



INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**Z.322**

**MAN-MACHINE LANGUAGE**

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**CAPABILITIES OF VISUAL DISPLAY  
TERMINALS**

**ITU-T Recommendation Z.322**

(Extract from the *Blue Book*)

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## NOTES

1 ITU-T Recommendation Z.322 was published in Fascicle X.7 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

**CAPABILITIES OF VISUAL DISPLAY TERMINALS**

**1 Introduction**

This Recommendation describes some of the capabilities which are important to the user and which are commonly available on interfaces based on VDTs. It is not an exhaustive list of capabilities. The use of additional capabilities, not covered in these Recommendations, is not precluded. Not all of the capabilities described need be present on a given system. Graphics capabilities are for future study and are therefore not considered in detail in these Recommendations.

System implementation of these capabilities may vary, depending for example on the degree of intelligence in the terminal itself and the allocation of responsibility for the man-machine interface among system components.

Items covered are treated from the point of view of the importance of their characteristics for designing the man-machine interface. Human factors are dealt with individually for each item.

**2 Screen**

*2.1 Character definition*

For further study.

*2.2 Cursor*

The cursor is important in the operation of a VDT because it directs the user's attention to that position on the screen appropriate to the task at hand, e.g., where the next character will appear. The cursor also allows the user to specify the location on the screen where an entry or change is desired by the user.

A set of general cursor qualities include:

- easily found by the user at any position in the display;
- easily tracked as it is moved through the display;
- does not interfere with the reading of the symbol that it marks;
- should not be so distracting as to impair the search for unrelated information displayed elsewhere on the screen;
- should be of a form that is unique and reserved for that purpose only;
- should be stable in respect to the position to which it is addressed until it is readdressed elsewhere as a result of user or system action.

*2.3 Screen partitioning definition*

The following definitions describe the physical partitioning of the VDT screen.

*2.3.1 Visible display*

The visible display is the entire physical screen of a VDT (see Figure 1/Z.322).

*2.3.2 Border area*

The border area is that part of a visible display which is physically unavailable for displaying or entering data (see Figure 1/Z.322).

*2.3.3 Display area*

The display area is that part of a visible display which is available for displaying or entering data (see Figure 1/Z.322).

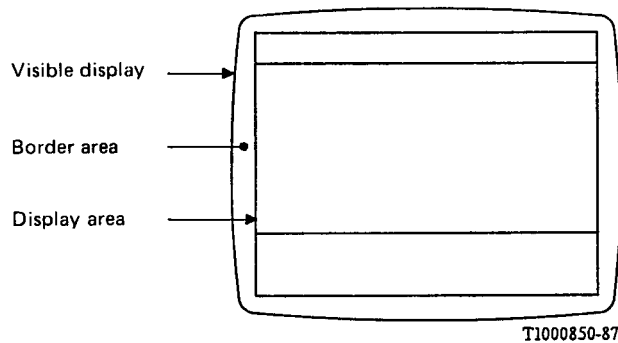


FIGURE 1/Z.322  
Screen partitioning

#### 2.3.4 *Window and window area*

The display area can contain one or more windows. A window contains a collection of related information. A window can consist of one window area or can be partitioned into window areas.

The different characteristics and operations specifying windows and window areas depend both on the system type and on the physical capabilities of the terminal.

##### 2.3.4.1 *Window definition*

A window is a collection of one or more window areas which can occupy a part of the display area (sometimes the entire display area) and it is used for entering and/or displaying data. The collection depends on the application. A window is dedicated to an application. More than one window per application can be present at the same time on the display area.

##### 2.3.4.2 *Window characteristics*

The main characteristics of a window are:

- its name: allowing it to be identified;
- its location: relation to the other windows in the display area. Windows are displayed independently of each other. Windows can appear superimposed – one on top of another – or located side by side. When a window is located on top, it can hide a window or windows that are below it;
- the list of window areas it can contain;
- its size: its size expressed as height and width can vary;
- its state: a window can be “interactive”, or “not interactive”. Information entry can be performed only when the window is “interactive”;
- its visibility: a window is visible when it appears totally or partially on the screen. It can be partially visible either because it is overlapped by another window or because a part of the window is outside the display area;
- its limits: when it is visible, the limits of a visible part of a window must be obvious to the user;
- the application it is dedicated to.

##### 2.3.4.3 *Window area definition*

A window area is a named part of a window that is dedicated for a specific purpose depending upon the application.

