APPENDIX I

(to Recommendation X.25)

Examples of data link layer transmitted bit patterns by the DCE and the DTE

This appendix is provided for explanatory purposes and indicates the bit patterns that will exist in the physical layer for some of the unnumbered frames. It is included for the purpose of furthering the understanding of the transparency mechanism and the frame check sequence implementation.

I.1 The following are examples of the bit patterns that will be transmitted by a DCE for some unnumbered frames.

Example 1 : SABM command frame with address = A, P = 1

First bit transmitted ↓				Last bit transmitted ↓
0111 1110	1100 0000	1111 1(0 [3])100	1101 1010 0011 0111	0111 1110
Flag	Address = A	SABM(P = 1)	Frame check sequence	Flag

Example 2 : UA response frame with address = B, F = 1

First bit transmitted ↓				Last bit transmitted ↓
0111 1110	1000 0000	1100 1110	1100 0001 1110 1010	0111 1110
Flag	Address = B	UA(F = 1)	Frame check sequence	Flag

I.2 The following are examples of the bit patterns that should be transmitted by a DTE for some unnumbered frames:

Example 1 : SABM command frame with address = B, P = 1

First bit transmitted ↓				Last bit transmitted ↓
0111 1110	1000 0000	1111 1(0 [3])100	1101 0111 11(0 [3])11 1011	0111 1110
Flag	Address = B	SABM(P = 1)	Frame check sequence	Flag

Example 2 : UA response frame with address = A, F = 1

First bit transmitted ↓				Last bit transmitted ↓
0111 1110	1100 0000	1100 1110	1100 1100 0010 0110	0111 1110
Flag	Address = A	UA(F = 1)	Frame check sequence	Flag [3]

[3] Zero inserted for transparency.

APPENDIX II

(to Recommendation X.25)

An explanation of how the values for N1 in Section 2.4.8.5 are derived

Introduction

This appendix provides a description of how the values given for the link level parameter N1 in § 2.4.8.5 are derived.

DTE N1

Section 2.4.8.5 states that for universal operation a DTE should support a value of DTE N1 which is not less than 1080 bits (135 octets).

For universal operation, a DTE must be capable of accepting at least the largest packet that can be transmitted across a DTE/DCE interface when no options apply. This implies that the DTE may choose not to support, for example, any optional facilities for universal operations, but must support, for example, a data packet using the standard default packet size. Therefore, the determining factor for the maximum value of N1 that a DTE must support is the standard default packet size of a data packet rather than the size of a call setup packet. Thus, for universal operation a DTE should support a value of DTE N1 which is not less than 135 octets, derived as shown in the following table.

TABLE II–1/X.25

Derivation of the maximum value of N1 for a DTE

Name of the field	Length of the field (octets)
Packet header (Layer 3)	3
User data (Layer 3)	128
Address (Layer 2)	1
Control (Layer 2)	1
FCS (Layer 2)	2
TOTAL	135

Note – A DTE will need to support larger values of N1 when optional facilities will apply.

DCE N1

Section 2.4.8.5 also states that all network shall offer to a DTE which requires it a value of DCE N1 which is greater than or equal to 2072 bits (259 octets) plus the length of the address field plus the length of the control field and plus the length of the FCS field.

When the maximum length of the data field of a data packet supported is less than or equal to the standard default value of 128 octets, the determining factor (for the value of DCE N1) is the clear request packet rather than the data packet. Therefore, the network shall offer to a DTE, a value of DCE N1 which is not less than 263 or 264 octets, derived as shown in the following table.

TABLE II–2/X.25

Derivation of the minimum value of N1 for a DCE

Name of the field	Length of the field (octets)
Header (Layer 3)	3
Clearing cause (Layer 3)	1
Diagnostic code (Layer 3)	1
DTE address length (Layer 3)	1
DTE address(es) (Layer 3)	15
Facility length (Layer 3)	1
Facilities (Layer 3)	109
Clear user data (Layer 3)	128
Layer 3 – TOTAL	259
Address (Layer 2)	1
Control (Layer 2)	1 or 2*
Multilink procedure	2**
FCS (Layer 2)	2
TOTAL	263 or 264* or 265** or 266*, **

* If level 2 modulo 128 is supported.

** Multilink procedures (MLP) are supported.

When the maximum length of the user data field of a data packet supported is greater than the standard default value of 128 octets, the determining factor (for the value of DCE N1) is the data packet rather than the clear request packet. Therefore, the network shall offer to a DTE, a value of DCE N1 which is greater than or equal to:

[the maximum length of the data packet +

the length of the address field (Layer 2) +

the length of the control field (Layer 2) +

the length of the FCS field (Layer 2)].

General DCE N1 calculations

The following table indicates the value of DCE N1 for each possible case. The table shows for each case, whether

a) Layer 2 Modulo 128 is used,

b) Multilink Procedures are used,

c) Layer 3 Modulo 128 is used, and/or

d) the maximum length of the data field (p) in a data packet is greater than or equal to 256 octets.

