web interfaces over the Ethernet ports (in-band) of the ATM Gateway Multiplexer.

3.2.3.2 Configuration Options (Kits)

Many of the system level and maintenance kits can be used for LM v2 module troubleshooting and cable repair. These kits include:

- Fireberd Analyzer Kit
- Cable Maintenance Kit
- Voice/Data Cable Kit
- Fiber Optic Cable Kit
- Circuit Extension Kit
- Laptop Computer Kit
- Tripod Kit

3.2.4 Physical Characteristics

3.2.4.1 Transit Case

The module is housed in a 13 U transportable container (transit case), approximately 22.5”W. x 27.3”D. x 34.5”H. The transit cases are designed to stack on top of and mechanically interlock to like cases. The transit cases with their covers in place are designed to protect the electronic equipment inside from direct exposure to environmental conditions; e.g., rain, snow, ice, dust, etc., likely to be encountered during world wide military transit.

3.2.4.2 Weight

The module, including all internally carried cables, does not exceed 179lb.

3.2.4.3 Storage Space

The module transit case includes cable storage pouches within its front and rear covers to hold the Laser Power cable. Laser fiber optic cable, manuals, inter-module cables, administration cables, filters etc. are contained in one of the rack mount drawers. The Laser outdoor unit is contained in the second rack mount drawer.

3.2.4.4 Marking

See TDC Standards Document for required markings.

3.2.5 Cables and Accessories

The module includes the cables and accessories listed in Table 5, stored within the covers (exception: the Laser Fiber Cable must be stored external to the transit case). Strain relief and cable management hardware are provided with the module as required.

Table 5 - Cables and Accessories included with LM

Item	Color Code	Quantity	Description
Laser Power cable	Yellow/Buff	2	10' and 100' AC power supply input cables (stored in drawer)
Laser Fiber cable	Yellow/Buff	1	200ft Fiber Optic Laser to DF cable (shipped with LM v2)
Admin cable	Yellow/Buff	1	Module Admin (stored in drawer)
Jumper cables	Yellow/Buff	3	3' RJ45-RJ45 Ethernet Straight thru Jumper cables (stored in drawer)
Documentation	Yellow/Buff	1	All necessary information, hardcopy and/or CD
Power	Yellow/Buff	1	IEC-320 C20 Jack to NEMA 5-15P
Filter Kit	Yellow/Buff	1	Multiple filters for the laser

3.2.6 Reliability

The module with its standard complement of LRUs, have a mean time between failure (MTBF) commensurate with similar commercial equipment in its class. The actual MTBF for the major system components are shown in Table 6. Where reliability data is not readily available from the vendor, this is indicated.

Table 6 - MTBF of Major Components

Component	MTBF
SupraConnect S155MR2	Not Available
DNE TAC-300 Media Gateway	Not Available
SI Tech Fiber Optic Modem	Not Available
Media Converters	Not Available

3.2.7 Maintainability

Maintainability characteristics will be part of the selection criteria for all hardware. Ease of maintenance, such as accessibility to Line Replaceable Units, fault detection/isolation software capability, and fault annunciation will be considered.

3.2.7.1 Mean Time Between Preventive Maintenance

The Mean Time Between Preventive Maintenance, during operation, is 30 days. The duration of preventive maintenance actions such as corrosion control, cleaning filters, etc., does not exceed 30 minutes.

3.2.8 Environmental Conditions

During storage, transport and operation the modules can withstand exposure to temperatures as shown in Table 7.

3.2.8.1 Temperature

Temperature characteristics for the major equipment components are shown in Table 7.

Table 7 - Module Temperature Characteristics

Equipment	Temperature (degrees C)	
	Operating	Non-Operating
SupraConnect S155MR2	-39 to 49	-40 to 65
DNE TAC-300 Media Gateway	0 to 4	-40 to 70
SI Tech Fiber Optic Modem	0 to 50	-40 to 70
Media Converters	0 to 50	-20 to 85

3.2.8.2 Relative Humidity

Relative humidity characteristics for the major equipment components are shown in Table 8.

Table 8 - Module Humidity Characteristics

Equipment	Humidity
	Non-condensing
SupraConnect S155MR2	100%
DNE TAC-300 Media Gateway	5 to 95%
SI Tech Fiber Optic Modem	95%
Media Converters	5 to 95%

3.2.8.3 Altitude

Altitude characteristics for the major equipment components are shown in Table 9.

Table 9 - Module Altitude Characteristics

Equipment	Altitude (feet)	
	Operating	Non-Operating
SupraConnect S155MR2	Not Available	Not Available
DNE TAC-300 Media Gateway	-500 ft to 10,000 ft	-1000 ft to 30,000 ft
SI Tech Fiber Optic Modem	Not Available	Not Available
Media Converters	0 to 10,000 ft	Not Available

3.2.8.4 Sand and Dust

During storage and transport, the modules are protected when exposed to sand and dust in accordance with the best commercial practices for close proximity to operating aircraft. During operation with covers removed, the modules can withstand sand and dust in accordance with the best commercial practices for natural conditions.

3.2.8.5 Shock

Module equipment racks are equipped with rubber shock isolation mounts and is protected from shocks induced during handling, setup and tear down. Modules and components can operate without degradation following exposure to the non-operating shock environment described by Method 516.4, Procedure VI (Bench Handling) of MIL STD 810F.

3.2.8.6 Vibration

The modules are equipped with rubber shock isolation mounts so that the modules can withstand the vibration encountered while being transported by commercial and military airlift, sealift and vehicular (over unimproved roads) systems. MIL-STD-810F, Method 514.5, Procedure I, Categories 4, 7 and 8. applies; alternative procedures may be substituted after TDC Program Office approval.

3.3 Design and Construction

3.3.1 Material Parts and Processes

This module is built to good commercial practices. Mechanical and electrical interchangeability exists between like systems, subsystems, assemblies, subassemblies and replaceable parts.

3.3.2 Safety

This module shall not present a safety, fire or health hazard to personnel.

