

Systems

**OS/VS Environmental
Recording Editing and
Printing (EREP) Program**

IBM

First Edition (January 1977)

This edition applies to Release 5 and 6 of OS/VS1 and to Release 1.7 (SVS) and to Releases 3.0, 3.6 and 3.7 (MVS) of OS/VS2, and to all subsequent releases of VS1, SVS or MVS until otherwise indicated in new editions or Technical Newsletters.

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Preface

This publication describes how EREP can be used to generate reports containing different errors and system conditions recorded on SYS1.LOGREC and/or Accumulation data sets can be retrieved and examined.

The OS/VS Environmental Recording Editing and Printing (EREP) Program supports all OS/VS versions and hardware (except the 1445) that are supported by:

- OS/VS1 Release 5 and Release 6.
- OS/VS2 Release 1.7 (SVS).
- OS/VS2 Release 3.0, Release 3.6 and Release 3.7 (MVS).

This provides a common EREP program across all OS/VS operating systems.

EREP support of device error records does not imply operating system support of the devices.

Note: Wherever Region occurs in reference to VS1, Partition is understood.

Contents

This publication contains four parts:

- “Part 1: Introduction” describes the overall functions of EREP.
- “Part 2: Retrieving and Writing Records from SYS1.LOGREC and/or Accumulation Data Sets” shows how to use EREP to edit, summarize, and print error information from the records on the SYS1.LOGREC and/or Accumulation data set.
- “Part 3: EREP Output” shows examples of the output which can be used for specific diagnostic and/or reliability measurement requirements.
- “Part 4: Error Incident Records” describes the format of each record on SYS1.LOGREC and/or Accumulation data sets.

Associated Publications

- *OS/VS Utilities*, GC35-0005, describes how to use utility programs to print certain types of service aid output and to allocate data sets with the IEHPROGM utility.
- *OS/VS1 Recovery Management Support Logic*, SY24-5170 describes the function and logic of the machine check handler, the channel check handler, and dynamic device reconfiguration.
- *OS/VS2 Recovery Management Support Logic*, SY27-7250, describes the function and logic of the channel check handler, dynamic device reconfiguration, the machine check handler, and the missing interruption handler.

- *OS/VS1 SYS1.LOGREC Error Recording Logic*, SY28-0669, describes the internal logic of IFCDIP00, IFCEREPO, and the system recording routines: DDR recorder, the deferred incident recorder, MCH emergency recorder, MCH error recorder, miscellaneous data recorder, outboard recorder, SVC 76, SVC 91, and VTAM SYS1.LOGREC recorder.
- *OS/VS2 SYS1.LOGREC Error Recording Logic*, SY28-0678, describes the internal logic of IFCDIP00, IFCEREPO, and the system recording routines: asynchronous recording facility, DDR/MIH recorder, MCH emergency recorder, OBR/MDR recorder, SVC 76, and SVC 91.
- *OS/VS Environmental Recording Editing and Printing (EREP) Program Logic*, SY28-0773, describes the internal logic of IFCEREP1.
- *OS/VS1 SYS1.LOGREC Error Recording*, GC28-0668, describes how to use the IFCDIP00 and IFCEREPO service aid programs and how error records are built and recorded on SYS1.LOGREC.
- *OS/VS2 SYS1.LOGREC Error Recording*, GC28-0677, describes how to use the IFCDIP00 and IFCEREPO service aid programs and how errors records are built and recorded on SYS1.LOGREC.
- *OS/VS SYS1.LOGREC Error Recording*, GQ28-0638, describes how to use the IFCDIP00 and IFCEREPO service aid programs. **(SVS only)**
- *OS/VS SYS1.LOGREC Error Recording Logic*, SQ68-0639, describes the internal logic of IFCDIP00, IFCEREPO, and the error recording routines: Outboard recorder Miscellaneous Data recorder, SVC 76, SVC 91, and 3330 DDR recorder. **(SVS only)**
- *OS/VS Message Library: Service Aids and OLTEP Messages*, GT00-0129, describes the messages issued by IFCDIP00 and IFCEREPO service aid programs. **(SVS only)**
- *OS/VS1 Message Library: Service Aids and OLTEP Messages*, GC23-0005-0 – describes the messages issued by IFCDIP00, IFCEREPO and IFCEREP1 service aid programs.
- *OS/VS2 Message Library: Service Aids and OLTEP Messages*, GC23-0006-0, describes the messages issued by IFCDIP00, IFCEREPO and IFCEREP1 service aid programs.
- *OS/VS1 JCL Reference*, GC24-5099, describes how to use job control statements to override default parameters, use cataloged procedures, allocate space for data sets, and code job control statements.
- *OS/VS2 JCL*, GC28-0692, describes how to use job control statements to override default parameters, use cataloged procedures, allocate space for data sets, code job control statements, and how to use JES2 control statements with other JCL statements.

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Part 1: Introduction

EREP is a service aid program that provides information for management and maintenance of a computer system.

Basic Functions

EREP can perform the following functions:

- Create an Accumulation data set from the SYS1.LOGREC data set and clear SYS1.LOGREC.
- Copy an Input Accumulation data set to an Output Accumulation data set.
- Merge data from an Accumulation data set and SYS1.LOGREC.
- Print a detailed description of the hardware and software error records.
- Summarize and print statistics for device failures.
- Format reliability measurement data.

Create an Accumulation Data Set from the SYS1.LOGREC Data Set and Clear SYS1.LOGREC

EREP can create an Accumulation data set (history) from SYS1.LOGREC either selectively by record criteria or in full. Whenever a full copy is created, the SYS1.LOGREC can be cleared.

Copy an Input Accumulation Data Set to an Output Accumulation Data Set

EREP can generate an output data set from an input Accumulation data set. The output can be a full copy of the input or can be a selective copy containing only the desired record types. One output data set can be generated from several input data sets by concatenating the input DD statements. Records can be blocked or unblocked on input or output, except that mixed blocked and unblocked input cannot be concatenated.

Note: The input Data set with largest blocksize must appear first in the input stream. All JCL conventions for concatenated data sets must be adhered to.

Merge Data from an Accumulation Data Set and SYS1.LOGREC

EREP can accept input from both an Accumulation data set and SYS1.LOGREC in a single job step. The output data set can be a full copy of both input data sets or can be a selective copy containing only the desired record types. The input Accumulation data set may be blocked or unblocked; SYS1.LOGREC is unblocked. The output Accumulation data set may be blocked or unblocked.

Print Detailed Description of the Hardware and Software Error Records

All records or selected records on the input data set can be printed in a detailed format which is dependent upon record type.

Summarize and Print Statistics for Device Failures

Data contained on SYS1.LOGREC and/or an Accumulation data set can be summarized by device type or system function. Several system reports are available via parameter keywords, e.g., PRINT = SU initiates a summary report of all device error records on the input data set. See the discussion on keywords for a detailed description of each and the reporting functions initiated by specific keywords.

Format Reliability Measurement Data

EREP can format a report of reliability data from IPL records on an Accumulation data set.

EREP Reporting Functions

During an EREP execution only one of the following functions can be performed:

- System Summary Reporting
- Trend Reporting
- Event History Reporting
- Media Error Statistics/Threshold Reporting
- Record Detail and Summary Reporting
- RDE Summary Reporting

System Summary Reporting

EREP can be used to generate a comprehensive condensed report of errors for the principal system elements. The System Summary provides data in two major categories:

- CPU/Channels/Storage/SCP
- Condensed I/O Subsystem Summary

The I/O subsystem summary reflects a shared I/O environment, if present, and if the shared configuration has been defined via control cards.

When the input data set includes SYS1.LOGREC an Accumulation (history) data set can be generated and SYS1.LOGREC cleared.

Trend Reporting

This function enables the user to specify a time frame – a maximum of 30 days – for which data is to be summarized by daily activity. The number of days reported depends on the input data and parameters. When no date range is specified, seven days of data ending with the current day are presented.

Event History Reporting

EREP can be used to generate a report of one line abstracts of all records recorded within a specified time frame. This report also permits examination of selected record types within the context of the overall recorded activity.

Media Error Statistics/Threshold Reporting

EREP can be used to generate reports of error statistics for 3410 and 3420 tape subsystems or a summary report for a 3420 tape subsystem. The keywords: **MES** or **THRESHOLD** initiate these functions. **MES** generates a report of error statistics by channel/unit address and volume serial number for both the 3410 and 3420 tape subsystems. **THRESHOLD** initiates a 3420 tape subsystem summary which contains:

1. Media statistics, for tape volumes that have exceeded the defined threshold error rates, for each tape subsystem (CUA).
2. A listing of all **UNIT CHECKS** (permanent read, permanent write and equipment check errors).
3. An error report for each tape drive on the subsystem.
4. A listing of all tape volumes processed by the system that exceed the defined error thresholds. This listing is for the customer's use in tape volume maintenance.

Either **MES** or **THRESHOLD** but not both, keywords can be used during a single execution of EREP.

Record Detail and Summary Reporting

EREP can be used to edit and print all or any selected records on the input data set. Data from the records can be summarized and the summary printed. The parameter – **PRINT** – indicates whether detailed and/or summaries are to be printed. See Part 2 for **PRINT** options.

RDE Summary Reporting

If RDE has been included as a system option, EREP can be used to generate a summary of IPL and error records from an Accumulation data set. Control information must be input via control cards following the **SYSIN DD** statement to specify the reporting period and the IPL clustering interval.

- An IPL report that contains each IPL in sequence, with the date and time of the IPL, the reason for the IPL, the subsystem, if any, that was responsible for the IPL, and the amount of time lost between successive IPLs. In addition for VS2, the average time between IPLs and a summary of lost time is printed on the report.
- A system error report that contains a count of the errors for each device type, CPU, and channel in the system. The error count is divided into two types: (1) severe errors — errors which required that the system be stopped and reinitialized, and (2) non-severe errors — errors that affected system performance but did not require that the system be reinitialized.

Refer to Part 2 of this book for the keywords required to initiate specific reporting and/or record selection and to Part 3 for illustrations of the output generated by EREP.

SYS1.LOGREC Offload

This function is provided as an emergency capability to clear SYS1.LOGREC at a time when it is imperative to clear the data set and not feasible to execute EREP using the normal execution. Offload is a separate program for execution purpose and is named IFCOFFLD. A System Summary Report and an Accumulation data set are the generated output.

Part 2: Retrieving and Writing Records from SYS1.LOGREC and/or Accumulation Data Sets

The service aid program IFCEREP1 can be used to retrieve all or selected records from the input data set(s), edit the records, and write them to any specified output device supported by the Queued Sequential Access Method (QSAM). A direct access device is required for allocation of a temporary work data for all functions, except System Summary and Trend Reporting, whenever the input is an Accumulation data. The access method utilized for sequentially writing this temporary data is BSAM. SYS1.LOGREC is processed both sequentially and randomly using the EXCP access method.

If the input is SYS1.LOGREC, the SDR (statistical data recorder) counters are dumped resulting in the generation of long and/or short OBR records or MDR records only when the following functions are required:

- System Summary Reporting
- Trend Reporting
- Media Error Statistics Reporting
- Threshold Reporting
- Edit and Summary Reporting when the keyword DEV is specified
- Detailed, Record Reporting and generating an Accumulation data set and clearing SYS1.LOGREC

Executing IFCOFFLD

Program IFCOFFLD is a special purpose load of EREP modules which is provided for clearing SYS1.LOGREC, under emergency conditions, without losing the data recorded thereon. A member of SYS1.PROCLIB should be created so that the operator can start the job from the console. See example 14.

There are no parameters allowed when executing IFCOFFLD.

- SYS1.LOGREC is input.
- ACCDEV is the output data set.
- System Summary Report is printed.
- SDR counters are not dumped to Short OBR records.

Specifying Keyword Parameters for EREP

EREP uses parameters, specified in the PARM field on the EXEC statement, to determine the functions requested and any restrictions placed on the records to be processed. Figure 1 summarizes the syntax of the EREP keyword parameters. Specifying keyword parameters for each application of the EREP program requires:

- Separating all keyword parameters with commas, when more than one keyword parameter is specified in the PARM field on the EXEC statement.
- Enclosing all the keyword parameters in the PARM field on the EXEC statement within a single pair of apostrophes or parentheses.
- Those keywords which have operands Y or N may be abbreviated to the keyword, only, to imply the Y operand. For example: ACC implies ACC= Y. Keyword combinations which are accepted or not accepted are shown in Figures 2 and 3.

$$\text{ACC} \left[= \begin{Bmatrix} \text{Y} \\ \text{N} \end{Bmatrix} \right]$$

Default exceptions are: MES, RDESUM and THRESHOLD

CPU = (serial. model [, serial. model])
Maximum of 7 entries

CPUCUA = (serial. addr, serial. addr [, serial. addr])
Maximum of 4 entries

CUA = (entry [, entry])
Maximum of 8 entries

DATE = (yyddd [, yyddd])
Single date or date range

DEV = (type [, type])

DEVSER = (serial [, serial])
Maximum of 8 entries

ERRORID = (seqno [, cupid, asid, hh, mm, ss, t])

$$\text{EVENT} \left[= \begin{Bmatrix} \text{Y} \\ \underline{\text{N}} \end{Bmatrix} \right]$$

$$\text{HIST} \left[= \begin{Bmatrix} \text{Y} \\ \underline{\text{N}} \end{Bmatrix} \right]$$

Default exception is: RDESUM

LIBADR = address

Figure 1. EREP Keyword Parameters (Part 1 of 3)

LINECT = nnn
Number of lines

MES $\left[= \left\{ \begin{array}{c} \underline{Y} \\ \underline{N} \end{array} \right\} \right]$

MERGE $\left[= \left\{ \begin{array}{c} \underline{Y} \\ \underline{N} \end{array} \right\} \right]$

MOD = (model [, model])
Maximum of 4 entries

PRINT = $\left\{ \begin{array}{c} \underline{SU} \\ \underline{PS} \\ \underline{PT} \\ \underline{NO} \end{array} \right\}$

RDESUM $\left[= \left\{ \begin{array}{c} \underline{Y} \\ \underline{N} \end{array} \right\} \right]$

SHORT $\left[= \left\{ \begin{array}{c} \underline{Y} \\ \underline{N} \end{array} \right\} \right]$

SYMCDE = $\left\{ \begin{array}{c} \underline{nnnn} \\ \underline{nnnX} \\ \underline{nnXX} \\ \underline{nXXX} \end{array} \right\}$

SYSUM $\left[= \left\{ \begin{array}{c} \underline{Y} \\ \underline{N} \end{array} \right\} \right]$

TABSIZE = size K
Default = 24K

TERMN = name

Figure 1. EREP Keyword Parameters (Part 2 of 3)

THRESHOLD = (xxx, yyy)

TIME = (hhmm, hhmm)

TRENDS $\left[= \begin{Bmatrix} Y \\ \underline{N} \end{Bmatrix} \right]$

TYPE = [C] [D] [E] [H] [I] [M] [O] [S] [T]

VOLID = (volser [, volser])
Maximum 4 entries

ZERO $\left[= \begin{Bmatrix} Y \\ \underline{N} \end{Bmatrix} \right]$

Figure 1. EREP Keyword Parameters (Part 3 of 3)

Keyword Parameters

ACCUMULATE

$$\text{ACC} \left[= \left\{ \frac{Y}{N} \right\} \right]$$

Default: ACC=Y, except for MES, RDESUM and THRESHOLD

Indicates: Whether selected records are to be accumulated in an Accumulation data set.

Notes: The output data set must be defined with an ACCDEV DD statement, when ACC=Y is specified or defaulted.

CPU

CPU = (serial. model [, serial. model]), maximum of 7 entries
where serial is the CPU serial number
model is the CPU model designation

Default: CPU identification is not a selection criterion.

Indicates: That only records with the specified CPU model and serial number are to be processed. The serial number is six decimal digits and the CPU model is four decimal digits; for example:

```
CPU=(123456.0155)
CPU=(234567.0155,987654.0168)
```

The following numbers are valid entries for model:

```
0135  0145  0155  0165  3062
0138  0148  0158  0168
```

CPUCUA

CPUCUA=(serial. addr, serial. addr [, serial. addr], maximum of four entries
where serial is the CPU serial number
addr is a unique device address

Default: CPUCUA is not a selection criterion.

Indicates: That only records with the specific CUAs on the specific CPUs will be processed. At least two entries must be present for this parameter. The serial number is six decimal digits and the unique device address is three hexadecimal digits; for example:

```
CPUCUA=(123456.2C0,987654.1B5)
```

- Notes:**
- This parameter implies multi-system input, but does not imply shared I/O devices.
 - Efficiency is increased by specifying only the record types desired. Type= DTHO is assumed.
 - For direct access devices the CUA in this parameter is physical address rather than logical (plug) address.

CUA

CUA=(entry [, entry]), maximum of 8 entries
where entry = addr or addr – addr
addr is three characters

- addr – addr specifies a range of continuous hexadecimal addresses and may include more than one channel and control unit. The lower address must be specified first.
- addr specifies a hexadecimal address or group of hexadecimal addresses. The format of the address may be nXX, nnX, or nnn (e.g., 1XX, 38X, or 49C). If nXX is specified, all CUAs on channel 'n' are processed. If nnX is specified, all devices on channel control unit 'nn' are processed.

Default: CUA is not a selection criterion.

Indicates: That records related to specific channel and/or unit addresses (CUAs) are to be processed.

Examples:

CUA=(12C)
CUA=(123,32X,4XX)
CUA=(123–320,4B0-C00).

- Notes:**
- TYPE=CTDO is assumed.
 - Efficiency is increased by specifying only the record types desired.
 - For direct access devices this parameter is the physical address rather than the logical (plug) address.

DATE

DATE=(yyddd [,yyddd])
where yyddd is a year/Julian day specification

Default: Date is not a selection criterion unless TRENDS is specified. If TRENDS has been specified, the default is to process seven days of data ending with the current date.

Indicates: The date span for selecting records.

- The first yyddd represents the year and date (of that year) when the time period begins.
- The second yyddd represents the year and day when the period ends.

For example:

DATE=(75236) or
DATE=(74201,75002)

- Notes:**
- If only one yyddd is specified then the specific time period is that day only.
 - The second yyddd must be greater than or equal to the first yyddd.

DEVICE

DEV=(type [, type])

where type = device or Ndevice

device is a valid device type or group

Default: Device is not a selection criterion.

Each device type specified must be four decimal digits or two decimal digits and two X's. To exclude a particular device type, the device must be preceded by an 'N'.

For example:

DEV=(3420)
or DEV=(33XX, 3705)
or DEV=(N2400,N33XX)

The following device types are valid entries for DEV:

1015	2282	2702	3330	3890
1052	2301	2703	3340	3895
1053	2302	2715	3350	5450
1275	2303	2955	3410	
1285	2305	3066	3420	
1287	2311	3158	3505	
1288	2314	3168	3525	
1403	2321	3203	3540	
1419	2400	3210	3670	
1442	2495	3211	3705	
1443	2501	3213	3791	
2150	2520	3215	3800	
2250	2540	3277	3838	
2260	2671	3284	3850	
2280	2701	3286	3886	

This parameter allows specifying devices as well as a class of devices such as 33XX or an exclusion of devices. A device that is emulating another device should be requested as the emulated device.

Notes:

- Both the selection of a particular device type and the exclusion of a particular device type is invalid, e.g., DEV=(3330, N2400) is invalid.
- If DEV=3410 or DEV=3420 is specified, both device types are included in the report.
- If DEV=3284 or DEV=3286 is specified, both devices are included in the report for MDR records.
- If DEV=3277 is specified, devices 3284, 3286 and 3277 are all included in the report for MDR records.
- An internal table is used to hold the device entries with a limit of 16. There are two tables, one for MDR records and one for DDR, MIH, OBR records. The single devices normally generate one entry with following exceptions:

<u>Device</u>	<u>No. Entries</u>	<u>Record Types</u>
2305	2	DDR, MIH, OBR
1275	2	DDR, MIH, OBR
1419	2	DDR, MIH, OBR
2540	2	DDR, MIH, OBR
3705	4	DDR, MIH, OBR
3330	2	DDR, MIH, OBR
3284	2	MDR
3277	4	MDR
3886	2	MDR

A class of devices such as 33XX will generate entries for all the XX values.

- TYPE=DTHO is assumed. Efficiency is increased by specifying only the record types desired.

DEVICE SERIAL NUMBER

DEVSER=(serial[,serial]), maximum of eight entries
where serial is a valid device serial number

Default: Device serial is not a selection criterion.

Indicates: That only records with the specified device serial number(s) are to be processed. The device serial number refers to the six decimal digits given in the service data (at present, this only applies to 3410/3420 devices). For example:

DEVSER=(012345)

- Notes:**
- If DEVSER is specified, device type (DEV) must either be specified as 3410 or 3420 or 34XX or will be assumed to be 3410/3420.
 - This parameter is allowed only for MES or THRESHOLD processing.

ERROR IDENTIFIER

ERRORID=(seqno [, cpuid, asid, hh, mm, ss, t])

seqno is a 5 decimal digit error identifier

cpuid is a 2 hexadecimal digit CPU identifier, the valid values are 00, 40 or 41

asid is a 4 hexadecimal digit address space id

hh is a 2 decimal digit hour

mm is a 2 decimal digit minute

ss is a 2 decimal digit second

t is a 1 decimal digit tenths of second

Default: Error id is not a selection criterion.

Indicates: That only records with the specified error sequence number (and cpuid, asid, hh, mm, ss, t if specified) will be processed, for example:

ERRORID=(01234) or
ERRORID=(23456,00,0012,06,21,31,6)

- Notes:**
- If only seqno is specified, only error identifier checking will be performed.
 - This parameter is applicable only to MCH and software records generated by MVS.
 - TYPE=MS (either or both) must be specified.
 - DATE must also be specified.

EVENT HISTORY

EVENT $\left[= \begin{Bmatrix} Y \\ N \end{Bmatrix} \right]$

Default: No Event History Report.

Indicates: That a report providing one line abstracts of all or selected records, in chronological order, is prepared and printed.

Note: If DEV, CUA, TYPE, DATE, and/or TIME are specified, only the records meeting those qualifications will be processed. If none of these are coded, an Event History will be produced for all records.

HISTORY

HIST $\left[= \left\{ \begin{array}{c} Y \\ \underline{N} \end{array} \right\} \right]$

- Default:** No Accumulation data set as input, except when requesting RDESUM then the default is HIST=Y.
- Indicates:** Whether the input data set is the Accumulation data set. When HIST is coded, the input data set must be defined with an ACCIN DD statement.
- Notes:**
- When HIST and/or MERGE are not coded, the input data set is specified on the SERLOG DD statement.
 - When more than one Accumulation data set is input, DD statement(s) concatenated to the ACCIN DD statement are required.

LINE INTERFACE BASE ADDRESS

LIBADR=address
where address is a four hexadecimal digit line interface base address

- Default:** Line interface base address is not a selection criterion.
- Indicates:** That MDR or MDR and OBR records relative to the line interface base address specified are processed; for example:

LIBADR=023D

- Notes:** When LIBADR is specified, device type (DEV) should also be specified, or will be assumed to be 3705.

LINE COUNT

LINECT=nnn
where nnn is one to three decimal digits.

- Default:** 50 lines per page.
- Indicates:** The number of lines to be printed on a page; for example:

LINECT=75 or
LINECT=121

- Note:**
- This value applies to the EREPPT data set when System Summary, Trend Report, or Event History has been requested and to the TOURIST data set.
 - If LINECT=0 is coded, the default is assumed.

MEDIA ERROR STATISTICS

MES $\left[= \left\{ \begin{array}{c} \underline{Y} \\ \underline{N} \end{array} \right\} \right]$

Default: No Media Error Statistics Report.

Indicates: Whether error statistics by channel/unit address and volume serial number are to be summarized and printed.

Notes:

- This parameter is valid for only the 3410 and 3420 magnetic tape subsystems.
- Only OBR records are processed.

MERGED INPUT

MERGE $\left[= \left\{ \begin{array}{c} \underline{Y} \\ \underline{N} \end{array} \right\} \right]$

Default: No merged input.

Indicates: That input will be from both the Accumulation data set and the SYS1.LOGREC data set.

Notes:

- Both the SERLOG DD and ACCIN DD statements must be present.
- If more than one history data set is to be input, DD statement(s) concatenated to the ACCIN DD statement are required.

CPU MODEL

MOD=(model [, model]), maximum of 4 entries
where model is the CPU model number

Default: Process all models.

Indicates: That records created by specific machine model(s) (CPU) are to be processed. The operand may be either three or four decimal digits in length; for example.

MOD=(158,3062)

Note: See CPU parameter for valid entries for model.

PRINT

PRINT = $\left\{ \begin{array}{c} \underline{SU} \\ \underline{PS} \\ \underline{PT} \\ \underline{NO} \end{array} \right\}$

Default: PRINT=SU, which produces a summary print for each selected record type(s).

Indicates: The *print format* for edit and/or summary record reports.

<i>Code</i>	<i>Meaning</i>
SU	Suppress full printing (print summary only)
PS	Print full record and summary
PT	Suppress summary printing (print full record only)
NO	Suppress full printing and summary printing

Note: If PRINT=SU or PRINT=NO and ZERO are coded, ACC=Y should be coded or will be assumed.

RDE SUMMARY

RDESUM $\left[= \begin{Bmatrix} Y \\ N \end{Bmatrix} \right]$

Default: No RDE summary.

Indicates: Whether the RDE summary function of EREP is to be run. It produces an IPL report and a hardware error report from the IPL and error records on the Accumulation data set.

- Notes:**
- This parameter is valid only when the RDE option has been included in the system.
 - The Accumulation data set is referenced by the ACCIN DD statement.
 - HIST is assumed if not coded.
 - An RDE Control Card specifying at least a Report Starting Date must be provided. See Control Card Specifications.

SHORT OBRs

SHORT $\left[= \begin{Bmatrix} Y \\ N \end{Bmatrix} \right]$

Default: Suppress detail printing of short OBR records.

