

# **Global Configurator Manual Version 8.1 (Updates)**

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# 1. Introduction and Overview

This manual describes Global Configurator, a suite of programs which enable you to update the configuration file used to tailor Global System Manager to the requirements of a particular configuration.

The configuration file contains machine-specific data, such as interrupt vectors and device addresses. When a particular type of computer is used in only a small number of well-defined configurations it is possible to provide a configuration file matching your requirements precisely, and there will then be no need for you to modify it. Where, however, the computer is highly configurable, you alone will know the details necessary for the appropriate configuration file to be built. In this case, Global System Manager will be generated to use an 'approximate' configuration file. If the distributed configuration is not appropriate, you will have to modify it so that it meets your requirements using Global Configurator.

For example, Global Configurator is typically used to add consoles and printers to a standard, distributed configuration file. Global Configurator can also be used to tailor a configuration by omitting unused devices or to optimize performance by adjusting buffer sizes.

Although CFUPDATE is the only utility that allows new controllers to be **added** to an existing configuration file, other utilities allow the contents of an existing configuration file to be **customised**. The \$CUSA overlay of \$CUS (invoked by the "Configuration maintenance" option - see section 6.1.5 of the Global System Manager Manual) allows most of the machine-independent, customisable fields in a configuration file to be modified without resorting to CFUPDATE. Note that the customisations applied by most of the other options of \$CUS (with the exception of Printer Control file customisation) amend the contents of the \$STARB file in the P.\$CMLB0 library - they do not affect the configuration file. The optional =.NNNN utility (e.g. =.5700 for configuration 5700 - see Chapter 5 of the Global Operating Manual) allows some of the machine-dependent, customisable fields in a configuration file to be modified without resorting to CFUPDATE.

In order to modify the Global System Manager configuration on some host operating systems it is necessary to amend a native format file instead of, or in conjunction with, changing the Global Configuration file. For example, on Global System Manager (Unix) configurations glconfig, or the gladmin script, may be employed to reconfigure some aspects of Global System Manager (normally **instead** of using Global Configurator). On Global System Manager (MS-DOS, Windows and Novell) configurations the contents of the GSM.INI text file may be edited to reconfigure some aspects of Global System Manager (normally **in conjunction** with Global Configurator). Please refer to the relevant Global Operating Manual for further details.

Section 1.1 of this overview chapter describes the Global Configurator installation procedure.

Global Configurator provides two programs, CFPRINT and CFUPDATE, to enable you to print and update configuration files. These programs are described briefly in sections 1.2 and 1.3 of this overview. A third utility, CFAUTO, allows you to automatically update an existing configuration for use with a new version of Global System Manager. This program is described briefly in section 1.4.

This chapter concludes by summarizing a number of important points you should bear in mind when using Global Configurator in section 1.5.

Chapter 2 describes the report produced by CFPRINT in complete detail. This chapter should be read before attempting to update a configuration file as it contains details of some of the prompts that appear during the updating dialogue.

Chapter 3 describes the updating dialogue of CFUPDATE in complete detail. To avoid repetition, many of the messages that appear on the screen during the updating dialogue, and in the configuration file report, are described in Chapter 2. The text of Chapter 3 includes several references to sections in Chapter 2. Typically, CFUPDATE is used to modify the parameters that control Global System Manager device drivers that already exist in the configuration (e.g. to change the baud-rate of a serial screen); or to add one, or more, new device drivers to a configuration (e.g. to add a new printer driver).

FILE	FUNCTION
CFINS	Installation program which allows you optionally to install Global Configurator onto your hard disk.
CFMJ \$MRUN \$MTEST	Also used for installing Global Configurator
CFCREATE	Configuration file create program
CFPRINT	Configuration file print program
CFUPDATE	Configuration file update program
CFAUTO	Configuration file automatic update program
P.CF	Global Configurator program library
A.VTYPE	The Volume Type Action File. A file containing the descriptions of all the supported diskette and hard disk formats.
A.\$H	A help file used to create the Action Files described below.
A.am	Template file used to create the Action Files described below.
A.a0	A number of Action Files - Indexed Sequential files containing architecture specific data which parameterizes the general purpose Global Configurator to operate correctly.
A.CO	Action File for Global System Manager (Unix) configurations.
A.J0	Action File for Global System Manager (BOS), Global System Manager (MS-DOS) and Global System Manager (Novell) configurations.
A.W0	Action File for Global System Manager (Windows) configurations.
SDCOPY	An obsolete single-disk file copying utility (see Appendix C for details).

**Table 1.1 - Contents of the CFA volume**

Refer to Appendix D, E, F and G for further information about the Action Files A.VTYPE, A.J0, A.CO, A.W0 and CFCREATE.

## 1.1 Installing Global Configurator

Global Configurator is distributed on a single diskette, with a volume name of CFA, containing the files listed in table 1.1. You can, if you wish, run CFPRINT and CFUPDATE from the CFA distribution diskette itself, but if you anticipate using Global Configurator frequently you

may prefer to use the CFINS installation program to install Global Configurator onto your hard disk.

Installing Global Configurator is, strictly speaking, unnecessary, since the CFA volume is not software-protected. You can simply use \$F to copy the contents of the CFA diskette onto a hard disk volume.

If you decide to install Global Configurator onto a hard disk, mount the CFA diskette on the distribution unit and run CFINS from the menu or ready prompt. For example:

```
GSM READY:CFINS<CTRL A>
PLEASE ASSIGN $P:140
```

After a short delay you are prompted for the hard disk sub-unit to be used for a CFPROG volume. The optional default given in brackets will be the first CFPROG unit allocated or, if there is no CFPROG unit, the first unused sub-volume on your hard disk unit of suitable capacity (i.e. 500 Kbytes minimum). Key <CR> to accept the default, or specify another unit you wish to use. You will then be prompted to confirm that you wish to destroy the volume currently occupying the sub-unit specified, if this unit is already allocated:

```
Destroy volume_name on unit_address? (N):
```

Key Y to proceed, or N or <CR> to return to the "Specify CFPROG unit:" prompt in order to use a different unit.

The next prompt asks you to supply a size for the CFPROG volume:

```
Specify size of CFPROG - minimum size 500K (500K):
```

Key <CR> to accept the default, or key a larger size if you want to allow extra space for more configuration files on the volume.

The installation process then continues automatically with the message "Installing Global Configurator" being displayed on the screen. When the process is complete the following message is displayed:

```
Installation of Global Configurator complete, key <CR> to continue:
```

Key <CR> to return to the menu or ready prompt.

## 1.2 Locating and Printing the Configuration File

The configuration file is located on either the BACRES, SYSRES or SYSIPL volume. It can be recognised by its file type, IN, and its file name which begins with two "+" characters (e.g. ++5700ZJ).

In order to print a configuration file CFPRINT requires the Action File A.am to be present on the same unit as the configuration file. The A.am Action File (e.g. A.J5) is the machine-specific variant of the architecture-specific Action File A.a0 (e.g. A.J0). The A.a0 Action File is supplied on the CFA diskette. The A.am Action File is supplied on the BACRES volume and is normally copied to the SYSRES (or SYSIPL) volume during the installation of Global System Manager. If you attempt to print a configuration file when the A.am Action File is not present, the following message will appear:

```
ACTION FILE A.am NOT FOUND
YOU MUST COPY IT FROM BACRES TO THE CONFIG. FILE UNIT,
```



Key <CR> to return to the menu prompt and proceed as advised.

Once you have located the configuration file you can print it by running CFPRINT from the ready prompt or system menu (mounting the CFA, SYSIPL or BACRES diskette if necessary). For example, suppose the configuration file ++5700ZJ is on BACRES on unit 150, and Global Configurator has been installed on 209:

```
GSM READY:CFPRINT<CTRL A>
PLEASE ASSIGN $P:209
V8.1 PRINT CONFIG. FILE
CONFIGURATION FILE NAME:++5700ZJ UNIT:150
```

(After a short interval the print report is directed to \$PR)

If \$PR is assigned to a direct access device, CFPRINT will create a file named L.nnnnxt, where nnnnxt is the variable part of the configuration file name following the ++ prefix. For instance, in the example above, file L.5700ZJ would be produced. If the report file, L.nnnnxt, already exists on the \$PR unit, it is automatically overwritten by the new print file.

Chapter 2 contains a detailed description of the information which appears on the configuration file report.

If the reply to the CONFIGURATION FILE NAME prompt is <CTRL A>, CFPRINT uses the file that was used to load Global System Manager. For example:

```
GSM READY:CFPRINT
V8.1 PRINT CONFIG. FILE
CONFIGURATION FILE NAME:<CTRL A> ++5700ZJ UNIT:$DP
```

(After a short interval the print report file L.5700ZJ is directed to \$PR)

If the terminator of the reply to the UNIT prompt is <CTRL C>, the name and unit of the print file may be specified. For example:

```
GSM READY:CFPRINT
V8.1 PRINT CONFIG. FILE
CONFIGURATION FILE NAME:++5700ZJ UNIT:150<CTRL C>
SPECIFY PRINT FILE (L.5700ZJ):L.PRFILE UNIT ($PR):210
```

(After a short interval the print report file L.PRFILE is directed to 210)

Both these special features may be combined if the reply to the CONFIGURATION FILE NAME prompt is <CTRL C>, CFPRINT uses the file that was used to load Global System Manager and prompts for the name and unit of the print file. For example:

```
GSM READY:CFPRINT
V8.1 PRINT CONFIG. FILE
CONFIGURATION FILE NAME:<CTRL C> ++5700ZJ UNIT:$DP
SPECIFY PRINT FILE (L.5700ZJ):L.PRFILE UNIT ($PR):210
```

(After a short interval the print report file L.PRFILE is directed to 210)

If the configuration file is not present on the unit specified the CONFIGURATION FILE NAME prompt is usually re-issued. For example:

```
GSM READY:CFPRINT
V8.1 PRINT CONFIG. FILE
CONFIGURATION FILE NAME:++5700ZJ UNIT:150 NOT FOUND
CONFIGURATION FILE NAME:
```

However, if either of the first two characters in the file name are "=" you are given the option of retrying using the file name obtained by replacing the "=" character(s) by "+". This option allows automatic correction of the common typing mistake committed by keying "=" instead of "+" (note that "+" is SHIFT = on most keyboards). For example:

```
GSM READY:CFPRINT
V8.1 PRINT CONFIG. FILE
FILE NAME:==5700ZJ UNIT:150 NOT FOUND,TRY ++5700ZJ (Y)?
```

### 1.3 Updating the Distributed Configuration File

The simplest way of changing the configuration file is to update the one distributed with Global System Manager. You may either update the file on the BACRES diskette, or change it on the SYSRES (or SYSIPL) volume of the installed system itself. In either case do not alter the first six characters of the file-id involved. If you do, any attempt to reload Global System Manager will fail. However, we recommend that you do change the last two characters in order to identify the new configuration.

The following dialogue illustrates how CFUPDATE can be used to update the configuration file on BACRES. Unit assignments are as in the earlier CFPRINT example:

```
GSM READY:CFUPDATE<CTRL A>
PLEASE ASSIGN $P:209
V8.1 UPDATE CONFIG. FILE
CONFIGURATION FILE NAME:++5700ZJ UNIT:150
```

(updating dialogue - see Chapter 3)

```
OUTPUT FILE ( ++5700ZJ ):<CR> UNIT (150):<CR>
FILE ALREADY EXISTS - DELETE?:Y
PRINT FORMATTED DUMP? (N):<CR>
PRINT (Y):<CR>
```

The <CR> responses to the output file and unit prompts cause the configuration file to be updated in place.

The print formatted dump prompt is for use by TIS Software staff, who use such a dump to help them debug new versions of Global Configurator (see Appendix D). Key <CR> to avoid printing the dump. If a formatted dump is required, key Y to this prompt to produce a report file named D.nnnxt, where nnnxt is the variable part of the configuration file name following the ++ prefix. The formatted dump report file is normally created on unit \$PR (see below).

Key <CR> to the next prompt to produce a listing file named L.nnnxt, where nnnxt is the variable part of the configuration file name following the ++ prefix. The listing file is normally created on unit \$PR (see below).

After updating a configuration file on a BACRES volume, you must reload Global System Manager from the BACRES diskette. If you have changed or added any direct access controllers, you can now check that the modifications were successful by accessing the units in question using \$F or \$V. Finally, install the updated Global System Manager as described in your Global Operating Manual.

If the reply to the CONFIGURATION FILE NAME prompt is <CTRL A>, CFUPDATE uses the file that was used to load Global System Manager. For example:

```
GSM READY:CFUPDATE
V8.1 UPDATE CONFIG. FILE
CONFIGURATION FILE NAME:<CTRL A> ++5700ZJ UNIT:$DP

      (updating dialogue - see Chapter 3)
```

If the terminator to the "Y" reply to the FORMATTED DUMP prompt is <CTRL C>, the name and unit of the dump file may be specified. For example:

```
OUTPUT FILE ( ++5700ZJ ):<CR> UNIT (150):<CR>
FILE ALREADY EXISTS - DELETE?:Y
PRINT FORMATTED DUMP? (N):Y<CTRL C>
SPECIFY DUMP FILE (D.5700ZJ):D.PRFIL        UNIT ($PR):210
```

If the terminator to the reply to the LISTING FILE prompt is <CTRL C>, the name and unit of the listing file may be specified. For example:

```
OUTPUT FILE ( ++5700ZJ ):<CR> UNIT (150):<CR>
FILE ALREADY EXISTS - DELETE?:Y
PRINT FORMATTED DUMP? (N):<CR>
PRINT? (Y):<CTRL C>
SPECIFY PRINT FILE (L.5700ZJ):L.PRFIL      UNIT ($PR):210
```

These special features may be combined. For example:

```
GSM READY:CFUPDATE
V8.1 UPDATE CONFIG. FILE
CONFIGURATION FILE NAME:<CTRL A> ++5700ZJ UNIT:$DP

      (updating dialogue - see Chapter 3)

OUTPUT FILE ( ++5700ZJ ):<CR> UNIT (201):<CR>
FILE ALREADY EXISTS - DELETE?:Y
PRINT FORMATTED DUMP? (N):Y<CTRL C>
SPECIFY DUMP FILE (D.5700ZJ):D.PRFIL        UNIT ($PR):210
PRINT? (Y):<CTRL C>
SPECIFY PRINT FILE (L.5700ZJ):L.PRFIL      UNIT ($PR):210
```

Using the standard dialogue the old configuration file is either overwritten by the new configuration file:

```
OUTPUT FILE ( ++5700ZJ ):<CR> UNIT (201):<CR>
FILE ALREADY EXISTS - DELETE?:Y
```

or, if the output file is given a new name or is written to a different unit from the input file, the old configuration file is unaffected by the update:

```
OUTPUT FILE ( ++5700ZJ ):<CR> UNIT (201):<CR>
FILE ALREADY EXISTS - DELETE?:N
OUTPUT FILE ( ++5700ZJ ):++5700ZJ UNIT (201):202
```

A special response of <CTRL A> to the FILE ALREADY EXISTS prompt at the end of the update allows the old configuration file to be renamed. Using the following dialogue, the new configuration file is given the same name as the old file but the existing file is renamed to avoid a deletion (i.e. a backup of the original configuration file is created):

```
OUTPUT FILE ( ++5700ZJ ):<CR> UNIT (201):<CR>
FILE ALREADY EXISTS - DELETE?:<CTRL A>
```

```
RENAME ++5700ZJ TO (*.5700ZJ):<CR>
```

The default name of the backup file may be overridden. For example:

```
OUTPUT FILE (++)5700ZJ):<CR> UNIT (201):<CR>
FILE ALREADY EXISTS - DELETE?:<CTRL A>
RENAME ++5700ZJ TO (*.5700ZJ):++BACKUP
```

If the backup file already exists, a warning is displayed. For example:

```
OUTPUT FILE (++)5700ZJ):<CR> UNIT (201):<CR>
FILE ALREADY EXISTS - DELETE?:<CTRL A>
RENAME ++5700ZJ TO (*.5700ZJ):<CR> FILE ALREADY EXISTS, DELETE?:N
RENAME ++5700ZJ TO (*.5700ZJ):++BACKUP
```

The special reply of <CTRL A> to the RENAME prompt may be used to return to the original OUTPUT FILE prompt. For example:

```
OUTPUT FILE (++)5700ZJ):<CR> UNIT (201):<CR>
FILE ALREADY EXISTS - DELETE?:<CTRL A>
RENAME ++5700ZJ TO (*.5700ZJ):<CR> FILE ALREADY EXISTS, DELETE?:N
RENAME ++5700ZJ TO (*.5700ZJ):<CTRL A>
OUTPUT FILE (++)5700ZJ):
```

If the configuration file is not present on the unit specified the CONFIGURATION FILE NAME prompt is usually re-issued. For example:

```
GSM READY:CFUPDATE
V8.1 UPDATE CONFIG. FILE
CONFIGURATION FILE NAME:++5700ZJ UNIT:150 NOT FOUND
CONFIGURATION FILE NAME:
```

However, if either of the first two characters in the file name are "=" you are given the option of retrying using the file name obtained by replacing the "=" character(s) by "+". This option allows automatic correction of the common typing mistake committed by keying "=" instead of "+" (note that "+" is SHIFT = on most keyboards). For example:

```
GSM READY:CFUPDATE
V8.1 UPDATE CONFIG. FILE
FILE NAME:==5700ZJ UNIT:150 NOT FOUND,TRY ++5700ZJ (Y)?
```

## 1.4 Automatically Updating a Configuration File

CFAUTO is provided to allow you to run an existing configuration file through Global Configurator WITHOUT giving you the opportunity to make any modifications to the configuration file. This utility should only be used to upgrade an existing configuration file for use with a new version of Global System Manager.

The initial dialogue for CFAUTO is very similar to the dialogue for CFUPDATE (see section 1.3). However, CFAUTO always overwrites the existing configuration file and never gives you the opportunity to produce a print report or a formatted dump. For example:

```
GSM READY:CFAUTO
V8.1 UPDATE CONFIG. FILE
CONFIGURATION FILE NAME:++5700ZJ UNIT:150
```

(updating dialogue - see Chapter 3)

As with CFUPDATE, if the reply to the CONFIGURATION FILE NAME prompt is <CTRL A>, CFAUTO uses the file that was used to load Global System Manager. For example:

```
GSM READY:CFAUTO
V8.1 UPDATE CONFIG. FILE
CONFIGURATION FILE NAME:<CTRL A> ++5700ZJ UNIT:$DP

      (updating dialogue - see Chapter 3)
```

If the configuration file is not present on the unit specified the CONFIGURATION FILE NAME prompt is usually re-issued. For example:

```
GSM READY:CFAUTO
V8.1 UPDATE CONFIG. FILE
CONFIGURATION FILE NAME:++5700ZJ UNIT:150 NOT FOUND
CONFIGURATION FILE NAME:
```

However, if either of the first two characters in the file name are "=" you are given the option of retrying using the file name obtained by replacing the "=" character(s) by "+". This option allows automatic correction of the common typing mistake committed by keying "=" instead of "+" (note that "+" is SHIFT = on most keyboards). For example:

```
GSM READY:CFAUTO
V8.1 UPDATE CONFIG. FILE
FILE NAME:==5700ZJ UNIT:150 NOT FOUND,TRY ++5700ZJ (Y)?
```

## 1.5 Operating Notes

When using Global Configurator please remember the following points:

- The volumes containing Global Configurator and the configuration file must both be online throughout the entire duration of the print (CFPRINT) or update (CFUPDATE and CFAUTO). This is necessary because Global Configurator requires constant access to the action files, as well as to the overlays in P.CF, even during a print operation.
- The machine-specific Action File A.am, which CFPRINT and CFUPDATE need in order to access the configuration file, must be on the same unit as the configuration file. Note that earlier versions of Global Configurator searched for this action file on both the Global Configurator unit and also on the configuration file unit which resulted in confusion if two different copies of the action file were present on each unit.

To summarise:

Action file type	Filename	Location
Architecture-specific	A.a0	Global Configurator unit
Volume type	A.VTYPE	Global Configurator unit
Machine-specific	A.am	Configuration file unit

In practice the configuration file unit can be the same as the Global Configurator unit.

- If you are updating the configuration file on a starter system it is essential to update a **copy** of the BACRES diskette in case your updates cause the Global System Manager initiation (i.e. bootstrap)

to fail. If you are updating the configuration file on an installed system it is essential to create an emergency SYSIPL diskette or to have the BACRES diskette available in case your updates cause the Global System Manager initiation (i.e. bootstrap) to fail.

- If event logging is enabled, CFUPDATE will write a record to the log file whenever a configuration file is updated. The Event Logging Application-code is set to "CF". The Event Logging Data-unit is set to the configuration file unit. The Event Logging log-type is set to "M". The Event Logging application-function is left blank.
- The following architecture-specific and machine-specific action files are distributed with Global System Manager V8.1:

Host operating system	A.a0	A.am
BOS	A.J0	A.J5
MS-DOS and Windows	A.J0	A.JW
Novell NetWare (workstation)	A.J0	A.JW
Novell NetWare (NLM)	A.C0	A.C3
Unix	A.C0	A.C2
Windows	A.W0	A.W1

- The Global System Manager loader expects the name of the configuration file on the IPL unit (i.e. BACRES, SYSRES or SYSIPL) to be ++NNNNxx, where NNNN is the numeric part of the configuration code. The loader only checks the first 6 characters of the configuration file name; the last 2 letters are ignored. If the IPL unit does not contain a configuration file with the expected name it will not be possible to load Global System Manager from that device. If more than one configuration file with the correct name is present on an IPL volume, the loader uses the first configuration file in the directory. This may give unexpected results if more than one configuration file with the expected name is present on an IPL unit.

**It is vital that there is one, and only one, ++NNNNxx configuration file on an IPL unit.** The recommended technique for deactivating a configuration file is to simply rename ++NNNNxx to \*.NNNNxx (i.e. replace the first two characters "+" by "\*.")

On Global System Manager (BOS), Global System Manager (MS-DOS, Windows) and Global System Manager (Novell NetWare) configurations the following severe warning message will be displayed on the master console if more than one active configuration file (i.e. with a file-name of ++NNNN) is present on the IPL volume:

WARNING-MULTIPLE ENTRIES IN IX-BLOCK FOR ++NNNNxx

- If you use the updating dialogue to change a single-user configuration to a multi-user configuration by, for example, adding extra screens or requesting concurrency for a single screen, the update will appear to succeed, and the diskette bootstrap will continue to operate (unless you have made some other error). However, it will still only be possible to install a single-user Global System Manager because the commands to support multi-user working will not be present on the BACRES volume. For the same reason you cannot upgrade a single-computer Global System Manager to a networking Global System Manager.

- The configuration file determines the size of the nucleus (i.e. the permanently resident, machine-specific component of the software). If the nucleus increases in size less space will be available for allocation as memory banks or RAM disk. **On some computers the space available for the nucleus is very limited and increasing its size may prevent Global System Manager from loading correctly.**

If this occurs, then if there is insufficient space for any type of system to be brought up a message of the form:

```
$99 ERROR M LOADING xxxxxxxx
```

may appear (under some circumstances the Global System Manager load may fail unexpectedly without any messages appearing).

If it is possible to bootstrap, but the nucleus is so large that the part of the monitor which cannot be swapped is forced into the memory bank area employed by user partitions, the message:

```
$57 INITIATION WARNING 201 TOO MUCH MONITOR IS SWAPPED
```

will appear, and a single-user Global System Manager will be initiated.

- In addition to CFPRINT, CFUPDATE and CFAUTO a fourth program, CFCREATE, is supplied on the CFA diskette. CFCREATE is used to create configuration files without requiring an existing template file. **Do not attempt to use CFCREATE.**
- Note to TIS Software staff only: The default reply to the PRINT? prompt is "Y" when CFUPDATE is used on an external version of Global System Manager. However, this default is "N" when CFUPDATE is used on an internal version of Global System Manager. The default reply to the PRINT FORMATTED DUMP? prompt is always "N" regardless of the serial number.

## 2. The Configuration File Report

Figure 2.1 is the first page of a typical configuration file report. Each page begins with a title line containing the configuration file name together with the date and time of printing. The remainder of the report is divided into a number of sections, each of which is described individually below.

### 2.1 The Prologue

The prologue contains information about the implementation of Global System Manager, and the date and time the configuration file was created or last updated, under the following headings.

#### 2.1.1 MACHINE

The information provided consists of the **machine short description** (e.g. IBM PC), which is used internally by Global Configurator, together with the full **machine name** (e.g. IBM PC/XT/AT). This string is displayed on the system information text produced by \$S and is made available to programmers in the PIC X(15) system variable \$MACH.

#### 2.1.2 CODE

This is the two-character machine code used to identify the machine-specific components used by your system. This information is displayed on the system information text produced by \$S and is made available to programmers in the PIC X(2) system variable \$MCOB. The current allowed values for \$MCOB are as follows:

```
J5  Global System Manager (BOS on IBM PC)
JW  Global System Manager (MS-DOS and Windows)
JW  Global System Manager (Novell NetWare)
C2  Global System Manager (Unix)
W1  Global System Manager (Windows)
```

#### 2.1.3 SUBCODE

The subcode is now obsolete. It was used to distinguish between computer variants, so that different prompts and defaults could be provided.

#### 2.1.4 ARCHITECTURE CODE

The architecture code is a single character that identifies the architecture-specific instruction set used by assembler language programs. This character is displayed on the system information text produced by \$S and is made available to programmers in the PIC X system variable \$ARCH. The current allowed values for \$ARCH are:

```
J    Global System Manager (BOS on IBM PC)
J    Global System Manager (MS-DOS and Windows)
J    Global System Manager (Novell NetWare)
C    Global System Manager (Unix)
W    Global System Manager (Windows)
```

#### 2.1.5 LAST UPDATED ON

The date and time at which the configuration file was last updated appear. The operator-id of the person who last updated the file appears on the same line.

#### 2.1.6 BOOTSTRAP MESSAGE



The bootstrap message consists of 10 lines of up to 40 characters. It will be displayed before the initial date prompt whenever Global System Manager is loaded from the distribution diskettes. It is suppressed once Global System Manager has been installed so as to avoid confusing operators with unnecessary detail. It describes the hardware configuration supported.

The first line of the bootstrap message includes a special keyword which indicates the Global System Manager software level (see section B.3). The first line also contains a number that indicates the maximum number of screens that can be included in the configuration file.

Note that the "\*\*\*" characters which appear before some lines of the Bootstrap Message are used internally by TIS Software and have no special significance within Global Configurator.

```

CONFIGURATION FILE ++5700ZJ                01/01/95    11.19.50    PAGE 1

  MACHINE : iSERVER /TIS iSERVER

  CODE : J5 SUB CODE :      5 ARCHITECTURE CODE : J

LAST UPDATED ON   01/01/95 AT 18.14.49 BY AJU

BOOTSTRAP MESSAGE :

  BOS/XLAN (Arcnet)  9999
  **1 5-inch Diskette Drive
  **2 Variable size Winchester Disks
  **Main Console on COM1
    6 Hyperport Consoles
  **1 Parallel Printer
    2 Hyperport Printers
  **Tape Streamer and RAM Disk disabled
  **Disk Cacheing enabled
  Arcnet

```

**Figure 2.1 - Configuration File Report Prologue**

## 2.2 Controller Details - General

The prologue is followed by the controller details section describing the **controllers** (i.e. device drivers) required for the direct access devices, consoles, tapes, printers and networking hardware supported by the configuration, in that order.

In order to use the same configuration file on a number of differently configured machines, the controller details section may sometimes specify a superset of the devices available on any particular computer. This can result in the eventual permanently-resident nucleus being larger than is strictly necessary. It may contain extra data tables as well as extra drivers that are not needed. In some implementations warning messages (described in Appendix B of the Global Operating Manual) appear during the diskette load procedure to inform you that the nucleus contains support for devices which the computer in question does not possess.

### 2.2.1 CONTROLLER SHORT DESCRIPTION

The controller short description is a code, up to eight characters in length, appearing in the leftmost column of the report. In the example

in figure 2.2 nine different controllers are defined: the short descriptions are DISKETTE, ADAPTEC (disk), RAM DISK, TTY, HYPER (console), ADAPTEC (tape), PRINTER, HYPER (printer) and ARCNET.

### 2.2.2 CONTROLLER TITLE

The controller title is an explanatory text of up to 30 characters separated from the short description by a / character. It will normally be the same as the title of the machine-code driver. The purpose of the title as far as Global Configurator is concerned is to make the controller short description more meaningful. These titles, unless further modified, appear with the associated units in the \$U display of disk and printer information.

### 2.2.3 CONTROLLER CODE

The controller code consists of two hexadecimal digits used to determine the program-id of the controller, which is of the form:

+amCxnn (for diskette, hard-disk, console, printer and network controllers)

or:

%.amCTnn (for tape controllers)

where:

am is the machine code (as described in 2.1);

x controller type code:

A	for a direct access controller;
B	for a console controller;
E	for a printer controller;
F	for a network controller;

nn is the two digit controller code.

Thus the name of the controller for the Adaptec SCSI disk (short description ADAPTEC) in the example is +J5CA09.

CONFIGURATION FILE ++5700ZJ PAGE 2	CONTROLLER DETAILS	01/01/95	11.19.50
DISKETTE/Diskette drive DRIVE	CONTROLLER CODE 01 Drive drive type 0 = Dynamically determine 1 = Low capacity (360K) 5" 2 = High capacity (1.2M) 5" 3 = Low capacity (720K) 3" 4 = High capacity (1.44M) 3" 5 = Extra high (2.88M) 3" Specify drive type 0	DRIVE 0	1ST DISKETTE
DISKETTE/Diskette drive DRIVE	CONTROLLER CODE 01 Drive drive type 0 = Dynamically determine 1 = Low capacity (360K) 5" 2 = High capacity (1.2M) 5" 3 = Low capacity (720K) 3" 4 = High capacity (1.44M) 3" 5 = Extra high (2.88M) 3" Specify drive type 0	DRIVE 1	2ND DISKETTE
ADAPTEC /Adaptec SCSI disk SCSI DISK	CONTROLLER CODE 09 Partition number 0	DRIVE 0	1ST ADAPTEC
ADAPTEC /Adaptec SCSI disk SCSI DISK	CONTROLLER CODE 09 Partition number 0	DRIVE 1	2ND ADAPTEC
RAM DISK/RAM DISK	CONTROLLER CODE 63		RAM DISK
TTY /Asynchronous console	CONTROLLER CODE 02 TYPE AHEAD BUFFER LENGTH DISPLAY BUFFER LENGTH FUNCTION KEY BUFFER LENGTH SCREEN IMAGE WIDTH SCREEN IMAGE DEPTH NUMBER OF STORED ATTR' BYTES NUMBER OF PARTITIONS CHARACTER TRANSLATION ENABLED CONSOLE EXECUTIVE FLAG BYTE Device address Baud rate Attribute byte Interrupt level (1-7) 0 = dynamically determine Modem input control lines 01=CTS, 02=DSR, 04=DCD Modem output control lines 01=RTS, 02=DTR Delay before raising control line after line down(bit0-3) Delay before flagging after line up(bit4-7) Enable NS16550A FIFO	100 500 100 132 24 1 4 Y #00 #03F8 9600 #74 0 #00 #00 #11 N	

**Figure 2.2 (part-1) - Configuration File Report Controller Details Section**

### 2.2.4 The Port Number, Device Register or Interrupt Vector

Frequently controller entries contain machine-specific information such as a port number, or the addresses of device registers or interrupt vectors. The information is used to parameterize the controller so that the same code can be used on a variety of configurations. It is impossible to describe all the message lines which may appear for different computers in a general-purpose manual, and the header preceding this paragraph just shows three typical examples. In practice the information will correspond closely to that described in the manufacturer's handbook for the computer and, in this sense, should be self-explanatory.

As a general guide, information that appears in lower-case text parameterizes the low-level, machine-specific drivers while information that appears in upper-case text parameterizes the higher level executives.

You should note that hexadecimal values are preceded by a # character (and octal ones by a ' character).

Some of the machine-dependent parameters in the configuration file can be customised using the Configuration Maintenance (Extended customisation) option of \$CUS. Please consult the Global Operating Manual for more details.

## 2.3 Direct Access Controller Information

There is a direct access controller entry in the controller details section for each physically distinct direct access device the configuration supports. Thus in the example there are five entries, representing two diskette drives, two hard disks, and the RAM disk (RAM disk is a pseudo-disk implemented using any spare memory in the computer). Each entry sets up a number of direct access peripheral control blocks in the nucleus data area (see section D.3).

### 2.3.1 DRIVE

When the same controller supports more than one drive, the **drive number** is used to distinguish the different controller table entries. By convention drive numbers are allocated consecutively from 0. Thus in the example, the DISKETTE and ADAPTEC controllers both handle two drives, numbered 0 and 1.

CONFIGURATION FILE	++5700ZJ	CONTROLLER DETAILS	01/01/95	11.19.50
PAGE 3				
HYPER /Console on Hyperport card		CONTROLLER CODE 60		
		TYPE AHEAD BUFFER LENGTH		100
		DISPLAY BUFFER LENGTH	500	
		FUNCTION KEY BUFFER LENGTH	100	
		SCREEN IMAGE WIDTH		132
		SCREEN IMAGE DEPTH		24
		NUMBER OF STORED ATTR' BYTES	1	
		NUMBER OF PARTITIONS	2	
		CHARACTER TRANSLATION ENABLED	Y	
		CONSOLE EXECUTIVE FLAG BYTE	#00	
		Hyperport card number (0-3)		0
		Channel number (1 to 24)		1
		Console baud rate	9600	
		Console attribute byte		#F4
ADAPTEC /Adaptec SCSI tape		CONTROLLER CODE 02		
		Default tape length in feet		600
		Drive SCSI I.D.		6
PRINTER /Parallel printer		CONTROLLER CODE 01		UNIT 500
Parallel printer				
		HARDWARE FORM FEED	Y	
		MAXIMUM PAGE WIDTH	132	
		TIME-OUT IN TENS OF SECONDS	2	
		SPOOLER CONTROL BITS	#00	
		PRINTER EXECUTIVE FLAG BYTE	#FF	
		DEVICE CHARACTERISTICS	#40	
HYPER /Printer on Hyperport card		CONTROLLER CODE 60		UNIT 502
Hyperport printer				
		Printer baud rate		9600
		HARDWARE FORM FEED	Y	
		MAXIMUM PAGE WIDTH	132	
		TIME-OUT IN TENS OF SECONDS	2	
		SPOOLER CONTROL BITS	#00	
		PRINTER EXECUTIVE FLAG BYTE	#FF	
		Printer attribute byte		#74
		Hyperport card number (0-3)		0
		Channel number (1 to 24)		8
ARCNET /SMC ARCNET-PC board		CONTROLLER CODE 02		
		Data length of full LAN buffer		2000
		POLLS TO WAIT BETWEEN ACCESSES		60
		NORMAL TIME-OUT IN SECS	15	
		TIMEOUT ON 1ST ACCESS IN SECS	3	
		LAN EXECUTIVE RETRY COUNT		0
		WAN MASTER NODE-ID	0	
		LAN EXECUTIVE FLAG BYTE	#00	
		Status register address		#0240
		Interrupt mask register		#0240
		Command register	#0241	
		Software reset port		#0248
		Interrupt vector address		#0028
		Interrupt channel	2	
		Top byte of memory address		#0D

**Figure 2.2 (part-2) - Configuration File Report Controller Details Section**

## 2.4 Console Controller Information

There is an entry in the controller details section for each terminal that can be used by Global System Manager. There will therefore be one entry for a single-screen Global System Manager configuration and one entry for each interactive user of a multi-user Global System Manager configuration. There is only one entry per screen, even if the screen supports concurrency. In the example there is an entry for a serial screen attached to a standard asynchronous port (e.g. COM1), called TTY, and a second screen attached to a Hyperport sub-system, called HYPER. Further information in this section establishes that the TTY screen supports up to four concurrent partitions, and the HYPER screen supports up to two concurrent partition.

