

# **VAX/VMS Accounting Utility Reference Manual**

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This document describes the Accounting Utility for use on VAX processors.

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# ACCOUNTING Contents

	<b>PREFACE</b>	<b>vii</b>
	<b>NEW AND CHANGED FEATURES</b>	<b>ix</b>
	<b>FORMAT</b>	<b>ACC-1</b>
	<b>DESCRIPTION</b>	<b>ACC-2</b>
1	<b>ACCOUNTING OUTPUTS</b>	<b>ACC-2</b>
1.1	<b>Listing Output</b>	<b>ACC-3</b>
1.1.1	Brief Listing Format	ACC-3
1.1.2	Full Listing Format	ACC-3
1.2	<b>Summary Listing Format</b>	<b>ACC-4</b>
1.3	<b>Binary Output</b>	<b>ACC-4</b>
2	<b>ERROR MESSAGES</b>	<b>ACC-5</b>
	<b>COMMAND QUALIFIERS</b>	<b>ACC-6</b>
	/ACCOUNT	ACC-7
	/ADDRESS	ACC-8
	/BEFORE	ACC-9
	/BINARY	ACC-10
	/BRIEF	ACC-11
	/ENTRY	ACC-12
	/FULL	ACC-13
	/IDENT	ACC-14
	/IMAGE	ACC-15
	/JOB	ACC-16
	/LOG	ACC-17
	/NODE	ACC-18

## ACCOUNTING Contents

/OUTPUT	ACC-19
/OWNER	ACC-20
/PRIORITY	ACC-21
/PROCESS	ACC-22
/QUEUE	ACC-23
/REJECTED	ACC-24
/REMOTE_ID	ACC-25
/REPORT	ACC-26
/SINCE	ACC-28
/SORT	ACC-29
/STATUS	ACC-31
/SUMMARY	ACC-32
/TERMINAL	ACC-34
/TITLE	ACC-35
/TYPE	ACC-36
/UIC	ACC-37
/USER	ACC-38
<b>EXAMPLES</b>	<b>ACC-39</b>

<b>SECTION A</b>	<b>SUPPLEMENTAL ACCOUNTING INFORMATION</b>	<b>ACC-43</b>
A.1	FORMAT OF THE ACCOUNTING RECORD	ACC-43
A.2	ACCOUNTING RECORD TYPES	ACC-45
A.3	ACCOUNTING PACKETS	ACC-46
A.3.1	General Format of Accounting Packets	ACC-47
A.3.2	Packet Type ACR\$K_ID (Identification Packet)	ACC-48
A.3.3	Packet Type ACR\$K_RESOURCE (Resource Packet)	ACC-50
A.3.4	Packet Type ACR\$K_IMAGENAME (Image Name Packet)	ACC-51
A.3.5	Packet Type ACR\$K_PRINT (Print Resource Packet)	ACC-52

A.3.6	Packet Type ACR\$K_FILENAME (Filename Packet)	ACC-53
A.3.7	Packet Type ACR\$K_USER_DATA (User Data Packet)	ACC-53

## INDEX

## EXAMPLES

ACC-1	Sample Brief Listing	ACC-3
ACC-2	Sample Full Listing	ACC-3
ACC-3	Sample Summary Output	ACC-4

## FIGURES

ACC-4	Accounting Record Format	ACC-44
ACC-5	Accounting Packet Format	ACC-47
ACC-6	Accounting Packet Header Format	ACC-47
ACC-7	Block Diagram for ACR\$K_ID	ACC-49
ACC-8	Block Diagram for ACR\$K_RESOURCE	ACC-51
ACC-9	Block Diagram for ACR\$K_IMAGENAME	ACC-52
ACC-10	Block Diagram for ACR\$K_PRINT	ACC-52
ACC-11	Block Diagram for ACR\$K_FILENAME	ACC-53
ACC-12	Block Diagram for ACR\$K_USER_DATA	ACC-54

## TABLES

ACC-1	Descriptions of Accounting Record Fields	ACC-44
ACC-2	Descriptions of ACR\$W_TYPE FIELDS	ACC-44
ACC-3	Accounting Record Types	ACC-46
ACC-4	Descriptions of Accounting Packet Header Fields	ACC-48
ACC-5	Descriptions of ACR\$W_TYPE Fields	ACC-48
ACC-6	Field Descriptions for ACR\$K_ID	ACC-49
ACC-7	Field Descriptions for ACR\$K_RESOURCE	ACC-50

## ACCOUNTING Contents

ACC-8	Field Descriptions for ACR\$K_IMAGE_NAME	ACC-52
ACC-9	Field Descriptions for ACR\$K_PRINT	ACC-53
ACC-10	Field Descriptions for ACR\$K_FILENAME	ACC-53
ACC-11	Field Descriptions for ACR\$K_USER_DATA	ACC-54



---

# Preface

---

## Intended Audience

This manual is intended for VAX/VMS system managers, operators, and system programmers.

---

## Structure of This Document

This document is composed of four major sections.

The Format Section is an overview of ACCOUNTING and is intended as a quick reference guide. The format summary contains the DCL command that invokes ACCOUNTING, listing all qualifiers and keywords. The usage summary describes how to invoke and exit from ACCOUNTING, how to direct output, and any restrictions you should be aware of.

The Description Section explains how to use ACCOUNTING.

The Qualifier Section describes each DCL command qualifier. Qualifiers appear in alphabetical order.

The Examples Section contains examples of common operations that you perform with ACCOUNTING.

The Supplemental Information Section describes the format of the data records written to the accounting log file.

---

## Associated Documents

For additional information on the topics covered in this document, refer to the *VAX/VMS DCL Dictionary* and the *Guide to VAX/VMS System Management and Daily Operations*.

---

## Conventions Used in This Document

Convention	Meaning
<code>RET</code>	A symbol with a one- to three-character abbreviation indicates that you press a key on the terminal, for example, <code>RET</code> .
<code>CTRL/x</code>	The phrase CTRL/x indicates that you must press the key labeled CTRL while you simultaneously press another key, for example, CTRL/C, CTRL/Y, CTRL/O.
<code>\$ SHOW TIME</code> <code>05-JUN-1985 11:55:22</code>	Command examples show all output lines or prompting characters that the system prints or displays in black letters. All user-entered commands are shown in red letters.

## Preface

Convention	Meaning
\$ TYPE MYFILE.DAT . . .	Vertical series of periods, or ellipsis, mean either that not all the data that the system would display in response to the particular command is shown or that not all the data a user would enter is shown.
file-spec,...	Horizontal ellipsis indicates that additional parameters, values, or information can be entered.
[logical-name]	Square brackets indicate that the enclosed item is optional. (Square brackets are not, however, optional in the syntax of a directory name in a file specification or in the syntax of a substring specification in an assignment statement.)
quotation marks apostrophes	The term quotation marks is used to refer to double quotation marks ("). The term apostrophe (') is used to refer to a single quotation mark.



---

## **New and Changed Features**

There are no technical changes in the Accounting Utility for Version 4.0.



ACCOUNTING

The Accounting Utility (ACCOUNTING) processes system accounting files. It uses the data in accounting files to produce reports and summaries of system usage.

FORMAT

ACCOUNTING [file-spec[,...]]

Command Qualifiers	Defaults
/[NO]ACCOUNT=[{"-",},account-name[,...]]	/NOACCOUNT
/[NO]ADDRESS=[{"-",},node-address[,...]]	/NOADDRESS
/BEFORE=[time]	See text.
/[NO]BINARY	/NOBINARY
/[NO]BRIEF	/BRIEF
/[NO]ENTRY=[{"-",},queue-entry[,...]]	/NOENTRY
/[NO]FULL	/NOFULL
/[NO]IDENT=[{"-",},process-id[,...]]	/NOIDENT
/[NO]IMAGE=[{"-",},image-name[,...]]	/NOIMAGE
/[NO]JOB=[{"-",},job-name[,...]]	/NOJOB
/[NO]LOG	/NOLOG
/[NO]NODE=[{"-",},node-name[,...]]	/NONODE
/[NO]OUTPUT=[file-spec]	/OUTPUT=SYS\$OUTPUT
/[NO]OWNER=[{"-",},owner-process-id[,...]]	/NOOWNER
/[NO]PRIORITY=[{"-",},priority[,...]]	/NOPRIORITY
/[NO]PROCESS=[{"-",},process-type[,...]]	/NOPROCESS
/[NO]QUEUE=[{"-",},queue-name[,...]]	/NOQUEUE
/[NO]REJECTED=[file-spec]	/NOREJECTED
/[NO]REMOTE_ID=[{"-",},remote-id[,...]]	/NOREMOTE_ID
/[NO]REPORT=[report-item[,...]]	/NOREPORT
/[NO]SINCE=[time]	/NOSINCE
/[NO]SORT=[{"-",},sort-item[,...]]	/NOSORT
/[NO]STATUS=[{"-",},exit-status[,...]]	/NOSTATUS
/[NO]SUMMARY=[summary-item[,...]]	/NOSUMMARY
/[NO]TERMINAL=[{"-",},terminal-name[,...]]	/NOTERMINAL
/[NO]TITLE=title	/NOTITLE
/[NO]TYPE=[{"-",},record-type[,...]]	/NOTYPE
/[NO]UIC=[{"-",},uic[,...]]	/NOUIC
/[NO]USER=[{"-",},user-name[,...]]	/NOUSER

Command Parameter

file-spec[,...]

Specifies one or more accounting files as input to be processed by ACCOUNTING. If you specify more than one file name, separate them with commas. If you omit the file-spec parameter, data is processed from the current accounting file, SYS\$MANAGER:ACCOUNTING.DAT.

Wild card characters are allowed in the file specification.

usage summary

Invoking

The following DCL command invokes the utility:

\$ ACCOUNTING [file-spec[,...]]

# ACCOUNTING

## Description

### Exiting

Generally, each ACCOUNTING request runs until it completes. However, you can press CTRL/Y and type EXIT to terminate ACCOUNTING earlier. Pressing CTRL/Y and typing EXIT terminates ACCOUNTING under normal conditions, ensuring that all files are handled properly.

### Directing Output

You can direct ACCOUNTING output to any supported terminal device or to a disk or tape file by specifying the /OUTPUT qualifier.

### Privileges/Restrictions

Use of ACCOUNTING requires read access to the input accounting file.

---

## DESCRIPTION

The Accounting Utility (ACCOUNTING) uses the data in one or more previously recorded copies of the system's accounting file to produce new files or reports. You can use the accounting reports as system management tools to learn more about how the system is used, how it performs, and in some cases, how particular individuals use the system. The reports can also provide a means of billing users for system resources.

