

TDC



Theater Deployable Communications

Baseline Requirements Document

SPICE NIPRNET Module

(v1)

Nov 2003

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Table of Contents

1.0 SCOPE - - - - -	6
2.0 APPLICABLE DOCUMENTS - - - - -	7
3.0 Requirements - - - - -	8
3.1 Module Definition - - - - -	8
3.2 Performance Requirements- - - - -	9
3.2.1 Electrical Interface Requirements (External)- - - - -	9
3.2.1.1 Prime Power - - - - -	10
3.2.1.2 10BaseT/100BaseTX (Ethernet Switch, Router and INE Encryptor) - -	10
3.2.1.3 IA-530 Synchronous Router Ports - - - - -	11
3.2.1.4 VOIP Voice Ports - - - - -	11
3.2.1.5 Triax Interface Connectors - - - - -	11
3.2.1.6 NET Interface - - - - -	11
3.2.1.7 GPS Antenna Interface - - - - -	11
3.2.1.8 Admin (GPS, Router and Switch ports) - - - - -	12
3.2.2 Electrical Interface (Internal) - - - - -	12
3.2.3 Functional Requirements - - - - -	12
3.2.3.1 Module Equipment Details - - - - -	12
3.2.3.1.1 Cisco 3560-48 PS Ethernet Switch - - - - -	12
3.2.3.1.2 Cisco 3725 Modular Access Router - - - - -	12
3.2.3.1.3 Router Software- - - - -	12
3.2.3.1.4 Cisco 827-4V ADSL Router - - - - -	13
3.2.3.1.5 Primary Reference Source - - - - -	13
3.2.3.2 Administration - - - - -	13
3.2.3.3 Configuration Options - - - - -	13
3.2.4 Physical Characteristics - - - - -	13
3.2.4.1 Transit Case - - - - -	13
3.2.4.2 Weight - - - - -	14
3.2.4.3 Storage Space - - - - -	14
3.2.4.4 Marking - - - - -	14
3.2.5 Cables and Accessories- - - - -	14
3.2.6 Reliability - - - - -	14
3.2.7 Maintainability- - - - -	15
3.2.7.1 Mean Time Between Preventive Maintenance - - - - -	15
3.2.8 Environmental Conditions - - - - -	15
3.2.8.1 Temperature - - - - -	15
3.2.8.2 Relative Humidity - - - - -	15
3.2.8.3 Altitude - - - - -	16
3.2.8.4 Sand and Dust - - - - -	16
3.2.8.5 Shock - - - - -	16
3.2.8.6 Vibration - - - - -	16
3.3 Design and Construction - - - - -	17
3.3.1 Material Parts and Processes - - - - -	17
3.3.2 Safety - - - - -	17

3.3.2.1 Electrical Safety	- - - - -	17
3.3.2.2 Mechanical Safety	- - - - -	17
3.4 Logistics	- - - - -	17
4.0 QUALITY ASSURANCE PROVISIONS	- - - - -	18
4.1 General	- - - - -	18
4.2 Responsibility for Inspection	- - - - -	18
4.3 Product Qualification Test (PQT)	- - - - -	18
4.3.1 Production Acceptance Test (PAT)	- - - - -	18
4.3.2 Verification Cross-Reference Matrix (VCRM)	- - - - -	18
4.3.3 Not Required (N/R)	- - - - -	18
4.3.4 Inspection	- - - - -	18
4.3.5 Analysis	- - - - -	19
4.3.6 Demonstration	- - - - -	19
4.3.7 Test	- - - - -	19
5.0 Preparation for Delivery	- - - - -	22
6.0 Baseline Configuration	- - - - -	23
6.1 Equipment	- - - - -	23
6.2 Elevation Drawings	- - - - -	25
6.3 Cable Diagrams	- - - - -	26
6.4 Interconnect Diagram	- - - - -	28

List of Figures

Figure 1 - SPICE NIPRNET Module Functional Diagram	- - - - -	9
Figure 2 - Front Elevation	- - - - -	25
Figure 3 - Rear Elevation	- - - - -	26

