



TPS3

**System
Definition**

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VSUB

VALIDATION SUBR : DEFINE A VALIDATION SUBROUTINE

DESCRIPTION Definition of a user-written validation or check-digit subroutine to be used in conjunction with the validation facilities of the Logical Terminal Interface

KEYWORD AND QUALIFIER DETAILS

Long Keyword VALIDATION SUBR

Short Keyword VSUB

Qualifier Subroutine name

Subroutine name

Enter the name of the user-written validation or check-digit subroutine; up to 12 alpha-numeric characters.

The user-written validation subroutine is identified by its subroutine name; i.e. the name to be used by the TPS validation software when calling the routine. This name should consist of up to 12 alpha-numeric characters, with the first character alphabetic.

The writing of user validation subroutines is discussed in the TPS Programming Manual, Part 1, Section 3.2.1.4.

Example of Keyword and Qualifier

The Validation Subroutine CUSTVAL is to be defined.

Enter : VALIDATION SUBR.CUSTVAL
 or VSUB.CUSTVAL

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SCREEN DISPLAYED IN RESPONSE TO KEYWORD/QUALIFIER ENTRY

]

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Enter Keyword.Qualifier [VALIDATION SUBR.XXXXXXXXXXX

[

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Press 'SEND' to Set up Record..[Y]

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COMPLETING THE VALIDATION SUBROUTINE SCREEN

To delete an existing Validation Subroutine, enter 'D' in the second Header Area field. Note that it is not possible to delete a validation subroutine which is referenced by Validation Rules (VALR) or Standard Rules (VALS).

To record a new validation subroutine, press send.

As the record of the validation subroutine merely records the Qualifier name, there is no amendment facility for this keyword.

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ACTION BY THE SYSTEM ON RECEIPT OF THE VALIDATION SUBROUTINE SCREEN

The input is checked to ensure that it is valid. Where an error is detected an appropriate error message is displayed on line 1, and the cursor positioned at the first field in error.

Where the input is correct, the System Definition File is updated, and the message 'CONFIRMED' displayed on line 1.

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DISP

DISPLAY LAYOUT : DEFINE PARAMETERS FOR OUTPUT DISPLAY

DESCRIPTION Definition of output display parameters for the Logical Terminal Interface; used in conjunction with the TPS program interface request TPSCDISPLAY.

KEYWORD AND QUALIFIER DETAILS

Long Keyword DISPLAY LAYOUT

Short Keyword DISP

Qualifiers

1. Format Identifier
2. Device Type
3. Set Number

1. Format Identifier

Enter three or four alphabetic characters

This is the Format Identifier of the format for which the output display parameters are to be defined. The format must be present on the System Definition file (to define the format, see Keyword FORMAT).

2. Device Type

Used to identify different versions of the same format. Enter one of the following values: 7181, 1020, 2020, DDE, CONS, NST1-9; or leave blank.

This identifies the version of the format for which the output display parameters are to be defined. A Device Type is usually only present if the system is to support mixed terminal devices which require different versions of the same format. The device type may be one of the following:

- 7181 - for devices handled according to standard 7181 procedures (this is the default if omitted).
- 1020 - Incoterm 1020 devices
- 2020 - Incoterm 2020 devices
- DDE - Direct Data Entry Keystations

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CONS - Central console

NST1-9 - Non-standard devices.

The format/device type combination specified must be present on the System Definition file. (To define the format, see keyword FORMAT).

3. Set Number

Enter a number in the range 1 to 63.

The set number identifies the version of the display layout to be defined or amended. This allows for the display of alternative selections of variable data onto a single format. Up to 63 different display layouts to be defined for a single format/device; each is identified by a number in the range 1 to 63.

Example entry of keyword and qualifiers

The first Display Layout set for the 7181 format DBQA is to be defined.

Enter: DISPLAY LAYOUT.DBQA/7181/1
or DISP.DBQA/7181/1
or DISP.DBQA//1

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SCREEN DISPLAYED IN RESPONSE TO KEYWORD/QUALIFIER ENTRY

]

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Enter Keyword.Qualifier [DISPLAY LAYOUT.XXXX/XXXX/nm
[

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Enter substitute characters for:

		Saved for XPRE
Standard messages....[@]	[]	
Text for XRES.....[]	[]	
Text.....[*]	[]	
Text.....[]	[]	(may be necessary if fields are adjoining)
Zero length entry....[]		
Final cursor.....[<]		

The values displayed in the unprotected areas are from the System Definition file if the Display Layout is already present or is being created from an existing layout.

When inserting a new layout the default values shown on the screen above are displayed.

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COMPLETING THE DISPLAY LAYOUT CONTROL SCREEN

To delete an existing Display Layout, enter 'D' in the second Header Area Field. Otherwise complete the Definition Area fields as described below.

1. Substitute characters for standard messages

Parameter name: STD MESSAGE SUBS

Enter the substitute character to be used to represent the position of a standard message, or leave blank.

One or two substitute characters may be used to represent the positioning of standard messages within the display layout; two substitute characters are required to differentiate between messages which are to be saved for XPRES, and those which are for display only. If a substitute is entered, this must be a character within the standard ICL 64-character set (lower case substitute characters if entered are automatically converted to upper case), and must not be the same as any other substitute character specified, nor the same as any character included within the format definition.

2. Substitute characters for text to be saved for XRES.

Parameter name: XRES TEXT SUB

Enter the substitute character to be used to represent text to be saved for XRES, or leave blank.

The XRES facility provides for the definition of a single text field to be displayed with the XRES format. A single substitute character may therefore be specified for restart formats, to define the text field which is either to be saved for XRES only, or for both XRES and XPRES. If a substitute is entered, this must be a character within the standard ICL 64-character set (lower case substitute characters if entered are automatically converted to upper case), and must not be the same as any other substitute character specified, nor the same as any character included within the format definition.

3. Substitute characters for text

Parameter name: TEXT SUBS

Enter the substitute character to be used to represent a text field, or leave blank.

Up to four substitute characters may be used to represent the positioning of text fields within the display layout; these are required to differentiate between text fields which are to be saved for XPRES and those which are for display only, and between adjoining

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text fields. If a substitute is entered, this must be a character within the standard ICL 64-character set (lower case substitute characters if entered are automatically converted to upper case), and must not be the same as any other substitute character specified, nor the same as any character included within the format definition.

4. Substitute character for zero length entry.

Parameter name: ZERO ENTRY SUB

Enter the substitute character to be used to represent a zero length entry, or leave blank.

Where control characters (e.g. for start of an unprotected 'flashing' area) are to be displayed with no associated text, a "zero-length entry" has to be defined, using a specified substitute character. If a substitute is entered, this must be a character within the standard ICL 64-character set (lower case substitute characters if entered are automatically converted to upper case), and must not be the same as any other substitute character specified, nor the same as any character included within the format definition.

5. Substitute character for final cursor position

Parameter name: FINAL CURSOR SUB

Enter a substitute character to represent the final cursor position, or leave blank.

The final cursor position for display of the output may be specified by the use of a substitute character. If no substitute is specified, the final cursor position will be according to the last variable field specified: i.e. following the last text field, or at the final cursor position associated with the last standard message, if this is the final element output, or at the final cursor position associated with the format if no variable elements are included in the display.

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DISP**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED DISPLAY LAYOUT CONTROL SCREEN**

The input fields are validated; where an error is found, an appropriate error message is displayed on line 1, and the cursor positioned at the first field in error.

Where all details entered are valid, the action taken is as follows:

- the appropriate Format is retrieved from the System Definition file and displayed as an entirely unprotected screen, with start of unprotected and protected fields replaced by the substitute characters nominated when the format was set up.
- where a Display Layout is being amended (or created from an existing Layout), the appropriate System Definition record is retrieved and the text and standard message details previously entered are superimposed on the format, using the substitute characters specified. The text/message details are displayed in the order in which they were recorded until an element is detected which is position before the preceding element on the screen. (The remaining elements will be displayed later in a further version of the format).
- where deletion of a Display Layout is requested, the appropriate System Definition record is retrieved and all text and standard message details previously entered are superimposed on the format using the substitute characters specified.

Note that no updating of the System Definition file occurs at this point.

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DISP

COMPLETING THE DISPLAY LAYOUT DEFINITION SCREEN

If on display of the requested screen it is apparent that an error has been made and the current insertion or amendment request is to be abandoned, *R is typed in the first two character positions of the screen for a return to the previous standard System Definition screen with no updating of the System Definition file.

Where deletion has been requested, press send to delete the Display Layout.

When entering a new display layout, enter details of the text and standard messages to be output using the substitute characters specified. The details must be defined in the order in which the elements are to appear within the data area defined in the COBOL A.R. which requests the output with function TPSCDISPLAY. Where the elements are defined in the order in which they appear on the screen, all may be specified on the first copy of the screen format displayed. Otherwise elements are defined until one occurs which appears at a screen position preceding the previous element. This and any other remaining elements may subsequently be defined when a further version of the format is presented. Note that if an output display is to consist of the format only, no details need be entered: just press send to update the System Definition file.

When amending a display layout, or creating a new layout from an existing one, alter the displayed details as required. Elements may be removed from the layout by replacing the displayed substitute characters by spaces. Before sending, ensure that the cursor is repositioned after the last data element specified on the screen (or at SOM); if this is not done, elements specified after the cursor will be "lost". The elements are defined in the order in which they are held within the COBOL area; note that the facility for definition of the elements over several screen displays allows data to be reordered in the display without alteration of the COBOL application code.

The substitute details to be entered are as follows:

Standard messages: enter a single character only, to indicate the position of the first character of the standard message.

Text fields: enter substitute characters to represent the position and length of the text field (i.e. enter substitute characters in consecutive screen positions to represent the number of displayable characters within the text). Two different substitute characters are allowed to differentiate between adjoining text fields.

Text for XRES: a single text field may be nominated for use with the XRES function (see System Design Manual, Part 1, Section 8 for the significance of this).

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Zero length entry: a zero length entry is specified where there is a requirement for the output of control characters with no associated text or standard message (e.g. to set an unprotected field 'flashing'). The zero length entry is represented as a single occurrence of the substitute character which must be present at the screen position following that at which the control character is to appear.

Any text field or standard message may be nominated to be saved for use with the XPRE function by the use of an alternative substitute character. The purpose of the XPRE function is to redisplay the previous screen transmitted to the sending terminal. The use of the XPRE feature with the Logical Terminal Interface is described in the Programming Manual, Part 1, Section 3.2.2.4.

When all elements have been defined (on one or more versions of the screen format) *R is typed in the first two character positions of the screen to indicate that the definition of the Display Layout is now complete.

(Note that the definition screens may be considered as an additional parameter for keyword DISP, with a parameter name of DATA).

Example

A screen includes 3 data elements, defined in the COBOL data area in the following order:

- text field at line 5, column 20
- text field at line 10, column 20
- standard message at line 2, column 40

The following screens will be required to define the Layout.

1. Define two text fields
2. Define standard message
3. Enter '*R' to complete layout.

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ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED DISPLAY LAYOUT DEFINITION SCREEN

The details entered are checked, and an appropriate error message displayed on line 1 if an error is detected.

Where the details entered are correct, the System Definition file is updated. For deletion, the standard S.D. screen is returned with the message 'CONFIRMED' on line 1. For insertion or amendment another display of the screen format is returned for entry of further display layout elements. For amendment of a Layout (or creation of a new layout from an existing one) any further elements present in the appropriate System Definition record are superimposed on the format output.

When the end of definition indicator is entered by entry of '*R' the standard S.D. screen is returned with the message 'CONFIRMED' on line 1.

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FORM

FORMAT : DEFINE SCREEN FORMAT

DESCRIPTION Definition of a Screen Format which will be held in the format file.

KEYWORD AND QUALIFIER DETAILS

Long Keyword FORMAT

Short Keyword FORM

Qualifiers

1. Format Identifier
2. Device Type.
3. Operating System

1. Format Identifier

Enter three or four alphabetic characters.

Each format is recognised by an Identifier consisting of three or four alphabetic characters (the first three of which are significant). For formats associated with User Functions each of the first three characters must be in the range A to W; formats which have the same first letter are considered by the system to form an "Application"; formats which have the first two characters in common form a "Transaction Group". These logical groupings have significance in Authority Control.

Format Identifiers commencing with X, Y and Z are provided to implement systems functions:

"X" functions are general system functions, available to all terminals

"Y" functions are for "inflight" engineering tests and other test functions

"Z" functions are control functions, available at Supervisor, System and Master terminals only.

2. Device type

Used to identify different versions of the same format. Enter one of following values: 7181, 1020, 2020, DDE, CONS, NST1-9; or leave blank.

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If the system is to support mixed terminal devices with different versions of the same format the versions are identified by a device type. This may be one of the following:

- 7181 - for devices handled according to standard 7181 procedures (this is the default if omitted).
- 1020 - Incoterm 1020 devices
- 2020 - Incoterm 2020 devices
- DDE - Direct Data Entry Keystations
- CONS - Central Console
- NST1-9 - Non-Standard devices.

When output of a format is requested, the version transmitted is that with device type corresponding to the type of the receiving terminal if present, or alternatively the version of the format defined without a device type.

3. Operating System

Used to identify the required version of certain TPS formats. Enter one of the following values: JCL, G2, G2+, G2+D; or leave blank.

Certain of the TPS formats within the Interactive Development System are available in different forms for each of the operating systems supported by IDS. For these formats the operating system qualifier must be specified; for all other formats this qualifier should be left blank.

The operating system may be one of the following:

- JCL - 2903 Range JCL
- G2 - George 2
- G2+ - George 2+
- G2+D - George 2+DOF

Note that in any system only one version of the format may be specified for each format identifier/device type.

Example entry of keyword and qualifier

The format with identifier BACC is to be set up in a special version for Direct Data Entry workstations.

Enter: FORMAT.BACC/DDE
or FORM.BACC/DDE

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This format is very similar to the format DACC which is set up in a single version only.