The Accounting Utility processes data by selection and/or sorting to produce four forms of optional output:

- A brief listing of selected records
- A full listing of selected records
- A binary copy of selected and/or rejected records
- A summary report of selected items from selected records

These forms of output can be directed to a terminal for display or to a disk or tape file.

You can select records based on fields in the records and their values. A large number of qualifiers define the field names for selection. Every time you select records, you create a group of one or more unselected records that you can optionally store in a binary output file with the /REJECTED qualifier. For brief or full reports, you can also sort the records prior to listing them.

ACCOUNTING processes accounting log data by reading the currently open accounting file on a running system or by receiving as input a previously recorded accounting file. All input data must be in binary format. For a complete description of the accounting log record formats, refer to the Supplemental ACCOUNTING Information Section.

## 1

---

## Accounting Outputs

The Accounting Utility can produce combinations of output for any single ACCOUNTING request. The basic forms of output are listing and binary output.

By default, the output is directed to SYS\$OUTPUT. However, you can specify an output file with the /OUTPUT qualifier. You can further specify whether the output should be in binary or ASCII format with the /BINARY qualifier. If you specify /BINARY, a binary accounting file is produced that can later be processed with other accounting commands. However, if you specify /FULL or /SUMMARY, or assume the default (/BRIEF), an ASCII file is

produced, containing statistics for all requested data over the duration of the ACCOUNTING request.

## 1.1 Listing Output

There are three basic output formats used for displaying data: the brief listing, the full listing, and the summarization report. These formats are described in the following sections, with a sample of each.

### 1.1.1 Brief Listing Format

The brief listing format provides one line for each record in the accounting file being processed. As shown in Example ACC-1, the output always includes the date and time, the type of record, the subtype, the username, the PROCESS ID, the source, and the status.

#### Example ACC-1 Sample Brief Listing

Date / Time	Type	Subtype	Username	ID	Source	Status
15-APR-1984 11:26:21	LOGFAIL		login	000C0019	TTF6:	00D38064
15-APR-1984 11:26:53	PROCESS	SUBPROCESS	BROSE	000A001D		00000001
15-APR-1984 11:27:33	PROCESS	NETWORK	NETNONPRIV	000B0016	AURA	10031230
15-APR-1984 11:27:58	PROCESS	INTERACTIVE	BBLACK	00040028	TTD3:	10000001
15-APR-1984 11:36:33	PROCESS	SUBPROCESS	JBROWN	00080028		10B90001
15-APR-1984 11:36:44	PRINT		JBROWN	00030010		00040001
15-APR-1984 11:37:34	PROCESS	DETACHED	ERUST	000B001D		00000000
15-APR-1984 11:38:24	PROCESS	INTERACTIVE	ERUST	00020039	TTB7:	00000001
15-APR-1984 11:39:43	PROCESS	NETWORK	NETNONPRIV	000C001D	R2ME2	10031230

### 1.1.2 Full Listing Format

The full listing format provides all the data for each record in the accounting file being processed. There are small variations in the record formats, based on the presence or absence of data in the record. Example ACC-2 presents a fairly typical single accounting record in the full format.

#### Example ACC-2 Sample Full Listing

##### INTERACTIVE Process Termination

Username:	BBLACK	Finish time:	23-MAR-1982 14:19:50.10
Account:	PERF	Start time:	23-MAR-1982 14:15:15.40
UIC:	[011,161]	Elapsed time:	0 00:04:34.70
Process ID:	0038001B	Processor time:	0 00:00:48.27
Owner ID:		Priority:	4
Terminal name:	RTA1:	Privilege 31-00:	0014C001
Remote node addr:	224	Privilege 63-32:	00000000
Remote node name:	AURA	Queue entry:	
Remote ID:	00150027	Queue name:	
Final status code:	00000001	Job name:	
Final status text:	%SYSTEM-S-NORMAL, normal successful completion		
Page faults:	7465	Direct IO:	1077
Page fault reads:	245	Buffered IO:	294
Peak working set:	719	Volumes mounted:	0
Peak page file:	1224	Images executed:	16



# ACCOUNTING

## Description

### 1.2 Summary Listing Format

Summary output is an ASCII file consisting of the specified report-item values grouped by the specified summary-items. The summary file reflects the accumulation throughout the ACCOUNTING period requested. The statistics in the summary output are either totals or maximum values encountered. (See the /REPORT qualifier for details.)

The summary output format includes the dates of the accounting period on the first line. The beginning date appears at the left, optionally followed by the title specified with the /TITLE qualifier. The ending date for the report appears at the right margin.

Example ACC-3 illustrates a summary output for the following command:

```
$ ACCOUNTING/SUMMARY=(ACCOUNT,USER) -  
$_/REPORT=(RECORDS,ELAPSES,PROCESSOR)
```

#### Example ACC-3 Sample Summary Output

---

From: 15-APR-1984 16:33		To: 23-APR-1984 14:18			
Account	Username	Total Records	Elapsed Time	Processor Time	
ADMIN	JFUSCIA	128	5 19:43:47.22	0	10:03:58.09
ADMIN	JGREEN	56	0 23:14:23.01	0	00:14:55.17
DECMail	POSTOFFICE	2	0 00:04:01.10	0	00:00:02.89
DECNET	NETMGR	1	0 00:01:31.17	0	00:00:02.81
DECNET	NETNONPRIV	2443	2 09:01:15.10	0	01:09:42.61
DECNET	NETPRIV	24	0 00:09:16.72	0	00:00:38.29
FIELD	FIELD	31	0 05:18:16.50	0	00:09:41.59
MANUF	BBLACK	37	1 02:38:45.03	0	02:23:35.42
MANUF	JBROWN	227	4 04:35:07.25	0	04:30:40.60
OPERATNS	OPERATOR	47	1 02:36:32.21	0	01:14:02.66
SALES	BROSE	87	3 01:24:29.01	0	02:07:41.71
SALES	RCORAL	31	2 14:07:14.36	0	00:17:27.38
SALES	RGRAY	116	2 15:41:44.62	0	01:38:22.01
SALES	TBLUE	30	2 13:52:43.64	0	00:10:27.69
SYSTEM	SYSTEM	215	7 00:48:18.81	0	00:48:40.20

---

### 1.3 Binary Output

A binary output file is itself a VAX/VMS accounting file that is created when an ACCOUNTING request includes the /BINARY or /REJECTED qualifier. This file contains a set of the accounting records from the input (source) accounting files. The set of records included depends on the selection criteria. All resulting files can be used as source files by later accounting requests to format and display the data, to create a summary file, or to record a new binary file with different selection criteria.

With the /BINARY qualifier, all records that match the selection criteria are written to the binary output file.

With the /REJECTED qualifier, only those records not being selected are directed to this file.

A complete description of the ACCOUNTING file record formats appears in the Supplemental ACCOUNTING Information Section.



### Notes

- 1 **Disk space**—When output from the Accounting Utility is directed to a file, it is possible to consume large quantities of disk space in a short period of time. In particular, if disk quota is exceeded during execution of an ACCOUNTING request, open files are closed and the request is terminated prematurely. To avoid this situation, carefully plan recording requests by estimating the amount of disk space required.
- 2 **Processing time**—The size of the file being processed and the type of processing being done (for example, sorting) can require significant processing time, which may be particularly noticeable on heavily loaded systems. If this becomes a problem, you may want to run accounting jobs in batch mode.

## 2

---

### Error Messages

The *VAX/VMS System Messages and Recovery Procedures Reference Manual* lists the messages generated by ACCOUNTING and provides explanations and suggested user actions.

# ACCOUNTING

## Command Qualifiers

---

### COMMAND QUALIFIERS

This section explains ACCOUNTING qualifiers and provides examples of their use. The qualifiers follow the standard rules of DCL grammar, as specified in the *VAX/VMS DCL Dictionary*. Thus, you can abbreviate any qualifier or keyword as long as the abbreviation is not ambiguous. The asterisk and the percent sign characters can be used as wildcard characters.

Some qualifiers accept a list of keywords. If the first keyword in the list is a minus sign enclosed in quotation marks "-", all records are selected except those matching any account-name in the list.

---

## /ACCOUNT

Controls whether only those records matching the specified account-name are selected. If you omit the qualifier or specify /NOACCOUNT, the account-name is not used to select records.

---

### FORMAT

**/ACCOUNT**=(["-"],*account-name*[...])  
**/NOACCOUNT**

### qualifier keywords

"\_"

Specifies that all records are selected except those matching any specified account-name.

***account-name***[...]

Specifies the account name used to select records. The account-name matches the account-name as specified in the user authorization file.

When you specify the /ACCOUNT qualifier, you must specify at least one account-name. If you specify more than one account-name, separate them with commas and enclose the list in parentheses.

---

### EXAMPLES

1   \$ ACCOUNTING /ACCOUNT=(MISHA,MARCO)

The command in this example selects records matching the accounts MISHA and MARCO.

2   \$ ACCOUNTING /ACCOUNT=("-",MARCO)

The command in this example selects records for all accounts except MARCO.

# ACCOUNTING

/ADDRESS

---

## /ADDRESS

Controls whether only those records matching the specified remote node-address are selected. If you omit the qualifier or specify /NOADDRESS, the node-address is not used to select records.

---

### FORMAT

**/ADDRESS=**(["-"],*node-address*[,...])  
**/NOADDRESS**

---

### qualifier keywords

**"\_"**

Specifies that all records are selected except those matching any specified node address.

***node-address*[,...]**

Specifies the node-address used to select records. The node-address is a unique numeric identifier for DECnet nodes.

When you specify the /ADDRESS qualifier, you must specify at least one node-address. If you specify more than one node-address, separate them with commas and enclose the list in parentheses.

---

## /BEFORE

Controls whether only those records dated earlier than the specified time are selected. If you specify /BEFORE without the time or omit the qualifier, the current date and time are used by default.

---

### FORMAT

/BEFORE[=*time*]  
/NOBEFORE

---

### qualifier keyword

#### *time*

Specifies the time used to select records. Records dated earlier than the specified time are selected. You can specify an absolute time, delta time, or a combination of the two. Observe the syntax rules for date and time described in the *VAX/VMS DCL Dictionary*.

---

### EXAMPLE

\$ ACCOUNTING /BEFORE=5-MAR-1984

The command in this example selects all records dated earlier than March 5, 1984.

# ACCOUNTING

/BINARY

---

## /BINARY

Controls whether output is a binary accounting file.

---

### FORMAT

/[NO]BINARY

---

### qualifier keywords

*None.*

---

### DESCRIPTION

When /BINARY is specified, the output file, specified using the /OUTPUT qualifier, contains image copies of the selected input records. If you specify /NOBINARY or omit the qualifier, the output file contains formatted ASCII records.

