

**GLOBAL 2000  
MANUFACTURER**

**GLOBAL**  
**2000**

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MANUFACTURER**

a product from the GLOBAL 2000 range



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## 1. INTRODUCTION

### Overview

Global 2000 Manufacturer provides a way of controlling stock items which are assembled or manufactured either for stock or to order. It runs under the BOS operating system. It will integrate with the standard Global 2000 Stock Control and will also use information from Global 2000 Sales Ledger and Global 2000 Payroll if these are present. Global 2000 Stock Control must be present to use Global 2000 Manufacturer. Global 2000 Sales Ledger is optional and may be used to provide accounts for the works orders. Global 2000 Payroll is also optional and may be used to provide names for the employees.

Global 2000 Manufacturer consists of two main functions: Parts Explosion and Works Order Costing. Parts Explosion is concerned with the materials and processes needed to make each item. These are specified in a "Parts structure definition" which can be considered to be like a recipe. Materials within the definition may themselves be manufactured and definitions would then exist for them. Each time one or more of the items in a structure definition has its own structure definition to show that it may also be manufactured, this adds an extra "level" to the original or "highest level" definition. For example, if a kettle is manufactured from purely bought-in parts by assembling them, then this would be a single-level definition i.e. Kettle = body + lid + handle + cable + assembly operation. If, however, the metal parts are manufactured from sheet metal which is bought-in, then this would make the kettle a two-level definition i.e. Kettle = body + lid + handle + cable + assembly operation, where Body = sheet metal + pressing operation, Lid = sheet metal + pressing operation.

Once the structures have been defined, the system allows you to move stock from the lower-level products to make up higher-level products. This may be done in one operation. For example, you may take enough lids, handles etc out of stock to make up twenty kettles. Without Parts Explosion you would have to make five stock movements within the normal Global 2000 Stock Control. Parts Explosion will perform these five stock movements for you in one operation.

Other functions allow you to enquire if you have enough stock to make up a specified number of finished items, to print structure definitions, to break a definition down to its lowest-level components, to find out which definitions use a specified product and to cost a structure as the sum of the costs of its component items.

Works Order Costing allows you to define works orders for products to be made up from stock. The materials and processes required must previously have been defined in a structure definition. Extra materials and processes in addition to those in the standard definition may be added for each individual works order.

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As the works order proceeds you will issue material and log time spent on the various operations. You may enquire on the progress of a works order at any time and you may obtain analyses of the time spent by works order number and by clock number. When all the materials have been released and all the processes completed, the works order may be completed.

#### How to use this manual

This manual assumes that you have a reasonable working knowledge of the BOS operating system and the Global 2000 Stock Control system. You will need to be familiar with how to start and stop your computer, how to use magnetic media like disks or diskettes, how to load paper into the printer and so on. All this information will be covered by your BOS Operating Manual and possibly other hardware user manuals. You should already have a user manual for Global 2000 Stock Control. It is recommended that you familiarise yourself with this before attempting to use Global 2000 Manufacturer.

Section 1 describes the main features of Global 2000 Manufacturer. This should give you a general idea of what the system is intended to do.

Section 2 guides you from the point where you decide to implement Global 2000 Manufacturer right through to the stage where you should be ready to carry on with a normal day's processing. You may decide to be guided by your dealer or even let him do the installation process for you, but it is recommended that you read this section at least to get some idea of what it involves.

Section 3 is a general guide to operating the system. It will not go into detail of all the individual facilities. These are dealt with in their own sections.

Sections 4 to 8 describe all the facilities within Global 2000 Manufacturer in detail. They are arranged in the order in which they appear in the menus to make it easier to use the manual for reference.

It is intended that you read this manual through before starting to use the system then use it as a reference manual as you get familiar with the operations involved in day-to-day running.

Each sub-section in sections 4 to 8 is actually a description of an individual program.

If you have a query on some function of the system you should refer to the appropriate section which deals with that function. If you have some more general query you should refer to section 2 or section 3 which include information on the design philosophy.

## 2. GETTING STARTED

### Planning the system

Although it is not difficult to start using Global 2000 Manufacturer, it is certainly worth spending some time deciding exactly what you intend to do with it and how you will use it.

It is important to look at your existing system (whether manual or otherwise) to see how it will be affected by the new system. Some - possibly all - functions may be replaced by the new system. This would of course have been done before the decision to implement the new system, but it is sensible to go over it again before starting the installation. This will help you to keep in mind the object of the new system and not to get too bogged down in technicalities if you hit a snag.

If you are going to start using Global 2000 Stock Control at the same time, you will probably have already considered some of the points affecting use of the parts explosion side of Global 2000 Manufacturer. Manufacturer is designed to run alongside Stock Control and to use the existing product file information. This avoids the need to enter the same data into Manufacturer again and also allows the system to update Stock Control files.

An important concept of parts explosion is that the main file holds only definitions or details of the relationships between the different levels of the structures. In practice it should be relatively static and would normally only change when you start to manufacture some new type of assembly or alter the materials or processes involved in the manufacture of an existing product. Movements of stock do not affect this file at all. Works order files on the other hand are dynamic and would be altered by the time booked to jobs and by material released. They would thus be likely to change often within a normal day.

A product record must exist within Stock Control for every structure and for every material component of every structure, so it is necessary to set up the product information first. If you already use Stock Control this data will of course be already present.

Disk space requirements are another consideration that should have been looked at before the decision to implement, but the investigation is unlikely to have been very detailed beyond finding out if enough space is available. At this point you must decide how the space is to be allocated. The section entitled "Calculating storage capacity required" is intended to show you how to work out the requirements for both data and programs.

As in starting any new computer system it is strongly recommended that you run the new system in parallel with the old for a period of at least two months and only go completely over to the new system when you are satisfied that all is as it should be.

The design of the system is such that it must run on a formatted terminal. In other words the terminal must be capable of cursor positioning. It will not run on a scrolling terminal like a teletype. If available the system will also utilise the colour and box drawing facilities provided by certain types of hardware.

#### Using the keyboard

Whenever the system requires input from the keyboard, it displays a prompt and waits for you to key a reply. Your reply should be terminated by hitting the RETURN key. This key is sometimes labelled C/R or ENTER or possibly with a right-angled arrow pointing down and to the left. It is equivalent to the Carriage Return key of a typewriter.

Some prompts invite you to press RETURN. This means that you just hit the RETURN key with no preceding input. Other prompts invite you to press ESCAPE. This means that you hit the key labelled ESCAPE or ESC.

At some points you may be expected to hit a "control" key. The prompt will be of the form "<CTRL C>". This means that you hold down the key labelled CONTROL or CTRL and hit the letter C at the same time.

In general, reports may be interrupted by hitting <CTRL G>, i.e. you hold down CONTROL and hit letter G.

Prompts are usually shown as a selection of functions and the choice is made by entering the first letter of the required feature. For example, the prompt may be "Key Amend, Insert or Cancel". This means that if you wish to amend an item you must key A, and if you wish to insert an item you key I. Prompts are explained more fully in the detailed sections of the manual dealing with the individual programs.

Note that most input is not "case conscious". This means that if you are invited to reply A for amend, you may key capital A or lower case a. Pure text like comments or product descriptions may be any combination of upper or lower case letters, numeric digits or punctuation marks.

#### Disk organisation

A working Manufacturer system consists of programs and data files. The programs are constant (they do not normally change) and they may reside on an individual program unit (PXPROG) as in the latest fashion or on a general program unit with other programs (PRGRES) as in the older convention.

The data files must be held on the SLDATA volume along with their corresponding Stock Control files. The data files will be secured whenever the Global 2000 Sales Ledger or Stock Control security routines are performed.

There may of course be more than one set of data files if you have more than one Stock Control. There would still be only one set of programs as these would not need to be different for each Stock Control.

It would be impractical to use Global 2000 Manufacturer on most computers having only diskettes unless you have very small amounts of data or the diskettes have unusually large capacities. If the diskettes are very large it would probably be easier to treat them as you would hard disks.

#### Calculating storage capacity required

A fixed amount of space is required for the programs. This is 900,000 bytes in the current version. This will remain constant unless a new version is released. As stated earlier, this may be in a new program volume or it may be in a general program volume. Also, this is regardless of how many Manufacturers you will be using.

The space required for the data files must be calculated from a few simple rules. For a start, the following data files are required:-

File name	Description	Contents
SPF	System parameter file	System parameters & options
PDH	Parts definition header file	One record for each parts structure
PDD	Parts definition detail file	One record for each parts structure line
MDF	Machine details file	One record for each machine
WOH	Works order header file	One record for each works order
WOD	Works order detail file	One record for each works order line
WHL	Work hours log file	One record for each clock card entry in an input session
HTF	History file	One record for each completed order
WOJ	Works order journal file	A record for each clock card entry for a current works order

The system parameter file will be created automatically when you first set up the system parameters. The other files may be created by the data file allocation function within the menus.

Only the first four files are required if you are not going to use the Works Order costing part of the system. The parts definition header file contains one record for each structure, while the parts definition detail file contains one record for each line of each definition. A definition line is a product reference, a comment or a process reference.

The machine details file is used to hold details of the machines used during the assembly process. The file contains one record for each machine.

The works order journal file is used to hold details of work done on a works order during the time that the works order is current (until it has been completed).

The following table tells you how much space each file takes:-

File	Space required
SPF	512 (constant)
PDH	130 times PH
PDD	96 times PD
MDF	64 times MD + 1000
WOH	280 times WH + 1000
WOD	100 times WD
WHL	54 times WL
HTF	96 times HT
WOJ	60 times WJ

where:-

PH is the number of structure definitions.

PD is the number of structure definition details.

MD is the number of machines

WH is the number of current works orders.

WD is the number of current works order detail lines these are similar to structure definition detail lines.

WL is the maximum number of clock card hours figures you will enter in one session.

HT is the maximum number of history records you wish to allow space for. Note that you put a limit on the maximum number of history records for each structure. See later under "Maintain system parameters".

