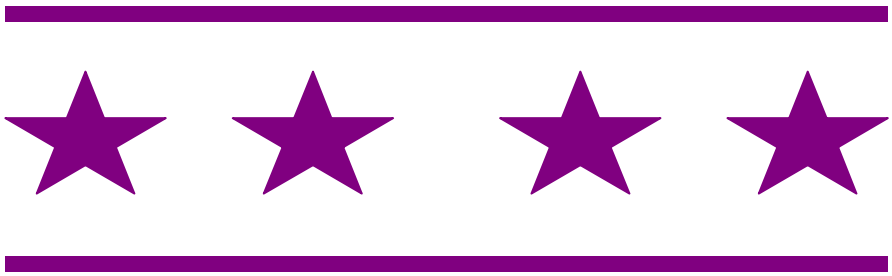
TDC



Theater Deployable Communications

Baseline Requirements Document

FTSAT Baseband Module

(v1)

Nov 2003

ESC/NI4T
5 Eglin Street
Hanscom AFB, MA 01731

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1.0 SCOPE

This requirements document establishes the performance, manufacture and test requirements for the TDC ICAP FTSAT Baseband Module v1.1.

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
CG-1267	Flyaway Triband Satellite Terminal AN/USC-60A Operation and Unit Level Maintenance Manual, Revision3, 21March 2003
CG-1290	Operator's Manual for the Generation III Nodal Satellite Multiplexer [NSM-20M]
IEEE 802.3	Ethernet Standard.
TIA/EIA–422–B	Electrical Characteristics of Balanced Voltage Digital Interface Circuits (ANSI/TIA/EIA–422–B–94) (May, 1994)
EIA–530-A-1992	High Speed 25 — Position Interface for Data Terminal Equipment and Data Circuit — Terminating Equipment, (June 1992)
EIA/TIA–232–E-1991	Interface between Data Terminal Equipment and Data Circuit-Terminating Equipment employing serial binary data interchange (rates to 20 Kbps) (July 1991).
MIL-STD-810F	Environmental Test Methods
	TDC Standards Document

3.0 REQUIREMENTS

3.1 Module Definition

The FTSAT Baseband Module consists of the Vertex/RSI NSM-20M nodal satellite multiplexer and L3 Communications Remote Fiber Optic Modem packaged in a 4U high rack mountable transit case. The NSM-8448 is a synchronous time division digital multiplexer used in a satellite earth terminal. The NSM 20M provides a full duplex interface capability into the satellite modem when connected to the satellite terminal. The Satellite terminal is part of the TDC-ICAP ground equipment. Inputs from synchronous data users are multiplexed into a single output aggregate and supplied to the modem in the satellite terminal for transmission. Similarly, received aggregates are demultiplexed (decombined) into their composite parts and supplied to the respective data users. The remote fiber optic modem is normally connected to a second fiber modem, which is an integral part of the FTSAT Electronics Case A2 see Figure 1. When the fiber modems are employed, the satellite terminal can be located up to 500 feet away from the baseband module. In addition, the laptop computer used to control the satellite terminal is either co-located with the baseband module or it is located with the terminal. A DB25-to-DB37 multiconductor cable is provided to connect the USC-60A Satellite Modem in Electronics Case A2 to the Satellite Multiplexer [TSSP] in the FTSAT Baseband Module. The cable would run from the satellite modem connector J1 [37 pin] on the back of USC-60A Electronics Case A2 to the TSSP aggregate connector [25 pin] on the back of the FTSAT Baseband Module.

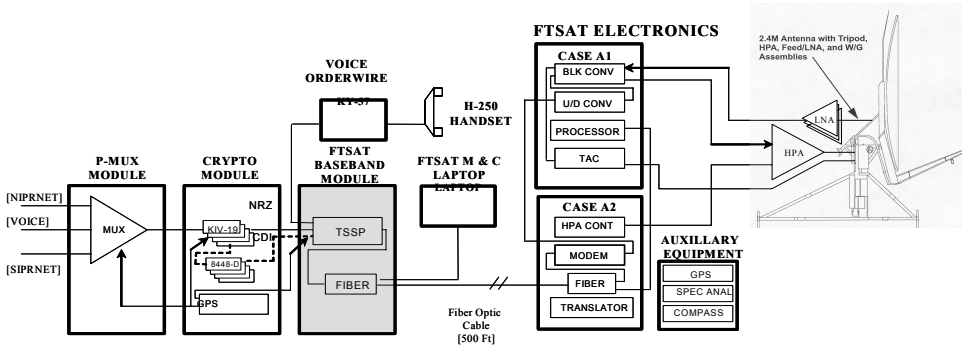


Figure 1 - FTSAT Baseband Module Application in TDC ICAP

3.2 Performance Requirements

3.2.1 Electrical Interface Requirements (External)

The FTSAT Baseband Module (v1.1) includes the number and type of active external interfaces presented in Table 2.

Table 2 - FCC-100 Tactical Module External Interface Characteristics

Signal Name	Quantity	Connector	Primary Interface	Electrical Characteristics
Prime Power	1	I/O	IEC 320-C20 Receptacle	100-130 VAC 200-240 VAC 50-60 VAC
Fiber Backbone connector	8	I/O	ST [Fiber]	USC-60A Terminal
Fiber Modem Data connector	1	I/O	DB-25(F)	Satellite Multiplexer
Fiber Modem Control connector	1	I/O	DB-9(F)	USC-60 Laptop
TSSP Aggregate Port connector	2	I/O	DB-25(F)	USC-60 Fiber Modem
TSSP NRZ User Port connector	12	I/O	DB-25(F)	Crypto Module
TSSP CDI User Port connector	2	I/O	Dual BNC	Crypto Module
TSSP Control Port connector	1	I/O	DB-9(F)	Local Admin
TSSP Station Clock Input connector	1	I/O	BNC	Crypto Module
TSSP KY-57 Secure Orderwire	1	I/O	Combo-D(F)	KY-57 Secure Voice Adapter
KY-57 Power connector	1	O	MS3120F14-5S	KY-57 DC Power

3.2.1.1 Prime Power

The FTSAT Baseband Module is designed to operate from 100 to130 VAC, 200 to 240 VAC, 50 to 60 Hz, single phase, three-wire power in accordance with the TDC Standards Document.

3.2.1.2 Fiber Backbone Connectors

The fiber backbone is 8 ST connectors. The Fiber Backbone connectors provide connectivity from the Remote Fiber Modem to the Local Fiber Modem.

Table 3 - Fiber Backbone Connectors [ST]

Pin	Signal
1	TX
2	RX

3.2.1.3 Fiber Modem Data Connector

The Fiber Modem Data Connectors are DB–25(F) type. Pin assignments are in accordance with EIA–530 as shown in Table 4.

