

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD DATA ORGANIZATION - UNIGRAPHICS A4

SECTION INDEX

1 INTRODUCTION	4.3	DETAILED COLLECTOR NAMES
2 FILE MANAGEMENT	4.4	MINIMUM COLLECTOR REQUIREMENTS
2.1 MASTER DATA	4.5	COMPONENT ENTITY NAMING
2.2 COPIED DATA	4.6	REVISION COLLECTOR NAMING
2.3 BULK DATA	4.7	COLLECTOR NAMING - QUICK REFERENCE CHART
2.4 FILE TYPES		
2.5 FILE NAMING	5 EXAMPLE FILE ORGANIZATIONS	
2.6 FILE CLASSIFICATIONS	5.1	SINGLE PART MASTER FILE - MLDES
2.7 FILE APPLICATION	5.2	DETAIL DRAWING FILE - DWGFMT
3 DATA ORGANIZATION	5.3	INTERMEDIATE ASSEMBLY FILE - MLASM
3.1 COLLECTOR USAGE	5.4	SINGLE PART REFERENCE FILE
3.2 LAYER RANGES	5.5	INTERMEDIATE ASSEMBLY REFERENCE FILE
4 COLLECTOR NAMING	APPENDIX A - REQUIRED TOOLS (PROGRAMS)	
4.1 BASE COLLECTOR NAMES		
4.2 BASE COLLECTOR DESCRIPTIONS		

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD DATA ORGANIZATION - UNIGRAPHICS

A4

1 INTRODUCTION. The purpose of this document is to establish a standard methodology for organizing and identifying three dimensional math model data within Unigraphics V10 or later part files.

Every effort has been put forth to make this standard as comprehensive and informative as possible. The standard makes available to every CAD Designer (Operator) the best knowledge of GM authorities on the subjects covered, to the extent that it is pertinent to their work.

The success of this standard depends solely on the Design Group Management. It is important that proper training and discipline be directed, to the CAD Designers (Operators), in the application of this standard until familiarity has been thoroughly established.

CAD Designers (Operators) who are trained to follow this standard will produce Unigraphics CAD files that will be recognized by other users of the same system and be able to be translated to other nonlike C4 Systems with less error and less effort. This also results in math model drawing data being more usable by downstream users. Suppliers and industries which deal with GM also benefit from the use of a common standard, to the ultimate advantage of the division involved.

While it is recognized that there is more than one way to create electronic math models and drawings, this standard has been commissioned by the GM Design Team. As such, the standard is expected to influence decisions concerning practices and procedures that are applicable and to provide clear cut direction in each instance. The standard is not intended to stifle the CAD Designers' (Operators') originality, but rather to furnish an authoritative guide in the mechanics of C4 CAD system data creation so that their abilities may be applied to more important design considerations.

The standard provides for the communication of electronic math model and drawing data across the automotive sector of the GM Corporation and its suppliers. However, conditions peculiar to the individual divisions may necessitate some minor enhancements. The enhancements shall be established by the proper authority in the division involved, after being carefully reviewed with both the customers and suppliers, and must not deem any portion of the standard inoperable.

2 FILE MANAGEMENT. All design data will be managed and maintained systematically by TDMF, referenced by its GM part number, with recorded information as to its evolution and status, (current step or level in the product release process).

2.1 MASTER DATA. Master data is the single controlling three dimensional mathematical definition of a part as it will be manufactured and installed in its vehicle application(s), using a C4 Strategic Partners' System. It is intended that this data exist only once in the TDMF database of the design group responsible for the product, (owners of the data).

2.2 COPIED DATA. Copied data is a duplication of the master data. This will occur when a user, (nonowner of the data),

can not directly access the TDMF database of the design group responsible for the product, (owners of the data). The data is copied and stored in the nonowners TDMF database.

2.3 BULK DATA. Bulk data files may consist of the single controlling 3D mathematical definition of one or more parts, defined by their respective GM part numbers. Annotative type data required to support engineering drawings or engineering layouts of the parts would accompany the mathematical definitions within the same Unigraphics file.

