

3.4.1 Diagnostic packet

The *diagnostic* packet is used by some networks to indicate error conditions under circumstances where the usual methods of indication (i.e. *reset*, *clear* and *restart* with cause and diagnostic) are inappropriate (see Tables C-1/X.25 and D-1/X.25). The *diagnostic* packet from the DCE supplies information on error situations which are considered unrecoverable at the packet layer of Recommendation X.25; the information provided permits an analysis of the error and recovery by higher layers at the DTE if desired or possible.

A *diagnostic* packet is issued only once per particular instance of an error condition. No confirmation is required to be issued by the DTE on receipt of a *diagnostic* packet.

4 Procedures for virtual circuit services

4.1 Procedures for virtual call service

Figures B-1/X.25, B-2/X.25 and B-3/X.25 show the state diagrams which define the events at the packet layer DTE/DCE interface for each logical channel used for virtual calls.

Annex C gives details of the action taken by the DCE on receipt of packets in each state shown in Annex B.

The call set-up and clearing procedures described in the following points apply independently to each logical channel assigned to the virtual call service at the DTE/DCE interface.

4.1.1 Ready state

If there is no call in existence, a logical channel is in the ready state (p1).

4.1.2 Call request packet

The calling DTE shall indicate a call request by transferring a *call request* packet across the DTE/DCE interface. The logical channel selected by the DTE is then in the *DTE waiting* state (p2). The *call request* packet includes the called DTE address.

Note 1 – A DTE address may be a DTE network address or any other DTE identification agreed for a period of time between the DTE and the DCE.

Note 2 – The call request packet should use the logical channel in the *ready* state with the highest number in the range which has been agreed with the Administration (see Annex A). Thus the risk of call collision is minimized.

4.1.3 Incoming call packet

The DCE will indicate that there is an incoming call by transferring across the DTE/DCE interface an *incoming call* packet. This places the logical channel in the *DCE waiting* state (p3).

The *incoming call* packet will use the logical channel in the *ready* state with the lowest number (see Annex A). The *incoming call* packet includes the calling DTE address.

Note – A DTE address may be a DTE network address or any other DTE identification agreed for a period of time between the DTE and the DCE.

4.1.4 Call accepted packet

The called DTE shall indicate its acceptance of the call by transferring across the DTE/DCE interface a *call accepted* packet specifying the same logical channel as that of the *incoming call* packet. This places the specified logical channel in the *data transfer* state (p4).

If the called DTE does not accept the call by a *call accepted* packet or does not reject it by a *clear request* packet as described in § 4.1.7 within time-out T11 (see Annex D), the DCE will consider it as a procedure error from the called DTE and will clear the virtual call according to the procedure described in § 4.1.8.

4.1.5 *Call connected packet*

The receipt of a *call connected* packet by the calling DTE specifying the same logical channel as that specified in the *call request* packet indicates that the call has been accepted by the called DTE by means of a *call accepted* packet. This places the specified logical channel in the *data transfer* state (p4).

The time spent in the *DTE waiting* state (p2) will not exceed time-limit T21 (see Annex D).

4.1.6 *Call collision*

Call collision occurs when a DTE and DCE simultaneously transfer a *call request* packet and an *incoming call* packet specifying the same logical channel. The DCE will proceed with the *call request* and cancel the *incoming call*.

4.1.7 *Clearing by the DTE*

At any time, the DTE may indicate clearing by transferring across the DTE/DCE interface a *clear request* packet (see § 4.5). The logical channel is then in the *DTE clear request* state (p6). When the DCE is prepared to free the logical channel, the DCE will transfer across the DTE/DCE interface a *DCE clear confirmation* packet specifying the logical channel. The logical channel is then in the *ready* state (p1).

The *DCE clear confirmation* packet can only be interpreted universally as having local significance; however, within some Administrations' networks, clear confirmation may have end-to-end significance. In all cases, the time spent in the *DTE clear request* state (p6) will not exceed time-limit T23 (see Annex D).

It is possible that subsequent to transferring a *clear request* packet the DTE will receive other types of packets, depending upon the state of the logical channel, before receiving a *DCE clear confirmation* packet.

Note – The calling DTE may abort a call by clearing it before it has received a *call connected* or *clear indication* packet.

The called DTE may refuse an incoming call by clearing it as described in this point rather than transmitting a *call accepted* packet as described in § 4.1.4.

4.1.8 *Clearing by the DCE*

The DCE will indicate clearing by transferring across the DTE/DCE interface a *clear indication* packet (see § 4.5). The logical channel is then in the *DCE clear indication* state (p7). The DTE shall respond by transferring across the DTE/DCE interface a *DTE clear confirmation* packet. The logical channel is then in the *ready* state (p1).

The action taken by the DCE when the DTE does not confirm clearing within time-out T13 is given in Annex D.

4.1.9 *Clear collision*

Clear collision occurs when a DTE and DCE simultaneously transfer a *clear request* packet and a *clear indication* packet specifying the same logical channel. Under these circumstances the DCE will consider that the clearing is completed. The DCE will not expect a *DTE clear confirmation* packet and will not transfer a *DCE clear confirmation* packet. This places the logical channel in the *ready* state (p1).

4.1.10 *Unsuccessful call*

If a call cannot be established, the DCE will transfer a *clear indication* packet specifying the logical channel indicated in the *call request* packet.

4.1.11 *Call progress signals*

The DCE will be capable of transferring to the DTE *clearing call progress* signals as specified in Recommendation X.96.

Clearing call progress signals will be carried in *clear indication* packets which will terminate the call to which the packet refers. The method of coding *clear indication* packets containing *call progress* signals is detailed in § 5.2.3.

4.1.12 *Data transfer state*

The procedures for the control of packets between DTE and DCE while in the *data transfer* state are contained in § 4.3.

4.2 Procedures for permanent virtual circuit service

Figures B-1/X.25 and B-3/X.25 show the state diagrams which give a definition of events at the packet layer DTE/DCE interface for logical channels assigned for permanent virtual circuits.

Annex C gives details of the action taken by the DCE on receipt of packets in each state shown in Annex B.

For permanent virtual circuits there is no call set-up or clearing. The procedures for the control of packets between DTE and DCE while in the *data transfer* state are contained in § 4.3.

If a momentary failure occurs within the network, the DCE will reset the permanent virtual circuit as described in § 4.4.3, with the cause “Network congestion”, and then will continue to handle data traffic.

If the network has a temporary inability to handle data traffic, the DCE will reset the permanent virtual circuit with the cause “Network out of order”. When the network is again able to handle data traffic, the DCE should reset the permanent virtual circuit with the cause “Network operational”.

4.3 Procedures for data and interrupt transfer

The data transfer and interrupt procedures described in this section apply independently to each logical channel assigned for virtual calls or permanent virtual circuits existing at the DTE/DCE interface.

Normal network operation dictates that user data in *data* and *interrupt* packets are all passed transparently, unaltered through the network in the case of packet DTE to packet DTE communications. The order of bits in *data* and *interrupt* packets is preserved. Packet sequences are delivered as complete packet sequences. DTE diagnostic codes are treated as described in §§ 5.2.4, 5.4.3 and 5.5.1.

4.3.1 States for data transfer

A virtual call logical channel is in the *data transfer* state (p4) after completion of call establishment and prior to a clearing or a restart procedure. A permanent virtual circuit logical channel is continually in the *data transfer* state (p4) except during the restart procedure. *Data*, *interrupt*, *flow control* and *reset* packets may be transmitted and received by a DTE in the *data transfer* state of a logical channel at the DTE/DCE interface. In this state, the flow control and reset procedures described in § 4.4 apply to data transmission on that logical channel to and from the DTE.