To create BACC from DACC enter in second field:

FORMAT.DACC
or FORM.DACC
or .DACC

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FORM

SCREEN DISPLAYED IN RESPONSE TO KEYWORD/QUALIFIER ENTRY

]

TPS3 System DefinitionEnter Keyword.Qualifier [FORMAT.XXXX/XXXX/XXXX
[

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Enter 'Y' For Automatic Validation.....[]
 Store Format.....[]
 Clear Screen.....[]
Control Sequence.....[]

Substitute Characters:

Final Cursor.....[] or Line [] Column []

New Line.....[]

Steady Flashing

Unprotected Fields.....[[] []

Protected Fields.....[] []

Fields with Validation.....[] []

Enter 'Y' if Space Compression Required.[Y]

If so, Enter Compressible Space [] or Non-compressible Space []

No. of Syncs Required After.....Line [] Column [] Both []

The values displayed in the unprotected areas are from the System Definition file if the format is already present or is being created from an existing format. When inserting a new format the default values shown on the screen above are displayed.

COMPLETING THE FORMAT CONTROL SCREEN

To delete an existing format, enter 'D' in the second Header Area field. Otherwise complete the Definition Area as described below.

1. Automatic Validation

Parameter name: AUTOMATIC VALIDATION

Enter 'Y' for Automatic Validation of Input, or leave blank.

If the input from the 'expected message' for this format/device is to be automatically validated and reformatted by TPS before passing control to the first user Application Routine, enter 'Y'. If this is entered 'Set 1' Validation Parameters must also be set up for the format/device (see short keyword VALH). Leave blank if Automatic Validation not required.

2. Store format

Parameter name: STORE FORMAT

Leave blank: will be implemented in a later release of the software.

3. Clear screen

Parameter name: CLEAR SCREEN

Enter 'Y' if the control characters for clear screen are to be inserted at the start of the format, or leave blank.

If 'Y' entered, the control characters '^;5' followed by twenty four synchronisation codes '^6' are inserted at the start of the format to clear the screen.

4. Control sequence

Parameter name: CONTROL SEQUENCE

Enter SMnn to define mode of operation for use with front-end validation.

To invoke the front-end validation facilities of the ICL 7502 or Tecs 4000, a control sequence is required specifying the mode of operation.

The "mode character" is described in the appropriate manual:

ICL 7502: ICL T.P. 4803, 7500 Systems, Section 5.2.2

Tecs 4000: 4001 System, Section 5.2

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The control sequence is specified in the form SMnn, where nn is the decimal equivalent of the binary mode character required.

5. Final cursor position

Parameter names: FINAL CURSOR SUB
FINAL CURSOR CO-ORD

Enter substitute character or line and column. If neither entered, final cursor defaults to first unprotected field.

The final cursor position for display of the format above may be specified either by entering a substitute character which is used to identify the final cursor position on the following screen, or by entering the required line (range 1-30) and column (range 1-80). If all three fields are left blank the cursor is positioned at the beginning of the first unprotected field after the message identifier (or at line 1, column 1 if no unprotected field present). The substitute character may not be a new-line character or zero, nor may it be the same as any other substitute character specified.

Note that when amending a format the current cursor position is displayed as line and column. These two fields should then be spacefilled to reposition the final cursor if the subsequent format amendment will move the first unprotected field.

6. Substitute character for newline

Parameter name: NEWLINE SUB

Enter the substitute character to represent 'new line' (^*), or leave blank.

When entering a format the 'new-line' character may be used, but on redisplaying the format for amendment it will not be apparent that 'new-line' was originally used. Therefore a substitute character may be chosen to represent 'new-line', ensuring that the 'new-line' is preserved when the format is amended. The substitute character chosen must not be zero or the same as any other substitute character specified. ('New-line' is the character pair '^*' which when displayed out has the effect of spacefilling the remainder of the line from the current cursor position, and repositioning the cursor at column 1 of the following line).

7. Substitute character for 'Start of Unprotected Steady'.

Parameter named: UNPROTECTED SUBS

Enter the substitute character to represent 'start of unprotected steady' (^4), or leave blank.

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The control characters for start of unprotected or protected fields cannot be typed into a video, so substitute characters have to be used when specifying the format. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character specified.

8. Substitute character for 'Start of Unprotected Flashing'

Parameter name: UNPROTECTED SUBS

Enter the substitute character to represent 'start of unprotected flashing' (^3), or leave blank.

The control characters for start of unprotected or protected fields cannot be typed into a video, so substitute characters have to be used when specifying the format. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character specified.

9. Substitute character for 'Start of Protected Steady'

Parameter name: PROTECTED SUBS

Enter the substitute character to represent 'start of protected steady' (^1), or leave blank.

The control characters for start of unprotected or protected fields cannot be typed into a video, so substitute characters have to be used when specifying the format. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character specified.

10. Substitute character for 'Start of Protected Flashing'

Parameter name: PROTECTED SUBS

Enter the substitute character to represent 'start of protected flashing' (^2), or leave blank.

The control characters for start of unprotected or protected fields cannot be typed into a video, so substitute characters have to be used when specifying the format. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character specified.

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11. Substitute character for 'Start of Unprotected steady with Validation'

Parameter name: UNPROTECT VAL SUBS

Enter the substitute character to represent 'start of unprotected steady with validation' (^<), or leave blank.

This is appropriate only where the front-end validation facilities of the ICL 7502 or Tecs 4000 are used. The control characters for start of unprotected or protected fields cannot be typed into a video so substitute characters have to be used when specifying the format. If a substitute is entered, this may not be a new-line character or zero nor the same as any other substitute character entered. In the definition of the format, the substitute character must be followed by a character specifying the validation required.

12. Substitute character for 'Start of Unprotected Flashing with Validation'

Parameter name: UNPROTECT VAL SUBS

Enter the substitute character to represent 'start of unprotected flashing with validation' (^=), or leave blank.

This is appropriate only where the front-end validation facilities of the ICL 7502 or Tecs 4000 are used. The control characters for start of unprotected or protected fields cannot be typed into a video so substitute characters have to be used when specifying the format. If a substitute is entered, this may not be a new-line character or zero nor the same as any other substitute character entered. In the definition of the format, the substitute character must be followed by a character specifying the validation required.

13. Space compression

Parameter name: SPACE COMPRESSION

Enter 'Y' for space compression, or leave blank.

This indicates whether the program is to replace strings of space characters by cursor positioning control codes where it is more efficient in terms of format size to do so. If this is left blank, no space compression will take place; if completed with 'Y', spaces will be compressed where appropriate.

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14. Substitute character for compressible space

Parameter name: COMPRESSIBLE SUB

For space compression: enter the substitute character to represent a compressible space, or leave blank.

If the space compression field was left blank (i.e. no space compression), this field is not relevant and must also be left blank. For space compression, a substitute character to represent a "compressible" space may be specified; this may not be a new-line character or zero, nor the same as any other substitute character entered. If a substitute is specified, any space characters occurring in the format definition are not compressed. It is prudent therefore to specify this only if most space characters are not to be compressed.

Note that it is not valid to specify substitute characters to represent both compressible and non-compressible spaces.

15. Substitute character for non-compressible space

Parameter name: UNCOMPRESSIBLE SUB

For space compression: enter the substitute character to represent a non-compressible space, or leave blank.

If the space compression field was left blank (i.e. no space compression), this field is not relevant and must also be left blank. For space compression a substitute character to represent a "non-compressible" space may be specified; this may not be a newline character or zero, nor the same as any other substitute characters entered. If a substitute is specified, any space characters occurring in the format definition are eligible for compression. It is therefore prudent to specify this only if most space characters are to be compressed.

Note that it is not valid to specify substitute characters for both compressible and non-compressible spaces.

16. Synchronisation Codes

Parameter name: SYNC CODES

Enter number of synchronisation codes to be inserted after cursor positioning control codes (in range 0 to 9), or leave blank.

The number of synchronisation codes (^6) to be inserted by the program following cursor positioning control codes within the format may be specified. Three fields may be entered, each in the range 0 to 9:

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number of synchronisation codes following line co-ordinates

number of synchronisation codes following column co-ordinates

number of synchronisation codes following line and column co-ordinates

Where a field is left blank, no synchronisation codes will be output.

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ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FORMAT CONTROL SCREEN

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1, and the cursor positioned at the first field in error.

Where all details entered are valid, the appropriate System Definition file record is retrieved (if present). For amendment or entry of the screen format, an entirely unprotected screen is displayed with start of unprotected and protected fields replaced by the nominated substitute characters. If the format is to be deleted it will be displayed with control characters for start of protected/unprotected in the normal way.

Note that no updating of the System Definition file occurs at this point.

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COMPLETING THE FORMAT DEFINITION SCREEN

If on display of the requested screen it is apparent that an error has been made and the current insertion/amendment/deletion request is to be abandoned, *R is typed in the first two character positions of the screen for a return to the previous standard S.D. screen without updating the S.D. File

Where deletion has been requested, press send to delete the format.

When entering a new format, complete details of the format on the blank screen, using substitute characters as required and send. Note that it is not valid to use the new line character itself if a substitute character for newline is specified.

When amending a format, or creating a new format from an existing one, alter the displayed format as required. Before sending, ensure that the cursor is repositioned at the end of the format (or at SOM); if this is not done, the remainder of the format after the cursor will be "lost".

When using the facility to specify unprotected fields with validation, the substitute control character must be followed by an alphabetic character specifying the type of validation required. The character may be determined by adding 40 to the decimal validation code as defined in the appropriate manual (i.e. A indicates validation code 1, B code 2, T code 20 etc.) When the format is displayed, using the correct control characters rather than substitutes, this validation character does not appear and the first character of the unprotected field will be a space. For example, if [A] is entered to indicate a single character field to be validated using code 1, the character string '^<A ^1' is transmitted in the format.

Where no validation is required (i.e. validation code zero) the validation character must be specified as a space.

(Note that the definition screen may be considered as an additional parameter for keyword FORM, with a Parameter Name of DATA).

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ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FORMAT DEFINITION SCREEN

The format entered is checked and an appropriate error message displayed on line 1 if an error is detected.

Where the format details entered are correct, the System Definition file is updated, and the standard S.D. screen returned with the message 'CONFIRMED' on line 1.

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FORM

DEFINITION OF FORMATS FOR TPS FUNCTIONS

The formats associated with all TPS Product Options are supplied in the System Definition Reference file. Where the standard issued version of a TPS format is to be incorporated into the system, a "short" entry is present in the User System Definition for reference purposes. This causes the format to be retrieved from the Reference file during the implementation process.

In the full version of System Definition, the short entries for the relevant formats will be automatically created when a product option is selected. However, until this facility is issued, it is necessary for the user to define the individual formats as described below.

1. Incorporating the standard version of a TPS format

To include the standard version of any individual TPS format (i.e. to create a "short" entry), enter keyword and qualifier details in standard form in the first field, and enter 'S' in the second field.

e.g. for the standad version of format ZACT, enter

FORM.ZACT

The system checks that the specified format is not already present in the User System Definition file and is recorded in the Reference file. A short entry is then created and the response 'CONFIRMED' returned.

The table below describes the formats associated with each product option, which are defined individually as required.

<u>Product option</u>	<u>Format</u>
Standard (STD)	ZACT ZBEG ZDIS ZEND ZINH ZLET ZPAS ZSUP ZTRG ZVOC
Online core-print (CP)	YCOR
Force File recovery (FR)	ZFME

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<u>Product option</u>	<u>Format</u>
File Specification Amendment (FS)	ZFSP ZFTP
IDMS Database (IDMS)	ZIDF
Interactive Development System (IO, IOG2, IOG2+)	XEDT XEIN XICY * XIDP XIEN XIFU XIGU XIIP * XILE XIMS XISY * ZFLC

* Different versions of these formats are maintained for each operating system supported by IDS. The Operating System qualifier must therefore be specified when defining these formats.

Runtime format amendment (OLF)	ZFFL
Print Option (PO)	ZPCF ZPDA ZPOD ZRPW
Personal Passwords (PP)	XPAS
Direct output printing (PR)	XFPR ZPQR
Remote print option of IDS (RP, RPG2, RPG2+)	XISY *

* Separate versions of this format are maintained for each operating system supported by IDS. The Operating System qualifier must therefore be specified when defining this format.

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<u>Product option</u>	<u>Format</u>
TOTAL Database (TDB)	ZTCD ZTDB ZTED ZTSC
Test functions (TEST)	YALT YTSS
Terminal Interface functions (TIS)	ZSTA ZSWT ZTAD
Integrated Teleload (TLD)	ZTLD

2. Incorporating user versions of a TPS format

The user may make amendments to TPS formats, providing that the position and length of the unprotected fields are not altered.

In most cases minor modifications only will be made to the format, so the recommended procedure is to set up the standard version of the format as described above, and then to use the amendment facilities exactly as if a user format were being altered. The amendment function retrieves the standard version of the format from the Reference file, and stores the amended format in the user System Definition file. To revert back to the standard version of the format is necessary first to delete the user version, and then to reinsert the format using the procedures described above.

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SMSG

STANDARD MESSAGE : DEFINE STANDARD MESSAGE

DESCRIPTION Definition of a Standard Message which will be held in the format file.

KEYWORD AND QUALIFIER DETAILS

Long Keyword STANDARD MESSAGE

Short Keyword SMSG

Qualifiers 1. Product Option
 2. Standard message number

1. Product option

Enter one of the following : STD, SD, LTI, USER; or omit (default USER)

Standard messages are grouped by Product Option; the appropriate standard message entries are created when the Product Option is selected. The Product Option is not usually specified, as it is not required when entering or amending User Messages. However, it must be specified if any TPS standard message is to be altered. Product Options are:

- STD - Standard TPS Messages (these are always present)
- SD - System Definition Messages
- LTI - Logical Terminal Interface Messages
- USER - User Application messages (this is the default value if Product Option omitted).

2. Standard Message Number

Enter message number (within Product Option) in range 1 to 4095.

