PRINT - Print File Assignments

This Natural profile parameter is for mainframes only.

It allows you to define the print files to be used during the session. Within a session, up to 31 logical print files (numbered 1 to 31) and the hardcopy print file (Number 0) can be used.

PRINT corresponds to the NTPRINT macro in the parameter module NATPARM. To provide different print file definitions, PRINT or NTPRINT can be specified multiple times.

Possible settings	See Keyword Subparameters below.	
Default setting	See below.	
Dynamic specification	YES	The parameter PRINT can only be specified dynamically. In NATPARM, the macro NTPRINT must be used.
Specification within session	NO	

The software components for accessing print files in different environments are called access methods. For the duration of a Natural session, each logical print file can be assigned to one access method only. The access method for a print file is determined by the keyword subparameter AM (see below).

In OS/390 under TSO and in batch mode, print files need not be predefined in the JCL. Provided they are defined by subparameter AM=STD, they can be allocated dynamically during the session by a Natural program using the DEFINE statement or application interface USR2021 (in library SYSEXT).

This document covers the following topics:

- PRINT Parameter Syntax
- NTPRINT Macro Syntax
- Keyword Subparameters for All Environments
- Keyword Subparameters for AM=STD in All Environments
- Keyword Subparameters for AM=STD in OS/390 Environments
- Keyword Subparameters for AM=STD in VSE/ESA Environments
- Keyword for AM=STD in BS2000/OSD Environments
- Keyword Subparameters for AM=CICS
- Keyword Subparameters for AM=COMP (Com-plete)
- Keyword Subparameters for AM=SMARTS (Com-plete)
- Keyword for AM=IMS
- Keyword Subparameters for DEFINE PRINTER Statement

See also Print and Work File Handling with External Datasets in a Server Environment in the Natural Operations for Mainframes documentation.

PRINT Parameter Syntax

With the PRINT parameter, you first specify one or more logical print file numbers, and then several keyword subparameters, which define the characteristics for these print files:

```
PRINT=((print-file-numbers),keyword-subparameters,...)
```


print-file-numbers

The file numbers must be specified first and enclosed in parentheses. The numbers can be from 0 to 31. They can be specified in any sequence. Multiple numbers must be separated from one another by commas or blanks. To specify a range of numbers, you can use a hyphen (-).

keyword-subparameters

The various types of keyword parameters are described below.

For print files with different characteristics, you specify different PRINT parameters. If any previous definition (or default) for the same print file exists, only the values for the specified keyword subparameters are overwritten, all other values remain unchanged.

Examples:

```
PRINT=((2,12,18),AM=STD,DEST='PRINT**',OPEN=INITOBJ,CLOSE=CMD)
PRINT=((1,3,6-11,15),AM=NAF)
PRINT=((0),AM=STD,DEST=HARDCOPX)
```

NTPRINT Macro Syntax

With an NTPRINT macro, you first specify one or more logical print file numbers, and then several keyword subparameters which define the characteristics that are to apply to these print files:

```
NTPRINT (print-file-numbers),keyword-subparameters,...
```

print-file-numbers

The file numbers must be specified first and enclosed in parentheses. The numbers can be from 0 to 31. They can be specified in any sequence. Multiple numbers must be separated from one another by commas. To specify a range of numbers, you can use a hyphen (-).

keyword-subparameters

The various types of keyword subparameters are described below.

For print files with different characteristics, you specify different NTPRINT macros. If any previous definition (or default) for the same print file exists, only the values for the specified keyword subparameters are overwritten, all other values remain unchanged.

Examples:

```
NTPRINT (2,12,18),AM=STD,DEST='PRINT**',OPEN=INITOBJ,CLOSE=CMD
NTPRINT (1,3,6-11,15),AM=NAF

NTPRINT (0),AM=STD,DEST=HARDCOPX
```


Keyword Subparameters for All Environments

The following keyword subparameters are available: AM | DEST | OPEN | CLOSE | ROUTE

AM - Type of Access Method

AM=*xxx* specifies the type of access method to be used.

