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PACKET ASSEMBLY DISASSEMBLY FACILITY (PAD) IN A PUBLIC DATA NETWORK

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NOTES

1 CCITT Recommendation X.3 was published in Fascicle VIII.2 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.

Recommendation X.3

**PACKET ASSEMBLY DISASSEMBLY FACILITY (PAD)
IN A PUBLIC DATA NETWORK**

*(provisional, Geneva, 1977; amended at Geneva, 1980,
Malaga-Torremolinos, 1984 and Melbourne 1988)*

Preface

The establishment in various countries of public data networks providing packet switched data transmission services creates a need to produce standards to facilitate access from the public telephone network, circuit switched public data networks and leased circuits.

The CCITT,

considering

(a) that Recommendations X.1 and X.2 define the user classes of service and user facilities in public data networks, Recommendation X.96 defines call progress signals, Recommendation X.29 defines the procedures between a packet assembly/disassembly facility (PAD) and a packet mode DTE or another PAD, Recommendation X.28 defines the DTE/DCE interface for a start-stop mode DTE accessing the PAD;

(b) that the logical control links for packet switched data transmission services are defined in Recommendation X.92, and that in particular Recommendation X.92 allows for the incorporation of a PAD;

(c) the urgent need to allow interworking between a start-stop mode DTE on a public switched telephone network, a public switched data network or leased circuit, and a packet mode DTE or another start-stop mode DTE using the virtual call facility of the packet switched data service;

(d) that DTEs operating in the start-stop mode will send and receive network control information and user information in the form of characters or the break signals;

(e) that DTEs operating in the packet mode will send and receive network control information and user information in the form of packets in accordance with Recommendation X.25;

(f) that the packet mode DTE shall not be obliged to use the control procedures for PAD functions, but that some packet mode DTEs may wish to control specific functions of the PAD;

unanimously declares

(1) that the functions performed by, and operational characteristics of, the PAD for the start-stop mode DTE are described below in § 1, *Description of the basic functions and user selectable functions of the PAD*;

(2) that the operation of the PAD for the start-stop mode DTE should depend on the possible values of internal variables known as PAD parameters which are described below in § 2, *Characteristics of PAD parameters*;

(3) that the PAD parameters for the start-stop mode DTE and their possible values should be those which are listed below in § 3, *List of PAD parameter and possible values*;

(4) that the PAD features described in §§ 1, 2 and 3 below could be expanded by future studies to allow interworking with non packet mode DTEs other than start-stop mode DTEs.

1 Description of the basic functions and user selectable functions of the PAD

1.1 The PAD performs a number of functions and exhibits operational characteristics. Some of the functions allow either or both the start-stop mode DTE and the packet mode DTE (or remote PAD) to configure the PAD so that its operation is adapted to the start-stop mode DTE characteristics, and possible to the application.

1.2 The operation of the PAD depends on the value of the set of internal variables called PAD parameters. This set of parameters exists for each start-stop mode DTE independently. The current value of each PAD parameter defines the operational characteristics of its related function.

1.3 *Functions of the PAD*

1.3.1 Basic functions include:

- assembly of characters into packets;
- disassembly of the *user data* field of packets;
- handling of virtual call set-up and clearing, resetting and interrupt procedures;
- generation of service signals;
- a mechanism for forwarding packets when the proper conditions exist, e.g., when a packet is full or an idle timer expires;
- a mechanism for transmitting data characters, including start, stop and parity elements as appropriate to the start-stop mode DTE;
- a mechanism for handling a *break* signal from the start-stop mode DTE;
- editing of *PAD command* signals;
- a mechanism for setting and reading the current value of PAD parameters.

1.3.2 Optional functions include:

- a mechanism for the selection of a standard profile;
- automatic detection of data rate, code, parity and operational characteristics;
- a mechanism for the remote DTE to request a virtual call between the start-stop mode DTE and another DTE.

1.4 *User selectable functions which may be provided by the PAD*

A number of packet-switched data network facilities may be available either on a subscription basis or on a per call basis, to start-stop mode DTEs as described in Recommendation X.2 for user classes of service 20-22. In addition, the following features may be available on a subscription basis:

- selection of an initial profile;
- modem type, speed, code and parity to be used by the PAD;
- other operational characteristics of the DTE.

As defined in this Recommendation, parameters provide for functions which concern:

- management of the procedure between the start-stop mode DTE and the PAD;
- management of the assembly and disassembly of packets;
- a number of additional functions related to the operational characteristics of the start-stop mode DTE.

