



DEFENSE INFORMATION SYSTEMS AGENCY
JOINT INTEROPERABILITY TEST COMMAND
2001 BRAINARD ROAD
FORT HUACHUCA, ARIZONA 85613-7051

IN REPLY
REFER TO:

Networks, Transmission and
Integration Division (JTE)

MEMORANDUM FOR DISTRIBUTION

SUBJECT: Joint Interoperability Test Certification of the Canoga Perkins Corporation 3240S Fiber Optic Multiplexer with Firmware Release 6750176G, Revision G

References: (a) DOD Directive 4630.5, "Interoperability and Supportability of Information Technology (IT) and National Security Systems (NSS)," 11 January 2002
(b) CJCSI 6212.01B, "Interoperability and Supportability of National Security Systems and Information Technology Systems," 8 May 2000

1. References (a) and (b) establish the Defense Information Systems Agency, Joint Interoperability Test Command (JITC), as the responsible organization for interoperability test certification. Additional references are provided in enclosure 1.
2. The Canoga Perkins 3240S Fiber Optic Multiplexer with Firmware Release 6750176G, Revision G, hereafter referred to as the 3240S, meets the interoperability requirements for the Defense Switched Network (DSN) and is certified for joint use. JITC tested the 3240S as set forth in reference (c) using test procedures derived from reference (d). This certification expires upon changes that affect interoperability, but no later than three years from the date of this memorandum.
3. This certification is based on interoperability testing conducted at the JITC's Network Engineering and Integration Lab, Fort Huachuca, Arizona in an operationally realistic environment that is similar to that of the DSN. The Certification Testing Summary (enclosure 2) documents the test results and describes the test network. Users should verify interoperability before deploying the 3240S in an environment that varies significantly from that described.
4. The primary purpose for testing the 3240S was to ensure that the 3240S can extend DSN Integrated Services Digital Network Primary Rate Interface exchange requirements via Multimode or single mode fiber optics. Users of this platform should ensure it meets their functional requirements prior to fielding.

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5. The certification of the 3240S is based upon evaluation of the platform using the Exchange Requirements (ERs) derived from DSN voice and data service requirements. The ERs used to evaluate the interoperability of the application are listed in table 1. The interoperability status of the 3240S is indicated in table 2.

Table 1. Canoga Perkins 3240S Fiber Optic Multiplexer Exchange Requirements

Platform	Interface	Exchange Requirement	
Canoga Perkins 3240S	T1 ISDN PRI	- Carrier Group Alarms - MLPP (ANSI T1.619a) - Non-secure voice - Asynchronous data	
	MM/SM Fiber	- Secure Voice (STE and STU-III) - Secure data (STE and STU-III) - Synchronous data - NX56 and NX64 Video Teleconferencing - Secure/Non-secure FAX	
Legend:			
ANSI	- American National Standards Institute	NX64	- Data format is restricted to multiples of 64K
FAX	- Facsimile	PRI	- Primary Rate Interface
ISDN	- Integrated Services Digital Network	SM	- Single Mode
Mbps	- Megabits per second	STE	- Secure Terminal Equipment
MLPP	- Multi-Level Precedence and Preemption	STU-III	- Secure Telephone Unit-III
MM	- Multimode	T1	- Digital Transmission Link level 1 (1.544 Mbps)
NX56	- Data format is restricted to multiples of 56K		

Table 2. Canoga Perkins 3240S Fiber Optic Multiplexer Exchange Status

Interface Requirement	Critical	Status	Remarks
T1 ISDN PRI	Yes	Certified	All Exchange Requirements of table 1 met
MM/SM Fiber	Yes	Certified	All Exchange Requirements of table 1 met
Legend:			
ISDN	- Integrated Services Digital Network	MM	- Multimode
PRI	- Primary Rate Interface	SM	- Single Mode
Mbps	- Megabits per second	T1	- Digital Transmission Link level 1 (1.544 Mbps)

6. JITC distributes interoperability information via the JITC Electronic Report Distribution (ERD) system -- ERD uses unclassified (NIPRNET) e-mail. More comprehensive interoperability status information is available via the JITC System Tracking Program (STP). The STP is accessible by .mil/gov users on the NIPRNET at <https://stp.fhu.disa.mil/>. Test reports, lessons learned, and related testing documents and references are on the JITC Joint Interoperability Tool (JIT) at <http://jit.fhu.disa.mil> (NIPRNET), or <http://199.208.204.125/> (SIPRNET). Information related to DSN testing is on the Telecom Switched Services Interoperability (TSSI) website at: <http://jitc.fhu.disa.mil/tssi>.