When a virtual call is cleared, *data* and *interrupt* packets may be discarded by the network (see § 4.5). In addition, *data*, *interrupt*, *flow control* and *reset* packets transmitted by a DTE will be ignored by the DCE when the logical channel is in the *DCE clear indication* state (p7). Hence it is left to the DTE to define DTE to DTE protocols able to cope with the various possible situations that may occur.

4.3.2 User data field length of data packets

The standard maximum user data field length is 128 octets.

In addition, other maximum user data field lengths may be offered by Administrations from the following list: 16, 32, 64, 256, 512, 1024, 2048 and 4096 octets. An optional maximum user data field length may be selected for a period of time as the default maximum user data field length common to all virtual calls at the DTE/DCE interface (see § 6.9). A value other than the default may be selected for a period of time for each permanent virtual circuit (see § 6.9). Negotiation of maximum user data field lengths on a per call basis may be made with the *flow control parameter negotiation* facility (see § 6.12).

The user data field of *data* packets transmitted by a DTE or DCE may contain any number of bits up to the agreed maximum.

Note – Some networks require the user data field to contain an integral number of octets (see the note in § 3).

If the user data field in a *data* packet exceeds the locally permitted maximum user data field length, then the DCE will reset the virtual call or permanent virtual circuit with the resetting cause “Local procedure error”.

4.3.3 Delivery Confirmation bit

The setting of the Delivery Confirmation bit (D bit) is used to indicate whether or not the DTE wishes to receive an end-to-end acknowledgement of delivery, for data it is transmitting, by means of the packet receive sequence number P(R) (see § 4.4).

Note – The use of the D bit procedure does not obviate the need for a higher layer protocol agreed between the communicating DTEs which may be used with or without the D bit procedure to recover from user or network generated resets and clearings.

The calling DTE may, during call establishment, ascertain that the D bit procedure can be used for the call by setting bit 7 in the General Format Identifier of the *call request* packet to 1 (see § 5.1.1). Every network or part of the international network will pass this bit transparently. If the remote DTE is able to handle the D bit procedure, it should not regard this bit being set to 1 in the *incoming call* packet as invalid.

Similarly, the called DTE can set bit 7 in the General Format Identifier of the *call accepted* packet to 1. Every network or part of the international network will pass this bit transparently. If the calling DTE is able to handle the D bit procedure, it should not regard this bit being set to 1 in the *call connected* packet as invalid.

The use by DTEs of the above mechanism in the *call request* and *call accepted* packets is recommended but is not mandatory for using the D bit procedure during the virtual call.

4.3.4 *More Data mark*

If a DTE or DCE wishes to indicate a sequence of more than one packet, it uses a more data mark (M bit) as defined below.

The M bit can be set to 1 in any *data* packet. When it is set to 1 in a full *data* packet or in a partially full *data* packet also carrying the D bit set to 1, it indicates that more data is to follow. Recombination with the following *data* packet may only be performed within the network when the M bit is set to 1 in a full *data* packet which also has the D bit set to 0.

A sequence of *data* packets with every M bit set to 1 except for the last one will be delivered as a sequence of *data* packets with the M bit set to 1 except for the last one when the original packets having the M bit set to 1 are either full (irrespective of the setting of the D bit) or partially full but have the D bit set to 1.

Two categories of *data* packets, A and B, have been defined as shown in Table 15/X.25. Table 15/X.25 also illustrates the network's treatment of the M and D bits at both ends of a virtual call or permanent virtual circuit.

4.3.5 *Complete packet sequence*

A complete packet sequence is defined as being composed of a single *category B* packet and all contiguous preceding *category A* packets (if any). *Category A* packets have the exact maximum user data field length with the M bit set to 1 and the D bit set to 0. All other *data* packets are *category B* packets.

When transmitted by a source DTE, a complete packet sequence is always delivered to the destination DTE as a single complete packet sequence.

Thus, if the receiving end has a larger maximum user data field length than the transmitting end, then packets within a complete packet sequence will be combined within the network. They will be delivered in a complete packet sequence where each packet, except the last one, has the exact maximum user data field length, the M bit set to 1, and the D bit set to 0. The user data field of the last packet of the sequence may have less than the maximum length and the M and D bits are set as described in Table 15/X.25.

TABLEAU 15/X.25

Definition of two categories of data packets and network treatment of the M and D bits

Data packet sent by source DTE				Combining with subsequent packet(s) is performed by the network when possible	Data packet ^{a)} received by destination DTE	
Category	M	D	Full		M	D
B	0 or 1	0	No	No	0 (see Note 1)	0
B	0	1	No	No	0	1
B	1	1	No	No	1	1
B	0	0	Yes	No	0	0
B	0	1	Yes	No	0	1
A	1	0	Yes	Yes (see Note 2)	1	0
B	1	1	Yes	No	1	1

^{a)} Refers to the delivered *data* packet whose last bit of user data corresponds to the last bit of user data, if any, that was present in the *data* packet sent by the source DTE.

Note 1 – The originating network will force the M bit to 0.

Note 2 – If the *data* packet sent by the source DTE is combined with other packets, up to and including a *category B* packet, the M and D bit settings in the *data* packet received by the destination DTE will be according to that given in the two right hand columns for the last *data* packet sent by the source DTE that was part of the combination.

If the maximum user data field length is the same at both ends, then user data fields of *data* packets are delivered to the receiving DTE exactly as they have been received by the network, except as follows. If a full packet with the M bit set to 1 and D bit set to 0 is followed by an empty packet, then the two packets may be merged so as to become a single *category B* full packet. If the last packet of a complete packet sequence transmitted by the source DTE has a data field less than the maximum length, the M bit set to 1 and the D bit set to 0, then the last packet of the complete packet sequence delivered to the receiving DTE will have the M bit set to 0.

If the receiving end has a smaller maximum user data field length than the transmitting end, the packets will be segmented within the network, and the M and D bits will be set by the network as described to maintain complete packet sequences.

4.3.6 Qualifier bit

In some cases, an indicator may be needed with the user data field to distinguish between two types of information. It may be necessary to differentiate, for example, between user data and control information. An example of such a case is contained in Recommendation X.29.

If such a mechanism is needed, an indicator in the data packet header called the Qualifier bit (Q bit) may be used.

The use of the Q bit is optional. If this mechanism is not needed, the Q bit is always set to 0. If the Q bit mechanism is used, the transmitting DTE should set the Q bit so as to have the same value (i.e. 0 or 1) in all *data* packets of the same complete packet sequence. A complete packet sequence transferred by the DTE to the DCE in this fashion will be delivered to the distant DTE as a complete packet sequence having the Q bit set in all packets to the value assigned by the transmitting DTE.

If the Q bit is not set by the DTE to the same value in all the *data* packets of a complete packet sequence, the value of the Q bit in any of the *data* packets of the corresponding packet sequence transferred to the distant DTE is not guaranteed by the network. Moreover, some networks may reset the virtual call or permanent virtual circuit as described in Annex C/X.25.

Successive *data* packets are numbered consecutively (see § 4.4.1.1) regardless of the value of the Q bit.

4.3.7 *Interrupt procedure*

The interrupt procedure allows a DTE to transmit data to the remote DTE, without following the flow control procedure applying to *data* packets (see § 4.4). The interrupt procedure can only apply in the *flow control ready* state (d1) within the *data transfer* state (p4).

The interrupt procedure has no effect on the transfer and flow control procedures applying to the *data* packets on the virtual call or permanent virtual circuit.

