



REV	APPLICATION		REVISIONS			
	NEXT ASSY	USED ON	REV	DESCRIPTION	DATE	APPROVED
D			A	SHEET 1: SIGNATURE BLOCK	7-7-98	K. HIGA
			B	SHEET 1: DISTRIBUTION STATEMENT	7-24-98	K. HIGA
			C	ALL SHEETS : REVISED PER REV L OF CHANGE NOTICE 1	4-1-99	K. HIGA
			D	ALL SHEETS : REVISED PER REV A OF CHANGE NOTICE 2	7-31-99	K. HIGA

NAVSEA DRAWING NO. 7325763
 ESWS 499

NOTES:

1. IDENTIFICATION OF THE SUGGESTED ITEMS HEREON IS NOT TO BE CONSTRUED AS A GUARANTEE OF PRESENT OR CONTINUED AVAILABILITY.
2. SUBSTITUTION OF ITEMS IS NOT ALLOWED WITHOUT APPROVAL OF THE DESIGN ACTIVITY, NSWC DD CODE B35 OR NSWCCD-SSES CODE 9631.
3. INDIVIDUAL ITEMS SHALL BE PROCURED USING THE VENDOR PART NUMBER.
4. COMPLETE KITS SHALL BE PROCURED USING THE BASE DRAWING NUMBER ONLY. COMPLETE TERMINATION SUPPORT KIT IS DEFINED ON SHEET 2.
5. QUANTITIES SHOWN ARE FOR THE INDIVIDUAL ITEMS AND MAY NOT CORRESPOND TO THE QUANTITY SUPPLIED FOR THE VENDOR PART NUMBER LISTED.

REV STATUS OF SHEETS	REV	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D			
	SHEET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE:		CAGE CODE CONTRACT NO.		DEPARTMENT OF THE NAVY NAVAL SEA SYSTEMS COMMAND WASHINGTON, D.C. 20362-5101										
FRACTIONS n	DECIMALS .XXn	APPROVED	G. Brown	6-30-98	PIERSIDE CONNECTIVITY, TERMINATION SUPPORT KIT FOR FIBER OPTIC ST CONNECTOR AND TERMINI									
ANGLES P	.XXXn	APPROVED	CDR M. ZIEGLER	7-7-98										
DO NOT SCALE DRAWING		APPROVED	D. INMAN	7-7-98										
		ENGINEER	E. Bluebond	6-30-98										
MATERIAL:	ACCEPTED FOR NAVSEA	H. LEWIS	7-7-98	SIZE	CAGE	ESWS	DRAWING NO.	REV						
FINISHES:	APPROVED BY NAVSEA	SIGNATURE DOES NOT DENOTE APPROVAL		A	53711	499	7325763	D	SCALE:	NONE	UCI	WT GRP	SHEET	1 OF 17
		(SIGN ONLY IF ENGINEERING HAS BEEN "PROVED" BY MANUFACTURE AND TEST)												



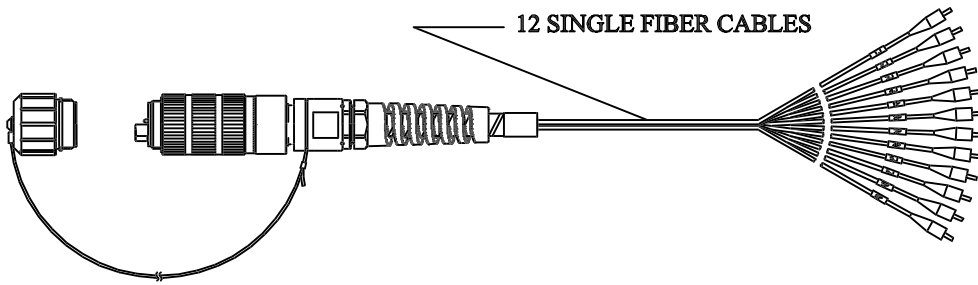
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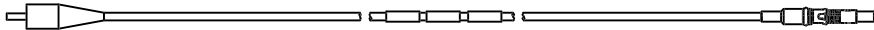
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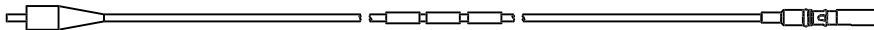
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HERMAPHRODITIC CABLE PLUG-TO-ST MQJ



ST-TO-PIN TERMINI MQJ



ST-TO-SOCKET TERMINI MQJ



ST-TO-ST MQJ

FIGURE 1. ITEMS OFFERED AS PART OF THIS DRAWING,
DIFFERENT MQJ (MEASUREMENT QUALITY JUMPER)
CONFIGURATIONS FOR SETS, KITS AND REPLACEMENTS

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Termination Support Kit Contents

Items in this kit comprise the fiber optic termination kit, optical test kit, measurement quality jumpers (MQJ) Sets and accessories needed to install and test the cable plant components for the pierside connectivity application at the pier and onboard ships. More specifically, the termination support kit contains the tools and test equipment to terminate ST connectors, AMP Inc. SC connectors and fiber optic termini (built to MIL-T-29504 or CID A-A-XX160) onto the end of fiber optic, single fiber cables and fiber optic test cable assemblies (MQJ's) for optical performance (loss and reflectance). Items offered as part of the termination support kit are listed in table 1A. These items are offered separately and as one "kit" (See note 1/). Description for these kits, sets and accessories are as follows:

