



**Ortel Fiber Optic Interface**

**144-696/144-697-X**

Serial Number \_\_\_\_\_

April 16, 2001  
Rev. N/C

**144-697-1      Fiber Optic Case Assembly**

All references to 144-697 should read 144-697-1.

**144-697-2      Wide Range P/S**

All references to 144-697 should read 144-697-2.

# ORTEL (LUCENT) FIBER OPTIC INTERFACE

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# ORTEL (LUCENT) FIBER OPTIC INTERFACE

## 1. GENERAL INFORMATION

### 1.1. SCOPE OF OPTION

This Manual contains the information necessary to operate and maintain a TrueTime Model 144-696 Fiber Optic Link Option.

### 1.2. PURPOSE OF EQUIPMENT

The Model 144-696 Option provides a secure, low loss method of interconnecting a standard TrueTime Antenna and a GPS-XL clock. It can be employed wherever a security boundary must be entered, when protection against lightning strikes is desired, or where the antenna must be located a long distance from the clock.

#### 1.2.1. PHYSICAL SPECIFICATION

Form: Two small enclosures  
Dimensions: 4.28" w x 1.50" h x 2.13" d (each)  
(10.87cm w x 3.81cm h x 5.41cm d [each])  
Weight: Approximately 12 ounces (each) (342 g)  
Fiber Length: 1 to 2000 M (6560 feet)

#### 1.2.2. POWER SUPPLY

Form: Plastic desktop enclosure  
Dimensions: 2.00" w x 4.00" h x 1.45" d  
(5.08cm x 10.16cm x 3.68cm)  
Weight: Approximately 1.04 pounds (0.472 kg)

#### 1.2.3. OPTIONAL OUTSIDE ENCLOSURE

Form: Fiberglass enclosure, hermetically sealed  
Dimensions: 6.50" w x 8.00" h x 5.38" d  
(16.51cm x 20.32cm x 13.67cm)  
Weight: Approximately 10 pounds (4.54 kg)  
Standard: NEMA 4X

#### 1.2.4. ENVIRONMENTAL SPECIFICATIONS

##### 1.2.4.1. FIBER OPTIC INTERFACE 3111A / 4111A

Operating Temp: -40° to +60°C  
Storage Temp: -45° to +65°C  
Humidity: 95% relative, non-condensing  
Cooling Mode: Convection  
Special: When installed in the TrueTime specified Outside Enclosure (144-697), and coaxial cables, the antenna end may be safely installed in virtually any natural or industrial environment.

##### 1.2.4.2. POWER SUPPLY

Operating Temp: -25° to +71°C  
Storage Temp: -25° to +85°C  
Humidity: 20-90% relative, non-condensing  
Cooling Mode: Convection

## 1.2.5. POWER REQUIREMENTS

### 1.2.5.1. ANTENNA-CONNECTED LINK

Voltage: 5 VDC  $\pm$ 10% (supplied by PM342 external supply)  
Power: <1 Watt

### 1.2.5.2. CLOCK-CONNECTED LINK

Voltage: 5 VDC (supplied by clock)  
Power: <1 Watt

## 1.2.6. SIGNAL SPECIFICATIONS

### 1.2.6.1. OPTICAL PARAMETERS

Type: Optical Fiber, 1310 nm wavelength  
Fiber: Single Mode  
Connector: FC/APC TYPE 'R'

### 1.2.6.2. RF PARAMETERS

Type: Coaxial  
Impedance: 50  $\Omega$   
Connector: SMA

## 2. **INSTALLATION AND OPERATION**

### 2.1. INSTALLATION

#### 2.1.1. GENERAL

The TrueTime Model 144-696 Fiber Optic Link requires some planning and careful consideration of certain parameters prior to installation. The simplest installation requires that a suitable length of Optical Fiber be installed between the clock site and the Antenna site, mounting the units on a suitable surface, connecting up the fibers and the coax cables, and, in the case of the antenna-connected link, installing the power supply and hooking up its power cables. Be careful to allow enough room for the fibers to make any required bends in a very gentle radius. Typically the bend radius should be greater than ten times the cable outside diameter at least. The optical connectors are FC/APC Type 'R'. TrueTime may also have supplied cable or cable assemblies as part of the order. Be especially careful when handling the optical fibers to avoid getting dirt or other contaminants in the optical fiber connectors since this will result in poor system performance.

#### 2.1.2. ANTENNA-CONNECTED FIBER OPTIC SUPPLY

The power supply is a desktop unit which will accept 110 VAC, 60 Hz power. It is not designed for extreme environmental conditions and so must be located in a benign location. See Specifications. It comes with power cable with installed connector for direct connection to the Antenna end Fiber Optic Transmitter.

#### 2.1.3. OUTSIDE AND OTHER CHALLENGING LOCATIONS

If you are installing the Antenna-Connected Fiber Optic Transmitter outside or in an unprotected location such as a warehouse or bunker, you must use the TrueTime specified components such as the optional Outside Enclosure (144-697) in order to obtain reliable long term operation. The steps and methods outlined above are essentially the

same, but extra steps, such as mounting the enclosure and installing connectors after the cable has been installed, are required.

Install the Outside Enclosure in the most favorable location you can. Consider such factors as service access (especially in inclement weather), power availability, and vandalism. No attempt has been made to make this installable device vandalproof. The recommended optical fiber and power cable can both be used outdoors in aerial or direct burial applications without any additional protection from the elements. Aerial installations should use a suitable messenger wire to support them. Take wind and ice loading into account when sizing the messenger. Follow the assembly instructions on sheet 2 of 2, print 144-697 for proper installation connections. The recommended optical fiber is a tightly coupled product that can be installed with regular wire pulling techniques and can be installed in long vertical runs without problem. It is UL listed and Riser rated so that it does not require a splice box or vault when coming inside a building. Terminate the power, coax, and fiber connectors per standard practice and connect them to the Fiber Optic module inside the box. Tuck all loops neatly inside the box and close it and secure it with the screws provided. Be very careful not to kink either the fibers or the coax cables as you do this. Note that where lightning is a problem, the use of a properly installed coaxial lightning arrester outside of the box may extend the useful life of this product. In an extensive antenna farm the use of lightning dissipative systems may be economically advisable.

#### 2.1.4. FINISH

Install the Clock and Antenna according to their manuals. Install the Clock-Connected Fiber Optic Link near the Clock and connect it to the antenna input of the clock with the provided coax cable. The Clock-Connected Fiber Optic Link is powered by the clock.

### 2.2. OPERATION

Aside from ensuring that power is applied to the Fiber Optic Link, there are no other operating instructions. However, if the fiber is long you will want to compensate for its length by using the standard cable length compensation function (51) of the clock. The propagation delay of the fiber is roughly the same as the coax that would normally be installed. The propagation delay of the Fiber Optic modules themselves is  $\cong 180$  ns. Do not forget to add in any coax between the down converter and the NTS/TV. In addition, remember that the position the NTS/TV reports is the position of the antenna, not the NTS/TV, since they may be physically quite a distance apart.

## 3. MAINTENANCE AND TROUBLESHOOTING

### 3.1. INTRODUCTION

Effective maintenance and troubleshooting of this equipment requires a thorough understanding of equipment characteristics, operating procedures, theory of operation, and knowledge of both linear and logic circuit elements. A working knowledge of Fiber Optics theory and connectorization methods are also required.

### 3.2. PREVENTIVE MAINTENANCE

A systematic preventive maintenance routine can reduce the possibility of a malfunction. This routine should include inspection, qualification, and cleaning of the instrument.

### 3.2.1. INSPECTION

Exercise care when handling this equipment. It contains sensitive parts that can be damaged by improper handling. Do not touch connector pin surfaces because of the danger of static discharge, also deposits on contact surfaces can cause corrosion, resulting in equipment damage or failure. Inspect the unit for damaged components, loose or frayed connections, and corrosion on metal surfaces. If damage is found, correct it immediately. Be especially careful not to get any foreign material into fiber optic connections as it will degrade or destroy the connection. Keep in mind that the active signal path in the fiber is only 62.5 microns in diameter, which is thinner than a ***thin*** human hair, and so requires only a very tiny speck of whatever to disrupt it.