Within a TPS program and on the Format File, each Standard Message is identified by a Message Number in the range 1 to 4095. The messages include user messages and also those used by TPS. When setting up messages on the System Definition file the messages are allocated numbers from 1 for each Product Option, including the "USER" option for definition of user application messages. When the standard messages are included in the Format File, the "USER" option messages retain their numbers allocated at System Definition, but TPS messages are allocated new ranges of numbers to give each a unique identifier in th range 1 to 4095.

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SMSG

Note in this regard that the sum of the highest message numbers assigned for each category at System Definition must be less than 4095.

For example, if the TPS options chosen have the following messages:

STD - 100 messages (numbered 1 to 100)

LTI - 10 messages (numbered 1 to 10)

SD - 25 messages (numbered 1 to 25)

Then NO USER message may be assigned a message number greater than 3960.

TPS accesses Standard Messages via an index which is set up on the format or standard message file. This index consists of one or more buckets, each holding entries for 128 messages. The first bucket of this index is given a retention value of 4; subsequent buckets have retention values of 8. Thus messages which are used most frequently should be assigned message numbers in the range 1 - 128 to give their index bucket a high chance of being retained in store under the Preferential Retention System.

Example entry of keyword and qualfier

The user standard message number 51 is to be set up.

Enter: STANDARD MESSAGE.USER/51
or STANDARD MESSAGE ./51
or SMSG.USER/51
or SMSG./51

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MSG

SCREEN DISPLAYED IN RESPONSE TO KEYWORD/QUALIFIER ENTRY

]

TPS3 System Definition

Enter Keyword.Qualifier [STANDARD MESSAGE.XXXX/nnnn]] Page []
 []

 Retention Value.....[32]
 Start Position.....Line [] Column []
 Substitute Characters:
 Final Cursor.....[] or Line [] Column []
 New Line.....[]
 Steady Flashing
 Unprotected Fields.....[[] []
 Protected Fields.....[] []
 Fields with Validation.....[] []

Enter 'Y' For: Clear Screen..[] Alarm.....[] Set Receive...[]
 Rack-up.....[] Set Send.....[]

Enter 'Y' if Space Compression Required.[Y]
 If so, Enter Compressible Space [] or Non-compressible Space []
 No. of Syncs Required After.....Line [] Column [] Both []

The values displayed in the unprotected areas will be from the System Definition file if the message is already present or is being created from an existing message. When inserting a new message the default values shown on the screen above are displayed.

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SMSG**COMPLETING THE STANDARD MESSAGE CONTROL SCREEN**

To delete an existing Standard Message, enter 'D' in the second Header Area field (note that it is not valid to delete individual Messages within a TPS product option). Otherwise complete the Definition Area fields as described below.

1. Retention Value

Parameter name: RETENTION VALUE

Enter the retention value to be allocated to the bucket holding the standard message (for Preferential Retention System). In range 1 - 32.

The buckets on the Format and Standard Messages File containing the messages may be assigned retention values in the range 1 to 32, by assigning a Retention Value for each message. Messages with the same Retention Value are then grouped together in one (or more) buckets when the Format File is created. Note that the lower the value, the greater the retention achieved using the Preferential Retention System.

2. Start position of message

Parameter name: START POSITION CO-ORDS

Enter the line number (1-30) and column number (1-80) or leave both fields blank.

The insertion of initial cursor co-ordinates at the start of a Standard Message may be achieved in one of two ways: by positioning the message at the appropriate point on the screen when defining the message contents, or by specifying line and column co-ordinates.

Where required, both line (in range 1 to 30) and column (in range 1 to 80) co-ordinates should be entered.

3. Final cursor position

Parameter names: FINAL CURSOR SUB
FINAL CURSOR CO-ORDS

Enter substitute character or line and column. If neither entered final cursor defaults to first unprotected field.

The final cursor position for display of the message may be specified either by entering a substitute character which is used to identify the final cursor position on the following screen, or by entering the required line (range 1-30) and column (range 1-80). If all three fields are left blank the cursor is positioned at the beginning of the first unprotected field (or at line 1, column 1, if no

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unprotected field present). The substitute character may not be a new-line character or zero, nor may it be the same as any other substitute character specified.

Note that when amending a message the current cursor position is displayed as line and column. These two fields should then be spacefilled to reposition the final cursor if the subsequent message amendment will move the first unprotected field.

4. Substitute character for new line.

Parameter name: NEWLINE SUB

Enter the substitute character to represent 'new line' (^*), or leave blank.

When entering a message the 'new-line' character may be used, but on redisplaying the message for amendment it will not be apparent that 'new-line' was originally used. Therefore a substitute character may be chosen to represent 'new-line', ensuring that the 'new-line' is preserved when the message is amended. The substitute character chosen must not be zero or the same as any other substitute character specified. ('New-line' is the character pair '^*' which when displayed out has the effect of spacefilling the remainder of the line from the current cursor position, and repositioning the cursor at column 1 of the following line).

5. Substitute character for 'Start of Unprotected Steady'.

Parameter name: UNPROTECED SUBS

Enter the substitute character to represent 'start of unprotected steady' (^4), or leave blank.

The control characters for start of unprotected or protected fields cannot be typed into a video, so substitute characters have to be used when specifying the message. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character specified.

6. Substitute character for 'Start of Unprotected Flashing'.

Parameter name: UNPROTECTED SUBS

Enter the substitute character to represent 'start of unprotected flashing' (^3), or leave blank.

The control characters for start of unprotected or protected fields cannot be typed into a video, so substitute characters have to be used when specifying the message. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character specified.

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7. Substitute character for 'Start of Protected Steady'

Parameter name: PROTECTED SUBS

Enter the substitute character to represent 'start of protected steady' (^1), or leave blank.

The control characters for start of unprotected or protected fields cannot be typed into a video, so substitute characters have to be used when specifying the message. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character specified.

8. Substitute character for 'Start of Protected Flashing'

Parameter name: PROTECTED SUBS

Enter the substitute character to represent 'start of protected flashing' (^2), or leave blank.

The control characters for start of unprotected or protected fields cannot be typed into a video, so substitute characters have to be used when specifying the message. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character specified.

9. Substitute character for 'Start of Unprotected Steady with Validation'

Parameter name: UNPROTECT VAL SUBS

Enter the substitute character to represent 'start of unprotected steady with validation' (^<), or leave blank.

This is appropriate only where the front-end validation facilities of the ICL 7502 or Tecs 4000 are used. The control characters for start of unprotected or protected fields cannot be typed into a video so substitute characters have to be used when specifying the message. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character entered. In the definition of the message, the substitute character must be followed by a character specifying the validation required.

10. Substitute Character for 'Start of Unprotected Flashing with Validation'

Parameter name: UNPROTECT VAL SUBS

Enter the substitute character to represent 'start of unprotected flashing with validation' (^=), or leave blank.

This is appropriate only where the front-end validation facilities of the ICL 7502 or Tecs 4000 are used. The control characters for start

of unprotected or protected fields cannot be typed into a video, so substitute characters have to be used when specifying the message. If a substitute is entered, this may not be a new-line character or zero, nor the same as any other substitute character entered. In the definition of the message, the substitute character must be followed by a character specifying the validation required.

11. Clear Screen

Parameter: CLEAR SCRREN

Enter 'Y' if the control characters for clear screen are to be inserted at the start of the message, or leave blank.

If 'Y' entered, the control characters '^;5' followed by twenty four synchronisation codes '^6' are inserted at the start of the message to clear the screen.

12. Alarm

Parameter name: ALARM

Enter 'Y' if the control characters to sound the audible alarm are to be inserted at the end of the message, or leave blank.

If 'Y' entered the control characters '^"' are inserted at the end of the message to sound the audible alarm.

13. Set Receive

Parameter name: SET RECEIVE

Enter 'Y' if the control characters for 'set receive' are to be inserted at the start of the message, or leave blank.

If 'Y' entered the control characters '^;1' are inserted at the start of the message for set receive.

14. Rack-up

Parameter name: RACK-UP

Enter 'Y' if the control characters to Rack-up the screen are to be inserted at the end of the message, or leave blank.

If 'Y' entered the control characters '^;7' are inserted at the end of the message, causing the screen to be racked-up by 2 lines.

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15. Set Send

Parameter name: SET SEND

Enter 'Y' if the control characters for set send are to be inserted at the end of the message, or leave blank.

If 'Y' entered, the control characters '^;4' for 'Set Send' are inserted at the end of the message. This causes the contents of all input fields from SOM to the final cursor position for the output to be 'sent' without terminal operator intervention.

16. Space compression

Parameter name: SPACE COMPRESSION

Enter 'Y' for space compression, or leave blank.

This indicates whether the program is to replace strings of space characters by cursor positioning control codes where it is more efficient in terms of message size to do so. If this is left blank, no space compression will take place; if completed with 'Y', spaces will be compressed where appropriate.

17. Substitute character for compressible space.

Parameter name: COMPRESSIBLE SUB

For space compression: enter the substitute character to represent a compressible space, or leave blank.

If the space compression field was left blank (i.e. no space compression), this field is not relevant and must also be left blank. For space compression a substitute character to represent a "compressible" space may be specified; this may not be a new-line character or zero, nor the same as any other substitute character entered. If a substitute is specified, any space characters occurring in the message definition are not compressed. It is therefore prudent to specify this only if most space characters are not to be compressed.

Note that it is not valid to specify substitute characters to represent both compressible and non-compressible spaces.

18. Substitute character for non-compressible space.

Parameter name: NON-COMPRESSIBLE SUB

For space compression: enter the substitute character to represent a non-compressible space, or leave blank.

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If the space compression field was left blank (i.e. no space compression), this field is not relevant and must also be left blank. For space compression a substitute character to represent a "non-compressible" space may be specified; this may not be a new-line character or zero, nor the same as any other substitute character entered. If a substitute is specified, any space characters occurring in the message definition are eligible for compression. It is therefore prudent to specify this only if most space characters are to be compressed.

Note that it is not valid to specify substitute characters to represent both compressible and non-compressible spaces.

19. Synchronisation Codes

Parameter name: SYNC CODES

Enter number of synchronisation codes to be inserted after cursor positioning control codes (in range 0 to 9), or leave blank.

The number of synchronisation codes (^6) to be inserted by the program following cursor positioning control codes within the message may be specified. Three fields may be entered, each in the range 0 to 9:

number of synchronisation codes following line co-ordinates

number of synchronisation codes following column co-ordinates

number of synchronisation codes following line and column co-ordinates

Where a field is left blank, no synchronisation codes will be output.

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MSG**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED STANDARD MESSAGE CONTROL SCREEN**

The input fields are checked to ensure that they are valid. Where an error is found, an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

When all details entered are valid, the appropriate System Definition file record is retrieved (if present). For amendment or entry of the standard message an entirely unprotected screen is displayed, with start of unprotected and protected fields replaced by the nominated substitute characters. If the standard message is to be deleted it will be displayed with control characters for start of protected/unprotected in the normal way.

Note that no updating of the System Definition file occurs at this point.

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SMSG

COMPLETING THE STANDARD MESSAGE DEFINITION SCREEN

If on display of the requested screen it is apparent that an error has been made and the current insertion/amendment/deletion request is to be abandoned, *R is typed in the first two character positions of the screen for a return to the previous standard S.D. screen with no updating of the S.D. file.

Where deletion has been requested, press send to delete the standard message.

When entering a new standard message, complete details of the standard message on the blank screen, using substitute characters as required, and send. Note that it is not valid to use the newline character itself if a substitute character for newline is specified. If initial cursor positioning is required, and no cursor position was specified on the initial screen, the message is positioned at the appropriate point on the screen. Otherwise the message definition should commence at line 1, column 1.

When amending a standard message, or creating a new standard message from an existing one, alter the displayed message as required. Before sending, ensure that the cursor is repositioned at the end of the standard message (or at SOM); if this is not done, the remainder of the message after the cursor will be "lost".

When using the facility to specify unprotected fields with validation, the substitute control character must be followed by an alphabetic character specifying the type of validation required. This character may be determined by adding 40 to the decimal validation code as defined in the appropriate manual (i.e. A indicates validation code 1, B code 2, T code 20 etc.) When the message is displayed, using the correct control characters rather than substitute this validation character does not appear and the first character of the unprotected field will be a space. For example if [A] is entered to indicate a single character field to be validated using code 1, the character string '^<A ^1' is transmitted in the format.

Where no validation is required (i.e. validation code zero), the validation character must be specified as a space.

(Note that the definition screen may be considered as an additional parameter for keyword SMSG, with a parameter name of DATA).

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MSG

**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED STANDARD MESSAGE
DEFINITION SCREEN**

The standard message entered is checked, and an appropriate error message displayed on line 1 if an error is detected.

Where the message details entered are correct, the System Definition file is updated, and the standard S.D. screen returned with the message 'CONFIRMED' on line 1.

SDEF-0181

VALH

VALIDATION HEADER : DEFINE HEADER FOR INPUT VALIDATION

DESCRIPTION Definition of input validation details for Logical Terminal Interface; used to provide the Automatic Validation facility or in conjunction with the TPS program request TPSCVALIDAT.

KEYWORD AND QUALIFIER DETAILS

Long Keyword VALIDATION HEADER

Short Keyword VALH

Qualifiers

1. Format
2. Device Type
3. Set Number

1. Format Identifier

Enter three or four alphabetic characters.

This is the Format Identifier of the format for which the input validation details are to be defined. The format must be present on the System Definition file (to define the format, see Keyword FORMAT).

2. Device Type

Used to identify different versions of the same format. Enter one of the following values: 7181, 1020, 2020, DDE, CONS, NST1-9; or leave blank.

This identifies the version of the format for which the input validation details are to be defined. A Device Type is usually only present if the system is to support mixed terminal devices which require different versions of the same format. The device type may be one of the following:

- 7181 - for devices handled according to standard 7181 procedures (this is the default if omitted).
- 1020 - Incoterm 1020 devices
- 2020 - Incoterm 2020 devices
- DDE - Direct Data Entry Keystations

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CONS - Central Console

NST1-9 - Non-standard devices

The format/device type combination specified must be present on the System Definition file (to define the format, see Keyword FORMAT).

