

VMS Accounting Utility Manual

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This document describes how to use the Accounting Utility on VMS operating systems.

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Preface

Intended Audience

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

Document Structure

This document consists of the following five sections:

- Description—Provides a full description of the Accounting Utility (ACCOUNTING).
 - Usage Summary—Outlines the following ACCOUNTING information:
 - Invoking the utility
 - Exiting from the utility
 - Directing output
 - Restrictions or privileges required
 - Qualifiers—Describes ACCOUNTING qualifiers, including format, parameters, and examples.
 - Examples—Provides additional ACCOUNTING examples.
 - Appendix A—Provides supplemental information.
-

Associated Documents

For additional information on the topics covered in this document, refer to the *VMS DCL Dictionary* and the *Guide to Setting Up a VMS System*. The *VMS System Messages and Recovery Procedures Reference Manual* lists the messages generated by ACCOUNTING and provides explanations and suggested user actions.

Conventions

Convention	Meaning
<code>RET</code>	In examples, a key name (usually abbreviated) shown within a box indicates that you press a key on the keyboard; in text, a key name is not enclosed in a box. In this example, the key is the RETURN key. (Note that the RETURN key is not usually shown in syntax statements or in all examples; however, assume that you must press the RETURN key after entering a command or responding to a prompt.)
<code>CTRL/C</code>	A key combination, shown in uppercase with a slash separating two key names, indicates that you hold down the first key while you press the second key. For example, the key combination CTRL/C indicates that you hold down the key labeled CTRL while you press the key labeled C. In examples, a key combination is enclosed in a box.
<code>\$ SHOW TIME</code> <code>05-JUN-1988 11:55:22</code>	In examples, system output (what the system displays) is shown in black. User input (what you enter) is shown in red.
<code>\$ TYPE MYFILE.DAT</code> . . .	In examples, a vertical series of periods, or ellipsis, means either that not all the data that the system would display in response to a command is shown or that not all the data a user would enter is shown.
<code>input-file, . . .</code>	In examples, a horizontal ellipsis indicates that additional parameters, values, or other information can be entered, that preceding items can be repeated one or more times, or that optional arguments in a statement have been omitted.
<code>[logical-name]</code>	Brackets indicate that the enclosed item is optional. (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 (ACCOUNTING) for Version 5.0.



ACCOUNTING Description

The Accounting Utility (ACCOUNTING) uses the data from the system's accounting log file (ACCOUNTNG.DAT) to produce accounting reports. Using ACCOUNTING qualifiers, you can produce a variety of report formats, choose how the reports are organized, and select specific report items. Accounting reports can serve 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 also provide a means of billing users for system resources.

You can also use the Accounting Utility to record a binary copy of the accounting log file, and then use this copy as input for future Accounting report requests.

Using ACCOUNTING qualifiers, you can select records based on fields in the records and their values. Every time you select records, ACCOUNTING creates 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.

The accounting log file, ACCOUNTNG.DAT, is created when the system is initialized. The system updates the accounting file for a number of system events, including the following:

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

Use the DCL command, SET ACCOUNTING, to close the current accounting log file and create a new version. Using the SET ACCOUNTING command, you can also enable and disable the recording of specific system events. Use the SHOW ACCOUNTING command to display a list of system events for which accounting is enabled.

All ACCOUNTING input data must be in binary format. For a complete description of the accounting log record formats, refer to Appendix A.

1

Accounting Output

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 using other accounting commands. If you specify /FULL or /SUMMARY or assume the default (/BRIEF), an ASCII file is produced. This file contains statistics covering the duration of the ACCOUNTING request.

ACCOUNTING Description

1.1 Listing Output

Following are three basic output formats used for displaying data:

- Brief listing
- Full listing
- Summary report

The following sections describe these formats and give 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, output always includes date and time, type of record, subtype, user name, process ID, source, and status.

Example ACC-1 Sample Brief Listing

Date / Time	Type	Subtype	Username	ID	Source	Status
31-DEC-1988 11:26:21	LOGFAIL		login	000C0019	TTF6:	00D38064
31-DEC-1988 11:26:53	PROCESS	SUBPROCESS	BROSE	000A001D		00000001
31-DEC-1988 11:27:33	PROCESS	NETWORK	NETNONPRIV	000B0016	AURA	10031230
31-DEC-1988 11:27:58	PROCESS	INTERACTIVE	BBLACK	00040028	TTD3:	10000001
31-DEC-1988 11:36:33	PROCESS	SUBPROCESS	JBROWN	00080028		10B90001
31-DEC-1988 11:36:44	PRINT		JBROWN	00030010		00040001
31-DEC-1988 11:37:34	PROCESS	DETACHED	ERUST	000B001D		00000000
31-DEC-1988 11:38:24	PROCESS	INTERACTIVE	ERUST	00020039	TTB7:	00000001
31-DEC-1988 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 record formats, based on the presence or absence of data in the record. Example ACC-2 presents a typical single accounting record in the full format.