### 3.2.2. GENERAL TROUBLESHOOTING PROCEDURES

Since an apparent problem may actually be the result of operator error, misunderstanding, or misuse, the technician will need a thorough understanding of the normal operation. Thoroughly evaluate the procedures used by the operator when the malfunction occurred.

## 4. DETAILED DRAWINGS

- 4.1. 144-696 FIBER OPTIC OPTION
- 4.2. 144-697 WEATHER RESISTANT CASE

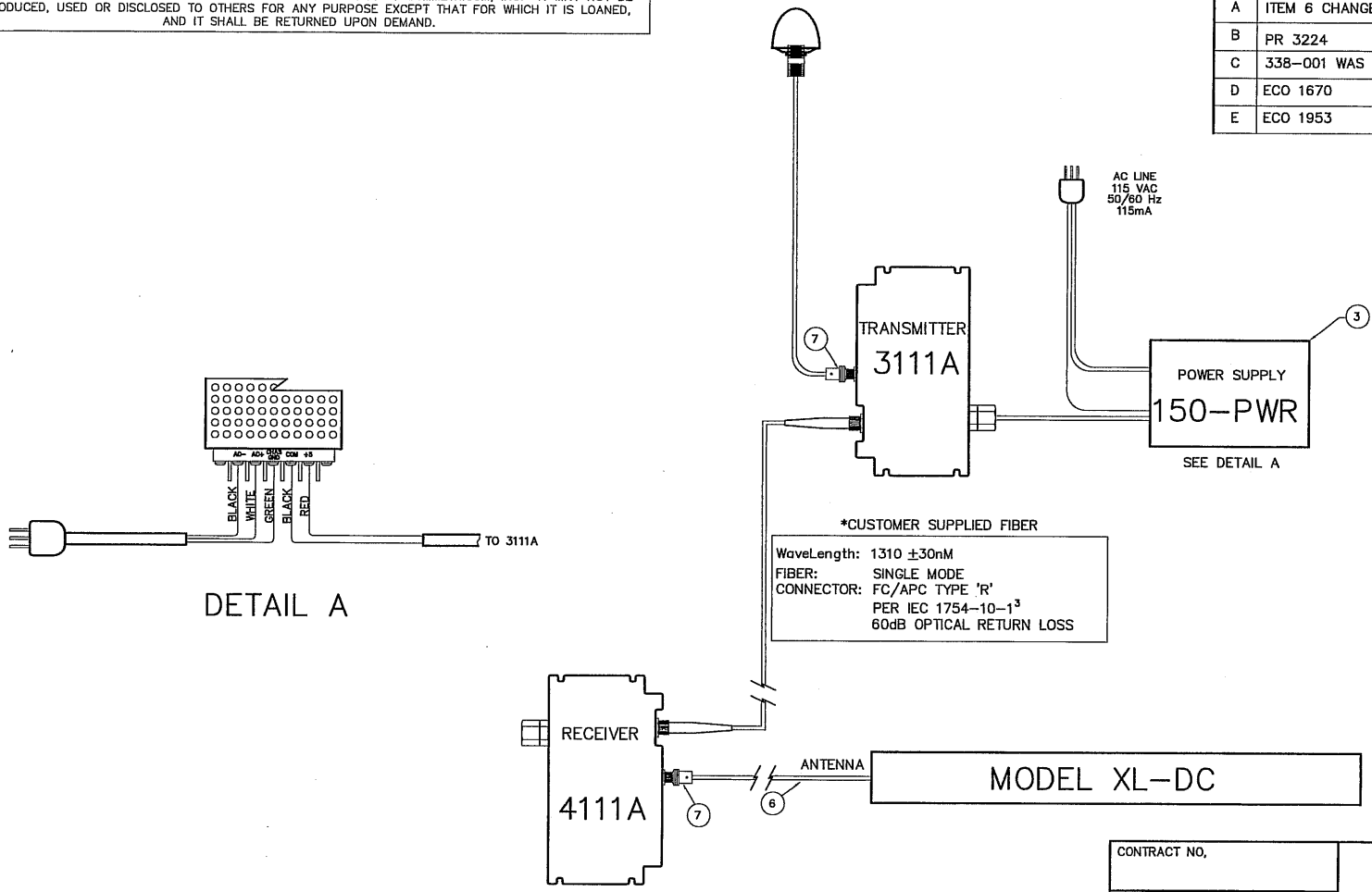
## 5. APPENDIX A

### 5.1. RECOMMENDED FIBER OPTIC CABLE

The fiber optic cable recommended for most indoor/outdoor installations is: **Single Mode Fiber, Connector Type FC/APC Type 'R', 60dB optical return loss.**

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	ITEM 6 CHANGE LENGTH TO 6'	02-16-98	MDK
B	PR 3224	05/25/99	MDK
C	338-001 WAS 340-6-1	05-01-00	JG/DR
D	ECO 1670	08-29-02	SBK
E	ECO 1953	02-20-03	Sgk



\*CUSTOMER SUPPLIED FIBER  
 WaveLength: 1310 ±30nm  
 FIBER: SINGLE MODE  
 CONNECTOR: FC/APC TYPE 'R'  
 PER IEC 1754-10-1<sup>3</sup>  
 60dB OPTICAL RETURN LOSS

CONTRACT NO.	
APPROVALS	DATE
DRAWN BY KOLLANDER	9/97
CHECKED BY	
APPROVED BY MDK	2/98

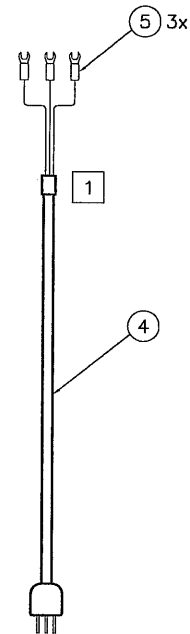
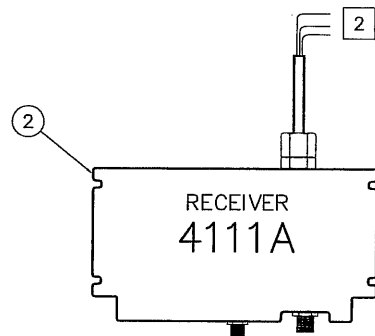
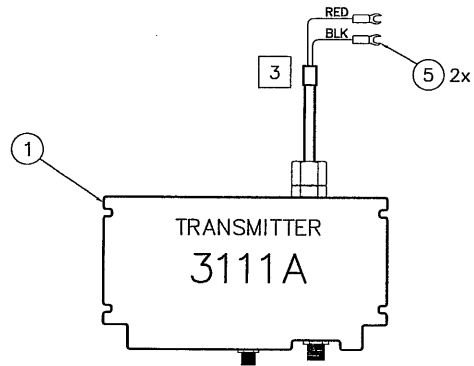
**Symmetricom**

FIBER OPTIC  
OPTION

NEXT ASSY	SIZE	CODE IDENT NO.	DRAWING NO.	REV
	B		144-696	E

FILENAME: 144-696A  
 DATE: 02-20-03





- 3 CUT OFF ALL CONDUCTORS EXCEPT RED AND BLACK AND ADD HEAT SHRINK AS SHOWN.
- 2 CUT OFF BARE WIRE ENDS AND ADD HEAT SHRINK SEPERATELY TO COVER. LEAVE POWER WIRES IN BUNDLE.
- 1 CUT BACK SUPPLY CORD APPROXIMATELY 3 INCHES TO EXPOSE 3 CONDUCTOR AC LINE POWER. ADD HEAT SHRINK AS SHOWN.