3. Set Number

Enter a number in the range 1 to 63.

The set number identifies the version of the input validation parameters to be defined or amended. This allows for the validation of input from screens where alternative selections of fields may be present on the same format (which may occur if certain of the unprotected fields are defined using standard messages). Up to 63 different input validation sets may be defined for a single format/device; each is identified by a number in the range 1 to 63.

Example entry of keyword and qualifiers

The first Input Validation set for the 7181 format BCPR is to be defined.

Enter: VALIDATION HEADER.BCPR/7181/1
or VALH.BCPR/7181/1
or VALH.BCPR//1

SCREEN DISPLAYED IN RESPONSE TO KEYWORD/QUALIFIER ENTRY

]

TPS3 System Definition

Enter Keyword.Qualifier [VALIDATION HEADER.XXXX/XXXX/nn]
[] Page []

Associated Standard Messages...[]
[]
[]
[]

Enter 'Y' if: Fields separators to be removed.....[]
Padding Char to be Applied to 'not sent' Fields..[]

Error handling options:
If standard message required then enter Line [] and Column []
Enter '1' for the first or 'A' for all fields in error if:
Fields to be flashed.....[]
Error codes to be displayed..[]

The values displayed in the unprotected areas are from the System Definition file if the Validation Header is already present or is being created from an existing header.

When inserting a new Validation Header the values shown on the screen above are displayed.

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VALH

COMPLETING THE VALIDATION HEADER CONTROL SCREEN

To delete an existing Validation Header, enter 'D' in the second Header Area field. Otherwise complete the Definition Area fields as described below.

1. Standard message identifier

Parameter name : STANDARD MESSAGE ID

Enter the identifier for the standard message(s) associated with the format (as Product Option/Standard Message Number); or leave blank.

The unprotected fields of a display which is to be validated using the Logical Terminal Interface facilities must be defined either as part of the format, or within a standard message. In defining the validation header, the Standard Messages which include unprotected fields to be validated in this "set" must be defined. Up to four standard messages may be defined, each identified by a combination of the product option and message number.

Standard messages are grouped by Product Option; however, this is not usually specified as it is not required for User Messages. Product options are:

STD - Standard TPS Messages

SD - System Definition Messages

LTI - Logical Terminal Interface Messages

USER - User Application messages (this is the default value if Product Option omitted).

The message number identifies a message within the product option by a unique number in the range 1 to 4095.

The Standard Message identifier is input in one of the following formats:

Product Option/Message Number (e.g. USER/50)
or Message Number (e.g./50)

The product option/message number specified must be present on the System Definition file (to define the standard message, see Keyword STANDARD MESSAGE).

2. Field Separators

Parameter name: FIELD SEPARATORS

Enter 'Y' if all field separators are to be removed when reformatting the input; or leave blank.

When reformatting the input message it is usual for all the field separators (i.e. ^4 or ^3) to be removed, so that the Application Routine receives only the contents of the unprotected fields. 'Y' is entered for all separators to be removed. Note that if this option is selected the separators are removed without reference to the field separator indicator recorded with each validation rule. Where not all field separators are to be removed during reformatting, this parameter is left blank. The removal of field separators will then be according to the indicator specified for each validation rule.

3. Padding for 'Not Sent' fields

Parameter name: PADDING IND

Enter 'Y' if the nominated padding character is to be applied to fields 'not sent'; or leave blank.

When reformatting the input message, two options are available for the handling of fields "not sent" (i.e. which were completely after the cursor when 'send' pressed): the fields may either be omitted from the reformatted message and a character count word adjusted to indicate that a short message has been set up, or the fields may be set in the reformatted message with each character set to the "padding character" nominated for the field's validation rule. If this latter option is required, 'Y' is entered in the padding indicator field; otherwise the field should be left blank.

Note that if 'Y' is entered in this field, validation rules for each unprotected field must be set up before the Validation Parameter Set may be used. This is necessary as the default validation rule details set up for each unprotected field when the Validation Header is created do not record the output length of the field.

4. Start position for error message

Parameter name: ERROR MESSAGE CO-ORDS

Enter the line number (1-30) and column number (1-80) or leave both fields blank.

There are three options for the reporting of validation errors via the Logical Terminal Interface. These are:

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VALH

- displaying an error message relating to the first field in error
- setting fields in error 'flashing'
- displaying an error code below fields in error.

Any combination of these error options may be selected.

If an error message is displayed, this appears at a specified position on the screen irrespective of which field is in error. The field to which the error message refers is indicated by the positioning of the cursor on the first character of the field. The start position on the screen for the error message is indicated by specifying the line and column co-ordinates. Where an error message display is required, both line (in range 1 to 30) and column (in range 1 to 80) co-ordinates should be entered.

5. Field in error to be set flashing

Parameter name: ERROR FLASHING

Enter '1' for the first or 'A' for all fields in error to be set flashing; or leave blank.

There are three options for the reporting of validation errors via the Logical Terminal Interface. These are:

- displaying an error message relating to the first field in error
- setting fields in error 'flashing'
- displaying an error code below fields in error.

Any combination of these error options may be selected.

The option to set fields in error flashing allows either the first field in error to be set flashing, or all fields in error to be set flashing. If a field is then corrected and resent, it is set steady on any subsequent error display. The required option is indicated by entering '1' for the first field or 'A' for all fields in error to be set flashing. The indicator is left blank if fields in error are to remain steady.

6. Error codes to be displayed

Parameter name: ERROR CODES

Enter '1' for the first or 'A' for all fields in error to have an error code displayed below the field: or leave blank.

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There are three options for the reporting of validation errors via the Logical Terminal Interface. These are:

- displaying an error message relating to the first field in error
- setting fields in error 'flashing'
- displaying an error code below fields in error.

Any combination of these error options may be selected.

The option to display error codes below fields in error allows for the display of codes below either the first field in error only or all fields in error. A single character error code is displayed immediately below the first character of the appropriate fields. (For full details of the error code values, see TPS Programming Manual, Part 1, Section 3.2.1). If a field in error is then corrected and resent, the error code is removed on any subsequent error display.

The required option is indicated by entering '1' for the code to be set below the first field in error or 'A' for codes below all fields in error. Note that it is the user's responsibility to ensure that the format design leaves the position below the first character in each unprotected field available for display of the error code.

The field is left blank if no error codes are to be displayed.

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VALH**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED VALIDATION HEADER SCREEN**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Note that an error is reported if an attempt is made to delete a validation header for which validation rules are recorded. The individual rules must be deleted before the header may be deleted.

Where all details entered are valid, the appropriate System Definition File record is retrieved (if present). The nominated Format and Standard Messages are then retrieved from the System Definition File and displayed so that the operator may confirm that the correct details have been specified.

Note that no updating of the System Definition File occurs at this point.

SDEF-0181

VALH

COMPLETING THE VALIDATION HEADER DISPLAY SCREEN

If on display of the requested Format and Standard Messages it is apparent that an error has been made and the current insertion/amendment/deletion request is to be abandoned, *R is typed in the first two character positions of the screen for a return to the standard S.D. screen without updating the System Definition File.

Otherwise press send to effect the appropriate action on the System Definition File.

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VALH**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED VALIDATION HEADER DISPLAY SCREEN**

The screen entered is checked and an appropriate error message displayed on line 1 if an error is detected.

Where the screen entered is correct, the System Definition File is updated and the standard S.D. screen returned with the message 'CONFIRMED' on line 1.

Where a new validation header is inserted default values are assigned to each unprotected field on the display. The default values assigned are:

Validation code : A

Field not mandatory

No dependency checks

No reformatting except conversion to upper case

Output field size equal to input field length

(Note that this implies that the option to pad all fields not sent may not be used).

No table check

For the significance of these options, refer to the description of the parameters for the Keyword VALIDATION RULE.

The information recorded in the System Definition File for the validation header includes the screen position for all the unprotected fields within the display and details of any 7502 or 4000 validation codes recorded for the fields. Therefore if the position of any unprotected fields, or the validation codes, are changed by alteration of the format or associated standard messages it is necessary to carry out the amendment procedures for the Validation Header in order to update this information.

SDEF-0181

VALR

VALIDATION RULE : DEFINE RULE FOR INPUT VALIDATION

DESCRIPTION Definition of validation rule details for fields associated with a validation header.

KEYWORD AND QUALIFIER DETAILS

Long Keyword VALIDATION RULE

Short Keyword VALR

Qualifiers 1. Format Identifier
 2. Device Type
 3. Set Number
 4. Rule Number

1. Format Identifier

Enter three or four alphabetic characters.

This is the Format Identifier of the format for which the Validation Rule is to be defined. The format must be present on the System Definition file (to define the format, see Keyword FORMAT).

2. Device Type

Used to identify different versions of the same format. Enter one of the following values: 7181, 1020, 2020, DDE, CONS, NST1-9; or leave blank.

This identifies the version of the format for which the Validation Rule is to be defined. A Device Type is usually only present if the system is to support mixed terminal devices which require different versions of the same format. The device type may be one of the following:

- 7181 - for devices handled according to standard 7181 procedures (this is the default if omitted).
- 1020 - Incoterm 1020 devices
- 2020 - Incoterm 2020 devices
- DDE - Direct Data Entry Keystations
- CONS - Central Console
- NST1-9 - Non-standard devices

The format/device type combination specified must be present on the System Definition File (to define the format, see Keyword FORMAT).

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VALR**3. Set Number**

Enter a number in the range 1 to 63.

This identifies the version of the input validation parameters for which the validation rule is to be defined. The validation parameter set is identified by a number in the range 1 to 63. The validation header for the specified parameter set must be present on the System Definition file (to define the validation header, see Keyword VALIDATION HEADER).

4. Rule Number

Enter a number in the range 1 to 4095.

The Rule Number identifies the validation rule to be defined. It is recommended that the Rule Numbers are allocated sequentially from 1 for each validation rule defined within a parameter set. Details of up to 4095 separate validation rules may be defined within a validation parameter set; each is identified by a number in the range 1 to 4095. Note that although the number of validation rules allowed is 4095, the number of input fields catered for by the Logical Terminal Interface is limited to 250.

Creation of a Validation Rule from a Standard Rule

Standard Validation Rules may be defined for fields independent of any Validation Parameter Set. Validation Rule details may then be created using the Standard Rule data as a basis. To achieve this, enter the Keyword/Qualifier for the Standard Rule in the second Header Area field; the specified standard rule must be present in the System Definition File (to define a Standard Validation Rule, see Keyword STD VALIDATION RULE).

When a Validation Rule is based on a Standard Rule, only those standard details relating to field dependencies and reformatting may be modified as required; the remainder of the validation parameters are taken directly from the Standard Rule.

Note that to change a Validation Rule definition from being based on a Standard Rule to being defined independently, or vice versa, it is necessary to delete the current Validation Rule and reinsert it in the new form.

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VALR

Enter : VALIDATION RULE.BCPR/7181/2/1

or VALR.BCPR/7181/2/1

or VALR.BCPR//2/1

This validation rule is to be created from the Standard Validation Rule ACCOUNTNO.

Enter in the second Header Area field:

STD VALIDATION RULE.ACCOUNTNO

or VALS.ACCOUNTNO

VALR

SCREEN DISPLAYED IN RESPONSE TO KEYWORD/QUALIFIER ENTRY

]

TPS3 System Definition

Enter Keyword.Qualifier [VALIDATION RULE.XXXX/XXX/nn/nnnn]
[] Page [1]

Logical Field Name.....[] XXXXXXXXXXXXX
Validation Code.....[A]
User Validation Routine.....[]

Validation Codes :

- | | |
|----------------------------|------------------|
| A...No Validation | G...Integer |
| B...Alphabetic | H...Pure Numeric |
| C...Alphanumeric | I...Full Numeric |
| D...Alphabetic and Space | J...Sterling |
| E...Alphanumeric and Space | K...Date |
| F...Numeric | |

The values displayed in the unprotected areas are from the System Definition File if the Validation Rule is already present or is being created from an existing rule. Where the Validation Rule is based on a Standard Rule, the Standard Rule validation code and user routine details are displayed in a protected area.

When inserting a new Validation Rule the values shown on the screen above are displayed.

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VALR**COMPLETING THE VALIDATION RULE INITIAL SCREEN**

To delete an existing Validation Rule, enter 'D' in the second Header Area field. Otherwise complete the Definition Area fields as described below.

1. Logical Field Name

Parameter name : LOGICAL FIELD NAME

Enter the name of the logical field; up to 12 characters.

The validation rule definition applies to one or more input fields; this "set" of input fields within a Validation Parameter Set is classed a Logical Field and identified by a Logical Field Name. The Logical Field Name consists of up to 12 characters, each of which lies within the standard ICL 64-character set (lower case characters if entered are automatically converted to upper case). The Logical Field Name specified must be unique within the Validation Parameter Set.

2. Validation Code

Parameter name : VALIDATION CODE

Enter an alphabetic code in the range A to K to indicate the basic type of validation required.

The basic type of validation to be applied to the Logical Field is specified by an alphabetic Validation Code. This may be one of the following:

- A - No Validation
- B - Alphabetic, characters A to Z only allowed
- C - Alpha-numeric, characters A to Z, 0 to 9 only allowed
- D - Alphabetic with space character allowed
- E - Alpha-numeric with space character allowed
- F - Numeric, characters 0 to 9 only allowed
- G - Integer, 0 to 9 with leading or trailing spaces
- H - Pure numeric, 0 to 9 with mandatory decimal point and leading or trailing spaces
- I - Full numeric, 0 to 9 with optional decimal point, optional leading + or -, and leading or trailing spaces.
- J - Sterling, 0 to 9 with mandatory decimal point, up to three digits following decimal point (third 0 or 5), optional leading + or -, and leading or trailing spaces.
- K - Date, dd/mm/yy or dd/mmyy or ddmmyy or ddmmyy.

Where the Validation Code is changed, the details relating to the final Validation Rule screen are automatically replaced by the default values for the new code if appropriate (e.g. if change from a character type code (A to E) to a numeric type code (F to J)).