The /BINARY /BRIEF, /FULL, and /SUMMARY qualifiers cannot be used in combination with each other.

---

### EXAMPLE

\$ ACCOUNTING/BINARY/OUTPUT=MYACC.DAT

The command in this example writes accounting data in binary format to the file MYACC.DAT.



/BRIEF

Controls whether a brief format is used in ASCII displays.

FORMAT

/[NO]BRIEF

qualifier  
keywords

None.

DESCRIPTION

By default, records are displayed in the brief format. You must specify /FULL to have the full contents of each selected record displayed.

The /BINARY /BRIEF, /FULL, and /SUMMARY qualifiers cannot be used in combination with each other.

EXAMPLE

\$ ACCOUNTING /OUTPUT=MYACC.DAT

The command in this example displays the brief contents of each selected record. See Example ACC-1 for a sample BRIEF display.

# ACCOUNTING

/ENTRY

---

## /ENTRY

Controls whether only those records matching the specified queue-entry number are selected. If you specify /NOENTRY or omit the qualifier, the queue entry is not used to select records.

---

### FORMAT

**/ENTRY=**(["-"],*queue-entry*[,...])  
**/NOENTRY**

### qualifier keywords

---

**"\_"**

Specifies that all records are selected except those matching any specified queue entry.

***queue-entry*[,...]**

Specifies the queue-entry identifier used to select records. The queue entry is a unique numeric identifier assigned to entries in device and batch queues.

When you specify the /ENTRY qualifier, you must specify at least one queue entry. If you specify more than one queue entry, separate them with commas and enclose the list in parentheses.

---

### EXAMPLES

**1**    \$ ACCOUNTING /ENTRY=(211,212,213)

The command in this example selects accounting records that match the queue-entry numbers specified in the list.

**2**    \$ ACCOUNTING /ENTRY=("-",25)

The command in this example selects records for all queue-entries except number 25.

---

/FULL

Controls whether a full format is used in ASCII displays. If you specify /NOFULL or omit the qualifier, records are displayed in the brief format.

---

FORMAT	/[NO]FULL
--------	-----------

---

qualifier keywords	None.
-----------------------	-------

---

**DESCRIPTION** By default, records are displayed in the brief format. You must specify /FULL to have the full contents of each selected record displayed.

The /BINARY /BRIEF, /FULL, and /SUMMARY qualifiers cannot be used in combination with each other.

---

EXAMPLE

\$ ACCOUNTING /FULL

The command in this example displays the full contents of each selected record. See Example ACC-2 for a sample FULL display.

# ACCOUNTING

/IDENT

---

## /IDENT

Controls whether only those records matching the specified process-id are selected. If you specify /NOIDENT or omit the qualifier, the process-id is not used to select records.

---

### FORMAT

**/IDENT=**(["-"],*process-id*[,...])  
**/NOIDENT**

---

### qualifier keywords

**"\_"**

Specifies that all records are selected except those matching the specified process-id.

***process-id***[,...]

Specifies the process-id used to select records. When you specify /IDENT, you must specify at least one process-id. If you specify more than one process-id, separate them with commas and enclose the list in parentheses.

---

## EXAMPLES

**1**    \$ ACCOUNTING /IDENT=(25634,045A6B)

The command in this example selects records matching the process-ids specified.

**2**    \$ ACCOUNTING /IDENT=("-",2B758)

The command in this example selects all records except those matching the specified process-id.

/IMAGE

Controls whether only those records matching the specified image-name are selected. If you specify /NOIMAGE or omit the qualifier, the image-name is not used to select records.

FORMAT

/IMAGE=([*"-"*,]*image-name*[...])

/NOIMAGE

qualifier  
keywords

*"\_"*

Specifies that all records are selected except those that match the specified image-name.

*image-name*[...]

Specifies the image-name used to select records. Specify only the filename portion of the image file specification, such as EDT.

When you specify /IMAGE, you must specify at least one image-name. If you specify more than one image-name, separate them with commas and enclose the list in parentheses.

EXAMPLES

1

\$ ACCOUNTING /IMAGE=SYSGEN

The command in this example selects all records that match the specified image-name SYSGEN.

2

\$ ACCOUNTING /IMAGE=("-",SYSGEN)

The command in this example selects records for all images except SYSGEN.

# ACCOUNTING

/JOB

---

## /JOB

Controls whether only those records matching the specified job-name are selected. A job-name is assigned to an entry in a device or batch queue. If you specify /NOJOB or omit the qualifier, the job-name is not used to select records.

---

### FORMAT

**/JOB=**(["-"],*job-name*[...])  
**/NOJOB**

### qualifier keywords

---

**"\_"**

Specifies that all records are selected except those matching any specified job-name.

***job-name*[...]**

Specifies the job-name used to select records. When you specify /JOB, you must specify at least one job-name. If you specify more than one job-name, separate them with commas and enclose the list in parentheses.

---

### EXAMPLES

**1**    \$ ACCOUNTING /JOB=(MYJOB1,MYJOB2)

The command in this example selects all records that match the job-names MYJOB1 and MYJOB2.

**2**    \$ ACCOUNTING /JOB=("-",MYJOB1,MYJOB2)

The command in this example selects all records except those that match MYJOB1 and MYJOB2.



---

**/LOG**

Controls whether informational messages (input filenames, selected record counts, rejected record counts) are displayed to SYS\$OUTPUT.

---

**FORMAT****/[NO]LOG**

---

**qualifier  
keywords***None.*

---

**DESCRIPTION**

By default, messages are not displayed. If more than one input file is specified in an ACCOUNTING command with the /LOG qualifier, there is one logging message for each file, and a total is provided.

---

**EXAMPLE**

\$ ACCOUNTING /LOG

Date / Time	Type	Subtype	Username	ID	Source	Status
15-APR-1984 13:42:44	FILE			00000000		00000000
15-APR-1984 13:53:29	PROCESS	BATCH	SYSTEM	20800116		10030001
15-APR-1984 13:53:38	SYSINIT		SYSTEM	20800104		107781AB
15-APR-1984 13:54:43	LOGFAIL		LOGIN, Login Processor		2080011D VTA4:	10D38064
15-APR-1984 13:58:04	PROCESS	INTERACTIVE	MATTHEWS	20800128	TTF5:	00000001
15-APR-1984 14:10:29	PROCESS	NETWORK	ROBIN_NET	20800132	AXEL	10000004
15-APR-1984 14:28:56	PROCESS	SUBPROCESS	SMITH	2080013E		10000001
15-APR-1984 14:33:31	PRINT		JONES	21400117		00040001

%ACC-I-INPUT, SYS\$SYSROOT:[SYSMGR]ACCOUNTING.DAT;1, 33 selected, 0 rejected

The command in this example displays accounting records along with any informational messages such as selected record counts and rejected record counts.

# ACCOUNTING

/NODE

---

## /NODE

Controls whether only those records matching the specified remote DECnet node-name are selected. If you specify /NONODE or omit the qualifier, the node-name is not used to select records.

---

### FORMAT

**/NODE=**(["-"],*node-name*[,...])  
**/NONODE**

### qualifier keywords

---

**"\_"**

Specifies that all records are selected except those matching any specified remote node-name.

***node-name*[,...]**

Specifies the remote node-name used to select records. Colons (:) are not allowed in the node-name specification, so you would select the records for a node such as AURA with /NODE=AURA.

When you specify /NODE, you must specify at least one node-name. If you specify more than one node-name, separate them with commas and enclose the list in parentheses.

---

### EXAMPLES

❶ \$ ACCOUNTING /NODE=NOROT

The command in this example selects records for the remote node-name NOROT.

❷ \$ ACCOUNTING /NODE=("-",NOROT,ROBERT,SEESHA)

The command in this example selects records for all remote node-names except those named in the list.

---

## /OUTPUT

Specifies where to direct accounting output. If you omit the qualifier, selected records are output to SYS\$OUTPUT.

---

### FORMAT

*/OUTPUT[=*file-spec*]*  
*/NOOUTPUT*

---

### qualifier keyword

***file-spec[,...]***

Specifies the name of the file that is to contain the selected records.

If you omit the device or directory specification, the current device and default directory are used. If you omit the file name, then the file name of the input file is used. If you omit the file type and the output is ASCII (/NOBINARY), the default file type is LIS. If you omit the file type and the output is binary (/BINARY), the default file type is DAT.

---

### EXAMPLES

**1**    \$ ACCOUNTING/BINARY/OUTPUT=STAT.DAT

The command in this example selects accounting records and outputs them in binary to the file STAT.DAT.

**2**    \$ ACCOUNTING /OUTPUT=STAT

The command in this example selects accounting records and outputs them in brief ASCII format to the file STAT.LIS. Notice that the default file type for ASCII output is LIS.

# ACCOUNTING

/OWNER

---

## /OWNER

Controls whether only those records matching the specified owner-process-id are selected. If you specify /NOOWNER or omit the qualifier, the owner-process-id is not used to select records.

---

### FORMAT

*/OWNER=([ " - " ,]owner-process-id[,...])*  
**/NOOWNER**

### qualifier keywords

---

**"\_"**

Specifies that all records are selected except those matching any specified owner-process-id.

### ***owner-process-id[,...]***

Specifies the owner process identification number used to select records. Owner-process-ids are only present in subprocesses to specify the process-id of their owner process.

When you specify /OWNER, you must specify at least one owner-process-id. If you specify more than one, separate them with commas and enclose the list in parentheses.

/PRIORITY

Controls whether only those records matching the specified base process priority are selected. If you specify /NOPRIORITY or omit the qualifier, the priority is not used to select records.

FORMAT

/PRIORITY=(["-"],priority[,...])

/NOPRIORITY

qualifier  
keywords

"\_"

Specifies that all records are selected except those matching any specified base process priority.

priority[,...]

Specifies the process base priority used to select records.

When you specify /PRIORITY, you must specify at least one priority. If you specify more than one priority, separate them with commas and enclose the list in parentheses.

EXAMPLES

- 1

\$ ACCOUNTING /PRIORITY=3

The command in this example selects records that match a base priority of 3.
- 2

\$ ACCOUNTING /PRIORITY=("-",3)

The command in this example selects all records except those that match a base priority of 3.

# ACCOUNTING

## /PROCESS

---

## /PROCESS

Controls whether only those process-termination records matching the specified process-type are selected. If you specify /NOPROCESS or omit the qualifier, the process-type is not used to select records.

---

### FORMAT

**/PROCESS=**(["-"],*process-type*[,...])  
**/NOPROCESS**

### qualifier keywords

**"\_"**

Specifies that all records are selected except those matching any specified process-type.

***process-type*[,...]**

Specifies the process-type used to select records.

When you specify /PROCESS, you must specify at least one process-type. If you specify more than one process-type, separate them with commas and enclose the list in parentheses.