List of Tables

Table 1 - Standards and Applicable Documents - - - - - 7
Table 2 - SNM External Interface Characteristics - - - - - 9
Table 3 - RJ-45 Connection Pinout for 10BaseT and 100BaseTX Connector - - - - - 10
Table 4 - EIA-530 Synchronous Serial Data Interface - - - - - 11
Table 5 - Admin Interfaces - - - - - 12
Table 6 - Cables and Terminators included with SNM - - - - - 14
Table 7 - MTBF of Major Components - - - - - 15
Table 8 - Module Temperature Characteristics - - - - - 15
Table 9 - Module Humidity Characteristics - - - - - 16
Table 10 - Module Altitude Characteristics - - - - - 16
Table 11 - Verification Cross Reference Matrix - - - - - 19
Table 12 - Equipment Listing - - - - - 23
Table 13 - Cables - - - - - 26

1.0 SCOPE

This requirements document establishes the performance, manufacture and test requirements for the Theater Deployable Communications (TDC) Small Package Initial Communications Equipment (SPICE) Non-Secure Internet Protocol Router Network (NIPRNET) Module or SNM.

2.0 APPLICABLE DOCUMENTS

To the extent specified herein, the following documents of latest current issue on the date of this document, form a part of this document.

Table 1 - Standards and Applicable Documents

Document Number	Title
EIA/TIA-232-E Jul 94	Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Binary Data Interchange (Rates to 20 kbps)
ISO/IEC 8802-3 1996ANSI/IEEE Std 802.3 1996	Information Technology-Local Metropolitan Area Network-Part3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) access Method and Physical Layer Specification.
TIA/EIA-422-B	Electrical Characteristics of Balanced Voltage Digital Interface Circuits (ANSI/TIA/EIA-422-B-94) (May, 1994)
EIA-530	High Speed 25 — Position Interface for Data Terminal Equipment and Data Circuit — Terminating Equipment, (June 1992)
ANSI TIA/EIA-470-B	Telephone Instruments with Loop Signaling for Voice Applications
MIL-STD-810F	Environmental Test Methods
IEEE 802.3af	Data Terminal Equipment via Media Dependent Interface (MDI)
Cisco	Cisco IOS Software/Product Documentation CDs
Cisco	Cisco 3560 Manual
Cisco	Cisco 827-4V Manual
Cisco	Cisco 3725 Manual
Air Force Document	TDC Standards Document

3.0 REQUIREMENTS

The Theater Deployable Communications (TDC) Small Package Initial Communications Equipment (SPICE) Terminal is a lightweight, transportable, small storage footprint, Satellite Communications (SATCOM) terminal. The terminal will be rapidly deployable anywhere in the world to provide global SATCOM communications capability. The terminal will provide deployed units access to both secure (SIPRNET) and sensitive but unclassified (NIPRNET) data networks and services as well as limited voice over internet protocol (VOIP) capability.

The SPICE terminal includes an Antenna / Radio Frequency Subsystem, Satellite Baseband Module, SIPRNET Module and NIPRNET Module. The requirements for the SPICE NIPRNET Module (SNM) are defined in this baseline requirements document (BRD).

3.1 Module Definition

The SPICE NIPRNET Module (SNM) provides non-secure interfaces for computer workstations, laptops and local network devices utilizing the Internet Protocol (IP) to exchange sensitive but unclassified data between nodes of the network. The electrical interfaces available to the local non-secure LAN user are 10/100BaseTX autosensing half or full duplex. Local serial interfaces are synchronous EIA-530. In addition, the SNM provides a non-secure analog voice interface for voice over IP traffic. Figure 1 shows a functional diagram of the SNM and the interconnections within the TDC SPICE terminal.

The SNM contains one Cisco 3560-48PS Ethernet switch which provides 48 10/100 local LAN ports and 3 10/100 LAN extension ports; a Cisco 3725 Router which provides two 10/100 autosensing LAN ports and a WAN interface providing 4 synchronous ports (up to 8 mbps); and a Cisco 827-4V Router which provides four voice ports for VOIP capability. In addition, the SNM contains a primary reference source that provides station clock / network timing for the SPICE network.

The SNM also contains a ruggedized laptop which provides for router and Ethernet switch administration. The laptop is stored in the SNM transit case for transport.