In a network environment, each computer on the network that is hosting Global System Manager may potentially use a different configuration file and hence have a different number of attached screens. The configuration file for a computer on a network will contain entries only for screens directly attached to it.

There is a 32-byte user element set up in the nucleus data area for each concurrent user (see section D.4). Furthermore, each controller sets up a number of nucleus data areas (see section D.4).

In a multi-user configuration the first console entry defines the master terminal used during the Global System Manager load procedure.

### 2.4.1 TYPE AHEAD BUFFER LENGTH

Normally the length of the type-ahead buffer is 100 characters: a larger buffer can be provided for terminals that are frequently used for screen transfers using the <SYSREQ> X facility.

A type-ahead buffer of N allows N-1 characters to be keyed ahead. Note that Global Configurator does not allow a type-ahead buffer of one character. The meaningless value of 1 is converted to 0.

A value of 0 is special and means that the device does not support type-ahead. (The CHECK\$ system routine will always signal exception condition 1 if the type-ahead buffer length is 0.)

If the Comms Support Pack \$FCOMM utility is used during a terminal emulation session on a port configured as a serial console the type-ahead buffer length must be at least 800 characters.

The TYPE AHEAD BUFFER LENGTH in the configuration file can be customised using the Configuration Maintenance (Console Control Blocks) option of \$CUS.

### 2.4.2 DISPLAY BUFFER LENGTH

Characters output by DISPLAY statements and their variants are temporarily stored in the console's display buffer. I/O for serially-connected screens usually proceeds asynchronously under interrupt control. The result is that a DISPLAY or equivalent statement only causes Global Cobol execution to be suspended when the buffer becomes full.

Increasing the length therefore improves performance, particularly on configurations with more than one screen. Global Configurator ensures that a minimum buffer length of 12 bytes more than the screen image

width, sufficient to hold the largest message produced by any one display, is set up (with an absolute minimum value of 92).

There is no benefit in increasing the buffer space allocated for memory-mapped screens above the minimum, as I/O to such screens is done immediately as part of the DISPLAY operation.

If the Comms Support Pack \$FCOMM utility is used during a terminal emulation session on a port configured as a serial console the display buffer length must be at least 500 characters.

The DISPLAY BUFFER LENGTH in the configuration file can be customised **for serial screens only** using the Configuration Maintenance (Console Control Blocks) option of \$CUS.

### 2.4.3 FUNCTION KEY BUFFER LENGTH

It is possible to program a set of software function keys so that repetitive commands can be accessed with two or three keystrokes. If the length of the buffer is 0 then no software function keys are allowed. Each software function key defined occupies text-length plus two bytes in the buffer. A different function key buffer is available for every console in the configuration.

Note that Global Configurator does not allow a function-key buffer that is less than 100 characters (a function-key buffer length of 1 to 99 is replaced by 0).

The FUNCTION KEY BUFFER LENGTH in the configuration file can be customised using the Configuration Maintenance (Console Control Blocks) option of \$CUS.

### 2.4.4 SCREEN IMAGE WIDTH

Normally the width of each screen image is 132 characters. The maximum width permitted is 192 characters.

The width of the screen image must not be less than terminal width of the screen as specified in the Terminal Attribute Program (TAP). If the terminal width, specified in the TAP, is greater than the screen image width, specified in the configuration file, the following message will appear when the operator attempts to sign on:

INCORRECT TERMINAL WIDTH

The SCREEN IMAGE WIDTH in the configuration file can be customised using the Configuration Maintenance (Console Control Blocks) option of \$CUS.

### 2.4.5 SCREEN IMAGE DEPTH

Normally the depth of each screen image is 24 lines. This value must be increased if a terminal which supports more than 24 display lines (usually 25 lines) is connected to the computer via the serial port accessed by the current controller.

The depth of the screen image must not be less than terminal depth of the screen as specified in the Terminal Attribute Program (TAP). If the terminal depth, specified in the TAP, is greater than the screen image depth, specified in the configuration file, the following message will appear when the operator attempts to sign on:

INCORRECT TERMINAL DEPTH

A screen depth of zero indicates that no screen image is stored (which effectively disables concurrency on the selected console).

The SCREEN IMAGE DEPTH in the configuration file can be customised using the Configuration Maintenance (Console Control Blocks) option of \$CUS.

#### **2.4.6 NUMBER OF STORED ATTR' BYTES**

Normally, this will be set to one for monochrome screens or two for colour screens. To reduce memory usage on very large multi-user systems it may be necessary to set the number of attribute bytes to 1 on all screens. However, to achieve the best results from a Global Speedbase application on a colour screen, the number of attribute bytes must be set to 2. Note that 2 is the maximum number of attribute bytes allowed.

The NUMBER OF STORED ATTR' BYTES in the configuration file can be customised using the Configuration Maintenance (Console Control Blocks) option of \$CUS.

#### **2.4.7 NUMBER OF PARTITIONS**

The number of partitions determines the maximum number of tasks that this particular screen can run concurrently.

Note that while it is possible to specify any number of partitions from one to nine, the default value is 4. Note also for versions of Global System Manager earlier than V8.1 you were recommended not to allocate more than four partitions, as only the first four partitions were catered for in the Global System Manager customisation (e.g. automatic menu entry selection). This restriction has been removed for Global System Manager V8.1, and later.

The NUMBER OF PARTITIONS in the configuration file can be customised using the Configuration Maintenance (Console Control Blocks) option of \$CUS.

#### **2.4.8 CHARACTER TRANSLATION ENABLED**

If character translation is enabled then both received characters and displayed characters may be translated using the translation table set up in the Terminal Attribute Program (TAP). Character translation is required for most TAPs. If translation is required by the TAP but not enabled in the configuration file, the following message will appear when the operator attempts to sign on:

UNABLE TO LOAD TRANSLATION TABLE

The "CHARACTER TRANSLATION ENABLED" text in the configuration file print report may be replaced by "Enable Character Translation" if character translation is obligatory for a particular console.

The CHARACTER TRANSLATION ENABLED flag in the configuration file can be customised using the Configuration Maintenance (Console Control Blocks) option of \$CUS.

#### **2.4.9 CONSOLE EXECUTIVE FLAG BYTE**

This is the hexadecimal value of the Console Executive flag byte, as defined below. Table 2.4.1 describes the allowed values of this flag



byte. Table 2.4.2 describes the meanings of the individual bits in this flag byte.

The CONSOLE EXECUTIVE FLAG BYTE in the configuration file can be customised using the Configuration Maintenance (Console Control Blocks) option of \$CUS.

#### **2.4.10 Baud Rate, Port Number or Interrupt Vector etc.**

All other items in the console controller section are machine-dependent though many of them are closely equivalent to each other. In the example the following prompts appear for the console on the Hyperport card:

Hyperport card number (0-3)

Channel number (1-24)

Console baud rate

Console attribute byte

The meanings of these extra prompts are explained in the Global Operating Manual.

Some of the machine-dependent parameters in the configuration file can be customised using the Configuration Maintenance (Extended customisation) option of \$CUS. Please consult the Global Operating Manual for more details.

Value	Meaning
#00	Normal mode
#01	No characters are displayed until a character is keyed. The "trigger character" is accepted by Global System Manager as normal.
#03	No characters are displayed until a <CR> is keyed. The <CR> is accepted by Global System Manager as normal.
#05	No characters are displayed until a character is keyed. The "trigger character" is ignored by Global System Manager.
#07	No characters are displayed until a <CR> is keyed. The <CR> is ignored by Global System Manager.
#08	Suppress the Global System Manager sign-on screen completely.
#13	No characters are displayed until an <ESC> is keyed. The <ESC> is accepted by Global System Manager as normal.
#17	No characters are displayed until an <ESC> is keyed. The <ESC> is ignored by Global System Manager.
#21	Same as #01 except that the option affects ALL sign-ons not just the first one.
#23	Same as #03 except that the option affects ALL sign-ons not just the first one.
#25	Same as #05 except that the option affects ALL sign-ons not just the first one.
#27	Same as #07 except that the option affects ALL sign-ons not just the first one.
#33	Same as #13 except that the option affects ALL sign-ons not just the first one.
#37	Same as #17 except that the option affects ALL sign-ons not just the first one.

**Table 2.4.1 - The Console Executive Flag Byte (part-1)**

Bit	Use
0 #01	<p>When this bit is set, the Global System Manager sign-on screen is not displayed until a character is keyed. This option is designed for use with remote screens that are attached to the host computer via a modem. The actual "trigger character" is determined by other bits in this flag (see below). When this bit is clear, the sign-on screen is displayed normally.</p> <p>This option normally applies only to the initial sign-on screen (i.e. the one displayed when Global System Manager is initiated). It does not normally affect the sign-on screen that is displayed when a user is restarted by \$E or the \$STATUS RES command. Bit-5 (see below) controls whether the option applies to only the first sign-on screen for a particular terminal or all sign-on screens for a terminal.</p> <p>This option applies to all screens in the configuration file (including the "master console"), although it is only expected to be of use with remote serial screens (connected to the host computer via a modem) or if the serial screen is switched off when Global System Manager is initiated resulting in feedback along the serial cable.</p>
1 #02	<p>When this bit is set, only a specific character may be keyed to trigger the initial display. The specific character may be either &lt;CR&gt; or &lt;ESC&gt; as determined by bit-4, see below. When this bit is clear, any input character will initiate the sign-on screen display.</p>
2 #04	<p>When this bit is set, the "trigger character" is ignored by Global System Manager. When this bit is clear, the "trigger character" is accepted normally.</p>
3 #08	<p>When this bit is set, the sign-on screen is suppressed completely. When this bit is clear, the sign-on screen is displayed normally.</p> <p>This option applies whenever Global System Manager attempts to display a sign-on screen. It applies to the sign-on screen displayed when a user is restarted by \$E or the \$STATUS RES command in addition to the sign-on screen that is displayed when Global System Manager is initiated (regardless of the value of bit-5).</p>
4 #10	<p>When this bit is set, the specific "trigger character" is &lt;ESC&gt;. When this bit is clear, the specific "trigger character" is &lt;CR&gt;. This bit is only meaningful if bit-1 is set.</p>
5 #20	<p>When this bit is set, the suppression applies to the initial sign-on screen, displayed when Global System Manager is initiated on a particular terminal AND all subsequent sign-ons (e.g. when after \$E has been used). When this bit is clear, the display suppression only affects the first sign-on screen.</p>
6 #40	<p>Reserved for future use.</p>
7 #80	<p>Reserved. This bit must be clear otherwise unpredictable results will occur.</p>

**Table 2.4.3 - The Console Executive Flag Byte (part-2)**

## 2.5 Tape Controller Information

For those computers which support the Tape Dump/Restore option (\$TDUMP) or the Streamer Tape utility (\$TAPE), there will be a single tape controller entry, which establishes a short control block. The corresponding controller is not part of the nucleus, but is loaded only when \$TDUMP or \$TAPE is active.

The following messages, which are only required by \$TDUMP, are illustrative and do not appear in the example configuration file.

### 2.5.1 DEFAULT TAPE LENGTH IN FEET

This is the length in feet of the tapes normally used for \$TDUMP. It is the default tape length when a new tape is initialized using \$TDUMP. Note that \$TAPE ignores all "tape size fields" in the configuration data and uses its own internal default tape capacity when initializing tapes. (N.B. DC300A cartridges are 300 feet long, and DC300XL are 450 feet long.)

### 2.5.2 MAXIMUM TAPE LENGTH (IN FEET)

This is the maximum length tape that can be used by \$TDUMP. This information is needed to enable \$TDUMP to allocate its buffers and internal tables.

### 2.5.3 4K BLOCKS PER TRACK ON TAPE OF MAXIMUM LENGTH

This is the number of 4 Kb blocks that can **always** be fitted on each track of a tape of the maximum length, allowing for permitted variations in the speed of the drive. You need not allow for extended inter-block gaps unless the tape controller automatically inserts such a gap following a read-after-write error.

### 2.5.4 NUMBER OF TRACKS

This is the number of separate tracks recorded on the tape.

### 2.5.5 BUFFERING FLAG (TAPE OPTIONS FLAG)

This indicates to \$TDUMP whether tape formatting is supported, whether or not the tape is to be read before it is initialized or formatted, and whether the RAM disk or user area is to be used as the buffer area. The flag's hexadecimal value is derived from the settings of the individual bits 0 - 7, which are used as follows (bit 7 is assumed to be the most significant bit of a byte, bit 0 the least significant):

#### Bit Description

- 0 set to 1 if overlapped I/O is not to be used, or to 0 otherwise;
- 1 set to 1 if RAM disk is to be used for buffering, or to 0 otherwise;
- 2 - 5 not used;
- 6 set to 1 if no attempt is to be made to read the tape before initialization/formatting;
- 7 set to 1 if formatting is supported, or to 0 otherwise.

Note that \$TAPE, unlike \$TDUMP, does make use of any of the machine-independent parameters supplied by the above prompts. Please refer to

the Global Tape Utility (\$TAPE) Manual for details of \$TAPE customisations.

### **2.5.6 Drive number, Device Register or Interrupt Vector etc.**

All other items in the tape controller section are machine-dependent though many of them are closely equivalent to each other. In the example the following prompts appear for the tape controller:

Drive SCSI ID;

Tape buffer length.

The meanings of these extra prompts are explained in the Global Operating Manual.

Some of the machine-dependent parameters in the configuration file can be customised using the Configuration Maintenance (Extended customisation) option of \$CUS. Please consult the Global Operating Manual for more details.

## **2.6 Printer Controller Information**

There is normally a printer controller entry in the controller details section for each different type of printer attachment that the machine is capable of supporting. Therefore, in the interests of making a single configuration file serve a variety of configurations, there may well be several printer entries. The entries are 'inexpensive' inasmuch as each of them only sets up a pair of nucleus data blocks occupying a total of about 80 bytes (see section D.6). Note that the much larger printer buffer requirement is defined in the basic options section and, since the buffers are pooled, does not depend directly on the number of printer controller entries.

### **2.6.1 UNIT**

Each printer is assigned a unique unit address in the range 500 to 599. When the system is installed print output can only be written to those addresses defining printers actually connected to the machine. An attempt to write to a unit address defined in the configuration file but not supported by real hardware will usually lead to an error. For this reason it is important that you make clear to users which printer addresses are available to them.

### **2.6.2 HARDWARE FORM FEED**

This indicator is Y if the hardware supports a form feed operation, or N if the form feed logic is provided by software counting the number of lines used on a page.

The HARDWARE FORM FEED option in the configuration file is displayed by the Configuration Maintenance (Printer Control Blocks) option of \$CUS. Furthermore, the HARDWARE FORM FEED flag in the configuration file can be overridden on an installed Global System Manager using the Customise Printers (Printer page size) option of \$CUS.

### **2.6.3 PAGE DEPTH**

The prompt only appears if hardware form feed is not supported and is the depth of the page in lines (normally 66). It is used by the software responsible for simulating a form feed.

The PAGE DEPTH in the configuration file can be customised using the Configuration Maintenance (Printer Control Blocks) option of \$CUS

(provided hardware form feed is not supported). Furthermore, the PAGE DEPTH in the configuration file can be overridden on an installed Global System Manager using the Customise Printers (Printer page size) option of \$CUS.

#### **2.6.4 MAXIMUM PAGE WIDTH**

This is the maximum line length the printer supports. (The largest line length supported by any printer determines the size of the print buffers, as explained in D.6).

The MAXIMUM PAGE WIDTH in the configuration file can be customised using the Configuration Maintenance (Printer Control Blocks) option of \$CUS. Furthermore, the MAXIMUM PAGE WIDTH in the configuration file can be overridden on an installed Global System Manager using the Customise Printers (Printer page size) option of \$CUS.

#### **2.6.5 TIME-OUT IN TENS OF SECONDS**

The value specified in response to this prompt (between 0 and 63) is used as a default for the printer time-out period. If a printer is busy for an extended period (perhaps because it is off-line) Global System Manager will not simply hang until the printer becomes free. After the time-out period has elapsed an error message will be displayed.

The TIME-OUT IN TENS OF SECONDS value in the configuration file can be customised using the Configuration Maintenance (Printer Control Blocks) option of \$CUS. Furthermore, the TIME-OUT IN TENS OF SECONDS in the configuration file can be overridden on an installed Global System Manager using the Customise Printers (Printer characteristics) option of \$CUS.

#### **2.6.6 SPOOLER CONTROL BITS**

This is the hexadecimal value of the Spooler Control Byte, as defined in table 2.6.1.

The SPOOLER CONTROL BITS flag in the configuration file can be customised using the Configuration Maintenance (Printer Control Blocks) option of \$CUS.

#### **2.6.7 PRINTER EXECUTIVE FLAG BYTE**

This is the hexadecimal value of the Printer Executive flag byte, as defined in tables 2.6.2 and 2.6.3.

The PRINTER EXECUTIVE FLAG BYTE in the configuration file can be customised using the Configuration Maintenance (Printer Control Blocks) option of \$CUS. Furthermore, bit-3 of the PRINTER EXECUTIVE FLAG BYTE (see table 2.6.3) in the configuration file can be overridden on an installed Global System Manager using the Customise Printers (Printer characteristics) option of \$CUS.

#### **2.6.8 DEVICE CHARACTERISTICS**

This is the hexadecimal value of the printer device characteristics byte, as defined in table 2.6.4. Note that only bits 6 and 7 are used by parallel printers, and that bit 7 is assumed to be the most significant bit of a byte, and bit 0 the least significant. For example, a device characteristics byte of #75 would be employed for a printer with the following features: no auto line feed, X-ON/X-OFF protocol, 8 data bits, 1 stop bit and odd parity.

For some printers the "DEVICE CHARACTERISTICS" in the print report may be replaced by "Printer attribute byte".

The DEVICE CHARACTERISTICS byte in the configuration file can be customised using the Configuration Maintenance (Printer Control Blocks) option of \$CUS. Furthermore, the DEVICE CHARACTERISTICS byte in the configuration file can be overridden on an installed Global System Manager using the Customise Printers (Printer characteristics) option of \$CUS. Note that this option in \$CUS decomposes the Device Characters byte into its constituent bit fields (see table 2.6.4).

If the bottom 6 bits of the Printer Device Characteristics are all 0, the Printer characteristics option of \$CUS will not prompt for the various serial protocol parameters (e.g. number of data bits).

### 2.6.9 BAUD RATE

The baud rate only appears for serial printers, when the rate is under program control.

The "BAUD RATE" text in the configuration file print report may be replaced by "Printer baud rate" for some printers.

The BAUD RATE in the configuration file can be overridden on an installed Global System Manager using the Customise Printers (Printer characteristics) option of \$CUS.

### 2.6.10 Port Number, Device Register or Interrupt Vector etc.

All other items in the printer controller section are machine-dependent though many of them are closely equivalent to each other. In the example the following prompts appear for the printer on the Hyperport card:

Printer attribute byte

Hyperport card number (0-3)

Channel number (1-24)

The meanings of these extra prompts are explained in the Global Operating Manual.

Some of the machine-dependent parameters in the configuration file can be customised using the Configuration Maintenance (Extended customisation) option of \$CUS. Please consult the Global Operating Manual for more details.

Value	Meaning
#00	The print device is a normal printer.
#40	The print device is a "native spooler".
#80	The print device is an "intelligent spooler".
	<b>All other values are invalid and should not be used otherwise unpredictable results will occur.</b>

**Table 2.6.1 - The Spooler Control Byte**



Value	Meaning
#FF	Normal operation.
#FB	Suppress <CR> character after final <FF>.
#F7	Suppress final <FF> character.
#F3	Same as #F7.
	<b>All other values are invalid and should not be used otherwise unpredictable results will occur.</b>

Table 2.6.2 - The Printer Executive Flag Byte (part-1)

Bit	Use
0 #01	Used internally by the Printer Executive. <b>This bit MUST be set otherwise unpredictable results will occur.</b>
1 #02	Used internally by the Printer Executive. <b>This bit MUST be set otherwise unpredictable results will occur.</b>
2 #04	If this bit is set (the default) a <CR> is printed after the final <FF> character in a print report. If this bit is clear, the <CR> after a <FF> is suppressed.
3 #08	If this bit is set (the default) a <FF> character is printed at the end of every print report. If this bit is clear, the final <FF> is suppressed.
4 #10	Used internally by the Printer Executive to indicate that the printer controller can handle Stationery Change records. <b>This bit MUST be set otherwise unpredictable results will occur.</b>
5 #20	Reserved for future use. <b>This bit MUST be set otherwise unpredictable results will occur.</b>
6 #40	If this bit is set (the default) the current line is reprinted if an error occurs while it is being printed. If this bit is clear the current line is not reprinted. <b>This bit is not generally useful and should not normally be altered.</b>
7 #80	Used internally by the Printer Executive. <b>This bit MUST be set otherwise unpredictable results will occur.</b>

Table 2.6.3 - The Printer Executive Flag Byte (part-2)

Bit(s)	Use
0,1 #03	These two bits define the parity to use when sending characters to the printer:  00 = no parity 01 = odd parity 10 = no parity 11 = even parity
2,3 #0C	These two bits define the number of stop bits appended to the end of each character sent to the printer:  00 = not allowed 01 = 1 stop bit 10 = 1.5 stop bits 11 = 2 stop bits
4,5 #30	These two bits define the number of bits in each character sent to the printer. In practice only 7 data bits and 8 data bits are actually used. The possible settings are:  00 = 5 data bits 01 = 7 data bits 10 = 6 data bits 11 = 8 data bits
6 #40	This bit must be set if the printer uses the X-ON/X-OFF protocol to govern the flow of characters sent to it by Global System Manager. The bit must be clear if the printer employs a busy-line protocol.  For <b>some</b> parallel printers if this bit is 0, the printer controller operates in "polled mode"; if this bit is 1 the printer controller operates in "interrupt mode".
7 #80	When set, Global System Manager does not send a line feed to the printer following the transmission of a carriage return, but assumes that the printer performs both actions when the carriage return is sent.

Table 2.6.4 - The Printer Device Characteristics Byte

## 2.7 LAN Controller Information

For network configurations there will be a single Local Area Network (LAN) controller required to handle the transmission and reception of packets on the network.

Only one LAN controller can be specified for a configuration, and the keyword in the first line of the bootstrap message must indicate a network configuration file.

### 2.7.1 POLLS TO WAIT BETWEEN LAN ACCESSES

This value indicates the proportion of time that Global System Manager spends on servicing local users in between processing file server requests from other nodes on the network. The smaller the number, the less time spent on local screens. That is, reducing the value decreases response times at local screens but improves response times for remote users of the file server. A value of about 50 is suitable

for most systems; this corresponds to executing a minimum of about 250 lines of Global Cobol for local users between file server accesses.

The POLLS TO WAIT BETWEEN LAN ACCESSES in the configuration file can be customised using the Configuration Maintenance (Network Control Blocks) option of \$CUS.

### **2.7.2 NORMAL TIME-OUT IN SECS**

The normal time-out period is the maximum time a file server is expected to take for any operation, after which it must be assumed that some error has occurred. A time of about 15 seconds is recommended. This full time will not normally be needed, but allows for several lengthy operations being queued on the file server.

The NORMAL TIME-OUT IN SECS in the configuration file can be customised using the Configuration Maintenance (Network Control Blocks) option of \$CUS.

### **2.7.3 TIME-OUT ON 1ST ACCESS IN SECS**

This time-out period is the period within which the remote node should respond to an operation checking its availability, which is issued by Global System Manager the first time each node is accessed by a program. A time of three seconds should be sufficient. If programs get spurious network errors when they first access the network (but not in the middle of execution) then increase this time-out.

The TIME-OUT ON 1ST ACCESS in the configuration file can be customised using the Configuration Maintenance (Network Control Blocks) option of \$CUS.

### **2.7.4 LAN EXECUTIVE RETRY COUNT**

If spurious network errors are occurring, then increasing this count may solve the problem. However, if a value greater than 3 is being used it implies there is some problem in the network hardware. If this count is set to 0 (as in the example) the default value 3 is used.

The LAN EXECUTIVE RETRY COUNT in the configuration file can be customised using the Configuration Maintenance (Network Control Blocks) option of \$CUS.

### **2.7.5 WAN MASTER NODE-ID**

This parameter is reserved for future use and should not be modified in the configuration file.

The WAN MASTER NODE-ID in the configuration file can be customised using the Configuration Maintenance (Network Control Blocks) option of \$CUS.

### **2.7.6 LAN EXECUTIVE FLAG BYTE**

This parameter is reserved for future use and should not be modified in the configuration file.

The LAN EXECUTIVE FLAG BYTE in the configuration file can be customised using the Configuration Maintenance (Network Control Blocks) option of \$CUS.

### **2.7.7 Port Number, Device Register or Interrupt Vector etc.**

All other items in the LAN controller section are machine-dependent though many of them are closely equivalent to each other. In the example the following prompts appear for the ARCNET controller:

Status register address  
 Interrupt mask register  
 Command register  
 Software reset port  
 Interrupt vector address  
 Interrupt channel  
 Top byte of memory address

The meanings of these extra prompts are explained in the Global Operating Manual.

Some of the machine-dependent parameters in the configuration file can be customised using the Configuration Maintenance (Extended customisation) option of \$CUS. Please consult the Global Operating Manual for more details.

CONFIGURATION FILE ++5700ZJ											DIRECT ACCESS DEVICES			01/01/95		11.19.50		PAGE 4	
CONT	DRIVE	UNIT	FILES	FOR''T	START	END	ACC.OPT	F.FLAGS	DESCRIPTION										
DISKETTE 0	190		63	C10A 1/ 0/ 0	39/ 1/ 7			1	D0	1ST									
DISKETTE DRIVE	194		63	C7B 0/ 1/ 0	34/ 1/ 15	1		D0	1ST	DISKETTE									
DRIVE	196		63	C24A 1/ 0/ 0	39/ 1/ 8			1	D0	1ST									
DISKETTE DRIVE	150		63	G1A 0/ 1/ 0	79/ 1/ 14	1		D0	1ST	DISKETTE									
DRIVE	152		250	G1B 0/ 1/ 0	79/ 1/ 14	1		D0	1ST	DISKETTE									
DISKETTE 1	191		63	C10A 1/ 0/ 0	39/ 1/ 7			1	D0	2ND									
DISKETTE DRIVE	195		63	C7B 0/ 1/ 0	34/ 1/ 15	1		D0	2ND	DISKETTE									
DRIVE	197		63	C24A 1/ 0/ 0	39/ 1/ 8			1	D0	2ND									
DISKETTE DRIVE	151		63	G1A 0/ 1/ 0	79/ 1/ 14	1		D0	2ND	DISKETTE									
DRIVE	153		250	G1B 0/ 1/ 0	79/ 1/ 14	1		D0	2ND	DISKETTE									
ADAPTEC 0	200	201-249	250	P246Z 0/ 1/ 0	999/15/ 31	1		00	1ST	ADAPTEC									
SCSI DISK																			
ADAPTEC 1	250	251-299	250	P246Z 0/ 1/ 0	999/15/ 31	1		00	2ND	ADAPTEC									
SCSI DISK																			
RAM DISK	109		99	P00A 0 255		1	80			RAM DISK									

**Figure 2.8 - Configuration File Report Direct Access Device Table**

## 2.8 The Direct Access Device Table

The configuration file report continues with the direct access device table, an example of which appears in figure 2.8. This lists all the

direct access unit addresses supported and summarizes the most important parameters associated with them. Much of the information the table contains appears in a slightly different form on the unit description report produced by the \$U command.

There is an 18-byte data area established in the nucleus for each unit or subunit defined in the table. In addition, each domain requires an extra 18 bytes to hold the current alternate track list. There is also a 26-byte data area associated with each different volume format defined in the FORMAT column. The Direct Access control blocks are fully described in section D.3.

### 2.8.1 The CONTROLLER details

This column contains the short description of the controller responsible for I/O operations on the unit.

### 2.8.2 The DRIVE number

This is the drive number used by the controller to access the unit. The short description and drive number together serve as a cross reference to the entry which appeared earlier in the direct access controller details table.

### 2.8.3 UNIT

This column identifies the unit address of a diskette, DLV, or a domain. Where a number of different diskette types can be read or written by the same drive, each will be distinguished by its format and accessed through a different unit address. Consistent conventions are adopted in associating particular ranges of unit addresses with particular diskette formats, and it is hoped that wherever possible you will continue to maintain these standards. (Normally this only involves accepting the recommended default unit addresses when introducing a new volume format, as explained in 3.3.) Unit addresses 100 to 103 must not be defined in a configuration file. Instead, Global System Manager automatically 'aliases' these addresses so that they are functionally identical to the higher numbers used for distribution diskettes and other volumes of the same format. Thus, in the example, G1A is used as the distribution medium and aliasing ensures that:

100 and 150 are identical

101 and 151 are identical

The effect is that the operator can always use 100 to access a distribution diskette in the first drive, 101 to access the next diskette drive, and so on. Note that if you load Global System Manager from the BACRES distribution diskette, but then escape from the installation procedure, the aliased unit addresses will **NOT** be set up.

### 2.8.4 SUBUNITS

If the unit is a domain, this column indicates the range of subunits it supports. Otherwise the column remains blank.

### 2.8.5 FILES

This is the maximum number of files that can be held on a diskette, or the maximum number of files that can be held on each sub unit of a hard disk domain. This value is normally 250 for domains, and 63, 99 or 250 for diskettes.

### 2.8.6 FORMAT

This is the format code associated with the unit address. In the example configuration report the DISKETTE controller supports no less than 5 different volume formats on each of its two drives. A domain and its subunits always share a common format.

### 2.8.7 START

This column defines the location of the first sector of the unit. It may appear either as a decimal cylinder, head and sector location, separated by / characters, as in the example, or as a decimal sector number. Counting always begins at 0, so location 0/0/0, or sector 0, identifies the very first sector.

Sometimes there are a number of units (known as **Distinct Logical Volumes**, or DLV's) on the same physical device, and in this case they will be distinguished by different start and end addresses. Usually, however, in the interests of flexibility, just a single domain is defined on a large direct access device such as a hard disk. The user can then allocate space to the subunits as they see fit, using the \$V command.

Normally the initial part of a device is reserved for a physical bootstrap or for native operating system software. In this case the address of the starting sector is not 0/0/0 or sector 0, but will be a higher address in order to avoid the reserved space.

### 2.8.8 END

This column defines the location of the last sector of the unit, and uses the same format as the start information. If the unit (or units) do not use the whole of the device, this probably indicates that a pool of tracks at the end is reserved for the drive hardware's own alternate track handling system.

Note that most hard disk controllers are capable of determining the size of the disk. For devices accessed by such controllers, the value in the END column will indicate the size of a "template disk". The actual end address will be altered by the controller as Global System Manager is being loaded. The \$U report will include the true size of the hard disk.

### 2.8.9 ACC OPT

This column indicates the default access option, which will be the value employed when the unit is formatted or initialized using \$V unless the operator chooses a different access option. The default value is chosen to optimize long reads and writes such as occur during program loading and file copying.

### 2.8.10 F.FLAGS

This column contains the hexadecimal value of the format flags byte which determines the type of formatting (if any) supported on the unit. The values currently employed are:

Value	Meaning
E0	Track format only, 179x range of chips;
D0	Track format only, uPD765 chip;
80	No formatting supported, six alternate tracks allowed on domains;

40 Track and drive formatting, six alternate tracks on domains;  
00 Drive formatting only, six alternate tracks allowed on domains;  
01 If this bit is set then the bad track mapping is not allowed on this disk.

### **2.8.11 DESCRIPTION**

The description which appears in this column is the one which appears in error messages and which is displayed on the \$U report for the unit.

CONFIGURATION FILE ++5700ZJ	CONTROLLER DETAILS	01/01/95	11.19.50
PAGE 5			
NUCLEUS OPTIONS	SET BTFLAG TO #72 FOR GSM V8.1		#72
	DYNAMIC DC/DF-BLOCK ALLOCATION		Y
	DYNAMIC LOCK TABLE ALLOCATION		Y
	LARGEST SECTOR SIZE		512
	NUMBER OF FILE CHANNELS	250	
	NUMBER OF FILE BUFFERS	8	
	NUMBER OF FILE BLOCKS	55	
	NUMBER OF LOCK TABLE ENTRIES	100	
	NUMBER OF PRINT BUFFERS	3	
	LENGTH OF PRINT BUFFERS	250	
	NUMBER OF PRINTER XLATION TABLES		1
	NUMBER OF FULL LAN BUFFERS	6	
	NUMBER OF SHORT LAN BUFFERS	30	
	RAM HIGH ADDRESS (KB)	0	
	RAM DISK START ADDRESS (KB)		0
	CACHE BUFFER SIZE	16384	
	CACHE START ADDRESS (KB)		1
	TARGET BOOTSTRAP STRATEGY	0	
	IS \$REMOTE SUPPORTED	Y	
	DEVICE ADDRESS (D= )		#03F8
	BAUD RATE (B= )	9600	
	TIME-OUT (T= )	0	
	Machine-specific version no.		#42
	Basic clock (microseconds)		54927
	Clock interval (milliseconds)		1000
	Swap interval (milliseconds)		250
	Use RTC for clock update?		N
	EMS handling enabled?		Y
	EMS controller		EXT
	Priority interrupt level (0-7)		#00
	Interrupt mask flag		#00
	Load keyboard tables		KEY
	Serial interrupt module		INT
	Apricot Quad cards required?		N
	Smartport cards required?		N
	Adaptec SCSI card required?		Y
	Adaptec SCSI card I/O address		#0000
	Hyperport card required?		Y
	Load PCC/i module	ASP	
	Load HyperMX module		MXP
	Load Hyperport debugger	HY*	
	Load Hyperport module		HYP
	Number of Hyperport cards		1

**Figure 2.9 (part-1) - Configuration File Report Nucleus & Distribution Options**

## 2.9 The Nucleus Options Section

The nucleus options section contains information used in constructing the permanently resident nucleus (Figure 2.9).

### 2.9.1 SET BTFLAG TO #72 FOR V8.1

This flag is used to indicate the software version number of the configuration file.

### 2.9.2 DYNAMIC DC/DF-BLOCK ALLOCATION

This flag determines whether the DC and DF blocks are allocated in the configuration data or dynamically by the File Executive (see section D.3). This flag is set to Y for all V8.1 systems.

### 2.9.3 DYNAMIC LOCK TABLE ALLOCATION



This flag determines whether the Lock Table is allocated in the configuration data or dynamically by the File Executive (see section D.3). This flag is set to Y for all V8.1 systems.

#### 2.9.4 LARGEST SECTOR SIZE

The largest sector size, S, of all the volumes supported is displayed so that you can use it in calculating the size of the file buffer area.

#### 2.9.5 NUMBER OF FILE CHANNELS

A four-byte **File Channel** is required for each FD that can be simultaneously opened. Global Configurator ensures that the number of file channels for any system is never less than:

$$8 * \text{number of users}$$

Because of the relatively small size of the DC-blocks (see section D.3) no warning message is displayed if the number of File Channels is increased by Global Configurator.

