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RED BOOK

VOLUME VI — FASCICLE VI.6

INTERWORKING OF SIGNALLING SYSTEMS

RECOMMENDATIONS Q.601-Q.685

VIIIᵀᴴ PLENARY ASSEMBLY
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APPLICABLE AFTER THE EIGHTH PLENARY ASSEMBLY (1984)

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Interworking of Signalling Systems

SECTION 2 —   *Logic procedures*

PRELIMINARY NOTES

1   The strict observance of the specifications for standardized international signalling and switching equipment is of the utmost importance in the manufacture and operation of the equipment. Hence these specifications are obligatory except where it is explicitly stipulated to the contrary.

The values given in Fascicles VI.1 to VI.9 are imperative and must be met under normal service conditions.

2   The Questions entrusted to each Study Group for the Study Period 1985-1988 can be found in Contribution No. 1 to that Study Group.

3   In this Fascicle, the expression "Administration" is used for shortness to indicate both a telecommunication Administration and a recognized private operating agency.

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SECTION 1

GENERAL CONSIDERATIONS

Recommendation Q.601

1 GENERAL

1.1   *Change from narrative to SDL presentation*

These Recommendations provide a set of interworking specifications for CCITT signalling systems. The specifications are based on the CCITT Specification and Description Language (SDL) described in Recommendations Z.101 to Z.104. In these Recommendations on interworking, the SDL is used as a specification language.

Existing specifications in narrative form have not completely and unambiguously specified interworking of CCITT Signalling Systems. In addition, the introduction of digital switching, transmission and signalling systems creates new interworking demands.

Previous interworking specifications have been analysed and reconsidered in preparation of the present Recommendations. Where discrepancies exist between the previously printed interworking specifications and the interworking specifications of the present Recommendations, the latter shall be binding.

The new SDL interworking specifications will not replace the existing (narrative) specifications of the signalling systems concerned. They will only cover that part of the signalling system procedures which is of importance to interworking. The detailed procedures of the signalling systems are to be found in the existing Recommendations (Red Book, Fascicles VI.2, VI.3, VI.4, VI.7 and VI.8). Furthermore, only those switching procedures are shown that are relevant to interworking.

SDL provides an implementation independent and comprehensive method of presentation. It encompasses the previous interworking Recommendations and ensures that the interworking conditions are included in a regular and formalized manner. The chosen method facilitates the specification of interworking with future signalling systems. The use of well defined events with a graphical presentation reduces readers' language problems.

1.2   *Compatibility between signalling systems*

During the development of CCITT Signalling Systems, the signalling capacity has constantly been increased. In this way it has been possible to incorporate new features. However, it is not always possible to transfer these features when interworking with older systems.

In the case of signalling systems with large signalling capacity, it is possible to transmit distinct statements on certain conditions, e.g. "busy", "type of connection", etc. On the other hand, however, signalling systems with small signalling capacity require more general meanings to be assigned to the signals. Figure 1/Q.601 illustrates this by an example.

Since the CCITT Signalling Systems are to be used for international telephone communication, interworking between the different signalling systems must be ensured. Interworking takes place in a transit exchange which must possess suitable equipment for processing the signals of both signalling systems involved. Interworking of the signalling systems can take place on all levels of the telephone network:

— national,
— regional,
— international.

With a number of s different signalling systems the maximum number of interworking combinations will be:

$$i = s \cdot (s - 1)$$

If the present standardized Signalling Systems No. 4, No. 5, No. 6, No. 7, R1 and R2 only are taken into account, a total of 30 different interworking combinations is obtained with $s = 6$.

| A   System No. 4 T_1 System No. 5 T_2 System R2 T_3 System No. 6   B |

Busy-flash signal	Busy-flash signal	A-4 : Congestion in the national network	NNC : National-network-congestion signal
		B-4 : Congestion (encountered after changeover from A signals to B signals)	CFL : Call-failure signal ADI : Address-incomplete signal
		A-15 : Congestion in an international exchange or its output	SEC : Switching-equipment-congestion signal CGC : Circuit-group-congestion signal
		B-3 : Subscriber line busy	SSB : Subscriber-busy signal (electrical)

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FIGURE 1/Q.601

Hypothetical transit connection; interworking of some backward signals

The number of possible combinations becomes even greater if the national signalling systems are taken into account.

The method for interworking of standardized CCITT Signalling Systems described in these Recommendations may also be advantageous for interworking with other signalling systems.

2 INTRODUCTION

interworking is defined to be

— the controlled transfer of signalling information across the interface between different signalling systems where the significance of the transferred information is identical or where the significance is translated in a defined number, and

— the performance of appropriate switching procedures in association with the transfer.

The duration of interworking commences with the instant when an outgoing signalling system is successfully selected and the interworking continues throughout the call until the connection is released. Interworking ceases with the release of the connection whether the release is initiated by reception of a clear-forward signal or in response to some other condition.

2.1 *Functional partitioning*

When interworking is specified in SDL, three separate functional blocks with distinct procedures[1] are used (see Figure 2/Q.602), namely

— the incoming signalling system logic procedures,

— the interworking logic procedures,

— the outgoing signalling system logic procedures.

It is understood that interworking logic procedures are dealt with in the second functional block. This functional subdivision allows only those events which can be processed within the individual incoming and outgoing signalling system logic procedures part to be sent to or from the interworking logic procedures part.

Both the incoming and outgoing signalling system logic procedures cause actions such as the sending of an acknowledgement signal, the starting of time supervision, and the generation of an interworking event that includes additional information, e.g. the use of satellite circuits and echo suppressors.

The action following the reception of an interworking event may be the generation of one or more signals as well as the operation of internal signalling and switching procedures.

The interworking logic procedures are used to specify the action to be taken in all cases, especially when there is no direct translation from an interworking event to a signal.

2.2 *Descriptive tools*

A general approach to specifying interworking — known as events approach — is used.

To prepare SDL diagrams three sets of events are used (see Recommendation Q.603), namely

— Forward Interworking Telephone Events (FITEs)

— Backward Interworking Telephone Events (BITEs) and

— Switching Processing Interface Telephone Events (SPITEs).

FITEs perform information transfer in the forward direction from an incoming signalling system to an outgoing signalling system.

BITEs perform information transfer in the backward direction from an outgoing signalling system to an incoming signalling system.

SPITEs describe the information flow at the functional interface between signalling and switching. These events are considered to be internal to the signalling procedures.

---

[1] In the Recommendations on interworking of signalling systems the term "procedure" is used in the same way as the term "process" in Recommendation Z.101, § 2.1

In the events approach, all information transfer between any incoming and outgoing signalling system occurs at a standard interface by means of interworking telephone events. This is illustrated in Figure 2/Q.602. The concept of an interworking event is generally valid and applies to all interworking combinations.

To provide a tool for the interworking specifications, *information analysis tables* (see Recommendation Q.604) are prepared. They identify the information elements of all forward and backward signals (which are relevant to interworking) for each signalling system. They also identify the possible information loss, addition or change which occurs in the case of interworking of signalling systems.

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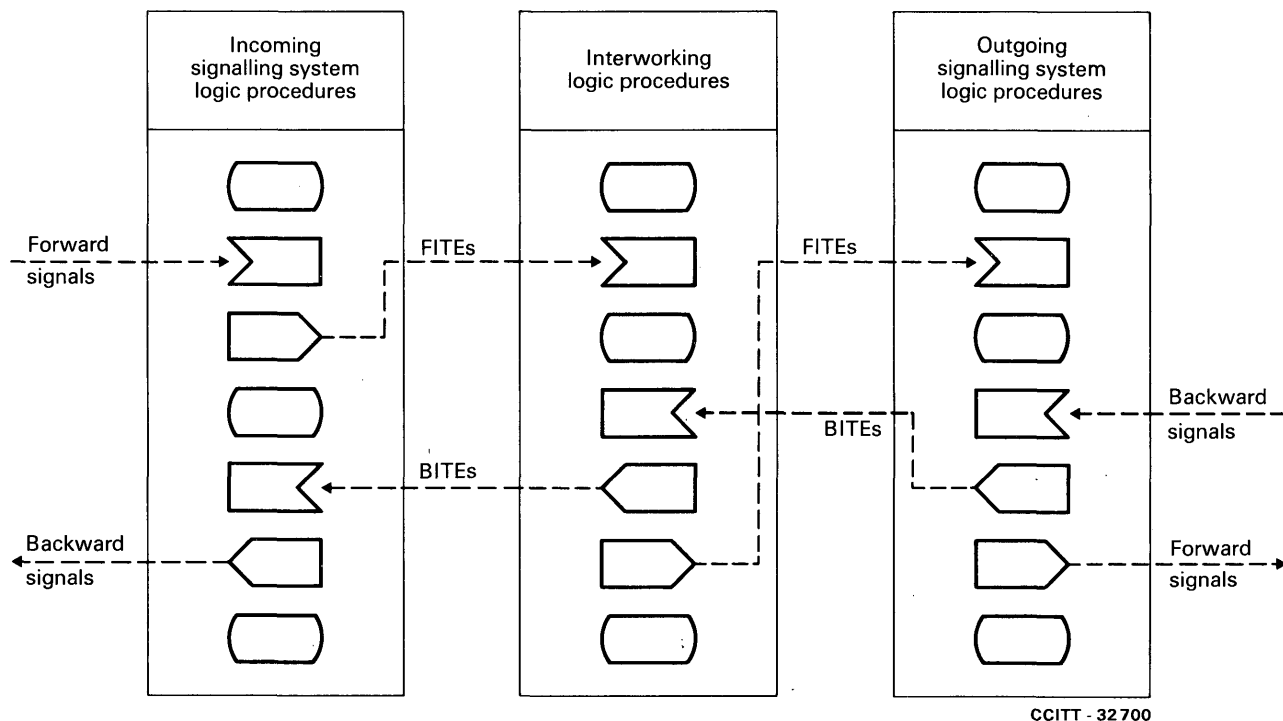
FIGURE 2/Q.602

Partitioning of interworking procedures in functional blocks (SPITEs are not presented in this figure)

2.3 *Symbols*

The symbols and rules of SDL used for interworking specifications are presented in Recommendation Z.102.

2.4 *Rules for interworking diagrams*

The general objective is to present all the interworking specifications by means of SDL.

The following rules apply to interworking specifications:

2.4.1 The interworking specifications shall be implementation independent.

2.4.2 They shall facilitate the specification of interworking with other signalling systems.

2.4.3 They shall be unambiguous and as complete as possible, this means specifically that:

a) only those switching procedures shall be represented which directly influence the interworking of signalling systems;

b) only those procedures of the outgoing and the incoming signalling system logic are specified which are relevant to interworking, i.e. procedures which are signalling system dependent and others which have no influence on the interworking procedures are not represented in the functional parts of the outgoing and incoming signalling system logic procedures;

c) detailed information, such as the exact description of the compelled signalling cycle, recognition times of signals, encoding, frequencies used, is not described in the outgoing or incoming functional parts. Such details can be found in the specifications of the signalling system;

d) conditions resulting from malfunctions of equipment which have no relevance to interworking, shall not be taken into account.

2.4.4 SDL connector symbols are used to cover some detailed procedures that need not be represented when their descriptions are not important for the interworking procedures.

2.4.5 Equipment terminology, e.g. "register" mentioned in the logic procedures is understood to be functional.

2.4.6 The information analysis tables include only signals relevant to interworking. Any internal signals with a meaning specific to a single signalling system are not listed.

2.4.7 In drawing the SDL diagrams for the interworking specifications, it was assumed that no time elapses between consecutive states; i.e. state transitions are instantaneous. Time elapses only within a state.

Recommendation Q.603

3 EVENTS

All information transfer between incoming and outgoing signalling systems logic procedures occurs as events. These events are represented as FITEs, BITEs and activation signals. In addition, SPITEs are used internally.

The translation of the information content of a signal into its corresponding interworking telephone event must not lead to a change of its information content, i.e. the information content must be translated only into one single interworking telephone event.

Tables A-1 to A-3[1] list all of the forward interworking telephone events (FITEs), backward interworking telephone events (BITEs) and switching processing interface telephone events (SPITEs).

There are some events which are the direct result of signals received in some particular call phase. These events perform the transfer of signalling information. However not all signals directly generate interworking events.

There are some events which are the result of signals in a particular call phase and internal logic procedures. This applies particularly to routing, country code indications and echo-suppressor control.

There are some events (e.g. due to time-outs) which are purely the result of internal interworking logic procedures. In addition, it may be useful to consider the internal procedures of the various signalling systems, which do not generate interworking events.

In using the events approach the following rules are observed:

a) In generating events all the circumstances under which the event may arise are examined so that the event description is exact.

b) All events which have been identified by considering the response of a signalling system to events are included in Tables A-1 to A-3.

---

[1] See Annex A to Recommendations Q.601-Q.608.

4 INFORMATION ANALYSIS TABLES

Information analysis tables are provided for each signalling system. These tables list the information elements of the forward and backward signals for CCITT signalling systems.

Tables A-4 to A-8 [1] show the forward signals relevant to interworking of Signalling Systems No. 4, No. 5, No. 6, No. 7, R1 and R2, split up into their individual information elements. In these tables, comparisons are made between the contents of the signals used by the different systems.

Tables A-9 to A-13 [1] show the backward signals relevant to interworking of Signalling Systems No. 4, No. 5, No. 6, No. 7, R1 and R2, split up into their individual information elements. In the rows headed "corresponds to signal No. .... of Signalling System ..." the signals are entered together with their corresponding signal, if any, in the different systems.

The tables include an indication to the other signalling systems where:

— equivalent signals have the same information content,

— equivalent signals are not provided,

— equivalent signals contain less or substitute information,

— equivalent signals contain additional or changed information.

4.1 *Information content of the signals*

The individual signals are assigned specific information so as to enable messages to be transmitted. The meaning of these signals can be seen from the specifications of CCITT Signalling Systems.

With regard to their information content, a basic distinction can be made between:

— signals containing a single information element, and

— signals containing several information elements.

An information element is understood to be the smallest indivisible component of information (within a signal) considered in this Recommendation.

For the interworking of different signalling systems, the information content of the signals to be translated is of great importance. In the case where two signalling systems interwork, it is possible to assign all signals used in the CCITT Signalling Systems to one of the following categories:

a) signals coinciding in all information elements;

b) signals coinciding at least in one, but not in all information elements;

c) signals coinciding in no information element at all.

4.2 *Consequences*

If signals with identical information content are present in the signalling systems, the interworking condition is fulfilled. No modification of information occurs (refer to a) of § 4.1 above).

If the signal meanings do not agree in all information elements, those signals must be allocated to one another where maximum agreement is to be achieved, so as to minimize the loss or addition of information (refer to b) of § 4.1 above).

If a signal possesses information elements which are not present in the signals of the other signalling system with which interworking should take place, the information concerned cannot be transmitted and the appropriate performance feature cannot be utilized (refer to c) of § 4.1 above).

In a few cases special procedures have to be laid down if the status of the connection does not permit transmission of the intended interworking signal. If conversion is not possible with certain backward signals, it may be necessary to apply a corresponding tone (see Recommendation Q.35).

In addition, there are cases in which the information content of several signals of one of the signalling systems has to be converted so as to obtain one signal of the other signalling system and vice versa.

---

[1] See Annex A to Recommendations Q.601-Q.608.

5 DRAWING CONVENTIONS

In addition to Recommendations Z.101 to Z.104, the following rules apply to the logic procedures of the interworking specifications.

5.1 *Inputs and outputs*

In accordance with the basic concepts of SDL, *internal* inputs and outputs are used for logic procedures that do not go beyond the functional block involved. In addition, some SPITEs are used as *internal* inputs to describe the information flow at the interface between the signalling and switching procedures.

All other inputs and outputs, including FITEs and BITEs as well as signals, which pass from one functional block to another are considered as being *external.*

The *external* inputs and outputs point in the direction of the data flow between the three functional blocks as shown in Figure 2/Q.602.

A multiple input (i.e. a group of signals) which leads to one and the same procedure can be represented by one standard symbol including that group of signals, if possible.

5.2 *States*

State symbols shall contain

— the state number, and
— the descriptive text of the state.

Most frequently the state indicates the input being waited for.

The layout of the state symbol to be used for the interworking specifications is given in Figure 3/Q.605.

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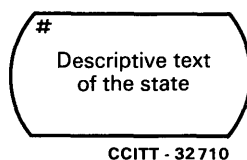
\#   State number

FIGURE 3/Q.605

State symbol

5.3 *Connectors*

Connectors are represented by a circle. The in-connector labels (within the connector symbol) shall be unique within the same interworking diagram.

The designations used within the connector symbols are as follows (see Figure 4/Q.605):

a)   arabic numbers, where the vertical line of flow of the procedure is to be interrupted. Subscripts outside the connector indicate the sheet numbers on which the associated connectors appear;

b)   capital letters, where the horizontal line of a multiple branching of the process is to be interrupted. Subscripts outside the connectors indicate the sheet numbers, on which the associated connectors appear;

c)   "P_i" to indicate that the procedures are not completed (e.g. a subroutine or another detailed procedure). The connector symbol will then be non-subscripted with sheet numbers but be provided with the comment "to be completed" associated with a reference to the Recommendation concerned, if any.

The connector reference is always shown in the left-hand column of each sheet of the interworking diagrams.

7

⑦₄

Out-connector No. 7, the
corresponding in-connector
is given on sheet 4

A

⟶Ⓐ₃

Out-connector A, the
corresponding in-connector
is given on sheet 3

In-connectors

7

2, 6, 8 ⑦ 2, 6, 8   ⑦——

or

In-connector No. 7, the
corresponding out-connectors
are given on sheets 2, 6 and 8

A

₅Ⓐ——

In-connector A, the corresponding
out-connector is given on sheet 5

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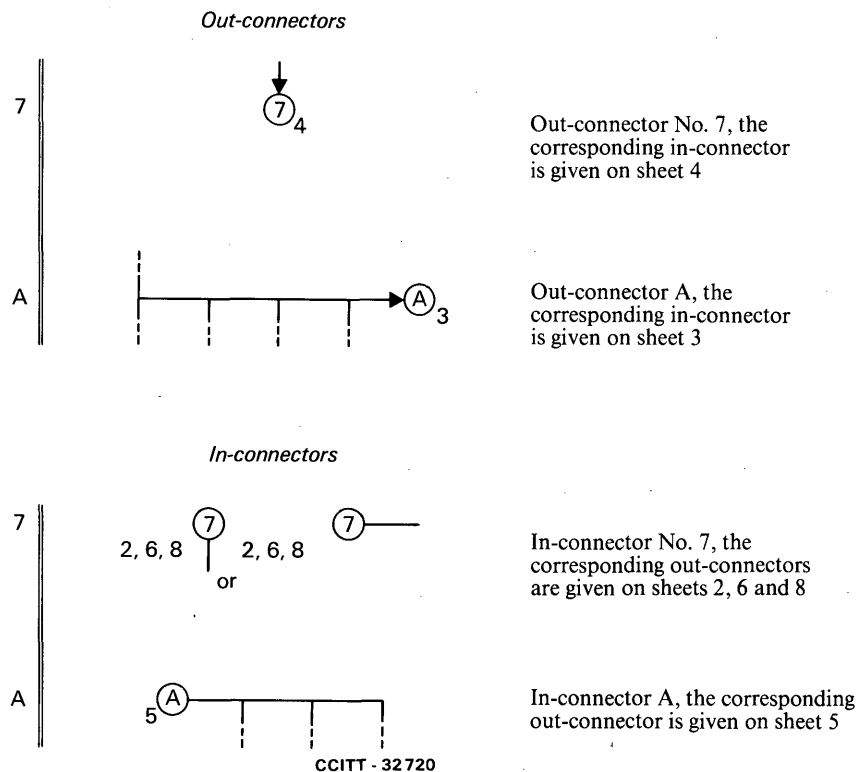
FIGURE 4/Q.605

Examples of how to use connectors

5.4   *Procedures not presented*

In general, possible signals which are not shown as inputs in a given state are to be considered as consumed but discarded, i.e. ignored. A special treatment may be required in the following cases:

a)   electrical conditions not recognized as regular signals (e.g. 1 out of 6 frequencies in the case of MFC signalling);

b)   regular signals, but not relevant to interworking (e.g. blocking, identification);

c)   any other regular signal recognized as an abnormality (e.g. out of sequence).

In the cases a) and c), the appropriate actions to be taken are not specified in the existing Recommendations. Further study is required.

The reactions in case of signals out of sequence can be shown by means of a state/signal matrix as auxiliary documentation. The interpretation of the diagrams will then be unambiguous.

5.5 *Presentation of time supervision*

The method of time supervision presentation to be used is shown in Figure 5/Q.605.

If two timers are running in a state such that the longer timer can never mature, the input "time release" should nevertheless be shown for both timers in order that no misunderstanding can result. The meaning of start t_1 also includes the possibility of restart t_1, $\bar{t}_1$ means the expiry of t_1.

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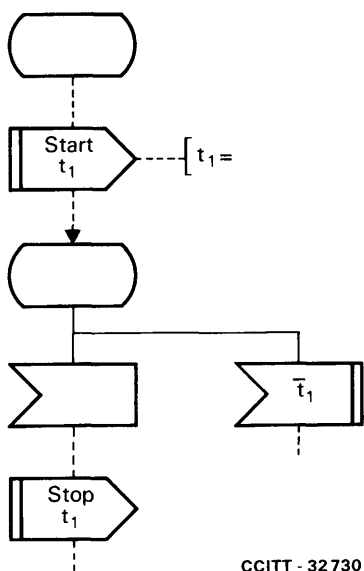
FIGURE 5/Q.605

Method of time supervision presentation

5.6 *Storage of inputs*

During the method of register function activation, all inputs are implicitly stored and the sequence of FITEs is also recorded. When the register function is not activated, inputs must explicitly be stored if required in a later state transition.

In several interworking situations, the order in which signals are received is not necessarily the order of their utilization. Therefore, a rearrangement of the order is necessary. To change the signalling sequence in the interworking diagrams, the method indicated in Figure 6/Q.605 should be applied. Figure 6/Q.605 shows how such a situation can be coped with by SDL.

Incoming logic procedures of system X | Interworking logic procedures from system X to system Y | Outgoing logic procedures of system Y

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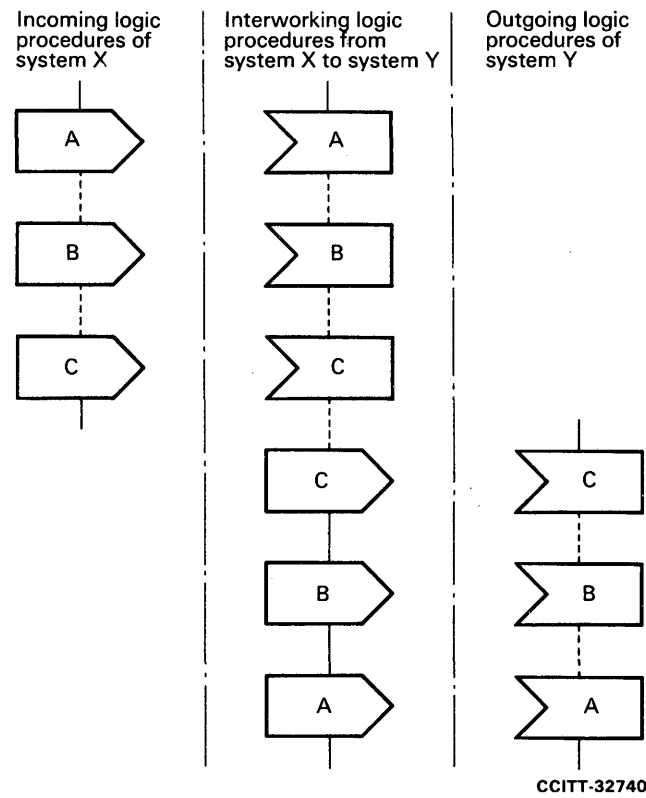
FIGURE 6/Q.605

Method of changing the order of signals

5.8   *Multiple sending of FITEs 1 or digits*

The case of multiple sending of FITEs 1 or digits often occurs in the logic procedures: in the former case in the incoming or interworking procedures, and in the latter case in the outgoing procedures of the en-bloc Signalling Systems No. 5 and R1. The presentation of Figure 7/Q.605 should be used. *a)* of Figure 7/Q.605 is used for multiple FITEs 1, while *b)* of Figure 7/Q.605 is used for outgoing Signalling Systems No. 5 or R1. In *b)* of Figure 7/Q.605 the outgoing logic has already received all the FITEs 1 and has established the "ST condition" prior to the logic sequence shown.

a) Normal method

b) Method for outgoing Signalling System R1 and No. 5
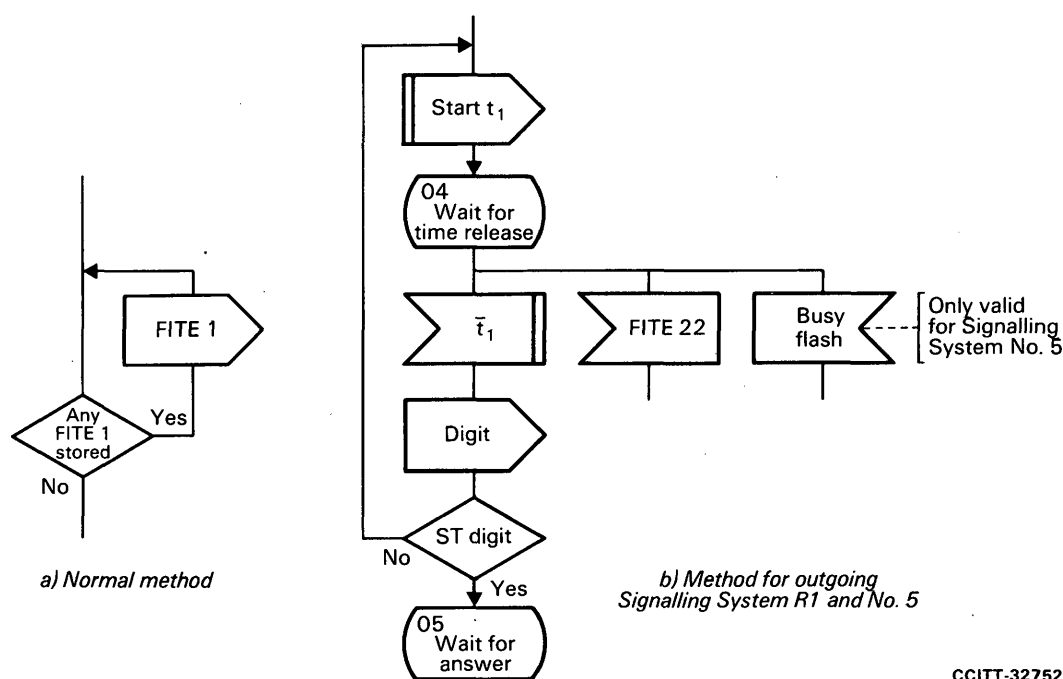
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FIGURE 7/Q.605

Presentation method for multiple use of FITE 1

5.9 . *Different signalling speeds*

In interworking cases where the signalling system at the outgoing end uses the overlap signalling mode with acknowledgements (Signalling Systems No. 4 and R2) or where the signalling speed of the system at the outgoing end is lower than that at the incoming end, the presentation method indicated in Figure 8/Q.605 should be used.
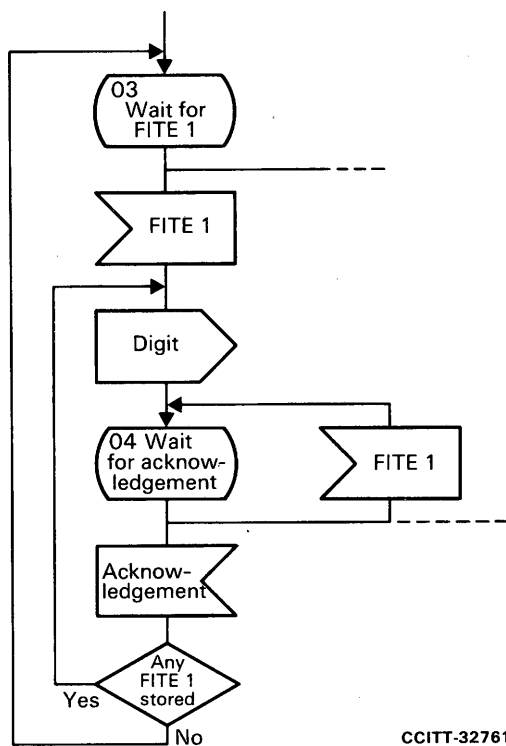
FIGURE 8/Q.605

**Presentation method for cases where the signalling system
at the outgoing end uses the overlap signalling method**

6 LOGIC PROCEDURES

The logic procedures are prepared as:
a) logic procedures for incoming signalling systems,
b) interworking logic procedures,
c) logic procedures for outgoing signalling systems.

A state overview diagram is provided with each procedure. The state overview diagram:
    — lists the states for the logic,
    — provides a sheet reference for each state, and
    — shows permitted transitions between states.

In addition, notes and timers are provided.

6.1   *Incoming signalling system logic procedures*

In specifying the logic procedures the following elements are used:
a) inputs in the form of forward signals,
b) outputs in the form of FITEs,
c) inputs in the form of BITEs,
d) outputs in the form of backward signals,
e) time supervision arrangements,
f) routing and switching aspects that are needed for interworking (SPITEs).

Incoming signalling system logic procedures are provided for:
    — Signalling System No. 4 in Recommendation Q.611,
    — Signalling System No. 5 in Recommendation Q.612,
    — Signalling System No. 6 in Recommendation Q.613,
    — Signalling System No. 7 in Recommendation Q.614,
    — Signalling System R1 in Recommendation Q.615,
    — Signalling System R2 in Recommendation Q.616.

6.2   *Interworking logic procedures*

In specifying the logic procedures the following elements are used:
a) inputs in the form of FITEs from the incoming signalling system,
b) outputs in the form of FITEs to the outgoing signalling system,
c) inputs in the form of BITEs from the outgoing signalling system,
d) outputs in the form of BITEs to the incoming signalling system,
e) routing and switching aspects that are needed for interworking (SPITEs).

Interworking logic procedures can be provided for every possible combination of CCITT Signalling Systems.

The following interworking combinations are provided:
    — Signalling System No. 4 to R2 in Recommendation Q.634,
    — Signalling System No. 5 to No. 6 in Recommendation Q.642,
    — Signalling System No. 5 to No. 7 in Recommendation Q.643,
    — Signalling System No. 5 to R1 in Recommendation Q.644,
    — Signalling System No. 5 to R2 in Recommendation Q.645,
    — Signalling System No. 6 to No. 5 in Recommendation Q.652,
    — Signalling System No. 6 to No. 7 in Recommendation Q.653,
    — Signalling System No. 6 to R1 in Recommendation Q.654,
    — Signalling System No. 6 to R2 in Recommendation Q.655,

- Signalling System No. 7 to No. 5 in Recommendation Q.662,
- Signalling System No. 7 to No. 6 in Recommendation Q.663,
- Signalling System No. 7 to No. 7 in Recommendation Q.664,
- Signalling System No. 7 to R1 in Recommendation Q.665,
- Signalling System No. 7 to R2 in Recommendation Q.666,
- Signalling System R1 to No. 5 in Recommendation Q.671,
- Signalling System R1 to No. 6 in Recommendation Q.672,
- Signalling System R1 to No. 7 in Recommendation Q.673,
- Signalling System R1 to R2 in Recommendation Q.674,
- Signalling System R2 to No. 4 in Recommendation Q.681,
- Signalling System R2 to No. 5 in Recommendation Q.682,
- Signalling System R2 to No. 6 in Recommendation Q.683,
- Signalling System R2 to No. 7 in Recommendation Q.684,
- Signalling System R2 to R1 in Recommendation Q.685.

6.3 *Outgoing signalling system logic procedures*

In specifying the logic procedures, the following elements are used:
a) inputs in the form of FITEs,
b) outputs in the form of forward signals,
c) inputs in the form of backward signals,
d) outputs in the form of BITEs,
e) time supervision arrangements,
f) routing and switching aspects that are needed for interworking (SPITEs).

Outgoing logic procedures are provided for:
- Signalling System No. 4 in Recommendation Q.621,
- Signalling System No. 5 in Recommendation Q.622,
- Signalling System No. 6 in Recommendation Q.623,
- Signalling System No. 7 in Recommendation Q.624,
- Signalling System R1 in Recommendation Q.625,
- Signalling System R2 in Recommendation Q.626.

Recommendation Q.607

7 INTERWORKING REQUIREMENTS FOR NEW SIGNALLING SYSTEMS

7.1 *Treatment of new signals in another signalling system*

In order to facilitate the interworking between new signalling systems and existing ones, it is desirable to elaborate rules to be taken into account when specifying the new signalling system(s). Since compatibility between all CCITT Signalling Systems must be ensured, any newly developed system has to meet the following requirements with regard to interworking:
a) new signalling systems should be capable of processing all interworking events specified for the existing signalling systems without losing or adding information elements.

This is best achieved by the concept of transparency, whereby the signals of all existing systems have a unique translation into the new system and back again. In this way a tandem connection via an interposed link employing the new signalling system will neither add nor subtract from the information transfer that would otherwise have occurred had the new signalling system not been present;
b) newly developed systems should not lead to any modification to the specifications covering the present signalling systems except that the translation of new interworking events arising from the meanings of new signals in the new system will need to be defined for the existing signalling systems.