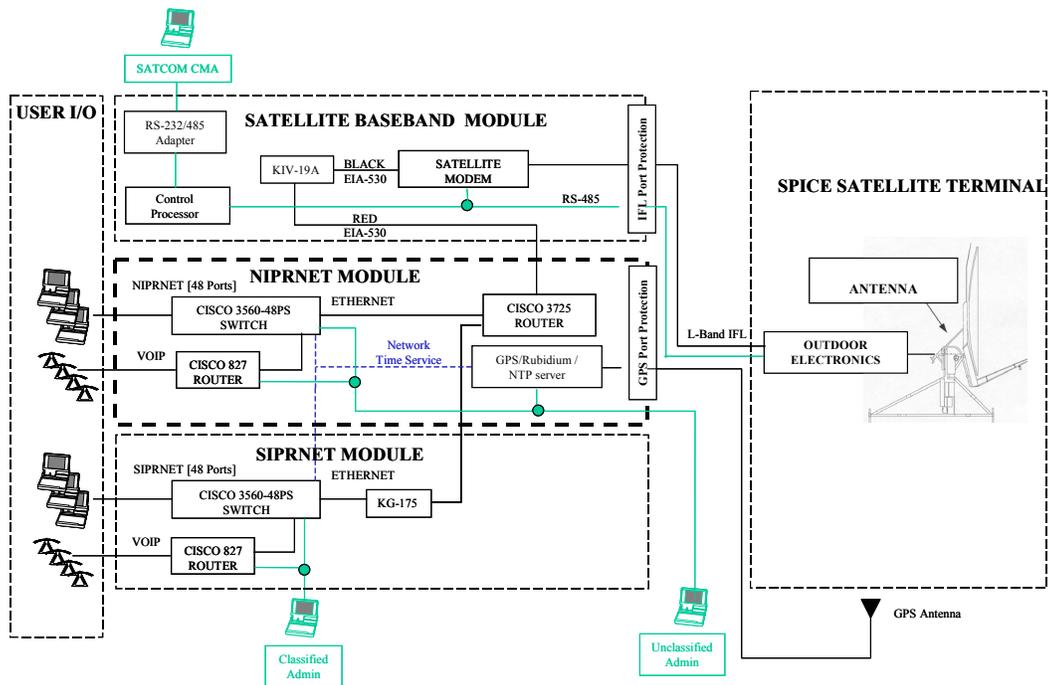


Figure 1 - SPICE NIPRNET Module Functional Diagram

3.2 Performance Requirements

3.2.1 Electrical Interface Requirements (External)

The SNM shall include the number and type of external interfaces presented in Table 2.

Table 2 - SNM External Interface Characteristics

Signal Name	Quantity	Connector	Primary Interface	Electrical Characteristics
Prime Power	1	IEC 320 C-20 Receptacle	AC Power	100 to 130 VAC, 200 to 240 VAC, 50 to 60 Hz
10BaseT/ 100BaseTX	48	RJ45	Cisco 3560-48PS Switch (NIPRNET) Local Users	IEEE STD 802.3
10BaseT/100Base TX	3	RJ45	Cisco 3560-48PS Switch (NIPRNET) LAN Ports	IEEE STD 802.3
10BaseT/ 100BaseTX	2	RJ45	Cisco 3725 Router LAN Ports	IEEE STD 802.3

Table 2 - SNM External Interface Characteristics

Signal Name	Quantity	Connector	Primary Interface	Electrical Characteristics
EIA-530 Synchronous Router Ports	4	DB25(F)	Cisco 3725 (NM-4T) Synchronous Ports	EIA-530
VOIP Voice Ports	4	RJ11	Cisco 827-4V Router Voice Ports	TIA/EIA-470-B
N.8 Clock Out (1A-1D)	1 each - 4 total	Triax (F)	GPS N.8 Clock Out Ports	50 ohm, RS-422
NET	1	RJ-45 (F)	LAN	Ethernet, IEEE 802.3
GPS Ant	1	N-Type	GPS Antenna	75 ohm, RG-59
Admin (Router Port)	1	DB-9 (F)	Cisco 3725 Router	RS-232
Admin (Switch Port)	1	DB-9 (F)	Cisco 3560-48PS Ethernet Switch (SIPRNET)	RS-232
Admin (GPS Port)	1	DB-9 (F)	Zyfer GPS	RS-232

3.2.1.1 Prime Power

The SNM is designed to operate from 100 to 130 VAC and 200 to 250 VAC, 50 to 60 Hz, single phase, three-wire power in accordance with the TDC Standards Document. The SNM includes an internal uninterruptible power supply (UPS) to minimize line variation and transients and provide backup power to allow graceful shutdown. The prime power connector is an IEC 320-C20 receptacle.