The method for the control of these functions is specified in Recommendation X.28 for the start-stop mode DTE and in Recommendation X.29 for the packet mode DTE or for another PAD.

Table 1/X.3 shows details of the valid values and combination of values of PAD parameters standardized by CCITT. Other values and combinations of values are for further study.

1.4.1 *PAD recall using a character*

This function allows the start-stop mode DTE to initiate an escape from the *data transfer* state or the *connection in progress* state in order to send *PAD command signals*.

1.4.2 *Echo*

This function provides for characters received from the start-stop mode DTE to be transmitted back to the start-stop mode DTE as well as being interpreted by the PAD.

1.4.3 *Selection of the data forwarding characters*

This function allows the selection of defined sets of character(s) received from the start-stop mode DTE to be recognized by the PAD as an indication to complete the assembly and forward a complete packet sequence as defined in Recommendation X.25.

1.4.4 *Selection of idle timer delay*

This function allows the selection of the duration of an interval between successive characters received from the start-stop mode DTE which, when exceeded, will cause the PAD to terminate the assembly of a packet and to forward it as defined in Recommendation X.255.

1.4.5 *Ancillary device control*

This function allows for flow control between the PAD and the start-stop mode DTE. The PAD indicates whether it is ready or not to accept characters from the start-stop mode DTE by transmitting special characters. These characters are those which in International Alphabet No. 5 (IA5) are used to switch an ancillary transmitting device on and off.

1.4.6 *Control of PAD service signals*

This function provides the start-stop mode DTE with the ability to decide whether or not and in what format *PAD service* signals are transmitted.

1.4.7 *Selection of operation of the PAD on receipt of the break signal*

This function allows the selection of the operation of the PAD after the receipt of a *break* signal from the start-stop mode DTE.

1.4.8 *Discard output*

This function provides for a PAD to discard the content of user sequences in packets upon request rather than disassembling and transmitting these to the start-stop mode DTE.

1.4.9 *Padding after carriage return*

This function provides for the automatic insertion by the PAD of padding characters in the character stream transmitted to the start-stop mode DTE after the occurrence of a carriage return character. This allows for the printing mechanism for the start-stop mode DTE to perform the carriage return function correctly.

1.4.10 *Line folding*

This function provides for the automatic insertion by the PAD of appropriate format effectors in the character stream transmitted to the start-stop mode DTE. The predetermined maximum number of graphic characters per line may be set.

1.4.11 *Flow control of the PAD by the start-stop mode DTE*

This function allows for flow control between the start-stop mode DTE and the PAD. The start-stop mode DTE indicates whether it is ready or not to accept characters from the PAD by transmitting special characters. These characters are those which in IA5 are used to switch an ancillary transmitting device on and off.

1.4.12 *Linefeed insertion after carriage return*

This function provides for the automatic insertion by the PAD of a linefeed character in the character stream to or from the start-stop mode DTE or after each of each carriage return character. This function applies only in the data *transfer* state.

1.4.13 *Padding after linefeed*

This function provides for the automatic insertion by the PAD of padding characters in the character stream transmitted to the start-stop DTE after the occurrence of a linefeed character. This allows for the printing mechanism of the start-stop mode DTE to perform the linefeed operation correctly. This function applies only in the *data transfer* state.

1.4.14 *Editing*

This function provides for character delete, line delete and line display editing capabilities in the *PAD command* state and the data *transfer* state for the start-stop mode DTE. During the *PAD command* state the editing function is always available.

1.4.15 *Editing PAD service signals*

This function provides the start-stop mode DTE with the ability to decide whether or not editing *PAD service* signals are transmitted and which format should be used.

1.4.16 *Echo mask*

When echo is enabled (§ 1.4.2), this function allows selected defined sets of character(s) received from the start-stop mode DTE not to be transmitted back to the start-stop mode DTE.

1.4.17 *Parity treatment*

This function allows the PAD to check parity in the data stream from the start-stop mode DTE and/or generate parity in the data stream to the start-stop mode DTE.

1.4.18 *Page wait*

This function allows the PAD to suspend transmission of additional characters to the start-stop mode DTE after a specified number of linefeed characters have been transmitted by the PAD.