In order that the new signals should cause the minimum loss or gain of information when interworking with existing signalling systems, any new signals should, if possible, not contain any information elements already existing. Hence it is better that these new signals convey only a single meaning rather than a multiple meaning as occurs in some existing systems (e.g. Signalling System R2 signal I-14 corresponds to FITE 8 which combines the elements of FITE 3 and FITE 5). Therefore, only one new information element will be associated with the new signal and only one new FITE or BITE will be needed.

In some cases the new signal will be translated into a presently defined signal of an existing system and hence will cause the addition or, more often, the loss of information. In some cases, no electrical signal being available, all the information may be lost or a tone may need to be used. In the case of Signalling Systems R2, No. 6 and No. 7, some reserved signals exist within the capacity of these systems and such signals may be introduced to enhance the signalling system and provide an interworking capability.

However it should be borne in mind that with such existing systems, it may not be easy or desirable to modify existing equipment, and even if such modification were possible, in the transitional period the interworking of existing and enhanced signalling equipment of the same system must also be considered.

In view of the difficulties of interworking with existing signalling systems, new features of signals should only be introduced in a new system if there are good operational reasons for doing so.

7.2 *Reserve for national use*

In practice, provision of appropriate spare signalling capacity in a new system reserved for national/regional use cannot be avoided. In such a case, precautions must be taken to prevent signals with an individual national meaning from entering the international network.

One general objective of a new signalling system should be to meet also the national requirements in order to avoid national versions of a given signalling system as far as possible.

7.3 *Unambiguous specifications*

After a clear specification of a new feature to be included in a signalling system, the related signalling procedures should be specified in a unique and standard form. The same applies to the signals involved.

The designation of signals of different signalling systems, which carry the same information, should be the same.

7.4 *Escape codes*

It is obvious that appropriate spare capacity should be provided in order to cope with future demands. One way of doing so is the provision of escape codes.

Recommendation Q.608

8 MISCELLANEOUS INTERWORKING ASPECTS

In producing the interworking specifications in the present form some interworking aspects were found, which are not covered by the specifications of the signalling systems themselves and need to be taken into account when using the SDL diagrams for interworking specification.

8.1 *Transfer of no charge information*

Difficulties related to the use of charge or no charge information were recognized by CCITT for the following reasons:

In the case of interworking with systems not able to provide the no charge information together with the answer signal, a *no charge* call is only possible by withholding the answer signal. In the international network, the absence of the answer signal results in a time-out within a delay period of 2 to 4 minutes as described in Recommendation Q.118, which considers this situation to be abnormal. Thus for certain cases of interworking, intentional withholding of the answer signal would be identical with the abnormal condition. Thus discrimination is impossible.

It is recommended that:

a) withholding the answer signal cannot be a satisfactory solution since

    — the connection may remain in the abnormal transmission condition (e.g. failure to enable the echo suppressor in Signalling System R2 and retention of band-stop filter in Signalling System R1),

    — the time supervision will interrupt the connection after 2 or 4 minutes,

    and the answer signal should thus be retained (be used) even in the case of a *no charge* condition over the international network;

b) there is no necessity to modify existing equipment to provide *charge/no charge* information transfer capabilities.

From a technical viewpoint, international *no charge* calls are possible without restrictions only when the Signalling Systems No. 6, No. 7 or R2 are used exclusively throughout the entire international network (assuming that *no charge* information is received from the national network).

In the case of interworking with systems not able to transfer the *no charge* information, a *no charge* call can at present only be provided by withholding the answer signal. Consequently the transfer of *no charge* information must not be performed in these cases.

In the case of Signalling System No. 6, the information *no charge* should be sent together with the *address-complete, no charge*. If this information is contradicted by the subsequent *answer, charge* signal the call should nevertheless not be charged (§ 4.1.9, Signalling System No. 6 specification).

The transfer of *no charge* information is possible when interworking:

from any of the Signalling Systems: No. 6[1] No. 7[1] R2 to any of the Signalling Systems: No. 6, No. 7 and R2.

8.2 *Time-out guidelines*

8.2.1 *Time-outs connected with subscribers' behaviour*

The specified register time-out of 4 to 6 seconds (after each digit is received which is resorted to when address complete cannot be identified in another way) has proved to give satisfactory technical functioning at least in those cases where the exception described in Recommendation Q.261, § 4.1.5, e) does not apply.

Insufficient information is obtained to motivate a change at this stage of the duration of the 4 to 6 seconds time-out specified in the outgoing register in cases where no address-complete indication is available.

It is recommended that the 4 to 6 seconds interdigital time-out procedure should be used where needed only. It is furthermore recommended that Administrations make their network numbering known to their respondents so that maximum use of number length analysis can be made whenever address-complete information cannot be given.

8.2.2 *General time-out guidelines for new signalling systems*

i) 20-30 seconds is considered to be the proper time-out interval for outgoing registers for non-receipt of address signals, or address complete.

ii) When backward signals are provided, if the address-complete signal is not available before 15-20 seconds after the last received address signal at the incoming register, then an address incomplete signal should be sent. If, however, it is known that the address is complete, then the time-out should be extended to 20-30 seconds.

iii) If it is known that a positive (real) address-complete signal is available but will *not* be returned within the lower limit of the 20-30 second time-out period of the outgoing register then an artificial address-complete signal should be sent within 15-20 seconds. The indiscriminate use of such a signal should be avoided. A new "call-in-progress" signal should not be used instead of the "artificial address-complete" signal.

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[1] When interworking from Signalling System No. 6 or No. 7 to Signalling System R2 the comments of § 8.1 have to be taken into account.

iv) When backward signals are not available and complete number length analysis in the outgoing register is not practical, then the 4-6 seconds time-out is used to determine address complete instead of the 20-30 seconds time-out mentioned in point i). This time-out commences when the minimum number length has been reached. The number length is determined when the time-out matures or if the known maximum number length is received.

8.2.3 General time-out guidelines for existing signalling systems

These guidelines are primarily intended for signalling on international calls where fully overlap digit sending can occur. Other guidelines may be appropriate to some national applications.

During call set up both incoming and outgoing registers are normally supervised by timers. The duration of the time-out interval is defined in the relevant Recommendations defining the signalling systems. These are summarised in the table below. In the case of a multi-link connection with overlap signalling, the time between digit transmission or reception will be supervised at each exchange, and according to existing Recommendations, at both incoming and outgoing registers in each exchange. It is considered that this situation is unsuitable since the cleardown of a call where insufficient digits are dialled can lead to unpredictable results because of the possibility of timers expiring in a different order on subsequent call attempts. In some cases this can lead to different tones being returned to the calling subscriber on subsequent calls. Since the first to expire and therefore normally the controlling time-out will be the incoming register time-out of around 15-20 seconds, it is recommended that this time-out should only be activated at a single point in the connection at any stage of call set up. The most suitable point is the incoming register at the exchange closest to the called subscriber at any point in the call set up. To achieve this it is recommended that the incoming register time-out should be inhibited at each exchange once the outgoing circuit has been seized. The longer time-out of around 20-30 seconds which will be active at outgoing registers, and in some cases incoming registers also, should not be inhibited.

This feature need not be implemented at existing exchanges or for Signalling System No. 4 which has time-outs not in conformance with modern practice.

8.2.4 Summary of inter-digital time-outs

Type of time-out	Signalling system					
	4	5	6	7	R1	R2
Outgoing	15-30 s Q.127 § 4.4.1.2a.2		20-30 s Q.268 § 4.8.5.1(a)	20-30 s Q.724 § 6.4.1		> 24 s Q.476 § 5.5.1.2
Incoming Receipt of digit	30-60 s Q.127 § 4.4.3(2)a	10-20 s (to KP signal) 20-40 s typical (to ST signal) Annex 2 Tables 4 and 6	15-20 s Q.261 § 4.1.6	15-20 s Q.724 § 1.7	10-20 s (to ST signal) Q.325 § 3.6.2.2	8-24 s (15-24 s) (preferred) Q.476 § 5.5.2.1
Outgoing Determination of ST condition		4-6 s Q.152 § 3.2.1			4-6 s Q.321 § 3.2.1b(ii)	
Incoming Time-out after ST received			20-30 s Q.268 § 4.8.5.3(a)	20-30 s Q.724 § 6.4.3(a)		

8.3   *Reset procedures*

8.3.1   When the reset signal is received on an incoming Signalling System No. 6 or 7 circuit the succeeding circuit is released by the clear-forward procedure in all cases.

8.3.2   When the reset signal is received on an outgoing Signalling System No. 6 or 7 circuit the response is:

i)   to initiate the clear-forward sequence on the outgoing circuit;

ii)   to release exchange equipment as appropriate, i.e. SPITE 3 in the register phase and SPITE 5 in the speech phase;

iii)   to return an appropriate signal and/or tone on the incoming circuit as shown in the following table.

Signalling System No.	Register phase	Wait for answer	Answered	Clear-back
4	Busy flash	Busy flash	Clear-back + congestion tone if possible	Congestion tone if possible
5	Busy flash	Busy flash		
6	CFL	CFL		
7	CFL	CFL		
R1	Congestion tone	Congestion tone		
R2	A4/B4	Congestion tone		

ANNEX A

(to Recommendations Q.601-Q.608)

**Lists and meanings of FITEs, BITEs and SPITEs.
Representation of information contents of signals
of the Signalling Systems.**

TABLE A-1

List of forward interworking telephone events (FITEs)

No.	Forward interworking telephone events	Equivalent with signal of Signalling System					
		No. 4	No. 5	No. 6	No. 7	R1	R2
1	Digit 1, 2, ... 9 or 0, code 11 or 12, end-of-pulsing (ST) signal	1	1	1	1	1	1
2	Country-code indicator, country code not included	8	8	2	2		18
3	Country-code indicator, country code included	9	9	3	3		
4	Echo-suppressor indicator, outgoing half-echo suppressor not included, incoming half-echo suppressor not required			6	6		19
5	Echo-suppressor indicator, outgoing half-echo suppressor included, incoming half-echo suppressor required	10		7	7		11
6	Country-code indicator, country code included; echo-suppressor indicator, outgoing half-echo suppressor not included, outgoing half echo suppressor required						8
7	Country-code indicator, country code included; echo-suppressor indicator, outgoing half-echo suppressor not included, no echo suppressor required						9
8	Country-code indicator, country code included; echo-suppressor indicator, outgoing half-echo suppressor included, incoming half-echo suppressor required						10
9	Calling-party's-category indicator, operator, language French	2	2	8	8		2
10	Calling-party's-category indicator, operator, language English	3	3	9	9		3
11	Calling-party's-category indicator, operator, language German	4	4	10	10		4
12	Calling-party's-category indicator, operator, language Russian	5	5	11	11		5
13	Calling-party's-category indicator, operator, language Spanish	6	6	12	12		6
14	Calling-party's-category indicator, operator with forward-transfer facility						15
15	Calling-party's-category indicator, subscriber						7
16	Calling-party's-category indicator, subscriber or operator without forward-transfer facility						12
17	Calling-party's-category indicator, subscriber, ordinary call	7	7	13	13		
18	Calling-party's-category indicator, subscriber, call with priority			14	14		14

No.	Forward interworking telephone events	Equivalent with signal of Signalling System					
		No. 4	No. 5	No. 6	No. 7	R1	R2
19	Calling-party's-category indicator, data call			15	15		13
20	Nature-of-circuit indicator, no satellite circuit in the connection			4	4		
21	Nature-of-circuit indicator, one satellite circuit in the connection			5	5		
22	Clear-forward	11	10	16	16	3	16
23	Forward-transfer	12	11	17	17	2	
24	Continuity			18	18		
25	Continuity-check indicator, continuity check not required				22		
26	Continuity-check indicator, continuity check required on this circuit				21		
27	Continuity-check indicator, continuity check done on previous circuit				23		

A.1   *Explanatory notes on the meanings and uses of FITEs* (see Table A-1)

These are Forward Interworking Telephone Events sent from an incoming procedure to an interworking procedure, or from an interworking procedure to an outgoing procedure.

A.1.1   FITE 1 means one of the digits 1-9, 0, code 11, code 12 and code 15 (ST), when used as an *address signal* (i.e. not including their use for other information, e.g. language digits). Each FITE 1 represents one digit only and that digits value is implicit in the signal.

A.1.2   FITEs 2, 3, 6, 7 and 8 are events representing *country code indicators.* These signals are not sent from the incoming procedure to the interworking procedure, since the country code indicator is a link dependent signal and is used by the incoming procedure as part of the input information to the digit analysis. These FITEs are generated in the interworking procedure by the use of SPITE 22 (see Table A-3).

A.1.3   FITEs 4-8 are events representing *echo-suppressor indicators.* These signals are not sent from the incoming procedure to the interworking procedure, since the echo-suppressor indicator is a link dependent signal and is used by the incoming procedure as part of the input information to the digit analysis. These FITEs are generated in the interworking procedure by the use of SPITE 21 (see Table A-3).

A.1.4   FITEs 9-19 are events representing *calling-party's category indicators* and include telephone events derived from language digits, discriminating digits and calling-party's-category signals.

A.1.5   FITEs 20 and 21 are events representing *nature-of-circuit indicators.* These signals are not sent from the incoming procedure to the interworking procedure, but the nature-of-circuit indicator is used by the incoming procedure as part of the input information to the digit analysis. These FITEs are generated in the interworking procedure by the use of SPITE 20 (see Table A-3). These signals are not completely link dependent, since if the nature-of-circuit indicator on the incoming circuit implies one satellite in the connection, the same signal (FITE 21) will be sent to the outgoing procedure.

A.1.6   FITE 22 is an event representing the *clear-forward signal* and overrides all other procedures. It should therefore be shown as an input in all call states except idle, even though the waiting state might not appear to be capable of receiving FITE 22.

A.1.7   FITE 23 is an event representing the *forward-transfer signal* and is assumed to be capable of reception after the state *Address-complete* when the register function is deactivated and the speech condition is set up.

A.1.8   FITE 24 is an event representing the *continuity signal* in common channel signalling systems. When interworking from a channel associated signalling system to a common channel signalling system, FITE 24 must be generated by the interworking procedure.

A.1.9   FITEs 25, 26, 27 are events which define the continuity check requirements on outgoing circuits for common channel systems.

A.2   *Explanatory notes on the meanings and uses of BITEs* (see Table A-2)

These are Backward Interworking Telephone Events sent from an outgoing procedure to an interworking procedure, or from an interworking procedure to an incoming procedure.

A.2.1   BITE 2 is an *address-complete event* which may be originated either by the receipt of an address complete signal or by the simulation of the address complete condition from a signalling system not employing address complete signals. This latter event is designated BITE 26, when signalling from the outgoing procedure to the interworking procedure. Since in most cases the forward signalling continues beyond the time that the address-complete is simulated, BITE 2 does not cause register deactivation in the incoming logic in the way that BITEs 3-7 do. The incoming procedure must wait for the subsequent reception of BITE 27 or BITE 28 (see §§ A.2.7 and A.2.8).

A.2.2   BITEs 3-7 are *address-complete events* which cause the speech condition to be set up and the register function to be deactivated.

A.2.3   BITEs 8-17, 19, 20 are *call unsuccessful events* which cause the return of a corresponding event to the incoming procedure where the register function will be deactivated. They are separated according to the reasons of an unsuccessful call.

A.2.4   BITEs 21-24 are *answer events*, differentiated where possible.

A.2.5   BITE 25 is the event representing the *clear-back signal.*

A.2.6   BITE 26 is an event signalling the *simulation of address-complete* condition by an outgoing signalling system which does not employ address-complete signals (e.g. No. 5 or R1). If the incoming signalling system uses address-complete signals, BITE 26 is translated to BITE 2 in the interworking procedures, in other cases it is discarded.

A.2.7   BITE 27 means that an outgoing signalling system which does not employ address-complete signals has *completed forward signalling* (e.g. ST has been sent) and the *speech condition should be set up.* When used, it will follow after BITE 26.

For incoming signalling systems employing address-complete signals, BITE 27 will always be expected after BITE 2. Therefore when both interworking systems employ address-complete signals, the interworking procedure must translate BITE 2 to BITE 2 + BITE 27.

A.2.8   BITE 28 is used only from an interworking procedure to an incoming procedure in the case where a BITE is received from the outgoing procedure which has no corresponding BITE in the incoming procedure. A tone will be returned by the use of SPITE 6 in the interworking procedure, and BITE 28 is used solely to deactivate the register function in the incoming procedure.

A.2.9   BITE 29 *release incoming side,* is used from an interworking procedure to an incoming procedure for incoming systems where release procedures may be initiated in the backward direction (e.g. the INMARSAT signalling system).

A.2.10   BITE 30 *switchthrough may be completed* is used to signal from an outgoing procedure to an incoming procedure via the relevant interworking, that the speech path may be connected through.

TABLE A-2

List of backward interworking telephone events (BITEs)

No.	Backward interworking telephone events	Equivalent with signal of Signalling System					
		No. 4	No. 5	No. 6	No. 7	R1	R2
1	Spare						
2	Address-complete, charge	1		1	1		2
3	Address-complete, no charge			2	2		
4	Address-complete, coin box			3	3		
5	Address-complete, subscriber free, charge			4	4		8 and 13
6	Address-complete, subscriber free, no charge			5	5		9
7	Address-complete, subscriber free, coin box			6	6		
8	Call unsuccessful	2	1				
9	Call unsuccessful, switching-equipment congestion			7	7		
10	Call unsuccessful, circuit-group congestion			8	8		
11	Call unsuccessful, switching-equipment congestion or circuit group congestion						3
12	Call unsuccessful, national-network congestion			9	9		1
13	Call unsuccessful, address-complete, national network congestion						6 and 15
14	Call unsuccessful, address incomplete			10	10		
15	Call unsuccessful, (address-complete), unallocated number			11	11		7 and 14
16	Call unsuccessful, address-complete, subscriber busy (elec.)			12	12		5
17	Call unsuccessful, address-complete, line out of service			13	13		10
18	Spare						
19	Call unsuccessful, call-failure			15	15		
20	Call unsuccessful, send special information tone			14	14		4 and 14
21	Answer, subscriber free						11
22	Answer, subscriber free, charge	3	2	16	16	1	
23	Answer, subscriber free, no charge			17	17		
24	Answer, re-answer			18	18		
25	Clear-back	4	3	19	19	2	12
26	Artificial address complete may be sent [a]		4			3	
27	Sending-finished; set up speech condition [a]		5			4	
28	Deactivate register function [a]						
29	Release incoming side [a]						
30	Switchthrough may be completed [a]						

[a] These signals do not necessarily correspond to a backward signal but correspond to logic events.

List of switching processing interface telephone events (SPITEs)

No.	Designation	Symbol
1	Activate register function (physical register or equivalent function)	Task
2	Register function activated	Internal input
3	Deactivate register function	Task
4	Set up speech condition	Task
4A	Speech path may be set up	Task
5	Release speech condition (of the speech path in the exchange)	Task
6	Return appropriate tone	Task
7	Disconnect tone	Task
8	Release all equipment (covers also disconnection of tones; exclusively used at the incoming procedures)	Task
9	Spare	
10	Spare	
11	Shall digit analysis be started?	Decision
12	Perform digit analysis	Task
13	Digit analysis cannot be completed (covers insufficient information, waiting for enough digits for routing, etc.)	Internal input
14	Routing information	Internal input
15	Unallocated number	Internal input
16	Unprovided routing (e.g. transit connection received at an exchange handling termination traffic only)	Internal input
17	Barred routing	Internal input
18	Switching equipment congestion	Internal input
19	Circuit group congestion	Internal input
20	Satellite link included?	Decision
21	Incoming half-echo suppressor to be included at distant end?	Decision
22	Transit connection following? (otherwise a terminal connection is following)	Decision
23	Has Z-digit been received?	Decision
24	Is this the Z-digit?	Decision
25 to 30	Spare	
31	Perform continuity check at the outgoing end (covers all necessary switching procedures: — connecting of the transceiver — disabling of echo suppressors — sending check tone — automatic reattempts, where applicable)	Task
32	Insert check loop at the incoming end (including disabling of echo suppressors)	Task
33	Continuity check OK (covers also receiving of checktone and removal of the transceiver)	Internal input
34	Remove check loop at the incoming end (including enabling of echo suppressors)	Task
35	Ignore further register signals	Task
36	Is continuity check required on outgoing circuit?	Decision
37 to 40	Spare	

A.3   *Explanatory notes on the meanings and uses of SPITEs* (see Table A-3)

SPITEs are Switching Processing Interface Telephone Events used in all three procedures. For convenience the three signalling procedures are considered to be processes within a larger switching process and all SPITEs are considered to be *internal to the signalling procedures* but having, where necessary, full access to any switching information provided by other signalling procedures. For example digit analysis is initiated by the incoming procedure, but the results are available to both the interworking and outgoing procedures, where necessary. By contrast all FITEs, BITEs and telephone signals are external signals. The SPITEs are grouped into three categories:

    a)   SPITEs 1-10 are allocated or reserved for *switching SPITEs*;

    b)   SPITEs 11-30 are allocated or reserved for *digit analysis SPITEs;*

    c)   SPITEs 31-40 are allocated or reserved for SPITEs used by a *restricted number of signalling systems.*

A.3.1   SPITE 1 *activate register function* is used in the incoming procedure to activate the register function following the receipt of the seizing signal or the initial address message. The register function keeps a memory of all received signals.

A.3.2   SPITE 2 *register function activated* is used following SPITE 1 where a proceed to send signal must be sent.

A.3.3   SPITE 3 *deactivate register function* is used in the incoming procedure to deactivate the register function. It is used after one of the following events:

    — clear-forward,

    — register timeout,

    — SPITEs 15-19 (reasons of unsuccessful calls),

    — BITEs 3-17, 19, 20, 27, 28 or any other error condition indicating an unsuccessful call.

A.3.4   SPITE 4 *set-up speech condition* is used in the incoming procedure to set-up the speech condition at the end of the register phase. It is therefore used in conjunction with SPITE 3 after reception of BITEs 3-7 and 27.

A.3.4(a)   SPITE 4A *speech path may be set up*, is used in the incoming procedure on calls where a BITE 30, has been received in order to allow early switchthrough of the speech circuits.

A.3.5   SPITE 5 *release speech condition* is used in the incoming or interworking procedure where a call unsuccessful BITE is received after SPITE 4. If the BITE is returned to the incoming procedure, SPITE 5 is used there but if the BITE is translated to a tone in the interworking procedure using SPITE 6, then SPITE 5 is used in the interworking procedure.

A.3.6   SPITE 6 *return appropriate tone* is used in the incoming procedure where no electrical signal corresponds to SPITEs 15-19, and also in the interworking procedure when a BITE is received for which no corresponding BITE exists in the incoming procedure.

A.3.7   SPITE 7 *disconnect tone*, is used to disconnect a tone at a point in the logic procedures other than the release of the call, i.e. when SPITE 8 is not appropriate. An example is the disconnection of ringing tone in the outgoing INMARSAT procedures.

A.3.8   SPITE 8 *release all equipment* is used in the incoming procedure when a clear-forward signal is received after the register phase.

A.3.9   SPITE 11 *shall digit analysis be started?* is used in the incoming procedure to determine, when sufficient digits have been received, that digit analysis may begin.

A.3.10   SPITE 12 *perform digit analysis* is used in the incoming procedure to perform digit analysis. The analysis takes into account the following information, where available:

    — address information,

    — Z-digit (L- or D-digit),

    — country-code indicator,

    — echo-suppressor indicator,

    — nature-of-circuit indicator,

    — calling-party's-category.

SPITE 12 will be followed by one of the SPITEs 13-19 which indicate the result of the analysis, and are only used in the incoming procedure.

A.3.11 SPITE 13 *digit analysis cannot be completed* indicates that insufficient address information is available to complete the digit analysis.

A.3.12 SPITE 14 *routing information* indicates that digit analysis has been completed and the following information determined:

- type of outgoing signalling system,
- transit or terminal connection,
- echo-suppressor indicator,
- nature-of-circuit indicator,
- position of Z-digit.

SPITEs 15-19 are results of digit analysis.

A.3.13 SPITE 15 *unallocated number* indicates that the received address digits represent an unallocated number (country code, area code, etc.).

A.3.14 SPITE 16 *unprovided routing* indicates that the received address digits represent a valid code but that the required destination cannot be reached via this exchange.

A.3.15 SPITE 17 *barred routing* indicates that the received address digits represent a valid code but that access to it is barred by reason of, for example:

- wrong calling party's category,
- prohibited route-route combination.

A.3.16 SPITE 18 *switching equipment congestion* indicates that the switching attempt to the outgoing circuit met switching equipment congestion.

A.3.17 SPITE 19 *circuit group congestion* indicates that all circuit groups to the required destination were congested.

SPITEs 20-24 ask for information from the results of digit analysis.

A.3.18 SPITE 20 *satellite link included?* is used in the interworking procedure to determine the required nature of circuit indicator that should be transmitted. This information is available from the results of digit analysis.

A.3.19 SPITE 21 *incoming half-echo-suppressor to be included at distant end?* is used in the interworking procedure to determine the required echo suppressor indicator that should be transmitted. This information is available from the results of digit analysis.

A.3.20 SPITE 22 *transit connection following?* is used in the interworking procedure to determine the required country code indicator that should be transmitted. This information is available from the results of digit analysis.

A.3.21 SPITE 23 *has Z-digit been received?* is used in the incoming procedure following digit analysis to decide whether the Z-digit has already been received. The position of the Z-digit is determined as part of the digit analysis.

A.3.22 SPITE 24 *is this the Z-digit?* is used in the incoming procedure to decide whether a received register signal is the Z-digit or an address digit. This can be determined, since the position of the Z-digit is known after digit analysis.

A.3.23 SPITE 31 *perform continuity check* is used in the outgoing procedure of common channel signalling systems to perform the continuity check including all necessary switching procedures.

A.3.24 SPITE 32 *insert check loop* is used in the incoming procedure of common channel signalling systems to insert the continuity check loop.

A.3.25 SPITE 33 *continuity check O.K.* is used in the outgoing procedure of common channel signalling systems to indicate a successful continuity check.

A.3.26 SPITE 34 *remove check loop* is used in the incoming procedure of common channel signalling systems to remove the continuity check loop.

A.3.27 SPITE 35 *ignore further register signals* is used in the incoming procedure of Signalling System No. 5 and R1 following the receipt of the ST signal to indicate that all further register signals should be ignored.

A.3.28 SPITE 36 *is continuity check required on outgoing circuit?* is used in conjunction with information received on the incoming link to determine the continuity check indicator required on the outgoing link.

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TABLE A-4

Representation of the information contents – Forward signals of Signalling System No. 5

Information elements / Signals of Signalling System No. 5	Address signals	Language digit 1: French	Language digit 2: English	Language digit 3: German	Language digit 4: Russian	Language digit 5: Spanish	Discriminating digit 0	Start-of-pulsing signal KP1	Start-of-pulsing signal KP2	Clear-forward signal	Forward-transfer signal								
Signal No.	1	2	3	4	5	6	7	8	9	10	11								
Digit 1, 2 ... 9 or 0, code 11 or 12,	×																		
end-of-pulsing (ST) signal	×																		
Country-code indicator								×	×										
Country-code not included								×											
Country-code included									×										
Nature-of-circuit indicator																			
No satellite circuit in the connection																			
One satellite circuit in the connection																			
Echo-suppressor indicator																			
Outgoing half-echo suppressor not included																			
Outgoing half-echo suppressor included																			
Outgoing half-echo suppressor required																			
No echo-suppressor required																			
Incoming half-echo suppressor required																			
Calling party's-category indicator		×	×	×	×	×	×												
Operator		×	×	×	×	×													
Subscriber							×												
Data call																			
Ordinary call							×												
Call with priority																			
Forward-transfer facility																			
No forward-transfer facility																			
Language: French		×																	
Language: English			×																
Language: German				×															
Language: Russian					×														
Language: Spanish						×													
Clear-forward										×									
Forward-transfer											×								
Corresponds to signal No. ... of Signalling System — No. 4	1	2	3	4	5	6	7	8	9	11	12								
No. 6	1	8	9	10	11	12	13	2	3	16	17								
No. 7	1	8	9	10	11	12	13	2	3	16	17								
R2	1	2	3	4	5	6	(7)	18	8,9 or 10	16	17								
R1	1	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	3	2								

⊗ No equivalent signal

(No.) Loss of information

[No.] Additional information of change of information

No. Identical meaning of signals

CCITT - 20532

Representation of the information contents – Forward signals of Signalling System No. 6

Information elements \ Signal No.	1 Address signals	2 Country-code indicator, country-code not included	3 Country-code indicator, country-code included	4 Nature of circuit indicator, no satellite circuit in the connection	5 Nature of circuit indicator, one satellite circuit in the connection	6 Echo-suppressor indicator, outgoing half-echo suppressor not included	7 Echo-suppressor indicator, outgoing half-echo suppressor included	8 Calling-party's-category indicator, operator, language French	9 Calling-party's-category indicator, operator, language English	10 Calling-party's-category indicator, operator, language German	11 Calling-party's-category indicator, operator, language Russian	12 Calling-party's-category indicator, operator, language Spanish	13 Calling-party's-category indicator, ordinary calling subscriber	14 Calling-party's-category indicator, calling subscriber with priority	15 Calling-party's-category indicator, data call	16 Clear-forward signal	17 Forward-transfer signal	18 Continuity signal
Digit 1, 2 ... 9 or 0, code 11 or 12,	×																	
end-of-pulsing (ST) signal	×																	
Country-code indicator		×	×															
Country-code not included		×																
Country-code included			×															
Nature-of-circuit indicator				×	×													
No satellite circuit in the connection				×														
One satellite circuit in the connection					×													
Echo-suppressor indicator						×	×											
Outgoing half-echo suppressor not included						×												
Outgoing half-echo suppressor included							×											
Outgoing half-echo suppressor required																		
No echo-suppressor required																		
Incoming half-echo suppressor required							×											
Calling-party's-category indicator								×	×	×	×	×	×	×	×			
Operator								×	×	×	×	×						
Subscriber													×	×				
Data call															×			
Ordinary call													×					
Call with priority														×				
Forward-transfer facility																		
No forward-transfer facility																		
Language: French								×										
Language: English									×									
Language: German										×								
Language: Russian											×							
Language: Spanish												×						
Clear-forward																×		
Forward-transfer																	×	
Continuity																		×
Corresponds to signal No. ... of Signalling System — No. 4	1	8	9	⊗	⊗	⊗	10ᵃ⁾	2	3	4	5	6	7	⊗	⊗	11	12	⊗
No. 5	1	8	9	⊗	⊗	⊗	⊗	2	3	4	5	6	7	⊗	⊗	10	11	⊗
No. 7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
R2	1	18	8,9 or 10	20	21	19	11	2	3	4	5	6	[12]	14	13	16	17	⊗
R1	1	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	3	2	⊗

a) Signal code 14 is available for use upon multi-lateral or bilateral agreement for echo-suppressor control.

⊗ No equivalent signal

(No.) Loss of information

[No.] Additional information or change of information

No. Identical meaning of signals

CCITT - 20353

TABLE A-5 *bis*

Representation of the Information Contents — Backward signals of System No. 7

Information elements (Signal No.)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Digit 1, 2 ... 0, code 11, code 12	X																					
end pulsing	X																					
Country-code indicator		X	X																			
Country-code not included		X																				
Country-code included			X																			
Nature-of-circuit indicator				X	X																	
No satellite circuits in the connection				X																		
One satellite circuit in the connection					X																	
Echo-suppressor indicator						X	X															
Outgoing half-echo suppressor not included						X																
Outgoing half-echo suppressor included							X															
Outgoing half-echo suppressor required																						
No echo suppressor required						X																
Incoming half-echo suppressor required							X															
Calling party's category indicator								X	X	X	X	X	X	X	X							
Operator								X	X	X	X	X										
Subscriber													X	X								
Data call															X							
Ordinary call													X									
Call with priority														X								
Language: French								X														
Language: English									X													
Language: German										X												
Language: Russian											X											
Language: Spanish												X										
Clear forward																X			X			
Forward transfer																	X					
Continuity check indicator																				X	X	X
Continuity check required on this circuit																				X		
Continuity check not required on this circuit																					X	
Continuity check performed on previous circuit																						X
Continuity proved																		X				
Corresponding signals — No. 4	1	8	9	⊗	⊗	⊗	10 b)	2	3	4	5	6	7	⊗	⊗	11	12	⊗	⊗	⊗	⊗	⊗
No. 5	1	8	9	⊗	⊗	⊗	⊗	2	3	4	5	6	7	⊗	⊗	10	11	⊗	⊗	⊗	⊗	⊗
No. 6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	⊗	⊗	⊗	⊗
R1	1	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	3	2	⊗	⊗	⊗	⊗	⊗
R2	1	8, 9 or 10	20	21	19	11	2	3	4	5	6	12		13		16	17	⊗	⊗	⊗	⊗	⊗

a) For the purposes of interworking, the continuity check failure signal is equivalent to a clear forward (Recommendation Q.724, § 7.3). No specific continuity check failure information element has therefore been included.

b) Signal code 14 is available for use upon multilateral or bilateral agreement for echo-suppressor control.