2.4 FILE TYPES. While Unigraphics Version 10 refers to the CAD files it creates as part files, the Data Creation Standard categorizes these files as follows.

2.4.1 Component Part Files. A component part file must contain the single controlling 3D mathematical definition of a single part, defined by its GM part number, as it will be manufactured and installed in its vehicle application(s). The 3D mathematical definition of the part in this file will subsequently be referred to as the Part Master. These files will not contain any annotative type data with the exception of the LOG view, (see Drawing Section for details).

2.4.2 Component Virtual Assembly Files. A component virtual assembly file contains component entities that access part master data from component part files or other component virtual assembly files. These files will not contain any part master data or annotative type data with the exception of the LOG view, (see Drawing Section for details).

2.4.3 Drawing Virtual Assembly Files. A drawing virtual assembly file contains component entities that access part master data from a component part file or a component virtual assembly file and annotative type data including drawing format required to support the engineering drawing of the part, which is also contained in this file. No master part data will reside in a drawing virtual assembly file.

2.4.4 Bulk Data Files. The primary uses for bulk data files are to maintain pre-V10 files and for sharing nonproprietary data. However, these files may be used for specific documented applications requiring this file type.

2.4.4.1 Pre-UG Version 10 Files. Typically, these files will have been created using a version of Unigraphics prior to version 10. These files could be maintained using UG V10 in their pre-V10 data structure. These files could contain part master data and annotative type data required to support an engineering drawing, which is also contained in this file.

2.4.4.2 Nonproprietary Data Sharing. Bulk data files are created to share nonproprietary data from component suppliers with their customers. These files will contain copies of portions of the part master data. These files could contain annotative type data required to support an engineering drawing, which could also be contained in this file.

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD DATA ORGANIZATION - UNIGRAPHICS

A4

2.5 FILE NAMING. The file name consists of five fields separated by periods. The second field is optional, reducing the number of fields to four.

2.5.1 Field One - (Mandatory). The first field (8 characters maximum) is the GM part or drawing number.

2.5.2 Field Two - (When required). The second field identifies the sheet number, multi file indicator, assembly designation, or installed position indicator when used.

2.5.2.1 Sheet Number. Sheet number is used for drawing classifications only.

e.g. S001, S002, S003, etc.

2.5.2.2 Multi File Indicator. Multi file indicators are used when more than one file is required to model a part completely, to contain models in their installed positions or on assembly files that contain partial information about a part (for example, the positioning of a part into it's vehicle position). Multi file indicators can be used for geometry classifications as well as MLASM files.

e.g. A, B, C, etc.

2.5.2.3 Purchased Assembly Items. Items are used for purchased assemblies whose individual parts do not have GM part numbers.

e.g. ITAA, ITAB, etc.

2.5.3 Field Three - (Mandatory). The third field is the file classification. The classification defines the general content of the file.

See 2.6 for available classifications.

2.5.4 Field Four - (Mandatory). The fourth field (4 numeric characters) is the sequence number as defined by the TDMF standard.

2.5.5 Field Five - (Mandatory). The fifth (last) field is the file type. Unigraphics automatically appends a ".PRT" extension to part files.

2.5.6 Example File Names.

```
23456789.ITAA.MLDES.0000.PRT
12345678.A.MLDES.0000.PRT
12345678.B.MLDES.0000.PRT
12345678.MDATA.0000.PRT
12345678.PKG.0000.PRT
34567890.MLDES.0000.PRT
34567890.A.MLASM.0000.PRT
34567890.DWGFMT.0000.PRT
45678901.S001.DWGFMT.0000.PRT
45678901.S002.DWGFMT.0000.PRT
3L123456.LYTFMT.0000.PRT
TL234567.MLASM.0000.PRT
TL345678.MDATA.0000.PRT
```

2.6 FILE CLASSIFICATIONS. The following file classifications are available for product engineering use with Unigraphics.

```
CRITIA (Criteria)
DOCMNT (Document)
DWG (CGM file)
DWGFMT (Drawing Format)
LYTFMT (Layout Format)
MDATA (Bulk Master Data)
MLDES (Master Layout Design)
MLASM (Master Layout Assembly)
MLELEC (Master Layout Electrical)
PKG (Package)
PLANAR (2D Only)
RAPPRO (Rapid Prototype)
SRFPLN (Surface Plan)
STDPRT (Standard Part)
STUDY
```

See Section E, TDMF Standard, for definitions of the above classifications.