Table 4 - Fiber Modem Data Connector [DB-25F]

Pin	Signal	Pin	Signal	Pin	Signal
1	NC	9	RT [B]	17	RT [A]
2	SD [A]	10	NC	18	EXC [A]
3	RD [A]	11	TT [B]	19	NC
4	NC	12	ST [B]	20	NC
5	NC	13	NC	21	NC
6	NC	14	SD [B]	22	NC
7	SGND	15	ST [A]	23	NC
8	NC	16	RD [B]	24	TT [A]
				25	EXC [B]

3.2.1.4 Fiber Modem Control Connector

The Fiber Modem Control Connector provides connectivity to the fiber modem administration port. The Admin connector is a DB-9F with pin assignments as shown in Table 5.

Table 5 - Fiber Modem Control Connector [DB-9F]

Pin	Signal	Pin	Signal	Pin	Signal
1	CD	4	DSR	7	CTS
2	TXD	5	GND	8	RTS
3	RXD	6	DTR	9	NC

3.2.1.5 TSSP Aggregate Port Connector

The TSSP Aggregate Port Interface connectors are DB–25(F) type. The TSSP Aggregate Port provides 2 connectors which interface to the Fiber Modem. Pin assignments are in accordance with EIA–530 as shown in Table 6.

Table 6 - Aggregate Port Connectors [DB-25F]

Pin	Signal	Pin	Signal	Pin	Signal
1	NC	9	RT [B]	17	RT [A]
2	SD [A]	10	NC	18	NC
3	RD [A]	11	TT [B]	19	NC
4	NC	12	ST [B]	20	NC
5	NC	13	NC	21	NC
6	NC	14	SD [B]	22	NC
7	SGND	15	ST [A]	23	NC
8	NC	16	RD [B]	24	TT [A]
				25	NC

3.2.1.6 TSSP NRZ User Port Connectors

The TSSP NRZ User Port connectors are DB–25(F) type. The TSSP Aggregate Port provides 12 NRZ User Ports, which interface to the Crypto Module. Pin assignments are in accordance with EIA–530 as shown in Table 7.

Table 7 - TSSP NRZ User Port Connectors [DB-25F]

Pin	Signal	Pin	Signal	Pin	Signal
1	NC	9	RT [B]	17	RT [A]
2	SD [A]	10	NC	18	NC
3	RD [A]	11	TT [B]	19	NC
4	NC	12	ST [B]	20	NC
5	NC	13	NC	21	NC
6	NC	14	SD [B]	22	NC
7	SGND	15	ST[A]	23	NC
8	NC	16	RD [B]	24	TT [A]
				25	NC

3.2.1.7 TSSP CDI User Port Connector

The TSSP CDI User Port connector provides connectivity to the Crypto Module. They provide an interface to the CX-11230 UG-1873/G to BNC Adapter Pigtail. Pin assignments are as shown in Table 8 and Table 9.

Table 8 - TSSP CDI User Port Connectors - Transmit Data [Dual BNC]

Pin	Signal
1	Data +
2	Data -

Table 9 - TSSP CDI User Port Connectors - Receive Data [Dual BNC]

Pin	Signal
1	Data +
2	Data -

3.2.1.8 TSSP Control Port Connector

The TSSP Control Port Connector provides connectivity to the TSSP Satellite Modem administration port. The Admin connector is a DB-9(F) with pin assignments as shown in Table 10.

Table 10 - TSSP Control Port Connector [DB-9F]

Pin	Signal	Pin	Signal	Pin	Signal
1	CD	4	DSR	7	CTS
2	TXD	5	GND	8	RTS
3	RXD	6	DTR	9	NC

3.2.1.9 TSSP Station Clock Input Connector

The TSSP Station Clock Input Connector provides an external clock input to the TSSP Satellite Modem. The Station Clock Input is an isolated BNC connector with pin assignments as shown in Table 11.

Table 11 - TSSP TSSP Station Clock Input Connector [BNC]

Pin	Signal
1	Data +
2	Data -

3.2.1.10 TSSP KY-57 Secure Orderwire

The TSSP KY-57 Secure Orderwire connector provides a secure interface to the KY-57 Voice Orderwire. The TSSP KY-57 Secure Orderwire connector is a DB-9 Female with pin assignments as shown in Table 12.

Table 12 - TSSP KY-57 Secure Orderwire Control Port Connector [DB-9F]

Pin	Signal	Pin	Signal	Pin	Signal
1	VIN_DVOW_IN_ RTN	4	VIN_DVOW_OUT	7	NC
2	VIN_DVOW_IN	5	NC	8	NC
3	VIN_DVOW_OUT _RTN	6	NC	9	GND

3.2.1.11 KY-57 Power Connector

The KY-57 Power Connector provides 24Vdc input power to the KY-57 Voice Orderwire. The KY-57 Power Connector is a MS3120F14-5S Militarized connector with pin assignments as shown in Table 13.

Table 13 - KY-57 Power Connector MS3120F14-5SC]

Pin	Signal	Pin	Signal		Signal
A	+24Vdc	C	NC	E	NC
B	RETURN	D	NC		

3.2.2 Electrical Interface (Internal)

The FTSAT Baseband Module utilizes several types of internal interfaces. The internal wiring of the major module components and the details of each major cable assembly internal to the module is found in Paragraph 6.3.

3.2.3 Functional Requirements

3.2.3.1 FTSAT Baseband Module Configuration

A block diagram of the FTSAT Baseband Module functional architecture within the TDC ICAP Network is provided in Figure 1. The heart of the module is the Vertex RSI Satellite Multiplexer. The multiplexer accepts traffic from the other ICAP modules and multiplexes it for transmission to off-base locations. Conversely, the multiplexer demultiplexes off-base traffic and routes it to the other ICAP modules.

3.2.3.2 TSSP Multiplexer

The VertexRSI Nodal Satellite Multiplexer (NSM) is a synchronous time division multiplexer that provides both:

- Aggregate interfaces to satellite modems and,
- Group interfaces to ground equipment.

The NSM is interoperable with legacy TD-1337 equipment, including remote configuration and automatic frequency control. A computer provides monitoring and control of the NSM through the RS-232 port. The graphical user interface software for control and monitoring of NSM operation runs under Microsoft Windows 95, Windows 98 or Windows NT. The NSM uses LED's to provide operational status. The LED's are located on the front of the unit. NSM external interface connections are provided on the rear of the unit. The NSM operational system is composed of the NSM unit and a computer that facilitates configuration and control of the NSM.

3.2.3.2.1 Timing

Timing to the satellite multiplexer for synchronization of data can be supplied from any one of multiple sources. The multiplexer can lock its timing reference to any one of the twelve user inputs, any one of the two receive aggregate inputs, or to a high-stability external timing standard (station clock). The multiplexer can also derive timing from a remote multiplexer or TD-1337 when operated in Automatic Frequency Control (AFC) slave mode.

3.2.3.3 Fiber Optic Modem

The FTSAT terminal will normally be connected to the baseband module using two fiber optic modems. One fiber modem is an integral part of the FTSAT electronics case A2 while the second fiber modem is part of the baseband module. When the fiber modems are employed, the FTSAT terminal can be located up to 500 feet away from the baseband module. In addition, the laptop computer used to control the FTSAT terminal can either be co-located with the baseband module or it can be located with the terminal.

3.2.3.4 Built-In Test

The satellite multiplexer and fiber modem include diagnostics to detect and report major faults.