TABLE II–3/X.25

Various cases and corresponding minimum N1 values for a DCE

Layer 2 Modulo 128	MLP	Layer 3 Modulo 128	$p \geq 256$	DCE N1 (octets)
				259 + 4*
	X			259 + 4* + 2*****
			X	p + 3** + 4*
	X		X	p + 3** + 4* + 2*****
		X		259 + 4*
	X	X		259 + 4* + 2*****
		X	X	p + 3** + 1*** + 4*
	X	X	X	p + 3** + 1*** + 4* + 2*****
X				259 + 4* + 1****
X	X			259 + 4* + 1**** + 2*****
X			X	p + 3** + 1**** + 4*
X	X		X	p + 3** + 1**** + 4* + 2*****
X		X		259 + 4* + 1****
X	X	X		259 + 4* + 1**** + 2*****
X		X	X	p + 3** + 1*** + 4* + 1****
X	X	X	X	p + 3** + 1*** + 4* + 1**** + 2*****

* The number of octets for modulo 128 layer 2 frame fields.

** The number of octets for layer 3 packet header fields.

*** Additional octet for layer 3 modulo 128 operations.

**** Additional octet for layer 2 modulo 128 operations.

***** Additional octets for MLP support.

APPENDIX III

(to Recommendation X.25)

Examples of multilink resetting procedures

III.1 *Introduction*

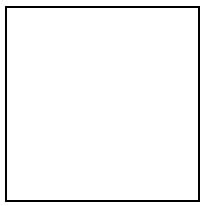
The following examples illustrate application of the multilink resetting procedures in the case of:

a) MLP reset initiated by either the DCE or the DTE; and

b) MLP reset initiated by both the DCE and the DTE simultaneously.

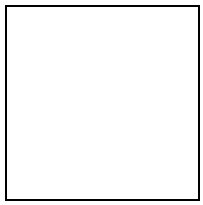
III.2 *MLP reset initiated by either the DCE or the DTE*

Figure III–1/X.25 - T0702241-87



III.3 *MLP reset initiated by both the DCE and the DTE simultaneously*

Figure III–2/X.25 - T0702250-87



APPENDIX IV

(to Recommendation X.25)

Information on addresses in call set–up and clearing packets

IV.1 *Main address and complementary address*

A DTE address may include two components: a main address and a complementary address.

IV.1.1 *Main address*

When the A bit is set to 0, the main address is conforming to formats described in Recommendations X.121 and X.301 (including possible prefixes and/or escape codes).

When the A bit is set to 1, the main address is as described in Figure IV–1/X.25.

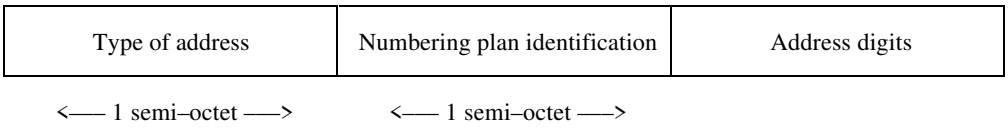


FIGURE IV–1/X.25

Format of the main address when the A bit is set to 1

The possible values and the semantic of these subfields are described in § 5.2.1.2.2.

IV.1.2 *Complementary address*

A complementary address is an address information additional to that defined in X.121 (see § 6.8.1 of Recommendation X.301).

Some networks allow the DTE to include a complementary address. When a complementary address is permitted by the network, the DTE is not obliged to use this complementary address. The complementary address may be as long as possible in considering the maximum value of the DTE address length fields defined in §§ 5.2.1.1.1 and 5.2.1.2.1.

When a complementary address is contained in a DTE address field of a packet transmitted by the network to the DTE, this complementary address is always passed transparently from the remote DTE: it means that the network never creates a complementary address from itself.

When a complementary address is invoked in the following sections, it is supposed that the network supports the use of complementary addresses.

When the A bit is set to 1 and a complementary address is present alone (i.e., without main address) in DTE address field, it is preceded by the type of address and numbering plan identification subfields.

IV.2 *Addresses in call request packet*

In *call request* packet, the called DTE address should be provided by the DTE except when the *bilateral closed user group selection* is provided in the facility field (see § 6.15.3). Depending on the called network and the DTE, this called DTE address may be made of a main address then a complementary address, or of a main address alone.

Depending on the network, the DTE may have the following possibilities for the called DTE address:

i) The DTE may include either no calling DTE address, or a main address optionally followed by a complementary address. When a calling DTE address is provided by the DTE, the network is required to check its validity. If the calling DTE address is not valid, the network may either replace this invalid calling DTE address by a valid one, or clear the call. If the *hunt group* facility has been subscribed to by the calling DTE (see § 6.24) and a specific address has been assigned to the calling DTE/DCE interface, the main address provided by the calling DTE may be the hunt group address or the specific address.

   Note – In this later case, some networks do not allow the calling DTE to indicate the hunt group address, but only the specific address.

ii) The DTE may include either no calling DTE address, or a calling complementary address. In this last case, when the A bit is set to 1, this complementary address shall be preceded by the type of address and numbering plan identification subfields.