3.3.2.1 Electrical Safety

This module is designed to eliminate the hazard to personnel of inadvertent lethal voltage contact. All electrical conductors carrying voltages in excess of 70 volts shall be insulated to prevent contact or covered by a protective barrier. All removable protective barriers shall be interlocked to automatically disconnect power behind the barrier upon removal or clearly marked with a warning label that indicates the voltage potential that will be encountered behind the barrier. All warning labels shall remain visible after the cover has been removed.

3.3.2.2 Mechanical Safety

Sharp surfaces shall have protective covers or other suitable features to minimize injury where personnel are likely to be exposed to such surfaces.

3.3.2.3 Laser Safety

The Laser Module uses lasers that emit in the near-infrared waveband. The emitted laser beam is invisible to the unaided eye, but can cause permanent eye damage if viewed directly. Therefore, do not turn the system on until transceivers are properly mounted and never look directly into the front of the transceiver while it is in operation. Wear approved eye protection with an optical density of three or greater for the wavelengths of 750 nm and 900 nm when working with the laser transceiver. The emitted laser beam is skin safe at all distances.

Warning labels are provided to inform personnel of the potential hazards that may be encountered when using the Laser Module.

Reference the SupraConnect 155 MR Users' Manual for a complete description of precautions and hazards associated with using the laser.

3.4 Logistics

This module accommodates a two level maintenance concept: organizational (Air Force personnel) and depot (contractor personnel). Removal and replacement of an LRU is defined at the organizational level and any needed repair of the LRU is defined at the depot level. Any special test or support equipment required to effect removal or replacement of an LRU at the organizational level can be provided as part of the module. No more than two persons shall be required to remove or replace an LRU.

An LRU is defined as the lowest element of the module which can be isolated to be faulty through inspection; built-in test; technical manuals; TDC-ICAP system performance; spares substitution; or other diagnostic aid approved by the Government for organizational level maintenance, exclusive of expendables such as fuses, lamps and LEDs. An LRU is defined at the card/module level or higher.

4.0 QUALITY ASSURANCE PROVISIONS

4.1 General

The quality assurance program includes tests and other evaluations to the extent specified herein. The quality assurance program is designed to verify the electrical, mechanical and functional characteristics of each module. The purpose is to ensure that each module complies with or performs better than the requirements specified herein.

4.2 Responsibility for Inspection

Unless otherwise specified in the contract, the contractor shall be responsible for the performance of all inspection requirements and may use his own or any other facilities suitable for the performance of the inspection requirements. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to the prescribed requirements.

4.3 Product Qualification Test (PQT)

Inspections, analyses, demonstrations and tests verify compliance of Section 3 of this specification on the first production unit.

4.4 Production Acceptance Test (PAT)

Each module delivered to the Government undergoes an Acceptance Test Process as identified in Table 10. The acceptance test verifies that the module interfaces are operating properly prior to delivery to the Government.

4.5 Verification Cross Reference Matrix (VCRM)

Table 10 provides a list of each Section 3 requirement and the verification method to be used. The following paragraphs define the codes employed in the VCRM. Unless otherwise noted, where more than more one verification method is shown, one method or a combination of methods may be used to show compliance.

4.5.1 Not Required (N/R)

This method indicates that verification is not required because the paragraph is a title, heading, general introductory paragraph or statement of a goal and contains no “shall” or “must” statements.

4.5.2 Inspection

Inspection is a method of verification of the module performance or characteristics by examination of the equipment or associated documentation. Inspections are conducted with the use of inspection tools, measurement devices, visual means and comparison. Most inspections apply to verification of requirements associated with physical characteristics such as size, weight,

appearance, adherence to specified standards and engineering practices, quality design, and construction supported with quality documentation. Inspections also include the auditing of manufacturer’s data that verifies the performance of non-developmental items that comprise the TDC ICAP module. Inspections may occur during any assembly stage of the unit under test.

4.5.3 Analysis

Analysis is a method of verification through technical evaluation of calculations, computations, models, analytical solutions, use of studies, reduced data, and/or representative data to determine that the item conforms to the specified requirements.

4.5.4 Demonstration

Demonstration is a method of verification whereby the properties, characteristics and parameters of the item are determined by observation alone and without the use of instrumentation for quantitative measurements. This method is used when a requirement does not contain a specific numerical parameter that must be measured. Demonstrations may occur during verification of a unit under test at any assembly stage. Pass/fail criteria are simple yes/no indications of functional performance since no quantitative values are specified.

4.5.5 Test

Test is a method to verify that a specified requirement is met by thoroughly exercising the applicable item under specified conditions and by using the appropriate instrumentation in accordance with test procedures. This method requires the use of laboratory equipment, simulators, or services to verify compliance to the specified requirements. This method is used when it is practicable to make direct or indirect measurement of a specified numerical parameter to verify compliance with a requirement. Tests may occur during verification of a unit at any assembly stage. Actual measured values are recorded, and pass/fail is determined by comparing the measured value with the specified value. Measurement accuracy is precise enough to ensure that the measured value is within the specified tolerance.

Table 10 - Verification Cross Reference Matrix

Paragraph	Title	Verification Method					
		N/R	PQT				ATP
			Inspect	Analysis	Demo	Test	
3.	Requirements	X					
3.1	Module Definition	X					
3.2	Performance Requirements	X					
3.2.1	Electrical Interface Requirements (External)	X					
3.2.1.1	Module Prime Power					X	
3.2.1.2	Laser Transceiver Power Supply				X		X
3.2.1.3	IP 10BaseT/100BaseTX				X		X
3.2.1.4	100BaseFX				X		X
3.2.1.5	10BaseFL				X		X