WJ is the maximum number of clock card and external work entries that may be present for current works orders at any one time.

All sizes are in bytes which is the standard measurement used for storage space.

The above algorithms are for making reasonable estimates. They should be quite accurate enough for most purposes. However, if you are very familiar with the BOS operating system, you may wish to make more accurate sizing calculations using \$CALC. For this purpose the following information may be useful:-

- PDH is an RS file, record length 130
- PDD is an RS file, record length 96
- MDF is an IS file, record length 64, key length 4
- WOH is an IS file, record length 280, key length 4
- WOD is an RS file, record length 100
- WHL is an RS file, record length 54
- HTF is an RS file, record length 96
- WOJ is an RS file, record length 60

Once you have calculated the desired size of each file, you should add these figures up to get the amount you must add to the size of the SLDATA volume. Note that you must take this extra space requirement into account when setting up your backup disks or tapes.

#### Installing the programs

Global 2000 Manufacturer is distributed on one, two or three diskettes depending on diskette capacity. These diskettes will be labelled PXA, PXB and PXC. Also written on the label will be the diskette format, for example "format C7B". Using the BOS \$U command you should be able to find the unit number on your machine which corresponds to this format.

The installation job PXINS adds the contents of the diskette(s) together to form a program library called P.PX which will be installed on your program volume. You run the job by keying its name at the READY prompt or at a menu selection prompt (in Version 5.1 of the operating system) followed by <CTRL A>. Then you will be prompted for the unit number of the distribution diskette or disk. You must key the unit number that you found from the \$U command above to continue with the installation. For example the following dialogue may take place:-

```
BOS READY:PXINS <CTRL A>
PLEASE ASSIGN $P:100
```

The installation job starts by asking you for the unit number of the program volume. If this unit does not already exist you are given the option of creating a new one. If Manufacturer is already present on the unit, you will be given the option to delete it. The data will not be altered. You will be asked if you wish to allocate a data unit and if you wish to update the main menu to include an entry for Manufacturer.

Once you have confirmed that the installation is to proceed, there will be a delay as the programs are copied from the distribution media and the volumes allocated etc. You may be prompted to change the diskette as the installation proceeds, if the capacity is such that more than one is required.

#### Customising your BOS

As stated earlier, the programs are contained in a library called P.PX which will be stored on the program volume. There is also a lead-in program called PX which is not in the library. This lead-in program attaches the library and executes the menu. This is the program which must be called from a system menu or from the READY prompt to get into the Manufacturer system. There are various unit assignments that must be in force for Manufacturer to run and these should be made before running the programs. The assignments are:-

SLD to the Sales Ledger/Stock Control unit

ICD to the Sales Ledger/Stock Control unit

PXD to the Manufacturer data unit (this will be the SLDATA unit)

PRX to the first Global 2000 Payroll unit (Optional)

PRY to the second Payroll unit (Optional)

PXW to the Manufacturer work unit (usually the SLWORK unit)

If you have not allowed the installation job to update your main menu, you should now do this by including an option that executes the PX program and makes the above unit assignments.

#### Making arrangements for security copies

As the data files are contained in an existing SLDATA volume, they will be secured when you do your normal Sales Ledger or Stock Control backup. So all you need to do is make sure that the backup volume has enough space to hold the extra data. Do bear in mind that if you have to restore Manufacturer, you will also restore your Sales Ledger, Invoicing and Stock Control (whatever was on the SLDATA volume) and vice versa.

If you wish to use tapes for your backups you will have to use a separate facility such as \$TDUMP. Operating instructions for \$TDUMP are contained in your BOS Operating Manual.

#### Data take-on

By now you should be ready to start entering data. The first thing to do is to set up the system parameters. This is described in detail in the section dealing with the function. The first time you do this, the file will not exist and you will be asked if you wish to create it.

Next you must allocate the data files with the sizes you have already decided. The procedure for doing this is described in the detailed section covering "Reallocate data files".

The data can now be set up with reference to the detailed sections covering the definition and amendment processes. You must define all the parts structures you will need before attempting to set up works orders.

When you first start to enter data you will notice that the speed of response of the machine may deteriorate after entering a number of definitions or Works Orders. This is because the files are becoming disorganised. It is thus advisable to batch the input into groups of no more than 50 or so items. The exact effect of the slowing down may indicate a higher or lower batch size. At the end of each batch input you should take a security copy and then reorganise the files. This will ensure that the performance does not drop too seriously and that it will not be too difficult to restore if some problem should occur during the take-on.

#### Multi-user considerations

As in most applications running under BOS, the majority of the programs are fully multi-user. This means that any number of users up to the maximum allowed by the operating system may share the files and update the data. Of course, only one user may update a particular record in a file at any one time. The system will normally inform you if a record is being updated by another user. Certain functions cannot by their nature do this as it would involve a high amount of operator intervention, so instead they will wait until the record they need to update has been freed. This can occasionally lead to conflict where a number of users wish to update the same record at the same time and the response may deteriorate because of this.

Certain programs by their nature must have complete control of one or all of the data files. In these cases only one user may use the system. If you attempt to use these programs while another user is in the system, you will be informed and prevented from carrying on. You can of course abandon the program in question and do something else until the system is free. Programs which require exclusive control of the data files are explained more fully in the detailed sections of this manual.

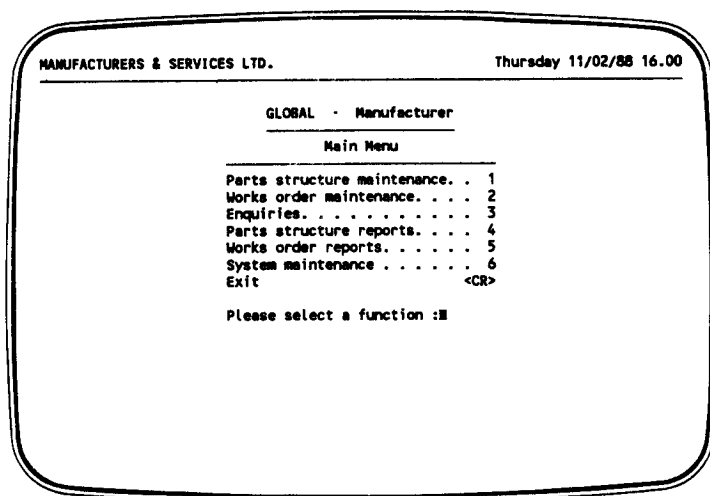


Figure 1 - The Global 2000 Manufacturer Main Menu

### 3. OPERATION

#### Starting the system

You should have started up your computer and signed on as described in your BOS Operating Manual.

If you have a main menu set up it will now appear and you can go straight into Global 2000 Manufacturer from it or from a submenu.

If there is no menu, the "BOS READY" prompt will be displayed. You can then get into the system by typing PX followed by <CTRL A> at this prompt. You will then be prompted for the program unit number. After keying this you should be presented with the Global 2000 Manufacturer main menu. Before running the menu you should use the \$A command to make the necessary unit assignments as detailed in the installation section above.

#### The normal sequence of operations

Products will normally be ordered, received, invoiced etc using the standard Global 2000 Stock Control and Global 2000 Invoicing systems. Components may be taken out of stock to make up higher-level structures. This may be done using the "Increase structure stock" facility.

Enquiries may be made at any time to find out if there is enough stock of components to make up finished structures or sub-assemblies. Note that this particular enquiry (Enquire structure stock) will go down as many levels as necessary to check the stock levels. For example, you may wish to know if you have enough stock to produce twenty kettles. You tell the program that you need twenty. There may be ten already in stock so the program will check that there is enough stock to manufacture ten. If there are say ten kettle bodies in stock but only five lids, the program will check that there is enough sheet metal etc to make five lids and so on.

Occasionally it may be necessary to alter the materials or processes used in making an existing structure. There may also be new structures to be defined.

The cost of manufacturing a product will change from time to time. This may be due to changes in the cost of the materials used and also changes in the cost or the amount of labour or machining needed. You will need to use the "Manufacturing cost changes" program. This will apply percentage changes to the operation costs across ranges of structures. The material costs are, or course, maintained within Global 2000 Stock Control.

Works orders will be set up as required. Each works order is a requirement to manufacture a number of items of one structure code to be put into stock. A Works order starts with a standard structure definition. This may be amended and added to for this particular order.

As the work proceeds on the works order, time spent will be logged and material taken from stock will be released to the order. When the order is complete you will update the stock level of the structure with the newly completed quantity.

**Regular processes**

As in all computer systems, one of the most regular activities should be taking security copies. Whatever way this is carried out, it is essential that you can recover from machine failure, program faults or keying errors without losing too much work. This may be obvious but it is as well to emphasise it again.

During the data take-on period the most regular processes will be the structure definition and amendment, the works order creation and amendment and file reorganisation.

Once all the data has been set up, the normal daily routine will mainly consist of logging ours worked, releasing material to works orders, getting rid of completed works orders and enquiring on stock and works order progress.

During normal running there will be little need to reorganise the parts structure file but the works order file and the works order detail file will need regular reorganisation to recover the space from completed and deleted works orders.



```

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GLOBAL - Manufacturer

Parts Structure Maintenance

Maintain parts structure . . . 1
Combine parts structure. . . 2
Exchange component part. . . 3
Increase assembly stock. . . 4
Manufacturing cost changes . . 5
Calculate assembly costs . . . 6
Automatic stock increase . . . 7
Maintain machines. . . . . 8
Exit                               <CR>

Please select a function :#

```

Figure 2 - The Structure Maintenance Menu

```

Structure      Description      Material costs
History records
Last cost calculation      Operation costs
Minimum order quantity      Total cost

----- Maintain Parts Structure -----
Item Product      Description      Location      Quantity

-----
Product      Description      Unit
Supplier reference      Location      Quantity

Key Create, Amend, Delete :#

```

Figure 3 - The Maintain Parts Structure Screen

## 4. PARTS STRUCTURE MAINTENANCE

### Maintain parts structure

Figure 3 shows the screen for the structure maintenance program. You are first asked if you wish to create, amend or delete a structure. In all cases you are then asked for the product code of the structure to be worked on, after which the program will check that the products exists on the Global stock file and that the product is either a stocked or a non stocked item.