To transmit an interrupt, a DTE transfers across the DTE/DCE interface a *DTE interrupt* packet. The DTE should not transmit a second *DTE interrupt* packet until the first one is confirmed with a *DCE interrupt confirmation* packet (see Table C-4/X.25). The DCE, after the interrupt procedure is completed at the remote end, will confirm the receipt of the interrupt by transferring a *DCE interrupt confirmation* packet. The receipt of a *DCE interrupt confirmation* packet indicates that the interrupt has been confirmed by the remote DTE by means of a *DTE interrupt confirmation* packet.

The DCE indicates an interrupt from the remote DTE by transferring across the DTE/DCE interface a *DCE interrupt* packet containing the same data field as in the *DTE interrupt* packet transmitted by the remote DTE. A *DCE interrupt* packet is delivered at or before the point in the stream of *data* packets at which the *DTE interrupt* packet was generated. The DTE will confirm the receipt of the *DCE interrupt* packet by transferring a *DTE interrupt confirmation* packet.

4.3.8 *Transit delay of data packets*

Transit delay is an inherent characteristic of a virtual call or a permanent virtual circuit, common to the two directions of transmission.

This transit delay is the *data* packet transfer delay as defined in § 3.1/X.135, measured between boundaries B_2 and B_{n-1} , as defined in Figure 2/X.135 (that means, excluding the access lines), with the conditions given in § 3.2/X.135, and is expressed in terms of a mean value.

Selection of transit delay on a per call basis, and indication to both the calling and called DTEs of the value of transit delay applying for a given virtual call, may be made by the means of the *transit delay selection and indication* facility (see § 6.27).

4.4 *Procedures for flow control*

Paragraph 4.4 only applies to the *data transfer* state (p4) and specifies the procedures covering flow control of *data* packets and reset on each logical channel used for a virtual call or a permanent virtual circuit.

4.4.1 *Flow control*

At the DTE/DCE interface of a logical channel used for a virtual call or permanent virtual circuit, the transmission of *data* packets is controlled separately for each direction and is based on authorizations from the receiver.

On a virtual call or permanent virtual circuit, flow control also allows a DTE to limit the rate at which it accepts packets across the DTE/DCE interface, noting that there is a network-dependent limit on the number of *data* packets which may be in the network on the virtual call or permanent virtual circuit.

4.4.1.1 *Numbering of data packets*

Each *data* packet transmitted at the DTE/DCE interface for each direction of transmission in a virtual call or permanent virtual circuit is sequentially numbered.

The sequence numbering scheme of the packets is performed modulo 8. The packet sequence numbers cycle through the entire range 0 to 7. Some Administrations will provide the *extended packet sequence numbering* facility (see § 6.2) which, if selected, provides a sequence numbering scheme for packets being performed modulo 128. In this case, packet sequence numbers cycle through the entire range 0 to 127. The packet sequence numbering scheme, modulo 8 or 128, is the same for both directions of transmission and is common for all logical channels at the DTE/DCE interface.

Only *data* packets contain this sequence number called the packet send sequence number P(S).

The first *data* packet to be transmitted across the DTE/DCE interface for a given direction of data transmission, when the logical channel has just entered the *flow control ready* state (d1), has a packet send sequence number equal to 0.

4.4.1.2 Window description

At the DTE/DCE interface, a window is defined for each direction of data transmission of a logical channel used for a virtual call or permanent virtual circuit. The window is the ordered set of W consecutive packet send sequence numbers of the *data* packets authorized to cross the interface.

The lowest sequence number in the window is referred to as the lower window edge. When a virtual call or permanent virtual circuit at the DTE/DCE interface has just entered the *flow control ready* state (d1), the window related to each direction of data transmission has a lower window edge equal to 0.

The packet send sequence number of the first *data* packet not authorized to cross the interface is the value of the lower window edge plus W (modulo 8, or 128 when extended).

The standard window size W is 2 for each direction of data transmission at the DTE/DCE interface. In addition, other window sizes may be offered by Administrations. An optional window size may be selected for a period of time as the default window size common to all virtual calls at the DTE/DCE interface (see § 6.10). A value other than the default may be selected for a period of time for each permanent virtual circuit (see § 6.10). Negotiation of window sizes on a per call basis may be made with the *flow control parameter negotiation* facility (see § 6.12).

4.4.1.3 Flow control principles

When the sequence number $P(S)$ of the next *data* packet to be transmitted by the DCE is within the window, the DCE is authorized to transmit this *data* packet to the DTE. When the sequence number $P(S)$ of the next *data* packet to be transmitted by the DCE is outside of the window, the DCE will not transmit a *data* packet to the DTE. The DTE should follow the same procedure.

When the sequence number $P(S)$ of the *data* packet received by the DCE is the next in sequence and is within the window, the DCE will accept this *data* packet. A received *data* packet containing a $P(S)$ that is out of sequence (i.e., there is a duplicate or a gap in the $P(S)$ numbering), outside the window, or not equal to 0 for the first *data* packet after entering the *flow control ready* state (d1) is considered by the DCE as a local procedure error. The DCE will reset the virtual call or permanent virtual circuit (see § 4.4.3). The DTE should follow the same procedure.

A number (modulo 8, or 128 when extended), referred to as a packet receive sequence number $P(R)$, conveys across the DTE/DCE interface information from the receiver for the transmission of *data* packets. When transmitted across the DTE/DCE interface, a $P(R)$ becomes the lower window edge. In this way, additional *data* packets may be authorized by the receiver to cross the DTE/DCE interface.

The packet receive sequence number, $P(R)$, is conveyed in *data*, *receive ready* (RR) and *receive not ready* (RNR) packets.

The value of a $P(R)$ received by the DCE must be within the range from the last $P(R)$ received by the DCE up to and including the packet send sequence number of the next *data* packet to be transmitted by the DCE. Otherwise, the DCE will consider the receipt of this $P(R)$ as a procedure error and will reset the virtual call or permanent virtual circuit. The DTE should follow the same procedure.

The receive sequence number $P(R)$ is less than or equal to the sequence number of the next expected *data* packet and implies that the DTE or DCE transmitting $P(R)$ has accepted at least all *data* packets numbered up to and including $P(R) - 1$.

4.4.1.4 Delivery confirmation

When the D bit is set to 0 in a *data* packet having $P(S) = p$, the significance of the returned $P(R)$ corresponding to that *data* packet [i.e., $P(R) - p + 1$] is a local updating of the window across the packet level interface so that the achievable throughput is not constrained by the DTE to DTE round trip delay across the network(s).

When the D bit is set to 0 in a *data* packet, the returned $P(R)$ corresponding to that *data* packet does not signify that a $P(R)$ has been received from the remote DTE.

When the D bit is set to 1 in a *data* packet having $P(S) = p$, the significance of the returned $P(R)$ corresponding to that *data* packet [i.e., $P(R) - p + 1$] is an indication that a $P(R)$ has been received from the remote DTE for all *data* bits in the *data* packet in which the D bit had originally been set to 1.

Note 1 – A DTE, on receiving a *data* packet with the D bit set to 1, should transmit the corresponding $P(R)$ as soon as possible in order to avoid the possibility of deadlocks (e.g. without waiting for further *data* packets). A *data*, *RR* or *RNR* packet may be used to convey the $P(R)$ (see Note to § 4.4.1.6). Likewise, the DCE is required to send $P(R)$ to the DTE as soon as possible from when the $P(R)$ is received from the remote DTE. When the DTE is not currently operating the D bit procedure, the receipt of a *data* packet with the D bit set to 1 may be treated by the DTE as an error condition.

Note 2 – If a P(R) for a *data* packet with the D bit set to 1 is outstanding, local updating of the window will be deferred for subsequent *data* packets with the D bit set to 0. Some networks may also defer updating the window for previous *data* packets (within the window) with the D bit set to 0 until the corresponding P(R) for the packet with the outstanding D bit set to 1 is transmitted to the DTE.

