5i’

PART I

Recommendations Q.251 to Q.297

SPECIFICATIONS OF SIGNALLING SYSTEM No. 6

MONTAGE: PAGE 2 = PAGE BLANCHE

SIGNALLING SYSTEM No. 6

Preamble

This specification of Signalling System No. 6 represents an evolution originating with the *Green Book* text and proceeding through the *Yellow Book* revision to the present text. It is intended that new or modernized applications of System No. 6 should be based on this text. Updating of earlier versions is encouraged with the caution that careful coordination is called for.

INTRODUCTION

General

Signalling System No. 6 can be used to control the switching of all types of international circuits to be used in a worldwide connection, including TASI-derived circuits and satellite circuits.

The system meets all requirements defined by the CCITT concerning the service features for world-wide international semi-automatic and automatic telephone traffic. It is designed for both-way operation of the speech circuits.

The system can also be used for regional and national applications, and a large part of the signal code capacity is reserved for this purpose.

Moreover, a large unused signal code capacity will allow the addition of new signals to cater for some unknown future requirements. This spare capacity may be used for increasing the number of telephone signals as well as for introducing other signals, e.g. network-management signals and network-maintenance signals.

The system features are obtained by entirely removing the signalling from the speech paths and introducing the concept of a separate common signalling link over which all signals for a number of speech circuits are transferred. A number of these common signalling links interconnected by a number of transit centres and signal transfer points will form a coherent signalling network which can transfer all signals for all speech circuit groups within that network area.

Modes of operation

The signalling system may be operated both in an *associated mode* and in a *non-associated mode* . In the associated mode of

operation, the signals are transferred between the two exchanges which are the end points of a group of speech circuits over a common signalling link terminating at the same exchanges. In the non-associated mode of operation, the signals are transferred via two or more common signalling links in tandem associated with other groups of circuits, the signals being processed and forwarded through one or more intermediate exchanges acting only as signal transfer point.

The associated mode of operation is suited for use with large circuit groups, while a non-associated mode makes the signalling system economically suitable for use with small circuit groups by sharing the capacity of a signalling link among several groups.

A signalling link may be operated in the associated mode for one circuit group and in a non-associated mode for other circuit groups, either under normal or under breakdown conditions.

Common signalling link

The separate common signalling link is capable of operation over both analogue and digital circuits. Signalling information is transmitted in

the serial data mode on a link-by-link basis — i.e. the signals are transferred from one link to the next only after processing.

Analogue signalling links are capable of operations over standard international voice bandwidth channels including the 3-kHz spaced telephone channels used for some intercontinental circuits. Over voice-frequency channels the stream of pulses is normally transmitted at a rate of 2400 bit/s using the four-phase modulation method.

With respect to digital signalling links, the 1544 kbit/s and 2048 kbit/s internationally standardized PCM primary multiplexes (Recommendation Q.47 and Recommendation Q.46) are treated differently. In the case of 1544 kbit/s a channel is derived over which the stream of pulses is transmitted at 4 kbit/s. Signalling information is also transmitted at 4 kbit/s. In the case of 2048 kbit/s, a channel is derived over which the stream of pulses is transmitted at 64 kbit/s. Signalling information may be sent over such a channel at specified rates of either 4 kbit/s or 56 kbit/s. Other bit rates may have application in the future and other provisions for channel derivation may also prove useful, but neither are included in the present specification.

In both analogue and digital channels the pulse stream is divided into signal units of 28 bits each and into blocks of 12 signal units each.

The error control necessary for a common signalling link is based on error detection by coding and on error correction by retransmission. Error detection is based on decoding of checking bits included in each signal unit and on data carrier failure detection. This provides the desired system reliability. Error-free signal messages are used without delay. Provision is made for automatic transfer to an alternative link in the event of failure caused by breakdown or excessive error rate.

Signal messages

Signal messages carry information to identify the telephone circuit concerned. Since the circuit identity, i.e. the *label* , requires a large proportion of the bits (11 out of the 20 available information bits), provision is made for sending *multi-unit messages* consisting of several signal units under one label. A single digit or a random telephone signal will normally be transferred in a one-unit message while several or even all digits may be transferred in a multi-unit message.