Indicates: Whether short OBR records are printed when printing OBR records. However, the information in the short OBR records is included in the OBR record summary.

FAULT SYMPTOM CODE

SYMCDE = $\begin{bmatrix} \text{nnnn} \\ \text{nnnX} \\ \text{nnXX} \\ \text{nXXX} \end{bmatrix}$

where n is a hexadecimal digit, and
X is a character

Default: Symptom code is not a selection criterion.

Indicates: That fault symptom codes (bits set in a two byte field of the 33XX sense data in an OBR record) are to be processed. If "X" has been specified, "any" code (0000 through 1111) will be accepted; for example:

<i>Parameter</i>	<i>Bit Mask</i>
SYMCDE=4032	0100 0000 0011 0010
SYMCDE=193X	0001 1001 0011 any
SYMCDE=92XX	1001 0010 any any
SYMCDE=9XXX	1001 any any any

Notes: DEV should be specified as 33XX or will be assumed to be 33XX.

SYSTEM SUMMARY

$\text{SYSUM} \left[= \left\{ \begin{array}{c} \text{Y} \\ \text{N} \end{array} \right\} \right]$

Default: No System Summary report.

Indicates: That a System Summary report is to be generated.

- Notes:**
- DATE and TIME may be used to restrict the range of the summary. No other parameters that restrict output can apply.
 - If ACC=Y is specified or assumed, and DATE and/or TIME are not specified, then the SYS1.LOGREC data set will be cleared.
 - If the SYS1.LOGREC data set is being input, ZERO may be specified, unless DATE and TIME are specified.
 - If ZERO has been specified, ACC=Y must be specified or assumed.

SORT TABLE SIZE

TABSIZE=size K

where size is a one, two, or three decimal digit number

Default: Table size of 24K.

Indicates: The size of the sort table to be used when selecting records for processing. Each one (1) K of table size will hold approximately 100 records. For example:

TABSIZE=8K
TABSIZE=64K

Note: If a value greater than 24K is specified for table size, the region size should be incremented accordingly.

TERMINAL NAME

TERMN=name
where name is a valid terminal name

Default: Terminal name is not a selection criterion.

Indicates: That OBR records produced by devices supported by a TP access method such as VTAM or TCAM are to be selected by terminal name. One to eight alphameric characters, representing any valid terminal name, can be specified; for example:

TERMN=T001 or
TERMN=TERM0025

THRESHOLD

THRESHOLD=(xxx, yyy)
where xxx is the 1 to 3 decimal digit threshold value for temporary read errors
yyy is the 1 to 3 decimal digit threshold value for temporary write errors

Requests a 3410/3420 tape subsystem summary report to be generated; for example:

THRESHOLD=(002,005)

With the above threshold values of 2 for read, and 5 for write, only those records with a temporary read error count of 2 or greater or a temporary write error count of 5 or greater are processed.

Notes:

- If device type (DEV) is not specified as 3410 or 3420 or 34XX, 34XX is assumed.
- Only OBR records are processed.

TIME

TIME=(hhmm, hhmm)
where hhmm is a valid time specification

Default: Time of day is not a selection criterion.

Indicates: That only records for the time period specified are to be processed. Each time specification is four decimal digits, specifying the start and end of the time range; for example:

TIME=(1105,1201)
TIME=(1201,1105)

- Notes:**
- Military time (e.g., 1400=2PM) must be used.
 - DATE must be specified.
 - If the second hhmm is greater than or equal to the first hhmm, then the time interval pertains to each day of the date range specified. If the second hhmm is less than the first hhmm, then the time interval is assumed to be crossing a day boundary. The interval will be treated as two subintervals (one ending at 2400, and the other beginning at 0000), each applicable to each day of the range, except the time subinterval ending at 2400 is not applied to the last day and the time subinterval starting at 0000 is not applied to the first day. For example:

DATE=(76001,76002),TIME=(1100,1000)

will retrieve records from 11:00 to 24:00 on day 76001 and 0:00 to 10:00 on day 76002.

TREND REPORT

TRENDS $\left[= \begin{Bmatrix} Y \\ N \end{Bmatrix} \right]$

- Default:** No Trend Report.
- Indicates:** That a Trend Report is to be generated.
- Notes:**
- DATE and TIME may be used to restrict the range of the report. TYPE, DEV, or CUA may be coded to restrict the records processed. Other parameters that restrict output are invalid.
 - If TRENDS has been specified and DATE has not been specified, the default will be to process seven days of data ending with the current date.
 - The maximum date range is 30 days.

TYPE OF RECORD

TYPE=[C] [D] [E] [H] [I] [M] [O] [S] [T]

- Default:** Type is not an explicit selection criterion.

Specifies the record types to be processed:

<i>Code</i>	<i>Meaning</i>
C	CCH (channel inboard) records
D	DDR (dynamic device reconfiguration) records
E	EOD (end-of-day) records
H	MIH (missing interrupt handler) records
I	IPL (initial program load) records
M	MCH (machine check) records
O	OBR (I/O outboard) records
S	Software records
T	MDR (miscellaneous data) records

Any combination of the nine (9) record types can be specified; for example:

TYPE=CM or
TYPE=CEOT

Note: Processing efficiency can be improved by coding TYPE whenever a subset of record types is desired or assumed.

VOLUME SERIAL NUMBER

VOLID=(volser [, volser]), maximum of 4 entries
where volser is a valid volume identification

Default: Volume serial number is not a selection criterion.

Indicates: Which specified volume identification (VOLSER) used by the 3410 and 3420 tape subsystem and 33XX direct access subsystems, are to be selected. Each specified VOLID, representing a valid VOLSER, can be one to six alphameric characters in length; for example:

VOLID=(TPEONE,TAPE2,TAPE03,4) or
VOLID=(TAPE5,123)

Notes:

- If VOLID and MES (or THRESHOLD) has been specified, only the specific volumes indicated will be selected for media error statistics or threshold reports. Device type 3410/3420 should be coded or will be assumed.
- If MES or THRESHOLD has not been specified, device type 33nn should be coded or 33XX will be assumed.

ZERO LOGREC

ZERO $\left[= \begin{Bmatrix} Y \\ N \end{Bmatrix} \right]$

Default: See notes.

- Indicates:** Whether the SYS1.LOGREC data set is to be reset to the cleared state after all the records are successfully written out on a printer or to an Accumulation data set.
- Notes:**
- If SYSUM is coded and ACC=Y is coded or assumed, the SYS1.LOGREC data set will be cleared even if ZERO=N is coded.
 - If an overflow occurs in SORTABLE or DIRECTWK, the data set is not cleared.
 - If ZERO is specified and ACC=Y is assumed or specified and the output data set (defined by the ACCDEV DD statement) cannot be opened or all records cannot be processed due to table overflow, the data set is not cleared.
 - If ZERO and PRINT=SU (or PRINT=NO) are coded, ACC=Y should be coded or will be assumed.
 - ZERO=Y is invalid if any parameters that restrict record selection are specified.

Keyword Parameter Errors

EREP terminates the job step if any syntax errors, duplicate or conflicting keyword parameters are detected.

Figure 2 shows the keyword parameter specifications not accepted by EREP and Figure 3 shows each EREP function with allowable Keyword specifications.

Keyword	ACC	CPU	CPUCUA	CUA	DATE	DEV	DEVSER	ERRORID	HIST	LIBADR	LINCT	MERGE	MOD	SHORT	SYMCDE	TABSIZE	TERMN	TIME	TYPE	VOLID	ZERO	
ACC																						
CPU		X																				
CPUCUA			X																			
CUA				X																		
DATE																						
DEV						X ^①																
DEVSER						X ^①	X															
ERRORID								X														
HIST											X											
LIBADR										X ^②												
LINCT												X										
MERGE																						
MOD													X									
SHORT														X								
SYMCDE															X							
TABSIZE																						
TERMN																	X					
TIME																		X				
TYPE																			X			
VOLID																					X	
ZERO																						X

NOTES: ① Devices 3410 and/or 3420 are allowed.
 ② Device 3705 is allowed.

Figure 2. Keyword Parameter Specifications Not Accepted by EREP

Figure 3. EREP Functions with Allowable Keyword Specifications

Keyword EREP Functions	Keyword																								
	ACC	CPU	CPUCUA	CUA	DATE	DEV	DEVSER	ERRORID	HIST	LIBADR	LINECT	MERGE	MOD	SHORT	SYMCDE	TABSIZE	TERMN	TIME	TYPE	VOLID	ZERO	PRINT=PT	PRINT=PS	PRINT=SU	
EVENT	X			X	X	X			X		X	X				X		X	X						
MES		X		X	X	X ^②	X		X		X	X				X		X		X		X	X	X	
PRINT=PS	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X ^①			
PRINT=PT	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X ^①			
PRINT=SU	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X				
PRINT=NO	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X ^①			
RDESUM											X	X													
SYSUM	X				X				X		X	X				X		X			X ^①				
TREND	X			X	X	X			X		X	X				X		X	X						
THRESHOLD		X		X	X	X ^②	X		X		X	X				X		X		X					

Notes: ① ZERO is acceptable only when no selective parameters are requested and a full print or Accumulation data set is generated.

② Devices 3410 and/or 3420 are allowed.

During an execution of EREP *one* of the above functions is performed. The default function is PRINT=su which is underscored and generates summary reports for all data contained on SYS1.LOGREC; this is the defaulted input.

Control Cards Specifications

EREP processes two types of control cards which are referenced by the SYSIN DD statement.

The RDE control card provides selection criteria for the RDE Summary Report.

The Share Control Card defines the Shared I/O Environment for the System Summary, Trend Reports, and Device Summary Reports.

RDE Control Card

When RDE Summary processing is requested, a control card is required to initiate the function. The format of the input card is:

Columns	Field	Contents	Default
1-6	Identifica- tion	Control card identifier 'CTLCRD'	None — You must specify 'CTLCRD'
11-15	Report Starting Date	Date specified as YYDDD on which report is to begin; must be within 30 days of date of first record on Accumulation data set.	None — You must specify a date.
17-21	Report Ending Date	Date specified as YYDDD on which report is to end	Last available date on Accumulation data set
23-24	IPL Clustering Interval (See Note)	Numeric, clustering interval specified in minutes.	No clustering.
26-80	Company Name	EBCDIC characters.	Blanks.

Note: IPL clustering requests reporting of IPLs within the clustering interval that you specify on the control card. For example, if you specify a clustering interval of 30 minutes, the IPL report prints all groups of IPLs that occurred within 30 minutes of each other.

Share Control Card

I/O device errors are recorded on the SYS1.LOGREC data set of the CPU which is in control at the time of the error. The CPU serial number and primary channel—control unit—device address (CUA) placed in the record reflect the path of the error from the device to the CPU in control. Separate paths exist when the device is shared by different CPUs, the device is attached to a switchable control unit, or alternate paths to a device exist from a single CPU.

Share Control Cards allow all errors from a single device to be summed regardless of the error path.

A share control card defines a series of paths (a path consists of CPU serial number and CUA) to a device which are to be equated. All error counts for a device will be tabulated and reported using the first path specified.

More than one control card may be necessary to equate all of the possible paths to one device.

The control cards follow the JCL SYSIN DD * card and are formatted as follows:

$$\text{SHARE} = \left(\text{cpu serial \#} \cdot \left. \begin{array}{l} \text{cua} \\ \text{cuX} \end{array} \right\} \right) \text{ maximum of 6 entries}$$

where cua is the channel, control unit, and device address
 cu is the channel and control unit address

At least two entries, separated by a comma, must appear on each card. No continuation is permitted. cua and cuX may not appear on the same card.

If more than six paths exist for a particular device, the first six can be specified on one SHARE card. The first entry should then be repeated on the next SHARE card(s) with the remaining paths.

Specify cuX instead of cua to reference all devices on a control unit. These control cards apply to the System Summary, Trend Report, 33XX Summary, 34XX Summary, and all other device summary reports. Each report will indicate whether a particular set of error statistics represents a device or control unit specified on SHARE cards.

For example, Figure 4 shows a hardware configuration consisting of three CPUs (serial numbers 011111, 022222, and 033333). Attached to each CPU are various 3830 and 3803 control units. The lines from each CPU to the 3830/3803 control units indicate which control unit is attached to which CPU; the circled number beside each line indicates the channel number. Each 3830/3803 control unit has a number associated with it representing the control unit number. Each 3830 has a series of 3330's attached to it with the available addresses as shown. Each 3803 has a series of 3420's attached to it with the available addresses as shown. Thus CPU A-serial number 011111 is attached via channel 3 to the 3830 control unit D with available physical addresses 0 thru F. The possible CUAs for this path are 3D0 thru 3DF.

The following control cards illustrate two of the shared configurations in Figure 4.

a) SHARE=(011111.1FX,022222.6FX,033333.1FX)

A report indicating error statistics for device on 011111.1FO SHARED will include statistics for device 011111.1FO, 022222.6FO, and 033333.1FO; a report for device 011111.1F1 SHARED will include statistics for device 011111.1F1, 022222.6F1, and 033333.1F1; . . .; a report for device 011111.1FF SHARED will include statistics on 011111.1FF, 022222.6FF, and 033333.1FF.

b) SHARE=(011111.585,033333.283)

A report indicating error statistics for device on 011111.585 SHARED will include error statistics for device on 011111.585 and 033333.283. If the report presents error statistics by control unit, then the statistics for a shared device will also be presented by control unit.

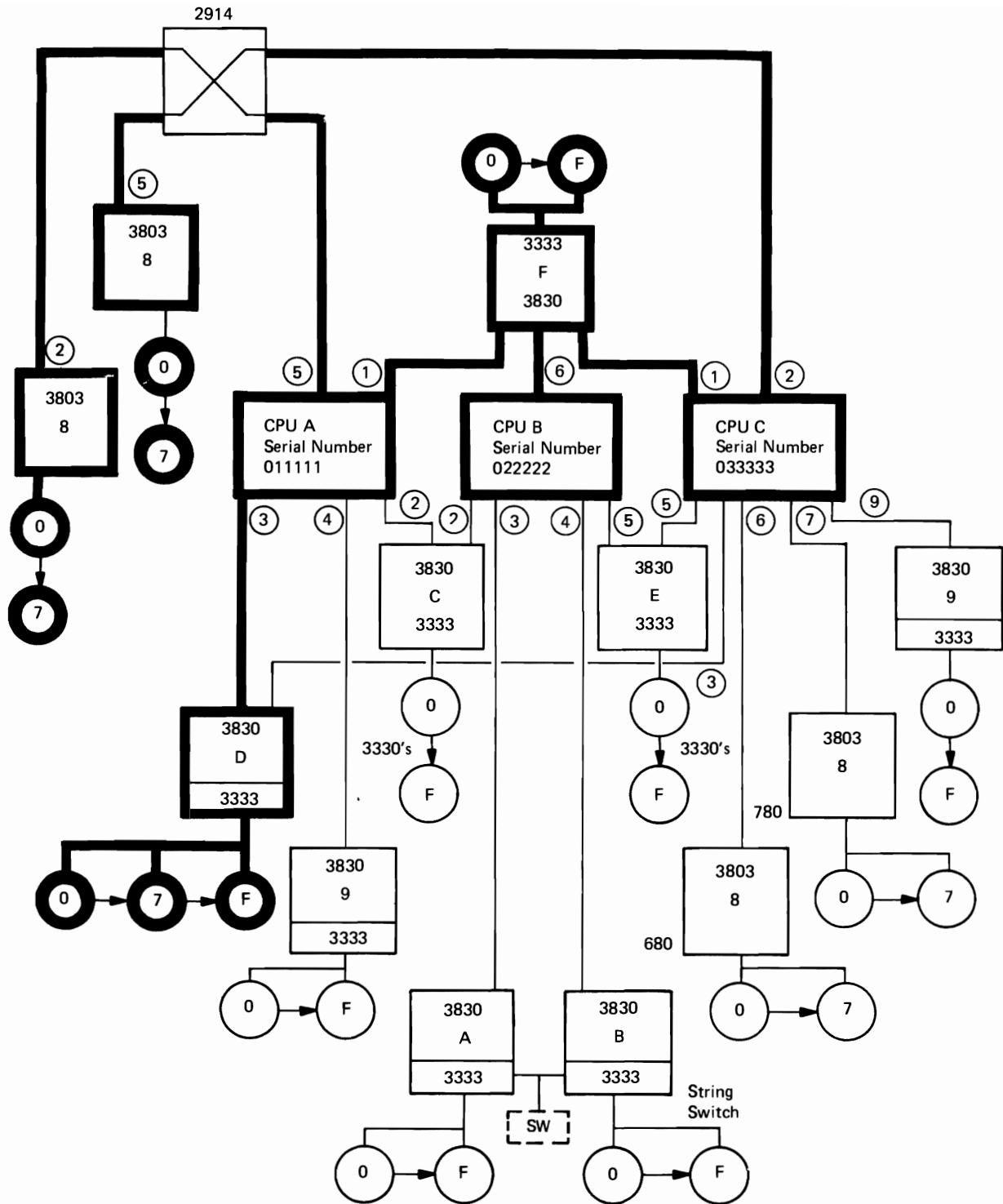


Figure 4. Hardware Configuration

Examples of Job Control Statements Required for Running EREP

In order to run and control EREP you must use job control statements, specify keyword parameters on the EXEC statement and include control cards in the SYSIN input stream.

EREP requires at least 100K of virtual storage, which provides for a 24K sort table and four 12K input/output buffers. The 24K sort table will permit processing of approximately 2400 records. If the sort table requirement exceeds 24K, the TABSIZE parameter must be used to increase table size; the region size must be increased accordingly.

Direct-access storage is required for the temporary data set (DIRECTWK) whenever the EREP Accumulation data set is input to the processing. The amount of storage required is dependent upon the device type and number of records being processed.

Device Type	Average Records per		MCH Records per	
	Track	Cylinder	Track	Cylinder
2314/2319	29	580	4	81
2305 Mod. 1	56	448	7	63
2305 Mod. 2	58	464	8	64
3330/3330 Mod. 11	52	988	7	139
3340/3344	33	401	4	48
3350	76	2,291	10	300

Notes:

1. Direct access capacities are from OS/VS2, JCL (VS2 Release 3.7).
2. Average record size is 70 bytes plus 180 bytes for inter-record gap except for MCH records.
3. Average MCH record size is 1600 bytes plus 180 bytes for inter-record gap.

Figure 5 is an overview of the job control statements necessary for running EREP. Figure 6 shows the DD statements required by function. Normal JCL conventions must be adhered to when executing EREP. When specifying job control statements, the following DCB fields MUST be included:

- RECFM and BLKSIZE must be specified for the ACCDEV DD Statement.
 - RECFM=VB with BLKSIZE= 12000 for tape, or full track blocking for DASD, will result in maximum performance.
 - RECFM=V with BLKSIZE=2000 can be used to produce an Accumulation data set that is compatible with the OLTEP LOGSCAN function, until OLTEP has been upgraded by PTF.
- RECFM and BLKSIZE must be specified for the ACCIN DD Statement if the data set resides on a non-labeled tape volume.
- BLKSIZE must be specified as a multiple of 133 for both ERREPT and TOURIST DD Statement.

Statement	Usage
JOB Statement	This statement initiates the job.
EXEC Statement	This statement specifies the program name and keyword parameters necessary to control the functions of the program.
SERLOG DD Statement	This statement defines the input data set as being the SYS1.LOGREC data set. Either a SERLOG DD statement or the ACCIN DD statement must be included for each execution of the IFCEREP1 program.*
ACCIN DD Statement	This statement defines the input data set as being an Accumulation data set. Either an ACCIN DD statement or the SERLOG DD statement must be included for each execution of the IFCEREP1 program.*
EREPT DD Statement	This statement defines the report output data set. It must be included whenever report output is needed.
ACCDEV DD Statement	This statement defines an output accumulation data set which can reside on a magnetic tape or direct access volume. Space must be allocated for a new output data set that is to reside on a direct access volume.
TOURIST DD Statement	This statement defines the informational message output data set and must be included for each execution of the IFCEREP1 program.
DIRECTWK DD Statement	This statement defines a temporary data set residing on a direct access device. This data set is required whenever the input data set is defined by the ACCIN DD statement. This is an unblocked data set consisting of variable-length records. Space allocation is dependent upon direct access device type, record length and number of records being processed.
SYSIN DD Statement	This statement indicates that input in the form of control card(s) follows. It may be a null data set.
* Both SERLOG and ACCIN DD statements are required when keyword MERGE is specified.	

Figure 5. IFCEREP1 Job Control Statements

Required DD Statements \ EREP Keywords	ACC=Y	HIST=Y ^①	MERGE=Y	RDESUM=Y	ALL OTHERS	HIST=N
ACCDEV	X					
ACCIN		X	X	X		
DIRECTWK		X	X			
SERLOG			X		X	X
EREPT	X	X	X	X	X	X
TOURIST	X	X	X	X	X	X
SYSIN ^②				X		

Note: ^① If "SYSUM" or "TRENDS" is requested, the DIRECTWK data set is not required.

^② SYSIN is required when share control cards are present.

Figure 6. DD Statements Required By Function

The JCL examples do not include all possible keyword parameter specifications. The fourteen examples illustrate the DD statements required when executing EREP Basic and Reporting functions, only.

Figure 7 can be used to assist you in determining which JCL example is applicable for your specific requirement.

EREP Basic Functions		JCL Example Number
1.	Create an Accumulation data set from the SYS1.LOGREC data set.	1, 2, 6, 14
2.	Clear SYS1.LOGREC.	1, 2, 14
3.	Copy an Input Accumulation data set to an Output Accumulation data set.	7
4.	Merge data from an Accumulation data set and SYS1.LOGREC.	2, 11
5.	Format Reliability Measurement data	9

EREP Reporting Functions		JCL Example Number
1.	System Summary Reporting	1, 2
2.	Trend Reporting	3
3.	Event History Reporting	4
4.	Media Error Statistics Reporting	13
5.	Threshold Reporting	10
6.	Record detail and/or Summary Reporting	5, 8, 11, 12
7.	RDE Summary Reporting	9

Figure 7. JCL Examples for EREP Basic and Reporting Functions

Example 1: Generating a System Summary Report from SYS1.LOGREC

In this example:

- All data on SYS1.LOGREC is summarized for the System Summary Report.
- All records on SYS1.LOGREC are written to an Accumulation data set and SYS1.LOGREC is cleared.
- The SDR counters are dumped to SYS1.LOGREC before data retrieval is begun.

```
//SYSUM      JOB
//STEP1     EXEC  PGM=IFCERE P1, PARM='SYSUM'
//SERLOG    DD    DSN=SYS1.LOGREC, DISP=OLD
//ACCDEV    DD    UNIT=2400, DSN=HISTOUT, DISP=(,CATLG), DCB=(RECFM=VB,
//           BLKSIZE=12000)
//TOURIST   DD    SYSOUT=A, DCB=BLKSIZE=133
//EREPT     DD    SYSOUT=A, DCB=BLKSIZE=133
//SYSIN     DD    *
SHARE=(011111.1FX,022222.6FX,033333.1FX)
SHARE=(011111.585,033333.283)
/*
//
```

Control Statements for Example 1

The EXEC statement specifies that a System Summary Report is to be generated. Effective defaults are ACC=Y and ZERO=Y, therefore, SDR records are dumped to SYS1.LOGREC before data retrieval is begun.

The SERLOG DD statement defines the input (SYS1.LOGREC) data set.

The ACCDEV DD statement defines the output (Accumulation) data set. The RECFM and BLKSIZE fields of the DCB define a variable blocked data set with a blocking factor of 12000 bytes.

The TOURIST DD statement defines the output data set for printing message generated by EREP.

The EREPPT DD statement defines the output data set for printing the System Summary report.

The SYSIN DD statement defines the input data set containing shared I/O control cards.

Example 2: Generating a System Summary Report from an Accumulation Data Set and SYS1.LOGREC

In this example:

- Data from multiple Accumulation data sets and SYS1.LOGREC are summarized for the System Summary report.
- All records on SYS1.LOGREC are written to an Accumulation data set and SYS1.LOGREC is cleared.
- The SDR counters are dumped to SYS1.LOGREC before data retrieval is begun.

```

//JOB A      JOB
//STEP1     EXEC  PGM=IFCERE P1, PARM='SYSUM, MERGE'
//ACCIN     DD    DSN=EREP.HIST, DISP=OLD, DCB=(RECFM=VB, BLKSIZE=12000),
//          UNIT=2400, VOL=SER=012345
//          DD    DSN=EREP.HIST1, DISP=OLD, DCB=(RECFM=VB, BLKSIZE=7280),
//          UNIT=2400, VOL=SER=012346
//SERLOG    DD    DSN=SYS1.LOGREC, DISP=OLD
//ACCDEV    DD    UNIT=2400, DSN=HISTOUT, DISP=(,CATLG), DCB=(RECFM=VB,
//          BLKSIZE=12000)
//TOURIST   DD    SYSOUT=A, DCB=BLKSIZE=133
//EREPT     DD    SYSOUT=A, DCB=BLKSIZE=133
//SYSIN     DD    *
SHARE=(011111.1FX, 022222.6FX, 033333.1FX)
SHARE=(011111.585, 033333.283)
/*
//

```

Control Statements for Example 2

The EXEC statement specifies (1) that a System Summary report be generated, (2) both Accumulation data sets and SYS1.LOGREC are input. By default an Accumulation data set is to be generated and SYS1.LOGREC is cleared.

The ACCIN DD statement defines concatenated Accumulation data sets. Note that the data set with the largest blocking factor appears first in the JCL stream and all concatenated data sets have the same RECFM attribute.

The SERLOG DD statement defines the input (SYS1.LOGREC) which is merged with the accumulation data sets.

The ACCDEV DD statement defines the output (Accumulation) data set. The data set is to reside on tape, is to be catalogued in the system catalog and the RECFM and BLKSIZE fields of the DCB define a variable blocked data set with a blocking factor of 12000 bytes.