Example ACC-2 Sample Full Listing

BATCH Process Termination

Username:	MCDONALD	UIC:	[CAP,MCDONALD]
Account:	CAP	Finish time:	31-DEC-1988 02:59:38.88
Process ID:	2100022E	Start time:	31-DEC-1988 02:54:14.63
Owner ID:		Elapsed time:	0 00:05:24.25
Terminal name:		Processor time:	0 00:00:06.39
Remote node addr:		Priority:	4
Remote node name:		Privilege <31-00>:	00108000
Remote ID:		Privilege <63-32>:	00000000
Queue entry:	221	Final status code:	10000001
Queue name:	CLOWN_BATCH		
Job name:	UPDATE		
Final status text:	%SYSTEM-S-NORMAL, normal successful completion		
Page faults:	2804	Direct IO:	306
Page fault reads:	93	Buffered IO:	280
Peak working set:	1541	Volumes mounted:	0
Peak page file:	4272	Images executed:	8

1.1.3 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 of records 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,ELAPSED,PROCESSOR)
```

ACCOUNTING Description

Example ACC-3 Sample Summary Output

From: 23-DEC-1988 16:33 VAX/VMS Accounting Report To: 31-DEC-1988 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

1.2 Binary Output

A binary output file is a binary 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 your selection criteria. You can use binary output files as source files for 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 records that do not match the selection criteria are directed to the output file.

A complete description of the ACCOUNTING file record formats appears in Appendix A.

Note: 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.

ACCOUNTING Usage Summary

The Accounting Utility (ACCOUNTING) processes system accounting files to produce reports and summaries of system usage.

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

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:ACCOUNTNG.DAT.

Wildcard characters are allowed in the file specification.

usage summary

The following DCL command invokes ACCOUNTING:

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

Each ACCOUNTING request runs until it completes. To terminate an ACCOUNTING request before completion, press CTRL/Y.

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

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

ACCOUNTING

ACCOUNTING Qualifiers

ACCOUNTING QUALIFIERS

This section explains ACCOUNTING qualifiers and provides examples of their use. The qualifiers follow the standard rules of DCL grammar.

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 item in the list.

Note: You can use the asterisk (*) as a wildcard character only in conjunction with the /UIC qualifier. Do not abbreviate qualifier keywords.

/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

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 specified in the user authorization file.

When you specify the /ACCOUNT qualifier, 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

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. Use the following formula to calculate the node address:

$node\ address = (area\ number * 1024) + node\ number$

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

EXAMPLE

\$ ACCOUNTING /ADDRESS=19656

The command in this example selects records that have remote node address fields that are equivalent to the DECnet address 19656 or DECnet node address 19.200.

/BEFORE

Controls whether only those records dated earlier than the specified time are selected. If you specify **/NOBEFORE** or omit the qualifier, time is not used to select records.

FORMAT **/BEFORE[=*time*]**
 /NOBEFORE

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 *VMS DCL Dictionary*.

EXAMPLE

\$ ACCOUNTING /BEFORE=31-DEC-1988

The command in this example selects all records dated earlier than December 31, 1988.

ACCOUNTING

/BINARY

/BINARY

Controls whether output is a binary accounting file.

FORMAT **/BINARY**
 /NOBINARY

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 **/BRIEF**
 /NOBRIEF

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 produces an ASCII file in brief format. The file is written to MYACC.DAT.

ACCOUNTING

/ENTRY

/ENTRY

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

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

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, 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 **/FULL**
 /NOFULL

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 in the Description section 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

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, 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 25634 and 045A6B.

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

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 file name portion of the image file specification, such as EDT.

 When you specify /IMAGE, 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

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, 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 file names, selected record counts, rejected record counts) are displayed to SYS\$OUTPUT.

FORMAT **/LOG**
 /NOLOG

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
31-DEC-1988 13:42:44	FILE			00000000		00000000
31-DEC-1988 13:53:29	PROCESS	BATCH	SYSTEM	20800116		10030001
31-DEC-1988 13:53:38	SYSINIT		SYSTEM	20800104		107781AB
31-DEC-1988 13:58:04	PROCESS	INTERACTIVE	MATTHEWS	20800128	TTF5:	00000001
31-DEC-1988 14:10:29	PROCESS	NETWORK	ROBIN_NET	20800132	AXEL	10000004
31-DEC-1988 14:28:56	PROCESS	SUBPROCESS	SMITH	2080013E		10000001
31-DEC-1988 14:33:31	PRINT		JONES	21400117		00040001

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

The command in this example displays accounting records informational messages such as selected 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

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.

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

1 \$ ACCOUNTING /NODE=NOROT

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

2 \$ 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

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, the file name of the input file is used. If you omit the file type and the output is ASCII, 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. 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

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 present only in subprocesses to specify the process id of their owner process.

When you specify /OWNER, 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

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

priority[,...]
Specifies the base process priority used to select records.

When you specify /PRIORITY, 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 process priority of 3.

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

The command in this example selects all records except those that match a base process 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.

To produce records for interactive processes, you must enable both PROCESS and INTERACTIVE logging using the SET ACCOUNTING command.

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

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, 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: BATCH, DETACHED, INTERACTIVE, NETWORK, and 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