### The create option

If you select the create option the program next checks that there is not a structure already defined for it. Next you would key E to go about building up the structure.

In the lower portion of the screen you may now enter details of the materials which go into making the structure. The program checks that each product code is valid and that each record exists in the product file. The description is then displayed and the quantity, location and supplier reference prompted for. Once these details have been entered, the line is displayed at its appropriate place in the middle portion of the screen.

Instead of a product code, you may press RETURN to allow you to key in a comment on this line. The comment text may be up to thirty characters in length.

If you press ESCAPE on its own to the product code prompt, it is assumed that this is the end of the material definitions and the acceptance prompt is displayed. You will then be allowed to amend or delete the product definitions you have keyed in, add more or accept this product definition stage and go on to the operations.

### Maintain parts structure

Figure 4 shows the process definition stage of a parts structure. For each operation you may key the following details which are shown on the lower portion of the screen:-

```

Operation number
Operation description
Quantity required
Production rate
Estimated cost
Cost code
Labour rate
Machine code
Tool reference
Setup operation

```

Each process is identified by its operation number and description. You may also enter the quantity required, an anticipated quantity per hour and an anticipated cost. The cost field code is a number between 1 and 10 that specifies which of the structure's cost fields will include the cost of this line. The meaning of these cost fields is defined in the system parameters.

Structure 2000		Description 3 Pint Kettle 2KW		
History records Y		Material costs	5.6050	
Last cost calculation		Operation costs	0.7950	
Minimum order quantity 0.0000		Total cost	6.4000	

Maintain Parts Structure				
Item	Op Description	C-Cd M/c	Prod-Rate	Cost
1	1 Assemble parts together	1	50.0000	0.2650
2	2 Pack in box with paperwork	1	50.0000	0.2650
3	3 Return to stores	1	50.0000	0.2650

Operation	Description	Setup Operation
Qty required	Production Rate	Labour Rate
Machine code	Tool Ref	Cost Code
Key Amend, Delete, Extend, First, Insert, Next, <ESC> :#		

Figure 4 - The Process Definition Stage

Combine Parts Structure	
Copying Material Details ....	
Copying Operation Details ....	
Copy to Structure 2000	
Copy from Structure 1000	
Copy complete, <CR> to continue :#	

Figure 5 - Combine Parts Structure

The labour rate must be between 1 and 3 and it indicates which labour rate will be taken as the default when booking time to the works order. The machine code is a four-character code which identifies the machine used for this operation. If the machine is present in the machine details file then the name of the machine will be shown on the relevant reports. It may be left blank if this is a manual operation. The tool reference may be any four characters which may be used to identify any special tools to be used for the operation. It may be left blank if not required. Any operation may be specified as a "set-up" operation. This means that its cost is the same irrespective of the quantity produced. This would include machine setting operations and the like.

In a similar way to the materials definition, you may enter comments by pressing RETURN in place of the operation number. As with materials, comments may be up to thirty characters in length.

At the end of the process definitions (when you press ESCAPE to the operation number prompt), you may amend or delete any of the items you have keyed, continue to add more or press ESCAPE to go on to the costing section. During the costing section the system will total up all the costs of the materials and operations for the structure. When this is complete the material and operation totals will be shown in the upper portion of the screen together with the grand total. This grand total will be used to update the unit cost held for the structure in the Global product file.

#### The amend option

If you select the amend option then the process is very similar to the create option. You may add new lines to the end of the existing definition using the extend function and you may insert items in the middle of a structure using the insert function. Using the amend function the existing details of a definition line may be changed. The details will be shown in the lower portion of the screen where either new values can be entered or the existing values left alone by pressing RETURN. Using the delete function you may remove any existing detail or comment line from a definition.

#### The delete option

This function allows you to remove the definition from the system. Works orders already set up for this structure will not be affected. When you key the product code of the structure definition you wish to delete, its description is displayed so that you can confirm that it is the one you intended. This program is slightly different from most of the other programs in the system in that you must key a character (in this case D) to proceed with the function instead of just pressing RETURN. This is to prevent you from accidentally deleting a structure if you have selected the wrong option. Once you have confirmed that you wish to delete the structure definition, it will be totally removed from the definition file. If you only wish to remove some of the lines from the definition, you should use the structure amendment option.

Exchange Component Part	
Processing Structure - 0003	
Old Product Code 1000	
New Product Code 2000	

Figure 6 - Exchange Component Part

Product 1000	EXECUTIVE DESK - MAHOGANY	Whse 1
Present free stock	551.000	Resulting free stock 551.000
Quantity increase	0.000	Resulting book stock 552.000
Highest structure level	0	
Increase stock of assemblies		
Product 1000	Whse 1 Increase by 5000	Highest level

Figure 7 - Increasing Stock of Assemblies

**Combine parts structure**

This function allows you to copy all of the materials and operations from one structure to another. Thus it may be used to either merge two structures in to one or to copy the details of one structure to another.

The duplicate facility would be used if you were setting up a new structure which is very similar to an existing one. The procedure is first to set up the new structure in the normal way but not to add any detail lines. Then you would copy the existing structure to the new one and then finally amend the new structure to the exact desired form. This can greatly reduce the effort of defining a number of similar structures.

The combine facility adds the details of one structure to another. You first specify the destination structure code. This is the structure to be added to. You may then add the details from a number of other structures in turn by entering their codes. Obviously, this may take some time if these structures are large. Once you have combined all of the old structures you would then delete these in the normal way.

**Exchange component part**

This function allows you to replace any references to a certain material product within all structures with an alternate product code. This could become necessary if a material or component became obsolete or unavailable due to shortage and a substitute needed to be used. Note that quantities will not be changed. It is assumed that replacements are direct equivalents. Also it may be necessary to re-cost the structures if the costs are not the same (see later).

**Increase assembly stock**

This function allows you to take stock from lower-level products to produce higher-level assemblies or structures. It should not be used if you are using works orders to control the manufacture of these assemblies. The function is intended to be used if you wish only to use the parts explosion facilities to help control your stock. Stock is taken from the highest levels first to produce the structure. If any of the highest-level components should not have enough stock to fulfil the requirement, the available stock is taken and the deficiency is made up from lower-level components. If the lowest-level components still do not have enough stock, the stock level is allowed to go negative and a warning is displayed on the screen. After the correct quantities have been taken from stock of the appropriate components, the made-up quantity is added to stock of the structure.

Manufacturing cost changes

---

First structure First                      Last structure Last

No	Description	% change	Costs	No	Description	% change
1.	Cost desc one			6.	Cost desc six	
2.	Cost desc two			7.	Cost desc seven	
3.	Cost desc three			8.	Cost desc eight	
4.	Cost desc four			9.	Cost desc nine	
5.	Materials			10.	Cost desc ten	

Figure 8 - Manufacturing Cost Changes

Calculate assembly costs

---

Processing structure - 2200

---

Figure 9 - Calculating Assembly Costs

**Automatic stock increase**

This function is similar to "increase assembly stock". It works in conjunction with the Global 2000 Invoicing or Sales Order Processing systems. When you invoice stock normally the stock used must be replenished to maintain the required stocking levels. With component parts or complete products bought in the state they may be sold, this is simply catered for by the Global 2000 Stock Control purchase order, goods receipt and so on processes. But for products manufactured from stocks of components, you would have to look at each invoice or order to work out how many need to be made up for sale. This function allows you to automatically take stock from the lower-level components to make up higher-level stock for sale. For example you may have an invoice for twenty kettles. It would thus be necessary to take enough lids etc from stock to replace these twenty kettles when they are sold. "Automatic stock increase" will do this for you.

Before using this function you must first set up the sales extract section of the system parameters in the Global 2000 Invoicing or Order Processing systems. These must be set so that the new orders and invoices options are set to yes and the rest set to no.

The automatic stock increase program would be run after the close session procedure had been completed in the invoicing or order processing systems. On running, the stock for any new order or invoice lines will be increased provided the line is for a structure. As in the "increase assembly stock", the next lower level will only be checked if necessary.

This function is only really feasible if you are only using the parts explosion facilities of the system. If you use works orders to manufacture stocks of assembled goods, you will not wish to bypass the works ordering to maintain stock levels. In this case you may wish to use the "suggested works orders" report to decide which works orders need to be set up to manufacture the goods. There is a detailed section on this facility later.

**Maintain machines**

For each operation defined in a structure, you may enter a machine code. This may refer to an actual machine (e.g. a drill) or it may refer to a working location or centre. This could be a group of machines in one place. Each machine code may have a description associated with it to make reports etc more informative.

This program allows you to enter and amend these machine descriptions along with some other machine-specific information that is useful to the system. Most of the information is used for costing purposes, but other fields ("available hours", "production rate") are intended for future extensions to the scope of Global 2000 Manufacturer. All of the information relating to a machine code is optional. The system will ignore any information which is not available.

```

MANUFACTURERS & SERVICES LTD.                      Thursday 11/02/88 16.37

GLOBAL - Manufacturer
Works Order Maintenance

Maintain works order . . . . . 1
Exchange part in works order . 2
Release material to work order 3
Log hours worked . . . . . 4
Log other costs . . . . . 5
List hours worked . . . . . 6
Complete works order . . . . . 7
List completed works orders . . 8
Exit                               <CR>

Please select a function :#

```

Figure 12 - The Works Order Maintenance Menu

```

Works order      Customer      Contract number
Customer ref no  Date ordered  Date required
Product          Warehouse     Comp
Quantity         Estimated cost

----- Maintain Works Orders -----

Customer 10000 A      Customer ref AG/12
Contract number 23456 Date ordered 21/01/88 Date required 11/02/88
Product 1000         EXECUTIVE DESK - MAHOGANY Qty 10.0000
Warehouse 1 EALING

Key Amend, <CR> to accept, <ESC> :#

```

Figure 13 - The Maintain Works Order Screen

## 5. WORKS ORDER MAINTENANCE

### Maintain Works Orders

This function allows you to set up a works order for any of the structures you have previously defined. Each works order may only be for one product. All reports and enquiries for works orders only deal with one level (the top level of the assembly or sub-assembly). So if you wish to make up a multi-level structure using works orders from its lowest-level component parts, you should do one works order for each sub-assembly or else set up a works order for a structure that defines every operation and material needed right from lowest component level.

