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TANDBERG DATA

TDV 2100 SERIES

PRELIMINARY

SPECIFICATION FOR
XMON/P
FORM HANDLER

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T A N D B E R G

XMON/P

FORM HANDLER

Preliminary specification

JULY — 1977

Contents ..

This documentation was produced on a Tandberg TDV-2114 display unit.

The firmware monitor XMON/P is intended for use with the TDV-2116 display unit.

The TDV-2116 has a large 16 inch screen with easy-to-read characters. The XMON/P firmware makes it an intelligent and flexible display unit.

The unit may be used

- as a local station for editing of messages for subsequent transmission to a host computer
- as a teletype replacement
- as a forms controlled data entry and retrieval station

Options include storage for up to eight forms, and attachment of printer.

The TDV-2116 Keyboard is based on the ECMA international type of keyboard, but is extended with text processing and data entry applications in mind. The Keyboard layout is shown in fig.1, and the generated codes in fig. 2.

The code allocation of function keys are shown in table 1 below.

The meaning of the individual function keys are dependent on the mode in which the TDV-2116 operates, and is described for each mode in section 7.

When power is turned on, the TDV-2116 is placed in the FORM-mode. By use of function keys, the unit may be put in the DATA-mode, BLOCK-mode or TELETYPE-mode. The difference between these modes of operation will be clear from the subsequent sections.

Except when in TELETYPE mode, the upper line on the screen (line 0) are used to show the status at any given moment. Error messages and unsolicited messages from the host computer are also shown on this line, called the "status line".

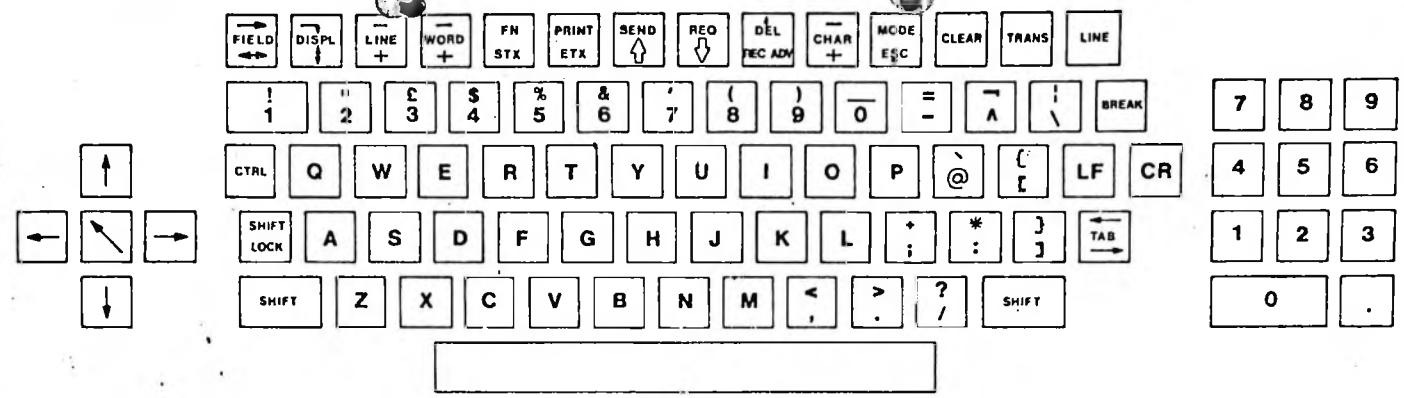
When an error situation is detected, an audible alarm (BEL) is given and input from the keyboard is ignored until the MODE-key is depressed to clear the error condition.

In ROLL and line insert/delete functions, the 24 line screen is extended by one hidden line "above" and one "below". See section 2.8 for details.

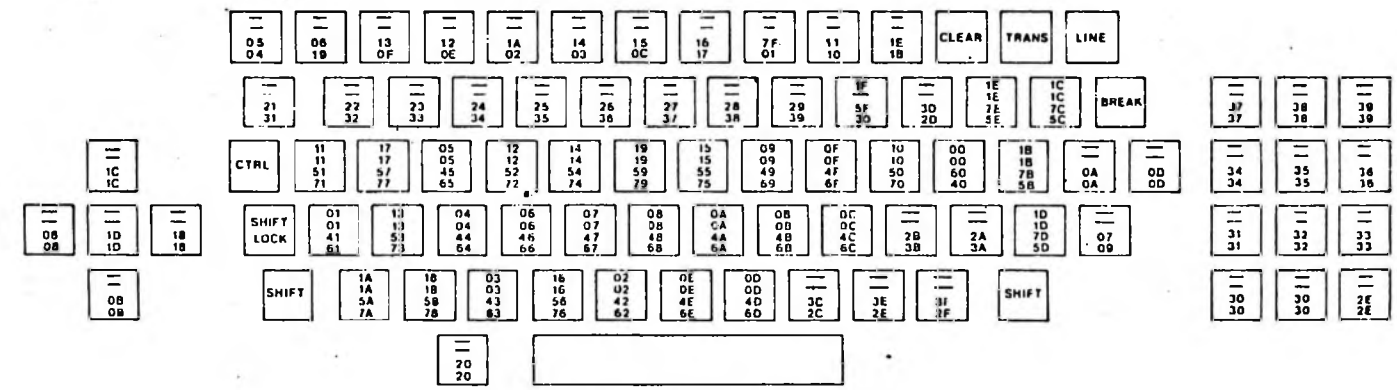
XMON/P Control Character Assignment

00 Not used	10 CHAR +
01 REC ADV	11 CHAR -
02 STX	12 WORD -
03 ETX	13 LINE -
04 FIELD <->	14 PRINT
05 FIELD ->	15 SEND
06 DISPL -V	16 REQ
07 TAB <-	17 ⇩ (ROLL DOWN)
08 <-	18 ->
09 TAB ->	19 DISPL ⇕ (ERASE ALL)
0A LF	1A FN
0B ↓ (DOWN CURSOR)	1B ESC
0C ⇧ (ROLL UP)	1C ↑ (UP CURSOR)
0D CR	1D ↖ (HOME CURSOR)
0E WORD +	1E MODE
0F LINE +	1F Not used

