

Double-Byte Character Sets

This section is only relevant for Asian countries which use double-byte character sets. It describes all features implemented in Natural to support DBCS terminals and printers and covers the following topics:

- FACOM Operating System
- Natural Profile Parameters SO and SI
- Internal CALL Features
- Output Format Specification
- Window Control
- Parameter Definitions for DBCS Support

Natural Execution - Miscellaneous - Other Topics:

Asynchronous Processing | Input/Output Devices | Back-End Program Calling Conventions | Natural 31-Bit Mode Support | LE Subprograms | External SORT

FACOM Operating System

Because of the different environments where DBCS is supported, Natural distinguishes between standard IBM support and FACOM support. This implies that the Natural system variable *OPSYS contains the value "FACOM" when the corresponding flag is set, and that the values "TSS" and "AIM/DC" can be set for the system variable *TPSYS. It is the task of the FACOM drivers to set the flags accordingly.

Natural Profile Parameters SO and SI

To support DBCS in mixed fields, two delimiter parameters (shift codes) are available in the Natural parameter module and also as dynamic profile parameters. All DBCS fields are embedded in these delimiters called SI (shift-in) and SO (shift-out). They can be used to pass the values of the shift-in and shift-out codes used in the current environment to Natural.

Both parameters accept a two-byte hexadecimal value, for example, "SO=0E, SI=0F". They can be used to establish either the IBM or the Fujitsu shift codes.

Remember that it is strongly recommended to use the IBM characters "0F" and "0E" internally. With this technique, all applications and data can be handled in a compatible manner, which means that a network supporting different mainframe types can still use the same Natural applications and process the same data.

For detailed information on these parameters, see SI and SO.

Internal CALL Features

The following callable features have been implemented in Natural to support DBCS handling:

```
CALL 'CMMPP' 'SOSI' 'x' field
```

where "x" can be:

T	which indicates that a normal Latin string is converted into the corresponding DBCS string;
F	which indicates that a DBCS string that contains Latin data only is converted to a single-byte string;
+	which indicates that the current shift codes are added at the beginning and at the end of the data in the parameter field, whereby it is guaranteed that the number of bytes enclosed is an even number;
-	which means that leading and trailing shift codes are removed from the data in the parameter field.

The last two functions can be used to either produce native DBCS strings or generate mixed-mode data out of native DBCS strings.

Output Format Specification

The Natural print mode specification "PM=D" is used to define native DBCS fields; that is, DBCS fields without shift codes (SO/SI). The fields with this format are enclosed with special attributes, depending on the environment.

For IBM terminals, the attribute X'43F8' is added to identify a "PM=D" field. For Fujitsu, the required SO/SI codes are added at the beginning and at the end of the data.

Window Control

One of the frequently-used features of Natural is the window technique for pop-up helps and information windows. These windows might destroy DBCS data already on the screen or might contain DBCS data which are truncated because of the window size.

Especially for cases in which fields are truncated in a way that the leading SO character is still present, but the terminating SI character is missing, a feature has been implemented in Natural which always sorts the generated window into the existing screen image. This allows Natural to control all data in the screen buffer.

With the DBCS flag set, an additional routine is activated which analyzes and adapts or corrects invalid DBCS data. The following checks are performed:

PM=D	If the PM session parameter is set to "D", the field length is checked for an even number of bytes. In the case of an odd number of bytes, the illegal byte is replaced with a dummy attribute, depending on whether the truncation has occurred at the front or at the end of the field.
SO/SI	With alphanumeric (non-repeatable) fields, the data are scanned for SO and SI characters. If a leading SO character is found but no terminating SI character, the last or the last but one character is replaced by the SI character or the SI character plus a blank character respectively, depending on an odd or even number of characters. If an SI character is found before an SO character has been encountered, a leading SO character or a leading blank character plus an SO character is written at the beginning of that field, depending on the number of bytes in the enclosed DBCS field.

Parameter Definitions for DBCS Support

The following parameters must be specified in the setup for Natural for the support of double-byte character sets:

Parameter	Explanation
TS=ON	If Latin lower-case characters are not available, this parameter translates all Natural system output using the translation table defined by the macro NTTABL in NATCONFIG.
TQ=OFF	Does not translate double quotes into single quotes.
	If TQ is not set to OFF and the Natural syntax checker processes a Natural program, Natural translates all hexadecimal X'7F' codes into X'7D' codes, even if these codes appear in DBCS strings.
SI=0F/29	Is the definition of the DBCS shift-in value as used from the current terminal.
SO=0E/28	Is the definition of the DBCS shift-out value as used from the current terminal.
LC=ON	Does not translate all input data to uppercase, which again would destroy possible DBCS input data.