For an online session, all print files to be used have to be assigned to a specific access method.

For a batch session, any print files not assigned to a specific access method will be automatically detected and assigned by the standard batch access method (AM=STD), provided that they have been predefined in the JCL. See also profile parameter FAMSTD (overwriting of print and work file access method assignments).

Value	Meaning
STD	Standard sequential batch files (batch, TSO, TIAM, VM/CMS OS simulation).
CMS	CMS disk and SFS files.
COMP	Com-plete print files.
CICS	CICS transient data or temporary storage.
NAF	Natural Advanced Facilities.
IMS	IMS/TM destinations.
PC	Entire Connection.
USER	Third-party vendor print interface.
SMARTS	SMARTS print file.
ESS	Entire System Server.
OFF	Unassigned. No automatic assignments if FAMSTD=OFF is set.
0	Unassigned. Automatic assignments if FAMSTD=OFF is set. This is the default value.

Note:
PRINT=OFF is equivalent to: PRINT=((1-31)), AM=OFF).
It does not affect any of the other keyword subparameter specifications.
`PRINT=((0),AM=`*`xxx`*`)` or `NTPRINT (0),AM=`*`xxx`* determines the hardcopy print access method and is equivalent to the profile parameter HCAM=*xxx*.

DEST - External Dataset Name

DEST=*name* specifies the print destination (1 - 8 characters).

This corresponds to the OUTPUT value of the DEFINE PRINTER statement (and can be overwritten by a DEFINE PRINTER OUTPUT specification).

The meaning of this keyword subparameter depends on the access method.

Access Method	Meaning of DEST
AM=STD	DEST is the logical dataset name (DDNAME, LINK name, DTF name). If the destination is to be for multiple files, two asterisks (**) have to be specified for the file number. These will be replaced by the corresponding logical file number for each print file. A DEST value including two asterisks must be enclosed in apostrophes when it is used as a dynamic parameter. The default value is DEST='CMPRT**' for IBM and DEST='P**' for SIEMENS environments. Under VSE/ESA only 7-character names are supported.
AM=CICS	There is no default value for print files under CICS. Here, the DEST subparameter is mandatory, that is, CICS print files defined without a valid DEST specification are ignored. The Natural CICS interface also supports a variable (see TERMVAR parameter in the NCIPARM generation macro; &TID is the default) as part of the DEST value which, when being specified, is replaced by the actual CICS terminal ID. See also Natural Print and Work Files under CICS in the Natural TP Monitors documentation.
AM=CMS	For usage of DEST under CMS, refer to Natural under VM/CMS (in the Natural Operations for Mainframes documentation).
AM=IMS	Specifies the IMS/TM destination.

Note:
`PRINT=((0),DEST=`*`xxx`*`)` or `NTPRINT (0),DEST=`*`xxx`* determines the hardcopy print destination and is equivalent to the Natural profile parameter HCDEST=*xxx*.

OPEN - Time of File Opening

OPEN=*xxx* determines when the file is to be opened:

Value	The file is opened
INIT	for output at session initialization.
OBF	according to the default OPEN value for the different environments (batch, CICS, Com-plete, TSO).
OBJ	when the execution of the first object which accesses the file starts. This is the general default, except for AM=COMP and AM=IMS.
OBJ1	when the execution of the first object on Level 1 that accesses the file starts. Otherwise, it is opened when it is first accessed.
ACC	when it is first accessed by a statement. This is the default for AM=COMP and AM=IMS.
INITOBF	for output at session initialization. Any subsequent re-opening of the file sets the default OPEN value for the different environments (batch, CICS, Com-plete, TSO).
INITOBJ	for output at session initialization. Any subsequent re-opening of the file will be performed when the execution of the first object which accesses the file starts.
INITOBJ1	when the execution of the first object on Level 1 that accesses the file starts. Otherwise, it is opened when it is first accessed.
INITACC	for output at session initialization. Any subsequent re-opening of the file will be performed when it is first accessed by a statement.