7F DEL



ECMA 2116 KEYBOARD



HEXADECIMAL CODES FOR ECMA 2116 KEYBOARD

CTRL+SHIFT
CTRL
SHIFT
UNSHIFT

EACH KEY HAS FOUR POSSIBLE MODES
— MEANS THAT NO CODE IS GENERATED
KEYS WITH TEXT ARE DC FUNCTION KEYS

The following keys depressed immediately after the MODE-key are recognized by XMON/F. Use of other keys causes the message MODE ERROR to appear on the status line.

B ---- Select block mode
Tranfers the terminal from the FORM-mode to the BLOCK-mode (see section 4).

C ---- Position cursor
Valid in FORM-mode and BLOCK-mode. The desired cursor position (line 1-24 and character 0-79) is typed as two decimal numbers (each one or two digits) separated by a space and terminated by CR.
The cursor is positioned, and the mode is not changed. (See section 6.1).

D ---- Enter DATA-mode
All unprotected fields (except those marked as 'do not clear') are cleared. The cursor moves to the first character of the first unprotected field. Valid in FORM-mode and DATA-mode only. (See section 3).

E ---- No clear DATA-mode
As D, but no fields are cleared. (See section 3).

F ---- Enter FORM-mode
Position to the home position and prepare to edit the current form. (See section 2).

H ---- Send message to host
Valid in DATA and FORM mode. The message typed on the status line will be sent directly to the host regardless of the current status of the TDV-2114 (See section 2.6).

J ---- Set/clear TAB-stop
Valid in BLOCK and FORM mode.
The character position which the cursor is currently at will get a TABstop set if the next character typed is +, cleared if it is -. (See section 6.2).

M ---- Maintenance
This mode is used by service personell for unit check and fault diagnosis. (See section 10).

P ---- Define protected field
This sub-mode of FORM-mode is described in detail below. (See section 2.1).

Q ---- Terminate host connection
The host is informed that the connection should be terminated (See section 2.7).
Valid in FORM and DATA mode only.

R ---- Retrieve form (0-7)
The form previously stored under the specified number (0-7) is retrieved on the screen. Valid in FORM and BLOCK mode only. Enters DATA-mode. (See section 3.4).

S ---- Save form (option)
The form currently displayed is saved under the specified number. Valid in FORM-mode only. (See section 2.4).

T ---- Teletype mode
The unit will operate as a teletype. Valid in FORM- and BLOCK-mode only. (See section 5).

U ---- Define unprotected field
This sub-mode of FORM-mode is described in detail below (see section 2.2).

1.2 2.1.4 Mode sequences

G ---- Get data
Read next record from input file on diskette. (See sections 9.3).

---- Define input data/format
Dependent on the mode, this command specifies which data set should be used as input, or a form to be loaded. (See section 9.4, 9.5).

O ---- Define output data/format
Dependent on the mode, this command specifies the output data set or that a form should be written. (See section 9.6, 9.7).

W ---- Write data
This command initiates output of a data record (See section 9.2).

X ---- Close output file
The currently open diskette output file is closed. (See section 9.8).

---- Return to TOS
Valid in FORM and BLOCK-mode only. Returns to the operating system (TOS). (See section 9.1).

2. The FORM-mode

When power is turned on initially, the FORM-mode is entered. The message FORM is shown on the status line, and the current form is one 1920 character unprotected field.

A form is composed by use of MODE P and MODE U sequences together with input of normal or function characters from the keyboard.

The byte preceeding an unprotected or a protected field is reserved for a field control character. It is shown as a blank on the screen.

The field control character contains a bit pattern which defines the video mode and (for unprotected fields) the field type.

2.1 Defining a protected field

To define a protected field:

1. Use non-destructive cursor position characters (or a MODE C sequence) to position to the location immediately preceeding the position where you desire the protected field to start.

2. Depress MODE P. The text PROTECTED FIELD will appear on the status line.

3. Define the video mode by depressing a numeric key according to the following table:

   2 - low intensity
   3 - blink
   4 - inverted video
   5 - underline
   6 - invisible
   7 - normal

4. FORM is again shown on the status line, and you can enter data you want to have in the protected field. This field is considered to end with the next field control character. Note that in FORM-mode field control characters may be freely changed, but this will result in alteration of field definitions.

If during step 3, a character other than those specified is entered from the keyboard, the message DISPLAY MODE ERROR will appear on the status line. The MODE key must be used to clear the error condition, and the entire definition sequence must be repeated.