Table 10 - Verification Cross Reference Matrix

Paragraph	Title	Verification Method					
		N/R	PQT				ATP
			Inspect	Analysis	Demo	Test	
3.2.1.6	DS1				X		X
3.2.1.7	OC-3				X		X
3.2.1.8	Admin				X		X
3.2.2	Electrical Interface (Internal)	X					
3.2.3	Functional Requirements	X					
3.2.3.1	Basic Configuration	X					
3.2.3.1.1	IP Backbone Connectivity				X		X
3.2.3.1.2	IP Administration				X		X
3.2.3.1.3	SCN Connectivity				X		X
3.2.3.1.4	SCN Administration				X		X
3.2.3.2	Configuration Options	X					
3.2.4	Physical Characteristics	X					
3.2.4.1	Transit Case		X				
3.2.4.2	Weight					X	
3.2.4.3	Storage Space		X				
3.2.4.4	Marking		X				
3.2.5	Cables And Accessories				X	X	X
3.2.6	Reliability			X			
3.2.7	Maintainability			X			
3.2.7.1	Mean Time Between Preventive Maintenance [MTBPM]			X			
3.2.8	Environmental Conditions	X					
3.2.8.1	Temperature					X	
3.2.8.2	Humidity			X			
3.2.8.3	Altitude			X			
3.2.8.4	Sand And Dust			X			
3.2.8.5	Shock					X	
3.2.8.6	Vibration					X	
3.3	Design And Construction	X					
3.3.1	Material Parts And Processes			X			
3.3.2	Safety	X					
3.3.2.1	Electrical Safety			X		X	
3.3.2.2	Mechanical Safety		X	X			
3.3.2.3	Laser Safety		X	X			
3.4	Logistics			X			

5.0 PREPARATION FOR DELIVERY

Each module is packaged for shipment and the package marked in accordance with the requirements of the contract under which the module is ordered.

6.0 BASELINE CONFIGURATION

6.1 Equipment

Table 11 - Equipment Listing

Device	Manufacturer	Part Number	Description	Quantity
SupraConnect	LSA Photonics	S155MR2.090005	SupraConnect 2.0mrad Transceiver with fine translation mounting unit and manual	1
Filter Kit	LSA Photonics	20104	Laser Optical Filter Kit	1
Laser Power Supply	Freedom Power Systems	01-480-0001	Outdoor Power Supply with detachable 20ft DC Output Cable and 1ft DC Patch Cable	1
Drawer, Storage	ECS Composites	52000861	6U Storage drawer for transceiver and filter kit	1
Drawer, Storage	ECS Composites	52002729	4U storage drawer for power supply and power cables	1
Chassis	DNE	97550001	TAC-300 ATM Gateway chassis, with power supply, Interface Control Module-Ethernet (ICM-E) and CPOD 150	1
Card	DNE	87550230	Circuit Emulation Quad DS1 IPOD interface card with 4, RJ-48 connectors	1
Card	DNE	87550140	ATM OC-3 XPOD interface Card with 1300 nm MM ST connectors	1
Case	ECS Composites	11722	Transit Case	1
Media Converter	Transition Networks	E-TBT-FRL-05	10BaseT to 10BaseFL Media Converter	1
Media Converter	Transition Networks	SBFTF1011-100	10/100 BaseTX to 100BaseFX Bridging Media Converter	1
Power Supply	Ault	SW109MA0002F02	Media Converters Power Supply	2
Conditioner	Marway	MPD411130	Power Conditioner	1
Fiber Optic Modem	S.I. Tech	2890-2R-ASP-1	Dual T1 Fiber Optic Modem	1
Cable Loop	Leviton Telcom	41020-SPR	Polytie Cable Loop	2
Cable Mgmt Bar	Leviton Telcom	41150-019	Polyrack Cable Management Bar	2
Connector	Fiber Systems Int.	BSTA2000	Bulkhead Coupler	10
Connector	Gruber	80-3029	SNMP RJ45 connector	9
(W1) Cable	TBD	TBD	10BaseT to Media Converter	1
(W2) Cable	TBD	TBD	100BaseTX to Media Converter	1
(W3) Cable	TBD	TBD	10BaseFL Media Converter to DF Fiber Optic Cable	1
(W4) Cable	TBD	TBD	100BaseFX Media Converter to DF Fiber Optic Cable	1

Table 11 - Equipment Listing

Device	Manufacturer	Part Number	Description	Quantity
(W5, W6, W7, W8) Cables	TBD	TBD	ATM Gateway DS1 Interface to DF Cable	4
(W9) Cable	TBD	TBD	ATM Gateway 10/100BaseTX to DF Cable	1
(W10) Cable	TBD	TBD	ATM Gateway Admin to DF Cable	1
(W11) Cable	TBD	TBD	Media Converter Y Power Cable	1
(W12) Cable	TBD	TBD	ATM Gateway Power Cable	1
(W13, W14) Cables	TBD	TBD	T1 Fiber Optic Modem to DF Cable	2
(W15, W16) Cables	TBD	TBD	DS1 Fiber Optic Modem to DF Cable	2
(W17) Cable	TBD	TBD	ATM Gateway OC-3 to DF Cable	1
(P1) Cable (In Drawer)	TBD	TBD	Admin Cable	1
(P2) Cable On Reel (Shipped with LM v2)	TBD	TBD	200ft Fiber Optic Laser to DF Cable on Reel	1
(P3) Cable (In Drawer)	TBD	TBD	10ft Power Supply AC Input Cable	1
(P4) Cable (In Drawer)	TBD	TBD	100ft Power Supply AC Input Cable	1
P5) Cables (In Drawer)	TBD	TBD	3' RJ45-RJ45 Ethernet Straight thru Jumper cables (stored in drawer)	3