In this connection, two fields called "customer reference" and "contract" are provided to tie together orders. These are intended to simplify multi-product and multi-level customer orders. If a customer orders a number of products each of which has to be manufactured, a works order must be set up for each product. Each works order should have the same customer reference. If any of these products is a multi-level structure, other works orders will need to be set up for the lower levels. Each works order for a part of the same structure for this customer should have the same contract reference. Reports are provided to list works orders with a common customer reference or contract. The customer reference and contract are interchangeable.

The maintain works order program works in much the same way as the maintain parts structures program in that it has separate create and amend options. However, it is not possible to delete a works order once it has been set up.

Once you have selected your option the first thing needed is a works order number. This seven digit number is generated automatically by the system by adding one to the previous works order number. The starting number for the works order sequence may be set in the system parameters. As well as the works order number itself there is also the works order prefix. This is an eight character alphanumeric code that is set up in the system parameters. The prefix may be used to identify different companies if you have more than one Manufacturer system installed on your computer.

### The create option

Once you select the create option you are first prompted for the customer account code. If you have Global 2000 Sales Ledger, this code is checked against the customer file and if present the account name is displayed. The customer code may be left blank if it is not required.

The date ordered, date required, customer reference and the contract number are purely for reference purposes (besides multi-level etc uses mentioned above) and they will appear on the various documents produced. The dates may be any valid date but will default to today's date. The customer reference can be any alphanumeric code up to 15 characters in length. The contract number may be any alphanumeric code up to 10 characters in length.

Works order WOPREFIX0000012		Customer 1000		Contract number 1234567890	
Customer ref no AG/12/1/88		Date entered 11/02/88		Date ordered 01/01/88	
Date required 11/02/88		Product 2000		3 Pint Kettle 2KW	
Quantity 300.0000		Estimated cost		0.0000	
Maintain Works Orders					
Item	Product	Description	Quantity	Qty Rel	
1	2100	Kettle lid for 3 pint mottle	300.0000		
2	2200	3 pint kettle body	300.0000		
3	2300	2KW Kettle lead	600.0000		
4		Comment line			
Product Description Unit					
Quantity in works order			Supplier reference		
Location					
Key Amend, Delete, Extend, First, Insert, Next, <ESC> :H					

Figure 14 - The Maintain Works Order Screen (Materials)

Works order WOPREFIX0000012		Customer 1000		Contract number 1234567890	
Customer ref no AG/12/1/88		Date entered 11/02/88		Date ordered 01/01/88	
Date required 11/02/88		Product 2000		3 Pint Kettle 2KW	
Quantity 300.0000		Estimated cost		0.0000	
Maintain Works Orders					
Item	Op	Description	C-Cd M/c	Prod-Rate	Cost
1		1 Assemble parts together	1	50.0000	79.5000
2		2 Pack in box with paperwork	1	50.0000	79.5000
3		3 Return to stores	1	50.0000	79.5000
Operation Description Setup Operation					
Qty required		Production Rate		Labour Rate	
Machine code		Tool Ref		Cost Code	
Key Amend, Delete, Extend, First, Insert, Next, <ESC> :H				Cost	

Figure 15 - The Maintain Works Order Screen (Processes)

You must enter the product code of the structure you wish to manufacture. This is checked to have a valid structure definition and the description displayed. Next you must enter the quantity that you wish to manufacture.

Finally, if you are using multiple warehouses, you must enter the warehouse number that this works order refers too. Note that the same warehouse will be used both for the materials used and the completed structure. The warehouse name will be displayed as confirmation.

At this stage you may alter any of the above information before you either press RETURN to accept this and create the works order or else press ESCAPE to abandon this works order and exit the program. Note that the works order number is not generated until you press RETURN and therefore if you press ESCAPE there will be no gap in the works order sequence.

There will be a slight delay as the works order information is extracted from the structure definition file. Note that the structure definition is duplicated for the works order, so that the definition may be altered subsequently or even deleted without affecting the works order.

Now that the structure details have been transferred you may amend the standard details for either the materials or the operations. This will enable you to tailor the structure to the precise needs of the works order and it will cater for "One offs" and special requirements. The amendment process is done in the same way as in the maintain parts structures program and you should consult the maintain parts structure section of the manual for details.

Once the amendments are complete the stock required for the works order will be allocated, on the stock file, for each item of material in the works order. (Provided this option is set in the system parameters.)

#### The amend option

If you select the amend option you are first invited to change the basic details such as the customer account and the date required. After that you may alter the material and operation details in the usual way.

#### Exchange works order component part

This function allows you to replace any references to a certain material product within all works orders with an alternate product code. This could become necessary if a material or component became obsolete or unavailable due to shortage and a substitute needed to be used. Note that quantities will not be changed. It is assumed that replacements are direct equivalents. If the allocate stock option is set then the program will deallocate and allocate stock for the original and replacement products respectively. Also Global stock movement (ICJ) records will be produced if required.

Exchange Works Order Component Part

Processing Works Order - 811

Old Product Code 1000

New Product Code 2000

Figure 16 - The Exchange Works Order Component Part Screen

Release material to works order

Works order WOPREFIX0000001 Customer 0000510 HAVANT OFFICE EQUIPMENT

Customer ref no Test works ord Contract number

Date entered 23/09/86 Date ordered 23/09/86 Date required 23/09/86

Product 2000 3 Pint Kettle 2KW Warehouse 1

Quantity 2.0000 Qty complete 0.0000

Component details

Product 2100 Kettle lid for 3 pint mottle Unit EACH

Qty required 1.0000 Book stock 0.0000

Qty released 0.0000 Allocated 300.0000

Qty to release 1.0000

Enter quantity to be released <CR> for remainder, <ESC>

Figure 17 - Release Material to Works Order

**Release material to works order**

It is expected that the life of a works order will follow more or less closely the following stages:-

- A - The works order is created
- B - The working details list is printed and given to the person responsible for the first operation
- C - He will withdraw some or all of the stock required from stores
- D - He or the storeman will notify the system that this stock has been withdrawn. This will update the component stock levels.
- E - He will begin work and book time spent on the job onto clock cards.
- F - These clock cards will be entered into the system against the works order.
- G - As the job proceeds other people may do work and more stock may be withdrawn for the works order. All this information will be entered as in D and F above.
- H - Eventually all the required products will be manufactured or a decision will be made to terminate the works order when only some or possibly none of the required products are completed. At this point, the system will be notified that the works order is complete.

The "release material" function removes components from stock and sets them aside as being worked on. The allocated quantity is also reduced at this point. This stock is thus in a state of "limbo" until the works order is completed when the stock of the parent structure will be increased. Of course, some or all of this material may be lost as scrap in which case it never returns to stock. This whole process is somewhat similar to the "increase assembly stock" process but obviously goes into much more detail of what happens on the way.

Note that works orders only take into consideration the first level of any structure. This is because it is unlikely that you would decide to set up a works order for a complete top-level assembly from lowest-level components to be completed in one job. It would be extremely complicated to keep track of stock and the progress of the operations involved. It is more likely that separate works orders would be set up for each of the major components needed.

Log Hours Worked		
Week number	52	
Clock card number	123456	
Works order number	12	3 Pint Kettle 2KW
Operation number	3	Return to stores
Date worked	24/12/87	
Hours worked	15.0000	
Rate per hour	10.0000	
Quantity complete	300.0000	

Amend, <CR> to accept, <ESC> :#

Figure 18 - Log Details of Hours Worked

Log other costs		
Works order number	3	3 Pint Kettle 2KW
Operation number	2	Pack in box with paperwork
Date worked	23/12/87	
Quantity complete	450.0000	
Total cost	150.0000	
Cost narrative		

Amend, <CR> to accept, <ESC> :#

Figure 19 - Log Other Costs

In the normal single step mode each component stock code needed is displayed in turn and you are prompted for the quantity to be released from stock. A suggested quantity is displayed to help in deciding. This suggested quantity is calculated from the quantity of the parent structure ordered times the quantity of the component required for each assembly less any stock already released. Note that negative suggested quantities will not be produced. If required a stock issue record is produced in the Global 2000 Stock Control journal file for each stock movement associated with the works order. This will be printed by the Stock Control in the normal daybook print. It is also possible for the release process to be run automatically, in which case the program will work as above except that the "suggested quantity" will be taken in all cases.

It is possible that you will use the normal Global 2000 Stock Control stock issue facility to take stock for works orders. This is not to be recommended as the costs of stock issued would not be taken into account of the cost of the works order. However, if you bear this in mind, and you are not too concerned to get the final cost of the works order absolutely correct, this would be perfectly acceptable.

#### Log hours worked

This function allows you to inform the system of time spent on the operations involved in a works order. It is intended that this information will come from job cards or clock cards. The costs of time spent are accumulated for the works order and are stored with the appropriate operations information. The information is also stored in the works order journal file and the work hours log file. The work hours log file is a daybook file which should be printed and cleared after each batch of input. It contains details of time logged against all current works orders. The works order journal file contains details of time spent on each individual works order. This information is held during the life of a works order and only goes out of the system when the journal file is reorganised after the works order is completed.

You must enter the works order number and the operation number. Both these are checked to be present in the works order files.

If you are using the Global 2000 Payroll the employee code will be checked against the payroll files and if present the employees name will be shown. Note that it is possible to attach two payrolls to the manufacturer system so that you may use both a monthly and weekly payroll. In this case the first payroll will always be checked first and only if no match is found will the second payroll be searched.