To define an unprotected field:

1. Position as for protected field.

2. Depress MODE U. The text UNPROTECTED FIELD will appear on the status line.

3. Define the video mode as for protected field.

4. Define the field type by depressing an alphabetic key according to table 2:

5. FORM is again shown on the status line. The unprotected field will extend to the beginning of the next field. The characters typed in an unprotected field when defining a form will be stored as part of the form when saved internally or sent to the host computer for storage.

If during step 3, a character other than those specified for video modes is entered, the message DISPLAY MODE ERROR will appear on the status line. Depressing MODE will clear the error condition.

If during step 4, a character other than those specified is entered, FIELD TYPE ERROR will appear on the status line. Depressing MODE will clear the error condition.

TABLE 2

A Alphanumeric field. No adjustment. Must occur.	B Alphanumeric field. No adjustment. May occur. Cleared.	C Alphanumeric field. No adjustment. May occur. Not cleared.
E Numeric field. No adjustment. Must occur.	F Numeric field. No adjustment. May occur. Cleared.	G Numeric field. No adjustment. May occur. Not cleared.
I Alphanumeric field. Right adjusted. Must occur.	J Alphanumeric field. Right adjusted. May occur. Cleared.	K Alphanumeric field. Right adjusted. May occur. Not cleared.
M Numeric field. Right adjusted with left zero fill. Must occur.	N Numeric field. Right adjusted with left zero fill. May occur. Cleared.	O Numeric field. Right adjusted with left zero fill. May occur. Not cleared.

FIELD TYPE CODES

The detailed description of the action of the function keys are found in section 7.

Edit is done in FORM-mode by using the five cursor control keys, CR and LF. Position by use of these keys (which are non-destructive moves) to the desired position. Any character typed will replace the one formerly in that position. If a field control character is replaced in this fashion, the previous field will be extended.

An alternate way to position the cursor for editing is to use the position cursor mode sequence, see section 6.1 for details.

When using function keys, position cursor as described above, and depress the function key. For delete functions other than delete character, it is sufficient to position within the word/line to be deleted.

If data is required by a function (e.g. insert word), the data entered is terminated by depressing the MODE-key.

2.4 Saving forms internally

The TDV-2116 may be optionally extended to save up to 8 forms internally.

To save a form:

1. Press MODE
2. Type S
3. Type the number of the form (0-7)

Any form stored previously under the same number is lost.

2.5 Saving forms externally

Forms may be stored externally either in a host computer or on a diskette (2114 version only).

When in the FORM-mode, the form currently shown on the screen may be transmitted to the host by depressing the SEND key.

The message TRANSMIT FORM appear on the status line. The desired form name is requested from the operator. The name may be up to 9 characters and is terminated by CR.

For details of the communications protocol see section 3.1.4.

Upon completion of the transmission, return will be made to FORM-mode.

2.6 Sending messages to host

In the FORM and DATA modes, messages may be sent to the host independent of the function currently performed by the operator by using the mode sequence MODE H.

The cursor is moved to the status line and the operator may type a message or command for the host. The message is terminated by the ESC - key. Any control keys (except <- and DEL which may be used for editing) will be stored as data.

For details of communication protocol see section 8.1.5.

2.7 Terminating host connection

In the FORM and DATA mode, the connection to the host may be (logically) terminated by the sequence MODE Q.

For communication protocol see section 8.1.6.

2.8 Extended screen

In ROLL and line insert/delete functions, the screen is considered to be 26 lines, in that an invisible line called "ABOVE" is added at the top and an invisible line called "BELOW" is added at the bottom. Initially, both ABOVE and BELOW are empty lines. When a ROLL UP function is performed, the top visible line is moved into the ABOVE line, line 24 is filled from the BELOW line, and the BELOW line cleared.

When a ROLL DOWN function is performed, the bottom visible line is moved into the BELOW line, line 1 is filled from the ABOVE line, and the ABOVE line is cleared.

The same type of effect occurs when LINE+ and LINE- functions are used. In these instances only the BELOW line is affected.

The modes discussed in the previous section was used to create, alter and saving forms with fields having special properties. In this section we discuss how data may be entered under control of these forms, how data may be transmitted to and received from host computers, and how local printouts may be made.

The DATA-mode is entered from the FORM-mode by:

- typing MODE D which will clear all unprotected fields (except those marked as 'do not clear', see section 2) and position the cursor to the first position of the first unprotected field before entering the data accept phase.

- typing MODE E which is similar to the one above, except that unprotected fields are not cleared.

- retrieving a form (see sections 3.4, 3.5, 9.5 and 9.7).

As each character is entered, the validity is checked against the defined field type. For numeric fields only the digits (0-9), minus sign and spaces are allowed non-control characters. If an illegal character is entered, the message CHARACTER TYPE ERROR is given on the status line. The MODE-key is used to clear the error condition.

When a field is left either because it is full, by use of TAB-> or CR, the field is right justified if required.

If data was required in a field ("must") and it is blank when the operator attempts to leave it, the cursor will return to the first position of the field, and the message FIELD ERROR appears on the status line. The error condition is cleared by depressing the MODE-key.

For a detailed description of each function key in DATA-mode see section 7.

3.1 Transmitting data

When all unprotected fields of a form has been filled, the message READY TO SEND appears on the status line.

If the operator wants to correct some fields prior to sending the data, the DATA-mode may be reentered by MODE E.

To send the data, the operator simply uses the SEND key. The message on the status line is altered to SENDING DATA.

If no errors were detected in transmission, the DATA-mode is reentered automatically with clear (MODE D).