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7. The JITC test point of contact is John Gese, DSN 879-5164 or commercial (520) 538-5164. The e-mail address is gesej@fhu.disa.mil.

FOR THE COMMANDER:

2 Enclosures:	LESLIE F. CLAUDIO
1 Additional References	Chief
2 Certification Testing Summary	Networks, Transmission and Integration Division

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Commander, Defense Information Systems Agency (DISA), ATTN: NS53 (Mr. Osman), Room 5w23, 5275 Leesburg Pike (RTE 7) Falls Church, VA 22041

ADDITIONAL REFERENCES

- (c) Defense Information Systems Agency (DISA), Joint Interoperability and Engineering Organization (JIEO), Technical Report 8249, "Defense Information System Network (DISN) Circuit Switched Subsystem, Defense Switched Network (DSN) Generic Switching Center Requirements (GSCR)," March 1997
- (d) Joint Interoperability Test Command, "Defense Switched Network Generic Switch Test Plan (GSTP)," 17 June 1999

CERTIFICATION TESTING SUMMARY

- 1. SYSTEM TITLE.** Joint Interoperability Test Certification of the Canoga Perkins Corporation 3240S Fiber Optic Multiplexer with Firmware Release 6750176G, Revision G.
- 2. PROPONENT.** Defense Information Systems Agency (DISA) / Canoga Perkins Corporation.
- 3. PROGRAM MANAGERS.** Mr. Howard Osman, NS53, Room 5W23, 5275 Leesburg Pike, Falls Church, VA 22041, e-mail: Osmanh@ncr.disa.mil. Denise Atlas, National Support Manager, Canoga Perkins Corporation, 20600 Prairie St., Chatsworth, CA 91311, (818) 678-3826, e-mail: datlas@canoga.com.
- 4. TESTERS.** Joint Interoperability Test Command (JITC), Ft. Huachuca, Arizona.
- 5. SYSTEM UNDER TEST DESCRIPTION.** The Canoga Perkins Corporation 3240S is a managed Fiber Optic Multiplexer. It supports interfaces physically and electrically compliant with the International Telecommunications Union – Telecommunications sector standard G.703. It has the capacity to provide up to eight T1 (1.544 kbps) Digital Signal Level One (DS1) circuits over single mode or multimode fiber optic links.
- 6. OPERATIONAL ARCHITECTURE.** The Defense Switched Network (DSN) operational architecture is depicted in figure 2-1.
- 7. REQUIRED SYSTEM INTERFACES.** Table 2-1 details the interfaces and Exchange Requirements (ERs) for interoperability certification of the 3240S. Interoperability certification of the interfaces is based on meeting criteria from the ERs. This interoperability test certification is based upon evaluation of the network interfaces as specified in:
 - a. The Chairman of the Joint Chiefs of Staff (CJCS) policy for Department of Defense voice services.
 - b. Interface and signaling requirements and ERs derived from the Generic Switching Center Requirements (GSCR) document.
 - c. The overall system interoperability performance.
- 8. TEST NETWORK DESCRIPTION.** The test network configuration is depicted in figure 2-2. The digital switching systems used to test the 3240S were Nortel Networks MSL-100, Lucent 5ESS, Avaya MultiVantage S8700, and the Siemens EWSD. The following interfaces as depicted in figure 2-2, were tested: Multimode (MM) and single mode (SM) fiber optics, Primary Rate Interface (PRI) T1 Bipolar Eight Zero Substitution (B8ZS), and Extended Super Frame (ESF).

