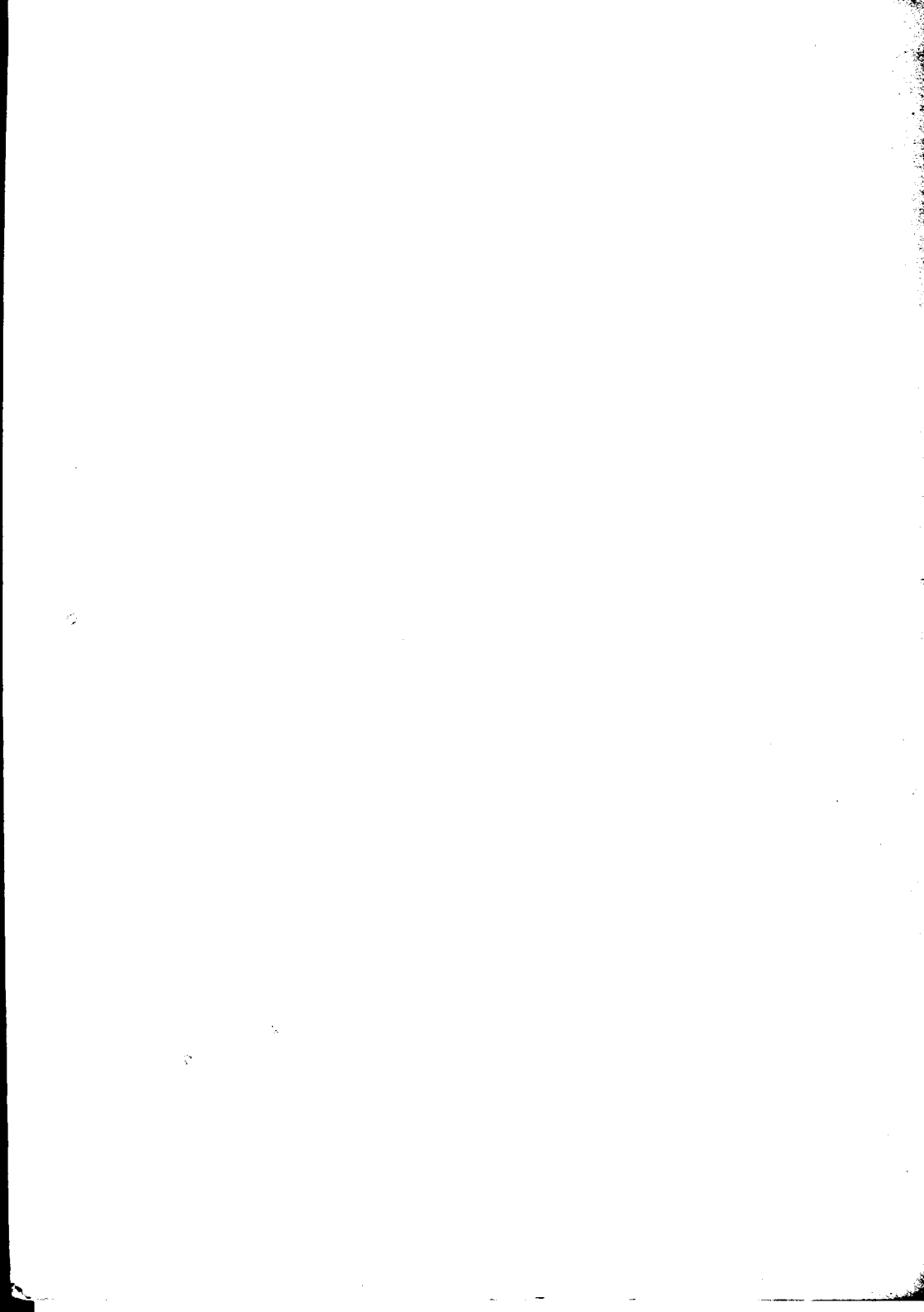


Guide to Operations

PANOS





Guide to Operations

PANOS



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1 Introduction

1.1 Context

This document describes the Panos user interface. As its name suggests, it is a guide to operating Panos from the keyboard - how to edit files, how to list directories etc. It does not deal with installation; this is described in the *User Guide* supplied with the system.

More specialised material, which will be of use to software developers, can be found in the companion *Panos Programmer's Reference Manual* which is primarily concerned with the Panos procedure library.

More specifically, the items dealt with in this Guide are as follows:

- the concepts (or user model) that govern the behaviour of Panos
- the organisation and configuration of a Panos system
- the command language for requesting Panos to carry out an action
- the operation of the Panos utilities including the editor and linker.

Panos provides the base for all systems software supplied with Cambridge Series hardware with the exception of BBC Basic.