##### 2.3.4.4 *Window area characteristics*

The main characteristics of a window area are:

- its name: allowing it to be identified;
- the purpose related to it;

- its presence state: a window area can be “present”, or “not present”. If a window area is “not present”, it can not be seen on the screen whatever the position of the window it belongs to;
- its position in the window: the relative location of the window areas in a window should be fixed. This location can only be modified by changing the presence state of other window area(s);
- its size: its size expressed as height and width may vary;
- its visibility: when a window area is present, it can appear or not appear on the screen depending whether the part of the window it belongs to is visible or not;
- its limits: when it is visible, the limits of a window area must be obvious to the user;
- its text management: scrolling can be available in a window area.

#### 2.3.4.5 *General rules for the display of windows and window areas*

A window can appear anywhere on the screen totally or partially in a non-restrictive manner.

Windows and window areas need not be displayed in all systems or in all applications or all the time in a given system.

The limits of windows and window areas must be unambiguously clear to the user. The techniques that may be used to achieve this include, but are not limited to the following:

- lines and boxes;
- inverse video;
- background colour. This use of colour should be distinguished from the use of colour as a highlighting technique where colour should be used in combination with other techniques.

Some examples of screens illustrating the use of windows and window areas are given in Figures 2/Z.322 to 5/Z.322. In these figures, windows are outlined by double-line boundaries while the boundaries between window areas are depicted by single lines. Lines and boxes are used simply as a concrete example that can be produced easily in print.

### 2.3.5 *Field*

#### 2.3.5.1 *Field definition*

A field is a part of a window (sometimes the entire window area), which is used for entering or displaying information.

#### 2.3.5.2 *Field characteristics*

The most important characteristics, which may vary in time, are:

- a) its position within the window area;
- b) its size;
- c) its type:
  - for entering information (input field): accessible for writing by user and system (e.g., default value);
  - for displaying information (output field): inaccessible for writing by user.

The limits of an input field must be obvious to the user. There may be one or several fields within one window area (see Figure 6/Z.322).

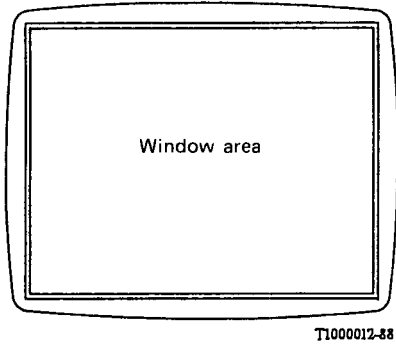


FIGURE 2/Z.322

1 window containing 1 window area

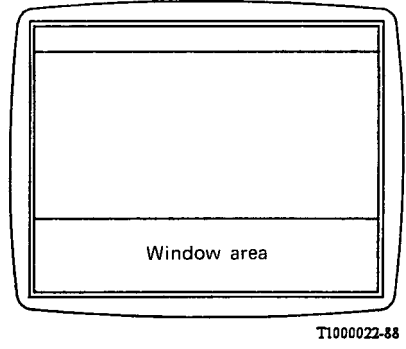


FIGURE 3/Z.322

1 window containing 3 window areas

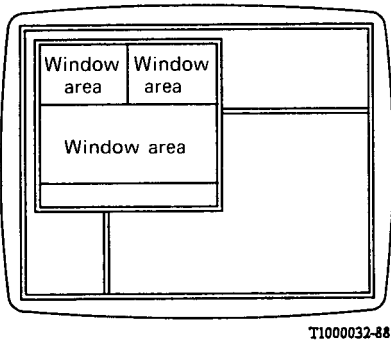


FIGURE 4/Z.322

2 overlapping windows one of which is partially displayed in the display area

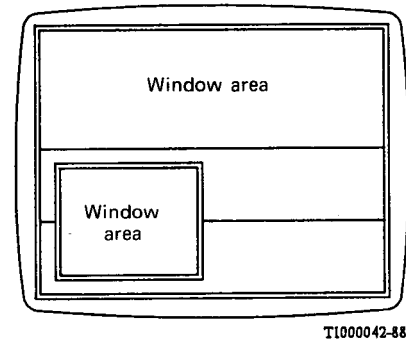


FIGURE 5/Z.322

2 windows

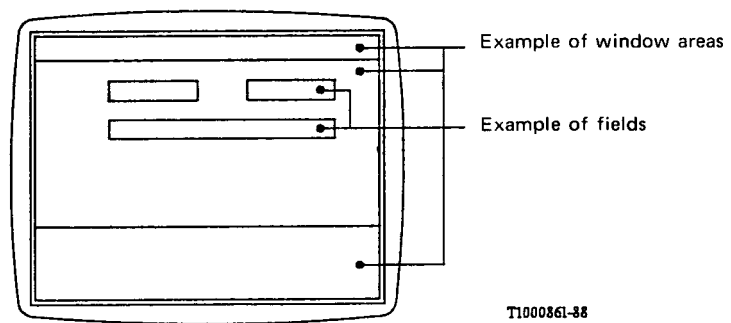


FIGURE 6/Z.322

Fields in a window area

2.4 Physical characteristics

For further study.