2.7 FILE APPLICATION.

2.7.1 Virtual Assembly Files. The Unigraphics virtual assembly files are used to collect component entities that access master part data. These files will not contain geometry if they are used to create displays of assemblies or subassemblies, (i.e., MLASM classification). *This is the standard method for creating and using virtual assembly files with Unigraphics Version 10.* See Figure 2.7.1.

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD DATA ORGANIZATION - UNIGRAPHICS A4

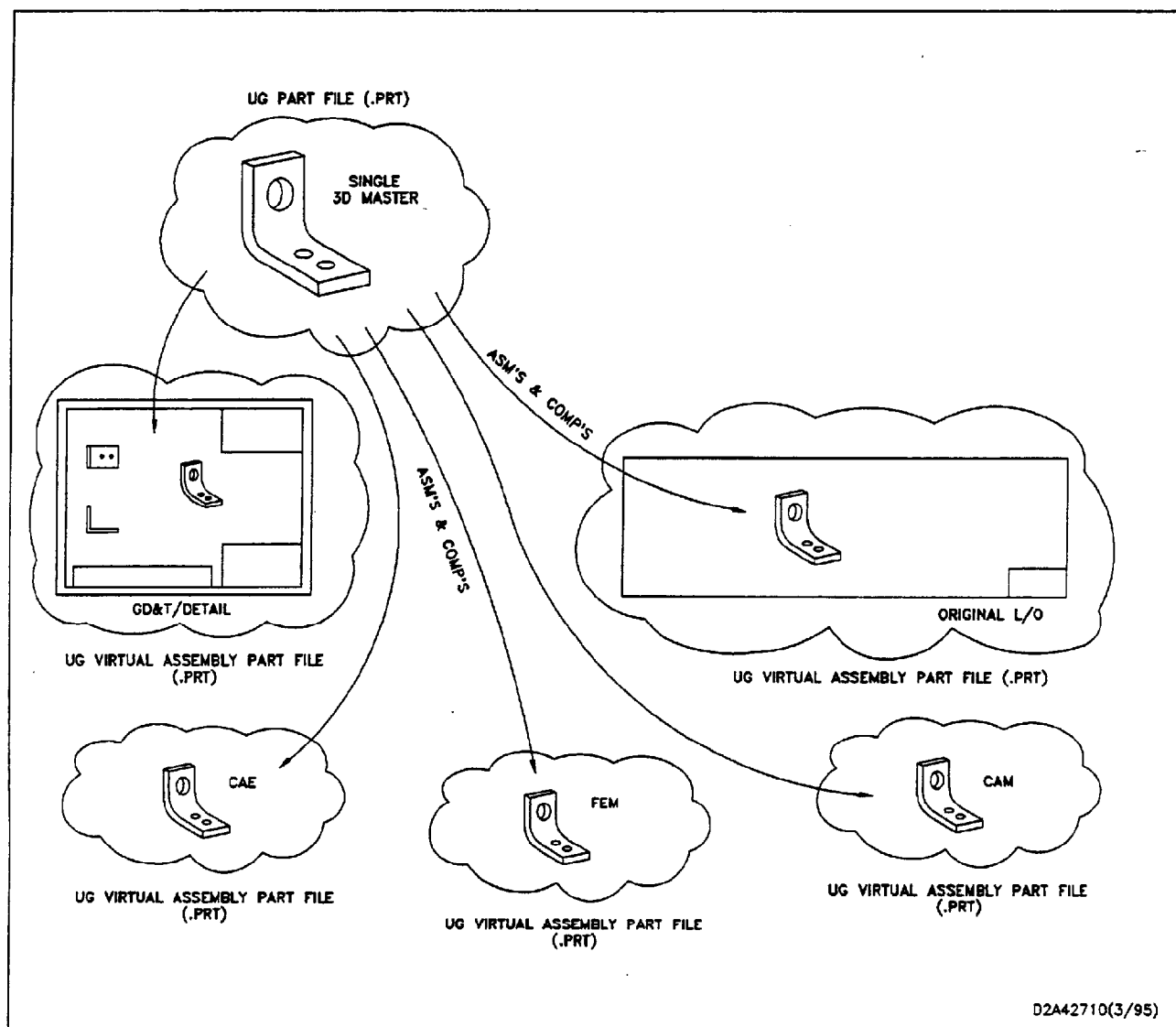


FIGURE 2.7.1

2.7.2 Single Part Master Files. Master Part geometry should be placed on as many layers as required to delineate and manipulate the data. See Figure 2.7.2. The data should then be placed into logical collections and given an appropriate name. Create reference sets in lowest level part files (single part master files) with attributes assigned. See 3.1.4.