2 Characteristics of PAD parameters

2.1 In this Recommendation parameters are identified by decimal reference numbers.

2.2 In this Recommendation the possible values of the parameters are represented by decimal numbers.

2.3 Specific procedures, described in Recommendations X.28 and X.29 are available for initializing, reading and changing values of PAD parameters.

2.4 *Determination of thevalues of PAD parameters*

2.4.1 *Initial values of PAD parameters*

On initialization, the initial value of each PAD parameter is set according to a predetermined set of values called an *initial standard profile*. Table 1/X.28 gives details of the initial values of parameters for transparent and simple standard profiles which have been agreed by CCITT.

Networks may offer other standard profiles that provide different, predetermined sets of PAD parameter values.

2.4.2 *Current values of PAD parameters*

The current values of PAD parameters are the values resulting from possible modifications by the PAD, the start-stop mode DTE and/or the packet mode DTE (or remote PAD).

3 List of PAD parameters and possible values

Restrictions on the permissible relationships between the values of the various parameters is a subject for further study.

3.1 *PAD recall using a character*

Reference 1

The Parameter will have the following selectable values:

not possible	–	represented by decimal 0;
possible by character 1/0 (DLE)	–	represented by decimal 1;
possible by graphic character defined by the user	–	represented by decimal 32-126.

A graphic character, defined by the user to escape from the *data transfer* state and to recall the PAD, is the binary representation of the decimal value in accordance with Recommendation T.50.

3.2 *Echo*

Reference 2

The parameter will have the following selectable values:

no echo	–	represented by decimal 0;
echo	–	represented by decimal 1.

Note – If parameter 20 is implemented, the selection of the characters to be echoed is dependent on the value of parameter 20.

3.3 *Selection of data forwarding character(s)*

Reference 3

This parameter is respresented by the following encoding of basic functions, each having a decimal value as shown below:

no data forwarding character	–	represented by decimal 0;
alphanumeric characters (A-Z, a-z, 0-9)	–	represented by decimal 1;
character CR	–	represented by decimal 2;
characters ESC, BEL, ENQ, ACK	–	represented by decimal 4;
characters DEL, CAN, DC2	–	represented by decimal 8;
characters EXT, EOT	–	represented by decimal 16;
characters HT, LF, VT, FF	–	represented by decimal 32;
all other characters in columns 0 and 1 of IA5 not included in above	–	represented by decimal 64.

Note – The decimal representation of individual values of this parameter allows coding to represent a single function or combination of functions, see Table 1/X.3.

3.4 *Selection of idle timer delay*

Reference 4

The parameter will have the following selectable values:

any number from 0 to 255	–	represented by the respective decimal number.

The value 0 will indicate that no data forwarding on time-out is required; a value between 1 and 255 will indicate the value of the delay in twentieths of a second.

Note 1 – Some PAD implementations may not offer all possible values of idle timer delay within the selectable range. In such cases where the value selected is not available, the PAD will assume the next higher available value in the range.

Note 2 – The effect of the idle timer delay on data forwarding may be subject to flow control constraints.

3.5 *Ancillary device control*

Reference 5

The parameter will have the following selectable values:

no use of X-ON (DC1) and X-OFF (DC3)	–	represented by decimal 0;
use of X-ON and X-OFF (data transfer)	–	represented by decimal 1;
use of X-ON and X-OFF (data transfer and command)	–	represented by decimal 2.

3.6 *Control of PAD service signals and PAD command signals*

Reference 6

The parameter is represented by the following encoding of basic functions, each having a decimal value as shown below:

no service signals are transmitted to the start-stop mode DTE	–	represented by decimal 0;
service signals other than the *prompt PAD service signal* are transmitted in the standard format	–	represented by decimal 1;
prompt PAD service signal is transmitted in the standard format	–	represented by decimal 4;
PAD service signals are transmitted in a network-dependent format	–	represented by decimal 8-15.

PAD service signals and PAD command signals in the extended dialogue mode format:

extended dialogue mode handling, with *PAD service* signals in English	–	represented by decimal 16;
extended dialogue mode handling, with *PAD service* signals in French	–	represented by decimal 32;
extended dialogue mode handling, with *PAD service* signals in Spanish	–	represented by decimal 48.

Note 1 – The decimal representation of individual values of this parameter allows coding to represent a single function or combination of functions, see Table 1/X.3. The transmission of service signals is controlled by the values 0, 1, 4 and 5. In addition, the actual text of the service signal is controlled by the values 16 and above.

Note 2 – Values of 64 to 240 in multiples of 16 represent additional languages provided on a network dependent basis.