1. Termination kit, combination ST, SC & Termini: This kit is used for placing (terminating) ST connectors, AMP Inc. SC connectors and termini (build to MIL-T-29504 or CID A-A-XX160) onto the end of fiber optic, single fiber cables. This kit does not include the additional tools needed to affix the strain relief onto a MIL-C-28876 connector or an A-A-XX159 hermaphroditic cable plug. The ST connector crimp tool in this kit is compatible with those ST connectors on the Navy Recommended Fiber Optic Components Parts List, NSWCCD-SSES ltr 9504 Ser 9542/28 of 1 Apr 98 or latest revision. Each SC connector manufacturer uses a different, proprietary crimp tool. An AMP Incorporated SC connector crimp tool is provided with the kit.
2. Optical test kit containing light sources and optical power meter: This kit has the test equipment to produce an optical signal (light source) and measure the optical power level (power meter) in a fiber optic cable assembly. The kit contains two light sources. A laser diode (LD) light source is used with single mode optical fiber. Likewise, an LED light source is used with multimode fiber.
3. ST connector MQJ set: This set is used to test cable assemblies for meeting optical loss requirements when at least one end of the cable is terminated with ST connectors. Cables on the pigtail assembly at the pier and from cable runs to the radio room on the ship will be terminated with ST connectors. SC-to-ST adapters are provided to test cable terminated with SC connectors found at the equipment rack.
4. Hermaphroditic connector MQJ set, CP-12: This set is used to test cable assemblies for meeting optical loss requirements when at least one end of the cable is terminated with either a hermaphroditic cable plug or a mating hermaphroditic (compatible) receptacle. The pigtail assembly at the pier and the adjoining interconnection boxes on ship (located port and starboard on most surface ship classes) have the mating hermaphroditic (compatible) receptacle for the cable plug. The umbilical assembly, which connects the pier to the ship, has two hermaphroditic cable plugs on each end. One hermaphroditic connector MQJ set is required to perform an optical loss test.
5. ST-to-termini MQJ set: This set is used to test cable assemblies for meeting optical loss requirements when at least one end of the cable is terminated with a fiber optic termini (built to MIL-T-29504 or CID A-A-XX160) which is not inserted into a hermaphroditic connector (cable plug or receptacle). The interconnection boxes on ship, which adjoin the pigtail assembly at the pier, have some single fiber cables terminated with termini that are not inserted into a hermaphroditic connector.
6. Cleaning Kit, For Utility Hook-Up Personnel: This kit is used for cleaning fiber optic termini prior to umbilical assembly connection to mating hermaphroditic receptacles at the pier and on the ship.
7. Consumable kit for 100 ST, SM: This kit serves to replenish for the consumable items in the termination kit. These consumable items are used during the bonding and polishing stages in terminating a ST connector or termini onto the end of a cable.
8. D hole punch: This punch places the proper size D shaped hole in an interconnection box. A hermaphroditic (compatible) receptacle, that mate with the hermaphroditic cable plug, fits into this D shaped hole.
9. Detachable socket insert, front piece, with 6 alignment sleeves, replacement part: This detachable socket insert is used to replace one on the hermaphroditic cable plug or on the hermaphroditic (compatible) receptacle that became lost after removal, damaged or requires alignment sleeve replacement.
10. Other accessories: Individual MQJ replacements that may have become damaged or developed a high optical loss.
11. OLTS (Optical Loss Test Set) MQJ kit: This kit includes the various MQJ sets that are used for determining cable assembly optical loss using a light source and power meter as the test equipment.
12. OTDR (Optical Time Domain Reflectometer) MQJ kit: This kit includes the various MQJ sets that function as dead zone jumpers and allow the determination of reflectance at the first connection interface after the OTDR optical interface.
13. MQJ Combo kit: This kit includes the Cleaning Kit, For Utility Hook-Up Personnel, OLTS MQJ Kit and the OTDR MQJ Kit.

Notes:

1/ For purpose of ordering a "termination support kit" (item 6009BF) to the NAVSEA drawing number; the termination support kit is to include one termination kit (item 6009AA), one optical test kit (item 6009AB), one ST- to-ST MQJ set (item 6009AC), one hermaphroditic connector MQJ set (item 6009AD), one ST-to-termini MQJ set (item 6009AE), one consumable kit for 100 ST connectors (item 6009AG) and one D hole punch (item 6009AH).

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Table 1A. Termination Kit, Optical Test Kit, Measurement Quality Jumpers (MQJ) Sets & Accessories

Item	Description 1/	Quantity	See Table
6009BF	Termination support kit 6/		
6009AA	Termination kit, combination ST & termini 2/, 3/, 5/	1	1B
6009AB	Optical test kit containing light sources and optical powermeter 2/, 5/	1	1C
6009AC	ST-to-ST MQJ set 2/	1	1D
6009AD	Hermaphroditic connector MQJ set, CP-12 type 2/	1	1E
6009AE	ST-to-termini MQJ set 2/	1	1F
6009AF	Cleaning kit, for Utility Hook-Up Personnel 2/, 3/, 5/	1	1G
	Accessories 7/		
6009AG	Consumable kit for 100 ST or termini, SM/MM 2/, 4/	1	1I
6009AH	D hole punch	1	1H
6009AJ	MQJ, ST connector-to-socket termini, 1 meter length, single mode	1	1F
6009AK	MQJ, ST connector-to-pin termini, 1 meter length, single mode	1	1F
6009AL	MQJ, ST connector-to-socket termini, 1 meter length, multimode	1	1F
6009AM	MQJ, ST connector-to-pin termini, 1 meter length, multimode	1	1F
6009AN	Detachable socket insert, front piece, with 6 alignment sleeves, replacement part	1	1H
6009AP	Snap lock, plug, termini-to-termini connection device	1	1F
6009AQ	Hermaphroditic connector MQJ, CP-12 type	1	1E
6009AR	Snap lock, receptacle, termini-to-termini connection device	1	1F
6009AS	Strap wrench with 3/8 inch drive adapter	1	1H
6009AT	Torque wrench, 3/8" drive	1	1H
6009AU	O-ring installation tool, hermaphroditic connector	1	1H
6009AV	Hydraulic adapter for D hole punch	1	1H
6009AX	MQJ, ST-to-ST connector, 1 meter length, multimode	1	1D
6009AY	MQJ, ST-to-ST connector, 1 meter length, single mode	1	1D
6009BA	LED source	1	1C
6009BB	Laser source	1	1C
6009BC	Powermeter	1	1C
6009BD	Optical loss test set	1	1C
6009BE	SC-to-ST adapter	1	1D

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Table 1A. Termination Kit, Optical Test Kit, Measurement Quality Jumpers (MQJ) Sets & Accessories
(Continued)

Item	Description ^{1/}	Quantity	See Table
6009BK	Termini insertion tool, straight, M29504	1	1F
6009BG	Termini removal tool, M29504	1	1F
6009BH	Alignment sleeve insertion & removal tool, (ASIRT)	1	1F
6009BJ	Termini alignment sleeve, (removable type)	1	1F
6009BM	MQJ Set Combo Kit	1	1L
6009BN	MQJ, ST connector-to- socket termini, 50 meter length, single mode	1	1K
6009BP	MQJ, ST connector-to-pin termini, 50 meter length, single mode	1	1K
6009BR	MQJ, ST connector-to-ST connector, 50 meter length, single mode	1	1K
6009BS	MQJ, hermaphroditic cable plug-to-ST connector, 50 meter length, single mode	1	1K
6009BT	Index Matching Material, Fiber Optic, one part	1	1K
6009BX	OLTS MQJ Kit	1	1J
6009BY	OTDR MQJ Kit	1	1K
6009CF	MQJ, ST connector-to-socket termini, 50 meter, multimode	1	1K
6009CG	MQJ, ST connector-to-pin termini, 50 meter, multimode	1	1K
6009CH	MQJ, ST connector-to-ST connector, 50 meter, multimode	1	1K

Notes for table 1A:

^{1/} Termination Kit, Optical Test Kit, Measurement Quality Jumpers (MQJ) Sets & Accessories must be approved by NSWC DD or NSWCCD-SSES. Approval process for these items to be in accordance with NSWCCD-SSES ltr 9504 Ser 9542/27 of 13 Mar 98 or latest revision. Vendor quality system to be in compliance with enclosure (3).