You can specify any of the following process-types:

Keyword	Meaning
BATCH	Batch process
DETACHED	Detached process
INTERACTIVE	Interactive process
NETWORK	Network processs
SUBPROCESS	Subprocess

---

## EXAMPLES

**1**    \$ ACCOUNTING /PROCESS=INTERACTIVE

The command in this example selects records that match the process-type INTERACTIVE.

**2**    \$ ACCOUNTING /PROCESS=("-", INTERACTIVE, DETACHED)

The command in this example selects all records except those that match the process-types INTERACTIVE or DETACHED.



/QUEUE

Controls whether only those records matching the specified queue-name are selected. If you specify /NOQUEUE or omit the qualifier, the queue-name is not used to select records.

FORMAT

/QUEUE=([ " - " , ]queue-name[,...])

/NOQUEUE

qualifier  
keywords

"\_"

Specifies that all records are selected except those matching any specified queue-name.

queue-name[,...]

Specifies the queue-name used to select records. A queue-name is a unique identifier for a device or batch queue.

When you specify /QUEUE, you must specify at least one queue-name. If you specify more than one queue-name, separate them with commas and enclose the list in parentheses.

# ACCOUNTING

/REJECTED

---

## /REJECTED

Controls whether records that do not match the selection criteria are output to a specified file. Unselected records are always in binary format. If you specify /NOREJECTED or omit the qualifier, unselected records are not output.

---

### FORMAT

**/REJECTED[=*file-spec*]  
/NOREJECTED**

---

### qualifier keyword

#### ***file-spec***

Specifies the name of the file to contain unselected records. If you omit the device or directory specification, the current device and default directory are used. If you omit the filename, then the filename of the input file is used. If you omit the file type, REJ is used.

---

### EXAMPLE

\$ ACCOUNTING /REJECTED=ACCOUNTING

The command in this example outputs all unselected records to the file ACCOUNTING.REJ. Notice that the default file type is REJ.

---

## /REMOTE\_ID

Controls whether only those records matching the specified remote-id are selected. The remote-id identifies the process or user on a remote node. If you specify /REMOTE\_ID or omit the qualifier, the remote-id is not used to select records.

---

### FORMAT

**/REMOTE\_ID=([*"*"-*"*],remote-id[,...])**  
**/NOREMOTE\_ID**

---

### qualifier keywords

***"\_"***

Specifies that all records are selected except those matching any specified remote-id.

### ***remote-id***

Specifies the remote process identification code used to select records. The exact format of a remote-id varies with the context and DECnet implementation. For VAX/VMS systems, the remote-id is always the username.

When you specify /REMOTE\_ID, you must specify at least one remote-id. If you specify more than one remote-id, separate them with commas and enclose the list in parentheses.

---

### EXAMPLE

**\$ ACCOUNTING /REMOTE\_ID=ROBIN**

The command in this example requests accounting information for the remote user ROBIN.

# ACCOUNTING

## /REPORT

---

## /REPORT

Controls whether a specified item is included in a summary report. One column is generated on the summarization report for each item specified. Items are summarized either as totals or maximum values. The /REPORT qualifier requires the /SUMMARY qualifier. (See the description of the /SUMMARY qualifier.)

---

### FORMAT

**/REPORT**[(*report-item*[,...])] ]  
**/NOREPORT**

### qualifier keyword

***report-item*[,...]**

Specifies the report-item used to select records.

You can specify any of the following items:

Keyword	Meaning	How Summarized
BUFFERED_IO	Buffered IOs	Total
DIRECT_IO	Direct IOs	Total
ELAPSED	Elapsed time	Total
EXECUTION	Image execution count	Total
FAULTS	Page faults	Total
GETS	VAX RMS gets	Total
PAGE_FILE	Page file usage	Maximum
PAGE_READS	Page read IOs	Total
PAGES	Pages printed	Total
PROCESSOR	Processor time consumed	Total
QIOS	QIOs issued	Total
RECORDS	Records in file (default)	Total
VOLUMES	Volumes mounted	Total
WORKING_SET	Working set size	Maximum

If you specify more than one report-item, separate them with commas and enclose the list in parentheses.

The columns on the summarization report appear in the same left-to-right sequence as given in the list of report-items.

---

### DESCRIPTION

If you specify /REPORT without a value (or if you specify /SUMMARY and do not specify /REPORT), then /REPORT=RECORDS is assumed.

To obtain a summary by image (when image accounting is enabled) showing the number of times individual images were executed, specify /SUMMARY=IMAGE/REPORT=RECORDS (not /REPORT=EXECUTION). These qualifiers will display the total number of termination records for each image.

Many report-items are present in only a few types of accounting records. If records are selected that do not contain a report value that has been requested, a default value, usually 0, is used.

---

## EXAMPLES

**1**    \$ ACCOUNTING /SUMMARY/REPORT=(DIRECT\_IO,BUFFERED\_IO)

The command in this example produces a summary report of direct I/O and buffered I/O records.

**2**    \$ ACCOUNTING /SUMMARY=IMAGE /REPORT=RECORDS

The command in this example produces a summary, by image name, of image terminations, along with the total number of image termination records for each image.

# ACCOUNTING

/SINCE

---

## /SINCE

Controls whether only those records dated later than a specified time are selected. If you specify /NOSINCE or omit the qualifier, no time is used to select records.

---

### FORMAT

/SINCE[=*time*]  
/NOSINCE

---

### qualifier keyword

#### *time*

Specifies the time used to select records. Records dated later than the specified time are selected. You can specify an absolute time, delta time, or a combination of the two. Observe the syntax rules for date and time described in the *VAX/VMS DCL Dictionary*.

If you specify /SINCE without the time, midnight of the current day is used.

---

### EXAMPLE

\$ ACCOUNTING /SINCE=15-APR-1984

The command in this example selects records dated later than April 15, 1984.



---

## /SORT

Specifies the sequence of the records in the brief or full listing. THE /SORT qualifier may be used with the /BINARY, /BRIEF, and /FULL qualifiers, but not with /SUMMARY.

---

### FORMAT

**/SORT**[(**[-**]*sort-item*[,...])] **/NOSORT**

---

### qualifier keywords

—

Specifies that the sort field is used as a descending key. By default the sequence is the same as that of the input files.

### *sort-item*[,...]

Specifies the sort-item used to select records.

At least one sort-item must be specified. If you specify more than one sort-item, separate them with commas and enclose the list in parentheses.

You can specify any of the following sort-items:

Keyword	Meaning
ACCOUNT	User's account name
ADDRESS	Remote node address
BUFFERED_IO	Buffered IO count
DIRECT_IO	Direct IO count
ELAPSED	Elapsed time
ENTRY	Number of batch or print job queue entry
EXECUTION	Image execution count
FAULTS	Page faults
FINISHED	Termination time or time record was written
GETS	Number of gets from the file to be printed
IDENT	Process identification
IMAGE	Image name
JOB	Name of batch or print job
NODE	Remote node name
OWNER	Owner process identification
PAGES	Number of pages printed
PAGE_FILE	Peak page file usage
PAGE_READS	Page read IOs
PRIORITY	Process base priority
PROCESS	Process type
PROCESSOR	Processor time

# ACCOUNTING

## /SORT

Keyword	Meaning
QIOS	Number of QIOs to the printer
QUEUE	Name of queue
QUEUED	Time batch or print job was queued
STARTED	Start time
TERMINAL	Terminal name
TYPE	Record type
UIC	User identification code
USER	User's name
VOLUMES	Number of volumes mounted
WORKING_SET	Peak working set size

### DESCRIPTION

If a sort-item is preceded by a minus sign (-), then that field is used as a descending key. By default keys are assumed to be ascending.

The selected records are sorted according to the sequence specified by the sort-items given with the /SORT qualifier prior to writing them to the designated output file. Unselected records are not sorted. The ordering of sort-items in the qualifier value list determines the relative ranking of the keys.

Note that if a sort-item specifies a field that is not present in a record, that record becomes unselected and will be reflected as such in the counts of selected and rejected records. For example, /SORT=IMAGE would cause non-image termination records to be excluded, since image termination records are the only record types that contain image names. Or, /SORT=PAGES would exclude nonprint termination records.

### EXAMPLE

```
$ ACCOUNTING /SORT=(PROCESS,FAULTS,IMAGE)
```

The command in this example sorts the selected records in the sequence specified by the /SORT qualifier.

---

## **/STATUS**

Controls whether only those records matching the specified exit-status are selected. The exit-status refers to the final completion status of the process or image. If you specify /NOSTATUS or omit the qualifier, the exit-status is not used to select records.

---

### **FORMAT**

**/STATUS=**(["-"],*exit-status*[,...])  
**/NOSTATUS**

### **qualifier keywords**

---

**"-"**

Specifies that all records are selected except those matching any specified exit-status.

***exit-status*[,...]**

Specifies the exit-status used to selected records.

When you specify /STATUS, you must specify at least one exit-status. If you specify more than one exit-status, separate them with commas and enclose the list in parentheses.

# ACCOUNTING

## /SUMMARY

---

## /SUMMARY

Specifies that a summary of the selected records, grouped by the list of summary keys, be produced. Use the /REPORT qualifier to control what information is summarized. If you omit the /REPORT qualifier, then /REPORT=RECORDS is assumed. The /SUMMARY qualifier is required with the /REPORT qualifier.

If you specify /NOSUMMARY or omit the qualifier, no summarization occurs.

---

### FORMAT

**/SUMMARY**[(*summary-item*[,...])] **/NOSUMMARY**

### qualifier keyword

***summary-item*[,...]**

Specifies the summary-item used to select records. You can specify any of the following summary-items:

Keyword	Outputs
ACCOUNT	Account name from the UAF
DATE	YYYY MM DD
DAY	Day of month (1-31)
HOURL	Hour of day (0-23)
IMAGE	Image name
JOB	Name of batch job or print job
MONTH	Month of year (1-12)
NODE	Remote node name
PROCESS	Process type
QUEUE	Batch or device queue name
TERMINAL	Terminal name
TYPE	Type of record (logout, batch)
UIC	User identification code
USER	User name from UAF
WEEKDAY	Day of week (0=Sunday, 1=Monday, and so on)
YEAR	Year

If you specify /SUMMARY without a value, then /SUMMARY=USER is assumed.

If you specify more than one summary-item, separate them with commas and enclose the list in parentheses.

---

### DESCRIPTION

The summarized items are sorted in ascending order and listed in the same left-to-right sequence given in the list of summary-items. The output is sent to SYS\$OUTPUT unless specifically directed elsewhere by the /OUTPUT qualifier.

The /BINARY /BRIEF, /FULL, and /SUMMARY qualifiers cannot be used in combination with each other.