Note 3 – Values of 16 to 240 in multiples of 16 may be combined with values 8-15 to provide a network-dependent extended dialogue mode (e.g. a value of 41 is equivalent to 32+9, network-dependent French).

Note 4 – To enable or disable service signals in the extended dialogue mode, the values 16-240 in multiples of 16 can be combined with; 0 for no service signals, 1 for service signals other than the prompt, and 5 (4+1) for service signals and the prompt.

3.7 *Selection of operation of PAD on receipt of break signal from the start-stop mode DTE*

Reference 7

This parameter is represented by the following encoding of basic functions, each having a decimal value as shown below:

nothing	–	represented by decimal 0;
send to packet mode DTE or other PAD an *interrupt* packet	–	represented by decimal 1;
reset	–	represented by decimal 2;
send to packet mode DTE or other PAD an *indication of break PAD* message	–	represented by decimal 4;
escape from *data transfer* state	–	represented by decimal 8;
discard output to start-stop mode DTE	–	represented by decimal 16.

Note – The decimal reprsentation of individual values of this parameter allows coding to represent a single function or combination of functions, see Table 1/X.3.

3.8 *Discard output*

Reference 8

The parameter will have the following selectable values:

normal data delivery to the start-stop mode DTE	–	represented by decimal 0;
discard output to start-stop mode DTE	–	represented by decimal 1.

3.9 *Padding after carriage return*

Reference 9

The parameter will have the following selectable values:

any number from 0 to 255	–	represented by the respective decimal number

A value between 0 and 255 will indicate the number of padding characters to be generated by the PAD after a carriage return character is transmitted to the start-stop mode DTE.

When parameter 9 is 0, there will be no padding except that *PAD service* signals will contain a number of padding characters according to the data rate of the start-stop mode DTE.

3.10 *Line folding*

Reference 10

The parameter will have the following selectable values:

no line folding	–	represented by decimal 0;
any value between 1 and 255	–	represented by the respective decimal number.

A value between 1 and 255 will indicate the number of graphic characters per line that will be transmitted by the PAD without inserting appropriate format effectors.

3.11 *Binary speed*

This parameter is a read-only parameter and cannot be changed by either of the DTEs. It enables the packet-mode DTE to access a characteristic of the start-stop mode DTE which is known by the PAD.

Reference 11

The parameter will have the following values:

50 bit/s	–	represented by decimal 10;
75 bit/s	–	represented by decimal 5;
100 bit/s	–	represented by decimal 9;
110 bit/s	–	represented by decimal 0;
134.5 bit/s	–	represented by decimal 1;
150 bit/s	–	represented by decimal 6;
200 bit/s	–	represented by decimal 8;
300 bit/s	–	represented by decimal 2;
600 bit/s	–	represented by decimal 4;
1 200 bit/s	–	represented by decimal 3;
1 800 bit/s	–	represented by decimal 7;
75/1 200 bit/s	–	represented by decimal 11;
2 400 bit/s	–	represented by decimal 12;
4 800 bit/s	–	represented by decimal 13;

9 600 bit/s – represented by decimal 14;

19 200 bit/s – represented by decimal 15;

48 000 bit/s – represented by decimal 16;

56 000 bit/s – represented by decimal 17;

64 000 bit/s – represented by decimal 18;

Note – The values implemented in individual PADs depend on the range of DTE data transmission rates which are supported. The allocation of decimal values to all known rates is to avoid revision of the Recommendation in the future.

3.12 *Flow control of the PAD by the start-stop mode DTE*

Reference 12

The parameter will have the following selectable values:

no use of X-ON (DC1) and X-OFF (DC3) for flow control – represented by decimal 0;

use of X-ON and X-OFF for flow control – represented by decimal 1.

3.13 *Linefeed insertion after carriage return*

Reference 13

This parameter is represented by the following encoding of basic functions, each having a decimal value as shown below:

no linefeed insertion – represented by decimal 0;

insert linefeed after each carriage return in the data stream *to* the start-stop DTE – represented by decimal 1;

insert linefeed after each carriage return in the data stream *from* the start-stop mode DTE – represented by decimal 2;

insert linefeed after each carriage return in the echo stream to the start-stop mode DTE – represented by decimal 4.

Note 1 – The decimal representation of individual values of this parameter allows coding to represent a single function or combination of functions, see Table 1/X.3.

Note 2 – This function applies only in the *data transfer* state.