^{2/} Kits, sets and accessories are to be obtained as assemblies. See the applicable table for items that comprise each kit, set or accessory.

^{3/} Information package shall be supplied with the kit. This information package shall be bound, covered and include: Material Safety Data Sheet (MSDS), list of items in the kit, copies of manufacturer's instruction sheets for tools and equipment that come with the item, notice for type and source of supply for alcohol to be used for cleaning fiber optic connectors. Alcohol specification is to be 99 percent or better reagent grade isopropyl alcohol or 99 percent or better pure anhydrous alcohol. Sources of supply listed as National Stock Number (NSN) include 6505 00 205 6513, 6810-00-183-4393, 6810-00-983-8551.

^{4/} Material Safety Data Sheet (MSDS) shall be supplied with these kits.

^{5/} Custom case supplied as part of this kit is one in which each item or next higher unit supplied as part of the kit has a separate, internal nest or compartment.

^{6/} Item number 6009BF is comprised of items in note 1, page 3.

^{7/} Accessory items 6009AH through 6009CH are referenced to a table for requirements on construction, performance, testing, etc. specified in the footnotes. Quantities for these accessories are specified in table 1A.

^{8/} Termini on any MQJ configuration in this drawing shall be fabricated with a crimp sleeve.

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Table 1B. Termination Kit, Combination ST, SC & Termini

Item	National Stock Number	Qty Req'd	Description	Manufacturer	Cage Code	Part Or Identifying No.
1	5110 01 419 5283	1	Kevlar shears	Heritage	OKN34	744
				Claus	71827	86 1/2S
2	9505 01 376 9398	1	125 micron connector cleaning wire w/ container	KitCo	08RC6	0700-3210
				Fibertron	0HLY3	F1-8265
6009BK	5120 01 144 5338	1	Termini insertion tool, straight, M29504	Packard-Hughes	53669	1093784S
				KitCo	08RC6	0701-3820
4	5120 01 145 5172	1	Termini insertion tool, 90 degrees, M29504	Packard-Hughes	53669	1143042-2S
				KitCo	08RC6	0701-3810
6009BG	5998 01 147 0198	1	Termini removal tool, M29504	Packard-Hughes	53669	TMF16RT006
				KitCo	08RC6	0701-3850
6009BH	5120 01 419 2942	1	Alignment sleeve insertion & removal tool (ASIRT)	KitCo	08RC6	0701-3901
				Packard-Hughes	53669	TMS16RT008
7	6080 01 377 4502	1	Glass polishing plate, 6"x6", 0.25"	KitCo	08RC6	0700-4110
				Lucent Technologies	64959	105 075 618
8	5110 01 419 3137	1	Multifiber cable jacket strip tool	Palladin	5Z102	PA1820
	5110 01 419 3137	1	Multifiber cable jacket strip tool	Eclipse	1EZR2	200-009
9	5110 01 419 4361	1	Buffer strip tool	Micro Electronics	59984	MS1-08N-5B5-FS40
				Klein	75347	MS1-FS-08N-RT-40
10	5110 00 246 0975	1	Breakout cable (OFCC) strip tool, 18 AWG (0.051")	Klein	75347	11046
				Lucent Technologies	64959	104 278 478
11	6675 01 420 5614	1	Template, Cut Length for ST connector (M83522)	KitCo	08RC6	0700-3870
12	None	1	Template, Cut Length for termini (M29504)	KitCo	08RC6	0701-4300
13	None	1	Curing oven with side panel set, composed of:	KitCo	08RC6	0701-4000
				KitCo	08RC6	0701-4010
	6070 01 420 7662	1	Heater block for St connector (M83522) & termini (M29504)	KitCo	08RC6	0701-4020
	6070 01 430 4607	1	Cable stand (post)	KitCo	08RC6	0701-4030
	5365 01 420 3692	1	Cable stand ring	KitCo	08RC6	0701-4040
	5340 01 422 2168	1	Cable clips	KitCo	08RC6	0701-4060
14	None	1	Marking pen, permanent	Guernsey	OFSU8	SAN30001
15	6635 01 232 9536	1	Tweezers	Grobel	32218	GTP-293
				Obbco	7J761	605268
16	6230 01 419 5898	1	Flashlight	Desco Industries	62576	230
				Obbco	7J761	1900C
17	5120 01 419 3142	1	Polishing tool for M29504 termini w/ ceramic ferrules	Packard-Hughes	53669	4568334H
				KitCo	08RC6	0701-4100
18	5120 01 419 3151	1	Polishing tool for ST connector (M83522)	KitCo	08RC6	0700-1740
19	6650 00 994 6883	1	Eye loop, 7X	Bausch & Lomb	06175	6542039
				Westover Scientific	4M564	ELP-174 10X
20	5120 01 419 3730	1	Crimp tool for termini (M29504)	Packard-Hughes	53669	1143130-9S
				KitCo	08RC6	0701-2001
21	5120 01 419 3735	1	Crimp tool frame, for ST connector (M83522)	Ideal	30119	28-500
				Rostra	OMP99	2100
22	5120 01 419 4363	1	Crimp tool die, for ST connector (M83522)	Ideal	30119	28-401
23	6070 01 420 0522	16	Cure adapters for M29504 ceramic termini	KitCo	08RC6	0701-4050
24	6070 01 420 0551	12	Cure adapters for M83522 ST connectors	KitCo	08RC6	0701-1450
				Lucent Technologies	64959	104 153 937

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(Continued)

