XMM Optical Monitor

MULLARD SPACE SCIENCE LABORATORY
UNIVERSITY COLLEGE LONDON

Author: Nigel R Bray

XMM OM Component Selection Control Plan

DOCUMENT: XMM-OM/MSSL/SP/0074.03

27-Nov-95

For MSSL Distribution Only.

Document Record

Prev. Issue	Date	Changes
1	26-Mar-95	New section 7 on data entry.

Document Statistics

Document File Name:	MSSLPRTS.DOC
Revision:	25
Application:	Microsoft Word 6 for Windows
Machine: File-System and Directory:	mssli7 d:\projects\xmm-om______
Included files:	none
Pasted Pages:	none
Print Date (this):	27-Nov-95 @ 14:46
Printer:	Postscript

Table of Contents

Table of Figures

1. Introduction

This document outlines the procedures used in the ^{XMM}OM project to progress the selection, approval and purchase of flight electronic components (parts).

Detailed procedures are included for the activities performed at MSSL.

Knowledge of the ESA project document PX-RS-0017 is necessary to understand the requirements for parts used on XMM.

In order to discuss the various procedures for flight parts, the following parts ‘life cycle’ can be considered.

Design > Parts > QA > ESA > Quotes > Purchasing > Goods Inwards > Stores > Datapack

Because there are stringent requirements on the quality of electronic components for use on XMM and more than on other projects performed at MSSL, significant effort is performed at the design stage to establish the suitability of a part intended for flight use.

A part can only be deemed suitable either if it is to be procured in a qualified form, or a Parts Approval Document (PAD) is accepted and ‘signed off’ by ESA (per PX-RS-0017). The designer ensures that all parts are available, affordable, meet the component derating requirements, and the radiation tolerance requirements (as per PX-RS-0017) and is involved in preparing the parts definitions as required by ESA and used to obtain quotes.

A system of generating the Declared Components List (DCL) and PADs for ESA is implemented using a Parts database and incorporating all units within ^{XMM}OM, not just those at MSSL.

Parts list information is extracted from the Parts database by unit, procurement group, the whole instrument, or combined with local RGS lists. These reports are used to feedback information for checking by the originator, sending to suppliers for quotes and sharing details between collaborators.

A consolidated MSSL FM and FS parts requirements list is generated from the current issue of each individual parts list. This list is the reference against which flight parts orders are controlled.

When flight parts are received, they are stored in kits. These kits are of parts to make a single assembly. An assembly could be a PCB or harness. Where there are duplicate assemblies within an instrument model, these have separate kits. Assemblies for each model FM and FS have separate kits. Attrition parts will be held in an ‘Attrition Kit’.

E.g. The HVPSU has a kit name ‘brd1’ and there are 2 HVPSUs per FM and FS model. The kits will be labeled: FM-HVPSU-brd1-A, FM-HVPSU-brd1-B, FS-HVPSU-brd1-A, FS-HVPSU-brd1-B.

The logbook for the FM-HVPSU1, will show that it is built from the kits FM-HVPSU-brd1-A, FM-HVPSU-brd2-A, FM-HVPSU-brd3-A, etc. NOTE that this may not necessarily be the case, FM-HVPSU-brd1-B could be used instead of FM-HVPSU-brd1-A. Additionally, the logged configuration of each unit will include the serial numbers of the PCBs associated with the kits used on that board.

A file of all the paperwork received for flight parts used on MSSL units is kept at MSSL along with a record of in which kits those parts are used. If parts are serial numbered, the kit and reference designator (R1, P01a, etc.) are listed for each part. From logbooks, a record of which kits are used in each unit is kept with this file for completeness.

2. Procedures for Defining MSSL/ ^{XMM}OM Electronic Components

(1) Issue of parts list.

The parts list includes the Component Identifier, Quantity and Value, plus optional fields Kit and Item N^{o}. Kit is used if there are more than one sub-assemblies in the unit (PCBs Harnesses etc.), and Item N^{o} is used to order the list according to the designers original.