Signal processing

All signals are processed at each transit centre or signal transfer point which has to be passed.

The processing of messages at a signal transfer point is minimal and includes label translation, if necessary, and the sending of signal messages within the proper priority category. In addition to the processing required at a signal point, a transit centre examines sufficient signal information to perform proper switching action.

Signalling equipment

Because of the new technique based on a separate common signalling link, on data type transmission and on central processing of the signalling information, Signalling System No. 6 will be used in general between exchanges of the stored programme control type.

Blanc

SECTION 1

FUNCTIONAL DESCRIPTION OF THE SIGNALLING SYSTEM

Recommendation Q.251

1.1 GENERAL

1.1.1 *Block diagrams*

Because common channel signalling , used in conjunction with exchanges having stored programme control , allows a wide latitude in the distribution of signalling functions between the processor and peripheral equipment, and because common channel signalling is not limited to exchanges

of this type, it is not practicable to specify well-defined equipment interfaces.

The major signal transfer functions are shown in Figures 1/Q.251, 2/Q.251 and Table 1/Q.251 for both the analogue version and the digital version. The blocks are functional blocks and should not be construed as depicting equipment arrangements.

Figure 1/Q.251, p. 1

Figure 2/Q.251, p. 2

Table [1/Q.251], p. 3

1.1.2 *Signal unit and block structure*

Each signalling channel of the system (shown in Figure 2/Q.251) is operated synchronously: that is, a continuous stream of

data flows in both directions. The data stream is divided into signal units of 28 bits each, of which the last 8 are check bits, and these signal units in turn are grouped into *blocks* of 12 signal units. The 12th and last signal unit of each block is an acknowledgement signal unit coded to indicate the number of the block being transmitted, the number of the block being acknowledged and whether or not each of the 11 signal units of the block being acknowledged was received without detected errors.

Eight consecutive blocks form a *multi-block* . Since the system allows for up to 32 multi-blocks, the maximum number of blocks in the error control loop is 256.

In normal operation, the first 11 signal units within a block will consist of signal units carrying either telephone signals or management signals, or of synchronization signal units. Synchronization signal units, which are transmitted only in the absence of other signalling traffic, are coded to indicate the number of the position they occupy within the block to facilitate locating the acknowledgement signal unit. Their format has been chosen to produce a large number of dibit transitions to facilitate achieving or maintaining bit synchronism in the analogue version.

During system-synchronizing procedures, only synchronization and acknowledgement signal units are transmitted until bit, signal unit, and block synchronism has been achieved at both ends of the signalling system.

1.1.3 *Transmitting terminal*

The transmission of a signal in System No. 6 starts in the processor as shown in Figure 1/Q.251. Signals corresponding to the information to be transmitted are formed in accordance with the format specified and delivered to the output buffer. These signals, which may be one-unit messages or multi-unit messages , are stored in this buffer according to their priority level. The output buffer delivers the highest priority signal awaiting transmission to the coder in serial form in the next available time slot. In the coder , each signal unit is encoded by the addition of check bits in accordance with the check bit polynomial

In the analogue version of the signalling system the signal is then modulated and delivered to the outgoing voice frequency channel for transmission to the distant receiving terminal. In the digital version of the

signalling system the signal is passed through the interface adaptor before entering the outgoing digital channel.

1.1.4 *Receiving terminal*

The receiving function starts with the acceptance of the serial data from the transmission path. The output of the demodulator or the interface adaptor is delivered to the decoder where each signal unit is checked for errors on the basis of the associated check bits. Signal units received with detected errors are discarded. Signal units carrying telephone signals or management signals which are error-free are transferred to the input buffer after deletion of the check bits. The input buffer delivers the signal units to the processor where the processor analyzes the signals and takes appropriate action.