NOTES: UNLESS OTHERWISE SPECIFIED

**Symmetricom**

SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		144-696	E
SCALE NONE		SHEET 2 OF 2	

FILENAME: 144-696B  
DATE: 02-20-03

R30410  
SR0000

Symmetricom  
Single Level Bill of Material Report

ORIGINAL

Date - 2/20/2003  
Time - 13:30:09  
Page - 1

SEE

Parent Item Component Item	Parent Description Component Description	Batch Quantity Quantity Per	Bubble			Level	Ty	Seq	T	Effective	
			UM	Seq No	Remarks					From	Thru
144-696	FIBER OPTIC OPTION		EA	Type	M	Draw	144-696				
0000-PL	PARTS LIST REV LEVEL	1.00	EA				1	S	2.0	0	1/1/2000 12/31/2010
0000-PRINT	REFERENCE PRINT	1.00	EA				1	S	3.0	0	1/1/2000 12/31/2010
048-005	MODULE, TRANSMITTER FOL	1.00	EA		1		1	S	4.0	P	1/1/2000 12/31/2010
048-006	MODULE, RCVR FOL (ORTEL)	1.00	EA		2		1	S	5.0	P	1/1/2000 12/31/2010
150-PWR	FINAL ASSY PWR SUP ENCLOSURE	1.00	EA		3		1	S	6.0	M	1/1/2000 12/31/2010
273-022	LUG SPADE AWG 22-16 NO.6	5.00	EA		5		1	S	7.0	P	1/1/2000 12/31/2010
326-001	SHRINK TUBING CLR 3/32 IN	.30	FT				1	S	8.0	P	1/1/2000 12/31/2010
326-006	SHRINK TUBING CLR 3/8 IN	.10	FT				1	S	9.0	P	1/1/2000 12/31/2010
332-002	POWER CORD	1.00	EA		4		1	S	10.0	P	1/1/2000 12/31/2010
338-001	CABLE GPS-56K	1.00	EA		6		1	S	11.0	P	1/1/2000 12/31/2010
381-018	ADPTR,SMA PLUG TO BNC FEM	2.00	EA		7		1	S	12.0	P	1/1/2000 12/31/2010

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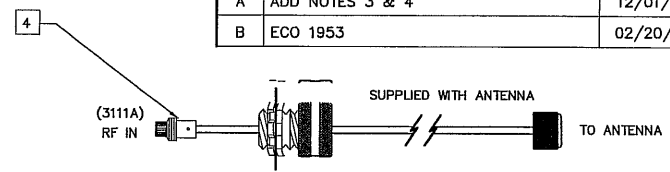
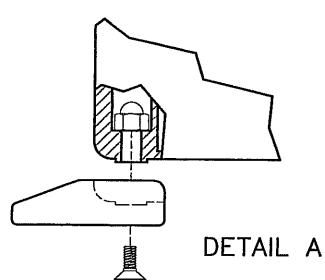
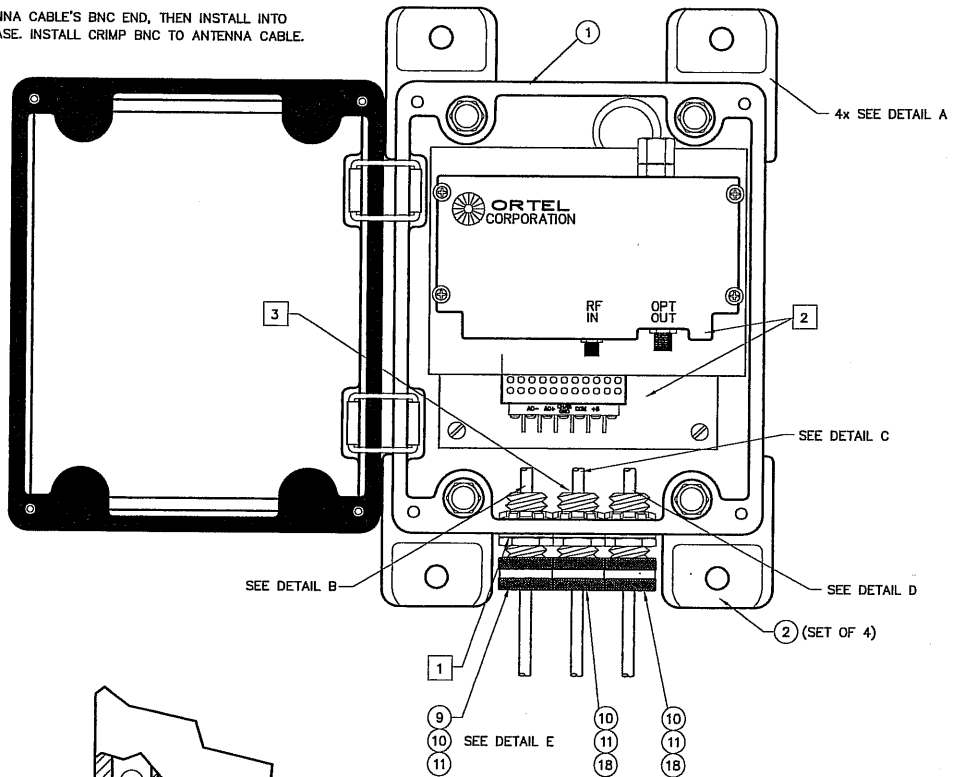
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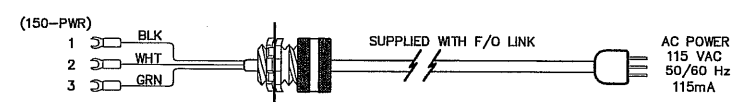
NOTES: UNLESS OTHERWISE SPECIFIED.

- 1 INSTALL WITH BROADEST PART OF WASHER TOWARDS WALL OF ENCLOSURE. SEAL THREADS WITH 5 MINUTE EPOXY.
- 2 INSTALL PARTS AS SHOWN ON SHEET 2.
- 3 RTV/SILICONE MAY BE REQUIRED, AT CUSTOMER INSTALLATION, TO SEAL ALL 3 CABLES.
- 4 CUT OFF ANTENNA CABLE'S BNC END, THEN INSTALL INTO FIBER OPTIC CASE. INSTALL CRIMP BNC TO ANTENNA CABLE.

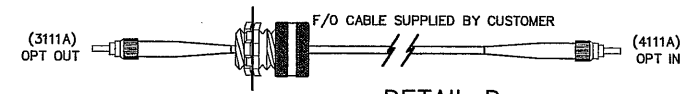
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A	ADD NOTES 3 & 4	12/01/97	MDK
B	ECO 1953	02/20/03	SBK



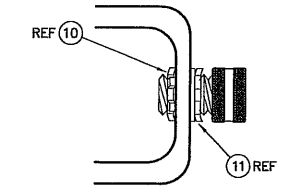
DETAIL B



DETAIL C



DETAIL D



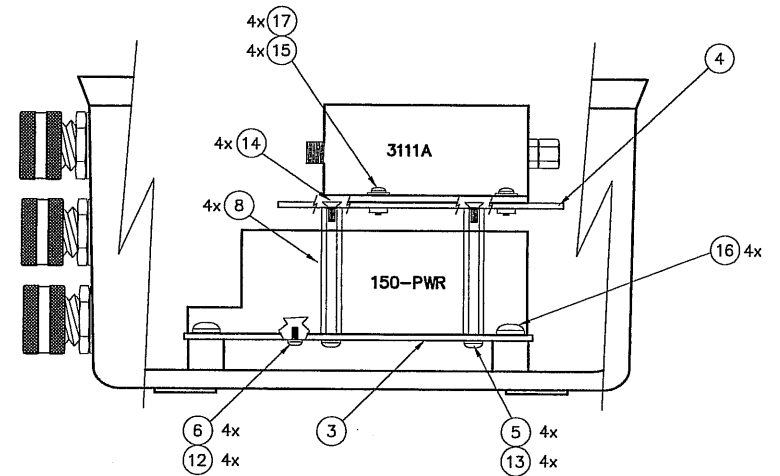
DETAIL E

CONTRACT NO.		 <b>ASSY, CASE FOL, WEATHER RESISTANT</b>		SIZE	CODE IDENT NO.	DRAWING NO.	REV
APPROVALS	DATE			B		144-697	B
DRAWN BY KOLLANDER	9/97						
CHECKED BY							
APPROVED BY MDK	12/01/97						
NEXT ASSY		SCALE NONE		SHEET 1 OF 2			