If an insufficient number of file channels are allocated the following error message will appear when running Global System Manager: TOO MANY OPEN FILES. The \$USAGE utility (introduced with Global System Manager V8.1) can be used to monitor the file channel usage.

The NUMBER OF FILE CHANNELS in the configuration file can be customised using the Configuration Maintenance (File Control Blocks) option of \$CUS.

#### 2.9.6 NUMBER OF FILE BUFFERS

Each direct access OPEN, CLOSE, READ or WRITE statement may need to use a **File Buffer**. However, the buffers are held in a pool, and if a free one is not available, Global System Manager will temporarily allocate one that is already in use, after writing out the information it contains if this is necessary. Obviously, the more file buffers available, the better the resulting overall performance. The disadvantage, however, is that file buffers require relatively large amounts of memory. Each needs  $16 + S$  bytes, where S is the largest sector size of any volume supported. This means, for example, that in a system with 512-byte sectors, each buffer removes 528 bytes from the address space available for the user area or default system stack.

To allow the OPEN NEW operation to function correctly Global Configurator ensures that there is a minimum of:

$$1 + (8 * (f + 1) / s) \text{ ROUNDED UP}$$

file buffers available, where f is the maximum number of files that can reside on any unit, typically 250; and s is the sector size. For example, a system with a maximum sector size of 512 bytes, requires at least five buffers.

If the number of File Buffers is increased by Global Configurator, a warning message (described in sections A.2 and D.10) is displayed.

The NUMBER OF FILE BUFFERS in the configuration file **cannot** be customised using the Configuration Maintenance (File Control Blocks) option of \$CUS.

	Card-0 addr. lines A12-A19		#C0
	Card-0 interrupt level		10
	Card-0 type (0=Hyperport, 1=HyperMX, 2=PCC/i or Super)	0	
	Ports per node		0
	Card-1 addr. lines A12-A19		#00
	Card-1 interrupt level		0
	Card-1 type (0=Hyperport, 1=HyperMX, 2=PCC/i or Super)	0	
	Ports per node		0
	Card-2 addr. lines A12-A19		#00
	Card-2 interrupt level		0
	Card-2 type (0=Hyperport, 1=HyperMX, 2=PCC/i or Super)	0	
	Ports per node		0
	Card-3 addr. lines A12-A19		#00
	Card-3 interrupt level		0
	Card-3 type (0=Hyperport, 1=HyperMX, 2=PCC/i or Super)	0	
	Ports per node		0
DISTRIBUTION OPTIONS	SOFTWARE LEVEL	9	
	SERIAL CONSOLES ATTACHED?		Y
	PRERELEASE ?		N
	Nucleus size in Kb		200
	MONITOR SUFFIX	OR	
	STARTER BOOTSTRAP STRATEGY	1	
	DISTRIBUTION UNIT ADDRESS		150
	IPL UNIT ADDRESS		150

**Figure 2.9 (part-2) - Configuration File Report Nucleus & Distribution Options**

### 2.9.7 NUMBER OF FILE BLOCKS

An 18-byte **File Block** is required for each distinct file that can be open at the same time. (The difference between file blocks and file channels is obvious if you consider three users who have the SASTAT file on unit 202 OPEN SHARED: three channel blocks are needed, but only one file block.)

Global Configurator ensures that the number of the blocks for each system is never less than:

$$(8 * \text{SQRT}(\text{number of users})) \text{ ROUNDED UP}$$

If the number of File Blocks is increased by Global Configurator, a warning message (described in sections A.2 and D.10) is displayed.

If an insufficient number of file blocks are allocated the following error message will appear when running Global System Manager: TOO MANY OPEN FILES. The \$USAGE utility (introduced with Global System Manager V8.1) can be used to monitor the file block usage.

The NUMBER OF FILE BLOCKS in the configuration file can be customised using the Configuration Maintenance (File Control Blocks) option of \$CUS.

### 2.9.8 NUMBER OF LOCK TABLE ENTRIES

A 10-byte **Lock Table Entry** is required for each lock outstanding. The number of entries in the lock table may need to be as large as 100 for file-servers on large networks. If an insufficient number of lock table entries are allocated the following error message will appear when running Global applications: TOO MANY OPEN FILES. Global

Configurator allows a maximum of 200 lock table entries. The \$USAGE utility (introduced with Global System Manager V8.1) can be used to monitor the file block usage.

The NUMBER OF LOCK TABLE ENTRIES in the configuration file can be customised using the Configuration Maintenance (File Control Blocks) option of \$CUS.

### **2.9.10 NUMBER OF PRINT BUFFERS**

At a minimum there should be at least one print buffer for each physical printer actually available to the end user. This may be different from the number of printers defined by the configuration file report, since it is common practice to describe a number of different printer ports at different unit addresses, to enable various types of attachment to be made using the same configuration file. Print buffers are held in a pool, and performance is improved by allocating as many as possible. Each one requires 5 + L bytes, where L is the data length of each buffer (see below).

The NUMBER OF PRINT BUFFERS in the configuration file can be customised using the Configuration Maintenance (Printer Buffers) option of \$CUS.

### **2.9.11 LENGTH OF PRINT BUFFERS**

The data length of the print buffers must be at least as wide as the maximum line width of any printer supported. An additional five bytes of control information are appended to the data portion of each print buffer. This buffer must be large enough to contain lines with expanded escape sequences that may be printed when a printer control file is used. A value of 250 bytes is recommended. Global Configurator ensures the size of the printer buffers is never less than 132 bytes.

For pre-V8.1 Global System Manager, if a printer control file is used, the length of the print buffers must be 250. This restriction has been relaxed for Global System Manager V8.1 (see below) but you are still recommended to set the print buffer length to 250 bytes.

The LENGTH OF PRINT BUFFERS in the configuration file can be customised using the Configuration Maintenance (Printer Buffers) option of \$CUS.

### **2.9.12 NUMBER OF PRINTER XLATION TABLES**

The Printer Executive maintains a table of escape sequences and translation characters for every printer that has an associated Printer Control File. A separate Printer Translation Table is required for each Printer Control File. If an insufficient number of Printer Translation Table are defined in the configuration file, an error "Z" will occur when attempting to print.

The default number of Printer Translation Tables is 1 (to provide compatibility with earlier versions of Global Configurator).

The NUMBER OF PRINTER XLATION TABLES in the configuration file can be customised using the Configuration Maintenance (Printer Buffers) option of \$CUS.

### **2.9.13 NUMBER OF FULL LAN BUFFERS**

For non-network configurations this prompt can be ignored (the number will automatically be set to zero). On network configurations the first full buffer is used for access to other file servers on the network (i.e. requests originating from local screens). The other buffers are used to contain requests from other computers on the network that access this computer as a file server. Therefore, if the computer is not a file server, only one buffer is needed. If it is a file server, at least two are needed. Three or four buffers should be allocated for hard disk file servers (the example has six), allowing four or five requests to be queued. For very large networks there may be performance benefits in allocating extra buffers on heavily-used file servers.

The size of the full LAN buffers in the configuration file is displayed by the Configuration Maintenance (LAN Buffers) option of \$CUS. The NUMBER OF FULL LAN BUFFERS in the configuration file can be customised using the Configuration Maintenance (LAN Buffers) option of \$CUS.

#### **2.9.14 NUMBER OF SHORT LAN BUFFERS**

This prompt can be ignored for non-network configurations. On network configurations the short buffers are used for file server requests when all the full buffers (see section 2.9.13) are in use. They simply allow a "busy" condition to be signalled to the requester, causing the operation to be retried. **This number must never be less than the total number of computers on the network** (the example has 30).

The size of the short LAN buffers in the configuration file is displayed by the Configuration Maintenance (LAN Buffers) option of \$CUS. The NUMBER OF SHORT LAN BUFFERS in the configuration file can be customised using the Configuration Maintenance (LAN Buffers) option of \$CUS.

#### **2.9.15 RAM HIGH ADDRESS (KB)**

This value should only be changed if the nucleus is unable to calculate the high address accurately itself. This will normally be due to some of the high memory being reserved for a special purpose, for example screen memory or memory-mapped I/O. The value supplied is the address in Kbytes of the first memory location not available. If the value is zero then the amount of memory available is determined automatically as Global System Manager is loaded. The nucleus treats the value as an upper limit on the available memory, and checks that memory is available up to this address. This field should normally be left at 0.

#### **2.9.16 RAM DISK START ADDRESS (KB)**

This information indicates the upper limit on the memory available for allocation as memory banks; any memory above this address is used as part of the RAM disk. This field should normally be left at 0 to mean that, if necessary, all the available memory can be allocated as memory banks.

The RAM DISK START ADDRESS in the configuration file can be customised using the Configuration Maintenance (RAM Disk/Cache) option of \$CUS.

#### **2.9.17 CACHE BUFFER SIZE**

This is the size of the cache buffers that will be allocated if disk cacheing is enabled, and corresponds to the largest track size of any disk on which cacheing is allowed. For example, in a configuration

file that includes format T259Z (32Kb track size) and format P246Z (16Kb track size) the cache buffer size will be set at 32768 bytes.

It is always prudent to check that the Cache Buffer Size is set to the largest track size of any disk in the configuration file. If the Cache Buffer Size is too small unpredictable data corruption will result.

The CACHE BUFFER SIZE in the configuration file is displayed by the Configuration Maintenance (RAM Disk/Cache) option of \$CUS.

### **2.9.18 CACHE START ADDRESS (KB)**

This governs the amount of memory to be allocated as cache buffers. If set to zero then cacheing is disabled. If it is set to 1 then any memory remaining after memory banks have been allocated will be used as cache buffers - provided that there is at least 128K available. Note that this means that there will be no RAM disk allocated. Normally if cacheing is to be used you will not want a RAM disk, and therefore it can be deleted from the configuration file. If, however, you want both a RAM disk and cacheing you should define a specific cache start address but not define a start address for RAM disk. The cache start address should be calculated to allow for a RAM disk of the required size to be allocated dynamically between the end of the area reserved for memory banks and the beginning of the cache.

The CACHE START ADDRESS in the configuration file can be customised using the Configuration Maintenance (RAM Disk/Cache) option of \$CUS.

### **2.9.19 BASIC CLOCK (MICROSECONDS)**

This is the duration in microseconds of the fundamental clock interval ('tick') supported by the hardware. This value is normally just displayed, and is used to decide how accurately the clock update period and swap interval can be determined.

In the example configuration file print report this information appears as "Basic clock (microseconds)".

### **2.9.20 CLOCK FREQUENCY**

This information appears instead of BASIC CLOCK on systems where timing is dependent upon the mains frequency. It should be 50 for systems operating in Europe, Africa and Australia, and 60 for North America. The clock interval is then 20 ms or 16.7 ms respectively.

This information does not appear in the example configuration file print report.

### **2.9.21 CLOCK INTERVAL (MILLISECS)**

This indicates how often the Global Cobol time-of-day field is updated (the exact period is always a multiple of the basic clock period). This is normally 1000 ms (= 1 second) but for network systems it should be reduced to 250-300 ms as it forms the basic unit for the network time-out handling.

In the example configuration file print report this information appears as "Clock interval (milliseconds)".

### **2.9.22 SWAP INTERVAL (MILLISECS)**

This information determines how often a time slice occurs in a multi-user system. An interval in the range 100 - 500 ms usually gives the best performance, depending on how fast the computer is. Memory bank

systems with fast swap times run best with a short time slice interval (say 200 ms), whereas computers with slower disk file swapping require a larger one (say 500-1000 ms).

In the example configuration file print report this information appears as "Swap interval (milliseconds)".

The SWAP INTERVAL value in the configuration file can be overridden on an installed Global System Manager using the Customise Configuration (Time-slice interval) option of \$CUS.

### 2.9.23 Machine-specific Information

Interspersed between the standard information described above will appear machine-specific information (usually in lower-case letters). In the example, the following information is of a machine-specific nature:

```
Machine-specific version no.
Use RTC for clock update?
Priority interrupt level (0-7)
Adaptec SCSI card required?
"BACNAT" format
```

The meanings of these extra prompts are explained in the Global Operating Manual.

Some of the machine-dependent parameters in the configuration file can be customised using the Configuration Maintenance (Extended customisation) option of \$CUS. Please consult the Global Operating Manual for more details.

### 2.9.24 TARGET BOOTSTRAP STRATEGY

This message appears in the Nucleus Options section of the configuration file although, because the value is only used when Global System Manager is generated, it logically belongs in the Distribution Options section (see section 2.10 below).

The information displayed is a number in the range 0 to 2 which defines the location of the files in the target bootstrap (i.e. Global System Manager load) procedure:

```
0    Prompt for a hard-disk bootstrap during installation;
1    Always bootstrap (i.e. load Global System Manager) from a
     hard-disk SYSRES;
2    Always bootstrap (i.e. load Global System Manager) from a
     diskette SYSIPL.
```

Refer to Appendix A of the Global Operating Manual for the actual prompt displayed during installation.

### 2.9.25 \$REMOTE parameters

This message, and the three related messages, appear in the Nucleus Options section of the configuration file although, because the values

are only used when Global System Manager is installed, they logically belong in the Distribution Options section (see section 2.10 below).

If Y is displayed as the reply to the **IS \$REMOTE SUPPORTED?** prompt, then when Global System Manager is installed the **DEVICE ADDRESS (D=)** is the initial default value of the device address used by \$REMOTE, the **BAUD RATE (B=)** is the initial default value of the baud rate used by \$REMOTE and the **TIME OUT (T=)** is the initial default value of the time out period used by \$REMOTE. If the baud rate is not software selectable, it will normally be set to zero. If the time out factor is set to zero, this means that it is to be calculated by \$REMOTE. The device address may be in decimal, or hexadecimal (if preceded by a #) or in octal (if preceded by a ').

## 2.10 The Distribution Options Section

The distribution options section contains information used to determine the format and contents of the distribution diskettes on which Global System Manager is supplied (i.e. when Global System Manager is being generated).

**You must not attempt to change any of these values, since the only effect will be to make the configuration file inconsistent with the software supplied.**

### 2.10.1 SOFTWARE LEVEL NUMBER

This number reflects the complexity of the configuration file. Different level numbers are allocated for single-user, multi-user and networking versions of Global System Manager.

**It is not possible, simply by changing the configuration file of an already generated system, to increase the Global System Manager level number because the level numbers are held elsewhere and are carefully checked.**

### 2.10.2 SERIAL CONSOLES ATTACHED?

If N is given in response to this prompt the Global System Manager installation procedure does not ask the user to supply the list of TAPs to be installed. Instead, the installation job simply installs only the machine-specific TAPs.

### 2.10.3 PRE-RELEASE?

If Y is given in response to this prompt then a system generated using this configuration file is generated with an expiry date three months in the future and a special contract protection message.

### 2.10.4 MONITOR SUFFIX

The monitor suffix is always "OR" indicating a monitor file name of \$MONITOR.

### 2.10.5 STARTER BOOTSTRAP STRATEGY

The information displayed is a number in the range 1 to 4 which defines the location of the files involved in the starter bootstrap (i.e. Global System Manager load) procedure:

- 1 All files are on BACRES;
- 2 The machine-specific files are on BACRES. The machine-invariant files are on BACEXA;

- 4 The physical bootstrap is on BACIPL. The other machine-specific files are on BACRES. The machine-invariant files are on BACEXA.

### **2.10.6 DISTRIBUTION UNIT ADDRESS**

This is the unit corresponding to the format to be used for BACEXA and software products distributed. It should, if possible, be one of the standard formats for which pre-generated stock is held. Global System Manager 'aliases' unit 100 to the distribution unit (150, in the example configuration file).

### **2.10.7 IPL UNIT ADDRESS**

This is the unit address occupied by the volume containing the physical bootstrap during the starter bootstrap procedure. When Global System Manager has been installed, the permanent unit-id \$IP is assigned to this address.

### **2.10.8 Machine-specific Information**

Various machine-specific information may appear in the Distribution Options section of the configuration file. For example, in Global System Manager (BOS) configurations the message **Nucleus size in Kb** will appear in this section. This information is only used when the software is installed (to calculate the size of the SYSRES volume) and has no relevance on installed systems.

Similarly, in Global System Manager (Unix) configurations, the message **Number of BACNAT diskettes** will appear in this section. As above, this information is only used when the software is generated and has no relevance on installed systems.



## 3. The Updating Dialogue

This chapter describes how to use CFUPDATE to modify an existing configuration file. When you have supplied the file-id and unit-id of the file you have located on the BACRES, SYSRES or SYSIPL volume (as explained in 1.2) the updating dialogue proper begins. It can be considered to be structured as a number of sections, blocks and sub-blocks. The structure corresponds to information appearing on the configuration file print report. Refer to the relevant section in Chapter 2 for further information about each section in the configuration file.

The **PROLOGUE** allows you to modify the computer name and bootstrap messages (2.1).

The **DIRECT ACCESS CONTROLLERS** section contains a dialogue block for each controller/drive combination. Each such block gives rise to a direct access controller entry in the controller details section of the report (2.3).

Within each controller/drive block there is a **VOLUME FORMAT** sub-block for each different direct access format supported on the drive. The information contributed by each sub-block is printed in the direct access device table (2.8).

The **CONSOLE CONTROLLERS** section contains a dialogue block for each console controller entry appearing in the controller details section of the report (2.4).

The **TAPE CONTROLLERS** section contains a single dialogue block if either the Tape Dump/Restore option, \$TDUMP, or the Streamer Tape utility, \$TAPE, are supported. The details are printed in the controller details section of the report (2.5).

The **PRINTER CONTROLLERS** section contains a dialogue block for each printer controller entry appearing in the controller details section of the report (2.6).

The **LAN CONTROLLERS** section contains a single dialogue block for the network controller in a network configuration (2.7).

The **NUCLEUS OPTIONS** section allows you to modify the options which are not specific to a particular device (2.9).

The **DISTRIBUTION OPTIONS** section allows you to modify options controlling the distributed Global System Manager. Normally you will not wish to alter this section (2.10).

The CFUPDATE process involves you scanning this information sequentially, and making any modifications required, including the adding or deleting of entire blocks or sub-blocks as necessary. Special responses to certain main prompts enable you to pass quickly from one section, block or sub-block to another once the correct values are established. By replying N to the edit complete prompt at the end of the DISTRIBUTION OPTIONS section you can repeat the process if you realise you have made a mistake earlier on.

Existing default	Response	Notes
(N) or (Y)	Y or N	Yes or No
(#hh...hh)	hh.hh	Each hh is a pair of hexadecimal digits, each in the range 0-F inclusive. Note that leading zeroes are <b>not</b> required. The initial # character is optional.
( number)	number	A number is always right justified in default area, whereas a character string which happens to be numeric is left justified.
(characters )	characters	The size of the default area enclosed by the brackets indicates the maximum size of character string acceptable.

**Table 3.1 - How the Existing Default Value Determines the Response**

### 3.1 General Conventions

Before describing the dialogue sections individually we will explain some of the general conventions used throughout CFUPDATE.

Most prompts have **default values** associated with them, which will be used if you key <CR> to the prompt, or if you make a special response earlier in the dialogue which causes the information supplied by the prompt to be used automatically, because, for example, the whole of the block of which it is part is accepted.

The current default value is shown in round brackets after the main text of the prompt but preceding the : character. If you wish to change the default the existing value will determine the format of the response, as shown in table 3.1. When you key a new value it will become the default for the affected prompt.

**When adding a dialogue block for a new controller, default values are taken from those last established for a controller of the same type.**

When updating information, always bear in mind that CFUPDATE is only capable of very simple validation, such as checking that a response is of the correct format. More sophisticated errors, such as a wrong machine address, may satisfy elementary checks but cause problems in the configuration you are creating. Either a device will not be supported properly or, more seriously, the starter bootstrap procedure will fail.

The prompts which begin a block (CONTROLLER:) or sub-block (VOLUME FORMAT:) are known as **main prompts** and accept a number of special

responses which enable you to add, insert or delete blocks, to move quickly to other parts of the dialogue or obtain a help screen. All the other prompts, termed **subordinate prompts**, only recognise three types of special responses, <CTRL A> and two which rely on the keying of <CTRL B>.

When <CTRL A> is keyed, control returns to the start of the current controller or options section, allowing you to correct any errors or omissions.

When <CTRL B> is keyed by itself in response to a subordinate prompt it completes the current block or sub-block by accepting the current default together with any defaults from subsequent subordinate prompts. You are then positioned at the main prompt of the next block or sub-block of the same type.

A special response of the form:

text <CTRL B>

to a subordinate prompt replaces the current default value with the text you have keyed and then completes the current block or sub-block, positioning you at the next main prompt, as above.

This is mainly (but not always) a shortcut for keying text <CR> to the prompt, then <CTRL B> to its successor.

The <CTRL B> keystroke is therefore particularly useful when the block you are updating only requires one or two amendments near the beginning since it allows you to move quickly on to the next block. An automatic update invoked by the use of <CTRL B> in a controller section, the NUCLEUS OPTIONS section (see 3.8) or the DISTRIBUTION OPTIONS section (see 3.9) may be aborted by keying <CTRL G>. However, this interrupt key has no effect during the Bootstrap Message section of the update.

In the descriptions which follow we detail all the responses available at the main prompt level, but to avoid repetition do not mention the possibility of keying <CTRL A> and <CTRL B> at the subordinate level. Usually, the following responses may be made to a main prompt:

Response	Action
<CTRL A>	Return to the start of the current section
<CTRL B>	Accept the current controller information and proceed to the start of the next controller section (<CTRL G> may be used to abort)
<CTRL C>	Display a help screen listing valid short descriptions, then repeat The current prompt
<CR>	Accept the existing default

A (or a)	Accept this and any subsequent controller information then proceed to a new controller prompt so that you can add one or more new controllers
B (or b)	Return to INPUT BOOTSTRAP MESSAGES at the beginning of the dialogue
D (or d)	Delete information for the current controller, then proceed to the Next controller prompt
I (or i)	Insert a new controller immediately before the current one. A colon prompt will appear requesting you for the new short description
N (or n)	Accept information for the current controller, then proceed to the next controller prompt
Q (or q)	Quit the configuration file update and return directly to the menu or ready prompt
New short description	Override the existing controller short description (e.g. when adding a controller to support a new device)

### 3.2 The Prologue

The prologue starts by displaying the header followed by the machine name prompt:

MACHINE NAME (machine name):

to allow you to change the default machine name, for example when a computer is sold under a different name in your country.

The header:

INPUT BOOTSTRAP MESSAGE

is then displayed. This is followed by the first message line. You may reply:

Response	Action
<CR>	Accept the line as it is and proceed to the next line
New text	Replace the line with up to 40 characters of new text and proceed to the next line

<CTRL A>	Return directly to the machine name prompt
<CTRL B>	Accept this and all subsequent lines, then proceed to the direct access controllers section
<CTRL C>	Replace the line with up to 40 characters of new text and proceed to the previous line

Individual lines may be field-edited using, for example, the cursor-left and cursor-right keys. If you wish to completely erase a line you should replace its text with a single space. When you supply the tenth line, or key <CTRL B> to an earlier line, you will proceed to the DIRECT ACCESS CONTROLLERS section.

Note that the first or second line must **NOT** be altered in any way.

You should read section B.3 which describes the recommended configuration file standards for bootstrap messages before updating this section.

### 3.3 The Direct Access Controllers Section

This section of the dialogue begins by displaying the header:

DIRECT ACCESS CONTROLLERS

or:

DATA FILE DEFINITIONS

This is then followed by a CONTROLLER prompt to allow you to modify or accept this first controllers/drive block, or to position yourself at another point in the dialogue.

#### 3.3.1 CONTROLLER (short description)

The following responses may be made to this main prompt:

Response	Action
<CTRL A>	Return to the start of the DIRECT ACCESS CONTROLLERS section
<CTRL B>	Accept this and any subsequent direct access controller information, then proceed to the next section (<CTRL G> may be used to abort)
<CTRL C>	Display a help screen listing valid short descriptions, then repeat the current CONTROLLER prompt
<CR>	Accept the existing short description and proceed to the DRIVE prompt

A (or a)	Accept this and any subsequent direct access controller information then proceed to a new CONTROLLER prompt so that you can add one or more controller/drive blocks
B (or b)	Return to INPUT BOOTSTRAP MESSAGES at the beginning of the dialogue
D (or d)	Delete information for the current controller and drive, then proceed to the next CONTROLLER prompt
I (or i)	Insert a new controller/drive block immediately before the current one. A colon prompt will appear requesting you for the new short description. Then you will proceed to the DRIVE prompt
N (or n)	Accept information for the current controller and drive, then proceed to the next CONTROLLER prompt
Q (or q)	Quit the configuration file update and return directly to the menu or ready prompt
New short description	Override the existing controller short description (e.g. when adding a controller to support a new type of device) then proceed to the DRIVE prompt

### 3.3.2 DRIVE (number)

You must reply with the drive number. A unique number must be associated with each distinct device supported by a particular controller. Usually drive numbers are allocated sequentially starting at 0, and where the controller only supports one drive, this is taken to be drive 0.

### 3.3.3 DESCRIPTION

The drive description, of up to 25 characters, which will appear in any error messages for this drive.

### 3.3.4 Controller-specific Prompts

For some controllers you will be prompted for machine-dependent information used to parameterize the direct access device driver. The following prompts are typical examples but different ones may appear for particular controllers: **Port Number** (number), **Device Register** (address) or **Interrupt Vector** (number). Refer to table 3.1 for rules about keying hexadecimal information.

**Important Note:** If a computer supports two or more similar drives (e.g. the DISKETTE drives in the example) then when you have set up the first controller/drive block, together with its volume format sub-blocks, the default mechanism can save you considerable extra keying.

Once you have supplied the drive number and machine dependent information (if any) for the second or subsequent block you simply need to key text <CTRL B> to the last prompt from this section to cause all the new volume format blocks to be set up. The appropriate device descriptions and unit numbers are determined from the current drive number; the other defaults are taken from the previous controller/drive block.

### 3.3.5 VOLUME FORMAT (format code)

This is a main prompt introducing the volume format sub-block. When a drive is capable of supporting N different volume formats there will be N such sub-blocks associated with it. Valid responses are:

Response	Action
<CTRL A>	Return to the start of the DIRECT ACCESS CONTROLLERS section
<CTRL B>	Accept this and any subsequent volume format information for this controller and drive, then proceed to the next direct access CONTROLLER: prompt (<CTRL G> may be used to abort)
<CTRL C>	Output a help screen listing valid format codes and their descriptions (as explained in table 3.3), then repeat the current VOLUME FORMAT: prompt
<CR>	Accept the existing format code and proceed to the next subordinate prompt
A (or a)	Accept this and any subsequent volume format information, then proceed to a new VOLUME FORMAT: prompt so that you can add one or more volume format sub-blocks
B (or b)	Return to INPUT BOOTSTRAP MESSAGES at the beginning of the dialogue
D (or d)	Delete information for this volume format, then proceed to the next VOLUME FORMAT prompt
I (or i)	Insert a new volume format sub-block immediately before the current one. A colon prompt will appear requesting you for the new format code. Then you will proceed to the first subordinate prompt
N (or n)	Accept the current volume format information, then proceed to the next VOLUME FORMAT prompt

New format code	Override the existing format code (e.g. when adding a new volume format) code then proceed to the first subordinate prompt.
-----------------	---

### 3.3.5.1 Displaying Full Volume Details

When a volume format is accepted, either by keying <CR> to the default or specifying a new value, the 24 character volume description is displayed. If the terminator to the reply is <ESCAPE>, the full volume details are displayed. For example:

```
VOLUME FORMAT (N1B) :<CR> 3" SS,DD (70T)
VOLUME FORMAT (N1B) :<ESCAPE>
N1B 9 SECTORS OF 512 BYTES PER TRACK 3" SS,SD (70T)
```

### 3.3.5.2 Invalid Volume Formats

If, when you update a configuration file, the existing, valid volume format is rejected, this indicates that it is not present in the A.VTYPE action file (see Table 1.1). You should order a new copy of Global Configurator to obtain the up-to-date version of A.VTYPE.

### 3.3.5.3 Volume Format Help Text

There is a subtle but very important difference between the help-text displayed when <CTRL C> is the reply to a CONTROLLER prompt and that displayed when <CTRL C> is the reply to the VOLUME FORMAT prompt.

The help-text for a CONTROLLER lists **all** the possible valid replies to the CONTROLLER prompt. No other replies are allowed. Both the help-text and the actual records are extracted from the machine-specific action-file (i.e. A.J5, A.JW A.C2 or A.W1).

The help-text for a VOLUME FORMAT lists the **suggested** replies: It may be possible to include volume formats other than those listed. The help-text is extracted from the machine-specific action-file (i.e. A.J5, A.JW, A.C2 or A.W1). The actual volume-format records are extracted from the volume format action file (i.e. A.VTYPE). It may be possible for A.J5 etc. to "get out of step" with A.VTYPE in which case some new volume formats present in A.VTYPE (e.g. T259Z) may not be included in the help-text within A.J5 etc.

### 3.3.5.4 Adding New Volume Formats

Not all the hundreds of volume types in the A.VTYPE file will work on a given computer. You **MUST** consult TIS Software before adding new formats.

### 3.3.6 MAXIMUM NUMBER OF FILES (number)

This prompt only appears for a domain. You may change the default to any number up to 250. **IF THIS VALUE IS CHANGED \$V MUST BE USED TO RE-INITIALISE THE DOMAIN.**



Type of Volume	Volume Format Description
DISKETTE	x SECTORS OF y BYTES PER TRACK desc  x    number of sectors per track y    number of bytes per sector desc 24 character description  The volume description may contain further details of the media (e.g. number of surfaces and density)
DOMAIN	DOMAIN (nn SUBUNITS) disk description  nn    default number of subunits
DLV	DLV (nn FILES) disk description  nn    number of files. This value cannot be varied.

**Table 3.3 - Volume Format Descriptions Displayed on the Help Screen**

### 3.3.7 NUMBER OF SUBUNITS (number)

This prompt only appears for a domain. You may change the default number of subunits to any value between 1 and N (where N is either 99 or two less than the maximum number of files (see above), whichever value is lower). For example, if the maximum number of files is 250, the maximum number of sub units is 99; if the maximum number of files is 99, the maximum number of subunits is 97.

When specifying the number of subunits, you must not implicitly define a unit address which has already been used. For example, if you request 49 subunits on the domain to be located at address 200, you implicitly define unit addresses 201 to 249. The DUPLICATE UNIT NUMBER error message will appear when you reply to the later UNIT NUMBER prompt if any implied unit is already defined.

Remember that when requesting a large number of subunits, each definition requires 18 bytes of nucleus data area (see section D.3).

### 3.3.8 UNIT NUMBER (address)

Normally you key <CR> to this prompt to accept the default unit address, which is calculated from the standard default (associated with the volume format) incremented by the drive number. This will ensure that your unit number allocation conforms to the convention adopted by most users.

The error message:

DUPLICATE UNIT NUMBER

will appear if you inadvertently key an address which has already been defined. The prompt will then be repeated so that you can correct your error.

You should read section B.5 describing the recommended direct access unit numbers before adding new unit numbers.

**Important note:** When updating a configuration file it is possible to get into the situation where any reply to this prompt results in a DUPLICATE UNIT NUMBER error message! For example, if an attempt is made to add a second domain with 99 subvolumes to a configuration file that already includes a domain (unit 200) with 99 subvolumes, and one or more diskette formats (with unit numbers in the range 110-199). The only way to continue the update is to key <CTRL A> to this prompt to return to the start of the DIRECT ACCESS CONTROLLER SECTION.

### 3.3.9 FORMAT FLAG (#byte value)

This prompt will not normally appear. If it does, you must specify the type of formatting supported on the volume by keying a hexadecimal byte value, as defined in the description of F.FLAGS in section 2.8.10. Note that #80 is always a 'safe' response to this prompt, but in this case the \$V Format, Format and Verify, and Reformat Track functions will not be allowed on the volume.

### 3.3.10 VOLUME START ADDRESS

This header will appear if the volume you are defining is a 'floating' hard disk domain or, more rarely, a DLV. (A DLV is normally only used on hard disk and cartridge tape systems where the disk supplies one or more DLV's to serve as a tape load area). A floating domain may be used for systems where a varying amount of the hard disk is required for the host operating system.

Following the header you will be prompted for the first cylinder, head and, optionally, the sector location occupied by the Global System Manager volume. In some implementations, where it is more convenient to count sectors, you will just be prompted for the first sector number. Remember that counting starts from 0, and the very first sector of the device is sector number 0 at cylinder 0, head 0, sector 0. Your response to the prompt or prompts involved should be decimal integers.

A floating domain must start on a track boundary, so if you are defining a domain the sector number mode of input is not available and you will only be prompted for the cylinder and head number.

### 3.3.11 VOLUME END ADDRESS

This header appears when you are defining a floating hard disk domain or DLV. It is followed by prompts similar to those used for the start address to allow you to define the last cylinder, head and, optionally, the sector occupied by the Global System Manager volume. In some implementations, where it is more convenient to count sectors, you will just be prompted for the last sector number.

For both this prompt and the previous one, the error message "PAST MEDIA EXTENT" will appear if you attempt to define an end address outside the device limits. The prompts will then be repeated so that you can correct your error.

## 3.4 The Console Controllers Section

This section of the dialogue begins by displaying the header:

CONSOLE CONTROLLERS

or:

USER DISPLAY ATTRIBUTES

This header is followed by a CONTROLLER prompt to allow you to modify or accept the first console controller block, or to position yourself elsewhere in the dialogue.

### 3.4.1 CONTROLLER (short description)

The following responses may be made to this main prompt:

Response	Action
<CTRL A>	Return to the start of the CONSOLE CONTROLLERS section
<CTRL B>	Accept this and any subsequent console controller information, then proceed to the next section (<CTRL G> may be used to abort)
<CTRL C>	Output a help screen listing valid short descriptions, then repeat the current CONTROLLER prompt
<CR>	Accept the existing short description and proceed to the first subordinate prompt
A (or a)	Accept this and any subsequent console controller information, then proceed to a new CONTROLLER prompt so that you can add one or more console controller blocks
B (or b)	Return to INPUT BOOTSTRAP MESSAGES at the beginning of the dialogue
D (or d)	Delete information for the current console controller, then proceed to the next CONTROLLER prompt
I (or i)	Insert a new console controller block immediately before the current one. A colon prompt will appear requesting you for the new short description. Then you will proceed to the first subordinate prompt
N (or n)	Accept information for the current console controller, then proceed to the next CONTROLLER prompt

Q (or q)	Quit the configuration file update and return directly to the menu or ready prompt
New short description	Override the existing controller short description (e.g. when adding a controller to support a new type of console) then proceed to the first subordinate prompt

### 3.4.2 TYPE AHEAD BUFFER LENGTH (number)

For the meaning of this subordinate prompt refer to section 2.4.1 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.4.3 DISPLAY BUFFER LENGTH (number)

For the meaning of this subordinate prompt refer to section 2.4.2 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.4.4 FUNCTION KEY BUFFER LENGTH (number)

For the meaning of this subordinate prompt refer to section 2.4.3 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.4.5 SCREEN IMAGE WIDTH (number)

For the meaning of this subordinate prompt refer to section 2.4.4 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.4.6 SCREEN IMAGE DEPTH (number)

For the meaning of this subordinate prompt refer to section 2.4.5 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.4.7 NUMBER OF STORED ATTR' BYTES (number)

For the meaning of this subordinate prompt refer to section 2.4.6 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.4.8 NUMBER OF PARTITIONS (number)

For the meaning of this subordinate prompt refer to section 2.4.7 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.4.9 CHARACTER TRANSLATION ENABLED (Y or N)

For the meaning of this subordinate prompt refer to section 2.4.8 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.4.10 CONSOLE EXECUTIVE FLAG BYTE (#number)

For the meaning of this subordinate prompt refer to section 2.4.9 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.4.11 Controller-specific Prompts

For some controllers you will be prompted for machine-dependent information used to parameterize the console device driver. The

following prompts are typical examples but different ones may appear for particular controllers: **Baud Rate** (number), **Port Number** (number), **Device Register** (address) or **Interrupt Vector** (address) etc. Refer to table 3.1 for rules about keying hexadecimal information.