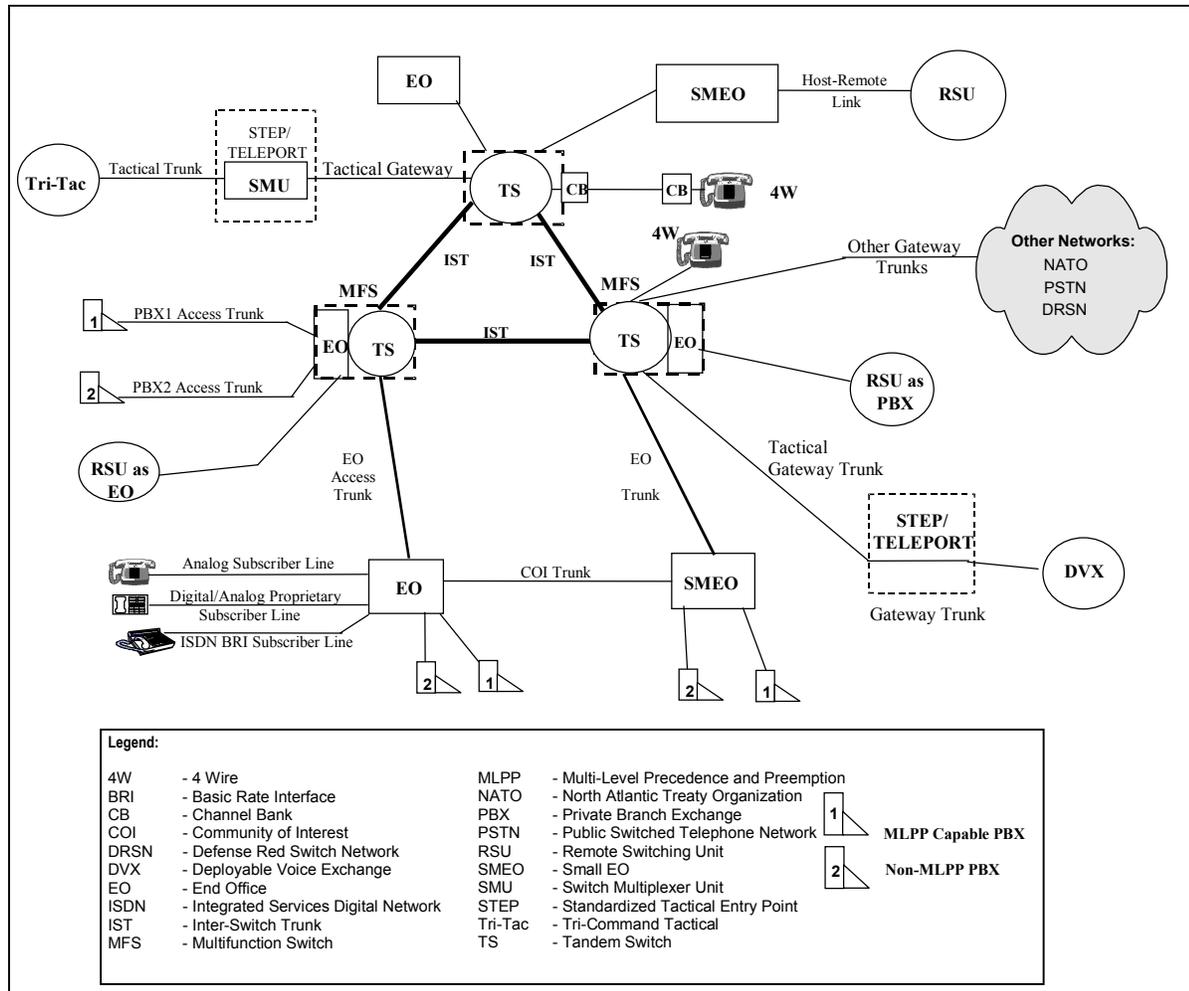


Figure 2-1. DSN Architecture

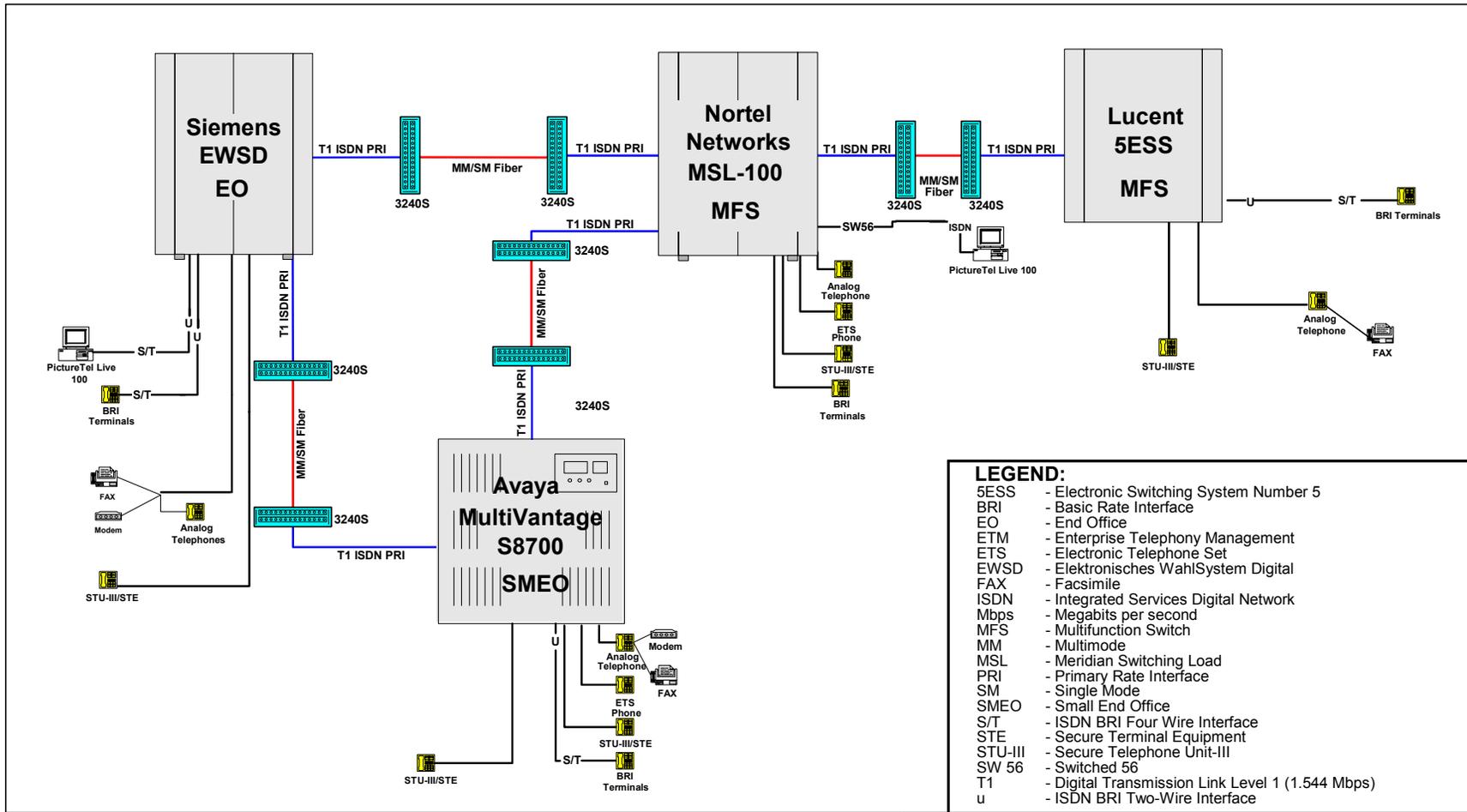


Figure 2-2. Test Network Configuration

Table 2-1. Canoga Perkins 3240S Fiber Optic Multiplexer Exchange Requirements

Interface Requirement	Exchange Requirements	Exchange Method	Critical	References
T1 ISDN PRI	- Carrier Group Alarms - MLPP (ANSI T1.619a) - Non-secure voice - Asynchronous data	B8ZS/ESF	Yes	GSCR Mar 97 GSTP Jun 99
Fiber Optics	- Secure Voice (STE and STU-III) - Secure data (STE and STU-III) - Synchronous data - NX56 and NX64 Video Teleconferencing - Secure/Non-secure FAX	MM/SM Fiber	Yes	
Legend:				
ANSI - American Standards National Institute B8ZS - Bipolar Eight Zero Substitution ESF - Extended Super Frame FAX - Facsimile GSCR - Generic Switching Center Requirements GSTP - Generic Switch Test Plan ISDN - Integrated Services Digital Network Mbps - Megabits per second MLPP - Multi-Level Precedence and Preemption MM - Multimode NX56 - Data format is restricted to multiples of 56K NX64 - Data format is restricted to multiples of 64K PRI - Primary Rate Interface SM - Single Mode STE - Secure Terminal Equipment STU-III - Secure Telephone Equipment-III T1 - Digital Transmission Link level 1 (1.544 Mbps)				

9. SYSTEM CONFIGURATIONS. Table 2-2 lists the hardware and software configurations associated with the systems used during the test.

Table 2-2. Tested System Configurations

System Name	Hardware	Software Release