If a transmission error occured, it is reported on the status line. This error must be acknowledged by the operator by using the MODE-key. Retries may then be attempted by the SEND-key.

Note that all characters typed during transmission will be ignored.

3.2 Receiving from host

To receive data, the operator uses the REQ-key. The message on the status line is changed to RECEIVING DATA.

If no errors were detected in transmission, the DATA-mode is reentered automatically without clear (MODE E).

If a transmission error occured, it is reported on the status line. This error must be acknowledged by the operator by using the MODE-key. Retries may then be attempted by using the REQ-key.

Note that all characters typed during transmission is ignored.

3.3 Printing a page

To print the contents of the screen, the operator depresses the PRINT-key.

The printout is started with a form feed character. A carriage return is inserted at the end of each line, and trailing blanks removed. Field control characters are printed as blanks.

3.4 Retrieving forms internally

If the TDV-2116 is extended to save forms internally (see section 5.4), a saved form may be retrived when in the FORM-mode. After retrieval, the DATA-mode is entered without clear (MODE E) automatically.

To retrieve a form:

1. Press MODE
2. Type R
3. Type the number of the form (0-7)

3.5 Retrieving forms externally

To retrieve a form from the host computer the TDV-2116 must be in FORM-mode.

The REQ-key is used. The message RECEIVE FORM will appear on the status line. The desired form name is requested from the operator. The name may be up to 9 characters and is terminated by CR.

During reception of the form, the screen (including the status line) will be blanked until the entire form is received, or a transmission error is detected.

When the entire form has been received, the DATA-mode is automatically entered without clear (MODE E).

If errors were detected during transmission, the appropriate error message is shown on the status line. The operator must acknowledge the error by using the MODE-key to clear the error condition. In this case, the FORM-mode is entered, and if desired, the user may reinitiate the request for the form.

3.6 Exchanging data or form with host

If a form is to be stored and another loaded from the host, the REC ADV key may be used. The operator is then first asked under which name the form should be stored. When the storing operation is complete, the name of the desired form is requested from the operator, and this form is fetched from the host.

In the DATA mode, use of the REC-ADV key will cause the current data to be sent to the host, and new data to be requested.

In the BLOCK-mode, the user may edit blocks of text for transmission to the host computer, and may also receive blocks of text.

A block of text is defined as a sequence of characters preceeded by an STX character and succeeded by an ETX character. The character sequence itself may not contain STX or ETX characters.

In the transmission, the STX and ETX characters is sent as part of the message.

In the BLOCK-mode, the user may freely edit his page, dividing it into as many blocks as he wants. When a particular block should be transmitted to the host, the operator positions the cursor somewhere within that block and presses the SEND-key. The message SEND BLOCK will appear on the status line.

When transmission is complete, return is made to the BLOCK-mode for subsequent editing or reception of data.

If errors were detected during transmission, the appropriate error message is shown on the status line. The operator may clear the error condition by using the MODE-key.

The cursor location is unchanged. Thus repetition of a block more than once may be done by repeatedly using the SEND-key.

Note that characters keyed in during transmission is ignored.

To receive a block from the host computer, the operator locates the cursor to within the block where he wants message reception to start and uses the REQ-key to request data. The cursor will be moved back to the nearest STX character on the screen, and the message will start immediately after that STX.

Note that a message may erase STX end ETX characters from the screen if the block size overlaps with previously defined blocks.

During reception, the message RECEIVE BLOCK is shown on the status line.

Note that characters typed on the Keyboard during reception is ignored.

If during transmission, errors are detected, the appropriate error message is displayed on the status line.

If no errors was detected, return is made to the BLOCK-mode with the cursor located on a STX character which is inserted immediately after the ETX of the received message. This allows the operator to directly request the next message by using the REQ-Key.

The TELETYPE-mode may be entered from the FORM- and BLOCK-mode. The entire screen - including the status line - is cleared and the cursor is put in the true home position.

The unit will now act as a TDV-2115 (teletype replacement).

Exit from the TELETYPE-mode may only be done by using the Reset-buttom on the unit or by turning power off and on again.

For detailed description of the character set and action of the various control characters consult the TDV-2115 documentation.

6.1 Position cursor

Typing MODE C followed by two one or two digit decimal numbers separated by a space will position the cursor to the designated line and character.

This mode sequence is only valid when in FORM- or BLOCK-mode.

6.2 Set/clear TABstops

Typing

MODE J +

will set a TABstop in the current cursor position. Note that this will have effect for all 24 lines.

Typing

MODE J -

will clear the TABstop in the current cursor position if set.

This MODE-sequence may be used when in FORM-mode or BLOCK-mode.

7. Meaning of function Keys

This section defines in detail the meaning of the individual function Keys in the different modes.

The Keys are listed in ascending numerical order according to the code generated by the Keyboard (see Table 1).

01

Form mode :

Send the current form to the host and request a new form.

Data mode :

The data fields of the current record is sent to the host computer and the next data record is requested from the host.

Block mode :

The current block is sent. The unit will then wait for the next block to be sent from the host.

* *

STX

02

Form mode :

Not valid.

Data mode :

Not valid.

Block mode :

The STX character is stored at the current cursor position. This marks the beginning of a block on the screen (for subsequent transfer to the host computer).

The cursor is advanced one position.

If the STX character is inserted in the last position of the screen, the block will wrap-around to the top (excluding the status line).

@3

Form mode :

Not valid.