6.2 Elevation Drawings

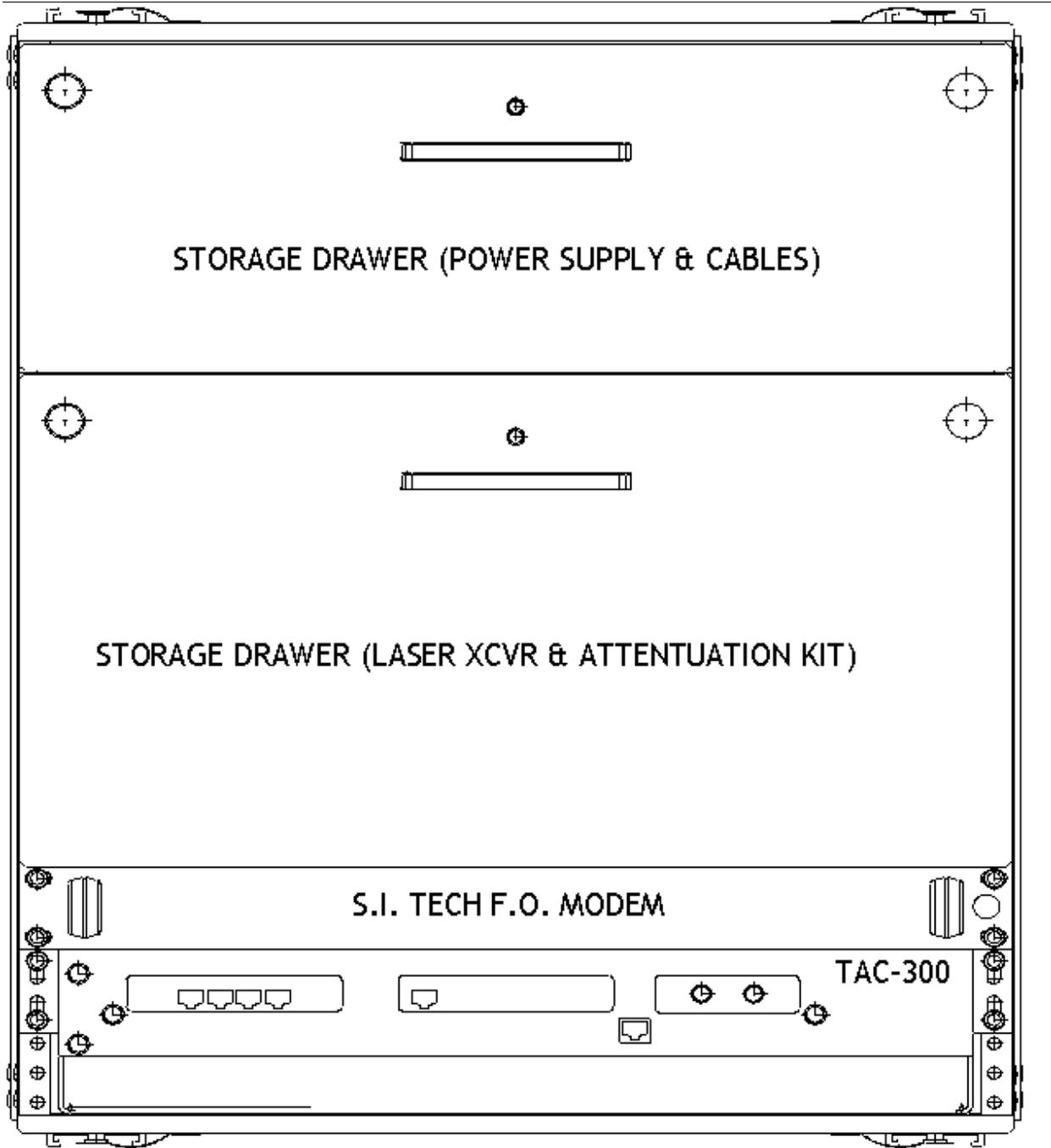


Figure 2 - Front Elevation

Figure 3 shows the rear elevation of the LM.