The TOURIST DD statement defines the output data set for printing messages generated by EREP.

The EREPPT DD statement defines the output data set for printing the System Summary report.

The SYSIN DD statement defines the input data set containing shared I/O control cards.

Example 3: Generating a Trend Report from an Accumulation Data Set

In this example:

- A TREND report is generated from data within a specific time and date range.

```

//TREND     JOB
//STEP1     EXEC  PGM=IFCERE P1, PARM=('TREND, DATE=(76022, 76052), HIST',
//          *TIME=(2300, 0800), ACC=N')
//ACCIN     DD    DSN=EREP.HIST, DISP=OLD
//TOURIST   DD    SYSOUT=A, DCB=BLKSIZE=133
//EREPT     DD    SYSOUT=A, DCB=BLKSIZE=133
//SYSIN     DD    *
SHARE=(011111.585, 033333.283)
/*
//

```

Control Statements for Example 3

The EXEC statement specifies (1) that a TREND Report is to be generated, (2) the report is to cover a 30 day period, (3) that the input is a history (Accumulation) data set, (4) the report covers a restricted time period in each day and (5) that no output Accumulation data set is to be generated.

The ACCIN DD statement defines the input (Accumulation) data set which has been catalogued and contains in the volume header the required DCB information relative to RECFM and BLKSIZE.

The TOURIST DD statement defines the output data set for messages generated by EREP.

The EREPPT DD statement defines an output data set for the TREND Report.

The SYSIN DD statement defines the input data set containing shared I/O control cards.

Example 4: Generating an Event History Report from an Accumulation Data Set

In this example:

- Date dependent data is retrieved for generating an EVENT History Report.

```
//EVENT      JOB
//STEP1     EXEC  PGM=IFCEREPI,PARM=('EVENT,DATE=(76130,76150),HIST',
//          'ACC=N')
//ACCIN     DD    DSN=EREP.HIST,DISP=OLD
//DIRECTWK  DD    UNIT=SYSDA,SPACE=(CYL,(5))
//TOURIST   DD    SYSOUT=A,DCB=BLKSIZE=133
//EREPPT    DD    SYSOUT=A,DCB=BLKSIZE=133
//SYSIN     DD    DUMMY
//
```

Control Statements for Example 4

The EXEC statement specifies (1) that an EVENT History Report is to be generated, (2) that records retrieved for reporting are date dependent, (3) that the input is an Accumulation data set, and (4) that no output Accumulation data set is to be generated.

The ACCIN DD statement defines the input (Accumulation) data set which resides on a catalogued standard labeled tape. Record format and blocksize information are contained in the tape label.

The TOURIST DD statement defines the output data set for printing messages generated by EREP.

The EREPPT DD statement defines the output data set for printing the EVENT History report.

The SYSIN DD statement defines a null data set.

Example 5: Printing Summaries of DDR, MDR and MIH Records for SYS1.LOGREC

In this example:

- Error statistics for dynamic device reconfiguration (DDR), miscellaneous data (MDR), and missing interruption handler (MIH) records are printed in record summary format.

```

//JOB8      JOB
//STEP1     EXEC  PGM=IFCEREPI,PARM=( *ACC=N,TYPE=DTH* )
//SERLOG    DD    DSN=SYS1.LOGREC,DISP=OLD
//TOURIST   DD    SYSOUT=A,DCB=BLKSIZE=133
//EREPT     DD    SYSOUT=A,DCB=BLKSIZE=133
//SYSIN     DD    DUMMY
//

```

Control Statements for Example 5

The EXEC statement specifies (1) that no accumulation is to take place, (2) that dynamic device reconfiguration, miscellaneous data, and missing interruption handler records are to be processed, and (3) by default the type of printout is summary only.

The SERLOG DD statement defines the input (SYS1.LOGREC) data set.

The TOURIST DD statement defines the output data set for printing messages generated by EREP.

The EREPPT DD statement defines the output data set for the edited record summaries.

The SYSIN DD statement defines a null data set.

Example 6: Generating an Accumulation Output Data Set of CCH Records from SYS1.LOGREC

In this example:

- Channel inbound (CCH) records on the SYS1.LOGREC data set are written to an Accumulation data set.

```

//JOB6      JOB
//STEP1     EXEC  PGM=IFCEREPI,PARM=( *PRINT=NO,TYPE=C* )
//SERLOG    DD    DSN=SYS1.LOGREC,DISP=OLD
//ACCDEV    DD    DSN=HIST.C,DISP=( ,CATLG),UNIT=2314,DCB=(RECFM=VB,
//           BLKSIZE=7280),SPACE=(CYL,(5,1),RLSE)
//TOURIST   DD    SYSOUT=A,DCB=BLKSIZE=133
//SYSIN     DD    DUMMY
//

```

Control Statements for Example 6

The EXEC statement specifies (1) the records are not to be printed or summarized, (2) that channel inbound records are to be processed, and (3) the records are to be accumulated by default of ACC=Y.

The SERLOG DD statement defines the input (SYS1.LOGREC) data set.

The ACCDEV DD statement defines the output (Accumulation) data set, which is to reside on a 2314 direct access device, is a variable blocked data set with a maximum blocking factor of 7280 bytes. Direct access space is allocated via cylinders.

The TOURIST DD statement defines the printed output data set containing messages generated by EREP.

The SYSIN DD statement defines a null data set.

Example 7: Generating an Accumulation Output Data Set of MCH Records from an Input Accumulation Data Set

In this example:

- Machine-dependent, machine check records in an accumulation data set are copied to a second accumulation (output) data set.

```
//JOB      JOB
//STEP1    EXEC  PGM=IFCEREP1,PARM=( *PRINT=NO,TYPE=M,MOD=(155),HIST' )
//ACCIN    DD    DSN=HISTORYIN,DISP=OLD
//ACCDEV   DD    DSN=EXISTAC,DISP=(MOD,KEEP)
//TOURIST  DD    SYSOUT=A,DCB=BLKSIZE=133
//SYSIN    DD    DUMMY
//
```

Control Statements for Example 7

The EXEC statement specifies (1) the records are not to be printed or summarized, (2) machine check records generated by a Model 155 II are to be processed, (3) an accumulation data set is the input data set, and (4) by default, accumulation is to take place.

The ACCIN DD statement defines the input (Accumulation) data which is a catalogued data set with required input DCB information—RECFM and BLKSIZE—provided by the data set header label.

The ACCDEV DD statement defines the output (Accumulation) data set to which this job will add the selected records, DISP=MOD. This data set is catalogued; therefore the DCB information for RECFM and BLKSIZE are provided by the data set header.

The TOURIST DD statement defines the output data set for printing messages generated by EREP.

The SYSIN DD statement defines a null data set.

Example 8: Print Detailed Record Summary of IPL and EOD Records from an Accumulation Data Set

- IPL and EOD records on an Accumulation data set are edited and written in full record and record summary format.

```
//JOB      JOB
//STEP1    EXEC  PGM=IFCEREP1,PARM=( *PRINT=PS,TYPE=IE,HIST,ACC=N' )
//ACCIN    DD    DSN=HISTORYIN,DISP=OLD,UNIT=2400,VOL=SER=012985,
//          LABEL=(,NL),DCB=(RECFM=VB,BLKSIZE=7280)
//DIRECTWK DD    UNIT=SYSDA,SPACE=(CYL,(5))
//TOURIST  DD    SYSOUT=A,DCB=BLKSIZE=133
//EREPT    DD    SYSOUT=A,DCB=BLKSIZE=133
//SYSIN    DD    DUMMY
//
```

Control Statements for Example 8

The EXEC statement specifies (1) the type of printout (full record and summary), (2) that IPL and EOD records are to be processed, (3) that the input data set is an Accumulation data set is an Accumulation data set, and (4) that no accumulation is to take place.

The ACCIN DD statement specifies the input (Accumulation) data set resides on an unlabeled tape. The DCB information for RECFM and BLKSIZE are provided in the JCL stream, a requirement for unlabeled input data sets.

The DIRECTWK DD defines the temporary work data set which is required because the input is an Accumulation data set. This data set resides on a direct access device. SYSDA indicates system designated direct access devices for temporary data sets.

The TOURIST DD statement defines the output data set for printing messages generated by EREP.

The EREPPT DD statement defines the output data set for the edited record reports.

The SYSIN DD statement defines a null data set.

Example 9: Printing an IPL and System Error Reports from an Accumulation Data Set

In this example:

- The records on an Accumulation data set are processed to produce an IPL report and a system error report.

```
//JOB      JOB
//STEP1   EXEC  PGM=IFCEREPI,PARM='RDESUM'
//ACCIN   DD    DSN=HISTORYIN,DISP=OLD
//TOURIST DD    SYSOUT=A,DCB=BLKSIZE=133
//EREPPT  DD    SYSOUT=A,DCB=BLKSIZE=133
//SYSIN   DD    *
CTLCRD   76030 76060 30
/*
//
```

Control Statements for Example 9

The EXEC statement specifies that the RDE summary function of EREP is to be performed. Note that, by default, because RDESUM is specified, no accumulation is to take place.

The ACCIN DD statement defines the input (Accumulation) data set which is catalogued. Required input DCB information is provided by the data set header.

The TOURIST DD statement defines the output data set for printing messages generated by EREP.

The EREPPT DD statement defines the output data set for the RDE reports.

The SYSIN DD statement defines the input data set containing the RDE control card. See the description of RDE control card.

Example 10: Printing Consolidated Summary of Statistics for IBM 3410/3420 Tape Devices from SYS1.LOGREC

In this example:

- The I/O Outboard (OBR) records for the IBM 3420 tape devices are summarized
- The SDR counters are dumped to SYS1.LOGREC before record retrieval is begun.

```

//JOB      JOB
//STEP1    EXEC  PGM=IFCEREPI,PARM=(*THRESHOLD=(001,005),ACC=N*)
//SERLOG   DD    DSN=SYS1.LOGREC,DISP=OLD
//TOURIST  DD    SYSOUT=A,DCB=BLKSIZE=133
//EREPT    DD    SYSOUT=A,DCB=BLKSIZE=133
//SYSIN    DD    DUMMY
//

```

Control Statements for Example 10

The EXEC statement specifies (1) that a tape device summary is to be printed, that the media statistics are to be printed for those volumes that have one or more read errors and five or more write errors, and (2) that no Accumulation output data set is to be generated.

The SERLOG DD statement defines the input data set (SYS1.LOGREC)

The TOURIST DD statement defines the output data set for messages generated by EREP.

The EREPPT DD statement defines the output data set for printing the edited record report.

The SYSIN DD statement defines a null data set.

Example 11: Printing Record Summaries from SYS1.LOGREC

In this example:

- All records on SYS1.LOGREC are processed.
- The edited output is record summaries by default of PRINT=SU.

```

//JOBPRT   JOB
//STEP1    EXEC  PGM=IFCEREPI
//SERLOG   DD    DSN=SYS1.LOGREC,DISP=OLD
//ACCDEV   DD    UNIT=2400,DSN=HISTOUT,DISP=(,CATLG),DCB=(RECFM=VB,
//          BLKSIZE=12000)
//TOURIST  DD    SYSOUT=A,DCB=BLKSIZE=133
//EREPT    DD    SYSOUT=A,DCB=BLKSIZE=133
//SYSIN    DD    *
SHARE=(011111.1FX,022222.6FX,033333.1FX)
SHARE=(011111.585,033333.283)
/*
//

```

Control Statements for Example 11

The EXEC statement specifies (1) that all records are processed by default, (2) that record summaries are generated by default of PRINT=SU, (3) that an Accumulation data set is generated by default of ACC=Y, and (4) the SYS1.LOGREC is *NOT* cleared.

The SERLOG DD statement defines the input (SYS1.LOGREC) data set.

The ACCDEV DD statement defines the output (Accumulation) data set which is to reside on a standard labeled tape, is to be catalogued and DCB information for RECFM and BLKSIZE is provided.

The TOURIST DD statement defines the output data set for printing messages generated by EREP.

The EREPPT DD statement defines the output data set for printing record summaries.

The SYSIN DD statement defines the input data set for shared I/O control cards.

Example 12: Printing Record Details from SYS1.LOGREC

In this example:

- Records on SYS1.LOGREC are edited and printed in full record format.
- Records selected for processing are date-dependent.

```
//JOBPRT JOB
//STEP1 EXEC PGM=IFCEREPI,PARM=('PRINT=PT,ACC=N,SHORT',
// 'TIME=(1500,2300),DATE=(76110)')
//SERLOG DD DSN=SYS1.LOGREC,DISP=OLD
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
//EREPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSIN DD *
SHARE=(011111.1FX,022222.6FX,033333.1FX)
SHARE=(011111.585,033333.283)
/*
//
```

Control Statements for Example 12

The EXEC statement specifies (1) the type of printout (full record only), (2) that no accumulation is to take place, (3) short OBR records are to be printed out, and (4) records processed are within a specified date and time range.

The SERLOG DD statement defines the input (SYS1.LOGREC) data set.

The TOURIST DD statement defines the output data set for printing messages generated by EREP.

The EREPPT DD statement defines the output data set for printing the edited record reports.

The SYSIN DD statement defines a null data set.

Example 13: Printing Media Error Statistics (MES) from SYS1.LOGREC

In this example:

- Error statistics for the 3410 and 3420 tape devices are written to the printer.

```
//JOB JOB
//STEP1 EXEC PGM=IFCEREPI,PARM=('PRINT=PS,ACC=N,MES,CUA=(484)')
//SERLOG DD DSN=SYS1.LOGREC,DISP=OLD
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
//EREPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSIN DD DUMMY
//
```

Control Statements for Example 13

The EXEC statement specifies (1) the type of printout (full record and summary), (2) that no accumulation is to be done, (3) media error statistics are to be printed, and (4) the specific CUA for which statistics are requested.

The SERLOG DD statement defines the input (SYS1.LOGREC) data set.

The TOURIST DD statement defines the data output set for printing messages generated by EREP.

The EREPPT DD statement defines the data output set for printing the edited record report.

The SYSIN DD statement defines a null data set.

Example 14: Emergency Offload of SYS1.LOGREC

In this example:

- A System Summary Report is generated
- An Accumulation data set is generated
- SYS1.LOGREC is reinitialized

```
//OFFLOD JOB
//STEP1 EXEC PGM=IFCOFFLD
//SERLOG DD DSN=SYS1.LOGREC,DISP=OLD
//ACCDEV DD UNIT=2400,DSN=HISTOUT,DISP=(,CATLG),DCB=(RECFM=VB,
// BLKSIZE=12000)
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
//EREPT DD SYSOUT=A,DCB=BLKSIZE=133
//
```

Control Statements for Example 14

The EXEC statement specifies execution of program IFCOFFLD, which:

- is a special load module of EREP,
- generates a System Summary Report,
- generates an Accumulation data set, and
- reinitializes SYS1.LOGREC.

The SERLOG DD statement defines the input (SYS1.LOGREC) data set.

The ACCDEVD statement defines the output (Accumulation) data set which is to reside on a standard labeled tape, is to be catalogued, and the DCB information for RECFM and BLKSIZE is provided.

The TOURIST DD statement defines the output data set for printing messages generated by EREP.

The EREPPT DD statement defines the output data set for printing the System Summary Report.

Part 3: EREP Output

EREP produces several different report types. The formats of the different reports are dependent upon the device(s) and/or machine(s) (CPU) that caused the various reports to be produced. Thus, the length, content, and format of the different reports may vary for different device types or machine models. A more detailed description of the device- and machine-dependent error information (sense and status bits) can be obtained from the component publication for the particular device type or machine model.

Types of EREP Output

The examples on the following pages are for planning and identification purposes only. Do not use them for diagnostic purposes. Use them to determine which output you need for your specific diagnostic and/or measurement requirements. Figures 8 through 33 show the following types of EREP output:

- System Summary (Figure 8)
- Trend Report (Figure 9)
- Event History (Figure 10)
- OBR/MDR Summary for 33XX (Figure 11)
- Threshold Summary for 3410/3420 (Figure 12)
- CCH Edit and CCH Summary Reports (Figures 13 and 14)
- EOD Edit and EOD Summary Reports (Figures 15 and 16)
- IPL Edit and IPL Summary Reports (Figures 17 and 18)
- MCH Edit and MCH Summary Reports (Figures 19 and 20)
- MDR Edit and MDR Summary Reports (Figures 21 and 22)
- OBR Edit and OBR Summary Reports (Figures 23 and 24)
- Software Edit and Software Summary Reports (Figures 25 and 26)
- IPL Report Provided by RDE Summary (Figure 27)
- Hardware Error Report Produced by RDE Summary (Figure 28)
- Media Error Statistics (MES) (Figure 29)
- DDR Edit and DDR Summary Reports (Figures 30 and 31)
- MIH Edit and MIH Summary Reports (Figures 32 and 33)

Note: The content, format, length, etc. of each EREP output example reflects unique error incidents and circumstances. They do not represent the exact results for any similar error incidents or reports.

System Summary

The System Summary provides a comprehensive condensed report of errors for each of the principal system elements. This report is initiated by the parameter SYSUM. The System Summary is given in two parts: CPU/Channels/Storage/SCP and I/O Subsystems. Errors are classified by CPU, when applicable, and totals for the complete system or installation.

The first part of the System Summary, illustrated in Figure 8 (Part 1), will give counts of machine checks and channel checks by channel; IPL and End of Day records, if recorded; and software error records for MVS, only.

The second part of the System Summary, illustrated in Figure 8 (Part 2), is a condensed report of every permanent and temporary error grouped by Product Type, Device Type, Controller or Device Address, and CPU. Shared I/O may apply to this part of the report.

A temporary read/write error is a retry, which finally resulted in a successful read or write operation.

A permanent read/write error is an unsuccessful conclusion of several retries.

For example, an unsuccessful write operation to a magnetic tape will be retried 25 times before a permanent error record is written on SYS1.LOGREC. These 25 temporary errors are not counted.

The format of the error data associated with communication controllers depends on whether it is operating in Emulator (EM) or NCP mode.

For example:

3705 EM (270X)

Device Address

3705 NCP (Mode)

Device Address

Controller

NCP/EP

Line Errors

Mode refers to the recording mode field in the 3705 MDR record.

Product types/groups will be presented in the following order and terminology:

Console and Unit Record

Operators Console, Card Reader, Card Punch

Printer, OCR/MICR

DASD

Disks, Drums/Fixed Head File, Mass Storage

Tape

Displays (Channel Attached)

Tape Controllers

Teleprocessing Controllers

Within each product type or group, error data is summarized by control unit (except for CONS+UR and displays), that is, all error data from device address (CUA) 280 through 28F should be presented as:

3803

28X

SYSTEM SUMMARY
(PART 1)
CPU/CHANNEL/STORAGE/SCP

REPORT DATE 309 76
PERIOD FROM 138 76
TO 220 76

	② TOTAL CPU-A CPU-B		
IPL ①	92	36	56
MACHINE CHECK			
RECOVERABLE	1	0	1
NON-RECOVERABLE	0	0	0
CHANNEL CHECK			
CHANNEL 0	7	2	5
CHANNEL 1	1	1	0
CHANNEL 2	1	1	0
CHANNEL 3	0	0	0
CHANNEL 4	3	0	3
CHANNEL 5	18	5	13
CHANNEL 6	0	0	0
CHANNEL 7	4	3	1
CHANNEL 8	0	0	0
CHANNEL 9	19	14	5
CHANNEL A	8	7	1
CHANNEL B	6	5	1
CHANNEL C	0	0	0
CHANNEL D	0	0	0
CHANNEL E	0	0	0
CHANNEL F	0	0	0
PROGRAM ERROR			
PRGM INT	0	0	0
ABEN	0	0	0
RESTART	0	0	0
END OF DAY	129	41	88
TOTAL	289	115	174

CPU	MODEL	SERIAL NO.
A	168	060374
B	168 ③	060219

- ① Error type
- ② Record counts
- ③ CPUs identified from filtered data or share card(s)

Figure 8. System Summary (Part 1 of 2)

SYSTEM SUMMARY				REPORT DATE 309 76			
(PART 2)				PERIOD FROM 138 76			
I/O SUBSYSTEM				TO 220 76			
CNNS +UR	PERM	TOTAL		CPU-A		CPU-B	
		PERM	TFMP	PERM	TFMP	PERM	TFMP
35C5	0C1	20	0	20	0	-	-
1443	001	114	0	0	916	114	0
1443	003	0	916	0	0	0	265
3211	004	0	1	0	1	0	0
3211	00F	1	0	1	0	0	0
3211	102	51	0	51	0	0	0
3211	102	101	0	-	-	101	0
DASD *****							
383C	20X	0	5	0	5	-	-
3830	21X	1	78	11	16	2	78
2305	30X	1	22	-	-	7	22
3830	40X	2	3804	2	3804	-	-
3830	43X	0	2520	0	2520	-	-
3830	43X	1	378	-	-	9	378
3830	43X	0	155	0	155	-	-
3830	43X	1	239	-	-	1	239
3830	60X	25	224	25	224	-	-
3830	60X	0	602	-	-	0	602
3830	61X	17	47	17	47	-	-
3830	62X	19	80	-	-	1	80
3830	62X	1	3	19	3	-	-
3830	63X	1	50	-	-	1	50
3830	63X	25	90	25	90	-	-
2305	72X	0	130	-	-	1	130
3830	75X	1	3	-	-	0	3
3830	75X	1	30	1	30	-	-
3830	75X	0	138	-	-	0	138
3830	90X	12	15	12	15	-	-
3830	90X	3	9	-	-	3	9
3830	91X	0	5973	8	5973	-	-
3830	91X	0	63	-	-	0	63
3830	92X	3	26	3	26	-	-
3830	92X	1	50	-	-	1	50
3830	93X	12	353	7	15	5	378
TAPE *****							
2400	0EX	43	891	43	891	-	-
2400	0EX	146	3057	-	-	146	3057
2400	0FX	66	2225	66	2225	-	-
2400	0FX	78	4035	-	-	78	4035
2400	1EX	3	158	3	158	-	-
2400	1FX	3	21	3	21	-	-
2400	1FX	338	12455	-	-	338	12455
2400	47X	7	3630	7	3630	-	-
2400	47X	19	4236	-	-	19	4236
TP CNTRL *****							
2703	170	-	-	-	-	-	-
2703	CNTRLR	138	0	-	-	138	0
2703	188	-	-	-	-	-	-
2703	CNTRLR	38	0	-	-	38	0
2703	1AC	-	-	-	-	-	-
2703	CNTRLR	18	0	-	-	18	0
TOTAL		1346	47003	325	9999	1021	9999
CPU MODEL SERIAL NO.							
A	168	060374					
B	168	067219					

- ① Device group
- ② Device type
- ③ CUA
- ④ Counts of errors
- ⑤ Dash (-); data indicates this CPU-CUA path does not exist
- ⑥ A 999 indicates this number was larger than the print positions allowed
- ⑦ CPUs identified from filtered data or share card(s)
- ⑧ Result of shared cards

Figure 8. System Summary (Part 2 of 2)

Trend Report

Data presented in the Trend Report is similar to that presented in the System Summary but provides the perspective of time. This report is initiated by the parameter TRENDS. Trend Report is illustrated in Figure 9, CPU/Channel/Storage/SCP data will be presented by day (horizontally) and by CPU (vertically). I/O subsystem data will be presented by day by CUA. Shared I/O applies to this report.

The number of days reported depends on the input data and keyword DATE. When no date range is specified, seven days of data ending with the current day are presented. The DATE parameter can be used to specify up to 30 days. The keywords TIME, CUA, TYPE and DEVICE may be used to restrict record selection.

The I/O subsystem portion of the Trend Report will be given by CPU within control unit type when the input data set contains records from more than one CPU. The associated CPU identifier is given on the line with the control unit address. When control units and devices are shared across multiple CPUs and the relationship is defined using the SHARE control cards and the control unit or device only appears once in the list, the error counts will be added together by control unit.

When the CPU-control unit/device relationship is not defined through the use of the SHARE control card, the devices appear more than once in the list, depending on addressing, and the totals given relate to the specific control unit listed. There is no summarization. For example, if a control unit is shared between two CPUs but is not attached to the same channel on each, not only will all the drives be listed using both addresses, but data from other drives cannot be added correctly (for example, data from 290 on CPU A would be combined with data from 290 on CPU B even though they are not the same physical unit).

Event History

The Event History Report provides a one-line abstract of the selected data in each record, in time sequence. This report is initiated by the parameter EVENT. Its primary value is the display of specific recorded data in context in order to investigate possible interaction, frequency of recording or pattern of operation.

The Event History, illustrated in Figure 10, is a highly condensed report in that it provides maximum information, unique to each specific record type, in one line. A template is produced, as the first page, indicating the appropriate header for each record type.

OBR/MDR Summary for 33XX

The OBR/MDR Summary for 33XX, illustrated in Figure 11, provides a summary of data extracted from 33XX records on the EREP data sets. Each report contains a summary of error statistics for each device for each particular record type. Figure 11 shows printing summaries of OBR records for the 33XX. Shared I/O applies to this report.

The OBR/MDR Summary for 33XX is initiated by the parameter PRINT whenever OBR/MDR 33XX summary is desired.