Data mode :

Not valid.

Block mode :

The ETX character is stored at the current cursor position. This marks the end of a block on the screen (for subsequent transfer to the host computer).

The cursor is NOT advanced, allowing for direct use of the SEND Key for transfer to host.

* *

FIELD
<----->

@4

Form mode :

Erase the current line and position cursor to the first position of the line.

Data mode :

Clear the current unprotected field and position to the first position of the field.

Block mode :

The current block is cleared,i.e. the screen is cleared backwards from the cursor position up to (but not including) the first STX character found, then forwards up to (but not including) the first ETX character found.

The cursor is positioned immediately after the STX character.

If no STX or ETX character was found, the entire screen is cleared.

Wrap-around home position (excluding status line).

ERASE
05

Form mode:

Erase the remaining part of line. Cursor position is not altered.

Data mode:

Clear remaining part of unprotected field. Cursor position is not altered.

Block mode:

The screen is cleared from the cursor position up to (but not including) the first ETX character.

If no ETX character is found, the entire screen is cleared.

Wrap-around home position (excluding status line).

The cursor position is not altered.

* *

DISPL
06

Form mode:

Delete to end of display. All information from the cursor position to the end of line 24 is cleared.

Cursor position is unchanged.

Data mode:

Clear the unprotected fields in remaining ("lower") part of screen.

Cursor position is unchanged.

Block mode:

The screen is cleared from the cursor position to the end of line 24.

Cursor position is unchanged.

<---
TAB
07

Form mode :

Positions to the preceding tab-stop on the current line, or if none is found to the first position of the line.

Data mode :

Positions to first character of preceeding unprotected field.

If in the first unprotected field, it will position to the first character of that field.

Block mode :

As FORM mode.

* *

<---
08

Form mode :

Moves the cursor (non-destructively) one position to the left on the current line.

No effect if the cursor is in the first position of the line.

Data mode :

Moves the cursor (non-destructively) one position to the left in the current unprotected field.

No effect if the cursor is in the first position of the field.

Block mode :

Move the cursor (non-destructively) one position to the left with line wrap-around.

If the cursor is moved to a STX or ETX character, BEL will be sounded.

(2 9

Form mode :

Positions to the next tab stop on the current line, or if none is found, to the last character of the line.

Data mode :

Position to the first character of the next unprotected field.

If in the last unprotected field, exit from this field. If legal contents, the message READY TO SEND will appear on the status line.

Block mode :

As in FORM mode.

* *

LF

(2 A

Form mode :

Moves the cursor (non-destructively) to the first character on the next line.

No effect if the cursor is on line 24.

Data mode :

Moves the cursor (non-destructively) to the first character on the next line, provided that this position is within the same unprotected field.

Otherwise, no effect.

Block mode :

Moves the cursor (non-destructively) to the first character on the next line.

If cursor is on line 24, it will move to the first position of line 1.

↓ (Cursor down)

ESC B

Form mode:

Moves the cursor (non-destructively) to the same character position in the line below.

No effect if the cursor is on line 24.

Data mode:

Moves the cursor (non-destructively) to the same character position in the line below, provided that this position is a part of the same unprotected field.

Otherwise, no effect.

Block mode:

Moves the cursor (non-destructively) to the same character position on the line below.

If the cursor is on line 24, it will move to the same position in line 1.

* *

⇧ (Roll up)

ESC C

Form mode:

The contents of the screen (with the exception of the status line) is rolled up one line.

Information in line 1 is moved to the ABOVE-buffer (see section 2.8). Line 24 is filled from the BELOW-buffer. The BELOW-buffer is cleared.

Data mode:

Not valid.

Block mode:

As in FORM mode.

Form mode:

Positions to the first position of the current line.

Data mode:

Early exit from field. The remaining part of the current unprotected field is cleared. The field is checked for validity. If legal, the cursor is positioned to the first character of the next unprotected field (if any) or the message READY TO SEND is shown and SEND or other control functions is expected (see section 3.1).

If the field contents was illegal, BEL is sounded, and cursor is positioned to the first character of the unprotected field. The appropriate error message is shown on the status line. The error condition must be cleared by depressing MODE before reentry of the field can be made.

Block mode:

Positions to the first position of the current line.

Form mode :

The characters from the cursor position to the end of the line are moved one character to the right. The message INSERT WORD appear on the status line.

For each character typed, the remaining part of the line and the cursor is moved one character to the right.

Information at the end of the line is lost.

The word is terminated by depressing any control key (with the exception of ESC). A control key code may be entered as data by first depressing ESC and then the control key.

Data mode :

As in FORM-mode, but characters are moved right until the end of the unprotected field. Characters may overflow to the next line if the unprotected field extends over more than one line.

Block mode :

As in FORM-mode.

Form mode :

Insert line. Inserts an erased line above the one which the cursor is on. The remaining information is pushed one line down.

The information in line 24 is moved to the BELOW-buffer (see section 2.8). The previous contents of the buffer is lost.

Cursor is positioned to the first character of the new line.

Data mode :

Not valid.

Block mode :

As FORM-mode.

Form mode :

Moves characters in the current line from the cursor position to the end of the line one character to the right. Inserts a space in the cursor position and is ready to accept a character there. The character in the last position of the line is lost.

Data mode :

Prepare to insert a character by moving the remaining part of the field one character to the right. The last character of the field contents is lost.

Block mode :

As in FORM mode.