### 3.5 The Tape Controllers Section

This section of the dialogue begins by displaying the header:

TAPE CONTROLLERS

This header is followed by a CONTROLLER prompt to allow you to modify or accept the tape controller block.

**Global System Manager only supports a single tape drive on a computer. You must not attempt to define more than one tape controller.**

The tape controllers section will not appear if your computer does not support either \$TDUMP, the Tape Dump/Restore option, or \$TAPE, the Streaming Tape utility.

#### 3.5.1 CONTROLLER (short description)

The following responses may be made to this main prompt:

Response	Action
<CTRL A>	Return to the start of the TAPE CONTROLLERS section
<CTRL B>	Accept this tape controller information, then proceed to the next section (<CTRL G> may be used to abort)
<CTRL C>	Output a help screen listing valid short descriptions, then repeat the current CONTROLLER prompt
<CR>	Accept the existing short description and proceed to the first subordinate prompt
A (or a)	Accept this and any subsequent tape controller information, then proceed to a new CONTROLLER prompt. <b>Global System Manager only supports a single tape drive on a machine, and so you must not have more than one controller defined</b>
B (or b)	Return to INPUT BOOTSTRAP MESSAGES at the beginning of the dialogue
D (or d)	Delete information for the current tape controller, then proceed to the next CONTROLLER prompt

I (or i)	Insert a new tape controller block immediately before the current one. <b>DO NOT USE - Global System Manager only supports a single tape drive on a machine, and so you must not have more than one controller defined</b>
N (or n)	Accept information for this tape and proceed to the next CONTROLLER prompt. <b>Global System Manager only supports a single tape drive on a machine, and so you must not have more than one controller defined</b>
Q (or q)	Quit the configuration file update and return directly to the menu or ready prompt
New short description	Override the existing controller short description (e.g. when adding a new type of tape), then proceed to the first subordinate prompt

### 3.5.2 Controller-specific Prompts

For some controllers you will be prompted for machine-dependent information used to parameterize the tape device driver. The following prompts are typical examples but different ones may appear for particular controllers: **Port Number** (number), **Device Register** (address) or **Interrupt Vector** (address) etc. Refer to table 3.1 for rules about keying hexadecimal information.

Section 2.5 explains the meaning of the individual prompts.

## 3.6 The Printer Controllers Section

This section of the dialogue begins by displaying the header:

PRINTER CONTROLLERS

or:

PRINTER ATTRIBUTES

This header is followed by a CONTROLLER prompt to allow you to modify or accept the first printer controller block, or to position yourself elsewhere in the dialogue.

### 3.6.1 CONTROLLER (short description)

The following responses may be made to this main prompt:

Response	Action
<CTRL A>	Return to the start of the PRINTER CONTROLLERS section

<CTRL B>	Accept this and any subsequent printer controller information, then proceed to the next section (<CTRL G> may be used to abort)
<CTRL C>	Output a help screen listing valid short descriptions, then repeat the current CONTROLLER prompt
<CR>	Accept the existing short description, then proceed to the UNIT NUMBER prompt
A (or a)	Accept this and any subsequent printer controller information, then proceed to a new CONTROLLER prompt so that you can add one or more printer controller blocks
B (or b)	Return to INPUT BOOTSTRAP MESSAGES at the beginning of the dialogue
D (or d)	Delete information for the current printer controller, then proceed to the next CONTROLLER prompt
I (or i)	Insert a new printer controller block immediately before the current one. A colon prompt will appear requesting you for the new short description. Then you will proceed to the UNIT NUMBER prompt
N (or n)	Accept information for the current printer controller, then proceed to the next CONTROLLER prompt
Q (or q)	Quit the configuration file update and return directly to the menu or ready prompt
New short description	Override the existing controller short description (e.g. when adding a controller to support a new type of printer) then proceed to the UNIT NUMBER prompt

### 3.6.2 UNIT NUMBER (address)

The unit address you supply must be in the range 500 to 599. It is usual to allocate the numbers consecutively starting at 500 although this is not a mandatory requirement (i.e. there can be gaps in the range of printer numbers).

The error message:

DUPLICATE UNIT NUMBER

will appear if you inadvertently key an address which has already been defined. The prompt will then be repeated so that you can correct your error.

### 3.6.3 DESCRIPTION (text)

You supply the text (up to 25 characters) that is displayed by \$U and which will appear in any error messages concerning the printer in question. This should indicate the type of printer, and, where relevant, how it is attached to the machine. For example:

```
SERIAL PRINTER ON COM1
```

The printer description is used in a special way to modify the dialogue used by the \$CUS Printer Characteristics option. If the description contains the keyword PARALLEL in upper case (i.e. capitals) then \$CUS does not request information about the baud rate and type of serial printer. Instead it asks whether the parallel printer is polled or interrupt driven.

### 3.6.4 HARDWARE FORM FEED (Y or N)

For the meaning of this subordinate prompt refer to section 2.6.2 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.6.5 PAGE DEPTH (depth in lines)

For the meaning of this subordinate prompt refer to section 2.6.3 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.6.6 MAXIMUM PAGE WIDTH (width in characters)

For the meaning of this subordinate prompt refer to section 2.6.4 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.6.7 TIME-OUT IN TENS OF SECONDS (timeout value)

For the meaning of this subordinate prompt refer to section 2.6.5 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.6.8 SPOOLER CONTROL BITS (#byte value)

For the meaning of this subordinate prompt refer to section 2.6.6 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.6.9 PRINTER EXECUTIVE FLAG BYTE (#byte value)

For the meaning of this subordinate prompt refer to section 2.6.7 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.6.10 DEVICE CHARACTERISTICS (#byte value)

For the meaning of this subordinate prompt refer to section 2.6.8 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.6.11 Controller-specific Prompts

For some controllers you will be prompted for machine-dependent information used to parameterize the printer device driver. The following prompts are typical examples but different ones may appear for particular controllers: **Baud Rate** (number), **Port Number** (number),



**Device Register** (address) or **Interrupt Vector** (address) etc. Refer to table 3.1 for rules about keying hexadecimal information.

### 3.7 The LAN Controllers Section

This section of the dialogue begins by displaying the heading:

LAN CONTROLLERS

or:

TRANSPORT LAYER

This is then followed by a CONTROLLER prompt to allow you to modify the or accept the LAN controller block. **Only one LAN controller can be specified for the configuration, and the keyword in the bootstrap messages must indicate a network configuration.**

#### 3.7.1 CONTROLLER (short description)

The following responses may be made to this main prompt:

Response	Action
<CTRL A>	Return to the start of the LAN CONTROLLERS section. As only one LAN controller can be specified for the configuration, this option is not very useful
<CTRL B>	Accept this and any subsequent LAN controller information, then proceed to the next section (<CTRL G> may be used to abort)
<CTRL C>	Output a help screen listing valid short descriptions, then repeat the current CONTROLLER prompt
<CR>	Accept the existing short description, then proceed to the first subordinate prompt
A (or a)	Accept this and any subsequent LAN controller information, then proceed to the next section
B (or b)	Return to INPUT BOOTSTRAP MESSAGES at the beginning of the dialogue
D (or d)	Delete information for the current LAN controller, then proceed to the next CONTROLLER prompt
I (or i)	Insert a new LAN controller block immediately before the current one. <b>DO NOT USE - Only one LAN controller can be specified for the configuration</b>

N (or n)	Accept information for the current LAN controller, then proceed to the next section
Q (or q)	Quit the configuration file update and return directly to the menu or Ready prompt
New short description	Override the existing controller short description (e.g. when adding a controller to support a new type of network card) then proceed to the first subordinate prompt

### 3.7.2 POLLS TO WAIT BETWEEN LAN ACCESSES (number)

For the meaning of this subordinate prompt refer to section 2.7.1 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.7.3 NORMAL TIME-OUT IN SECS (number)

For the meaning of this subordinate prompt refer to section 2.7.2 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.7.4 TIME-OUT ON 1ST ACCESS IN SECS (number)

For the meaning of this subordinate prompt refer to section 2.7.3 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.7.5 LAN EXECUTIVE RETRY COUNT (number)

For the meaning of this subordinate prompt refer to section 2.7.4 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.7.6 WAN MASTER NODE-ID (letter)

For the meaning of this subordinate prompt refer to section 2.7.5 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.7.7 LAN EXECUTIVE FLAG BYTE (#byte value)

For the meaning of this subordinate prompt refer to section 2.7.6 where the corresponding information appearing on the configuration file report is explained in detail.

### 3.7.8 Controller-specific Prompts

For some controllers you will be prompted for machine-dependent information used to parameterize the LAN device driver. The following prompts are typical examples but different ones may appear for particular controllers: **Port Number** (number), **Device Register** (address) or **Interrupt Vector** (address) etc. Refer to table 3.1 for rules about keying hexadecimal information.

## 3.8 The Nucleus Options Section

This section of the dialogue begins by displaying the header:

```
NUCLEUS OPTIONS
```

This is followed by a number of subordinate prompts, which specify parameters governing the allocation of buffers and channels, and other nucleus information which is not specific to a particular controller or unit. You can alter the values of these parameters if you wish: for their meaning refer to section 2.9 where the corresponding information appearing on the print report is described in detail.

The following responses may be made to any of the subordinate prompts:

Response	Action
<CTRL A>	Return to the start of the NUCLEUS OPTIONS section
<CTRL B>	Accept this and any subsequent NUCLEUS OPTIONS information, then proceed to the DISTRIBUTION OPTIONS section
<CTRL C>	No special meaning and is treated as <CR>
<CR>	Accept the existing value, then proceed to the next subordinate prompt
A (or a)	Has no special meaning and is treated as an invalid response
B (or b)	Has no special meaning and is treated as an invalid response
D (or d)	Has no special meaning and is treated as an invalid response
I (or i)	Has no special meaning and is treated as an invalid response
N (or n)	Has no special meaning and is treated as an invalid response
Q (or q)	Has no special meaning and is treated as an invalid response

### 3.9 The Distribution Options Section

This section of the dialogue begins by displaying the header:

DISTRIBUTION OPTIONS

This is then followed by a number of subordinate prompts, which specify parameters which governed the selection of various options when Global System Manager was generated. **You must not attempt to**

**change any of these values, since the only effect will be to make the configuration file inconsistent with the software supplied.**

You should therefore key `<CTRL B>` to the first prompt which appears to accept the existing values. For the meaning of the prompts, refer to section 2.10 where the corresponding information appearing on the print report is explained.

Note that a reply of `<CTRL A>` to either the DISTRIBUTION UNIT ADDRESS or the IPL UNIT ADDRESS prompt will return to the start of the DISTRIBUTION OPTIONS section.

During the processing of the DISTRIBUTION OPTIONS section a number of warnings may be displayed (see section A.2 for an explanation of the warning messages).

### 3.9.1 The EDIT COMPLETE? (Y) prompt

This prompt appears at the end of the DISTRIBUTION OPTIONS section to enable you to return to an earlier stage in the dialogue if you realise you have made an error. Valid responses are:

Response	Action
<code>&lt;CTRL A&gt;</code>	Return to the start of the NUCLEUS OPTIONS section
<code>&lt;CTRL B&gt;</code>	Repeat the EDIT COMPLETE prompt. This is useful if <code>&lt;CTRL B&gt;</code> has been keyed repeatedly to complete the edit phase of the update
<code>&lt;CTRL C&gt;</code>	No special meaning and is treated as <code>&lt;CR&gt;</code>
<code>&lt;CR&gt;</code>	Indicate that the edit process is complete and proceed to output and optionally print the modified configuration file
N (or n)	Return to the start of the INPUT BOOTSTRAP MESSAGES section
Y (or y)	Indicate that the edit process is complete and proceed to output and optionally print the modified configuration file

## 3.10 The Output and Print Stage

This stage is entered at the very end of the dialogue to enable you to output and optionally print the modified configuration file created by the previous updating process.

### 3.10.1 OUTPUT FILE (file-id) and UNIT (address)

These two prompts enable you to change the name and unit of the configuration file you are updating. The defaults identify the original file. If you are updating in place you must reply `<CR>` to

both prompts and then key Y to the subsequent FILE ALREADY EXISTS - DELETE?: warning. Section 1.3 describes a special reply to the FILE ALREADY EXISTS -DELETE? prompt which allows the original configuration file to be renamed.

The error message:

OUTPUT FILE SPACE EXHAUSTED

appears if there is insufficient space for the new file on the specified unit. It will be followed by another OUTPUT FILE: and UNIT: prompt so that you can store the file elsewhere, for example on the volume containing CFUPDATE.

### **3.10.2 PRINT FORMATTED DUMP ? (N)**

This prompt allows you to print out a hexadecimal dump of the configuration file, formatted in such a way as to show all the control blocks. Section 1.3 explains how to alter the default dump file name and unit.

### **3.10.3 PRINT? (Y)**

This prompt appears once the new file has been written back to disk satisfactorily. If you key Y or <CR> the configuration file report will be directed to the unit assigned to \$PR. Key N to avoid printing. Section 1.3 explains how to alter the default report file name and unit.

[Note to TIS Software staff: The default to the PRINT? prompt is N when Global Configurator is used on internal systems.]

## Appendix A - Errors and Error Messages

This appendix describes some of the errors which may occur when printing or updating a configuration file (A.1 and A.2), or when you access a device supported by the configuration file but not by the hardware (A.3). Errors which may occur during the bootstrap process and which arise from incorrect updating of a configuration file are described in the Global Operating Manual.

### A.1 Errors Printing or Updating a Configuration File

This section lists error messages that may be displayed by CFAUTO, CFPRINT or CFUPDATE to indicate that an error has arisen which will prevent the print or update succeeding.

#### **ACTION FILE A.am NOT FOUND**

#### **YOU SHOULD COPY IT FROM BACRES TO THE CONFIGURATION FILE UNIT**

This error means either that you are trying to print or update a configuration file for a computer which is not supported by your version of Global Configurator. Alternatively, (which is more likely) the machine-specific Action File required to process the configuration file is not on the same unit as the configuration file. The print or update operation is aborted, and you should copy the file in question to the same unit as the configuration file as advised before trying again.

#### **BOOTSTRAP MESSAGE DOES NOT CONTAIN BOS NAME**

This message appears if the first line of the bootstrap message does not define the software level. See section B.3.

#### **BOS TYPE IN BOOTSTRAP MESSAGE INCONSISTENT WITH CONFIGURATION FILE**

This message appears if the level number of Global System Manager, as defined in the first line of the bootstrap message, does not match the level number of the configuration file.

#### **EDIT AREA FULL**

The modified configuration file you are building using CFUPDATE contains too much information. Global Configurator's internal tables have room for 250 edit slots. Each controller block normally requires only two of these and each volume format block one, so in practice this error should rarely, if ever, occur. If it does you will not be able to add any more controller or volume format entries to the new configuration file unless you delete some of the current ones. Zaps are available to increase the number of edit areas.

#### **FILE A.VTYPE IS OUT OF DATE**

This self-explanatory message may appear during a CFPRINT if the configuration file was created using a more recent version of A.VTYPE. A volume type that is included in the configuration file is not defined in your version of A.VTYPE.

#### **INCONSISTENT ACTION FILES**

This message appears if you try to print a configuration file that references a controller that is not defined in the action files. You should copy the latest A.am file from BACRES to the same unit as the configuration file. The print operation is aborted.

### **INSUFFICIENT MEMORY**

Global Configurator requires at least 29 Kbytes of user area to work properly. If there is less this message may abort CFPRINT or CFUPDATE at any point of the updating dialogue. More memory may be required for network configurations.

### **INVALID - REINPUT**

This message may appear for a variety of reasons. If it appears during an update to the reply to the VOLUME FORMAT prompt, the Volume Format action file, A.VTYPE, is out of date (see above).

### **MACHINE short description NOT SUPPORTED**

This message appears if you try to print or update a configuration file for a computer whose short description is not defined on the action files. You should copy the latest A.am file from BACRES to the configuration file unit.

### **OUTPUT FILE SPACE EXHAUSTED**

There is no room to write the new configuration file created by CFUPDATE. The error message will be followed by a new OUTPUT FILE: and UNIT: prompt so that you can store the file elsewhere, as explained in 3.10.

### **NUMBER OF SCREENS HIGHER THAN ALLOWED MAXIMUM**

You have attempted to include more than the maximum number of screens allowed for the configuration file.

### **TOTAL NUMBER OF PARTITIONS MUST BE LESS THAN 100 (nnn)**

You have attempted to include more than the maximum number of partitions allowed for any configuration file (i.e. 99). The value nnn is the number of partitions defined in the configuration file.

### **MULTIPLE OF SCREENS \* PARTS MUST BE LESS THAN 256 (nnnn)**

You have attempted to include more than the maximum number of screens numbers allowed for any configuration file (i.e. 255). The number of screens multiplied by the highest number of partitions for any screen must be less than 256. The value nnnn is the multiple of the number of screens and the highest number of partitions for any screen.

### **PRINT FILE SPACE EXHAUSTED**

This error occurs if \$PR is assigned to a direct access device and there is insufficient space to hold the configuration file report. The partially produced print file is deleted.

## A.2 Warnings Updating a Configuration File

The following warning message may be displayed at the end of the update:

### WARNING - UPGRADING FROM PRE-V6.2 FILE

This message should never appear and is included for completeness only. It indicates that the "maximum number of screens" field in the first line of the bootstrap message is missing.

### MAXIMUM NUMBER OF SCREENS (number)

This message will only appear when Global Configurator is being used on an internal version of Global System Manager. It indicates the maximum number of screens that can be included in the configuration.

### INCREASING NUMBER OF FILE BUFFERS TO number

This warning message appears if you specified a number of file buffers less than the minimum allowable (as explained under NUMBER OF FILE BUFFERS in section 2.9.6). Each file buffer requires  $(S + 16)$  bytes of nucleus data space, where S is the largest sector size of any volume supported.

### INCREASING NUMBER OF FILE BLOCKS TO number

This warning message is displayed if you specified a number of file blocks less than the minimum allowable (as explained under NUMBER OF FILE BLOCKS in section 2.9.7). Each file block requires 18 bytes of nucleus data space. (Note that CFUPDATE will also automatically increase the NUMBER OF FILE CHANNELS (see section 2.9.5) to be 8 times the number of users but, since the cost of a file channel is only four bytes of nucleus data space the additional requirement is not considered significant enough to warrant a warning message.)

### Warning - Volume with more than 65535 tracks

This message is displayed if a hard disk volume contains more tracks than the maximum number supported by Global System Manager.

## A.3 Unsupported Device Errors

If a Global System Manager command or Global application program attempts to access a unit which is not defined in the system's configuration file an irrecoverable I/O Error D will occur:

\* ASSIGNMENT ERROR on uuu

When you are using a 'superset' configuration file supporting a number of different configurations, it may define units that are not matched by physical hardware on a particular computer. This is often the case for printers or diskettes. If one of the missing units is accessed by mistake, the outcome depends on the sophistication of the computer involved:



- If the hardware is capable of detecting that no device is attached, I/O Error D will occur as above. This is ideal, since the handling is the same as for a genuinely undefined unit;
- If the hardware is less sophisticated it will not realise that the device is missing but will instead signal an I/O error which Global System Manager will report as HARDWARE ERROR (error "H") or NOT READY (error "U"). This is adequate but not ideal;
- The worst case is when the hardware is unable to detect there is any problem. For printers this may mean that a report directed to a missing device is simply lost since Global System Manager is not informed of any error. Alternatively, the system may simply hang. It may be sensible to avoid using 'superset' configuration files on this type of computer.

## Appendix B - Recommended Configuration File Standards

The conventions and guidelines described in this appendix are used when creating the configuration files distributed with Global System Manager. For consistency we would recommend that you adhere to them when updating configuration files using CFUPDATE.

### B.1 Configuration File Names (post 1992)

For configuration files distributed after 31-Dec-1992, the configuration file name should be of the form:

++nnnnp<sub>x</sub>

where nnnn is the four digit **Set Number** and p is the operating system price code, as described below. For configuration files distributed with Global System Manager, x will always be "J" although all other upper-case letters are reserved for future expansion. If you want to create your own configuration files you should use lower case letters to avoid clashes.

The Global System Manager price code, p, should be one of the following:

W	single user (SBOS);
A	concurrent, single screen (CBOS);
B	multi user/network (MBOS/PC - 2 or 3 screens);
X	multi user/network (MBOS, BOS/XLAN - 4 to 7 screens);
Y	multi user/network (MBOS, BOS/XLAN - 8 to 12 screens);
D	multi user/network (MBOS, BOS/XLAN - 13 to 24 screens);
E	multi user/network (MBOS, BOS/XLAN - 25 to 39 screens);
F	multi user/network (MBOS, BOS/XLAN - 40 to 59 screens);
G	multi user/network (MBOS, BOS/XLAN - 60 to 99 screens);
V	network (BOS/XLAN - 100 to 150 screens);
U	network (BOS/XLAN - 151 to 200 screens);
T	network (BOS/XLAN - 201 to 250 screens);
Z	network (BOS/XLAN - up to 9999 users);

Note that the configuration file determines the level of Global System Manager supplied on BACRES. The level number is derived from the configuration file only at software **generation** time. Consequently, it is not possible to change the Global System Manager software level on an installed system by modifying the configuration file on SYSRES. Similarly, it is not possible to change the Global System Manager software level on a starter system by modifying the configuration file on BACRES.

Renaming the last character of the configuration file name from "J" to "D" enables bootstrap diagnostics.

The set number is used to identify a group of related configuration files for similar configurations. The Global Reseller Handbook lists the set numbers used for each computer. The sets are chosen so that each represents a readily identified group of configurations and contains, typically, between 6 to 10 configuration files.

### B.2 Configuration File Names (pre 1993)

For configuration files distributed before 1-Jan-1993 the configuration file name is of the form:

++nnnxt

where nnnn is the four digit **Set Number**, x is any alphabetic character, and t is the operating system type code, as described below. For configuration files distributed with Global System Manager, x will be upper case: if you want to create your own configuration files you should use lower case letters to avoid clashes. When there are several configuration files that differ only in the Global System Manager level, the same character x should be used for them all.

The Global System Manager level code, t, should be one of the following:

```
S    single user (SBOS);
C    concurrent, single screen (CBOS);
P    multi user (MBOS/PC - 2 or 3 screens);
E    multi user (MBOS - 4 to 7 screens);
M    multi user (MBOS - 8 to 12 screens);
N    multi user (MBOS - 13 to 24 screens);
Q    multi user (MBOS - 25 to 39 screens);
R    multi user (MBOS - 40 to 59 screens);
T    multi user (MBOS - 60 to 99 screens);
K    restricted network (BOS/LAN - 2 or 3 users);
F    restricted network (BOS/LAN - 4 to 7 users);
L    restricted network (BOS/LAN+ - 8 to 12 users);
+    restricted network (BOS/LAN+ - 13 to 24 users);
U    extended network (BOS/XLAN - 2 or 3 users);
G    extended network (BOS/XLAN - 4 to 7 users);
V    extended network (BOS/XLAN - 8 to 12 users);
W    extended network (BOS/XLAN - 13 to 24 users);
X    extended network (BOS/XLAN - 25 to 39 users);
Y    extended network (BOS/XLAN - 40 to 59 users);
Z    extended network (BOS/XLAN - 60 to 99 users);
A    extended network (BOS/XLAN - 100+ users);
D    enable bootstrap diagnostic messages;
```

Note that the configuration file determines the level of Global System Manager supplied on BACRES. The level number is derived from the configuration file only at software **generation** time. Consequently, it is not possible to change the Global System Manager software level on an installed system by modifying the configuration file on SYSRES. Similarly, it is not possible to change the Global System Manager software level on a starter system by modifying the configuration file on BACRES.

Renaming the last character of the configuration file name to "D" enables bootstrap diagnostics.

The set number is used to identify a group of related configuration files for similar configurations. The Global Reseller Handbook lists the set numbers used for each computer. The sets are chosen so that each represents a readily identified group of configurations and contains, typically, between 6 to 10 configuration files.

### B.3 Bootstrap Messages

The lines of the bootstrap message are employed as follows:

LINE 1 defines the Global System Manager level by including one of the special keywords:

Keyword(s)	Description
LEVEL2 or SBOS	Single screen, single partition
LEVEL3 or CBOS	Single screen, concurrent
LEVEL4 or MBOS/PC	Multi-user (2-3 screens)
LEVEL5 or MBOS	Multi-user (up to 99 screens)
LEVEL6 or BOS/NET	Obsolete
LEVEL7 or BOS/LAN	Obsolete
LEVEL8 or BOS/LAN+	Obsolete
LEVEL9 or BOS/XLAN	Networking

LINE 2 is always blank.

LINES 3 - 10 outline the hardware configuration, defining:

- The number of consoles, their device addresses and baud rates (where relevant), and concurrent capability;
- The number and types of direct access devices, with device addresses where relevant. For hard disks include full details of the drive, such as the capacity, manufacturer and the name of the drive;
- The tape drive, if one is supported;
- The number and types of printers, highlighting any significant hardware details;
- Any machine options that are necessary such as an expansion memory card;
- Any special configuration file features that should be brought to the reader's attention. For example, more file buffers or print buffers than usual, or a special bootstrap unit.

## B.4 Standard Diskette Formats

When a Global System Manager configuration supports several drives of the same type, the same volume formats are defined for each one. For diskettes there are certain standard formats which are common to a large number of computers, and these are always specified (when supported) in the interest of portability.

For 5¼" diskettes the standard formats currently supported are:

C7B (194) double sided, double density, 35 tracks with 16 256-byte sectors;

COA (190) double sided, double density, 40 tracks with eight 512-byte sectors  
(equivalent to DOS 320Kb diskettes);

C24A (196) double sided, double density, 40 tracks with nine 512-byte sectors (equivalent to DOS 360Kb diskettes);

R19A (160) double sided, double density, double tracking, 80 tracks with 16 256-byte sectors;

R20A (162) double sided, double density, double tracking, 80 tracks with eight 512-bytes sectors;

G1A (150) double sided, high capacity, double tracking, 80 tracks with 15 512-bytes sectors (equivalent to DOS 1.2Mb diskettes);

G1B (152) As G1A but with 250 labels.

For 3½" diskettes the standard formats currently supported are:

N1B (170) single sided, 70 tracks, nine 512-byte sectors;

B3B (190) double sided, 80 tracks, nine 512-byte sectors (equivalent to DOS 720Kb diskettes);

O1A (142) double sided, high capacity, 80 tracks, 15 512-byte sectors;

O2A (140) double sided, high capacity, 80 tracks, 18 512-byte sectors (equivalent to DOS 1.44Mb diskettes);

O2B (142) As O2A but with 250 labels;

V2A (130) double sided, extra high capacity, 80 tracks, 36 512-byte sectors (equivalent to DOS 2.88Mb diskettes);

V2B (132) As V2A but with 250 labels.

## B.5 Direct Access Unit Numbers

Unit numbers are conventionally allocated as follows:

100-103 not used, 'aliased' to be the same as the distribution format for diskette computers;

104-108 reserved;

109 RAM disk;

110-119 reserved;

120-129 reserved;

130-139 3½" extra high capacity diskettes (Vxx formats);

140-149 3½" high capacity diskettes (Oxx formats);

150-159 5¼" high capacity diskettes (Gxx formats);

160-169 5¼" double tracking diskettes (Rxx formats);

170-179 3½" double sided, low capacity diskettes (Bxx formats);

180-189 3½" single sided, low capacity diskettes (Nxx formats);

- 190-199 5¼" single tracking diskettes (Cxx formats);
- 200-299 hard disk domains and subunits;
- 300-399 reserved for future use for hard disk domains and subunits.  
**DO NOT ATTEMPT TO ADD THESE UNITS TO A CONFIGURATION FILE;**
- 400-499 reserved for future use for hard disk domains and subunits.  
**DO NOT ATTEMPT TO ADD THESE UNITS TO A CONFIGURATION FILE;**
- 500-599 printers;
- 600-699 not used, 'aliased' to hard-disk domains and subunits on the master computer of a network configuration (i.e. units 2xx on the master computer appear as 6xx on all computers on the network);
- 700-799 reserved for future use for hard disk domains and subunits.  
**DO NOT ATTEMPT TO ADD THESE UNITS TO A CONFIGURATION FILE;**
- 800-899 not used, 'aliased' to remote diskette units (i.e. units 1xx on the \$REMOTE slave computer appear as 8xx on the \$REMOTE master computer);
- 900-999 not used, 'aliased' to remote hard-disk and subunits (i.e. units 2xx on the \$REMOTE slave computer appear as 9xx on the \$REMOTE master computer).

## B.6 Memory Utilization

If there is plenty of memory available, the performance of the system can be improved by increasing the buffer space allocated in the configuration file, and thus decreasing the size of the user area.

Increasing the length of the display buffer for serially connected screens can greatly enhance the performance of a multi-user system, particularly if it uses disk swapping, since a user is swapped out when this buffer becomes full. Hence a program displaying a screen containing, say, 500 characters could be swapped five or more times with the minimum buffer length of 92, but would only be swapped once if the buffer length was increased to 250. In single user systems increasing the buffer length may give slight performance improvements by allowing more processing to be overlapped with displays. Note that there is no advantage in increasing the buffer length for integral consoles, since 'transmission' to such screens is immediate.

The performance of programs that access files sequentially can be greatly enhanced by increasing the number of file buffers, since if there are fewer buffers available than there are files open, some of them will be used by two or more files. There is no advantage in increasing the number of buffers beyond the maximum number of files that are likely to be open at any one time, since a direct access file can have at most one buffer assigned to it.

Increasing the number of printer buffers can improve the performance of multi-user systems and of programs which write to the printer at irregular intervals. If you use a printer which contains its own buffer there may be no point in defining more than one printer buffer.

## **B.7 Systems with Small User Areas**

You may find that the configuration file you have generated does not give a sufficiently large user area for your applications. You can increase the user area, at the expense of performance, by decreasing the buffer areas in the configuration file. You can make the following reductions:

- Decrease the length of the type-ahead buffers (e.g. to 10);
- Set the function buffer length to 0;
- Decrease the number of partitions;
- Decrease the number of printer buffers.

You can also save space by removing direct access units that you do not require, and only supporting those volume formats which you will actually be using.

Refer to Appendix D for more information regarding the sizes the control blocks created using Global Configurator.

## Appendix C - Single Drive Copy Program, SDCOPY

The single drive copy program, SDCOPY, enables you to transfer a file between two different volumes using only a single drive. It is particularly useful on computers with one diskette drive and a hard disk when the distributed configuration file on the BACRES diskette cannot be used to access the hard disk. SDCOPY allows you to transfer the configuration file and action file to the CFA diskette so that the configuration file can be updated. SDCOPY can then be used to copy the amended configuration file back to the BACRES diskette. The program is distributed on the CFA volume.

To use the single drive copy program, run SDCOPY, mount the input volume, and then specify the file name, input unit and output unit:

```
GSM READY:SDCOPY
$35 MOUNT INPUT VOLUME:
    (mount input volume then key <CR>)
$35 COPY FILE:file-name UNIT:input TO UNIT:output
```

If you reply <CR> to the output unit, the input unit will be used (the unit numbers will only be different if the volumes are of different formats). You will then be prompted to mount the output volume. If the file is too large to fit into memory, the input and output volume prompts will be repeated until the copy operation is complete:

```
$35 MOUNT OUTPUT VOLUME:<CR>
$35 MOUNT INPUT VOLUME:<CR>
```

These prompts may be repeated a number of times, according to the size of the file.

In order that SDCOPY can ensure that the correct volume has been mounted, either the volumes must be on different units, or they must have different volume-ids. If you attempt to copy between two volumes with the same volume-id on the same unit, the mount prompt for the output volume will be repeated until you supply a volume with a different volume-id, or abandon the operation.

The following example dialogue illustrates the use of SDCOPY to copy configuration file ++5700XJ from an O2A BACRES diskette (unit 140) to an O2A CFA diskette (unit 140):

```
GSM READY:SDCOPY
$35 MOUNT INPUT VOLUME:<CR>    (after BACRES diskette mounted)
$35 COPY FILE:++5700XJ FROM UNIT:140 TO UNIT (140):140
$35 MOUNT OUTPUT VOLUME:<CR>  (after CFA diskette mounted)
PLEASE MOUNT BACRES    ON 3" DISKETTE DRIVE - 140 AND KEY <CR>:<CR>
PLEASE MOUNT CFA    ON 3" DISKETTE DRIVE - 140 AND KEY <CR>:<CR>
$35 MOUNT INPUT VOLUME:<ESC>
GSM READY:
```

The following example dialogue illustrates the use of SDCOPY to copy configuration file ++5700XJ and action file A.J5 from an O2A BACRES diskette (unit 140) to an O2A CFA diskette (unit 140):

```
GSM READY:SDCOPY
$35 MOUNT INPUT VOLUME:<CR>    (after BACRES diskette mounted)
$35 COPY FILE:++5700XJ FROM UNIT:140 TO UNIT (140):140
$35 MOUNT OUTPUT VOLUME:<CR>  (after CFA diskette mounted)
PLEASE MOUNT BACRES    ON 3" DISKETTE DRIVE - 140 AND KEY <CR>:<CR>
PLEASE MOUNT CFA    ON 3" DISKETTE DRIVE - 140 AND KEY <CR>:<CR>
$35 MOUNT INPUT VOLUME:<CR>    (after BACRES diskette mounted)
```



Appendix C - Single Drive Copy Program, SDCOPY

```
$35 COPY FILE:A.J5 FROM UNIT:140 TO UNIT (140):140
$35 MOUNT OUTPUT VOLUME:<CR> (after CFA diskette mounted)
PLEASE MOUNT BACRES ON 3" DISKETTE DRIVE - 140 AND KEY <CR>:<CR>
PLEASE MOUNT CFA ON 3" DISKETTE DRIVE - 140 AND KEY <CR>:<CR>
PLEASE MOUNT BACRES ON 3" DISKETTE DRIVE - 140 AND KEY <CR>:<CR>
PLEASE MOUNT CFA ON 3" DISKETTE DRIVE - 140 AND KEY <CR>:<CR>
$35 MOUNT INPUT VOLUME:<ESC>
GSM READY:
```

## Appendix D - Global Configurator Technical Overview

This appendix is intended for TIS Software staff only. It provides extra technical information beyond that covered in chapters 1, 2 and 3.

### D.1 General Overview

This section contains an overview of the Global Configurator program suite, the structure of a configuration file and the configuration file update process.