Note 3 – P(R) values corresponding to the data contained in *data* packets with the D bit set to 1 need not be the same at the DTE/DCE interfaces at each end of a virtual call or a permanent virtual circuit.

Note 4 – If the DTE has sent *data* packets with the D bit set to 0, the DTE does not have to wait for local updating of the window by the DCE before initiating a resetting or clearing procedure.

4.4.1.5 DTE and DCE receive ready (RR) packets

RR packets are used by the DTE or DCE to indicate that it is ready to receive the W *data* packets within the window starting with P(R), where P(R) is indicated in the RR packet.

4.4.1.6 DTE and DCE receive not ready (RNR) packets

RNR packets are used by the DTE or DCE to indicate a temporary inability to accept additional *data* packets for a given virtual call or permanent virtual circuit. A DTE or DCE receiving an RNR packet shall stop transmitting *data* packets on the indicated logical channel, but the window is updated by the P(R) value of the RNR packet. The receive not ready situation indicated by the transmission of an RNR packet is cleared by the transmission in the same direction of an RR packet or by the initiation of a reset procedure.

The transmission of an RR packet after an RNR packet at the packet level is not to be taken as a demand for retransmission of packets which have already been transmitted.

Note – The RNR packet may be used to convey across the DTE/DCE interface the P(R) value corresponding to a *data* packet which had the D bit set to 1 in the case that additional *data* packets cannot be accepted.

4.4.2 Throughput characteristics and throughput classes

The definitions of throughput and steady state throughput are given in § 4 of Recommendation X.135.

A throughput class for one direction of transmission is an inherent characteristic of the virtual call or permanent virtual circuit related to the amount of resources allocated to this virtual call or permanent virtual circuit. It is a measure of the steady state throughput that can be provided under optimal conditions on a virtual call or permanent virtual circuit. However, due to the statistical sharing of transmission and switching resources, it is not guaranteed that the throughput class can be reached 100% of the time.

The relations between throughput class and the throughput parameters and objectives described in Recommendation X.135 require further study. The complete definition of the optimal conditions where the measure of the steady state throughput in relation to throughput class is meaningful also requires further study. Pending the results of these further studies, it cannot be guaranteed or verified that a network supporting a given throughput class value (64 kbit/s for instance) offers better performance to its users than a network not supporting that throughput class. However, a network may offer a guarantee to its users on a contribution basis.

The optimal conditions for measurement include the following:

- 1) the access line characteristics of the local and remote DTEs do not constrain the throughput class;
Note – In particular, because of the overhead due to the frame and packet headers, when the throughput class corresponding to the user class of service of the DTE is applicable to a virtual call or permanent virtual circuit, a steady state throughput equal to that throughput class can never be reached.
- 2) the window sizes at the local and remote DTE/DCE interfaces do not constrain the throughput;
- 3) the traffic characteristics of other logical channels at local and remote DTE/DCE interfaces do not constrain the throughput;
- 4) the receiving DTE is not flow controlling the DCE such that the throughput class is not attainable;
- 5) the transmitting DTE sends only *data* packets which have the maximum data field length;
- 6) the D bit is not set to 1.

The throughput class is expressed in bits per second. The maximum data field length is specified for a virtual call or permanent virtual circuit, and thus the throughput class can be interpreted by the DTE as the number of full *data* packets/second that the DTE/DCE interface.

In the absence of the *default throughput classes assignment* facility (see § 6.11), the default throughput classes for both directions of transmission correspond to the user class of service of the DTE (see § 7.2.2.2) but do not exceed the maximum throughput class supported by the network. Negotiation of throughput classes on a per call basis may be made with the *throughput class negotiation* facility (see § 6.13).

Note – The sum of the throughput classes of all virtual calls and permanent virtual circuits supported at a DTE/DCE interface may be greater than the data transmission rate of the access line.

4.4.3 Procedure for reset

The reset procedure is used to reinitialize the virtual call or permanent virtual circuit and in so doing removes in each direction all *data* and *interrupt* packets which may be in the network (see § 4.5). When a virtual call or permanent virtual circuit at the DTE/DCE interface has just been reset, the window related to each direction of data transmission has a lower window edge equal to 0, and the numbering of subsequent *data* packets to cross the DTE/DCE interface for each direction of data transmission shall start from 0.

The reset procedure can only apply in the *data transfer* state (p4) of the DTE/DCE interface. In any other state of the DTE/DCE interface, the reset procedure is abandoned. For example, when a clearing or restarting procedure is initiated, *reset request* and *reset indication* packets can be left unconfirmed.

For flow control, there are three states d1, d2 and d3 within the *data transfer* state (p4). There are *flow control ready* (d1), *DTE reset request* (d2), and *DCE reset indication* (d3) as shown in the state diagram in Figure B-3/X.25. When entering state p4, the logical channel is placed in state d1. Table C-4/X.25 specifies actions taken by the DCE on the receipt of packets from the DTE.

4.4.3.1 Reset request packet

The DTE shall indicate a request for reset by transmitting a *reset request* packet specifying the logical channel to be reset. This places the logical channel in the *DTE reset request* state (d2).

4.4.3.2 Reset indication packet

The DCE will indicate a reset by transmitting to the DTE a *reset indication* packet specifying the logical channel being reset and the reason for the resetting. This places the logical channel in the *DCE reset indication* state (d3). In this state, the DCE will ignore *data*, *interrupt*, *RR* and *RNR* packets.

4.4.3.3 Reset collision

Reset collision occurs when a DTE and a DCE simultaneously transmit a *reset request* packet and a *reset indication* packet specifying the same logical channel. Under these circumstances the DCE will consider that the reset is completed. The DCE will not expect a *DTE reset confirmation* packet and will not transfer a *DCE reset confirmation* packet. This places the logical channel in the *flow control ready* state (d1).

4.4.3.4 Reset confirmation packets

When the logical channel is in the *DTE reset request* state (d2), the DCE will confirm reset by transmitting to the DTE a *DCE reset confirmation* packet. This places the logical channel in the *flow control ready* state (d1).

The *DCE reset confirmation* packet can only be interpreted universally as having local significance; however, within some Administrations' networks, *reset confirmation* may have end-to-end significance. In all cases the time spent in the *DTE reset request* state (d2) will not exceed time-limit T22 (see Annex D).

When the logical channel is in the *DCE reset indication* state (d3), the DTE will confirm reset by transmitting to the DCE a *DTE reset confirmation* packet. This places the logical channel in the *flow control ready* state (d1). The action taken by the DCE when the DTE does not confirm the reset within time-out T12 is given in Annex D.

4.5 Effects of clear, reset and restart procedures on the transfer of packets

All *data* and *interrupt* packets generated by a DTE (or the network) before initiation by the DTE or the DCE of a clear, reset or restart procedure at the local interface will either be delivered to the remote DTE before the DCE transmits the corresponding indication on the remote interface, or be discarded by the network.

No *data* or *interrupt* packets generated by a DTE (or the network) after the completion of a reset (or for permanent virtual circuits also a restart) procedure at the local interface will be delivered to the remote DTE before the completion of the corresponding reset procedure at the remote interface.

When a DTE initiates a clear, reset or restart procedure at its local interface, all *data* and *interrupt* packets which were generated by the remote DTE (or the network) before the corresponding indication is transmitted to the remote DTE will be either delivered to the initiating DTE before DCE confirmation of the initial clear, reset or restart request, or be discarded by the network.