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, 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

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 file name, the file name 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.

/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

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 VMS systems, the remote ID is always the user name.

When you specify /REMOTE_ID, 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.

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

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 issued by symbiont	Total
PAGE_FILE	Page file usage	Maximum
PAGE_READS	Page read IOs	Total
PAGES	Pages printed	Total
PROCESSOR	Processor time consumed	Total
QIOS	Printer QIOs issued by symbiont	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.

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

ACCOUNTING

/REPORT

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. 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, and the total number of image termination records for each image.

ACCOUNTING

/SINCE

/SINCE

Controls whether only those records dated the same or later than a specified time are selected. If you specify /NOSINCE or omit the qualifier, time is not used to select records.

FORMAT /SINCE[=*time*]
 /NOSINCE

KEYWORD *time*
Specifies the time used to select records. Records dated the same or 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 *VMS DCL Concepts Manual*.

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

EXAMPLE

\$ ACCOUNTING /SINCE=31-DEC-1988

The command in this example selects records dated later than December 31, 1988.

/SORT

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

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

KEYWORDS

—
Specifies that the sort field is used as a descending key. By default, keys are assumed to be ascending.

***sort-item*[...]**

Specifies the sort item used to select records.

When you specify /SORT, specify at least one sort item. If you specify more than one sort item, separate the items 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

ACCOUNTING

/SORT

Keyword	Meaning
PROCESS	Process type
PROCESSOR	Processor time
QIOS	Number of QIOs to the printer
QUEUE	Name of queue
QUEUED	Time batch or print job was queued
STARTED	Start time
STATUS	Exit status
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 (-), 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 the records to the designated output file. Unselected records are not sorted. The ordering of sort items determines the relative ranking of the keys.

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 nonimage-termination records to be excluded, since image-termination records are the only record types that contain image names. Similarly, /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

KEYWORDS **"_"**
Specifies that all records are selected except those matching any specified exit status.

exit-status[,...]
Specifies the exit status used to select records.

When you specify /STATUS, specify at least one exit status. If you specify more than one exit status, separate them with commas, and enclose the list in parentheses. Specify each status as a character string of hexadecimal numerals.

EXAMPLE

\$ ACCOUNTING /STATUS=10D38064

The command in this example selects all records that have a status field value of 10D38064 in hexadecimal.

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, /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

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

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

Summary Item	Outputs
ACCOUNT	Account name from the UAF
DATE	YYYY MMM DD
DAY	Day of month (1–31)
HOUR	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, /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.

Note: Report item totals on summary reports can be misleading if you do not know the number of records that were added together to produce the totals. Use the /REPORT=RECORDS qualifier to show the number of records that were added to produce each total.

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

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, 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 includes the beginning and ending times for the data summary at the left and right margins, respectively.

FORMAT */TITLE=title*
 /NOTITLE

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

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:

Record Type	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 other specified record types
USER	Arbitrary user messages

When you specify /TYPE, 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

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, 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. You may use the asterisk (*) as a wildcard character.

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 user name are selected. The user name matches the user name in the user authorization file. If you specify /NOUSER or omit the qualifier, the user name is not used to select records.

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

KEYWORDS

"_"

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

username[,...]

Specifies the user name used to select records.

When you specify /USER, specify at least one user name. If you specify more than one user name, 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 user name SASHA.

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

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

ACCOUNTING 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 troubleshooting 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

This command creates a full listing of all the records in the current accounting file.

SELECTING RECORDS

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 determine the selection of all records. The next example illustrates selection.

1 \$ ACCOUNTING /SINCE=15-APR-1985 -
_ \$ /BEFORE=22-JUN-1985/ACCOUNT=MANUFA/NODE=OSCAR -
_ \$ /TYPE=LOGFAIL

This command selects and lists in brief format all login failure records dated after April 15, 1985, but before June 22, 1985, from the MANUFA account on the remote node OSCAR.

ACCOUNTING

ACCOUNTING Examples

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

```
2 $ ACCOUNTING/TYPE=PROCESS/PROCESS=INTERACTIVE -  
  _$ /PRIORITY=( "-" , 4)/SUMMARY=(USER, TERMINAL) -  
  _$ /REPORT=(RECORDS, ELAPSED, PROCESSOR)
```

This command selects all interactive process terminations with 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

Use the /SORT qualifier to specify the fields that you want to use to sort, and to specify the sequence as ascending or descending. For example:

```
1 $ ACCOUNTING/SORT=(USER, ACCOUNT, -STATUS)
```

This command sorts all records in the current accounting file first by the user name, then by the account, in ascending order; and finally by status, in descending order. A brief listing is produced.

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