* *

CHAR

1 1

Form mode :

Removes the character in the cursor position and moves the remainder of the line one character to the left. A space is inserterd as the last character of the line.

Data mode :

Delete character and remove the remainder of the field one character to the left. A blank is inserted as the last character of the field.

Block mode :

As in FORM mode.

I. 2

Form mode :

Delete the word which the cursor is currently pointing to.

The deletion will logically be done as follows:

- If the cursor points to a blank charater, no effect.

- The character in the cursor position is deleted, and the remaining part of the line is moved one character to the left. This operation is repeated as long as the character in the cursor position is not a blank , a field control character, STX or ETX.

- The cursor is moved one character to the left, and the character there is deleted. The remaining part of the line is moved one character to the left. This operation is repeated until either a blank, a field definition character, STX or ETX has been deleted, or the beginning of line reached.

Data mode :

As in FORM-mode, but:

1) Characters are moved left until the end of the unprotected field only. Characters may pass from one line to the line above if the unprotected field extends over more than one line.

2) The operation is not terminated when the beginning of a line is encountered.

3) If the operation is terminated by reaching the field control character it is not deleted.

Block mode :

As in FORM-mode.

LINE

3.3

Form mode:

Delete the line which the cursor is currently on.

The lines below are moved up, and line 24 is filled from the BELOW line. The BELOW line is cleared (See section 2.8).

Cursor position is unchanged.

Data mode:

Not valid.

Block mode:

As FORM-mode.

* *

PRINT

3.4

Form mode:

The contents of the screen is printer on the (optionally) attached line printer.

The printout is preceeded by a Form Feed character. Field control characters are replaced by blanks.

Trailing blanks are removed from the lines, and CR inserted.

Data mode:

As FORM-mode. Cursor position is unchanged. If data has not been entered in all fields, PRINT must be depressed twice to have effect.

Block mode:

As FORM-mode. STX and ETX characters are printed as blanks.

1.5

Form mode :

The current form should be transmitted to the host computer for storage. See section 2.5 for details.
See section 8.1.4 for transmission protocol.

Data mode :

The data in the unprotected fields should be sent to the host computer. See section 3.1 for details.
See section 8.1.3 for transmission protocol.

Block mode :

The current block (delimited by a STX on or preceeding the current cursor position and the ETX on or succeeding the current cursor position) is transmitted to the host computer.

* *

REQ

1.6

Form mode :

A form is requested from the host computer. See section 3.5 for details.
For transmission protocol refer to section 8.1.2.

Data mode :

Data is requested from the host computer. See section 3.2 for details.
For transmission protocol refer to section 8.1.1.

Block mode :

A block is requested from the host computer. See section 4 for details.
The message will be stored preceeded by a STX character and followed by an ETX and a STX character. The cursor will be positioned on the last STX character to enable direct reception of next block.

⇩ (Roll down)

Form mode:

The contents of the screen (with the exception of the status line) is rolled down one line.

Information in line 24 is moved to the BELOW buffer and line 1 is filled from the ABOVE buffer. The ABOVE buffer is cleared. (See section 2.8).

Data mode:

Not valid.

Block mode:

As in FORM mode.

* *

-->

1.8

Form mode:

Moves the cursor (non-destructively) one position to the right on the current line. No effect if cursor is in the last position of the line.

Data mode:

Moves the cursor (non-destructively) one position to the right in the current field. No effect if the cursor is in the last position of the field.

Block mode:

Moves the cursor one position to the right with wraparound to beginning of next line or home position. BEL is sounded if cursor is positioned to a STX or an ETX character.

↕

I 9

Form mode :

The entire screen is cleared, and the cursor put in the home position.

Data mode :

All unprotected fields which are not marked as 'noclear' will be cleared, and the cursor positioned to the first location of the first unprotected field.

Block mode :

As in FORM-mode.

* *

FN

I A

Form mode :

This key is meaningful only if a user custom program is installed. A jump to the fixed address 4000 (hex) is executed if location 4000 contains C3 (hex). The A-register contains the mode: 0 - FORM, 1 - DATA, 2 - BLOCK. HL contains the cursor address (H - line, L - character position).

Data mode :

As FORM-mode.

Block mode :

As FORM-mode.

ESC

B

Form mode :

The next character is inserted in the form even if it is a control code.
(Exceptions: ESC and WORD+ codes are not accepted).

Data mode :

The next character is inserted as data even if it is a control code.
(Exceptions: The ESC and WORD+ characters are not accepted).

Block mode :

The next character is inserted as data even if it is a control code. (Exceptions: The ESC and WORD+ characters are not accepted).

* *

↑ (Up cursor)

1 C

Form mode :

Moves the cursor (non-destructively) to the same character position in the line above. No effect if the cursor is on the first line.

Data mode :

Moves the cursor (non-destructively) to the same character position in the line above, provided that this position is within the same unprotected field. Otherwise no effect.

Block mode :

As FORM-mode, but with wrap-around from line 1 to line 24.

↖ (Home cursor)

1D

Form mode:

Moves the cursor (non-destructively) to the home position.

Data mode:

Moves the cursor (non-destructively) to the first position of the first unprotected field.

Block mode:

As FORM-mode.