Note – The maximum number of packets which may be discarded is a function of network end-to-end delay and throughput characteristics and, in general, has no relation to the local window size. For virtual calls and permanent virtual circuits on which all *data* packets are transferred with the D bit set to 1, the maximum number of packets which may be discarded in one direction of transmission is not larger than the window size of the direction of transmission.

4.6 *Effects of the physical layer and the data link layer on the packet layer*

4.6.1 *General principles*

In general, if a problem is detected in one layer (physical, data link or packet layer) and can be solved in this layer according to the DCE error recovery procedures provided in this Recommendation without loss or duplication of data, the adjacent layers are not involved in the error recovery.

If an error recovery by the DCE implies a possible loss or duplication of data, then the higher layer is informed.

The reinitialization of one layer by the DCE is only performed if a problem cannot be solved in this layer.

Changes of operational states of the physical layer and the data link layer of the DTE/DCE do not implicitly change the state of each logical channel at the packet layer. Such changes when they occur are explicitly indicated at the packet layer by the use of restart, clear or reset procedures as appropriate.

4.6.2 *Definition of an out of order condition*

In the case of a single link procedure, there is an out of order condition when:

- a failure on the physical and/or data link layer is detected: such a failure is defined as a condition in which the DCE cannot transmit or cannot receive any frame because of abnormal conditions caused by, for instance, a line default between DTE and DCE;

Note – Short physical layer outages (e.g. loss of carrier) are not considered as physical layer failures by the DCE and the data link layer and packet layer are not informed.

- the DCE has received or transmitted a DISC command.

There may be other out of order network-dependent conditions such as: reset of the data link layer, expiration of T3 timer (see § 2.4.5.3), receipt or transmission of a DM response, . . . etc.

In the case of the Multilink procedure, an out of order condition is considered as having occurred when it is present at the same time for every single link procedure of the DTE/DCE interface. There may be other out of order network-dependent conditions such as the performance by DTE or DCE of the multilink resetting procedure (see § 2.5.4.2), loss of multilink frame(s) (see § 2.5.4.4), etc.

4.6.3 *Actions on the packet layer when an out of order condition is detected*

When an out of order condition is detected, the DCE will transmit to the remote end:

- 1) a reset with the cause “Out of order” for each permanent virtual circuit; and
- 2) a clear with the cause “Out of order” for each existing virtual call.

4.6.4 *Actions on the packet layer during an out of order condition*

During an out of order condition:

- 1) the DCE will clear any incoming virtual call with the cause “Out of order”;
- 2) for any *data* or *interrupt* packet received from the remote DTE on a permanent virtual circuit, the DCE will reset the permanent virtual circuit with the cause “Out of order”;
- 3) a *reset* packet received from the remote DTE on a permanent virtual circuit will be confirmed to the remote DTE by either *reset confirmation* or *reset indication* packet.

4.6.5 *Actions on the packet layer when the out of order condition is recovered*

When the out of order condition is recovered:

- 1) the DCE will send a *restart indication* packet with the cause “Network operational” to the local DTE;
- 2) a reset with the cause “Remote DTE operational” will be transmitted to the remote end of each permanent virtual circuit.

5 **Packet formats**

5.1 *General*

The possible extension of packet formats by the addition of new fields is for further study.

Note – Any such field:

- a) would only be provided as an addition following all previously defined fields, and not as an insertion between any of the previously defined fields;
- b) would be transmitted to a DTE only when either the DCE has been informed that the DTE is able to interpret this field and act upon it, or when the DTE can ignore the field without adversely affecting the operation of the DTE/DCE interface (including charging);
- c) would not contain any information pertaining to a user facility to which the DTE has not subscribed, unless the DTE can ignore the facility without adversely affecting the operation of the DTE/DCE interface (including charging).

Bits of an octet are numbered 8 to 1 where bit 1 is the low order bit and is transmitted first. Octets of a packet are consecutively numbered starting from 1 and are transmitted in this order.

5.1.1 *General format identifier*

The general format identifier field is a four bit binary coded field which is provided to indicate the general format of the rest of the header. The general format identifier field is located in bit positions 8, 7, 6 and 5 of octet 1, and bit 5 is the low order bit (see Table 16/X.25).

TABLE 16/X.25

General format identifier

General format identifier		Octet 1 Bits			
		8	7	6	5
<i>Call set-up</i> packets	Sequence numbering scheme modulo 8	X	X	0	1
	Sequence numbering scheme modulo 128	X	X	1	0
<i>Clearing</i> packets	Sequence numbering scheme modulo 8	X	0	0	1
	Sequence numbering scheme modulo 128	X	0	1	0
<i>Flow control, interrupt, reset, restart, registration and diagnostic</i> packets	Sequence numbering scheme modulo 8	0	0	0	1
<i>Data</i> packets	Sequence numbering scheme modulo 128	0	0	1	0
	Sequence numbering scheme modulo 8	X	X	0	1
	Sequence numbering scheme modulo 128	X	X	1	0
General format identifier extension		0	0	1	1
Reserved for other applications		*	*	0	0

* Undefined.

Note – A bit which is indicated as “X” may be set to either 0 or 1, as indicated in the text.

Bit 8 of the general format identifier is used for the Qualifier bit in *data* packets, for the Address bit in call set-up and clearing packets, and is set to 0 in all other packets.

Bit 7 of the general format identifier is used for the delivery confirmation procedure in *data* and *call set-up* packets and is set to 0 in all other packets.

Bits 6 and 5 are encoded for four possible indications. Two of the codes are used to distinguish packets using modulo 8 sequence numbering from packets using modulo 128 sequence numbering. The third code is used to indicate an extension to an expanded format for a family of general format identifier codes which are a subject of further study. The fourth code is reserved for other applications.

Note 1 – The DTE must encode the GFI to be consistent with whether or not it has subscribed to the *extended packet sequence numbering* facility (see § 6.2).

Note 2 – It is envisaged that other general format identifier codes could identify alternative packet formats.

5.1.2 Logical channel group number

The logical channel group number appears in every packet except *restart*, *diagnostic* and *registration* packets in bit position 4, 3, 2 and 1 of octet 1. For each logical channel, this number has local significance at the DTE/DCE interface.

This field is binary coded and bit 1 is the low order bit of the logical channel group number. In *restart*, *diagnostic* and *registration* packets, this field is coded all zeros.

5.1.3 *Logical channel number*

The logical channel number appears in every packet except *restart*, *diagnostic* and *registration* packets in all bit positions of octet 2. For each logical channel, this number has local significance at the DTE/DCE interface.

This field is binary coded and bit 1 is the low order bit of the logical channel number. In *restart*, *diagnostic* and *registration* packets, this field is coded all zeros.

5.1.4 *Packet type identifier*

Each packet shall be identified in octet 3 of the packet according to Table 17/X.25.

5.2 *Call set-up and clearing packets*

5.2.1 *Address block format*

The call set-up and clearing packets contain an address block. This address block has two possible formats: a non-TOA/NPI address format and a TOA/NPI address format. These two formats are distinguished by bit 8 of the general format identifier (A bit). When the A bit is set to 0, the non-TOA/NPI address format is used. When the A bit is set to 1, the TOA/NPI address format is used.

The non-TOA/NPI address format is supported by all networks. The TOA/NPI address format may be supported by some networks, in particular by those networks wishing to communicate with ISDNs for which the non-TOA/NPI address format provides insufficient addressing capacity.

Note – Prior to 1997, packet-mode DTEs operating according to case B of Recommendation X.31 (ISDN virtual circuit bearer service) will be addressed by a maximum 12 digit address from the E.164 numbering plan. After 1996, such a packet-mode DTE may have 15 digit E.164 address TOA/NZI address procedures will be required to address these DTEs. Recommendations E.165 and E.166 provide further guidance.