#### D.1.1 Contents of the P.CF Program Library

The Global Configurator program library, P.CF, contains a root program, 4 overlays and the AFP and VTP utilities:

```
$INSTALL Configurator root program
$INST1   Configurator edit phase overlay
$INST2   Configurator generate phase overlay
$INST3   Configurator print overlay
$INST4   Configurator initialisation overlay
AFP      Action File print utility (see section E.7)
VTP      Volume Type print utility (see section F.4)
```

CFCREATE, CFPRINT, CFUPDATE, CFAUTO are merely jobs that run \$INSTALL and supply a suppressed response to its first prompt. If \$INSTALL is run directly from the P.CF library, the following modes are allowed:

A Update configuration file automatically (used by the CFAUTO job);

C Create a new configuration file automatically (used by the CFCREATE job);

D Update configuration file in diagnostic mode (does not update last update date, time, operator-id or filename). This mode should only be used when testing Global Configurator;

E Update configuration, allowing the EDIT-AREA SIZE to be specified (to over-ride the default of 250 Edit Areas);

P Print configuration file (used by the CFPRINT job);

U Update configuration file manually (used by the CFUPDATE job).

For example:

```
GSM READY:P.CF
V8.1 GLOBAL CONFIGURATOR
GSM READY:*INSTALL
AUTO, CREATE, UPDATE OR PRINT?:U
CONFIGURATION FILE:
```

#### D.1.2 Configuration File Structure

Configuration files are in two sections. The first section is in relocatable program format so that it can be loaded by the Global

System Manager loader (aka Steering Routine). This part contains all the control blocks that make up the resident Global System Manager configuration data.

The second section of a configuration file consists of a number of 30-byte "Edit Areas" which can be considered the source form of the file and contain the information used by Global Configurator to generate the loadable file. When a configuration file is updated, the Edit areas are updated (during the "edit" phase) and the control blocks are then created from them (during the "generate" phase). In general, patches and customisations made to control blocks within configuration files are "lost" when the configuration file is updated unless the changes have been made to edit areas as well. However, this generalisation does not apply to patches and customisations made to the IO control block. The IO-block, and its extension, are the only control blocks that are not derived from edit areas.

The ultimate source of a configuration file is derived from the edit-areas and IO-block within the file, rather than records in the A.a0 and A.am action files. Consequently, if a prompt record is deleted from an action file (using AFU - see Appendix E), the corresponding field in the configuration file will not be reset when Global Configurator is used to amend the configuration file. To remove a "persistent field" in a configuration file control-block, caused by a deleted action file record in a controller section, the controller entry must be deleted and re-inserted. To remove a "persistent field" in a configuration file IO-block, caused by a deleted action file record in the Nucleus section or Distribution section, the configuration file must be recreated using CFCREATE. This last point is especially important if the deleted action file record patched the IONLIS array (see section E.5.7.1).

The PHTTL field (i.e. program title) of all configuration files is set to:

```
INSTALL DATA - nnnnnnnnnnnnnnn
```

where nnnnnnnnnnnnnnn is the 15 character Long Machine Description (see section E.5.1.1).

Whenever CFUPDATE is used to update a configuration file, the current system date and time, and the operator-id, are written to the configuration file (in the IODATE, IOTIME and IOOPID fields, respectively). The file name of the configuration file is also included in the IO/BT block (in BTIFID). As a result of these automatic updates, if a configuration file is updated by CFUPDATE, **without making any explicit changes**, the resulting file will not be identical to the original file. The \$F CFI command and \$FCOMP utility will both report differences between the newly created and original configuration files. The \$INSTALL "D" option suppresses these invisible, and sometimes irritating, automatic modifications. For example:

```
GSM READY:P.CF
V8.1 GLOBAL CONFIGURATOR
GSM READY:*INSTALL
AUTO, CREATE, UPDATE OR PRINT?:D
CONFIGURATION FILE:
```

The file type of configuration files, as displayed by the \$F LIS command, is "IN" instead of the more obvious "CF" or "CO" for

historical reasons. In Global System Manager V5.0, and earlier, the nucleus data and control blocks were described as the "install data" and the files containing this data (i.e. the current configuration files) were known as "install files". The terms "install data" and "install file" were renamed "configuration data" and "configuration file" with the advent of Global System Manager V5.1.

Although configuration files may potentially contain more than one load record (i.e. more than 3 HT-blocks) all configuration files created using "modern versions" of Global Configurator contain a **single** load record. The Configuration data is held in increasing load address sequence. As for all program files, the first HT-block describes the PH-record (details of the PH-record is beyond the scope of this manual). The second HT-block describes the configuration data load record. Conventionally, HTLEN contains the length of the following data and HTPTR contains the load address, relative to the start of the configuration load area. The third, and final, HT-block terminates the loadable section of the file. The HTLEN field in the final HT-block contains 0. The HTPTR field in the final HT-block contains the "entry-point" of the configuration file which is redefined as the load address of the start of the IO-block. Note that early versions of Global Configurator created configuration data with several load records and gaps representing uninitialised LAN buffers and control blocks.

As for a standard relocatable program file, the final HT-block is immediately followed by the 16-bit relocation records in ascending order, each containing the load address of the 1st byte of a word to be relocated. The table is terminated by an entry of HIGH-VALUES (i.e. #FFFF).

The Edit Area immediately follows the relocation records. The edit area consists of a number of 30-byte records. The number of edit areas is held in the IOEND field. Each edit area record consists of a 1-byte type code followed by 29-bytes of data. When an Action File record patches a field in a "Header Record" (see section E.6.1) the offset refers to an Edit Area record. The format of Edit Area records is beyond the scope of this manual.

The order of the edit area records is described below.

The following records are repeated once for each Direct Access controller:

Type code	Description
31 #1F	Disk header
21 #15	Disk description (29 characters)
21 #15	DP extension data (none or several)
1 #01	Volume format record (1 per volume format)

The following records are repeated once per Console controller:

Type code	Description
32 #20	Console header
22 #16	CP block data (none or several)

The following records are included if a Tape controller is present in the configuration file:

Type code	Description
33 #21	Tape header
23 #17	TA block data part-1 of 3
23 #17	TA block data part-2 of 3
23 #17	TA block data part-3 of 3

The following records are repeated once per Printer controller:

Type code	Description
35 #23	Printer header
25 #19	Printer description (29 characters)
25 #19	PP block data (none or several)

The following records are included if a LAN controller is present in the configuration file:

Type code	Description
36 #24	LAN header
26 #1A	NP block data (none or several)

Other, obsolete, type-codes are:

Type code	Description
0 #00	Free entry
39 #27	Early (un-released) version of BOS/LAN
29 #1D	Early (un-released) version of BOS/LAN

### D.1.3 The Configuration Update Process

Creating or updating a configuration file is a 2-phase process. The first pass, "Edit Phase", uses the edit areas and IO block from an existing file and updates them as required using prompt records from the various action files. The results are written to a work file, \$INSWKnn (where nn is the user number) on the \$P unit. The second pass, "Generate Phase", uses the work file to create the new configuration file.

During the Edit Phase, most of the prompts issued by Global Configurator are extracted from the Prompt Records in the A.a0 and A.am action files. However, in addition to the customisable dialogue generated from the action files, Global Configurator displays some hard-coded prompts and messages.

### D.1.4 Using CFCREATE to Create a Configuration File

When CFUPDATE or CFAUTO are used to amend an existing configuration file the Machine Code (see section 2.1.2) is obtained from the configuration file (from BTMCD). When CFCREATE is used to create a new configuration file, the machine code must be supplied explicitly.

For example:

```
GSM READY:CFCREATE
V8.1 CREATE CONFIG. FILE
CREATE CONFIGURATION FILE FOR MACHINE CODE:J5
CONFIGURATION FILE:++5700ZZ UNIT:210
```

The machine-specific action file (e.g. A.J5) must be on the configuration file unit otherwise the following warning message will be displayed:

```
ACTION FILE A.am NOT FOUND
```

If the machine-specific action file is on the specified unit, the following prompt is issued:

```
SHORT MACHINE DESCRIPTION:
```

The reply **must** be the short machine name of one of the Machine Type records in the A.am action file (see section E.5.1). The machine-specific action file usually contains a single Machine Type record so only one Short Machine Description will be valid. The Global Configurator "help facility" may be invoked by using <CTRL C> to display all the available Short Machine Descriptions.

For example:

```
SHORT MACHINE DESCRIPTION:<CTRL C>

CTRL A      = RETURN TO START OF CONTROLLER/SECTION
CTRL B      = GO TO END OF SECTION
A           = ADD NEW ENTRY AT END
B           = RETURN TO 1ST BOOTSTRAP MESSAGE INPUT
D           = DELETE ENTRY (CONTROLLER OR VOLUME)
I           = INSERT NEW ENTRY
N           = GO TO NEXT ENTRY
Q           = QUIT

VALID RESPONSES ARE -

FX50        ==      Future FX50
IBM PC      ==      IBM PC/XT/AT
XEN-I ==    XEN-i
ISERVER     ==      TIS iSERVER
```

If the supplied Short Machine Name is not in the action file, a warning message is displayed and the prompt is reissued. For example:

```
SHORT MACHINE DESCRIPTION:IBM 370 NOT SUPPORTED
SHORT MACHINE DESCRIPTION:
```

Once a valid Short Machine Name has been given, the Prologue update screen (see section 3.2) is displayed and the dialogue for CFCREATE is exactly the same as for CFUPDATE except that the OUTPUT FILE prompt (see section 3.10) is not required.

The Short Machine Description is used by Global Configurator to determine the Computer Subcode (N). Only records with a subcode of N or 0 will be used by Global Configurator when extracting records from the A.am action file (see section E.3.2).

### D.1.5 Global Configurator Help Text

Global Configurator includes a rudimentary help-text mechanism. In general, a reply of <CTRL C> to a controller prompt will display all the valid controllers for the relevant type of peripheral device. For example, in the Printer Controller section of the configuration file a reply of <CTRL C> to the CONTROLLER: prompt will result in a list of all the valid printer controllers extracted from the Header records in the Printer Controllers section of the A.am action file (see section E.3.1.2).

There is one exception to this generalisation: The help text displayed when `<CTRL C>` is keyed to the VOLUME FORMAT: prompt is obtained from the Volume Format record for the selected controller within the A.am action file (see section E.5.2.3).

## D.2 The Prologue Section

This section should be read in conjunction with sections 2.1 and 3.2.

The section commences by displaying the following prompt:

```
MACHINE NAME (111111111111111):
```

where 111111111111111 is the 15-character Long Machine description. The default Machine Name supplied by Global Configurator when CFCREATE is being used to create a new configuration file is the Long Description of the Machine Type record in the A.am action file (see section E.3.2). The default Machine Name may be changed to any 15-character string. This description is displayed and printed by Global System Manager in a number of places (e.g. the screen of information displayed by \$S) and is also available as the Global System Manager system variable \$MACH.

The Short Machine Description is held in the IODESC field. The Long Machine Description is held in the IOLDES field.

The first line of the bootstrap message **must** contain one of the level names described in section B.3. Important note: The "/" character in the "MBOS/PC" string is essential. If it is omitted (i.e. "MBOS PC" is typed), an MBOS configuration file is produced.

The Bootstrap Message is held in the IOMESS array (10 \* 40). This array is redefined to include the IOMSCR field (Maximum Number of Screens) which overlays the last 4 characters of the first line of the Bootstrap Message.

Global Configurator includes numerous checks to ensure that the actual level of the configuration file agrees with the level name in the Bootstrap Message. At the end of an update, if the level of the configuration file does not agree with the level name in the Bootstrap Message, the following warning message is displayed:

```
BOS TYPE IN BOOTSTRAP MESSAGE INCONSISTENT WITH CONFIGURATION FILE
```

and Global Configurator returns to the Prologue Section.

If the serial number is not 1 (i.e. not an internal Global System Manager system), Global Configurator does not display the first two lines of the Bootstrap Message. This is to prevent external users from illegally changing the level name and thus changing the level of the configuration file.

## D.3 The Direct Access Controllers Section

This section should be read in conjunction with sections 2.3 and 3.3.

The following standard prompts issued by Global Configurator are not derived from either action file:

Prompt	Field
--------	-------

DRIVE	DADRIV
DESCRIPTION	DPTXT

The DRIVE prompt will only appear if the direct access controller supports more than 1 drive (see section E.5.2.1.5).

The default drive description is obtained from the relevant entry in the Drive Description record within the Direct Access controller section of the A.am action file (see E.5.2.4).

The following message displayed by Global Configurator for a direct access controller originate in the A.a0 action file:

Message	Field
DIRECT ACCESS CONTROLLERS	none
or: DATA FILE DEFINITIONS	none

For most Direct Access controllers, Global Configurator issues a series of prompts that originate from records in the A.am action file.

After the "device" information has been specified. Global Configurator prompts for the "volume type" information. The following standard prompts issued by Global Configurator, which appear for all direct access devices, are not derived from either action file:

Prompt	Field
VOLUME FORMAT	DVDESC
UNIT NUMBER	DADEV

See section 3.3.5.1 for a useful feature that is available when replying to the VOLUME FORMAT prompt.

The value in the DADEV field is 100 less than the actual diskette unit number (e.g. 40 for unit 140).

In addition to the standard prompts above, Global Configurator displays the following prompts for hard-disk domains (i.e. AVCLA nonzero; see section F.3.9.5):

Prompt	Field
MAXIMUM NUMBER OF FILE	DVMAXF
NUMBER OF SUBUNITS	DACLA

If the volume is defined as a "floating domain" or a DLV (i.e. AVTYPE = -ve; see section F.3.9.6) Global Configurator displays the following prompts:

Prompt	Field
VOLUME START ADDRESS	DASTA
VOLUME END ADDRESS	DAFIL

The VOLUME START ADDRESS and VOLUME END ADDRESS may be specified either as a CYLINDER/HEAD address for domains, or as CYLINDER/HEAD/SECTOR address for DLV's.



Finally, and esoterically, if no standard format flags are defined for the direct access device (see section E.5.2.3) Global Configurator displays the following prompt:

Prompt	Field
FORMAT FLAG	DVFORM

The Controller Code from the direct access controller Header Record in the A.am action file is patched into DPCNCD. The Multi-sector flag in the direct access controller Header Record in the A.am action file determines the value of DPMULT. The Read-via-Buffer flag in the direct access controller Header Record in the A.am action file determines the value of DPODD. The Number of Retries flag in the console controller Header Record in the A.am action file determines the value of DPRTRY. The DPCAL flag is set to 1 to ensure a drive recalibrate, if supported, is issued before any reads or writes are attempted on the drive. The DPREM flag (cacheing allowed/removable hard-disk flag) is set to 1 for all domain formats (volume type 30).

In addition to constructing the DP-block, the DA-block(s) for the unit(s) and DV-block(s) for the volumes are constructed. The structures of the DA-block and DV-block is beyond the scope of this manual. However, the following points are germane: The DVDENS byte (density code) is copied from the AVDENS field from the A.VTYPE file (see section F.3.1.10). The DVFORM byte (formatting flags) is usually obtained from the corresponding entry in the Volume Format record within the A.am action file or, if the Volume Format record does not contain an entry for the current volume type, from the Header Record (see section E.5.2.1.10).

During the edit phase, Global Configurator creates the following edit-areas for each direct access controller included in the configuration file:

Type code	Number	Description
31 #20	1	Disk header
21 #15	1	Disk description (29 characters)
21 #15	N	DP extension data (none or several)
1 #01	N	Volume format records (1 per format)

During the generate phase, Global Configurator creates the following control blocks in the configuration file:

Description	Size (bytes)	Number
AZ block	364 #16C	1 AZ block only
DB block	16 #10	IONBUF (buffer control blocks)
DA block	18 #12	1 per unit number (see below)
DP block	18 #12	1 per direct access controller
DP extension controller	Variable	1 per direct access
Desc. Size controller	1 #01	1 per direct access
Desc. Text controller	Variable	1 per direct access

DV block            26    #1A                    1 per volume type (see below)

The structure of the AZ-block is beyond the scope of this manual. However, the AZ-block no longer contains the File Executive Operation Code table. The information formerly contained within this table is now hard-coded in a data-area in the File Executive.

The DA-block and DV-block allocation is relatively complicated. A single DA-block is allocated for each diskette or DLV unit in the configuration file. For domains (i.e. volume formats with a nonzero number of subvolumes), N+2 DA-blocks are allocated, where N is the number of subvolumes on the domain. One of the additional DA-blocks is used for the domain itself. The other is used to hold the "alternate-track" table. For example, in a configuration that includes 2 diskette units (140 and 150) and a hard-disk (unit 200) with 99 sub-volumes, a total of 103 DA-blocks are allocated:

```
1 DA-block for unit 140
1 DA-block for unit 150
1 DA-block for unit 200
1 DA-block for domain alternate-track table
99 DA-blocks for 99 subvolumes
```

A separate DV-block is allocated for every volume format defined in the configuration file. The only exception to this rule occurs when a diskette volume type (but not a domain or DLV) is included for more than 1 drive: A single diskette DV-block is allocated for, and shared between, all the drives.

For example, in a configuration file that includes the following volume types:

Controller	Drive	Volume format
DISKETTE	0	02A
DISKETTE	0	B3B
DISKETTE	1	02A
DISKETTE	1	B3B
DISK	0	P259Z
DISK	1	P259Z

A total of 4 DV-blocks will be allocated (i.e. one for diskette format 02A (shared by both diskette drives), one for diskette format B3B (shared by both diskette drives) and one for each of the P259Z domain formats). A separate DV-block is required for each domain or DLV because the size of the volume, as defined in the DV-block, may be dynamically updated by the controller when Global System Manager is loaded.

The DP block extension length (between 0 and 127), derived from the direct access controller Header Record, is used by Global Configurator to generate the DP block extension (which immediately follows the fixed part of the DP-block). The field DPEXTZ contains the length of the extension area.

In addition to the control blocks within the configuration data, the File Executive dynamically allocates more control blocks in the nucleus data and in high-memory. The following control blocks are allocated dynamically in the nucleus data:

Description	Size (bytes)	Number
Disk buffers	IOMAXS	IONBUF
DC block	4 #04	IONCHA
DF block	18 #12	IONFIL

The following control blocks are allocated dynamically in high-memory:

Description	Size (bytes)	Number
Lock Table	10 #0A	BTLOCK

Details regarding the allocation of Cache Control blocks and Cache buffers is beyond the scope of this manual.

## D.4 The Console Controllers Section

This section should be read in conjunction with sections 2.4 and 3.4.

The following messages and prompts displayed by Global Configurator for a console controller originate in the A.a0 action file:

Message or prompt	Field
or: CONSOLE CONTROLLERS	none
USER DISPLAY ATTRIBUTES	none
TYPE AHEAD BUFFER LENGTH	CATALN
DISPLAY BUFFER LENGTH	CABLEN
FUNCTION KEY BUFFER LENGTH	CAFLEN
SCREEN IMAGE WIDTH	CAIMGW
SCREEN IMAGE DEPTH	CAIMGD
NUMBER OF STORED ATTRIBUTE BYTES	CAIMGA
NUMBER OF PARTITIONS	CANCB
or: NUMBER OF VIRTUAL PARTITIONS	CANCB
CHARACTER TRANSLATION ENABLED	CAXLAT
CONSOLE EXECUTIVE FLAG BYTE	CAFLG2

All further prompts issued by Global Configurator for a console controller originate from records in the A.am action file.

The Controller Code from the console controller Header Record in the A.am action file is patched into CACNCD.

The CALEN field is set to the length of the CA-block (i.e. 128).

The Block Transmission flag in the console controller Header Record in the A.am action file determines the value of CABLTR. If block transmission is enabled, CABLTR is set to 1. If block transmission is disabled, CABLTR is set to 0. The value of this flag determines the nature of the interface between the Console Executive and the console controller.

The Memory Mapped Interface flag in the console controller Header Record in the A.am action file determines the value of CAMMAP. If the memory mapped interface is used, CAMMAP is set to 1. If the memory mapped interface is not used, CAMMAP is set to 0.

During the edit phase, Global Configurator creates the following edit-areas for each console controller included in the configuration file:

Type code	Number	Description
-----------	--------	-------------

32	#20	1	Console header
22	#16	N	CP block data (none or several)

During the generate phase, Global Configurator creates the following control blocks in the configuration file:

Description	Size (bytes)	Number
BZ block	10 #0A	1 BZ block only
CA block	128 #80	1 CA block per console
CP length	2 #02	1 per console (may contain 0)
CP block	Variable	1 per console (optional)

The structure of the BZ-block is beyond the scope of this manual.

The CP block length (between 0 and 127), derived from the console controller Header Record, is used by Global Configurator to generate the CP block. The field CACP is initialised to point to the CP block.

In addition to the control blocks within the configuration data, the Console Executive dynamically allocates more control blocks in the nucleus data and in high-memory. The following control blocks are allocated dynamically in the nucleus data:

Description	Size (bytes)	Number
CB block	140 #8C	1 CB block per partition
User element	32 #20	1 UE block per partition

The following control blocks are allocated dynamically in high-memory:

Description	Size (bytes)	Number
CS block	527 #20F	1 CS block per serial screen
CS block	283 #11B	1 CS block per integral screen

Note that the length of the CS-block is dependent on the type of interface between the Console Executive and the controller.

In addition to the CS-block(s), virtual screen images and buffers are allocated in high-memory. The amount of memory occupied by screen images and buffers for a single console is given by:

$$(((a + 1) * w * d) + b + t) * p) + f + x$$

where:

a	Number of stored attribute bytes
b	Display buffer length
d	Screen image depth
f	Function-key buffer length
p	Number of partitions
t	Type-ahead buffer length
w	Screen image width
x	896 if character translation enabled; 0 if disabled

**Important note:** The memory arrangement for Hyperport family console controllers is different from that described above. Some control

blocks, buffers and screen images are allocated on the Hyperport co-processor card. Please refer to Hardware Factsheet Number 1 for full details of Hyperport-family memory allocation.

## D.5 The Tape Controllers Section

This section should be read in conjunction with sections 2.5 and 3.5.

The Tape Controllers Section of Global Configurator will only appear if the A.am action file contains records in the Tape Controllers section. Because Global System Manager only supports a single tape drive on a computer, only one tape controller should be defined in the configuration file. Although Global Configurator allows multiple tape controllers to be added to a configuration file, unpredictable results will occur if this is attempted.

The following message displayed by Global Configurator for a tape controller originate in the A.a0 action file:

Message	Field
TAPE CONTROLLERS	none

None of the prompts issued by Global Configurator for a tape controller originate in the A.a0 action file. All the prompts for a tape controller originate from records in the A.am action file. For a \$TAPE tape controller, only hardware-specific prompts (e.g. interrupt vector, I/O address) are required. For a \$TDUMP tape controller, the following "tape parameters" must be established, in addition to any hardware-specific prompts:

Prompt	Field
Filler set to #FFFF	TAFILL
Tape flag	TAFLAG
Maximum tape length in feet	TAMLEN
4K blocks per track (maximum tape)	TAMBPT
Default tape length in feet	TADLEN
Number of tracks per tape	TATRA

Note that the prompt record that sets the TAFILL word to -1 is not strictly necessary as code exists in Global Configurator to unconditionally set the first two words of the TA-block to HIGH-VALUES.

The default value of TAFLAG should only be changed in conjunction with the tape handler. For example, altering this flag to indicate that tape formatting is supported will be disastrous unless the tape handler is also upgraded to recognise the "Format Tape" operation.

The TAMLEN field is used by \$TDUMP to allocate buffers and internal tables. \$TDUMP will not allow a tape that is longer than this maximum length to be initialised.

The value of the TAMBPT field is used by \$TDUMP as the number of 4Kb blocks that fit on each track of a tape of maximum length allowing for permitted variations in the speed of the drive.

The value of the TADLEN field is used by \$TDUMP as the length, in feet, of the tapes normally used. It is displayed by \$TDUMP as the default length when a new tape is being initialised.

The TATRA field holds the number of separate tracks recorded on the tape. The total number of 4Kb blocks on a tape of maximum length is given by:

$$\text{TATRA} * \text{TAMBPT}$$

The Controller Code from the tape controller Header Record in the A.am action file is patched into TACNCD.

During the edit phase, Global Configurator creates the following edit-areas in the configuration file:

Type code	Number	Description
33 #21	1	Tape header
23 #17	3	TA block data (always 3 records)

During the generate phase, Global Configurator creates the following control blocks in the configuration file:

Description	Size (bytes)	Number
CZ block	4 #04	1 CZ block only
TA block	64 #40	1 TA block only

The structure of the CZ-block is beyond the scope of this manual.

If the configuration file includes a tape controller the IGTAPE flag is set to 0. If the configuration file does not include a tape controller the IGTAPE flag is set to 1 (sic).

## D.6 The Printer Controllers Section

This section should be read in conjunction with sections 2.6 and 3.6.

The following prompts issued by Global Configurator are not derived from either action file:

Prompt	Field
UNIT NUMBER	PADEV
DESCRIPTION	PPTXT

The value in the PADEV field is 500 less than the actual printer unit (e.g. 1 for printer unit 501).

The following messages and prompts displayed by Global Configurator for a printer controller originate in the A.a0 action file:

Message or prompt	Field
PRINTER CONTROLLERS	none
PRINTER ATTRIBUTES	none
HARDWARE FORM FEED	PASPZ
PAGE DEPTH	PASPZ
MAXIMUM PAGE WIDTH	PAWIDE
	IOSPB
TIME-OUT IN TENS OF SECONDS	PADC2
SPOOLER CONTROL BITS	PADC2

PRINTER EXECUTIVE FLAG BYTE  
DEVICE CHARACTERISTICS

PADC3  
PADC1

A value of 0 in the PASCZ field indicates that hardware pagination is used.

The printer time-out is held in the bottom 6 bits of PADC2 (i.e. bits 0-5). The spooler control bits are held in the top 2 bits of PADC2 (i.e. bits 6-7).

Note that Global Configurator ensures that IOSPB (see section D.8) is at least as large as the highest value of PAWIDE for all the printers in the configuration file.

All further prompts issued by Global Configurator for a printer controller originate from records in the A.am action file. The following two important prompt records are often present in the A.am action file:

Message or prompt	Field
Printer baud rate	PABAUD
Printer characteristics	PADC1

The Controller Code from the printer controller Header Record in the A.am action file is patched into PACNCD.

During the edit phase, Global Configurator creates the following edit-areas for each printer controller included in the configuration file:

Type code	Number	Description
35 #23	1	Printer header
25 #19	1	Printer description text
25 #19	N	PP block data (none or several)

During the generate phase, Global Configurator creates the following control blocks in the configuration file:

Description	Size (bytes)	Number
EZ block	20 #14	1 EZ block only
PA block	56 #38	1 PA block per printer
PP length	2 #02	1 per printer (may contain 0)
PP block	Variable	1 per printer (optional)
Desc. Size	1 #01	1 per printer
Desc. Text	Variable	1 per printer

The structure of the EZ-block is beyond the scope of this manual.

The PP block length (between 0 and 127), derived from the printer controller Header Record, is used by Global Configurator to generate the PP block. The field PAPP is initialised to point to the PP block.

In addition to the control blocks within the configuration data, the Printer Executive dynamically allocates more control blocks in high-memory. The following control blocks and buffers are allocated dynamically in high-memory:

Description	Size (bytes)	Number
PB block	IOSPB + 5	IONPB
PT block	407 #197	IONPT

The number of buffers allocated is held in the IONPB field. Note that the actual length of the printer buffers is always 5 more than the length held in IOSPB (to allow for buffer control information). The number of Printer Translation Tables allocated is held in the IONPT field.

## D.7 The LAN Controllers Section

This section should be read in conjunction with sections 2.7 and 3.7.

The LAN Controllers Section of Global Configurator will only appear if the LAN Controllers section of the A.am action contains one, or more, LAN Controllers. Because Global System Manager only supports a single LAN controller on a computer, Global Configurator only allows one LAN controller to be defined in the configuration file. A LAN controller is obligatory if the level number defined in the first line of the bootstrap message (see section D.2) is LEVEL9 (aka BOS/XLAN), or the obsolete LEVEL8 (aka BOS/LAN+) or LEVEL7 (aka BOS/LAN).

The following messages and prompts displayed by Global Configurator for a LAN controller originate in the A.a0 action file:

Message or prompt	Field
LAN CONTROLLERS	none
or: TRANSPORT LAYER	none
POLLS TO WAIT BETWEEN ACCESSES	NAPCTI
NORMAL TIME-OUT IN SECS	NATO-I
TIMEOUT ON 1ST ACCESS IN SECS	NATO-S
LAN EXECUTIVE RETRY COUNT	NARTRY
WAN MASTER NODE-ID	NAWANID
LAN EXECUTIVE FLAG BYTE	NAFLAG

The NATO-I and NATO-S fields actually contain the time-out value multiplied by 16 (as required by the LAN executive).

All further prompts issued by Global Configurator for a LAN controller originate from records in the A.am action file. The following two prompt records must be present in the A.am action file:

Prompt	Field
Data length of full LAN buffer	IOSLB
Maximum packet length	NAPKLN

Note that the "maximum packet length" is usually fixed for a particular type of LAN (e.g. Arcnet, Ethernet) and is often a "no display" record in the action file (see section E.5.9.2). Also, see the comments in section E.5.9.2 regarding the unique nature of the record that patches the "Data Length of full LAN buffer".

The Controller Code from the LAN controller Header Record in the A.am action file is patched into NACNCD.

During the edit phase, Global Configurator creates the following edit-areas for each LAN controller included in the configuration file:



Type code	Number	Description
36 #24	1	LAN header
26 #1A	N	NP block data (maybe several)

During the generate phase, Global Configurator creates the following control blocks in the configuration file:

Description	Size (bytes)	Number
FZ block	40 #28	1 FZ block only
NA block	40 #28 (sic)	1 NA block only
NP length	2 #02	1 NP block (may contain 0)
NP block	Variable	1 NP block (optional)

The structure of the FZ-block is beyond the scope of this manual. However, the FZ-block contains, amongst other data, an obsolete table used by early versions of the LAN Executive. The table contains the amount of data to transmit for each File Executive operation. The information contained within this table is now hard-coded in a data-area in the LAN Executive.

The NP block length (between 0 and 127), derived from the LAN Controller Header Record, is used by Global Configurator to generate the NP block. The field NANP is initialised to point to the NP block.

In addition to the control blocks within the configuration data, the LAN Executive dynamically allocates the LAN buffers in high-memory:

Description	Size (bytes)	Number
Full LAN buffers	IOSLB + 24	IONLB
Short LAN buffers	68 (i.e. 44 + 24)	IONLSB

The number of Full LAN buffers (IONLB) and Short LAN buffers (IONLSB) are defined in the Nucleus Options section of the configuration file (see section D.8).

If the configuration file includes a LAN controller the BTLAN flag is set to 1. If the configuration file does not include a LAN controller the BTLAN field is set to 0.

## D.8 The Nucleus Options Section

This section should be read in conjunction with sections 2.9 and 3.8.

The Nucleus Options section contains system-wide information. All the action file records in this system patch fields in the IO-block or the optional, machine-specific, IO-extension. Note that the 900-byte IO-block is logically split into the following control blocks:

BT-block	Bootstrap information
IO-block	System-wide information
IG-block	Generation control information

The following messages displayed, and prompt records processed, by Global Configurator in the Nucleus Options section that affect the IO-block originate in the A.a0 action file:

Message or prompt	Field
-------------------	-------

NUCLEUS OPTIONS	none
SET BTFLAG TO #72 FOR V8.1	BTFLAG
DYNAMIC DC/CF-BLOCK ALLOCATION	IODFBA
DYNAMIC LOCK TABLE ALLOCATION	IODLKA
LARGEST SECTOR SIZE	IOMAXS
NUMBER OF FILE CHANNELS	IONCHA
NUMBER OF FILE BUFFERS	IONBUF
NUMBER OF FILE BLOCKS	IONFIL
NUMBER OF LOCK TABLE ENTRIES	BTLOCK
NUMBER OF PRINT BUFFERS	IONPB
LENGTH OF PRINT BUFFERS	IOSPB
NUMBER OF PRINT XLATION TABLES	IONPT
NUMBER OF FULL LAN BUFFERS	IONLB
NUMBER OF SHORT LAN BUFFERS	IONLSB
RAM HIGH ADDRESS (KB)	IOMEMK
RAM DISK START ADDRESS (KB)	IOHMBK
CACHE BUFFER SIZE	IOCSIZ
CACHE START ADDRESS (KB)	IOSDCK
DYNAMIC FILE BUFFER ALLOCATION	IODBFG
DYNAMIC LAN BUFFER ALLOCATION	IODLBA
DYNAMIC CONSOLE BUFFER ALLOC'	IODCBA
DYNAMIC CS-BLOCK ALLOCATION	IODCSA
TARGET BOOTSTRAP STRATEGY	IGTARG
IS \$REMOTE SUPPORTED	IOBBKM
DEVICE ADDRESS (D= )	IOREMP + 2
BAUD RATE (B= )	IOREMP + 4
TIME-OUT (T= )	IOREMP + 0
BASIC CLOCK (MICROSECONDS)	IOBCLK
or: CLOCK FREQUENCY	IOFREQ
CLOCK INTERVAL (MILLISECONDS)	IOCUP
SWAP INTERVAL (MILLISECONDS)	IOSWIN

Note that not all of the prompts in the above table are displayed by Global Configurator. Furthermore, some of the fields in the IO-block are validated and/or amended by Global Configurator (see below).

Global Configurator uses the IOBCLK (or IOFREQ), IOCUP and IOSWIN fields to calculate the timer and swap control fields that are actually used by SVC-9 and SVC-59 (i.e. IOCUCT, IOCUV, IOCUV2 and IOSWCT).

Global Configurator includes the following logic to ensure the values of the IONLB and IONLSB fields are reasonable:

```

IF BTLAN ZERO THEN
    MOVE 0 TO IONLSB IONSLB
ELSE
    IF IONLB ZERO THEN
        MOVE 3 TO IONLSB
    ENDIF
    IF IONLB = 1 THEN
        MOVE 0 TO IONSLB
    ENDIF
ENDIF

```

- \* Non-LAN configuration
  - \* No LAN buffers required
- \* Else a LAN configuration
  - \* Full LAN buffers mandatory
    - \* Use a default of 3
  - \* If only 1 LAN buffer then
    - \* assume a non-file server so
    - \* no short buffers required

All further prompts issued by Global Configurator in the Nucleus section originate from records in the A.am action file. Three general-types of machine-specific prompt records will appear:

- Machine-specific prompt records that patch fields in the machine-independent IO-block (see below);
- Machine-specific prompt records that patch fields in the machine-specific IO-extension. These records are described in the relevant Global Operating Manual;
- Machine-specific prompt records that patch the IONLIS array (see section E.5.7.1).

The following prompt records, processed by Global Configurator in the Nucleus Options section, that affect the IO-block originate in the A.am action file:

Message or prompt	Field
Machine-specific version no	BTMSCV
Basic clock (microseconds)	IOBCLK
Clock interval (milliseconds)	IOCUP
Swap interval (milliseconds)	IOSWIN
Use RTC for clock update?	IOCUME
Global System Manager flag	BTSYSM
Automatic date/time?	BTAUDT

Note that not all of the prompts in the above table are displayed by Global Configurator. Note also that not all of the above records will be present in a particular A.am action file. Finally, note that the IOCUME field should really be located in the machine-specific IO-block extension!

During the generate phase, Global Configurator creates the following control blocks in the configuration file:

Description	Size (bytes)	Number
IO-block	900 (#384)	Fixed part of IO-block
IO-extension extension	Variable	Machine-specific

The length of the machine-specific IO-block extension is derived from the Machine Type record in the A.am action file (see section E.5.1.2).

