File No. S370-34
Order No. GC34-2004-0

Systems

OS/VS2 MVS Interactive Problem Control System (IPCS) System Information

SUID 5752-857

IBM

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FIRST EDITION (March, 1978)

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Preface

This manual provides information needed to plan for the installation and use of the OS/VS2 MVS Interactive Problem Control System (IPCS), a selectable unit that allows the user to analyze and manage system software problems in an OS/VS2 MVS TSO environment.

This manual, which provides a general description of IPCS as well as planning information, is divided into the following sections:

1. Introduction -- a general understanding of IPCS structure and function.

2. Planning -- the IPCS requirements on the hardware and programming environments of the installation.

3. Supplemental Information -- publications support and program module information related to IPCS.

This publication is intended to provide planning information for installation managers, system programmers, and IBM Field Engineering personnel. It is assumed that the readers have a basic knowledge of OS/VS2 MVS and TSO.

For general information on installing selectable units, refer to Selectable Unit Installation Guide, GC28-0747.

For specific installation information, refer to the program directory for the OS/VS2 MVS IPCS selectable unit, shipped with the program from the Program Information Department.

Detailed information for the IPCS user, including selected installation considerations, is provided in the OS/VS2 MVS Interactive Problem Control System (IPCS) User's Guide and Reference, GC34-2006.

Contents

Section 1. Introduction

The OS/VS2 MVS Interactive Problem Control System (IPCS) provides MVS installations with expanded capabilities for diagnosing software failures and facilities for managing problem information and status. This section provides an overview of the IPCS functions provided to a user, an overview of its use, and the data utilized and maintained by IPCS.

Operating Environment

IPCS operates as a TSO command processor under OS/VS2 MVS. All IPCS subcommands are treated as subcommands of the IPCS command.

Functional Characteristics

IPCS includes facilities for:

- Online examination of storage dumps.
- Analysis of key MVS system components and control blocks.
- Online management of a directory of software problems that have occurred in the user's system.
- Online management of a directory of problem-related data, such as dumps or the output of service aids.

IPCS runs under TSO, allowing the user to access existing TSO facilities during an IPCS session, and giving the user the ability to create and execute command procedures (CLISTs) containing the IPCS command and its subcommands.

Dump Data Examination and Analysis

IPCS provides functions for displaying and analyzing information present in an OS/VS2 MVS storage dump.

The functions operate in line-oriented mode or full-screen mode. Line-oriented mode allows the user to enter subcommands, TSO commands, or TSO CLISTs, and to display areas of storage or summary reports of MVS components or control blocks.

For IBM display stations supported by TSO (3275 Model 2, 3277 Model 2, 3276 Models 2 and 12, and the 3278 Model 2 attached via the 3276 or 3274), full-screen option is available for examining dump data. The option provides functions to utilize these display terminals in preformatted full-screen mode. Data entry, cursor placement, or program function keys (where available) may be used for basic operations, such as scrolling or splitting the screen to display multiple areas or multiple formats within a dump.

Dumps Supported

Dumps must reside on DASD prior to the use of the dump data examination and analysis functions. IPCS supports three forms of MVS storage dumps:

- High-speed stand-alone dumps produced by AMDSADMP.
- Virtual dumps produced by MVS SDUMP on SYS1.DUMPnn data sets.
- Virtual dumps produced by MVS SDUMP on data sets specified by the SYSMDUMP DD statement, when the Dumping Improvements Selectable Unit (SU33) is installed.

Dumps on data sets specified by the SYSABEND or SYSUDUMP DD statements cannot be analyzed using IPCS facilities.

Dump Access

When a stand-alone dump, created by AMDSADMP, is being processed, IPCS supports access to:

- The storage and storage keys.
- The dump title, the CAW, the CSW, and other data placed in the header record.
- The data placed in the CPU status record.

Access to the storage is available by:

- Virtual addresses, using both DAT hardware simulation and emulation of MVS page reclamation.
- Real addresses, simulating prefixing on multiprocessor systems.
- Absolute addresses.

When a virtual dump, created by MVS SDUMP, is being processed, IPCS supports access to:

- The virtual storage and storage keys.
- The dump title, current PSW, and registers written in the header record.
- The dump summary records, when the Dumping Improvements Selectable Unit (SU33) is installed.