3.2.1.2 10BaseT/100BaseTX (Ethernet Switch, Router and INE Encryptor)

These connections provide 10BaseT/100BaseTX connectivity to the data network. Each connector is an eight-wire RJ45 type modular female jack connector with pin assignments in accordance with IEEE 802.3 for Ethernet signals over Unshielded Twisted Pair (UTP) cable as shown in Table 3.

Table 3 - RJ-45 Connection Pinout for 10BaseT and 100BaseTX Connector

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

3.2.1.3 IA-530 Synchronous Router Ports

The router synchronous interface connectors are DB-25(F) type. Pin assignments are in accordance with EIA-530 as shown in EIA-530 Synchronous Serial Data Interface.

Table 4 - EIA-530 Synchronous Serial Data Interface

Pin	Signal	I/O	Pin	Signal	I/O
1	Shield	-	14	Transmit Data Return	O
2	Transmit Data	O	15	Transmit Clock	I
3	Receive Data	I	16	Receive Data Return	I
4	Request to Send	O	17	Receive Clock	-
5	Clear to Send	I	18	NC	-
6	Data Set Ready	I	19	Request to Send Return	O
7	Signal Ground	-	20	Terminal Ready	O
8	Receiver Ready (DCD)	I	21	NC	-
9	Receive Clock Return	-	22	Data Set Ready Return	I
10	Receiver Ready Return	I	23	Terminal Ready Return	O
11	Terminal Timing	O	24	Terminal Timing Return	O
12	Transmit Clock Return	I	25	NC	-
13	Clear to Send Return	I			

Note: I/O direction is with respect to the Router

3.2.1.4 VOIP Voice Ports

The 827-4V Router VOIP voice ports are RJ-11 type modular female jack connectors with pin assignments as follows: Tip (pin3) and Ring (pin4).

3.2.1.5 Triax Interface Connectors

The Primary Reference Source (PRS) clocking interfaces utilize Triax connectors. All Triax connectors will be female at the panels. These include the N.8 Clocks (1A-1D).

3.2.1.6 NET Interface

The NET connector uses an RJ-45 Ethernet/802.3 connection to interface to the local 10/100BaseT LAN network.

3.2.1.7 GPS Antenna Interface

The GPS ANT connector uses an N-type connector on a 75 Ohm, RG-59 cable. The center conductor of this connector can also be used to supply 5 VDC power to the connected antenna.

3.2.1.8 Admin (GPS, Router and Switch ports)

The GPS, Router and Ethernet Switch's Administration ports are in accordance with the DB 9 RS-232 standards using the VT100 Emulators. Each Admin connector is a DB-9F with pin assignments as shown in Admin Interfaces.

Table 5 - Admin Interfaces

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. This information is found in Section 6.3.

3.2.3 Functional Requirements

3.2.3.1 Module Equipment Details

The following subsections provide details of the functionality of the major equipment in the SPICE NIPRNET Module.

3.2.3.1.1 Cisco 3560-48 PS Ethernet Switch

The 3560-48 PS Ethernet switch provides access for up to 48 10/100BaseTX Black LAN users. Three LAN ports from the switch appear on the patch panel to allow flexibility in connecting the switch with other module components. Further details for these switches can be found at <http://www.cisco.com/>.

3.2.3.1.2 Cisco 3725 Modular Access Router

The Cisco 3725 router provides connectivity to the backbone network for transport to exterior data networks. The router consists of the following interfaces:

- Two fixed FastEthernet 10/100BaseTX ports built into the chassis
- One NM slot1 populated as follows: Four port serial network module used to support the Synchronous Serial Router ports.

Further details for this router can be found at <http://www.cisco.com/>.

3.2.3.1.3 Router Software

The Cisco 3725 router is delivered with the Cisco Internetworking Operating System (IOS) with Enterprise PLUS IPSEC 3DES version 12.2(15) T2. 32 MB of Flash and 128 MB DRAM memory comes standard. This memory will be upgraded to 64MB of Flash and 256 DRAM. Additional information can be found at <http://www.cisco.com/>.

3.2.3.1.4 Cisco 827-4V ADSL Router

The 827-4V router provides voice over IP connectivity for up to 4 telephones. The router consists of the following interfaces:

- Four FXS/POTS ports
- One 10BaseT Ethernet port
- One ADSL port

Further details for this router can be found at <http://www.cisco.com/>.