Canoga Perkins Fiber Optic Multiplexer	3240S	6750176G
Nortel Networks MSL-100	RISC Processor	MSL-17
Siemens EWSD	CP 113C	19d with patch set 35
Avaya MultiVantage S8700	Linux Processor	R011x.7585.7.0.2
Lucent 5ESS	3B21D Processor	R5E16.2
Legend:		
5ESS - Electronic Switching System Number 5 CP - Central Processor EWSD - Elektronisches WahlSystem Digital MSL - Meridian Switching Load RISC - Reduced Instruction Set Computer		

10. TEST LIMITATIONS. None.

11. TEST RESULTS.

a. T1 PRI B8ZS/ESF

(1) Carrier Group Alarms (CGA). Red and yellow (Remote) passed in accordance with the GSCR paragraph 10.2. All alarms propagated through the 3240S Multiplexer transparently.

(2) Multi-Level Precedence and Preemption (MLPP). The four types of MLPP call scenarios listed below were tested. Each preemption scenario met the MLPP requirements in accordance with the GSCR paragraph 21.3.1. Those scenarios were:

- (a) Answered Call; Circuit to be Reused
- (b) Unanswered Call; Circuit to be Reused
- (c) Answered Call; Circuit not to be Reused
- (d) Unanswered Call; Circuit not to be Reused

(3) Non-secure Voice. Manual Integrated Services Digital Network (ISDN) Basic Rate Interface (BRI) digital calls and analog calls were placed. All calls resulted in a 100-percent call completion rate with a Mean Opinion Score (MOS) of 4 or better on the International Voice Quality scale. Automated calls were also placed using the Abacus call loader. All automated calls resulted in a 100-percent completion rate with a MOS of 4 or better. All calls passed in accordance with the GSCR paragraph 10. The 3240S Multiplexer had no adverse effect on non-secure voice calls and appeared transparent to the circuit under test.

(4) Asynchronous Data. All asynchronous modem calls were placed with a 100-percent success rate. All calls passed in accordance with the GSCR paragraph 10.2. The 3240S Multiplexer had no adverse effect on asynchronous modem calls and appeared transparent to the circuit under test.

(5) Secure Voice, Secure Telephone Unit-III (STU-III)/Secure Terminal Equipment (STE). The following secure voice call scenarios were conducted with a 100-percent success rate. All calls passed in accordance with the GSCR paragraph 10. The 3240S Multiplexer had no adverse effect on STU-III/STE secure voice calls and appeared transparent to the circuit under test.

- (a) STU-III to STU-III calls @ 9.6 kilobits per second (kbps)
- (b) STE to STE calls @ 4.8 kbps and 32 kbps
- (c) STU-III to STE calls @ 4.8 kbps

(6) Secure Data, STU-III/ STE. The Sunset T10 test set was used to conduct an asynchronous Bit Error Rate Test (BERT) using a 511 test pattern in the secure data mode for a period of 30 minutes per call. The 3240S System had no adverse effect on STU-III/STE secure data calls and appeared transparent to the circuit under test. All calls passed in accordance with the GSCR paragraph 10. The following secure data call scenarios were conducted with a 100-percent success rate.