1.1.5 *Error control*

Error control is based on error detection by redundant coding and on error correction by retransmission of those signal messages found to be in error. This procedure requires that each transmitted signal message be stored until acknowledged as being received correctly. In the case of multi-unit

messages, each signal unit of the message must be stored until all units of the message are acknowledged as being received correctly. When an acknowledgement signal unit is received, it is analyzed in the box marked *error control* in Figure 1/Q.251. If an acknowledgement bit indicates that a signal unit being acknowledged was received in error, the retransmission process is started. Request for retransmission of a synchronization signal unit is ignored. If any unit of a multi-unit message is in error, the entire multi-unit message must be retransmitted in its initial order.

The data channel failure detector complements the decoder for longer error bursts. When activated it gives an indication to the box marked *error control* in Figure 1/Q.251. An error indication from either the decoder or the data channel failure detector is associated with the position of the erroneous signal unit(s) within the block.

This information is used by the acknowledgement signal unit generator to control the marking of the acknow ledgement bits.

As shown in Figure 1/Q.251, the processor may also be notified whenever an error is detected in a signal unit. This information may be used by the processor to erase the memory of any signal unit(s) of a multi-unit message received which is associated with the one found in error, since this entire message will be retransmitted.

Recommendation Q.252

1.2 SIGNAL TRANSFER TIME DEFINITIONS

1.2.1 *Functional reference points*

The major functional reference points are as indicated in Figure 3/Q.252, i.e. points A, B, C and D, which are defined below:

Point A. — That point in a switching centre where the signal as a signal unit, before being coded (check bits added), is delivered from the processor to an output buffer store

Point B. — That point where the signal unit (check bits included) in serial form will be delivered to the transmission path.

Point C. — That point where the signal unit (check bits included) in serial form will be delivered to the demodulator or interface adaptor.

Point D. — That point in a switching centre where the signal unit, after being decoded (check bits deleted), will be presented from an input buffer store to the processor.

The functional reference points B and C are typically those points which define the transmission path used for common channel signalling. In the analogue version this transmission path is provided by a voice frequency channel and in the digital version by a digital channel.

Figure 3/Q.252, p. 4

1.2.2 *Signal transfer time components*

The various components of signal transfer time between two switching centres are defined as follows:

T_c = cross-office transfer time ,

T_e = emission time of a signal unit (included in T_s),

T_h = processing (handling) time ,

T_p = transfer channel propagation time ,

T_q = queueing delay in the output buffer store (included in T_s),

T_r = receiver transfer time ,

T_s = sender transfer time ,

T_t = total signal transfer time

T_h is that period from the moment the signal is available for acceptance by the processor to the moment the signal is placed in the output buffer and is available for transmission.

T_r is that period of time from the moment when the last bit of the signal unit leaves the transfer channel to that time when the signal is completely in the input buffer and is available for acceptance by the processor. T_r thus includes the following actions: demodulation, decoding (error detection) and, where present, serial to parallel conversion.

T_s is that period of time from the moment when the signal enters the output buffer store to that time when the last bit of the signal unit passes into the transfer channel. T_s thus includes the following times and actions: emission time of signal unit(s) (one-unit or multi-unit message), queueing delay in the output buffer store, encoding (adding check bits), parallel to serial conversion where present, modulation in the analogue version and clock and data rate conversion where applicable in the digital version.

The definitions of signal transfer times give rise to the following time relationships:

$$T_c = T_r + T_h + T_s$$

$$T_t = T_s + T_p + T_r$$

In the case when an error is detected, retransmission will occur and the above time relationships are not valid. Rather, the time involved in retransmission and the extra queueing delays, which may occur on a retransmitted signal, must be taken into consideration.

Recommendation Q.253

1.3 ASSOCIATION BETWEEN SIGNALLING AND SPEECH NETWORKS

1.3.1 *Definitions*

The signals pertaining to a given group of speech circuits between two exchanges utilizing a common channel signalling system can be transferred in the following ways:

1.3.1.1 **associated mode of operation**

In the associated mode of operation, the signals are transferred between the two exchanges over a common signalling link which terminates at the same exchanges as the group of speech circuits to which the signalling link has been assigned.