Dump Formatting

The dump examination function allows the user to tailor the formatting of storage by providing:

- Hexadecimal displays.
- Character displays.
- Traditional dump formats of combined hexadecimal and character displays.
- Decimal displays.
- Compression of repetitive data from storage.
- Optional display of storage keys.

Dump Data Isolation

IPCS allows the user to refer to and locate link pack area modules and key MVS control blocks by name. To avoid unnecessary system overhead, the look-up process for each control block is deferred until it is explicitly requested by the user, or until it is implicitly requested by the use of a subcommand which must find and use the data.

Dump Data Validation

Key MVS control blocks in dumps accessed by IPCS are checked for validity prior to their use. One validation process is used for each control block, regardless of the number of IPCS subcommands accessing it.

Dump Analysis Routines

IPCS provides high-level summaries of the status of several key MVS system components:

- The ASCBs, ASXBs, TCBs, and RBs are located, formatted, and summarized. Selective display of the ASCB, ASXB, TCBs, and RBs for one address space at a time is supported.
- The status of the auxiliary storage management component is summarized, highlighting critical statistics, the locations of key data areas, and the addresses of the paging data sets.
- The status of the communication task component is summarized, highlighting outstanding WTOR messages, and those consoles to which messages have been queued but not yet transmitted.
- ENQ/DEQ resource management chains are summarized. The selective display of the chains associated with a major resource name is supported.
- The status of the I/O supervisor component is summarized, highlighting critical statistics and the locations of key data areas.

Problem Management

Functions are provided for managing problem information and status at an MVS installation and keeping that information centralized and available to all personnel involved in the resolution of problems.

Problem management includes functions for:

- Adding problems to, and deleting problems from, the IPCS problem directory.
- Maintaining problem status information.
- Displaying and printing existing problem information.

Data Management

Functions are provided for maintaining a list of the data sets associated with a problem. The purpose of this list is to allow the IPCS user to rapidly find the data associated with a problem.

Data management includes functions for:

- Associating a data set with, or disassociating a data set from, a problem.
- Maintaining type and description information about a data set.
- Displaying and printing information about existing data sets.

IPCS Use

To fully understand the problem management and problem-solving capabilities that IPCS offers, it is helpful to:

- Walk through a typical IPCS session.
- Know the functions offered by the IPCS commands and subcommands.
- Visualize the full-screen displays of IPCS.

Session Scenario

When problems are discovered, the user now has IPCS to control them. He can create an entry for the problem in the problem directory and provide descriptive information. He can associate data sets (dumps, service aid output, etc.) with that problem in the data set directory.

Once the problem and its associated data have been identified, the user can proceed to display dumps and other problem-related data needed to solve the problem. IPCS provides extensive dump analysis and examination facilities to aid in the debugging process. The DSPL3270 subcommand provides dump display in a full-screen environment.

At any point in the process, new information can be added to the problem

directory which keeps the status of the problem current. The user can gather information about this problem, together with data about other problems, to prepare comprehensive reports of all problems within an installation or problems of a particular category.

When the problem has been resolved, the user can write the results in the problem directory. Then by updating the problem data directory, he can remove the names of dumps or other associated data sets.

Commands and Subcommands

The following list shows the TSO commands and the subcommands of IPCS with a general statement of the functions provided. The commands are listed first, followed by the subcommands.

TSO Commands

- IPCS -- Start an IPCS session.
- SYSDSCAN -- Allocate SYS1.DUMP data sets and display the titles of the dumps in them.
- IPCSDDIR -- Prepare a dump directory data set for dump analysis.

Subcommands of the IPCS Command

- ADDDSN -- Add a data set name to a problem.
- ADDPROB -- Add a problem.
- ASCBEXIT -- Pass control to an exit routine that is compatible with the AMDPRDMP ASCB exit.
- ASMCHECK -- Analyze the auxiliary storage manager (ASM).
- COMCHECK -- Analyze the communication task component.
- COMPARE -- Perform logical data comparison.
- DELDSN -- Delete a data set name from a problem.
- DELPROB -- Delete a problem.
- DROPDUMP -- Delete all records that describe a particular dump from the dump directory (a data set that contains information about fields within a dump).
- DROPMAP -- Delete records of control blocks that have been located in a dump.
- DROPSYM -- Delete symbols from the table of symbols that have been defined by the user or by IPCS during dump analysis.
- DSPL3270 -- Display selected portions of a dump with full-screen operation.
- END -- Terminate an IPCS session.
- ENQCHECK -- Summarize ENQ/DEQ resource management chains.
- EQUATE -- Create a symbol.
- EVALUATE -- Obtain dump data for CLIST processing.
- FIND -- Locate data in a dump.
- FINDMOD -- Search for a module by name.