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3. User Validation Routine

Parameter name : VALIDATION SUBR

Enter the name of a user-written validation subroutine (up to 12 alpha-numeric characters); or leave blank.

The actions of the Logical Terminal Interface validation software are performed in the following sequence:

- mandatory field and field dependency checking
- basic validation according to type
- reformatting of the field
- additional validation

The additional validation may consist either of standard range checking, totalling and check digit validation or may be performed by a user-written validation subroutine. If the latter option is required, the name of the subroutine is specified in this field as up to 12 alpha-numeric characters. The subroutine must already be defined on the System Definition File (to define a validation subroutine, see Keyword VALIDATION SUBR).

This field is left blank if standard procedures are to be used for additional validation.

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VALR**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED VALIDATION RULE INITIAL SCREEN**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, for a new Validation Rule a record is created on the System Definition File, with default values assigned to the fields which may be entered on subsequent screens. For an amendment, the System Definition File record is updated to reflect new values entered on the initial screen. For a deletion, no updating of the System Definition File occurs at this point.

For all functions, the appropriate System Definition File record is retrieved (if present). The Validation Header record for the specified Validation Parameter Set is read from the System Definition File. The associated Format and Standard Messages are then retrieved and displayed. An asterisk (*) is displayed in the first character of any unprotected fields assigned to this Validation Rule, and a less than symbol (<) in the first character of any other unprotected fields for which validation rules have been defined.

COMPLETING THE VALIDATION RULE DISPLAY SCREEN

If on display of the Format and Standard Messages for the Validation Header it is apparent that an error has been made and the current request is to be abandoned, *R is typed in the first two character positions of the screen for a return to the standard System Definition screen without further updating of the System Definition File. Note that where an error has been made it may be necessary to reverse updates which have already been applied to the System Definition File (e.g. by deleting a rule which has been inserted).

Otherwise, for a deletion, press send to delete the Validation Rule from the System Definition File.

For an insertion or an amendment, the input fields to which the Validation Rule is to be applied must be nominated. This is achieved by marking an asterisk (*) in the first character position of the appropriate input fields. For an amendment, input fields may be disassociated from a rule by spacefilling the first character of the field. Note that for an amendment it is important to ensure that the cursor is positioned correctly to ensure that all input fields including asterisks are transmitted.

All input fields for a Validation Rule (i.e. those marked with asterisks) are considered to constitute a 'Logical Field'. In the further definition of the Validation Rule, any characteristic assigned to a Logical Field applies to each input field constituting the Logical Field, unless otherwise stated.

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ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED VALIDATION RULE DISPLAY SCREEN

The screen is checked and an appropriate error message displayed on line 1 if an error is detected.

Where the screen entered is correct, the System Definition File is updated. For a deletion, or if the Validation Rule is based on a Standard Validation Rule, the standard System Definition screen is returned with the message 'CONFIRMED' on line 1. Otherwise for an insertion or an amendment, the second validation rule screen is displayed (see following page).

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VALR**COMPLETING THE SECOND VALIDATION RULE SCREEN**

Complete the Definition Area fields as described below.

1. Mandatory Field

Parameter name: FIELD MANDATORY

Enter 'Y' for a mandatory field, or leave blank.

Where a Logical Field is defined as mandatory, an error is reported if the field is either not sent, or is spacefilled. For a mandatory field, enter 'Y' in this field; otherwise leave the field blank.

2. Field Must Be Sent

Parameter name: FIELD MUST BE SENT

Enter 'Y' if the field must be sent, or leave blank.

For a field which must be sent, enter 'Y' in this field; otherwise leave the field blank. Note that the specification of the last field on a screen as "must be sent" ensures that the operator always inputs the whole screen (usually by positioning the cursor at 'Home' before pressing Send), thus avoiding any data loss by incorrect positioning of the cursor.

3. Dependent Field Name

Parameter name: DEPENDENT FIELD NAME

Enter the name of the dependent field for cross-field checking; or leave blank.

In many cases, dependencies exist between the input fields: for example, a screen might include several iterations of the two fields 'product code' and 'quantity'; a quantity may validly be entered if and only if the corresponding product code is entered, so that quantity may be defined as dependent on product code for cross-field checking.

Where a dependency exists, enter the Logical Field Name of the dependent field (up to 12 characters). Validation Rule details for the specified Logical Field within the current Validation Parameter Set must be present on the System Definition File.

Where the Logical Fields involved in cross-field checks consist of more than one input field, the input fields are matched in pairs for dependency checks, as illustrated by the following example:

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Logical Field B consisting of 4 input fields is dependent on Logical Field A with 2 input fields.

Input field 1 of B is dependent on input field 1 of A

Input field 2 of B is dependent on input field 2 of A

Input field 3 of B is dependent on input field 1 of A

Input field 4 of B is dependent on input field 1 of A

If the dependency was reversed and A was dependent on B, then no field would depend on the input fields 3 and 4 of B.

4. Action if Dependent Field Present

Parameter name: DEPENDENT PRESENT

Enter the action to be taken if the dependent field is present (in range 0 to 2); or leave blank.

This field may only validly be entered if cross-field checking is required (indicated by the nomination of a dependent field name). Where no cross-field check is required, the field must be left blank.

For cross-field checking, enter a value to indicate the validation that is required when the dependent field is entered. This may be one of the following:

0 - no check (this is the default if the field is left blank)

1 - field must be absent

2 - field must be entered

5. Action if Dependent Field Absent

Parameter name: DEPENDENT ABSENT

Enter the action to be taken if the dependent field is absent (in range 0 to 2); or leave blank.

This field may only validly be entered if cross-field checking is required (indicated by the nomination of a dependent field name). Where no cross-field check is required, the field must be left blank.

For cross-field checking, enter a value to indicate the validation that is required when the dependent field is not entered. This may be one of the following:

0 - no check (this is the default if the field is left blank)

1 - field must be absent

2 - field must be entered

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VALR**6. Conversion to Upper Case**

Parameter name: UPPER CASE CONVERSION

Enter 'Y' for conversion of the input field to upper case; or leave blank.

If required, case changes are removed so that the input data is presented in the reformatted message as a single case fixed length field. The characters \$ | ^ and ← which on input are normally represented as delta shift pairs (^T, ^U, ^V, ^W) are converted back to their true values (i.e. octal 74, 75, 76, 77).

For conversion to upper case, 'Y' is entered; otherwise the field is left blank.

7. Left or Right Justification

Parameter name: JUSTIFICATION

For a field with Validation Code in the range A to E or K, enter 'L' for left or 'R' for right justification; or leave blank.

The Logical Terminal Interface reformatting procedures perform justification according to the Validation Code entered on the initial screen.

For character and date fields (Validation Codes A to E or K) the field is left or right justified according to the justification parameter and padded with trailing or leading spaces. For numeric fields (Validation Codes F to J) valid fields are always right justified and padded with leading zeros. In addition, for codes H to J the decimal point is removed, a leading sign character is inserted and trailing zeros added as appropriate (thus reformatting the field to COBOL DISPLAY-3 standards).

For justification of character fields, enter 'L' for left or 'R' for right justification; otherwise leave the field blank.

8. Field Separators

Parameter name: FIELD SEPARATORS

Enter 'Y' if the field separator preceding this field is to be removed when reformatting the input; or leave blank.

This field is only relevant if the Validation Header option to remove all field separators has not been specified. If this option has been selected (see Keyword VALIDATION HEADER), all field separators are removed regardless of the field separator option specified for the individual Validation Rules.

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Where the option to remove all separators is not selected, the removal of field separators (i.e. ^4 or ^3) is according to the Field Separator indicator for each validation rule. 'Y' is entered for the separator preceding the field to be removed; if this parameter is left blank the separator will be present in the reformatted message.

9. Padding Character

Parameter name: PADDING CHARACTER

Enter the character to be used to fill the field in the reformatted message if it is "not sent".

Where a complete field is "not sent" (i.e. is after the cursor when send pressed) the field in the reformatted message is filled with the specified padding character if the padding indicator has been set on the Validation Header (see Keyword VALIDATION HEADER). The padding character specified must lie within the ICL 64-character set (lower case characters if entered are automatically converted to upper case). The default padding character is a space; alternative values are used if there is a requirement to differentiate between a field which is "not sent" and one which is "sent but spacefilled".

Note that if a field is partially sent, it is always padded to the full input length with spaces before validation.

10. Output Field Size

Parameter Name: OUTPUT FIELD SIZE

Enter the length in characters of the field in the reformatted message.

This specifies the length of the field in characters as it is to appear in the reformatted message.

For character fields converted to upper case (Validation Codes A to E) the output field size is usually the length of the input field.

For numeric fields converted to upper case (Validation Codes F to J) the reformatting procedures must be considered in calculating the correct output length (see Programming Manual, Part 1, Section 3.2.1).

For fields not converted to upper case, the output field size allocated must be large enough to cater for the maximum number of shift changes which may occur within the input. In particular the output field size must be at least one character longer than the input field length, as the reformatting procedures always insert a character to indicate the current shift (alpha or beta) at the start of an unconverted field in the reformatted message.

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**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED SECOND VALIDATION
RULE SCREEN**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated. For a Validation Rule based on a Standard Rule, the message 'CONFIRMED' is displayed on Line 1. Otherwise the final validation rule screen is then displayed. The version of the final screen displayed depends on the Validation Code specified (see following sections).

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DISPLAY OF THE FINAL VALIDATION RULE SCREEN : CODES A TO E

This screen is displayed for Validation Rules with Code A to E following the entry of the Keyword/Qualifier with Page 3 specified in the third Header Area field, or on receipt of a valid second validation rule screen. Note that it is not possible to access this screen for Validation Rules based on a Standard Rule.

]

TPS3 System Definition

Enter Keyword.Qualifier [VALIDATION RULE.XXXX/XXXX/nn/nnnn]
[] Page [3]

Logical Field Name..... XXXXXXXXXXXXX

Table Check:

Enter Data..[]

The values displayed in the unprotected area are from the System Definition File. When inserting a new Validation Rule the values shown on the screen above are displayed.

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VALR**COMPLETING THE FINAL VALIDATION RULE SCREEN : CODES A TO E**

Complete the Definition Area field as described below.

1. Table Check Data

Parameter Name: TABLE CHECK DATA

Enter details of the range checks to be applied to each character of the field; or leave blank.

For character type fields (Validation Codes A to E) a table may be set up consisting of a set of range values to be applied to each character in the field. Separate ranges may be specified for each character in the field. Where the number of ranges defined is less than the number of characters in the field, the last range is used for the validation of all remaining characters.

Each range is specified by parameters enclosed by parentheses. The parameters, which are separated from each other by commas and specify the values which may validly be entered, may be either a character pair indicating the start and end of a range, or SP indicating a space, or NC indicating that no check is required.

Example: A seven character field has the first two characters alpha numeric, the third alphabetic or hyphen or space, the fourth any value, and the remainder numeric.

The required table check data is

(09,AZ) (09,AZ) (AZ,—,SP) (NC) (09)

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**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FINAL VALIDATION
RULE SCREEN : CODES A TO E**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated and the message 'CONFIRMED' returned on line 1.

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DISPLAY OF THE FINAL VALIDATION RULE SCREEN : CODES F AND G

This screen is displayed for Validation Rules with Code F or G following the entry of the Keyword/Qualifier with Page 3 specified in the third Header Area field, or on receipt of a valid second Validation Rule screen. Note that it is not possible to access this screen for Validation Rules based on a Standard Rule.

]

TPS3 System Definition

Enter Keyword.Qualifier [VALIDATION RULE.XXXX/XXXX/nn/nnnn
[

]] Page [3]

Logical Field Name..... XXXXXXXXXXXXX

Range Check:

Enter Minimum Value.....[]
Enter Maximum Value.....[]

Totalling:

Screen Accumulator 1..[] Batch Accumulator 1..[]
2..[] 2..[]

Accumulator 1 - Add Field to this Accumulator
Accumulator 2 - Compare Field to this Accumulator and Clear

Check Data:

Enter Modulus [] and Weights []
User Validation Routine.....[]

The values displayed in the unprotected area are from the System Definition File. When inserting a new Validation Rule the values shown on the screen above are displayed.

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VALR**COMPLETING THE FINAL VALIDATION RULE SCREEN : CODES F AND G**

Complete the Definition Area fields as described below.

1. Range check minimum

Parameter name: RANGE CHECK MINIMUM

Enter the minimum value as an integer; or leave blank.

Where no minimum range check is to take place, this field is left blank. Otherwise the minimum acceptable value is specified as an integer. The value entered must be consistent with the length of the input field; the maximum length allowed for range check values is 12 digits.

2. Range check maximum

Parameter name: RANGE CHECK MAXIMUM

Enter the maximum value as an integer; or leave blank.

Where no maximum range check is to take place, the field is left blank. Otherwise the maximum acceptable value is specified as an integer. The value entered must be greater than any minimum value specified and must be consistent with the length of the input field; the maximum length allowed for range check values is 12 digits.

3. Totalling: Screen Accumulator 1

Parameter name: SCREEN ACCUMULATOR 1

Enter the number of the screen accumulator (range 1 to 7) into which the field is to be added; or leave blank.

The accumulators maintained for screen totalling are zeroised before validating each input. Up to seven separate screen accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits). Note that all the fields being totalled concurrently into a single accumulator with fields of code F or G must be integers.

For the input value to be added into a screen accumulator, enter the appropriate accumulator number, in the range 1 to 7; otherwise leave the field blank.

4. Totalling: Batch Accumulator 1

Parameter Name: BATCH ACCUMULATOR 1

Enter the number of the batch accumulator (range 1 to 7) into which the field is to be added; or leave blank.

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The accumulators maintained for batch totalling are held in the last 14 words of the User Area of the Terminal Control Record and are therefore cleared by TPS only when the System File is reset, or on request by completion of the Batch Accumulator 2 field. It is therefore essential that systems making use of the Batch Totalling facility are designed to ensure either that the Batch Totals are initialised at the start of each totalling transaction, or that having commenced a totalling transaction the operator has to continue to the message which clears the batch total (this is usually achieved by defining the appropriate message types as 'no change'). Up to seven separate batch accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits). Note that all the fields being totalled concurrently into a single accumulator with fields of Type F or G must be integers.