FILENAME: 144-697A  
DATE: 02-20-03

ASSEMBLY INSTRUCTIONS:

1. MOUNT 150-PWR TO THE BOTTOM MOUNTING PLATE (ITEM 3) WITH ITEMS 6 AND 12.
2. MOUNT THE FOUR SPACERS (ITEM 8) TO THE BOTTOM MOUNTING PLATE (ITEM 3) WITH ITEMS 5 AND 13.
3. MOUNT THE TOP MOUNTING PLATE (ITEM 4) TO THE SPACERS (ITEM 8) WITH ITEM 14.
4. LOOSELY MOUNT THE 3111A TO THE TOP MOUNTING PLATE (ITEM 4) WITH TWO OF FOUR ITEMS 15 AND 17.
5. USE 144-696 DRAWING (WIRING DETAIL) TO CONNECT THE SUPPLY WIRING FROM THE 3111A TO THE 150-PWR.
6. USE 144-696 DRAWING (WIRING DETAIL) TO CONNECT THE REMAINING WIRING.
7. PLACE THE BOTTOM MOUNTING PLATE (ITEM 3) INTO THE WEATHER PROOF CASE (ITEM 1) AND FASTEN THE TWO ACCESSIBLE OF THE FOUR MOUNTING HOLES WITH ITEM 16.
8. REMOVE THE LOOSE MOUNTING HARDWARE FOR THE 3111A (ITEMS 6 & 15) AND GENTLY MOVE THE 3111A FORWARD IN ORDER TO MOUNT THE REMAINING TWO BOTTOM PLATE MOUNTING HOLES WITH ITEM 16, AND TIGHTEN THROUGH THE TOP MOUNTING PLATE'S (ITEM 4) ACCESS HOLES.
9. REMOUNT AND TIGHTEN THE 3111A TO THE TOP MOUNTING PLATE (ITEM 4) WITH ITEMS 15 AND 17.



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SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		144-697	B
SCALE NONE		SHEET 2 OF 2	

FILENAME: 144-697B  
DATE: 02-20-03

ORIGINAL

*SBK*  
Effective

Parent Item	Parent Description	Batch Quantity	Bubble	UM	Seq No	Remarks	Level	Ty	Seq	T	From	Thru
Component Item	Component Description	Quantity Per	UM	Seq No	Remarks	Level	Ty	Seq	T	From	Thru	
144-697	FIBER OPTIC INSTL KIT		EA	Type	M	<del>Rev A</del>	Draw	144-697				
0000-PL	PARTS LIST REV LEVEL	1.00	EA			REV B (02-20-03)	1	S	2.0	0	1/1/2000	12/31/2010
0000-PRINT	REFERENCE PRINT	1.00	EA			144-697 REV B	1	S	3.0	0	1/1/2000	12/31/2010
0001-PRINT	REFERENCE PRINT	1.00	EA			SEE 144-696 WIRING	1	S	4.0	0	1/1/2000	12/31/2010
048-007	PATCHCORD,FIBER OPTIC 1M	1.00	EA			SHIPPING KIT/TEST CABLE	1	S	5.0	P	1/1/2000	12/31/2010
074-002	STRAIN RELIEF, CABLE	1.00	EA		9		1	S	6.0	P	1/1/2000	12/31/2010
074-003	STRAIN RELIEF, CABLE	2.00	EA		18		1	S	7.0	P	1/1/2000	12/31/2010
093-694-1	CASE FIBER OPTIC	1.00	EA		1		1	S	8.0	M	1/1/2000	12/31/2010
093-694FT	CASE MTG FEET (SET OF 4)	1.00	LT		2		1	S	9.0	P	1/1/2000	12/31/2010
206-695	PLT,F/O WEATHERPROOF BOX	1.00	EA		3		1	S	10.0	P	1/1/2000	12/31/2010
206-696	PLT,F/O WEATHERPROOF CASE	1.00	EA		4		1	S	11.0	P	1/1/2000	12/31/2010
240-004-002	SCREW PH PN SS 4-40X1/4	4.00	EA		6		1	S	12.0	P	1/1/2000	12/31/2010
240-004-003	SCREW PH PN SS 4-40X3/8	4.00	EA		17		1	S	13.0	P	1/1/2000	12/31/2010
240-006-002	SCREW PH PN SS 6-32X1/4	4.00	EA		5		1	S	14.0	P	1/1/2000	12/31/2010
240-010-003	SCREW PH BH SS 10-32X3/8	4.00	EA		16		1	S	15.0	P	1/1/2000	12/31/2010
241-006-002	SCREW PH FH SS 6-32X1/4	4.00	EA		14		1	S	16.0	P	1/1/2000	12/31/2010
252-012	LOCKNUT, CONDUIT 1/2	3.00	EA		10		1	S	17.0	P	1/1/2000	12/31/2010
253-004L	WSHR,FLT #4 SS .312 OD LP	4.00	EA		15		1	S	18.0	P	1/1/2000	12/31/2010
254-.312	WSHR SPLIT #4 SS	4.00	EA		12		1	S	19.0	P	1/1/2000	12/31/2010
254-006	LOCKWSHR SPLIT #6	4.00	EA		13		1	S	20.0	P	1/1/2000	12/31/2010

R30410  
SR0000

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Single Level Bill of Material Report

Date - 2/20/2003

Time - 13:52:56

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Parent Item	Parent Description	Batch Quantity		Bubble						Effective	
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255-006-018	SPCR HEX ALU 6-32X2-1/4	4.00	EA	8		1	S	21.0	P	1/1/2000	12/31/2010
257-009	WASHER,SEALNG 1/2 CONDUIT	3.00	EA	11		1	S	22.0	P	1/1/2000	12/31/2010
375-018	CONN, BNC (RG-59)	1.00	EA		SHIPPING KIT	1	S	23.0	P	1/1/2000	12/31/2010