---

### EXAMPLE

\$ ACCOUNTING /SUMMARY=IMAGE

The command in this example generates a summary report of all image records.

# ACCOUNTING

/TERMINAL

---

## /TERMINAL

Controls whether only those records matching the specified terminal-names are selected. Terminal-names are associated with interactive processes. If you specify /NOTERMINAL or omit the qualifier, the terminal-name is not used to select records.

---

### FORMAT

**/TERMINAL=**(["-"]*terminal-name*[,...])  
**/NOTERMINAL**

### qualifier keywords

---

**"-"**

Specifies that all records are selected except those matching any specified terminal-name.

***terminal-name*[,...]**

Specifies the terminal-name used to select records.

When you specify /TERMINAL, you must specify at least one terminal-name. Specify terminal-names as standard device names and include the colon (:), for example, TTA6:.

If you specify more than one terminal-name, separate them with commas and enclose the list in parentheses.

---

### EXAMPLES

**1**    \$ ACCOUNTING /TERMINAL=TTB3:

The command in this example selects records that match the terminal-name TTB3:.

**2**    \$ ACCOUNTING /TERMINAL=("-",TTB3:)

The command in this example selects all records except those that match the terminal-name TTB3:.



---

## /TITLE

Specifies the title to be printed in the center of the first line of summary reports. The title line also includes the beginning and ending times for the data summary at the left and right margins, respectively.

---

### FORMAT

/TITLE=*title*  
/NOTITLE

---

### qualifier keyword

#### *title*

Specifies the title to be printed on the summary report. If the title includes spaces or special characters, you must enclose it in quotation marks ("").

---

### EXAMPLE

\$ ACCOUNTING /SUMMARY=IMAGE/TITLE="JUNE ACCOUNTING REPORT"

The command in this example selects image records for a summary report and writes the title "JUNE ACCOUNTING REPORT" at the top of the report.

# ACCOUNTING

/TYPE

---

## /TYPE

Controls whether only those records matching the specified record-type are selected. If you specify /NOTYPE or omit the qualifier, the record-type is not used to select records.

---

### FORMAT

**/TYPE=([*"*–*"*,]*record-type*[...])**  
**/NOTYPE**

### qualifier keywords

***"*–*"***

Specifies that all records are selected except those matching any specified record-type.

***record-type*[...]**

Specifies the record-type used to select records. You can specify any of the following record types:

Keyword	Meaning
FILE	Accounting file forward and backward pointers
IMAGE	Termination of image
LOGFAIL	Unsuccessful conclusion of a login attempt
PRINT	Termination of print job
PROCESS	Termination of process
SYSINIT	System initialization
UNKNOWN	Any record not recognized as one of the above
USER	Arbitrary user messages

When you specify /TYPE, you must specify at least one record-type. If you specify more than one record-type, separate them with commas and enclose the list in parentheses.

---

## EXAMPLES

**1**    \$ ACCOUNTING /TYPE=PRINT

The command in this example selects records that match the record-type PRINT.

**2**    \$ ACCOUNTING /TYPE=("*"*–*"*,PRINT)

The command in this example selects all records except those that match the record-type PRINT.

---

## **/UIC**

Controls whether only those records matching the specified user identification code (UIC) are selected. If you specify /NOUIC or omit the qualifier, the UIC is not used to select records.

---

### **FORMAT**

**/UIC=([ " - " ,]uic[...])**  
**/NOUIC**

### **qualifier keywords**

---

**"\_"**

Specifies that all records are selected except those matching any specified UIC.

***uic[...]***

Specifies the user identification code (UIC) used to select records.

When you specify /UIC, you must specify at least one UIC. If you specify more than one UIC, separate them with commas and enclose the list in parentheses. You may specify the UIC in numeric or alphanumeric format (see the *VAX/VMS DCL Dictionary*).

---

### **EXAMPLE**

**\$ ACCOUNTING /UIC=[360,\*]**

The command in this example selects records that match UICs having a group number of 360.

# ACCOUNTING

/USER

---

## /USER

Controls whether only those records matching the specified username are selected. The username matches the username in the user authorization file. If you specify /NOUSER or omit the qualifier, the username is not used to select records.

---

### FORMAT

**/USER=(["-",]username[,...])**  
**/NOUSER**

### qualifier keywords

---

**"\_"**

Specifies that all records are selected except those matching any specified username.

**username[,...]**

Specifies the user-name used to select records.

When you specify /USER, you must specify at least one username. If you specify more than one username, separate them with commas and enclose the list in parentheses.

---

### EXAMPLES

**1**    \$ ACCOUNTING /USER=SASHA

The command in this example selects records that match the username SASHA.

**2**    \$ ACCOUNTING /USER=("-" ,SASHA)

The command in this example selects all records except those that match the username SASHA.

### EXAMPLES

#### Listing Accounting Files

The following examples illustrate the listing mode of operation. Use this mode when you want to examine the activity of the system, either on a routine basis, or as part of an installation checkout, tuning, or trouble-shooting exercise. No historical record of output is kept.

**1**    \$ ACCOUNTING

This command produces a display of all accounting records in the current accounting file. Since no command qualifiers have been named, ACCOUNTING applies the following defaults to the command:

- /BRIEF = a brief listing
- input file=SYS\$MANAGER:ACCOUNTNG.DAT
- /OUTPUT = SYS\$OUTPUT

By default, listing begins when the command is issued and ends when you reach the end of the accounting file.

**2**    \$ ACCOUNTING MYFILE

This command also provides a brief listing, but lists from a specified binary input file.

**3**    \$ ACCOUNTING/FULL

The command in this example provides a full listing of all the records in the current accounting file.

#### Selecting Records

You identify groups of accounting records with one or more of the following selection qualifiers: /ACCOUNT, /ADDRESS, /BEFORE, /ENTRY, /IDENT, /IMAGE, /JOB, /NODE, /OWNER, /PRIORITY, /PROCESS, /QUEUE, /REMOTE\_ID, /SINCE, /STATUS, /TERMINAL, /TYPE, /UIC, and /USER. If you omit these qualifiers, the defaults provide for selecting all records. The next example illustrates selection.

**4**    \$ ACCOUNTING /SINCE=15-APR-1984 -  
       \$\_/BEFORE=22-JUN-1982:23:59:99/ACCOUNT=MANUFA/NODE=OSCAR -  
       \$\_/TYPE=LOGFAIL

This command selects and lists in brief format only the login failure records on a particular day from the MANUFA account on the remote node OSCAR.

Selection is also valuable for summary reports, as the following example illustrates.



# ACCOUNTING

## Examples

5     \$ ACCOUNTING/TYPE=PROCESS/PROCESS=INTERACTIVE -  
      \$ \_/PRIORITY=("- ",4)/SUMMARY=(USER,TERMINAL) -  
      \$ \_/REPORT=(RECORDS,ELAPSED,PROCESSOR)

This command selects all interactive process terminations that had a base priority other than 4, summarizes them by user name and terminal name, and reports the number of records of each, their total elapsed time, and the total processor time. The output is directed to SYS\$OUTPUT.

### Sorting Records

You use the /SORT qualifier to specify the fields that you want the sort to occur on and whether the desired sequence is ascending or descending. For example:

6     \$ ACCOUNTING/SORT=(USER,ACCOUNT,-STATUS)

This command sorts all records in the current accounting file first by the username and then by the account in ascending order and by final status, in descending order to provide a brief listing.

You can also sort just those records that you select, by combining one or more selection qualifiers with the /SORT qualifier. However, you use the /SORT qualifier only for brief or full listings, not for summary reports. For example:

7     \$ ACCOUNTING/TYPE=PRINT/QUEUE=LPC0/SORT=USER

This command selects all print jobs completed on queue LPC0 and then sorts them by user name, producing a brief listing.

### Directing ACCOUNTING Output

ACCOUNTING output can be routed to any supported terminal device or to a disk or tape file. The command in Example 8 sends an ASCII listing of all records in the accounting file to the file ACCOPY.LIS. You can then print out the file on a hardcopy device.

8     \$ ACCOUNTING /OUTPUT=ACCOPY

You can also direct binary output to a file whenever you need to capture ACCOUNTING data for future use. For example, you might want to plan for routine performance data gathering for long-term analysis. ACCOUNTING data can be recorded on a routine basis and summarized to gather data about system resource utilization over long periods of time.

Example 9 illustrates another case of directing the output to a separate file.

9     \$ ACCOUNTING/TYPE=PROCESS/PROCESS=BATCH/QUEUE=("- ",SYS\$BATCH) -  
      \$ \_/OUTPUT=BATCH/REJECTED=NOBATCH

This command uses the current accounting file and selects all records that are batch process terminations for all queues other than SYS\$BATCH. The selected records are formatted into a brief listing and output to a BATCH.LIS. The rejected records are copied in their binary form to NOBATCH.REJ.



### Using DCL Symbols

You may want to define DCL symbols for frequently used combinations. For example:

```
10 $ MY_GROUP ::= "/USER=(MARY,TOM,DICK,HARRY,BARNEY,ALICE) -  
$_/PROCESS=INTERACTIVE/TYPE=PROCESS"  
$_ACCOUNTING 'MY_GROUP'
```

This example shows how you can define the DCL symbol MY\_GROUP and use it as a parameter to the ACCOUNTING command.



---

## **A Supplemental ACCOUNTING Information**

The following sections describe the format of the data records written to the accounting log file SYS\$MANAGER:ACCOUNTNG.DAT.

These records are generated by a number of system events, including the following:

- Process or image termination
- System initialization
- Login failure
- Printer jobs

User processes can send messages to the accounting log file using the Send Message to Accounting Manager (\$SENDACC) system service. These messages can be used to write an arbitrary message to the accounting log file or to enable or disable accounting log file operations. The \$SENDACC system service and the formats of these messages are documented in the *VAX/VMS System Services Reference Manual*.

The accounting record types, the offsets within the accounting records, and the other symbols used in these formats are all defined by the symbolic definition macro \$ACRDEF.

**Note:** The formats described here are valid for VAX/VMS Versions 3.0 and 4.0, but are subject to change without further advance notice at the time of any future system release.