3.2.3.1.5 Primary Reference Source

The Primary Reference Source (PRS) provides a network timing and station clock timing reference function for the network. The PRS employs a rubidium oscillator that is disciplined by a GPS receiver reference to develop a STRATUM 1 timing reference. An N.8 option card provides two independently programmable clock rates that are provided as four RS-422 outputs via Triax connectors. These clock rates have a frequency range of 8 KHz to 8192 KHz in 8 KHz increments.

3.2.3.2 Administration

SNM functions are administered via an external PC computer interconnected to the administration port connectors of the ethernet switch, router, and GPS using 9600 baud, 8 data, no parity, 1 stop bit as the connection parameters.

3.2.3.3 Configuration Options

None

3.2.4 Physical Characteristics

3.2.4.1 Transit Case

The SNM is housed in an 8 U transportable container (transit case), approximately 22.5”W. x 18.1”H. x 34.5”D. The transit cases are designed to stack on top of and mechanically interlock to like cases. The frame inside the transit case is designed to slide out of the case to allow removal and replacement of Line-Replaceable-Units in the field. 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 SNM, including all internally carried cables, does not exceed TBD pounds.

3.2.4.3 Storage Space

The SNM transit case includes storage pouches within its covers to contain the VOIP router, cables, and manuals 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 SNM includes the cables listed in Table 6, stored within the covers. Strain relief and cable management hardware are provided with the module.

Table 6 - Cables and Terminators included with SNM

Function	Color Code	Quantity	Description
(P1) Cable (in pouch)	Red	1	10/100BaseTX Red Patch Crossover Cable
(P2) Cable (in pouch)	Black	1	10/100BaseTX Black Patch Crossover Cable
(P3) Cable (in pouch)	Red	1	10/100BaseTX Red Patch Straight-through Cable
(P4) Cable (in pouch)	Black	1	10/100BaseTX Black Patch Straight-through Cable
(P5) Cable (in pouch)	Black	1	10/100BaseTX Network Timing Cable
(P6) Cable (in pouch)	N/R	1	Admin cable, DB9 plug to DB9 jack (10 feet)
(P7) Cable (in pouch)	Red	1	Black I/O Jumper Cable DB-25 Male to male (straight-through) (10 feet)
(P8) Cable (in pouch)	N/R	1	Ethernet Patch Cable (10 feet)
(P9) Cable (in pouch)	N/R	1	Triax to Triax Timing Jumper Cable (3 feet)

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

Table 7 - MTBF of Major Components

Component	MTBF
Cisco 3560-48 PS	268,292 hours
Cisco 3725	Not Available
Cisco 827-4V	Not Available
Gsync GPS Receiver	55,080 hours

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 8.

3.2.8.1 Temperature

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

Table 8 - Module Temperature Characteristics

Equipment	Temperature (degrees C)	
	Operating	Non-Operating
Cisco 3560-48 PS	0 to 40	-25 to 70
Cisco 3725	0 to 40	-25 to 70
Cisco 827-4V	0 to 40	-20 to 70
Gsync GPS Receiver	0 to 50	-40 to 85

3.2.8.2 Relative Humidity

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

Table 9 - Module Humidity Characteristics

Equipment	Humidity
	Non-condensing
Cisco 3560-48 PS	5 to 95%
Cisco 3725	5 to 95%
Cisco 827-4V	5 to 95%
Gsync GPS Receiver	0 to 95%

3.2.8.3 Altitude

Altitude characteristics for the major equipment components are shown in Table 10.

Table 10 - Module Altitude Characteristics

Equipment	Altitude (feet)	
	Operating	Non-Operating
Cisco 3560-48 PS	-500 to 10,000	-1000 to 30,000
Cisco 3725	Not Available	Not Available
Cisco 827-4V	Not Available	Not Available
Gsync GPS Receiver	0 to 4000 meters	0 to 9000 meters

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 516.5, 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 is 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 were used to verify compliance of Section 3 of this specification on the initial module.

4.3.1 Production Acceptance Test (PAT)

Each module delivered to the Government undergoes a Production Acceptance Test (PAT) as identified in Table 11. The acceptance test verifies that the module interfaces are operating properly prior to delivery to the Government. The SNM Acceptance Test Procedure governs the performance of the PAT.

4.3.2 Verification Cross-Reference Matrix (VCRM)

Table 11 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 one verification method is shown, one method or a combination of methods may be used to show compliance.

4.3.3 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.

4.3.4 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.

4.3.5 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.

4.3.6 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, which 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.