3.2.3.5 Configuration Options (Kits)

None

3.2.4 Physical Characteristics

3.2.4.1 Transit Case

The the FTSAT Baseband Module is housed in an 4U transportable container (transit case), approximately 22.5”W. x 34.5”D. x 12.24”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 FTSAT Baseband Module, including all internally carried cables, does not exceed 90 lb.

3.2.4.3 Storage Space

The FTSAT Baseband Module transit case includes storage pouches within its covers to contain cables, manuals, etc. that must be transported and used with the module.

3.2.4.4 Marking

See TDC Standards Document for required markings.

3.2.5 Cables and Accessories

The FTSAT Baseband Module includes the cables listed in Table 14. Unique cables are marked with the module's White and Green color code as indicated.

Table 14 - Cables and Adapters included with FTSAT Baseband Module

Function	Color Code	Quantity	Description
Power	N/R	1	IEC-320 C20 Jack to NEMA 5-15P
TSSP Aggregate to Fiber Data	White/Green	1	TSSP Aggregate Jumper Cable (stored in pouch)
TSSP Admin	White/Green	1	TSSP Admin Cable (stored in pouch)
TSSP NRZ to Crypto Module	White/Green	3	TSSP External User Ports Cable (stored in Bag)
FTSAT terminal to FTSAT Baseband	White/Green	1	TSSP Direct Connect Cable (stored in Bag)

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 15. Where reliability data is not readily available from the vendor, this is indicated.

Table 15 - MTBF of Major Components

Component	MTBF
Vertex RSI Satellite Mux	TBD
L3 Fiber Optic Modem	TBD

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 16.

3.2.8.1 Temperature

Temperature characteristics for the major equipment components are shown in Table 16.

Table 16 - Module Temperature Characteristics

Equipment	Temperature (degrees C)	
	Operating	Non-Operating
Vertex RSI Satellite Mux	0 to 50	-40 to 85
L3 Fiber Optic Modem	0 to 50	-40 to 70

3.2.8.2 Relative Humidity

Relative humidity characteristics for the major equipment components are shown in Table 17.

Table 17 - Module Humidity Characteristics

Equipment	Humidity
	Non-condensing
Vertex RSI Satellite Mux	5 to 95%
L3 Fiber Optic Modem	Not Available

3.2.8.3 Altitude

Altitude characteristics for the major equipment components are shown in Table 18.

Table 18 - Module Altitude Characteristics

Equipment	Altitude (feet)	
	Operating	Non-Operating
Vertex RSI Satellite Mux	Not Available	Not Available
L3 Fiber Optic Modem	Not Available	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.

3.4 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 19. 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 19 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 19 - Verification Cross Reference Matrix

		Verification Method					
			PQT				
Paragraph	Title	N/R	Inspect	Analysis	Demo	Test	ATP
3.0	Requirements	X					
3.1	Module Definition	X					
3.2	Performance Requirements	X					
3.2.1	Electrical Interface Requirements (External)	X					
3.2.1.1	Prime Power					X	X
3.2.1.2	Fiber Backbone Connectors				X		X
3.2.1.3	Fiber Modem Data Connector				X		X
3.2.1.4	Fiber Modem Control Connector				X		X

Table 19 - Verification Cross Reference Matrix

Paragraph	Title	Verification Method					
			PQT				
		N/R	Inspect	Analysis	Demo	Test	ATP
3.2.1.5	TSSP Aggregate Port Connector				X		X
3.2.1.6	TSSP NRZ User Port Connector				X		X
3.2.1.7	TSSP CDI User Port Connector				X		X
3.2.1.8	TSSP Control Port Connector				X		X
3.2.1.9	TSSP Station Clock Input Connector				X		X
3.2.1.10	TSSP KY-57 Secure Orderwire				X		X
3.2.1.11	KY-57 Power Connector				X		X
3.2.2	Electrical Interface (Internal)	X					
3.2.3	Functional Requirements	X					
3.2.3.1	FTSAT Baseband Module Configuration	X					
3.2.3.2	TSSP Multiplexer				X		X
3.2.3.2.1	Timing				X		X
3.2.3.2.2	Fiber Optic Modem				X		X
3.2.3.2.3	Built-In-Test				X		X
3.2.3.2.4	Configuration Options (Kits)	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				X
3.2.4.4	Marking		X				X
3.2.5	Cables and Accessories				X		X
3.2.6	Reliability			X			
3.2.7	Maintainability			X			
3.2.7.1	Mean Time Between Preventive Maintenance			X			
3.2.8	Environmental Conditions	X					
3.2.8.1	Temperature					X	
3.2.8.2	Relative 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	Materials Parts and Processes			X			
3.3.2	Safety	X					
3.3.2.1	Electrical Safety			X		X	

Table 19 - Verification Cross Reference Matrix

Paragraph	Title	Verification Method					
			PQT				
		N/R	Inspect	Analysis	Demo	Test	ATP
3.3.2.2	Mechanical 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 20 - Equipment Listing

Device	Manufacturer	Part Number	Descritpion	Quantity
Case	ECS Composites	110079	Transit Case, 4U	1
TSSP	Vertex/RSI	NSM-20M	Satellite Multiplexer	1
Optical Modem	L-3 Comm	0094AA	Remote Fiber Optic Modem	1
KY-57 Power Supply	TBD	TBD	KY-57 Power Supply	1
Conditioner	Marway	411355	Power Conditioner	1
Adaptor	Various	M55339/13-00492	BNC Adaptor	4
Adapter	Amphenol	31-4803	Isolated BNC J/J Bulkhead	1
Connector	Fiber Systems Int.	BSTA2000	Bulkhead Connector	8
CableW1	TBD	TBD	ST/SD Fiber Optic Cable Assembly	1
CableW2	TBD	TBD	RD/TT Fiber Optic Cable Assembly	1
CableW3	TBD	TBD	RT/EXT Fiber Optic Cable Assembly	1
CableW4	TBD	TBD	Tx/Rx Fiber Optic Cable Assembly	1
Cable W5	TBD	TBD	Data Cable Assembly	1
Cable W6	TBD	TBD	CPU CTRL Cable Assembly	1
Cable W7	TBD	TBD	TSSP AGGREGATE 1 & AGGREGATE 2 Cable Assembly	1
Cable W8	TBD	TBD	TSSP CPU CTRL Cable Assembly	1
Cable W9	TBD	TBD	TSSP STATION CLOCK Cable Assembly	1
Cable W10	TBD	TBD	TSSP NRZ1, NRZ2, NRZ3, NRZ4, NRZ5, NRZ6 Cable Assembly	1
Cable W11	TBD	TBD	TSSP NRZ7, NRZ8, NRZ9, NRZ10, NRZ11, NRZ12 Cable Assembly	1
Cable W12			Reserved	1
Cable W13			Reserved	1
Cable W14	TBD	TBD	TSSP CDI 1 Cable Assembly	1
Cable W15	TBD	TBD	TSSP CDI 2 Cable Assembly	1
Cable W16	TBD	TBD	F/O Modem Power Cord	1
Cable W17	TBD	TBD	TSSP Power Cord	1