⊗ No equivalent information

(No) Loss of information

[No.] Additional information or change of information

CCITT-60660

Representation of the information contents – Forward signals of Signalling System R1

Information elements \ Signals of Signalling System R1 — Signal No.	Address signals — 1	Ring-forward (forward-transfer) — 2	Clear-forward — 3																
Digit 1, 2 ... 9 or 0, ST signal	×																		
Country-code indicator																			
Country-code not included																			
Country-code included																			
Nature-of-circuit indicator																			
No satellite circuit in connection																			
One satellite circuit in connection																			
Echo-suppressor indicator																			
Outgoing half-echo suppressor not included																			
Outgoing half-echo suppressor included																			
Outgoing half-echo suppressor required																			
No echo suppressor required																			
Incoming half-echo suppressor required																			
Calling-party's-category indicator																			
Operator																			
Subscriber																			
Data call																			
Ordinary call																			
Call with priority																			
Forward-transfer facility																			
No forward-transfer facility																			
Language: French																			
Language: English																			
Language: German																			
Language: Russian																			
Language: Spanish																			
Clear-forward			×																
Forward-transfer		×																	

Corresponds to signal No. ... of Signalling System		Address signals 1	Ring-forward 2	Clear-forward 3
	No. 5	1	11	10
	No. 6	1	17	16
	No. 7	1	17	16
	R2	1	17	16

CCITT - 20250

TABLE A-7

Representation of information contents – Forward signals of Signalling System R2

Information elements / Signal No.	1 Address signals	2 I-1: Language digit: French	3 I-2: Language digit: English	4 I-3: Language digit: German	5 I-4: Language digit: Russian	6 I-5: Language digit: Spanish	7 I-10: Discriminating digit	8 I-11: Country-code indicator, outgoing half-echo suppressor required	9 I-12: Country-code indicator, no echo suppressor required	10 I-14: Country-code indicator, incoming half-echo suppressor required	11 I-14: Incoming half-echo suppressor required [c)]	12 II-7: Calling-party's-category, subscriber or operator without forward-transfer facility	13 II-8: Calling-party's-category, data transmission control	14 II-9: Calling-party's-category, subscriber with priority	15 II-10: Calling-party's-category operator with forward-transfer facility	16 Clear-forward signal	17 Forward-transfer signal [a)]	18 First digit I-1, I-2, ...I-10	19 Reply to A-14, I-1,... I-10 [e)]	20 Reply to first A-13, I-13	21 Reply to first A-13, I-14
Digit 1, 2 ... 9 or 0, code 11 or 12,	×																		×		
end-of-pulsing (ST) signal	×																				
Country-code indicator								×	×	×								×			
Country-code not included																			×		
Country-code included								×	×	×											
Nature-of-circuit indicator																				×	×
No satellite circuit in the connection																				×	
One satellite circuit in the connection																					×
Echo-suppressor indicator								×	×	×	×										
Outgoing half-echo suppressor not included								×	×												
Outgoing half-echo suppressor included										×	×										
Outgoing half-echo suppressor required								×													
No echo-suppressor required									×									×			
Incoming half-echo suppressor required										×	×										
Calling party's-category indicator		×	×	×	×	×	×					×or×	×	×	×						
Operator		×	×	×	×	×						×			×						
Subscriber							×					×		×							
Data call													×								
Ordinary call												×									
Call with priority														×							
Forward-transfer facility															×						
No forward-transfer facility												×									
Language: French		×																			
Language: English			×																		
Language: German				×																	
Language: Russian					×																
Language: Spanish						×															
Clear-forward																×					
Forward-transfer																	×				

Corresponds to signal No. ... of Signalling System

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
No. 4	1	2	3	4	5	6	7	10c)+9d)	(9)	10d)+9	10	7	⊗	⊗	7f)	11	12	8	⊗	⊗	⊗
No. 5	1	2	3	4	5	6	7	⊗	(9)	⊗	⊗	7	⊗	⊗	7f)	10	11	8	⊗	⊗	⊗
No. 6	1	8	9	10	11	12	b)	3/7c)	3/+6	3/+7	7	13	15	14	13f)	16	17	2	6	4	5
No. 7	1	8	9	10	11	12	b)	3c)/8	3/6c)	3/7	7	13	15	14	13f)	16	17	2	6	4	5
R1	1	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	⊗	3	2	⊗	⊗	⊗	⊗

a) See Rec. Q. 400, § 1.1.3. A forward-transfer signal does not normally form part of Signalling System R2.

b) See signals II-7, II-8 and II-9.

c) Translation of signal I-11, succeeding circuit must be equipped with outgoing half-echo suppressor.

d) Signal code 14 is available for use upon multi-lateral or bilateral agreement for echo-suppressor control.

e) In reply to signal A-14.

f) The 1/0 logic treats the signal II-10 as II-7, as long as no treatment of the forward-transfer signal is considered.

⊗ No equivalent signal

(No.) Loss of information

[No.] Additional information or change of information

No. Identical meaning of signals

CCITT-60670

Representation of the information contents – Backward signals of Signalling System No. 5

Information elements / Signals of Signalling System No. 5	Busy-flash signal	Answer signal	Clear-back signal	Proceed-to-send signal	Inform that ST has been sent										
Signal No.	1	2	3	4	5										
Address-complete															
Subscriber free		×													
Coin box															
Charge		×													
No charge															
Call unsuccessful	×														
Switching-equipment congestion															
Circuit-group congestion															
National-network congestion															
Address-incomplete															
Unallocated number															
Subscriber busy (elec.)															
Line-out-of-service															
Send special-information tone															
Call failure															
Answer		×													
Re-answer															
Clear-back			×												
Artificial address-complete				×											
Sending-finished					×										
Corresponds to signal No. ... of Signalling System — No. 4	2	3	4	⊗	⊗										
No. 6	8	16 or 18	19	⊗	⊗										
No. 7	8	16 or 18	19	⊗	⊗										
R2	a)	11	12	⊗	⊗										
R1	b)	1	2	3	4										

a) Busy tone.

b) Appropriate tone or announcement

⊗ No equivalent signal

Ⓝⓞ Loss of information

[No.] Additional information or change of information

No. Identical meaning of signals

CCITT-60680

TABLE A-9

Representation of the information contents – Backward signals of Signalling System No. 6

Signals of Signalling System No. 6

Information elements \ Signal No.	ADC: Address complete, charge (1)	ADN: Address complete, no charge (2)	ADX: Address complete, coin box (3)	AFC: Address-complete, subscriber free, charge (4)	AFN: Address-complete, subscriber free, no charge (5)	AFX: Address-complete, subscriber free, coin box (6)	SEC: Switching-equipment congestion (7)	CGC: Circuit-group congestion (8)	NNC: National-network congestion (9)	ADI: Address-incomplete (10)	UNN: Unallocated number (11)	SSB: Subscriber busy (elec.) (12)	LOS: Line-out-of-service (13)	SST: Send special information tone (14)	CFL: Call failure (15)	ANC: Answer, charge (16)	ANN: Answer, no charge (17)	RA1-3: Re-answer No.1-No.3 (18)	CB1-3: Clear-back No.1-No.3 (19)
Address-complete	×	×	×	×	×	×					×	×	×	×		(×)c)	(×)c)		
Subscriber free				×	×	×										×	×		
Coin box			×			×													
Charge	×			×												×			
No charge		×			×												×		
Call unsuccessful							×	×	×	×	×	×	×	×	×				
Switching-equipment congestion							×												
Circuit-group congestion								×											
National-network congestion									×										
Address-incomplete										×									
Unallocated number											×								
Subscriber busy (elec.)												×							
Line-out-of-service													×						
Send special-information tone														×					
Call failure															×				
Answer																×	×		
Re-answer																		×	
Clear-back																			×

Corresponds to signal No. ... of Signalling System																			
No. 4	1	(1)	(1)	(1)	(1)	(1)	(2)	(2)	(2)	b)	b)	(2)	b)	b)	(2)	3	(3)	(3)	4
No. 5	⊗	⊗	⊗	⊗	⊗	⊗	(1)	(1)	(1)	b)	b)	(1)	b)	b)	(1)	2	(2)	(2)	3
No. 7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
R2	[2]	[9]	2	8	9	(8)	(3)	(3)a)	1a)	(1)	7	5	10	4	[(2)a)]	(11)	(11)	(11)	12
R1	⊗	⊗	⊗	⊗	⊗	⊗	b)	b)	b)	b)	b)	b)	b)	b)	b)	1	(1)	(1)	2

a) Before an address-complete signal is sent; otherwise audible tone.

b) Appropriate tone and possibly announcement.

c) **When received before address complete.**

⊗ No equivalent signal

(No.) Loss of information

[No.] Additional information or change of information

No. Identical meaning of signals

CCITT-60690

TABLE A-9 *bis*

Representation of the Information Contents — Backward signals of System No. 7

a) Before an address complete signal is sent; otherwise audible tone.

b) Appropriate tone and possibly announcement.

⊗ No equivalent signal

(No) Loss of information

[No] Additional information or change of information

Information elements \ Signals of Signalling System No. 7	ADC: Address complete, charge (c)	ADN: Address complete, no charge	ADX: Address complete, coinbox	AFC: Address complete, subscriber free, charge	AFN: Address complete, subscriber free, no charge	AFX: Address complete, subscriber free, coinbox	SEC: Switching-equipment congestion	CGC: Circuit-group congestion	NNC: National network congestion	ADI: Address-incomplete	UNN: Unallocated number	SGB: Subscriber busy (elec)	LOS: Line-out-of-service	SST: Send special information tone	CFL: Call failure	ANC: Answer, charge	ANN: Answer, no charge	RAN: Re-answer	CLB: Clearback
Signal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Address complete	X	X	X	X	X	X					X	X	X	X	X	X	X		
Subscriber free				X	X	X										X	X		
Coin box			X			X													
Charge	X			X												X			
No charge		X			X												X		
Call unsuccessful							X	X	X	X	X	X	X	X	X				
Switching equipment congestion							X												
Circuit group congestion								X											
National network congestion									X										
Address incomplete										X									
Unallocated number											X								
Subscriber busy (elec)												X							
Line out-of-service													X						
Send special information tone														X					
Call failure															X				
Answer																X	X		
Re-answer																		X	
Clear-back																			X

Corresponding Signals:

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
No. 4	1	(1)	1	(1)	(1)	(1)	(2)	(2)	(2)	b)	(2)	(b)	(b)	(b)	(b)	3	[3]	3	4
No. 5	⊗	⊗	⊗	⊗	⊗	⊗	(1)	(1)	(1)	(b)	(1)	(b)	(b)	(b)	(b)	2	[2]	(2)	3
No. 6	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
R1	⊗	⊗	⊗	⊗	⊗	⊗	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	(b)	1	[1]	1	2
R2	(2)	9	2	8	9	9	(3)	(3a)	1a)	(1)	7	5	10	4	2a)	(11)	(11)	(11)	12

CCITT-60701

TABLE A-10

Representation of the information contents – Backward signals of Signalling System R1

Information elements / Signals of Signalling System R1	Answer signal	Clear-back (hang-up)	Circuit seized	Inform that ST has been sent																		
Signal No.	1	2	3	4																		
Address-complete																						
Subscriber free	×																					
Coin box																						
Charge	×																					
No charge																						
Call unsuccessful																						
Switching-equipment congestion																						
Circuit-group congestion																						
National-network congestion																						
Address-incomplete																						
Unallocated number																						
Subscriber busy (elec.)																						
Line-out-of-service																						
Send special-information tone																						
Call failure																						
Answer	×																					
Re-answer																						
Clear-back		×																				
Artificial-address-complete			×																			
Sending-finished				×																		
Corresponds to signal No. ... of Signalling System — No. 5	2	3	4	5																		
No. 6	16 or 18	19	⊗	⊗																		
No. 7	16 or 18	19	⊗	⊗																		
R2	⑪	12	⊗	⊗																		

⊗ No equivalent

⟨No.⟩ Loss of information

[No.] Additional information or change of information

No. Identical meaning of signals

CCITT-20243

TABLE A-11

Representation of the information contents – Backward signals of Signalling System R2

Information elements \ Signal No.	A-4: Congestion on the national network (1)	A-6: Address-complete, charge, set-up speech conditions (2)	A-15: Congestion in an international exchange or at its output (3)	B-2: Send special-information tone (4)	B-3: Subscriber line busy (5)	B-4: Congestion (encountered after change-over from A-signals to B-signals) (6)	B-5: Unallocated number (7)	B-6: Subscriber line free, charge (8)	B-7: Subscriber line free, no charge (9)	B-8: Subscriber line out of order (10)	Answer signal (11)	Clear back signal (12)	B-1–B-6: International, subscriber line free, charge (13)	B-9, B-10: International send special information tone (14)	B-11–B-15 = B-4 (15)	16	17	18	19
Address-complete		×		(×)	×	×	(×)	×	×	×			×	(×)	×				
Subscriber free								×	×		×		×						
Coin box																			
Charge		×						×					×						
No charge									×										
Call unsuccessful	×		×	×	×	×	×			×				×	×				
Switching-equipment congestion		× or ×																	
Circuit-group congestion																			
National-network congestion	×						×								×				
Address-incomplete																			
Unallocated number							×												
Subscriber busy (elec.)					×														
Line-out-of-service										×									
Send special-information tone				×										×					
Call failure																			
Answer											×								
Re-answer																			
Clear-back												×							
Corresponds to signals No. ... of Signalling System No. 4	(2)	1	(2)	a)	(2)	(2)	a)	⊗	⊗	a)	(3)	4	⊗	a)	(2)				
No. 5	(1)	⊗	(1)	a)	(1)	(1)	a)	⊗	⊗	a)	(2)	3	⊗	a)	(1)				
No. 6	9	1	(8)	14	12	9	11	4	5	13	16,17 or 18	19	4	14	9				
No. 7	9	1	(8)	14	12	9	11	4	5	13	16,17 or 18	19	4	14	9				
R1	b)	⊗	b)	b)	b)	b)	b)	⊗	⊗	b)	1	2	⊗	b)	b)				

Legend:

a) Special information tone.

b) Appropriate tone or announcement.

⊗ No equivalent signal

(No.) Loss of information

[No.] Additional information or change of information

No. Identical meaning of signals

CCITT-60710

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SECTION 2

LOGIC PROCEDURES

Recommendation Q.611

LOGIC PROCEDURES FOR INCOMING SIGNALLING SYSTEM No. 4

CCITT - 48 540
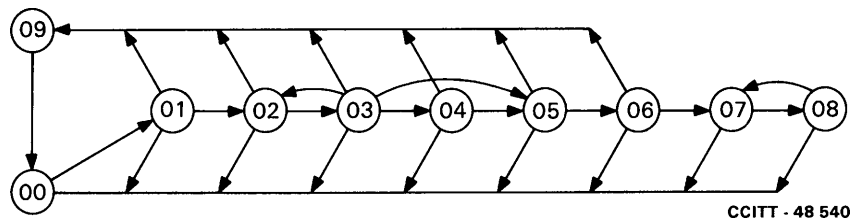
State number	State description	Sheet reference	Timers running
00	Idle	1, 3	
01	Wait for register activation	1	t_1
02	Wait for (next) forward reg. signal	1	$t_2, (t_4)$
03	Wait for digit analysis	2	t_3
04	Wait for address-complete	2	t_4
05	Wait for register deactivation	3	
06	Wait for answer	3	
07	Answered	3	
08	Clear-back	3	

FIGURE 1/Q.611

State overview diagram for incoming Signalling System No. 4

Supervisory timers

$t_1 \leqslant 5$ s	Recommendation Q.125, § 4.2.4
$t_2 = 5\text{-}10$ s	Recommendation Q.127, § 4.4.3 (2), b)
$t_3 \leqslant 10$	Recommendation Q.125, § 4.2.4
$t_4 = 30\text{-}60$ s	Recommendation Q.125, § 4.4.3 (2), a)

Procedures not shown

The following procedures, not directly relevant to interworking, are not shown in the logic procedures.

FIGURE 2/Q.611

Notes to incoming Signalling System N°. 4
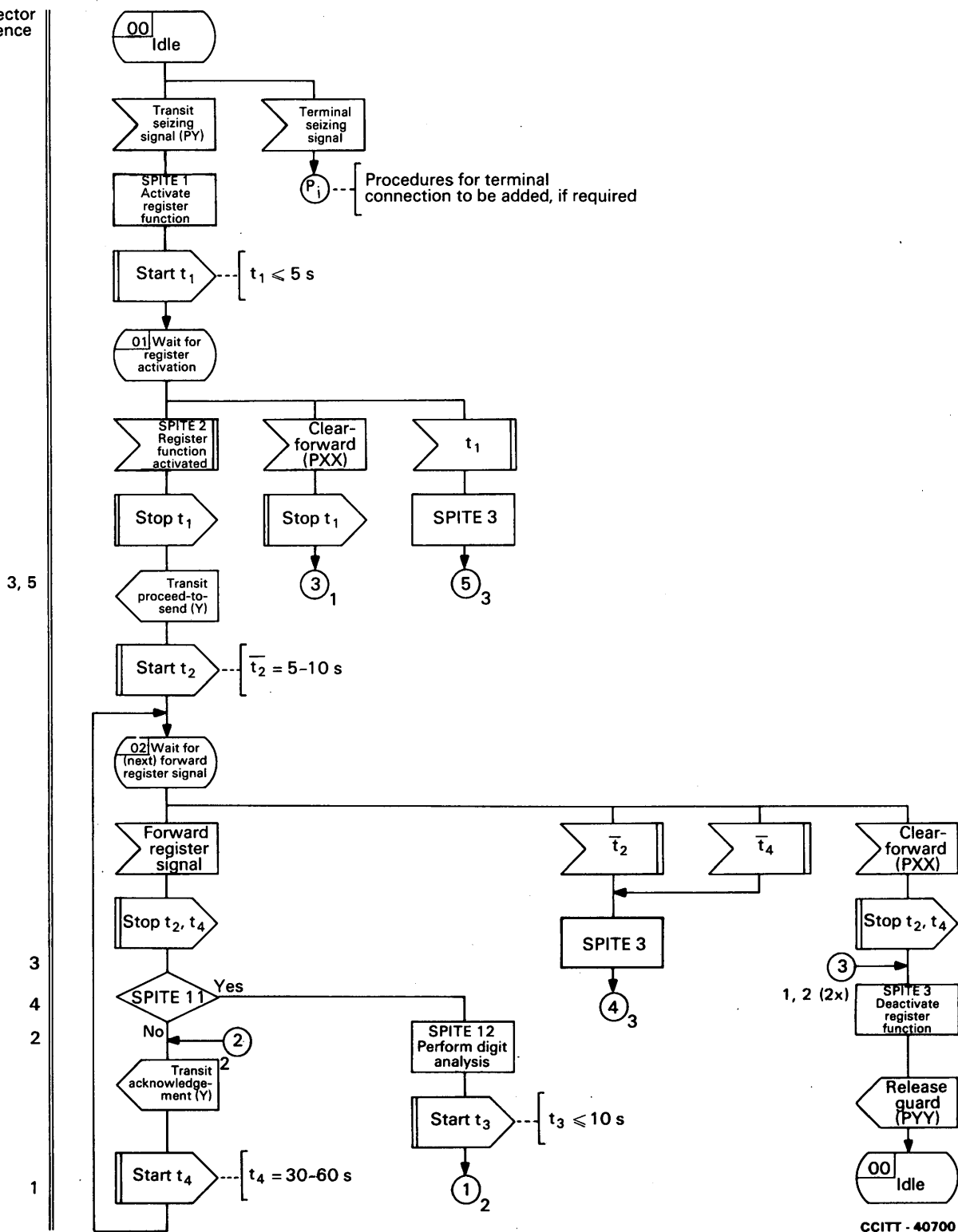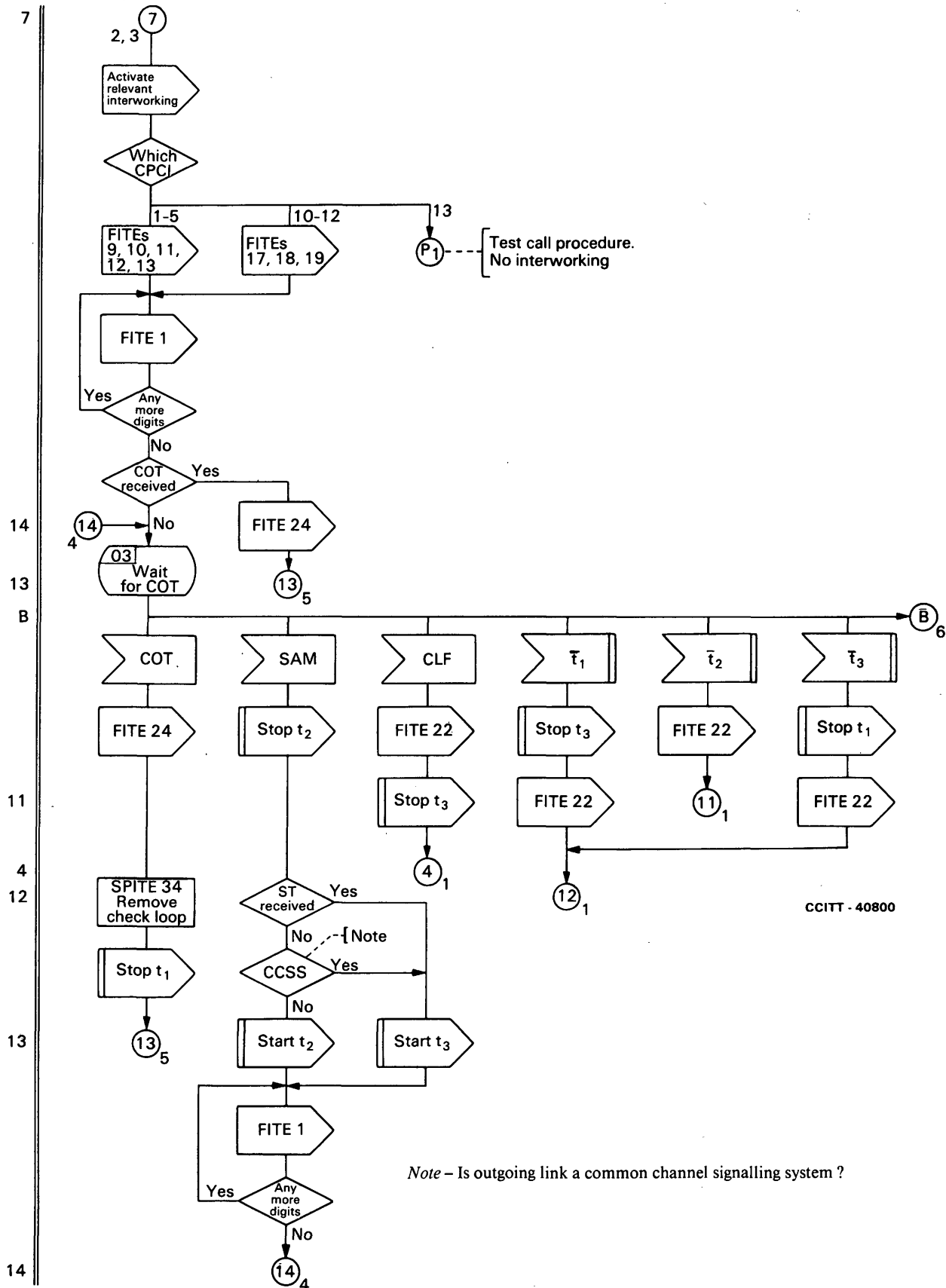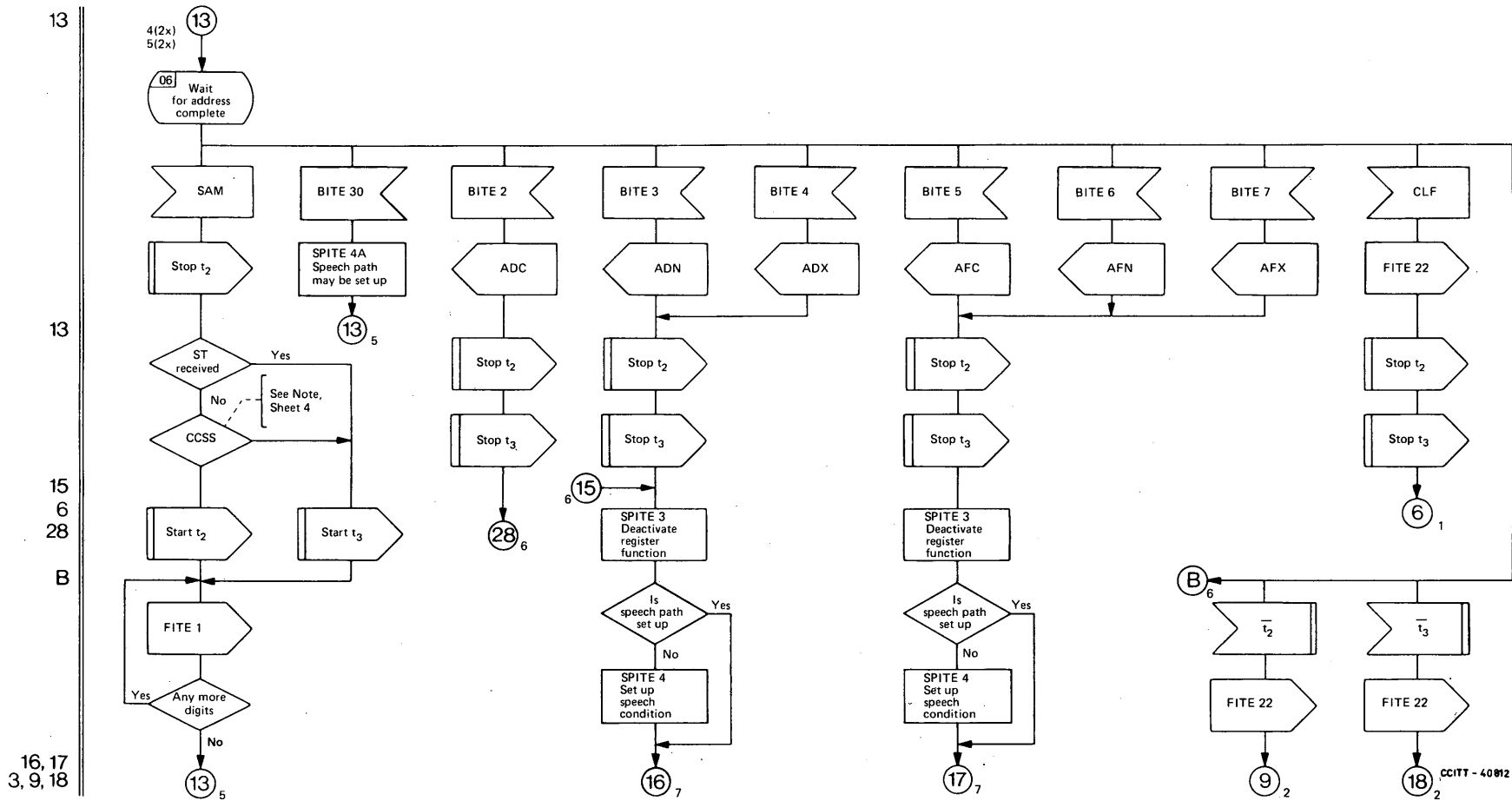
FIGURE 3/Q.611 (Sheet 1 of 3)

Incoming Signalling System No. 4

FIGURE 3/Q.611 (sheet 2 of 3)

Incoming Signalling System No. 4
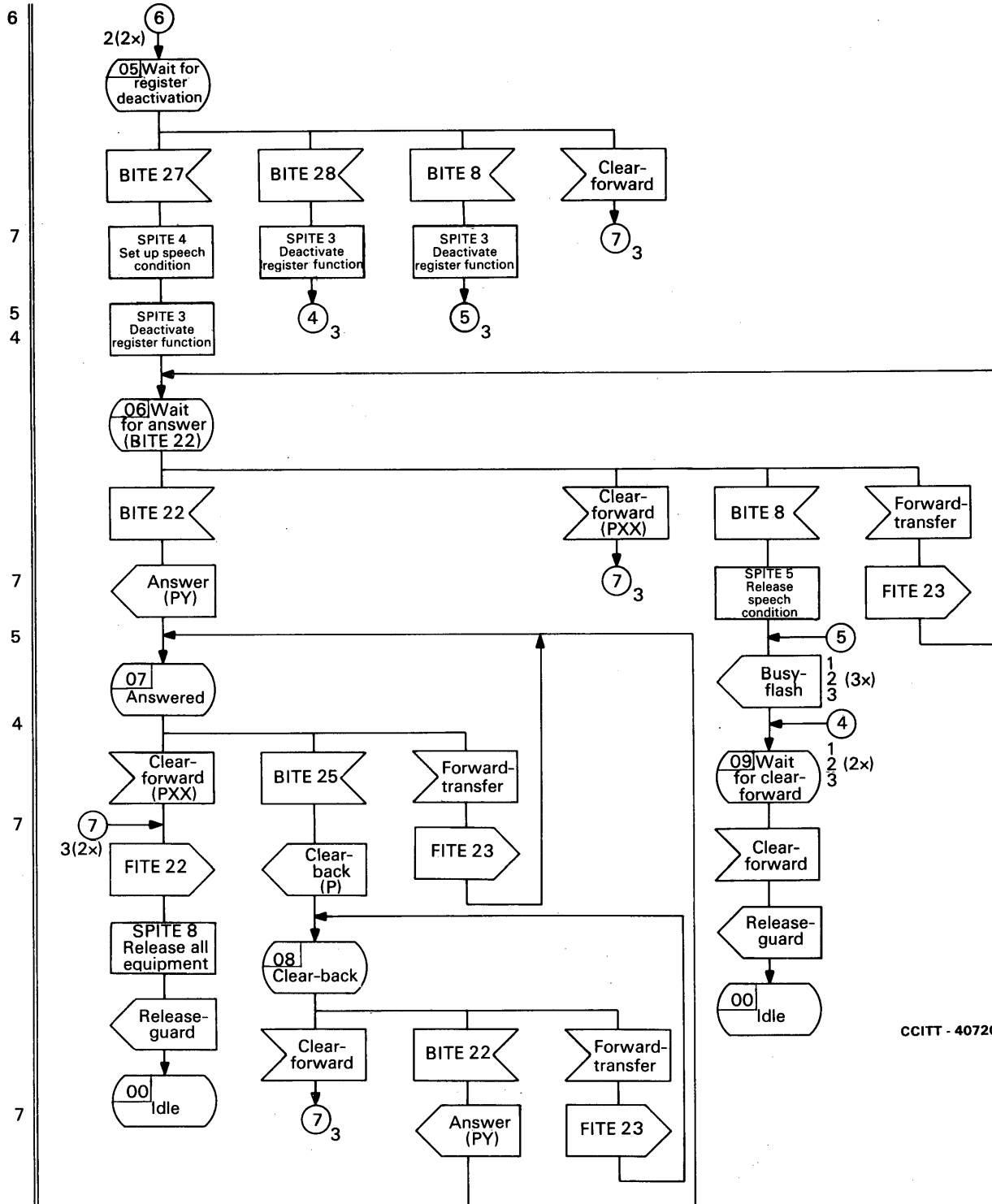
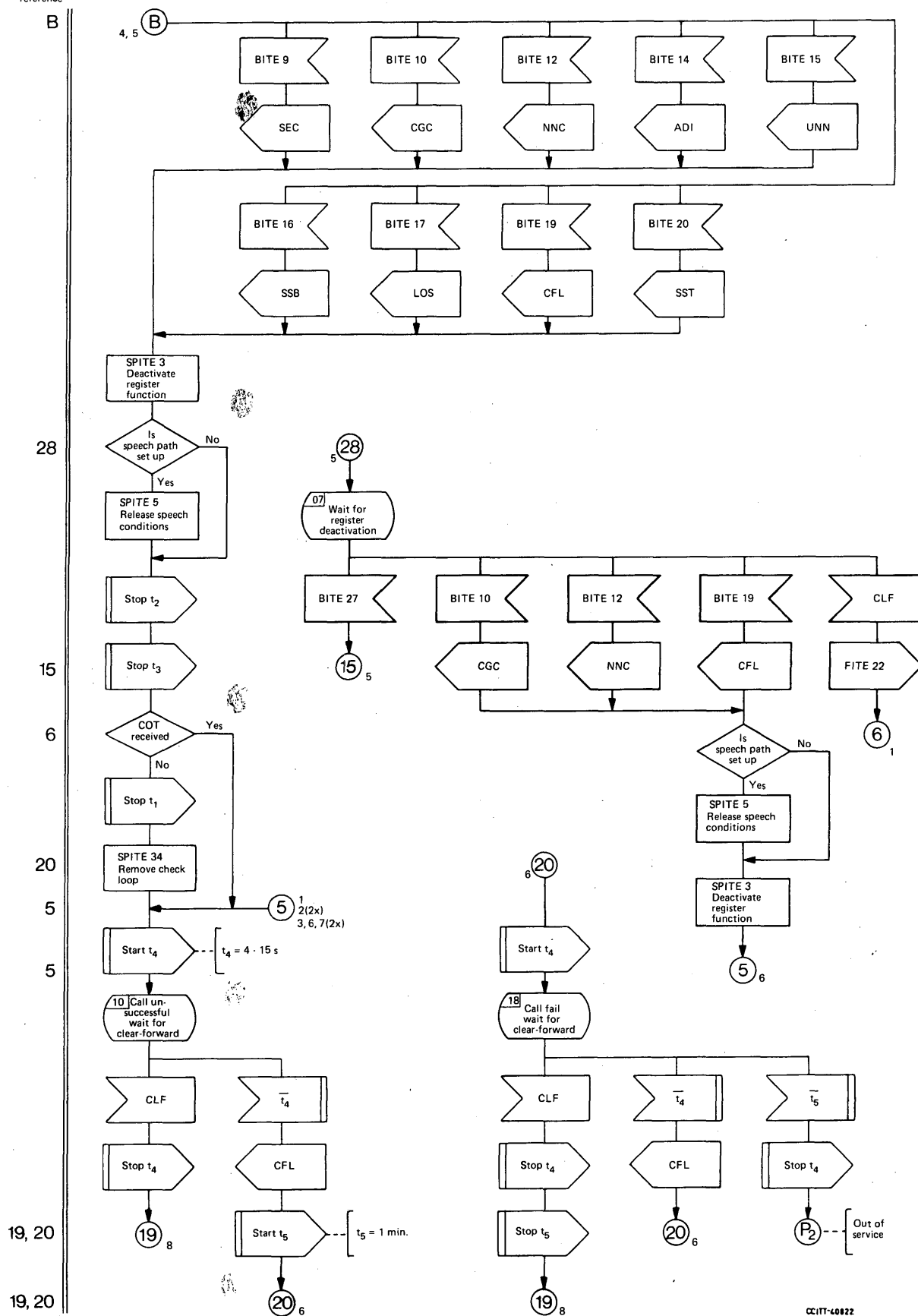FIGURE 3/Q.611 (Sheet 3 of 3)

Incoming Signalling System No. 4

CCITT - 40720

LOGIC PROCEDURES FOR INCOMING SIGNALLING SYSTEM No. 5
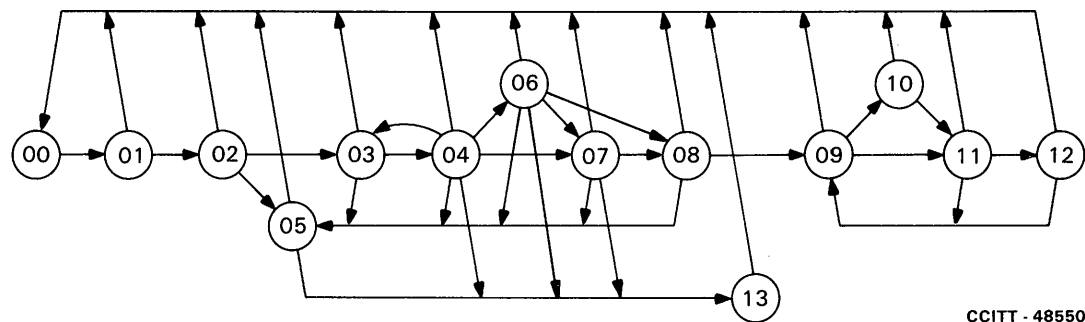
CCITT - 48550

State number	State description	Sheet reference	Running timers
00	Idle	1, 4	
01	Wait for register activation	1	
02	Wait for register signal	1	t_1, t_2
03	Wait for next register signal	1	t_2
04	Wait for digit analysis	2	t_2
05	Wait for acknowledgement	2	t_3
06	Wait for next register signal	3	t_2
07	Wait for register deactivation	3	
08	Wait for answer	3	
09	Wait for acknowledgement	4	t_3
10	Answered	4	
11	Wait for acknowledgement	4	t_3
12	Clear-back	4	
13	Wait for clear-forward	2	

FIGURE 1/Q.612

State overview diagram for incoming Signalling System No. 5

Supervisory timers

t_1 = 10-20 s Recommendation Q.141, § 2.1.3.1, e); Q.141, § 2.1.6, d)

t_2 = 20-40 s Recommendation Q.156, § 3.6.2, b)

t_3 = 10-20 s Recommendation Q.141, § 2.1.3.1, e)

Procedures not shown

The following procedures, not directly relevant to interworking, are not shown in the logic procedures.