Item	National Stock Number	Qty Req'd	Description	Manufacturer	Cage Code	Part Or Identifying No.
25	None	16	Micro clips	Mueller	76545	BU-34
26	None	1	Microscope 400X	Leica	OF735	NA
	6650 01 420 0232	1	Microscope body, with IR filter	Leica	OF735	31 22 70
	6650 01 420 0231	1	Eyepiece	Leica	OF735	31 22 73
	6650 01 420 0233	1	Objective	Leica	OF735	31 22 82
	6070 01 421 1234	1	Connector mount	Leica	OF735	31 22 85
		2	Battery, D size, alkaline	Rayovac	77542	RAY ALD
	6240 00 155 7786	1	Incandescent lamp	General Electric	08806	PR2
27	8125 01 428 8839	1	Water bottle with cap	KitCo	08RC6	0700-9700
28	6540 01 443 7953	1	Spectacles, nylon utility, flex head	Klein	75347	KLE-60050
				Obbco	7J761	TK110
29	8040 01 421 3510	6	Epoxy, bi-pack, MIL-A-24792	Tracon	22835	F112
				Lucent Technologies	64959	105 489 355
30	5350 01 420 1454	25 Sheets	Polishing paper, 5 micron, aluminum oxide, foam backed sheet, 5.5 X 5.5 inch min	Moyco	41946	915-05-604
				Lucent Technologies	64959	105 488 175
31	5350 01 376 9388	25 Sheets	Polishing paper, 1 micron, aluminum oxide, mylar backed sheet, 5.5 X 5.5 inch min	Moyco	41946	915-01-301
				Lucent Technologies	64959	105 076 798
32	None	3 Sheets	Polishing paper, 1/10 micron, diamond, mylar backed sheet, 5.5 X 5.5 inch min	Moyco	41946	903-0.1SP
33	5120 01 438 6563	12	Syringe, w/twist-on dispensing needle, 3 mL	KitCo	08RC6	0700-5100
				Fibertron	0HLY3	TS3ML
34	7920 01 321 6791	25 Sheets	Wipes, cleaning cloth, white	Texwipe	21994	TX404
				TechSpray	54700	Tech 2351-100
35	6838 01 038 4517	1	Canned air	Chemtronics	21267	ES-1220
				AccTech LLC	09ZF6	3507
36	5110 01 419 4360	1	Cleaver, fiber optic (carbide)	Lunzer	23975	58905-600
				KitCo	08RC6	0700-3725
37	8125 01 439 5367	1	Dispenser, solvent, 4 oz., leakproof (for alcohol)	Menda	33092	3714
38	None	1	Custom case, watertight, max. size 22"W x 15"H x 9.5" deep (includes roll-up pouches) with plastic boxes	KitCo	08RC6	0701-7105
39	None	1	Resilient pad, 70 to 90 durometer, 5.5" X 5.5" min	Moyco	41946	960-00071
				3M	76381	78-8073-7525-4
40	5210 00 725 7347	1	Scale, 6 inch	Gov't Supply Admin.	81348	GGG-R-79
				American Falcon Corp.	32445	SS-6
41	None	32	Alcohol pads	TechSpray	54700	1610-50
42	None	1	Allen wrench, 5/64	W.W. Grainger	25795	3G674
43	None	12	Cure adapter holder for SC connector	KitCo	08RC6	0700-1455
44	None	1	Boot installation tool (FSI, M83522)	KitCo	08RC6	0701-3070
				FSI	OYPM2	FSTF0371
45	None	1	Lint free swabs	GC Electronics	72653	19-757
46	None	1	Template, cut length for AMP SC connector	KitCo	08RC6	0100-1045
47	None	1	Crimp tool (frame with die) for AMP SC connector (KitCo: .195, .140, .110 inch circular cavities)	KitCo	08RC6	0700-1645
				AMP Inc.	00779	492026-1

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Table 1C. Optical Test Kit Containing Light Sources and Optical Powermeter

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
6009BA	None	1	LED source <u>1/</u>	094M9	PX-C101
6009BB	None	1	Laser source <u>2/</u>	094M9	PX-C203
6009BC	None	1	Powermeter <u>3/</u>	094M9	PX-B220
50	None	1	Custom case	08RC6	0700-8025
6009BD	6625 01 304 1739	1	Optical Loss Test Set <u>4/</u>	0T1F7	MS9020D

Notes for table 1C (minimum requirements):

1/ LED Source: 1300 ± 20 nm wavelength, -20 dBm min output level for multimode, maximum of 170 nm FWHM spectral width, ≤ 0.1 dB/hr stability, Coupled Power Ratio (CPR) per TIA/EIA-526-14 shall be ≥ 21 dB at 1300 nm for 62.5/125 micron optical fiber.

2/ LD (laser) Source: 1310 +20/-30 nm wavelength, -10 dBm min output level for single mode, maximum of 5 nm FWHM spectral width, ≤ 0.1 dB/hr stability.

3/ Powermeter: -60 dB min noise floor, 0.01 dB resolution, 0.25 dB accuracy, ≤ 5 % or ≤ 0.1 dB linearity over range of optical power from -60 dBm to 3 dBm, sufficient active area of the detector and placed sufficiently close to the end of the fiber (62.5/125 micron multimode that conforms to TIA/EIA-492AAA) to detect all the radiation emitted from it.

4/ This item is used in lieu of items 6009BA and 6009BC.

Table 1D. ST-to-ST MQJ Set (With SC-to-ST adapters)

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
6009AX	6625 01 417 5230	2	MQJ, ST-to-ST connector, 1 meter length, multimode <u>1/</u>	53669	1123804H
				08RC6	KFO 10028
6009AY	None	2	MQJ, ST-to-ST connector, 1 meter length, single mode <u>2/</u>	53669	1123805H
				08RC6	KFO 10029
6007AB	None	2	ST-to-ST adapter, single mode, split ceramic alignment sleeve, metal housing	64959	105 271 142
6009BE	None	2	SC-to-ST adapter, simplex, split ceramic alignment sleeve, metal housing	00779	503638-2

Notes for table 1D:

1/ MQJ is to meet NAVSEA Drawing 6877804 Jumpers, Test Equipment, Fiber Optic; Item number 05: ST-to-ST connector, multimode.

2/ MQJ is to meet NAVSEA Drawing 6877804 Jumpers, Test Equipment, Fiber Optic; Item number 05SM: ST-to-ST connector, single mode. Connection reflectance values (returned optical power at one connection interface) shall be in the range between -30 dB to -40 dB at each interface when tested in accordance with MIL-STD-2042, Method 7J1-2. This reflectance requirement is applicable at both the ST connector and termini connector.