1.3.1.2 **non-associated mode of operation**

In a non-associated mode of operation, the signals are transferred between the two exchanges over two or more common signalling links in tandem, the signals being processed and forwarded through one or more intermediate *signal transfer points* (see § 1.3.3 below). Following this definition, there may be a range of non-associated modes of operation which vary in the degree of rigidity imposed on the choice of the path utilized by the signals pertaining to the speech circuit. The ends of this range can be described as fully dissociated mode and quasi-associated mode of operation.

a) **fully dissociated mode of operation**

The fully dissociated mode of operation is the extreme case of the non-associated mode. It is assumed that there is an established network of common signalling links and signal transfer points which may have its own routing principles.

In the fully dissociated mode of operation, the signals are transferred between the two exchanges via any available path in the signalling network according to the rules of that network.

b) **quasi-associated mode of operation**

The quasi-associated mode of operation is the limited form of the non-associated mode. The common signalling links to be used are generally each operating in the associated mode with a group of circuits.

In the quasi-associated mode of operation the signals are transferred between the two exchanges over two or more common signalling links in tandem, but only over certain predetermined paths and through predetermined signal transfer points.

1.3.2 *Association methods provided by the System No. 6*

Signalling System No. 6 is designed to provide associated and quasi-associated modes of operation as defined in §§ 1.3.1.1 and 1.3.1.2, b) above, e.g. as shown in Figure 4/Q.253.

Figure 4/Q.253, p. 5

As far as quasi-associated structures are concerned, the number of signal transfer points in the signalling path for a group of speech circuits

between the two System No. 6 exchanges should be kept as low as practicable. Normally, one such signal transfer point should suffice. However, there may be groups of circuits without associated common signalling links which will need more than one signal transfer point to handle the signalling traffic.

Attention is drawn to the fact that the addition of a signal transfer point involves the handling time at that point and one additional signal transfer time. Extensive use of signal transfer points will reduce some of the advantages of the signalling speed of System No. 6.

Note — It should be noted that where a speech circuit group has an associated signalling link, dependability requirements may be met with economically, by using quasi-associated operation under breakdown condition when the associated signalling link is non-operative.

1.3.3 **signal transfer point**

1.3.3.1 *Definition*

A signal transfer point is a signal relay centre handling and forwarding telephone signals from one signalling link to another in case of signalling in a non-associated mode of operation as defined in § 1.3.1.2 above.

Note — Following this definition there is no need for a signal transfer point to have any connection with, or relation to, a switching centre.

However, in the case of a quasi-associated mode of operation as defined in § 1.3.1.2 |) above, it is obvious that a signal transfer point may coincide with the System No. 6 exchange where the signalling links terminate and that the equipment may be incorporated into the signalling equipment of that System No. 6 exchange.

1.3.3.2 *Functions of a signal transfer point*

a) The equipment at a signal transfer point has to analyze the label and telephone signal information of every telephone signal message received in order to offer the message to the proper outgoing signalling channel, taking account of its priority, if any.

b) In doing so, it may be necessary to change the label of the received telephone signal message according to some preset rules. However, the telephone signal information included in the message will never be changed by the equipment of a signal transfer point.

c) If for some reason a signal transfer point is unable to transfer signal messages, a procedure is provided to notify the preceding exchange(s) so that signal messages may be sent via reserve routes if available.

Note — The fact mentioned under b) above and the fact that the analysis of the received message will never be accompanied by the switching of speech circuits provide a distinction between a signal transfer point and a transit exchange. In general, a transit exchange will be designed to perform both the normal transit exchange functions and the signal transfer point functions.

Blanc

MONTAGE: PAGE 12 = PAGE BLANCHE

SECTION 2

DEFINITION AND FUNCTION OF SIGNALS

Recommendation Q.254

2.1 TELEPHONE SIGNALS

Signals concerning a particular call or a particular speech circuit.

2.1.1 **address signal**

A call set-up signal sent in the forward direction containing one element of information (digit 1, 2, . | | 9 or 0, code 11 or code 12) about the called party's number or the end-of-pulsing (ST) signal.

