XMM Optical Monitor

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MSSL *XMM*OM System Level Harness Plan

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1. Introduction

This document defines the build standard and characteristics of the OM external and internal harnesses.

It includes or references all the information required to ensure compatibility with the spacecraft.

It is intended that this document does not repeat specifications or information belonging in the reference documents.

2. Reference Documents

[1] XMM Experiment Interface Document, Part A, RS-PX-0016, Issue 4, 3-Oct-94

[2] XMM Experiment Interface Document, Part B, RS-PX-0018, Issue 4, to be issued

[3] XMM-OM Electrical Interface Specification, XMM-OM/MSSL/SP/0007.05, 20-Sep-95

[4] XMM-OM External Harness, XMM-OM/MSSL/SP/0045.03, to be issued

[5] XMM-OM Internal Harness, XMM-OM/MSSL/SP/0044, to be issued

3. Spacecraft Harness

3.1. Overall Shields

There will be no overall shields. Power interface signals to OM1 will be carried using shielded twisted pair. These shields will be commoned and connected to the structure.

The Data Bus Interface (DBI) with OM2 will be carried using individually shielded wires. The shields will be commoned and connected to the structure.

Power signals require 20 awg

Substitution Heater signals require 22 awg

Keep Alive signals require 26 awg in high strength copper alloy

Data signals require 28 awg in high strength copper alloy.

4. External Harness - OM3a and OM3b

4.1. EM Harness

The EM Harness is to be built as only one redundant half. The PRIME, OM3a half of the harness will be built connecting OM1 with OM2a.

4.2. Overall Shields

There will be no overall shields. All signals including power, will be carried using shielded twisted pair (TSP). These shields will be commoned and connected to the structure.

DEM Power signals require 20 awg

Keep Alive signals require 26 awg in high strength copper alloy

Data signals require 28 awg in high strength copper alloy.

4.3. Foil Tape

The OM project was offered foil tape for making up screens.

Foil tape will be required for the internal harness.

4.4. Screen Terminations

Each screen from TSP cable will be soldered to 26 awg wire and connected to a separate 26 awg crimp pin in the connector.

4.5. OM1 and OM3 Connector Identification

Connectors on OM1 will be numbered sequentially such that:

J01a	becomes	J01
J02a	"	J02
J03a	"	J03
J01b	"	J04
J02b	"	J05
J03b	"	J06

4.6. OM Required Interface Connectors at MSP

Component Identifier	Ways	Description	Part Number	Mass
M13P	22	Plug '13'	MS27656T13F35PN	28+22*0.08
M15P	34	Plug '15'	MS27656T15F35PN	34+37*0. 08
M13S	22	Receptacle '13'	MS27467T13F35SN	28+22*0.26
M15S	34	Receptacle '15'	MS27467T15F35SN	34+37*0.26

	Test	STM	QM	EM	FM	FS	Attrition	Total
OM3 Models	-	*2*	*0*	*1*	*2*	*1*	-	*6*
Plug '13'	-	2	0	1	2	1	1	7
Plug '15'	-	2	0	1	2	1	1	7
Receptacle '13'	1	0	0	0	0	0	1	2
Receptacle '15'	1	0	0	0	0	0	1	2
Need Date	Dec-95	Dec-95	-	Oct-96	Aug-97	Aug-97	Dec-95	

4.7. Backshells

There will be no EMC backshells for any of the external harness connectors. Strain relief cable-clamps will be used.

4.8. Cable Clamps

The following range of cable clamps are base-lined, from ESA/SCC 3401/022:

Shell Size (Ways)	Round Clamp		60° Angled Clamp		Mass
	SCC Variant	Component Id.	SCC Variant	Component Id.	g
E (9)	29	di9cc	60	di9acc	9
A (15)	30	di15cc	61	di15acc	11
B (25)	31	di25cc	62	di25acc	12
C (37)	32	di37cc	63	di37acc	15
D (50)	33	di50cc	64	di50acc	16

4.9. Connector Types

OM propose to use Positronic stainless steel "Rhapso-D" series connectors (MIL-C-24308, MIL-C-39029) for all models and connectors except those chassis connectors that mate with the spacecraft harness (OM1-J01, J02, J03, J04, J05, J06, OM2a-J03, OM2b-J03). Spacecraft harness mating connectors will be compatible types.

OM connector Component Identifiers are made up according to the following scheme:

<di OR d> <ww> <part_type> OR

<di OR d> <contact_type> <gauge>

di - refers to 'instrument standard' D-types

d - refers to 'spacecraft standard' D-types

ww - is the number of ways

part_type is one of:
f - female removable contact shell
m - male removable contact shell
fss - female straight solder spills
mss - male straight solder spills
sv - saver
bs - backshell
cc - cable clamp
acc - angled cable clamp
msl - male screw lock
fsl - female screw lock

contact_type is one of:
-pin - male removable crimp
-skt - female removable crimp
pinskt - saver removable contact

gauge - refers to the largest size wire that the contact will take.

4.10. Wire Types

OM propose to use wire to ESA/SCC specifications 3901/002 and/or 3901/019.

From manufacturers Gore, the characteristics of 3901/019 wire is as follows:

Gauge[1]	Strands/Diameter mm	Nominal Cross Section /mm^2	Resistance Ω/km	Part Number
30	*7/0.102*	*0.057*	*383*	*not used on OM*
28	7	0.09	258	SPL10-28
26	19	0.15	170	SPL10-26
24	19	0.25	120	SPL10-24
22	19	0.4	63	SPL10-22
20	19	0.6	35	SPL10-20
18				n/a
16	*19*	*1.2*	*15*	*not used on OM*

[1] Note 30 and 28 Gauges are equivalent to AWG. Others are ISO standard that are close to but not exactly the same as AWG.

Also available are TSP cable types. The characteristics of each internal core is as per the table above. The part numbers for these are constructed as follows.

SPL [D] <number of cores> <number of screens> - <gauge>

without the optional D, all SPLnn-nn cables are to ESA/SCC 3901-019.

with the optional D, all SPLDnn-nn include a drain wire inserted inside the screen to enable crimp termination, as per ESA/SCC 3901-021.

4.11. Fully Populating Connectors

For crimp contacts, unused ways in connectors will be filled with the largest size contacts used in the connector.