For the input value to be added into a batch accumulator, enter the appropriate accumulator, in the range 1 to 7; otherwise leave the field blank.

5. Totalling: Screen Accumulator 2

Parameter name: SCREEN ACCUMULATOR 2

Enter the number of the screen accumulator (range 1 to 7) which is to be cleared following comparison with the field; or leave blank.

The accumulators maintained for screen totalling are zeroised before validating each input. Up to seven separate screen accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits). This therefore implies that the field against which the accumulator total is to be compared may not exceed 12 digits in length. Note that a field of Code F or G may only validly be compared against a total of integer fields.

For the value input to be compared with a screen accumulator, enter the appropriate accumulator number, in the range 1 to 7. Where the two values are equal, the accumulator is cleared (i.e. zeroised) and may be reused for subsequent input fields. If the input value is not to be compared with a screen accumulator, leave the field blank.

Example of screen totalling:

ABCD]

```
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
           [C ]
```


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Each line of the screen above consists of three value fields ("A") which produce a line subtotal ("B"). A grand total ("C") is the sum of the subtotals.

The following totalling validation would be specified for this screen.

Fields 'A' : Screen Accumulator 1 : 1
Screen Accumulator 2 : blank

Fields 'B' : Screen Accumulator 1 : 2
Screen Accumulator 2 : 1

Field 'C' : Screen Accumulator 1 : blank
Screen Accumulator 2 : 2

6. Totalling: Batch Accumulator 2

Parameter name: BATCH ACCUMULATOR 2

Enter the number of the batch accumulator (range 1 to 7) which is to be cleared following comparison with the field; or leave blank.

The accumulators maintained for batch totalling are held in the last 14 words of the User Area of the Terminal Control Record and are therefore cleared by TPS only when the System File is reset or following successful comparison with an input value as specified by the Batch Accumulator 2 field. It is therefore essential that systems making use of the Batch Totalling facility are designed to ensure either that the Batch Totals are initialised at the start of each totalling transaction, or that having commenced a totalling transaction the operator has to continue to the message which clears the batch total (this is usually achieved by defining the appropriate message types as "no change"). Up to seven separate batch accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits). This implies therefore that the field against which the accumulator total is to be compared may not exceed 12 digits in length. Note that a field of Code F or G may only validly be compared against a total of integer fields.

For the value input to be compared with a batch accumulator, enter the appropriate accumulator number, in the range 1 to 7. Where the two values are equal, the accumulator is cleared (i.e. zeroised). If the input value is not to be compared with a batch accumulator, leave the field blank.

7. Standard Check Digit Data

Parameter name: CHECK DIGIT STD DATA

Enter the modulus and weightings to be applied to the characters or leave both fields blank.

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The standard check digit validation is available for numeric fields with numeric check digits which occur as the last character in the field. Where appropriate the input field is right justified with leading zeros inserted before the check digit validation is applied.

The standard check digit validation operates as follows:

Given a field of output length n (i.e. characters x_1, x_2, \dots, x_n), a modulus (m) is specified and also one or more weighting constants (say w_1, \dots, w_p , where p is less than n). Then

$$\text{if } A = w_1x_1 + \dots + w_px_p + w_{p+1}x_{p+1} + \dots + w_nx_n$$

(i.e. weights are repeated until all digits of the output field excepting the check digit have been exhausted)

and if B = A divided by m, remainder C

then the calculated check digit is zero if C equals zero, or otherwise is (m-C). This calculated value is then compared with the last character of the value input. Note that the check digit is always reported as invalid if the calculated check digit value is not in the range 0 to 9.

Where standard check digit validation is required, enter the appropriate modulus and weights. The modulus is specified as an integer in the range 2 to 11. The weightings to be applied to the characters of the field are specified as single digit integers, separated by commas. As illustrated above, the first weighting applies to the most significant digit of the field.

8. User Check Digit Subroutine

Parameter name: CHECK DIGIT SUBR

Enter the name of a user-written check digit validation subroutine (up to 12 alphanumeric characters); or leave blank.

For numeric integer fields, non-standard check digit procedures may be performed by a user-written check digit validation subroutine. If this option is required, the name of the subroutine is specified in this field as up to 12 alphanumeric characters. The subroutine must already be defined on the System Definition File (to define a check digit subroutine, see Keyword VALIDATION SUBR). If this field is entered, both standard check digit data fields must be left blank. This field is left blank if the standard check digit validation or no check-digit validation is required.

Note that check digit validation for fields with a basic validation code other than F or G may be incorporated only by the use of a user written subroutine for all addition validation.

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**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FINAL VALIDATION
RULE SCREEN : CODES F AND G**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated and the message 'CONFIRMED' returned on line 1.

VALR

DISPLAY OF THE FINAL VALIDATION RULE SCREEN : CODES H TO J

This screen is displayed for Validation Rules with Code H to J following the entry of the Keyword/Qualifier with Page 3 specified in the third Header Area field, or on receipt of a valid second Validation Rule screen. Note that it is not possible to access this screen for Validation Rules based on a Standard Rule.

]

TPS3 System Definition

Enter Keyword.Qualifier [VALIDATION RULE.XXXX/XXXX/nn/nnnn

]

] Page [3]

Logical Field Name..... XXXXXXXXXXXXX

Number of Decimal Places.....[]

Range Check:

Enter Minimum Value.....[]

Enter Maximum Value.....[]

Totalling:

Screen Accumulator 1..[] Batch Accumulator 1..[]
2..[] 2..[]

Accumulator 1 - Add Field to this Accumulator

Accumulator 2 - Compare Field to this Accumulator and Clear

The values displayed in the unprotected areas are from the System Definition File. When inserting a new Validation Rule the values shown on the screen above are displayed.

COMPLETING THE FINAL VALIDATION RULE SCREEN : CODES H TO J

Complete the Definition Area fields, as described below.

1. Number of decimal places

Parameter name: DECIMAL PLACES

Enter the number of decimal places to be present in the reformatted field (in range 1 to 12); or leave blank.

For codes H to J valid fields are always right justified, with any decimal point input removed, and leading and trailing zeros inserted where necessary. Trailing zeros are inserted so that the number of decimal places present in the reformatted field is that specified by this parameter. On input the number of digits entered following the decimal point may not be more than the number specified here.

Where the field is not an integer, for codes H and I enter the number of decimal places in the range 1 to 12; for code J (sterling) enter the number of decimal places in the range 2 to 3. For an integer value, leave this parameter blank.

2. Range Check Minimum

Parameter name: RANGE CHECK MINIMUM

Enter the minimum value in a format consistent with the validation definition; or leave blank.

Where no minimum range check is to take place, this field is left blank. Otherwise the minimum acceptable value is specified in a format consistent with the length of the input field and its validation definition (e.g. appropriate number of decimal places). Note in this regard that the maximum length for range check values is 12 digits.

3. Range Check Maximum

Parameter name: RANGE CHECK MAXIMUM

Enter the maximum value in a format consistent with the validation definition; or leave blank.

Where no maximum range check is to take place, the field is left blank. Otherwise the maximum acceptable value is specified in a format consistent with the length of input field and its validation definition (e.g. appropriate number of decimal places). Note in this regard that the maximum length allowed for range check values is 12 digits. The value entered must be greater than any minimum value specified.

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4. Totalling: Screen Accumulator 1

Parameter name: SCREEN ACCUMULATOR 1

Enter the number of the screen accumulator (range 1 to 7) into which the field is to be added; or leave blank.

The accumulators maintained for screen totalling are zeroised before validating each input. Up to seven separate screen accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits including decimal places). Note that all fields being totalled concurrently into a single accumulator must be defined with the same number of decimal places.

For the input value to be added into a screen accumulator, enter the appropriate accumulator number, in the range 1 to 7; otherwise leave the field blank.

5. Totalling: Batch Accumulator 1

Parameter Name: BATCH ACCUMULATOR 1

Enter the number of the batch accumulator (range 1 to 7) into which the field is to be added; or leave blank.

The accumulators maintained for batch totalling are held in the last 14 words of the User Area of the Terminal Control Record and are therefore cleared by TPS only when the System File is reset or on request by completion of the Batch Accumulator 2 field. It is therefore essential that systems making use of the Batch Totalling facility are designed to ensure either that the Batch Totals are initialised at the start of each totalling transaction, or that having commenced a totalling transaction the operator has to continue to the message which clears the batch total (this is usually achieved by defining the appropriate message types as "no change"). Up to seven separate batch accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits including decimal places). Note that all fields being totalled concurrently into a single accumulator must be defined with the same number of decimal places.

For the input value to be added into a batch accumulator, enter the appropriate accumulator, in the range 1 to 7; otherwise leave the field blank.

6. Totalling: Screen Accumulator 2

Parameter name: SCREEN ACCUMULATOR 2

Enter the number of the screen accumulator (range 1 to 7) which is to be cleared following comparison with the field; or leave blank.

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The accumulators maintained for screen totalling are zeroised before validating each input. Up to seven separate screen accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits including decimal places). This therefore implies that the field against which the accumulator total is to be compared may not exceed 12 digits in length. Note that the field for comparison must be defined with the same number of decimal places as the fields being totalled.

For the value input to be compared with a screen accumulator, enter the appropriate accumulator number, in the range 1 to 7. Where the two values are equal, the accumulator is cleared (i.e. zeroised) and may be reused for subsequent input fields. If the input value is not to be compared with a screen accumulator, leave the field blank.

Example of screen totalling:

ABCD]

```

[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
                [C ]

```

Each line of the screen above consists of three value fields ("A") which produce a line subtotal ("B"). A grand total ("C") is the sum of the subtotals.

The following totalling validation would be specified for this screen.

```

Fields 'A' : Screen Accumulator 1 : 1
            Screen Accumulator 2 : blank

```

```

Fields 'B' : Screen Accumulator 1 : 2
            Screen Accumulator 2 : 1

```

```

Fields 'C' : Screen Accumulator 1 : blank
            Screen Accumulator 2 : 2

```

7. Totalling: Batch Accumulator 2

Parameter name: BATCH ACCUMULATOR 2

Enter the number of the batch accumulator (range 1 to 7) which is to be cleared following comparison with the field; or leave blank.

The accumulators maintained for batch totalling are held in the the last 14 words of the User Area of the Terminal Control Record and are therefore cleared by TPS only when the System File is reset or

VALR

following successful comparison with an input value as specified by the Batch Accumulator 2 field. It is therefore essential that systems making use of the Batch Totalling facility are designed to ensure either that the Batch Totals are initialised at the start of each totalling transaction, or that having commenced a totalling transaction the operator has to continue to the message which clears the batch total (this is usually achieved by defining the appropriate message types as "no change"). Up to seven separate batch accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits including decimal places). This implies therefore that the field against which the accumulator total is to be compared may not exceed 12 digits in length. Note that the field for comparison must be defined with the same number of decimal places as the fields being totalled.

For the value input to be compared with a batch accumulator, enter the appropriate accumulator number, in the range 1 to 7. Where the two values are equal, the accumulator is cleared (i.e. zeroised). If the input value is not to be compared with a batch accumulator, leave the field blank.

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VALR

**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FINAL VALIDATION
RULE SCREEN : CODES H TO J**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated and the message 'CONFIRMED' returned on line 1.

VALR

DISPLAY OF THE FINAL VALIDATION RULE SCREEN : CODE K

This screen is displayed for Validation Rules with Code K following the entry of the Keyword/Qualifier with Page 3 specified in the third Header Area field, or on receipt of a valid second Validation Rule screen. Note that it is not possible to access this screen for Validation Rules based on a Standard Rule.

]

TPS3 System Definition

Enter Keyword.Qualifier [VALIDATION RULE.XXXX/XXXX/nn/nnnn
[

] Page [3]

Logical Field Name..... XXXXXXXXXXXXX

Range Check:

Earliest Date.....[]
Latest Date.....[]

Enter DDMMYY for a Specific Date
or E+nnnn or E-nnnn where E = Exec Date and
nnnn = Relative No. of Days

The values displayed in the unprotected areas are from the System Definition File. When inserting a new Validation Rule the values shown on the screen above are displayed.

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VALR

COMPLETING THE FINAL VALIDATION RULE SCREEN : CODE K

Complete the Definition Area fields as described below.

1. Earliest Date

Parameter name : EARLIEST DATE

Enter the earliest valid date in format ddmmyy or relative to Executive Date (E-nnnn or E+nnnn); or leave blank.

Where no minimum range check is to take place, this field is left blank. Otherwise the earliest acceptable date is specified, either as ddmmyy or as a value dependent on the date obtained from Executive. Dates relative to the Executive Date are entered in the format E-nnnn or E+nnnn where nnnn gives the number of days before (-) or after (+) the Executive Date which is the earliest acceptable date.

2. Latest Date

Parameter name: LATEST DATE

Enter the latest valid date in format ddmmyy or relative to Executive Date (E-nnnn or E+nnnn); or leave blank.

Where no maximum range check is to take place, the field is left blank. Otherwise the latest acceptable date is specified, either as ddmmyy or as a value dependent on the date obtained from Executive. Dates relative to the Executive Date are entered in the format E-nnnn or E+nnnn where nnnn gives the number of days before (-) or after (+) the Executive Date which is the latest acceptable date. The latest date entered must be after any earliest date specified.

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VALR

**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FINAL VALIDATION
RULE SCREEN : CODE K**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated and the message 'CONFIRMED' returned on line 1.

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VALS

STD VALIDATION RULE : DEFINE STANDARD RULE FOR INPUT VALIDATION

DESCRIPTION Definition of standard validation rule details for use with the Logical Terminal Interface when defining a Validation Rule.

KEYWORD AND QUALIFIER DETAILS

Long Keyword STD VALIDATION RULE

Short Keyword VALS

Qualifier Standard Rule Name

Standard Rule Name

Enter the name of the Standard Rule; up to 12 characters.