In addition to the fields in the BT-block and IO-block initialised during the processing of action records in the A.a0 and A.am action files, Global Configurator also initialises the following fields:

Description	Field
Architecture code from A.am Machine Type	BTARCH
Machine code (e.g. "J5" from A.am action file)	BTMCD
Machine sub-code from A.am Machine Type	BTMSCD
Obsolete multi-processor flag from IOMP	BTPROC
Pointer to array of xZ executive blocks	BTEXZ
Nucleus version number (obsolete)	BTNVER
Machine swap format from A.am action file	BTFORM
Total number of partitions	BTNUSE
Total number of screens	BTCSR
Obsolete number of screens count	BTINT
Maximum number of partitions for any screen	BTCPAR
Obsolete foreground/background flag	BTFGRQ

Configuration file creation/last amend filename	BTIFID
Flag set if LAN executive included	BTLAN
Array of 10 pointers to xZ executive blocks	IODEXC
Array of 10 length of xZ executive blocks	IOLEXC
Obsolete multi-processor flag from A.am	IOMP
Flag initially set to 1 ("generated flag")	IODGEN
Obsolete flag (unused)	IONDRI
Configuration file version number (obsolete)	IODVER
Copy of BTFORM	IOFORM
Max. number of files for any volume format	IOMAXF
Obsolete flag that was used to indicate LAN	IOXLAN
Obsolete flag to indicate EBCDIC directory	IOIBM
Obsolete File Executive flag	IONSEG
Configuration file creation/last amend date	IODATE
Configuration file creation/last amend time	IOTIME
Configuration file creation/last amend operator	I00PID
Size of cache buffers (size of largest track)	IOCSIZ
Computer 8-character short description	IODESC
Computer 15-character long description	IOIDES
Bootstrap message text	IOMESS
Maximum number of screens	IOMSCR
Number of records in the edit area	IOEND
Obsolete File Executive flag	IOIBFG

Note that the (misnamed) IOXLAN flag is always set regardless of the software level number (e.g. it is set for non-LAN, level-5 configurations).

## D.9 The Distribution Options Section

This section should be read in conjunction with sections 2.10 and 3.9.

The Distribution Options section contains system-wide information. All the action file records in this section patch fields in the fixed part of the IO-block (i.e. the first 900 bytes). Changes made to any fields in this section will have absolutely no effect until a fresh system is generated with the updated configuration file.

**The parameters in this section are only used during Global System Manager generation and should not be changed on either a Starter system (i.e. on a BACRES diskette) or on an installed Target system (i.e. on SYSRES or SYSIPL). The only effect of changing these parameters will be to make the configuration file inconsistent with the software supplied which could result in the amended system from bootstrapping.**

The following messages displayed, and prompt records processed, by Global Configurator in the Distribution Options section that affect the IO-block originate in the A.a0 action file:

Message or prompt	Field
DISTRIBUTIONS OPTION	none
SOFTWARE LEVEL NUMBER	IGLEVN
SERIAL CONSOLES ATTACHED?	IGUTL
PRERELEASE?	IGPREL
MONITOR SUFFIX	IGMON
STARTER BOOTSTRAP STRATEGY	IGSTAR
DISTRIBUTION UNIT ADDRESS	IGRESA
IPL UNIT ADDRESS	IGIPLA

Note that not all of the prompts in the above table are displayed by Global Configurator.

The MONITOR SUFFIX is always set to "OR" by Global Configurator.

The SOFTWARE LEVEL NUMBER record in the A.a0 action file causes Global Configurator to display the value of the IGLEVN field as determined from the level name within the bootstrap message (see section B.3). The level number can only be changed by amending the bootstrap message. This field cannot be changed explicitly. It is not possible, simply by changing the configuration file of an already generated system, to change the Global System Manager level number. The level numbers of a generated system are held elsewhere within Global System Manager. If the level number of the configuration file is different from the Global System Manager level number fixed at generation time any attempts to load Global System Manager using the illegal configuration will fail.

The following prompts records processed by Global Configurator in the Distribution Options section that affect the IO-block originate in the A.am action file:

Prompt	Field
Nucleus size in Kb	IONUCS
BACNAT format	IGNATF
Number of native diskettes	IGNATN

Note that not all of the prompts in the above table are displayed by Global Configurator. Note also that not all of the above records will be present in a particular A.am action file.

If the IGNATF string contains a full "AnA" code (e.g. "02A"), Global Configurator automatically removes the trailing letter (i.e. the Global System Manager directory code) to produce an "An" code for a non-Global System Manager volume (e.g. "02"). Note that the IGNATF string can be set to "TAPE" to indicate that Global System Manager is distributed on tape.

In addition to the fields in the IG-block initialised during the processing of action records in the A.a0 and A.am action files, Global Configurator also initialises the following fields:

Description	Field
Copy of BTARCH (see section D.8)	IGARCH
Set to "Y" if multi-user configuration	IGMU
Set to "Y" if IOMP nonzero (see section D.8)	IGMP
Copy of IOMP (see section D.8)	IGIOMP
Obsolete flag set if neither A1M nor D1F	IGBDX
Flag set if domain included in configuration	IGDOM
Flag set if tape controller NOT included	IGTAPE
Global System Manager software level number	IGLEVN
Volume type of distribution unit	IGRESV
Volume description of Distribution unit	IGRESF
Capacity code (e.g. "H") of Distribution unit	IGRESC
Volume type of IPL unit	IGIPLV
Volume description of IPL unit	IGIPLF

Global Configurator uses the value of IGRESA to initialise the IGRESF, IGRESV and IGRESC fields. The Distribution Unit Address must be a unit number defined in the Direct Access Controllers section of the configuration file. Similarly, Global Configurator uses the value of IGIPLA to initialise the IGIPLF and IGIPLV fields. The IPL Unit Address must be a unit number defined in the Direct Access Controllers section of the configuration file.

## D.10 Configuration File Validation

After the last record from the Distribution Option of the action files has been processed, the "edit phase" is almost complete. However, before the work-file is written to disk (as \$IN\$WKnn) and the "generate phase" invoked (see section D.1.3), Global Configurator validates the nascent configuration file. During this validation one of the following error or warning messages (described in Appendix A) may be displayed.

The possible warning messages (see section A.2) are:

```
WARNING - UPGRADING FROM PRE-V6.2 FILE
MAXIMUM NUMBER OF SCREENS (number)
INCREASING NUMBER OF FILE BUFFERS TO number
INCREASING NUMBER OF FILE BLOCKS TO number
```

The possible error messages (see section A.1) are:

```
MULTIPLE OF SCREENS * PARTS MUST BE LESS THAN 256 (number)
TOTAL NUMBER OF PARTITIONS MUST BE LESS THAN 100 (number)
NUMBER OF SCREENS HIGHER THAN ALLOWED MAXIMUM
BOS TYPE IN BOOTSTRAP MESSAGES INCONSISTENT WITH CONFIGURATION
FILE
```

If any of the above error messages appear a valid configuration file cannot be generated and control is returned to the Prologue Section (see section D.2).

The last error message in the above list (i.e. level number in bootstrap message is inconsistent with the actual configuration data) will be displayed if ANY of the following conditions are met:

```
IGLEVN > 6 and BTLAN = 0
IGLEVN < 7 and BTLAN > 0
IGLEVN < 3 and BTNUSE > 1
IGLEVN = 3 and BTCSCR > 1
IGLEVN = 4 and BTCSCR > 3
```

If the configuration file is valid, the EDIT COMPLETE prompt (see section 3.9.1) is displayed. If the reply to this prompt is affirmative, the work-file is written to disk and the "generate phase" is invoked.

## D.11 Configuration File Generation

The "generate phase" commences by displaying the OUTPUT FILE and PRINT FORMATTED DUMP? prompts (see section 1.3).

If the reply to the PRINT FORMATTED DUMP? prompt is terminated by <CTRL A>, irrespective of the actual reply, the total size, in bytes, of the control blocks within the configuration file is displayed (as a decimal quantity).

The Formatted Dump report is created as the configuration file is constructed thus the control block details are produced in order of increasing file address. Note that this report differs from that produced by the Global Porting-Kit CFDUMP utility (which produces a formatted dump in order of control block hierarchy). Note also that all numeric quantities (including offsets within control blocks) in the formatted dump report are in hexadecimal. This format differs from the offset values for prompt records in an actions file displayed by AFU (see section E.2) and printed by AFP (see section E.7), which are in decimal.

During the "generation phase" the following warning message (described in Appendix A) may be displayed:

Warning - Volume with more than 65535 tracks

The generation phase involves constructing the various configuration control blocks, relocation records and edit areas from the information in the \$INSWKnn work-file.

When the various controller control-blocks (e.g. CP, DP-extension, NP and PP) are built, the patch-offsets are ultimately derived from the offset defined in the A.am file (see section E.4.4.5). The swap-flag (see section E.4.4.6) is used to indicate that word quantities are to be swapped in the extension block.

When the various executive control-blocks (e.g. CA, DP, NA and PA) are built, the patch-offsets are hard-coded into Global Configurator. Thus to include another configuration field in the PA-block, for example, the \$INST2 overlay must be recompiled! If the computer architecture requires word quantities to be swapped (e.g. architecture code "J"), selected word fields within executive control blocks are swapped automatically (if required by the corresponding executive). For example, in the CAFLEN field is swapped but the PABAUD field (which is accessed by \$CUS) is not swapped.

## D.12 Configuration Data Used During Generation and Installation

Most of the configuration data is used to parameterize the Global System Manager nucleus. Changes to this data only become effective when the Global System Manager nucleus is reloaded. However, as described in sections 2.9.24, 2.9.25, D.8 and D.9 some configuration file data is used only when Global System Manager is generated (i.e. when the BACRES volume is created) or when Global System Manager is installed (i.e. when the SYSRES volume is created). Changes to "generation time configuration data" will be ineffective once Global System Manager has been generated. Similarly, changes to "installation time configuration data" be ineffective once Global System Manager has been installed. This section describes those parameters in the Nucleus

Options and Distribution Options of the configuration file that are only recognised when Global System Manager is generated or installed. Note to pedants: The following parameters **should** all be in the Distribution Options.

Changing the STARTER BOOTSTRAP STRATEGY (i.e. IGSTAR) in the configuration file after Global System Manager has been generated (i.e. on a BACRES) has no effect. The TARGET BOOTSTRAP STRATEGY flag is used when Global System Manager is generated. Similarly, the following parameters have no relevance after Global System Manager has been generated: BTFLAG, IOMSCR, IGLEVN, IGARCH, IGMON (and IGMNGS and IGMNGL).

Changing the TARGET BOOTSTRAP STRATEGY in the configuration file after Global System Manager has been generated (i.e. on a BACRES, SYSRES or SYSIPL volume) has no effect. The TARGET BOOTSTRAP STRATEGY flag is patched into \$MONITOR when Global System Manager is generated.

As explained in section 2.9.25, changing the default \$REMOTE PARAMETERS (and the IS \$REMOTE SUPPORTED flag) in the configuration file after Global System Manager has been installed (i.e. on a SYSRES or SYSIPL volume) has no effect. These parameters are patched into \$REMOTE when Global System Manager is installed. Similarly, changing the SERIAL CONSOLES ATTACHED flag in the configuration file after Global System Manager has been installed is also pointless: This flag is used during installation. The internal IGTAPE flag (see section D.5) is also used during installation (to determine whether \$TDUMP should be included in the command library).



## Appendix E - Action File Update and Print

This appendix, which is intended for TIS Software staff only, describes the use and operation of the following utilities:

AFU Action File Update;

AFP Action File Print.

AFP is distributed with Global Configurator (in the P.CF library) and thus is available for use by resellers and end-users. AFU is NOT distributed with Global Configurator (it must be copied from the CF81A generation master). AFU is not intended for external use.

### E.1 Introduction

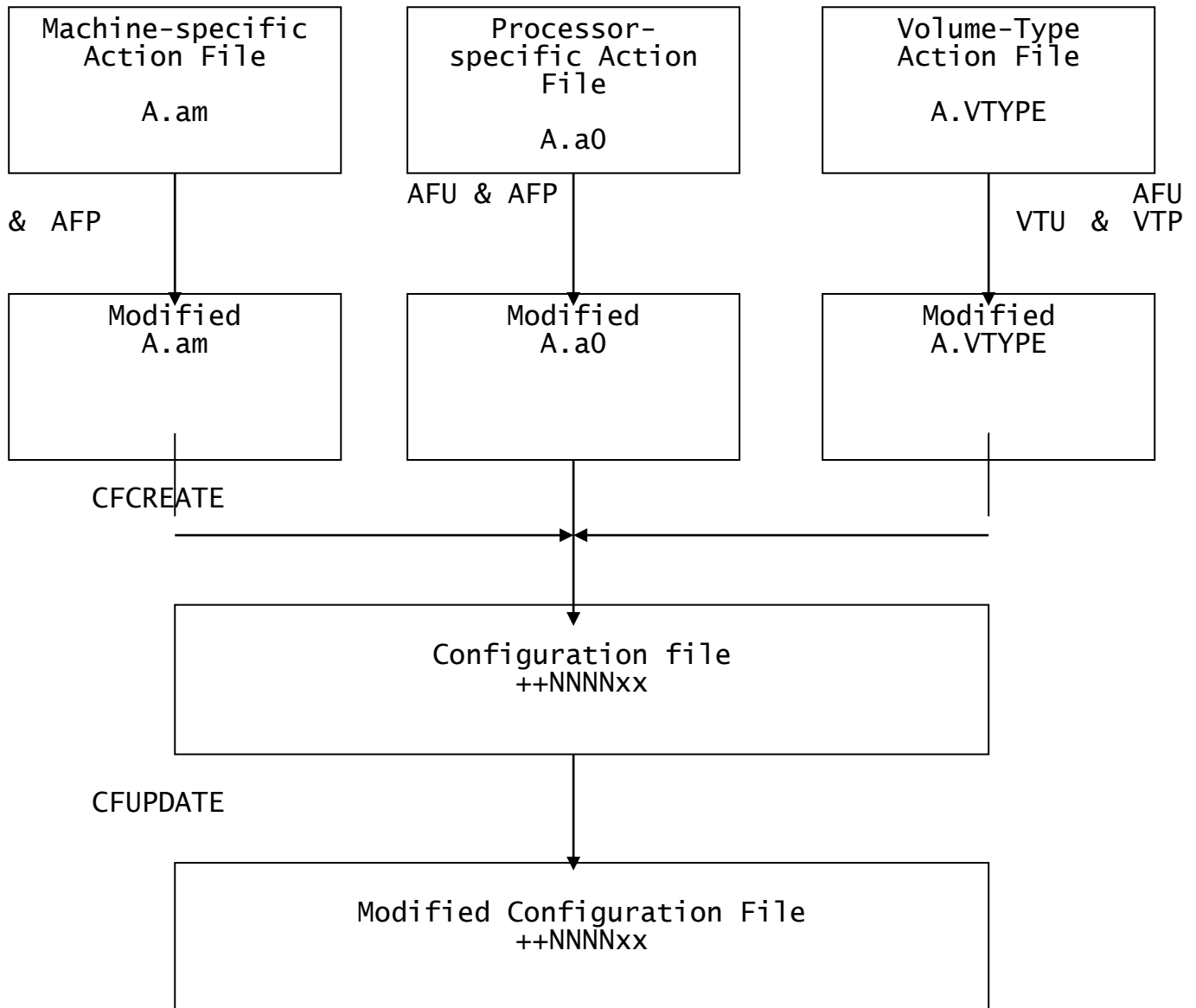
Each Global System Manager has at its heart a configuration file which parameterises all aspects of the Global System Manager nucleus. When building the configuration file (using Global Configurator) the user is prompted for information, some of which is general, some of which is specific to a particular architecture and some of which is specific to a particular computer. Because of the vast range of computers supported by Global System Manager the questions asked by Global Configurator vary enormously depending on the processor type and computer. So widely do the questions vary, that no single program could encompass all the possibilities. Just as Global System Manager is parameterised by a configuration file, so Global Configurator is parameterised by other files, **Action Files**.

The action files contain all of the prompts used by Global Configurator when a configuration file is being created or updated. Simply by changing the action files Global Configurator can be made to ask questions and build a configuration file for a completely different computer. Figure E.1 illustrates the action file and configuration file update process.

Three action files are used by Global Configurator:

- A.a0 Processor specific action file. This action file contains prompts specific to a particular processor (a is the Global System Manager architecture code - see section 2.1.4);
- A.am Computer specific action file. This action file contains prompts specific to a particular computer (am is the machine code - see section 2.1.2);
- A.VTYPE Volume Type Action File. This action file contains definitions of each of the types of disk and diskette supported by Global System Manager (see Appendix F).

The A.am (e.g. A.J5) action file is distributed on the BACRES diskette. The A.a0 (e.g. A.J0, A.C0) and A.VTYPE action files are distributed with Global Configurator.



**Figure E.1 Action File and Configuration File update**

Two extra action files are distributed with Global Configurator:

A.\$H Help text action file. This action file contains help text displayed by AFU;

A.am Template action file. This action file can be used when a new action file is being created.

A.a0 should only be modified by employees of TIS Software Ltd. A.VTYPE should only be modified with great care and in conjunction with TIS Software Ltd (see Appendix F). The main purpose of this appendix to explain how to create and modify a machine-specific action file A.am.

## E.2 Using AFU to Create or Update an Action File

AFU can be run either from the READY prompt or the selection prompt of a standard menu using the following dialogue:

GSM READY: AFU

Note that unlike AFP (see section E.7) there is no need to load the P.CF library in order to run AFU.

AFU prompts for the Machine Code and the unit of the action file. For example:

```
GSM READY:AFU
Machine code:J5
Action file unit:210 New?:Y Size in Kbytes:20
```

The above dialogue creates an empty action file A.J5 on unit 210. If the reply to the "Unit" prompt is <CR> then \$P is used as the default. To simplify the process of creating a new action file, AFU then provides the option of using an existing action file as a template for the new action file. For example:

```
GSM READY:AFU
Machine code:J5
Action file unit:210 New?:Y Size in Kbytes:20
Template action file:A.J1 Unit:210
Copying
```

In the above example, records are copied from the template file A.J1 to the new action file A.J5. The records in the old file contain the machine code "J1" as part of their ISAM key. As the records are copied to the new file the keys are changed so that they contain the new machine code "J5". The machine type records (see section E.3.1.1) are NOT copied to the new file. The machine type records contain fundamental information about the computer (as opposed to the computer's peripherals) and must be added to the new file once the copying process is complete. A template action file, A.am, is supplied with Global Configurator.

If the reply to the "Template" prompt is <CR> the new action file is created, but contains no records. They must all be added afresh.

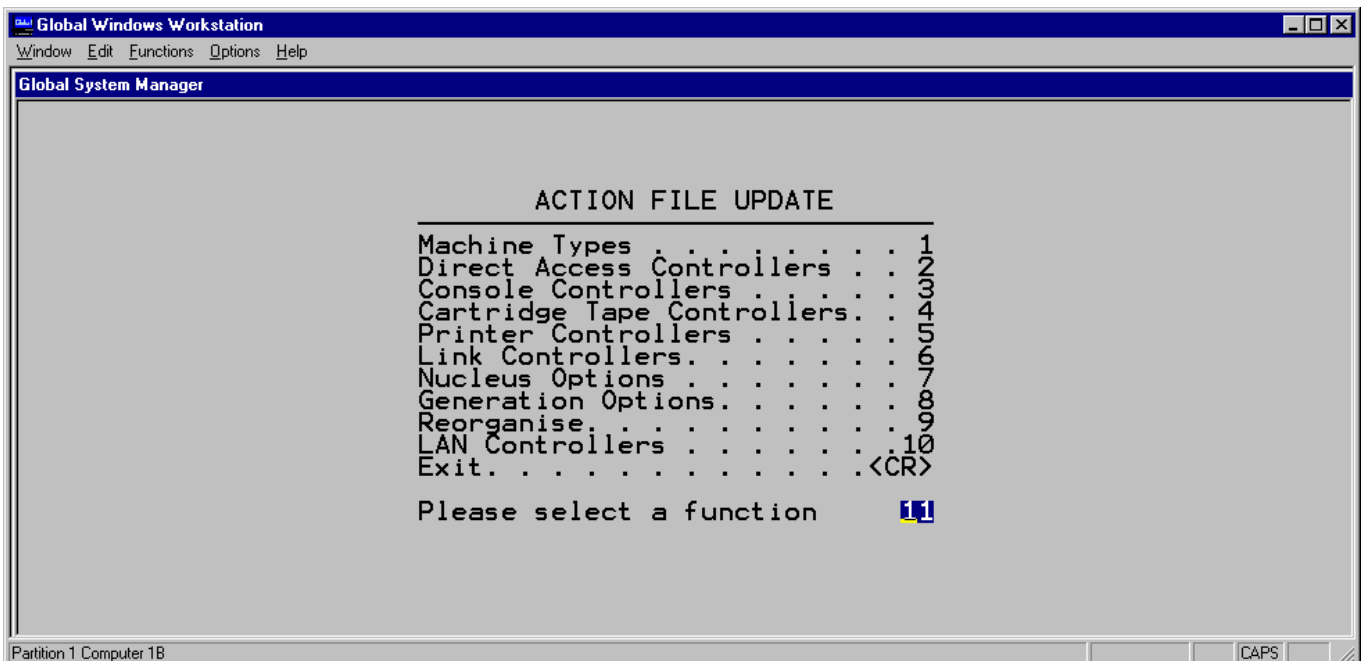


Figure E.2 - The AFU main menu

Once the action file has been created, with or without template records, AFU displays the main menu (see figure E.2) to allow records to be added or modified in the various sections of the file.

If the action file already exists on the specified unit, AFU displays the main menu directly to allow the modification of records in the file (see figure E.2).

## E.3 The Structure of an Action File

An action file is a standard Global System Manager Indexed-Sequential (IS) file, consisting of a number of fixed-length records. Global Configurator reads each record in order and performs the action specified by that record.

### E.3.1 Record Types

The action file for a typical computer will contain the following types of records:

Machine Type Records

Diskette Controller Header Record

Prompt records for diskette information  
Record defining standard diskette volume formats  
Records containing diskette drive descriptions

Hard Disk Controller Header Record

Prompt records for hard disk information  
Record defining standard hard disk volume formats  
Records containing hard disk drive descriptions

Integral screen controller header record

Prompt records for hardware specific information

Serial screen header record

Prompt records for hardware specific information

Tape controller header record

Prompt records for hardware specific information

Parallel printer header record

Prompt records for hardware specific information

Serial printer header record

Prompt records for hardware specific information

LAN controller header record

Prompt records for hardware specific information

Prompt records for general machine nucleus information

Prompt records for general machine generation information

There are five different categories of record.

#### E.3.1.1 Machine Type records

A Machine Type record is required for each computer subcode defined in the action file (see section E.3.2). A single action file can support more than one computer, but this is only if the computers are very similar to each other.

**E.3.1.2 Controller Header records**

Controller Header records are used to introduce a section of the configuration file for a hardware device. The action file must contain a controller header for each device driver written for the computer. The action file for a typical computer will contain controller header records for the following devices:

- Diskette drive;
- Hard disk drive;
- Serial console;
- Serial printer;
- Parallel printer.

Controller header records may also be required for the following optional devices:

- Integral screen;
- Local area network (LAN) controller;
- Cartridge tape.

**E.3.1.3 Prompt records**

Prompt records are employed to ask the user of Global Configurator a question specific to a particular computer, accept the answer and patch the answer into the configuration file at a particular location.

**E.3.1.4 Device Description records**

Device Description records are used primarily to supply "help" information for use when running Global Configurator. These records are only used in the diskette and hard disk sections of the action file.

**E.3.1.5 Volume Format records**

Volume Format records are used primarily to supply "help" information for use when running Global Configurator. These records are only used in the diskette and hard disk sections of the action file.

**E.3.2 Computer Subcodes**

If two computers are almost identical then it is often desirable to use the same action file to create configuration files for them both. This is done by creating an action file with two machine type records. A computer subcode is associated with each of the different machine type records. For example, the first machine type record is subcode 1 and the second machine type record is subcode 2. Most of the other records in the file have a subcode of 0, and will therefore be used for either computer types. A few records in the file, however, have subcodes of 1 or 2. Those records with a subcode of 1 are only used when creating or updating configuration files for the first machine type; records with a subcode of 2 are only used with the second machine type. In general, records with a subcode of N (where N is not zero) are only used when creating or updating configuration files for the N'th machine type.

The file is organised in an hierarchical fashion. The machine type record is at the head of the tree, followed by the header records for

particular devices, while for each device there are a number of prompt records. However, the tree is not quite as neat as it might be as records with a subcode of zero are shared between all branches.

### E.3.3 Record Numbers

Each section of the action file for a device is referred to throughout AFU and Global Configurator by an unique controller name that is 1 to 8 characters in length (e.g. in the A.J5 action file the Adaptec hard disk is referred to by the name ADAPTEC). The same controller name may be present in more than one section (e.g. HYPER is present in both the console controller and printer controller sections).

Within a particular controller section, record numbers (in the range 0 to 999) are used to distinguish the records. The header record for that section is **always** record 0. Prompt records are in the range 100 to 799. Diskette and hard-disk format records **always** use record number 800. Diskette and hard-disk device description records **always** use record number 900.

Some prompt records do not come under the aegis of any particular device and prompt for computer-specific rather than device-specific information. These nucleus option and generation option prompts have record numbers in the range 100 to 799.

Global Configurator usually reads the action file records and displays the associated prompts in ascending order of record numbers. Thus record 100 is used before record 101.

Records for different controller sections can have the same record numbers but remain distinct. Records can also have the same record number if they have different subcodes. A record with a non-zero subcode will override equivalent non-specific record (i.e. the one with the same record-number and a subcode of zero).

### E.3.4 Short and Long Machine Names

Throughout the suite of programs that make up AFU and Global Configurator a particular computer is always referred to by its short machine name which can be up to 8 characters in length. For example, the short name for the IBM Personal Computer in the A.J5 action file is "IBM PC". The short machine name is intimately linked with subcode: There will be a short name for every subcode.

The long machine name is used in certain reports to describe the computer in more detail. The long name is only used to expand upon the short machine name which, because it is limited to 8 characters, may be too short to hold the computer's proper name. The IBM's long name is IBM PC/XT/AT. The long name can be up to 15 characters in length.

## E.4 Using AFU - General Conventions

AFU commences by prompting for the name and unit of the file to be updated or created (see section E.2) and then displays the main menu (see figure E.2).

Most of the menu entries allow records to be added to particular parts of the action file. For example, by keying 3 to the menu selection prompt, records concerning screens attached to the computer can be added or modified.

### E.4.1 Quitting AFU

When <CR> is keyed to the menu selection prompt AFU first checks the action file that has been created or modified. During the checking process it displays the message:

```
Validating Action File
```

If the action file is self-consistent, AFU continues by prompting for a print-out of the action file if required:

```
Print?:<CR>or Print?:y
```

Using the dialogue above results in the file being printed (report file D.A.am on unit \$PR). Once the file has been printed, or if N is keyed to the "Print?" prompt, AFU will return to the READY prompt or the main menu. To print the action file AFU invokes a separate program, AFP which can be used separately if necessary (see section E.7).

If the reply to the "Print?" prompt is <CTRL C>, AFU will prompt for the name and unit of the print file. For example:

```
Print?:<CTRL C>
Specify report file (D.A.J5 ):D.NEW Unit ($PR):299
```

If the action file contains an invalid record or lacks a vital record, one of the following warning messages will be displayed during the action file validation:

```
SUBCODE MUST BE NON-ZERO
INVALID SUBCODE
BEYOND END OF IO BLOCK
RECORD MISSING
HEADER MISSING
BEYOND END OF EXTENSION AREA
```

The message is prefixed by the section name, the controller name, the record subcode and the record number allowing the invalid or missing record to be identified.

For example, if a diskette controller prompt record contains an offset that is too large for the extension area, the following message will be displayed:

```
DISK CONTR. DISKETTE SUBCODE 0 RECORD 100 -
BEYOND END OF EXTENSION AREA
```

```
Amend?:y
```

Using the dialogue above results in the main AFU menu being redisplayed. **AN INVALID ACTION FILE MUST NEVER BE USED WHEN ATTEMPTING TO CREATE OR UPDATE A CONFIGURATION FILE.**

### E.4.2 Reorganising Action Files

As new records are added to an action file, access to the file slows down, particularly if the file is large. This can significantly affect the speed at which Global Configurator operates. Option 9 of the main

AFU menu allows the action file to be reorganised so that it can be accessed more efficiently.

AFU always checks the condition of the file when an attempt is made to exit the program. If the file is becoming inefficient to access, because there are more than 20 records in the ISAM overflow area, AFU will display:

```
nn RECORDS IN OVERFLOW AREA - REORGANISE?:Y
```

Using the dialogue above causes the file to be reorganised. Once the file has been reorganised, or if N is keyed to the REORGANISE?" prompt then AFU validates the action file as described in section E.4.1 above.

### E.4.3 Standard Prompts used by AFU

The AFU dialogue is largely independent of the option selected from the main menu. This section describes the standard prompts issued by AFU.

#### E.4.3.1 The Short Description Prompt

Once a function has been selected from the main menu, AFU displays the following prompt:

```
KEY short description, <CR> to page, <CTRL C>, <ESC>:
```

Note that this prompt is **not** displayed by the Nucleus or Generation options, which both start by prompting for the record number directly (see section E.4.3.2).

The name of the controller to be added or modified must be specified. In the case of the machine types section of the file, the short machine name must be specified. The following keys have special functions:

<ESC> returns to the main menu;

<CTRL C> displays all of the controllers or machine types already in the action file;

<CR> steps through each of the controllers or machine types in turn, inviting one to be selected. Key Y to select a particular record. Key N or <CR> to display the next.

#### E.4.3.2 The Record Number Prompt

Once the controller or machine type has been specified (or when either the Nucleus or Generation options are selected from the main menu), AFU prompts for the record number of a record within that particular section of the file:

```
KEY record number, N for next, <CR> to page, <CTRL C>, <ESC>:
```

The following keys have special functions:

<ESC> returns the controller short description prompt (or the main menu in the case of the nucleus and generation options);

<CTRL C> displays all of the records for that particular area of the file;



<CR> steps through each of the records in turn, inviting one to be selected. Key Y to select a particular record. Key N or <CR> to display the next;

N selects the next (or first) record for that particular area of the file.

#### E.4.3.3 The Subcode Prompt

Once both the controller and record number have been specified, AFU prompts for the subcode associated with the record (usually records are given a subcode of zero):

Subcode, zero if general, <CTRL C> to list ( 0):

The following keys have special functions:

<ESC> returns to the record number prompt;

<CTRL C> displays details of all of the available subcodes;

<CR> selects the current default subcode (the subcode will usually be 0).

#### E.4.3.4 The New? Prompt

Once the three parameters that completely define the record (i.e. controller name, record number and subcode) have been specified, the record is displayed if it already exists in the action file. If the record is being added, AFU checks that the parameters are correct by issuing the following prompt:

New?

The reply must be Y or y to create a new record.

#### E.4.3.5 The Record Amendment Form

Once the existing record or a blank form has been displayed, AFU allows the details to be changed. The following baseline prompt is displayed:

KEY Accept, Delete, Next, <CR> to amend, <ESC> to exit:

The following keys have special functions:

<ESC> returns to the record number prompt. If <ESC> is keyed after a record has been amended, AFU displays the confirmation prompt "Are you sure?". If the reply is Y or y, AFU redisplay the record number prompt without amending the record in the action file;

D deletes the current record and returns to the record number prompt;

A accepts the new or amended record, updates the action file and returns to the record number prompt;

N accepts the new or amended record, updates the action file and displays the next record in the particular section;

<CR> allows the record to be amended. The following terminators may be given to each field in the form:

- <CR> accept reply and proceed to the next field;
- <LF> proceed to the previous field if the reply is <LF> only, or redisplay the default if <LF> terminates a partial reply;
- <ESC> accept reply and return to the base-line prompt.

#### E.4.4 Prompt Records

Controller header records in the action file have one specific purpose. Prompt records, however, are more general. They allow the implementor of the Global System Manager port to cause Global Configurator to prompt the user of Global Configurator questions, the answers to which can then be patched into a variety of control blocks within the configuration file.

When creating a prompt record using AFU a number of fields must be specified.

##### E.4.4.1 Prompt/Message

This character string can be up to 30 characters long and is used to prompt the user of Global Configurator for some information. The text also appears in the configuration file listing. There is a convention for those messages displayed by Global Configurator that originate from action files. All prompt records in machine-independent action-files A.a0 (e.g. A.J0) are composed of upper-case letters only. Prompts and messages in machine-specific action-files A.am (e.g. A.J5) should be in lower-case text. This standard allows a user of Global Configurator to readily determine whether a particular prompt is requesting a general purpose or a machine-specific parameter.

The prompt message should describe machine-specific parameters in the most "user-friendly" way possible. This maxim applies particularly to console and printer controllers. For example, if possible, the prompt for a device address on a multi-channel serial card should refer to an easily understood concept such as a channel number rather than a hardware port address. Any channel-number to port-address translation should be hidden in the device driver where possible. Similarly, the prompt for a baud-rate should use a real baud-rate (e.g. 38400) rather than a hardware/firmware mode number.

##### E.4.4.2 Prompt(P), Display(D), No Display(N)

Records do not always have to prompt for information. If required, they can be used to patch the configuration file control blocks directly (i.e. without prompting the user) with or without displaying the details.

- P causes the prompt message to be displayed and waits for a user response, which is validated and patched into the control block;
- D the message and the default value from the prompt record are displayed. The user of Global Configurator is not asked to respond and the default is patched directly into the configuration file;

N the default value is patched into the configuration file directly without any display.

#### E.4.4.3 Field format (e.g. H1, X6, D2, O2, Y/N, spaces if none)

The manner in which Global Configurator prompts for data and the size of the field into which it patches the data are specified by this prompt. The following field formats are recognised:

- Hn The reply must be in hexadecimal digits and will be patched into an n byte field (n = 1,2 or 4);
- Dn The reply must be in decimal digits and will be patched into an n byte field (n = 1,2 or 4);
- O2 The reply must be in octal digits and will be patched into a 2 byte field;
- Xn The prompt will expect n ASCII characters and patch them into an n byte field (n = 1,2,3,4,5 or 6);
- Y/N The reply must be "Y" or "N". A reply of "Y" will patch 0 into the field. A reply of "N" will patch 1 into the field. The field size is always 1 byte;
- N/Y The reply must be "N" or "Y". A reply of "N" will patch 0 into the field. A reply of "Y" will patch 1 into the field. The field size is always 1 byte;
- Spaces This special value causes Global Configurator to merely display the 30 character message text. This field format is used to provide introductory text for a following record.

**Important note:** Although AFU allows both X5 and X6 strings, Global Configurator only patches 1, 2, 3 or 4 bytes from a single action file record. Consequently, the only usable ASCII string formats are X1, X2, X3 or X4.

#### E.4.4.4 Default available? and Default Value

Using these fields, a default can be specified for a prompt record. These fields are also used for "display only" and "no display" records to specify the value to be patched into the control block.

#### E.4.4.5 Offset in xx block

This field specifies the offset within the xx block into which the default or accepted value will be patched. The actual number of bytes patched is determined by the field format described in section E.4.4.3. Usually the offset will be in the range 0 to 127. The offset is always a decimal number.

A special technique allows prompt records to patch fields in the header block. If the offset is 1000, or higher, the **Offset in xx block** prompt is replaced by **Offset in header** with an offset 1000 less than the value keyed. For example, a value of 1002 to the "offset in xx block" prompt actually means a offset of 2 in the header block. The header block offset does not refer to an offset in a nucleus control block (e.g. CA or PA block) but to an internal control block used by AFU and Global Configurator. Fields from the internal control block

are moved to the nucleus control block by Global Configurator. Special records that patch header blocks are described in more detail in the sections below.