P_1 — Procedure for timeout of receipt of busy flash acknowledgement signal

P_2 — Procedure for timeout of receipt of answer acknowledgement signal

P_3 — Procedure for timeout of receipt of clearback acknowledgement signal

FIGURE 2/Q.612

Notes to incoming Signalling System N°. 5
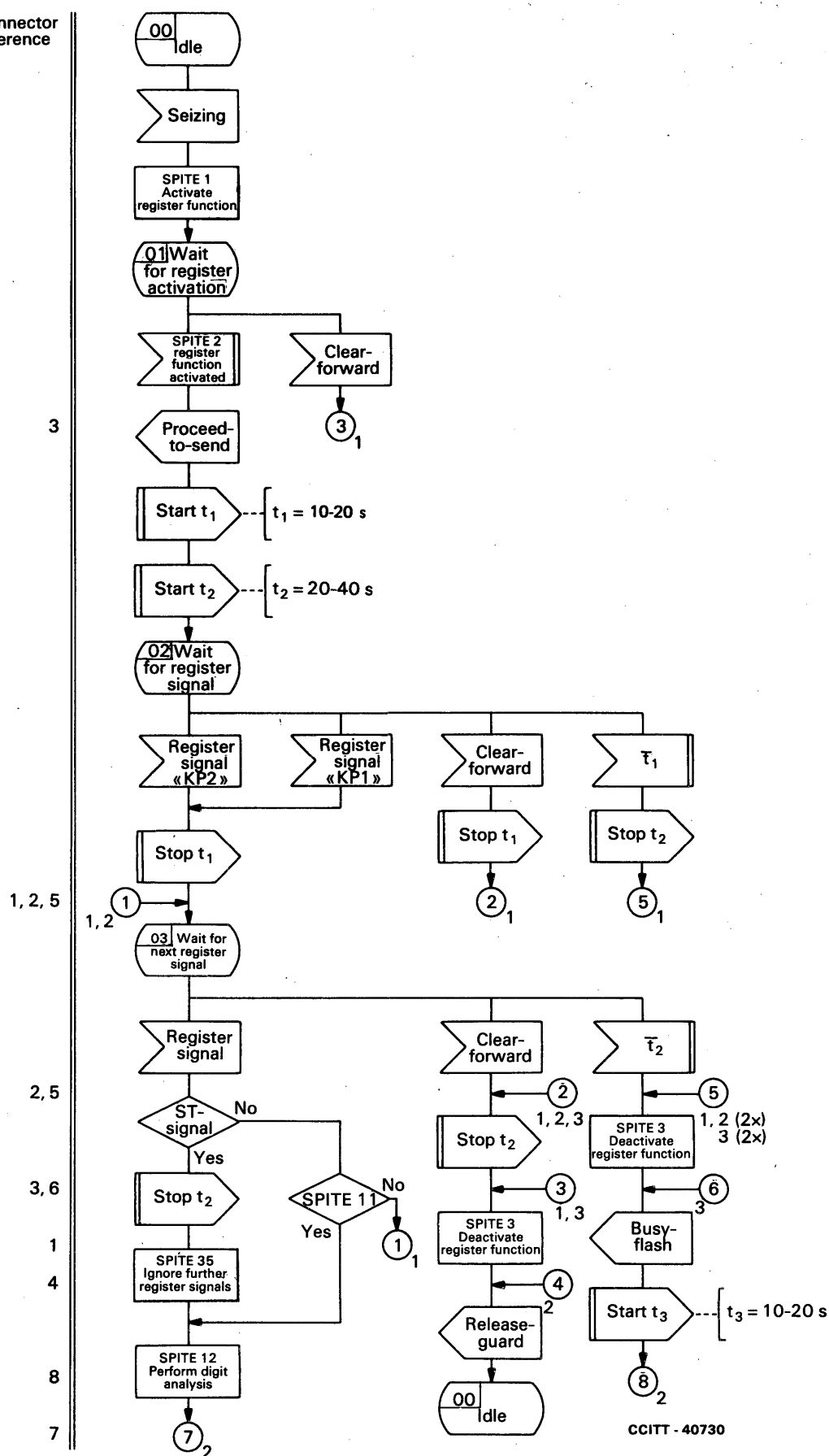
FIGURE 3/Q.612 (Sheet 1 of 4)

Incoming Signalling System No. 5
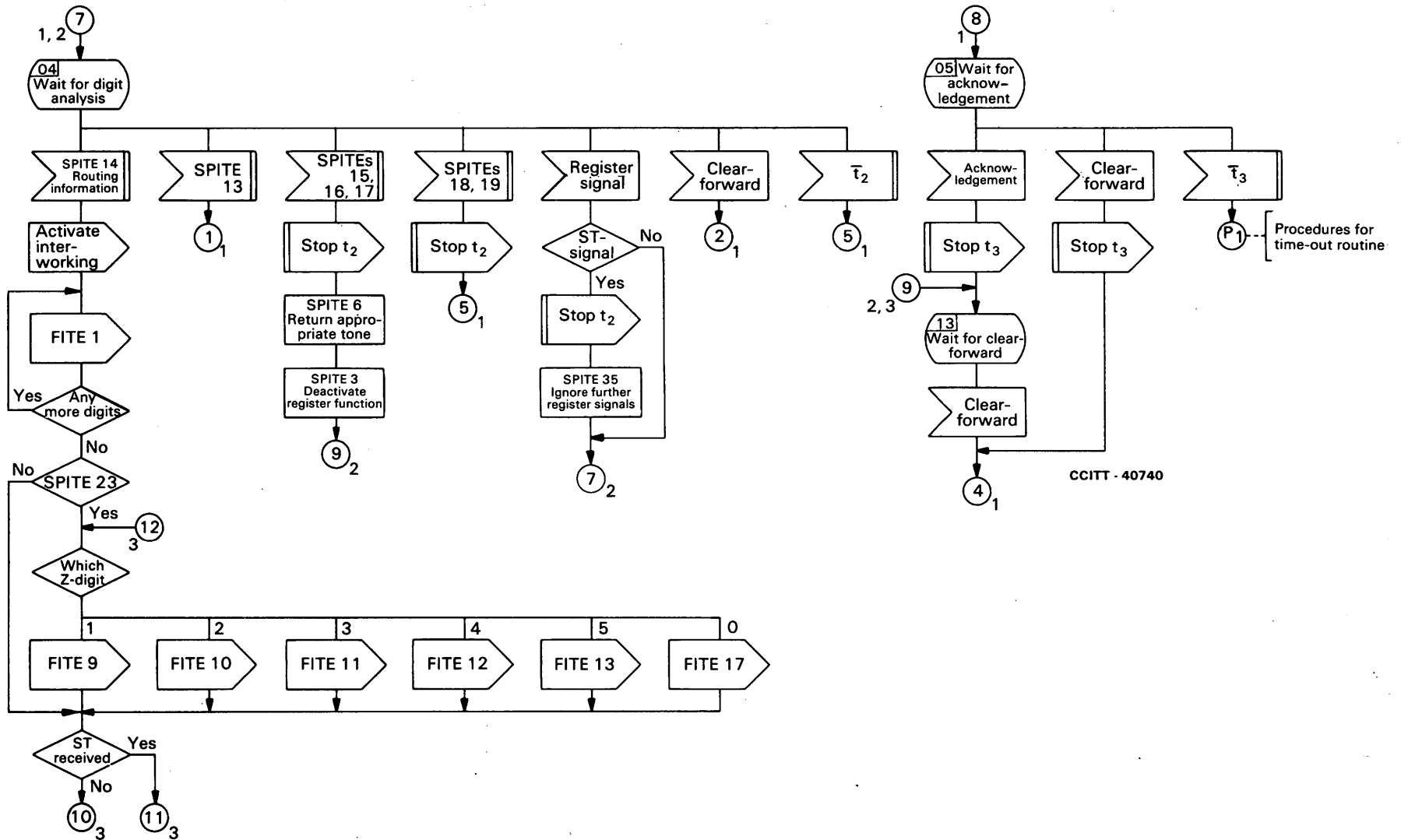
FIGURE 3/Q.612 (Sheet 2 of 4)

Incoming Signalling System No. 5
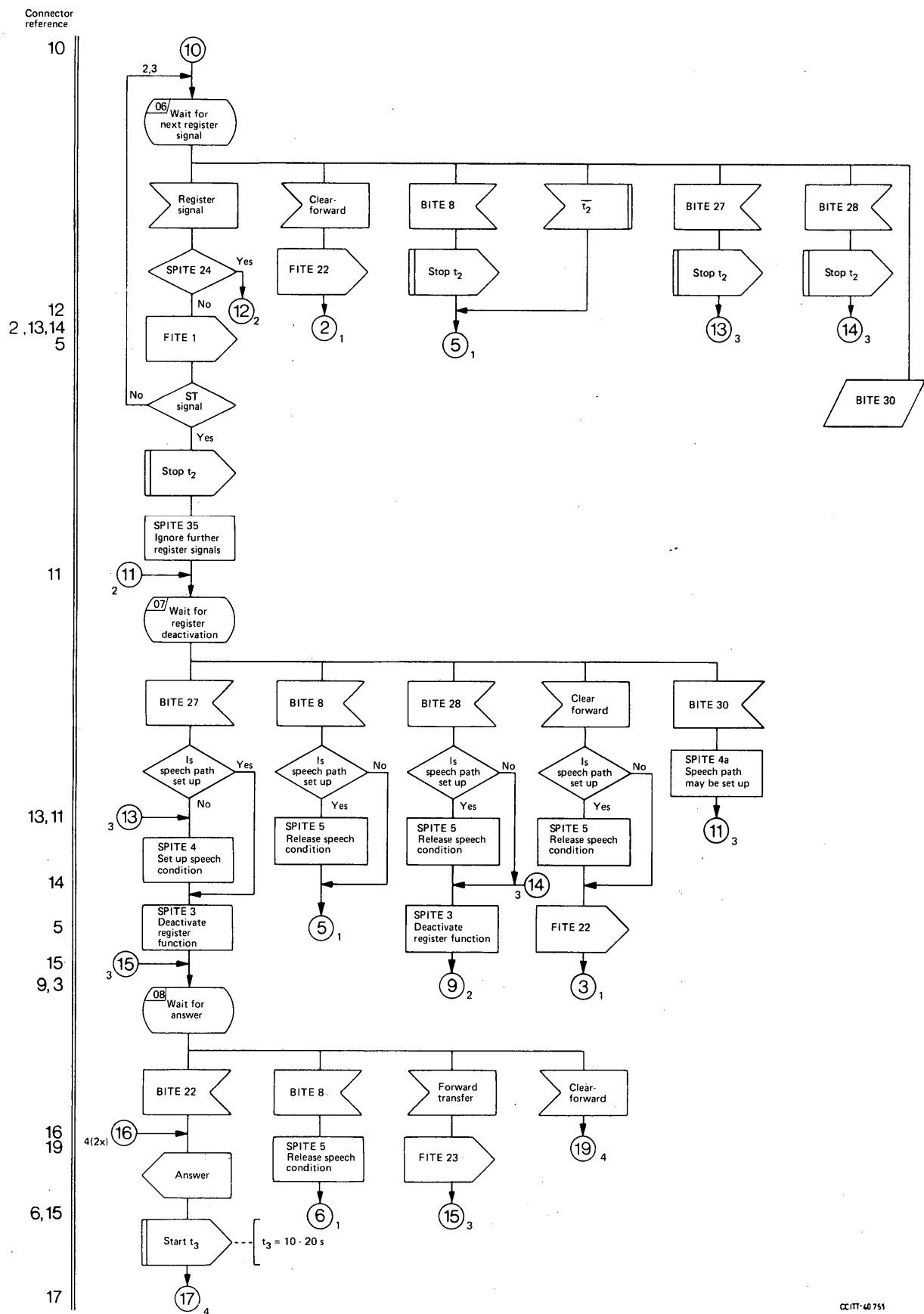
FIGURE 3/Q.612 (Sheet 3 of 4)

Incoming Signalling System No. 5
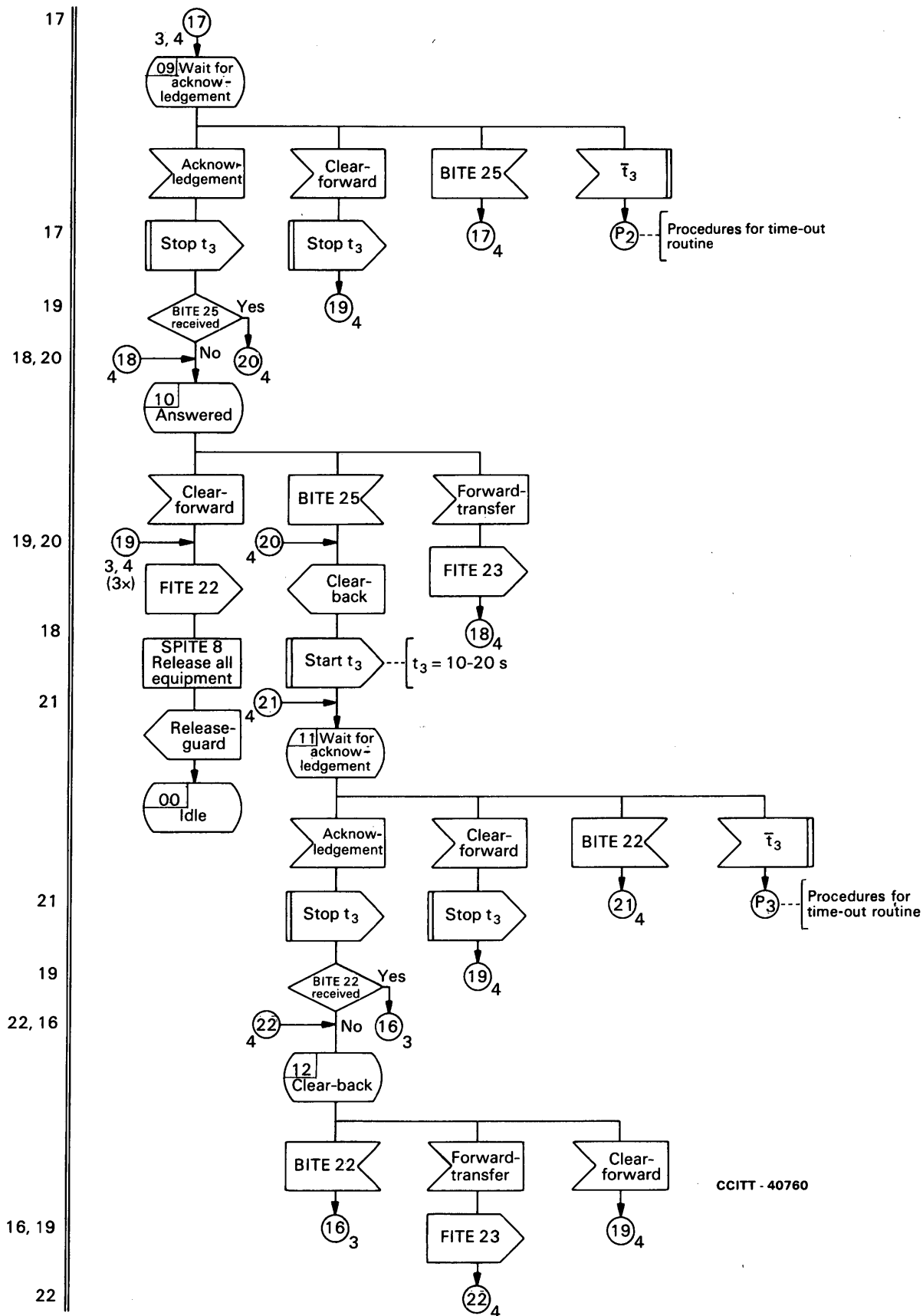
FIGURE 3/Q.612 (Sheet 4 of 4)
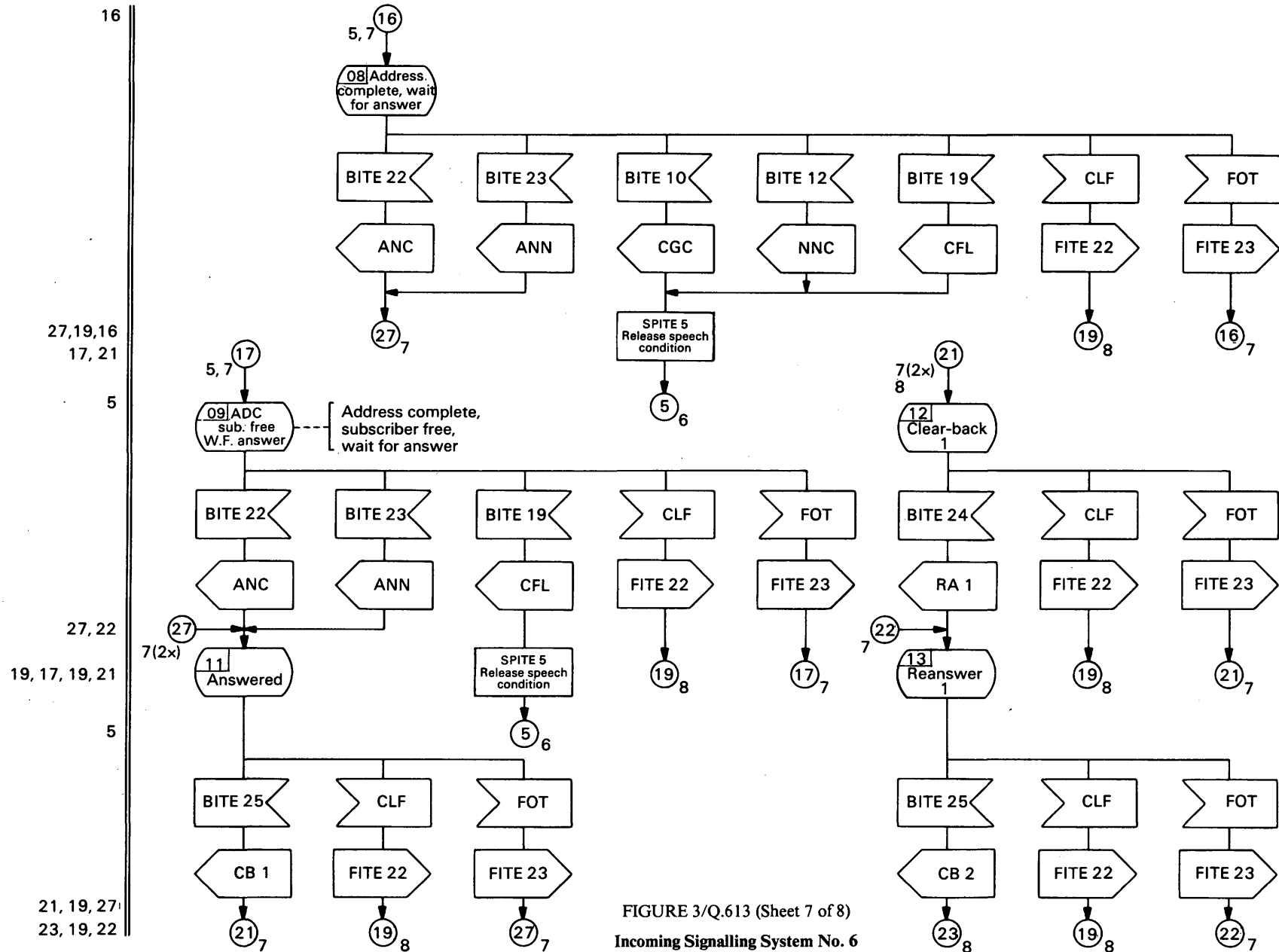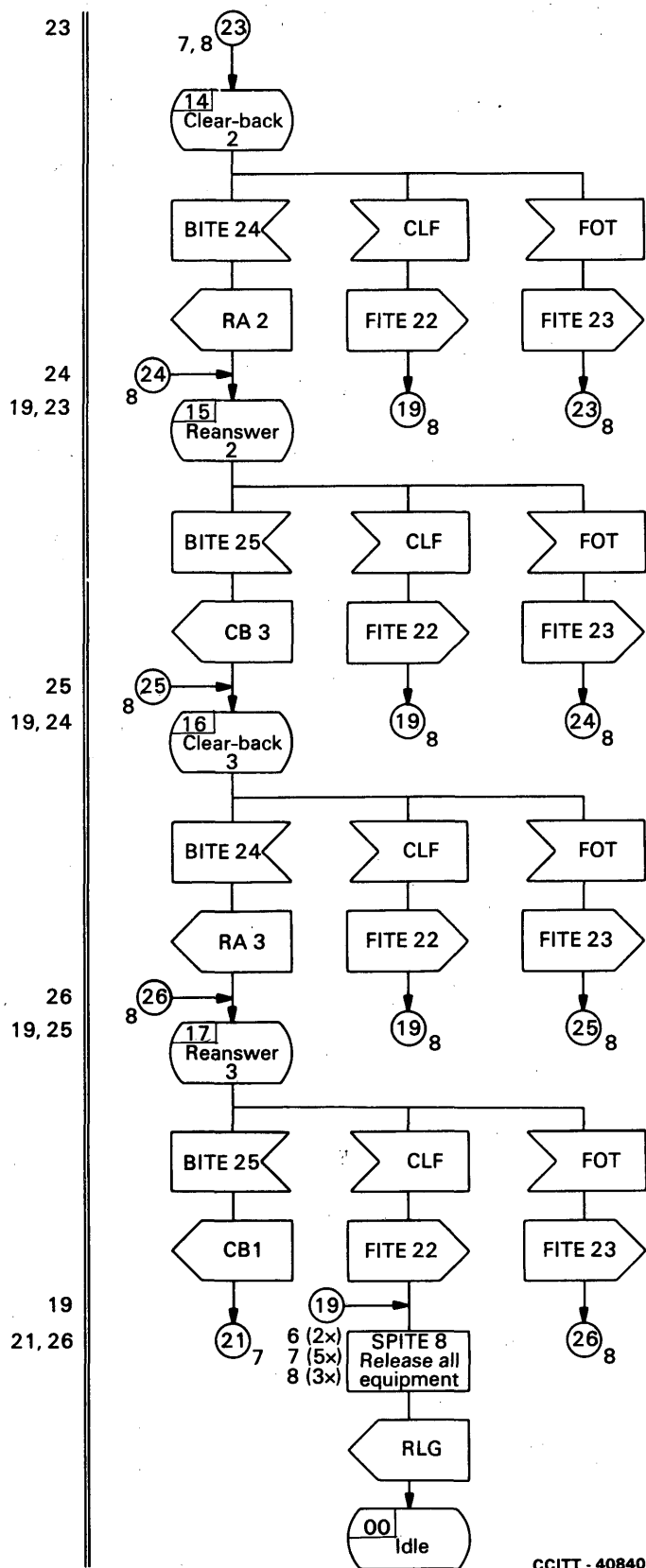
Incoming Signalling System No. 5

LOGIC PROCEDURES FOR INCOMING SIGNALLING SYSTEM No. 6
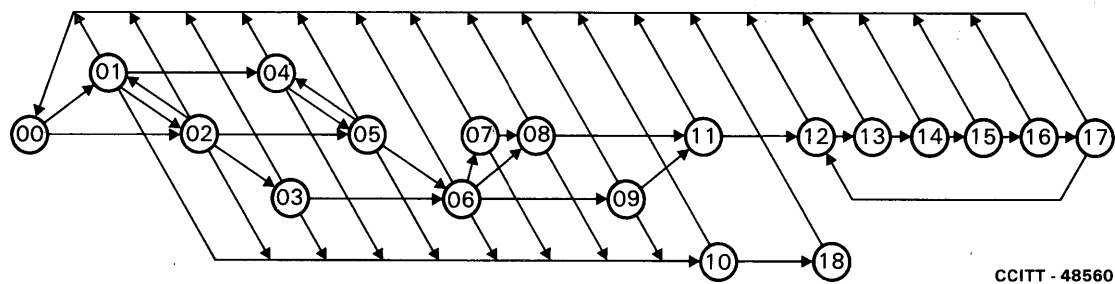
State number	State description	Sheet reference	Timers running
00	Idle	1, 8	
01	Wait for further digits	1	t_1, t_2
02	Wait for digit analysis	3	t_1, t_2 or t_3
03	Wait for continuity check (COT)	4	t_1, t_2 or t_3
04	Wait for further digits (COT received)	2	t_2
05	Wait for digit analysis (COT received)	2	t_2 or t_3
06	Wait for address complete (COT received)	5	t_2 or t_3
07	Wait for register deactivation	5	
08	Address complete – Wait for answer	7	
09	Address complete, subscriber free – Wait for answer	7	
10	Call unsuccessful – wait for clear-forward	6	t_4
11	Answered	7	
12	Clear-back 1	7	
13'	Reanswer 1	7	
14	Clear-back 2	8	
15	Reanswer 2	8	
16	Clear-back 3	8	
17	Reanswer 3	8	
18	Call failure – wait for clear-forward	6	t_4, t_5

FIGURE 1/Q.613

State overview diagram for incoming Signalling System No. 6

Supervisory timers for incoming Signalling System No. 6

t_1 = 10-15 s	Recommendation Q.268, § 4.8.5.3, a)
t_2 = 15-20 s	Recommendation Q.261, § 4.1.6
t_3 = 20-30 s	Recommendation Q.268, § 4.8.5.3, a)
t_4 = 4-15 s	Recommendation Q.268, § 4.8.5.3, b)
t_5 = 1 min	Recommendation Q.268, § 4.8.5.3, b)

Procedures not shown

The following procedures, not directly relevant to interworking, are not shown in the logic procedures :

— Dual seizure,

— Blocking and unblocking sequences,

— Unreasonable sequences,

— Confusion and message refusal signals,

— Reset circuit/band procedures,

— Test call procedures,

— Out of service.

Signal abbreviations used

The signal abbreviations used correspond to those of the Signalling System No. 6 specifications unless otherwise indicated on the same sheet.

