INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Q.400

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

SPECIFICATIONS OF SIGNALLING SYSTEM R2

DEFINITION AND FUNCTION OF SIGNALS

FORWARD LINE SIGNALS

ITU-T Recommendation Q.400

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation Q.400 was published in Fascicle VI.4 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

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

1.1 FORWARD LINE SIGNALS

1.1.1 **seizing signal**

A signal sent at the beginning of the call to initiate transition of the circuit at the incoming end from the idle state to seized state. At the incoming exchange it causes the association of equipment capable of receiving register signals.

1.1.2 **clear-forward signal**

A signal sent to terminate the call or call attempt and to release in the incoming exchange and beyond it all switching units held on the call.

The signal is sent when:

a) in semi-automatic working the operator of the outgoing international exchange takes the plug out or performs an equivalent operation;

b) in automatic working, the calling subscriber clears or performs an equivalent operation.

This signal is also sent by the outgoing international exchange upon receiving a backward register signal requesting the outgoing international R2 register to clear the connection, or in the case of forced release of the connection as mentioned in Recommendation Q.118. This signal may also be sent as the result of abnormal release of the outgoing international R2 register.

1.1.3 **forward-transfer signal**[1)]

A signal sent on semi-automatic calls when the outgoing international exchange operator wants the help of an operator at the incoming international exchange. The signal will usually bring an assistance operator (see Recommendation Q.101) into the circuit. If the call is completed via an incoming or delay operator at the incoming international exchange, the signal indicates that recall of this operator is wanted.

1.2 BACKWARD LINE SIGNALS

1.2.1 **seizing-acknowledgement signal**[2)]

A signal sent to the outgoing exchange to indicate the transition of the equipment at the incoming end from the idle state to seized state. Recognition of the seizing acknowledgement signal at the outgoing end causes the state of the circuit to change from seized to seizure acknowledged.

1.2.2 **answer signal**

A signal sent to the outgoing international exchange to indicate that the called party has answered the call (see Recommendation Q.27). In semi-automatic working this signal has a supervisory function.

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1) This signal is not provided in either the analogue or digital version of System R2 line signalling. Information about possible arrangements for such a signal and signalling procedures involved are contained in Annex A to the present Specifications.

2) This signal is only used in the digital version of System R2 line signalling.

In automatic working this signal is used:

- to start metering the charge to the calling subscriber, unless the register signal indicating no charge has been sent previously;
- to start measurement of the call duration for international accounting purposes.

1.2.3 **clear-back signal**

A signal sent to the outgoing international exchange to indicate that the called party has cleared. In semi-automatic working, this signal has a supervisory function. In automatic working, arrangements must be made in accordance with Recommendation Q.118, and the Notes of Recommendation Q.120, § 1.8 also apply.

1.2.4 **release-guard signal**

A signal sent to the outgoing exchange in response to a clear-forward signal to indicate that the latter has been fully effective in returning the switching units at the incoming end of the circuit to idle condition. An international circuit is protected against subsequent seizure as long as the release operations initiated by the clear-forward signal have not been completed at the incoming end.

1.2.5 **blocking signal**

A signal sent on an idle circuit to the outgoing exchange to cause engaged conditions (blocking) to be applied to this circuit, guarding it against subsequent seizure.

1.3 FORWARD REGISTER SIGNALS

1.3.1 **address signal**

A signal containing one element of information (digit 1, 2, ..., 9 or 0, code 11, code 12 or code 13) about the called or calling party's number or the end of pulsing indication (code 15).

For each call a series of address signals is sent (see Recommendations Q.101 and Q.107).

1.3.2 **country-code and echo-suppressor indicators**

Signals indicating:

- whether or not the country-code is included in the address information (international transit or terminal call);
- whether or not an outgoing half-echo suppressor should be inserted in the first international exchange reached;
- whether or not an incoming half-echo suppressor should be inserted (an outgoing half-echo suppressor having already been inserted in the connection).