For each call, a succession of address signals is sent.

2.1.2 **country-code indicator**

Information sent in the forward direction indicating whether or not the country code is included in the address information.

2.1.3 **nature-of-circuit indicator**

Information sent in the forward direction about the nature of the circuit or any preceding circuit(s) already engaged in the connection:

— *satellite circuit* , or

— *no satellite circuit* .

An international exchange receiving this information will use it (in combination with the appropriate part of the address information) to determine the nature of the outgoing circuit to be chosen.

2.1.4 **echo suppressor indicator**

Information sent in the forward direction indicating whether or not an outgoing half-echo suppressor is included in the connection.

2.1.5 **calling-party's-category indicator**

Some section numbers have been reserved for future use.

Information sent in the forward direction about the *category of the calling party* | nd, in case of semi-automatic calls about the *service language* to be spoken by the incoming, delay and assistance operators.

The following categories are provided:

— operator,

— ordinary calling subscriber,

— calling subscriber with priority,

— data call,

— test call.

2.1.6 **end-of-pulsing (ST) signal**

An address signal sent in the forward direction indicating that there are no more address signals to follow.

2.1.10 **continuity signal**

A signal sent in the forward direction indicating continuity of

the preceding No. 6 speech circuit(s) as well as of the selected speech circuit to the following international exchange, including verification of the speech path across the exchange with the specified degree of reliability.

2.1.12 **switching-equipment-congestion signal**

A signal sent in the backward direction indicating the failure of the call set-up attempt due to congestion encountered at international switching equipment.

2.1.13 **circuit-group-congestion signal**

A signal sent in the backward direction indicating the failure of the call set-up attempt due to congestion encountered on an international circuit group or on the outgoing links of a terminal international exchange.

2.1.14 **national-network-congestion signal**

A signal sent in the backward direction indicating the failure of the call set-up attempt due to congestion encountered in the national destination network (excluding the busy condition of the called party's line(s)).

2.1.15 **address-incomplete signal**

A signal sent in the backward direction indicating that the number of address signals received is not sufficient for setting up the call. This condition may be determined in the incoming international exchange (or in the national destination network):

— immediately after the reception of an ST signal, or

— on time-out after the latest digit received.

2.1.16 **address-complete signal, charge**

A signal sent in the backward direction indicating that all the address signals required for routing the call to the called party have been received, that no called-party's-line-condition signals (electrical) will be sent, and that the call should be charged on answer.

2.1.17 **address-complete signal, no charge**

A signal sent in the backward direction indicating that all the address signals required for routing the call to the called party have been received, that no called-party's-line-condition signals (electrical) will be sent, and that the call should not be charged on answer.

2.1.18 **address-complete signal, coin-box**

A signal sent in the backward direction indicating that all the address signals required for routing the call to the called party have been received, that no called-party's-line-condition signals (electrical) will be sent, that the call should be charged on answer, and that the called number is a coin (box) station.

2.1.19 **address-complete, subscriber-free signal, charge**

A signal sent in the backward direction as an alternative to the address-complete, charge signal indicating that the called party's line is free, and that the call should be charged on answer.

2.1.20 **address-complete, subscriber-free signal, no charge**

A signal sent in the backward direction as an alternative to the address-complete, no charge signal indicating that the called party's line is free, and that the call should not be charged on answer.

2.1.21 **address-complete, subscriber-free signal, coin-box**

A signal sent in the backward direction as an alternative to the address-complete, coin-box signal indicating that the called party's line is

free, that the call should be charged on answer, and that the called number is a coin (box) station.

2.1.23 **unallocated-number signal**

A signal sent in the backward direction indicating that the received number is not in use (for example spare level, spare code, vacant subscriber's number).

2.1.24 **subscriber-busy signal (electrical)**

A signal sent in the backward direction indicating that the line(s) connecting the called party with the exchange is (are) engaged. The subscriber-busy signal will also be sent in case of complete uncertainty about the place where the busy or congestion conditions are encountered and in the case where a discrimination between subscriber-busy and national-network congestion is not possible.