3.14 *Linefeed padding*

Reference 14

The parameter will have the following selectable values:

any number from 0 to 255 – represented by the respective decimal number.

A value between 0 and 255 will indicate the number of padding characters to be generated by the PAD after a linefeed character is transmitted to the start-stop mode DTE during the data transfer state.

3.15 *Editing*

Reference 15

The parameter will have the following selectable values:

no use of editing in the *data transfer* state – represented by decimal 0;

use of editing in the *data transfer* state – represented by decimal 1.

The use of value 1 suspends the following operations of the PAD:

a) data forwarding on full packet until the editing buffer is full,

b) data forwarding on idle timer period expiry.

Note – The value of parameter 4 remains unchanged.

3.16 *Character delete*

Reference 16

The parameter will have the following selectable values:

one character from IA5	–	represented by decimal 0-127.

The character defined by the user for character delete is the binary representation of the decimal value in accordance with Recommendation T.50.

3.17 *Line delete*

Reference 17

The parameter will have the following selectable values:

one character from IA5	–	represented by decimal 0-127.

The character defined by the user for line delete is the binary representation of the decimal value in accordance with Recommendation T.50.

3.18 *Line display*

Reference 18

The parameter will have the following selectable values:

one character from IA5	–	represented by decimal 0-127.

The character defined by the user for line display is the binary representation of the decimal value in accordance with Recommendation T.50.

3.19 *Editing PAD service signals*

Reference 19

The parameter will have the following selectable values:

no editing *PAD service* signals	–	represented by decimal 0;
editing *PAD service* signals for printing terminals	–	represented by decimal 1;
editing *PAD service* signals for display terminals	–	represented by decimal 2;
editing *PAD service* signals using one character from the range of IA5	–	represented by decimal 8 and 32-126.

Note – This parameter does not apply if the value of parameter 6 is set to 0.

3.20 *Echo mask*

Reference 20

This parameter is represented by the following encoding of basic functions, each having a decimal value as shown below:

no echo mask (all characters echoed)	–	represented by decimal 0;
no echo of character CR	–	represented by decimal 1;
no echo of character LF	–	represented by decimal 2;
no echo of characters VT, HT, FF	–	represented by decimal 4;
no echo of characters BEL, BS	–	represented by decimal 8;
no echo of characters ESC, ENQ	–	represented by decimal 16;

no echo of characters ACK, NAK, STX, SOH, EOT, ETB, ETX	–	represented by decimal 32;
no echo of editing characters as designated by parameters 16, 17 and 18	–	represented by decimal 64;
no echo of all other characters in columns 0 and 1 of IA5 not mentioned above, and the character DEL	–	represented by decimal 128.

Note 1 – The decimal representation of individual values of this parameter allows coding to represent a single function or combination of functions, see Table 1/X.3.

Note 2 – If parameter 5, 12 or 22 is set to a non-zero value, then X-ON and X-OFF are not echoed.

Note 3 – The PAD recall character specified by the value of parameter 1 is not echoed.

Note 4 – A character need only be specified by a single value of parameter 20 in order for it not to be echoed.

Note 5 – This parameter applies only when parameter 2 is set to 1.

Note 6 – Parameter 20 value 64 (in combination) does not apply if editing is not enabled.

3.21 *Parity treatment*

Reference 21

This parameter will have the following selectable values:

no parity checking or generation	–	represented by decimal 0;
parity checking	–	represented by decimal 1;
parity generation	–	represented by decimal 2.

Note 1 – The decimal representation of individual values of this parameter allows coding to represent a single function or a combination of functions, see Table 1/X.3.

Note 2 – Characters generated by the PAD itself (e.g. *PAD service signals*) have even parity when parameter 21 is set to zero unless the parity is determined by alternate means.

3.22 *Page wait*

Reference 22

This parameter will have the following selectable values:

page wait disabled	–	represented by decimal 0;
page wait condition after *n* linefeed characters are sent by the PAD to the start-stop mode DTE	–	represented by decimal 1-255.