The parts list is usually generated from a CAD tool.

The parts list is entered into the Parts database with the component identifier selected according to whether the part corresponds to an existing entry or not.

A Parts database printout is given back to the designer for checking.

(2) Definition of part types.

For each part, fields are included for Manufacturer, Description, Generic and Detail Specifications. A table of parts used on each unit is given to the designer for checking and completion.

The Part N^{o}, field is for the Manufacturers reference. NOTE that this is not used for procurement purposes, the Generic and Detail Specifications define the part. The manufacturer’s reference is updated from quotes and delivery notes.

(3) Acquisition or Generation of Generic and Detail Specifications.

If specifications for a part exist, they are obtained for in house reference from the appropriate organisation. E.g. ESA, MIL standards publishers, or the manufacturer.

If the part is not to be purchased to an existing specification then it is generated, either in-house, by an agent or the manufacturer.

(4) Raising of Parts Approval Documents (PADs).

If the part is ESA qualified, and the part is to be purchased to the ESA qualification specifications, then a PAD is only raised when requested by ESA.

In all other cases a PAD is raised, and submitted to ESA for approval. The PAD is updated in collaboration with ESA component quality assurance personnel. Procurement procedures for the flight part are enabled once the PAD has been ‘signed off’ by ESA.

3. Costing of the MSSL OM Components

There is a need to maintain up to date costs for the flight components that we have to procure here at MSSL for the OM.

This information is needed for us to track our intended spending against our budgets.

The model philosophy assumes a ‘Flight Model (redundant)’ and ‘Flight Spare (half of redundant)’.

The first stage in preparing the costs is to complete the Parts List Data.

Then to make contact with each manufacturer to establish who is the point of contact for receiving a request for quotation, with their telephone and fax numbers.

After which send out request for quotations to each manufacturer, listing the components, values and quantities that we require.

4. Purpose of the Parts Database

Components information is held on a database. For those with a computer set-up that can use it, the details are:

Connect using LanMan (only):	net use l: \\mssli7\database
Using Access Workgroup Administrator:	Join... L:\ACCESS\SYSTEM.MDA
Using Access	File-Open: L:\ACCESS\PAD6.MDB

Usernames and passwords are available from nrb.

The Parts database consolidates the various electronics parts lists:

in order to -

generate the ESA required reports for all of ^{XMM}OM.
I.e. the Declared Components List (DCL), and Parts Approval Documents (PADs)

provide basic parts requirement information for MSSL costing and eventual purchasing

reduce parts diversity and identifying common[1] parts for possible combined[2] procurement

in a way that -

maintains static data on Manufacturer, Part N^{o}, Description and Specifications

allows underlying parts lists to be individually modified.

5. Structure of the Parts Database

Key Field

The Component Identifier has a one to one relationship with final manufacturers flight part number and is used as the in-house flight part number with parts lists, ESA reports and schematics.

The Component Identifier is the main key field of the Parts database. It is a unique specific reference to a part or a type of part (having values). It has two to eight characters formed as a recognisable name or an abbreviation of a manufacturers number. It is used as the number to reference and identify parts used in FM and FS hardware. From the Component Identifier full details of the part are available: Manufacturer, Generic and Detail Specifications, PAD data, Manufacturers reference, Usage data.

Hierarchy

Family	Each Series/Component is a member of an ESA defined category.
Series	Associates a number of part types that have a common Generic Specification and if included, PAD.
Component	Unique reference to a part type. May be defined to be a member of a series, and/or to have values.
Values	Limited to a unitless standard electronic component value. E.g. 5k6, 5R6 for resistors.

[1] Parts with the same Component Identifier in the Parts database.

[2] As opposed to Joint or Common procurement where a number of part types are purchased for two or more groups in a single ordering exercise from a frozen parts list.

Relationships

The database consists of a set of tables, where the various fields are linked, as illustrated in the diagram below.