When transmitting a call set-up or clearing packet, a DCE will use the TOA/NPI address format if the DTE has subscribed to the *TOA/NZI address subscription* facility (see § 6.28), the non TOA/NPI address format if it has not.

TABLE 17/X.25

Packet type identifier

Packet type		Octet 3 Bits							
From DCE to DTE	From DTE to DCE	8	7	6	5	4	3	2	1
<i>Call set-up and clearing</i>									
Incoming call	Call request	0	0	0	0	1	0	1	1
Call connected	Call accepted	0	0	0	0	1	1	1	1
Clear indication	Clear request	0	0	0	1	0	0	1	1
DCE clear confirmation	DTE clear confirmation	0	0	0	1	0	1	1	1
<i>Data and interrupt</i>									
DCE data	DTE data	X	X	X	X	X	X	X	0
DCE interrupt	DTE interrupt	0	0	1	0	0	0	1	1
DCE interrupt confirmation	DTE interrupt confirmation	0	0	1	0	0	1	1	1
<i>Flow control and reset</i>									
DCE RR (modulo 8)	DTE RR (modulo 8)	X	X	X	0	0	0	0	1
DCE RR (modulo 128) ^{a)}	DTE RR (modulo 128) ^{a)}	0	0	0	0	0	0	0	1
DCE RNR (modulo 8)	DTE RNR (modulo 8)	X	X	X	0	0	1	0	1
DCE RNR (modulo 128) ^{a)}	DTE RNR (modulo 128) ^{a)}	0	0	0	0	0	1	0	1
DTE REJ (modulo 8) ^{a)}		X	X	X	0	1	0	0	1
DTE REJ (modulo 128) ^{a)}		0	0	0	0	1	0	0	1
Reset indication	Reset request	0	0	0	1	1	0	1	1
DCE reset confirmation	DTE reset confirmation	0	0	0	1	1	1	1	1
<i>Restart</i>									
Restart indication	Restart request	1	1	1	1	1	0	1	1
DCE restart confirmation	DTE restart confirmation	1	1	1	1	1	1	1	1
<i>Diagnostic</i>									
Diagnostic ^{a)}		1	1	1	1	0	0	0	1
<i>Registration^{a)}</i>									
	Registration request	1	1	1	1	0	0	1	1
Registration confirmation		1	1	1	1	0	1	1	1

^{a)} Not necessarily available on every network.

Note – A bit which is indicated as “X” may be set to either 0 or 1 as indicated in the text.

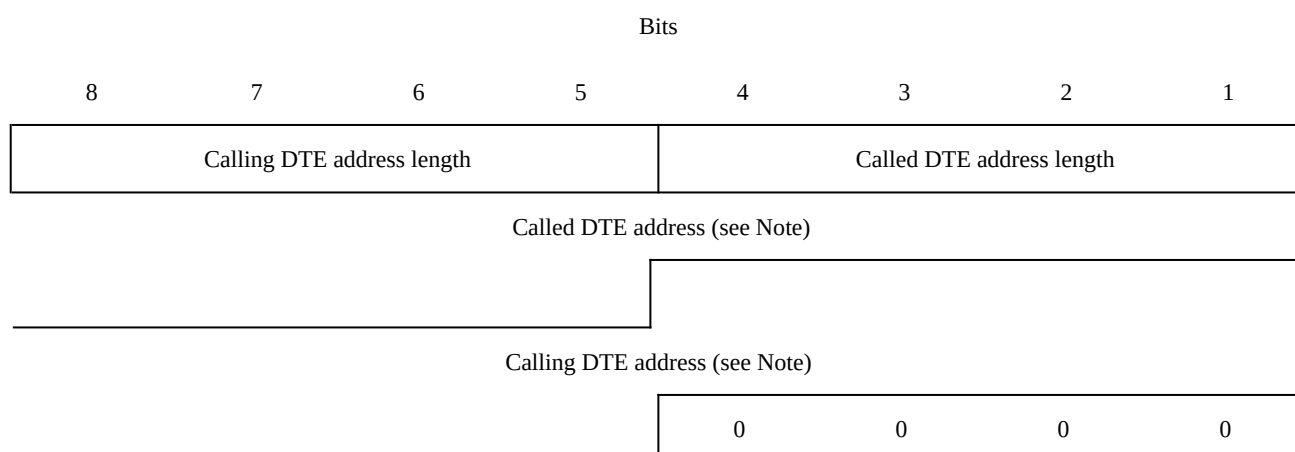
Note – The *TOA/NPI address subscription* facility is designated in Recommendation X.2 for further study (FS). In addition, there are several technical items associated with this TOA/NPI address format which are for further study.

When transmitting a call set-up or clearing packet, a DTE will use the TOA/NPI address format if the DTE has subscribed to the *TOA/NPI address subscription* facility, the non-TOA/NPI address format if it has not.

When the address format used by one DTE in a call set-up or clearing packet is different from the address format used by the remote DTE, the network (if it supports the TOA/NPI address format) converts from one address format to the other (see § 6.2.8).

5.2.1.1.1 Format of the address block when the A bit is set to 0 (non-TOA/NPI address)

Figure 4/X.25 illustrates the format of the address block when the A bit is set to 0.



Note – The figure is drawn assuming the number of address digits present in the called DTE address field is odd and the number of address digits present in the calling DTE address field is even.

FIGURE 4/X.25
Format of the address block when the A bit is set to 0

5.2.1.1.1.1 Calling and called DTE address length fields

These fields are four bits long each and consist of field length indicators for the called and calling DTE addresses. Bits 4, 3, 2 and 1 indicate the length of the called DTE address in semi-octets. Bits 8, 7, 6 and 5 indicate the length of the calling DTE address in semi-octets. Each DTE address length indicator is binary coded and bit 1 or 5 is the low order bit of the indicator.

5.2.1.1.1.2 Called and calling DTE address fields

Each digit of an address is coded in a semi-octet in binary coded decimal with bit 5 or 1 being the low order bit of the digit.

Starting from the high order digit, a DTE address is coded in consecutive octets with two digits per octet. In each octet, the higher order digit is coded in bits 8, 7, 6 and 5.

When present, the calling DTE address field starts on the first semi-octet following the end of the called DTE address field. Consequently, when the number of digits of the called DTE address field is odd, the beginning of the calling DTE address field, when present, is not octet aligned.

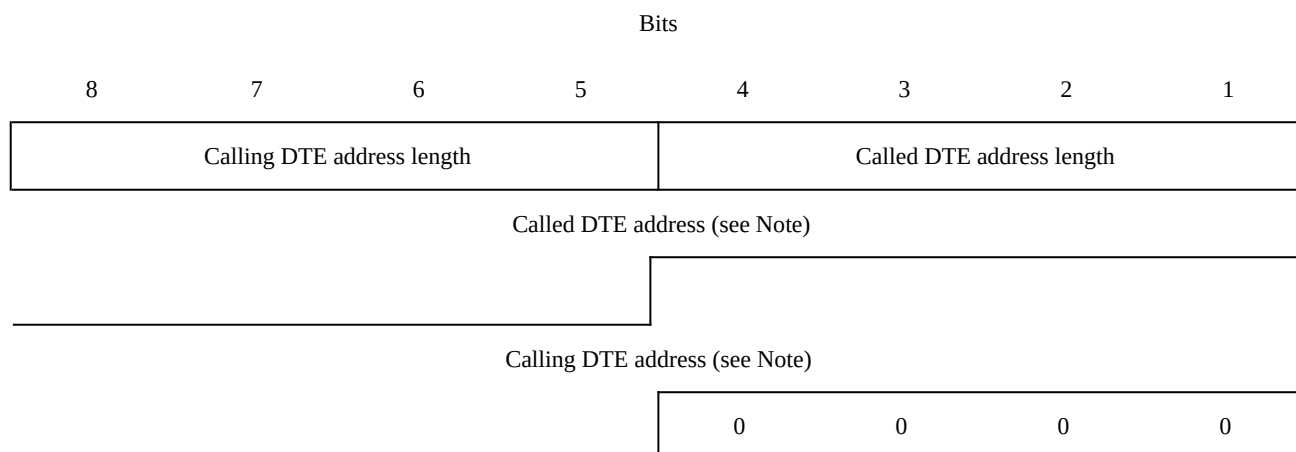
When the total number of digits in the called and calling DTE address fields is odd, a semi-octet with zeros in bits 4, 3, 2 and 1 will be inserted after the calling DTE address field in order to maintain octet alignment.