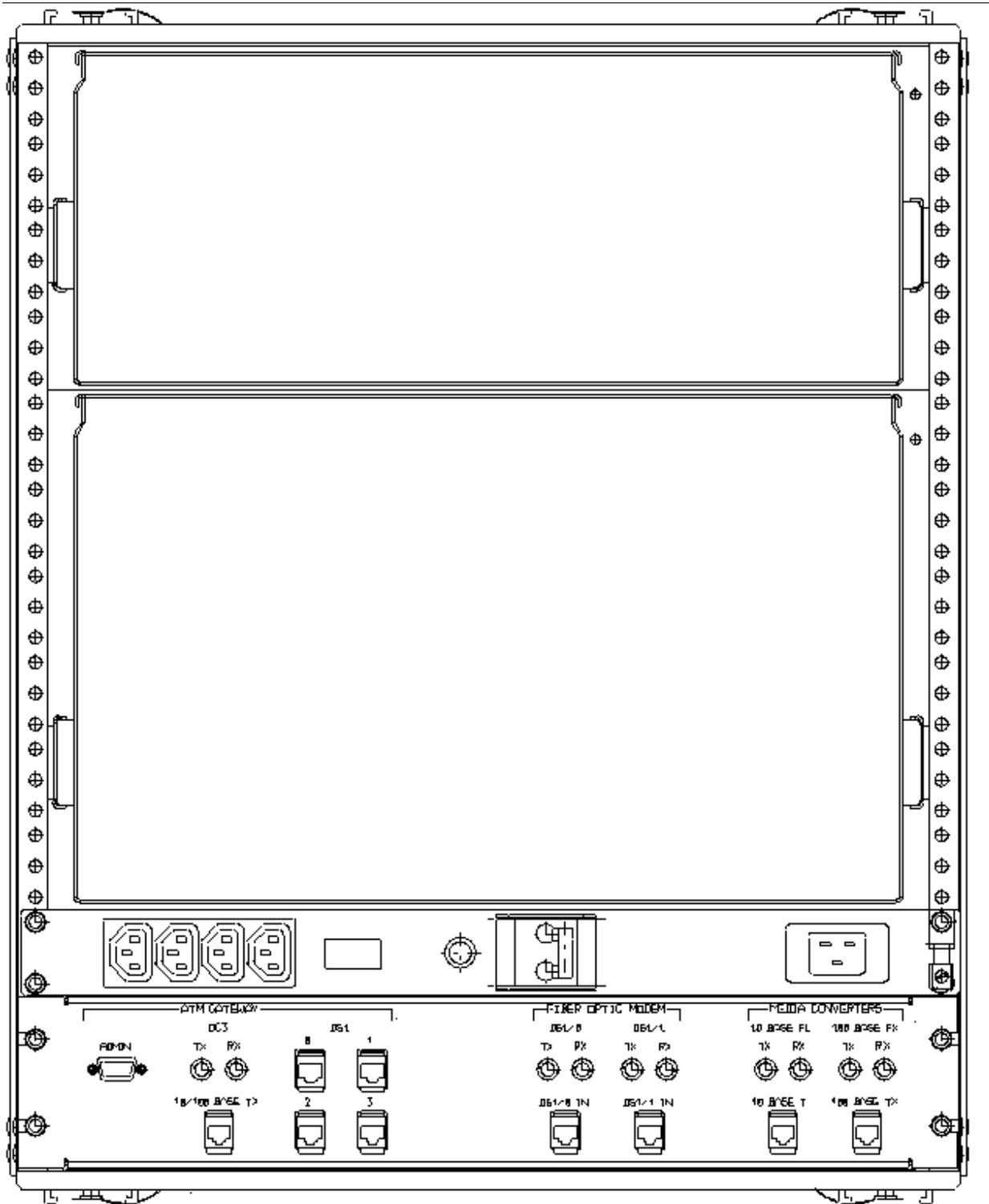


Figure 3 - Rear Elevation

6.3 Cable Diagrams

Table 12 - Cable Listing

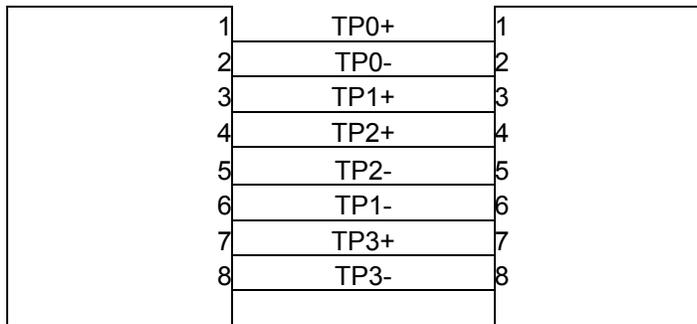
Wire Number	Part Number	Manufacturer	Description
W1	TBD	TBD	10BaseT to Media Converter
W2	TBD	TBD	100BaseTX to Media Converter
W3	TBD	TBD	10BaseFL Media Converter to DF Fiber Optic Cable
W4	TBD	TBD	100BaseFX Media Converter to DF Fiber Optic Cable
W5, W6, W7, W8	TBD	TBD	ATM Gateway DS1 Interface to DF Cable
W9	TBD	TBD	ATM Gateway 10/100BaseTX to DF Cable
W10	TBD	TBD	ATM Gateway Admin to DF Cable
W11	TBD	TBD	Media Converter Y Power Cable
W12	TBD	TBD	ATM Gateway Power Cable
W13, W14	TBD	TBD	T1 Fiber Optic Modem to DF Cable
W15, W16	TBD	TBD	DS1 Fiber Optic Modem to DF Cable
W17	TBD	TBD	ATM Gateway OC-3 to DF Cable
P1	TBD	TBD	Admin Cable (stored in drawer)
P2	TBD	TBD	200ft Fiber Optic Laser to DF Cable, On Reel (shipped with LM v2)
P3	TBD	TBD	10ft Power Supply AC Input Cable (stored in drawer)
P4	TBD	TBD	100ft Power Supply AC Input Cable (stored in drawer)
P5	TBD	TBD	3' RJ45-RJ45 Ethernet Straight thru Jumper cables (stored in drawer)