1.2 Panos Design Objectives

Panos was designed with the following objectives:

- to provide minicomputer user facilities
- to provide microcomputer control over the environment
- to be a specialist single user system
- to be installable and maintainable by the end-user
- to provide support for professionals: both for end-users and programmers
- to be relatively simple, yet extensible
- to be capable of operating on modest configurations
- to take advantage of fast, 32 bit computer power

- to integrate with the BBC Microcomputer hardware and software
- to exploit networking and other communications
- to support high level language programming in many languages
- to permit ease of learning and use

1.3 Conventions in this Manual

The following conventions are observed in this publication:

1. Numbers not in decimal are prefixed by their base, for example 16_1A is decimal 26; -2_1010 is -10 in decimal.
2. Angled brackets refer to a class of objects, for example <device name> means any one device.
3. Square brackets or braces enclose optional items.
4. The term 'BBC Microcomputer' should be extended to include the term 'IO Processor' as used in the Cambridge Workstation, and vice-versa.

1.4 Organisation of this Manual

This manual has been carefully structured to permit its use both as a reference guide, and as a primer. This has been achieved by dividing it into many relatively self-contained sections and sub-sections, ordering these sections for the sequential reader, but providing numerous cross-references for the browser. Some sections contain more specialist material; these may be omitted on first reading.

The manual and its constituent parts have been separated into:

- concepts that define the 'user model'
- organisational and configuration details
- principles of the command language
- feedback to the user (including errors)
- operational ('how to') details.

This structure applies both to the manual as a whole, and to individual chapters where applicable. Thus Chapters 1 to 5 introduce, then describe general concepts, organisation, command language, and feedback for Panos as a whole. Chapters 7,8 and 6 detail operational use of the editor, linker, and remaining utilities respectively. These three chapters are structured to some extent in the same way as the whole, i.e. describe particular concepts, command languages etc.

Before embarking on the operational details it will be helpful to read at least some of the preliminary material.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

2 Concepts

2.1 Introduction

Context

This chapter presents many of the concepts that determine the 'user model' of Panos. They are described in a manner suitable for the end-user rather than for the programmer.

Many of these concepts have an equivalent form for the programmer, and as such are described in the *Panos Programmer's Reference Manual* as follows:

Storage Management	Module Store	Chapter 5
Input and Output	Module IO	Chapter 6
Filing Systems	Module File	Chapter 7
Program Loading	Module Loader	Chapter 8
Condition Handling	Module Handler	Chapter 11
Asynchronous Events	Module Handler	Chapter 12
Global Strings	Module GlobalString	Chapter 13
Program Control	Module Program	Chapter 14

Organisation of this Chapter

This chapter simply describes in turn the conceptual models for the user interface, program control, input and output, filing system, event handling, global variables, and configuration data.

2.2 User Interface Model

The model for interaction with the user is described in this section.

Input/Output, and hence dialogue with the user is based on the notion of streams. There are four such logical streams associated with Panos:

- input stream
- output stream
- control stream
- error stream

The input stream is used for the data being operated on by a program, for example numeric values by a user program, or text prepared for a text formatter.

The output stream is used for the results of a program, for example a table of values from a user program, or formatted text from a text formatter.

The control stream is for input from the user to control the action of a program, for example the response to a prompt, or the name of a program or command to run. Associated with the device for such input is the device used for the output of prompts. By default the control stream uses the screen (vdu) for output, and the keyboard for input.

The error stream is for feedback to the user, i.e. error messages, warnings, or for confirmatory messages to provide reassurance. By default the error stream uses the screen.

Logical streams may be associated with physical streams and hence with actual devices in a number of ways. If the user takes no specific action, the default mappings as indicated above are used. Alternatively, the user may explicitly redirect input or output to a particular device. For example, error messages could be redirected to a printer.

There is no requirement on programs to use logical streams, so many will use direct I/O from or to physical streams instead. However, where appropriate, all the supplied systems software follows the model of interaction as described. Error and Control streams are used by most system programs, input and output streams are however mainly applicable to filter type programs.

Interaction with the user is also governed to some extent by the values of certain system attributes:

- global (environment) variables
- vdu characteristics
- tab settings
- function key bindings
- date and time
- working directories

These attributes have certain default values or may be set by users for the duration of Panos use. They are described in full later.

2.3 Program Control Model

Panos provides support for the execution of programs, both user and system. More specifically it provides a runtime environment for programs, in particular for programs written in high-level languages, and including those written in mixed languages.

Panos supports a procedural model of program execution. This means that programs may call other programs and resume execution on return. This property is capitalised on by the command line interpreter and by the editor.

In addition to the execution of single programs, Panos is also able to obey command sequences, and thus to execute a sequence of programs. This is achieved through the use of command files.

Communication between two programs running sequentially or procedurally may be achieved through the use of global variables.

When a program is invoked from its parent (which typically would be the command line interpreter), its initial environment consists of:

- the logical streams of its parent (see 2.4),
- its own memory,
- the same environment for events as its parent (see 2.6)
- the same global variables as its parent (see 2.7), since these are a shared resource.

For full details see the *Panos Programmer's Reference Manual*.