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Table 1E. Hermaphroditic Connector MQJ Set, CP-12 Type

See notes 1/ to 8/, 10/ and 11/

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
6009AQ	None	2	MQJ, hermaphroditic connector cable plug to ST connector, 1 meter length	53669	1123807H 9/

Notes for table 1E:

1/ Hermaphroditic connector cable plug, part number CP-12-DI-A-12, and hermaphroditic connector dust cover with male threads, part number DP-A, shall be used as two components which comprise the MQJ. These two components shall meet Commercial Item Description (CID) A-A-XX159 Fiber Optic Connectors, Hermaphroditic, Multiple Removable Termini, Draft dated 31 July 1999 or latest version. Approval process for this component to be in accordance with NSWCCD-SSES ltr 9504 Ser 9542/27 of 13 Mar 98 or latest revision. Vendor quality system to be equivalent to that specified in enclosure (2). NSWCCD-SSES audit may be substituted for DSCC audit if deemed appropriate.

2/ Termini in the hermaphroditic connector cable plug shall meet Commercial Item Description (CID) A-A-XX160 Removable Termini For Multiple Termini Fiber Optic Connectors, Draft dated 31 July 1999 or latest version. Approval process for this component to be in accordance with NSWCCD-SSES ltr 9504 Ser 9542/27 of 13 Mar 98 or latest revision. Vendor quality system to be equivalent to that specified in enclosure (2). NSWCCD-SSES audit may be substituted for DSCC audit if deemed appropriate.

3/ Single fiber cable, SM fiber per TIA/EIA-492CAAA, 900 \pm 50 μ m buffer, PVC jacket shall be used. The single fiber cable shall consist of a buffered fiber surrounded with a concentric layer of yarn strength members and jacket. Outer jacket shall have a diameter between 1.8 and 2.4 mm with a tolerance on a particular vendor part number of \pm 0.2 mm. Cable shall have an operating temperature of -28 to 65 °C and a minimum protrusion length from the hermaphroditic connector of 1 meter.

4/ Single fiber breakout cable, 62.5/125 μ m MM fiber per TIA/EIA-492AAAA, 900 \pm 50 μ m buffer, PVC jacket shall be used. The single fiber cable shall consist of a buffered fiber surrounded with a concentric layer of yarn strength members and jacket. Outer jacket shall have a diameter between 1.8 and 2.4 mm with a tolerance on a particular vendor part number of \pm 0.2 mm. Cable shall have an operating temperature of -28 to 65 °C and a minimum protrusion length from the hermaphroditic connector of 1 meter.

5/ ST connectors shall have:

- a. Ceramic ferrule (no plastic or metal ferrules) with domed end face.
- b. Metal housing (also referred to as: bayonet cap, coupling nut or outside part) and ferrule/crimp sleeve support (also referred to as: barrel, body or inside part) with no zinc die cast parts (stainless steel or nickel plated brass are acceptable).
- c. Crimp sleeve (ring) capture mechanism for yarn strength member rated for a minimum tensile loading of 20 lb.
- d. Adhesive filled system for accepting an externally injected adhesive during cable assembly fabrication. The adhesive is used to encapsulate the bare fiber inside the connector.
- e. Polymeric materials that are fungus resistant.
- f. Crimp sleeve is to accept a single fiber cable with a tight buffer and a maximum outer diameter of 2.5 mm (0.0984 in).

6/ MQJ shall be tested to and shall meet performance requirements of MIL-STD-2042, Method 7J1. Connection reflectance values (returned optical power at one connection interface) shall be in the range between -30 dB to -40 dB at each interface when tested in accordance with MIL-STD-2042, Method 7J1-2. This reflectance requirement is applicable at both the ST connector and hermaphroditic connector.

7/ Individual termini-to-ST connector MQJ's may be used if built up as a cable assembly. A means of strain relief shall be provided for this cable assembly at the location where the cable assembly exits the hermaphroditic cable plug.

8/ Pin-out positions in the hermaphroditic connector cable plug are as follows for multimode and single mode termini:

- a. Multimode positions: 1J, 2J, 3J, 4J, 1P, 2P, 3P, 4P.
- b. Single mode positions: 5J, 6J, 5P, 6P.

9/ For purposes of ordering a "Hermaphroditic connector MQJ set, CP-12 type", a quantity of two hermaphroditic connector cable plug to ST connector MQJ's, item 6009AQ, is to be provided under the item number 6009AD in table 1A using the part number specified in table 2.

SIZE A	CAGE 53711	ESWS 499	DRAWING NO. 7325763	REV D
SCALE: NONE	UCI	WT GRP	SHEET	9

10/ Hermaphroditic MQJ shall be labeled (letter height 0.6 inch minimum) as follows:

- Label stating hermaphroditic description as "Fiber Optic Test Equipment, Measurement Quality Jumper (MQJ)".
- Label listing vendor name, date code MQJ built and vendor part number.
- Label listing hermaphroditic MQJ NAVSEA Drawing part number (7325763-6009AQ) and vendor assigned serial number.
- Label at the end of each single fiber cable, about 2 inches from the ST connector listing the pinout designation for the ST connector (see note 8).

11/ Hermaphroditic MQJ shall incorporate a means of strain relief for the single fiber cables.

Table 1F. ST-to-Termini MQJ Set

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
6009AJ	None	2	MQJ, ST connector-to-socket termini, 1 meter length, single mode <u>1/</u> , <u>2/</u> , <u>3/</u>	53669	1123792H
				08RC6	KFO 10024
6009AK	None	2	MQJ, ST connector-to-pin termini, 1 meter length, single mode <u>1/</u> , <u>2/</u> , <u>3/</u>	53669	1123793H
				08RC6	KFO 10025
6009AL	None	2	MQJ, ST connector-to-socket termini, 1 meter length, multimode <u>1/</u> , <u>2/</u> , <u>3/</u>	53669	1123794H
				08RC6	KFO 10026
6009AM	None	2	MQJ, ST connector-to-pin termini, 1 meter length, multimode <u>1/</u> , <u>2/</u> , <u>3/</u>	53669	1123795H
				08RC6	KFO 10027
6009AP	None	2	Snap lock, plug, termini-to-termini connection device	53669	4568515H
6009AR	None	2	Snap lock, receptacle, termini-to-termini connection device	53669	4568516H
6009BK	5120 01 144 5338	1	Termini insertion tool, straight, M29504	53669	1093784S
				08RC6	0701-3820
6009BG	5998 01 147 0198	1	Termini removal tool, M29504	53669	TMF16RT006
				08RC6	0701-3850
6009BH	5120 01 419 2942	1	Alignment sleeve insertion & removal tool, (ASIRT)	53669	TMS16RT008
				08RC6	0701-3901
6009BJ	None	6	Termini alignment sleeve, (termini fixed type) <u>4/</u>	53669	4569989H
				08RC6	4569989H