- FINDUCB -- Search for a UCB.
- HELP -- Provide descriptive information about the IPCS command and its subcommands.
- IOSCHECK -- Analyze the I/O supervisor component.
- LIST -- Display storage.
- LISTDSN -- List data set attributes.
- LISTDUMP -- List dumps represented in the dump directory.
- LISTMAP -- List control blocks that have been located in a dump.
- LISTPROB -- List reported problems.
- LISTSYM -- List attributes of symbols in the symbol table.
- MODDSN -- Modify data set attributes.
- MODPROB -- Modify problem attributes.
- NOTE -- Produce messages and control pagination.
- RUNCHAIN -- Search through a chain of control blocks.
- SCAN -- Validate key MVS control blocks.
- SETDEF -- Set, change, and display IPCS session defaults.
- SUMMARY -- Summarize selected control block fields.
- TCBEXIT -- Pass control to an exit routine that is compatible with the AMDPRDMP TCB exit.
- TSO -- Invoke a non-IPCS TSO command or subcommand function.
- VERBEXIT -- Pass control to an exit routine that is compatible with the AMDPRDMP user control statement exit.

DSPL3270 Screen Format

The DSPL3270 subcommand initializes the 3270 screen into a 24-line display. The top five lines are used for specific control operations, and the bottom 19 lines for the display of data. The basic format of the screen is shown below:

```
3END  7<-SCROLL+>8  9STACK  10<-SKIP+>11
SK 00E090
RF CVT
ADDR 000008 ASID 0014 FMT X AREA A LINES/AREA: A 19 B 00 C 00 D 00 SKIP 000200
SUBCMND/CLIST:
000000                   00000000 00000000 0000E090 00000000 070C1000 00D4A832
000020  070C2000 00D4A0CE 070C0000 00D4A000 040C1000 0001259A 070E0000 00000000
000040  0006BE78 0C000001 000088A0 0000E090 B4F35AFF 00000000 040C0000 0004555E
000060  040C0000 000308AA 000C0000 000367C4 00080000 0000AF18 040C0000 00045766
000080  00000000 00001004 00020001 00D4A000 00000000 00000000 00000000 00000000
0000A0  00000000 00000000 20000000 001FE298 FFFFFFFF 00000000 000001D3 00000000
0000C0  00000000 00000000 00000000 00000000 00000000 00000000 7FFFFFEE 4523CFF8
0000E0  8B26520F 19744000 00000000 00000000 00000000 00000000 00000000 00000000
000100  03000148 00000000 00000000 00410080 00000000 00000000 00000000 00000000
000120  00000000 00000000 00000000 00000000 FFFFFFFF 0000002A FFFFFFFF FFFFFFFF
000140  FFFFFFFF FFFFFFFF 01010523 447EE000 23323339 42483849 00000000 00000000
000160  00000000 00000000 00000000 00000000 00000000 00000000 00000000 00000000
000180  00FFE398 00FFE1F0 00FF6634 00FFDE28 800123B0 00012070 00000508 000051B0
0001A0  0001306E 0001406C 00007F80 00FF9828 00008110 00FFB3E8 00005080 00000000
0001C0  C080EC40 0F1D7C00 FC000000 00000000 00000000 00000000 00000000 00000000
0001E0  00000000 00000000 00000000 00000000 00000000 00000000 0FC00000 001E6560
000200  D7E2C140 00000040 00FFE1F0 001FE1F0 00FFDE28 001FDE28 00A258F8 00A258F8
000220  00FED098 00FED098 00000000 00B74340 00000000 00000000 00000000 00B74E40
000240  040C1000 00D4A832 00000000 00000000 070C0000 00D4EA76 040C0000 0001A8EC
```

Line 1 contains a message area and four basic operations that are available to the user, either by cursor selection or by program function key selection:

END -- Ends the DSPL3270 function and leaves full-screen mode.

SCROLL -- Shifts the area of the dump being viewed.

STACK -- Adds the address being displayed to the address stack.

SKIP -- Moves the pointer of the display forward or backward.

Note that each function has one or more numbers shown with it. These numbers indicate which program function key, if available on that terminal, can be used to perform the operation.