Cable W1
Pin Assignments
10BaseT to Media Converter Cable

RJ45 (SOLID)
DF I/O
10BaseT

RJ45 (SOLID)
Media Converter
10BaseT

Signal

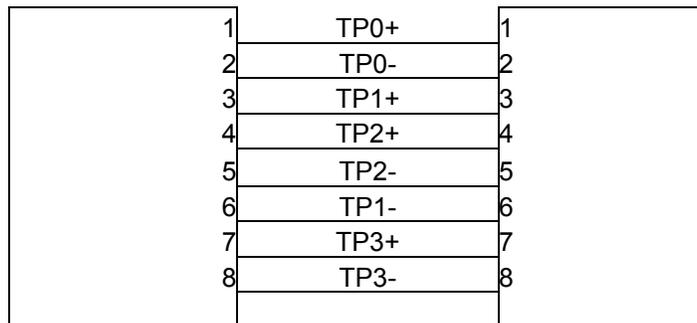


Cable W2
Pin Assignments
100BaseTX to Media Converter Cable

RJ45 (SOLID)
Plug
DF I/O
100BaseTX

RJ45 (SOLID)
Plug
Media Converter
100BaseTX

Signal



Cable W3
Pin Assignments
10BaseFL Media Converter to DF Fiber Optic Cable

ST
Plug
Media Converter
10BaseFL

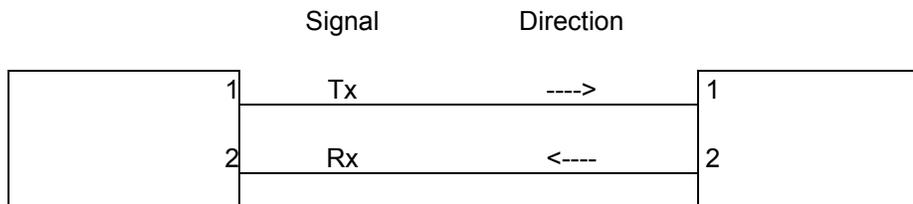
ST
Plug
DF I/O
10BaseFL

	Signal	Direction	
1	Tx	---->	1
2	Rx	<----	2

Cable W4
Pin Assignments
100BaseFX Media Converter to DF Fiber Optic Cable

ST
Plug
Media Converter
100BaseFX

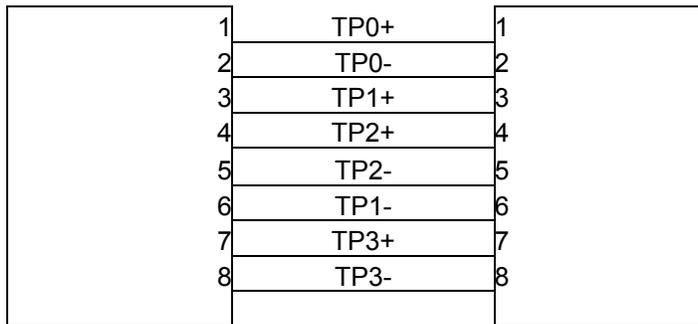
ST
Plug
DF I/O
100BaseFX



Cable W5, W6, W7, W8
Pin Assignments
ATM Gateway DS1 Interface to DF Cable

RJ45	RJ45
ATM Gateway	DF I/O
DS1 CES	DS1

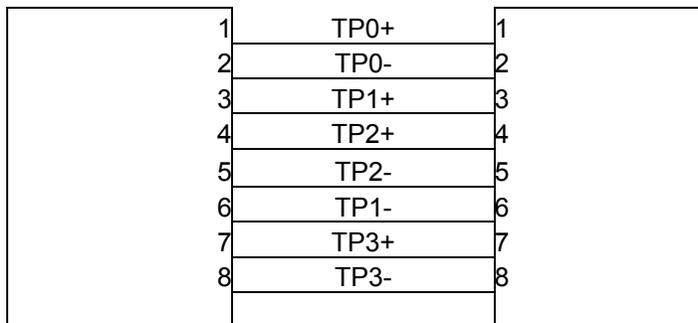
Signal



Cable W9
Pin Assignments
ATM Gateway 10/100BaseTX to DF Cable

RJ45	RJ45
ATM Gateway	DF I/O
10/100 ENET	10/100BaseTX

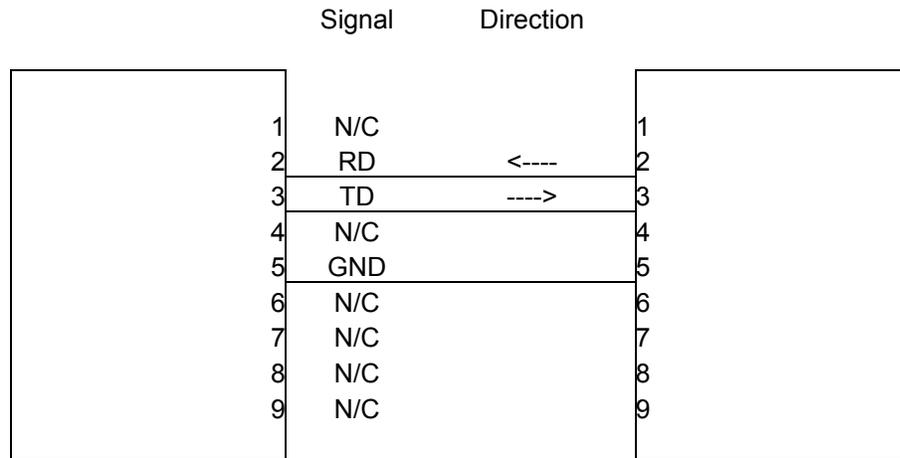
Signal



Cable W10
Pin Assignments
ATM Gateway Admin to DF Cable

DB9M
Receptacle
ATM Gateway
Console A

DB9F
Plug
Gateway Admin
DF I/O



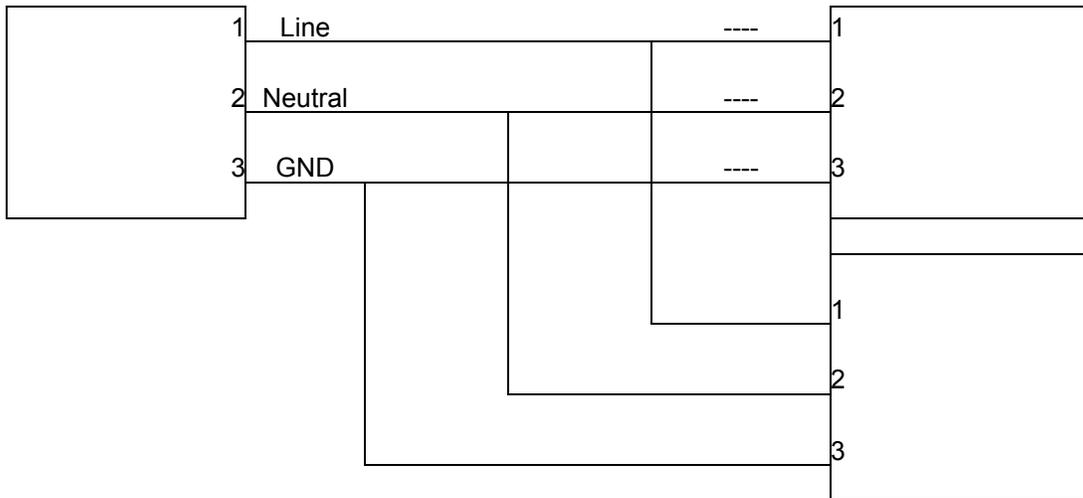
Cable W11
Pin Assignments
Media Converter Y Power Cable

Power
RECEPTACLE
Power Conditioner
IEC-320/C-14

Power
RECEPTACLE
Media Converter
Power Supply
IEC-320/C-13 (x2)

Signal

Direction



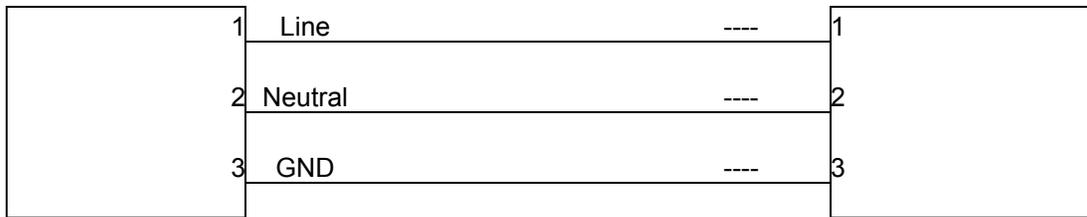
Cable W12
Pin Assignments
ATM Gateway Power Cable