---

### **A.1 Format of the Accounting Record**

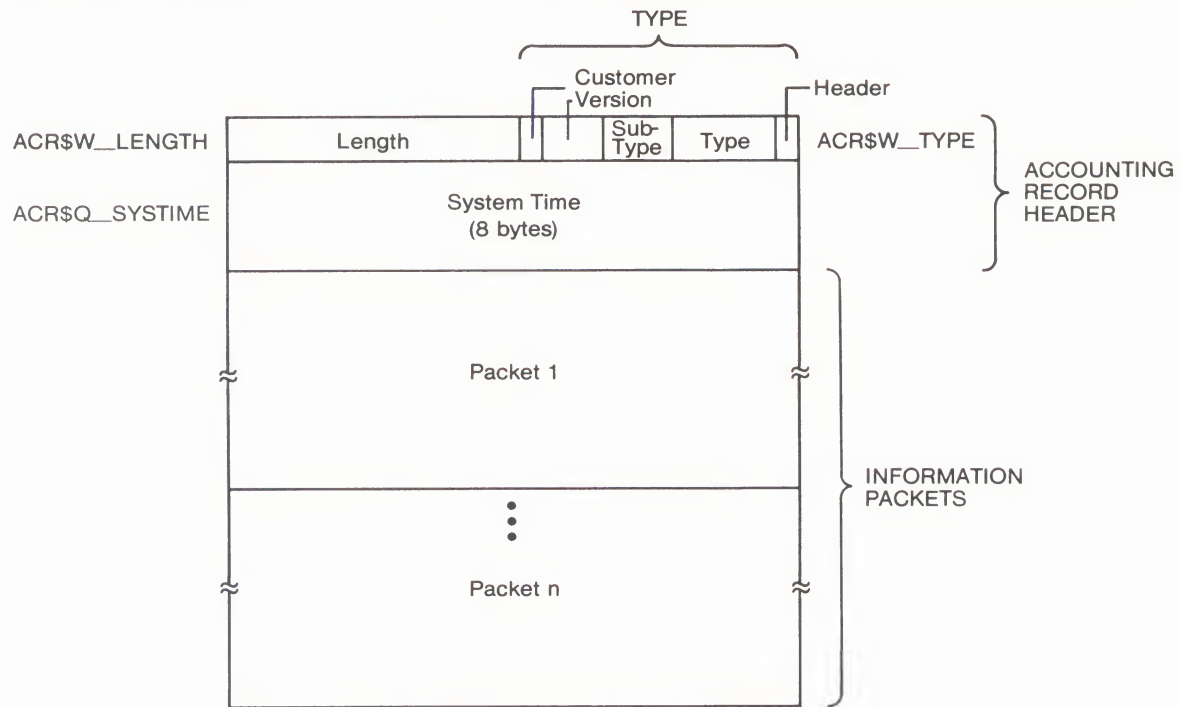
An accounting record consists of an accounting record header and a number of information packets. The number of information packets depends on the type of information being sent.

Figure ACC-4 illustrates the general format of the accounting record; Table ACC-1 describes the fields contained in this record. The type field in the accounting record header (described in Table ACC-1) is subdivided into five fields. Table ACC-2 describes these fields.

# ACCOUNTING

## Supplemental ACCOUNTING Information

**Figure ACC-4 Accounting Record Format**



ZK-957-82

**Table ACC-1 Descriptions of Accounting Record Fields**

Field	Symbolic Offset	Contents
type	ACR\$W_TYPE	Information describing the record. This field is subdivided into five fields, as described in Table ACC-2 (word)
length	ACR\$W_LENGTH	Total length of the record (word)
system time	ACR\$Q_SYSTIME	Current system time (quadword)
packet 1-n		Information packets associated with the record (variable length)

**Table ACC-2 Descriptions of ACR\$W\_TYPE FIELDS**

Field	Symbolic Offset	Contents
header	ACR\$V_PACKET	Identifies this header as a record header. This bit must be set to 0 (1 bit)
type	ACR\$V_TYPE	Indicates the purpose of the record. There are currently 8 record types. Record types and their meanings are summarized in the discussion of the /TYPE qualifier.

# ACCOUNTING

## Supplemental ACCOUNTING Information

**Table ACC-2 (Cont.) Descriptions of ACR\$W\_TYPE FIELDS**

Field	Symbolic Offset	Contents												
subtype	ACR\$V_SUBTYPE	Indicates the process type with which the record is associated. The subtypes (4 bits) are <table><tr><th>Symbol</th><th>Meaning</th></tr><tr><td>ACR\$K_INTERACTIVE</td><td>Interactive process</td></tr><tr><td>ACR\$K_SUBPROCESS</td><td>Subprocess</td></tr><tr><td>ACR\$K_DETACHED</td><td>Detached process</td></tr><tr><td>ACR\$K_BATCH</td><td>Batch process</td></tr><tr><td>ACR\$K_NETWORK</td><td>Network process</td></tr></table>	Symbol	Meaning	ACR\$K_INTERACTIVE	Interactive process	ACR\$K_SUBPROCESS	Subprocess	ACR\$K_DETACHED	Detached process	ACR\$K_BATCH	Batch process	ACR\$K_NETWORK	Network process
Symbol	Meaning													
ACR\$K_INTERACTIVE	Interactive process													
ACR\$K_SUBPROCESS	Subprocess													
ACR\$K_DETACHED	Detached process													
ACR\$K_BATCH	Batch process													
ACR\$K_NETWORK	Network process													
version	ACR\$V_VERSION	Indicates the accounting format with which the record is associated. The formats (3 bits) are <table><tr><th>Symbol</th><th>Meaning</th></tr><tr><td>ACR\$K_VERSION2</td><td>VAX/VMS Version 2.0 Accounting format</td></tr><tr><td>ACR\$K_VERSION3T</td><td>VAX/VMS Version 3.0 field test accounting format</td></tr><tr><td>ACR\$K_VERSION3</td><td>VAX/VMS Version 3.0 accounting format</td></tr></table>	Symbol	Meaning	ACR\$K_VERSION2	VAX/VMS Version 2.0 Accounting format	ACR\$K_VERSION3T	VAX/VMS Version 3.0 field test accounting format	ACR\$K_VERSION3	VAX/VMS Version 3.0 accounting format				
Symbol	Meaning													
ACR\$K_VERSION2	VAX/VMS Version 2.0 Accounting format													
ACR\$K_VERSION3T	VAX/VMS Version 3.0 field test accounting format													
ACR\$K_VERSION3	VAX/VMS Version 3.0 accounting format													
customer	ACR\$V_CUSTOMER	Identifies whether the record was written by DIGITAL software or by customer software. If the bit is not set, the record was written by DIGITAL software. If the bit is set to 1, the record was written by customer software (1 bit).												

## A.2 Accounting Record Types

Accounting record types identify the type of operation that caused the record to be sent. There are currently eight accounting record types.

Each type of accounting record requires a defined set of packets. Table ACC-3 describes the accounting record types and lists the packets required by each type. Note that the subtype field in the ACR\$W\_TYPE field is only meaningful when used with the first two record types: process deleted and image deleted.

# ACCOUNTING

## Supplemental ACCOUNTING Information

**Table ACC-3 Accounting Record Types**

Symbol	Meaning
ACR\$_PRCDEL	A process was deleted. Requires: ACR\$_ID ACR\$_RESOURCE
ACR\$_IMGDEL	An image was deleted. Requires: ACR\$_ID ACR\$_RESOURCE ACR\$_IMAGENAME
ACR\$_SYSINIT	System was initialized. Requires: ACR\$_ID ACR\$_RESOURCE
ACR\$_LOGFAIL	A login validation failed. Requires: ACR\$_ID ACR\$_RESOURCE
ACR\$_PRINT	A print job was queued. Requires: ACR\$_ID ACR\$_PRINT
ACR\$_USER	User-supplied data. Requires: ACR\$_ID ACR\$_USER_DATA
ACR\$_FILE_FL	Accounting file forward link. Requires: ACR\$_FILENAME
ACR\$_FILE_BL	Accounting file backward link. Requires: ACR\$_FILENAME

## A.3 Accounting Packets

There are six types of accounting packets:

- Identification packet
- Resource packet
- Image name packet
- Print resource packet
- Filename packet
- User data packet

Section A.3.1 describes the general format of the accounting packets. Sections A.3.2 through A.3.7 describe the organization of the different accounting packets.

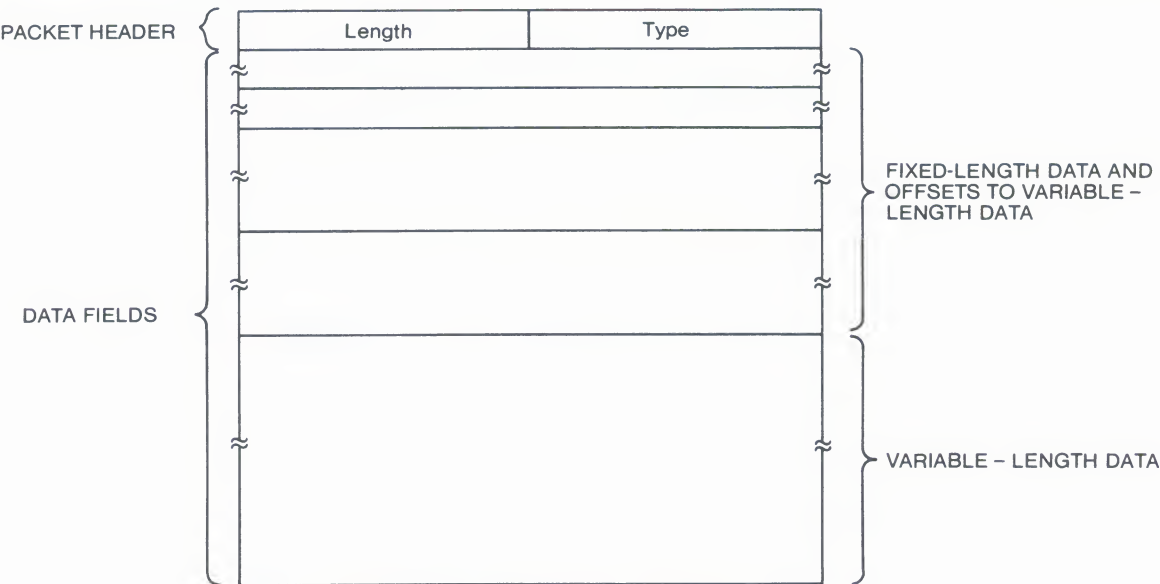


A.3.1 General Format of Accounting Packets

Each packet type contains a packet header, followed by data fields. The data fields can contain fixed-length data, variable-length data, or offsets to variable-length data. Offsets contain the distance, in bytes, from the beginning of the packet to the variable-length data.

All variable-length data are represented as counted strings. Variable-length data follow the last fixed-length data field in the packet. Figure ACC-5 illustrates the general format of the accounting packet.