The rate per hour is the cost per hour of the time spent. This cost will probably be mainly labour cost. It may include overheads like the running cost of the machine (if any). You may select one of the three standard labour rates by keying the single character 1, 2 or 3. If you actually wanted to enter a rate of #1 you must key in more than one character such as 01. The default labour rate will be taken from the operation detail record.



Log of hours worked

Report printing, Key <CTRL G> to interrupt

Key Clear work log file, <ESC> :H

Figure 20 - The Log of Hours Worked Report

Complete works order

Works order WOPREFIX0000003		Customer 0000510 HAVANT OFFICE EQUIPMENT	
Customer ref no	Contract number	Warehouse 1	
Product 2000	3 Pint Kettle 2KW	Date ordered 25/09/86	
Date entered 25/09/86	Date work started 25/09/86	Date required 28/02/86	
Quantity 50.0000		Qty completed	50.0000

Description	Estimated	Actual
Cost desc one	39.7500	1.2650
Cost desc two	0.0000	0.0000
Cost desc three	0.0000	0.0000
Cost desc four	0.0000	0.0000
Materials	5.1050	0.0000
Cost desc six	0.0000	0.0000
Cost desc seven	0.0000	0.0000
Cost desc eight	0.0000	0.0000
Cost desc nine	0.0000	0.0000
Cost desc ten	0.0000	0.0000
Totals	44.8550	1.2650

Quantity to complete 0.0000
Complete H

Key Amend, <CR> to continue, <ESC> :H

Figure 21 - Complete Works Order

The quantity completed is the number of items which have been produced during the process. It may of course be zero if this is a long process. This quantity is not necessarily the same as the quantity of the finished product for which parts have been made nor is it the same as the quantity of material used. It is the usable quantity over which the cost of manufacture may be reasonably split. An example may serve to elucidate this point.

You want ten kettles to be made. Each kettle has three plastic feet. Each foot is composed of a piece of plastic rod cut to length with a screw attached. On average each foot requires half an inch of plastic rod. You would expect the manufacture to use ten times three times one half inches of rod (this equals 15 inches of rod). In practice a twenty inch length of rod may be withdrawn from stock. The remaining five inches is lost through cutting or the remainder may be unusable. So in this case the quantity produced will be thirty.

The total material cost would, of course, have been the same if you had required to make feet for twelve kettles (you would have needed 18 inches of plastic rod). This does not alter the fact that the actual cost of making each of the thirty feet is equal to total cost divided by thirty. A similar situation may arise where standard sizes of a stock item are used to make as many components as possible no matter what the requirement. In operations where the whole of the material may be used and any remaining may be returned to stock, this problem does not arise.

#### Log other costs

Certain operations required to manufacture an item may not be done by the normal work-force. For example, processes like electro-plating may be contracted to an outside firm. In this case information about hours worked would not be available and would not really be relevant anyway. The costs of the operation would still have to be taken into account when the total cost of the order is calculated. We must therefore inform the system of costs like these. This function works in a similar way to "log hours worked" except that there are no clock card numbers involved as they would not be relevant. With an external cost you may also enter a thirty character cost narrative which will be shown on the relevant reports and enquiries.

#### Print log of hours worked

This journal report lists all the clock card details entered in the current batch. They appear in the order they were entered. This list is mainly intended to be used for checking input against the clock cards themselves. A quick check may be done by checking the number of entries and the total hours. The report may not be limited by any sort of range, but may be interrupted in the normal way by keying <CTRL G>. After printing out the report you are given the option to clear the work log file, which you do by entering Clear.

Completed works order report

Printing works order - WOPREFIX0000012

Report printing, Key <CTRL G> to interrupt

Key Delete completed works orders, <ESC> :H

Figure 22 - List Completed Works Orders

**Complete works order**

Whenever all the operations have been carried out on a works order, the system should be informed that the order is complete. Only after this has been done will the works order go from the system and the details appear in the structure history.

In the upper part of the screen the general details of the works order such as the customer and product are shown. In the middle part of the screen you will find both the estimated and the actual costs of the works order.

In the lower part of the screen you are asked for the quantity be completed. A suggested quantity is displayed for guidance and as a default. This quantity is the original order quantity less the amount already completed, however the actual quantity produced may differ from this for reasons such as wastage. You are also asked if you wish to finally complete the works order. Once a works order is finally completed it will be considered finished and no more work may be done on it.

**List completed works orders**

This report shows all the works orders in the system which have been completed. Brief details are shown of each one. After printing you are given the option of deleting these completed orders. If you do choose to delete them, they are removed completely from the system and no further reference may be made to them. The only trace that will remain will be in the structure history file. This report will thus provide an audit trail of works orders that have gone from the system. Obviously if the printer fails or the report is spoiled in some other way during the print, you should not delete these works orders but print the report again before doing so.

```

MANUFACTURERS & SERVICES LTD.                      Thursday 11/02/88 17.26

GLOBAL - Manufacturer

Enquiries

Enquire structure stock. . . . 1
Display structure explosion. . 2
Enquire structure cost summary 3
Enquire works order. . . . . 4
Enquire product history. . . . 5
File status enquiry. . . . . 6
Exit                               <CR>

Please select a function :#

```

Figure 23 - The Enquiries Menu

```

Product 2100      Kettle lid for 3 pint mottle      Whse 1
Present free stock -300.000      Resulting free stock 100.000
Quantity increase  400.000      Resulting book stock 400.000
Highest structure level 999

Enquire stock of assemblies

Warning - these      Product      Description      Shortage
items would be
short by the
quantities shown
2110      Lid handle      -404.000
2120      Metal lid pressing -404.000
2130      2mm screw      -1224.000
2140      2mm nut      -1212.000
2150      2mm washer      -1224.000

Product 2100      Whse 1      Increase by      400.000      Highest level 999
Completed, <CR> to continue :#

```

Figure 24 - Enquire Stock of Completed Structures

## 6. ENQUIRIES

### Enquire structure stock

This enquiry is intended to allow you to see if you have enough stock of components to manufacture structures to your requirement. If you simply wish to see how many of a particular item you have in stock, this is covered by the normal Global 2000 Stock Control enquiries facility. For example you may wish to know if you have in stock or can manufacture enough kettles to fulfil a sales order for twenty. When you enter the stock code for kettle, the "stock level" is how many are currently in stock. If this is at least twenty, you may see at a glance that there are enough. If there are less than twenty or you know that of the twenty in stock some may be required for another purpose, you may enter a quantity required.

Assume for instance that there are ten in stock and you enter twenty as the quantity required. The program will first of all look to see if there are enough lids, bodies etc in stock to make up the ten kettles that you are short. If there is sufficient, the program will report this and allow you to enquire on another structure. If not, the program will next check if there is enough sheet metal and so on in stock to make up the lids or whatever are short. It will continue to do this right down to the lowest level components. If any of these will be short, the product code and details of these components will be displayed with a warning message. Otherwise, the program will report that there is sufficient stock to fulfil the requirement. Note that this enquiry will not show what manufacturing needs to be done to make up the deficiency. For example it may report that there is enough stock to make the ten kettles but not show that you need to make five lids from sheet metal to do this. Further information in this respect may be available from the "suggested works orders" report.

Display parts explosion			
Product 2000	3 Pint Kettle 2KW	Whse 1	
Lev Product	Description	Quantity	Stock
1 2100	Kettle lid for 3 pint mottle	1.0000	0.000
2 2110	Lid handle	1.0000	-4.000
2 2120	Metal lid pressing	1.0000	-4.000
2 2130	2mm screw	3.0000	-24.000
2 2140	2mm nut	3.0000	-12.000
2 2150	2mm washer	3.0000	-24.000
1 2200	3 pint kettle body	1.0000	0.000
2 2210	Body handle, black plastic	1.0000	-4.000
2 2220	Rubber foot	3.0000	-12.000
2 2230	Metal 3 pint body pressing	1.0000	-3.000
3 2231	Sheet metal	5.0000	-5.000
2 2240	Metal spout	1.0000	-4.000
2 2250	Cable socket	1.0000	-4.000
2 2130	2mm screw	3.0000	-24.000
2 2150	2mm washer	3.0000	-24.000

Key <CR> to continue, <ESC> to exit :■

Figure 25 - Display Parts Explosion

Enquire structure cost summary	
Product 2000	3 Pint Kettle 2KW
Last works order WOPREFIX0000013	History records Y
Customer 0000510 HAVANT OFFICE EQUIPMENT	Cost last calculated 11/02/88
Costs	
Cost desc one	0.7950
Cost desc two	0.0000
Cost desc three	0.0000
Cost desc four	0.0000
Materials	4.5550
Cost desc six	0.0000
Cost desc seven	0.0000
Cost desc eight	0.0000
Cost desc nine	0.0000
Cost desc ten	0.0000
Total unit cost	5.3500

Key <CR> to continue, <ESC> :■

Figure 26 - Display Structure Cost Summary

**Display structure explosion**

This enquiry will show you all the components needed to make a structure. Where a component is itself a structure then the component structure will be broken down as well. The breakdown will continue until the lowest level is reached. Thus the program will show all of the components needed to make a structure from raw materials.

**Enquire structure cost summary**

This program will display the costs of a structure summarised by the ten analysis headings specified in the system parameters. It provides a quick way of looking at the costs involved in producing an assembly and provides some more detail than the standard cost in the Global 2000 Stock Control record.