4.3.7 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 shall be precise enough to ensure that the measured value is within the specified tolerance.

Table 11 - Verification Cross Reference Matrix

Paragraph	Title	Verification Method					
		N/R	PQT				ATP
			Inspect	Analysis	Demo	Test	
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	

Table 11 - Verification Cross Reference Matrix

Paragraph	Title	Verification Method					
		N/R	PQT				ATP
			Inspect	Analysis	Demo	Test	
3.2.1.2	10BaseT/100BaseTX/10/100 BaseTX (Ethernet Switches, Routers and INE Eccryptor)					X	X
3.2.1.3	EIA-530 Synchronous Router Ports				X		X
3.2.1.4	VOIP Voice Ports				X		X
3.2.1.5	Triax Interface Connectors				X		X
3.2.1.6	NET Interface				X		X
3.2.1.7	GPS Antenna Interface				X		X
3.2.1.8	Admin (GPS, Router and Switch)				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	Cisco 3560-48 PS Ethernet Switches		X		X		X
3.2.3.1.2	Cisco 3725 Modular Access Router		X		X		X
3.2.3.1.3	Router Software		X		X		X
3.2.3.1.4	Cisco 827-4v ADSL Router		X		X		X
3.2.3.1.5	Primary Reference Source		X		X		X
3.2.3.2	Administration		X		X		X
3.2.3.3	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		
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	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					

Table 11 - Verification Cross Reference Matrix

Paragraph	Title	Verification Method					
		N/R	PQT				ATP
			Inspect	Analysis	Demo	Test	
3.3.1	Materials 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			
3.4	Logistics			X			

5.0 PREPARATION FOR DELIVERY

Each module shall be 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 12 - Equipment Listing

Device	Manufacturer	Part Number	Description	Quantity
Ethernet Switch	Cisco	Cisco 3725	10/100 Ethernet Router	1
Flash Memory	Cisco	MEM3725-32U128CF	32 to 128 MB flash memory factory upgrade for Cisco 3725	1
DRAM	Cisco	MEM3725-128D=	256 MB DRAM Factory upgrade for Cisco 3725	2
Software	Cisco	S374VP-12215T	Cisco 3725 Software v12.20(15)T2	1
Serial Card	Cisco	NM-4T	4 Port Synchronous serial network module	1
Router	Cisco	Cisco 827-4V	ADSL Router 1E, 1ADSL, 4 Voice	1
Ethernet Switch	Cisco	3560-48 PS	Ethernet Switch with 48 10/100BaseTX local LAN ports and 3 10/100BaseTX ports	1
GPS	FEI-Zyfer	391-MC-BKD	Chassis with Backplane, Keypad/Display	1
GPS	FEI-Zyfer	391-C3-RBX	Standard C/A Receiver with Rubidium External Clock Input	1
GPS	FEI-Zyfer	391-PS-115A	115-220VAC Power Input Module (100 watts)	1
GPS Software	FEI-Zyfer	385-3022	GPS Firmware version v1.21.00	1
GPS Software	FEI-Zyfer	385-3011	KDC Firmware version v1.18.00	1
GPS	FEI-Zyfer	385-4038-02	Ethernet I/O External Input Module	1
GPS	FEI-Zyfer	385-4007-01	5 Mhz Output Module	1
GPS	FEI-Zyfer	385-4069-02	N.8 Frequency Synthesizer	1
Laptop	Panasonic	CF-29CTKGZKM	Toughbook 29 Laptop	1
UPS	UPSI	650 BRS	Uninterruptible Power Supply	1
Transit Case	ECS Composites	TBD	8U Transit Case	1
(W1) Cable	TBD	TBD	Cisco 3560-48 PS Ethernet BaseTX Cable	1
(W2) Cable	TBD	TBD	Cisco 3560-48 PS Ethernet BaseTX Cable	1
(W3) Cable	TBD	TBD	Cisco 3560-48 PS Ethernet BaseTX Cable	1
(W4) Cable	TBD	TBD	Cisco 3725 Ethernet BaseTX Cable	1
(W5) Cable	TBD	TBD	Cisco 3725 Ethernet BaseTX Cable	1