* *

MODE

1E

Form mode:

Next character is a mode selection character.
Valid characters are: B, C, D, E, F, J, M, P, Q, R, S, T, U
For 2114 version also: I, O, X, Z

Data mode:

Next character is a mode selection character.
Valid characters are: D, E, F, M, Q
For 2114 version also: G, I, O, W, X

Block mode:

Next character is a mode selection character.
Valid characters are: B, C, F, J, M, T
For 2114 version also: G, I, O, W, X, Z

BRODSJYREN

UNNDSPONDANSE

DEL
/F

General:
This Key is used during entry of form names etc. to restart the Keyin, i.e. delete the typed text.

8.1 Formatta mode

The TDV-2116 is equipped with a simple communications protocol oriented towards usage with minicomputers. The protocol may be factory modified to handle special user protocols.

The protocol is based on the following principles:

1. All transmission sequences are initiated from the terminal.

2. For each character sent by the terminal or host, a response is expected from the other.

   The following responses are valid (except in request data, below):

   ACK - indicating error-free reception of a character

   NAK - indicating that the received character had a parity error and should be retransmitted

   ESC - indicating that the receiving unit wants to report an error condition (sent by host only).

3. The 2116 only sends two characters without an intervening response as indicated above when one transmission sequence has been ended and a new one is to be started.

4. The host sends two characters in sequence only when changing direction of data flow (send a form to terminal after it has received the name).

In the following, acknowledgements of individual characters and retransmissions following the rules above has been omitted.

Each request for one new data character is handled as a separate sequence.

For each character desired, the terminal sends the question mark character to the host (?).

Host reply is received by the terminal as either:

1. A valid parity-error-free character

   This character is accepted as a data character. Its reception is not acknowledged.

2. An ESC character.

   This indicates that an end-of-file or error condition has been detected by the host. The receipt of an ESC character is acknowledged by ACK from the terminal. The terminal now expects an error code (binary) indicating the type of error. The error code ESC (1B hex) is used to indicate end-of-file. The error code is acknowledged by the terminal.

3. A character with a parity error.

   The NAK character is sent from the terminal, and a retransmission of the character is expected.

The sequence

ESC ? formname

is sent from the terminal.

Form name is 9 characters, and periods (.) has been substituted for zero value (non-significant) characters.

(Example: The form name XXXXX is transmitted as XXXXX....).

The host replies by sending the form, terminating by ESC ESC to indicate end of form.

The following special sequences are used:

0E hex X Y	indicates that a byte with binary value 16*(X-21hex)+(Y-21hex) is transmitted. This enables transmission of 8 bit characters, such as field control characters. Example: The byte A7 hex is transmitted as 0E 2B 28 hex.
10 hex X Y	indicates cursor positioning to line X-21hex and position Y-21hex.
ESC ESC	indicates end-of-form
ESC X	indicates that error with binary code corrtesponding to the ASCII value of X occured.

8.1.3 Transmit data

The sequence

! data ESC ESC

is sent from the terminal.

8.1.4 Transmit form

The sequence

ESC ! formname form ESC ESC

is transmitted from the terminal.

'formname' is 9 characters long. Cursor positioning sequences and field control characters are encoded as defined in section 8.1.2.

8.1.5 Sending message to host

The following sequence is sent by the terminal:

" message ESC

8.1.6 Terminating host connection

The single character * is sent. AcKnowledgement from host is expected.

8.2 Block mode

A block is sent (and received) as

STX data ETX

with no acknowledgement expected.

9. Modes 2114 version

9.1 Returning to TOS

The form handler program may in an extended form be run on the TDV-2114 under control of the TOS operating system. The command MODE Z is used to return control to the operating system.

9.2 Write data

When in the DATA-mode, the mode sequence MODE W will write data from the unprotected fields onto diskette. After transfer, fields are cleared as for MODE D. The MODE O sequence must have been used previously to establish an output file.

9.3 Read data

When in the DATA-mode, the mode sequence MODE G will read data from the diskette and store in the unprotected fields. The cursor is positioned to the first character of the first unprotected field. The MODE I sequence must have been used previously to establish an input data set.

9.4 Select an input file

When in the DATA-mode, the diskette input data set is selected by a MODE I sequence. The dataset name (up to 9 characters) is requested from the operator.

Any previously assigned dataset is closed.

9.5 Load form

When in the FORM-mode, a form may be loaded by the MODE I sequence. After loading, the DATA-mode is entered without clear (MODE E).

9.6 Select an output file

When in the DATA-mode, the output data set to be used may be created by the MODE O sequence. The operator is asked for the desired dataset name. Any previous open output dataset is closed.

9.7 Write form

When in the FORM-mode, the current form may be stored on diskette by a MODE O sequence. The operator is asked for the desired name (max. 9 characters).

9.8 Close output file

The data output file may be closed by using the mode sequence MODE X. The file will also be automatically closed when returning to the operating system through MODE Z.

9.9 Applicable TOS I/O errors

The error codes are hexadecimal values as shown on the status line when an error occurs.

01

A sector was missing on the diskette.

02

A CRC error occured while reading a diskette sector or a sector header.

03

A timing error occured in a read operation

04

No address mark was found on the diskette.

06

A timing error occured in reading a sector or sector header.

07

The diskette controller was busy for too long. (Machine malfunction, contact service representative).

08

The diskette drive was not ready. Possible source of error: Wrong diskette drive number specified, diskette not inserted, diskette inserted wrong way.

09

The specified output file (or form name) could not be inserted in the diskette directory as this was full. Use TOS utility program DIRPAC to pack the directory.