```
2 $ 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 1 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.

```
1 $ 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 2 illustrates another case of directing the output to a separate file.

ACCOUNTING

ACCOUNTING Examples

```
2 $ 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 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 combinations you use frequently. For example:

```
1 $ 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
- Print jobs

User processes can send messages to the accounting log file, enable accounting operations, and disable accounting operations using the Send to Job Controller (\$SNDJBC/\$SNDJBCW) system service. For more information on the \$SNDJBC/\$SNDJBCW system service, see the *VMS System Services Reference Manual*.

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

Note: The formats described here are valid for VAX/VMS Versions 3.0 through 5.0 but are subject to change without advance notice at the time of any future system release.

A.1 Format of the Accounting Record

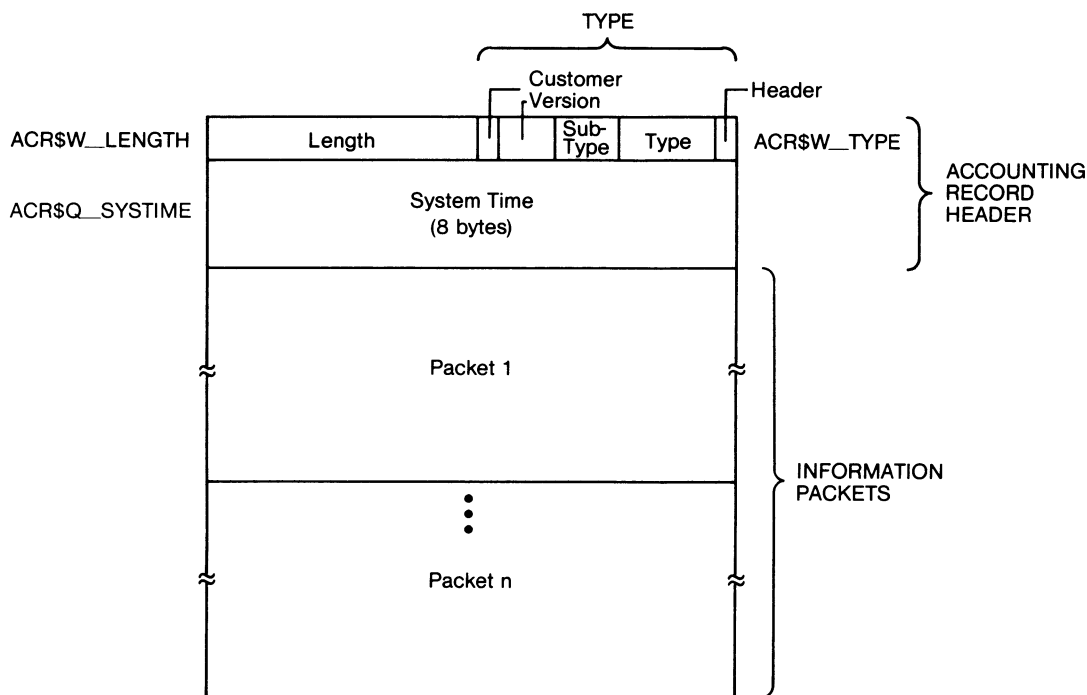
An accounting record consists of an accounting record header and a number of information packets. The number of information packets depends on the type of information being sent.

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

Supplemental ACCOUNTING Information

A.1 Format of the Accounting Record

Figure A-1 Accounting Record Format



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Table A-1 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 A-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)

Supplemental ACCOUNTING Information

A.1 Format of the Accounting Record

Table A-2 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 Section A.2. (7 bits)												
subtype	ACR\$V_SUBTYPE	Indicates the process type with which the record is associated. The subtypes (4 bits) are: <table border="1" data-bbox="1053 714 1540 1060"> <thead> <tr> <th>Symbol</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>ACR\$_INTERACTIVE</td> <td>Interactive