For additional information on this process, see Section 3, Data Organization. The corporate minimum category UFUNC Program cat_mgr.uf assigns layers 1 - 4. The examples in this document show various layer configurations.

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD DATA ORGANIZATION - UNIGRAPHICS

A4

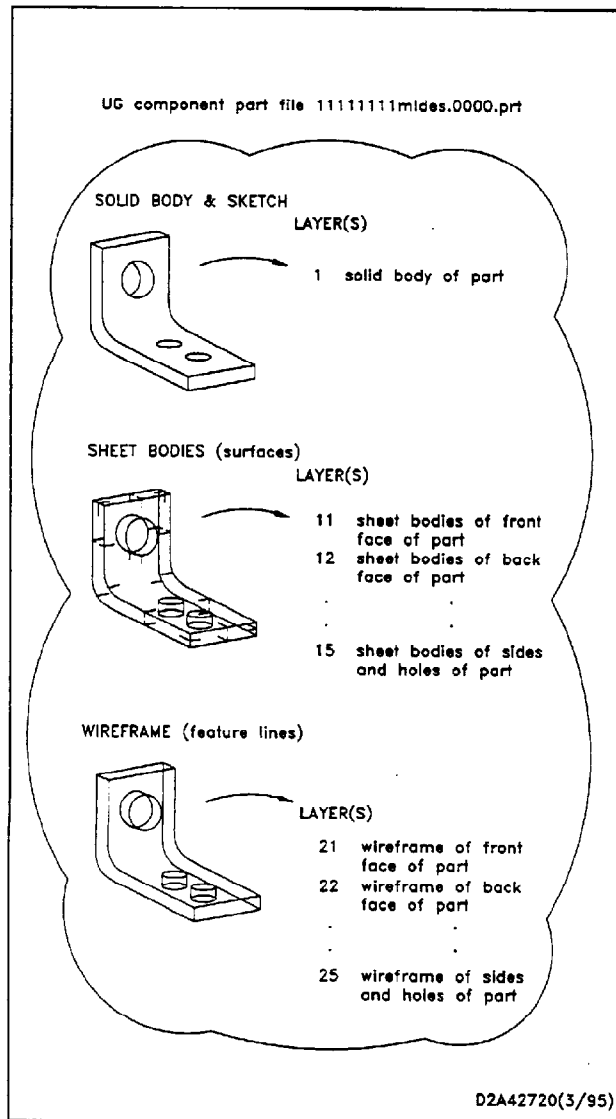


FIGURE 2.7.2

2.7.2.1 Intermediate Assembly Files. The UG mechanisms package requires data which supports this application to be contained in this file. Therefore, data which supports this

application may be included in this file type until a permanent solution can be determined. These files will consist of component entities which access the 3D math master files that make up the assembly. When the master data is accessed, it should be placed on as many layers as required to delineate the data into logical collections. All data must then be assigned to properly named reference sets.

The following is a brief description of how this is accomplished. See Figure 2.7.2.1.