Enquire works order

---

Works order WOPREFIX0000001    Customer 0000510 HAVANT OFFICE EQUIPMENT  
 Customer ref no Test works ord    Contract number  
 Date entered 23/09/86    Date ordered 23/09/86    Date required 23/09/86  
 Product 2000    3 Pint Kettle 2KW    Warehouse 1    Comp M  
 Quantity 2.0000    Qty completed 0.0000

---

Description	Costs	
	Total estimate	Actual so far
Cost desc one	0.0000	120.0000
Cost desc two	0.0000	0.0000
Cost desc three	0.0000	0.0000
Cost desc four	0.0000	0.0000
Materials	0.0000	0.0000
Cost desc six	0.0000	0.0000
Cost desc seven	0.0000	0.0000
Cost desc eight	0.0000	0.0000
Cost desc nine	0.0000	0.0000
Cost desc ten	0.0000	0.0000
Total cost	0.0000	120.0000

Key <CR> to continue, <ESC> :■

Figure 27 - Enquire Works Order (Costs)

Enquire works order

---

Works order WOPREFIX0000001    Customer 0000510 HAVANT OFFICE EQUIPMENT  
 Customer ref no Test works ord    Contract number  
 Date entered 23/09/86    Date ordered 23/09/86    Date required 23/09/86  
 Product 2000    3 Pint Kettle 2KW    Warehouse 1    Comp M  
 Quantity 2.0000    Qty completed 0.0000

---

Material details				
Product	Description	Unit	Qty released	Cost each
2100	Kettle lid for 3 pint mottle	EACH	0.0000	1.5750
2200	3 pint kettle body	EACH	0.0000	1.9800
2300	2KW Kettle lead	EACH	0.0000	0.5000

Key First, Next, <CR> to continue, <ESC> :■

Figure 28 - Enquire Works Order (Materials)

**Enquire works order**

During the time that a works order is in the system, you may enquire on it to look at its progress. Even after the works order is completed it remains in the system with a status of "completed" until you run the delete works order report. This allows you to look at the final state of a works order.

After entering the works order number the top part of the screen will show you the basic details of the works order. These include the structure code and description together with details of the customer and the quantity produced. Next you may select which of the detail screens you wish to see first. You may choose from costs, materials, operations and journals.

The costs section shows you a table containing the ten cost codes and descriptions together with the estimated & actual figures for each cost.

The material information screen shows the details of the materials required for the works order together with the quantity released.

The operations screen shows details of the works orders operations together with the quantity completed and the cost expected. Using this screen you can obtain a more complete picture of how the final costs were arrived at. The screen may also be used to check the progress of an order if it is not yet completed.

Using the journals screen you may find out details of the actual work done on a works order. This may show much more information than the operations screen if, for example, more than one person worked on an operation or if the process took a number of weeks to complete. For internal work you are given the following details: Date, operation, clock number, Hours worked, Labour rate, Cost and quantity completed. For external work you are given details of the date, operation, quantity complete and cost together with the cost narrative.

Enquire works order

---

Works order WOPREFIX0000001      Customer 0000510 HAVANT OFFICE EQUIPMENT  
 Customer ref no Test works ord      Contract number  
 Date entered 23/09/86      Date ordered 23/09/86      Date required 23/09/86  
 Product 2000      3 Pint Kettle 2KW      Warehouse 1      Comp W  
 Quantity      2.0000      Qty completed      0.0000

---

Operation details

Op No	Description	Ops per hr	Completed	Cost
1	Assemble parts together	50.0000	300.0000	0.5300
2	Pack in box with paperwork	50.0000	0.0000	0.5300
3	Return to stores	50.0000	0.0000	0.5300

Key First, Next, <CR> to continue, <ESC> :||

Figure 29 - Enquire Works Order (Operations)

Enquire works order

---

Works order WOPREFIX0000001      Customer 0000510 HAVANT OFFICE EQUIPMENT  
 Customer ref no Test works ord      Contract number  
 Date entered 23/09/86      Date ordered 23/09/86      Date required 23/09/86  
 Product 2000      3 Pint Kettle 2KW      Warehouse 1      Comp W  
 Quantity      2.0000      Qty completed      0.0000

---

Works order journal details

Date	Oper	Qty complete	Cost Clk cd	Hours	Labour rate
23/12/87	1	300.0000	120.0000 100	12.0000	10.0000

Key First, Next, <ESC> :||

Figure 30 - Enquire Works Order (Journals)

**File status enquiry**

This program will display information about the current data files in the system. It will show the total number of records available for each file together with the number of records actually used and the number of records free. The later two fields are also shown as percentages. This information may be of use in deciding how to reallocate the files after you have been running the system for a while. By keeping a regular check on this you will have plenty of warning of impending problems with files filling up. Note that an indexed-sequential file must have at least a small amount of spare space to be capable of being reorganised. The actual amount of space depends on a number of variables like the key length and the extent of the overflow area, but a rough figure to work to would be 10%.

After displaying the above information you are asked if you would like a print out which you do by keying P.

The screen displayed by this program is very similar to the re-allocate screen. However, it is advisable to use this enquiry function rather than the reallocate program to look at the file status as it does not require exclusive use of the data files.

```

MANUFACTURERS & SERVICES LTD.                      Thursday 11/02/88 18.04

GLOBAL - Manufacturer
Parts Structure Reports

Print parts structure. . . . . 1
Explode parts structure. . . . 2
Parts structure reorder report 3
Where used list (products) . . 4
Where used list (machines) . . 5
Inventory status by range. . . 6
Exit                               <CR>

Please select a function :#

```

Figure 33 - The Parts Structure Reports Menu

```

----- Parts structure list -----

Processing structure - 2200      ■

Report printing, Key <CTRL G> to interrupt

-----

First structure First
Last structure Last

Print material details Y
Print operation details Y
Print costs             Y

Extended quantity times      1.0000

```

Figure 34 - Print Parts Structure

## 7. PARTS STRUCTURE REPORTS

### Print parts structure

This report shows the details that have been defined for a structure. The report is basically in three parts - Overall expected costs, Materials required and Processes or operations involved. Any of the three sections may be omitted by setting the appropriate option on the screen. This report will only show the top level of a structure. The extended quantity times will be used to multiply the quantities of each material and operation required and its cost. This is only to allow you to see quickly, for example, how many screws would be needed to make twenty kettles. You may enter a range of structure codes to be printed. This facility to limit to a range of codes is common to most of the printed reports. If you press RETURN on its own to the "first" code, it will default to the first on file. Similarly, pressing RETURN to the "last" code will default to the last structure code on file. So if you wish to print details of only one structure, you must enter its code for both start and end of range. Also in common with most of the other reports, you may key <CTRL G> while it is printing to halt the print. Note that this interruption will only take effect after it has printed the structure it is currently processing and before it starts on the next. Thus there may be a delay after you hit the key before anything happens. This is so that you do not end up with any half-printed structures which could cause confusion.

Print parts explosion

---

Processing structure - 1000 ■

Report printing, Key <CTRL G> to interrupt

---

First structure First  
Last structure Last

In product code order Y

Warehouse 1

Figure 35 - Print Parts Explosion

**Explode parts structure**

This report is similar to the last but shows additional detail. In fact, it will "explode" the structure right down to its lowest-level component parts. An option allows you to suppress printing operation details if you only want a parts list.

Reorder Structures Report

---

Processing structure - 2230 ■

Report printing, Key <CTRL G> to interrupt

---

First structure First  
Last structure Last

Warehouse 1

Figure 36 - Reorder Structure Report

**Reorder structures report**

This report is similar to the stock reorder report from the Global 2000 Stock Control. The difference is that this report will only report on items that are structure definitions. This report may not be necessary if you have given the structure levels different product groups or ranges of product codes.



Figure 37 - Products Where Used in Assemblies

**Where used list (products)**

This function is provided to allow you to find out which structures make use of a particular product. This product may be a lowest-level component or a sub-assembly. You may thus see the likely effects of price changes of a certain commodity or the results of supply shortages. Note that only the immediately next higher level of use is shown. For example, the price of aluminium may suddenly increase and you wish to find out what will be influenced by this. The report will show you that aluminium sheet is used to make kettle lids and kettle bodies but not that these are used to make kettles. If you wish to find out everything that will be affected, you will have to run the program again with lid and body as the products to find where used.

Figure 38 - Machines where used in Assemblies

**Where used list (machines)**

This function is similar to the last. It provides a way to find out which structures may depend on the use of a certain machine or machine type. You may use this information to assess the effects of a machine breakdown. The report is subject to the same limitations as the previous report in that it will only show you the next higher-level structure (see note to above program). When you define a structure, you are invited to enter a four-character code for a machine to be used in each operation. You may give a different code to each physical machine you have available or a code to each logical type of machine (e.g. "A" for drilling machines, "B" for milling machines and so on). The first system is preferable as more detail is available. This information, though possibly not of use at present, may be desirable for further developments.

Inventory status by range

Processing product - 1008

Report printing, Key <CTRL G> to interrupt

---

First product First  
Last product Last  
Product group All  
Warehouse 1

Figure 39 - Global 2000 Stock status by range

**Global 2000 Stock status by range**

This report may be used to obtain stock level and other information about both structures and ordinary products. The report is similar to that provided by the Global 2000 Stock Control system except that only one line of report is used for each product.

```

MANUFACTURERS & SERVICES LTD.          Thursday 11/02/88 18.20

      GLOBAL - Manufacturer
      Works Order Reports

List new works orders. . . . . 1
List works orders by structure 2
List works orders by contract. 3
Where used list (products) . . 4
Where used list (machines) . . 5
List works order work details. 6
Print works order job cards. . 7
Works order cost sheet . . . . 8
Estimated versus actual costs. 9
List wrks ordrs for completion 10
Hours worked by clock card . . 11
Exit                               <CR>

Please select a function :#
  
```

Figure 40 - The Works Order Reports Menu

```

----- New works orders report -----

Printing works order - WOPREFIX0000012W

Report printing, Key <CTRL G> to interrupt

-----

First date set up 11/02/88
Last date set up 11/02/88
  
```

Figure 41 - The List New Works Orders Report

## 8. WORKS ORDER REPORTS

### List new works orders

This report prints out brief details of works orders that were set up on particular dates. You may enter a range of dates and the program will print out any works orders which were set up when the computer's system date was within the specified range. This report may be used as a works order daybook to show all input for a particular day.

```

      _____ Works orders for a structure _____
      |
      | Printing works order - WOPREFIX0000012M
      |
      | Report printing, Key <CTRL G> to interrupt
      |
      |_____
      |
      | Product code 2000
      |
  
```

Figure 42 - The Works Orders For a Structure Report

```

      _____ Common contract works order report _____
      |
      | Printing works order - WOPREFIX0000013M
      |
      | Report printing, Key <CTRL G> to interrupt
      |
      |_____
      |
      | Customer account  0000510
      | Contract number   All
      | Customer reference All
      |
  
```

Figure 43 - The Common Contract Works Order Report

**Works orders for a structure**

This report may be used to obtain brief details of all current works orders which are for a particular structure. You will be asked for the structure required and the report will print one line per works order. The report may be interrupted in the usual way by keying <CTRL G>.