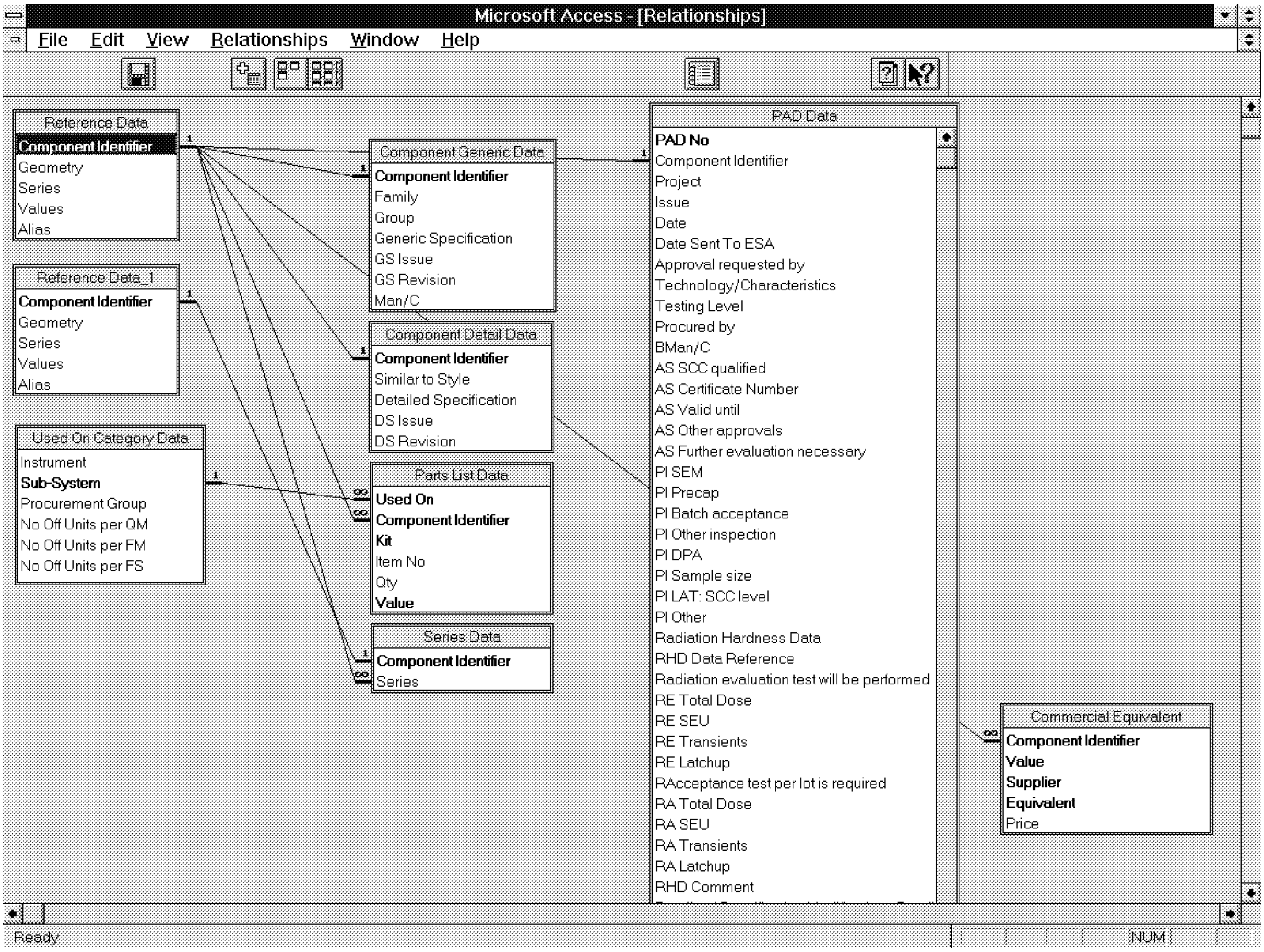

Figure 4.1: Illustration of the Tables and Linked Fields within the Parts Database

The tables are described below.