Power
RECEPTACLE
Power Conditioner
IEC-320/C-14

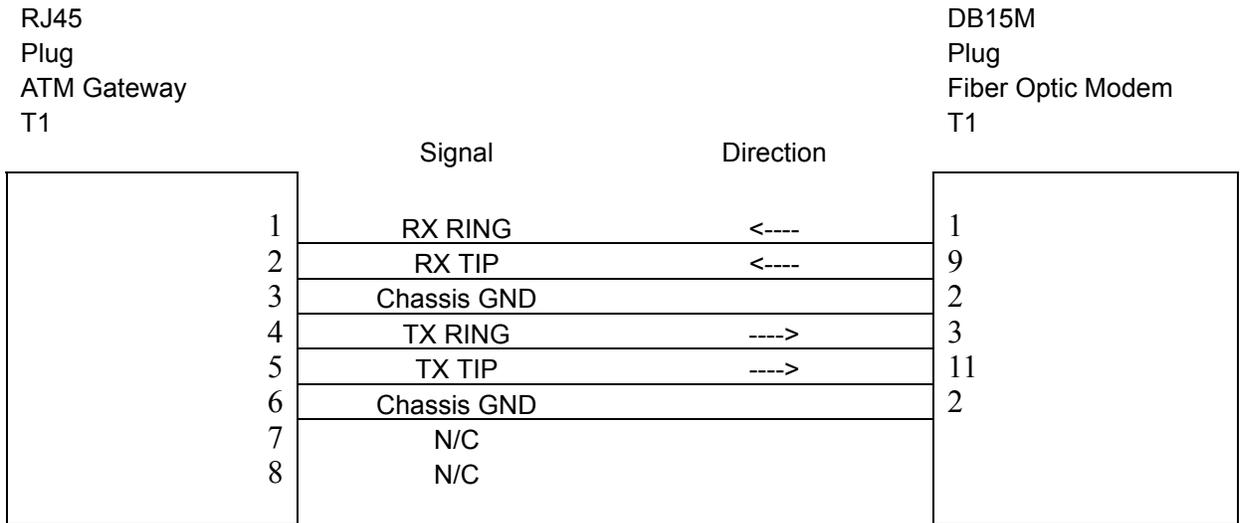
Power
RECEPTACLE
ATM Gateway
IEC-320/C-13

Signal

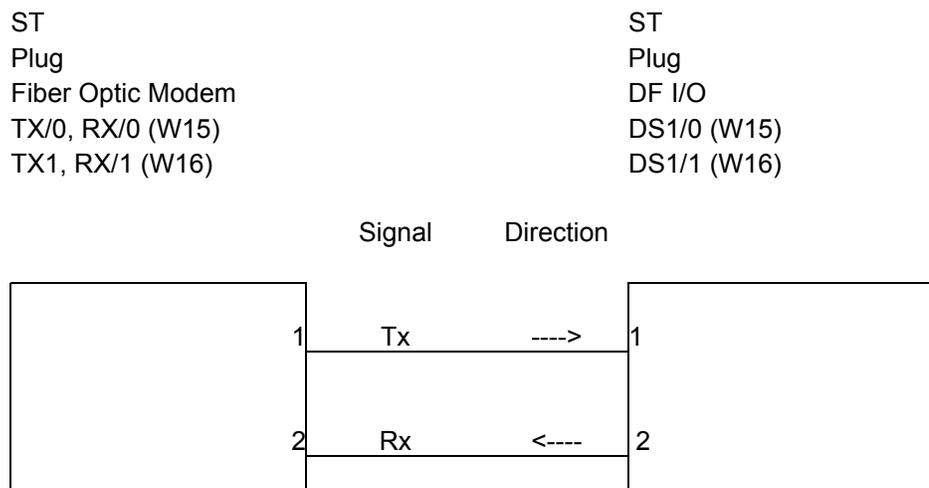
Direction



Cable W13, W14
Pin Assignments
T1 Fiber Optic Modem to DF Cable

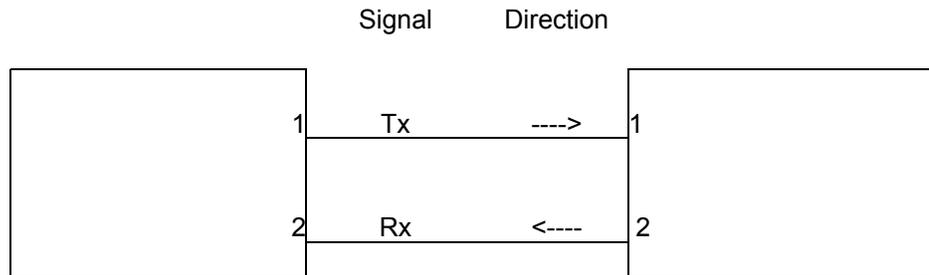


Cable W15, W16
Pin Assignments
DS1 Fiber Optic Modem to DF Cable



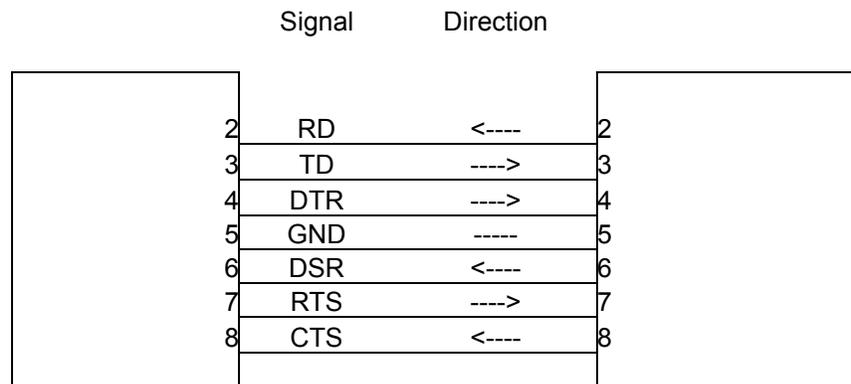
Cable W17
Pin Assignments
ATM Gateway OC-3 to DF Cable