FIGURE 2/Q.613

Notes to incoming Signalling System No. 6
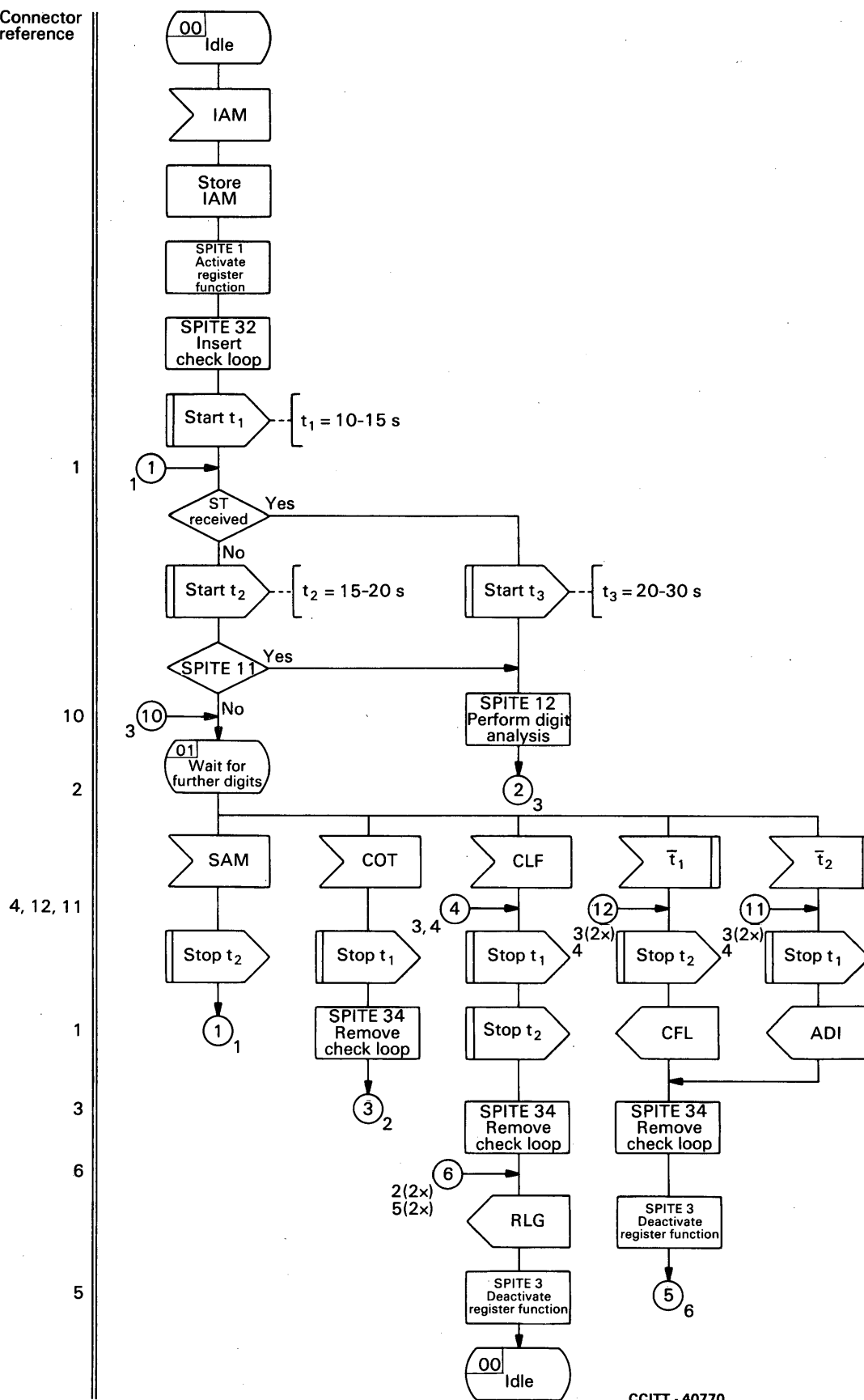
FIGURE 3/Q.613 (Sheet 1 of 8)

Incoming Signalling System No. 6
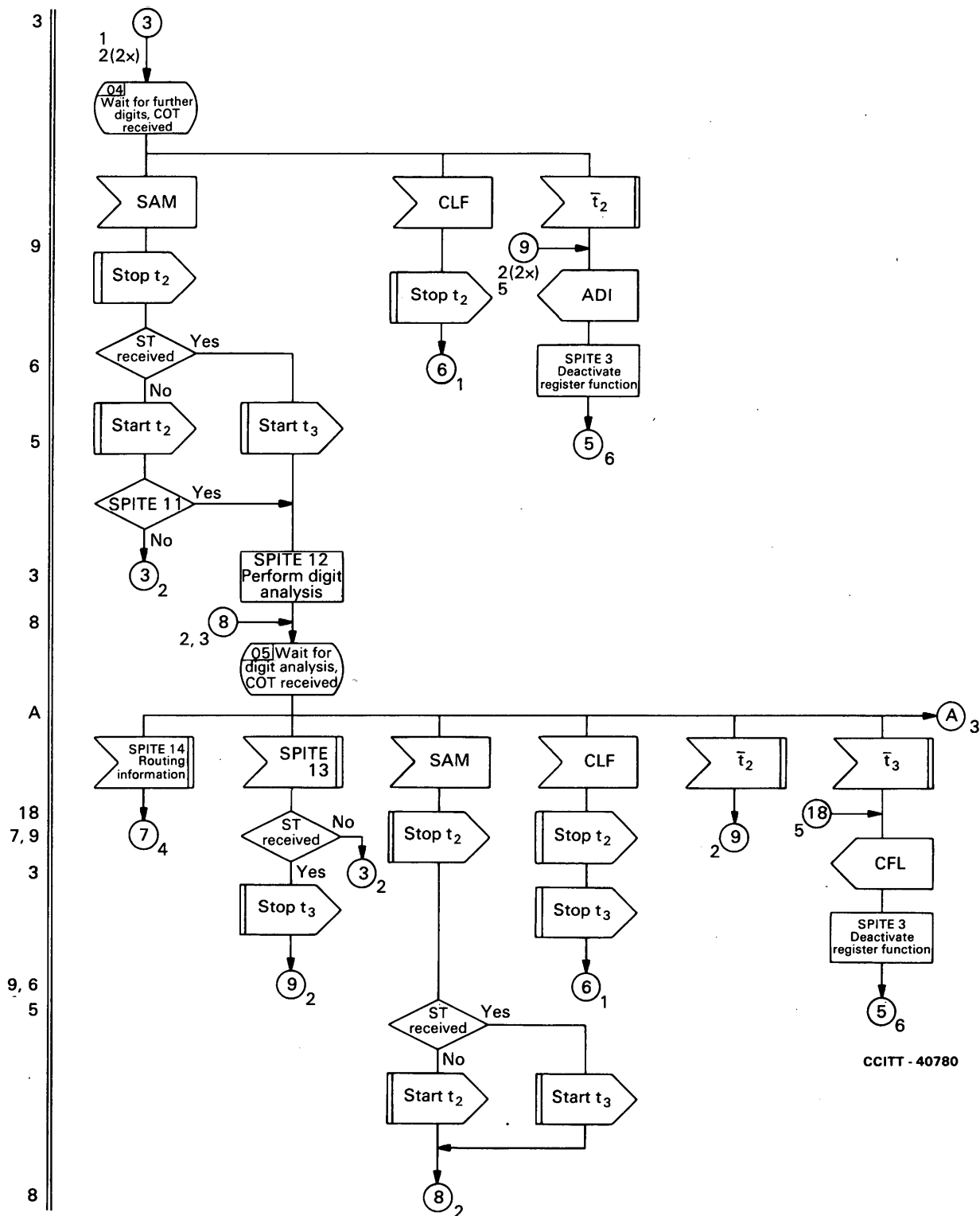
FIGURE 3/Q.613 (Sheet 2 of 8)

Incoming Signalling System No. 6
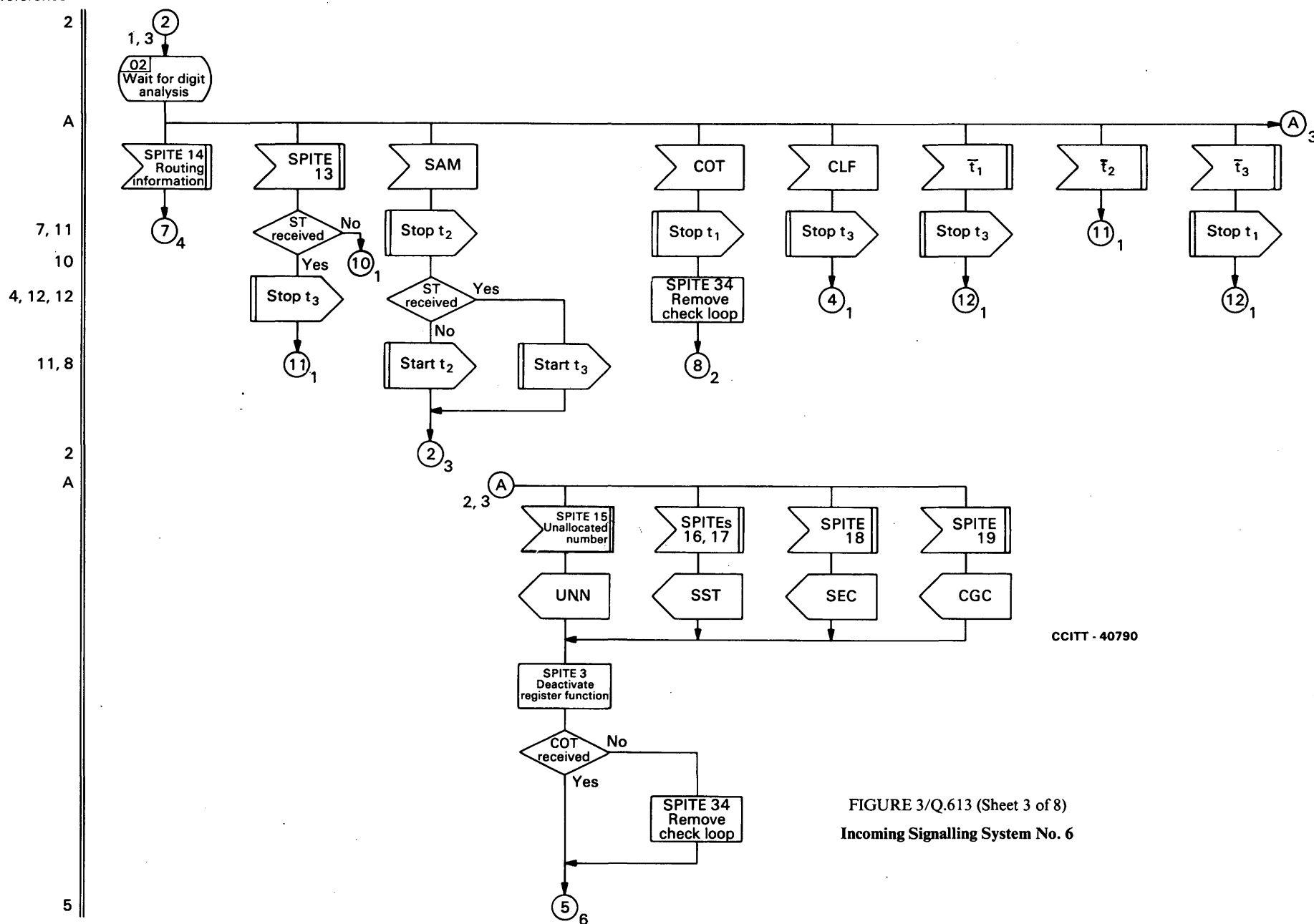
CCITT - 40790

FIGURE 3/Q.613 (Sheet 3 of 8)

Incoming Signalling System No. 6

FIGURE 3/Q.613 (Sheet 4 of 8)

Incoming Signalling System No. 6

Connector
reference

13

4(2x)
5(2x)

(13)

06. Wait
for address
complete

| SAM | BITE 30 | BITE 2 | BITE 3 | BITE 4 | BITE 5 | BITE 6 | BITE 7 | CLF |

Stop t₂ — t_2

SPITE 4A
Speech path
may be set up

(13) 5

ADC

ADN

ADX

AFC

AFN

AFX

FITE 22

13

ST
received — Yes

Stop t₂

Stop t₂

Stop t₂

Stop t₂

See Note,
Sheet 4

No

CCSS

Stop t₃

Stop t₃

Stop t₃

Stop t₃

15
6
28

Start t₂

Start t₃

6 (15)

(28) 6

SPITE 3
Deactivate
register
function

SPITE 3
Deactivate
register
function

(6) 1

B

Is
speech path
set up — Yes

Is
speech path
set up — Yes

(B) 6

t₂

t₃

FITE 1

No

No

SPITE 4
Set up
speech
condition

SPITE 4
Set up
speech
condition

FITE 22

FITE 22

Yes — Any more
digits

16, 17
3, 9, 18

No

(13) 5

(16) 7

(17) 7

(9) 2

(18) 2 CCITT - 40812

FIGURE 3/Q.613 (Sheet 5 of 8)

Incoming Signalling System No. 6

FIGURE 3/Q.613 (Sheet 6 of 8)

Incoming Signalling System No. 6

Connector
reference

FIGURE 3/Q.613 (Sheet 7 of 8)

Incoming Signalling System No. 6

CCITT - 40830

FIGURE 3/Q.613 (Sheet 8 of 8)

Incoming Signalling System No. 6

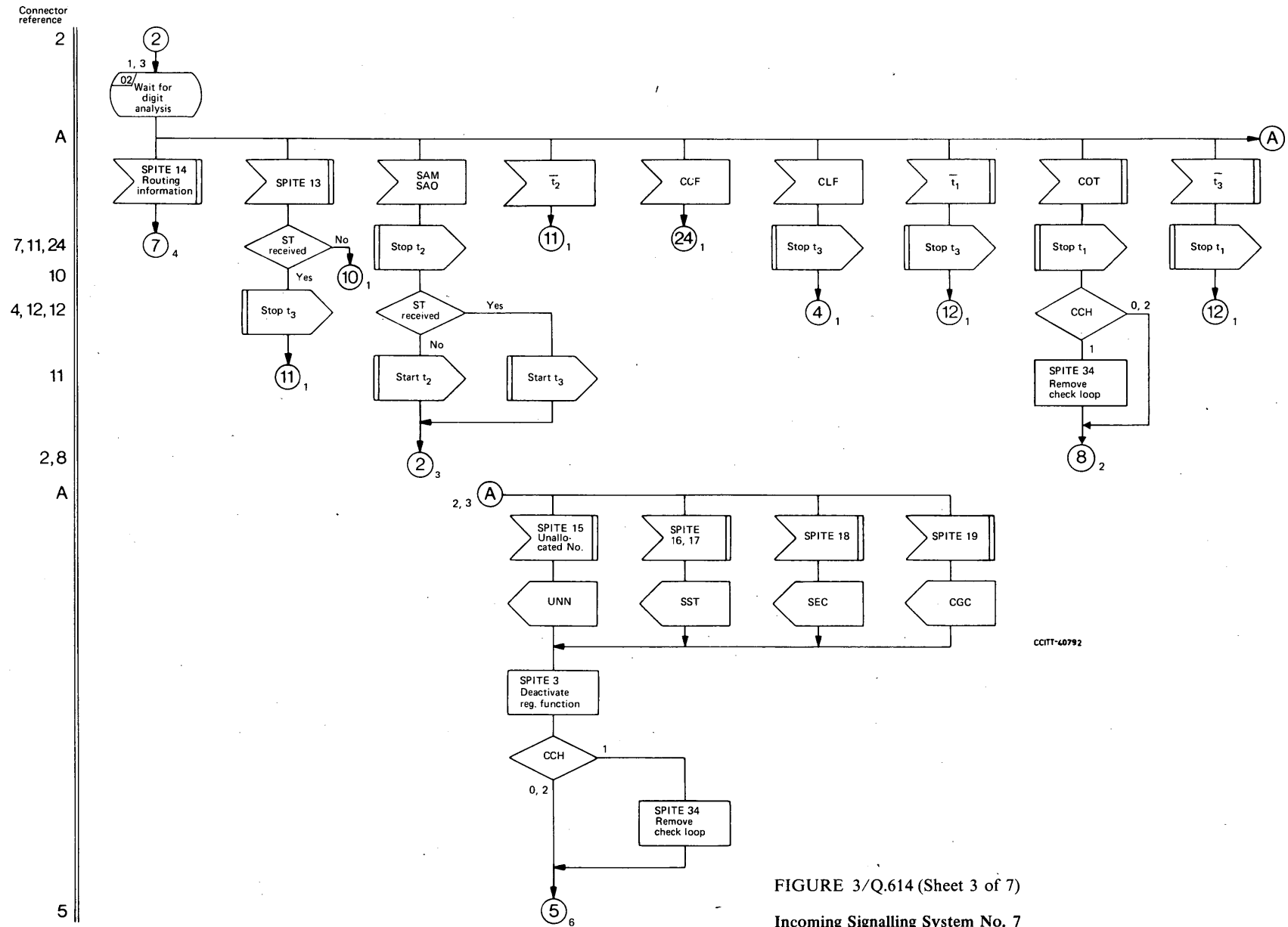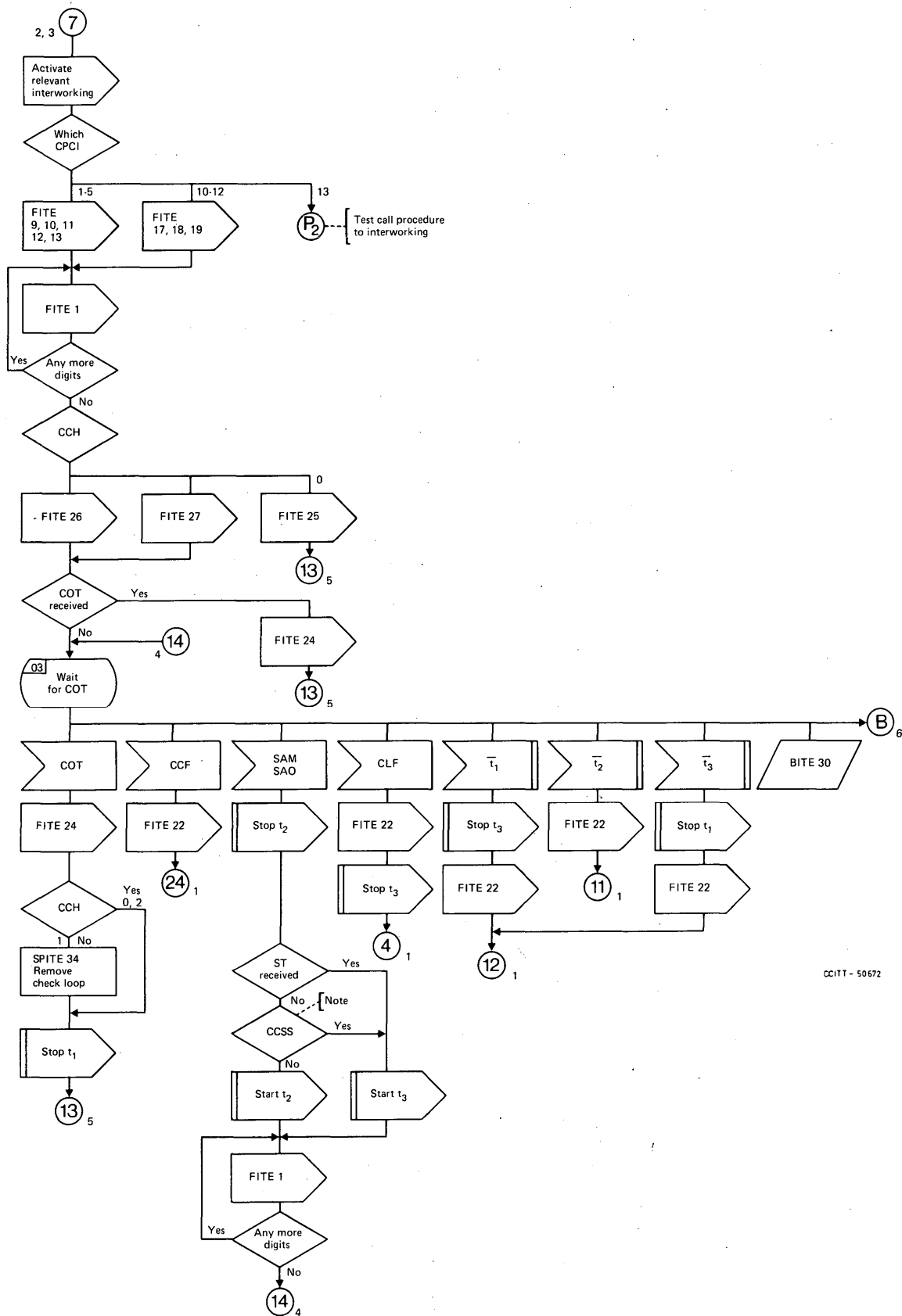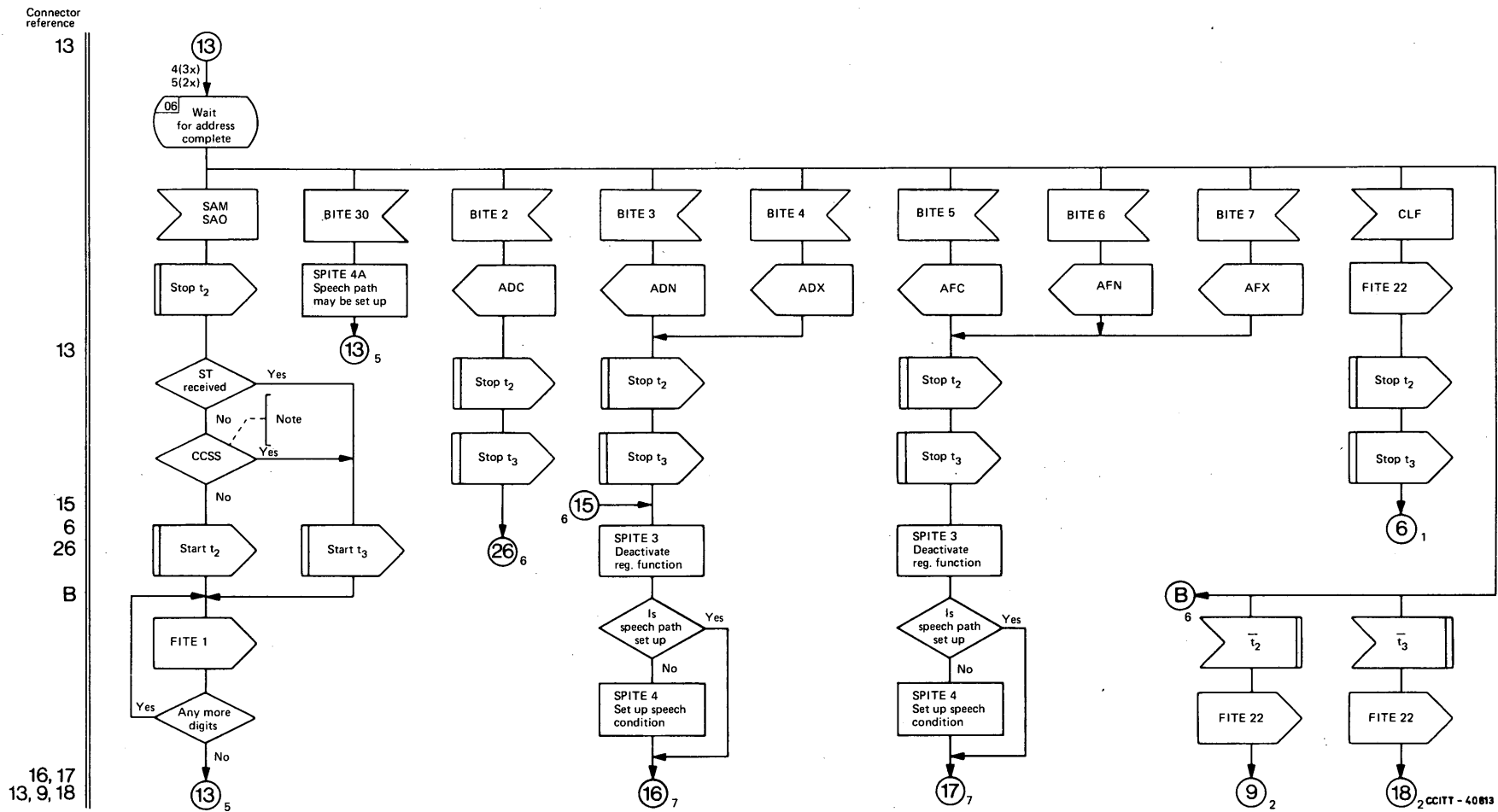**LOGIC PROCEDURES FOR INCOMING SIGNALLING SYSTEM No. 7**

CCITT - 53621
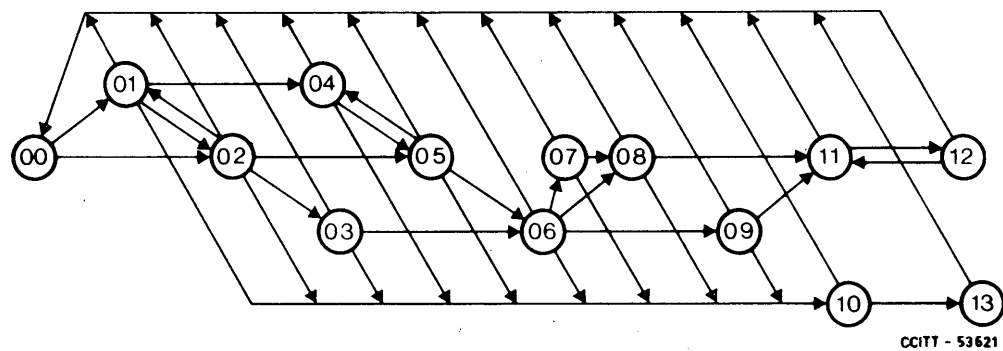
State number	State description	Sheet reference	Timers running
00	Idle	1, 7	
01	Wait for further digits	1	t_1, t_2
02	Wait for digit analysis	3	t_1, t_2 or t_3
03	Wait for continuity check (COT)	4	t_1, t_2 or t_3
04	Wait for further digits (COT received)	2	t_2
05	Wait for digit analysis (COT received)	2	t_2 or t_3
06	Wait for address complete (COT received)	5	t_2 or t_3
07	Wait for register deactivation	5	
08	Address complete — wait for answer	7	
09	Address complete, subscriber free — wait for answer	7	
10	Call unsuccessful — wait for clear-forward	6	t_4
11	Answered	7	
12	Clear-back	7	
13	Call failure wait for clear forward	6	

FIGURE 1/Q.614

State overview diagram for incoming Signalling System No. 7

Supervisory timers for incoming Signalling System No. 7

t_1 = 10 - 15 s   Recommendation Q.724, § 6.4.2, a)

t_2 = 15 - 20 s   Recommendation Q.724, § 1.7

t_3 = 20 - 30 s   Recommendation Q.724, § 6.4.3

t_4 = 4 - 15 s   Recommendation Q.724, § 6.4.2, b)

t_5 = 1 min   Recommendation Q.724, § 6.4.2, b)

Procedures not shown

The following procedures, not directly relevant to interworking, are not shown in the logic procedures:
- dual seizure,
- blocking and unblocking sequences,
- user part selection (see Note),
- confusion and message refusal signals,
- reset circuit procedures,
- test call procedures,
- out of service,
- national procedures.

Signal abbreviations used

The signal abbreviations used correspond to those of the Signalling System No. 7 specifications unless otherwise indicated on the same sheet.

The signal abbreviations used are listed below with their meanings:

ADC	Address complete, charge
ADI	Address incomplete
ADN	Address complete, no charge
ADX	Address complete, coin box
AFC	Address complete, subscriber free, charge
AFN	Address complete, subscriber free, no charge
AFX	Address complete, subscriber free, coin box
ANC	Answer charge
ANN	Answer no charge
CCH	Continuity check indicator
CFL	Call failure
CGC	Circuit group congestion
COT	Continuity
CPCI	Calling party category indicator
ESI	Echo suppressor indicator
LOS	Line-out-of-service
NCI	Nature of circuit indicator
NNC	National network congestion
NAI	Nature of address indicator
SAM	Subsequent address message
SAO	Subsequent address message with one address digit
SEC	Switching equipment congestion
SSB	Subscriber busy
SST	Send special information tone
UNN	Unallocated number

Note — This SDL diagram relates only to the International Telephony User Part (TUP) specified for Signalling System No. 7 in Recommendations Q.721 - Q.725. The selection of the TUP is assumed to have been made on a per message basis by the Level 3 message distribution process.

FIGURE 2/Q.614

Notes to incoming Signalling System No. 7
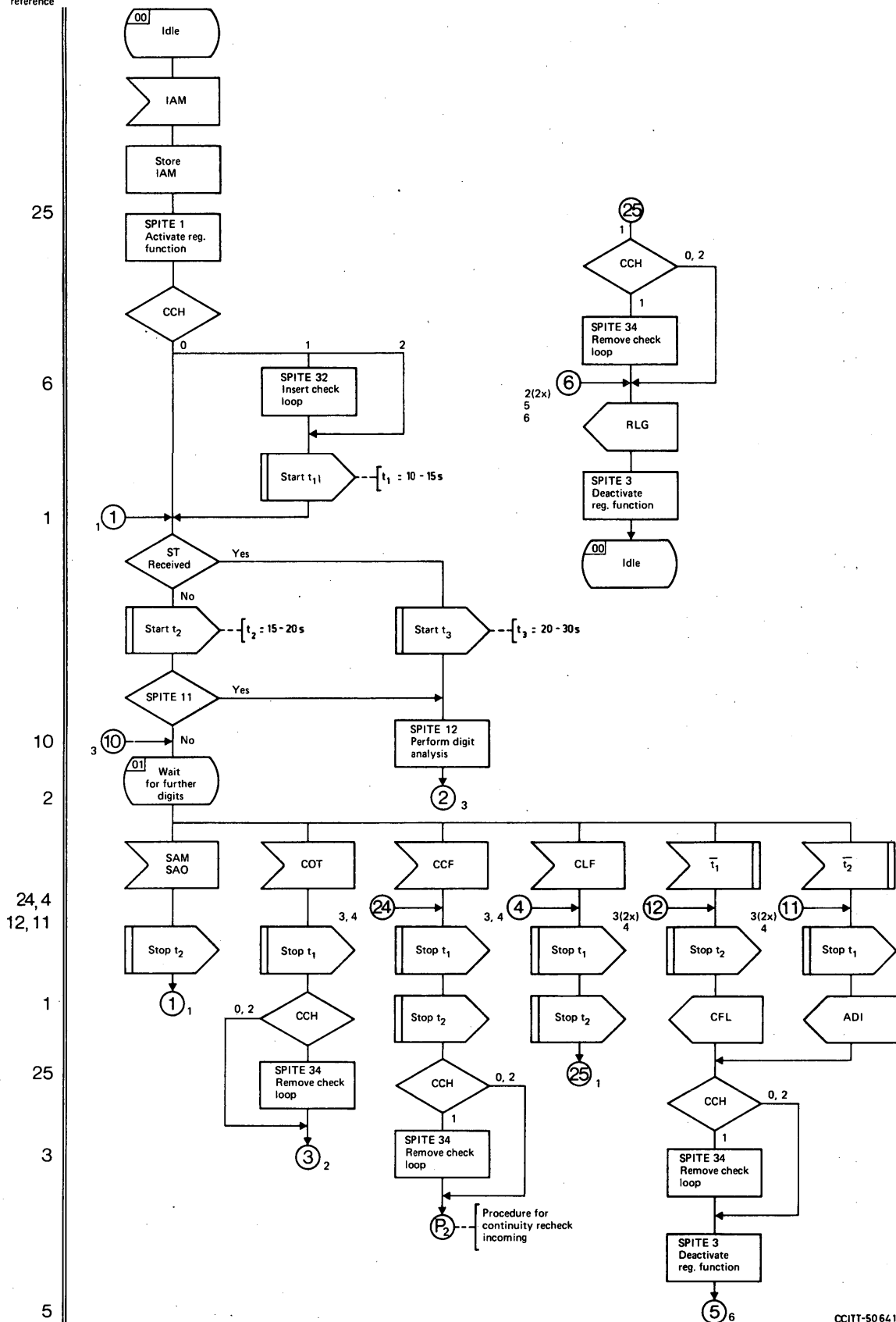
FIGURE 3/Q.614 (Sheet 1 of 7)

Incoming Signalling System No. 7
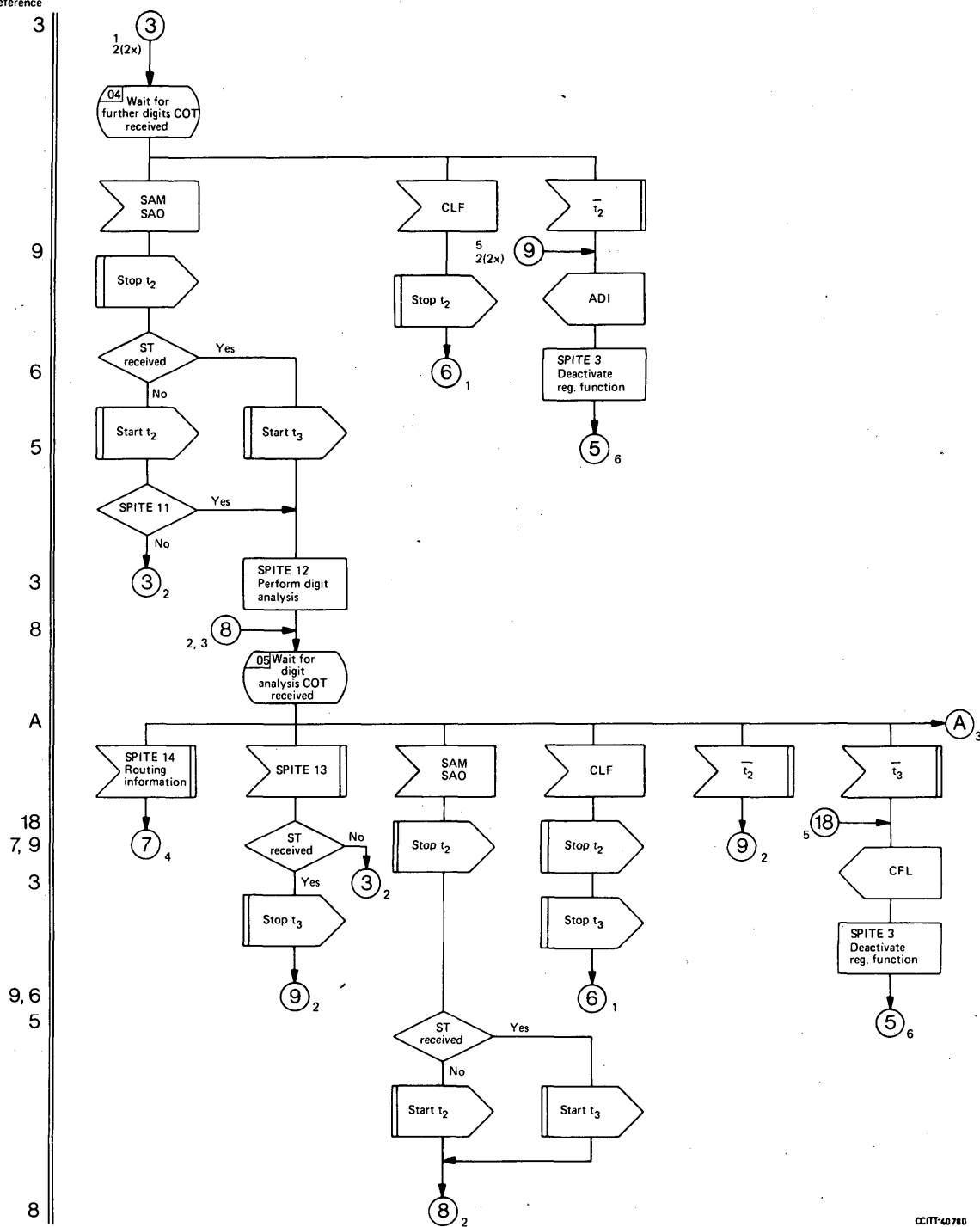
FIGURE 3/Q.614 (Sheet 2 of 7)

Incoming Signalling System No. 7

FIGURE 3/Q.614 (Sheet 3 of 7)

Incoming Signalling System No. 7

Note — Is outgoing link common channel Signalling System?

FIGURE 3/Q.614 (Sheet 4 of 7)

Incoming Signalling System No. 7

Note — Is outgoing link common channel Signalling System?