CLOSE - Time of File Closure

CLOSE=*xxx* determines when the file is to be closed:

Value	The file is closed
OBJ	either when processing of the object in which it was first accessed is finished or when command mode, NEXT mode or MAINMENU is reached.
CMD	when command mode, NEXT mode or MAINMENU is reached. This is the default for AM=NAF, AM=COMP and AM=IMS.
FIN	at session end (this is the default for AM=STD). With CLOSE=FIN, a DEFINE PRINTER PRINTER statement causes an error if the printer was opened already. A CLOSE PRINTER statement for the printer is ignored.
USER	only if the file is open and one of the following conditions is true: • a CLOSE PRINTER statement is issued, • a DEFINE PRINTER statement is issued, • the session terminates.

ROUTE - Logical Print File Routing

Route=*xxx* determines whether logical print file routing is done according to the OUTPUT clause of the DEFINE PRINTER statement.

ON	Print file routing is done. This is the default value.
OFF	No print file routing is done.

Print file routing means that, if the name defined in the OUTPUT clause of a DEFINE PRINTER statement denotes a print file destination which is defined by a different logical printer, all print output is routed to this print file.

NTPRINT Keyword Subparameters for AM=STD in All Environments

The following keyword subparameters are available: RECFM | BLKSIZE | LRECL | TRUNC | PAD | PADCHRO | ASA

RECFM - Default Record Format of Dataset

RECFM=*xxxx d*etermines the default record format of the dataset.

The following formats are supported:

F	Fixed
V	Variable
U	Undefined
B	Blocked
S	Spanned
A	ASA
M	Machine control characters

The following values and also combinations of values are possible:

Possible value:	F, FA, FM, FB, FBA, FBM, V, VA, VM, VB, VBA, VBM, VBS, VBSA, VBSM, U, UA, UM.
Default value:	RECFM=VBA (variable blocked with ASA).

The RECFM specification only applies if no record format is predefined in the JCL or (OS/390 only) in the dataset DCB.

BLKSIZE - Default Block Size of Dataset

BLKSIZE=*nnnnn* determines the default block size (in bytes) of the dataset.

Possible values:	0, or 8 to 32767.
Default value:	1016.

The BLKSIZE specification only applies if no block size is predefined in the JCL or (OS/390 only) in the dataset DCB.

LRECL - Default Record Length of Dataset

LRECL=*nnn d*etermines the default record length (in bytes) of the dataset.

Possible values:	0, or 5 - 254.
Default value:	0

This subparameter is used particularly to check for truncation and padding.

For RECFM=V (B) the LRECL value includes a 4-byte record descriptor word.

If LRECL = 0 is defined, the following applies:

- With RECFM = V (B), LRECL defaults to the minimum of BLKSIZE-4 and 254.
- With RECFM = U, LRECL defaults to BLKSIZE.
- With RECFM = F (B), the maximum record length in the Natural program being executed is taken when the file is opened. If no record length from a program is available when the file is opened, for example with OPEN=INIT, a record length of 132 is taken (plus 1 for ASA or a machine control character and/or plus 4 for a record-descriptor word if the record format is variable).

The LRECL specification only applies if no record length is predefined in the JCL or (OS/390 only) in the dataset DCB.

TRUNC - Truncation of Output Records

TRUNC=*xxx* determines whether the output records are truncated:

ON	Output records that are longer than the record length (LRECL) of the dataset will be truncated. This is the default value.
OFF	Error NAT1512 will be issued if an output record is longer than the dataset record length.

PAD - Padding of Output Records

PAD=*xxx* determines whether the output records are padded or not (applies only to datasets of fixed record length):

ON	Output records that are shorter than the record length (LRECL) of the dataset will be padded with padding characters defined by keyword subparameter PADCHRO. This is the default value.
OFF	Error NAT1510 will be issued if an output record is shorter than the dataset record length.

PADCHRO - Padding Character of Output Records

This subparameter defines the character which is used for padding if PAD=ON is defined for the print file.

Possible values:	*'x'* *x'xx'*	(one character *x* within single quotes) (one hex character *xx*)
Default value:	' '	(blank or *x*'40')

ASA - Use of ASA Record Format

ASA=*xxx* determines whether the ASA record format is used.