Table 12 - Equipment Listing

Device	Manufacturer	Part Number	Description	Quantity
(W6, W7, W8, W9) Cables	TBD	TBD	Cisco 3725 Router Synchronous Cable	4
(W10) Cable	TBD	TBD	Cisco Ethernet Switch Admin Cable	1
(W11) Cable	TBD	TBD	Router Admin Cable	1
(W12) Cable	TBD	TBD	Zyfer Time and Freq Gen Admin Cable	1
(W13) Cable	TBD	TBD	PRS Network to Timing Panel	1
(W14, W15, W16, W17) Cables	TBD	TBD	N.8 Ports to Timing Panel	4
(W18) Cable	TBD	TBD	PRS GPS Antenna to Lightning Protection, BNC Clocking	1
(W19) Cable	TBD	TBD	GPS Power Cable	1
(W20, W21) Cables	TBD	TBD	Ethernet Switch and Router Power Cables	2
(P1) Cable (In Pouch)	TBD	TBD	10/100BaseTX Red Patch Crossover Cable	1
(P2) Cable (In Pouch)	TBD	TBD	10/100BaseTX Black Patch Crossover Cable	1
(P3) Cable (In Pouch)	TBD	TBD	10/100BaseTX Red Patch Straight-thru Cable	1
(P4) Cable (In Pouch)	TBD	TBD	10/100BaseTX Black Patch Straight-thru Cable	1
(P5) Cable (In Pouch)	TBD	TBD	10/100 Base TX Network Timing Patch Straight-thru Cable	1
(P6) Cable (In Pouch)	TBD	TBD	Admin cable, DB9 plug to DB9 jack, 10 feet	1
(P7) Black Serial I/O Jumper Cable (in Pouch)	TBD	TBD	Black I/O Jumper Cable DB-25 Male to Male (straight-through) (10 feet)	1
(P8) PRS Ethernet Cable (in pouch)	TBD	TBD	Ethernet Patch Cable (10 feet)	1
(P9) Jumper Cable (in pouch)	TBD	TBD	Triax to Triax Timing Jumper Cable (3 feet)	1
(L1) GPS Antenna Cable (stored in cable bag)	Gsnc	0810384	GPS Antenna and Antenna Cable (50 feet)	1

6.2 Elevation Drawings

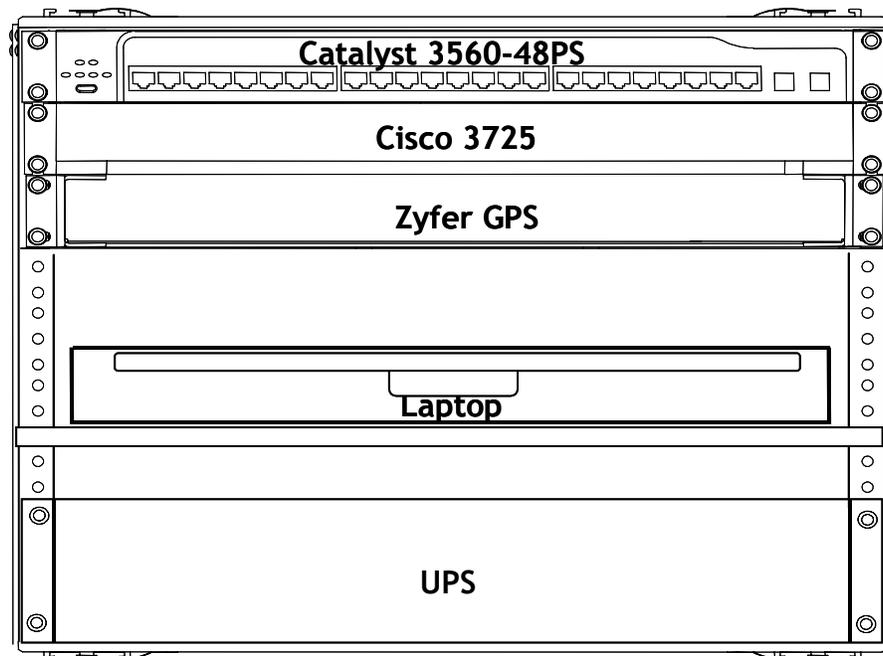


Figure 2 - Front Elevation

Note 1: 827-4V VOIP Router stored in SPICE SIPRNET Module pouch.

Note 2: Laptop stored on shelf, secured with Velcro straps for transport.