Figure ACC-5 Accounting Packet Format

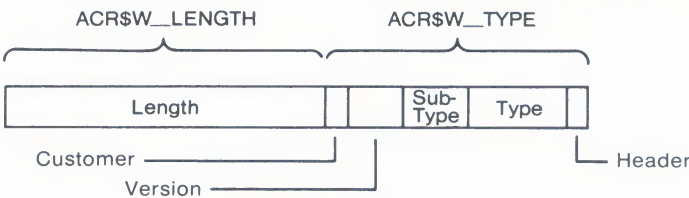


ZK-958-82

Accounting packets need not use each type of data field. See Sections A.3.2 through A.3.7 for complete descriptions of the fields contained in each accounting packet.

All accounting packets start with a packet header. The packet header uses the same symbolic offsets as the first longword of the record header. Figure ACC-6 illustrates the accounting packet header; Table ACC-4 describes the fields in this header. The type field in the accounting packet header is subdivided into five fields. Table ACC-5 describes these fields.

Figure ACC-6 Accounting Packet Header Format



ZK-959-82

# ACCOUNTING

## Supplemental ACCOUNTING Information

**Table ACC-4 Descriptions of Accounting Packet Header Fields**

Field	Symbolic Offset	Contents
type	ACR\$W_TYPE	Information describing the packet (word). This field is subdivided into five fields, as described in Table ACC-5)
length	ACR\$W_LENGTH	Total length of the packet (word).

**Table ACC-5 Descriptions of ACR\$W\_TYPE Fields**

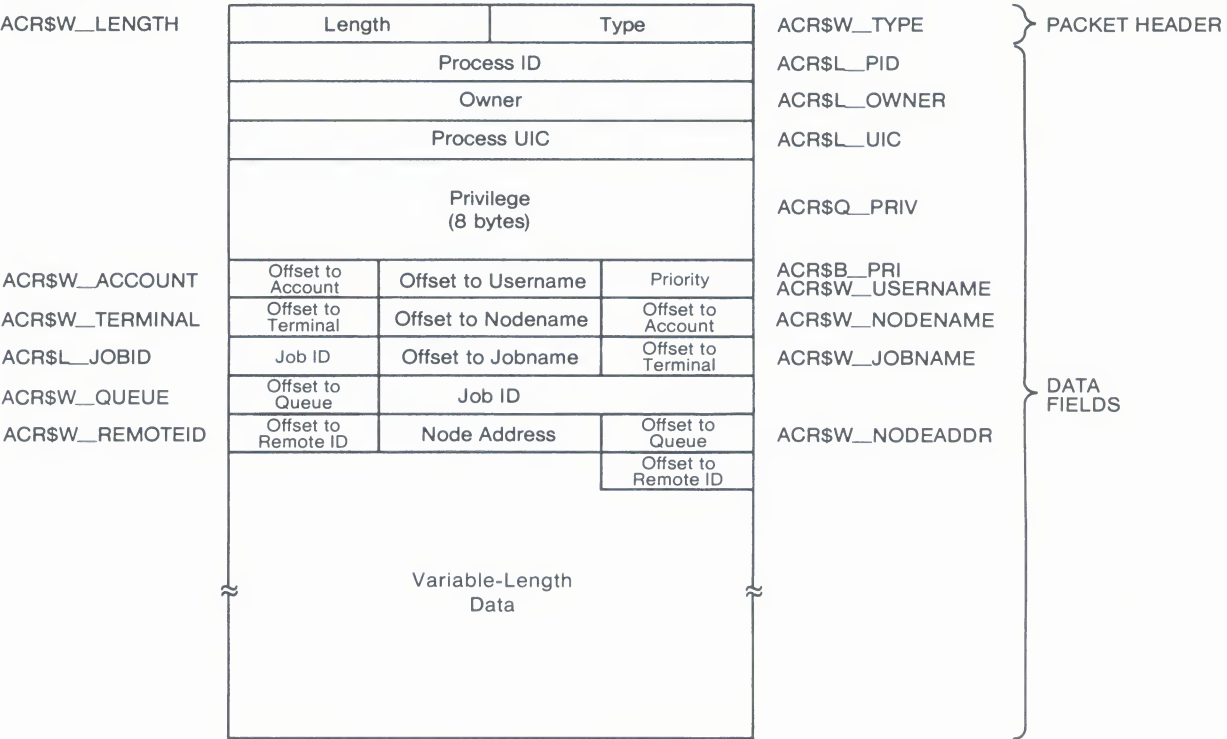
Field	Symbolic Offset	Contents								
header	ACR\$V_PACKET	Identifies this header as a packet header. This bit must be set to 1 (1 bit).								
type	ACR\$V_TYPE	Indicates the purpose of the packet. There are currently six packet types. These packet types are described in Section A.3 (7 bits).								
subtype	ACR\$V_SUBTYPE	Indicates the packet subtype; reserved for future use (4 bits)								
version	ACR\$V_VERSION	Indicates the accounting format with which the record is associated. The formats are								
		<table><tr><th>Symbol</th><th>Meaning</th></tr><tr><td>ACR\$K_VERSION2</td><td>VMS Version 2.0 accounting format</td></tr><tr><td>ACR\$K_VERSION3T</td><td>VMS Version 3.0 field test accounting format</td></tr><tr><td>ACR\$K_VERSION3</td><td>VMS Version 3.0 accounting format (3 bits)</td></tr></table>	Symbol	Meaning	ACR\$K_VERSION2	VMS Version 2.0 accounting format	ACR\$K_VERSION3T	VMS Version 3.0 field test accounting format	ACR\$K_VERSION3	VMS Version 3.0 accounting format (3 bits)
Symbol	Meaning									
ACR\$K_VERSION2	VMS Version 2.0 accounting format									
ACR\$K_VERSION3T	VMS Version 3.0 field test accounting format									
ACR\$K_VERSION3	VMS Version 3.0 accounting format (3 bits)									
customer	ACR\$V_CUSTOMER	Identifies whether the record was written by DIGITAL software or by customer software. If the bit is not set, the record was written by DIGITAL software. If the bit is set to 1, the record was written by customer software (1 bit).								

### A.3.2 Packet Type ACR\$K\_ID (Identification Packet)

The identification packet identifies the process that caused information to be sent to the accounting manager.

Figure ACC-7 depicts the organization of the identification packet; Table ACC-6 describes the fields contained in the packet. See Section A.3.1 for more information on the packet header.

Figure ACC-7    Block Diagram for ACR\$K\_ID



ZK-960-82

Table ACC-6    Field Descriptions for ACR\$K\_ID

Field	Symbolic Offset	Contents
pid	ACR\$L_PID	Process identification of the process (longword)
owner	ACR\$L_OWNER	Process identification of owner process, if the process is a subprocess. If the process is not a subprocess, the value is 0 (longword)
uic	ACR\$L_UIC	Process UIC of the process. The UIC can be addressed as two separate words: ACR\$W_MEM for the member number, and ACR\$W_GRP for the group number (longword)
privilege	ACR\$Q_PRIV	Privileges held by the process (quadword)
prio	ACR\$B_PRI	Priority of the process (byte)

# ACCOUNTING

## Supplemental ACCOUNTING Information

**Table ACC-6 (Cont.) Field Descriptions for ACR\$K\_ID**

Field	Symbolic Offset	Contents
username	ACR\$W_USERNAME	Offset to counted ASCII string containing the user name of the process (word)
account	ACR\$W_ACCOUNT	Offset to counted ASCII string containing the account name of the process (word)
node name	ACR\$W_NODENAME	Offset to counted ASCII string containing the node name of the remote process (word)
terminal	ACR\$W_TERMINAL	Offset to counted ASCII string containing the terminal name of the process (word)
jobname	ACR\$W_JOBNAME	Offset to counted ASCII string containing the job name of the process (word)
jobid	ACR\$L_JOBID	Identification of the job (longword)
queue	ACR\$W_QUEUE	Offset to counted ASCII string containing the name of the queue with which a batch or print job is associated (word)
node address	ACR\$W_NODEADDR	Contains the remote node address (word)
remote id	ACR\$W_REMOTEID	Offset to counted ASCII string containing the remote ID of the remote process (varies with network implementation and use) (word)

### A.3.3 Packet Type ACR\$K\_RESOURCE (Resource Packet)

The resource packet contains information on the identified process.

Figure ACC-8 depicts the organization of the resource packet; Table ACC-7 describes the fields contained in the packet. See Section A.3.1 for more information on the packet header.

**Table ACC-7 Field Descriptions for ACR\$K\_RESOURCE**

Field	Symbolic Offset	Contents
start time	ACR\$O_LOGIN	64-bit binary time at which process or image was started (quadword)
status	ACR\$L_STATUS	Final status of the process or image (longword)
image count	ACR\$L_IMGCNT	Execution count or sequence number of the image (longword)

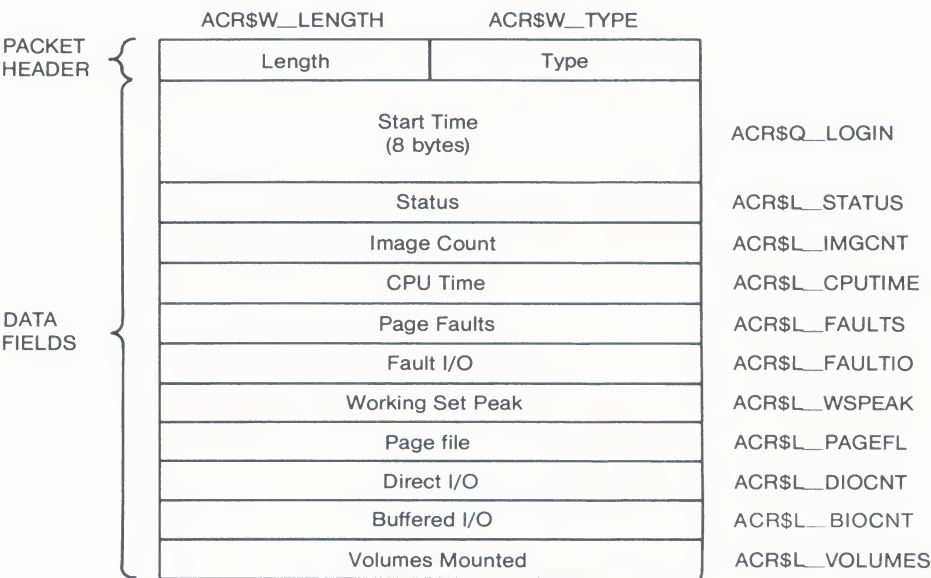
# ACCOUNTING

## Supplemental ACCOUNTING Information

**Table ACC-7 (Cont.) Field Descriptions for ACR\$K\_RESOURCE**

Field	Symbolic Offset	Contents
cputime	ACR\$L_CPUTIME	Total CPU time of the process or image (longword)
page faults	ACR\$L_FAULTS	Page fault count of the process or image (longword)
fault I/O	ACR\$L_FAULTIO	Page fault I/O count of the process or image (longword)
wspeak	ACR\$L_WSPEAK	Peak working set of the process or image (longword)
pagefile	ACR\$L_PAGEFL	Peak page file usage of the process or image (longword)
dir I/O	ACR\$L_DIOCNT	Direct I/O count of the process or image (longword)
buff I/O	ACR\$L_BIOCNT	Buffered I/O count of the process or image (longword)
vol mount	ACR\$L_VOLUMES	Number of volumes mounted by the process or image (longword)

**Figure ACC-8 Block Diagram for ACR\$K\_RESOURCE**



ZK-961-82

### A.3.4 Packet Type ACR\$K\_IMAGENAME (Image Name Packet)

The image name packet contains the name of image run by the identified process.