Notes for table 1F:

1/ MQJ shall be tested to and shall meet performance requirements of MIL-STD-2042, Method 6F1. Connection reflectance values (returned optical power at one connection interface) shall be in the range between -30 dB to -40 dB at each interface when tested in accordance with MIL-STD-2042, Method 7J1-2. This reflectance requirement is applicable at both the ST connector and hermaphroditic connector.

2/ Notes 2, 3, 4, 5 and 10 in table 1E are applicable for the ST connector-to-termini MQJ's.

3/ Each ST connector-to-termini MQJ is to include a termini fixed alignment sleeve.

4/ Six additional termini fixed alignment sleeves, supplied with this kit, are to be used to test spare termini (those termini not inserted into the hermaphroditic receptacle).

SIZE	CAGE	ESWS	DRAWING NO.	REV
A	53711	499	7325763	D
SCALE:	NONE	UCI	WT GRP	SHEET 10

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ESWS
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Table 1G. Cleaning Kit, For Utility Hook-Up Personnel

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
37	8125 01 439 5367	1	Dispenser, solvent, 4 oz., leakproof (for alcohol)	33092	3714
35	6838 01 038 4517	1	Canned air	21267	ES-1220
				09ZF6	3507
45	None	1	Lint free swabs	72653	19-757
34	7920 01 321 6791	25 Sheets	Wipes, cleaning cloth, white	21994	TX404
				54700	Tech 2351-100
19	6650 00 994 6883	1	Eye loop, 7X	06175	6542039
				4M564	ELP-174 10X
42	None	1	Allen wrench, 5/64	25795	3G674
41	None	32	Alcohol pads	54700	1610-50
59	None	1	Carrying case	08RC6	0700-8070
				53669	1123861H

Table 1H. Miscellaneous Single Item Accessories

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
6009AH	None	1	D hole punch 1/, 4/	26289	6/
6009AN	None	1	Detachable socket insert, configuration A with 6 alignment sleeves (DI-A-12) 2/	53669	1123796H
6009AS	None	1	Strap wrench with 3/8 inch drive adapter 3/	06324	TG70
6009AT	5120 00 230 6380	1	Torque wrench, 3/8" drive 3/	55719	TQ12BL
				08194	1502 LDIN
6009AU	None	1	O-ring installation tool, hermaphroditic connector 3/	08RC6	0701-3600
6009AV	None	1	Hydraulic adapter, for D hole punch 5/	26289	60167

Notes for table 1H:

1/ Tool shall meet requirements for producing a panel cutout to comply with Figure 1, Appendix B of Commercial Item Description (CID) A-A-XX159 Fiber Optic Connectors, Hermaphroditic, Multiple Removable Termini, Draft dated 31 July 1999 or latest version. Tool shall be rated for use on soft metals (such as aluminum, brass and mild steel) and plastics (including fiberglass and mildly fibrous materials).

2/ Component shall meet Commercial Item Description (CID) A-A-XX159 Fiber Optic Connectors, Hermaphroditic, Multiple Removable Termini, Draft dated 31 July 1999 or latest version. Approval process for this component to be in accordance with NSWCCD-SSES ltr 9504 Ser 9542/27 of 13 Mar 98 or latest revision. Vendor quality system to be equivalent to that specified in enclosure (2). NSWCCD-SSES audit may be substituted for DSCC audit if deemed appropriate.

SIZE A	CAGE 53711	ESWS 499	DRAWING NO. 7325763	REV D
SCALE: NONE	UCI	WT GRP	SHEET	11

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ESWS 499

3/ Items 6009AS, 6009AT, 6009AU are required for hermaphroditic cable plug strain relief assembly installation in addition to the following standard tools: 3/4 inch open end wrench, 1-3/8 inch open end wrench, 0.050 inch Allen wrench.

4/ A 1-7/8 inch open end wrench is required to fasten the hermaphroditic receptacle into the interconnection box once the D hole is punched. Appropriate tools are required to place a 3/4 inch diameter pilot hole into the interconnection box prior to inserting the draw stud on the D hole punch.

5/ D hole punch is configured for "manual" punching of a D hole using a 1-1/4 inch socket wrench to tighten (draw) the punch to the die. As an alternative, a Greenlee hydraulic pump may be used with the hydraulic adapter.

6/ Use the following description for specifying this D hole punch since it is not a standard item and the manufacturer does not assign it a part number: D hole punch, hole diameter (A dimension) 1.635 inch, flat (B dimension) 1.575 inch, manual drive (ball bearing drive nut), for use on mild steel with a thickness of 14 gauge (0.078 inch) or less, softer metals (aluminum and brass) with a thickness of 12 gauge (0.105 inch) or less and plastics (including fiberglass and mildly fibrous materials) with a thickness of 0.135 inch or less.

Table II. Consumable Kit for 100 ST Connectors or Termini

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
29	8040 01 421 3510	6	Epoxy, bi-pack, MIL-A-24792	22835	F112
				64959	105 489 355
30	5350 01 420 1454	25 Sheets	Polishing paper, 5 micron, aluminum oxide, foam backed sheet, 5.5 X 5.5 inch min	64959	105 488 175
				41946	915-05-604
31	5350 01 376 9388	25 Sheets	Polishing paper, 1 micron, aluminum oxide, mylar backed sheet, 5.5 X 5.5 inch min	41946	915-01-301
				64959	105 076 798
32	None	3 Sheets	Polishing paper, 1/10 micron, diamond, mylar backed sheet, 5.5 X 5.5 inch min	41946	903-0.1SP
33	5120 01 438 6563	12	Syringe, w/twist-on dispensing needle, 3 mL	08RC6	0700-5100
				0HLY3	TS3ML
34	7920 01 321 6791	25 Sheets	Wipes, cleaning cloth, white	21994	TX404
				54700	Tech 2351-100

SIZE A	CAGE 53711	ESWS 499	DRAWING NO. 7325763	REV D
SCALE: NONE	UCI	WT GRP	SHEET	12

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13

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ESWS
499Table 1J. OLTS (Optical Loss Test Set) MQJ Kit 1/

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
54	None	1	Carrying case for Loss Test Set MQJ Kit <u>2</u> /	53669	1123848H
6009AC	None	1	ST connector-to-ST connector MQJ set	53669 08RC6	1123806H KFO 10022
6009AD	None	1	Hermaphroditic connector MQJ set	53669	1123808H
6009AE	None	1	ST connector-to-termini MQJ set	53669 08RC6	1123797H KFO 10023

Notes for table 1J:

1/ OLTS MQJ Kit (item 6009BX) is comprised of items 6009AC, 6009AD and 6009AE and the carrying case (item 54).