Lines 2 and 3 provide for a "stack" mechanism. The stack allows the user to keep addresses for more parts of the dump than can be displayed concurrently and to remember what the addresses point to. Line 2 (SK) contains a list of addresses, and line 3 (RF) provides space for a reference or note about the first address in the list.

Line 4 contains various fields that define the current display environment. These fields can be altered by the user. The effect of changing these fields is reflected on the next screen update.

Line 5 is used to enter IPCS subcommands or TSO commands or CLISTs. When data is entered on this line and the ENTER key is pressed, DSPL3270 terminates full-screen operation and passes the input to IPCS for processing. When the specified operation is complete, the display is automatically returned to full-screen mode.

Lines 6-24 are used to display data from the dump. On line 4, the user can allocate these display lines among four display areas: A, B, C, and D. The AREA field on line 4 indicates which area is to contain the next display.

Section 2. Planning for IPCS

This section identifies the effect of the OS/VS2 MVS Interactive Problem Control System (IPCS) Selectable Unit on:

- Machine requirements.
- Programming requirements.
- Storage estimates.

Machine Requirements

IPCS operates on any configuration and processor that meets the minimum specifications of OS/VS2 MVS with TSO.

Use of the DSPL3270 subcommand requires an IBM 3275 Model 2, 3277 Model 2, 3276 Model 2 or 12, or 3278 Model 2 display terminal attached via the 3276 or 3274. If the optional program function key feature is available, the usability of the DSPL3270 subcommand is enhanced.

Programming Requirements

IPCS is designed for use with the OS/VS2 MVS operating system. It executes in a TSO environment and supports multiple concurrent users sharing a common data base.

IPCS requires an OS/VS2 MVS Release 3.7 operating system with TSO.

Dependencies

The following selectable units are prerequisite to the installation of IPCS:

- Supervisor Performance #1 (SU5).
- Supervisor Performance #2 (SU7).

The Dumping Improvements Selectable Unit (SU33), though not prerequisite to the installation of IPCS, will enhance its effectiveness. SU33 captures machine-readable dumps on failures and provides more accurate trace table information by preserving the supervisor trace table earlier in recovery processing.

Programming Considerations

Before installing IPCS for use with TCAM, a new message control program (MCP) generation may need to be done. The macros for this MCP generation are supplied with IPCS. If the OS/VS2 MVS TSO 3270 Extended

Display Support -- Session Manager Program Product, Program Number 5740-XE2, or TSO-3270 Structured Programming Facility Program Product, Program Number 5740-XT8, is installed, the new MCP generation is not required.

Data Sets

The following data sets or members are unique to IPCS:

- IPCSPRxx Member of SYS1.PARMLIB

  This member contains the parameters needed to tailor the operating characteristics of the IPCS system to those desired by the user, and contains the cluster names of the data set directory and the problem directory. More than one member can be defined, to allow for different default requirements within an installation.

- Data Set Directory

  This VSAM data set contains information about all data sets that have been associated with problems.

- Problem Directory

  This VSAM data set is the central file for all problem-related information. It contains the information used for problem selection, problem reporting, and problem data set management.