A Standard Validation Rule is identified by a name consisting of up to 12 characters, each of which lies within the ICL 64-character set (lower case characters if entered are automatically converted to upper case).

Example entry of Keyword and Qualifier

A Standard Validation Rule named ACCOUNTNO is to be defined

Enter: STD VALIDATION RULE.ACCOUNTNO
 or VALS.ACCOUNTNO

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VALS

SCREEN DISPLAYED IN RESPONSE TO KEYWORD/QUALIFIER ENTRY

]

TPS3 System Definition

Enter Keyword.Qualifier [STD VALIDATION RULE.XXXXXXXXXXX
[

] Page [1]

Validation Code.....[A]

User Validation Routine.....[]

Validation Codes :

- | | |
|----------------------------|------------------|
| A...No Validation | G...Integer |
| B...Alphabetic | H...Pure Numeric |
| C...Alphanumeric | I...Full Numeric |
| D...Alphabetic and Space | J...Sterling |
| E...Alphanumeric and Space | K...Date |
| F...Numeric | |

The values displayed in the unprotected areas are from the System Definition File if the Standard Validation Rule is already present or is being created from an existing rule.

When inserting a new Standard Validation Rule the values shown on the screen above are displayed.

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VALS

COMPLETING THE STANDARD VALIDATION RULE INITIAL SCREEN

To delete an existing Standard Validation Rule, enter 'D' in the second Header Area field. Otherwise complete the Definition Area fields as described below.

1. Validation Code

Parameter name : VALIDATION CODE

Enter an alphabetic code in the range A to K to indicate the basic type of validation required.

The basic type of validation to be applied is specified by an alphabetic Validation Code. This may be one of the following:

- A - No Validation
- B - Alphabetic, characters A to Z only allowed
- C - Alpha-numeric, characters A to Z, 0 to 9 only allowed
- D - Alphabetic with space character allowed
- E - Alpha-numeric with space character allowed
- F - Numeric, characters 0 to 9 only allowed
- G - Integer, 0 to 9 with leading or trailing spaces
- H - Pure numeric, 0 to 9 with mandatory decimal point and leading or trailing spaces
- I - Full numeric, 0 to 9 with optional decimal point, optional leading + or -, and leading or trailing spaces.
- J - Sterling, 0 to 9 with mandatory decimal point, up to three digits following decimal point (third 0 or 5), optional leading + or -, and leading or trailing spaces.
- K - Date, dd/mm/yy or dd/mmyy or dmmm/yy or dmmmyy.

Where the Validation Code is changed, the details relating to the final Standard Validation Rule screen are automatically amended to the default values for the new Code if appropriate (e.g. if change from a character type code (A to E) to a numeric type code (F to J)).

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VALS**2. User Validation Routine**

Parameter name : VALIDATION SUBR

Enter the name of a user-written validation subroutine (up to 12 alpha-numeric characters); or leave blank.

The actions of the Logical Terminal Interface validation software are performed in the following sequence:

- basic validation according to type
- mandatory field and field dependency checking
- reformatting of the field
- additional validation

The additional validation may consist either of standard range checking, totalling and check digit validation or may be performed by a user-written validation subroutine. If the latter option is required, the name of the subroutine is specified in this field as up to 12 alpha-numeric characters. The subroutine must already be defined on the System Definition File (to define a validation subroutine, see Keyword VALIDATION SUBR).

This field is left blank if standard procedures are to be used for additional validation.

VALS

**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED STANDARD VALIDATION
RULE INITIAL SCREEN**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, for a new Standard Validation Rule a record is created on the System Definition File, with default values assigned to the fields which may be entered on subsequent screens. For an amendment, the System Definition File record is updated to reflect new values entered on the initial screen. For an insertion or an amendment, the second Standard Validation Rule screen is displayed (see following page).

For a deletion, the Standard Validation Rule record is removed from the System Definition File and the message 'CONFIRMED' returned on line 1.

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VALS

DISPLAY OF SECOND STANDARD VALIDATION RULE SCREEN

This screen is displayed following the entry of a Keyword/Qualifier with Page 2 specified in the third Header Area field; or on receipt of a correct initial Standard validation rule screen for insertion or amendment functions.

]

TPS3 System Definition

Enter Keyword.Qualifier [STD VALIDATION RULE.XXXXXXXXXXXXXX]
 [] Page [2]

Logical Field Name..... XXXXXXXXXXXXXXXX

Enter 'Y' if Field Mandatory...[] Must be sent...[]

Cross Field Check:

Enter Dependent Field Name..[]
 Validation Required if Dependent Field Present []
 Absent []

0-No Check. 1-Must be Absent. 2-Must be Entered

Reformatting:

Convert to Upper Case..[Y] Left/Right Justify.....[]
 Remove Field Separator.[] Padding Character.....[]
 Output Field Size.....[]

The values displayed in the unprotected areas are from the System Definition File. When inserting a new Standard Validation Rule the values shown on the screen above are displayed.

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VALS

COMPLETING THE SECOND VALIDATION RULE SCREEN

Complete the Definition Area fields as described below.

1. Mandatory Field

Parameter name: FIELD MANDATORY

Enter 'Y' for a mandatory field, or leave blank.

Where a field is defined as mandatory, an error is reported if the field is either not sent, or is spacefilled. For a mandatory field, enter 'Y' in this field; otherwise leave the field blank.

2. Field Must Be Sent

Parameter name: FIELD MUST BE SENT

Enter 'Y' if the field must be sent, or leave blank.

For a field which must be sent, enter 'Y' in this field; otherwise leave the field blank. Note that the specification of the last field on a screen as "must be sent" ensures that the operator always inputs the whole screen (usually by positioning the cursor at 'Home' before pressing Send), thus avoiding any data loss by incorrect positioning of the cursor.

3. Cross Field Checking

Parameter names: DEPENDENT FIELD NAME
DEPENDENT PRESENT
DEPENDENT ABSENT

Cross field checking is not appropriate for Standard Validation Rule definition; the three fields must all be left blank.

4. Conversion to Upper Case

Parameter name: UPPER CASE CONVERSION

Enter 'Y' for conversion of the input field to upper case; or leave blank.

If required, case changes are removed so that the input data is presented in the reformatted message as a single case fixed length field. The characters δ , \uparrow and \leftarrow which on input are normally represented as delta shift pairs (\hat{T} , \hat{U} , \hat{V} , \hat{W}) are converted back to their true values (i.e. octal 74, 75, 76, 77).

For conversion to upper case, 'Y' is entered; otherwise the field is left blank.

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5. Left or Right Justification

Parameter name: JUSTIFICATION

For a field with Validation Code in the range A to E or K, enter 'L' for left or 'R' for right justification; or leave blank.

The Logical Terminal Interface reformatting procedures perform justification according to the Validation Code entered on the initial screen.

For character and date fields (Validation Codes A to E or K) the field is left or right justified according to the justification parameter and padded with trailing or leading spaces. For numeric fields (Validation Codes F to J) valid fields are always right justified and padded with leading zeros. In addition, for codes H to J the decimal point is removed, a leading sign character is inserted and trailing zeros added as appropriate (thus reformatting the field to COBOL DISPLAY-3 standards).

For justification of character fields, enter 'L' for left or 'R' for right justification; otherwise leave the field blank.

6. Field Separators

Parameter name: FIELD SEPARATORS

Enter 'Y' if the field separator preceding this field is to be removed when reformatting the input; or leave blank.

When a Validation Rule is based on Standard Rule details, this field is only relevant if the Validation Header option to remove all field separators has not been specified. If this option has been selected (see Keyword VALIDATION HEADER) all field separators are removed regardless of the field separator option specified for the individual Validation Rules.

Where the option to remove all separators is not selected, the removal of field separators (i.e. ^4 or ^3) is according to the Field Separator indicator for each validation rule. 'Y' is entered for the separator preceding the field to be removed; if this parameter is left blank the separator will be present in the reformatted message.

7. Padding Character

Parameter name: PADDING CHARACTER

Enter the character to be used to fill the field in the reformatted message if it is "not sent".

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VALS

Where a complete field is "not sent" (i.e. is after the cursor when send pressed) the field in the reformatted message is filled with the specified padding character if the padding indicator has been set on the Validation Header (see Keyword VALIDATION HEADER). The padding character specified must lie within the ICL 64-character set (lower case characters if entered are automatically converted to upper case). The default padding character is a space; alternative values are used if there is a requirement to differentiate between a field which is "not sent" and one which is "sent but spacefilled".

Note that if a field is partially sent, it is always padded to the full input length with spaces before validation.

8. Output Field Size

Parameter Name: OUTPUT FIELD SIZE

Enter the length in characters of the field in the reformatted message.

This specifies the length of the field in characters as it is to appear in the reformatted message.

For character fields converted to upper case (Validation Codes A to E) the output field size is usually the length of the input field.

For numeric fields converted to upper case (Validation Codes F to J) the reformatting procedures must be considered in calculating the correct output length (see Programming Manual, Part 1, Section 3.2.1).

For fields not converted to upper case, the output field size allocated must be large enough to cater for the maximum number of shift changes which may occur within the input. In particular the output field size must be at least one character longer than the input field length, as the reformatting procedures always insert a character to indicate the current shift (alpha or beta) at the start of an unconverted field in the reformatted message.

VALS

**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED SECOND STANDARD
VALIDATION RULE SCREEN**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated. The final validation rule screen is then displayed. The version of the final screen displayed depends on the Validation Code specified (see following sections).

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VALS

DISPLAY OF THE FINAL STANDARD VALIDATION RULE SCREEN : CODES A TO E

This screen is displayed for Standard Validation Rules with Code A to E following the entry of the Keyword/Qualifier with Page 3 specified in the third Header Area field, or on receipt of a valid second standard validation rule screen.

]

TPS3 System Definition

Enter Keyword.Qualifier [STD VALIDATION RULE.XXXXXXXXXXXXXX
[

] Page [3]

Logical Field Name..... XXXXXXXXXXXXXXXX

Table Check:

Enter Data..[

]

The values displayed in the unprotected area are from the System Definition File. When inserting a new Standard Validation Rule the values shown on the screen above are displayed.

VALS

COMPLETING THE FINAL STANDARD VALIDATION RULE SCREEN : CODES A TO E

Complete the Definition Area field as described below.

1. Table Check Data

Parameter Name: TABLE CHECK DATA

Enter details of the range checks to be applied to each character of the field; or leave blank.

For character type fields (Validation Codes A to E) a table may be set up consisting of a set of range values to be applied to each character in the field. Separate ranges may be specified for each character in the field. Where the number of ranges defined is less than the number of characters in the field, the last range is used for the validation of all remaining characters.

Each range is specified by parameters enclosed by parentheses. The parameters, which are separated from each other by commas and specify the values which may validly be entered, may be either a character pair indicating the start and end of a range, or SP indicating a space, or NC indicating that no check is required.

Example: A seven character field has the first two characters alpha numeric, the third alphabetic or hyphen or space, the fourth any value, and the remainder numeric.

The required table check data is

(09,AZ) (09,AZ) (AZ,—,SP) (NC) (09)

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VALS

**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FINAL VALIDATION
RULE SCREEN : CODES A TO E**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated and the message 'CONFIRMED' returned on line 1.

VALS

DISPLAY OF THE FINAL STANDARD VALIDATION RULE SCREEN : CODES F AND G

This screen is displayed for Validation Rules with Code F or G following the entry of the Keyword/Qualifier with Page 3 specified in the third Header Area field, or on receipt of a valid second Validation Rule screen.

]

TPS3 System Definition

Enter Keyword.Qualifier [STD VALIDATION RULE.XXXXXXXXXXXXXX]
[] Page [3]

Logical Field Name..... XXXXXXXXXXXXX

Range Check:

Enter Minimum Value.....[]
Enter Maximum Value.....[]

Totalling:

Screen Accumulator 1..[] Batch Accumulator 1..[]
2..[] 2..[]

Accumulator 1 - Add Field to this Accumulator
Accumulator 2 - Compare Field to this Accumulator and Clear

Check Data:

Enter Modulus [] and Weights []
User Validation Routine.....[]

The values displayed in the unprotected area are from the System Definition File. When inserting a new Standard Validation Rule the values shown on the screen above are displayed.

COMPLETING THE FINAL STANDARD VALIDATION RULE SCREEN : CODES F AND G

Complete the Definition Area fields as described below.

1. Range check minimum

Parameter name: RANGE CHECK MINIMUM

Enter the minimum value as an integer; or leave blank.

Where no minimum range check is to take place, this field is left blank. Otherwise the minimum acceptable value is specified as an integer. The value entered must be consistent with the length of the input field; the maximum length allowed for range check values is 12 digits.

2. Range check maximum

Parameter name: RANGE CHECK MAXIMUM

Enter the maximum value as an integer; or leave blank.

Where no maximum range check is to take place, the field is left blank. Otherwise the maximum acceptable value is specified as an integer. The value entered must be greater than any minimum value specified and must be consistent with the length of the input field; the maximum length allowed for range check values is 12 digits.

3. Totalling: Screen Accumulator 1

Parameter name: SCREEN ACCUMULATOR 1

Enter the number of the screen accumulator (range 1 to 7) into which the field is to be added; or leave blank.

The accumulators maintained for screen totalling are zeroised before validating each input. Up to seven separate screen accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits). Note that all the fields being totalled concurrently into a single accumulator with fields of code F or G must be integers.

For the input value to be added into a screen accumulator, enter the appropriate accumulator number, in the range 1 to 7; otherwise leave the field blank.

4. Totalling: Batch Accumulator 1

Parameter Name: BATCH ACCUMULATOR 1

Enter the number of the batch accumulator (range 1 to 7) into which the field is to be added; or leave blank.