Figure 9. Trend Report (Part 1 of 2)

T R E N D R E P O R T		REPORT DATE 309 76																													
(PART 1)		PERIOD FROM 140 76																													
CPU/CHANNEL/STORAGE/SCP		TO 169 76																													
JULIAN DAY	76	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169
IPL		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CPU A	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CPU B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
MACHINE CHECK																															
CPU A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CPU B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CHANNEL CHECK																															
CPU A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CPU B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
PROGRAM EPRCR																															
CPU A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CPU B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CPU	MODEL	SERIAL NO.																													
A	③ 0168	060374																													
B	0168	060219																													

- ① System error types by CPU
- ② Each column contains error counts for one day
- ③ CPUs identified from filtered data or share card(s)

Figure 9. Trend Report (Part 2 of 2)

T R E N D R E P O R T		REPORT DATE 309 76																													
(PART 2)		PERIOD FROM 140 76																													
I/O SUBSYSTEM		TO 169 76																													
JULIAN DAY	76	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169
CONSR	3501	4			2																										
CO1 A	PERM	0	0	0	0	0	0	1	C	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
	TEMP	0	0	0	0	0	0	0	C	0	0	0	0	0	0	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	
DASD	3330	5																													
930 A	PERM	0	0	0	0	C	C	0	C	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	TEMP	0	0	0	0	C	C	0	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
931 A	PERM	0	C	0	0	C	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	
	TEMP	0	C	0	0	C	0	0	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
93E A	PERM	0	0	0	0	0	1	0	C	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	TEMP	0	0	0	0	0	C	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TAPE	24C0	6																													
OEO A	PERM	0	0	0	3	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	TEMP	5	0	5	26	6	0	2	8	8	8	16	1	3	1	5	1	1	4	0	0	0	3	5	0	15	3	0	0	0	
OEO B	PERM	0	0	0	0	0	C	C	C	0	C	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	1	0	
	TEMP	0	0	0	0	0	C	C	C	0	C	0	0	0	0	0	0	0	0	0	0	3	13	2	14	7	2	8	8	25	
TP CNTRL	2703																														
170 B	CNTRLR	0	0	0	0	C	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	10	0	4	0	0	7	
	PERM	0	0	0	0	C	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	10	0	4	0	0	7	
	TEMP	0	0	0	0	C	0	C	C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CPU	MODEL	SERIAL NO.																													
A	3	0168	060374																												
B		0168	060219																												

- ① Entity reported upon by CPU
- ② Each column contains permanent and temporary error counts for one day. The maximum printable count of 999 indicates overflow of print positions.
- ③ CPUs identified from filtered data or share card(s)
- ④ Device group
- ⑤ Device type
- ⑥ CUA-CPU path(s)

Figure 10. Event History (Part 1 of 3) - Template

EVENT HISTORY TEMPLATE																										
FOR RECORD TYPES:		MCH, MCH-TRM																								
TIME	JORNAME	RECTYP	CPU																	PSW-MCH /PROG-EC						
FOR RECORD TYPES:		CCH, CCH-INC, CCH-CRH																								
TIME	JORNAME	RECTYP	CPU	CUA	DEVICE															CSW						
FOR RECORD TYPES:		OBR																								
TIME	JORNAME	RECTYP	CPU	CUA	DEVICE	CMD	CSW																			
FOR RECORD TYPES:		OBR-DMT, OBR-ECB, OBR-TMP, DDR, DDR-OPR, DDR-SYS, MIH, MIH-CE, MIH-DE, MDR																								
TIME	JORNAME	RECTYP	CPU	CUA	DEVICE															VOLUME/TERMINAL NAME						
FOR RECORD TYPES:		OBR-PRM																								
TIME	JORNAME	RECTYP	CPU	CUA	DEVICE	CMD	CSW	SENSE	04	06	08	10	12	14	16	18	20	22	VOLUME	R	B	C	C	H	H	R
FOR RECORD TYPES:		SFT, SFT-ABN, SFT-MCH, SFT-PI, SFT-RST																								
TIME	JORNAME	RECTYP	CPU															PSW-MCH /PROG-EC	PCYRYXIT	COMP/MOD	CSECTID					
FOR RECORD TYPES:		IPL																								
TIME	JORNAME	RECTYP	CPU	SSYS	ID	REASON																				
FOR RECORD TYPES:		EOD																								
TIME	JORNAME	RECTYP	CPU																							
FOR RECORD TYPES:		MDR-DAS																								
TIME	JORNAME	RECTYP	CPU	CUA	DEVICE															BYTES	DATA	CK	SFEKS	OVERRUN	VOLUME	
																		RD/SRCHD	COR/RTRY	CNT/ERR	COM/DATA					

Figure 10. Event History (Part 2 of 3) - Report

EVENT HISTORY				①		②		REPORT DATE	309 76	PERIOD FROM		140 76	PERIOD TO		141 76	PSW-MCH /PROG-EC	RCYRYXIT	COMP/MOD	CSECTID	22	VOLUME	B	B	C	C	H	H	R	
TIME	JOBNAME	RECTYP	CPU	CUA	DEVICE	REASON	SSYS ID	REASON	PSW-MCH /PROG-EC	RCYRYXIT	COMP/MOD	CSECTID	22	VOLUME	B	B	C	C	H	H	R								
DATE 140 76																													
16 15 29 80	N/A	MDR-DAS	A	218	3330																								
16 16 15 58	N/A	CRR-PRM	A	62D	3330	F1 0E40	00200000	05CB1200																					
16 35 11 89	N/A	MDR-DAS	A	751	3330																								
17 16 52 69	N/A	MDR-DAS	A	218	3330																								
18 07 52 58	N/A	MDR-DAS	A	401	3330																								
18 12 24 00	RLPSAVEP	OBR-DMT	A	470	3420																								
18 36 06 63	N/A	CBR-TMP	A	003	1443																								
19 05 57 10	RHZ0BC02	OBR-DMT	A	470	3420																								
19 06 08 10	N/A	MDR-DAS	A	401	3330																								
19 09 49 88	N/A	MDR-DAS	A	40F	3330																								
19 29 38 95	N/A	MDR-DAS	A	400	3330																								
19 41 30 38	N/A	MDR-DAS	A	401	3330																								
20 06 20 78	SRR01J1	OBR-PRM	A	CE1	2400																								
20 43 03 81	N/A	IPL	A	70																									
20 43 44 49	N/A	MDR-DAS	A	435	3330																								
20 49 06 55	N/A	MDR-DAS	A	93F	3330																								
21 07 07 09	N/A	MDR-DAS	A	751	3330																								
21 07 36 66	N/A	MDR-DAS	A	937	3330																								
22 21 08 40	N/A	CRR-PRM	A	0F1	2400																								
22 01 08 53	HASPP3	OBR-PRM	A	102	2211																								
23 04 52 28	N/A	MDR-DAS	A	400	3330																								
23 05 12 52	N/A	MDR-DAS	A	404	3330																								
23 42 50 68	N/A	MDR-DAS	A	406	3330																								
23 58 42 96	N/A	MDR-DAS	A	404	3330																								
DATE 141 76																													
00 01 57 42	N/A	MDR-DAS	A	401	3330																								
00 09 59 69	N/A	MDR-DAS	A	406	3330																								
00 24 59 28	N/A	MCR-DAS	A	400	3330																								
00 24 59 39	N/A	MDR-DAS	A	409	3330																								
00 32 57 46	N/A	OBR-PRM	A	0E4	2400																								
00 38 18 59	N/A	CRR-PRM	A	0E5	2400																								
00 46 12 60	N/A	MDR-DAS	A	430	3330																								
00 46 14 35	N/A	CRR-PRM	A	0F2	2400																								
00 47 00 92	N/A	OBR-EOD	A	003	1443																								
00 47 00 98	N/A	OBR-EOD	A	0E2	2400																								
00 47 01 03	N/A	CBR-ECD	A	0F3	2400																								
00 47 01 08	N/A	OBR-ECD	A	0E6	2400																								
00 47 01 14	N/A	OBR-EOD	A	0E7	2400																								
00 47 01 18	N/A	CBR-ECD	A	0F1	2400																								
00 47 01 23	N/A	OBR-EOD	A	0F3	2400																								
00 47 01 28	N/A	CBR-ECD	A	0F7	2400																								
00 47 01 34	N/A	OBR-EOD	A	1F3	2400																								
00 47 01 38	N/A	OBR-EOD	A	1E5	2400																								
00 47 01 56	N/A	MDR-DAS	A	201	3330																								
00 47 01 67	N/A	MDR-DAS	A	207	3330																								

- ① The header is a universal type. Headers for each record type are provided on a template, illustrated in Figure 10, Part 1.
- ② CPU models and serial numbers associated with the letter identifiers are shown at the end of this report.

RECORD TYPES ①	TOTAL	CPU-A ②
MCH	0	0
MCH-TRM	0	0
MACHINE CHECK	0	0
CCH	0	0
CCH-INC	2	2
CCH-CRH	0	0
CHANNEL CHECK	2	2
OBR	0	0
OBR-SHT	0	0
OBR-DMT	61	61
OBR-EOD	31	31
OBR-TMP	27	27
OBR-PRM	21	21
OUTBOARD	140	140
SFT	0	0
SFT-ABN	0	0
SFT-MCH	0	0
SFT-PI	0	0
SFT-RST	0	0
SOFTWARE	0	0
IPL	3	3
SYSTEM INITIALIZATION	3	3
DDR	0	0
DDR-OPR	0	0
DDR-SYS	0	0
SYSTEM RECONFIGURATION	0	0
MIH	0	0
MIH-CE	0	0
MIH-DE	0	0
MISSING INTERRUPT	0	0
EOD	2	2
SYSTEM TERMINATION	2	2
MDR	0	0
MDR-DAS	810	810
BUFFER OFFLOAD	810	810
OVER ALL TOTALS	957	957
CPU MODEL SERIAL NO.		
A 168 ③ 060374		

① Record types and subtypes ② Record counts by CPU

③ CPUs identified from filtered data or share card(s)

Figure 10. Event History (Part 3 of 3) – Report Summary

Threshold Summary for 3410/3420

The Threshold Summary for the 3410/3420, as illustrated in Figure 12, provides a one line entry for all unit checks and for each temporary or permanent device failure in the subsystem.

The report summarizes the I/O outboard (OBR) records on the EREP data set for the 3410/3420 tape drives. The consolidated summary is by tape subsystem.

The first section of the report is a one line entry for all unit checks (permanent read/write errors and equipment checks). See discussion of permanent and temporary errors under System Summary.

The next two sections are permanent and temporary errors that are summarized and printed as one line entries for each device in the system.

The Threshold Summary for 3410/3420 is initiated by the parameter THRESHOLD. Shared I/O applies to this report.

CCH Edit and CCH Summary Reports

The CCH Edit report provides a comprehensive condensed report of every channel failure (e.g., channel control check, channel data check, or interface control check) that does not terminate system operation. Its primary value is to display specific recorded data for channel dependent error information. Figure 13 illustrates the CCH Edit report.

The CCH Summary report, illustrated in Figure 14, shows the number and type of channel failures recorded on EREP input data sets.

The CCH Edit and Summary reports are initiated by the parameter PRINT whenever CCH Edit and/or summary is desired.

System Termination Edit and System Termination (EOD) Summary Reports

The System Termination Edit and System Termination EOD Summary reports can be generated only if the reliability data extractor (RDE) option has been included in the system.

The System Termination Edit, illustrated in Figure 15, is a condensed report which contains information related to the normal termination of the operating system. Whenever the system operator enters the HALT EOD command to terminate the operating system one system termination record is created. The number of records appearing in the system termination edit is dependent upon the number of times the HALT EOD command is issued.

The System Termination Summary, illustrated in Figure 16, denotes the number of EOD records recorded on EREP input data set.

The System Termination Edit and Summary reports are initiated by the parameter PRINT whenever system termination edit and/or summary is desired.

XXXXX 34xx/3803 SUBSYSTEM SUMMARY XXXXX																														
CUA		TU	CUA STATISTICS		- CUAS		EXCEEDING 001		TEMP RDS		OP 015		TEMP WRTS		LRC		CRC		ECC		SKEM		ERLY		VEL		HDR			
SERIAL	DATE	DAY	YR	HH	MM	SS	TH	RDS	WRTS	COUNT	SITTY	NOI	VFRC	VRFC	MTE	EDC	ENV	ERR	BOR	CHG	SER	ERR	BOR	CHG	SER	ERR	BOR	CHG	SER	
0C0470	N/A	138	76	027612	19	19	43	72	0C00	0021	05939	N/A	N/A	0005	0000	0005	0000	0003	0006	0003	0000	0001	0000	0001	0000	0001	0000	0000	N/A	N/A
000470	N/A	138	76	027598	23	55	09	04	0001	0002	02207	N/A	N/A	0002	0000	0002	0000	0002	0000	0002	0001	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000471	N/A	140	76	027071	00	21	11	24	0000	0015	09500	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	140	76	027065	00	27	18	08	0000	0015	09500	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	140	76	027896	00	42	00	86	0000	0024	11664	N/A	N/A	0009	0000	0009	0001	0009	0000	0009	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	141	76	026522	01	05	50	05	0C00	0017	12269	N/A	N/A	0002	0000	0002	0000	0002	0000	0002	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	141	76	026524	01	25	38	05	0C00	0019	13613	N/A	N/A	0004	0000	0004	0000	0004	0000	0004	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	141	76	027330	01	45	12	79	0000	0025	06232	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	142	76	027949	12	39	59	3C	0000	0022	13613	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000472	N/A	142	76	027116	18	27	17	34	0000	0022	14410	N/A	N/A	0007	0000	0007	0000	0007	0000	0007	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	143	76	027330	01	20	16	28	0000	0018	14330	N/A	N/A	0003	0000	0003	0000	0003	0000	0003	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	143	76	027491	01	30	47	31	0000	0024	13737	N/A	N/A	0009	0000	0009	0000	0009	0000	0009	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	143	76	027270	02	02	30	15	0000	0051	13643	N/A	N/A	0006	0000	0006	0001	0006	0000	0006	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	143	76	027521	02	18	34	24	0000	0020	12587	N/A	N/A	0005	0000	0005	0002	0005	0000	0005	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	143	76	026566	02	36	30	38	0000	0021	13798	N/A	N/A	0006	0000	0006	0000	0006	0000	0006	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	143	76	027598	23	55	09	04	0000	0015	09500	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	145	76	027739	08	39	00	41	0000	0020	05644	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	146	76	027762	00	44	18	86	0000	0019	11479	N/A	N/A	0004	0000	0004	0000	0004	0000	0004	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	146	76	038315	15	08	22	98	0C01	0000	21111	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	146	76	027598	23	55	09	04	0000	0015	09500	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	147	76	027259	02	31	32	26	0C00	0028	14057	N/A	N/A	0004	0000	0004	0000	0004	0000	0004	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	147	76	027486	02	42	37	34	0000	0020	14067	N/A	N/A	0005	0000	0005	0001	0005	0000	0005	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	147	76	027511	03	13	36	84	0000	0023	14259	N/A	N/A	0003	0000	0003	0000	0003	0000	0003	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	147	76	027579	08	18	29	52	0000	0018	01556	N/A	N/A	0003	0000	0003	0000	0003	0000	0003	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	150	76	027685	00	12	25	72	0000	0017	11195	N/A	N/A	0002	0000	0002	0000	0002	0000	0002	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	150	76	027511	03	33	58	53	0000	0017	14180	N/A	N/A	0002	0000	0002	0000	0002	0000	0002	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000472	N/A	150	76	027486	02	42	37	34	0000	0020	14067	N/A	N/A	0005	0000	0005	0001	0005	0000	0005	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	150	76	027486	02	42	37	34	0000	0020	14067	N/A	N/A	0005	0000	0005	0001	0005	0000	0005	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	150	76	027511	03	13	36	84	0000	0023	14259	N/A	N/A	0003	0000	0003	0000	0003	0000	0003	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	150	76	027752	16	23	36	57	0000	0027	09210	N/A	N/A	0012	0000	0012	0005	0012	0000	0012	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	151	76	027C99	21	01	55	37	0C00	0016	13695	N/A	N/A	0001	0000	0001	0001	0001	0000	0001	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	153	76	027680	22	29	31	06	0000	0021	08690	N/A	N/A	0006	0000	0006	0001	0006	0000	0006	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	153	76	026566	02	36	30	38	0000	0015	13773	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000472	N/A	154	76	038024	00	56	21	30	0000	0017	13423	N/A	N/A	0002	0000	0002	0000	0002	0000	0002	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	154	76	026542	04	24	16	16	0C00	0016	12178	N/A	N/A	0001	0000	0001	0000	0001	0000	0001	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	154	76	027904	18	13	49	02	0000	0027	10482	N/A	N/A	0012	0000	0012	0000	0012	0000	0012	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	154	76	027284	19	45	33	37	0C00	0015	13178	N/A	N/A	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	154	76	027285	19	57	17	44	0000	0038	11191	N/A	N/A	0008	0000	0008	0001	0008	0000	0008	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	155	76	026565	08	31	16	48	0000	0016	13182	N/A	N/A	0004	0000	0004	0001	0004	0000	0004	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	156	76	027685	00	51	58	48	0000	0019	11221	N/A	N/A	0004	0000	0004	0000	0004	0000	0004	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	157	76	026551	00	31	52	86	0000	0016	13679	N/A	N/A	0001	0000	0001	0000	0001	0000	0001	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	157	76	026554	01	04	39	94	0C00	0031	13638	N/A	N/A	0001	0000	0001	0000	0001	0000	0001	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	157	76	027082	03	27	01	35	0C00	0044	06532	N/A	N/A	0014	0000	0014	0002	0014	0000	0014	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	157	76	026998	03	38	19	67	0000	0015	13165	N/A	N/A	0003	0000	0003	0000	0003	0000	0003	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	157	76	027C64	04	01	17	54	0000	0020	13668	N/A	N/A	0005	0000	0005	0000	0005	0000	0005	0000	0000	0000	0000	0000	0000	0000	0000	N/A	N/A
000470	N/A	157	76	027340	04	03	4																							

```

MODEL 0165 SERIAL NO. 010185
--- RECORD SOURCE - CCH TYPE - INBOARD
OS/VS REL X
JOB NAME
DAY YEAR HH MM SS.TH
DATE _ 034 XX TIME _ 02 44 32 86
CHANNEL/UNIT ADDRESS 000000
      CC DA FL CT
FAILING CCW 00 000000 00 00 0000
      K CA US CS CT
CSW 00 000000 00 04 0000
UNIT STATUS CHANNEL STATUS
ATTENTION 0 PRGM-CTLD IRPT 0
STATUS MODIFIER 0 INCORRECT LENGTH 0
CONTROL UNIT END 0 PROGRAM CHECK 0
BUSY 0 PROTECTION CHECK 0
CHANNEL END 0 CHAN DATA CHECK 0
DEVICE END 0 CHAN CTRL CHECK 1
UNIT CHECK 0 I/F CTRL CHECK 0
UNIT EXCEPTION 0 CHAINING CHECK 0
I/O UNIT FOUND BUSY
CHANNEL/UNIT ADDR 0009 001C 001F 0021 0022 0023 0024 0025
--- CHANNEL TYPE ---
2870
HEADER SENSE SWITCHES FOUND ON
SYSTEM TERMINATED
*****
CHANNEL ERROR ANALYSIS
CSW STORED BY INTERRUPT
TERMINATION BY -- SYSTEM RESET- CODE 3
TIME CHANNEL DETECTED ERROR - COULD NOT BE ASSESSED
RETRY CODE 7
VALIDITY OF RECORDED DATA
COUNT = VALID
SENSE DATA = STORED
UNIT STATUS = VALID
COMMAND ADDRESS = VALID
CHANNEL ADDRESS = VALID
DEVICE ADDRESS = VALID
PROBABLE SOURCE OF ERROR- CHANNEL
*****
2870 MPX CHANNEL
KEY-CCW 0
DATA ADR 000000
FLAGS 00000000
BYTE COUNT 0000
KEY-CAW 0
COMMAND ADR 000000
UCW PARITY 00
RESID CMND ADR 000000
CHANNEL ADD 0
UNIT ADD 00
OPS
INCORRECT LEN 0 HALT I-O BIT 0 OPERATION CODE 00
STATUS
PREFETCH 0 PRG CHK 0 BYTE CT (MSC) 0
DT ADR PRG CHK 0 PROT CHK 0 COUNT PO (SSC) 0
CTRL CHK 1 DATA CHK 0 COUNT 7 (SSC) 0
CONTROL TRIGGERS
CAW 0 TEST I/O 0 MODE 3 0 MODE 10 0
CCW REQD 0 HALT I/O 0 MODE 4 0 MODE 11 0
CCW IN CHAN 0 PSEUDO SIO 0 MODE 6 0 MC BC PARITY 0
DATA REQ 0 MODE 1 0 MODE 7 0
START I/O 0 MODE 2 0 MODE 9 0

```

Figure 13. CCH Edit Report (Part 1 of 2)

MAIN CHANNEL CHECKS									
WORD 0 UCW	0	LS ADR	0	BYTE CT	0	PRIORITY	1		
WORD 2 UCW	0	STOR	0	TIME OUT	0				
SUB CHANNEL									
UNIT ADR	0	BYTE CT (SSC)	0	NO RESPONSE	0	AD-I	0		
CMND	0	ICRCT SELN	0	ICRCT TAG SEQ	0	ST-I	0		
SELECTOR SUB CHANNEL									
BC P	0	BC 2	0	ILI	0	CHAIN CHK	0		
BC 4	0	BC 1	0	DATA CHK	0				
HEX DUMP OF RECORD									
HEADER	20140C20	00000000	0072034F	02443286	00000000	00650000			
	0000	00000000	00000000	0009001C	001F0021	00220023	00240025	00000000	00000000
	0020	00000000	00040000	46401FC7	00000000	06000000	00000000	00000000	00400000

Figure 13. CCH Edit Report (Part 2 of 2)

DAY YEAR		DAY YEAR	
INBOARD DATE RANGE	141 XX TO 143 XX		
		---MODEL---	0165 SERIAL NO 012345
		---CHANNEL NUMBER---	00
CHANNEL INBOARD SUMMARY FOR 2870 CHANNEL			
NUMBER OF RECORDS EXAMINED = 0003			
-----TITLE-----		TOTAL	
DEVICE ADDRESS SUMMARY (MAX- 10 VALUES)			
	0018	0002	
	0074	0001	
FAILING CCW SUMMARY (MAX-10 VALUES)			
CMND CODE			
	04	0001	
	03	0001	
	00	0001	
-----TITLE-----		TOTAL	-----TITLE----- TOTAL
CHAN DATA CHK		0001	
CHAN CTRL CHK		0001	
IF CTRL CHK		0001	
UCW PARITY ERROR SUMMARY			
BYTE 0	0000	BYTE 1	0000
BYTE 2	0000	BYTE 3	0000
BYTE 4	0002	BYTE 5	0002
BYTE 6	0000	BYTE 7	0000
CONTROL TRIGGER SUMMARY			
CAW	0000	HALT I/O	0000
CCW REQD	0000	PSEUDO SIO	0000
CCW IN CHAN	0000	MODE 1	0001
DATA REQD	0000	MODE 2	0000
START I/O	0000	MODE 3	0000
TEST I/O	0000	MODE 4	0000
MODE 6	0000	MODE 10	0000
MODE 7	0000	MODE 11	0000
MODE 9	0000	MC BC PARITY	0000
MAIN CHANNEL CHECKS SUMMARY			
WORD 0 UCW	0000	BYTE CT	0000
WORD 2 UCW	0000	TIME OUT	0000
LS ADR	0000	PRIORITY	0000
STORE	0000	SECOND CHECK	0000
SUB-CHANNEL CHECKS			
UNIT ADR	0000	NO RESPONSE	0000
CMND	0000	ICRCT TAG SEQ	0001
BYTE CT (SSC)	0000	AD-I	0000
ICRCT SELN	0000	ST-I	0001
UNIT NUMBER SUMMARY			
	78	0001	
	D0	0001	

Figure 14. CCH Summary Report

```

EOD RECORD EDIT AND PRINTING SECTION

      DAY  YEAR                HH MM SS TH
DATE -101  XX                TIME -08 09 10 11

MODEL - 0135      CPU SERIAL NO. - 123456

OS/VIS REL X

HEX DUMP OF RECORD
HEADER  80150800   00000000   0071101F   08091011   00123456   01301010

0000

```

Figure 15. EOD Edit Report

```

SUMMARY OF EOD RECORDS

                                DAY YEAR    DAY YEAR    MODEL 135
                                101  XX    TO 101  XX    CPU SERIAL 123456

NO. OF RECORDS 002

XXXXXXXX END OF EOD SUMMARY XXXXXX

```

Figure 16. EOD Summary Report

IPL Edit and IPL Summary Reports

The IPL Edit and IPL Summary reports can be generated only if the reliability data extractor (RDE) option has been included in the system.

The IPL Edit, illustrated in Figure 17, is a condensed report, which contains the IPL record(s) generated by the master scheduler each time the system operator initializes the operating system. The system operator must provide the following information during initialization: (1) the reason for the IPL and (2) the subsystem (device or program) responsible for the restart.

The IPL Summary, illustrated in Figure 18, shows the IPL reason code, subsystem ID Code used with IPL reason code, and the number of occurrences of each code.

The IPL Edit and Summary reports are initiated by the parameter PRINT whenever IPL edit and/or summary is desired.