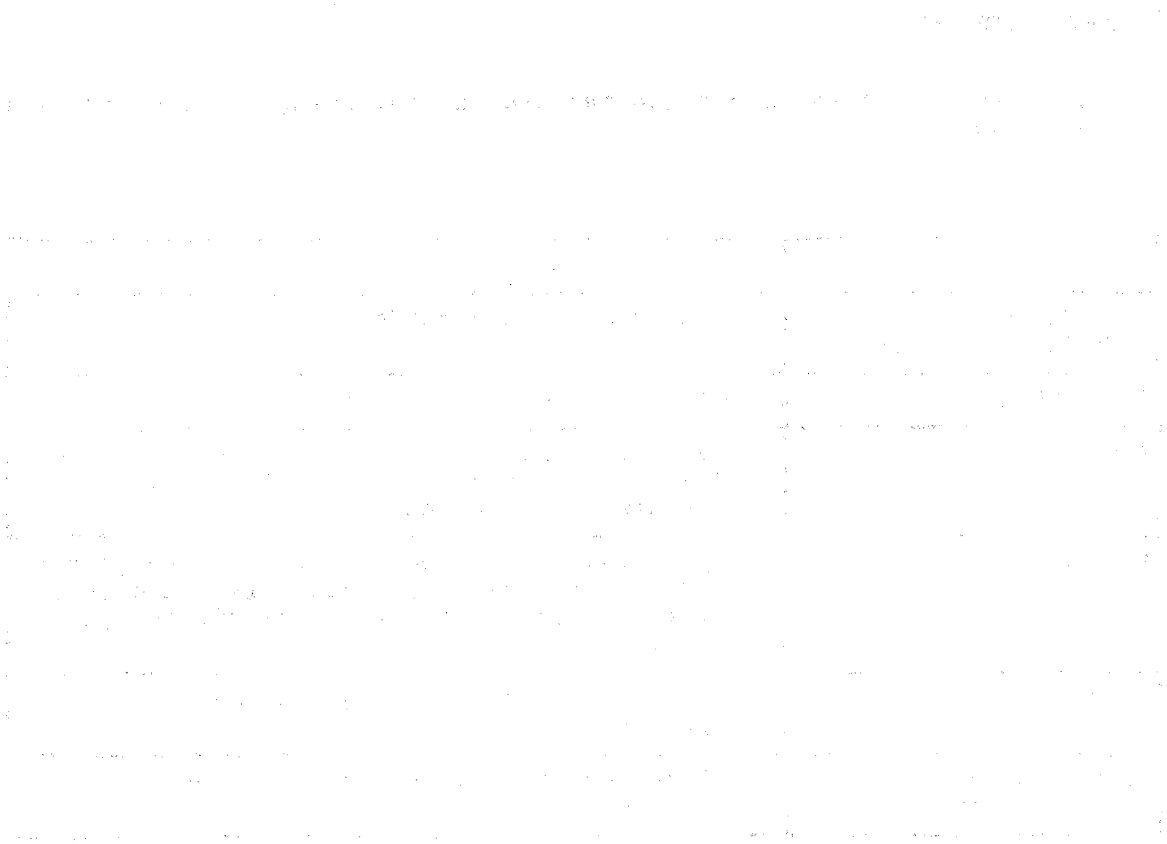
- Dump Directory

  This VSAM data set contains information used to identify a record in the dump that corresponds to a request for an address in the dump. It also contains additional information generated during dump analysis, such as symbol table records and map records. Each IPCS user concurrently viewing dumps requires his own dump directory.

Storage Estimates

IPCS runs in a 1.5M address space and has the following requirements for disk storage.

Data Set	Size
SYS1.PARMLIB (IPCSPRxx Member)	3 to 9 80-byte records.
SYS1.CMDLIB	60 tracks of 3330 storage.
Data Set Directory	Approximately 57 data set record groups per 3330 format track, assuming 2 problem associations per data set.
Problem Directory	Approximately six problem record groups per 3330 format track, assuming five associated data sets and 10 lines of description per problem.
Dump Data Set	86 tracks of 3330 storage for each 1M bytes of dump data.
Dump Directory	38 tracks of 3330 storage per dump (average).



Section 3. Supplemental Information

This section contains information for the system planner about publications support and module identification for IPCS.

Supporting Publications

The publication that describes IPCS and its use is OS/VS2 MVS Interactive Problem Control System (IPCS) User's Guide and Reference, GC34-2006.

The publication OS/VS2 MVS Interactive Problem Control System (IPCS) Messages and Codes, GC34-2007, contains a listing of all messages and user completion codes issued by IPCS, along with explanations and associated problem determination actions. This information is provided in the format of the OS/VS messages library so that it can be filed with other messages documentation.

A description of the functions performed by IPCS is contained in the System Control Programming Specification for OS/VS2 MVS IPCS, GC34-2005.

For information needed to maintain or modify the IPCS program, refer to OS/VS2 MVS Interactive Problem Control System (IPCS) Logic, SY25-0001.

Supplements to the following publications also contain overview information about IPCS:

Supplement to OS/VS2 MVS System Programming Library: Service Aids (GC28-0674), GD23-0094.

Supplement to OS/VS2 System Programming Library: Debugging Handbook (GC28-0708), GD23-0096.

Supplement to OS/VS2 System Programming Library: MVS Diagnostic Techniques (GC28-0725), GD23-0095.

Module Information

All the modules supplied with IPCS are new and have module names beginning with BLS. Storage estimates for the IPCS component are contained in Section 2.

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(IPCS) System Information

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