Table 20 - Equipment Listing

Device	Manufacturer	Part Number	Descritpion	Quantity
Cable P1	TBD	TBD	TSSP Aggregate Jumper Cable (stored in Pouch)	1
Cable P2	Blackbox	EDN12H-0010-MF	TSSP Admin Cable (stored in cable bag)	1
Cable P3, P4, P5	Blackbox	BC00715	TSSP External User Port Cables (stored in cable bag)	3
Cable P6	TBD	TBD	TSSP Direct Connect Cable (stored in Cable Bag)	1
Cable P7	TBD	TBD	KY-57 Power Supply Cable	1
W 18	TBD	TBD	KY-57 PS to DF	1
Cable Storage Bag	Jetpack	AD.DBJ1622	Padded Drum Bag	1

6.2 Elevation Drawings

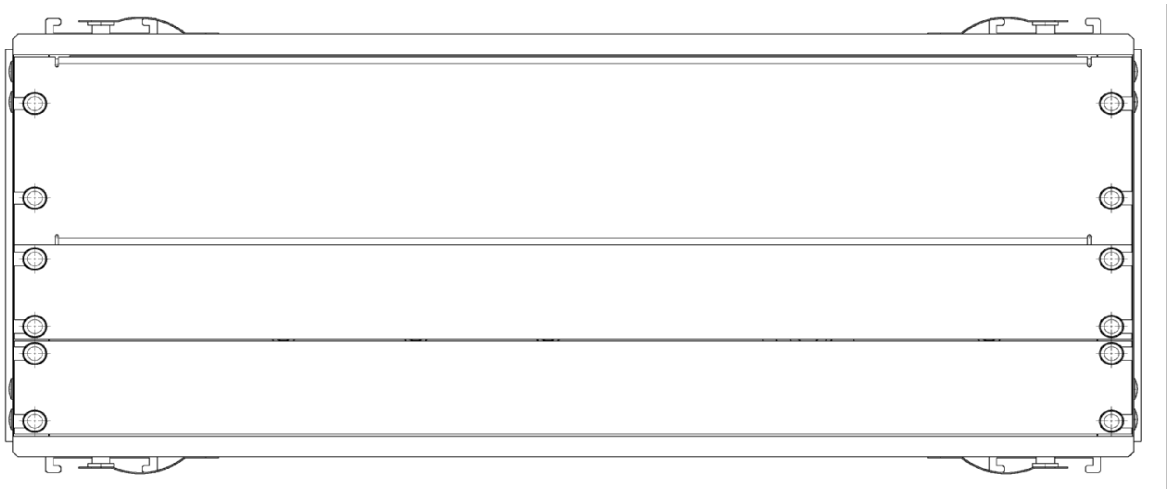


Figure 2 - Front Elevation

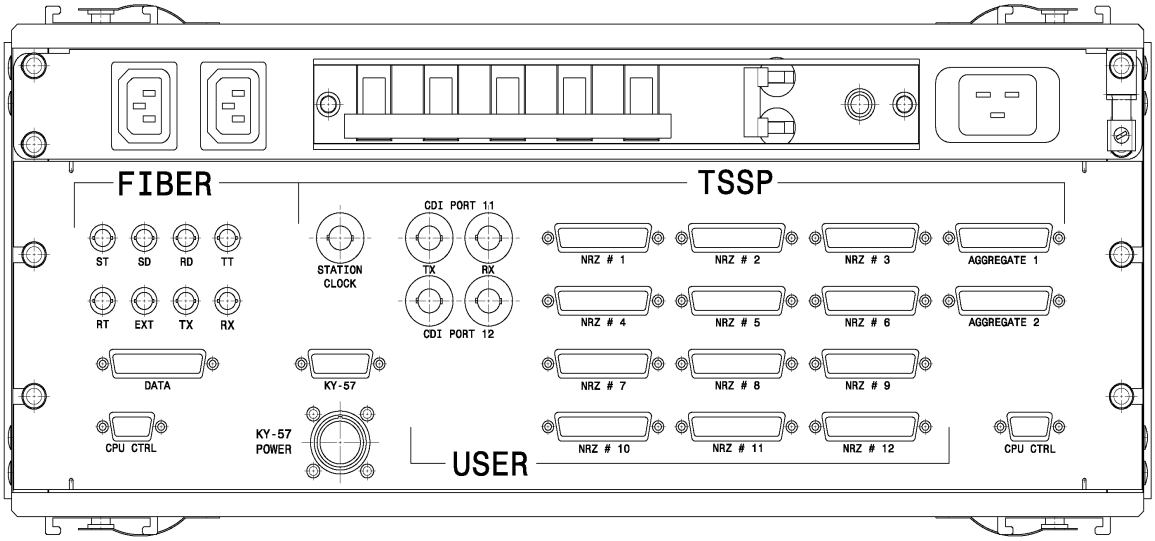


Figure 3 - Rear Elevation

6.3 Cable Diagrams

Table 21 - Cable Diagrams

Wire Number	Manufacturer	Part Number	Description
W1	TBD	TBD	ST/SD Fiber Optic Cable Assembly
W2	TBD	TBD	RD/TT Fiber Optic Cable Assembly
W3	TBD	TBD	RT/EXT Fiber Optic Cable Assembly
W4	TBD	TBD	Tx/Rx Fiber Optic Cable Assembly
W5	TBD	TBD	Data Cable Assembly
W6	TBD	TBD	CPU CTRL Cable Assembly
W7	TBD	TBD	TSSP AGGREGATE 1 & AGGREGATE 2 Cable Assembly
W8	TBD	TBD	TSSP CPU CTRL Cable Assembly
W9	TBD	TBD	TSSP STATION CLOCK Cable Assembly
W10	TBD	TBD	TSSP NRZ1 to NRZ3 Cable Assembly
W11	TBD	TBD	TSSP NRZ2to NRZ6 Cable Assembly
W12	TBD	TBD	TSSP NRZ7to NRZ9 Cable Assembly
W13	TBD	TBD	TSSP NRZ10to NRZ12 Cable Assembly
W14	TBD	TBD	TSSP CDI 1 Cable Assembly
W15	TBD	TBD	TSSP CDI 3 Cable Assembly

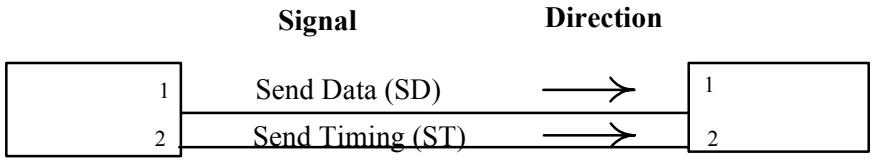
Table 21 - Cable Diagrams

Wire Number	Manufacturer	Part Number	Description
W16	TBD	TBD	F/O Modem Power Cord
W17	TBD	TBD	TSSP Power Cord
P1	TBD	TBD	TSSP Aggregate Jumper Cable(Stored in Pouch)
P2	EDN12H-0010-MF	Backbox	TSSP Admin (Stored in Pouch)
P3, P4, P5	BC00715	Backbox	TSSP External User Ports (Stored in Pouch)
P6	TBD	TBD	TSSP Direct Connect Cable
P7	TBD	TBD	KY-57 Power Supply Cable
W18	TBD	TBD	KY-57 PS to DF