2.4 I/O System Model

Panos presents its own device and filing system models to the user. These models are currently implemented by lower level BBC Microcomputer mechanisms. For example, Panos files are simply stored and maintained by a filing system such as the DFS (for floppy disc), ADFS (for Winchester or MFM floppy), or NFS (for file server).

The user need not be aware of the lower level implementation except perhaps when transferring BBC Microcomputer files to or from Panos, and to some extent when the underlying filing system imposes certain restrictions.

Panos is able to provide more useful higher level properties than the raw filing system, for example, time-stamping of files, file name extensions, and filing system names forming part of a file specification.

Within Panos, devices and filing systems are treated uniformly wherever possible. For instance, when using the utilities, specifying a device or filing system for output follows the same format.

In this section the Panos I/O model is described. This applies to all devices. The Panos filing system model for devices that maintain directories extends the I/O model, and is described in the next section.

For further details, refer to Chapter 6 of the *Panos Programmer's Reference Manual*.

2.4.1 Streams

Input/output is based upon the concept of streams. An I/O object may be a device or a file, and must be identified by a string (i.e. textual name) with one of the following syntactic forms:

- (a) < device name > :
- (b) < filing system name > : < file name >
- (c) < file name >

The case (upper or lower) of < device name > and < filing system name > is not significant. The actual names of currently supported filing systems and devices are listed in Tables 2-1 and 2-2.

Examples (most showing a file called data-dat) are:

- (a) vdu: screen (visual display unit)
- (b) adfs:\$.data-dat file in root directory on adfs
- (c) data-dat file in current working directory
- (d) dfs:data-dat file on current DFS drive
- (e) dfs::2.data-dat file on DFS drive 2

Note the position of the colon after the filing system or device name. Because the DFS filing system also uses a colon to specify the drive number, in some cases, two colons will need to be used; one for the device, and one for the drive number, as in example (e).

The streams described in this section are physical and refer to actual devices; the logical streams of the Panos model of interaction may be mapped onto physical streams, (see 2.2 and 4.9.1). The logical streams are listed in Table 2-3.

Table 2-1 Filing System Names

DFS	- disc filing system (floppy disc)
ADFS	- advanced disc filing system (Winchester, MFM floppies)
NFS	- network filing system (for Econet file server)

Table 2-2 Physical Devices

vdu:

Refers to the screen (output only) with filtering of control characters. Only ASCII characters (32..126), clear-screen (FF), newline (NL = LF) and carriage-return (CR) are sent to the screen. All others are output as a pair of hexadecimal digits enclosed in square brackets.

rawvdu:

Refers to the screen (for output only) with no filtering. The effect is exactly as defined for VDU codes.

kb:

Refers to the machine's keyboard (input only) with both carriage-return (CR) and line-feed (LF) being read as newline (NL). Input is buffered and line editing (see 4.4) is enabled. Only the printing

characters and line-editing characters are accepted, plus `(ESCAPE)` and `(CTRL) - (D)`. All others are ignored.

rawkb:

Refers to the keyboard (input only) with no translation or filtering of characters. Raw characters are read directly from the keyboard and are not echoed.

bbc:

A combination of `rawvdu`: for output and `rawkb`: for input.

tt:

A combination of `vdu`: for output and `kb`: for input.

RS423:

Refers to the serial line (input or output).

printer:

(or `lp`:) Refers to the printer (output only).

null:

Refers to a 'sink'. Output to this device is discarded. Input from this device appears as if end of file were reached immediately.

Table 2-3 Logical Streams (Special Devices)

Input:	Current Input Stream
Output:	Current Output Stream
Control:	Current Control Stream
Error:	Current Error Stream

2.5 Filing System Model

The Panos filing system model presents a logical filing system to the user. This model is currently implemented partly by Panos directly, and partly by mappings onto more primitive BBC Microcomputer, i.e. physical filing systems. In principle, the user need only know about the Panos model, but see below.

Wherever possible Panos presents a uniform view regardless of the physical filing system, but where there are differences, limitations of the physical system may impose restrictions. There are three possibilities.

Firstly (and usually) the user request is carried out exactly as requested. Secondly, Panos will sometimes be able to make an obvious interpretation, for example, date-stamps have different granularity in different systems, so fractions of a second may need to be rounded. Finally, sometimes there will be restrictions, for example a legal length Panos name will always map onto an ADFS or NFS name, but not onto a DFS name. The user request will be rejected in such a situation.

The Panos filing system model has the following components which are described in detail in the remainder of this section:

- file names
- file name extensions
- time and date stamping
- access rights (permissions)
- hierachical directory structure

Together with size, these determine the file attributes.

2.5.1 File Names

Panos basic file names (with no directory or drive prefix) consist of a base filename plus an extension separated by a hyphen "-". Names may be of any length, although in practice the physical filing system will impose constraints.

Legal characters in names are:

- alphanumeric characters A-Z, a-z, 0-9,
- special characters ! _ /

The characters \$, &, →, , . : and - have special meanings (see below). File names are case (lower/upper) insensitive, that is case is ignored in referring to file names, although files are stored with names in mixed case.