MCH Edit and MCH Summary Report

The Machine-Check (MCH) Edit report is illustrated in Figure 19, Parts 1 and 2. MCH records may occur as a result of the following types of machine failures:

- CPU (processor)
- Storage protect key
- Storage
- External damage.

```

IPL RECORD EDIT AND PRINTING SECTION

      DAY YEAR                HH MM SS TH
DATE -102  XX                TIME -08 09 10 11

MODEL - 145      CPU SERIAL NO. - 123456

OS/VIS REL X

--CHANNEL TYPE--
CHANNELS 0-14

UNATT  MPX  UNATT  MPX  UNATT  MPX  UNATT  MPX
UNATT  MPX  UNATT  MPX  UNATT  MPX  UNATT

IPL REASON CODE -      THE IPL REASON CODE IS INVALID
SUBSYSTEM ID - 09                SUBSYSTEM NAME - NULL
HIGHEST STORAGE ADDRESS 09090909

END OF IPL RECORD

HEX DUMP OF RECORD
HEADER 50150800 00000000 0071102F 08091011 00123456 01300909
0024 09090909 09090909 09090909 09090909 09090909 09090909

```

Figure 17. IPL Edit Report

```

SUMMARY OF IPL RECORDS

                                DAY YEAR    DAY YEAR    MODEL 145
                                101  XX    102  XX    CPU SERIAL 123456
DATE RANGE FROM

NO. OF RECORDS 002

XXXX SUBSYSTEM NAME AND NUMBER OF OCCURENCES XXXX

NULL          000      PROCESSOR          000
TAPE          000      TELEPROCESSING    000
MICR/OCR      000      GRAPHIX/DISPLAY/AUDIO 000
CARD/PRINT    000      IBM SYSTEM CONTROL PROGRAM 000
DIRECT ACCESS 000      IBM PROGRAMMING PRODUCT 000
OTHER         000

XXXX IPL REASON CODE AND NUMBER OF OCCURENCES XXX

NORMAL        000      MEDIA          000
UNKNOWN       000      OPERATIONAL    000
USER PROGRAM  000      ENVIRONMENTAL  000
IBM HARDWARE PROGRAMMING PROBLEM-CE/SE NOT REQUIRED 000
IBM HARDWARE PROGRAMMING PROBLEM-CE/SE REQUIRED      000
CE/SE HAS THE SYSTEM 000
DEFAULT -U-    000
INVALID IPL REASON CODE 002

XXXXXXXX END OF IPL SUMMARY XXXXXXXX

```

Figure 18. IPL Summary Report

```

MODEL 145                      SERIAL NO  00 00 00
OS/V5 REL X
--- RECORD SOURCE - MCH ---      TYPE - CPU
EC PSW      07 0C 00 00 00 06 18 C6
JOB NAME     TEG
PROGRAM NAME RMSTEG
          DAY YEAR                HH MM SS.TH
DATE  _ 355  XX                   TIME  _ 14 59 19 00
ERRORID=SEQ00001 CPU41 ASID0001 TIME 14.59.18.3
          ---MACHINE CHECK INTERRUPT CODE---
--- SUB CLASS ---
SYSTEM DAMAGE (SD)                0          TIMING FACILITIES DAMAGE (CD)      0
INSTRUCTION PROCESSING DAMAGE (PD) 0          EXTERNAL DAMAGE (ED)                 0
SYSTEM RECOVERY (SR)               1          DEGRADATION (DG)                    0
TIMER DAMAGE                        0          WARNING (W)                          0
--- INTERRUPT TENSE CODES ---
BACKED-UP (B)                      1          DELAYED (D)                          0
--- STORAGE AND PROTECTION ERROR CODES ---
UNCORRECTED STORAGE ERRORS (SE)    0          KEY IN STORAGE ERROR UNCORRECTED (KE) 0
CORRECTED STORAGE ERRORS (SC)      0
--- PSW VALIDITY CODES ---
EMWP BITS OF M.C. OLD ARE VALID (WP) 1          SYSTEM MASK AND KEY ARE VALID (MS)    1
PGM MASK AND COND CODE ARE VALID (PM) 1          INSTR ADDR OF M.C. OLD IS VALID (IA)  1
--- MISC VALIDITY CODES ---
FAILING STORAGE ADDR IS VALID (FA)  0          REGION CODE VALID (RC)                0
FP REGS STORED ARE VALID (FP)       1          GP REGS STORED ARE VALID (GP)         1
CONTROL REGS STORED ARE VALID (CR)   1          EXTENDED LOGOUT AREA VALID (LG)      1
INSTR MODIFIED STORAGE VALID (ST)    1          CPU TIMER VALID                       0
CLOCK COMPARATOR VALID              0
EXTENDED LOGOUT LENGTH              00 C0
FAILING STORAGE ADDRESS             00 00 00 00
--- REGION CODE ---
CONTROL STORAGE ADDRESS (BYTES 0-1) 0000      BIT (BYTE 3)
ERROR CORRECTION CODES (BYTE 2)    00
0  UNUSED 0
1  UNUSED 0
2  CHECK BIT OR DATA BIT FAILURE 0
3  DATA BIT FAILURE 0
4  CONTROL STORAGE DOUBLE BIT FAILURE 0
5  THRESHOLD LIMIT EXCEEDED (BIT 7 ALSO 1) 0
6  INTERMITTENT SINGLE BIT FAILURE (CS/MS) 0
7=0 MAIN STORAGE FAILURE IF BIT 6=1 0
7=1 CONTROL STORAGE FAILURE IF BIT 6=1 0
--- FLOATING POINT REGISTERS ---
FP REGS 0,2  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
FP REGS 4,6  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
--- GENERAL PURPOSE REGISTERS ---
GP REGS 0-3  00 02 22 04  00 06 1D 68  00 06 1D 88  00 06 1E 58
GP REGS 4-7  00 00 00 01  00 07 F6 60  00 DE F5 1C  00 DE F8 64
GP REGS 8-B  00 01 70 D8  B0 06 18 4C  00 04 5D A8  00 00 00 00
GP REGS C-F  40 06 2E 66  40 06 1E 66  40 06 0E 66  40 01 93 72
--- CONTROL REGISTERS ---
CR REGS 0-3  00 80 0C 7F  0F 07 FB 40  FF FF FF FF  00 00 00 00
CR REGS 4-7  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
CR REGS 8-B  00 00 00 00  00 00 00 00  00 00 00 00  00 00 00 00
CR REGS C-F  00 00 00 00  00 00 00 00  E1 00 00 00  00 04 5D A8

```

Figure 19. MCH Edit Record (Part 1 of 2)

CPU DEPENDENT LOGOUT

MACHINE CHECK REGISTER A

BYTE 0		BYTE 2	
LOCAL STORAGE A SOURCE ADDR CHK	0	ALU 2 HALF SUM CHK	0
LOCAL STORAGE B SOURCE ADDR CHK	0	ALU 3 HALF SUM CHK	0
LOCAL STORAGE A DEST ADDR CHK	0	ALU LOGICAL CHK	0
LOCAL STORAGE B DEST ADDR CHK	0	B REG SHIFT CHK	0
DEST BYTE CTRL CHK	0	A REG PTY CHK	0
LOCAL STORAGE A-B DEST ADDR COMPARE	0	B REG PTY CHK	0

MACHINE CHECK STATUS FIELD

MCSTATD FIELD LENGTH 0000

--- SYSTEM STATUS ---

HARDWARE RECOVERY	0	SOFTWARE RECOVERY	0
TASK ABORTED	0	TASK SET NON-DISPATCHABLE	0
OPERATING SYSTEM TERMINATION	0	QUIET MODE IN EFFECT	0

--- DAMAGE AREA ---

MAIN STORAGE	0	BUFFER	0
CONTROL STORAGE	0	INTERVAL TIMER	0
PROCESSOR	0	CHANNEL ERROR	0
TOD CLOCK	0	SYSTEM DAMAGE	0

--- ERROR TYPE ---

INTERMITTENT	0	SOLID	0
DATA	0	RESERVED	0
RESERVED	0	PROTECT	0

--- RMS ACTION DATA ---

LOOP TIME OUT	0	REPAIR	0
STORAGE RECONFIGURE	0	BUFFER RECONFIGURE	0

--- RMS INFORMATION STATUS ---

RESERVED	0	INVALID MCI CODE	0
INVALID FAILING STORAGE ADDRESS	0	PROGRAM CHECK IN MCH	0

--- RMS WAIT STATE ---

A00

--- HISTORY OF TRANSIENT MODULES ---

00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00
00 00 00 00	00 00 00 00	00 00 00 00	00 00 00 00

--- PDAR ACTION ---

TERMINATION OF CURRENT TASK	0	RETRY POSSIBLE	0
BYPASS(AFFECTED TASK) POSSIBLE	0	REPAIR UNSUCCESSFUL	0
INDETERMINATE INSTRUCTION COUNTER	0	RESERVED	0

--- FAILURE TYPE ---

SOLID STORAGE DATA ERROR	0	INTERMITTENT STOR. DATA ERR	0
SOLID SPF KEY ERROR	0	INTERMITTENT SPF KEY ERROR	0

--- OPERATING SYSTEM STATUS ---

WAIT PSEUDO TASK	0	PAGE SUPERVISOR TASK	0
MASTER SCHEDULER TASK	0	SYSTEM TASK	0
PROBLEM PROGRAM TASK	0	CURRENT PSW DISABLED FOR I/O	0

--- LOCATION OF FAILURE ---

NUCLEUS	0	SQA AREA	0
LSQA AREA	0	PQA	0
PAGEABLE AREA	0	FIXED PAGE AREA	0
V=R ADDRESS AREA	0	CRITICAL AREA	0

--- REQUESTED OPERATOR AWARENESS ---

SUPERVISOR DAMAGE MESSAGE	0	TASK ABNORM TERMINATION MSG	0
DAMAGED PAGE NOW UNAVAILABLE MSG	0	DAMAGED PAGE NOW DELETED MSG	0
TASK NON-DISPATCHABLE MESSAGE	0	SOFTWARE RECOVERY MESSAGE	0

--- FOOTPRINTS ---

CHANGE BIT ACTIVE	0	KEY IN EXTERNAL PAGE TABLE	0
PAGE RECURSION	0	PAGE FIX ACTIVE IN LOW END	0
TRANSLATE ERROR	0	NO PAGE EXISTS	0
RELOCATE OFF	0	LOW END INTERFACE ACTIVE	0

--- FOOTPRINTS - INTERFACES ---

ABTERM INTERFACE ACTIVE	0	TRANSLATE INTERFACE ACTIVE	0
FIND PAGE INTERFACE ACTIVE	0	PAGE DEQUEUE INTERFACE ACT.	0
PAGE ENQUEUE INTERFACE ACTIVE	0	STAT FUNCTION INTERFACE ACT.	0
V=R RELEASE INTERFACE ACTIVE	0	POST INTERFACE ACTIVE	0

FAILING STORAGE REAL ADDRESS 00000000
 BEGINNING FAILING STORAGE VIRTUAL ADDRESS 00000000
 ENDING FAILING STORAGE VIRTUAL ADDRESS 00000000
 INSTRUCTION ADDRESS AT FAILURE 00000000
 CURRENT TCB POINTER 00000000

HEX DUMP OF RECORD									
HEADER	10420000	00001100	0072355F	14591900	00000000	014500C0	D9D4E2E3	C5C74040	
	E3C5C740	40404040	07000000	00061BC6					
0000	20020F1F	000000C0	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0020	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0040	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0060	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00000000
0080	00000000	00000000	00000000	00000000	00000000	00000000	00000000	00022204	00061D68
00A0	00061D88	00061E58	00000001	0007F660	00DEF51C	00DEFB64	000170D8	00061D84	B006184C
0000	00045DA8	00000000	40062E66	40061E66	40060E66	40019372	C0800C7F	0F07FB40	

Figure 19. MCH Edit Report (Part 2 of 2)

If the machine-check interrupt is for a soft failure (one that was corrected by the hardware retry), the information is formatted and recorded on SYS1.LOGREC.

If the machine-check interrupt is for a hard failure (one that could not be corrected by the hardware retry), the MCH record format indicates that the failure resulted in system termination.

The MCH Summary, illustrated in Figure 20, denotes the counts for each error for all records in the date range.

The MCH Edit and Summary reports are initiated by the parameter PRINT whenever MCH edit and/or summary is desired.

MDR Edit and MDR Summary Reports

The Miscellaneous Data (MDR) Edit report records, illustrated in Figure 21, are produced whenever the following conditions occur:

- Buffer overflow
- Demounts
- Device failures.

The MDR Summary report as illustrated in Figure 22 contains a summary of error statistics for each device. Shared I/O applies to this report.

The MDR Edit and Summary are initiated by the parameter PRINT whenever MDR and/or OBR edit and/or summary is desired.

OBR Edit and OBR Summary Reports

The OBR Edit report as illustrated in Figure 23 provides a comprehensive condensed report for the following conditions:

- Counter overflow statistics for devices.
- Counter overflow statistics and device failures on teleprocessing devices.
- Demount conditions on 34XX series of magnetic tape devices.
- End-of-day requests.
- Paging I/O errors.
- Permanent (uncorrectable or unit check) channel and device failures.
- Temporary or intermittent I/O device failures.

The OBR Summary, illustrated in Figure 24, gives a summary of error statistics for each device. Shared I/O applies to this report.

The OBR Edit and Summary Reports are initiated by the parameter PRINT whenever OBR edit and/or summary is desired.

MODEL 145 MACHINE CHECK RECORDS				DAY YEAR	DAY YEAR
DATE RANGE - FROM 301 XX TO 304 XX					
		SERIAL	234567		
		NO.OF RECORDS	00004		
- SUMMARY OF MODEL 145 MACHINE CHECK RECORDS -					
MACHINE CHECK REGISTER A					
BYTE 0			BYTE 2		
LOCAL STORAGE A SOURCE ADDR CHK	00004	ALU 2 HALF SUM CHK	00004		
LOCAL STORAGE B SOURCE ADDR CHK	00002	ALU 3 HALF SUM CHK	00002		
LOCAL STORAGE A DEST ADDR CHK	00002	ALU LOGICAL CHK	00002		
LOCAL STORAGE B DEST ADDR CHK	00003	B REG SHIFT CHK	00003		
DEST BYTE CTRL CHK	00004	A REG PTY CHK	00004		
LOCAL STORAGE A-B DEST ADDR COMPARE	00002	B REG PTY CHK	00002		
LOCAL STORAGE CTRL ASSM CHK	00002	Z REG PTY CHK	00002		
CTRL REG PTY CH5	00003	D REG PTY CHK	00003		
BYTE 1			BYTE 3		
ADDR CHK BOUND REC CHK	00004	EXT REG DEST X COMP CHK	00004		
LOCAL STORAGE COMP CHK	00002	EXT REG DEST Y COMP CHK	00002		
FLUSH THRU CHK	00002	EXT REG SOURCE Y CHK	00002		
H REG PTY CHK	00003	EXT CTRL ASSM PTY CHK	00003		
BIT 4	00004	INTERV TIMER PTY CHK	00004		
P REG PTY CHK	00002	S REC DUP CHK	00002		
T REG PTY CHK	00002	TIME OF DAY CLOCK CHK	00002		
L REG PTY CHK	00003	CTRL STORAGE ADDR CHK	00003		
MACHINE CHECK REGISTER B					
BYTE 0			BYTE 2		
STORAGE ADD CHK	00004	T CYCLE HARD ERROR	00004		
SDBI PTY CHK	00002	DOUBLE ECC ERROR	00002		
SDBO PTY CHK	00002	P21 CTRL LINE PTY CHK	00002		
STORE PTY CHK	00003	BUSY CHK	00003		
TIME OUT CHK	00004	ECC HARDWARE CHK	00004		
STORAGE PROT STACK PTY CHK	00002	DOUBLE ECC ERROR	00002		
CLOCK SYN CHK A	00002	SINGLE ECC ERROR	00002		
CLOCK SYN CHK B	00003	SINGLE DATA BIT CORRCT	00003		
BYTE 1			BYTE 3		
M REG COMP A CHK	00004	P2I CT ERROR CORRCT	00004		
M REG COMP B CHK	00002	C32 DATA BIT CORRCT	00002		
M REG COMP C CHK	00002	C16 DATA BIT CORRCT	00002		
M REG COMP D CHK	00003	C8 DATA BIT CORRCT	00003		
NO ADR ADJ REG MTCH	00004	C4 DATA BIT CORRCT	00004		
MULT ADR ADJ REG MTCH	00002	C2 DATA BIT CORRCT	00002		
ALR ADJ LRU INVALID	00002	C1 DATA BIT CORRCT	00002		
ANY MACH CHK ON	00003	C0 DATA BIT CORRCT	00003		
RETRY REG 3 ERRORS HMRTY			RETRY REG 4 ERRORS CPURTY		
MACHINE CHECK TRAP	00004	STORAGE 2 CYCLE ERROR	00004		
RETRY TRAP	00002	TYPE 1 ERROR	00002		
CPU HIGH TRAP	00002	TYPE 2 ERROR	00002		
IFA OR SEL CHAN 1,2,3	00003	TYPE 3 ERROR	00003		
SEL CHANNEL 1,2 OR 3	00004	LOCAL OR EXT STORAGE DEST	00004		
MPX TRAP	00002	STORAGE WORD IN ERROR	00002		
IFA TRAP	00002	STOP WORD IN ERROR	00002		
STORE DISPLAY	00003	UNTRYABLE ERROR	00003		
SYSTEM REGISTER					
BYTE 0			BYTE 2		
MACHINE CHK INTERPT PENDING	00004	DOCUMENTARY CONSOLE 2	00004		
RETRY ROUTINE	00002	TMPLE	00002		
MACHINE CHK ROUTINE	00002	LOAD FILE WAIT	00002		
DOCUMENTARY CONSOLE	00003	CE KEY IN CE MODE	00003		
LOG PRESENT	00004	IPL	00004		
SPARE	00002	POWER ON RESET	00002		
I/O INSTN LATCH	00002	SPARE	00002		
FORCE MODULE 0 TO LSCS	00003	INSTR PROC LATCH	00003		
BYTE 1			BYTE 3		
ADDR CONTENTS	00004	MACHINE CHECK TRAP	00004		
CPU INTRPT FORCE	00002	RETRY TRAP	00002		
SAR INTRPT FORCE	00002	CPU HIGH TRAP	00002		
PSW RESTART	00003	SEL CHAN 1,2 OR 3	00003		
MDO MODE	00004	SEL CHAN 2,3 OR 4	00004		
SYS CTRL INTRPT	00002	MPX TRAP	00002		
TIMER INTRPT FORCE	00002	INT FILE ADAPTR TRAP	00002		
PRTY INTRUPT	00003	STORE-DISPLAY	00003		

Figure 20. MCH Summary Report

```

2715 ERROR LOG DATA EDITING AND PRINTING SECTION
MODEL-UNIVERSAL
OS/V5 REL X
--RECORD ENTRY SOURCE - MDR    TYPE - TELEPROCESSING
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

DISK ADAPTER ERROR LOG      CUA 0208    2715 ID  0001    DAY      TIME
ERROR STATUS                SECTOR ADDRESS          606
  READ CHECK                 0
  CSBI PTY ERROR-DATA       0
  CSBI PTY ERROR-ADDR       0    READ/WRITE OP CODE STATUS
  DATA REG PARITY CK       0    READ LABEL                0
  ADDR REG PARITY           0    WRITE                      0
  OVERRUN                   1    READ CHECK                 0
  WRITE SELECT CHECK        1    READ                       0
  MODULO 4/LENGTH CK       0

DISK ADAPTER ERROR LOG      CUA 0208    2715 ID  0001    DAY      TIME
ERROR STATUS                SECTOR ADDRESS          606
  READ CHECK                 0
  CSBI PTY ERROR-DATA       0
  CSBI PTY ERROR-ADDR       0    READ/WRITE OP CODE STATUS
  DATA REG PARITY CK       0    READ LABEL                0
  ADDR REG PARITY           0    WRITE                      0
  OVERRUN                   1    READ CHECK                 0
  WRITE SELECT CHECK        1    READ                       0
  MODULO 4/LENGTH CK       0

DISK ADAPTER ERROR LOG      CUA 0208    2715 ID  0001    DAY      TIME
ERROR STATUS                SECTOR ADDRESS          606
  READ CHECK                 0
  CSBI PTY ERROR-DATA       0
  CSBI PTY ERROR-ADDR       0    READ/WRITE OP CODE STATUS
  DATA REG PARITY CK       0    READ LABEL                0
  ADDR REG PARITY           0    WRITE                      0
  OVERRUN                   1    READ CHECK                 0
  WRITE SELECT CHECK        1    READ                       0
  MODULO 4/LENGTH CK       0

DISK ADAPTER ERROR LOG      CUA 0208    2715 ID  0001    DAY      TIME
ERROR STATUS                SECTOR ADDRESS          606
  READ CHECK                 0
  CSBI PTY ERROR-DATA       0
  CSBI PTY ERROR-ADDR       0    READ/WRITE OP CODE STATUS
  DATA REG PARITY CK       0    READ LABEL                0
  ADDR REG PARITY           0    WRITE                      0
  OVERRUN                   1    READ CHECK                 0
  WRITE SELECT CHECK        1    READ                       0
  MODULO 4/LENGTH CK       0

```

Figure 21. MDR Edit Report

```

2715 ERROR LOG DATA SUMMARY
MODEL -135          SERIAL NO 123456
TOTAL NUMBER OF RECORDS PROCESSED 00001

DISK ADAPTER ERROR SUMMARY CUA 0208    2715 ID          DATA RANGE - FROM -    TO -
ERROR STATUS                TOTAL RECORDS PROCESSED 00042
  READ CHECK                 00000
  CSBI PTY ERROR - DATA    00000
  CSBI PTY ERROR - ADDR    00000    READ/WRITE OP CODE STATUS
  DATA REG PARITY CK      00000    READ LABEL                00000
  ADDR REG PARITY CX       00000    WRITE                     00000
  OVERRUN                  00042    READ CHECK                00000
  WRITE SELECT CHECK        00042    READ                      00000
  MODULO 4/LENGTH CK       00000

```

Figure 22. MDR Summary Report


```

---RECORD ENTRY TYPE - UNIT CHECK      SOURCE - OUTBOARD      MODEL- 145      SERIAL NO. 123456

OS/V5 REL X
                DAY YEAR      HH MM SS.TH      JOB IDENTITY ABCDEFGH
                DATE- 103 XX      TIME- 08 09 10 11      C1C2C3C4 C5C6C7C8

DEVICE TYPE      2703
PRIMARY CHANNEL UNIT ADDRESS 000003
ALTERNATE CHANNEL UNIT ADDRESS 000103
COMMUNICATION ADAPTER TYPE    IBM TERM I
TERMINAL TYPE      1050

                CC CA FL C1      K CA .US CS CT
                FAILING CCW      C9 004000 40 00 0088      CSW F0 03EFF8 DE BC 0008

UNIT STATUS      CHANNEL STATUS      STATISTICAL DATA      STATISTICAL DATA

ATTENTION      1      PRGM-CTLD TRPT 1      TEMPY READS      000      TEMPY WRITES      015
STATUS MODIFIER 1      INCORRECT LENGTH 0      INTRVN REQD      000      BUS OUT CHK      015
CONTROL UNIT END 0      PROGRAM CHECK 1      EQUIP CHK      000      OVERRUN      015
BUSY      1      PROTECTION CHECK 1      LOST DATA      000      TIME OUT      015
CHANNEL END      1      CHAN DATA CHECK 1      NOT USED      000      NOT USED      006
DEVICE END      1      CHAN CTL CHECK 1      NOT USED      000      NOT USED      006
UNIT CHECK      1      I/F CTL CHECK 0      NOT USED      000      NOT USED      006
UNIT EXCEPTION 0      CHAINING CHECK 0      NOT USED      000      CHAN DATA CHK      006

SENSE BYTE DATA

BYTE 0      06

CMND REJ 0
INTV REQD 0
BUS C CHK 0
EQUIP CHK 0
DATA CHK 0
OVERRUN 1
RECEIVING 1
TIME OUT 0

HEX DUMP OF RECORD
HEADER      30550800      00000000      0071103F      08091011      00123456      01300000

0018      01020304      05060708      09004000      40000088      F003EFF8      DEB00008      00000103      01004013
0038      00000003      0F0F0F0F      0F0F0F0F      06060606      06060606      06060606

```

Figure 23. OBR Edit Report

```

                DAY YEAR      DAY YEAR      MODEL- 145      SERIAL NO. 123456
OUTBOARD DATE RANGE - 103 XX TO 103 XX
SUMMARY OF I/O OUTBOARD ENVIRONMENT RECORDS FOR DEVICE 000003      DEVICE TYPE 2703
TOTAL NUMBER OF RECORDS      002
TOTAL OF OVERFLOW RECORDS      001

CCW COMMAND CODES ENCOUNTERED (MAXIMUM OF 24)

CMND TOTAL
09      001

SENSE BYTE SUMMARY

BYTE 0

CMND REJ 000
INTV REQD 000
BUS O CHK 000
EQUIP CHK 000
DATA CHK 000
OVERRUN 001
RECEIVING 001
TIMEOUT 000

STATISTICAL DATA

TEMPY READS      012      TEMPY WRITES      016
INTRVN REQD      012      BUS OUT CHK      016
EQUIP CHK      000      OVERRUN      021
LOST DATA      000      TIME OUT      021
NOT USED      000      NOT USED      012
NOT USED      000      NOT USED      012
NOT USED      000      NOT USED      012
NOT USED      000      CHAN DATA CHK      012

```

Figure 24. OBR Summary Report

Software Edit and Software Summary Reports

The Software Edit Report, as illustrated in Figure 25, provides a report of software records.

The report contains information such as the name of the abending program or the request block (RB) of the abending program if it is in supervisor mode, the contents of the general-purpose registers, the PSW, and the name of the module and CSECT, in which the error occurred. Also included is VTAM component recovery area (CRA) information, such as the address of the component recovery record being built when the abend occurred, VTAM lock information, and tracing switches for the executing module.

The Software Edit is initiated by the parameter PRINT whenever software edit is desired.

The Software Summary Report, as illustrated in Figure 26, summarizes the software records. This report is initiated by the parameter PRINT whenever TYPE=S is specified. The summary lists 1 to 112 unique recovery routine and CSECT name combinations in alphanumeric order. Any record without a recovery routine and CSECT name is not used in this summary. The ERROR CNT summarizes the number of times that this recovery routine and CSECT name combination has appeared in the software records.

IPL Report Provided by RDE Summary

The IPL Report produced by RDE Summary is illustrated in Figure 27. The IPL Report contains each IPL in sequence, with the date and time of the IPL, the reason for the IPL, and the subsystem, if any, that was responsible for the IPL. In addition, the average time between IPL's is printed on the report.

This IPL Report is initiated by the parameter RDESUM.

Hardware Error Report Produced by RDE Summary

The Hardware Error Report, as illustrated in Figure 28, contains a count of the errors for each device type, CPU, and channel in the system. The error count is divided into two types:

- (1) SEVERE ERRORS—those that cause the system to be stopped and reinitialized and
- (2) NONSEVERE ERRORS—those that affected system performance but did not cause the system to be reinitialized.