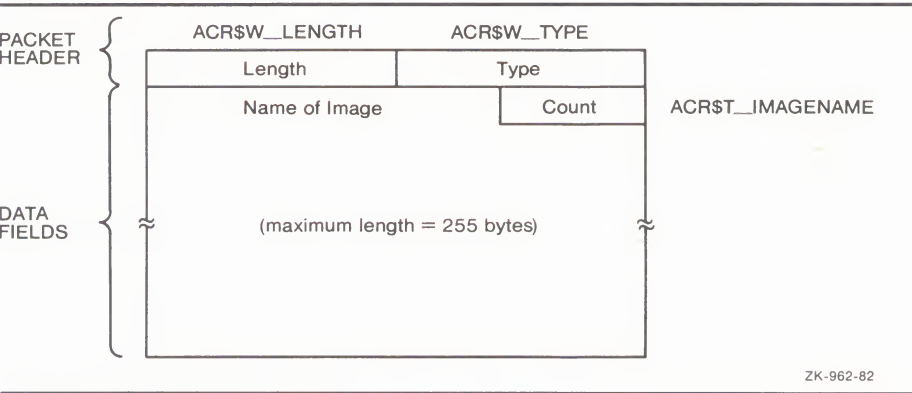


# ACCOUNTING

## Supplemental ACCOUNTING Information

Figure ACC-9 depicts the organization of the image name packet; Table ACC-8 describes the field contained in the packet. See Section A.3.1 for more information on the packet header.

**Figure ACC-9 Block Diagram for ACR\$K\_IMAGENAME**



**Table ACC-8 Field Descriptions for ACR\$K\_IMAGENAME**

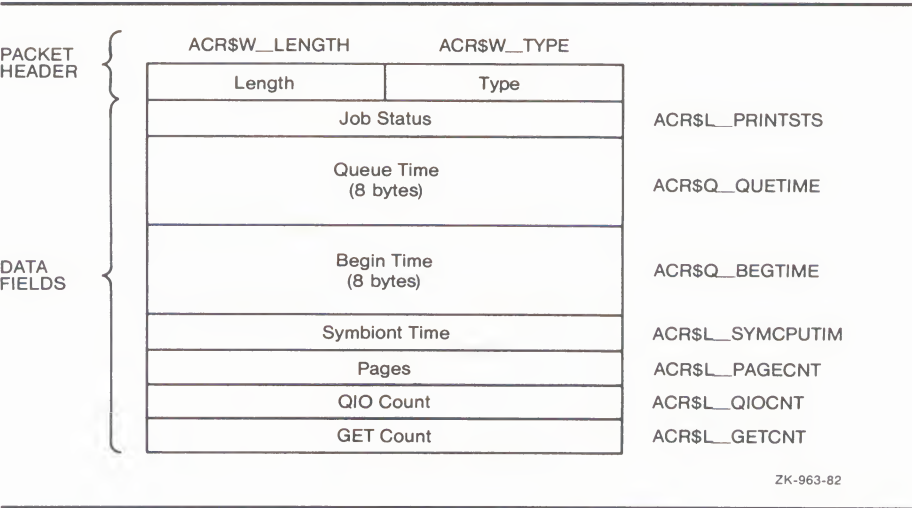
Field	Symbolic Offset	Contents
imagename	ACR\$T__IMAGENAME	Name of the image (counted ASCII string)

### A.3.5 Packet Type ACR\$K\_PRINT (Print Resource Packet)

The print resource packet contains information on printer jobs.

Figure ACC-10 depicts the organization of the print resource packet; Table ACC-9 describes the fields contained in the packet. See Section A.3.1 for more information on the packet header.

**Figure ACC-10 Block Diagram for ACR\$K\_PRINT**





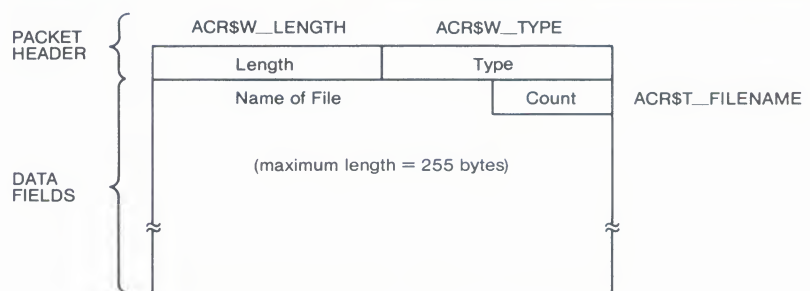
**Table ACC-9 Field Descriptions for ACR\$K\_PRINT**

Field	Symbolic Offset	Contents
job status	ACR\$_PRINTSTS	Status of the printer job (longword)
queue time	ACR\$_Q_QUEETIME	Time the job was queued (64-bit binary time)
begin time	ACR\$_Q_BEGTIME	Time the job was started (64-bit binary time)
Symb time	ACR\$_SYMCPUTIM	Total symbiont CPU time (longword)
pages	ACR\$_PAGECNT	Total number of pages printed (longword)
qio count	ACR\$_QIOCNT	Total number of QIOs issued (longword)
get count	ACR\$_GETCNT	Total number of GETs issued (longword)

### A.3.6 Packet Type ACR\$K\_FILENAME (Filename Packet)

The filename packet contains the name of the accounting file to point to or modify. Figure ACC-11 depicts the organization of the filename packet; Table ACC-10 describes the field contained in the packet. See Section A.3.1 for more information on the packet header.

**Figure ACC-11 Block Diagram for ACR\$K\_FILENAME**



ZK-964-82

**Table ACC-10 Field Descriptions for ACR\$K\_FILENAME**

Field	Symbolic Offset	Contents
filename	ACR\$T_FILENAME	Name of the file (counted ASCII string)

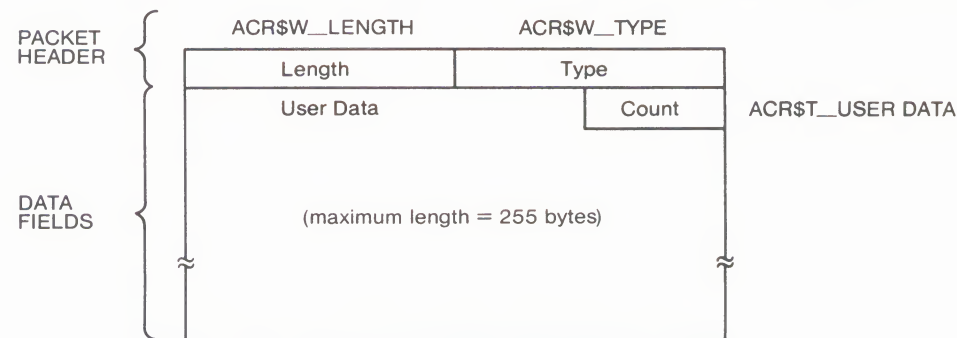
### A.3.7 Packet Type ACR\$K\_USER\_DATA (User Data Packet)

The user data packet contains user information to be sent to the accounting manager. Figure ACC-12 depicts the organization of the user data packet; Table ACC-11 describes the fields contained in the packet. See Section A.3.1 for more information on the packet header.

# ACCOUNTING

## Supplemental ACCOUNTING Information

**Figure ACC-12    Block Diagram for ACR\$K\_USER\_DATA**



ZK-965-82

**Table ACC-11    Field Descriptions for ACR\$K\_USER\_DATA**

Field	Symbolic Offset	Contents
user data	ACR\$T_USER_DATA	Any user data (counted string)

---

# Index

---

## A

---

/ACCOUNT qualifier • ACC-7  
ACCOUNTING outputs • ACC-2  
/ADDRESS qualifier • ACC-8

---

## B

---

/BEFORE qualifier • ACC-9  
Binary output • ACC-4  
/BINARY qualifier • ACC-10  
/BRIEF qualifier • ACC-11

---

## D

---

Directing output of ACCOUNTING • ACC-2  
Disk space • ACC-4

---

## E

---

/ENTRY qualifier • ACC-12  
Examples  
    directing ACCOUNTING output • ACC-40  
    listing accounting files • ACC-39  
    selecting records • ACC-39  
    sorting records • ACC-40  
    using DCL symbols • ACC-40  
Exiting from ACCOUNTING • ACC-2

---

## F

---

/FULL qualifier • ACC-13

---

## I

---

/IDENT qualifier • ACC-14  
/IMAGE qualifier • ACC-15  
Invoking ACCOUNTING • ACC-1

---

## J

---

/JOB qualifier • ACC-16

---

## L

---

Listing output  
    brief format • ACC-3  
    full format • ACC-3  
    summary format • ACC-4  
/LOG qualifier • ACC-17

---

## N

---

/NODE qualifier • ACC-18

---

## O

---

/OUTPUT qualifier • ACC-19  
/OWNER qualifier • ACC-20

---

## P

---

/PRIORITY qualifier • ACC-21  
/PROCESS qualifier • ACC-22  
Process types • ACC-22

## Index

Processing time • ACC-4

---

## Q

---

/QUEUE qualifier • ACC-23

---

## R

---

/REJECTED qualifier • ACC-24

/REMOTE\_ID qualifier • ACC-25

/REPORT qualifier • ACC-26

Restrictions of ACCOUNTING • ACC-2

---

## S

---

/SINCE qualifier • ACC-28

/SORT qualifier • ACC-29

/STATUS qualifier • ACC-31

/SUMMARY qualifier • ACC-32

Summary-items • ACC-32

---

## T

---

/TERMINAL qualifier • ACC-34

/TITLE qualifier • ACC-35

/TYPE qualifier • ACC-36

---

## U

---

/UIC qualifier • ACC-37

/USER qualifier • ACC-38

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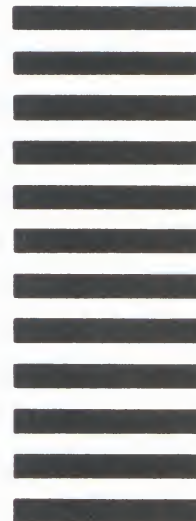
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