2/ Soft, padded carrying case with strap is to be provided as part of this kit is one in which all components are protected during transportation/storage. Carrying case is to be compact and light weight.

Table 1K. OTDR MQJ Kit 1/

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
64	None	1	Carrying case for OTDR MQJ Kit <u>2</u> /	53669	1123848H
6009BN	None	1	MQJ, ST connector-to-socket termini, 50 meter length, single mode <u>3</u> /	53669 08RC6	1123851H 6877804-04SM
6009BP	None	1	MQJ, ST connector-to-pin termini, 50 meter length, single mode <u>4</u> /	53669 08RC6	1123852H 6877804-03SM
6009BR	None	2	MQJ, ST connector-to-ST connector, 50 meter length, single mode <u>5</u> /	53669 08RC6	1123853H 6877804-01SM
69	None	4	Mandrel, 6.4 mm (0.25 in) diameter, 15.2 cm (6 in) long minimum	53669	1123849H
6009BS	None	1	MQJ, hermaphroditic cable plug-to-ST connectors, 50 meter length, single mode <u>6</u> /	53669	1123854H
6009BT	None	6	Index Matching Material, Fiber Optic, one part	98354 64959	OC-432/1 cc 107 428 948

SIZE A	CAGE 53711	ESWS 499	DRAWING NO. 7325763	REV D
SCALE: NONE	UCI	WT GRP	SHEET	13

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ESWS
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Table 1K. OTDR MQJ Kit (Continued) 1/

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
6009CF	None	1	MQJ, ST connector-to-socket termini, 50 m length, multimode 7/	53669	4567775-2H
				08RC6	6877804-04
6009CG	None	1	MQJ, ST connector-to-pin termini, 50 meter length, multimode 8/	53669	4567775-1H
				08RC6	6877804-03
6009CH	None	1	MQJ, ST connector-to-ST connector 50 m length, multimode 9/	53669	4567773-1H
				08RC6	6877804-01

Notes for table 1K:

1/ OTDR MQJ Kit (item 6009BY) consists of items 6009BN, 6009BP, 6009BR and 6009BS with accessory items 69, 6009BT and the carrying case (item 64).

2/ Soft, padded carrying case with strap is to be provided as part of this kit is one in which all components are protected during transportation/storage. Carrying case is to be compact and light weight.

3/ MQJ shall meet NAVSEA Drawing 6877804 Jumpers, Test Equipment, Fiber Optic; Item number 4SM. MQJ shall be tested to and shall meet performance requirements of MIL-STD-2042, Method 6F1.

Reflectance (returned optical power at one connection interface) shall be in the range between -30 dB to -40 dB at each interface when tested in accordance with MIL-STD-2042, Method 7J1-2. This reflectance requirement is applicable at the interfaces for both the ST connector and the terminus.

4/ MQJ shall meet NAVSEA Drawing 6877804 Jumpers, Test Equipment, Fiber Optic; Item number 3SM. MQJ shall be tested to and shall meet performance requirements of MIL-STD-2042, Method 6F1.

Reflectance (returned optical power at one connection interface) shall be in the range between -30 dB to -40 dB at each interface when tested in accordance with MIL-STD-2042, Method 7J1-2. This reflectance requirement is applicable at the interfaces for both the ST connector and the terminus.

5/ MQJ shall meet NAVSEA Drawing 6877804 Jumpers, Test Equipment, Fiber Optic; Item number 1SM. MQJ shall be tested to and shall meet performance requirements of MIL-STD-2042, Method 6F1.

Reflectance (returned optical power at one connection interface) shall be in the range between -30 dB to -40 dB at each interface when tested in accordance with MIL-STD-2042, Method 7J1-2. This reflectance requirement is applicable at the interfaces for both ST connectors.

6/ MQJ shall be tested to and shall meet performance requirements of MIL-STD-2042, Method 7F1.

Reflectance (returned optical power at one connection interface) shall be in the range between -30 dB to -40 dB at each interface when tested in accordance with MIL-STD-2042, Method 7J1-2. This reflectance requirement is applicable at the interfaces for both the ST connector and the hermaphroditic cable plug.

Components used to construct the MQJ shall conform to notes 1, 2, 3, 5 and 8 for table 1E. Labeling shall conform to note 10 for table 1E as applicable for this NAVSEA Drawing number (7325763-6009BS).

7/ MQJ is to meet NAVSEA Drawing 6877804 Jumpers, test Equipment, Fiber Optic; Item number 4. MQJ shall be tested to and shall meet performance requirements of MIL-STD-2042, Method 6F1.

8/ MQJ is to meet NAVSEA Drawing 6877804 Jumpers, test Equipment, Fiber Optic; Item number 3. MQJ shall be tested to and shall meet performance requirements of MIL-STD-2042, Method 6F1.

9/ MQJ is to meet NAVSEA Drawing 6877804 Jumpers, test Equipment, Fiber Optic; Item number 1. MQJ shall be tested to and shall meet performance requirements of MIL-STD-2042, Method 6F1.

SIZE A	CAGE 53711	ESWS 499	DRAWING NO. 7325763	REV D
SCALE: NONE	UCI	WT GRP	SHEET	14

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NARSEA DRAWING NO.