The Hardware Error Report is initiated by the parameter RDESUM.

```

--- RECORD ENTRY SOURCE - SOFTWARE --- TYPE
ERRORID=SEQ00001 CPU00 ASID0012 TIME=01.02.02.5 DATE 068 XX TIME 01 02 03 04 CPU 020008 CPU 0158 RELEASE LEVEL VS 1 REL. X

JOBNAME TESTSOFT
ABENDING PROGRAM NAME IEBGENER BC MODE PSW AT TIME OF ERROR BC MODE PSW OF LAST RB
NAME OF MODULE INVOLVED IEBGEN03
NAME OF CSECT INVOLVED IEBGENS3 AAAAAAAAA AAAAAAAAA BBBBBBBB BBBBBBBB
FUNCTIONAL RECOVERY ROUTINE IEBHELP

REGS AT TIME OF ERROR
REGS 0-7 00000000 00000001 00000002 00000003 00000004 00000005 00000006 00000007
REGS 8-15 00000008 00000009 0000000A 0000000B 0000000C 0000000D 0000000E 0000000F

EC PSW AT TIME OF ABEND FFFFFFFF FFFFFFFF EC PSW FROM ESTAE RB(0 FOR ESTAI) 77777777 77777777
ADDITIONAL INFO:
INST LENGTH CODE 00 INST LENGTH CODE 00
INTERRUPT CODE 0000 INTERRUPT CODE 0000
VIRT ADDR OF TRANS EXCEP 00000000 VIRT ADDR OF TRANS EXCEP 00000000

REGS OF RB LEVEL OF ESTAE EXIT OR ZERO FOR ESTAI
REGS 0-7 80000000 80000001 80000002 80000003 80000004 80000005 80000006 80000007
REGS 8-15 80000008 80000009 8000000A 8000000B 8000000C 8000000D 8000000E 8000000F

MCH FLAG BYTE 0 MCK INPUT INFO 0 FRAME ERROR INDICATORS 0 STORAGE ERROR INDICATORS
STORAGE ADDRS ARE VALID 0 STORAGE KEY FAILURE 0 STORAGE ERROR ALREADY SET 0 FRAME OFFLINE(OR SCHED) 0
MCK RECORD NOT RECORDED 0 REGISTERS UNPREDICTABLE 0 CHANGE INDICATOR ON 0 INTERCEPT 0
TIME STAMP IS VALID 0 PSW UNPREDICTABLE 0 STORAGE DATA CHECK 0 STORAGE ERROR PERMANENT 0
STORAGE IS RECONFIGURED 0 STORAGE DATA CHECK 0 PERMANENT RES. STORAGE 0
RECONFIGURE STATUS AVAIL 0 ACR REQUEST 0 FRAME IN SQA 0
RECONFIGURE NOT ATTEMPTED 0 INSTRUCTION FAILURE 0 FRAME IN LSQA 0
SOFT ERROR 0 FRAME IS PAGE FIXED 0
TIMER ERROR 0 FRAME IS V=R 0

BEGINNING VIRT ADDR OF STORAGE CHECK 00000000 TIME STAMP OF ASSOCIATED MACHINE CHECK RECORD
ENDING VIRT ADDR OF STORAGE CHECK FFFFFFFF DATE TIME
REAL STORAGE FAILING ADDRESS 66666666 DAY YR HH MM SS.TH
000 00 00 00 00 00

MACHINE CHECK 0 TYPE 1 SVC IN CONTROL 0 PREV ESTA OR FRR FAILED 0 EXIT TO CLEANUP ONLY 0
PROGRAM CHECK 0 ENABLED RB IN CONTROL 0 (E)STAI PREV IN CONTROL 0 RB OF ESTA NOT IN CONTROL 0
RESTART KEY DEPRESSED 0 DISABLED RTN IN CONTROL 0 IRB PRECEDED RB 0 ESTA EXIT FOR PREV ABEND 0
TASK ISSUED SVC 13 0 SYSTEM IN SRB MODE 0 THIS RTN PERCOLATED TO 0 STEP ABEND REQUESTED 0
SYSTEM FORCED SVC 13 0 LOWER LEVEL EXIT INFO 0 TASK ANCESTOR ABENDED 0
SVC BY LOCKED OR SRB RTN 0 REGS AND PSW UNAVAILABLE 0
TRANSLATION FAILURE 0 MCK INFO UNAVAILABLE 0
PAGE I/O ERROR 0

MEMORY ASID 0000 CURRENT I/O STATUS
RECOVERY RETURN CODE 00 I/O IS RESTOREABLE 0
I/O IS NOT RESTOREABLE 0
NO I/O OUTSTANDING 0
NO I/O PROCESSING 0

ADDITIONAL PROCESSING GLOBAL LOCKS TO BE FREED LOCKWORDS
RECORDING REQUESTED 0 DISPATCHER LOCK 0
VALID SPIN 0 OPTIMIZER LOCK 0
UPDATED REGS FOR RETRY 0 IOSCAT LOCK 0 IOSCAT LOCKWORD 00000001
FREE RTCA BEFORE RETRY 0 IOSUCB LOCK 0 IOSUCB LOCKWORD 00000002
IOSLCH LOCK 0 IOSLCH LOCKWORD 00000003
IOSYNCH LOCK 0 IOSYNCH LOCKWORD 00000004
NCB LOCK 0 NCB LOCKWORD 00000006
DNCB LOCK 0 DNCB LOCKWORD 00000007
ACBDEBS LOCK 0 ACBDEBS LOCKWORD 00000008
ASMPAT LOCK 0 ASMPAT LOCKWORD 00000005
SALLOK LOCK 0
CMS LOCK 0
LOCAL LOCK 0

DUMP CHARACTERISTICS
DUMP FLAGS SDATA OPTIONS PDATA OPTIONS DUMP RANGES AREA
SNAP DUMP REQUEST 0 DISPLAY NUCLEUS 0 DISPLAY SAVE AREAS 0 RANGE 1 00000000 11111111
PARM LIST SUPPLIED 0 DISPLAY SQA 0 DISPLAY SAVE AREA HEADER 0 RANGE 2 22222222 33333333
STORAGE LIST SUPPLIED 0 DISPLAY LSQA 0 DISPLAY REGISTER 0 RANGE 3 44444444 55555555
DISPLAY SWA 0 DISPLAY TASK LPA MODULES 0 RANGE 4 66666666 77777777
DISPLAY GTF TRACE TABLE 0 DISPLAY TASK JPA MODULES 0
DISPLAY CONTROL BLOCKS 0 DISPLAY PSW 0
DISPLAY QCB/QELS 0 DISPLAY USER SUBPOOLS 0

USER VARIABLE EBCDIC DATA
THIS IS USER SUPPLIED EBCDIC RECORDING DATA
HEX DUMP OF RECORD
HEADER 40820800 00000000 0073068F 01020304 00020008 015802A0 E3C5E2E3 E2D6C6E3
0000 00000000 00000000 AAAAAAAAA AAAAAAAAA BBBBBBBB BBBBBBBB 00000000 00000001

```

Figure 25. Software Edit Report

```

SOFTWARE SUMMARY
DATE RANGE FROM 109 75 TO 110 75 MODEL 165
SERIAL 345678
NUMBER OF RECORDS 0005
RECOVERY RTN CSECT NAME ERROR CNT RECOVERY RTN CSECT NAME ERROR CNT
IGXF00BB IFCER02 09 IGXF003 IFCER00 02
IGXF00BB IFCER01 01

```

Figure 26. Software Summary Report

XYZ CORPORATION

STATISTICS OF IPLS DUE TO ALL CAUSES

STARTING DATE OF REPORT - 73/313 (2)

SEQUENCE	DATE	TIME	REASON FOR IPL*	SUBSYSTEM RESPONSIBLE*	LOST TIME	CATEGORY
001 (1)	73/313	07.43.31	NM-NORMAL IPL	00-NORMAL OR UNKNOWN	00.20.40	IDLE
002	73/313	09.12.51	IE-IBM PROBLEM-NO CE/SE SUPPORT	20-DIRECT ACCESS	00.05.12	IBM RESP
003	73/313	09.43.57	UN-UNKNOWN	00-NORMAL OR UNKNOWN	00.04.18	IBM RESP
004	73/313	09.59.32	IM-IBM PROBLEM-CE/SE SUPPORT	70-TELEPROCESSING	00.06.12	IBM MAINT
005	73/313	19.33.42	OP-OPERATIONAL/PROCEDURAL	00-NORMAL OR UNKNOWN	00.10.00	OTHER
006	73/313	23.46.00	EN-ENVIRONMENTAL-POWER,ETC	00-NORMAL OR UNKNOWN	01.05.24	OTHER
007	73/314	08.12.00	IE-IBM PROBLEM-NO CE/SE SUPPORT	90-IBM CONTROL PROG	00.30.12	IBM RESP

* THIS INFORMATION WAS PROVIDED BY THE OPERATOR

IPL CLUSTERING, MULTIPLE IPLS WITHIN 30 MINUTES (4)

GROUP 001 002-004

LOST TIME SUMMARY

CATEGORY	HARDWARE		SOFTWARE		TOTAL	
	CNT	HRS	CNT	HRS	CNT	HRS
IBM MAINT	1	0.1			1	0.1 (5)
IBM RESP	1	0.1	2	0.5	3	0.6 (6)
OTHER					2	1.2 (7)
IDLE					1	0.3 (8)
TOTALS	2	0.2	2	0.5	7	2.2 (9)

ENDING DATE OF REPORT - 73/314

TOTAL TIME - 25.3
 PROCESS TIME - 23.1
 AVE RUN TIME/IPL - 3.6 (9)
 % PROD AVAILABILITY - 92.4
 AVE LOST TIME - 0.3

(1) Sequence

Lowest sequence number is for the first IPL recorded during the report period specified on the control card; highest sequence number is for the last IPL recorded during the report period specified on the control card.

(2) Reason for IPL

IPL reason code provided by the operator in reply to system message IFB010D. Reason code is taken from the IPL record on the measurement data set.

(3) Subsystem Responsible

Subsystem ID provided by the operator in reply to system message IFB010D. Subsystem ID is taken from the IPL record on the measurement data set.

(4) IPL Clustering

Field contains groups, by sequence numbers, of IPLs that occurred within a specified number of minutes of each other. In this figure, 30 minutes was specified as the clustering interval. Group 1 contains the IPLs with sequence numbers 2, 3, and 4. The sequence numbers in this field cannot exceed 99. When 99 is reached, the next sequence number is 1.

(5) Lost Time—Maintenance

Total lost time for IPL records with an IPL reason code for IBM maintenance (IM) for the report period specified on the control card. Calculates the lost time for each record as being the time interval in that IPL record between the time the record was recorded and the date and time values from the time stamp record.

(6) Lost Time—IBM Responsibility

Total lost time for IPL records with an IPL reason code for IBM product problems (CE, IE, and UN) for the report period specified on the control card. Calculates the lost time for each record as being the time interval in that IPL record between the time the record was recorded and the date and time values from the time stamp record.

(7) Lost Time—Other

Total lost time for all IPL records with IPL reason codes of EN, ME, OP, and UP for the report period specified on the control card.

(8) Idle Time

Total idle time found in IPL records with IPL reason codes of DF and NM for the report period specified on the control card.

(9) Average Run Time/IPL

Total running time divided by the number of IPLs. Number cannot be larger than 4 decimal digits.

Figure 27. IPL Report Produced by RDE Summary Function

<u>STATISTICS OF ERRORS FROM HARDWARE UNITS ON MODEL 145 SYSTEM</u>		
<u>NON-TRANSPARENT ERRORS</u>		
<u>SUBSYSTEM</u> ①	<u>System Continued To Operate (Possible Partial Degradation)</u> ②	<u>System Stopped Re-IPL Required</u> ③
<u>PROCESSOR SUBSYSTEM</u>		
CPU	1	2
STORAGE	3	1
<u>CHANNELS</u>		
1	2	1
2	0	1
3	1	0
TOTAL	3	2
UNKNOWN PROCESSOR	1	1
TOTAL	8	6
<u>TAPE SUBSYSTEM</u>		
180	5	3
181	1	0
280	3	0
281	1	2
282	1	0
UNKNOWN	0	1
TOTAL	11	6
<u>DASD SUBSYSTEM</u>		
336	0	1
337	2	0
UNKNOWN	0	1
TOTAL	2	2
UNKNOWN SUBSYSTEM	0	1

① Subsystem

Column contains the equipment in your system that had any errors recorded for it. It is divided into subsystems (processor, unit record, tape, DASD, teleprocessing, graphics, and unknown) and specific device addresses whenever possible.

② System Continued to Operate

Column contains the number of nonsevere errors that occurred for each subsystem – errors severe enough to degrade system performance, but not severe enough to force the system to be reinitialized. For errors of this type, the system has recovered by using the hardware or software error recovery procedures (ERPs). The ERPs may have canceled the job associated with the error.

An example of this type of error is a transmit error from tape to storage. This error results from the transfer of invalid data and may be caused by a faulty tape drive or a bad tape. This error causes the system ERPs to attempt to retry reading the tape. If it is impossible to read the section of invalid data, the error is considered permanent, and the associated ERP is notified of the condition. If an ERP has not been provided for the faulty device which handles this error condition, the job is terminated.

③ System Stopped

Column contains the number of severe errors that occurred for each subsystem – errors severe enough to force the system to be reinitialized. This type of error occurs when the normal ERPs fail to recover from the error.

Figure 28. Hardware Error Report Produced by RDE Summary Function

Media Error Statistics (MES)

The Media Error Statistics Report, illustrated in Figure 29, provides information, unique to each CUA and VOLSER in a one line detailed printout of error statistics for every requested record. The report includes an Edit by CUA (error statistics for every requested record, grouped by CUA),

The report includes an Edit by CUA (error statistics for every requested record, grouped by CUA), Summary by CUA (error statistics for every CUA, grouped by day), Edit by VOLSER (error statistics grouped by VOLSER, from every selected OBR record), and Summary by VOLSER (error statistics grouped for every VOLSER, by day). Shared I/O applies to this report.

The MES Report is initiated by the parameter MES.

DDR Edit and DDR Summary Report

The DDR Edit Report provides a report for each operator-or-system-initiated swap between direct access devices or magnetic tape devices and for each operator-initiated swap on a unit record device. Its primary value is to document the devices involved in a DDR swap. Figure 30 illustrates the DDR Edit Report.

The DDR Summary, illustrated in Figure 31, shows the total number of DDR records recorded.

The DDR Edit and Summary Reports are initiated by the parameter PRINT.

MIH Edit and MIH Summary Report

The MIH Edit Report provides a report of all missing (pending) channel end and device end interruptions on all devices except the teleprocessing devices. Figure 32 illustrates the MIH Edit Report.

The MIH Summary Report illustrated in Figure 33 shows the total number of MIH records recorded.

The MIH Edit and Summary Reports are initiated by the parameter PRINT.

(Detail by CUA)* ①

CUA	TU SERIAL	DATE DAY YR	VOLUME SERIAL	TIME HH MM SS TH	--TEMP-- RDS	SIO WRTS	DEN- NRZI	R/W VRC	WR VRC	TG	LRC MTE	CRC EDC	ECC ENV	SKEW ERR	ERLY BOR	VEL CHG	TIE
000172	N/A	002 72	TETT2	00 35 54 84	0004	0006 32767	1600	N/A	0001	N/A	0001	0001	0001	0000	N/A	N/A	01111111
000172	N/A	003 72	TETT4	00 35 54 84	0004	0006 32767	N/A	N/A	0001	N/A	0001	0001	0001	0000	N/A	N/A	01111111
000172	N/A	006 72	DUMONE	00 07 12 32	0005	0006 00264	556	0000	0000	N/A	0000	0000	0000	0000	N/A	N/A	00000000
000172	N/A	007 72	TETT1	00 07 12 32	0004	0006 32767	N/A	N/A	0001	N/A	0001	0001	0001	0000	N/A	N/A	01111111

(Summary by CUA)* ③

CUA	DATE DAY YR	TU SERIAL	SIO COUNT	--TEMP-- RDS	--PERM-- WRTS	NRZI NOISE	EQUIP RUN	OVER END	EARLY	WR CHECK	TM DROP	IBG THRU	FEED RETRY	VEL REC	PART BOR	SLOW BOR	EXC PAMB	START CHECK
000172	001 72	N/A	061439	0004	0006	0002 0003	N/A	0000	0000	0001	0001	0001	0001	0001	0001	0001	0001	0001
000172	002 72	N/A	000000	0000	0000	0000 0000	N/A	0000	0000	0001	0001	0001	0001	0001	0001	0001	0001	0001
000172	003 72	N/A	032767	0004	0006	0002 0003	N/A	0000	0000	0001	0001	0001	0001	0001	0001	0001	0001	0001
000172	006 72	N/A	000000	0000	0000	0000 0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000

(Detail by VOLSER)* ⑥

VOLUME SERIAL	DATE DAY YR	TIME HH MM SS TH	CUA	TU SERIAL	RD/ WRT	--PERM-- RDS	--TEMP-- WRTS	SIO COUNT	BLOCK LENGTH	PROGRAM ID	---CPU--- ID SERIAL	MOD NUMBER	DENSITY
DUMONE	001 72	00 35 54 84	000192	N/A	N/A	0002 0003	0004 0006	32767	00016	JOBONE	0155 111111	N/A	N/A
DUMONE	002 72	00 35 54 84	000292	00002	R	0002 0003	0004 0006	32767	00016	JOBONE	0155 111111		1600
DUMONE	006 72	00 07 12 32	000172	N/A	R	0009 0000	0005 0006	00264	00000	TEST3420	0155 111111	1	556
DUMONE	009 72	00 07 12 32	000182	00009	R	0002 0003	0004 0006	32767	00016	TEST3420	0155 111111	5	1600
TETT1	010 72	00 07 12 32	000282	00011	R	0002 0003	0004 0006	32767	00016	TEST3420	0155 111111	Y	1600
TETT2	002 72	00 35 54 84	000272	00002	R	0002 0003	0004 0006	61439	00016	JOBONE	0155 111111	6	1600

(Summary by VOLSER)*

VOLUME SERIAL	DATE-FROM DAY YR	-TO- DAY YR	--PERM-- RDS	--TEMP-- WRTS	SIO COUNT	NRZI NOISE	--- CPU --- ID NUMBER	MOD NO	ERASE GAPS	CLEANER ACTIONS
DUMONE	001 72	009 72	0016	0024	0032 0048	818040	N/A 0155 111111	5	00048	00056
TETT1	007 72	011 72	0004	0006	0008 0012	570558	N/A 0155 111111	7	00012	00014
TETT2	001 72	003 72	0008	0012	0016 0024	490748	N/A 0155 111111	7	00024	00028
TETT3	001 72	007 72	0006	0009	0012 0018	831933	N/A 0155 111111	5	00018	00021
TETT4	003 72	006 72	0008	0012	0016 0024	589948	N/A 0155 111111	N/A	00024	00028

*** END OF MEDIA ERROR STATISTICS PROCESSING ***

*These titles do not appear in the actual report.

① Detail by CUA

A one-line detailed printout of error statistics for every requested record, grouped by CUA. Except where noted, information is taken from the device-dependent and SDR areas of OBR records.

② TU Serial

Tape unit serial number, which reflects a unique tape drive ID. Determined from the sense data in the OBR records.

③ Density

Tape density (bits per inch), which is determined from the sense data in the OBR records.

④ N/A

Not applicable. Denotes a field for which the information cannot be determined.

⑤ Summary by CUA

A one-line summary printout of error statistics for every CUA, grouped by day. Use this information to help determine tape units in need of maintenance.

⑥ Detail by VOLSER

A one-line detailed printout of error statistics, grouped by VOLSER, from every selected OBR record. Use this information to edit those magnetic tapes that exceed installation-defined error rates.

⑦ HDR SER

Header serial appears in this column to identify the unique tape unit ID of the creating tape drive. Numbers appear for only the IBM 3420 tape devices. Column is blank if the field in the record format is zero. Zero means that the tape was created on an IBM 3410 tape device or that no labels were on the tape.

Figure 29. MES Report Produced by MES Function

```

--- RECORD ENTRY TYPE - MIH    SOURCE - MIH    MODEL - 0155    SERIAL NO. 123789

OS/VVS REL X

                DAY YEAR    HH.MM.SS.TH    JOB IDENTITY DUMMYMIH
                033 XX    05 06 07 08                C4E4D4D4E8D4C9C8

UCB DEVICE TYPE                00112233
PRIMARY CHANNEL UNIT ADDRESS    0566
ALTERNATE CHANNEL UNIT ADDRESS  0234
MISSING INTERRUPT                00

TIME INTERVAL                01234567

VOLUME SERIAL NUMBER          111111

HEX DUMP OF RECORD
HEADER    70820800    00001100    0073033F    05060708    01123789    015502A0
          0000 C4E4D4D4    E8D4C9C8    F2F3F4F5    F6F6F1F1    F1F1F1F1    00112233    F0F1F2F3    F4F5F6F7

```

Figure 30. DDR Edit Report

```

SUMMARY OF MIH RECORDS                CUA 0566

RECORD DATE RANGE    DAY YEAR    DAY YEAR
                    039 XX    039 XX

MODEL - 0155    SERIAL NO - 123789

TOTAL NUMBER OF RECORDS=0001

```

Figure 31. DDR Summary Report

```

--- RECORD ENTRY TYPE - DDR    SOURCE - DDR    MODEL - 0155    SERIAL NO. 123458

OS/VVS REL X

                DAY YEAR    HH.MM.SS.TH    JOB IDENTITY DUMMYDDR
                032 XX    01 02 03 08                C4E4D4D4E8C4C4D9

FROM UCB DEVICE TYPE                00001008                TO UCB DEVICE TYPE                00001008
FROM CHANNEL UNIT ADDRESS            0234                TO CHANNEL UNIT ADDRESS            0432
FROM VOLUME SERIAL NUMBER            234567                TO VOLUME SERIAL NUMBER            765432
FROM PHYSICAL ID                      01                TO PHYSICAL ID                      02

RECORD DEPENDENT SWITCH                10

RECONFIGURATION PERFORMED AS A RESULT OF A PERMANENT ERROR

HEX DUMP OF RECORD
HEADER    60630810    00001100    0073032F    01020308    01123458    015502A0
          0000 C4E4D4D4    E8C4C4D9    F2F3F4F5    F6F7F7F6    F5F4F3F2    01F2F3F4    00001008    02F4F3F2
          0020 00001008

```

Figure 32. MIH Summary Report

```

SUMMARY OF DDR RECORDS                CUA 0234

RECORD DATE RANGE    DAY YEAR    DAY YEAR
                    031 XX    032 XX

MODEL - 0155    SERIAL NO - 123458

TOTAL NUMBER OF RECORDS=0002

```

Figure 33. MIH Summary Report

Part 4: Error Incident Records

Types of Records on SYS1.LOGREC and/or Accumulation Data Set

Records are recorded for every hardware failure or software failure and system condition that has an associated recording request. The records can contain two types of data:

- Error statistics—Counts of the number of times that channels, machine models, and I/O devices have failed.
- Environmental data—Time and circumstances for each failure or system condition.

The records on SYS1.LOGREC are of variable length. In general, each record contains:

- Relevant system information at the time of the record generation.
- Device hardware status at the time of the record generation.
- Results of any device/control unit recovery attempt.
- Results of any software system recovery attempt.
- Statistical data
- Record length.

The recording routines are included as standard modules of the OS/VS system control program by the system generation process.

All records contain a standard 24-byte header, followed by data that is specific for the record type and device type or machine model. The header provides the information necessary to identify the type and origin of the record:

- Type information—Defines the specific type of record, the specific source of the record, the general reason the record was made, and any special record-dependent attributes (such as length, content, hardware features, format)
- Origin information—Includes the operating system on which the record was generated, the generating program, the time and date the record was generated, the CPU identity, and the CPU serial number on which the record was generated.

The following list identifies the valid record types or classes (the first hexadecimal digit, bits 0-3, of the record) and specific record sources (second digit, bits 4-7) which are valid.

- 1X Machine Check (MCH record)
 - 10 MCH.
 - 13 MCH in multiple storage environment. (MVS only)
- 2X Channel Check (CCH record)
 - 20 CCH
 - 21 CCH in multiple storage environment. (MVS only)
- 3X Unit Check (OBR record)
 - 30 OBR (unit check).
 - 34 TCAM OBR.
 - 36 VTAM OBR.
- 4X Software Error (software record) (MVS only)
 - 40 Software detected software error.
 - 42 Hardware detected software error.
 - 44 Operator detected error.
 - 48 Hardware detected hardware error.
 - 4F Lost record summary.
- 5X System initialization (IPL record) (MVS and other systems with RDE)
 - 50 IPL.
- 6X Reconfiguration (DDR record)
 - 60 DDR.
- 7X Missing Interruption (MIH record) (MVS only)
 - 70 Missing interruption handler.
- 8X System Termination (EOD record)
 - 80 EOD.
 - 81 MCH forced termination (MVS only)
 - 84 EOD from IOS (MVS only)
- 9X Non-Standard (MDR record)
 - 90 SVC 91.
 - 91 MDR.