FTSAT BASEBAND MODULE CABLE PINOUTS

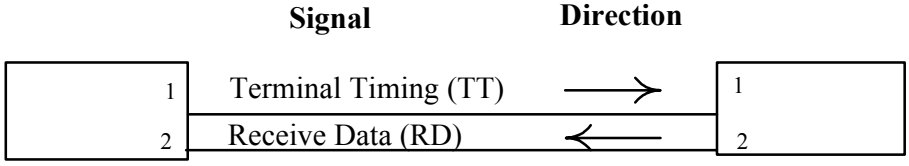
CableW1[TBD]
Pin Assignments
ST/SD Fiber Optic Cable Assembly

ST Plug — ST Plug



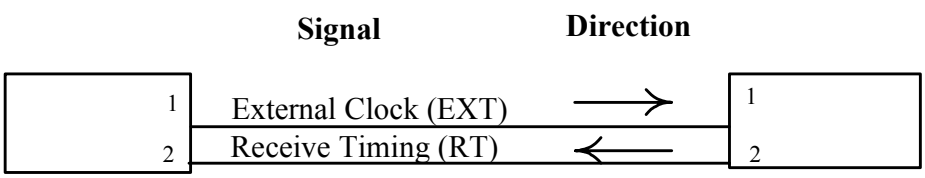
Cable W2 [TBD]
Pin Assignments
RD/TT Fiber Optic Cable Assembly

ST Plug — ST Plug



Cable W3 [TBD]
Pin Assignments
RT/EXT Fiber Optic Cable Assembly

ST Plug — ST Plug



Cable W4 [TBD]
Pin Assignments
Tx/Rx Fiber Optic Cable Assembly

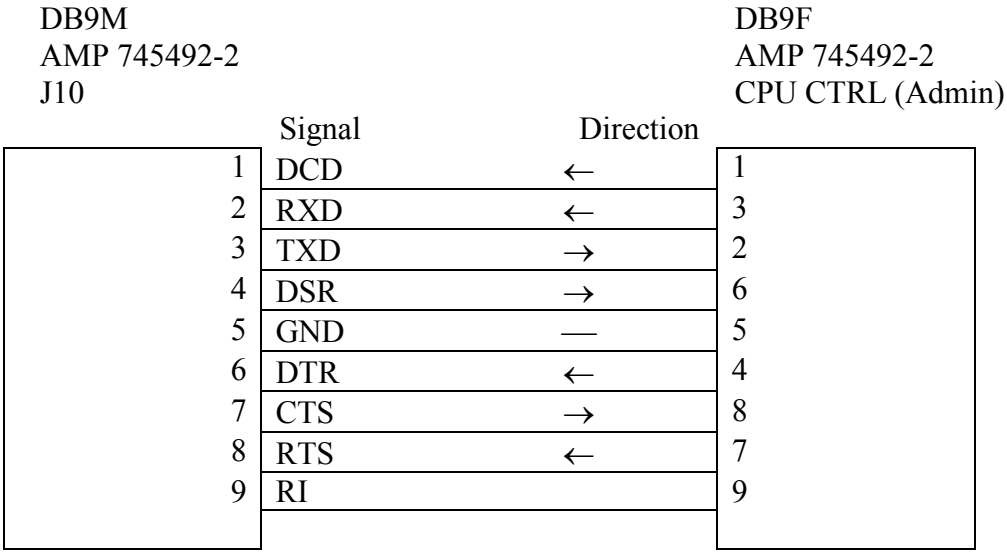
ST Plug	Signal	Direction	ST Plug
1	Transmit (Tx)	→	1
2	Receive (Rx)	←	2

Cable W5 [TBD]
Pin Assignments
Data Cable Assembly

DB37M AMP 745498-2 J1	Signal	Direction	DB25F AMP 745495-2 Data
4	SD-A	→	2
22	SD-B	→	14
5	ST-A	→	15
23	ST-B	→	12
6	RD-A	←	3
24	RD-B	←	16
8	RT-A	←	17
26	RT-B	←	9
16	EXC-A	←	18
34	EXC-B	←	25
17	TT-A	→	24
35	TT-B	→	11
1	S GND	—	7

Cable W6 [TBD]
Pin Assignments
CPU CTRL Cable Assembly

1

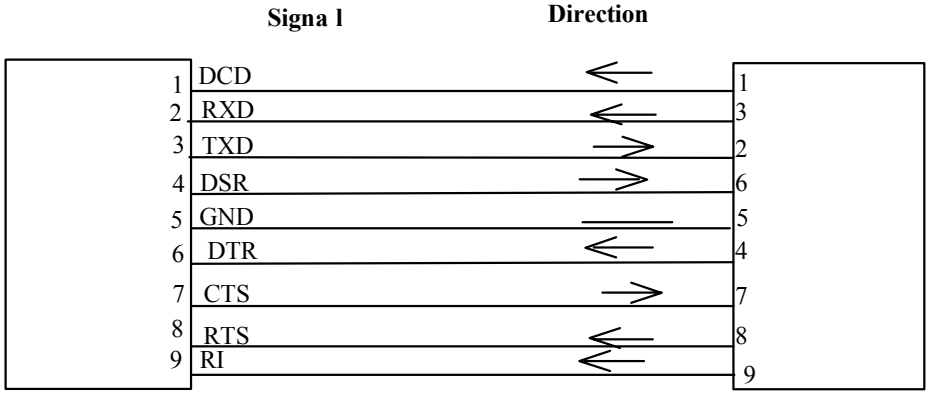


Cable W7 [TBD]
Pin Assignments
TSSP Aggregate 1 and Aggregate 2 Cable Assembly

TSSP DB50 AMP 205212-3 J4	Signal	Direction	DF DB25 (2X) AMP 745495-2 (2X) Aggregate 1 & 2
11	SD[A[	→	2
16	RD[A]	←	3
44	GND	—	7
17	RT[B]	←	9
28	TT[B]	→	11
10	SD[B]	→	14
1	RD[B]	←	16
31	RT[A]	←	17
29	TT[A]	→	24
41	ST[A]		15
40	ST[B]		12
29	TT[A]	→	24
3	RD[A]	←	3
30	GND	—	7
18	RT[B]	←	9
13	SD[A]	→	2
28	TT[B]	→	11
2	RD[B]	←	16
32	RT[A]	←	17
12	SD[B]	→	14
43	ST[A]		15
42	ST[B]		12

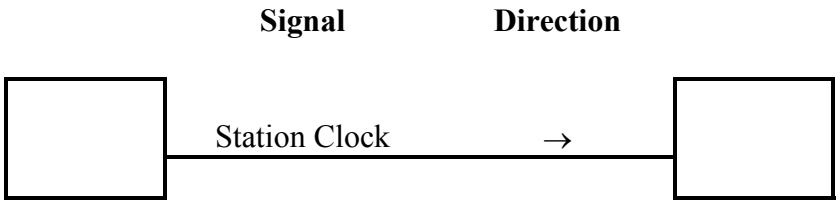
Cable W8 [TBD]
Pin Assignments
TSSP CPU CTRL Cable Assembly