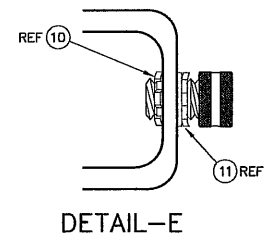
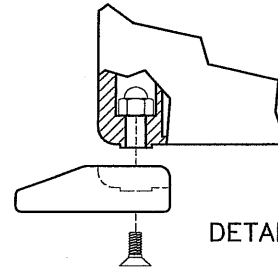
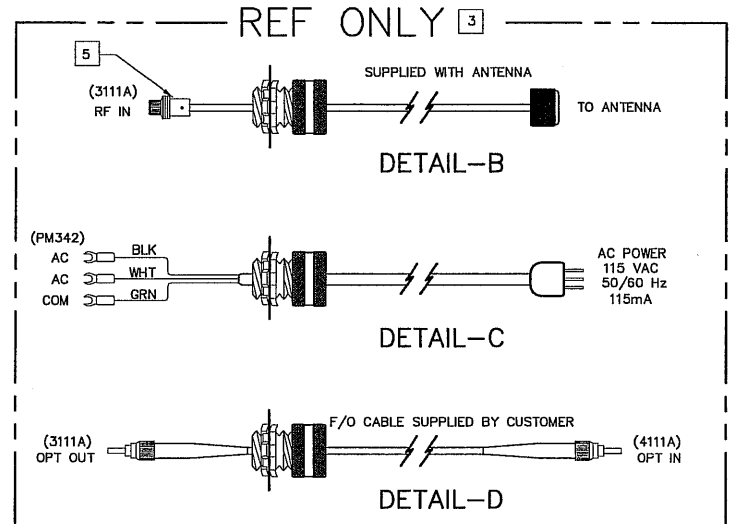
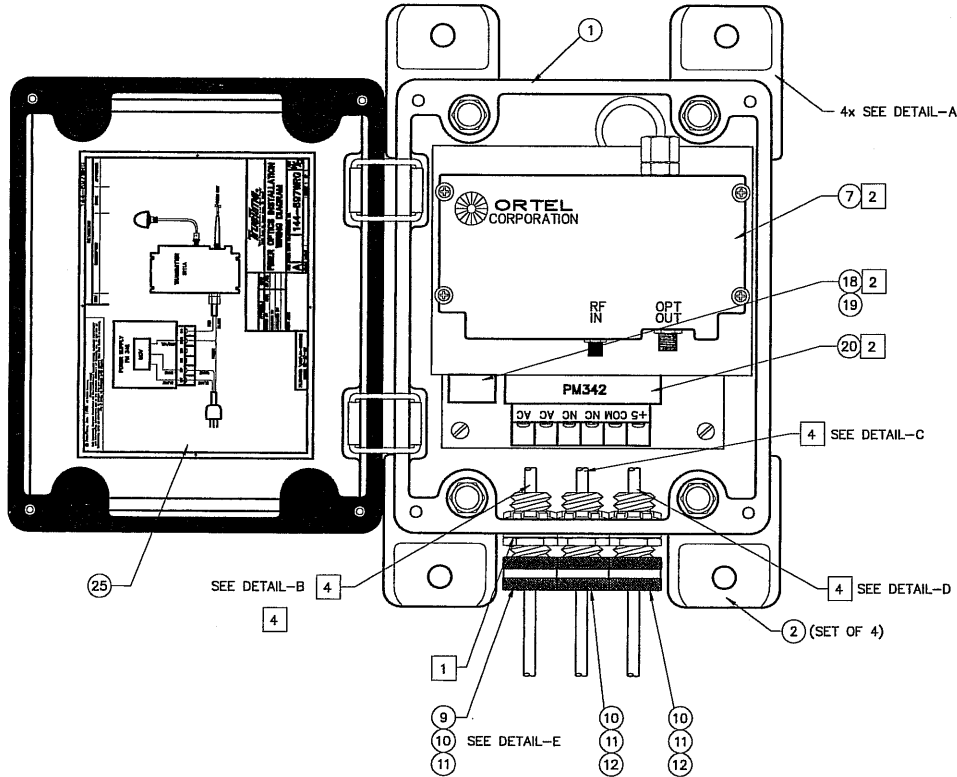
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REVISIONS

REV	DESCRIPTION	DATE	APPROVED



- 5 AT CUSTOMER SITE, CUT OFF ANTENNA CABLE'S BNC END, THEN INSTALL INTO FIBER OPTIC CASE. INSTALL BNC TO ANTENNA CABLE.
- 4 CABLE MAY REQUIRE RTV/SILICONE AT CUSTOMER INSTALLATION.
- 3 CABLES TO BE INSTALLED AT CUSTOMER SITE. DO NOT INSTALL AT TRUETIME. SEE DWG SHEET 3.
- 2 FOLLOW ASSEMBLY INSTRUCTIONS SHOWN ON SHEET 2.
- 1 INSTALL WITH BROADEST PART OF WASHER TOWARDS WALL OF ENCLOSURE. SEAL THREADS WITH 5 MINUTE EPOXY.

NOTES: UNLESS OTHERWISE SPECIFIED.

FILENAME: \100\44-697-1A  
DATE: 08-12-99

CONTRACT NO.	
APPROVALS	DATE
DRAWN BY RNR	8/99
CHECKED BY	
APPROVED BY	

**TrueTime**  
"Where Customer Satisfaction Is our Highest Priority"  
2835 Duke Ct. Santa Rosa, CA 95407

**ASSY, FIBER OPTIC CASE**

NEXT ASSY	SIZE	CODE IDENT NO.	DRAWING NO.	REV
	B		144-697-1	N/C
SCALE NONE		SHEET 1 OF 3		

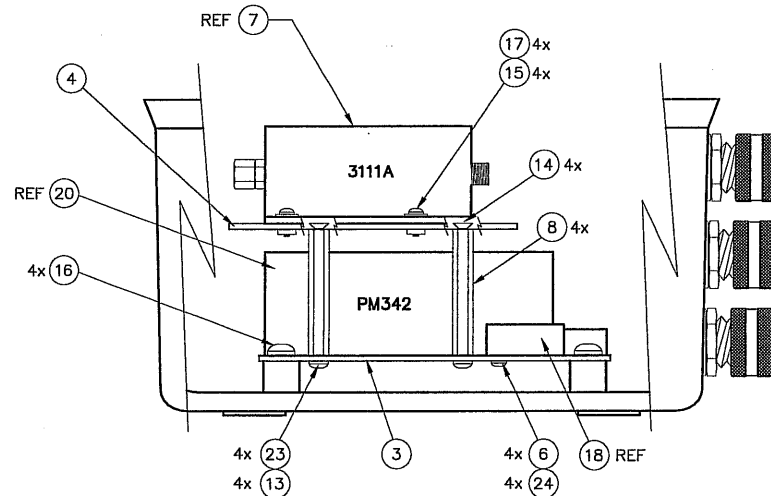
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### ASSEMBLY INSTRUCTIONS

1. MOUNT PWR SUPPLY (ITEM 20) TO BOTTOM MOUNTING PLATE (ITEM 3) USING ITEMS 6 & 24.
2. MOUNT FOUR SPACERS (ITEM 8) TO BOTTOM MOUNTING PLATE (ITEM 3) USING ITEMS 23 & 13.
3. MOUNT TOP MOUNTING PLATE (ITEM 4) TO SPACERS (ITEM 8) USING ITEM 14.
4. MOUNT MOV (ITEM 18) TO BOTTOM PLATE (ITEM 3) USING DOUBLE-SIDED TAPE (ITEM 19).
5. LOOSELY MOUNT FOL XMTR (ITEM 7) TO TOP MOUNTING PLATE (ITEM 4) USING TWO (OF FOUR) ITEMS 15 & 17.
6. REFER TO WIRING DIAGRAM (SHT 3) TO CONNECT SUPPLY WIRING FROM FOL XMTR (ITEM 7) TO PWR SUPPLY (ITEM 20).
7. PLACE BOTTOM MOUNTING PLATE (ITEM 3) INTO FO CASE (ITEM 1) AND FASTEN TWO (OF FOUR) ACCESSIBLE MOUNTING HOLES USING ITEM 16.
8. REMOVE LOOSE MOUNTING HARDWARE (ITEMS 17 & 15) FOR FOL XMTR (ITEM 7) AND GENTLY MOVE FOL XMTR (ITEM 7) FORWARD IN ORDER TO MOUNT THE REMAINING TWO BOTTOM PLATE MOUNTING HOLES USING ITEM 16. TIGHTEN THROUGH TOP MOUNTING PLATE (ITEM 4) ACCESS HOLES.
9. REMOUNT AND TIGHTEN FOL XMTR (ITEM 7) TO TOP MOUNTING PLATE (ITEM 4) USING ITEMS 15 & 17.