2.1.25 **line-out-of-service signal**

A signal sent in the backward direction indicating that the called party's line is out-of-service or faulty.

2.1.26 **send-special-information tone signal**

A signal sent in the backward direction indicating that the special information tone should be returned to the calling party. This tone indicates that the called number cannot be reached for reasons not covered by other specific signals and that the unavailability is of a long term nature. (See also Recommendation Q.35.)

2.1.27 **confusion signal**

Signal sent in the backward direction indicating that an exchange is unable to act upon a message received from the preceding exchange because the message is considered unreasonable.

2.1.28 **call-failure signal**

A signal sent in the backward direction indicating the failure of a call set-up attempt due to the lapse of a time-out or a fault not covered by specific signals and where the congestion tone is the appropriate tone to be returned to the calling party.

2.1.29 **message-refusal signal**

A signal sent by a signal transfer point in response to the reception of a telephone signal which it is unable to deal with as a consequence of the transfer-prohibited situation.

2.1.31 **forward-transfer signal**

A signal sent in the forward direction on semi-automatic calls when the outgoing international exchange operator wants the help of an operator at the incoming international exchange. The signal will normally serve to bring an assistance operator (see Recommendation Q.101) into the circuit if the call is automatically set up at that exchange. When a call is completed via an operator (incoming or delay operator) at the incoming international exchange, the signal should preferably cause this operator to be recalled.

2.1.32 **answer signal, charge**

A signal sent in the backward direction indicating that the call is answered and subject to charge.

In semi-automatic working, this signal has a supervisory function. In automatic working, the signal is used:

— to start metering the charge to the calling subscriber (Recommendation Q.28), and

— to start the measurement of call duration for international accounting purposes.

2.1.33 **answer signal, no charge**

A signal sent in the backward direction indicating that the call is answered but is not subject to charge. It is used for calls to particular destinations only.

In semi-automatic working, this signal has a supervisory function. In automatic working, the reception of this signal shall not start the metering to the calling subscriber.

2.1.34 **clear-back signals**

Signals sent in the backward direction, the first of which indicates that the called party has cleared. Subsequent clear-back signals indicate that the called party has cleared following a reanswer, e.g. switch-hook flashing.

In semi-automatic working, they perform a supervisory function. In automatic working, the arrangements specified in Recommendation Q.118 apply.

2.1.35 **reanswer signals**

Signals in the backward direction indicating that the called

party, after having cleared, again lifts his receiver or in some other way reproduces the answer condition, e.g. switch-hook flashing.

2.1.36 **clear-forward signal**

A signal sent in the forward direction to terminate the call or call attempt and release the circuit concerned. This signal is normally sent when the calling party clears but also may be a proper response in other situations, as for example, when reset circuit is received.

2.1.37 **release-guard signal**

A signal sent in the backward direction in response to a clear-forward signal, or if appropriate to the reset-circuit signal, when the circuit concerned has been brought into the idle condition.

2.1.38 **reset-circuit signal**

A signal that is sent to release a circuit when, due to memory multilation or other causes, it is unknown whether, for example, a clear-forward or clear-back signal is appropriate. If at the receiving end the circuit is blocked, this signal should remove that condition.

2.1.41 **blocking signal**

A signal sent for maintenance purposes to the exchange at the other end of a circuit to cause engaged conditions of that circuit for subsequent calls outgoing from that exchange. An exchange receiving the blocking signal must be capable of accepting incoming calls on that circuit unless it also has sent a blocking signal. Under conditions covered later, a blocking signal is also a proper response to a reset-circuit signal.

2.1.42 **unblocking signal**

A signal sent to the exchange at the other end of a circuit to cancel in that exchange the engaged conditions of that circuit caused by an earlier blocking signal.

2.1.43 **blocking-acknowledgement signal**

A signal sent in response to a blocking signal indicating that the speech circuit has been blocked.