- (a) STU-III to STU-III calls @ 9.6 kbps
- (b) STE to STE calls @ 19.2 kbps

(c) STU-III to STE calls @ 9.6 kbps

(7) Synchronous 56 kbps Data Calls. Switched 56 kbps calls were also placed over the circuits using the Ameritec AM2D call loaders. There were 28,646 switched 56 kbps data calls using a 2047 pattern for a period of 25 seconds per call were placed over a 14-hour period producing a 100-percent success rate. A successful call requires a completed BERT with no bit errors per call. All calls passed in accordance with the GSCR paragraph 10.2. The 3240S Multiplexer had no adverse effect on switched 56 kbps data calls and appeared transparent to the circuit under test.

(8) NX56 and NX64 Video Teleconferencing (VTC). Ten two-way 312 kbps (6X56) and 384 kbps (6X64) Bonding One VTC calls were made for a period of 60 seconds per call in each direction producing a 100-percent success rate. All calls passed in accordance with the GSCR paragraph 10.2. The 3240S Multiplexer had no adverse effect on VTC calls and appeared transparent to the circuit under test.

(9) Secure/Non-secure FAX. Ten two-way calls were made in each direction producing a 100-percent success rate. All calls passed in accordance with the GSCR paragraph 10.1. The 3240S Multiplexer had no adverse effect on FAX calls and appeared transparent to the circuit under test.

b. Fiber Optics

(1) CGA. Red and yellow (Remote) passed in accordance with the GSCR paragraph 10.2. All alarms propagated through the 3240S Multiplexer transparently.

(2) MLPP. The four types of MLPP call scenarios listed below were tested. Each preemption scenario met the MLPP requirements in accordance with the GSCR paragraph 21.3.1. Those scenarios were:

- (a) Answered Call; Circuit to be Reused
- (b) Unanswered Call; Circuit to be Reused
- (c) Answered Call; Circuit not to be Reused
- (d) Unanswered Call; Circuit not to be Reused

(3) Non-secure Voice. Manual ISDN BRI digital calls and analog calls were placed. All calls resulted in a 100-percent call completion rate with a MOS of 4 or better on the International Voice Quality scale. Automated calls were also placed using the Abacus call loader. All automated calls resulted in a 100-percent completion rate with a MOS of 4 or better. All calls passed in accordance with the GSCR

paragraph 10. The 3240S Multiplexer had no adverse effect on non-secure voice calls and appeared transparent to the circuit under test.

(4) Asynchronous Data. All asynchronous modem calls were placed with a 100-percent success rate. All calls passed in accordance with the GSCR paragraph 10.2. The 3240S Multiplexer had no adverse effect on asynchronous modem calls and appeared transparent to the circuit under test.

(5) Secure Voice, STU-III/ STE. The following secure voice call scenarios were conducted with a 100-percent success rate. All calls passed in accordance with the GSCR paragraph 10. The 3240S Multiplexer had no adverse effect on STU-III/STE secure voice calls and appeared transparent to the circuit under test.

- (a) STU-III to STU-III calls @ 9.6 kbps
- (b) STE to STE calls @ 4.8 kbps and 32 kbps
- (c) STU-III to STE calls @ 4.8 kbps

(6) Secure Data, STU-III/ STE. The Sunset T10 test set was used to conduct an asynchronous BERT using a 511 test pattern in the secure data mode for a period of 30 minutes per call. The 3240S System had no adverse effect on STU-III/STE secure data calls and appeared transparent to the circuit under test. All calls passed in accordance with the GSCR paragraph 10. The following secure data call scenarios were conducted with a 100-percent success rate.