- Create component entities in the intermediate assembly file which access the reference set name(s) in the lowest level single part master file(s).
- Create reference sets in intermediate assembly file(s).

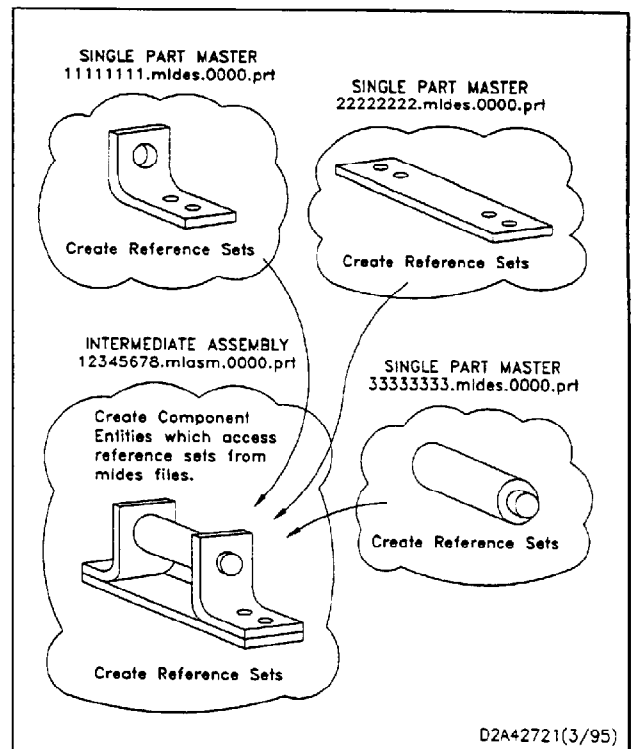


FIGURE 2.7.2.1

ELECTRONIC MATH MODEL AND DRAWING DATA CREATION STANDARD DATA ORGANIZATION - UNIGRAPHICS

A4

2.7.2.2 Single Part Detail Drawings. These files will consist of a component entity which accesses the 3D math master file to which is added a drawing format created by the use of the UNFUNC program `fmt_user_tool.uf`. Annotation and geometry required to support an engineering drawing reside in these files. See Figure 2.7.2.2

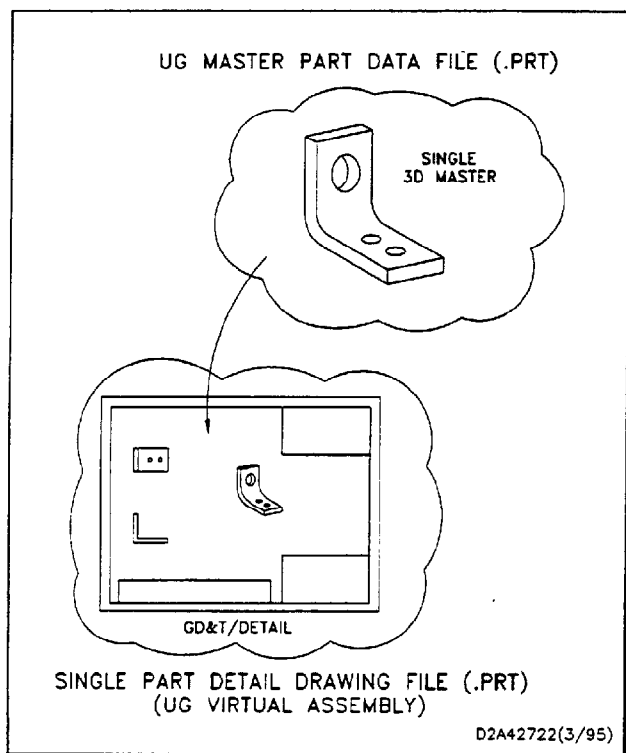


FIGURE 2.7.2.2

2.7.2.3 Assembly Detail Drawings. These files will consist of component entities which access an intermediate assembly file. See Figure 2.7.2.3.

- Add components to drawing utilizing the part number of the intermediate assembly reference sets.
- Create component entities in the drawing file which access the intermediate assembly reference sets.