1.3.3 **language or discriminating digit**

A numerical signal occupying a predetermined position in the sequence of address signals indicating:

- in semi-automatic working, the service language to be used in the incoming international exchange by the incoming, delay and assistance operators when they come in the circuit (language digit);
- the automatic working or any other special characteristic of the call (discriminating digit).

1.3.4 **test call indicator**

A signal occupying the position of the language digit when the call is originating from test equipment.

1.3.5 **nature of circuit indicators**

Signals only sent on request by certain backward signals and using a second meaning of some signals, to indicate whether a satellite link is already included in the connection or not.

1.3.6 **end-of-pulsing signal**

An address signal sent indicating (in semi-automatic service) that no other address signal will follow or (in automatic service) that the transmission of the code identifying the origin of the call is completed.

1.3.7 **calling party's category signals**

A special group of signals providing, in addition to the information contained in the language or discrimination digit, supplementary information concerning the nature of the call (i.e. whether national or international) and its origin.

Typical categories are:

- operator capable of sending the forward-transfer signal;
- ordinary subscriber or operator with no forward-transfer facility;
- subscriber with priority;
- data transmission call;
- maintenance call.

1.3.8 *Signals for use on the national network*

Some of the Group II forward signals (see Recommendation Q.441, § 4.2.3.2) have been allocated for national use. When the outgoing international R2 register receives them, it must react as specified in Recommendation Q.480.

1.4 BACKWARD REGISTER SIGNALS

1.4.1 *Signals requesting transmission of address signals*

Five backward signals without particular names are provided; four of them are interpreted with reference to the latest address signal sent:

- signal requesting the transmission of the address signal following the latest address signal sent;
- signal requesting repetition of the address signal preceding the latest address signal sent (last but one);
- signal requesting the repetition of the last but two address signals sent;
- signal requesting the repetition of the last but three address signals sent;
- signal requesting the transmission or repetition of the language or discrimination digit.

1.4.2 *Signal requesting information about the circuit*

A backward signal is provided to request the nature of the circuit.

1.4.3 *Signals requesting information about the call or calling party*

Three backward signals without particular names are provided for this purpose:

- signal inquiring the calling party's category;
- signal requesting the repetition of the country-code indicator;
- signal inquiring whether or not incoming half-echo suppressor should be inserted.

1.4.4 *Congestion signals*

Two congestion signals are provided:

- a signal indicating international congestion, i.e. that the call set-up attempt has failed owing to congestion of the group of international circuits, or congestion in the international switching equipment, or to time-out or abnormal release of an incoming R2 register in an international transit exchange;
- a signal indicating national congestion, i.e. that the call set-up attempt has failed owing to congestion in the national network (excluding a busy called subscriber's line) or to time-out or abnormal release of an incoming R2 register in a terminal international exchange or a national exchange.

1.4.5 **address-complete signals**

Signals indicating that it is no longer necessary to send another address signal, and

- either cause immediate passage to the speech position to enable the calling subscriber to hear a tone or a recorded announcement of the national incoming network;
- or announce the transmission of a signal indicating the condition of the called subscriber's line.

1.4.6 *Signals indicating the condition of the called subscriber's line*

Six signals sent in the backward direction are provided to give information about the called subscriber's line and to indicate the end of interregister signalling. These signals are:

- **send special information tone**

  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);

- **subscriber line busy**

  a signal indicating that the line or lines connecting the called subscriber to the exchange are busy;

- **unallocated number**

  a signal indicating that the number received is not in use (e.g. an unused country code or an unused trunk code or subscriber number that has not been allocated);

- **subscriber line free, charge**

  a signal indicating that the called subscriber's line is free and that the call is to be charged on answer;

- **subscriber line free, no charge**

  a signal indicating that the called subscriber's line is free and that the call is not to be charged on answer. This signal is used only for calls to special destinations;

- **subscriber line out of order**

  a signal indicating that the subscriber's line is out-of-service or faulty.

1.4.7 *Signals for use in the national network*

Some of the backward signals have been allocated for national use. Since not all incoming registers can know the origin of the connection and since end-to-end signalling is used, it may happen that the above-mentioned signals are sent to the outgoing international R2 register. When this register receives them it must react as indicated in Recommendations Q.474 and Q.480.