ON	An ASA character is included in the output print records. Under OS/390, this enforces ASA record format, regardless of the RECFM setting in the DCB or the RECFM subparameter. This is the default value.
OFF	No ASA character is included in the output print records. Under VSE/ESA batch access method (AM=STD), a valid ASA character must be supplied in column one of the output record if the output file is a spool file, otherwise error NAT1530 will be issued.

Keyword Subparameters for AM=STD in OS/390 Environments

The following keyword subparameters are available: REREAD | FREE | BUFNO | DISP | VMAX

REREAD - Closing of Tape File Datasets

REREAD=*xxx* sets the REREAD option for the closing of the tape file:

ON	The REREAD option is set for the CLOSE SVC. This causes the volume to be repositioned to reprocess the dataset . This is the default value.
OFF	The REREAD option is not set for the CLOSE SVC.

FREE - Dataset De-allocation at File Closure

FREE=*xxx* determines whether the dataset is de-allocated when the file is closed:

ON	The FREE option is set for the CLOSE SVC, which means that the dataset is de-allocated when it is closed (and not at step termination).
OFF	The FREE option is not set for the CLOSE SVC . This is the default value.

BUFNO - Default Number of OS/390 I/O Buffers of Dataset

BUFNO=*nnn* defines the default number of OS/390 I/O buffers of the dataset.

Possible values	0 - 255.
Default value	0. In this case, OS/390 allocates five I/O buffers per default.

The number of I/O buffers can improve the performance of print file access dramatically. Note that the storage for I/O buffers is allocated below the 16 MB line.

The BUFNO specification applies only if the BUFNO parameter is not specified in the JCL for the dataset.

DISP - Open Print File for Modification

DISP=*xxx* determines whether the print file is opened for modification.

This corresponds to the JCL DD statement subparameter DISP=MOD.

MOD	New records are added at the end of the file.
NOMOD	The print file is rewritten from the start. This is the default value.

VMAX - Control LRECL for Variable Record Format

VMAX=*xxx* controls the LRECL setting for an output file with variable record format (RECFM=V).

ON	Providing a nonzero BLKSIZE value exists for the file, VMAX=ON sets LRECL=BLKSIZE-4 for variable record format, regardless of the LRECL setting in the DCB or the LRECL subparameter.
NAT	LRECL is set to the length +4 of the largest record in the application program if this value is less than LRECL in the DCB for the dataset.
OFF	LRECL from the DCB for the dataset or the LRECL subparameter is used. This is the default value.

PRINT Keyword Subparameters for AM=STD in VSE/ESA Environments

The following keyword subparameters are available: SYSNR | LABEL | REWIND

SYSNR - Logical VSE SYS Number

SYSNR=*nn* determines the logical VSE SYS number.

Possible values:	1 - 99.
Default value:	By default, the SYS number is print file number plus 40 for print files 1 - 31; for print file 0, that is the hardcopy printer, the default is SYSLST. **Example:** The VSE default SYS number for print file 11 is 11 + 40 => SYS051.

LABEL - Tape Label Processing

LABEL=*xxx* determines the tape label processing:

ON	The tape is in standard label format . This is the default value.
OFF	The tape is unlabeled with front tape mark.
NOTM	The tape is unlabeled without front tape mark.

REWIND - Action at File Closure

REWIND=*xxx* determines the action to be taken when a tape file is closed:

ON	The tape is rewound when the file is closed . This is the default value.
OFF	The tape is not rewound when the file is closed.
UNLOAD	The tape is unloaded when the file is closed.

PRINT Keyword Subparameters for AM=STD in BS2000/OSD Environments

The following keyword subparameter is available: DISP

DISP - File Open Mode

DISP=*xxx* determines the open mode of the file:

EXT	The open mode is set to EXTEND.
NOEXT	The open mode is set to the default value OUTPUT. This is the default value.