TSSP	DF
DB9F	DB9F.
AMP 745491-2	AMP 745492-2
J2	CPU CTRL



Cable W9 [TBD]
Pin Assignments
TSSP STATION CLOCK Cable Assembly

TSSP	DF
BNC	BNC
J1	Station Clock



Cable W10 [TBD] TSSP NRZ1, NRZ2, NRZ3 Cable Assembly
Pin Assignments

TSSP			**DF**
DB62			**DB25**
AMP 745498-2 J2			AMP 745495-2 NRZ(1-3)
	Signal	Direction	
1	PORT1_SD[B]	←	14
23	PORT1_SD[A]	←	2
2	PORT1_TT[B]	←	11
24	PORT1_TT[A]	←	24
3	PORT1_RD[B]	→	16
25	PORT1_RD[A]	→	3
22	PORT1_RT[B]	→	9
43	PORT1_RT[A]	→	17
44	PORT1_ST[B]	→	12
45	PORT1_ST[A]	→	15
21	GND	—	7
4	PORT2_SD[B]	←	14
26	PORT2_SD[A]	←	2
5	PORT2_TT[B]	←	11
27	PORT2_TT[A]	←	24
6	PORT2_RD[B]	→	16
28	PORT2_RD[A]	→	3
46	PORT2_RT[B]	→	9
46	PORT2_RT[A]	→	17
48	PORT2_ST[B]	→	12
49	PORT2_ST[A]	→	15
		—	7
7	PORT3_SD[B]	←	14
29	PORT3_SD[A]	←	2
8	PORT3_TT[B]	←	11
30	PORT3_TT[A]	←	24
9	PORT3_RD[B]	→	16
10	PORT3_RD[A]	→	3
50	PORT3_RT[B]	→	9
51	PORT3_RT[A]	→	17
31	PORT3_ST[B]	→	12
52	PORT3_ST[A]	→	15

Cable W11 [TBD] TSSP NRZ4, NRZ5, NRZ6 Cable Assembly
Pin Assignments

TSSP			**DF**
DB62			**DB25**
AMP 745498-2			AMP 745495-2
J2			NRZ(4-6)
	Signal	Direction	
11	PORT4_SD[B]	←	14
33	PORT4_SD[A]	←	2
12	PORT4_TT[B]	←	11
34	PORT4_TT[A]	←	24
13	PORT4_RD[B]	→	16
35	PORT4_RD[A]	→	3
32	PORT4_RT[B]	→	9
53	PORT4_RT[A]	→	17
54	PORT4_ST[B]	→	12
55	PORT4_ST[A]	→	15
42	GND	—	7
14	PORT5_SD[B]	←	14
36	PORT5_SD[A]	←	2
15	PORT5_TT[B]	←	11
37	PORT5_TT[A]	←	24
16	PORT5_RD[B]	→	16
38	PORT5_RD[A]	→	3
56	PORT5_RT[B]	→	9
57	PORT5_RT[A]	→	17
58	PORT5_ST[B]	→	12
59	PORT5_ST[A]	→	15
		—	7
17	PORT6_SD[B]	←	14
39	PORT6_SD[A]	←	2
18	PORT6_TT[B]	←	11
40	PORT6_TT[A]	←	24
19	PORT6_RD[B]	→	16
20	PORT6_RD[A]	→	3
60	PORT6_RT[B]	→	9
61	PORT6_RT[A]	→	17
41	PORT6_ST[B]	→	12
62	PORT6_ST[A]	→	15

Cable W12 [TBD] TSSP NRZ7, NRZ8, NRZ9 Cable Assembly
Pin Assignments

TSSP			**DF**
DB62			**DB25**
AMP 745498-2			AMP 745495-2
J3			NRZ(7-9)
	Signal	Direction	
1	PORT7_SD[B]	←	14
23	PORT7_SD[A]	←	2
2	PORT7_TT[B]	←	11
24	PORT7_TT[A]	←	24
3	PORT7_RD[B]	→	16
25	PORT7_RD[A]	→	3
22	PORT7_RT[B]	→	9
43	PORT7_RT[A]	→	17
44	PORT7_ST[B]	→	12
45	PORT7_ST[A]	→	15
21	GND	—	7
4	PORT8_SD[B]	←	14
26	PORT8_SD[A]	←	2
5	PORT8_TT[B]	←	11
27	PORT8_TT[A]	←	24
6	PORT8_RD[B]	→	16
28	PORT8_RD[A]	→	3
46	PORT8_RT[B]	→	9
46	PORT8_RT[A]	→	17
48	PORT8_ST[B]	→	12
49	PORT8_ST[A]	→	15
		—	7
7	PORT9_SD[B]	←	14
29	PORT9_SD[A]	←	2
8	PORT9_TT[B]	←	11
30	PORT9_TT[A]	←	24
9	PORT9_RD[B]	→	16
10	PORT9_RD[A]	→	3
50	PORT9_RT[B]	→	9
51	PORT9_RT[A]	→	17
31	PORT9_ST[B]	→	12
52	PORT9_ST[A]	→	15

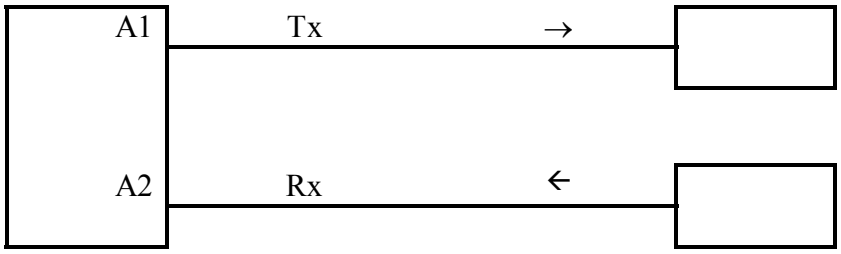
Cable W13 [TBD] TSSP NRZ10, NRZ11, NRZ12 Cable Assembly
Pin Assignments

TSSP			**DF**
DB62			**DB25**
AMP 745498-2			AMP 745495-2
J3			NRZ(10-12)
	Signal	Direction	
11	PORT10_SD[B]	←	14
33	PORT10_SD[A]	←	2
12	PORT10_TT[B]	←	11
34	PORT10_TT[A]	←	24
13	PORT10_RD[B]	→	16
35	PORT10_RD[A]	→	3
32	PORT10_RT[B]	→	9
53	PORT10_RT[A]	→	17
54	PORT10_ST[B]	→	12
55	PORT10_ST[A]	→	15
42	GND	—	7
14	PORT11_SD[B]	←	14
36	PORT11_SD[A]	←	2
15	PORT11_TT[B]	←	11
37	PORT11_TT[A]	←	24
16	PORT11_RD[B]	→	16
38	PORT11_RD[A]	→	3
56	PORT11_RT[B]	→	9
57	PORT11_RT[A]	→	17
58	PORT11_ST[B]	→	12
59	PORT11_ST[A]	→	15
		—	7
17	PORT12_SD[B]	←	14
39	PORT12_SD[A]	←	2
18	PORT12_TT[B]	←	11
40	PORT12_TT[A]	←	24
19	PORT12_RD[B]	→	16
20	PORT12_RD[A]	→	3
60	PORT12_RT[B]	→	9
61	PORT12_RT[A]	→	17
41	PORT12_ST[B]	→	12
62	PORT12_ST[A]	→	15