- (a) STU-III to STU-III calls @ 9.6 kbps
- (b) STE to STE calls @ 19.2 kbps
- (c) STU-III to STE calls @ 9.6 kbps

(7) Synchronous 56 kbps Data Calls. Switched 56 kbps calls were also placed over the circuits using the Ameritec AM2D call loaders. There were 28,646 switched 56 kbps data calls using a 2047 pattern for a period of 25 seconds per call were placed over a 14-hour period producing a 100-percent success rate. A successful call requires a completed BERT with no bit errors per call. All calls passed in accordance with the GSCR paragraph 10.2. The 3240S Multiplexer had no adverse effect on switched 56 kbps data calls and appeared transparent to the circuit under test.

(8) NX56 and NX64 VTC. Ten two-way 312 kbps (6X56) and 384 kbps (6X64) Bonding One VTC calls were made for a period of 60 seconds per call in each direction producing a 100-percent success rate. All calls passed in accordance with the GSCR paragraph 10.2. The 3240S Multiplexer had no adverse effect on VTC calls and appeared transparent to the circuit under test.

(9) Secure/Non-secure FAX. Ten two-way calls were made in each direction producing a 100-percent success rate. All calls passed in accordance with the GSCR paragraph 10.1. The 3240S Multiplexer had no adverse effect on FAX calls and appeared transparent to the circuit under test.

12. SUMMARY. The Canoga Perkins Corporation 3240S Fiber Optic Multiplexer with Firmware Release 6750176G, Revision G is certified for joint use in the DSN, in accordance with the requirements set forth in the GSCR. When connected to the interfaces certified in this letter, the 3240S was transparent to the switching systems or lines interfaced and caused no degradation of service or negative impact. The 3240S Fiber Optic Multiplexer Interoperability Status is shown in table 2-3.

Table 2-3. Canoga Perkins 3240S Fiber Optic Multiplexer Exchange Status

Interface	ER/Criteria	Critical Interface	Result	Interface Status
T1 ISDN PRI	Carrier Group Alarms in accordance with GSCR Para. 10.2	Yes	ER met	Certified
	MLPP Messages must be propagated in accordance with GSCR Para 21.3.1		ER met	
	Non-secure voice in accordance with GSCR Para. 10		ER met	
	Asynchronous Data must pass in accordance with GSCR Para. 10.2		ER met	
	Secure Voice (STE and STU-III) in accordance with GSCR Para. 10		ER met	
	Secure Data (STE and STU-III) in accordance with GSCR Para. 10		ER met	
	Synchronous Data must pass in accordance with GSCR Para. 10.2		ER met	
	NX56 and NX64 Video Teleconferencing in accordance with GSCR Para. 10.2		ER met	
Secure/Non-secure FAX in accordance with GSCR Para 10.1	ER met			
MM/SM Fiber	Carrier Group Alarms in accordance with GSCR Para. 10.2	Yes	ER met	Certified
	MLPP Messages must be propagated in accordance with GSCR Para 21.3.1		ER met	
	Non-secure voice in accordance with GSCR Para. 10		ER met	
	Asynchronous Data must pass in accordance with GSCR Para. 10.2		ER met	
	Secure Voice (STE and STU-III) in accordance with GSCR Para. 10		ER met	
	Secure Data (STE and STU-III) in accordance with GSCR Para. 10		ER met	
	Synchronous Data must pass in accordance with GSCR Para. 10.2		ER met	
	NX56 and NX64 Video Teleconferencing in accordance with GSCR Para. 10.2		ER met	
Secure/Non-secure FAX in accordance with GSCR Para 10.1	ER met			
Legend:				
ER	- Exchange Requirements	NX56	- Data format is restricted to multiples of 56K	
FAX	- Facsimile	NX64	- Data format is restricted to multiples of 64K	
GSCR	- Generic Switching Center Requirements	PRI	- Primary Rate Interface	
ISDN	- Integrated Services Digital Network	SM	- Single Mode	
Mbps	- Megabits per second	STE	- Secure Telephone Equipment	
MLPP	- Multi-Level Precedence and Preemption	STU-III	- Secure Telephone Unit-III	
MM	- Multimode	T1	- Digital Transmission Link level 1 (1.544 Mbps)	