**Common Contract Works Order Report**

This report may be used to print out brief details of works orders with the range being specified by any combination of customer, contract number or customer reference. On entering the program you will be asked for each of the above details. If you do not wish to restrict the range on one or more of the criteria you should press RETURN to the prompt. By use of the contract number and customer reference you may print out details of works orders which have been "tied together" as discussed in the maintain works orders section.

Products where used in works orders

Printing works order - WOPREFIX0000003M

Report printing, Key <CTRL G> to interrupt

Product code 2000

Figure 44 - The Where Used List (Products)

Machines where used in works orders

Printing works order - WOPREFIX0000006M

Report printing, Key <CTRL G> to interrupt

Machine code FRED

Figure 45 - The Where Used List (Machines)

**The where used list (products)**

This function will find out which works orders make use of a particular product. Thus you will be able to find out the likely effects of commodity price changes or supply shortages on work that is already in progress.

**The where used list (machines)**

This function is very similar to the last. It provides a way to find out which works orders depend on the use of a certain machine. You may use this information to assess the effects of a machine breakdown on jobs that are already in progress.

```

      _____ Works order working details list _____

      Printing works order - WOPREFIX0000001#

      Report printing, Key <CTRL G> to interrupt

      _____

      First works order      1
      Last works order 9999999
  
```

Figure 46 - The Works Order Working Details Report

```

      _____ Works order job card print _____

      Printing works order - WOPREFIX0000002#

      Report printing, Key <CTRL G> to interrupt

      _____

      First works order      1
      Last works order 9999999
      Page length      66
  
```

Figure 47 - Print Works Order Job Cards

**Print works order work details**

The working details list shows all the details that will be needed to actually manufacture the required product. It does not show costs or any other non-essential information. It is laid out in a similar way to the cost sheet with separate sections for general details, materials required and operations to be done. This report may be replaced by the job card if desired. The program works in a normal manner for reports in that it may be limited by range of works order numbers and may be interrupted at the end of each works order.

**Print works order job cards**

This report contains the same information as the works order working details list. It is intended that this will be printed on more substantial card or similar so that it may be used in the factory. It should thus stand up to wear and tear better than normal line-printer paper. The format allows it to be printed on card or paper which is a minimum of eight inches wide and which may be any depth between five and fifteen inches long (it must of course be a multiple of one sixth of an inch as this is the standard printer line spacing). The width includes the half-inch at each side for the sprocket holes. This may be perforated to allow it to be removed from the main card for filing.

The width of the printing is always the same so the paper width is not important. The page length must be specified when the program is run. A default is displayed which you may amend if required. The page length that you specify is "remembered" by the program so that it will appear as the default the next time you run this program.

```

Works order cost sheet print

Printing works order - 00000011

Report printing, Key <CTRL G> to interrupt

First works order      1
Last works order 9999999
  
```

Figure 48 - Print Works Order Cost Details

```

Estimated versus actual costs

Printing works order - 00000121

Report printing, Key <CTRL G> to interrupt

First works order      1
Last works order 9999999
Completed or outstanding C
Summary or detailed    S
  
```

Figure 49 - Print Estimated Versus Actual Costs

**Print works order cost sheet**

The cost sheet is basically a report of the actual costs involved in producing a works order. It is composed of five logically distinct sections. These are general information, materials used, processes completed, analysed costs and work done.

Take the five sections in order. The general section shows details such as the customer code, structure code, order date and so on.

The materials used section shows each material which is required on a separate line. The quantity actually released from stock is shown and the total cost of this quantity. A unit cost is shown. This is present even if none has been released.

The processes section shows all the operations required, again each on a separate line. The significant details shown against each operation include the quantity actually processed, the total hours worked and the cost of producing each item. This is calculated as the total cost of the process divided by the quantity processed.

The costs section shows the final costs incurred (if the works order is complete) or the costs so far (if not complete) analysed under the ten headings set up in system parameters and material costs. If the works order is complete, these costs are additionally divided by the final quantity completed to give a cost of producing each item.

Finally the work done section shows details of all the time logged to this works order in the reverse order of how it was entered (i.e. latest first). You may see each occasion time was logged along with the clock card number.

**Print estimated versus actual costs**

It may be of interest to compare the actual costs of production with the anticipated costs which were arrived at before manufacture started. This could be significant for new jobs where the estimates of time and so on may not be very accurate. In normal circumstances, if a process is repeated many times for a number of works orders, you should be able to form a fairly accurate estimate of how much it will cost to perform the process for the next order. You may also get a picture of the profitability of the works order by comparing the actual and estimated costs. Indications of a tendency one way or the other may actually help you to make more accurate estimates in future.

The report may be taken from completed orders or from outstanding orders. Obviously the completed orders will be of more interest in the above cases, but it may be of interest to see the costs incurred so far for orders which have not yet been completed. This may be useful in arriving at values for stage payments for example.

The report may also be printed with one line for each works order or full details of each operation. The latter may be used in locating where large deviations from the estimate occur.

Works orders ready for completion

Printing works order - WOPREFIX0000006M

Report printing, Key <CTRL G> to interrupt

Figure 50 - List Works Orders Ready For Completion

Hours worked by clock card

Sorting

Report printing, Key <CTRL G> to interrupt

First clock card

Last clock card zzzzzz

Figure 51 - The Hours Worked By Clock Card Report

**Works orders ready for completion**

This report shows you all of the works orders which are ready for completion but have not yet been completed. The program will check that all material items have had the full quantity of stock released to them while operations will be checked for all of the required work being done. Only if all stock is released and all work done will the works order appear on this report.

**List hours worked in clock card order**

This report prints out details of the clock card information which has been previously entered in the current batch. The concept of entering clock card data in batches has already been explained. You will thus realise that the information supplied by this and the previous report will only refer to any details entered since the file was last cleared. Sub-totals are printed for each clock card number. These and the final total are provided as an aid to checking the input. No batch total is requested when you enter the data. The report may be limited by range of clock card number. This allows you to list only the hours logged against one clock card number if you wish.



```

MANUFACTURERS & SERVICES LTD.          Thursday 11/02/88 18.30

GLOBAL - Manufacturer
System Maintenance
Reorganise data files. . . . . 1
Reallocate data files. . . . . 2
Maintain system parameters . . 3
Exit                               <CR>

Please select a function :#

```

Figure 52 - The System Maintenance Menu

```

Reorganise data files
-----
File
-----
Description      Required      Status
-----
Parts structure files      Y      Completed
Works order header        Y      Completed
Works order detail        Y      Completed
Works order journal        Y      Completed
History                  Y      In progress
Machine detail            Y

```

Figure 53 - Reorganise Data Files

## 9. SYSTEM MAINTENANCE

### Reorganise data files

#### Indexed-sequential files

Certain files in the system (works order header file and machine) are indexed-sequential. With such files the speed of response may deteriorate after new records are added. This degradation will affect every program accessing the file so it can have a marked effect on operation of the system.

Indexed files are arranged with the records stored in the order of their "keys". In the case of the works order file, for example, the records are stored in works order number sequence. The "disorganising" symptom is due to the fact that new records are added onto the end of the file and not slotted into their proper places. When any record is accessed, the system looks in the file at the location where the record should be. If it is not there, then the system must obviously look again to find it at the end of the file. This means that two attempts instead of just one must be made to access the record. The result of this can be very serious if the file is large and the system must look at widely-separated parts of the storage disk.

Another result of this way of handling records is that when a record is deleted or removed, the space it occupied is still tied up and may not be re-used unless a record is added with exactly the same key.

Reorganisation utilities in general rearrange the records into their correct sequence and regain space from deleted records. This will bring the speed of response back to its previous level. The file is first copied to a work area and then copied back to the data unit. The records are reorganised during the time that the file is copied back to the data unit. During this procedure, no one must attempt to access the file in question. The function gets "exclusive control" of the file. If someone is already using the file before the copy begins, an error message will be displayed and you will be prevented from carrying on. If the process fails during the copy to work area, the system will still be usable afterward. This failure may be due to insufficient space on the work unit or because the area is in use for some other purpose. If the failure is during the copy back to data area, the file will not be returned and it will not be usable. In this case you must restore from the last security copy or copy the file back using the BOS utilities. It may be advisable to contact your service centre if you are unsure about what to do in these circumstances.

In any event, it is always good policy to take a security copy immediately before any process which does large-scale updates to the data files. This includes file reorganisation.

### Relative-sequential files

The other main type of data file is relative-sequential. The records in this are not stored in any particular order and usually end up in chronological order. There are thus no keys to be disorganised. This would imply that you should never need to reorganise this type of file.

This type of file is necessary for rapidly-moving records like transactions for example, where the speed degradation inherent with indexed-sequential files would be unacceptable. However, if data were simply stored in this way, you would have to search through the whole file to find data items relating to a particular subject of interest. For example, you may wish to find all the transactions relating to a particular account. To get round this problem, relative-sequential files may have "pointers" associated with each record. For example, each transaction may have a pointer called "next transaction for this account". The system could thus jump quickly to the next desired transaction without having to inspect all the records in between. This is the strategy employed for some of the files in Global 2000 Manufacturer. For example the structure history file contains a pointer in each record which locates the next history (completed works order) record for the same structure. A series of records which may be followed using these pointers is referred to as a "chain".