Cable W14 [TBD]
Pin Assignments
TSSP CDI 1 Cable Assembly

TSSP	DF
Combo D-F	BNC (2X)
Positronics CBD7W2M20000	
J7	CDI 1

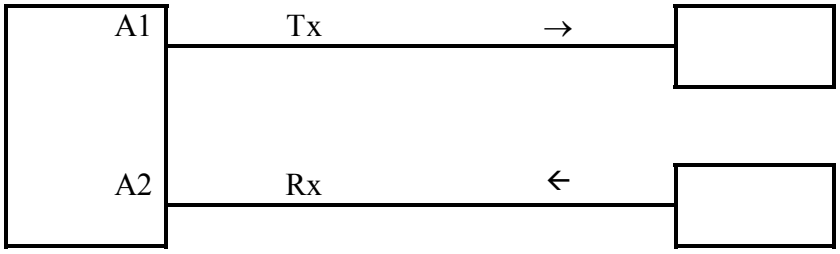
Signal	**Direction**



Cable W15 [TBD]
Pin Assignments
TSSP CDI 3 Cable Assembly

TSSP	DF
Combo D-F	BNC (2X)
Positronics CBD7W2M20000	
J8	CDI 3

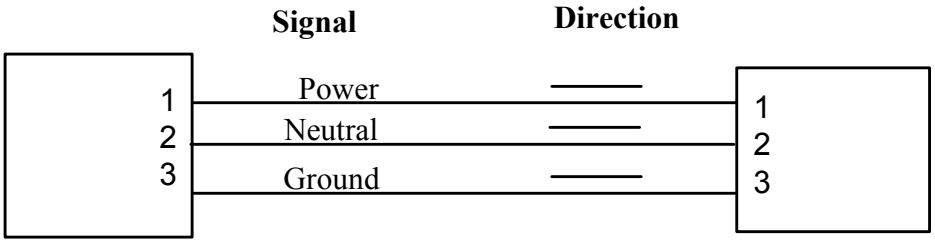
Signal	**Direction**



Cable W16 [TBD] F/O Modem Power Cord
Cable W17 [TBD] TSSP Power Cord
Pin Assignments

IEC 320
Receptacle
Modem/TSSP
Power

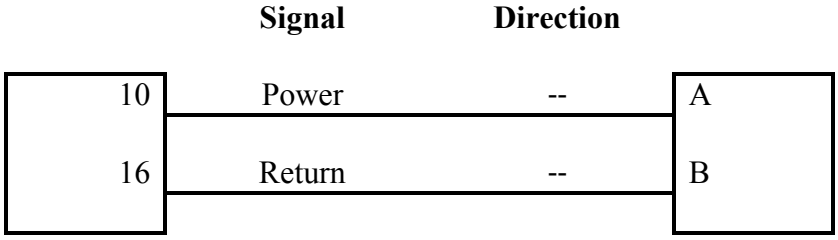
IEC 320
Plug
Power Conditioner
Power



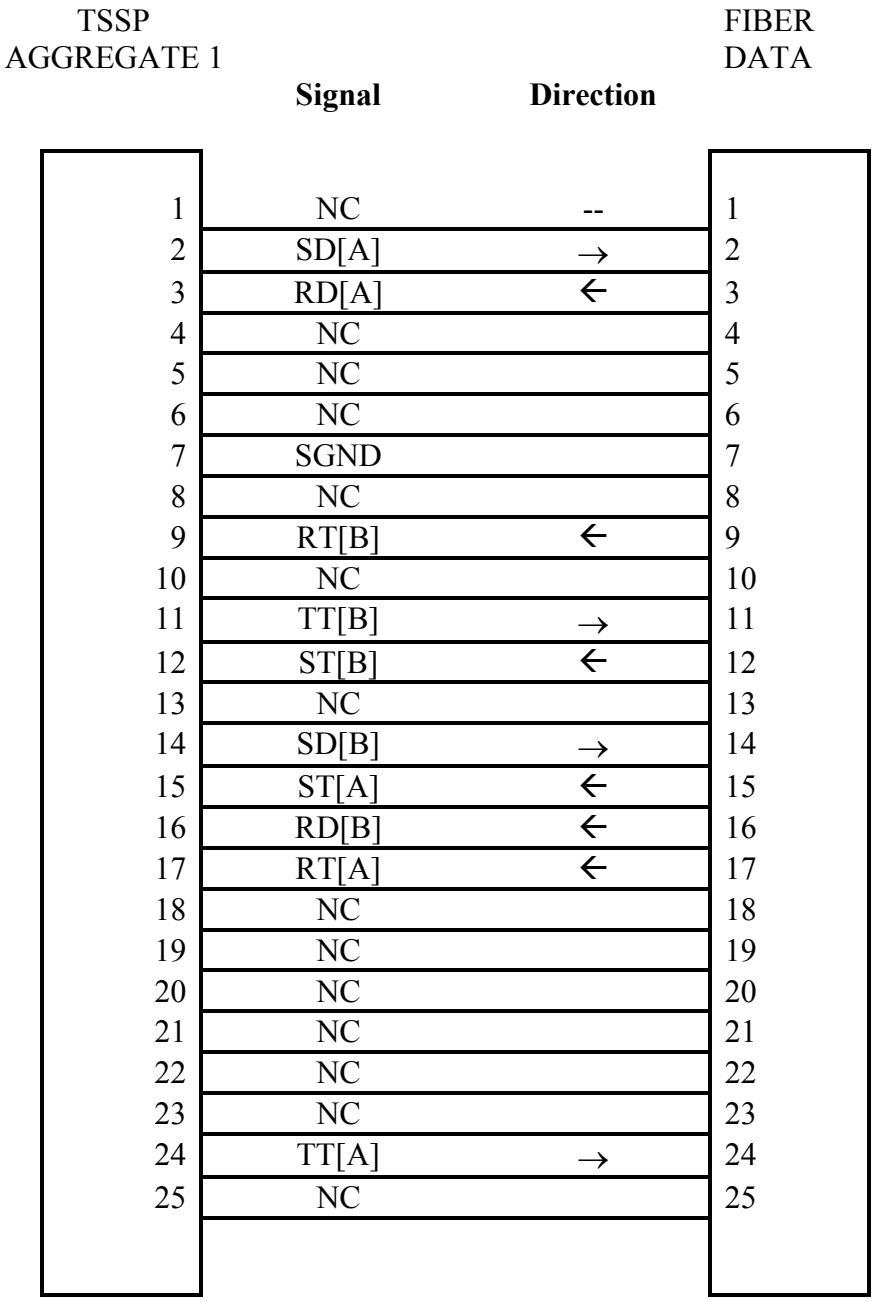
Cable W18 KY-PWR SUP (TBD)
Pin Assignments