## 2.5 *Video attributes*

Video attributes are used to emphasize certain important information, e.g., a title, a message, a chosen item, in order to attract the attention of the user. Video attributes work on the characters of the information shown within an entire window or window area, a part of a window or window area, an entire field or within just a part of the field.

The following video attributes may be provided singularly or in combination:

### 2.5.1 *Luminance*

For further study.

Information can be displayed in different levels of luminance.

### 2.5.2 *Colour*

Information can be displayed in different colours.

### 2.5.3 *Flashing*

Information can be displayed alternately as normal characters and as spaces in the prevailing background colour.

### 2.5.4 *Underline*

Information can be displayed with underlined characters.

### 2.5.5 *Size*

Information can be displayed in different character sizes.

### 2.5.6 *Font*

Information can be displayed in different fonts, e.g., italics, bold.

### 2.5.7 *Inverse video*

Information can be displayed by inverting the image of the characters, such as going from light characters on a dark background to dark characters on a light background.

### 2.5.8 *Concealment*

Information can be displayed as space characters, e.g., secret parts of a password.

## **3 Other output devices**

For further study.

## **4 Keyboard characteristics**

For further study.

## **5 Other input devices**

For further study.

## **6 Transmission characteristics**

There are two fundamental transmission mechanisms commonly employed and referred to as “character mode” and “block mode”.

If a terminal uses character mode transmission, each and every character input at the keyboard is sent to the controlling processor one at a time. Thus, as is the case with the syntax of Recommendation Z.315, if certain regular keys have special meanings ascribed to them e.g., ; or !, then they can act as specific triggers to the controlling software which then performs some process on the preceding information in accordance with the given syntax rules.

If the same terminal uses block mode transmission, all of the regular typewriter keys and some of the special purpose keys only have an effect local to the terminal, i.e. the information input goes into the “memory” of the terminal and onto the screen normally, but not to the controlling processor. The implication is, obviously, that special actions assigned to these keys do not get processed until an explicit “send” action is made. A “send” action by the user is only required when information is to be moved from the terminal to the host processor.

The important point for the purposes of these Recommendations is that the use of a “send” key is not explicitly shown at any time. It is recommended that systems that employ “block mode” transmission either convey very explicit instruction on when a “send” action is required of the user or are designed to be able to accept and respond intelligently to incomplete input, i.e. “send” can be used by the user at any point without a fundamental disruption of the dialogue. As far as possible this will shield the user from the effects of the transmission mode employed.

## 7 Control functions

Control functions are those functions related to the man-machine interface that are applied by the user independently while in a dialogue with the system functions. Control functions have no direct impact on the system functions. Control functions are subdivided into cursor control functions and interface control functions.

### 7.1 *Cursor control functions*

A cursor is generally used as an indicator of the position where an action will take place, such as a character being written on the screen – either by the system or by the user. Cursor control functions do not directly affect the overall system state, but assist users in selecting data entry fields, editing fields, etc.

Examples include:

a) *Home position of the cursor*

Here “home” means a position in the display area to which the cursor can be consistently moved, from any position, by a single keystroke. The actual position in the display area which represents “home” may vary according to the activity being performed and the current layout of the display area.

b) *Movement control of the cursor*

Assuming that the VDT used supports direct cursor addressing, the following types of cursor movement are possible:

i) by the system, and

ii) by the user via cursor control functions. General cursor control functions independent of dialogue are:

- one line up;
- one line down;
- one place left;
- one place right.

Ideally, cursor movement should be easy to accomplish by means of a single, dedicated key for each function. Shifted characters should be avoided. If a cursor positioning control key is used, it should repeat when held down. Cursor movement may also be controlled by other input devices, e.g., light pen, trackball, mouse or joystick.

When cursor positioning is incremental by discrete steps, the step size of cursor movement should be consistent in both right and left directions and both up and down directions. However, the cursor may bypass inaccessible fields.

When character size is variable on the display, incremental cursor positioning should have a variable step size corresponding to the currently selected character size.

### 7.2 *Interface control functions*

Functions of this class are used to force specific actions relating to the interface. They are invoked by various means, including pressing dedicated control keys.

Examples of man-machine interface control functions include, but are not limited to:

- send (other words for the same function are “transmit” and “enter”) [see § 6];
- editing control functions (insert character, insert line, replace character, etc.);
- capitals lock (the condition where letters are input as capitals only);
- select different font [see § 2.5.6];
- select different character size [see § 2.5.5].