FIGURE 3/Q.614 (Sheet 5 of 7)

Incoming Signalling System No. 7

4, 5 Ⓑ

BITE 9   BITE 10   BITE 12   BITE 14   BITE 15

SEC   CGC   NNC   ADI   UNN

BITE 16   BITE 17   BITE 19   BITE 20

SSB   LOS   CFL   SST

26

SPITE 3
Deactivate
reg. function

Is
speech path
set up   No

Yes

SPITE 5
Release speech
conditions

Stop t₂

Stop t₃

15

CCH   0, 2

6

COT
Received   Yes

No

Stop t₁

20

SPITE 34
Remove
check loop

5

5   2(2x), 1, 3, 7, 6   ⑤

Start t₄   t₄ = 4 - 15 s

10 Call un-
successful
wait for clear
forward

CLF   t̄₄

Stop t₄   CLF

19, 20   ⑲₇   Start t₅   t₅ = 1 min

19

5 ㉖

07 Wait
for register
deactivation

BITE 27   BITE 10   BITE 12   BITE 19   CLF

⑮₅   CGC   NNC   CFL   FITE 22

⑥₁

SPITE 3
Deactivate
reg. function

Is
speech path
set up   No

Yes

SPITE 5
Release speech
condition

⑤₆

㉒₆

Start t₄

13 Call fail
wait for clear
forward

CLF   t̄₄   t̄₅

Stop t₄   CFL   Stop t₄

Stop t₅   ㉒₆   Ⓟ₂   Out of
service

⑲₇

CCITT-40823

FIGURE 3/Q.614 (Sheet 6 of 7)

Incoming Signalling System No. 7

FIGURE 3/Q.614 (Sheet 7 of 7)

Incoming Signalling System No. 7

LOGIC PROCEDURES FOR INCOMING SIGNALLING SYSTEM R1

CCITT - 48570
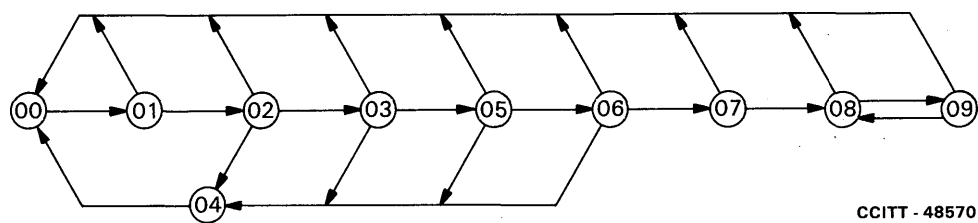
State number	State description	Sheet reference	Timers running
00	Idle	1, 2	
01	Wait for register activation	1	
02	Wait for first register signal (KP)	1	t_1
03	Wait for next register signal	1	t_1
04	Wait for clear-forward	1	
05	Wait for digit analysis	2	
06	Wait for register deactivation	2	
07	Wait for answer	2	
08	Answered	2	
09	Clear-back	2	

FIGURE 1/Q.615

State overview diagram for incoming Signalling System R1

Supervisory timers for incoming Signalling System R1

t_1 = 10-20 s   Recommendation Q.325

Remarks to facilitate reading and understanding the SDL flow chart

a) The procedure described in Recommendation Q.313, § 2.3.3.2, e) is not shown because this has no impact on the interworking.

b) This incoming Signalling System R1 procedure assumes the inclusion of country code digits in the case where Signalling System R1 is used to access the outgoing international exchange.

FIGURE 2/Q.615

Notes to incoming Signalling System R1

Connector reference
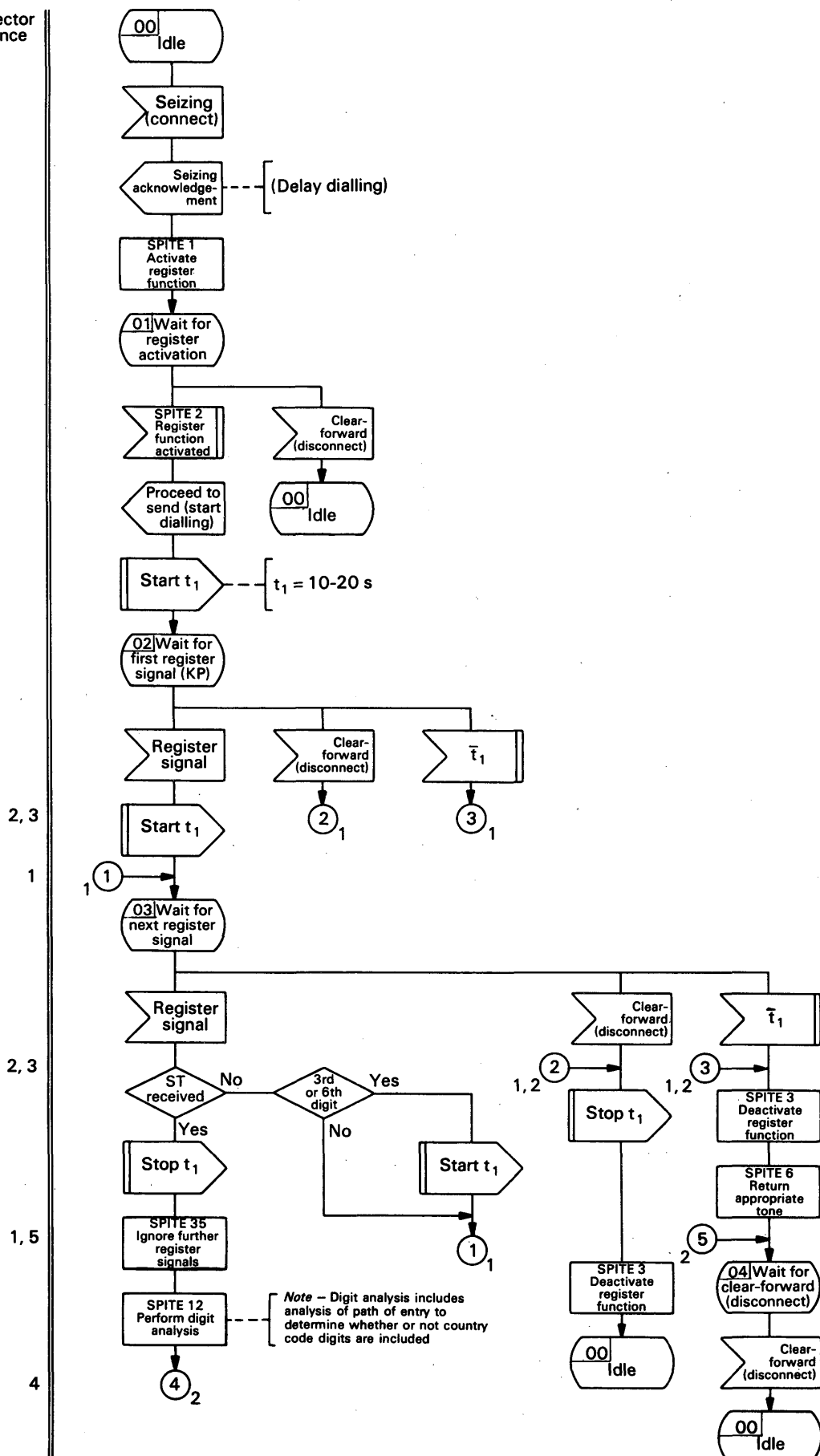
FIGURE 3/Q.615 (Sheet 1 of 2)

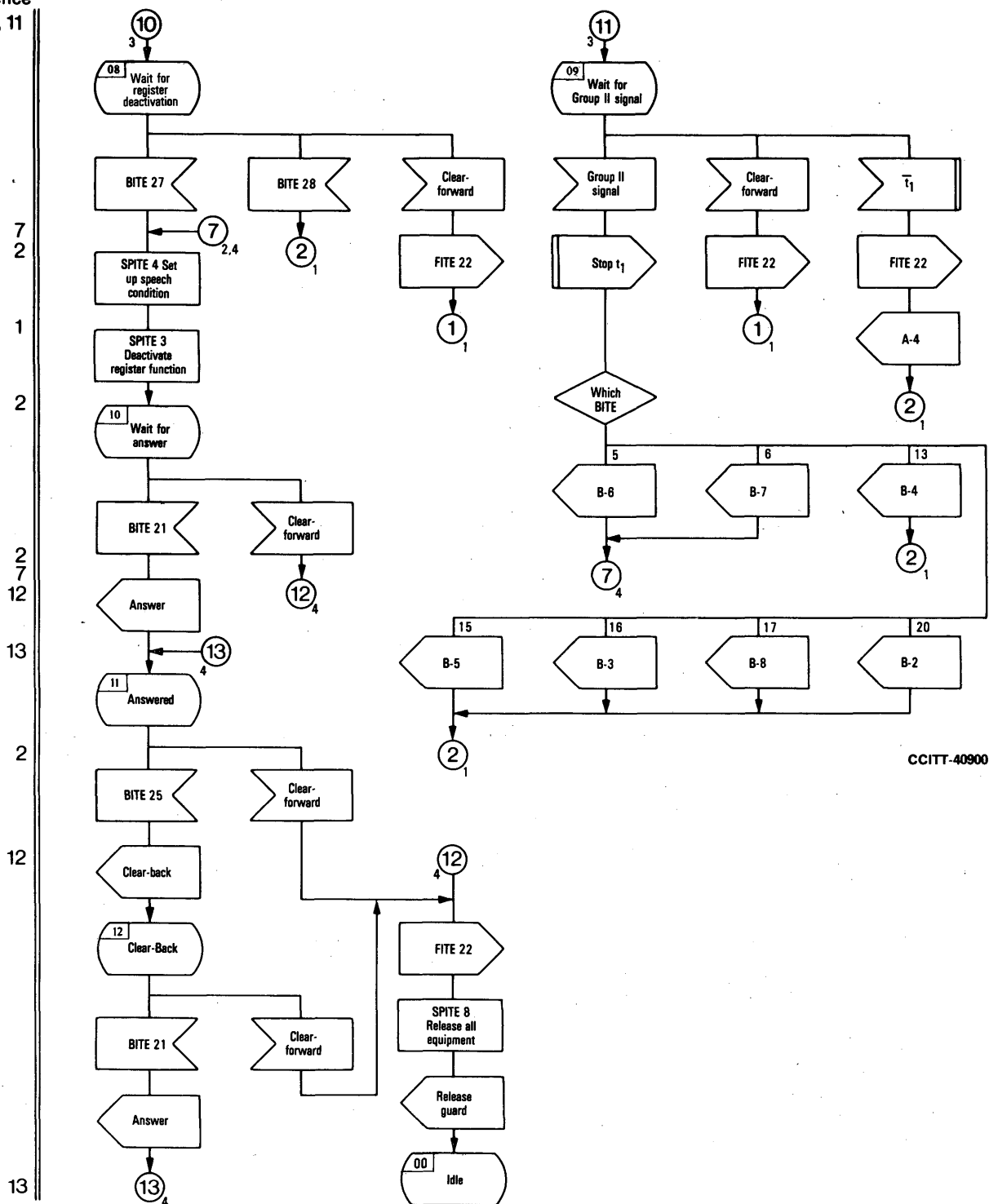**Incoming Signalling System R1**

CCITT - 40850
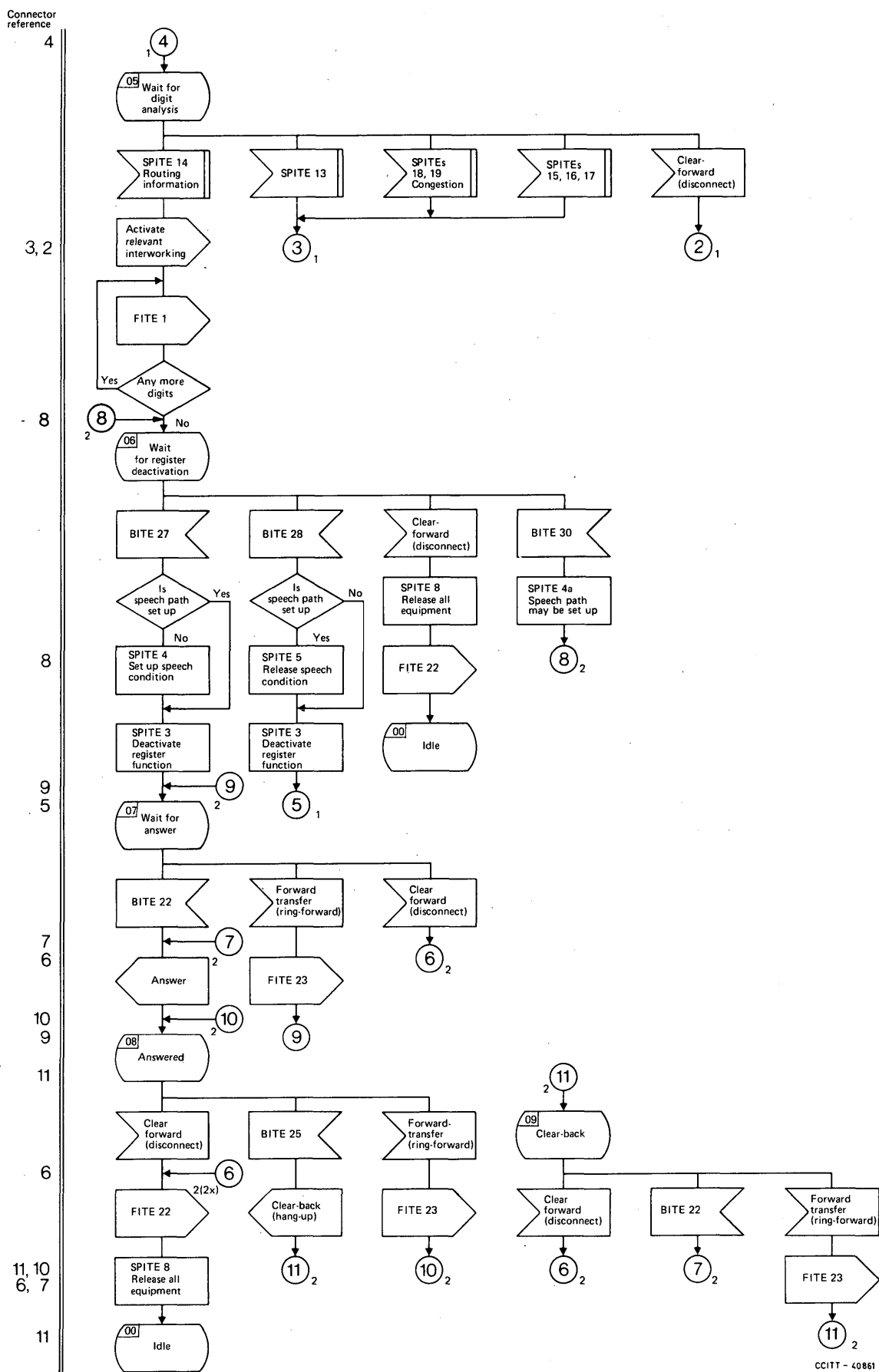
FIGURE 3/Q.615 (Sheet 2 of 2)

Incoming Signalling System R1

LOGIC PROCEDURES FOR INCOMING SIGNALLING SYSTEM R2
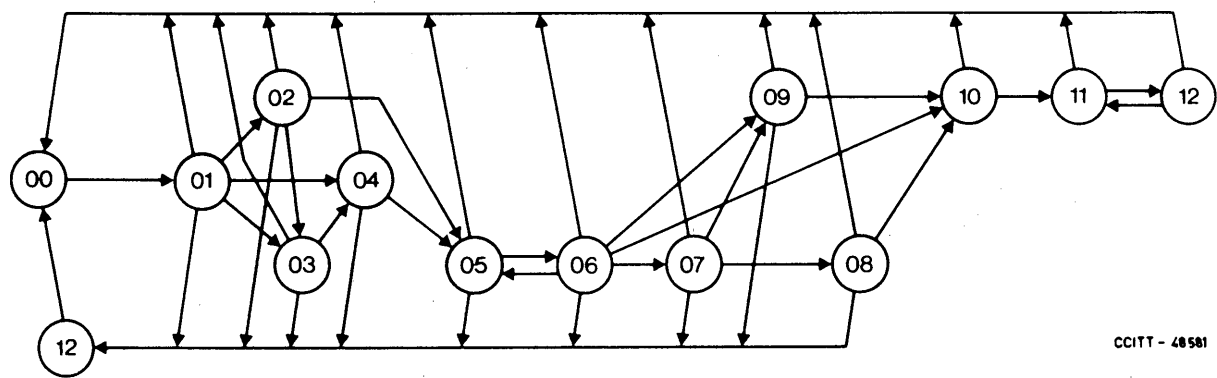
State number	State description	Sheet number	Running timers
00	Idle	1	
01	Wait for first forward signal	1	t_1
02	Wait for reply to A-14	2	t_1
03	Wait for nature of circuit indicator	1	t_1
04	Wait for calling party's category	2	t_1
05	Wait for forward register signal	2	t_1
06	Wait for digit analysis	2	t_1
07	Wait for address-complete	3	t_1
08	Wait for register deactivation	4	
09	Wait for group II signal	4	t_1
10	Wait for answer	4	
11	Answered	4	
12	Clear-back	4	
13	Wait for clear-forward	1	

FIGURE 1/Q.616

State overview diagram for Incoming Signalling System R2

Supervisory timers

t_1 = 8-24 s   Recommendation Q.476, § 5.5.2.1

Procedures not shown

The following procedures, not directly relevant to interworking, are not shown in the logic procedures:

— Interrupt control procedures (analogue version).

— Transmission fault procedures (digital version).

— Test call procedures.

— Analogue T_2 release guard timing.

— Optional forward transfer procedure.

— Blocking and unblocking sequences.

FIGURE 2/Q.616

Notes to incoming Signalling System R2
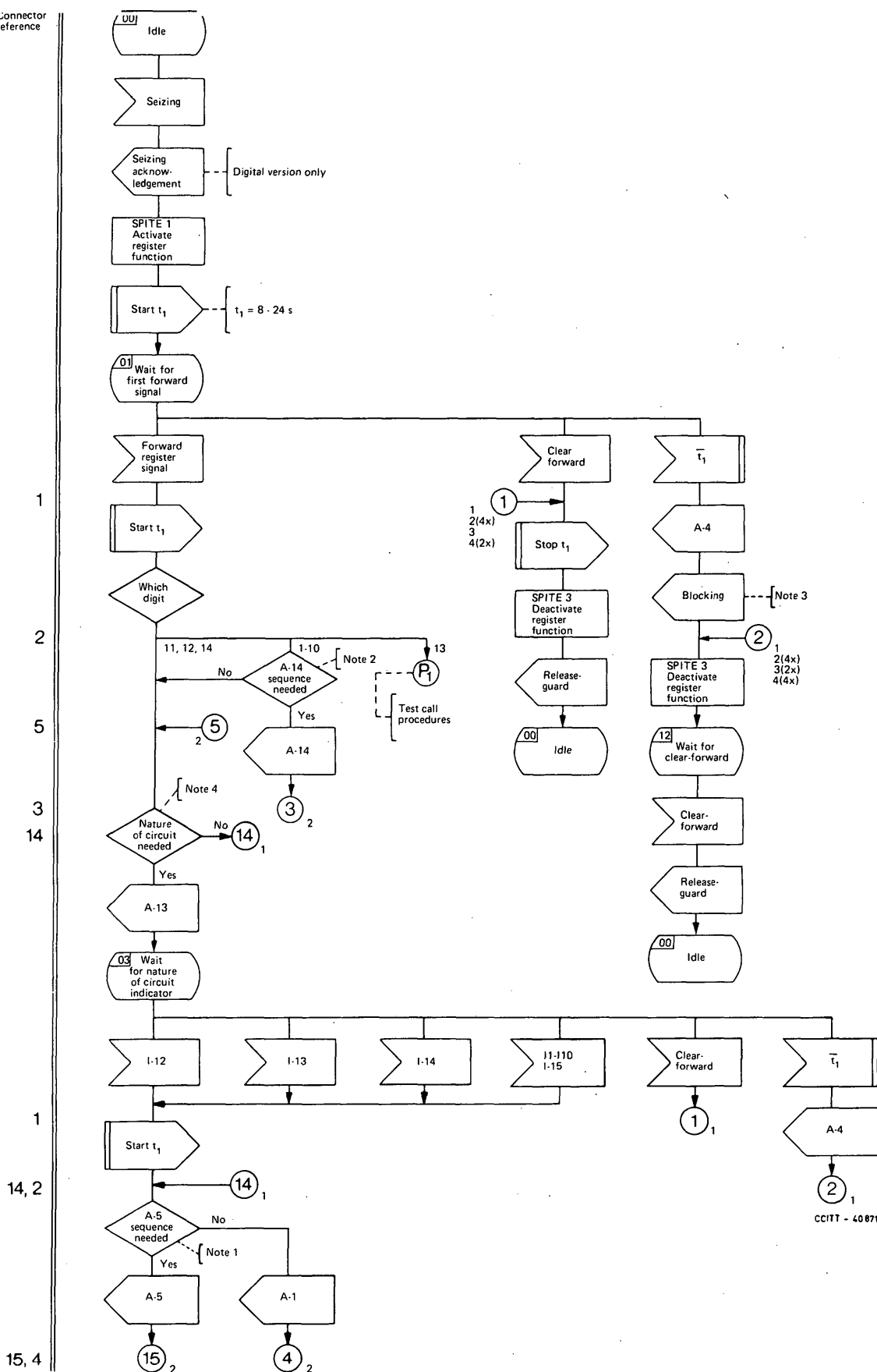
Note 1 — Required for interworking reasons except when only capable of interworking with Signalling System 4, 5 and R1, but A-5 may be sent at any time as required.

Note 2 — Required when the international exchange can insert incoming half-echo suppressors as specified in Recommendation Q.479. Q.479.

Note 3 — The blocking signal should not be sent if the digital version of line signalling is being used.

Note 4 — This sequence is defined in Recommendation Q.480, § 5.8.1.

FIGURE 3/Q.616 (Sheet 1 of 4)

Incoming Signalling System R2

FIGURE 3/Q.616 (Sheet 2 of 4)

Incoming Signalling System R2
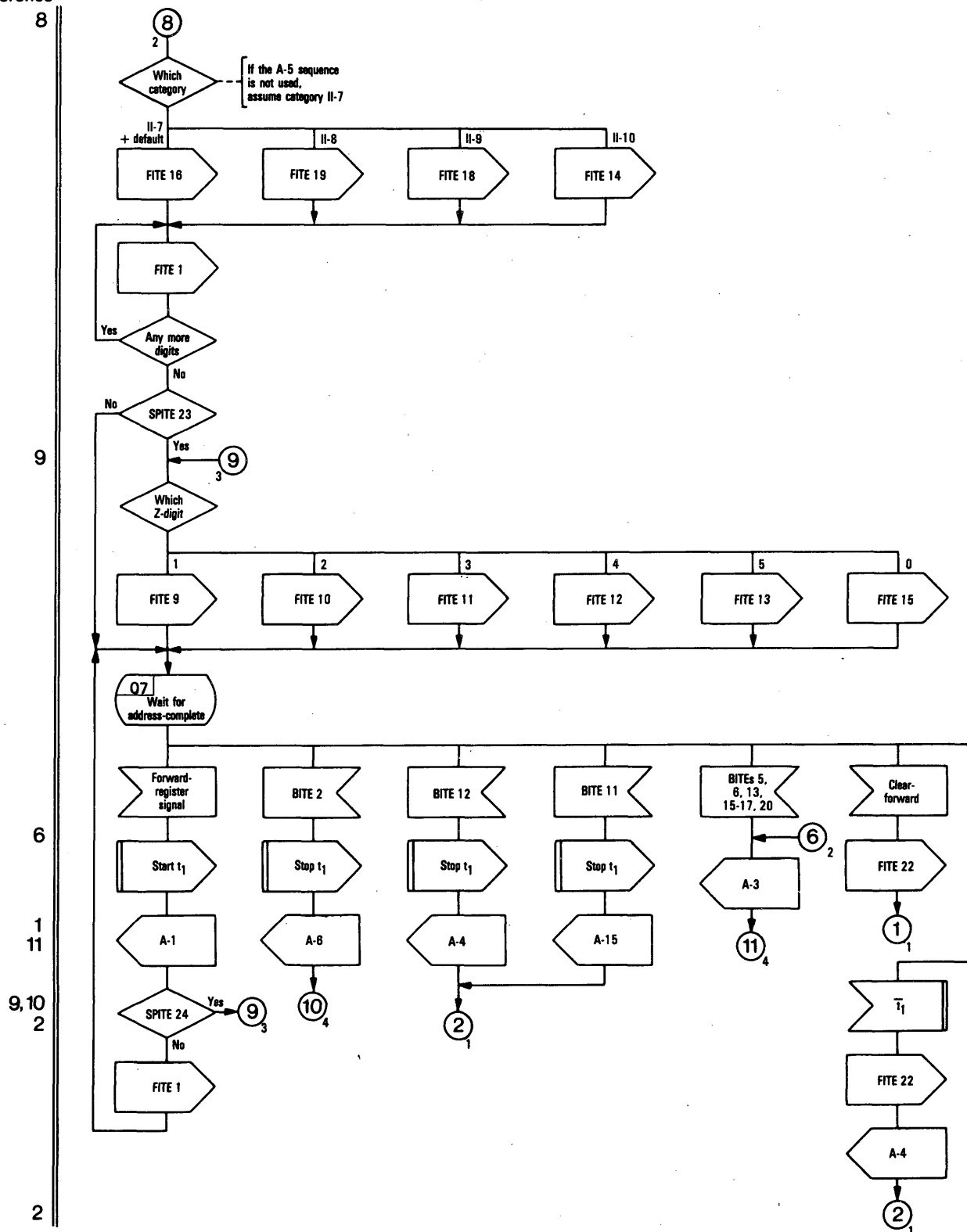
FIGURE 3/Q.616 (sheet 3 of 4)
Incoming Signalling System R2

CCITT-40890

FIGURE 3/Q.616 (Sheet 4 of 4)

Incoming Signalling System R2

LOGIC PROCEDURES FOR OUTGOING SIGNALLING SYSTEM No. 4

CCITT-48590
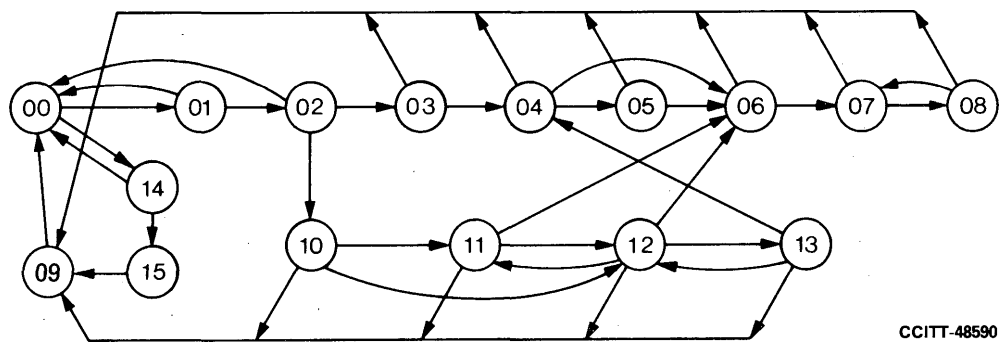
State number	State description	Sheet reference	Timers running
00	Idle	1, 2	
01	Wait for CPCI-FITE	1	
02	Wait for FITE 2 or 3	1	
03	Wait for terminal proceed-to-send	1	t_1
04	Wait for acknowledgement	1	t_2
05	Wait for number-received	2	t_3
06	Wait for answer	2	
07	Answered	2	
08	Clear-back	2	
09	Wait for release-guard	2	t_4
10	Wait for proceed-to-send	3	t_1
11	Wait for number-received	3	t_3
12	Wait for acknowledgement signal	3	t_2
13	Wait for proceed-to-send	4	t_3
14	Wait for FITE 2 or 3 (end-to-end)	1	
15	Wait for clear-forward	1	

FIGURE 1/Q.621

State overview diagram for outgoing Signalling System No. 4

Supervisory timers

|		
t_1 =	10 - 30 s	Recommendation Q.127, § 4.4.1 (2), c)
t_2 =	5 - 10 s	Recommendation Q.127, § 4.4.1 (2), d)
t_3 =	15 - 30 s	Recommendation Q.127, § 4.4.1 (2), a)
t_4 =	5 - 10 s	Recommendation Q.130, § 4.7.1

Procedure not shown

The following procedure, not directly relevant to interworking, is not shown in the logic procedures:

P_1 = Procedure for time-out due to non-receipt of release guard (see Recommendation Q.130, § 4.7.1).