Reference Data

Contains all the allocated Component Identifiers. Defines whether they require values. Also contains a record of the package type (Geometry), and an equivalent name (Alias). The Alias should be the manufacturers flight part number, excluding any coding that is specific to value. NOTE that the Alias is not tested for uniqueness and is not restricted in format.

The Series field is a marker normally set to No to indicate that the record refers to a part type rather than a series. Thus, identifiers for series names are listed in the Reference Data table under 'Component Identifier'. The Geometry, Values and Alias fields are not used in this case.

The Component Identifier may be changed in the Reference Data table, and all others in the database that are linked to it will be changed too.

Component Generic Data

Has records for all parts that are not in a series, plus one entry for each series.

Component Detail Data

Has records for each part, plus entries for each series if it has a PAD (included as summary data on PAD).

PAD Data

Has records for selected individual parts and some series. A new pad is raised for a component/series manually as necessary. (If a non ESA qualified part is intended for flight use).

Parts List

Has records for each item on each design's parts list. Entries are for:

Unit,	Kit,	Item N^{o},
Component Identifier,	Value,	
Quantity		

The first three entries determine where the component is to be used. A Kit is usually a PCB, Item N^{o} is provided to allow reports to be sorted in the same order as supplied by the designer.

The Value field is restricted to a standard electronic component value format:

nnnXnnn

Where X is the multiplier from p, n, u, m, R, V, k, M, G.

nnn and nnn together are a 2, 3, or 4 digit number with X in the position of the decimal point.

6. Data Entry into Fields of the Parts Database

The database integrity relies upon the quality of the data entered, and also it is very important that the data entered into a particular field is appropriate for that field.

Component Identifier

Use no more than 8 characters, must not be specific to a given value.

Geometry

Very specific name understood and agreed with the EDO.

Series

Yes if there are a group of components that share the same Generic specification. Generic information is then entered under the name of the series to which the components belong. Only one PAD covers all components in a series.

Values

Yes if the component is valued (resistors, capacitors etc.) EVEN if only one value is ever used. Then Value field must be filled in.

Alias = (Manufacturers) Part Number

Exactly as marked on the final flight part this specific number is understood by the manufacturer to fully identify the part. Where the value is normally included the text "value" is used as a placeholder.

Family

Number derived from the ESA/SCC categories.

Generic Specification

As required for the DCL and PAD this is a 'process' and 'test method' specification.

Man/C

Manufacturer/Country. Needs to be consistent with exact same values per manufacturer. The country must be that where the components are manufactured.

Similar to Style = Description

Must include all of: Voltage ratings, tolerances, range of available values, material, technology, logic type, other applicable parameters.

Detail Specification

As required for the DCL and PAD this is a specification which defines the parameters to be tested and their allowable ranges both before and after burn-in.

Used On

One of the Sub-System values in the Used on Category Data

Kit

Field value available for sorting parts requirement into separate groups (e.g. PCB).

Item No

Field value available for sorting parts in the order required by the designed for comparing against the input list.

Qty

Number of parts required in this kit. Quantities for the number of models to be produced and for attrition are allowed for elsewhere.

Value

If the component is valued, then the value must be entered in this field only.

7. Facilities Available from the Parts Database

There is a report 'Components Requirement by Manufacturer Output', which is generated using information from the database and can then be attached to a request for quotation. It prompts for the instrument which is entered as 'om'. The attrition level on parts is entered as 1.1 for 10%. It calculates the number of flight parts according to the data in the 'Used On' table. It always rounds up. The procurement group is entered as 'mssl'. Ideally the part numbers used by the manufacturer will be entered in the Alias field. The report will show such manufacturer codes as upper case, XMM-OM Component Identifiers are used if no manufacturers code is available and is shown in lower case.