TABLE 1/X.3

Possible values and combination of values of PAD parameters (Note 1)

Parameter reference number	Parameter description	Selectable possible values		PAD parameter meaning	Remarks
		Mandatory	Optional (Note 2)		
1	PAD recall using a character (E)	0		Not possible	
				Character DLE	
		1	32 to 126	Possible; using one graphic character defined by user	
2	Echo (E)	0		No echo	
		1		Echo	
3	Selection of data forwarding character(s) (E)	0		No *data forwarding* character(s)	
			1	Alphanumeric characters (A-Z, a-z, 0-9)	
				Character CR	
		2	4	Characters ESC, BEL, ENQ, ACK	
			6	Characters CR, ESC, BEL, ENQ, ACK	Value formed by combination (2 + 4)
			8	Characters DEL, CAN, DC2	
			16	Characters ETX, EOT	
			18	Characters CR, EOT, ETX	Value formed by combination (2 + 16)
			32	Characters HT, LF, VT, FF	
			64	All characters in columns 0 and 1 of IA5 except those shown above for values 2, 4, 8, 16, 32	
				Values 3, 5-7, 9-15, 17-31, 33-63, 65-125 127 may be formed by combinations of values 1, 2, 4, 8, 16, 32, 64	
		126		All characters in columns 0 and 1 and character DEL	Value formed by combination (2 + 4 + 8 +16 + 32 + 64)
4	Selection of idle timer delay (E)	0	1 to 19	Value of idle timer in twentieths of a second	(Note 3)
		20	21 to 254		
		255			
5	Ancillary device control (E)	0		No use of X-ON (DC1) and X-OFF (DC3)	
		1		Use of X-ON and X-OFF (data transfer)	
			2	Use of X-ON and X-OFF (data transfer and command)	

TABLE 1/X.3 *(cont.)*

Parameter reference number	Parameter description	Selectable possible values		PAD parameter meaning	Remarks
		Mandatory	Optional (Note 2)		
6	Control of *PAD service* signals and PAD *command* signals (E)	0		No *PAD service* signals are transmitted to the start-stop mode DTE	
		1		*PAD service* signals are transmitted in the standard format	
			5	*PAD service* signals and the *prompt PAD service* signal are transmitted in the standard format	Value formed by combination (1+4)
			8 to 15	*PAD service* signals are transmitted in a network dependent format	
			16	Extended dialog mode, *PAD service* signals are in English	
			32	Extended dialog mode, *PAD service* signals are in French	
			48	Extended dialog mode, *PAD service* signals are in Spanish	
7	Selection of operation of the PAD on receipt of break signal from the start-stop mode DTE (E)	0		Nothing	
			1	Interrupt	
		2		Reset	
			4	Send to DTE an indication of *break PAD message*	
			5	Interrupt and indication of break	Value formed by combination (1+4)
		8		Escape from *data transfer* state	
			16	Discard output, to start-stop mode DTE	
		21		Discard output, interrupt and indication of break	Value formed by combination (1+4+16)
				Values 3, 4, 6, 7, 9-20, 22-31 may be formed by combination of values 1, 2, 4, 8, 16	
8	Discard output (E)	0		Normal data delivery	
		1		Discard output	
9	Padding after carriage return (CR) (E)	0		No padding after CR (Note 4)	
		1 to 7	8 to 255	Number of padding characters inserted after CR	

TABLE 1/X.3 *(cont.)*

Parameter reference number	Parameter description	Selectable possible values		PAD parameter meaning	Remarks
		Mandatory	Optional (Note 2)		
10	Line folding (E)	0		No line folding	
		1 to 255		Number of graphic characters per line	
11 (read only)	Binary speed of start-stop mode DTE (E)	0		110 bit/s	The values implemented in individual PADs depend on the range of DTE data transmission rates which are supported. The allocation of decimal values to all known rates is to avoid revision of the Recommendation in the future
			1	134.5 bit/s	
		2		300 bit/s	
			3	1 200 bit/s	
			4	600 bit/s	
			5	75 bit/s	
			6	150 bit/s	
			7	1 800 bit/s	
			8	200 bit/s	
			9	100 bit/s	
			10	50 bit/s	
			11	75/1 200 bit/s	
			12	2 400 bit/s	
			13	4 800 bit/s	
			14	9 600 bit/s	
			15	19 200 bit/s	
			16	48 000 bit/s	
			17	56 000 bit/s	
			18	64 000 bit/s	
12	Flow control of the PAD (E)	0		No use of X-ON (DC1) and X-OFF (DC3) for flow control	
		1		Use of X-ON (DC1) and X-OFF (DC3) for flow control	
13	Linefeed insertion after carriage return (A)	0		No linefeed insertion	
		1		Insert linefeed after transmission of CR to the start-stop mode DTE	
			2	Insert linefeed after each carriage return in the data stream from the start-stop mode DTE	
		4		Insert linefeed after echo of CR to start-stop mode DTE	
		5		Insert linefeed after transmission to the start-stop mode DTE and after echo of CR	Combination (1+4)
		6		Insert linefeed in data stream after CR from the start-stop mode DTE and after echo of a CR to the start-stop mode DTE	Combination (2+4)
		7		Insert linefeed in the data stream to and from the start-stop mode DTE and after echo of a CR to the start-stop mode DTE	Combination (1+2+4) *Note* – Applies only to *data transfer* state