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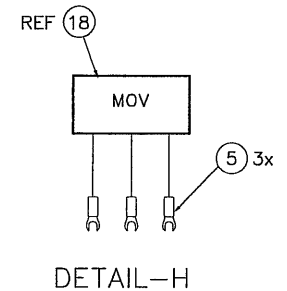
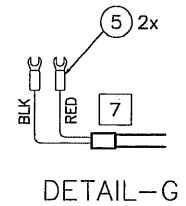
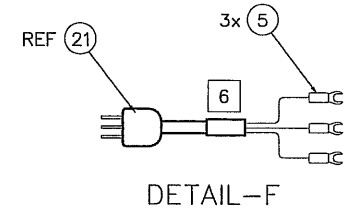
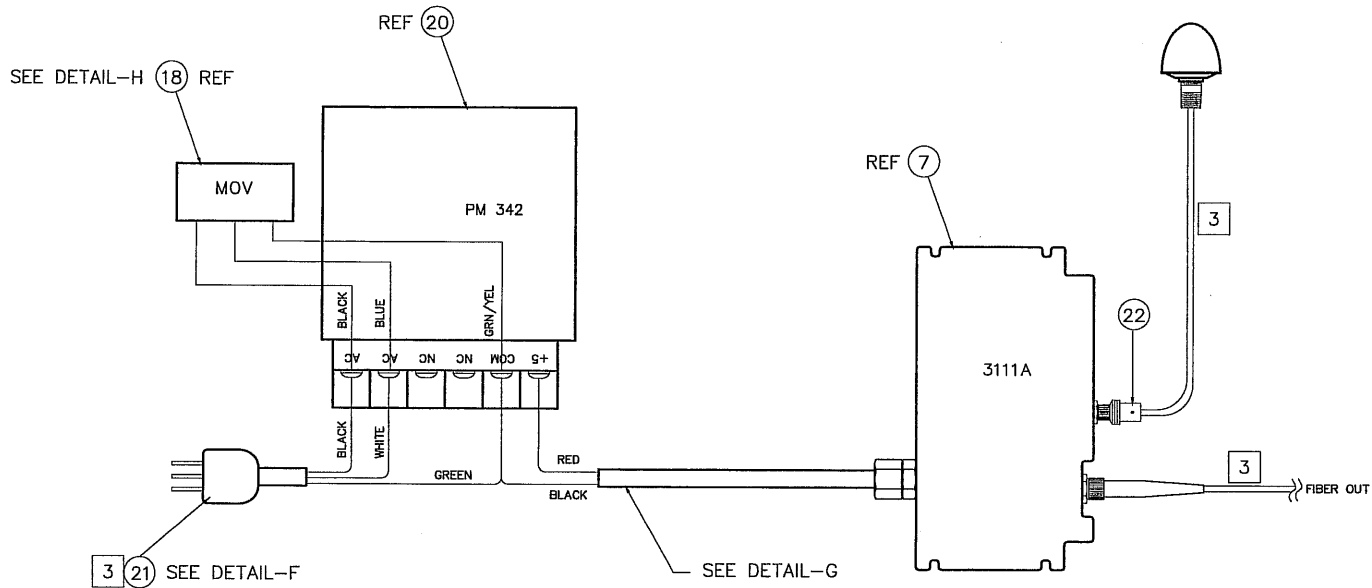
SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		144-697-1	N/C

FILENAME: \\100\44-697-1B  
DATE: 08-12-99

SCALE NONE

SHEET 2 OF 3





- 7 CUT OFF ALL CONDUCTORS EXCEPT RED AND BLACK AND ADD HEAT SHRINK AS SHOWN.
- 6 CUT BACK SUPPLY CORD APPROXIMATELY 3 INCHES TO EXPOSE 3 CONDUCTOR AC LINE POWER. ADD HEAT SHRINK AS SHOWN.

NOTES: CONT'D

FILENAME: \\100\44-697-1C  
DATE: 08-05-99

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SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		144-697-1	N/C
SCALE NONE		SHEET 3 OF 3	

MAX \* BILL OF MATERIALS \* SINGLE-LEVEL EXPLOSION BY PART IDENTIFIER W/REFERENCE

PART IDENTIFIER	DESCRIPTION 1	DESCRIPTION 2	EFF DATE	ECN #	QTY/ASSY	REV UOM LVL	REFERENCE DESCRIPTION
144-697-1	FIBER OPTIC INSTL KIT	F/O & PWR SUP INSTALLED				EA	
0000-APPROVAL	PARTS LIST APPROVAL		000000		1.0000	EA	JG/82 8/99
0000-PL	PARTS LIST REV LEVEL		000000		1.0000	EA	REV N/C (08-12-99)
0000-PRINT	REFERENCE PRINT		000000		1.0000	EA	144-697-1 REV N/C
012-003	150V 10A MOV ASSY	TRI-MAG MOV 150-104	000000		1.0000	EA	18
048-005	MODULE, TRANSMITTER FOL	ORTEL 3111A-001-002-003	000000		1.0000	EA	07
048-007	PATCHCORD, FIBER OPTIC 1M	FIS S3-77S-1-APC	000000		1.0000	EA	SHIPPING KIT/TEST CABLE
074-002	STRAIN RELIEF, CABLE	APPLETON CG-1850	000000		1.0000	EA	09
074-003	STRAIN RELIEF, CABLE	APPLETON CG-3150	000000		2.0000	EA	12
088-001	PWR SUP 5VDC 5W	COMP PROD PM342	000000		1.0000	EA	20
093-694-1	CASE FIBER OPTIC	FAB/PAINT SCREEN	000000		1.0000	EA	01
093-694FT	CASE MTG FEET (SET OF 4)	HOFFMAN A-50MFK	000000		1.0000	LT	02
206-695	PLT, F/O WEATHERPROOF BOX	FAB (BOTTOM PLATE)	000000		1.0000	EA	03
206-696	PLT, F/O WEATHERPROOF CASE	FAB (TOP PLATE)	000000		1.0000	EA	04
240-004-002	SCREW PH PN SS 4-40X1/4	SCREW PAN	000000		4.0000	EA	06
240-004-003	SCREW PH PN SS 4-40X3/8	SCREW PAN	000000		4.0000	EA	17
240-006-002	SCREW FF PN SS 6-32X1/4	SCREW PAN HEAD, SLOTTED	000000		4.0000	EA	23
240-010-003	SCREW PH BH SS 10-32X3/8	AROW SBM-10F06-S-0 (NAV)	000000		4.0000	EA	16
241-006-002	SCREW PH FH SS 6-32X1/4	BUY/USE ONLY 100 DEGREE	000000		4.0000	EA	14
252-012	LOCKNUT, CONDUIT 1/2	T & B 141	000000		3.0000	EA	10
253-004L	WSHR, FLT #4 SS .312 OD LP	AROW FW-960-C-4-M	000000		4.0000	EA	15
254-.312	WSHR SPLIT #4 SS	STAINLESS	000000		4.0000	EA	24
254-006	LOCKWSHR SPLIT #6	SPC TECH WLS-06-018-SZ	000000		4.0000	EA	13
255-006-018	SPCR HEX ALU 6-32X2-1/4	RAF# 2130-632-A-0	000000		4.0000	EA	08
257-009	WASHER, SEALNG 1/2 CONDUIT	T & B 5262	000000		3.0000	EA	11
273-022	LUG SPADE AWG 22-16 NO.6	AMP 8-34541-1	000000		8.0000	EA	05
290-001	TAPE FOAM DBL SIDE.5X1/16	3M# Y-4950	000000		0.2000	SI	19
326-001	SHRINK TUBING CLR 3/32 IN	MOUSER 5174-13323	000000		0.3000	FT	APPLY PER DWG NOTES
326-006	SHRINK TUBING CLR 3/8 IN	MOUSER 5174-1383	000000		0.1000	FT	APPLY PER DWG NOTES
332-002	CORD POWER	BELDEN 17250	000000		1.0000	EA	21 (SHIPPING KIT)
375-005	CONN BNC SCREW ON	AMPHENOL 31-002	000000		1.0000	EA	SHIPPING KIT
381-018	ADPTR, SMA PLUG TO BNC FEM	PASTERNAK PE9074	000000		1.0000	EA	22
400-097	LABEL, F/O NEMA CASE	144-697WRG LAMINATED-NAV	000000		1.0000	EA	25 ATTACH INSIDE LID
LA	LABOR ASSEMBLY COST HRS		000000		0	EA	
LT	LABOR TEST COST HOURS		000000		0	EA	