process</td> </tr> <tr> <td>ACR\$_SUBPROCESS</td> <td>Subprocess</td> </tr> <tr> <td>ACR\$_DETACHED</td> <td>Detached process</td> </tr> <tr> <td>ACR\$_BATCH</td> <td>Batch process</td> </tr> <tr> <td>ACR\$_NETWORK</td> <td>Network process</td> </tr> </tbody> </table>	Symbol	Meaning	ACR\$_INTERACTIVE	Interactive process	ACR\$_SUBPROCESS	Subprocess	ACR\$_DETACHED	Detached process	ACR\$_BATCH	Batch process	ACR\$_NETWORK	Network process
Symbol	Meaning													
ACR\$_INTERACTIVE	Interactive process													
ACR\$_SUBPROCESS	Subprocess													
ACR\$_DETACHED	Detached process													
ACR\$_BATCH	Batch process													
ACR\$_NETWORK	Network process													
version	ACR\$V_VERSION	Indicates the accounting format with which the record is associated. The formats (3 bits) are: <table border="1" data-bbox="1053 1197 1540 1669"> <thead> <tr> <th>Symbol</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>ACR\$_VERSION2</td> <td>VAX/VMS Version 2.0 accounting format</td> </tr> <tr> <td>ACR\$_VERSION3T</td> <td>VAX/VMS Version 3.0 field test accounting format</td> </tr> <tr> <td>ACR\$_VERSION3</td> <td>VAX/VMS Version 3.0 accounting format</td> </tr> </tbody> </table>	Symbol	Meaning	ACR\$_VERSION2	VAX/VMS Version 2.0 accounting format	ACR\$_VERSION3T	VAX/VMS Version 3.0 field test accounting format	ACR\$_VERSION3	VAX/VMS Version 3.0 accounting format				
Symbol	Meaning													
ACR\$_VERSION2	VAX/VMS Version 2.0 accounting format													
ACR\$_VERSION3T	VAX/VMS Version 3.0 field test accounting format													
ACR\$_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)												

Supplemental ACCOUNTING Information

A.2 Accounting Record Types

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 A-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.

Table A-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

Supplemental ACCOUNTING Information

A.3 Accounting Packets

- Print resource packet
- File name packet
- User data packet

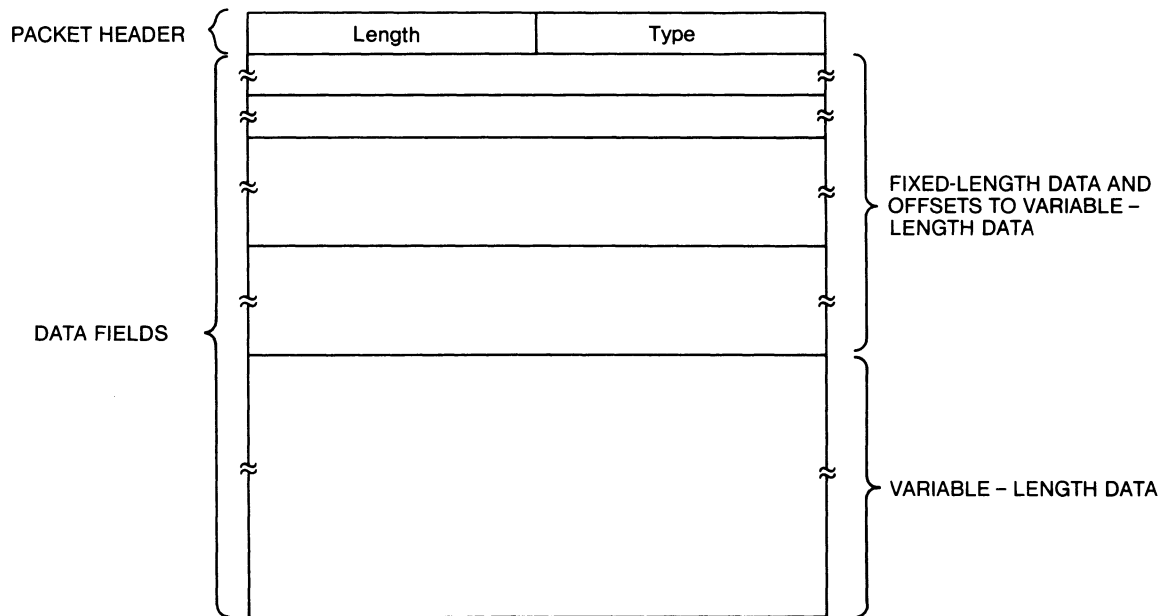
Section A.3.1 describes the general format of the accounting packets. Sections A.3.2 through A.3.7 describe the organization of the different accounting packets.