SYS1.LOGREC Header Record Format

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description																								
0 (0)	2	CLASRC	Header record identifier. Each bit in this field is set to 1 unless critical data has been destroyed.																								
2 (2)	4	LOWLIMIT	Address of low extent. Track address (in CCHH format) of first extent of SYS1.LOGREC.																								
6 (6)	4	UPLIMIT	Address of high extent. Track address (in CCHH format) of last extent of SYS1.LOGREC.																								
10 (A)	1	MSGCNT	Count of the number of times IFB040I has been issued.																								
11 (B)	7	RESTART	Address of record entry area. Starting track address (in BBCCHHR format) for recording area on SYS1.LOGREC.																								
18 (12)	2	BYTSREM	Remaining bytes on track. Number of bytes remaining on track upon which last record entry was written.																								
20 (14)	2	TRKCAP	Total bytes on track. Number of bytes which can be written on a track of volume containing SYS1.LOGREC.																								
22 (16)	7	LASTTR	Address of last record written. Track address (in BBCCHHR format) of last record written on SYS1.LOGREC.																								
29 (1D)	2	TRKSPER	Highest addressable track for each cylinder on volume containing SYS1.LOGREC.																								
31 (1F)	2	EWMCNT	Warning count. Number of bytes remaining on early warning message track of SYS1.LOGREC when 90% full point of data set is reached. When this is detected by a recording routine, it issues a message and turns on early warning message switch at displacement 38.																								
33 (21)	1	DEVCODE	Device code. Code indicating device type of system residence volume on which SYS1.LOGREC resides: <table border="1" data-bbox="917 1081 1534 1449"> <thead> <tr> <th>Code</th> <th>Device</th> </tr> </thead> <tbody> <tr><td>01</td><td>2311 (not supported by VS)</td></tr> <tr><td>02</td><td>2301</td></tr> <tr><td>03</td><td>2303</td></tr> <tr><td>04</td><td>2302</td></tr> <tr><td>06</td><td>2305 MOD 1</td></tr> <tr><td>07</td><td>2305 MOD 2</td></tr> <tr><td>08</td><td>2314</td></tr> <tr><td>09</td><td>3330 and 3333 MOD 1 or 3350 operating in 3330-1 compatability mode</td></tr> <tr><td>0A</td><td>3340 and 3344</td></tr> <tr><td>0B</td><td>3350 native mode</td></tr> <tr><td>0D</td><td>3330 and 3333 MOD 11 or 3350 operating in 3330-11 compatability mode</td></tr> </tbody> </table>	Code	Device	01	2311 (not supported by VS)	02	2301	03	2303	04	2302	06	2305 MOD 1	07	2305 MOD 2	08	2314	09	3330 and 3333 MOD 1 or 3350 operating in 3330-1 compatability mode	0A	3340 and 3344	0B	3350 native mode	0D	3330 and 3333 MOD 11 or 3350 operating in 3330-11 compatability mode
Code	Device																										
01	2311 (not supported by VS)																										
02	2301																										
03	2303																										
04	2302																										
06	2305 MOD 1																										
07	2305 MOD 2																										
08	2314																										
09	3330 and 3333 MOD 1 or 3350 operating in 3330-1 compatability mode																										
0A	3340 and 3344																										
0B	3350 native mode																										
0D	3330 and 3333 MOD 11 or 3350 operating in 3330-11 compatability mode																										
34 (22)	4	EWMTRK	Early warning message track. Track address (in CCHH format) on which 90% full point for data set exists.																								
38 (26)	1	EWM5W	Switch byte: 1... .. 90% full point message has been issued. This switch is turned on by recording routine detecting 90% full point and is turned off by IFCEREPO when clearing SYS1.LOGREC to hexadecimal zeros. Reserved. .xxx xxxx																								
39 (27)	1	SFTYBYTS	Check byte. Each bit in this field is set to 1 and is used to check validity of header record identifier.																								

Figure 34. SYS1.LOGREC Header Record Format

Time Stamp Record (MVS only)

A time stamp record resides in the first record space following the header record when the error incident data set is SYS1.LOGREC. The time stamp record provides current date and time information for the IPL record. This allows the user to measure the approximate time interval, recorded in the IPL records, between the termination and reinitialization of the operating system.

SYS1.LOGREC Time Stamp Record Format

Offset	Size (bytes)	Field	Description
Dec Hex	Alignment (bits)	Name	
0 (0)	1 1... ..1	CLASRC	Class/Source: Time stamp record.
1 (1)	1 000. 001. 010. 011. 100. bits 3-7 0-1F	OPSYS	System/Release level: OS/360. DOS. OS/VS1. CP67 or VM/370. OS/VS2. Release level 0-31.
2 (2)	4 Byte .0 1... 0... .... .x.. .... ..1. .... ...x 1... .... .xxx Bytes 1 and 2 Byte 3	SW1	Record switches: More records follow. Last record. Time-of-Day clock instruction issued (0 = IBM System/360. 1 = IBM System/370). Used in conjunction with date and time values at displacements 8 and 12. Record truncated. (Not used for time stamp record.) Reserved. TIME macro used. Reserved Not used for time stamp record. Incremental release number (alphameric) of operating system.
6 (6)	2		Not used for time stamp record.
8 (8)	4	DATE	System date for IPL records (updated by MIH at user or system specified time intervals).
12 (C)	4	TIME	System time for IPL records (updated by MIH at user or system specified time intervals).
16 (10)	1 xxxx xxx. .... ...0.... ...1	VERNO	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	CPUSER	CPU serial number.
20 (14)	2	CPUMODEL	CPU machine model number (0158, 0168, etc.).
22 (16)	2	MCELLNG	Maximum length of machine- (CPU) dependent, machine check extended logout area. (Not used for time stamp record).
24 (18)	16		Reserved.

Figure 35. SYS1.LOGREC Time Stamp Record Format

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
6 (6)	1 bits 0-3 bits 4-7	LRBHCNT	Record count: Sequence number of this physical record. Total number of physical records in this logical record.
7 (7)	1		Reserved.
8 (8)	4	LRBHDATE	System date of failure.
12 (C)	4	LRBHTIME	System time of failure.
16 (10)	1 xxxx xxx. .... ...0.... ...1	LRBHCPID	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	LRBHCSER	CPU serial number equals zero. Note: If bit 5 of switch 2 (offset 5 of LRBHSW3) is set, indicating channel reconfiguration hardware (CRH) is active, the following information is applicable (for IBM Mod 168 MP CPUs only): 1. The CPU serial number field (offset 17 decimal) is that of the "live" or running CPU and not that of the CPU to which the channel is actually attached (i.e., the "dead" CPU). 2. The active CPU address and channel status fields of the MP information area (offset 88 decimal plus a variable logout length identified by labels LRBCMPPA and LRBCMPCS) always reflect the address and channel status of the dead CPU. That is, the first entry for these fields is for the dead CPU, and the second entry is for the live CPU (the one on which CRH receives control).
20 (14)	2	LRBHMDL	CPU machine model number (0158,0168,etc.).
22 (16)	2	LRBHMCEL	Maximum length of machine- (CPU) dependent, machine check extended logout area.
24 (18)	8	LRBCJOB	Alphanumeric name assigned to job (as identified, for example, by a jobname on a JCL JOB statement) being executed and/or requesting service at time of channel detected error.
32 (20)	16	LRBCAIO	List of active I/O units or addresses, one to eight devices, on failing channel that were found to be busy (device end outstanding). List includes device address associated with failure.
48 (30)	8	LRBCFCCW	Last real CCW executed before failure.
56 (38)	8	LRBCFCSW	Contents of CSW that were stored following detection of I/O failure.
64 (40)	4	LRBCECSW	Contents of extended CSW or last four bytes of ERPIB for 28xx channels.
68 (44)	4	LRBCDEVT	Device type (from UCB) associated with failing device.
72 (48)	1	LRBCCHID	Channel ID associated with failing channel:
		Code	Meaning
		00	Channel Unknown (CCH defaults to provide a 15511 channel analysis assuming channel adheres to System/370 channel design)
		01	Integrated Multiplexor (MPX)
		02	Integrated Selector
		03	Integrated Block MPX
		05	Standalone Selector (2860)
		06	Standalone MPX (2870)
		07	Standalone Block MPX (2880)
		08	Selector Channel (2880)
		0A	Integrated File Adaptor

Figure 36. Channel Inboard (CCH) Record Format (Part 2 of 3)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description														
73 (49)	1	LRBCCUA	Label for three byte CUA.														
74 (4A)	2	LRBCCUA2	CUA for channel and unit being used at time of failure.														
76 (4C)	2	LRBCHCUA	CUA, right justified, as stored by operating system in machine location 184.														
78 (4E)	2	LRBCLOGL	Length of channel logout starting at displacement 80.														
80 (50)	4	TIOADDR	CUA, right justified, as stored by operating system in machine location 184. (See "Note" for CHNLOG field.)														
84 (54)	variable	CHNLOG	Machine-dependent, channel logout associated with failure that caused channel check. Logout size is model and channel dependent: <table border="1"> <thead> <tr> <th>Channel</th> <th>Length (Bytes)</th> </tr> </thead> <tbody> <tr> <td>2860</td> <td>24</td> </tr> <tr> <td>2870</td> <td>24</td> </tr> <tr> <td>2880</td> <td>112</td> </tr> <tr> <td>135</td> <td>24</td> </tr> <tr> <td>145</td> <td>96 (maximum)</td> </tr> <tr> <td>15511/158</td> <td>0</td> </tr> </tbody> </table>	Channel	Length (Bytes)	2860	24	2870	24	2880	112	135	24	145	96 (maximum)	15511/158	0
Channel	Length (Bytes)																
2860	24																
2870	24																
2880	112																
135	24																
145	96 (maximum)																
15511/158	0																
	2	LRBCFT	CCH footprints:														
	4		Reserved.														
	2	LRBCMPNO	Number of online processors (CPUs).														
	variable	LRBCMP	Multiprocessing information that consists of a variable number of fields with LRBCMPPA, LRBCMPCS format. Number of fields corresponds with number of online CPUs described in LRBCMPNO field.														
Note: Following two fields, LRBCMPPA and LRBCMPCS, represents a format which is repeated a variable number of times within LRBCMP field. However, first LRBCMPPA, LRBCMPCS format belongs to CPU with failing channel.																	
	2	LRBCMPPA	CPU address.														
	2	LRBCMPCS	Channel status for each channel (0-15) associated with system. Each channel, beginning with channel 0 as high order bit, is represented by a one bit code (0 = online, 1 = offline). <i>Note:</i> For 2860, 2870, and 2880 channels there is no TIOADDR field, and CHNLOG field begins at displacement 80.														

Figure 36. Channel Inboard (CCH) Record Format (Part 3 of 3)

Dynamic Device Reconfiguration (DDR) Records

DDR information is recorded by MVS for each operator—or system—initiated swap between direct-access devices having buffered logs and demountable disk packs (such as the IBM 3330, 3330 MOD 11, and 3340 devices).

The DDR record contains the sense and statistical data from the record buffer for each disk drive involved in the swap.

Dynamic Device Reconfiguration (DDR) Record Format

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
0 (0)	1 .11.	LRBHTYPE	Record key: DDR record.
1 (1)	1 000. 001. 010. 011. 100. bits 3-7 0-1F	LRBHSYS	System/Release level: OS/360. DOS. OS/VS1. CP67 or VM/370. OS/VS2. Release level 0-31.
2 (2)	1 1... 0... .... .x... .... ..1. .... ...x 1... .... .xxx	LRBHSW0	Record independent switches: More records follow. Last record. Time-of-Day clock instruction issued (0 = IBM System/360, 1 = IBM System/370). Used in conjunction with date and time values at displacements 8 and 12. Record truncated. (Not used for DDR record.) Reserved. TIME macro used. Reserved.
3 (3)	3 Byte 0 1... .... .1.. .... ..1. .... ...1 xxxx Bytes 1 and 2	LRBHSW1	Record dependent switches: Primary storage reconfiguration. Secondary storage reconfiguration. Operator requested reconfiguration. Permanent error caused reconfiguration. Reserved. Reserved.
6 (6)	1 bits 0-3 bits 4-7	LRBHCNT	Record count: Sequence number of this physical record. Total number of physical records in this logical record.
7 (7)	1		Reserved.
8 (8)	4	LRBHDATE	System date of failure.
12 (C)	4	LRBHTIME	System time of failure.
16 (10)	1 xxxx xxx. .... ...0.... ...1	LRBHCPID	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	LRBHCSER	CPU serial number.
20 (14)	2	LRBHMDL	CPU machine model number (0158,0168,etc.).
22 (16)	2	LRBHMCEL	Maximum length of machine- (CPU) dependent, machine check extended logout area. (Not used for DDR record).
24 (18)	8	LRBRJOB	Name of job using 'FROM' device. Field valid only if system initiated swap for permanent error or for operator initiated tape swaps.
32 (20)	6	LRBRVOL1	VOLSER ID of volume mounted on 'FROM' swap device.
38 (26)	6	LRBRVOL2	VOLSER ID of volume mounted on 'TO' swap device. Field is zero if no volume is mounted on 'TO' device.
44 (2C)	1	LRBRPH1	Physical ID of device (not address). DASD only.
45 (2D)	3	LRBRCUA1	Primary CUA of 'FROM' device.
48 (30)	4	LRBRDEV1	Device type of 'FROM' device.
52 (34)	1	LRBRPH2	Physical ID of 'TO' device.
53 (35)	3	LRBRCUA2	Primary CUA of 'TO' device.
56 (38)	4	LRBRDEV2	Device type of 'TO' device.

Figure 37. Dynamic Device Reconfiguration (DDR) Record Format

Machine-Check (MCH) Records

MCH records contain information relative to the following machine failures:

- CPU (processor)
- Storage protect key
- Storage
- External damage.

When machine failures occur, MCH records are generated containing environmental, model-independent and model-dependent data. There are two types of machine failures:

- Soft—one that was correctable by hardware retry features
- Hard—one that could not be corrected by hardware retry features and resulted in system termination.

Machine Check (MCH) Record Format

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
0 (0)	1	LRBHTYPE	Class/Source: MCH record.
	...1		Converted MCH record (not used by VS).
	...1 ..1.	LRBHMCH	MCH record recorded in multiple virtual storage environment. (For VS2 Release 2 and any subsequent VS2 releases.)
	...1 ..11		SER1 (not used by VS).
	...1 1...		SERO (not used by VS).
	...1 1..1		Converted SER1 (not used by VS).
	...1 1.1.		Converted SER0 (not used by VS).
	...1 1.11		Converted SER0 (not used by VS).
1 (1)	1	LRBHSYS	System/Release level:
	000.		OS/360.
	001.		DOS.
	010.		OS/VS1.
	011.		CP67 or VM/370.
	100.		OS/VS2.
	bits 3-7		Release level 0-31.
	0-1F		
2 (2)	1	LRBHSWO	Record independent switches:
	1...		More records follow.
	0...		Last record.
	.x..		Time-of-Day clock instruction issued (0 = IBM System/360, 1 = IBM System/370). Used in conjunction with date and time values at displacements 8 and 12.
	..1.		Record truncated. (Not used for MCH record.)
	...x		Reserved.
	.... 1...		TIME macro used.
	.... .xxx		Reserved.
3 (3)	3	LRBHSW1	Record dependent switches:
	Byte 0		Not used by MCH record.
	xx..		System terminated by MCH.
	..1.		Record contains an ERRORID*
	...1		Not used by MCH record.
	.... xxxx		*Valid only for 145, 155-II, 158, 165-II, 168, and 3062 MCH records.
	Byte 1	LRBMACT	Reserved.
	Byte 2	LRBMCLB	MCH SYS1.LOGREC record buffer overlaid with another record. If this byte is X'FF', SVC 76 does not record this record on SYS1.LOGREC.

Figure 38. Machine Check (MCH) Record Format (Part 1 of 3)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
6 (6)	1 bits 0-3 bits 4-7	LRBHCNT	Record count. Sequence number of this physical record. Total number of physical records in this logical record.
7 (7)	1		Reserved.
8 (8)	4	LRBHDATE	System date of failure from TOD clock.
12 (C)	4	LRBHTIME	System time of failure from TOD clock. Packed decimal if valid; binary zero if clock failed.
16 (10)	1 xxxx xxx. .... ..0.... ..1	LRBHCPID	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	LRBHCSER	CPU serial number.
20 (14)	2	LRBHMDL	CPU machine model number (0158,0168,etc.).
22 (16)	2	LRBHMCEL	Maximum length of machine- (CPU) dependent, machine check extended logout area.
24 (18)	8	PROGID	Alphameric module name of program being processed and/or requesting service at time of failure. Byte 0-3 Length of record for SYS1.LOGREC. Byte 4-7 Wait state code.
32 (20)	8	JOBID	Alphameric name assigned to job (as identified, for example, by a jobname on a JCL JOB statement) being executed and/or requesting service at time of failure.
	Byte 0-3	LRBMCEIA	Machine check error indication area.
	Byte 0	LRBMTERM	Terminal error switches: Reserved.
	xxx. .... ...1	LRBMTSEC	Secondary error.
	.... 1...	LRBMTCKS	Check stop.
	.... .1..	LRBMTWRN	Power warning.
	.... ..1.	LRBMTDMG	System damage.
	.... ...1	LRBMTINV	Invalid logout.
	Byte 1	LRBMHARD	Hard machine error switches:
	1...	LRBMHHRD	Hard error assumed.
	...xx		Reserved.
	.... 1...	LRBMHINV	Register or PSW invalid.
	.... .1..	LRBMHSTO	Hard storage error.
	.... ..1.	LRBMHSPF	Hard storage protection key error.
	.... ...1	LRBMHIPD	Instruction processing damage.
	Byte 2	LRBMINTM	Intermediate error switches: Reserved.
	xxxx		Reserved.
	.... 1...	LRBMITOD	TOD clock error.
	.... .1..	LRBMICKC	Clock comparator error.
	.... ..1.	LRBMICTM	CPU timer error.
	.... ...1	LRBMIL80	Interval timer error.
	Byte 3	LRBMSOFT	Soft machine error switches:
	1...	LRBMSSFT	Soft error assumed.
	...xx		Reserved.
	.... 1...	LRBMSEXD	External damage.
	.... .1..	LRBMSECC	ECC corrected storage error
	.... ..1.	LRBMSHIR	HIR corrected processor (CPU) error.
	.... ...1	LRBMSBUF	Buffer error.
	Byte 4	LRBMPDAR	PDAR (program damage assessment and repair) data supplied by RTM: Reserved.
	xxx.		Reserved.
	...1	LRBMINVP	Storage reconfigured — page invalidated.
	.... 1...	LRBMRSRC	Storage reconfiguration status available at displacement 37.
	.... 1..	LRBMRSRF	Storage reconfiguration not attempted.
	.... ..xx		Reserved.
	Bytes 5-6	LRBMRSR1	Storage reconfiguration status:
	Byte 5		Reserved.
	xxxx xx.. .... .1.	LRBMSEER	Storage error was already set in frame.
	.... ...1	LRBMCHNG	Frame had change indicator on.
	Byte 6	LRBMRSR2	
	1...	LRBMOFLN	Frame offline or scheduled to go offline.
	..1.	LRBMINTC	Intercept — frame scheduled to go offline, has a permanent storage error or scheduled for V = R status.

Figure 38. Machine Check (MCH) Record Format (Part 2 of 3)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
	...1...	LRBMSPER	Permanent error occurred in frame.
	...1...	LRBMNUCL	Frame contains permanently resident system storage.
	.... 1...	LRBMFSQA	Frame is in use for SQA.
	.... .1..	LRBMLSQA	Frame is in use for LSQA.
	.... ..1.	LRBMFGFX	Frame contains page fixed data.
	.... ...1	LRBMVEQR	Frame is in use for V = R or scheduled for V = R.
	Byte 7	LRBMPWL	Length of checking block used by machine model.
40 (28)	8	LRBMMOSW	Machine check old PSW from storage locations 48-55.
48 (30)	8	LRBMCIC	Machine check interruption code (from storage locations 232 - 239) as stored by hardware routines at time of machine check:
	Byte 0		
	1...	LRBMFSD	System damage.
	.1..	LRBMFPD	Processing damage.
	..1.	LRBMFSR	System recovery.
	...1	LRBMFTD	Timer damage.
	.... 1...	LRBMFCD	Clock damage.
	.... .1..	LRBMFED	External damage.
	.... ..x.		Reserved.
	.... ...1	LRBMFDG	Degradation.
	Byte 1		
	1...	LRBMFWN	Power warning.
	..xxx xx..		Reserved.
	.... ..1.	LRBMIBU	Backed up indicator.
	.... ...1	LRBMIDY	Delayed.
	Byte 2		
	1...	LRBMFSE	Storage error.
	.1..	LRBMFSC	Storage error corrected.
	..1.	LRBMFKE	Key error.
	...x		Reserved.
	.... 1...	LRBMVWP	PSW EMWP is valid.
	.... .1..	LRBMVMS	PSW masks and key are valid.
	.... ..1.	LRBMVPM	Program masks and condition code are valid.
	.... ...1	LRBMVIA	Instruction address is valid.
	Byte 3		
	1...	LRBMVFA	Failing storage address is valid.
	.1..	LRBMVRC	Region code is valid.
	..x.		Reserved.
	.... 1...	LRBMVFP	Floating point register is valid.
	.... 1...	LRBMVGR	General purpose register is valid.
	.... .1..	LRBMVCR	Control register is valid.
	.... ..1.	LRBMVLG	Logout (MCEL) is valid.
	.... ...1	LRBMVST	Storage logical is valid.
	Byte 4		Reserved.
	Byte 5		Reserved.
	xxxx xx..		Reserved.
	.... ..1.	LRBMVPT	Processor timer is valid.
	.... ...1	LRBMVCC	Clock comparator is valid.
	Bytes 6 and 7	LRBMCELL	Actual length of MCEL' data stored for this machine check interruption.
56 (38)	8		Data from storage locations 240-247.
64 (40)	4	LRBMFSA	Failing storage address from storage locations 248-251
68 (44)	260		Data from storage locations 252-511.
328 (148)	variable	LRBMCEL	Model dependent machine check extended logout area - actual length in LRBMCCELL field. Maximum length in LRBHMCEL field and minimum length is zero. Contains model dependent logout information. Size is machine dependent:
			Model Maximum Length
			135 0 bytes
			145 192 bytes
			155II/158 672 bytes
			165II/168 1416 bytes
variable	10	ERRORID	RTM generated error identifier consists of: 2 byte sequence number 2-byte CPU identifier 4-byte ASID 4-byte time stamp

Figure 38. Machine Check (MCH) Record Format (Part 3 of 3)

Miscellaneous Data (MDR) Records

MDR records are recorded for buffered log devices whenever the following conditions occur:

- Buffer overflow
- Demounts
- Device failures.

The buffered log devices (devices attached to a control unit with a buffer for recording or logging device-dependent status and sense information) are listed in byte four of the MDR record.

MDR data consists of device-dependent counter information and sense information from the device's error buffer.

Miscellaneous Data (MDR) Record Format

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
0 (0)	1	MCLASRC	Class/Source: MDR record formatted by SVC 91. MDR record. Converted MDR record (not used by VS).
	1..1		
	1..1 ...1		
	1..1 ..11		
1 (1)	1	MSYSREL	System/Release level: OS/360. DOS. OS/VS1. CP67 or VM/370. OS/VS2.
	000.		
	001.		
	010.		
	011.		
	100.		
	bits 3-7		
	0-1F		Release level 0-31.
2 (2)	4	MSWITCHS	Record switches:
	Byte 0		
	1...		More records follow.
	0...		Last record.
	.x...		Time-of-Day clock instruction issued (0 = IBM System/360, 1 = IBM System/370). Used in conjunction with date and time values at displacements 8 and 12.
	..1.		Record truncated. (Not used for MDR record.)
	...x		Reserved.
	.... 1...		TIME macro used.
	.... .xxx		Reserved.
	Byte 1		
	x...		Not used by MDR record.
	.1..		Record incomplete.
	..xx xxxx		Not used by MDR record.
	Byte 2		
	.... ...1		IBM 3330.
	.... ..1.		IBM 2305 MOD 2.
	.... ..11		IBM 3270.
	.... .1..		IBM 3211.
	.... .1.1		IBM 3705.
	.... .11.		IBM 3670.
	.... 1...		IBM 2715.
	.... 1..1		IBM 3340 and 3344
	.... 1.1.		IBM 3330 MOD 11.
	.... 11..		IBM 3800
	.... 11.1		IBM 3895
	.... ..1		IBM 3350.
	.... ..1		IBM 2305 MOD1.

Figure 39. Miscellaneous Data (MDR) Record Format (Part 1 of 2)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
Byte 3 0... ..			Two-byte sub-ID field used by record.
1... ..			Variable length sub-ID field used by record.
.xxx ..			Reserved.
bits 4-7			Number of characters in sub-ID field of device identified at displacement 26.
6 (6)	1 bits 0-3 bits 4-7	MRCDCNT	Record count: Sequence number of this physical record. Total number of physical records in this logical record.
7 (7)	1		Reserved.
8 (8)	4	MDATE	System date of incident.
12 (C)	4	MTIME	System time of incident.
16 (10)	1 xxxx xxx. .... ...0.... ...1	MVERNO	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	MCPUSER	CPU serial number.
20 (14)	2	MCPUMOD	CPU machine model number (0158,0168,etc.).
22 (16)	2	MCELLNG	Maximum length of machine- (CPU) dependent, machine check extended logout area. (Not used for MDR record).
24 (18)	2	BUFRECID	Device address of data identified in this record.
26 (1A)	variable	BUFSUBID	Identification field (2-16 bytes) to identify device at displacement 24. Length of this field (2-16 bytes) is defined at displacement 5. Note: Depending on device, field can denote serial number or CUA of unit.
	variable	BUFINFO	Device-dependent information supplied by ERP that detected error.

Figure 39. Miscellaneous Data (MDR) Record Format (Part 2 of 2)

Missing Interrupt Handler (MIH) Records

MIH records are recorded in MVS for missing (pending) channel end and device end interruptions on all devices except the teleprocessing devices. Data contained in these records includes device type, CUA, time interval used by MIH, etc.