TABLE 1/X.3 *(cont.)*

Parameter reference number	Parameter description	Selectable possible values		PAD parameter meaning	Remarks
		Mandatory	Optional (Note 2)		
14	Padding after linefeed (A)	0		No padding after linefeed	*Note* – Applies only to *data transfer* state
		1 to 7		Number of padding characters inserted after linefeed	
			8 to 255		
15 (Note 5)	Editing (A)	0		No use of editing in the *data transfer* state	
		1		Use of editing in the *data transfer* state	
16 (Note 5)	Character delete (A)		0 to 126	One character from IA5	
		127		Character 7/15 (DEL)	
17 (Note 5)	Line delete (A)		0 to 23	One character from range of IA5	
		24		Character 1/8 (CAN)	
			25 to 127	One character from range of IA5	
18 (Note 5)	Line display (A)		0 to 17	One character from IA5	
		18		Character 1/2 (DC2)	
			19 to 127	One character from IA5	
19 (Note 5)	Editing PAD service signals (A)		0	No editing *PAD service* signals	
		1		Editing *PAD service* signals for printing terminals	
			2	Editing *PAD service* signals for display terminals	
			8	Editing *PAD service* signals using one character from the range of IA5	
			32 to 126		
20 (Notes 6 and 7)	Echo mask (A)	0		No echo mask (all characters echoed)	Values may be formed by combination of basic values
			1	No echo of CR	
			2	No echo of LF	
			4	No echo of VT, HT, FF	
			8	No echo of BEL, BS	
			16	No echo of ESC, ENQ	
			32	No echo of ACK, NAK, STX, SOH, EOT, ETB, ETX	
			64	No echo of editing characters as designated by Parameters 16, 17, 18 (Note 8)	
			128	No echo of all other characters in columns 0 and 1 not mentioned above and DEL	

TABLE 1/X.3 *(end)*

Parameter reference number	Parameter description	Selectable possible values		PAD parameter meaning	Remarks
		Mandatory	Optional (Note 2)		
21 (Note 9)	Parity treatment (A)	0		No parity checking or generation	
			1	Parity checking	
			2	Parity generation	
			3	Parity checking and parity generation	Value formed by combination (1+2)
22	Page wait (A)	0		Page wait disabled	
			1 to 22	Number of line feed characters considered by the PAD for the page wait function	
		23			
			24 to 255		

E An essential parameter to be made available internationally.

A An additional parameter which may be available on certain data networks and may also be available internationally.

Note 1 – Other values and possible combination of values are for further study.

Note 2 – These parameter values provide additional user facilities which are not necessarily provided in all PADs.

Note 3 – Some PAD implementations may not offer all possible values of idle timer delay within the selectable range. In such cases where the value selected is not available, the PAD will assume the next higher value available.

Note 4 – There is no padding after CR except that *PAD service* signals will contain a number of padding characters according to the data signalling rate of the start-stop mode DTE.

Note 5 – When parameter 15 is implemented, the values of parameters 16, 17, 18 and 19 are either default values or are selectable from the optional range shown. The editing function is provided during the *PAD command* state whether parameter 15 is implemented or not. If parameters 16, 17, 18 and 19 are implemented, the editing characters and editing *PAD service* signals during the *PAD command* state are defined by the appropriate values of these parameters. If parameters 16, 17, 18 and 19 are not implemented, the default values for the functions of these parameters are applicable to the *PAD command* state.

Note 6 – This parameter does not apply if parameter 2 is set to zero.

Note 7 – If parameter 5, 12 or 22 is set to a nonzero value, then the X-ON and X-OFF characters are not echoed.

Note 8 – Parameter 20 value 64 (in combination) does not apply if editing is not enabled.

Note 9 – Characters generated by the PAD itself (e.g., *PAD service* signals) have even parity when parameter 21 is set to zero unless the parity is determined by alternate means.

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