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 A-2 illustrates the general format of the accounting packet.

Figure A-2 Accounting Packet Format



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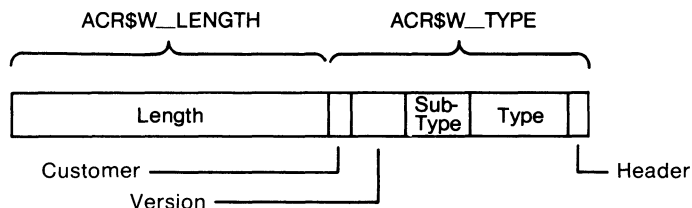
Accounting packets need not use each type of data field. See Sections A.3.2 through A.3.7 for complete descriptions of the fields contained in each accounting packet.

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 A-3 illustrates the accounting packet header; Table A-4 describes the fields in this header. The type field in the accounting packet header is subdivided into five fields. Table A-5 describes these fields.

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A.3 Accounting Packets

Figure A-3 Accounting Packet Header Format



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Table A-4 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 A-5.
length	ACR\$W_LENGTH	Total length of the packet (word).

Table A-5 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 (3 bits) are:

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

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A.3 Accounting Packets

Table A-5 (Cont.) ACR\$W_TYPE Fields

Field	Symbolic Offset	Contents
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)

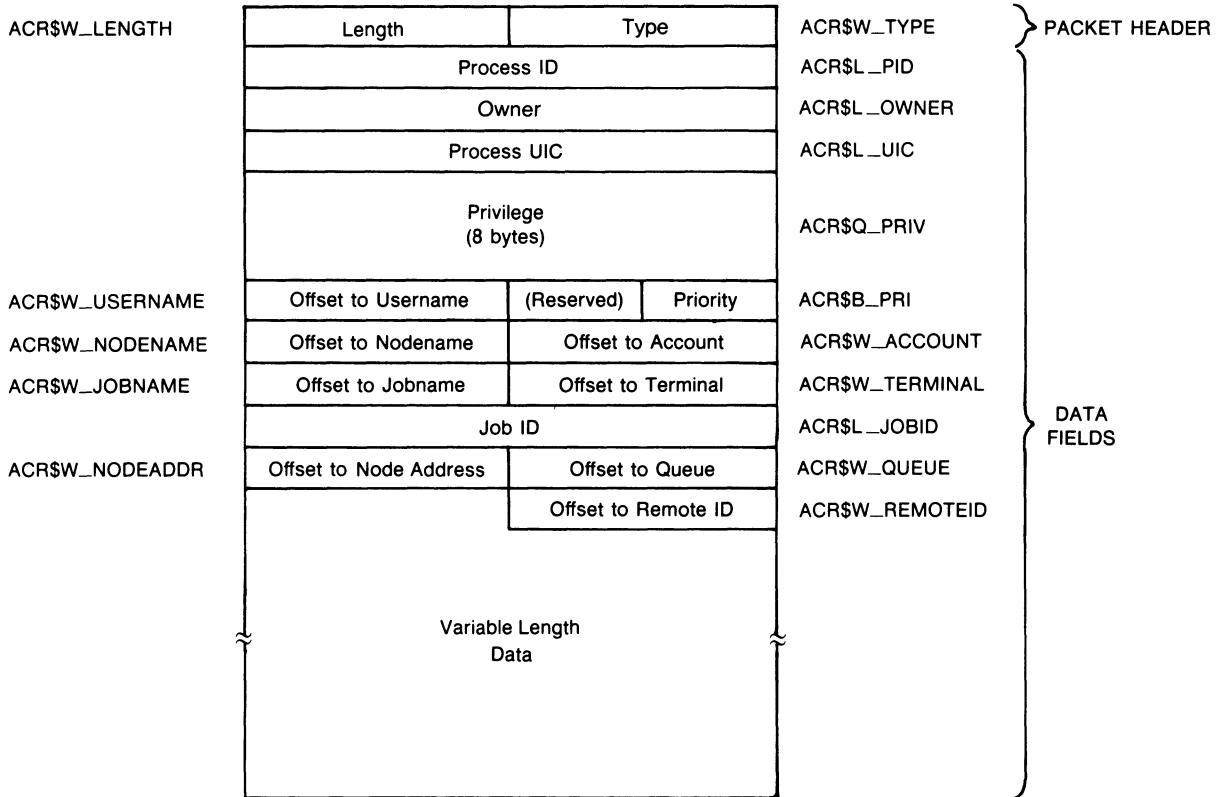
The identification packet identifies the process that caused information to be sent to the accounting manager.

Figure A-4 depicts the organization of the identification packet; Table A-6 describes the fields contained in the packet. See Section A.3.1 for more information on the packet header.

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A.3 Accounting Packets

Figure A-4 ACR\$K_ID Format



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Table A-6 ACR\$K_ID Fields

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)
priority	ACR\$B_PRI	Priority of the process. (byte)

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Table A-6 (Cont.) ACR\$K_ID Fields

Field	Symbolic Offset	Contents
user name	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)