Further information on the coding of called and calling DTE address fields is given in Appendix IV.

Note – These fields may be used for optional addressing facilities such as abbreviated addressing. The optional addressing facilities employed as well as the coding of those facilities are for further study.

5.2.1.2 Format of the address block when the A bit is set to 1 (TOA/NPI address)

Figure 5/X.25 illustrates the format of the address block when the A bit is set to 1.



Note – The figure is drawn assuming the number of semi-octets present in the called DTE address field is odd and the number of semi-octets present in the calling DTE address field is even.

FIGURE 5/X.25

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

5.2.1.2.1 Called and calling DTE address length fields

These fields are one octet long each and consist of field length indicators for the called and calling DTE addresses. They indicate the length of the called DTE address and the calling DTE address, respectively, in semi-octets. Each DTE address length indicator is binary coded and bit 1 is the low order bit of the indicator.

The maximum value of a DTE address field length indicator is 17.

5.2.1.2.2 Called and calling DTE address fields

These fields respectively consist of the called DTE address when present, and the calling DTE address when present.

Each DTE address field, when present, has three subfields: type of address subfield (TOA), numbering plan identification subfield (NPI), address digits subfield. The first two subfields are at the beginning of the address and are binary coded with the values indicated in Tables 18/X.25 and 19/X.25.

Note 1 – Currently, no non-BCD encodable values have been allocated for type of address and numbering plan identification subfields.

Note 2 – A DTE address containing type of address and numbering plan identification subfields but no address digits subfield is invalid.

TABLE 18/X.25

Coding of the type of address subfield

Bits: or	8 7 6 5	Type of address
Bits:	4 3 2 1 (see Note 1)	
	0 0 0 0	Network-dependent number (see Note 2)
	0 0 0 1	International number (see Note 3)
	0 0 1 0	National number (see Note 3)
	to be defined	Complementary address alone (see Note 4)
	other values	Reserved

Note 1 – The type of address subfield of the called DTE address field uses bits 8, 7, 6 and 5. The type of address subfield of the calling DTE address field uses bits 4, 3, 2 and 1 if the called DTE address field does *not* end on an octet boundary; otherwise, it uses bits 8, 7, 6 and 5.

Note 2 – In this case, the address digits subfield present after the type of address and numbering plan identification subfields are organized according to the network numbering plan, e.g., prefix or escape code might be present. This case is equivalent to the use of the same code point in Q.931, where it is called “unknown”.

Note 3 – As for Q.931, prefix or escape code shall not be included in the address digits subfield.

Note 4 – See Appendix IV for the definition of a complementary address.

TABLE 19/X.25

Coding of the numbering plan identification subfield

Bits: or	8 7 6 5	Numbering plan
Bits:	4 3 2 1 (see Note 1)	
	0 0 1 1	X.21 (see Note 2)
	to be defined	Network-dependent (see Note 3)
	other values	Reserved (see Note 4)

Note 1 – The numbering plan identification subfield of the called DTE address field uses bits 4, 3, 2 and 1. The numbering plan identification subfield of the calling DTE address field uses bits 8, 7, 6 and 5 if the called DTE address does *not* end on an octet boundary; otherwise, it uses bits 4, 3, 2 and 1.

Note 2 – A mechanism equivalent to that provided by escape digits, as defined in Recommendation X.121, is not yet defined for use in conjunction with the TOA/NPI capability; such a mechanism will not use the numbering plan identification subfield. Until the availability of such a mechanism (potentially, an optional user facility), only the code point for X.121 shall be used. The X.121 escape codes shall apply and, when they are used, the type of address subfield shall indicate network-dependent number.

Note 3 – In this case, the address digits subfield present after the type of address and numbering plan identification subfields are organized according to the network numbering plan, e.g., prefix or escape code might be present.

Note 4 – Included among the reserved values are those corresponding to numbering plan identifiers in Q.931 (e.g., F.69, E.164).

The other semi-octets of a DTE address are digits, coded in binary coded decimal with bit 5 or 1 being the low order bit of the digit. Starting from the high order digit, the address digits are coded in consecutive semi-octets. In each octet, the higher order digit is coded in bits 8, 7, 6 and 5.

When present, the calling DTE address field starts on the first semi-octet following the end of the called DTE address field. Consequently, when the number of semi-octets of the called DTE address field is odd, the beginning of the calling DTE address field, when present, is not octet aligned.

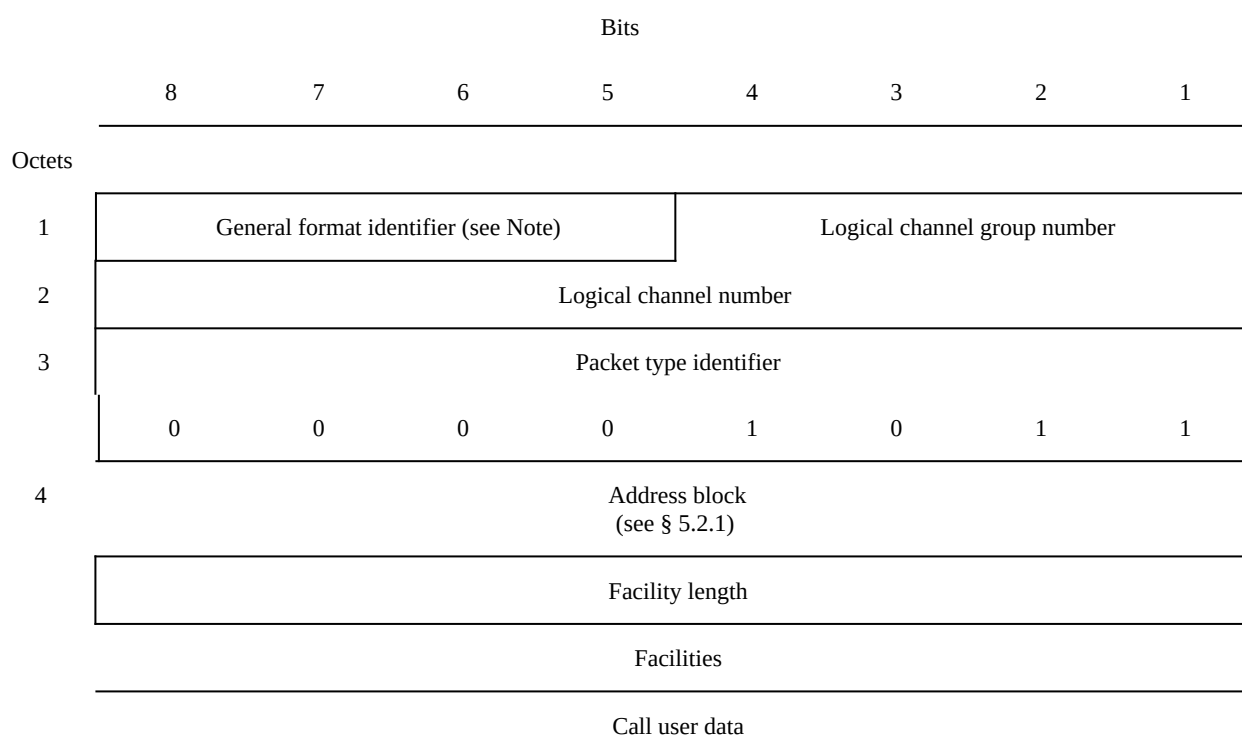
When the total number of semi-octets in the called and calling DTE address fields is odd, a semi-octet with zeros in bits 4, 3, 2 and 1 will be inserted after the calling DTE address field in order to maintain octet alignment.