ESWS

499

Table 1L MQJ Combo Kit 1/

Item	National Stock Number	Quantity Required	Description	Cage Code	Part Or Identifying No.
6009AF	None	1	Cleaning Kit, for Utility Hook-Up Personnel	53669	1123859H
				08RC6	4000-1030
6009BX	None	1	OLTS MQJ Kit <u>2/</u>	53669	1123847H
6009BY	None	1	OTDR MQJ Kit <u>3/</u>	53669	1123860H

Notes for table 1L:

1/ Item number 6009BM (MQJ Combo Kit) is comprised of the items listed in table 1L.2/ OLTS MQJ Kit is comprised of items in table 1J.3/ OTDR MQJ Kit is comprised of items in table 1K.

SIZE	CAGE	ESWS	DRAWING NO.	REV
A	53711	499	7325763	D
SCALE: NONE	UCI	WT GRP	SHEET	15

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MAYSEA DRAWING NO.

ESNBS

499

Table 2. Termination Kit, Optical Test Kit, Measurement Quality Jumpers (MQJ) Sets & Accessories
Recommended Sources Of Supply

Item	Vendor Name	Part Number	Vendor Address	Vendor Phone/FAX
6009AA	KitCo Fiber Optics, Inc.	4000-1010	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AB	KitCo Fiber Optics, Inc.	4000-1020	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AC	Packard Hughes Interconnect	1123806H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc.	KFO 10022	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AD	Packard Hughes Interconnect	1123808H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009AE	Packard Hughes Interconnect	1123797H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc.	KFO 10023	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AF	KitCo Fiber Optics, Inc.	4000-1030	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AG	KitCo Fiber Optics, Inc.	4000-1050	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AH	Greenlee Textron Inc.	50756737	4455 Boeing Dr. Rockford, IL 61109	(815) 397-7070 (815) 397-1865
6009AJ	Packard Hughes Interconnect	1123792H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc.	KFO 100024	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AK	Packard Hughes Interconnect	1123793H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc.	KFO 100025	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AL	Packard Hughes Interconnect	1123794H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc.	KFO 100026	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AM	Packard Hughes Interconnect	1123795H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc.	KFO 100027	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AN	Packard Hughes Interconnect	1123796H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009AP	Packard Hughes Interconnect	4568515H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009AQ	Packard Hughes Interconnect	1123807H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009AR	Packard Hughes Interconnect	4568516H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009AS	Glenair, Inc.	TG70	1211 Air Way Glendale, CA 91201-2497	(818) 247-6000 (818) 500-9912
6009AT	Snap-On Tool Company	TQ12BL	2801 80 th St. Kenosha, WI 53143-5651	(414) 656-4794 (414) 656-5500
	Consolidated Devices, Inc.	1502 LDIN	19220 San Jose Ave. Rowland Heights, CA 91748	(626) 965-0668 (626) 965-2410
6009AU	KitCo Fiber Optics, Inc.	0701-3600	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009AV	Greenlee Textron Inc.	60167	4455 Boeing Dr. Rockford, IL 61109	(815) 397-7070 (815) 397-1865
6009AX	Packard Hughes Interconnect	1123804H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc.	KFO 10028	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529

SIZE	CAGE	ESNBS	DRAWING NO.	REV
A	53711	499	7325763	D
SCALE:	NONE	UCI	WT GRP	SHEET
				16

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17

7325763

MUSEA DRAWING NO.

ESWS
499

Table 2. Termination Kit, Optical Test Kit, Measurement Quality Jumpers (MQJ) Sets & Accessories
Recommended Sources Of Supply
(Continued)

Item	Vendor Name	Part Number	Vendor Address	Vendor Phone/FAX
6009AY	Packard Hughes Interconnect	1123805H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc.	KFO 10029	5269 Cleveland St. Virginia Beach VA 23462	(888) 548-2636 (757) 518-0529
6009BA	Photonix	PX-C101	435 Main St. Johnson City, NY 13790	(800) 404-5868 (607) 729-4931
6009BB	Photonix	PX-C203	435 Main St. Johnson City, NY 13790	(800) 404-5868 (607) 729-4931
6009BC	Photonix	PX-B220	435 Main St. Johnson City, NY 13790	(800) 404-5868 (607) 729-4931
6009BD	Anritsu Wiltron Sales Company	MS9020D	1155 East Collins Richardson, TX 75081	(800) 267-4878 (972) 644-3416
6009BE	AMP Incorporated	503638-2	PO Box 3608 Harrisburg, PA 17105	(800) 526-5126 (717) 986-3605
6009AF	Packard-Hughes Interconnect	1123859H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009BK	Packard-Hughes Interconnect	1093784S	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc	0701-3820	5269 Cleveland St. Virginia Beach, VA 23462	(888) 548-2636 (757) 518-0529
6009BG	Packard-Hughes Interconnect	TMF16RT006	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc	0701-3850	5269 Cleveland St. Virginia Beach, VA 23462	(888) 548-2636 (757) 518-0529
6009BH	Packard-Hughes Interconnect	TMS16RT008	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc	0701-3901	5269 Cleveland St. Virginia Beach, VA 23462	(888) 548-2636 (757) 518-0529
6009BM	Packard-Hughes Interconnect	1123850H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009BN	Packard-Hughes Interconnect	1123851H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009BP	Packard-Hughes Interconnect	1123852H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009BR	Packard-Hughes Interconnect	1123853H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009BS	Packard-Hughes Interconnect	1123854H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009BT	Nye Lubricants, Inc.	OC-432/1 cc	12 Howland Rd. Fairhaven, MA 02719	(508) 996-6721 (508) 997-5285
	Lucent Technologies, Inc.	107 428 948	2000 Northeast Expy. Norcross, GA 30071	(770) 798-3605 (770) 798-2001
6009BX	Packard-Hughes Interconnect	1123847H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009BY	Packard-Hughes Interconnect	1123860H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
6009CF	Packard-Hughes Interconnect	4567775-2H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc	6877804-04	5269 Cleveland St. Virginia Beach, VA 23462	(888) 548-2636 (757) 518-0529
6009CG	Packard-Hughes Interconnect	4567775-1H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc	6877804-03	5269 Cleveland St. Virginia Beach, VA 23462	(888) 548-2636 (757) 518-0529
6009CH	Packard-Hughes Interconnect	4567773-1H	17150 Von Karman Ave. Irvine, CA 19685	(949) 660-5704 (949) 660-6981
	KitCo Fiber Optics, Inc	6877804-01	5269 Cleveland St. Virginia Beach, VA 23462	(888) 548-2636 (757) 518-0529

SIZE A	CAGE 53711	ESWS 499	DRAWING NO. 7325763	REV D
SCALE: NONE	UCI	WT GRP	SHEET	17