job name	ACR\$W_JOBNAME	Offset to counted ASCII string containing the job name of the process. (word)
job ID	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	Offset to a counted ASCII string containing the remote node address. (word)
remote ID	ACR\$W_REMOTID	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)

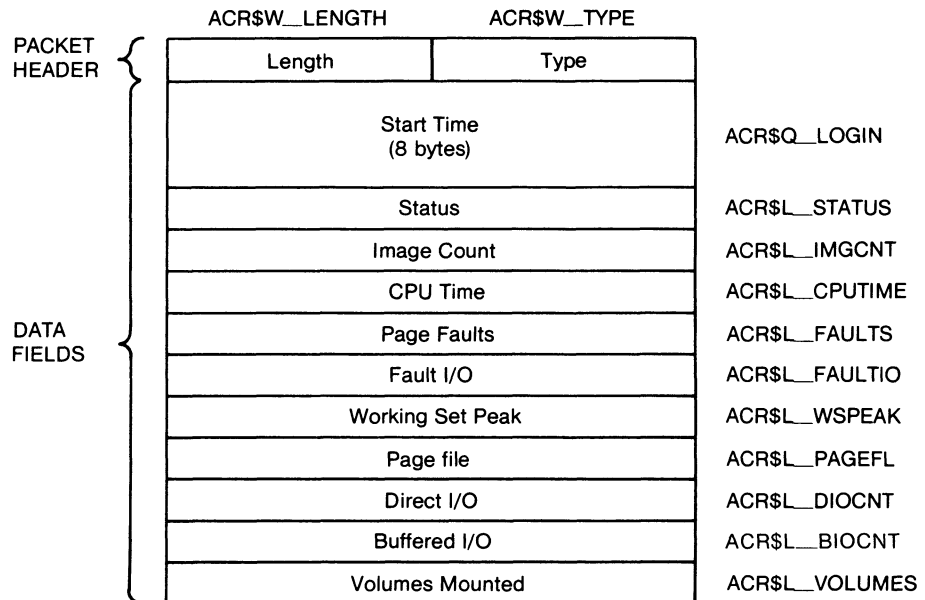
The resource packet contains information on the identified process.

Figure A-5 depicts the organization of the resource packet; Table A-7 describes the fields contained in the packet. See Section A.3.1 for more information on the packet header.

Supplemental ACCOUNTING Information

A.3 Accounting Packets

Figure A-5 ACR\$K_RESOURCE Format



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Table A-7 ACR\$K_RESOURCE Fields

Field	Symbolic Offset	Contents
start time	ACR\$Q_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)
cpu time	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)
working set peak	ACR\$L_WSPEAK	Peak working set of the process or image. (longword)
page file	ACR\$L_PAGEFL	Peak page file usage of the process or image. (longword)
direct I/O	ACR\$L_DIOCNT	Direct I/O count of the process or image. (longword)
buffered I/O	ACR\$L_BIOCNT	Buffered I/O count of the process or image. (longword)

Supplemental ACCOUNTING Information

A.3 Accounting Packets

Table A-7 (Cont.) ACR\$K_RESOURCE Fields

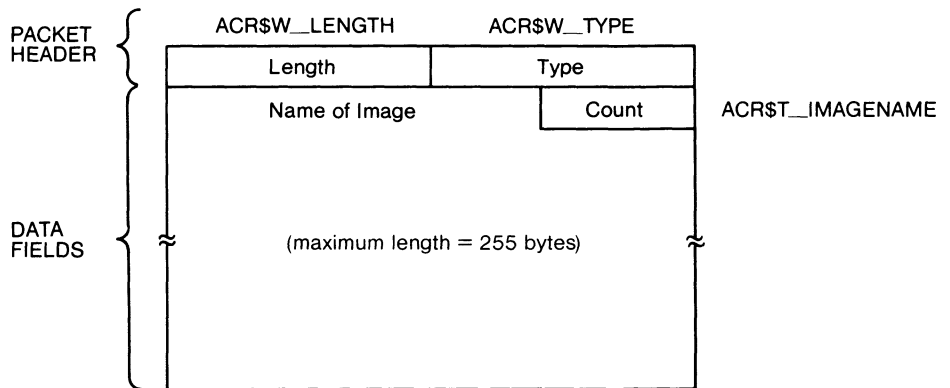
Field	Symbolic Offset	Contents
volumes mounted	ACR\$L_VOLUMES	Number of volumes mounted by the process or image. (longword)

A.3.4 Packet Type ACR\$K_IMAGENAME (Image Name Packet)

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

Figure A-6 depicts the organization of the image name packet; Table A-8 describes the field contained in the packet. See Section A.3.1 for more information on the packet header.

Figure A-6 ACR\$K_IMAGENAME Format



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Table A-8 ACR\$K_IMAGENAME Field

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

A.3.5 Packet Type ACR\$K_PRINT (Print Resource Packet)

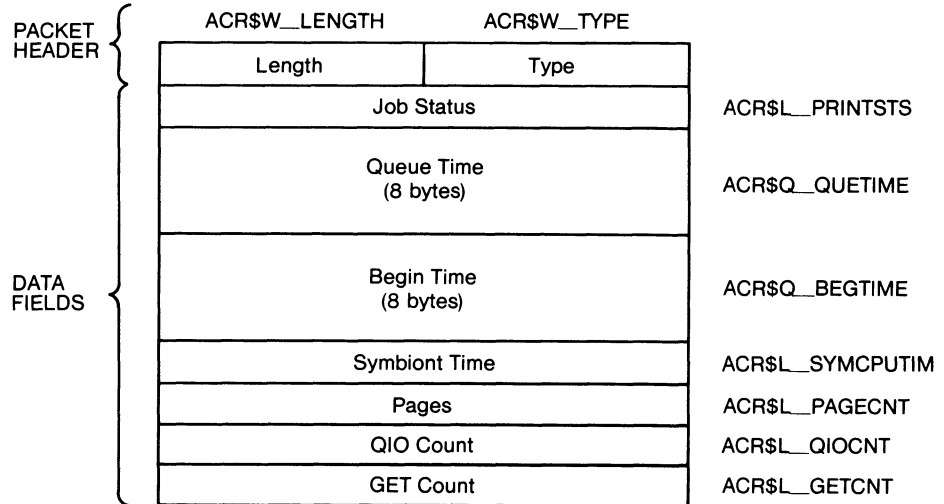
The print resource packet contains information on printer jobs.