IV.3 *Addresses in incoming call packets*

In *incoming call* packet, the calling DTE address should be provided by the DCE except when the *bilateral closed user group selection* is provided in the facility field (see § 6.15.3) or in one case described in § 6.28. This calling DTE address always includes a main address. This main address is followed by a calling complementary address if such a complementary address had been provided by the calling DTE in the *call request* packet (see § IV.2), and the calling DTE address was considered as valid by the network at the calling DTE side. If the *hunt group* facility has been subscribed to by the calling DTE (see § 6.24) and a specific address has been assigned to the calling

DTE/DCE interface, the main address indicated in the calling DTE address may be the hunt group address (only if the calling DTE had indicated either its hunt group address or no main address, in the calling DTE address field of the *call request* packet) or the specific address (regardless of the contents of the calling DTE address field in the *call request* packet).

Depending on the network, the called DTE address may be made of:

i) The main called address optionally followed by the called complementary address if this complementary address had been provided by the calling DTE. If the *hunt group* facility has been subscribed to by the called DTE (see § 6.24) and a specific address has been assigned to the called DTE/DCE interface, the main address indicated in the called DTE address field may be the hunt group address (only if the calling DTE had indicated this hunt group address or no main address, in the calling DTE address field of the *call request* packet) or the specific address (regardless of the contents of the calling DTE address field in the *call request* packet).

ii) The called complementary address alone when provided by the calling DTE, or nothing if the calling DTE had not provided this called complementary address. When a called complementary address is alone and the A bit is set to 1, the called complementary is preceded by the type of address and numbering plan identification subfields.

IV.4 *Addresses in call accepted packets*

Some networks do not allow any DTE addresses in *call accepted* packets except a called DTE address in conjunction with the *called line address modified notification* facility when supported by the network and provided by the DTE.

Some other networks allow the DTE to include in the *called accepted* packet none, one or both of the two DTE addresses. When provided by the DTE, the calling DTE address in the *call accepted* packet should be the same as the calling DTE address in the *incoming call* packet. When provided by the DTE, the called DTE address in the *called accepted* packet should be the same as the called DTE address in the *incoming call* packet, except if the *called line address modified notification* facility (when supported by the network) is also provided by the DTE.

When the *called line address modified notification* facility (when supported by the network) is provided by the DTE in the *call accepted* packet, the called DTE address may be made of one of the following exclusive network–dependent possibilities:

i) A main DTE address identical to that of the *incoming call* packet, followed by a called complementary address different from that of the *incoming call* packet, or another main DTE address valid for the DTE/DCE interface optionally followed by any complementary address.

ii) A called complementary address, different from that which was possibly present in the called DTE address of the *incoming call* packet. In this case, when the A bit is set to 1, the called complementary address shall be preceded by the type of address and numbering plan identification subfields.

IV.5 *Addresses in call connected packets*

Some networks do not provide any DTE address in *call connected* packets except a called DTE address in conjunction with the *called line address modified notification* facility.

Some other networks always provide both DTE addresses in *call connected* packets.

Some other networks provide a DTE address in a *call connected* packet only if this DTE address was present in the *call ccepted* packet or in conjunction with the *called line address modified notification* facility.

In any case, when an address is provided by the network in the *call connected* packet, this address should be the same as that in the *call request* packet except when the *called line address modified notification* facility is present in the facility field: in this case, the called DTE address contains always a main address optionally followed by a complementary address.

IV.6 *Addresses in clear request packets*

No DTE address is permitted in *clear request* packets except a called DTE address when the *called line address modified notification* facility (see § 6.26) is used in this packet. In this case, the *clear request* packet is transmitted as a direct response to the *incoming call* packet and the called DTE address may be made of one of the following network–dependent possibilities:

i) A main DTE address identical to that of the *incoming call* packet, followed by a called complementary address different from that of the *incoming call* packet, or another main DTE address valid for the DTE/DCE interface.

ii) A called complementary address, different from that which was possibly present in the called DTE address of the *incoming call* packet. In this case, when the A bit is set to 1, the called complementary address shall be preceded by the type of address and numbering plan identification subfields.

IV.7 *Addresses in clear indication packets*

No DTE address is permitted in *clear indication* packets except when the *called line address modified notification* facility (see § 6.26) is used in this packet. In this case, the *clear indication* packet is transmitted as a direct response to the *call request* packet and the called DTE address contains always a main address optionally followed by a complementary address.

IV.8 *Addresses in clear confirmation packets*

DTE addresses are not present in *clear confirmation* packets.

IV.9 *Addresses in call redirection and call deflection related facilities*

The alternative DTE address, indicated at subscription–time (for the *call redirection* facility) or in the *call deflection selection* facility of the *clear request* packet (see §§ 6.25.1 and 6.25.2), is composed of a main address optionally followed by a complementary address.

If a called complementary address was present in the *call request* packet, some networks may add this called complementary address after the alternative DTE address.