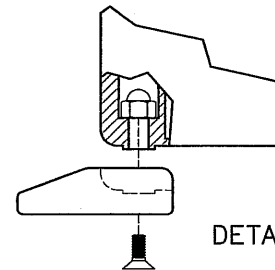
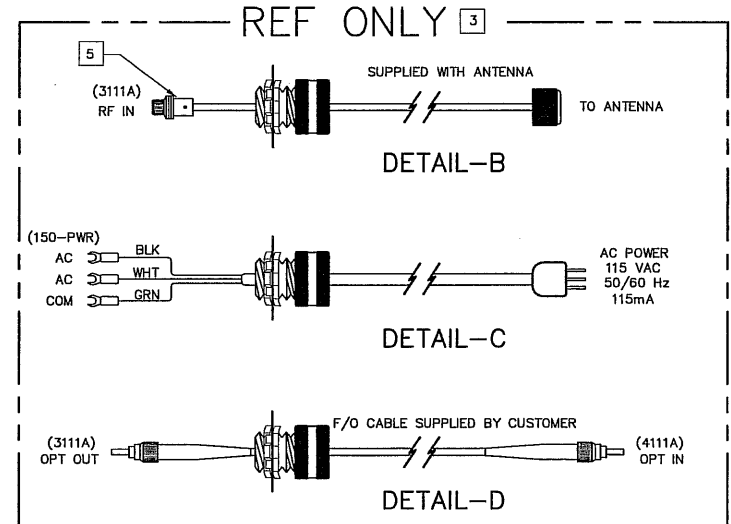
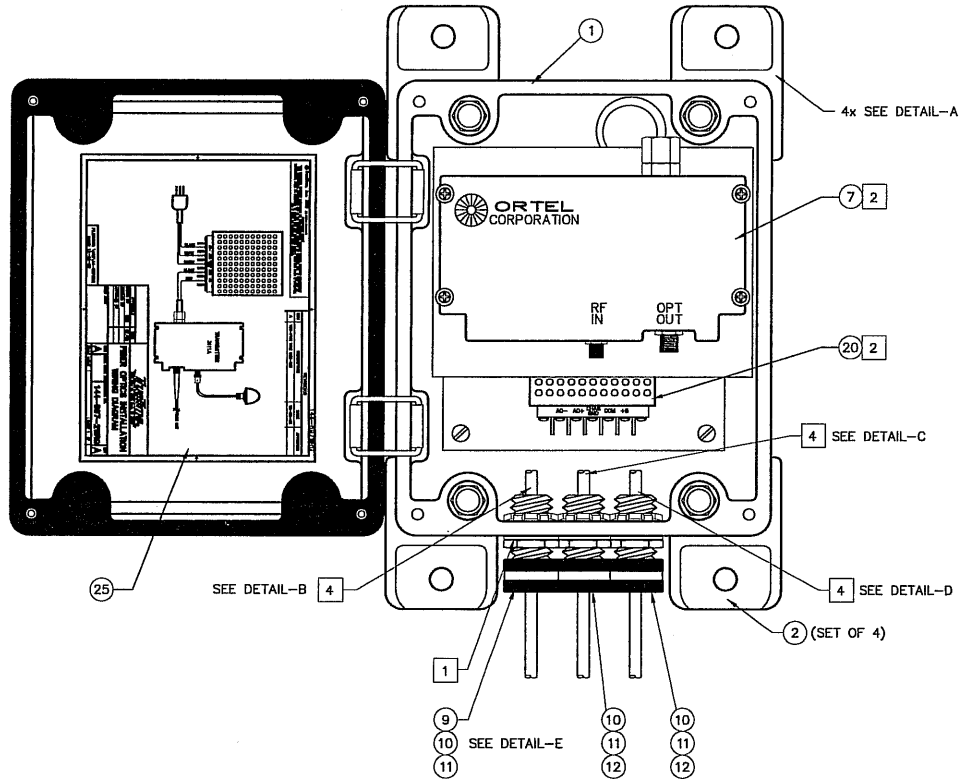
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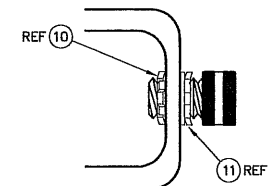
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REVISIONS

REV	DESCRIPTION	DATE	APPROVED



DETAIL-A



DETAIL-E

- 5 AT CUSTOMER SITE, CUT OFF ANTENNA CABLE'S BNC END, THEN INSTALL INTO FIBER OPTIC CASE. INSTALL BNC TO ANTENNA CABLE.
- 4 CABLE MAY REQUIRE RTV/SILICONE AT CUSTOMER INSTALLATION.
- 3 CABLES TO BE INSTALLED AT CUSTOMER SITE. DO NOT INSTALL AT TRUETIME. SEE DWG SHEET 3.
- 2 FOLLOW ASSEMBLY INSTRUCTIONS SHOWN ON SHEET 2.
- 1 INSTALL WITH BROADEST PART OF WASHER TOWARDS WALL OF ENCLOSURE. SEAL THREADS WITH 5 MINUTE EPOXY.

NOTES: UNLESS OTHERWISE SPECIFIED.

FILENAME: \\100\44-697-2A  
DATE: 12-06-99

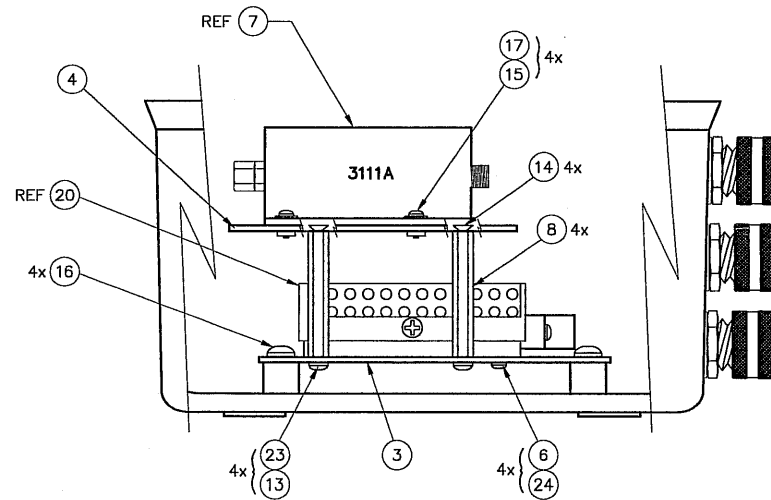
CONTRACT NO.		<p>Where Customer Satisfaction is our Highest Priority 2835 Duke Ct. Santa Rosa, CA 95407</p>			
APPROVALS	DATE				
DRAWN BY RNR 8/99 CHECKED BY [Signature] 12/99 APPROVED BY [Signature] 12/99					
NEXT ASSY		SIZE	CODE IDENT NO.	DRAWING NO.	REV
		B		144-697-2	N/C
		SCALE NONE		SHEET 1 OF 3	