Figure A-7 depicts the organization of the print resource packet; Table A-9 describes the fields contained in the packet. See Section A.3.1 for more information on the packet header.

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A.3 Accounting Packets

Figure A-7 ACR\$K_PRINT Format



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Table A-9 ACR\$K_PRINT Fields

Field	Symbolic Offset	Contents
job status	ACR\$L_PRINTSTS	Status of the print job. (longword)
queue time	ACR\$Q_QUETIME	Time the job was queued. (64-bit binary time)
begin time	ACR\$Q_BEGTIME	Time the job was started. (64-bit binary time)
symbiont time	ACR\$L_SYMCPUTIM	Total symbiont CPU time. (longword)
pages	ACR\$L_PAGECNT	Total number of pages printed. (longword)
QIO count	ACR\$L_QIOCNT	Total number of QIOs issued. (longword)
GET count	ACR\$L_GETCNT	Total number of GETs issued. (longword)

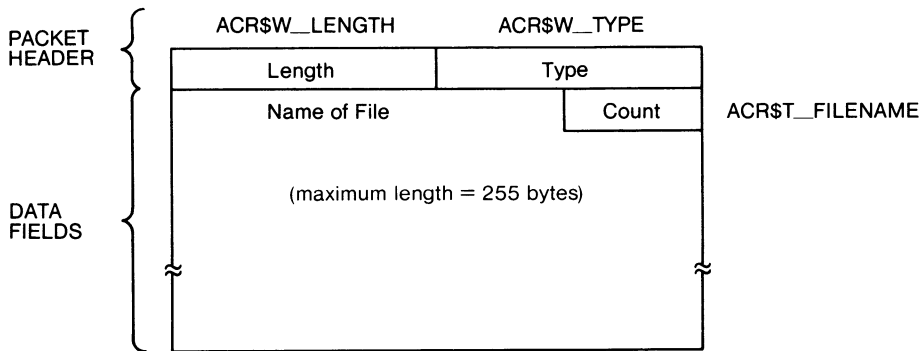
A.3.6 Packet Type ACR\$K_FILENAME (File Name Packet)

The file name packet contains the name of the accounting file to point to or modify. Figure A-8 depicts the organization of the file name packet; Table A-10 describes the field contained in the packet. See Section A.3.1 for more information on the packet header.

Supplemental ACCOUNTING Information

A.3 Accounting Packets

Figure A-8 ACR\$K_FILENAME Format



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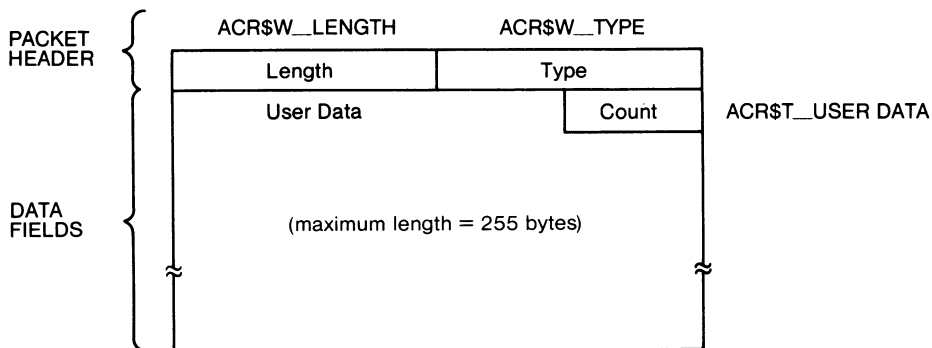
Table A-10 ACR\$K_FILENAME Field

Field	Symbolic Offset	Contents
file name	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 A-9 depicts the organization of the user data packet; Table A-11 describes the fields contained in the packet. See Section A.3.1 for more information on the packet header.

Figure A-9 ACR\$K_USER_DATA Format



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A.3 Accounting Packets

Table A-11 ACR\$K_USER_DATA Field

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

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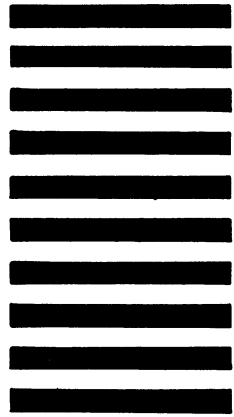


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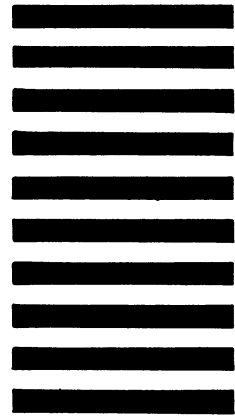
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