SC Plug ATM Gateway OC3 ATM	ST Plug DF I/O OC3
--------------------------------------	-----------------------------

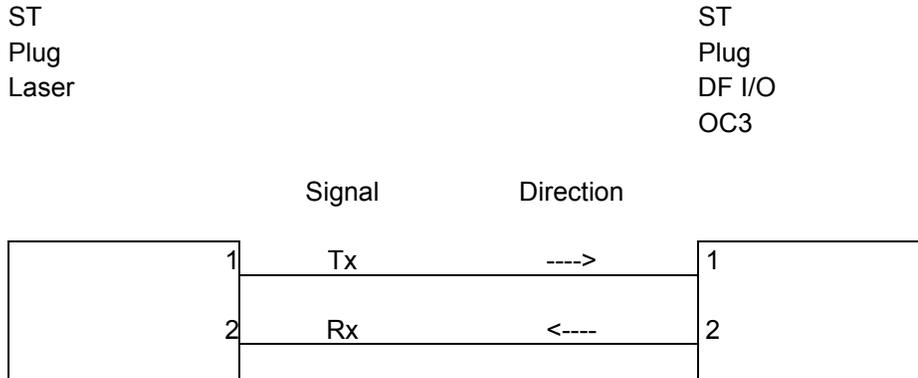


Cable P1
Pin Assignments
Admin Cable (stored in drawer)

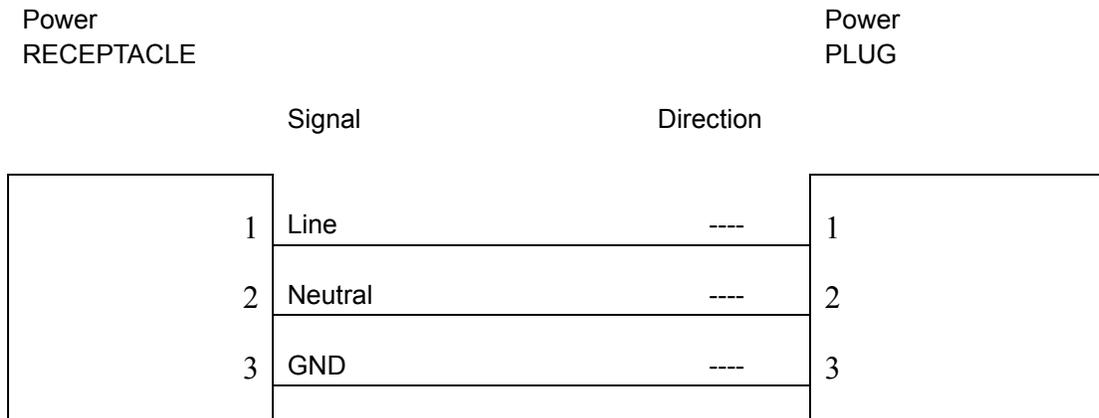
DB9F Receptacle	DB9M Plug
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Cable P2
 Pin Assignments
 200ft Fiber Optic Laser to DF Cable, On Reel
 (shipped with LM v2)



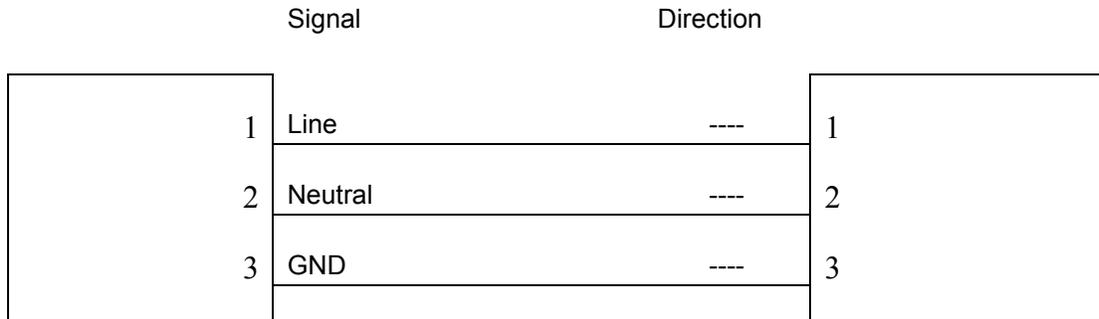
Cable P3
 Pin Assignments
 10ft Power Supply AC Input Cable
 (stored in drawer)



Cable P4
 Pin Assignments
 100ft Power Supply AC Input Cable
 (stored in drawer)

Power
RECEPTACLE

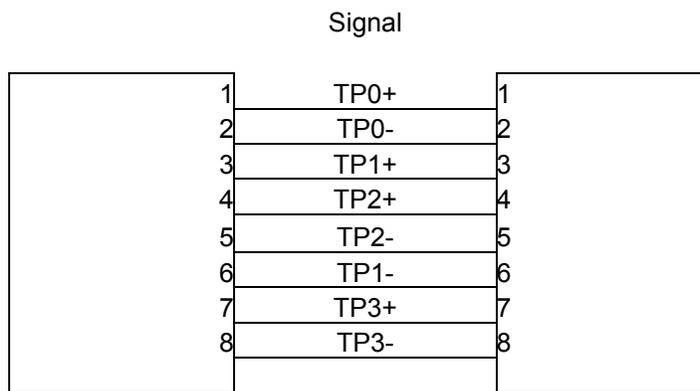
Power
PLUG



Cable P5
 Pin Assignments
 3ft Ethernet Straight-Thru Cable (stored in drawer)

RJ45

RJ45



6.4 Interconnection Diagram