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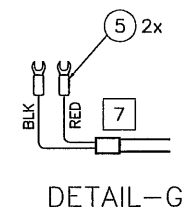
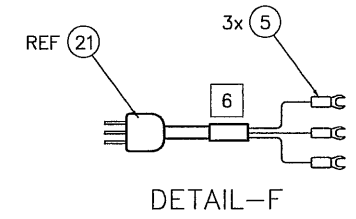
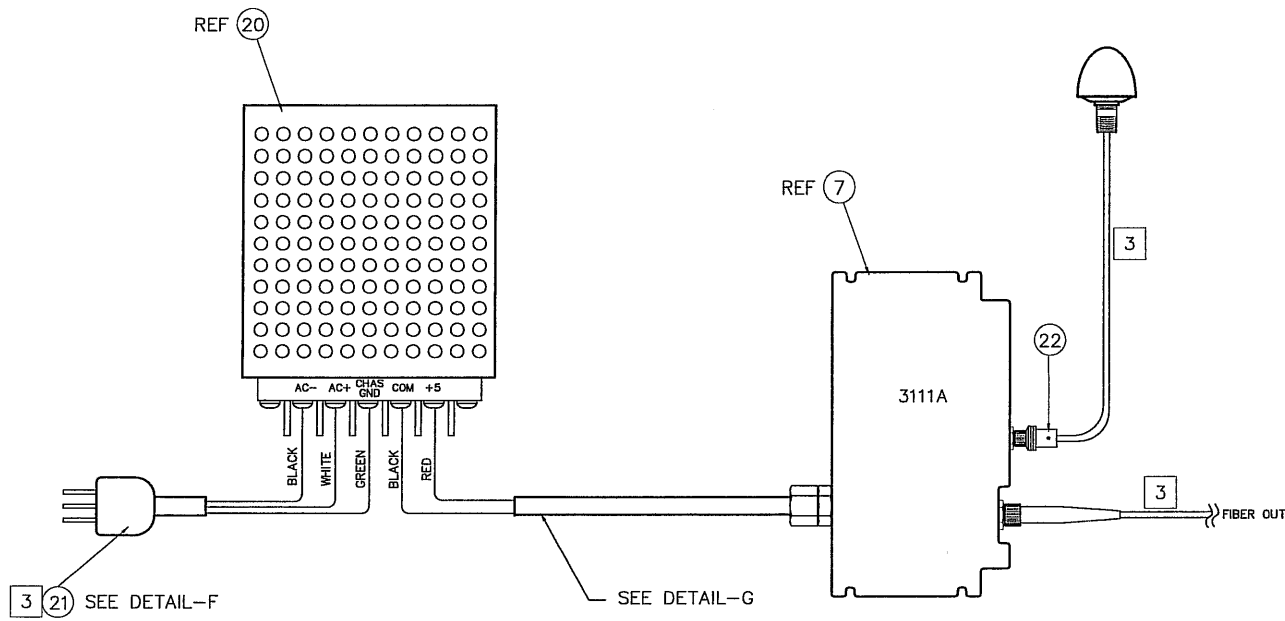


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SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		144-697-2	N/C
SCALE NONE		SHEET 2 OF 3	

FILENAME: \\100\44-697-2B  
DATE: 12-03-99



- 7 CUT OFF ALL CONDUCTORS EXCEPT RED AND BLACK AND ADD HEAT SHRINK AS SHOWN.
- 6 CUT BACK SUPPLY CORD APPROXIMATELY 3 INCHES TO EXPOSE 3 CONDUCTOR AC LINE POWER. ADD HEAT SHRINK AS SHOWN.

NOTES: CONT'D

FILENAME: \100\44-697-2C  
DATE: 12-03-99

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SIZE	CODE IDENT NO.	DRAWING NO.	REV
B		144-697-2	N/C
SCALE NONE		SHEET 3 OF 3	

R30410  
SR0000

Symmetricom  
Single Level Bill of Material Report

ORIGINAL

Date - 2/19/2003  
Time - 16:07:46  
Page - 1 *JG*

Parent Item Component Item	Parent Description Component Description	Batch Quantity Quantity Per	Bubble UM	Seq No	Remarks	Level	Ty	Seq	T	Effective	
										From	Thru
144-697-2	FIBER OPTIC INSTL KIT		EA	Type	M						
0000-PL	PARTS LIST REV LEVEL	1.00	EA		REV N/C (12-06-99)	Draw	1	S	2.0	0	1/1/2000 12/31/2010
0000-PRINT	REFERENCE PRINT	1.00	EA		144-697-2 REV N/C		1	S	3.0	0	1/1/2000 12/31/2010
048-005	MODULE, TRANSMITTER FOL	1.00	EA	7			1	S	4.0	P	1/1/2000 12/31/2010
048-007	PATCHCORD,FIBER OPTIC 1M	1.00	EA		SHIPPING KIT/TEST CABLE		1	S	5.0	P	1/1/2000 12/31/2010
074-002	STRAIN RELIEF, CABLE	1.00	EA	9			1	S	6.0	P	1/1/2000 12/31/2010
074-003	STRAIN RELIEF, CABLE	2.00	EA	12			1	S	7.0	P	1/1/2000 12/31/2010
093-694-1	CASE FIBER OPTIC	1.00	EA	1			1	S	8.0	M	1/1/2000 12/31/2010
093-694FT	CASE MTG FEET (SET OF 4)	1.00	LT	2			1	S	9.0	P	1/1/2000 12/31/2010
150-PWR	FINAL ASSY PWR SUP ENCLOSURE	1.00	EA	20			1	S	10.0	M	1/1/2000 12/31/2010
206-695	PLT,F/O WEATHERPROOF BOX	1.00	EA	3			1	S	11.0	P	1/1/2000 12/31/2010
206-696	PLT,F/O WEATHERPROOF CASE	1.00	EA	4			1	S	12.0	P	1/1/2000 12/31/2010
240-004-002	SCREW PH PN SS 4-40X1/4	4.00	EA	6			1	S	13.0	P	1/1/2000 12/31/2010
240-004-003	SCREW PH PN SS 4-40X3/8	4.00	EA	17			1	S	14.0	P	1/1/2000 12/31/2010
240-006-002	SCREW PH PN SS 6-32X1/4	4.00	EA	23			1	S	15.0	P	1/1/2000 12/31/2010
240-010-003	SCREW PH BH SS 10-32X3/8	4.00	EA	16			1	S	16.0	P	1/1/2000 12/31/2010
241-006-002	SCREW PH FH SS 6-32X1/4	4.00	EA	14			1	S	17.0	P	1/1/2000 12/31/2010
252-012	LOCKNUT, CONDUIT 1/2	3.00	EA	10			1	S	18.0	P	1/1/2000 12/31/2010
253-004L	WSHR,FLT #4 SS .312 OD LP	4.00	EA	15			1	S	19.0	P	1/1/2000 12/31/2010
254-.312	WSHR SPLIT #4 SS	4.00	EA	24			1	S	20.0	P	1/1/2000 12/31/2010

Parent Item Component Item	Parent Description Component Description	Batch Quantity Quantity Per	UM	Bubble Seq No	Remarks	Level	Ty	Seq	T	Effective From	Thru
254-006	LOCKWSHR SPLIT #6	4.00	EA	13		1	S	21.0	P	1/1/2000	12/31/2010
255-006-014	SPCR AL HX F-F 6-32X1-3/4	4.00	EA	8		1	S	22.0	P	1/1/2000	12/31/2010
257-009	WASHER,SEALNG 1/2 CONDUIT	3.00	EA	11		1	S	23.0	P	1/1/2000	12/31/2010
273-022	LUG SPADE AWG 22-16 NO.6	8.00	EA	5		1	S	24.0	P	1/1/2000	12/31/2010
326-001	SHRINK TUBING CLR 3/32 IN	.30	FT		APPLY PER DWG NOTES	1	S	25.0	P	1/1/2000	12/31/2010
326-006	SHRINK TUBING CLR 3/8 IN	.10	FT		APPLY PER DWG NOTES	1	S	26.0	P	1/1/2000	12/31/2010
332-002	POWER CORD	1.00	EA	21	SHIPPING KIT	1	S	27.0	P	1/1/2000	12/31/2010
375-005	CONN BNC SCREW ON	1.00	EA		SHIPPING KIT	1	S	28.0	P	1/1/2000	12/31/2010
381-018	ADPTR,SMA PLUG TO BNC FEM	1.00	EA	22		1	S	29.0	P	1/1/2000	12/31/2010
400-103	LABEL, F/O INSTL KIT	1.00	EA	25	ATTACH INSIDE LID	1	S	30.0	M	1/1/2000	12/31/2010