#### E.4.4.6 Swap 2 bytes of field?

For some architectures (e.g. Intel 80x86 family) word-values patched into control blocks may need to be swapped (i.e. low-byte, high-byte). Setting this flag to "Y" is only sensible for records with a field format of H2, D2 or O2 for architectures that support swapped words.

#### E.4.4.7 Jump to record

Usually Global Configurator processes records in strict order of record number. Specifying a record number in this field causes Global Configurator to process that record next rather than the following record in the action file. The "jump to" record number will normally be higher than the number of the record in which it appears (i.e. only forward jumps are useful in Global Configurator).

#### E.4.4.8 Dont jump if = default?

The "jump to record" processing in Global Configurator described above provides an "unconditional jump" facility if this field is set to "N". Setting this field to "Y" provides a more useful "conditional jump" facility. The jump to record is only taken by Global Configurator if the value keyed to the prompt is different from the default associated with the record. If the reply is the same as the default, Global Configurator processes the next record in the action file as if the "jump to record" field was not specified. Note that "jump to" records are not normally required. Their use is described in the advanced techniques section E.6.2.

## E.5 Using AFU - Controller Sections

This section describes the individual options selected from the AFU main menu.

### E.5.1 Machine Types

Once a new action file has been created, one or more "Machine Type" records **must** be added before any other type of record can be added or updated. After selecting option 1 at the main menu prompt a short machine name must be specified in response to the next prompt. Once a short machine name has been given a form prompting for further details of the computer is displayed.

#### E.5.1.1 Long Description

The Long Description is expansion of the short machine name. It can be up to 15 characters in length and is displayed and printed by Global System Manager in a number of places (e.g. the screen of information displayed by \$S). The long description is also available as the Global System Manager system variable \$MACH.

Each of the variants of the computer supported by an action file must be given a unique **Subcode** in the range 1 to 99.

#### E.5.1.2 IO Extension Length

The IO Extension Length is rarely used and should be left at 0. If it is nonzero, the IO block will be followed by a small area which can be used for any purpose. It might, for example, be used to communicate between the controllers during the Global System Manager bootstrap or to hold 'system wide' information that is used by both drivers and nucleus components. The maximum length of the IO extension is 100 (#64) bytes. [Note to TIS Software staff only: This limit is imposed

by the size of a data area in the Steering Routine. The length of the field to hold a local copy of the IO block and extension is 1000 bytes (i.e. 900 bytes for the fixed part of the IO block, leaving just 100 bytes for the extension length).]

#### **E.5.1.3 BOS Architecture Code**

The BOS Architecture Code (sic) should be the same as the first character of the machine family code. It is available as the Global System Manager system variable \$\$ARCH.

#### **E.5.1.4 Multi-Processor Flag**

The Multi-Processor Flag is obsolete and must be left at 0.

### **E.5.2 Direct Access Controllers**

A direct access controller header record (record number 0) **must** be included for each disk or diskette driver written for the computer. After selecting option 2 at the main menu prompt a controller short description must be specified. Standard names are DISKETTE, DISK and HARDDISK. Once a short description, record number of 0 and computer subcode have been given a form prompting for header record details is displayed.

#### **E.5.2.1 Header Record**

The Header Record for a Direct Access controller contains the following fields.

##### **E.5.2.1.1 Long Description**

The Long Description is an expansion of the short description and may be up to 30 characters in length. It is displayed and printed by Global Configurator.

##### **E.5.2.1.2 Controller Code (hex)**

The Controller Code (hex) is a unique number starting from 01 and must be the same as the value of nn in the controller filename +amCAnn. The value is patched into DPCNCD by Global Configurator. Controller numbers are normally allocated sequentially as direct access drivers are written (e.g. 01 for the diskette driver, 02 for the first type of hard disk driver).

##### **E.5.2.1.3 Length of DP extension**

The DP extension length must be between 0 and 127. If it is nonzero the DP block will be followed by a small area (DPEXTN) which can be used for any purpose by the controller. The field DPEXTZ contains the length of the DP extension. Further prompt records can be used to patch controller specific values into the DP extension area.

##### **E.5.2.1.4 Multi-sector reads flag**

The multi-sector reads flag determines the value of DPMULT. If multi-sector reads and writes are supported, DPMULT will contain 1. If single-sector accesses only are allowed, DPMULT will contain 0. See Chapter 3 of the Global Porting-Kit Manual for more details on the DPMULT flag.

##### **E.5.2.1.5 Highest drive number**

The highest drive number is tested by Global Configurator as drives supported by the controller are added to a configuration file. This record prevents the user of Global Configurator from adding more drives than the controller can support. If the value associated with this record is 0 then only one drive is allowed.

If the value is negative the drives share a common DP block. This feature is only included if the drives have linked heads and should not be required for most controllers.

#### E.5.2.1.6 Read via buffer flag

The read via buffer flag determines the value of DPODD. If data transfers can read into or write from user memory directly, DPODD should contain 0. If data transfers must always access memory on an even address boundary, DPODD should contain 1. If data transfers can only proceed via a file buffer (which are always even byte aligned in the nucleus segment), DPODD must contain -1. The "always read via buffer" technique is used when a controller is only able to access the lowest 64Kb of memory.

#### E.5.2.1.7 Number of retries

The number of retries prompt determines the value of DPRTRY. This field contains the number of retries performed by the File Executive before signalling an I/O error to Global System Manager. It is normally set to 7 but may need to be reduced if the controller performs its own internal retries, otherwise the time taken to report I/O errors will be too long.

#### E.5.2.1.8 Default access option

The default access option prompt duplicates that in the volume format record (record number 800) and is only used if this record is omitted. The access option flag is also used for a volume format which is not in the volume format record (see below).

#### E.5.2.1.9 Standard volume format

The standard volume format prompt duplicates that in the volume format record (record number 800) and is only used if this record is omitted.

#### E.5.2.1.10 Formatting flag

The formatting flag prompt duplicates that in the volume format record (record number 800) and is only used if this record is omitted. The formatting flag is also used for a volume format which is not described in the volume format record.

#### E.5.2.2 Prompt records

The following prompt records **may** be required in A.am to patch values into the fixed part of the DP block:

Record	Prompt	Header	DPxxxx
10	Device address	0009	DPDEVA
20	Interrupt vector address	0011	
DPVECT			
30	Removable device flag	0017	DPREM
40	BOS/NET lock flag	0029	
DPLOCK			
50	Formatting flags	0010	
DVFORM			

A header offset is obtained by replying 1000+offset to the "offset in DP extension" prompt in the prompt record form (as explained in section E.4.4.5).

Prompt records with record numbers 100 to 799 should be used to patch values into the DP extension area.

### E.5.2.3 Volume format records

A volume format record (record number 800) is required for every disk and diskette controller that can support more than a single format. This record is used primarily to supply default information for Global Configurator. Up to 16 volume formats can be included in this record. Once a short description, record number of 800 and a computer subcode have been given a form prompting for volume format details is displayed.

#### E.5.2.3.1 Format code

The Format code is a unique 3 to 6 character AnA code (see Appendix F) that identifies the volume and directory format. This string is patched into DVDESC by Global Configurator. Records in the volume type action file A.VTYPE contain details of all the supported disk and diskette formats (see Appendix F).

#### E.5.2.3.2 Formatting flag

The Formatting flag determines the value of DVFORM. This field describes the type of formatting, if any, supported by the controller on the particular volume type (see Chapter 3 of the Global Porting-Kit Manual).

#### E.5.2.3.3 Unit number for drive 0

The unit number for drive 0 supplies the default unit number displayed by Global Configurator for the volume type when accessed on the first (or only) drive. For other higher numbered drives, the device number is added to the unit number for drive 0 to supply the default. See section B.5 for standard unit addresses.

#### E.5.2.3.4 Default access option

The default access option should be the access option which gives the best performance for large read and write operations. The value is patched into DVACO by Global Configurator. This will be the value used when a disk is formatted or initialised unless specifically overridden by the operator. It will usually be 1 (i.e. no interleaving) for disks and diskettes that support multi-sectoring.

### E.5.2.4 Drive Description record

A drive description record (record number 900) is required for every disk or diskette controller. It should contain a description for each of the possible drive numbers defined in the controller header record. Once a short description, record number of 900 and computer subcode have been given a form prompting for drive descriptions is displayed. Descriptions for up to 16 drives can be specified in this record. Although these descriptions can be up to 30 characters in length, Global Configurator only uses the first 25.

## E.5.3 Console Controllers

A console controller header (record number 0) **must** be included for each screen driver written for the computer. After selecting option 3 at the main menu prompt a controller short description must be specified. Standard names are TTY, SERIAL and INTEGRAL. Once a short description, record number of 0 and computer subcode have been given a form prompting for header record details is displayed.

### E.5.3.1 Header Record

The Header Record for a Console controller contains the following fields.

#### E.5.3.1.1 Long Description

The Long Description is an expansion of the short description and may be up to 30 characters in length. It is displayed and printed by Global Configurator.

#### E.5.3.1.2 Controller Code (hex)

The Controller Code (hex) is a unique number starting from 01 and must be the same as the value of nn in the controller filename +amCBnn. The value is patched into CACNCD by Global Configurator. Controller numbers are normally allocated sequentially as screen drivers are written (e.g. 01 for the integral screen driver, 02 for the first type of serial screen driver).

#### E.5.3.1.3 Block Transmission Flag

The Block Transmission flag determines the value of CABLTR. If block transmission is enabled CABLTR will contain 1. If block transmission is disabled CABLTR will contain 0. The value of this flag determines the nature of the interface between the Console Executive and the device controller (see Chapter 4 of the Global Porting-Kit Manual).

#### E.5.3.1.4 Length of CP Block

The CP block length must be between 0 and 127. If it is nonzero the configuration data will contain a CP block for each console. The CP block can be used for any purpose by the controller. The field CACP contains a pointer to the CP block. Further prompt records can be used to patch controller specific values into the CP block.

#### E.5.3.1.5 Memory Mapped Interface Flag

The Memory Mapped Interface flag determines the value of CAMMAP. If the memory mapped interface is used CAMMAP will contain 1. If the memory mapped interface is not used CAMMAP will contain 0. The value of this flag determines the nature of the interface between the Console Executive and the device controller (see Chapters 4 and 5 of the Global Porting-Kit Manual).

### E.5.3.2 Prompt Records

A prompt record with record number 10 is standardly used for the DEVICE ADDRESS if appropriate for the controller.

A prompt record with record number 20 is standardly used for the INTERRUPT VECTOR ADDRESS if appropriate for the controller.

Prompt records with record numbers 100 to 799 should be used for all CP block fields.

The processor specific action file A.a0 contains the following prompt records in the console controller section to patch values into the CA block:

Record	Prompt	Header	CAXxxx
30	TYPE AHEAD BUFFER LENGTH	0017	CATALN
40	DISPLAY BUFFER LENGTH		0015
	CABLEN		
50	FUNCTION KEY BUFFER LENGTH	0023	CAFLEN
60	SCREEN IMAGE WIDTH	0025	CAIMGW
70	SCREEN IMAGE DEPTH	0027	CAIMGD
75	NUMBER OF STORED ATTRIBUTE BYTES	0009	CAIMGA
80	NUMBER OF PARTITIONS		0022 CANCB
90	CHARACTER TRANSLATION ENABLED	0021	CAXLAT
92	CONSOLE EXECUTIVE FLAG BYTE	0012	CAFLG2



## E.5.4 Cartridge Tape Controllers

A cartridge tape controller header (record number 0) **must** be included for each tape driver written for the computer. After selecting option 4 at the main menu prompt a controller short description must be specified. Standard names are TAPE and CARTRIDGE. Once a short description, record number of 0 and computer subcode have been given a form prompting for header record details is displayed.

### E.5.4.1 Header record

The Header Record for a Tape controller contains the following fields.

#### E.5.4.1.1 Long Description

The Long Description is an expansion of the short description and may be up to 30 characters in length. It is displayed and printed by Global Configurator.

#### E.5.4.1.2 Controller Code (hex)

The Controller Code (hex) is a unique number starting from 01 and must be the same as the value of nn in the handler filename `%.amCTnn`. The value is patched into TACNCD by Global Configurator. Controller numbers are normally allocated sequentially as tape drivers are written.

#### E.5.4.1.3 Length of TP Block Length

The TP block length must **always** be 64. Prompt records in the cartridge tape section of the action file patch values into the primary control block (i.e. the TA block) which is always 64 bytes long. There is no secondary control block (i.e. TP block) in the cartridge tape interface although this misleading prompt in AFU would suggest otherwise.

### E.5.4.2 Prompt Records

The following prompt records are required in A.am to patch values in the TA block:

Record	Prompt	TA block	TAXxxx
10 TADLEN	Default tape length in feet		0032
20 TAMBPT	4K blocks per track	0034	
30 40 TAFLAG	Number of tracks Tape flag	0036 0037	TATRA
50 TAFILL	Filler set to #FFFF	0000	

Prompt records with record numbers 100 to 799 should be used for all other TA block fields (i.e. fields in the TAPRE and TAPST areas as well as fields within the controller specific TAWORK area).

Offsets in the cartridge tape section of the action file refer to offsets in the TA block rather than an internal control block used by AFU and Global Configurator (unlike offsets in the CA, DP, NA and PA blocks).

## E.5.5 Printer Controllers

A printer controller header (record number 0) **must** be included for each printer driver written for the computer. After selecting option 5

at the main menu prompt a controller short description must be specified. Standard names are PRINTER, SPRINTER and PARALLEL. Once a short description, record number of 0 and computer subcode have been given a form prompting for header record details is displayed.

#### E.5.5.1 Header Record

The Header Record for a Printer controller contains the following fields.

##### E.5.5.1.1 Long Description

The Long Description is an expansion of the short description and may be up to 30 characters in length. It is displayed and printed by Global Configurator.

##### E.5.5.1.2 Controller Code (hex)

The Controller Code (hex) is a unique number starting from 01 and must be the same as the value of nn in the controller filename +amCenn. The value is patched into PACNCD by Global Configurator. Controller numbers are normally allocated sequentially as printer drivers are written (e.g. 01 for the parallel printer driver, 02 for the serial printer driver).

##### E.5.5.1.3 Length of PP Block

The PP block length must be between 0 and 127. If it is nonzero the configuration data will contain a PP block for each printer. The PP block can be used for any purpose by the controller. The field PAPP contains a pointer to the PP block. Further prompt records can be used to patch controller specific values into the PP block.

#### E.5.5.2 Prompt Records

A prompt record with record number 10 is standardly used for the DEVICE ADDRESS if appropriate for the controller.

A prompt record with record number 20 is standardly used for the INTERRUPT VECTOR ADDRESS if appropriate for the controller.

A prompt record with record number 30 is standardly used for the BAUD RATE if appropriate for the controller.

A prompt record with record number 99 is standardly used for the DEVICE CHARACTERISTICS if appropriate for the controller.

Prompt records with record numbers 100 to 799 should be used for all other PP block fields.

The processor specific action file A.a0 contains the following prompt records in the printer controller section to patch values into the PA block:

Record	Prompt	Header	PAXxxx
60	HARDWARE FORM FEED	0016	PASPZ
70	PAGE DEPTH	0017	PASPZ
80	MAXIMUM PAGE WIDTH	0018	PAWIDE
85	TIME-OUT IN TENS OF SECONDS	0019	PADC2
97	SPOOLER CONTROL BITS	0020	PADC2
98	PRINTER EXECUTIVE FLAG BYTE	0021	PADC3
99	DEVICE CHARACTERISTICS	0010	PADC1

The following prompt records may be required in A.am to patch values in the PA block:

Record	Prompt	Header	PAxxxx
30	Printer baud rate	0011	
PABAUD			
99	Device characteristics	0010	PADC1

A header offset is obtained by replying 1000+offset to the "Offset in PP block" prompt in the prompt record form.

**Important note:** The printer baud rate, if required, is held in a Controller independent field in the PA block whereas the console baud rate, if required, is held in a controller dependent field in the CP block. Although the printer baud-rate is a word field it is never "swapped" regardless of the architecture as it is also accessed by Global System Manager utilities (e.g. \$CUS).

### E.5.6 Link Controllers

Link controllers are only required for implementations of the obsolete BOS/NET (sic) networking system.

### E.5.7 Nucleus Options

Nucleus Option records are used to set up fields in the I0 block. The I0 block contains assorted information, some of which concerns the bootstrap process.

The most important records are those that govern the loading of assembler components that do not fall into the rigid controller strategy.

#### E.5.7.1 Records to load Nucleus Modules

By creating records in the range 140 to 159 up to twenty assembler modules can be loaded in addition to the standard diskette, screen, printer and LAN controllers. The modules must have names of the form +amNxxx, where the three characters xxx are specified in the Nucleus Options record and hence in the I0 block in the configuration file. Most computers require at least one of these records to load the timer nucleus component +amNTIM (i.e. xxx = TIM).

##### E.5.7.1.1 Prompt/Message

This character string can be up to 30 characters long and is used to either describe the component or prompt the user of Global Configurator for the last 3 characters of the module name. It also appears in the configuration file listing.

##### E.5.7.1.2 Prompt(P), Display(D), No Display(N)

This field is used as described in section E.4.4.2.

##### E.5.7.1.3 Field format (e.g. H1, X6, D2, O2, Y/N, spaces if none)

The field format MUST be "X3" to prompt for a 3 character string.

##### E.5.7.1.4 Default available? and Default Value

These fields are used as described in section E.4.4.4.

##### E.5.7.1.5 Offset in I0 block

This field specifies the offset within the I0 block into which the default or accepted value will be patched. Record number 140+x should patch I0 offset 264+3x (where x = 0 to 19).

**E.5.7.1.6 Swap 2 bytes of field?**

This field should be set to N for records that load nucleus components.

**E.5.7.1.7 Jump to record**

This feature should not be required for records that load nucleus components.

**E.5.7.1.8 Dont jump if = default?**

This feature should not be required for records that load nucleus components.

**E.5.7.2 Prompt Records**

Further records are required to initialise fields in the IO block that control the Global System Manager clock and multi-user time slice. These prompt records are present in the A.a0 action file but are usually overridden by records in the machine specific action file A.am (e.g. A.J5) to supply the correct defaults for a particular computer.

Record 550 "BASIC CLOCK (MICROSECONDS)" patches the 4 bytes at offset 180 in the IO block (IOBCLK). This is the duration in microseconds of the fundamental clock interval "tick" supported by the hardware.

Record 551 "CLOCK FREQUENCY (HERTZ)" **may** be used instead of record 550 to patch the 2 bytes at offset 184 in the IO block (IOFREQ) if the clock speed is more easily expressed as a frequency.

Record 552 "CLOCK INTERVAL (MILLISECONDS)" patches the 2 bytes at offset 186 in the IO block (IOCUP) to indicate how often the Global System Manager time of day field is updated. The exact period is always a multiple of the basic clock period. This is normally 1000 (i.e. 1 second) but for network configurations it should be reduced to 250 as it forms the basic unit for the network time-out handling.

Record 554 "SWAP INTERVAL (MILLISECONDS)" patches the 2 bytes at offset 188 in the IO block (IOSWIN) to indicate how often a time slice occurs in a multi-user configuration. An interval in the range 100 - 500 ms is usual.

Prompt records with record numbers 600 - 699 should be used to patch values into the IO extension on those few computers where an extension area has been specified. The first byte in the IO extension is at offset 900 (#384) in the control block.

The processor specific action file A.a0 contains several prompt records in the "Nucleus Options" section to patch further fields in the IO block. Occasionally, these standard prompt records may be overridden by records in the A.am action file (see E.6.3).

**E.5.8 Generation Options**

The processor specific action file A.a0 contains several prompt records in the "Generation Options" section to patch fields in the IO block.

The only machine specific records that may be required in A.am to patch values in the IO block are:

Record	Prompt	Format	Offset	Field
--------	--------	--------	--------	-------

200	Nucleus size in KB	D2	742
IONUCS			
210	BACNAT format is "AnA"	X6	826
IGNATF			

Record-200 is only required if the size of the nucleus components (i.e. nucleus libraries, stand-alone handlers and the configuration file) on the SYSRES unit is greater than 130Kb. This record is not required for most computers.

Record-210 is only required if a BACNAT diskette (i.e. a native format diskette containing files from another operating system) must be distributed with every Global System Manager Starter System in order to bootstrap and/or install Global System Manager. A BACNAT diskette is usually required for most Global System Manager configurations (note that a BACNAT diskette is NOT required for Global System Manager (BOS) configurations).

### E.5.9 LAN Controllers

A LAN controller header (record number 0) **must** be included for each LAN driver written for the computer. After selecting option 10 at the main menu prompt a controller short description must be specified. Standard names are ARCNET, OMNINET and ETHERNET. Once a short description, record number of 0 and computer subcode have been given a form prompting for header record details is displayed.

#### E.5.9.1 Header Record

The Header Record for a LAN controller contains the following fields.

##### E.5.9.1.1 Long Description

The Long Description is an expansion of the short description and may be up to 30 characters in length. It is displayed and printed by Global Configurator.

##### E.5.9.1.2 Controller Code (hex)

The Controller Code (hex) is a unique number starting from 01 and must be the same as the value of nn in the controller filename +amCFnn. The value is patched into NACNCD by Global Configurator. Controller numbers are normally allocated sequentially as LAN drivers are written (e.g. 01 for the Arcnet LAN driver, 02 for the Omnet LAN driver).

##### E.5.9.1.3 Length of NP Block

The NP block length must be between 0 and 127. If it is nonzero the configuration data will contain an NP block. The NP block can be used for any purpose by the controller. The field NANP contains a pointer to the NP block. Further prompt records can be used to patch controller specific values into the NP block.

#### E.5.9.2 Prompt Records

Prompt records with record numbers 100 to 799 should be used for all NP block fields.

The processor specific action file A.a0 contains the following prompt records in the LAN controller section to patch values into the NA block:

Record	Prompt	Header	NAxxxx
30	POLLS TO WAIT BETWEEN ACCESSES	0024	
NAPCTI			

	40	NORMAL TIME-OUT IN SECS	0022	NATO-I
S	50	TIME-OUT ON 1ST ACCESS IN SECS	0020	NATO-
	60	LAN EXECUTIVE RETRY COUNT	0019	
	NARTRY			
	70	WAN MASTER NODE-ID	0017	NAWANID
	80	LAN EXECUTIVE FLAG BYTE	0018	NAFLAG

The following prompt records are required in A.am to patch values in the NA and IO blocks:

Record	Prompt	Header	NAxxxx
10	Data length of full LAN buffer		0026
IOSLB			
20	Maximum packet length	0011	
NAPKLN			

A header offset is obtained by replying 1000+offset to the "Offset in NP block" prompt in the prompt record form.

The record that patches a value into offset 26 of the LAN header block is unique because special processing in Global Configurator copies this field from the internal LAN control block to the central IO block in the configuration file. This is the only example of a record in a controller specific section of the action file patching a value into the IO block. Normally, only records in the "Nucleus Options" (see E.5.7) and "Generation Options" (see E.5.8) sections of the action file patch the IO block. The record occurs in the LAN section of the action file because the value it prompts for is dependent on the type of network. For example, the length of a full LAN buffer for an Arcnet system is different from that for an Omninet system.

## E.6 Using AFU - Advanced Techniques

This section fully describes some techniques that have been mentioned briefly in the previous sections.

### E.6.1 Header Offsets

Prompt records in the controller sections usually patch records into secondary control blocks, the CP block for console controllers, the PP block for printer controllers, the NP block for LAN controllers or the DP extension for direct access controllers. There is no secondary control block for the Cartridge Tape handler so tape controller prompt records always patch values into the primary TA block. If the offset is 1000 or above, the **offset in xP block** or **offset in DP extension** prompt is replaced by an **offset in header** prompt with an offset 1000 less than the value given. The header block does not refer to an offset in the nucleus control block (i.e. the CA block for console controllers, the PA block for printer controllers, the NA block for LAN controllers or the fixed part of the DP block for direct access controllers) but to an offset in an internal control block (i.e. the IB block for console controllers, the IE block for printer controllers, the IF block for LAN controllers or the IX block for direct access controllers) used only by AFU and Global Configurator. Fields from the internal control block are moved to the nucleus control blocks by Global Configurator. Only fields in the primary control block described in the controller dependent sections above can be patched using this technique.

The following table summarizes the control blocks affected by the various prompt records in the action files:

Controller	Offset < 1000	Offset > 999
Disk/diskette part of DP block	DP block extension. A record with an offset of N patches byte N+18 in the DP block.	Fixed
Console	CP block	CA block
Printer	PP block	PA block
LAN	NP block	NA block
Cartridge tape	TA block	Not used

### E.6.2 Jump Records

Usually Global Configurator processes records in strict order of record number. Specifying a **jump to record number** causes Global Configurator to process the next record non-sequentially. The target record number will normally be higher than the number of the record in which it appears (i.e. only forward jumps are useful in Global Configurator). If the target record does not exist then Global Configurator simply uses the record in the same section with the next highest record number or processes the next controller if no more records are present in the current section. Usually, only records with a "Y/N" or "N/Y" field format should include a jump record number.

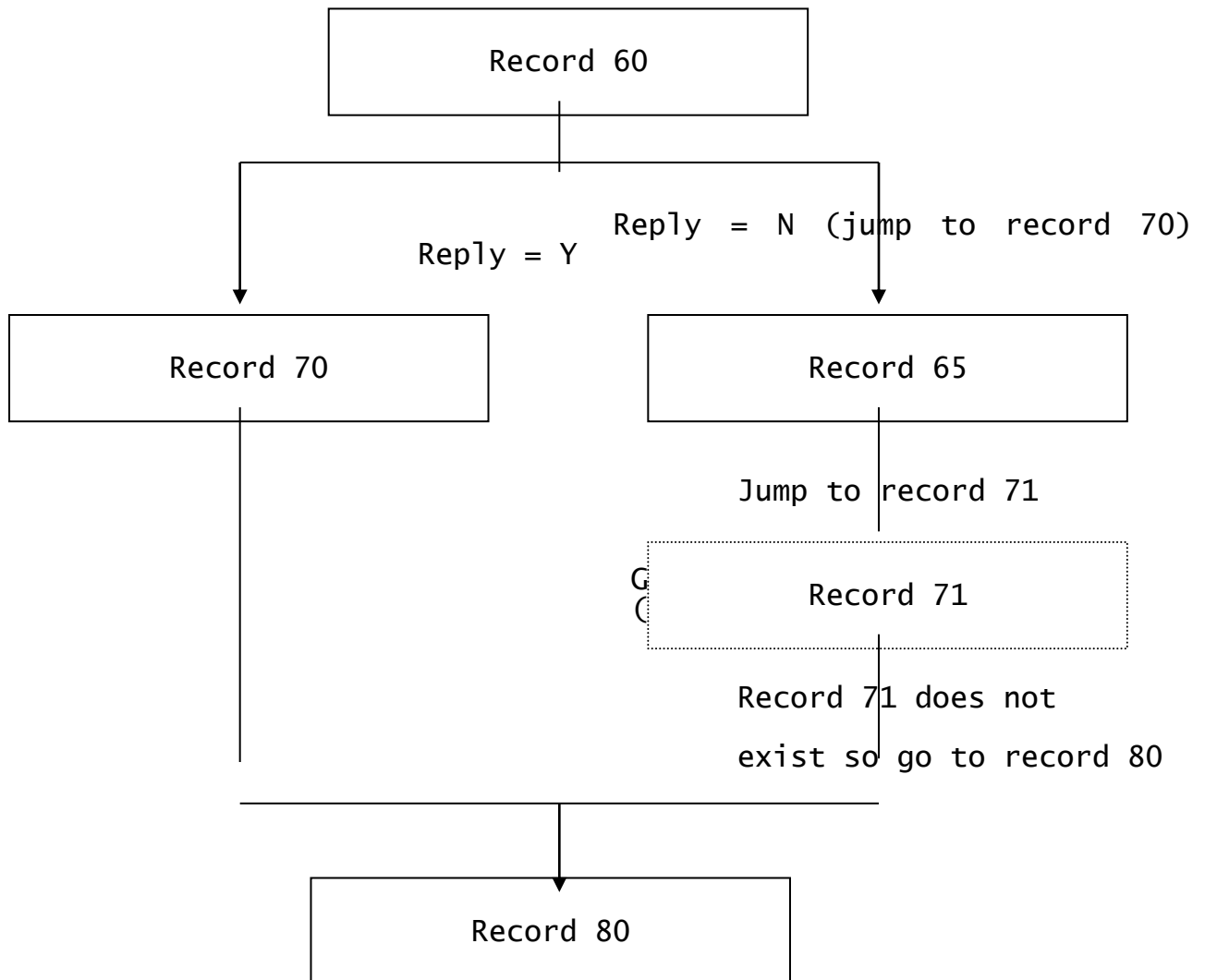
If the **dont jump if = default?** flag is "N" then the jump to record is unconditional because the jump is always taken by Global Configurator. Setting this flag to "Y" introduces a conditional jump facility as the jump is only taken by Global Configurator if the value keyed to the prompt is different from the default associated with the record. If the reply is the same as the default, Global Configurator processes the next record in the controller section as usual.

An example of this technique is to be found in the Nucleus Options section of the A.J0 machine independent action file. Record 500 prompting for "IS \$REMOTE SUPPORTED?" contains a conditional jump to record 510. Records 502, 504 and 506 will only be processed if the reply to this prompt is "Y" because Global Configurator will jump to record 510 if the reply is not equal to the default. Because record 510 does not exist in the action file, Global Configurator will actually process the next record (i.e. record 550).

Another, more complicated, example of this technique is to be found in the printer section of the A.J0 machine independent action file. Record 70 prompting for the "PAGE DEPTH" will only be processed by Global Configurator if the reply to record 60 prompting for a "HARDWARE FORM-FEED" is "N". A listing of the A.a0 action file (obtained by running AFP as described in section E.7) should be available when reading the next paragraph.

If the reply to the "HARDWARE FORM-FEED" prompt (record number 60) is "N" (i.e. not the default) then the "PAGE DEPTH" prompt (record number 70) is processed next because record 60 contains a jump to record 70 if the reply does not equal the default of "Y". If the reply to the "HARDWARE FORM-FEED" prompt is "Y" then record 65 (i.e. the next one)

will be processed next. This is a non-display record with a field-format of "spaces" so will not patch a control block but it does contain an unconditional jump to record 71. Record 71 does not exist so Global Configurator will process the next sequential one i.e. record 80 "MAXIMUM PAGE WIDTH".



### E.6.3 Override Records

If two records in the same section with the same record number occur in both the machine independent action file A.a0 (e.g. A.J0) and the machine-specific action file A.am (e.g. A.J5) then only the record in the A.am file is used by Global Configurator. This allows standard records to be overridden by machine-specific records. This technique is normally used to override records 550, 552 and 554 in the "Nucleus Options" section with machine specific default values. It may also be used in the Printer Controller section to override the default value of the "DEVICE CHARACTERISTICS BYTE" or in the Console Controller section for a memory-mapped screen that always requires character translation to override the default value of the "CHARACTER TRANSLATION FLAG".

It is also possible to override a general computer record (subcode of 0) by a machine-type specific record (nonzero subcode) with the same record number and driver description.

### E.6.4 Suppress Records



A suppress record is just a special type of override record (see above). The record number and sub-code of the 'suppress record' must be the same as the existing record that it is to suppress. The "field format" and "prompt message" should both be set to "spaces".

### E.6.5 Message-only Records

If an accurate prompt description will not fit in the 30 character message area of a prompt record it may be necessary to introduce the prompt with one or more message-only records. These records cause Global Configurator to display the text of the message field only without patching the configuration file. Message-only records should have the following characteristics:

Prompt(P), Display(D), No display(N) ?	D
Field format	<spaces>
Default available ?	N
Default Value	<blank>
Offset in xx block	0
Swap 2 bytes of field ?	N
Jump to record	<blank>
Dont jump if = default ?	N

### E.6.6 Copying Records

The top line of a prompt record or controller header form contains the short description, computer subcode and record number fields (prompt records only). When a record is amended, the cursor is positioned on the next field of the form. By keying <LINEFEED>, or <UPARROW> if the keystroke generates just a single byte, it is possible to move back to the header line and change the fields it contains. When the amended record is accepted it is written to the action file with the new description, subcode and record number (if appropriate). The old record will be unchanged and must be deleted explicitly if no longer required. It is possible, for example, to go through all the records for a controller changing the subcode thus creating copies of every record but for a different machine type.

### E.6.7 Controller Codes

Controller codes are normally allocated in the range 01 to #3F inclusive. Values 00 and #40 - #FF, are reserved for use by Global System Manager for machine-independent drivers. The following codes are currently used:

+a0CA63	Ram disk controller
+a0CB40	Generalised console driver
+J0CB60	Hyperport family console driver
+a0CE40	Generalised printer driver
+a0CE50	Auxiliary printer driver
+J0CE60	Hyperport family printer driver

## E.7 Using AFP to print an Action File

AFP can be run either from the READY prompt or the selection prompt of a standard menu using the following dialogue:

```
GSM READY:P.CF
V8.1 GLOBAL CONFIGURATOR
GSM READY:AFP
Machine code:J5
Action file unit:210
```

Note that the P.CF library must be loaded in order to run AFP.

This dialogue results in a report file, D.A.J5 printed to unit \$PR. Once one file has been printed, the "machine code" prompt is reissued allowing another to be specified. To exit back to the READY prompt or a menu, key <ESC> to this prompt.

If the terminator to the AFP program name is <CTRL C>, instead of the normal <CR>, you are prompted for the filename and unit of the report file. For example:

```
GSM READY:P.CF
V8.1 GLOBAL CONFIGURATOR
GSM READY:AFP<CTRL C>
Machine code:J5
Action file unit:210
Specify report file (D.A.J5):D.NEW Unit ($PR):299
```

## Appendix F – Volume Type Update and Print

This appendix, which is intended for TIS Software staff only, describes the use and operation of the following utilities:

VTU Volume Type Update;

VTP Volume Type Print.

VTP is distributed with Global Configurator (in the P.CF library) and thus is available for use by resellers and end-users. VTU is NOT distributed with Global Configurator (it must be copied from the CF81A generation master). VTU is not intended for external use.

### F.1 Introduction

The Volume Type Action File A.VTYPE contains the details of all diskette and hard-disk volume formats supported by Global System Manager. It is supplied on the CFA distribution diskette and is used by Global Configurator when creating or updating a configuration file. This chapter explains how to use VTU and VTP to maintain the Volume Type Action File. Usually this will involve only the addition of a new volume type record and the printing of existing records. Normally, existing records should not be amended or deleted although these functions may be required to alter or remove volume types added for testing purposes.

The supplied action file contains records for all the common diskette formats so it should only be necessary to add extra records for hard disk formats.

**If any changes are made to A.VTYPE, the updated version must be returned to TIS Software Ltd so that the amendments can be incorporated into the master copy of this file.**

Global System Manager direct-access volumes fall into one of several categories.

#### F.1.1 Diskettes

Diskettes are treated as discrete volumes allocated only 1 unit number (e.g. 150). Both soft-sectored and (obsolete) hard-sectored diskettes are supported.

#### F.1.2 Domains

Domains may be defined for hard disk formats only. A two-tier directory format used. The domain is broken down into a number of diskette-like areas of varying size called subvolumes. Allocated a range of unit numbers (e.g. 200 for the domain and 201 to 249 for the subvolumes). Both fixed and removable hard disks are supported.