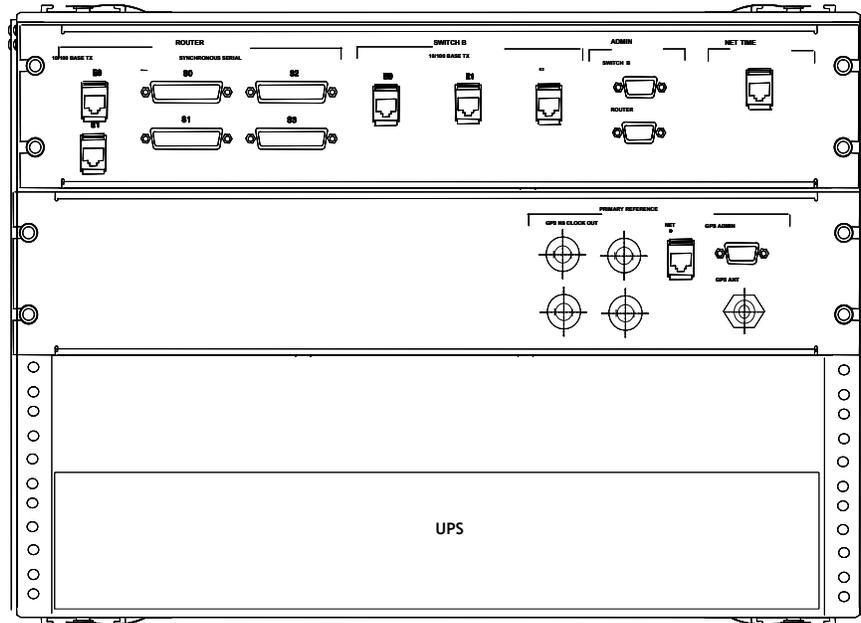


Figure 3 - Rear Elevation

6.3 Cable Diagrams

Table 13 - Cables

Wire Number	Part Number	Manufacturer	Description
(W1) Cable	TBD	TBD	Cisco 3560-48 PS Ethernet BaseTX Cable
(W2) Cable	TBD	TBD	Cisco 3560-48 PS Ethernet BaseTX Cable
(W3) Cable	TBD	TBD	Cisco 3560-48 PS Ethernet BaseTX Cable
(W4) Cable	TBD	TBD	Cisco 3725 Ethernet BaseTX Cable
(W5) Cable	TBD	TBD	Cisco 3725 Ethernet BaseTX Cable
(W6, W7, W8, W9) Cables	TBD	TBD	Cisco 3725 Router Synchronous Cable
(W10) Cable	TBD	TBD	Cisco Ethernet Switch B Admin Cable
(W11) Cable	TBD	TBD	Router Admin Cable
(W12) Cable	TBD	TBD	Zyfer Time and Freq Gen Admin Cable

Table 13 - Cables

Wire Number	Part Number	Manufacturer	Description
(W13) Cable	TBD	TBD	PRS Network to Timing Panel
(W14, W15, W16, W17) Cables	TBD	TBD	N.8 Ports to Timing Panel
(W18) Cable	TBD	TBD	PRS GPS Antenna to Lightning Protection, BNC Clocking
(W19) Cable	TBD	TBD	GPS Power Cable
(W20, W21) Cables	TBD	TBD	Ethernet Switch and Router Power Cables
(P1) Cable (In Pouch)	TBD	TBD	10/100BaseTX Red Patch Crossover Cable
(P2) Cable (In Pouch)	TBD	TBD	10/100BaseTX Black Patch Crossover Cable
(P3) Cable (In Pouch)	TBD	TBD	10/100BaseTX Red Patch Straight-thru Cable
(P4) Cable (In Pouch)	TBD	TBD	10/100BaseTX Black Patch Straight-thru Cable
(P5) Cable (In Pouch)	TBD	TBD	10/100 Base TX Network Timing Patch Straight-thru Cable
(P6) Cable (In Pouch)	TBD	TBD	Admin cable, DB9 plug to DB9 jack, 10 feet
(P7) Black Serial I/O Jumper Cable (in Pouch)	TBD	TBD	Black I/O Jumper Cable DB-25 Male to Male (straight-through) (10 feet)
(P8) PRS Ethernet Cable (in pouch)	TBD	TBD	Ethernet Patch Cable (10 feet)
(P9) Jumper Cable (in pouch)	TBD	TBD	Triax to Triax Timing Jumper Cable (3 feet)
(L1) GPS Antenna Cable (stored in cable bag)	Gsnc	0810384	GPS Antenna and Antenna Cable (50 feet)

6.4 Interconnect Diagram