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The accumulators maintained for batch totalling are held in the last 14 words of the User Area of the Terminal Control Record and are therefore cleared by TPS only when the System File is reset, or on request by completion of the Batch Accumulator 2 field. It is therefore essential that systems making use of the Batch Totalling facility are designed to ensure either that the Batch Totals are initialised at the start of each totalling transaction, or that having commenced a totalling transaction the operator has to continue to the message which clears the batch total (this is usually achieved by defining the appropriate message types as 'no change'). Up to seven separate batch accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits). Note that all the fields being totalled concurrently into a single accumulator with fields of Type F or G must be integer.

For the input value to be added into a batch accumulator, enter the appropriate accumulator, in the range 1 to 7; otherwise leave the field blank.

5. Totalling: Screen Accumulator 2

Parameter name: SCREEN ACCUMULATOR 2

Enter the number of the screen accumulator (range 1 to 7) which is to be cleared following comparison with the field; or leave blank.

The accumulators maintained for screen totalling are zeroised before validating each input. Up to seven separate screen accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits). This therefore implies that the field against which the accumulator total is to be compared may not exceed 12 digits in length. Note that a field of Code F or G may only validly be compared against a total of integer fields.

For the value input to be compared with a screen accumulator, enter the appropriate accumulator number, in the range 1 to 7. Where the two values are equal, the accumulator is cleared (i.e. zeroised) and may be reused for subsequent input fields. If the input value is not to be compared with a screen accumulator, leave the field blank.

Example of screen totalling:

ABCD]

```
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
                [C ]
```


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VALS

Each line of the screen above consists of three value fields ("A") which produce a line subtotal ("B"). A grand total ("C") is the sum of the subtotals.

The following totalling validation would be specified for this screen.

Fields 'A' : Screen Accumulator 1 : 1
Screen Accumulator 2 : blank

Fields 'B' : Screen Accumulator 1 : 2
Screen Accumulator 2 : 1

Field 'C' : Screen Accumulator 1 : blank
Screen Accumulator 2 : 2

6. Totalling: Batch Accumulator 2

Parameter name: BATCH ACCUMULATOR 2

Enter the number of the batch accumulator (range 1 to 7) which is to be cleared following comparison with the field; or leave blank.

The accumulators maintained for batch totalling are held in the last 14 words of the User Area of the Terminal Control Record and are therefore cleared by TPS only when the System File is reset or following successful comparison with an input value as specified by the Batch Accumulator 2 field. It is therefore essential that systems making use of the Batch Totalling facility are designed to ensure either that the Batch Totals are initialised at the start of each totalling transaction, or that having commenced a totalling transaction the operator has to continue to the message which clears the batch total (this is usually achieved by defining the appropriate message types as "no change"). Up to seven separate batch accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits). This implies therefore that the field against which the accumulator total is to be compared may not exceed 12 digits in length. Note that a field of Code F or G may only validly be compared against a total of integer fields.

For the value input to be compared with a batch accumulator, enter the appropriate accumulator number, in the range 1 to 7. Where the two values are equal, the accumulator is cleared (i.e. zeroised). If the input value is not to be compared with a batch accumulator, leave the field blank.

7. Standard Check Digit Data

Parameter name: CHECK DIGIT STD DATA

Enter the modulus and weightings to be applied to the characters or leave both fields blank.

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VALS

The standard check digit validation is available for numeric fields with numeric check digits which occur as the last character in the field. Where appropriate the input field is right justified with leading zeros inserted before the check digit validation is applied.

The standard check digit validation operates as follows:

Given a field of output length n (i.e. characters x_1, x_2, \dots, x_n), a modulus (m) is specified and also one or more weighting constants (say w_1, \dots, w_p , where p is less than n). Then

$$\text{if } A = w_1x_1 + \dots + w_px_p + w_1x_{p+1} + \dots + w_yx_{n-1}$$

(i.e. weights are repeated until all digits of the output field excepting the check digit have been exhausted)

and if $B = A$ divided by m , remainder C

then the calculated check digit is zero if C equals zero, or otherwise is $(m-C)$. This calculated value is then compared with the last character of the value input. Note that the check digit is always reported as invalid if the calculated check digit value is not in the range 0 to 9.

Where standard check digit validation is required, enter the appropriate modulus and weights. The modulus is specified as an integer in the range 2 to 11. The weightings to be applied to the characters of the field are specified as single digit integers, separated by commas. As illustrated above, the first weighting applies to the most significant digit of the field.

8. User Check Digit Subroutine

Parameter name: CHECK DIGIT SUBR

Enter the name of a user-written check digit validation subroutine (up to 12 alphanumeric characters); or leave blank.

For numeric integer fields, non-standard check digit procedures may be performed by a user-written check digit validation subroutine. If this option is required, the name of the subroutine is specified in this field as up to 12 alphanumeric characters. The subroutine must already be defined on the System Definition File (to define a check digit subroutine, see Keyword VALIDATION SUBR). If this field is entered, both standard check digit data fields must be left blank. This field is left blank if the standard check digit validation or no check-digit validation is required.

Note that check digit validation for fields with a basic validation code other than F or G may be incorporated only by the use of a user written subroutine for all addition validation.

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VALS

**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FINAL STANDARD
VALIDATION RULE SCREEN : CODES F AND G**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated and the message 'CONFIRMED' returned on line 1.

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VALS

DISPLAY OF THE FINAL STANDARD VALIDATION RULE SCREEN : CODES H TO J

This screen is displayed for Standard Validation Rules with Code H to J following the entry of the Keyword/Qualifier with Page 3 specified in the third Header Area field, or on receipt of a valid second Standard Validation Rule screen.

]

TPS3 System Definition

Enter Keyword.Qualifier [STD VALIDATION RULE.XXXXXXXXXXXXXX]
[] Page [3]

Logical Field Name..... XXXXXXXXXXXXXXXX

Number of Decimal Places.....[]

Range Check:

Enter Minimum Value.....[]
Enter Maximum Value.....[]

Totalling:

Screen Accumulator 1..[] Batch Accumulator 1..[]
2..[] 2..[]

Accumulator 1 - Add Field to this Accumulator
Accumulator 2 - Compare Field to this Accumulator and Clear

The values displayed in the unprotected areas are from the System Definition File. When inserting a new Standard Validation Rule the values shown on the screen above are displayed.

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VALS**4. Totalling: Screen Accumulator 1**

Parameter name: SCREEN ACCUMULATOR 1

Enter the number of the screen accumulator (range 1 to 7) into which the field is to be added; or leave blank.

The accumulators maintained for screen totalling are zeroised before validating each input. Up to seven separate screen accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits including decimal places). Note that all fields being totalled concurrently into a single accumulator must be defined with the same number of decimal places.

For the input value to be added into a screen accumulator, enter the appropriate accumulator number, in the range 1 to 7; otherwise leave the field blank.

5. Totalling: Batch Accumulator 1

Parameter Name: BATCH ACCUMULATOR 1

Enter the number of the batch accumulator (range 1 to 7) into which the field is to be added; or leave blank.

The accumulators maintained for batch totalling are held in the last 14 words of the User Area of the Terminal Control Record and are therefore cleared by TPS only when the System File is reset or on request by completion of the Batch Accumulator 2 field. It is therefore essential that systems making use of the Batch Totalling facility are designed to ensure either that the Batch Totals are initialised at the start of each totalling transaction, or that having commenced a totalling transaction the operator has to continue to the message which clears the batch total (this is usually achieved by defining the appropriate message types as "no change"). Up to seven separate batch accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits including decimal places). Note that all fields being totalled concurrently into a single accumulator must be defined with the same number of decimal places.

For the input value to be added into a batch accumulator, enter the appropriate accumulator, in the range 1 to 7; otherwise leave the field blank.

6. Totalling: Screen Accumulator 2

Parameter name: SCREEN ACCUMULATOR 2

Enter the number of the screen accumulator (range 1 to 7) which is to be cleared following comparison with the field; or leave blank.

COMPLETING THE FINAL STANDARD VALIDATION RULE SCREEN : CODES H TO J

Complete the Definition Area fields, as described below.

1. Number of decimal places

Parameter name: DECIMAL PLACES

Enter the number of decimal places to be present in the reformatted field (in range 1 to 12); or leave blank.

For codes H to J valid fields are always right justified, with any decimal point input removed, and leading and trailing zeros inserted where necessary. Trailing zeros are inserted so that the number of decimal places present in the reformatted field is that specified by this parameter. On input the number of digits entered following the decimal point may not be more than the number specified here.

Where the field is not an integer, for codes H and I enter the number of decimal places in the range 1 to 12; for code J (sterling) enter the number of decimal places in the range 2 to 3. For an integer value, leave this parameter blank.

2. Range Check Minimum

Parameter name: RANGE CHECK MINIMUM

Enter the minimum value in a format consistent with the validation definition; or leave blank.

Where no minimum range check is to take place, this field is left blank. Otherwise the minimum acceptable value is specified in a format consistent with the length of the input field and its validation definition (e.g. appropriate number of decimal places). Note in this regard that the maximum length for range check values is 12 digits.

3. Range Check Maximum

Parameter name: RANGE CHECK MAXIMUM

Enter the maximum value in a format consistent with the validation definition; or leave blank.

Where no maximum range check is to take place, the field is left blank. Otherwise the maximum acceptable value is specified in a format consistent with the length of input field and its validation definition (e.g. appropriate number of decimal places). Note in this regard that the maximum length allowed for range check values is 12 digits. The value entered must be greater than any minimum value specified.

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The accumulators maintained for screen totalling are zeroised before validating each input. Up to seven separate screen accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits including decimal places). This therefore implies that the field against which the accumulator total is to be compared may not exceed 12 digits in length. Note that the field for comparison must be defined with the same number of decimal places as the fields being totalled.

For the value input to be compared with a screen accumulator, enter the appropriate accumulator number, in the range 1 to 7. Where the two values are equal, the accumulator is cleared (i.e. zeroised) and may be reused for subsequent input fields. If the input value is not to be compared with a screen accumulator, leave the field blank.

Example of screen totalling:

ABCD]

```

[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
[A ][A ][A ][B ]
                [C ]

```

Each line of the screen above consists of three value fields ("A") which produce a line subtotal ("B"). A grand total ("C") is the sum of the subtotals.

The following totalling validation would be specified for this screen.

Fields 'A' : Screen Accumulator 1 : 1
 Screen Accumulator 2 : blank

Fields 'B' : Screen Accumulator 1 : 2
 Screen Accumulator 2 : 1

Fields 'C' : Screen Accumulator 1 : blank
 Screen Accumulator 2 : 2

7. **Totalling: Batch Accumulator 2**

Parameter name: BATCH ACCUMULATOR 2

Enter the number of the batch accumulator (range 1 to 7) which is to be cleared following comparison with the field; or leave blank.

The accumulators maintained for batch totalling are held in the the last 14 words of the User Area of the Terminal Control Record and are therefore cleared by TPS only when the System File is reset or

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following successful comparison with an input value as specified by the Batch Accumulator 2 field. It is therefore essential that systems making use of the Batch Totalling facility are designed to ensure either that the Batch Totals are initialised at the start of each totalling transaction, or that having commenced a totalling transaction the operator has to continue to the message which clears the batch total (this is usually achieved by defining the appropriate message types as "no change"). Up to seven separate batch accumulators may be maintained; for each accumulator the total is held as a double length binary word (i.e. maximum length 12 digits including decimal places). This implies therefore that the field against which the accumulator total is to be compared may not exceed 12 digits in length. Note that the field for comparison must be defined with the same number of decimal places as the fields being totalled.

For the value input to be compared with a batch accumulator, enter the appropriate accumulator number, in the range 1 to 7. Where the two values are equal, the accumulator is cleared (i.e. zeroised). If the input value is not to be compared with a batch accumulator, leave the field blank.

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**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FINAL STANDARD
VALIDATION RULE SCREEN**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated and the message 'CONFIRMED' returned on line 1.

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COMPLETING THE FINAL STANDARD VALIDATION RULE SCREEN : CODE K

Complete the Definition Area fields as described below.

1. Earliest Date

Parameter name : EARLIEST DATE

Enter the earliest valid date in format ddmmyy or relative to Executive Date (E-nnnn or E+nnnn); or leave blank.

Where no minimum range check is to take place, this field is left blank. Otherwise the earliest acceptable date is specified, either as ddmmyy or as a value dependent on the date obtained from Executive. Dates relative to the Executive Date are entered in the format E-nnnn or E+nnnn where nnnn gives the number of days before (-) or after (+) the Executive Date which is the earliest acceptable date.

2. Latest Date

Parameter name: LATEST DATE

Enter the latest valid date in format ddmmyy or relative to Executive Date (E-nnnn or E+nnnn); or leave blank.

Where no maximum range check is to take place, the field is left blank. Otherwise the latest acceptable date is specified, either as ddmmyy or as a value dependent on the date obtained from Executive. Dates relative to the Executive Date are entered in the format E-nnnn or E+nnnn where nnnn gives the number of days before (-) or after (+) the Executive Date which is the latest acceptable date. The latest date entered must be after any earliest date specified.

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VALS

**ACTION BY THE SYSTEM ON RECEIPT OF THE COMPLETED FINAL STANDARD
VALIDATION SCREEN**

The input fields are checked to ensure that they are valid. Where an error is detected an appropriate error message is displayed on line 1 and the cursor positioned at the first field in error.

Where all details entered are valid, the System Definition File is updated and the message 'CONFIRMED' returned on line 1.

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DISPLAY OF THE FINAL STANDARD VALIDATION RULE SCREEN : CODE K

This screen is displayed for Standard Validation Rules with Code K following the entry of the Keyword/Qualifier with Page 3 specified in the third Header Area field, or on receipt of a valid second Standard Validation Rule screen.

]

TPS3 System Definition

Enter Keyword.Qualifier [STD VALIDATION RULE.XXXXXXXXXXXXXX
[

] Page [3]

Logical Field Name..... XXXXXXXXXXXXXXXX

Range Check:

Earliest Date.....[]
Latest Date.....[]

Enter DDMMYY for a Specific Date
or E+nnnn or E-nnnn where E = Exec Date and
nnnn = Relative No. of Days

The values displayed in the unprotected areas are from the System Definition File. When inserting a new Standard Validation Rule the values shown on the screen above are displayed.