#### F.1.3 Integrated Data Volumes

On some Global System Manager configurations (e.g. Global System Manager (Unix) and Global System Manager (MS-DOS)) a hard-disk domain is simulated by a single, large host operating system file. Such virtual hard-disks are known as "Integrated Data Volumes" or "Integrated Data Files".

#### F.1.4 Discrete Data Volumes

On some Global System Manager configurations (e.g. Global System Manager (Unix) and Global System Manager (MS-DOS)) a hard-disk domain

is simulated by a series of host operating system files within a single host operating system directory. Each file corresponds to a Global System Manager subvolume. Such virtual hard-disks are known as "Discrete Data Volumes" or "Separated Subunit Domains".

### **F.1.5 Floating Domains**

Floating domains are similar to ordinary hard disk domains (see section F.1.2) except that Global Configurator prompts for the start and end addresses of the Global System Manager area.

### **F.1.6 Discrete Logical Volumes (DLVs)**

A Discrete Logical Volume on a hard disk is allocated only 1 unit number, usually 150. Global Configurator prompts for the start and end addresses of the Global System Manager area.

## **F.2 Standard Format Descriptions**

The full standard description of a volume is:

```
<media-type code><sector code><directory code>
```

The "media-type code" and "directory code" are both alphabetic characters. The "sector code" is a decimal number. The volume type format code is sometimes called the "AnA" code.

### **F.2.1 Media-type Code**

The media-type code differentiates between volumes that are physically different. As a new type of volume is supported it is allocated the next media-type code alphabetically. Two different sector arrangements for the same diskette do not merit a different media-type code unless formatting from one arrangement to another is not possible. Appendix G describes the currently supported media-type codes.

### **F.2.2 Sector Code**

The sector code is a further description which narrows down the format of a volume beyond the media-type code. The code specifies the number of tracks and sectors as well as the sector size. As a new formatting arrangement is supported for a particular media-type it is allocated the next decimal sector code numerically. For a sector code to be meaningful it must be preceded by a media-type code. The media-type code and sector code together identify the type of disk that can be replicated or verified on a given computer.

### **F.2.3 Directory Code**

The directory code is a further description which narrows down the format of a volume beyond the media-type code and sector code. The code specifies the Global System Manager directory format used. As a new directory format for a volume identified by a media-type code/sector code pair is supported it is allocated the next directory code alphabetically. For a directory code to be meaningful it must be preceded by both a media-type code and a sector code. The full volume format specifies all details of the media and directory format. Different software interleavings are not given different sector codes. The directory code for hard disk domains is usually "Z".

If a volume does not include a Global System Manager directory, the Directory Code is absent.

### **F.2.4 Example Format Descriptions**

The following formats illustrate the points above:

<b>02A</b>	3½"	high-density (1.44Mb)
<b>V2A</b>	3½"	extra high-density (2.88Mb)
<b>01A</b>	3½"	high-density (1.44Mb); 15 sectors per track
<b>02A</b>	3½"	high-density (1.44Mb); 18 sectors per track
<b>02A</b>	3½"	high-density (1.44Mb); 18 sectors per track; 63 files per directory
<b>02B</b>	3½"	high-density (1.44Mb); 18 sectors per track; 250 files per directory
<b>02C</b>	3½"	high-density (1.44Mb); 18 sectors per track; 99 files per directory
<b>02</b>	3½"	high-density (1.44Mb); 18 sectors per track; without a Global System Manager directory (e.g. MS-DOS 1.44Mb diskette).

Note that some volume formats are identical (e.g. 02A and 02D). The format with the higher "AnA" code has been invented to highlight the fact that on some Global System Manager configurations (usually Global System Manager (Unix)) "plus format" stock diskettes are not readable. On such configurations, Global distribution diskettes are supplied on, for example, 02D not 02A+.

### F.3 Using VTU to update A.VTYPE

VTU can be run either from the READY prompt or the selection prompt of a standard menu using the following dialogue:

```
GSM READY:VTU
```

Note that unlike VTP (see section F.4) there is no need to load the P.CF library in order to run VTU.

If the A.VTYPE action file is not on the \$P unit, a warning message is displayed and the unit is requested:

```
A.VTYPE not found or wrong type
AV UNIT:210
```

In the example dialogue the copy of A.VTYPE on unit 210 will be used. Usually A.VTYPE will be on the same unit as VTU.

If the terminator to the VTU program name is <CTRL C>, instead of the normal <CR>, you are prompted for the filename and unit of the Volume Type Action File and the filename and unit of the report file (see sections F.3.5 and F.3.6). For example:

```
GSM READY:VTU<CTRL C>
Specify Action File (A.VTYPE):<CR> Unit ($P):206
Specify report file (D.VTYPE):<CR> Unit ($PR):210
```

Once the action file has been found the main menu shown in figure F.1 is displayed:

Key 1 to 8 to select one of the options. If the reply is invalid the menu is redisplayed. Key <CR> to the menu selection prompt to quit VTU and return to the READY prompt or the menu.

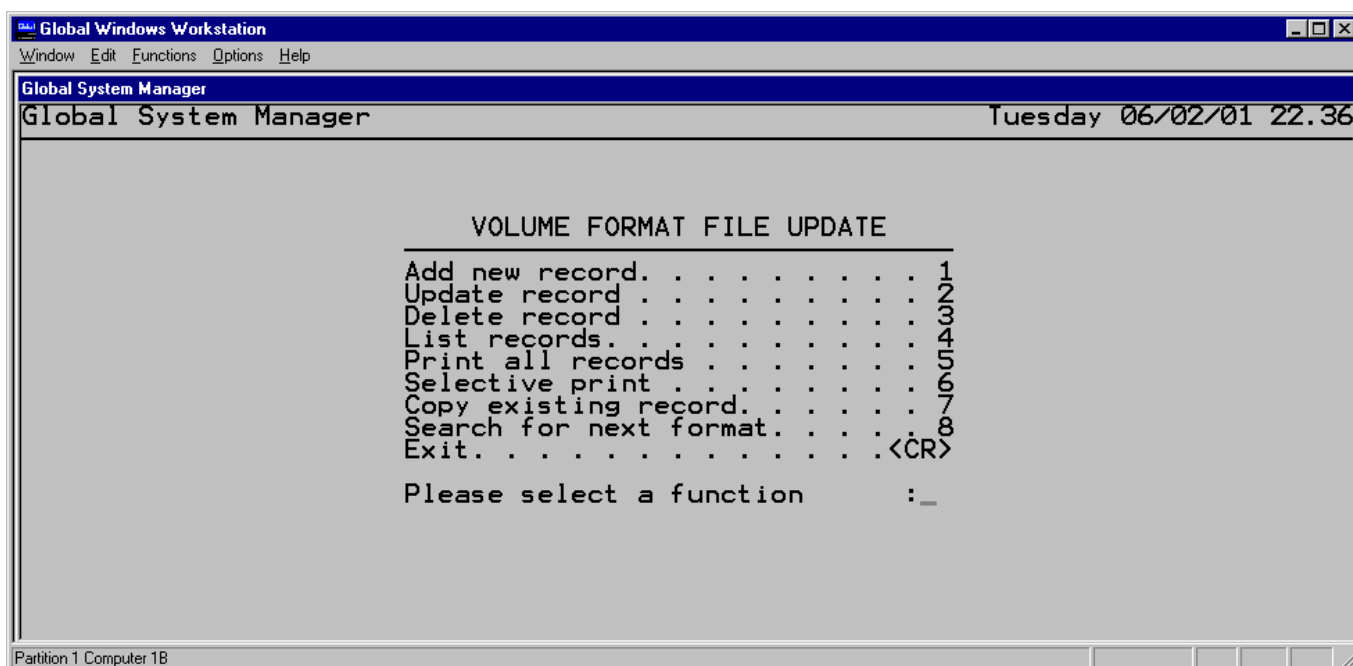


Figure F.1 - The VTU main menu

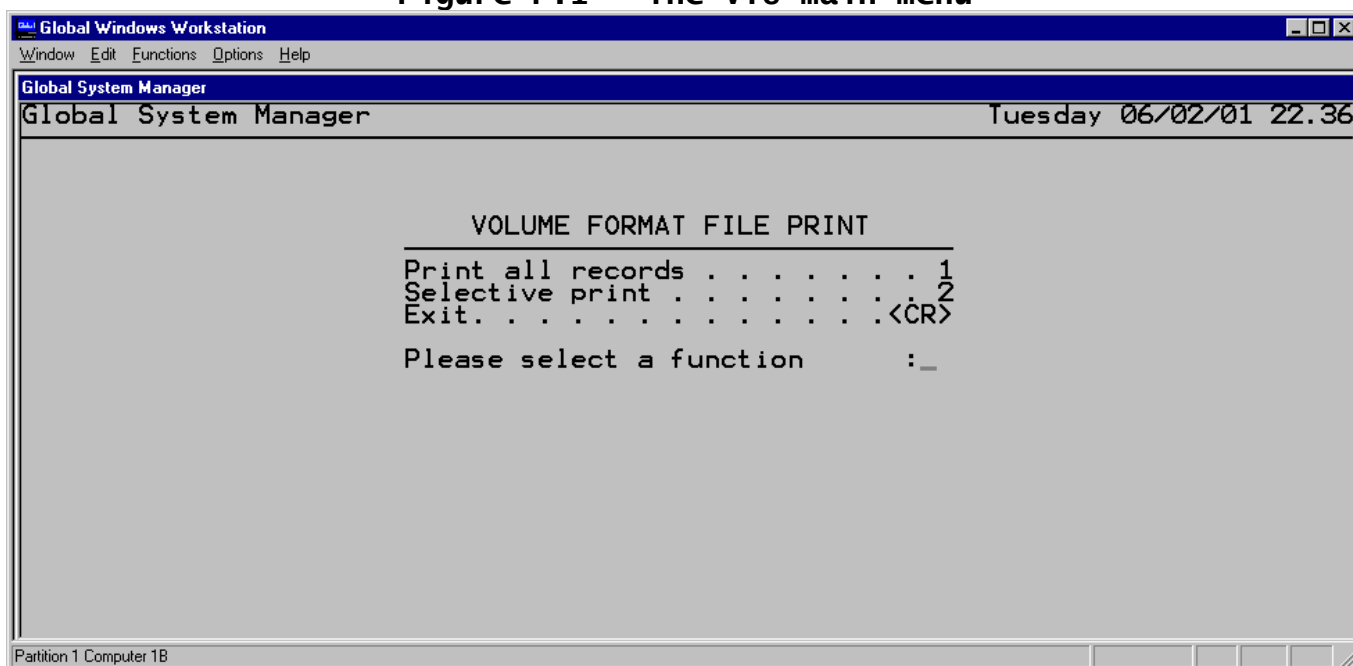


Figure F.2 - The VTP main menu

### F.3.1 Adding a New Record

Key 1 to the VTU main menu prompt to add a new volume format. A new volume format AnA code must be specified. For example to add volume type P999Z:

```
FORMAT: P999Z
```

Section F.3.11 describes how to select the AnA code for a new volume.

If the volume type already exists VTU will display "Already exists" and re-prompt for a format code. Once a new format code has been supplied, VTU prompts for the details described below.

### F.3.1.1 VOLUME TYPE

The VOLUME TYPE is a number between 1 and 99. It **must** be 30 for all fixed hard disks. To indicate that a hard disk is removable the volume type should be a value other than 30. When only a few diskette formats were supported by Global System Manager, the volume type was unique for each format code. Now that so many different types of diskette and removable hard disks are recognised by Global System Manager some duplication of volume type numbers is inevitable. Care must be taken that the volume type of a new diskette format does not clash with that of an existing one if a computer is capable of accessing both types of diskettes. This is to prevent a configuration file containing two different diskette formats with the same volume type number.

### F.3.1.2 SUBVOLUMES

The number of SUBVOLUMES must be left blank for all discrete volumes (i.e. diskettes and DLVs) but should be between 1 and 99 for all hard disk domains. Specifying a value to this prompt indicates that the volume is to be treated as a domain. This value (usually 49 or 99) is displayed as a default by Global Configurator but may be changed by the user when a configuration file is being created or updated.

Note to TIS Software staff only: Earlier internal documentation suggested a value of 19 for the default number of subvolumes on a domain. This number was acceptable for a small disk (e.g. 5Mb to 20Mb) but is far too low for more typical disk sizes (e.g. 200Mb to 2Gb). The suggested value for the default number of subvolumes is 49. This allows two disks to be sensibly addressed (i.e. units 201 - 249 on domain 200, units 251 - 299 on domain 250). If more than two disks are frequently configured on a computer, the default should be reduced to 29 or 39 subvolumes. Appendix M of the Global Porting-Kit Manual describes the minor consequences of changing the number of subvolumes on a hard disk without re-initialising the domain. The maximum number of subvolumes on a domain is 2 less than the maximum number of files per directory (see below), with an absolute maximum value of 99.

### F.3.1.3 MAXIMUM NUMBER OF FILES

The MAXIMUM NUMBER OF FILES is usually 63 or 99 for diskettes; or 99 or 250 for hard disk domains. If the volume is a hard disk, this value is the number of files per subvolume (e.g. 99 files on unit 201, 99 files on unit 202, etc.). The default value is 99 although a value of 250 is strongly recommended.

### F.3.1.4 DESCRIPTION

The DESCRIPTION is a 24 character string that is displayed and printed by Global Configurator. It should describe any special features of the volume type. For example:

02A	3" IBM PC HIGH CAPACITY
02B	"02A" WITH 250 FILES
02C	"02A" WITH 99 FILES
02D	ISOMETRIC WITH "02A"

### F.3.1.5 SECTOR SIZE

The SECTOR SIZE is the number of bytes on each sector. For those (obsolete) double density diskette formats with special single density

IPL tracks, the Global System Manager sector size reflects the sector size on the majority of the diskette. The sector size is the minimum amount of data transferred by a read or write operation on a direct access device.

#### **F.3.1.6 CYLINDERS, HEADS and SECTORS PER TRACK**

The number of CYLINDERS, HEADS and SECTORS PER TRACK define the **total** extent of the device. The device extent is that part of the media that can be accessed by Global System Manager but may include areas of the device that are reserved for non-Global System Manager use. For example, the total extent will include any special IPL tracks, that must be accessible by Global System Manager (to install the bootstrap) but are not part of the Global System Manager directory or data area. The device extent may also include tracks at the end of the device reserved for use as

hardware alternates. See Appendix M of the Global Porting-Kit Manual for a detailed description of the layout of a Global System Manager direct access device. Global System Manager assumes a constant number of sectors per track. If the media actually contains a variable number of sectors per track (e.g. for the obsolete R11x and R12x diskette formats) then the diskette controller must contain extra code to compensate. For example, formats R11x and R12x contain more sectors on the outermost tracks to ensure that the data density is roughly constant across the entire disk.

#### **F.3.1.7 START CYLINDER and START HEAD**

The START CYLINDER and START HEAD numbers define the first track on the device used by Global System Manager. The first sector on this track will contain the start of the Global System Manager directory.

#### **F.3.1.8 END CYLINDER and END HEAD**

The END CYLINDER and END HEAD numbers define the last track on the device used by Global System Manager. If the disk address of the last track is higher than the volume extent the warning message "End of volume is beyond end of media" is displayed and the CYLINDERS prompt is reissued. The last 6 tracks of a hard disk domain are reserved for use as alternates by the Global System Manager bad track management mechanism.

#### **F.3.1.9 INTER-SECTOR GAP LENGTH**

The INTER-SECTOR GAP LENGTH is only required for diskettes. It is used by \$V when building the track image required for a format operation.

#### **F.3.1.10 OPTION**

The OPTION prompt allows up to 5 special options to be specified. This prompt is repeated until 5 options have been given or the reply is <CR>. The following 2 options may be required:

FLT Define the device as a "floating domain";

Dhh Set the density flag to the hexadecimal value hh. This value is used by Global Configurator to initialise the DVDENS field (see Appendix D).

Section F.3.9.1 contains a full list of the possible options (including some that are very esoteric and obsolete).

### **F.3.2 Updating an Existing Record**



Key 2 to the VTU main menu prompt to update an existing record. An existing volume format AnA code must be specified. For example to update volume type 02A:

```
FORMAT:02A
```

If the format does not exist the warning message "Not found" is displayed and the FORMAT prompt is reissued. If the reply to the FORMAT prompt is <CR> the VTU main menu is redisplayed.

Updating an existing volume type uses the same dialogue as described in section F.3.1 for adding a new record except that the default values are read from the existing record.

### F.3.3 Deleting a Record

Key 3 to the VTU main menu prompt to delete an existing record. An existing volume format AnA code must be specified. For example to delete volume format 02A:

```
FORMAT:02A
```

If the format does not exist the warning message "Not found" is displayed and the FORMAT prompt is reissued. If the reply to the FORMAT prompt is <CR> the VTU main menu is redisplayed.

**EXISTING RECORDS SHOULD ONLY BE DELETED BY EMPLOYEES OF TIS SOFTWARE LTD.**

### F.3.4 Listing All Records

Key 4 to the VTU main menu prompt to display brief details of all the records in the Volume Type Action File (i.e. A.VTYPE). The display contains the following details:

FORMAT	6 character AnA code (e.g. 02A);
TYPE	Volume type number (e.g. 18);
SUBVOLS	Default number of sub-volumes (domains only);
FILES	Maximum number of files in directory;
DESCRIPTION	24 character volume description;
S-SIZE	Sector size in bytes;
MEDIA SIZE	Total media size (CCCC/HH/SS).

After a complete screen has been displayed the following prompt is issued:

```
Next page?:
```

Key N to return to the VTU main menu. All other replies result in the display of the next screen.

Normally, the report starts with the first AnA code in the Volume Type Action File (i.e. the obsolete A10A format). However, if the terminator to the reply of 4 to the menu prompt is <CTRL A>, instead of the normal <CR>, you are prompted for the first AnA code. For

example, to list all records starting from format 02A use the following dialogue:

```
Please select a function :4<CTRL A>
FORMAT:02A
```

### F.3.5 Print All Records

Key 5 to the VTU main menu prompt to print a full report of all the records in the Volume Type Action File (i.e. A.VTYPE) to unit \$PR (creating report file D.VTYPE). The report contains the following details:

FORMAT	6 character AnA code (e.g. 02A);
TYPE	Volume type number (e.g. 18);
SUBVOLS	Default number of sub-volumes (domains only);
FILES	Maximum number of files in directory;
DESCRIPTION	24 character volume description;
S-SIZE	Sector size in bytes;
MEDIA SIZE	Total media size (CCCC/HH/SS);
START (CCCC/HH/SS);	Start address of Global System Manager extent
END (CCCC/HH/SS);	End address of Global System Manager extent
GAP	Intersector gap size (diskettes only);
OPTIONS	List of various options (e.g. FLT, D10).

If the terminator to the reply of 5 to the menu prompt is <CTRL A>, instead of the normal <CR>, a more comprehensive report is printed, including all the details described in section F.3.6.

### F.3.6 Selective Print

Key 6 to the VTU main menu prompt to print a full report of selective record(s) from the Volume Type Action File (i.e. A.VTYPE) to unit \$PR (creating report file D.VTYPE). An existing volume format AnA code must be specified. For example to print full details of volume type 02A:

```
FORMAT:02A
```

If the format does not exist the warning message "Not found" is displayed and the FORMAT prompt is reissued. The FORMAT prompt repeated until the reply is <CR>.

The report contains the following details:

FORMAT	6 character AnA code (e.g. 02A);
TYPE	Volume type number (e.g. 18);
SUBVOLS	Default number of sub-volumes (domains only);

FILES	Maximum number of files in directory;
DESCRIPTION	24 character volume description;
S-SIZE	Sector size in bytes;
MEDIA SIZE	Total media size (CCCC/HH/SS);
START (CCCC/HH/SS);	Start address of Global System Manager extent
END (CCCC/HH/SS);	End address of Global System Manager extent
GAP	Intersector gap size (diskettes only);
OPTIONS	List of various options (e.g. FLT, D10);
DIRECTORY	Directory size in bytes;
LPS	Number of labels per directory sector;
MEDIA SIZE decimal);	Total media size in bytes (hexadecimal and
START	Start address of Global System Manager extent in bytes (hexadecimal and decimal);
END	End address of Global System Manager extent in bytes (hexadecimal and decimal);
CAPACITY	Media capacity (diskettes only):
	SMALL      Less than 240Kb
	LOW        Between 240Kb and 480Kb
	MEDIUM    Between 480Kb and 960Kb
	HIGH       960Kb or higher

### F.3.7 Copy existing record

Key 7 to the VTU main menu prompt to add a new volume format using an existing volume as a template. A new volume format AnA code must be specified. For example to add volume type O2E:

```
NEW FORMAT:O2E
```

If the volume type already exists VTU will display "Already exists" and reprompt for a format code. Once a new format code has been supplied, VTU prompts for the template volume format. For example to use O2A as the template for O2E:

```
NEW FORMAT:O2E TEMPLATE FORMAT:O2A
```

If the template format does not exist the warning message "Not found" is displayed and the NEW FORMAT prompt is reissued.

Once valid New and Template volume formats have been supplied, VTU prompts for the details described in sections F.3.1.1 to F.3.1.10 supplying default replies obtained from the template format.

### F.3.8 Search for next format

Key 8 to the VTU main menu prompt to add a new volume format to the Volume Type Action File allowing VTU to determine the AnA code using the algorithm described in section F.3.11.

You are prompted for the media-type code (see section F.2.1) with a default of "P":

```
First character of AnA code (P):
```

#### F.3.8.1 Adding a new Domain Volume Format

Key <CR> or P to the above prompt. VTU will read the A.VTYPE file, searching for the next free "P" format. For example:

```
First character of AnA code (P):P
Searching volume type file...
Next free volume format is PnnnZ - Add new record (Y):
```

Key <CR> to add the volume format selected by VTU. Key N to abandon the search and return to the VTU main menu. Key <CTRL A> to allow VTU to scan for the next free record.

If you select to add the volume format selected by VTU you are prompted for the parameters described in sections F.3.1.1 to F.3.1.10. When all the required parameters have been supplied VTU will add the new volume format to the Volume Type Action File.

#### F.3.8.2 Adding a new Diskette Volume Format

If the reply to the "first character of AnA code" prompt is not "P", VTU will prompt for the parameters described in sections F.3.1.3 to F.3.1.10. When all the required parameters have been supplied VTU will read the A.VTYPE file, searching for an existing volume format that matches the specified diskette geometry.

If an existing format matches both the sector type and the directory type of the new volume format you will be warning that the required volume format is already present in the Volume Type Action File. For example:

```
Format O2A already exists, key <CR> to continue:
```

If an existing format matches the new volume format in terms of the sector type only, VTU will determine the next unused directory type and offer you a default AnA code:

```
Next free volume format is O2Y - Add new record (Y):
```

If no existing formats match the new volume format in terms of the sector type VTU will determine the next unused sector type and offer you a default AnA code:

```
Next free volume format is O3A - Add new record (Y):
```

Key <CR> to add the volume format selected by VTU. Key N to abandon the search and return to the VTU main menu.

If you select to add the volume format using the AnA code selected by VTU you will be asked to specify the volume type code (see section F.3.1.1). You can either supply a number directly or allow VTU to select a value that does not clash with the volume type of other

diskette formats that are likely to be included in a configuration file with the new volume format. If you supply a number directly VTU will add the new volume format to the Volume Type Action File. If you allow VTU to select a value automatically the following dialogue will appear:

```
(initial dialogue)
Searching volume type file...
Next free volume format is 03A - Add new record (Y):<CR>
Specify volume type or key <CR> to check other formats:<CR>

Specify all the other formats that are expected to be
included in configuration files that contain the new format.

Format:02A
Format:02B
Format:03B
Format:<CR>
```

The selected volume type code is 28 - Use this value (Y):

Key <CR> to accept the suggested volume type code. VTU will add the new volume format to the Volume Type Action File. Key N to reject the suggested volume type code and return to the previous prompt.

### F.3.9 Using VTU - Advanced Techniques

This section describes some special techniques that may be used occasionally when adding or updating a volume type record.

#### F.3.9.1 Allowed Options

A complete list of allowed options, including those described in section F.3.1.10, is as follows:

- FLT Define the device as a "floating domain";
- Dhh Set the density flag to the hexadecimal value hh. This value is used by Global Configurator to initialise the DVDENS field (see Appendix D);
- DLV Define the volume as a Discrete Logical Volume;
- IBM Directory labels are in IBM format;
- S/1 Special format for the IBM Series/1 computer;
- Ldd Each directory sector contains dd (decimal) labels;
- Sdd Allocate dd (decimal) sectors for the Global System Manager directory. This option can only be used to increase the size of a directory from the value calculated by VTU. If an attempt is made to reduce the directory size from the value calculated by VTU then the "DIRECTORY SIZE TOO SMALL - INCREASING TO nn SECTORS" warning message is displayed. This option is used to force the Global System Manager directory size to an exact number of tracks.

#### F.3.9.2 Defaults Based on Last Letter of "AnA" Code

If the last character of the AnA code is between "A" and "S" the format is assumed to be that of a discrete device when adding a record (i.e. the default number of maximum files is 63 and the default number of subvolumes is 0). If the last character of the AnA code is between

"T" and "Z" the format is assumed to be that of a hard disk domain when adding a record (i.e. the default number of maximum files is 99 and the default number of subvolumes is 19).

#### F.3.9.3 The START SECTOR prompt

Although prompts are issued for the START CYLINDER and START HEAD numbers, the START SECTOR number is usually set to 0 without VTU issuing a prompt. For discrete volumes (i.e. diskettes and DLVs) only, if the reply to the START HEAD is terminated by <CTRL C>, VTU will prompt for the START SECTOR number. **This technique is only documented for completeness and should not be used.**

#### F.3.9.4 The END SECTOR prompt

Although prompts are issued for the END CYLINDER and END HEAD numbers, the END SECTOR number is usually set to 1 less than the number of sectors per track without VTU issuing a prompt. For discrete volumes (i.e. diskettes and DLVs) only, if the reply to the END HEAD is terminated by <CTRL C> then VTU will prompt for the END SECTOR number. **This technique is only documented for completeness and should not be used.**

#### F.3.9.5 The AVCLA Field

The number of subvolumes is held in the field AVCLA. Historically, AVCLA held the following values:

- 0 Diskette or DLV
- ve Fixed domain (Global Configurator prompts for the number of subvolumes using AVCLA \* -1 as the default)
- +ve Removable domain (Global Configurator uses AVCLA for the number of subvolumes)

The current versions of Global Configurator (V5.1 and later) do not differentiate between positive and negative values of AVCLA and **always** prompt for the number of subvolumes.

#### F.3.9.6 The AVVTYP Field

Floating domains (option = FLT) and DLVs (option = DLV) are both indicated by negative values of AVVTYP:

AVCLA	AVVTYP	Description
0	+ve	Diskette
0	-ve	DLV
N	+ve	Domain
N	-ve	Floating domain

When Global Configurator processes a diskette or domain, the start/end cylinder, head and sector numbers are fixed. When Global Configurator processes a floating domain, the start/end cylinder and head numbers may be specified. When Global Configurator processes a DLV, the start/end cylinder, head and sector numbers may be specified.

### F.3.10 Special Terminators for Addition and Update Modes

When using VTU to add a new record (F.3.1 and F.3.7) or to update an existing record (F.3.2), the terminator to each reply is normally <CR>. This has the effect of accepting the reply, or default value, and prompting for the next parameter in the sequence described in

sections F.3.1 to F.3.10. In addition to <CR>, a number of special terminators are recognised by VTU when in addition or update modes:

Prompt	<CR>	<CTRL A>	<CTRL B>	<CTRL C>
FORMAT	Menu	Menu	Menu	Menu
VOLUME TYPE	Next	Format	Next	Previous
SUBVOLUMES	Next	Format	Next	Previous
MAX FILES	Next	Format	Diags	Previous
DESCRIPTION	Next	Format	Next	Previous
SECTOR SIZE		Next	Format	Next
CYLINDERS	Next	Format	Next	Previous
HEADS	Next	Format	Next	Previous
SECTORS	Next	Format	Next	Previous
START CYL	Next	Format	Next	Previous
START HEAD		Next	Next	Next
END CYL	Next	Format	Next	Previous
END HEAD	Next	Next	Next	End
GAP LENGTH	Next	Format	Next	Previous
OPTION	Option	Option	Option	Option

The following terms are used in the above table:

Menu	Return directly to the main VTU menu.
Next	Accept the reply (or default value) and prompt for the next parameter in the sequence.
Format	Abandon the addition or update and re-prompt for a new format, staying in the current mode.
Previous	Accept the reply (or default value) and prompt for the previous parameter in the sequence.
Diags	Display the "number of sectors in the directory" after the record has been written back to the action file.
Start	Prompt for the "start sector number" if the volume is a discrete device (see above).
End	Prompt for the "end sector number" if the volume is a discrete device (see above).
Option	Accept options until the reply is <NULL>.

### F.3.11 Selecting the AnA code for a new Volume Type

This section describes the rules that must be followed when selecting the volume type format code for a new Volume Type.

The "media-type" is determined by the physical media. Appendix G should be consulted when selecting this letter. The media-type code for fixed disks is always "P". **New media codes should only be allocated by employees of TIS Software.**

The "sector-code" is determined by the formatting arrangement of the media and is allocated on a next number basis by referring to the full listing of current Volume Types (see F.3.4). A new sector-code is always allocated for fixed disks. At the time of writing this documentation, the next available fixed disk AnA code is "P260Z". A

sector-code already exists for most of the common diskette formats. For two or more diskette formats to share a common "sector-code", the following parameters must be identical:

SECTOR SIZE

CYLINDERS

HEADS

SECTORS PER TRACK

DENSITY OPTION

The "directory-code" is determined by the location and size of the Global System Manager directory. It is allocated on a next letter basis by referring to the full listing of current Volume Types (see F.3.4). A directory-code of "Z" is conventionally allocated for fixed disks.

The following algorithm should be followed when allocating a new AnA code (this algorithm is included in the logic for the Search for Next Format option in VTU - see section F.3.8), where MTC is the Media-Type Code; DC is the Directory Code; SC is the Sector Code:

```

Compare the device with those listing in Appendix G
IF a new MTC is required THEN
    Contact TIS Software Ltd
ELSE
    Use the existing MTC
    IF the media-type code = "P"
        Search the Volume Type file for all "P" formats
        Use the next number for the SC
        Use "Z" for the DC
    ELSE
        Search the Volume Type file for all sector codes with
        the selected MTC
        IF a new SC is required THEN
            Use the next number for the SC
            Use "A" for the DC
        ELSE
            Use the existing SC
            Search the Volume Type file for all DC's with the
            selected MTC & SC
            IF a new DC is required THEN
                Use the next letter for the DC
            ELSE
                The format is already allocated
            ENDIF
        ENDIF
    ENDIF
ENDIF
ENDIF
ENDIF

```

## F.4 Using VTP to print A.VTYPE

VTP can be run either from the READY prompt or the selection prompt of a standard menu using the following dialogue:

```

GSM READY: P.CF
V8.1 GLOBAL CONFIGURATOR
GSM READY: VTP

```



Note that the P.CF library must be loaded in order to run VTP.

If the A.VTYPE action file is not on the \$P unit, a warning message is displayed and the unit is requested:

```
A.VTYPE not found or wrong type
AV UNIT:210
```

In the example dialogue the copy of A.VTYPE on unit 210 will be used. Usually A.VTYPE will be on the same unit as VTP.

If the terminator to the VTP program name is <CTRL C>, instead of the normal <CR>, you are prompted for the filename and unit of the Volume Type Action File and the filename and unit of the report file (see sections F.4.1 and F.4.2). For example:

```
GSM READY:VTP<CTRL C>
Specify Action File (A.VTYPE):<CR> Unit ($P):206
Specify report file (D.VTYPE):<CR> Unit ($PR):210
```

Once the action file has been found the main menu shown in figure F.2 is displayed.

Key either 1 or 2 to select one of the options. If the reply is invalid the menu is redisplayed. Key <CR> to the menu selection prompt to quit VTP and return to the READY prompt or the menu.

#### F.4.1 Print All Records

Key 1 to the VTP main menu prompt to print a full report of all the records in the Volume Type Action File (i.e. A.VTYPE) to unit \$PR (creating report file D.VTYPE).

The report contains the same details as the Print All Records option of VTU (see section F.3.5).

If the terminator to the reply of 1 to the VTP menu prompt is <CTRL A>, instead of the normal <CR>, a more comprehensive report is printed, including all the details described in section F.3.6.

#### F.4.2 Selective Print

Key 2 to the VTP main menu prompt to print a full report of selective record(s) from the Volume Type Action File (i.e. A.VTYPE) to unit \$PR (creating report file D.VTYPE). An existing volume format AnA code must be specified. If the format does not exist the warning message "Not found" is displayed and the FORMAT prompt is reissued. The FORMAT prompt repeated until the reply is <CR>.

The report contains the same details as the Selective Print option of VTU (see section F.3.6).

## Appendix G - Volume Type Media Codes

### G.1 Current "AnA" codes

This section describes the convention for the first character of a volume format "AnA" code (i.e. the "media" code) for all current volume formats:

- B 3½" diskette, soft-sectored, double-sided, low-density;
- C 5¼" diskette, soft-sectored, single-tracking, low-density, single and double sided;
- G 5¼" diskette, soft-sectored, double-tracking, high-density, double-sided;
- N 3½" diskette, soft-sectored, single-sided, low-density;
- O 3½" diskette, soft-sectored, double-sided, high-density;
- P Fixed disks and Integrated Data File virtual domains (P0xx used for RAM disks and domains);
- R 5¼" diskette, soft sectored, double-tracking, low-density, single and double sided;
- T Separated Subunit Domains;
- V 3½" diskette, soft-sectored, double-sided, extra high-density.
- Y Open file pseudo volumes
- Z Simulated volumes;

All other media codes are obsolete (see section G.2)

### G.2 Obsolete "AnA" codes

This section may be of interest to historians. It describes the convention for the first character of a volume format "AnA" code (i.e. the "media" code) for all obsolete volume formats:

- A 8" diskette, soft-sectored, single-sided, single-density;
- B 8" diskette, soft-sectored, reversible, single-density;
- C 5¼" diskette, soft-sectored, double-sided, double-density;
- D 8" diskette, soft-sectored, double-sided, single-density;
- E 8" diskette, soft-sectored, double-sided, double-density;
- F 8" diskette, soft-sectored, single-sided, double-density;
- G 5¼" diskette, soft-sectored, single-sided, single-density;
- H Magazine of 10 type-A diskettes;
- I Magazine of 10 type-E diskettes;

- J RK05, RK06, RK07 & emulations;
- K RL01, RL02 and other miscellaneous removable disks;
- L 5¼" diskette, 10 hard sectors, single-tracking, double-sided (also used for Dysan diskettes switchable between type-E and type-F);
- M 5¼" diskette, 10 hard sectors, double-tracking, double-sided;
- N Dysan diskettes similar to type-L;
- Q CMD removable Phoenix cartridges;
- R CPT Hermes single-sided, single-density;
- S Honeywell-Bull removable cartridges;
- T CDS Trident T25 disk pack;
- U 5¼" diskette, 16 hard sectors, single and double tracking, double-sided;
- V Trivector Triton 4 streamer tape;
- W RP02 & RP03 disk drives;
- X CDC Phoenix cartridges;
- Y Lark removable cartridges;
- AA Unused;
- AB Iomega 5¼" cartridges;
- AC Iomega 8" cartridges.