FIGURE 2/Q.621

Notes to outgoing Signalling System No. 4

Connector reference
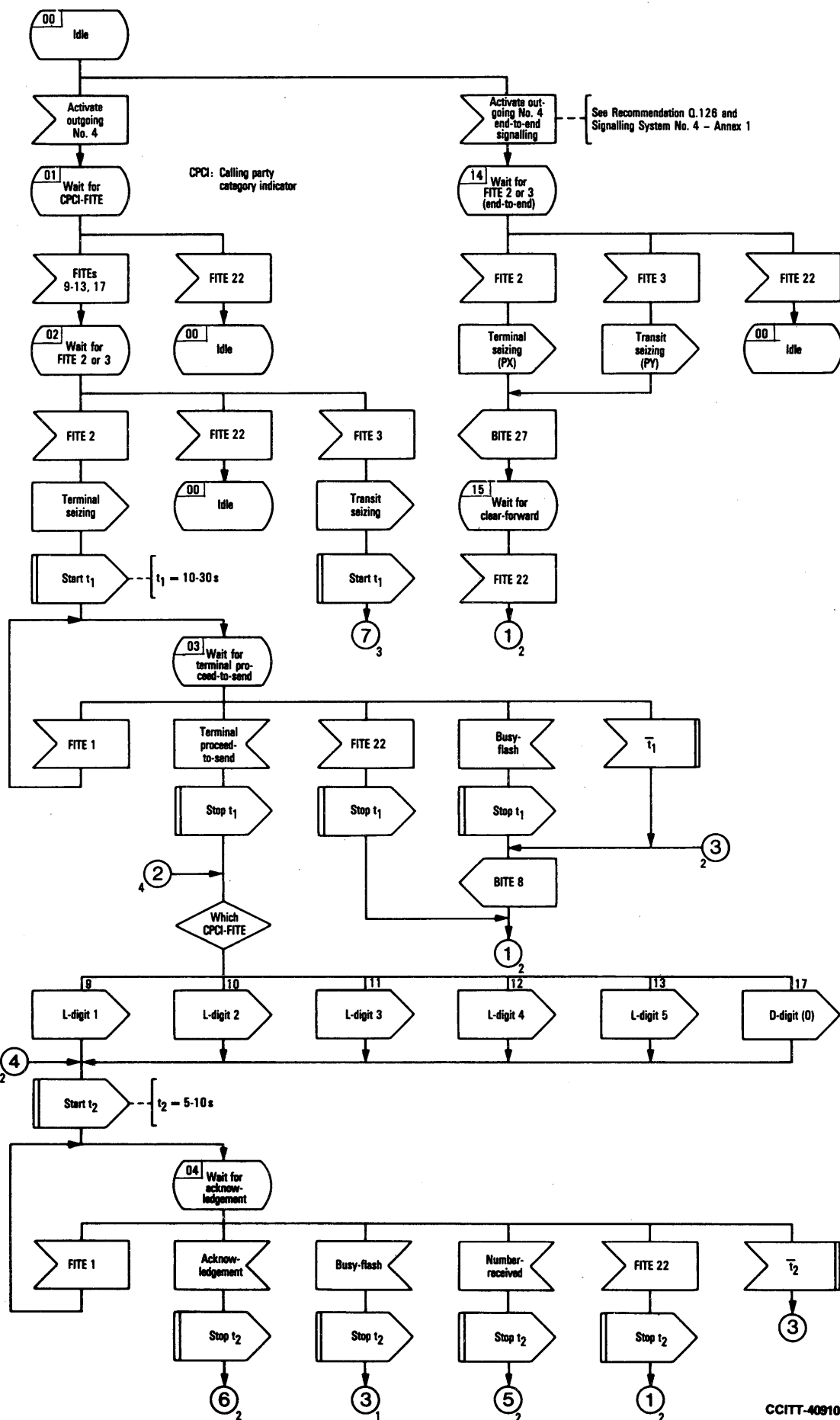
FIGURE 3/Q.621 (Sheet 1 of 4)
Outgoing Signalling System No. 4
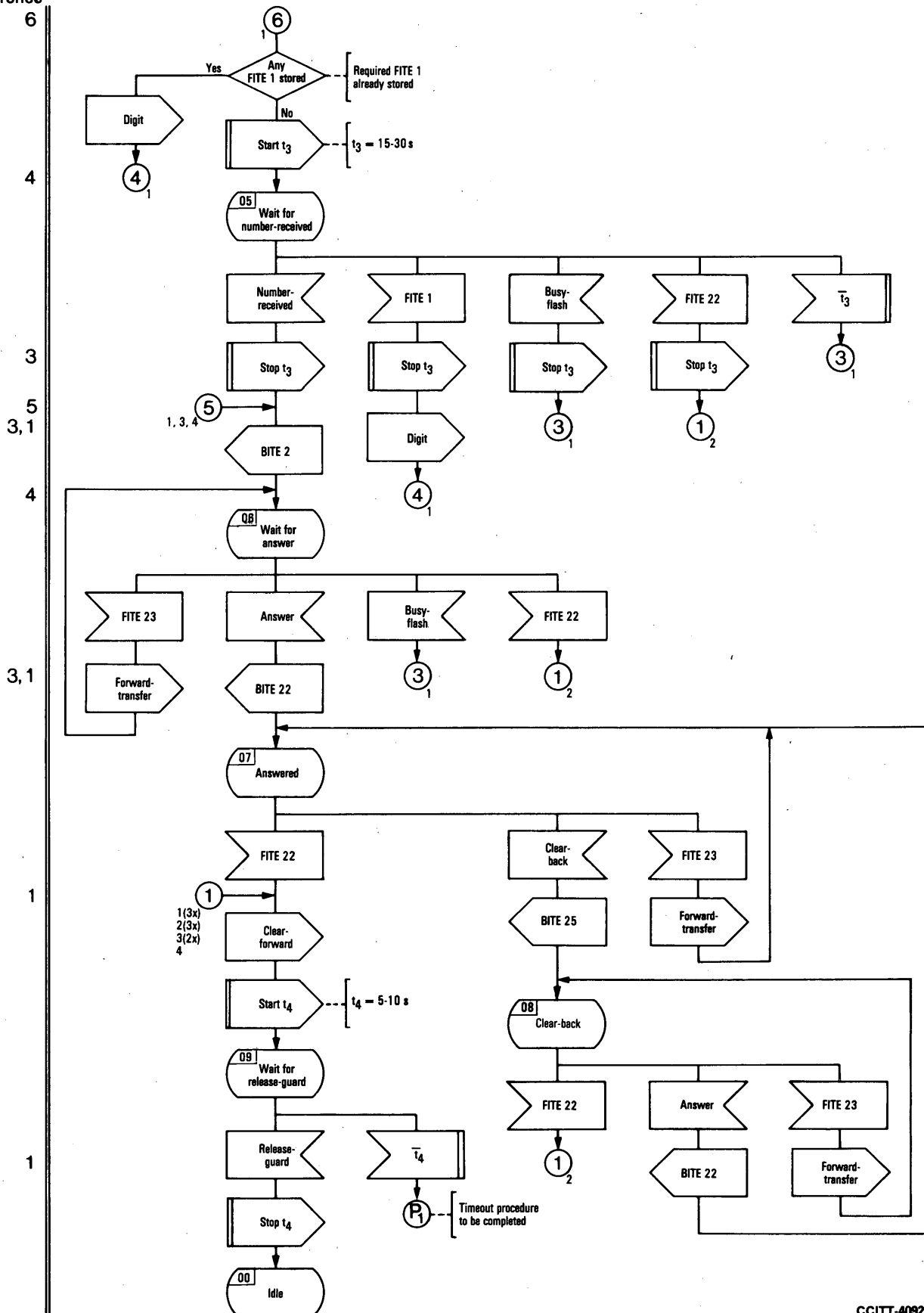
FIGURE 3/Q.621 (Sheet 2 of 4)
Outgoing Signalling System No. 4
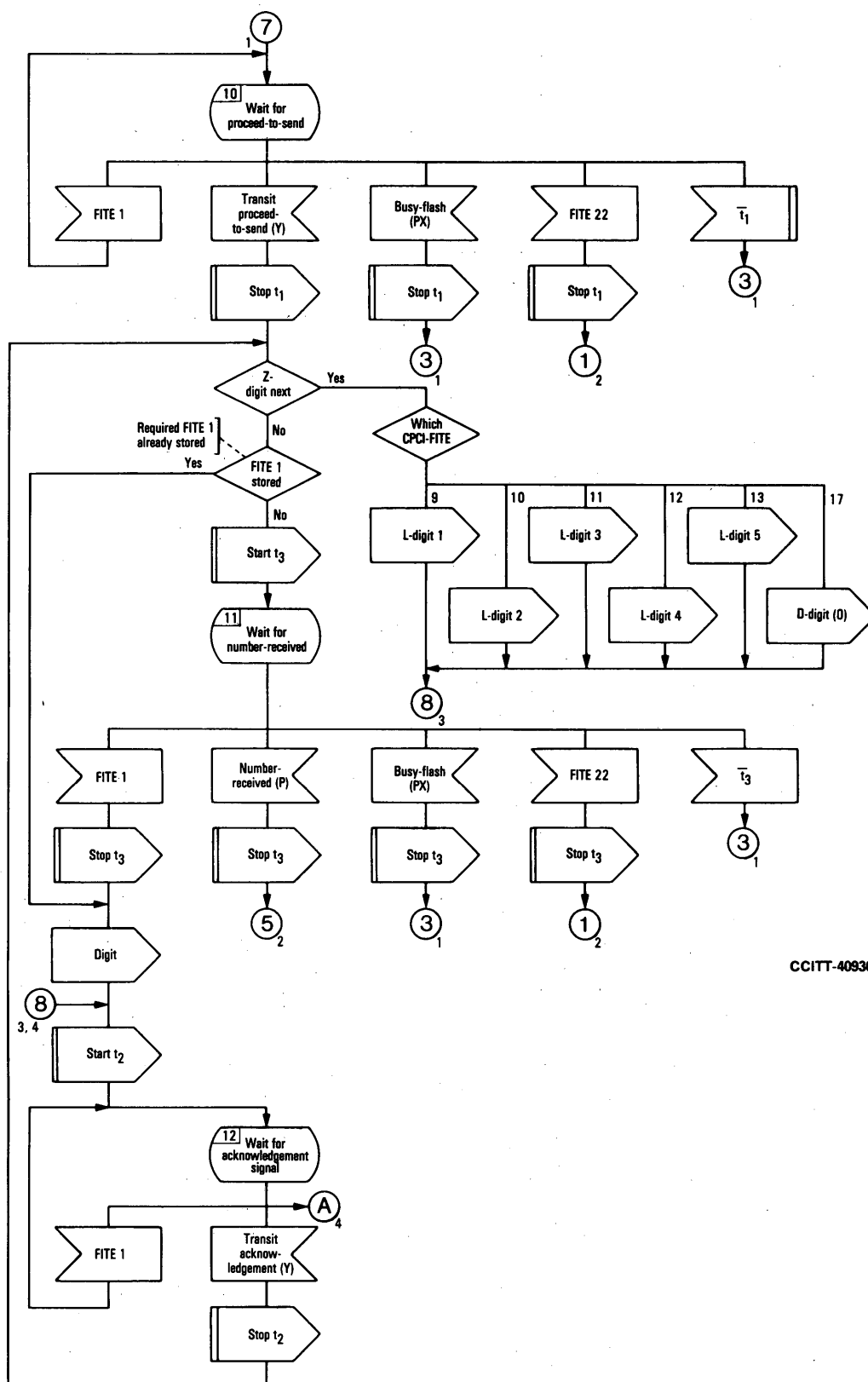
FIGURE 3/Q.621 (Sheet 3 of 4)

Outgoing Signalling System No. 4

FIGURE 3/Q.621 (Sheet 4 of 4)
Outgoing Signalling System No. 4

LOGIC PROCEDURES FOR OUTGOING SIGNALLING SYSTEM No. 5
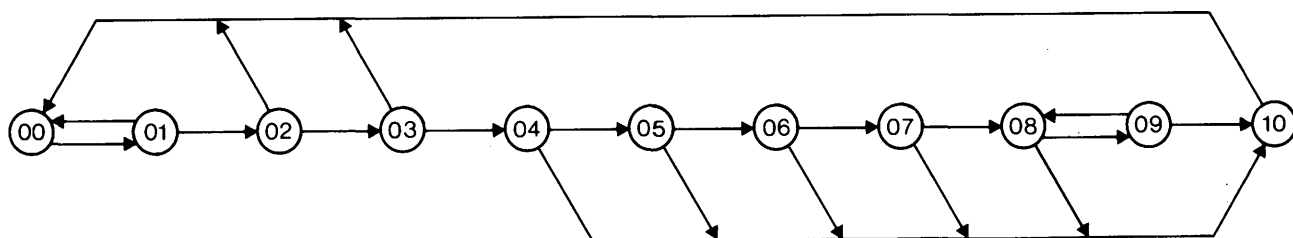
CCITT-48600

State number	State description	Sheet reference	Timers running
00	Idle	1	
01	Wait for calling party's category (CPCI)	1	
02	Wait for country code indicator (CCI)	1	
03	Wait for ST	1	t_1
04	Wait for proceed-to-send	1	t_2
05	Wait for time release t_3	2	t_3
06	Wait for time release t_4	2	t_4
07	Wait for answer	3	
08	Answered	3	
09	Clear-back	3	
10	Wait for release-guard	3	t_2

FIGURE 1/Q.622

State overview diagram for outgoing Signalling System No. 5

Supervisory timers for outgoing Signalling System No. 5

$t_1 = 4 - 6$ s	Recommendation Q.152, § 3.2.1, b)
$t_2 = 10 - 20$ s	Recommendation Q.141, § 2.1.3.1, e), i)
$t_3 = (100 \pm 10) + (55 \pm 5)$ ms	Recommendation Q.153, § 3.3.3
$t_4 = 2 (55 \pm 5)$ ms	Recommendation Q.153, § 3.3.3

Procedure not shown

The following procedure, not directly relevant to interworking, is not shown in the logic procedures:

P_1 = Procedure for non-receipt of release-guard (Recommendation Q.141, § 2.1.3.1, e), i)).

FIGURE 2/Q.622

Notes to outgoing Signalling System No. 5
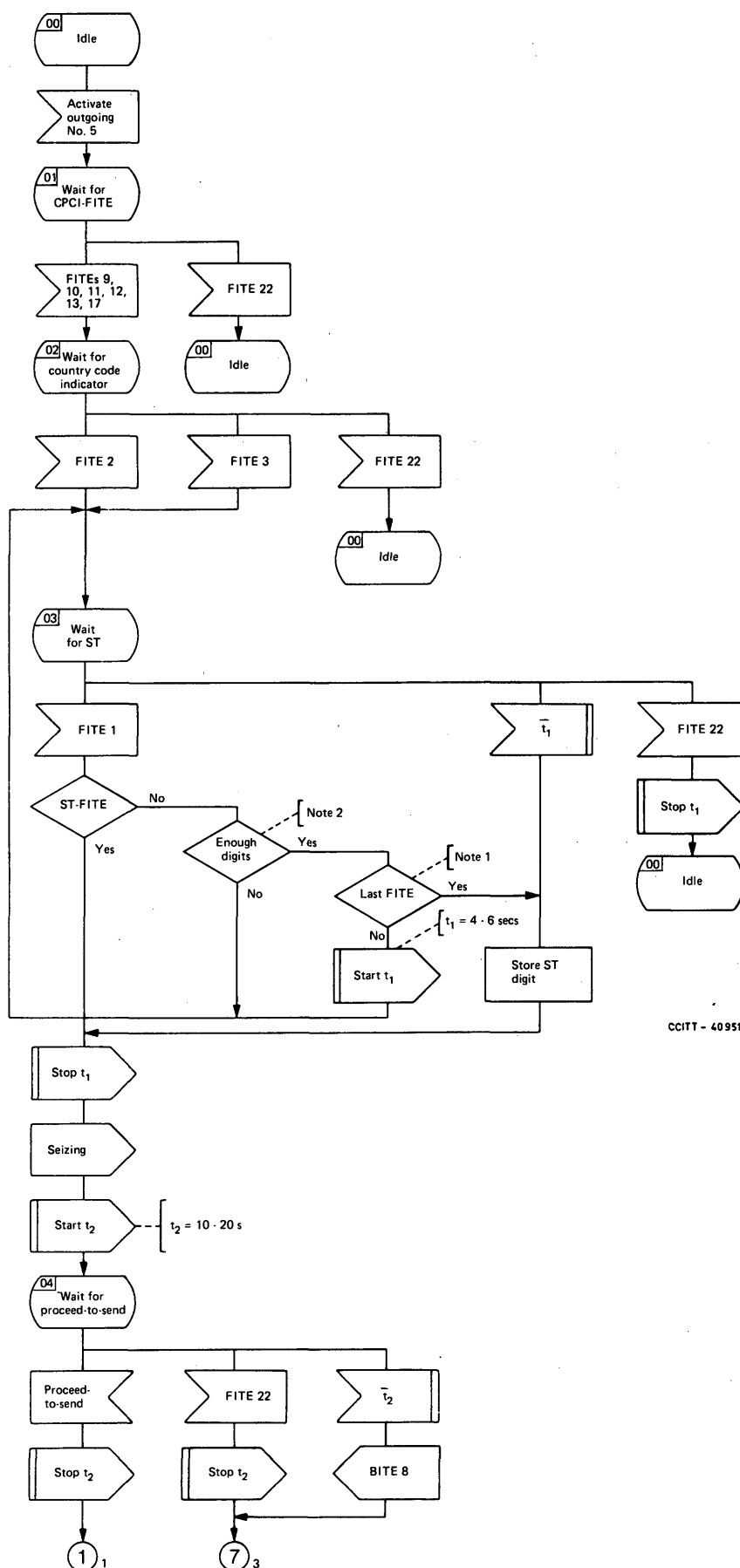
Note 1 — Fixed or maximum number length reached?

Note 2 — Has the minimum number of digits been received?
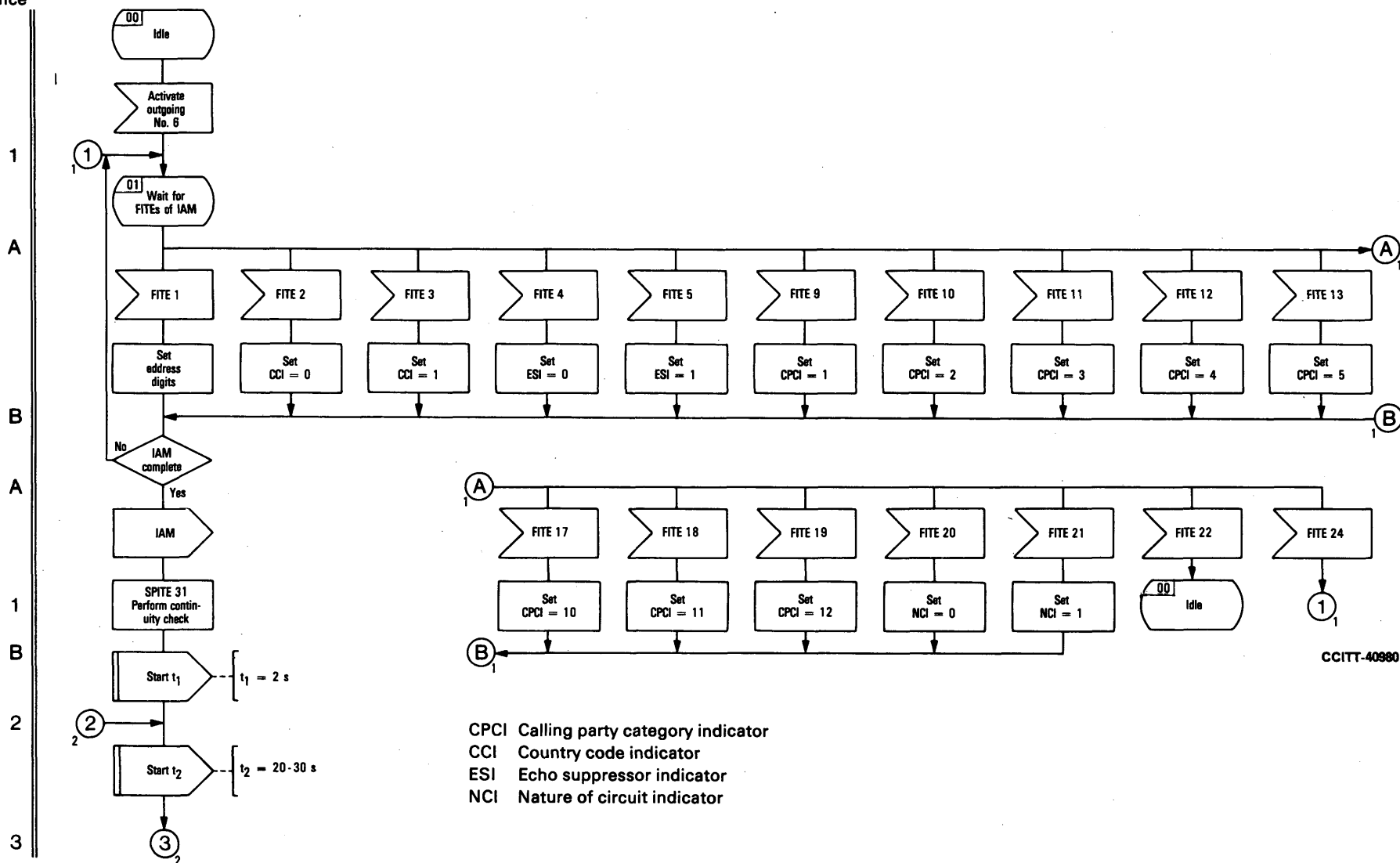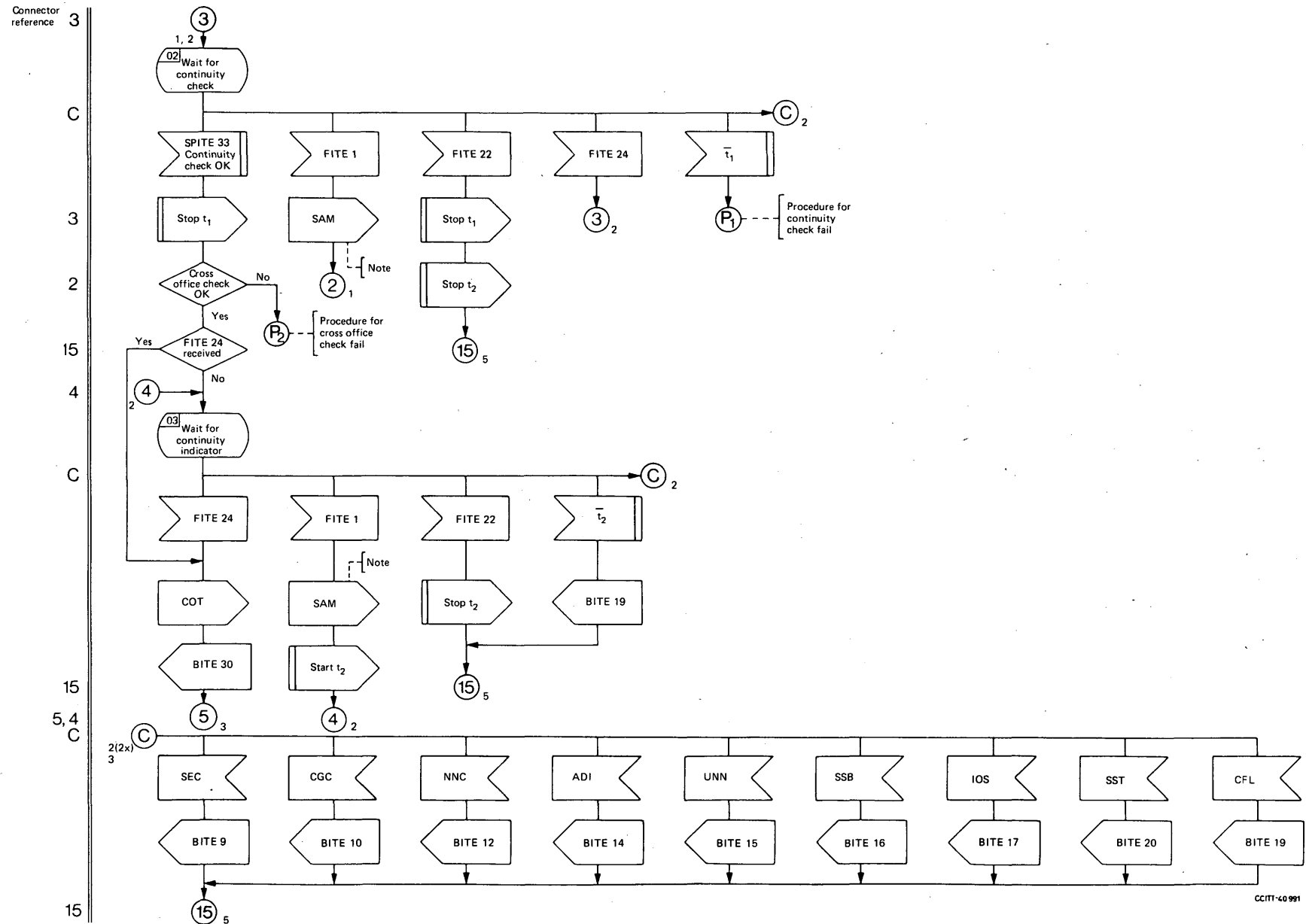
FIGURE 3/Q.622 (Sheet 1 of 3)

Outgoing Signalling System No.5
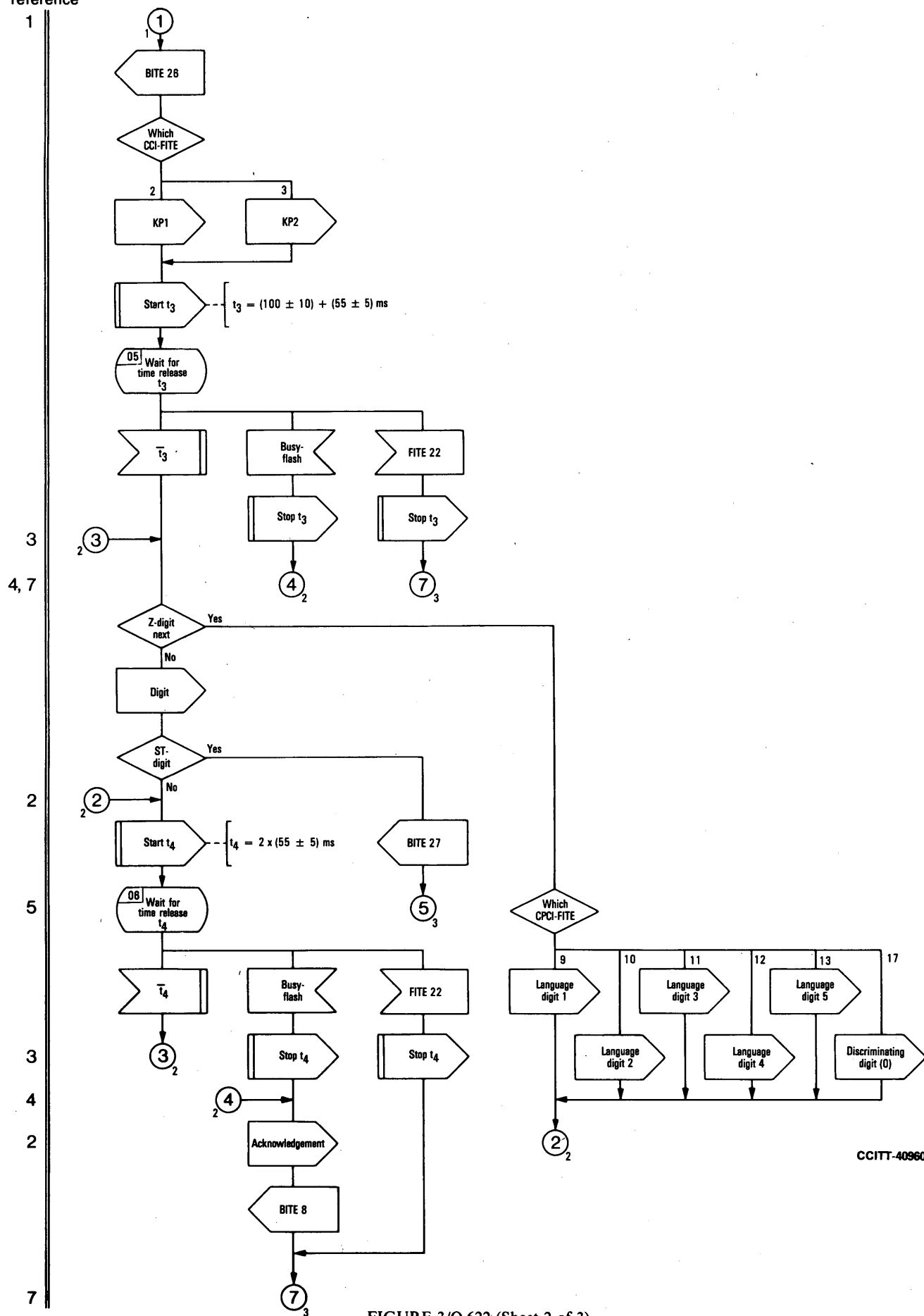
FIGURE 3/Q.622 (Sheet 2 of 3)
Outgoing Signalling System No. 5

CCITT-40960

CCITT-40970

Figure 3/Q.622 (Sheet 3 of 3)
Outgoing Signalling System No. 5

LOGIC PROCEDURES FOR OUTGOING SIGNALLING SYSTEM No. 6
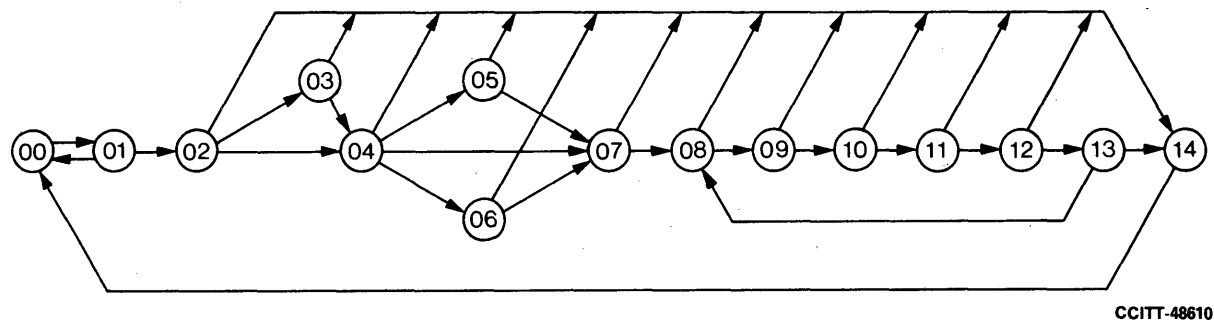
CCITT-48610

State number	State description	Sheet reference	Timers running
00	Idle	1, 5	
01	Wait for FITEs OF IAM	1	
02	Wait for continuity check	2	t_1, t_2
03	Wait for continuity indicator	2	t_2
04	Wait for address-complete	3	t_2
05	Wait for answer	3	
06	Wait for answer (subscriber free)	4	
07	Answered	4	
08	Clear-back 1	4	
09	Reanswer 1	4	
10	Clear-back 2	4	
11	Reanswer 2	5	
12	Clear-back 3	5	
13	Reanswer 3	5	
14	Wait for release-guard	5	t_3, t_4

FIGURE 1/Q.623

State overview diagram for outgoing Signalling System No. 6

Supervisory timers for outgoing Signalling System No. 6

$t_1 = 2s$	Recommendation Q.271, § 5.7.1
$t_2 = 20$-$30s$	Recommendation Q.268, § 4.8.5.1, a)
$t_3 = 4$-$15s$	Recommendation Q.268, § 4.8.2.3
$t_4 = 1$ min.	Recommendation Q.268, § 4.8.2.3, a)

Procedures not shown

The following procedures, not directly relevant to interworking, are not shown in the logic procedures:

- Dual seizure.
- Blocking and unblocking sequences.
- Unreasonable sequences.
- Confusion and message refusal signals.
- Reset circuit/band procedures.
- Test call procedures.
- Out of service.

Signal abbreviations used

The signal abbreviations used correspond to those of the Signalling System No. 6 specifications unless otherwise indicated on the same sheet.

FIGURE 2/Q.623

Notes to outgoing Signalling System No. 6

CPCI Calling party category indicator
CCI Country code indicator
ESI Echo suppressor indicator
NCI Nature of circuit indicator

FIGURE 3/Q.623 (Sheet 1 of 5)
Outgoing Signalling System No. 6

Note — Digits should be forwarded to the outgoing link as soon as they are available. Multi digit SAMs should only be sent if more than one address digit is waiting.

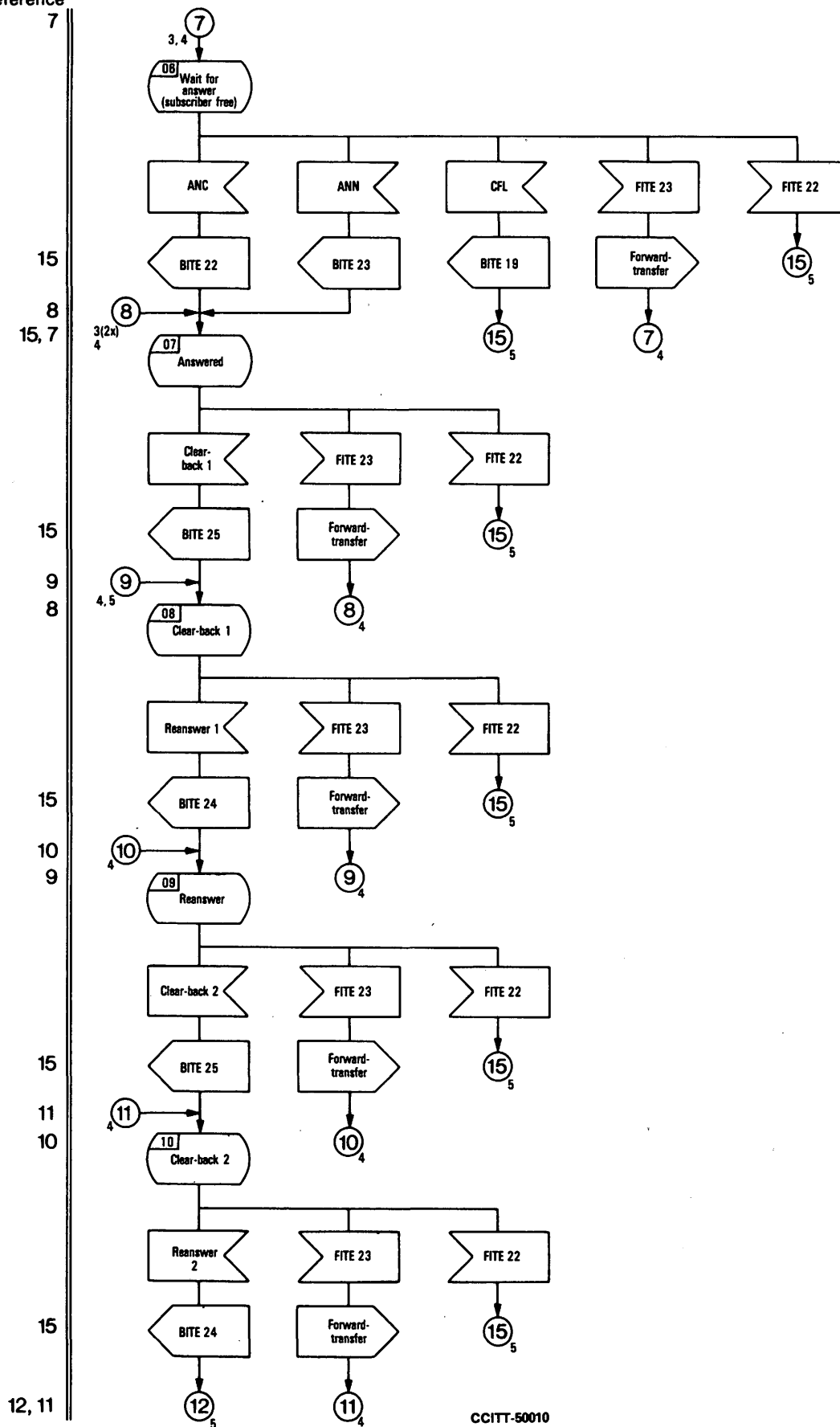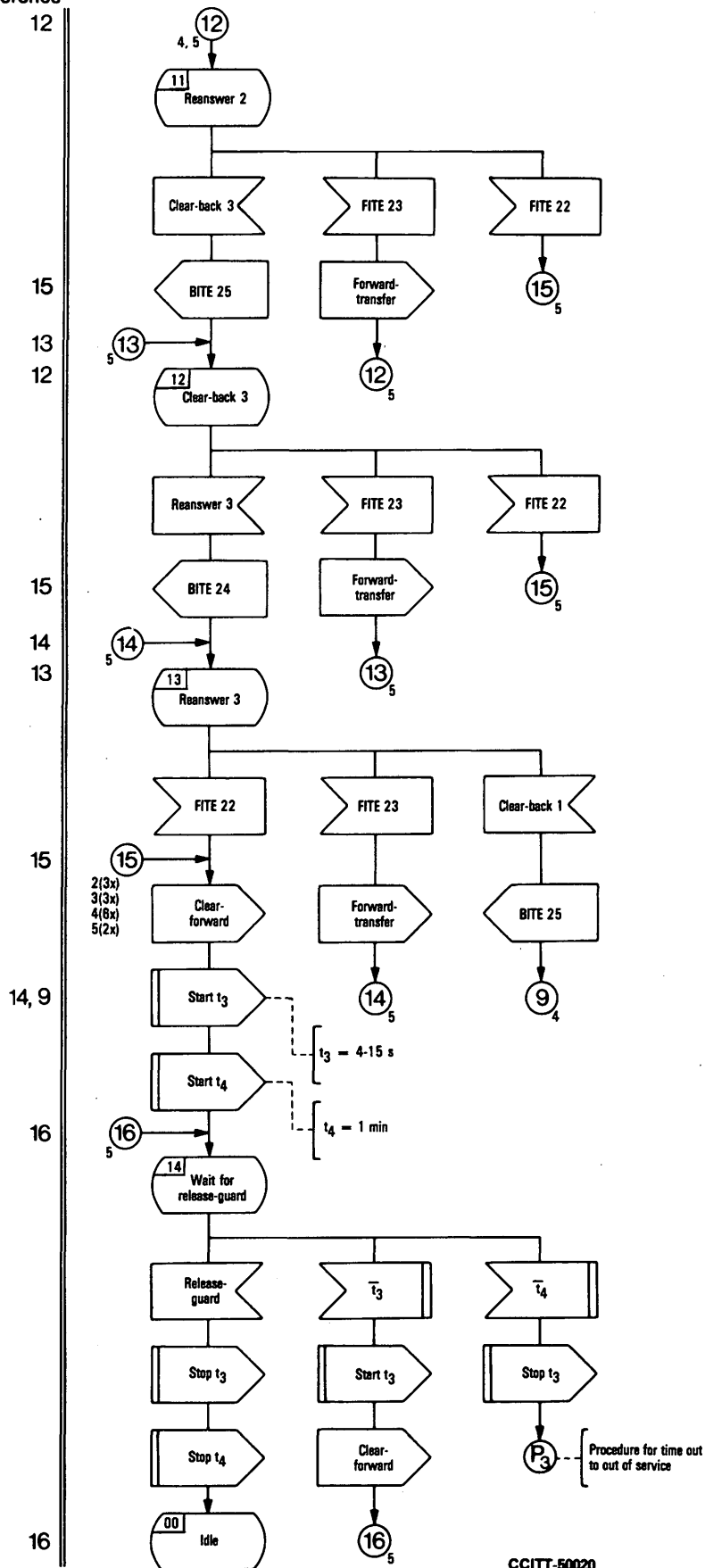FIGURE 3/Q.623 (Sheet 2 of 5)

Outgoing Signalling System No. 6

Note — ·Digits should be forwarded to the outgoing link as soon as they are available. Multi digit SAMs should only be sent if more than one address digit in waiting.