Missing Interruption Handler (MIH) Record Format

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
0 (0)	1 .111	LRBHTYPE	Class/Source: MIH record.
1 (1)	1 000. 001. 010. 011. 100. bits 3-7 0-1F	LRBHSYS	System/Release level: OS/360. DOS. OS/VS1. CP67 or VM/370. OS/VS2. Release level 0-31.
2 (2)	1 1... 0... .... .x... .... ..1. .... ...x 1... .... .xxx	LRBHSW0	Record independent switches: More records follow. Last record. Time-of-Day clock instruction issued (0 = IBM System/360, 1 = IBM System/370). Used in conjunction with date and time values at displacements 8 and 12. Record truncated. (Not used for MIH record.) Reserved. TIME macro used. Reserved.
3 (3)	3 Byte 0 Byte 1 1... .... .1... .... ..xx .xxx Byte 2	LRBHSW1	Record dependent switches: Reserved. Channel end interruption found pending. Device end interruption found pending. Reserved. Reserved.
6 (6)	1 bits 0-3 bits 4-7	LRBHCNT	Record count: Sequence number of this physical record. Total number of physical records in this logical record.
7 (7)	1		Reserved.
8 (8)	4	LRBHDATE	System date of incident.
12 (C)	4	LRBHTIME	System time of incident.
16 (10)	1 xxxx xxx. .... ...0.... ...1	LRBHCPID	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	LRBHCSER	CPU serial number.
20 (14)	2	LRBHMDL	CPU machine model number (0158,0168,etc.).
22 (16)	2	LRBHMCEL	Maximum length of machine- (CPU) dependent, machine check extended logout area. (Not used for MIH record).
24 (18)	8	LRBNJOB	Alphameric name assigned to job (as identified, for example, by a jobname on a JCL JOB statement) with an I/O request pending. If jobname cannot be determined, field is set to blanks.
32 (20)	3	LRBNCUA2	CUA used to address device.
35 (23)	3	LRBNCUA1	Primary CUA of device.
38 (26)	6	LRBNVOL	VOLSER of volume on device associated with pending I/O request.
44 (2C)	4	LRBNDEVT	Device type (from UCB) for device associated with pending I/O request.
48 (30)	8	LRBNINT	Time interval (decimal) used by MIH to check for pending conditions.

Figure 40. Missing Interruption Handler (MIH) Record Format

Outboard (OBR) Records

OBR records are recorded for the following incidents:

- Counter overflow statistics for devices (SDR counters)
- Counter overflow statistics and device failures on teleprocessing devices
- Demount condition on IBM 3400 series of magnetic tape devices
- End-of-day requests
- Paging I/O errors
- Permanent (uncorrectable or unit check) channel and device failures
- Temporary or intermittent I/O device failures
- Unit check errors on RES-supported control units and remote devices.

Long OBR records exist for permanent failures, temporary failures, paging I/O errors, unit check errors for RES-supported control units and device statistics. The running incidents are recorded in short OBR records.

Outboard (OBR) Record Format — (Short Form)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
0 (0)	1 ..11 ......11 ..1. ..11 .1.. ..11 .11.	CLASRC	Class/Source: OBR (unit check) record. Converted OBR record (not used by VS). TP access method (TCAM) OBR record. TP access method (VTAM) OBR record.
1 (1)	1 000. 001. 010. 011. 100. bits 3-7 0-1F	SYSREL	System/Release level: OS/360. DOS. OS/VS1. CP67 or VM/370. OS/VS2. Release level 0-31.
2 (2)	4 Byte 0 1... 0... .... ... .... ..1. .... ...x 1... ... .xxx Byte 1 1... .... .1.. .... ..1. .... ...1 0... ... 1... ... .1.. ... ..x. ... ..x Bytes 2 and 3	SWITCHES	Record switches: More records follow. Last record. Time-of-Day clock instruction issued (0 = IBM System/360, 1 = IBM System/370). Used in conjunction with date and time values at displacements 8 and 12. Record truncated. (Not used for OBR record.) Reserved. TIME macro used. Reserved. SDR counters dumped at EOD. Counter overflow. Short record. MP system. CPU A (MP system) issued last SIO. CPU B (MP system) issued last SIO. Volume demount. Not used by OS/VS2. Reserved. Not used for OBR record.
6 (6)	1 bits 0-3 bits 4-7	RCDCNT	Record count: Sequence number of this physical record. Total number of physical records in this logical record.
7 (7)	1		Reserved.
8 (8)	4	DATE	System date of incident.
12 (C)	4	TIME	System time of incident.
16 (10)	1 xxxx xxx. .... ...0.... ...1	VERNO	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	CPUSER	CPU serial number.
20 (14)	2	CPUMOD	CPU machine model number (0158,0168,etc.).
22 (16)	2	MCELLNG	Maximum length of machine- (CPU) dependent, machine check extended logout area. (Not used for OBR record).
24 (18)	4	SDEV TYP	Device type associated with failing device.
28 (1C)	1	SSDR CNT	Number of bytes of statistical data to be recorded from SDR work area at displacement 32.
29 (1D)	3	SCUA	Primary CUA being used when failure occurred.
32 (20)	variable	SSDR	SDR counter area containing statistical counter/indicator data from device statistics table.

Figure 41. Outboard (OBR) Record Format — (Short Form)

Outboard (OBR) Record Format — (Long Form)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
0 (0)	1 ..11 ......11 ..1. ..11 ..1. ..11 ..11.	CLASRC	Class/Source: OBR (unit check) record. Converted OBR record (not used by VS TP access method (TCAM) OBR record TP access method (VTAM) OBR record.
1 (1)	1 000. 001. 010. 011. 100. bits 3-7 0-1F	SYSREL	System/Release level: OS/360. DOS. OS/VS1. CP67 or VM/370. OS/VS2. Release level 0-31.
2 (2)	4 Byte 0 1... 0... .... .x.. .... ..1. .... ...x 1... .... .xxx Byte 1 1... .... .1.. .... ..1. .... ...1 0... 1... .... .1.. .... .x.. .... ...x Bytes 2 and 3	SWITCHES	Record Switches: More records follow. Last record. Time-of-Day clock instruction issued (0 = IBM System/360, 1 = IBM System/370). Used in conjunction with date and time values at displacements 8 and 12. Record truncated. (Not used for OBR record.) Reserved. TIME macro used. Reserved. SDR counters dumped at EOD. Temporary error. Short record. MP system. CPU A (MP system) issued last SIO. CPU B (MP system) issued last SIO. Volume demount. Not used by OS/VS2. Reserved. Not used for OBR record.
6 (6)	1 bits 0-3 bits 4-7	RDCDCNT	Record count: Sequence number of this physical record. Total number of physical records in this logical record.
7 (7)	1		Reserved.
8 (8)	4	DATE	System date of incident.
12 (C)	4	TIME	System time of incident.
16 (10)	1 xxxx xxx. .... ...0.... ...1	VERNO	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	CPUSER	CPU serial number.
20 (14)	2	CPUMOD	CPU machine model number (0158,0168,etc.).
22 (16)	2	MCELLNG	Maximum length of machine- (CPU) dependent, machine check extended logout area. (Not used for OBR record).
24 (18)	8	JOBID	Alphanumeric name assigned to job (as identified, for example, by a jobname on a JCL JOB statement) being executed and/or requesting service at time of failure.
32 (20)	8	FAILCCW	CCW being executed at time of failure.
40 (28)	8	CSW	Contents of CSW that was stored following detection of I/O error.

Figure 42. Outboard (OBR) Record Format — (Long Form) (Part 1 of 2)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
48 (30)	1	DEVDEPC	Count of doublewords which record uses for device dependent data.
49 (31)	3	SECUA	Secondary channel and unit address (actual CUA) associated with final retry of failing I/O device.
52 (34)	4	DEVTYPE	Device type associated with failing device.
56 (38)	1	SDRCNT	Number of bytes of statistical data which record uses to record statistical data recorder (SDR) work area.
57 (39)	3	PCUA	Primary CUA of device being used when failure occurred. For IBM 2314, 3330 or 3340 series of devices, field contains physical location (not address) of failing unit.
60 (3C)	2	IORETRY	Number of I/O retries attempted for this error incident.
62 (3E)	2	SENSCNT	Number of bytes of data in SENSE field.
64 (40)	variable	DEVDEP	Device dependent information.
	variable	SDRINF	SDR counter area that contains statistical counter/indicator data from device statistics table.
	variable	SENSE	Device-dependent sense information that was received on first sense command to failing device.

Figure 42. Outboard (OBR) Record Format – (Long Form) (Part 2 of 2)

System Initialization (IPL) Records

IPL records are present for MVS or if the reliability data extractor (RDE) option has been included in the system. Each master scheduler initialization of the operating system initiates one IPL record that contains information related to that initialization. An IPL record is also generated to provide information related to power-line disturbances that cause system termination.

IPL Record Format

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
0 (0)	1 .1.1	CLASRC	Class/Source: IPL Record.
1 (1)	1 000. 001. 010. 011. 100. bits 3-7 0-1F	OPSYS	System/Release level: OS/360. DOS. OS/VS1. CP67 or VM/370. OS/VS2. Release level 0-31.
2 (2)	4 Byte 0 1... 0... .... .x... .... .1. .... ...x 1... .... .xxx Bytes 1 and 2 Byte 3	SW1	Record switches: More records follow. Last record. Time-of-Day clock instruction issued (0 = IBM System/360, 1 = IBM System/370). Used in conjunction with date and time values at displacements 8 and 12. Record truncated. (Not used for IPL record.) Reserved. TIME macro used. Reserved. Not used for IPL record. Incremental release number (alphanumeric) of operating system.
6 (6)	2		Not used for IPL record.
8 (8)	4	DATE	System date when system was initialized.
12 (C)	4	TIME	System time when system was initialized.
16 (10)	1 xxxx xxx. .... ...0.... ...1	CPUSER	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	CPUSER1	CPU serial number.
20 (14)	2	CPUMODEL	CPU machine model number (0158,0168,etc.).
22 (16)	2	MCELLNG	Maximum length of machine- (CPU) dependent, machine check extended logout area. (Not used for IPL record).
24 (18)	1	SUBSYSID	Device type or program that caused restart. See Figure 16.
25 (19)	3		Not used for IPL record.
28 (1C)	2	REASON	Alphanumeric reason for IPL. See Figure 15.
30 (1E)	2	CHANMAP	Contains an indicator for each channel in field CHANASSN. A one in the bit corresponding to a channel indicates that it is online.
32 (20)	8	CHANASSN	Channel types (0-15) assigned to system. Each channel is represented by a four bit code in appropriate sub-field: Code Meaning 00 Channel Unknown (although assumes channel adheres to System/370 channel design) 01 Integrated Multiplexor (MPX) 02 Integrated Selector 03 Integrated Block MPX 05 Standalone Selector (2860) 06 Standalone MPX (2870) 07 Standalone Block MPX (2880) 08 Selector Channels (2880). 0A Integrated File Adaptor 0F Channel Unknown (although assumes channel adheres to System/370 channel design)
40 (28)	4	HIGHADDR	Address of last valid byte of storage found at IPL time. If system has large capacity storage (LCS), field reflects LCS address.
44 (2C)	4		Reserved.
48 (30)	8	LASTACT	Last activity time and date from the Time Stamp Record.

Figure 43. IPL Record Format

Software Error Records

Software records are recorded by MVS. They contain information relative to the name of abending program or the request block of the abending program, contents of the general-purpose registers, the PSW, the module name and CSECT in which the error occurred, component recovery area information.

Software Record Format

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
0 (0)	1 .1.. .... .1.. ..1. .1.. ..1. .1.. 1.. .1.. 1111	HDRTYP	Class/Source: Software detected software error. Hardware detected software error. Operator detected error. Hardware detected hardware error. Lost record summary.
1 (1)	1 000. 001. 010. 011. 100. bits 3-7 0-1F	HDROPRN	System/Release level: OS/360. DOS. OS/VS1. CP67 or VM/370. OS/VS2. Release level 0-31.
2 (2)	1 1... 0... .... .x... .... ..1. .... ...x 1.. ... .xxx	HDRIS	Record independent switches: More records follow. Last record. Time-of-Day clock instruction issued. Used in conjunction with date and time values at displacements 8 and 12. Record truncated. (When IFCEREPO detects this bit being on, it does not edit record but prints it out in hexadecimal.) Reserved. TIME macro used. Reserved.
3 (3)	3 Byte 0 1 ... .....1.. .... ..1. .... ...x xxxx	HDRDS	Record dependent switches: Short record. (Set for '4F' type records to indicate that record is not as long as other software records.) Record incomplete. (Record truncated because of lack of buffer space.) Record contains an ERRORID. Not used.
	Byte 1 Byte 2		Reserved. Reserved.
6 (6)	1 bits 0-3 bits 4-7	HDRCNT	Record count: Sequence number of this physical record. Total number of physical records in this logical record.
7 (7)	1		Reserved.
8 (8)	4	HDRTM	System date of incident.
12 (C)	4		System time of incident.
16 (10)	1 xxxx xxx. .... ...0.... ...1	HDRCPID	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3		CPU serial number.
20 (14)	2		CPU machine model number (0158,0168,etc.).

Figure 44. Software Record Format (Part 1 of 3)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
22 (16)	2		Maximum length of machine- (CPU) dependent, machine check extended logout area. (Not used for software record).
24 (18)	8	JOBID	Alphanumeric name assigned to job (as identified, for example, by a jobname on a JCL JOB statement) being executed and/or requesting service at time of failure.
32 (20)	400	SDWA	SDWA area detailed by IHASDWA mapping macro. Consult System Data Areas , SYB8-0606, for detailed SDWA format. However, area contains FRR or ESTAE/ESTAI dependent data such as:
	4	SDWAABCC	ABEND completion code on entry to exit routine.
	64	SDWAGRSV	General purpose registers at time of error.
	8	SDWAEC1	Extended control PSW at time of error (ABEND).
	8	SDWAAEC1	Additional EC mode information.
	4	SDWAFGLS	Switches describing reasons and conditions for entering a recovery exit routine.
	Byte 0	SDWAERRA	Error type causing entry to recovery exit routine:
	1..	SDWAMCHK	Machine check.
	.1.. ...	SDWAPCHK	Program check.
	..1. ...	SDWARKEY	Console restart key depressed.
	...1	SDWASVCD	Task issued SVC 13.
	.... 1...	SDWAABTM	System forced SVC 13 (ABTERM).
	.... .1..	SDWASVCE	SVC issued by a locked or SRB routine.
	.... ..1.	SDWATEXC	Unrecoverable translation failure.
	.... ...1	SDWAPGIO	Page I/O error.
	Byte 1	SDWAERRB	Additional error entry information at time of failure:
	xxxx		Reserved.
	.... 1..	SDWATYP1	Type 1 SVC was in control.
	.... .1..	SDWAENRB	Enabled RB was in control.
	.... ..1.	SDWALDIS	Logically or physically disabled routine was in control.
	.... ...1	SDWASRBM	System was in SRB mode.
	Byte 2	SDWAERRC	Additional error entry information:
	1...	SDWASTAF	Previous ESTAE exit or FRR failed.
	1.	SDWASTAI	ESTAI exit previously received control.
	1 ...	SDWAIRB	IRB preceded RB associated with this exit.
	...1	SDWAPERC	This recovery routine is being percolated to.
	.... 1...	SDWAEAS	Lower level exit recognized error and provided serviceability information.
	.... .xxx		Reserved.
	Byte 3	SDWAERRD	Additional error entry information:
	1...	SDWACLUP	Recovery routine cleanup only — no retry.
	.1..	SDWANRBE	RB associated with this ESTAE exit not in control at time of error.
	..1.	SDWASTAE	This ESTAE exit has been entered for a previous ABEND. Not applicable for FRRs.
	...1	SDWACTS	This task not in control at time of error, but task within same jobstep tree requested ABEND.
	.... 1...	SDWAMABD	This task not in control at time of error, but is ancestor of ABENDED task. Used with SDWACLUP field.
	.... .1..	SDWARPIV	Registers and PSW at time of error unavailable.
	.... ..1.	SDWAMCIV	Machine check error information unavailable.
	.... ...x		Reserved.
	2	SDWALCPU	Logical address of CPU holding requested resource.
	24	SDWARECP	Recording parameters:
	Bytes 0-7	SDWAMODN	Module name, supplied by recovery routine, involved in error.
	Bytes 8-15	SDWACSCT	CSECT name, supplied by recovery routine, involved in error.
	Bytes 16-23	SDWAREXN	Name of recovery routine handling error.
432 (1B0)	2	SDWAURAL	Length of variable area containing recovery exit data.

Figure 44. Software Record Format (Part 2 of 3)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
434 (1B2)	variable	SDWAVRA	Contains FRR dependent data such as damage assessment, recovery action information, and specific diagnostic information to assist in isolating or identifying problem. Consult appropriate program listing or program logic manual describing program that issued FRR or recovery exit for a description of specific data supplied by recovery exit routine.
variable	10	ERRORID	RTM-generated error identifier consists of: 2-byte sequence number 2-byte CPU identifier 2-byte ASID 4-byte time stamp

Figure 44. Software Record Format (Part 3 of 3)

System Termination (EOD) Records

System termination records initiated by HALT EOD, are present for MVS or if the RDE option has been included in the system. The system termination record contains information relating to the cause of termination and system environmental information.

System Termination (EOD) Record Format

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
0 (0)	1 1... ..	CLASRC	Class/Source: EOD Record.
1 (1)	1 000. 001. 010. 011. 100. bits 3-7 0-1F	OPSYS	System/Release level: OS/360. DOS. OS/V51. CP67 or VM/370. OS/V52. Release level 0-31.
2 (2)	4 Byte 0 1... 0... .... .x... .... ..1. .... ...x 1... .... .xxx Bytes 1 and 2 Byte 3	SW1	Record switches: More records follow. Last record. Time-of-Day clock instruction issued (0 = IBM System/360, 1 = IBM System/370). Used in conjunction with date and time values at displacements 8 and 12. Record truncated. (Not used for EOD record.) Reserved. TIME macro used. Reserved. Not used for EOD record. Incremental release number (alphameric) of operating system.
6 (6)	2		Not used for EOD record.
8 (8)	4	DATE	System date of condition.
12 (C)	4	TIME	System time of condition.

Figure 45. System Termination (EOD) Record Format (Part 1 of 2)

Offset Dec Hex	Size(bytes) Alignment(bits)	Field Name	Description
16 (10)	1 xxxx xxx. .... ...0.... ...1	VERNO	Machine version code: Reserved. Version I CPUs. Version II CPUs.
17 (11)	3	CPUSER	CPU serial number.
20 (14)	2	CPUMODEL	CPU machine model number (0158,0168,etc.).
22 (16)	2	MCELLNG	Maximum length of machine- (CPU) dependent, machine check extended logout area. (Not used for EOD record).

Figure 45. System Termination (EOD) Record Format (Part 2 of 2)



Appendix A. Installation Planning Procedures

Functional Summary

The OS/VS Environmental Recording Editing and Printing (EREP) supports:

- OS/VS1 Release 5 and Release 6.
- OS/VS2 Release 1.7 (SVS).
- OS/VS2 Release 3.0, Release 3.6 and Release 3.7 (MVS).

EREP enhancements provide a common EREP program across all OS/VS Operating Systems. An expanded parameter capability and improved history processing performance are provided. Three new reports—System Summary, Trend Report and Event History have been added. Multi-system data can be merged for display in the System Summary and Trend Report. Shared Input/Output Devices can be indicated for all summary reports.

Machine Requirements

The System/370 is the only computer supported by this new version of EREP. The minimum system configuration must include a direct access device for a temporary data set to be used when processing from an Accumulation (history) data set. The System/370 CPU models supported are the 135 and higher numbered ones.

Programming Requirements

EREP Enhancements run in a virtual region of 100K (See note.). This allows space for 12000 byte buffers for Accumulation data sets and a 24K processing table. If the TABSIZE parameter is used to increase table size, it is necessary to increment the region size by the same amount. The DCB parameter must be used on DD cards for ACCDEV, ACCIN, EREPPT and TOURIST (if non-labeled tape). The inclusion of EREP support for a particular device does not imply that the operating system supports that device. All modules of EREP are relinked to give new internal alias names. The JCLIN file on the installation tape provides the new alias and name cards for SMP. The SYSGEN macro SGIFB400 must be applied to SYS1.AGENLIB for future system generations.

Note: In VS2 Releases 3.0, 3.6 and 3.7, use the default of 256K.

Installation

The space requirements on SYS1.LINKLIB and SYS1.AOSCD are approximately 752,080 bytes each.

This new EREP is a complete replacement for the current IFCEREPO. Most of the old modules are updated and many are changed. The following IFCEREPO modules are not included in the new EREP:

IFCEREPO	IFCEP005	IFCEP007	IFCEP008
IFCEP009	IFCRE002	IFCRE003	IFCMG00
IFCMES00	IFCSPTCK	IFCESPOT	IFCANAPT

The above modules may be scratched by use of utility program IEHPROGM.

Programming Guidelines

When using the new EREP be aware that:

1. A temporary DASD work file is required whenever an Accumulation data set is the input except when producing a System Summary or Trend Report. If insufficient space allocation is designated on the DD statement for the temporary work file, the output will not include all records on the input data set.
2. A new parameter, TABSIZE, exists, by which the user may specify a table size for processing. This table size is specified in blocks of 1K and defaults to 24K. Each 1K of table size allows processing of approximately 100 records.
3. The DCB information for RECFM and BLKSIZE must be supplied via data set headers or JCL statements for the data sets referenced by the following DD names:

ACCIN	—	input data set
ACCDEV	—	output data set

RECFM must be specified as either V or VB. Blocksize is dependent upon the device. Data sets residing on tape are restricted to a maximum of 12,000 bytes per block. Data sets residing on direct access devices are restricted to track capacity.

OLTEP must be upgraded by PTF before the LOGSCAN feature will accept variable blocked input.

4. A new parameter, LINECT, exists by which the user can specify the line count per page. This parameter defaults to 50 and is applicable to the TOURIST data set and the three new reports—System Summary, Event History, and Trend Report.

5. SYS1.LOGREC will be cleared when:

- The emergency offload is executed.
- System Summary is requested and ACC is implied or explicitly requested without any data restricting keywords.
- PRINT=PS or PRINT=PT and ZERO are explicitly requested without any data restricting keywords.
- When ZERO is requested and ACC is implied or explicitly requested without any data restricting keywords.

System and Publication Support

EREP Enhancements are supported by the following System/Releases:

- OS/VS2 Release 3.7 (MVS) Selectable Unit—EREP Program VS2.03.827
- OS/VS1 Release 6.0 Selectable Unit—EREP Program VS1.06.601
- OS/VS1 Release 5.0 Independent Component Release UX99936
- OS/VS2 Release 1.7 (SVS) Independent Component Release UY99941
- OS/VS2 Release 3.0 and 3.6 (MVS) Independent Component Release UZ99946

The following publications contain pertinent information helpful in using OS/VS EREP.

Title	Base Order #
OS/VS Environmental Recording Editing and Printing (EREP) Program Logic	SY28-0773-0
OS/VS Environmental Recording Editing and Printing (EREP) Program Listing (Microfiche)	
System/Release Level	
OS/VS2 Release 3.7 (MVS) - Selectable Unit	SJD2-4350 SNC1-4359
OS/VS1 Release 6.0 - Selectable Unit	SJD2-2038-05 SSC0-6227
OS/VS1 Release 5.0 - Independent Component Release	SJD2-2150
OS/VS2 Release 1.7 (SVS) - Independent Component Release	SJB2-9003
OS/VS2 Release 3.0 and 3.6 (MVS) - Independent Component Release	SJB2-9004
OS/VS1 Message Library: Service Aids and OLTEP Messages	GC23-0005-0 GC23-0017
OS/VS2 Message Library: Service Aids and OLTEP Messages	GC23-0006-0 GC23-0016



Appendix B. Glossary of Abbreviations Used in EREP Output

BYTES RD/SRCHD	Megabytes Read/Searched
CCH	Channel Check Record
CCH-CRH	CCH-Channel Reconfiguration Hardware
CCH-INC	CCH Incomplete Record
CHNL	Channel
CK or CHK	Check
CMD or CMND	Command
CNTRL	Control
CNTRLR	Controller
COMP/MOD	Component/Module
CONS+UR	Console plus Unit Record
CORR	Correctable
CSECTID	Control Section Identification
CSW	Channel status word
C.U.	Control Unit
CUA	Channel-control unit-device address
DATA CKS CORR/RTRY	Data checks correctable/retry
DDR	Dynamic Device Reconfiguration Record
DDR-OPR	DDR-Operator Requested
DDR-SYS	DDR-System Requested
EOD	End-of-Day Record
EQUIP.	Equipment
ERROPS	Error Operations
FMT	Format
HDR SER	Header (tape)/serial number of drive that created tape
ID	Identification
INV	Invalid
IPL	Initial Program Load
LEN	Length
MCH	Machine Check Record
MCH-TRM	MCH-System Terminated
MDR	Miscellaneous Data Record
MIH	Missing Interrupt Handler Record
MIH-CE	MIH-Channel End Pending
MIH-DE	MIH-Device End Pending
OBR	Outboard Record
OBR-DMT	OBR-Dismount
OBR-EOD	OBR End of day
OBR-PRM	OBR-Permanent error record
OBR-SHT	OBR-Short
OBR-TMP	OBR Temporary error
OVERRN	Over run
OVERRUN CDDA/CDDA	Overrun Command Data/Command Data
PERM	Permanent
PRGM INT	Program Initiated
PROG-EC	Program-Extended Control Mode
PSW	Program Status Word
RCYRYXIT	Recovery Exit module
REC-TYP	Record Type
RTN	Routine
SCP	System Control Program

SEEKS CNTR/HH	Seek errors Cylinder Track/Head
SFT	Software Record
SFT-ABN	SFT-ABEND record
SFT-MCH	SFT-Machine Error, recoverable
SFT-PI	SFT-Program Interrupt
SFT-RST	SFT-Restart
SSYS ID	Sub-system Identification
TEMP	Temporary
TERM	Terminal
WRTS	Writes

Note: Most other abbreviations are meant only for the Customer Engineer, and are not meaningful to other personnel, even in translation.

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