0A

The specified input file or form name did not exist on the diskette. Check if the name was spelled correctly. Note particularily that a name in uppercase letters is different from the same name in lowercase letters.

0 C

Illegal directory entry. Check whether a 10S-diskette in the Intel format is used. If so, retry the operation. If the error persists, the directory on the diskette has been destroyed.

0 F

Diskette map cannot be located. Check if correct diskette is mounted.

1 0

Non-valid command. (Machine malfunction, consult service engineer).

1 3

Drive number not 0 - 3. Check if acceptable drive number is specified.

2 0

A deleted data record was encountered on the diskette. Retry operation. If error persists, the diskette contents has in some way been distorted.

2 F

No more space on diskette.

3 1

Non-existent file name for input file (data or form).

3 2

Output file with same name already on diskette (data or form).

3 3

No more space on diskette.

In case other error codes should appear, please report this to your local TR service representative.

For maintenance purposes, the command MODE M gives access to certain diagnostic commands. These are not described here, as they are outside the scope of this document.

Messages may be divided into three groups according to their meaning and where they will appear on the status line.

Mode and submode messages appear on the left, and informs the user of the status of the terminal.

Request for form and dataset names appear in the center.

Error messages and special conditions the user should be aware of appears on the right. As long as a message is shown on the right side of the status line, the terminal will not accept input from the keyboard until the MODE Key is depressed to show that the user has seen the message.

3.3.1.1 Mode and submode messages

BLOCK

The terminal is in the BLOCK-mode.

A

The terminal is in the DATA-mode.

DEFINE INPUT

The MODE I sequence has been initiated. This message is shown with the NAME = message, requesting the name of input data

DEFINE OUTPUT

The MODE O sequence has been initiated. This message is shown with the NAME = message, requesting the desired name of output file.

FORM

The terminal is in the FORM-mode.

DATA

This message will be shown while data is transferred from the diskette to the screen.

INSERT WORD

This message will appear when the WORD+ Key has been pressed, and will stay until the word is completed be a control character.

LOAD FORM

This message will appear after MODE I when selected from FORM-mode. The NAME = message will appear at the same time, requesting the name of the desired form from the operator.

MODE SELECT (xxx)(yyy)

xxx and yyy are each a sequence of letters. The message will appear when the MODE-Key is pressed. The letters in the first parenthesis show the valid alternatives on a 2116, the letters in the second group those which in addition may be used on a 2114.

This message will appear after MODE C while cursor coordinates are entered.

PROTECTED FIELD

This message will appear after MODE P while video type is entered.

READY TO SEND

This message will appear when all fields have been filled in DATA-mode.

RECEIVE BLOCK

The message will appear while the terminal is receiving a block.

RECEIVE DATA

This message will be shown in DATA-mode from REQ is depressed until data for the complete form has been received, or an I/O error or end of file has occured.

RECEIVE FORM

This message will be shown in FORM-mode from REQ is pressed, requesting a form until the terminal starts receiving the form.

SEND BLOCK

This message will be shown from SEND-Key is used in BLOCK-mode until the block has been sent.

SEND DATA

This message will be shown from SEND-Key is used in DATA-mode until the data in all unprotected fields have been sent.

SEND FORM

This message will be shown from SEND-Key is used in FORM-mode until the form has been sent.

SEND HOST MESSAGE:

The message will be shown while the operator is typing a text to be sent to the host on the status line.

SET/CLEAR TAB STOP

This message will be shown in a MODE J sequence when the terminal is expecting a + or - for the tab-stop.

UNPROTECTED FIELD

This message will be shown while the operator enter video mode and field type of an unprotected field (after MODE U).

WRITE DATA

This message is shown after a MODE W sequence in the DATA-mode while data is written to the diskette.

This message is shown after MODE 0 when in FORM-mode, together with the NAME = message while the operator enter the desired name of the form and the terminal writes the form to diskette.

1.2.2 Name request message

NAME =

This message is shown in the center of the status line, and requests the name of a form or a file from the operator. A name may consist of up to 9 letters and digits. A period (.) may be used to indicate a "null" character within the name. The name may for operations on diskettes be optionally preceeded by a colon (:) followed by a digit in the range 0 - 3. This then specifies the diskette unit number. If no unit number is specified, unit 0 is assumed.

1.2.3 Informative/error messages

;ONNECT

The MODE Q sequence has been executed, disconnecting (logically) the terminal from the host.

-OF-FILE

An end-of-file has been detected on diskette or indicated from host.

D MISSING

The operator attempted to exit from a 'must' field while the field was still empty.

D TYPE ERROR

When defining an unprotected field of a form, the type of field was not A through P (see section 2.2).

NUMBER ERROR

The number of a form to be saved or retrieved was not in the range 0 through 7.

ION NOT INSTALLED

The user function option was not installed.

ID KEY

The key used by the operator was illegal in this context.

ROR xx

An input/output error occured on diskette. See section 9.9 for detailed explanation on how to interpret the hexadecimal number xx.

RROR

The key depressed immediately after MODE was not a valid mode

selection.

NAME ERROR

The operator attempted to use a control key within a name, or attempted to use a name longer than 9 characters.

PRINT WITHIN RECORD

The operator attempted to use the PRINT-Key while not all fields had yet been filled.

TRANSMISSION ERROR xx

An error condition has been reported from the host. Interpretation of xx is dependent on host.

VIDEO TYPE ERROR

When defining a protected or unprotected field, the video type specified was not in the range 2 through 7.