PRINT Keyword Subparameters for AM=CICS

The following keyword subparameters are available: TYPE | DISP

TYPE - Type of CICS Storage Medium

TYPE=*xxxx* specifies the type of CICS storage medium to be used:

MAIN	Temporary main storage.
AUX	Temporary auxiliary storage.
TD	Transient data.

The default value used depends on the DEST parameter setting. If the DEST subparameter value matches a valid CICS transient data queue, the TYPE subparameter defaults to TD, otherwise MAIN will be taken as the default value.

DISP - CICS Temporary Storage Queue Disposition

DISP=(*xxx*,*xxx*) specifies the CICS temporary storage queue disposition.

Possible value pairs are:

(NEW,KEEP)	The storage queue is deleted when the file is opened. This is the default value.
(NEW,DELETE)	The storage queue is deleted when the file is opened and when it is closed.
(OLD,DELETE)	The storage queue is deleted when the file is closed.
(OLD,KEEP)	The storage queue is not deleted.

Note:
The DISP specification does not apply to CICS extra-partition transient data queues.

PRINT Keyword Subparameters for AM=COMP (Com-plete)

The following keyword subparameter is available: DRIVER

DRIVER - Name of Com-plete Print Driver

DRIVER=*name* specifies the *name* of the Com-plete print driver to be used.

PRINT Keyword Subparameters for AM=SMARTS (Com-plete)

The following keyword subparameter is available: DEST

DEST - Logical Printer

DEST=*print-server-queue*	The environment variable SAG_APS_LPD_*xyz* defines a logical printer under complete, where *xyz* is the name of the print server queue. If the environment variable SAG_APS_LPD_*xyz* exists for the specified DEST, the output is directly routed to that line printer. For more information, see the *Complete Initialization and Startup Manual*, section *Defining Terminals and Printers*.
DEST=*printer-file-name*	If no print server queue for that printer is available, DEST specifies a printer file name. It specifies the location of the output file in the file system. The name of the output file is generated from the userId and a sequence number. Since the DEST clause is restricted to an 8 character maximum, it is useless to define a file with absolute PFS path specification. The name specified in the DEST clause is relative to the print file root directory. The print file root directory is specified with the environment variable NAT_PRINT_ROOT.

Example:

```
NAT_PRINT_ROOT=/nat/printer
DEST=printer1
UserId=xyz
```

The first output will be written to file /nat/printer/printer1/xyz1.

To specify a file with absolute path definition, the OUTPUT clause of the DEFINE PRINTER statement must be used.

PRINT Keyword Subparameters for AM=IMS

The following keyword subparameters are available: BLKSIZE | DRIVER

BLKSIZE - Size of the Print Buffer

BLKSIZE=nnnnn specifies the size of the print buffer sent to the IMS/TM destination.

DRIVER - Name of Natural IMS Print Driver

DRIVER=*name* specifies the *name* of the Natural IMS print driver to be used.

For possible values, see NIMPARM Macro Parameters and Support of the Natural WRITE (*n*) Statement in the section Natural under IMS/TM in the Natural TP Monitor Interfaces documentation.

PRINT Keyword Subparameters for DEFINE PRINTER Statement

With the following keyword subparameters, you can set default values for the DEFINE PRINTER statement options of the same names (see the Natural Statements documentation). When a printer is closed, all DEFINE PRINTER statement options are reset to their default values.

The following keyword subparameters are available: PROFILE | NAME | FORMS | DISP | COPIES | CLASS | PRTY

PROFILE - Name of Printer Control Characters Table

PROFILE=*name* specifies the *name* of printer control characters table (NTCCTAB macro).

NAME - Name of Listing

NAME=*name* specifies the listing *name*.

FORMS - Name of Listing Forms

FORMS=*name* specifies the listing forms *name*.

DISP - Listing Disposition

DISP=*disposition* specifies the listing *disposition* (HOLD, KEEP, DELETE or LEAVE).

COPIES - Number of Copies

COPIES=*nnn* specifies the number of copies to be printed (1 - 255).

CLASS - Spool Class

CLASS=*class* specifies the spool class (1 byte).

PRTY - Listing Priority

PRTY=*nnn* specifies the listing priority (1 - 255).