Further information on the coding of called and calling DTE address fields is given in Appendix IV.

Note – These fields may be used for optional addressing facilities such as abbreviated addressing. The optional addressing facilities employed as well as the coding of those facilities are for further study.

5.2.2 Call request and incoming call packets

Figure 6/X.25 illustrates the format of *call request* and *incoming call* packets.



Note – Coded XX01 (modulo 8) or XX10 (modulo 128).

FIGURE 6/X.25
Call request and incoming call packet format

5.2.2.1 General format identifier

Bit 8 of octet 1 (A bit) should be set as described in § 5.2.1.

Bit 7 of octet 1 should be set to 0 unless the mechanism defined in § 4.3.3 is used.

5.2.2.2 Address block

The address block is described in § 5.2.1.

5.2.2.3 Facility length field

The octet following the address block indicates the length of the facility field, in octets. The facility length indicator is binary coded and bit 1 is the low order bit of the indicator.

5.2.2.4 Facility field

The facility field is present only when the DTE is using an optional user facility requiring some indication in the *call request* and *incoming call* packets.

The coding of the facility field is defined in §§ 6 and 7.

The facility field contains an integral number of octets. The actual maximum length of this field depends on the facilities which are offered by the network. However, this maximum does not exceed 109 octets.

Note – It is for further study whether another value should be defined, relative to the total number of octets in the packet.

5.2.2.5 Call user data field

Following the facility field, the call user data field may be present and has a maximum length of 128 octets when used in conjunction with the *fast select* facility described in § 6.16, 16 octets in the other case.

Note – Some networks require the call user data field to contain an integral number of octets (see the note in § 3).

When the virtual call is being established between two packet-mode DTEs, the network does not act on any part of the call user data field. In other circumstances, see Recommendation X.244.

5.2.3 Call accepted and call connected packets

Figure 7/X.25 illustrates the format of the *call accepted* and *call connected* packets in the basic or extended format.

5.2.3.1 Basic format

5.2.3.1.1 General format identifier

Bit 8 of octet 1 (A bit) should be set as described in § 5.2.1

Bit 7 of octet 1 should be set to 0 unless the mechanism defined in § 4.3.3 is used.

5.2.3.1.2 Address block

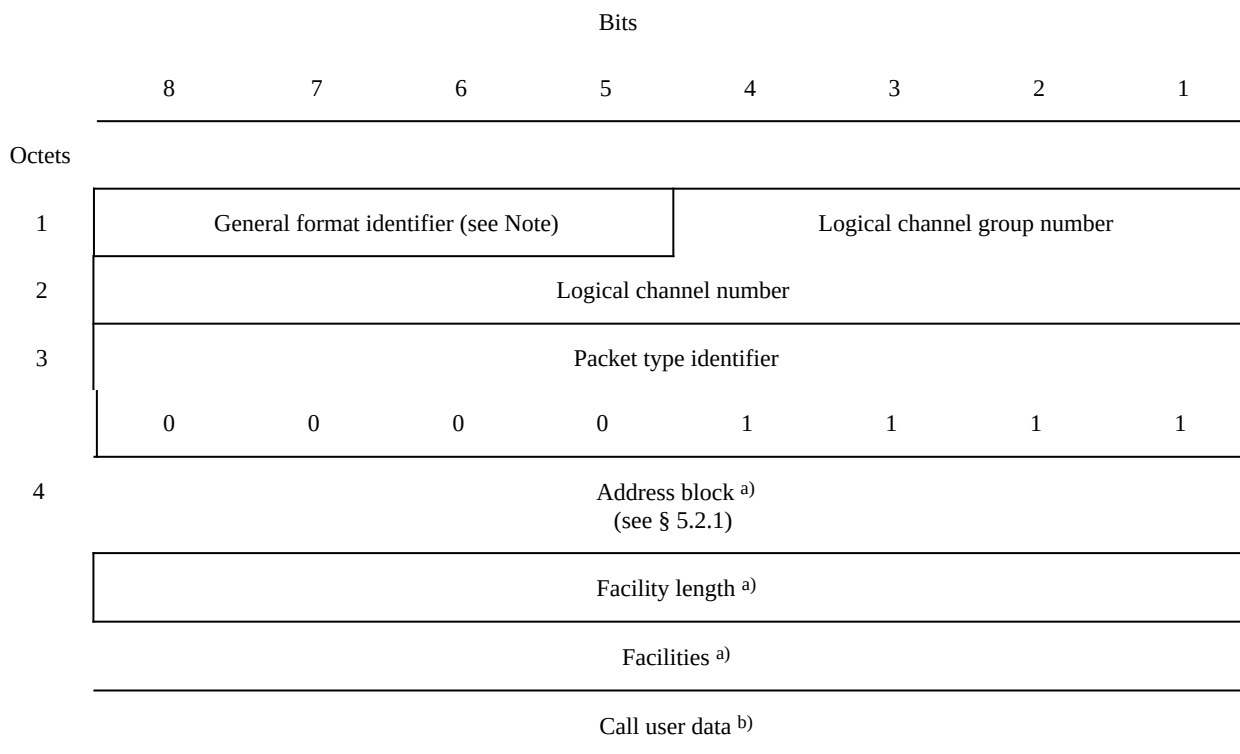
The address block is described in § 5.2.1.

The use of the called and calling DTE address length fields in *call accepted* packets is only mandatory when the called DTE address field, the calling DTE address field or the facility length field is present.

5.2.3.1.3 Facility length field

The octet following the address block indicates the length of the facility field, in octets. The facility length indicator is binary coded and bit 1 is the low order bit of the indicator.

The use of the facility length field in *call accepted* packets is only mandatory when the facility field is present.



^{a)} These fields are not mandatory in the basic format of *call accepted* packets (see § 5.2.3.1).

^{b)} This field may be present only in the extended format (see § 5.2.3.2).

Note – Coded XX01 (modulo 8) or XX10 (modulo 128).

FIGURE 7/X.25
Call accepted and call connected packet format

5.2.3.1.4 Facility field

The facility field is present only when the DTE is using an optional user facility requiring some indication in the *call accepted* and *call connected* packets.

The coding of the facility field is defined in §§ 6 and 7.

The facility field contains an integral number of octets. The actual maximum length of this field depends on the facilities which are offered by the network. However, this maximum does not exceed 109 octets.

Note – It is for further study whether another value should be defined, relative to the total number of octets in the packet.

5.2.3.2 Extended format

The extended format may be used only in conjunction with the *fast select* facility described in § 6.16. In this case, the called user data field may be present and has a maximum length of 128 octets.

The calling and called DTE address length fields and the facility length field must be present when the called user data field is present.

Note – Some networks require the called user data field to contain an integral number of octets (see the note in § 3).

When the virtual call is being established between two packet-mode DTEs, the network does not act on any part of the called user data field. See Recommendation X.244.