01-P50225H001
KY-57 PS
24VDC

MS3120F14-5S
Receptacle
KY-57 DC Power



Cable P1 TSSP Aggregate Jumper Cable (TBD)
Pin Assignment
(Stored in Pouch)



Cable P3, P4, P5 TSSP External NRZ User Port (TBD)
Pin Assignment
(Stored in Pouch)

Any NRZ User Port

DB25	Signal	Direction	DB25
1	NC	--	1
2	SD[A]	→	2
3	RD[A]	←	3
4	NC		4
5	NC		5
6	NC		6
7	SGND		7
8	NC		8
9	RT[B]	←	9
10	NC		10
11	TT[B]	→	11
12	ST[B]	←	12
13	NC		13
14	SD[B]	→	14
15	ST[A]	←	15
16	RD[B]	←	16
17	RT[A]	←	17
18	NC		18
19	NC		19
20	NC		20
21	NC		21
22	NC		22
23	NC		23
24	TT[A]	→	24
25	NC		25

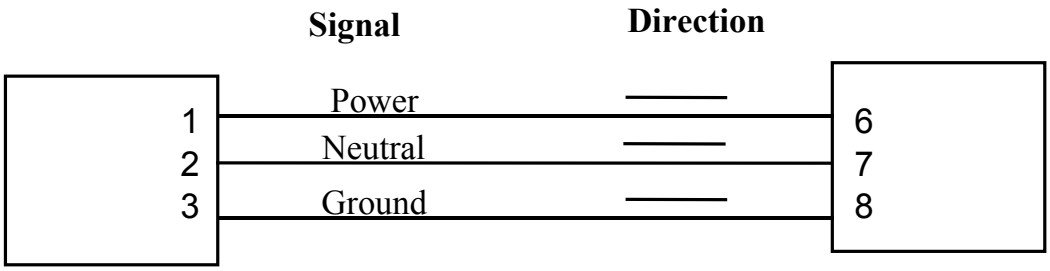
P6 TSSP Direct Connect Cable (AM6426)
Pin Assignment
Direct Connect Cable from FTSAT Terminal to FTSAT Baseband Module
(Stored in Pouch)

Satellite Modem-to-TSSP Aggregate Data

Satellite Modem DB37[M]	Signal	Direction	TSSP I/O DF DB25[M]
4	SD[A]	→	1
22	SD[B]	→	2
5	ST[A]	←	3
23	ST[B]	←	4
6	RD[A]	←	5
24	RD[B]	←	6
8	RT[A]	←	7
26	RT[B]	←	8
17	TT[A]	→	9
35	TT[B]	→	10
16	EXC[A]	←	11
34	EXC[B]	←	12
19	SGND		
		→	

Cable P7 KY 57 PWR SUP
Pin Assignments

IEC 320 Receptacle	01-P50225H001
Power Conditioner Power	KY-57 Power Supply



SGND --

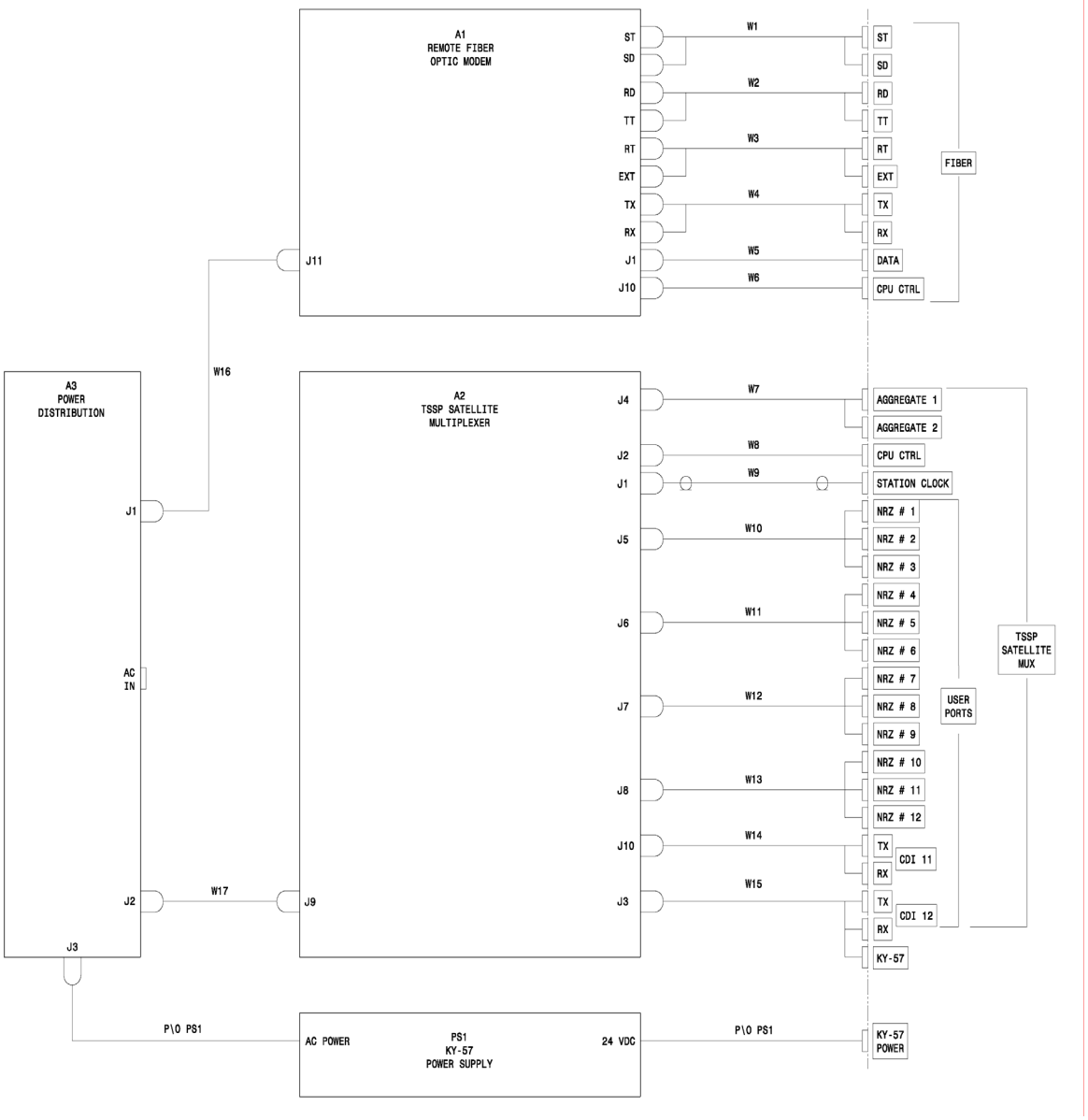


Figure 4 - FTSAT BB Module Interconnect Diagram