2.1.44 **unblocking-acknowledgement signal**

A signal sent in response to an unblocking signal indicating that the speech circuit has been unblocked.

2.2 SIGNALLING-SYSTEM-CONTROL SIGNALS

Signals used for the proper functioning of the signalling system via the common signalling link.

2.2.1 **acknowledgement indicator**

Information indicating whether or not an error has been detected in a received signal unit.

2.2.2 **synchronization signal**

A signal sent in order to establish and maintain synchronization between the two ends of a signalling channel.

2.2.3 *System-control signals*

2.2.3.1 **changeover signal**

A signal sent to indicate a failure on a synchronized signalling link. If this signal is sent on a link carrying signalling information, it also indicates that a changeover to the next reserve signalling link is required.

2.2.3.2 **manual-changeover signal**

A signal sent to initiate a changeover to a reserve signalling link or to initiate the removal of full-time synchronized reserve link from service availability because of need for rearrangements, changes, maintenance, etc.

2.2.3.3 **manual-changeover-acknowledgement signal**

A signal sent in response to a manual-changeover signal to indicate that manual changeover can take place.

2.2.3.4 **standby-ready signal**

A signal sent on a standby reserve link to indicate that the error rate on that link has met the requirements of the *one-minute proving period* .

2.2.3.5 **standby-ready-acknowledgement signal**

A signal sent on the standby reserve link in response to a standby-ready signal and indicating that the error rate on that link has met the requirements of the *one-minute proving period* .

2.2.3.6 **load transfer signal**

A signal sent on a link to indicate that the error rate on that link has met the requirements of the *one-minute proving period* and that signalling traffic should be transferred to that particular link.

2.2.3.7 **emergency-load-transfer signal**

A signal sent on as many links as possible to indicate that the error rate on those links has met the requirements of the *emergency proving period* , and that emergency transfer can take place to one of these links.

2.2.3.8 **load-transfer-acknowledgement signal**

A signal sent on a link in response to a load-transfer signal or to an emergency-load-transfer signal to indicate that the load-transfer will take place to that particular link.

2.2.4 *Multi-block synchronization signals*

2.2.4.1 **multi-block monitoring signal**

A signal, required on links where the number of blocks in the error control loop exceeds 8, and sent to check multi-block synchronism.

2.2.4.2 **multi-block acknowledgement signal**

A signal sent on a link in response to a multi-block monitoring signal and used by the receiving terminal to verify multi-block synchronism.

Recommendation Q.256

2.3 MANAGEMENT SIGNALS

Signals concerning the management of the speech circuit network and the signalling network. The three following categories of signals are distinguished:

2.3.1 **network-management signals**

Information regarding the conditions of circuit groups or equipment sent from one point in the network to one or more other points. This excludes information relevant to individual calls or individual speech circuits.

2.3.2 **network-maintenance signals**

Management signals used for maintenance purposes.

2.3.2.1 **reset-band signal**

A signal sent by a failed exchange during recovery to request that all circuits in the band be put in the idle state except those circuits at the receiving end that have imposed a blocked condition on the sending end. If at the receiving end the circuit is blocked, the reset-band signal should remove that condition.

2.3.2.2 **reset-band-acknowledgement signal**

A signal sent in response to the reset-band signal to indicate whether a circuit is available for use or should be blocked in the failed exchange.

2.3.2.3 **reset-band-acknowledgement signal, all circuits idle**

A signal sent in response to the reset-band signal to indicate that all circuits in the band are available for use.

2.3.3 **signalling-network-management signals**

Information regarding the conditions of signalling links which may be required to modify signal routings. This excludes information relevant to the signals concerned with individual calls or speech circuits.

2.3.3.1 **transfer-prohibited signal**

A signal sent by a signal transfer point when it is unable to transfer signals for a particular group of circuits.

2.3.3.2 **transfer-allowed signal**

A signal sent by a signal transfer point when it is once again ready to transfer signals for the particular group of circuits.

2.3.3.3 **transfer-allowed-acknowledgement signal**

A signal sent in response to the reception of a transfer-allowed signal.