A problem arises when you wish to remove a record from one of these chains. If the record is simply removed, any pointers which located this record will no longer be valid and any pointers which this record contained will be lost. In practice, a number of other things are altered because all the records following the deleted one are "shuffled down" to fill the gap. These pointers must be corrected to the new values to make the chains still valid.

A form of reorganisation is therefore required to keep these chains in order. A side benefit of the process is that the records will be re-arranged to keep each chain as short as possible. This means that all the records for each structure will be placed next to each other thus improving performance by avoiding any widely-separated accesses on the file.

In use, the reorganise process is almost identical to an indexed-sequential reorganise. The file is copied to the work area and copied back. On the way over, deleted records are removed and the pointers are reset to the correct values.

### Using the program

The reorganise data files screen is shown in figure 53. If you wish to reorganise all of the files you need only press RETURN to start the process going. However if you wish only to reorganise some of the files you should key Amend. You may then select which files are required by entering Yes or No as requested. After you have selected the files required you should then press RETURN to start the reorganisation process. The status of each reorganise is displayed in the right hand column of the screen as the process proceeds.

Reallocate Data Files					
Data Files		Current Allocation		New Allocation	
		Recs.	Used	Size	
PDH	Parts structure header	10	6	1300	10
PDD	Parts structure detail	30	25	2880	30
WOW	Works order header	20	13	5600	20
WOD	Works order detail	55	55	5500	55
WOJ	Works order journal	10	2	600	10
WML	Work log	10	1	540	10
HTF	History	10	2	960	10
MDF	Machine detail	20	8	1280	20
				18660	18660
Space remaining on data unit					93696

Figure 54 - Reallocate Data Files

The length of time taken to do the reorganise depends on the file size, the number of active records, how disorganised it is and the speed of the disk drive. It may take over an hour for very large files so you should plan this for a quiet period when the process will not disrupt normal operation too much.

### Reallocate data files

When the system is first set up you must allocate space for the data files. Each file is a constant-size area of the disk set aside for data relating to a particular subject. In BOS these areas must be decided before adding any data. A file is allocated empty and is filled up with records. Note that this is different from the concept of dynamically sized files, i.e. where a file is only as big as the data it contains and it increases in size as you add more. The file space calculations at the beginning of the manual are provided to allow you to work out the maximum space you will need on disk. It is always better to err on the side of allowing too much space rather than too little.

Once you have decided on the amount of space you are going to allow for each file, you must inform the system of this. This is the purpose of the file allocation function. The program will set up the files to the sizes you require and alter these sizes later if needed. A correctly planned system will have file sizes which can cope with fluctuations and increases in data over a reasonable period of at least a year and preferably more. The files may be reallocated to refine the estimated sizes after the system has been used for a while.

This ability to change file sizes must not be used as a substitute for accurate estimates. It is impossible to guess safely at the space which will be required for data without first obtaining accurate and detailed information on the exact form and quantities of data to be stored. This should have been done as one of the earliest parts of the planning stage.

The program first asks you if you wish to allocate new data files or reallocate existing files. You may press ESCAPE instead to exit the program. If you are setting up a new system, you should key N for new data. You will then be asked for the number of records you require for each file in turn.

If you are reallocating existing data files details of the existing files will now be displayed. You may see the maximum number of records allowed for, the number actually in use and the total file size in bytes. You are now asked for a new number of maximum records for each file in turn. This must not be smaller than the existing records used and must not be so large that there is not sufficient space for it in the data volume. Once you have entered the file sizes required you press RETURN to start the reallocation process going.

Any errors in reallocating the files will leave the system in an unusable condition so the same rules about security copies as in file reorganisation will apply. In other words, you should take a security copy before any reallocation and you may have to restore if it fails.

Maintain System Parameters			
Auth level display costs A	Cost element materials 5	Stock movement Y	
Update products Y	Update statistics Y	History recs per structure 10	
Cost descriptions 1. Cost desc one	2. Cost desc two		
3. Cost desc three	4. Cost desc four	5. Materials	6. Cost desc six
7. Cost desc seven	8. Cost desc eight	9. Cost desc nine	10. Cost desc ten
Hourly rates 1. 33.3300	2. 66.6600	3. 99.9900	
Bonus rates 1. 0.0000	2. 0.0000	3. 0.0000	
Works order prefix WOPREFIX	Last works order 13	Allocate Stock Y	
Operations per hour Y	Bonus rates Y		
Key Amend, <CR> to accept, <ESC> :H			

Figure 55 - Maintaining System Parameters

#### Maintain system parameters

Certain parts of the system are controlled by variable parameters. These parameters inform the system of information which is common to all the programs for any given set of data files. It would be tedious to have to enter this information in every program so it is stored in a parameter file. This file is not included in the reallocation process as it must always be present and its size will not need to change. The file may be allocated within this update program the first time you set up the parameters. If the file is not present, you are informed and asked if you wish to allocate it.

We will now take each of the system parameters in turn:-

The authorisation level display costs indicates the lowest authority level that is required to show costs on works order enquiries. This enables you to restrict cost information to operators who are entitled to know it.

The cost element materials selects which one of the ten cost elements is to be used for materials. All costs relating to materials will be logged to this code.

The stock movement, update products, update statistics and allocate stock flags control the way that stock is handled by the parts structure and works order programs. If the stock movement flag is set to "Y" for yes, stock movement records will be produced in the Global ICJ (Stock Movement Journal) file when stock is withdrawn or added. These records will appear on the Global 2000 Stock Control daybook. If the update products flag is set to yes then the book stock levels will be updated by the works order programs. If the product statistics flag is set to yes, the product statistics (sales to date, cost of sales, receipts to date etc) will be updated by stock movements. This may not always be required if you do not consider issues to works orders to be sales. If the allocate stock flag is set to yes then stock will be allocated and deallocated to works orders by the create works order and release material to works order programs respectively

History records per structure limits the maximum number of historical records that may be stored for any structure. When this limit has been reached, any new records (created by completing a works order) will overwrite the oldest ones. It will normally be necessary to keep this limit quite low to avoid using excessive amounts of disk space.

The ten cost descriptions are for analysis of the structure costs. This has already been explained. One of the costs should be reserved for materials and this would normally have the description "materials".

The three hourly rates are used to reduce the amount of data to be remembered and entered when defining structures and logging work hours. The rate will normally include the labour cost and any machine costs. The three bonus rates and the bonus rates flag are not used in this version of Manufacturer.

The works order prefix is an eight character alphanumeric item that is shown on works order reports and enquiries. The field is intended for use in multi company situations where it may be used to quickly identify which company a works order belongs to.

The last works order number is used to calculate the next works order number and it should not need to be changed. If you do change this number you should take care that the new works order number does not overlap with any existing works orders.

Depending on the normal length of time taken to perform an operation, it will be convenient to estimate for either operations per hour or hours per operation. Obviously very large operations would be easier to consider in terms of hours per operation. This flag applies across the whole system, so if your production involves operations that may vary between wide extremes, you will have to pick the setting that applies to the majority of cases and convert all timings to this form.

After you have entered all the amendments required, you may press RETURN to accept these amendments or ESCAPE to ignore them.

During the time that you are amending the parameters on the screen, no one else may be using the Global 2000 Manufacturer system. If they attempt to use one of the functions, an error message will be displayed and they will be prevented from going further. The reason for this is that one of the parameters you change may have some affect on what they are doing. This could lead to inconsistencies.

## 10. SETTING PASSWORDS AND AUTHORISATION LEVELS

```

Company Name                                     11/02/88 18.35

GLOBAL - Manufacturer

System Maintenance

Reorganise data files. . . . . 1
Reallocate data files. . . . . 2
Maintain system parameters . . 3
Exit                               <CR>

Please select a function

New Password:TERCESM
  
```

Each program within Global 2000 Manufacturer may optionally have a password and/or an authorisation level associated with it. Thus it is possible to restrict access to a program or group of programs to particular categories of operator.

To change the passwords or authorisation levels you must have an authorisation level of S or above; that is, you must be classed as a supervisor.

To make the actual change, key CUS at the menu which contains the function to be protected. You are then prompted for the line number to be updated followed by the new password and authorisation level. The password may be any six alphanumeric characters and the authorisation level may be from A to Z. For information on associating an authorisation level with a particular operator you should consult the BOS Operating Manual.

Note that if a password is already set for a particular line then that password will have to be quoted before it can be changed.

## Data file name

Program	SPF	PDH	PDD	WOH	WOD	WHL	HTF	MDF	WOJ
PX010	X	X	X						
PX020		X	X						
PX030		X	X						
PX040	X	X	X	X	X				
PX050	X			X	X				
PX080								X	
PX100									
PX110									
PX120	X	X	X						
PX130									
PX140	X	X							
PX200	X	X	X					X	
PX220	X	X	X	X					
PX230	X			X	X				
PX300									
PX310									
PX320	X	X	X	X					
PX400	*	*	*						
PX410	X	X	X						
PX420									
PX500	X			X	X	X			X
PX510	X					X			
PX520						X			
PX530	X		X	X				X	
PX540				X	X				X
PX600	X			X	X				
PX610	X			X	X			X	
PX620	X			X	X				X
PX630	X			X	X				
PX640	X			X	X				
PX660	X	X		X			X		
PX670	X			X	X				
PX680	X			X					
PX690	X			X					
PX700	X	X					X		
PX710	X	X	X	X				X	
PX720	X			X	X			X	
PX730	X			X					
PX899									
PX900		*	*						
PX910				*					
PX920		*	*	*	*	*	*	*	*
PX930				*	*				
PX940				*					*
PX950		*					*		
PX960		X	X	X	X	X	X	X	X
PX999	*								

"X" in a box means the file is accessed, "\*" means the file is locked.

## READERS' COMMENTS

Every care has been taken to make this Global software manual as clear, accurate and complete as possible. However, if you feel you can help us improve it please make your suggestions on the form provided below and return it to your dealer or to the Documentation Manager, BOS Software Limited, 87-89 Saffron Hill, London EC1N 8QU, United Kingdom.

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