CCITT-50 001

FIGURE 3/Q.623 (Sheet 2 of 5)

Outgoing Signalling System No.6

FIGURE 3/Q.623 (Sheet 4 of 5)
Outgoing Signalling System No. 6

Connector
reference

12

4, 5 (12)

11 Reanswer 2

Clear-back 3   FITE 23   FITE 22

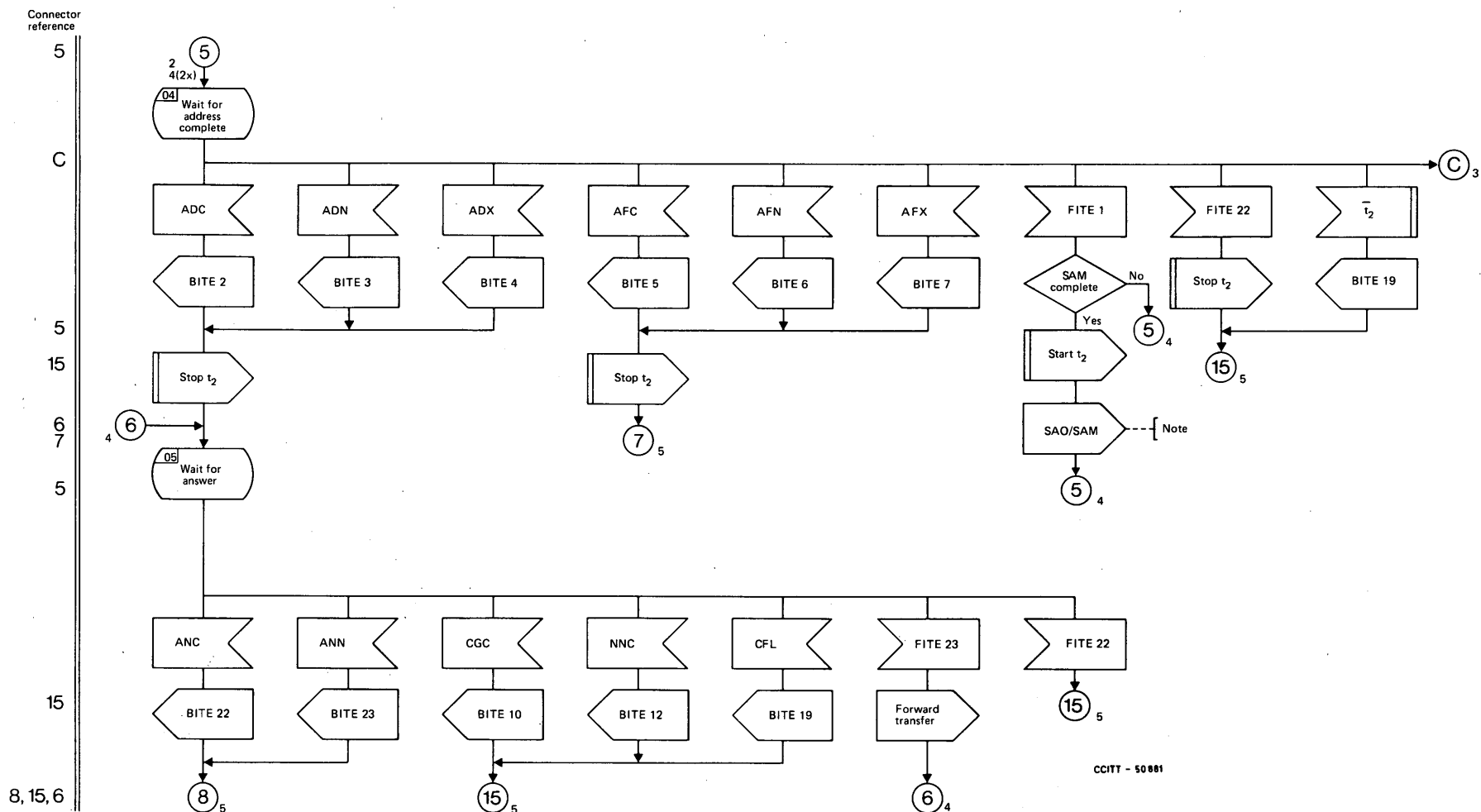15   BITE 25   Forward-transfer   (15)₅

13 ₅(13)

12   12 Clear-back 3   (12)₅

Reanswer 3   FITE 23   FITE 22

15   BITE 24   Forward-transfer   (15)₅

14 ₅(14)

13   13 Reanswer 3   (13)₅

FITE 22   FITE 23   Clear-back 1

15 (15)

2(3x)
3(3x)
4(6x)   Clear-forward   Forward-transfer   BITE 25
5(2x)

14, 9   Start t₃   (14)₅   (9)₄

$t_3 = 4\text{-}15\ s$

Start t₄

16 ₅(16) $t_4 = 1\ min$

14 Wait for release-guard

Release-guard $\overline{t_3}$ $\overline{t_4}$

Stop t₃   Start t₃   Stop t₃

Stop t₄   Clear-forward   (P₃) — Procedure for time out to out of service

16   00 Idle   (16)₅   CCITT-50020

FIGURE 3/Q.623 (Sheet 5 of 5)
Outgoing Signalling System No. 6

LOGIC PROCEDURES FOR OUTGOING SIGNALLING SYSTEM No. 7
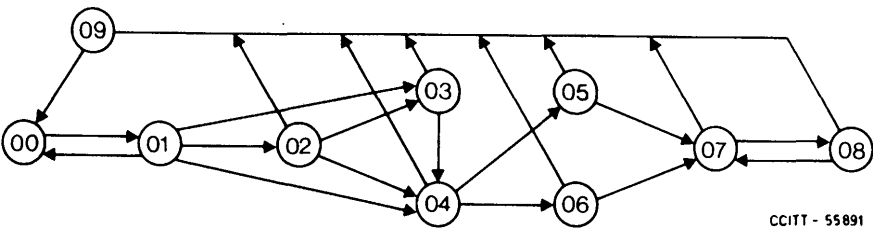
Número del estado	Descripción del estado	Referencia de hoja	Temporizadores en funcionamiento
00	Reposo	1, 5	
01	Esperar ETADs de MIE	1	
02	Esperar prueba de continuidad	2	t_1, t_2
03	Esperar indicador de continuidad	2	t_2
04	Esperar dirección completa	4	t_2
05	Esperar respuesta	4	
06	Esperar respuesta (abonado libre)	5	
07	Respuesta (conversación)	5	
08	Colgar	5	
09	Esperar liberación de guarda	5	t_3, t_4

FIGURA 1/Q.624

Diagrama sinóptico de estados del sistema de señalización N.° 7 de salida

Supervisory timers for outgoing Signalling System No. 7

$t_1 = 2$ s	Recommendation Q.724, § 7.4.1	
$t_2 = 20$-30 s	Recommendation Q.724, § 6.4.1	
$t_3 = 4$-15 s	Recommendation Q.724, § 6.2.3	
$t_4 = 1$ min	Recommendation Q.724, § 6.2.3	

Procedures not shown

The following procedures, not directly relevant to interworking, are not shown in the logic procedures:

— Dual seizure.
— Blocking and unblocking sequences.
— Reset signals.
— Test call procedures.
— Out of service.

Signal abbreviations used

The signal abbreviations used correspond to those of the Signalling System No. 7 Specifications and are listed in Figure 2/Q.614.

FIGURE 2/Q.624

Notes to outgoing Signalling System No. 7

Connector
reference

1	
A	
B	
A D	
B E	
17 D	
1	
E	
3	

```
00  Idle
```

Activate
outgoing
No. 7

①₁

```
01  Wait for
    FITES
    of IAM
```

→ Ⓐ₁

FITE 1	FITE 2	FITE 3	FITE 4	FITE 5	FITE 9	FITE 10	FITE 11	FITE 12
Set address digits and field length indicator	Set NAI = 0	Set NAI = 1	Set ESI = 0	Set ESI = 1	Set CPCI = 1	Set CPCI = 2	Set CPCI = 3	Set CPCI = 4

→ Ⓑ₁

No ← IAM complete

Yes

IAM

Start t_2 --- [t_2 = 20 - 30 s

CCI ── 0, 2 ── ⑰₂

1

SPITE 31
Perform
cont.check

Start t_1 --- [t_1 = 2 s

③₂

₁Ⓐ → Ⓓ₁

FITE 13	FITE 17	FITE 18	FITE 19	FITE 25	FITE 26	FITE 27
Set CPCI = 5	Set CPCI = 10	Set CPCI = 11	Set CPCI = 12	Set cont. check ind. = 0	Set cont. check ind. = 1	Set cont. check ind. = 2

Ⓑ₁ ← → Ⓔ₁

₁Ⓓ

FITE 20	FITE 21	FITE 22	FITE 24
Set NCI = 0	Set NCI = 1	```00 Idle```	①₁

Ⓔ₁ ←

FIGURE 3/Q.624 (Sheet 1 of 5)

CCITT - 50850

Outgoing Signalling System No. 7

Note – Digits should be forwarded to the outgoing link as soon as they are available. Multi-digit SAMs should only be sent if more than one address digit is waiting.

FIGURE 3/Q.624 (Sheet 2 of 5)

Outgoing Signalling System No. 7

C

Ⓒ
2(2x)

| SEC | CGC | NNC | ADI | UNN | SSB | LOS | SST | CFL |

| BITE 9 | BITE 10 | BITE 12 | BITE 14 | BITE 15 | BITE 16 | BITE 17 | BITE 20 | BITE 19 |

Stop t_2

CCITT - 50 870

CCH — 0, 2

1

Cont.
check OK — Yes

No

Stop t_1

15

Ⓐ⁵

FIGURE 3/Q.624 (Sheet 3 of 5)

Outgoing Signalling System No. 7

Connector
reference

CCITT - 50881

Note — Digits should be forwarded to the outgoing link as soon as they are available. Multi-digit SAMs should only be sent if more than address digit is waiting.

FIGURE 3/Q.624 (Sheet 4 of 5)

Outgoing Signalling System No. 7
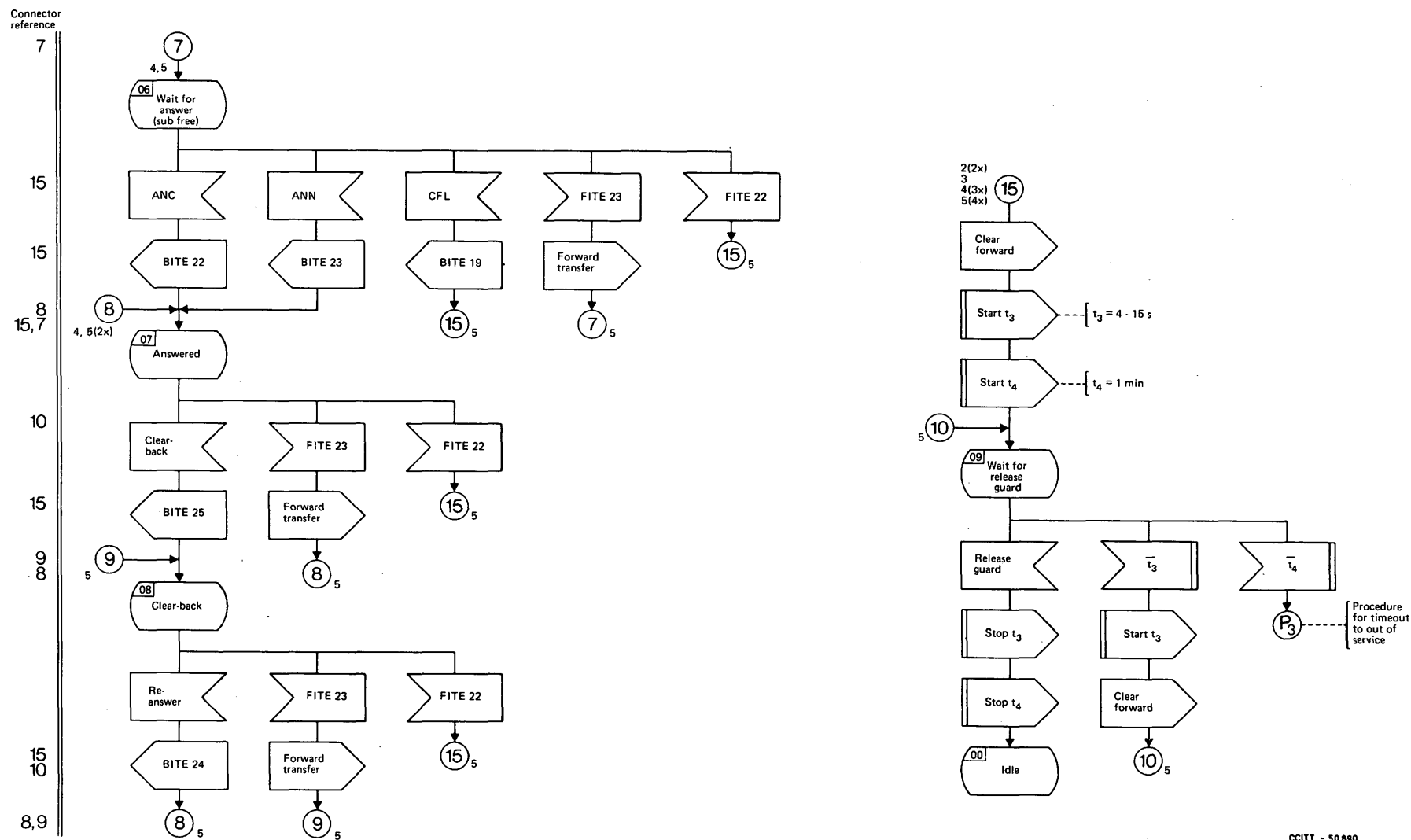
FIGURE 3/Q.624 (Sheet 5 of 5)

Outgoing Signalling System No. 7

CCITT - 50 890

LOGIC PROCEDURES FOR OUTGOING SIGNALLING SYSTEM R1

CCITT-48620
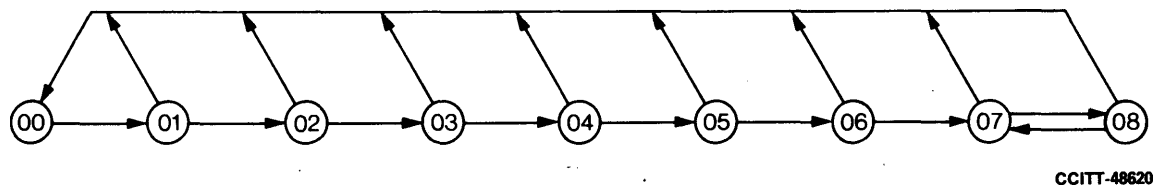
State number	State description	Sheet reference	Timers running
00	Idle	1	
01	Wait for ST-FITE	1	t_1
02	Wait for seizing acknowledgement	1	t_2
03	Wait for proceed-to-send	1	t_3
04	Wait for time release t_4 (KP pulse + pause)	2	t_4
05	Wait for time release t_5 (pulsed digit + pause)	2	t_5
06	Wait for answer	2	
07	Answered	2	
08	Clear-back	2	

FIGURE 1/Q.625

State overview diagram for outgoing Signalling System R1

Supervisory timers for outgoing Signalling System R1

$t_1 = 5 \pm 1$ s	Recommendation Q.321, § 3.2.1, b), ii)
$t_2 = 5$ s	Recommendation Q.325, § 3.6.2, 1), a)
$t_3 = 5$ s	Recommendation Q.325, § 3.6.2, 1), b)
$t_4 = 100 + 68$ ms	Recommendation Q.322, § 3.3.4
$t_5 = 2 \times 68$ ms	Recommendation Q.322, § 3.3.4

Remarks to facilitate reading and understanding the SDL flow chart

a) The procedure P_2 for non-receipt of seizing acknowledgement is described in Recommendation Q.325, § 3.2.6, 1), a).

b) The procedure P_3, related to dual seizure with both-way operation, is not described because no procedure is specified with consequences to interworking.

c) The time supervisions t_4 and t_5 are introduced to ensure the possibility of handling a clear-forward signal during outpulsing.

d) It is assumed that no country code digits are sent in the outgoing Signalling System R1 procedures.

FIGURE 2/Q.625

Notes to outgoing Signalling System R1
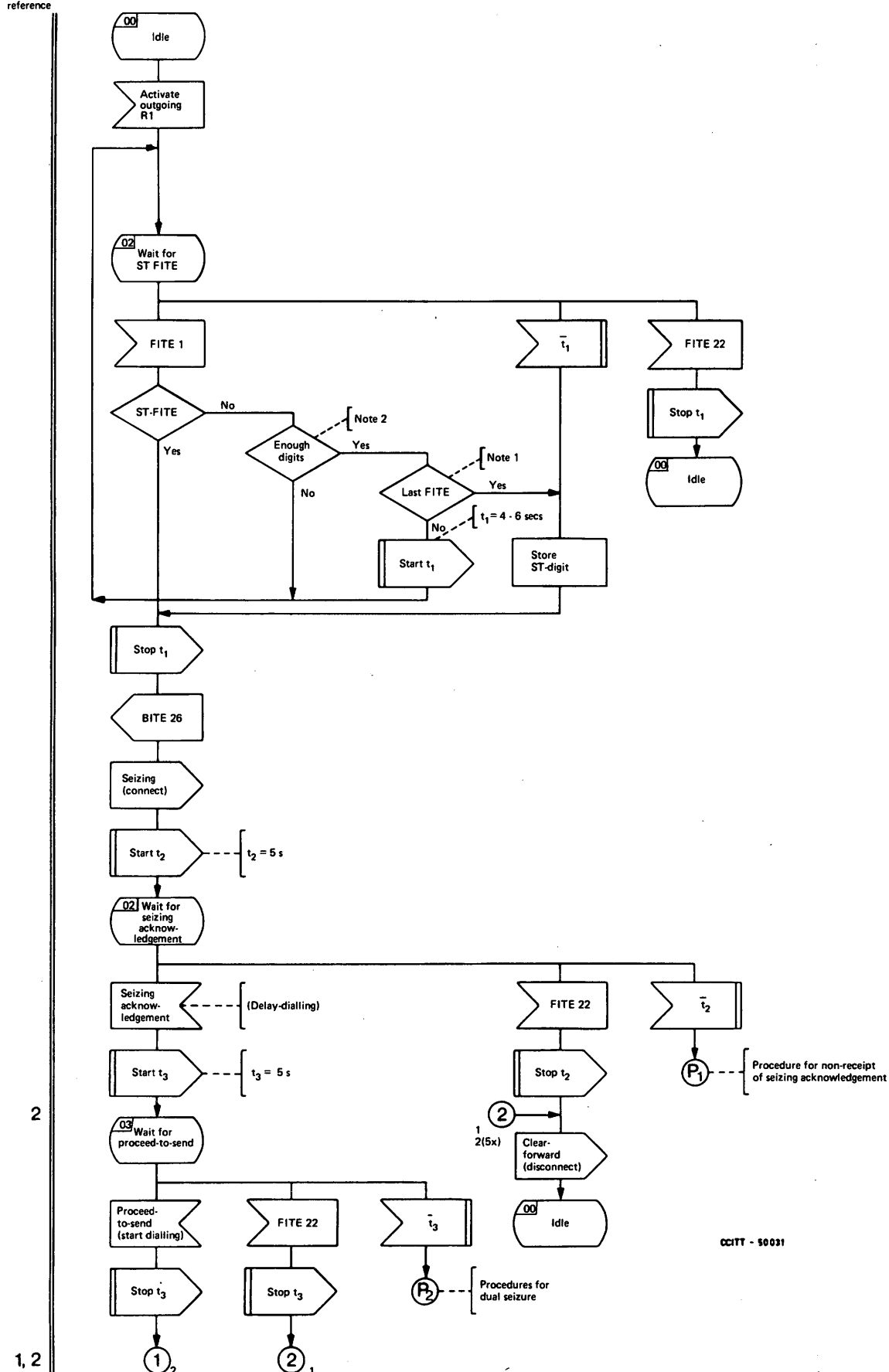
Note 1 — Fixed or maximum number length reached?

Note 2 — Has minimum number of digits been received?

FIGURE 3/Q.625 (Sheet 1 of 2)

Outgoing Signalling System R1
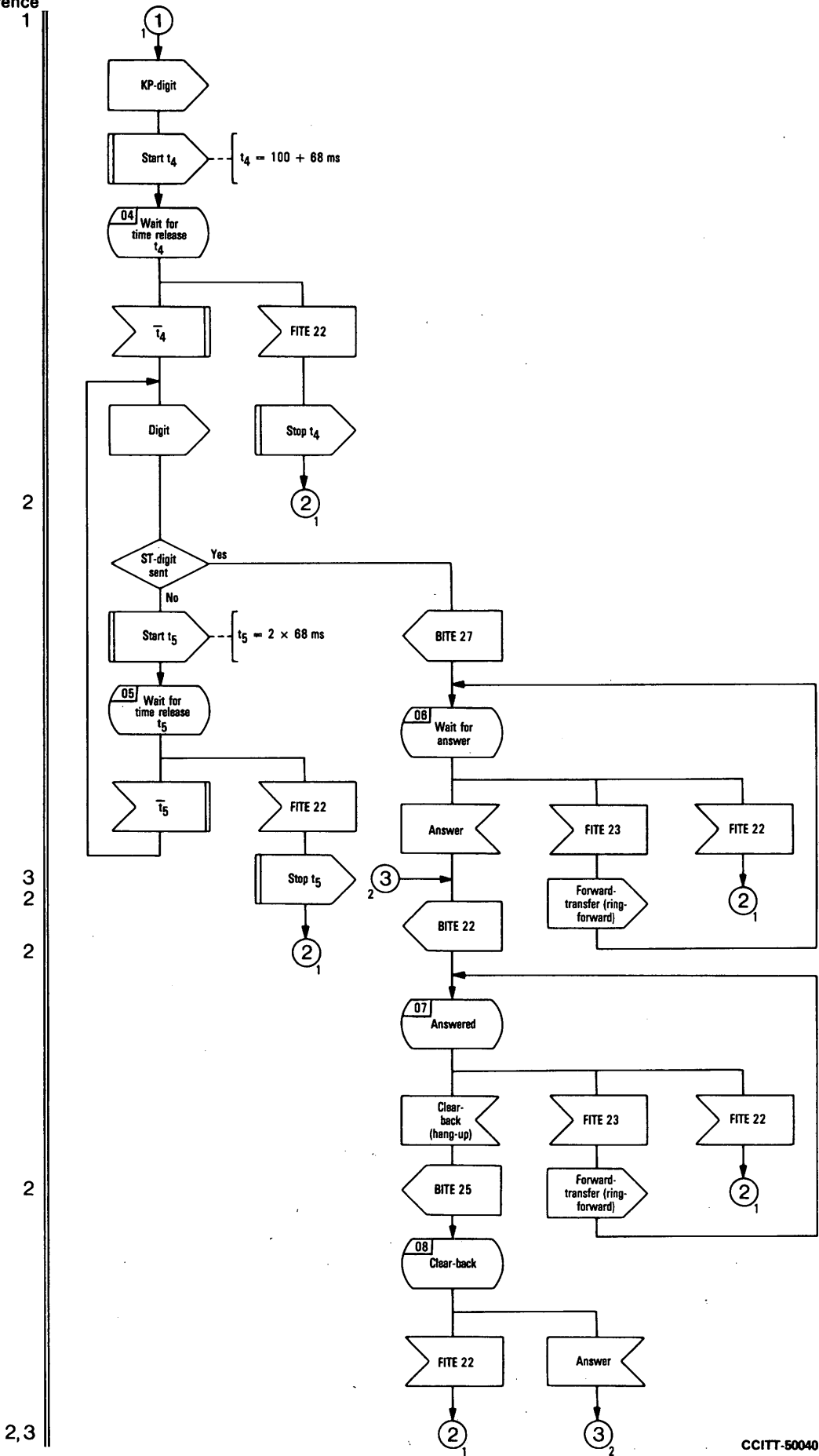
FIGURE 3/Q.625 (Sheet 2 of 2)
Outgoing Signalling System R1

CCITT-50040

LOGIC PROCEDURES FOR OUTGOING SIGNALLING SYSTEM R2
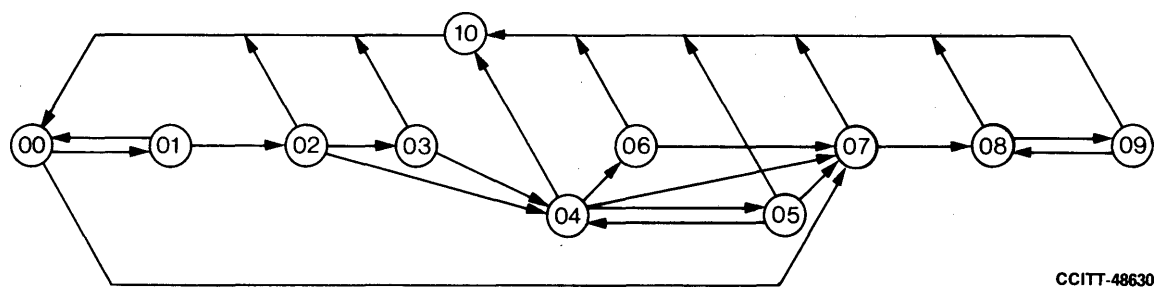
CCITT-48630

State number	State description	Sheet reference	Timers running
00	Idle	1, 4	
01	Wait for calling party's category (CPCI)	1	
02	Wait for country code indicator (CCI)	1	
03	Wait for echo suppressor indicator (ECI)	1	
04	Wait for backward signal	2	t_1
05	Wait for address information	3	t_2
06	Wait for Type B signal	3	t_1
07	Wait for answer	4	
08	Answered	4	
09	Clear-back	4	
10	Clear-forward	4	

FIGURE 1/Q.626

State overview diagram for outgoing Signalling System R2

Supervisory timers for outgoing Signalling System R2

t_1 = 12-18 s   Recommendation Q.476, § 5.5.1.1

t_2 > 24 s   Recommendation Q.476, § 5.5.1.2

Procedures not shown

The following procedures, not directly relevant to interworking, are not shown in the logic procedures:

— Interrupt control procedures (analogue version).

— Seizing acknowledgement (digital version).

— Transmission fault procedures (digital version).

— T_1 time-out and abnormal release sequence (analogue version).

— Optional forward transfer.

— Blocking and unblocking sequences.

FIGURE 2/Q.626

Notes to outgoing Signalling System R2

00 Idle

Activate outgoing R2

Activate outgoing R2 end-to-end signalling

Seizing

1

01 Wait for CPCI-FITE

①₄

FITEs 9, 10, 11, 12, 13, 15, 16, 18, 19

FITE 22

02 Wait for country code indicator

00 Idle

FITE 2

FITE 7

FITE 8

FITE 6

FITE 22

Seizing

Seizing

Seizing

00 Idle

I-12

I-14

I-11

2

03 Wait for echo-suppresor indicator

②₂

FITE 4

FITE 5

FITE 22

00 Idle

Seizing

3

③
2, 3

Which CPCI-FITE

9 Language digit 1

10 Language digit 2

11 Language digit 3

12 Language digit 4

13 Language digit 5

15, 16, 18, 19 Discriminating digit (0)

2

②₂

CCITT-50050

FIGURE 3/Q.626 (Sheet 1 of 4)

Outgoing Signalling System R2

FIGURE 3/Q.626 (Sheet 2 of 4)
Outgoing Signalling System R2
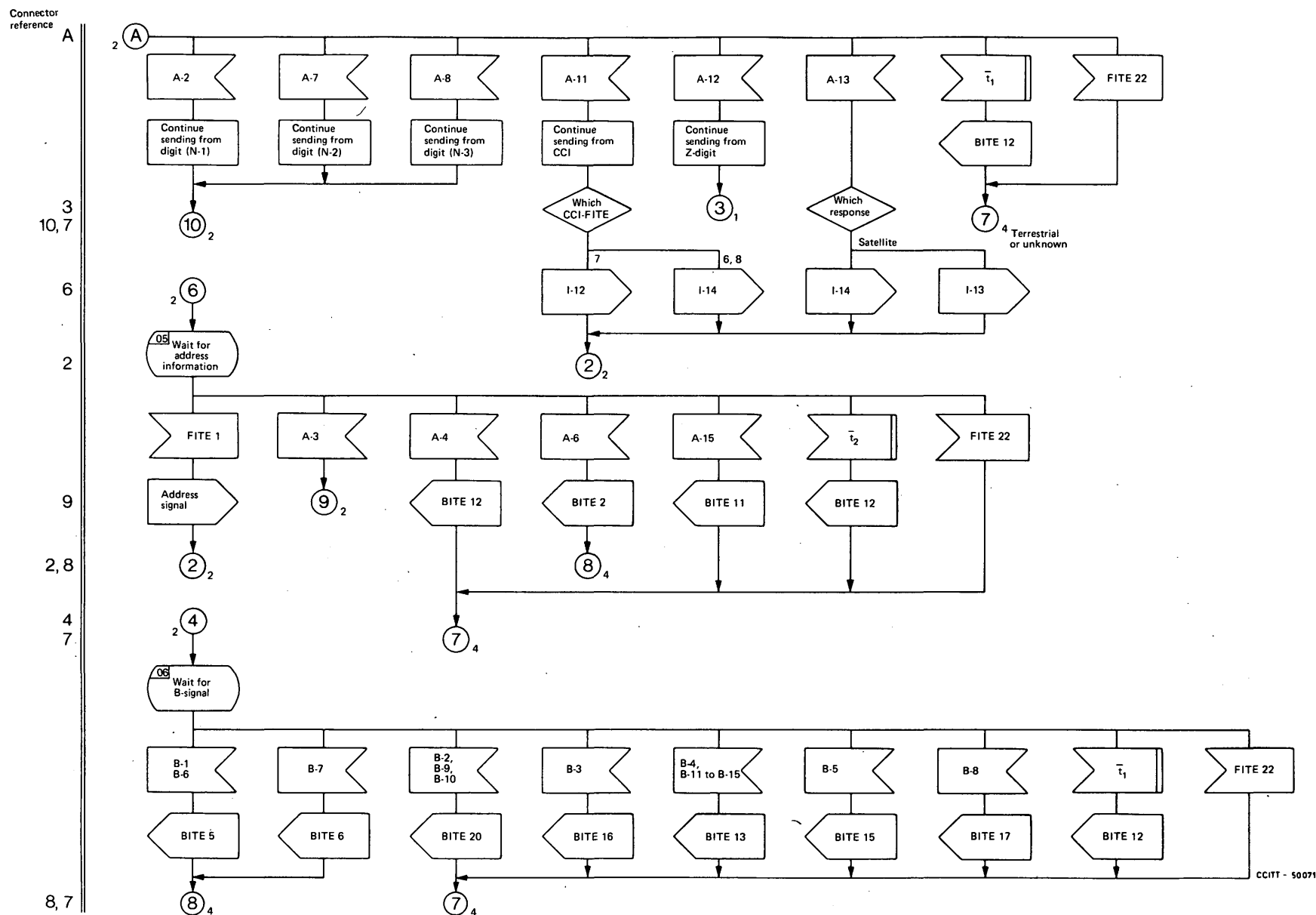
FIGURE 3/Q.626 (Sheet 3 of 4)

Outgoing Signalling System R2

Connector
reference

8

2
3(2x)

⑧

Stop t₁

Stop t₂

1

①
1

07 Wait for answer

Answer

FITE 22

7

BITE 21

⑦4

11

⑪
4

08 Answered

Clear-back

FITE 22

7

BITE 25

⑦4

09 Clear-back

Answer

FITE 22

7

⑦
2(2x)
3(3x)
4(2x)

BITE 21

Stop t₁

11

⑪4

Stop t₂

Clear-forward

10 Clear-forward

Release-guard
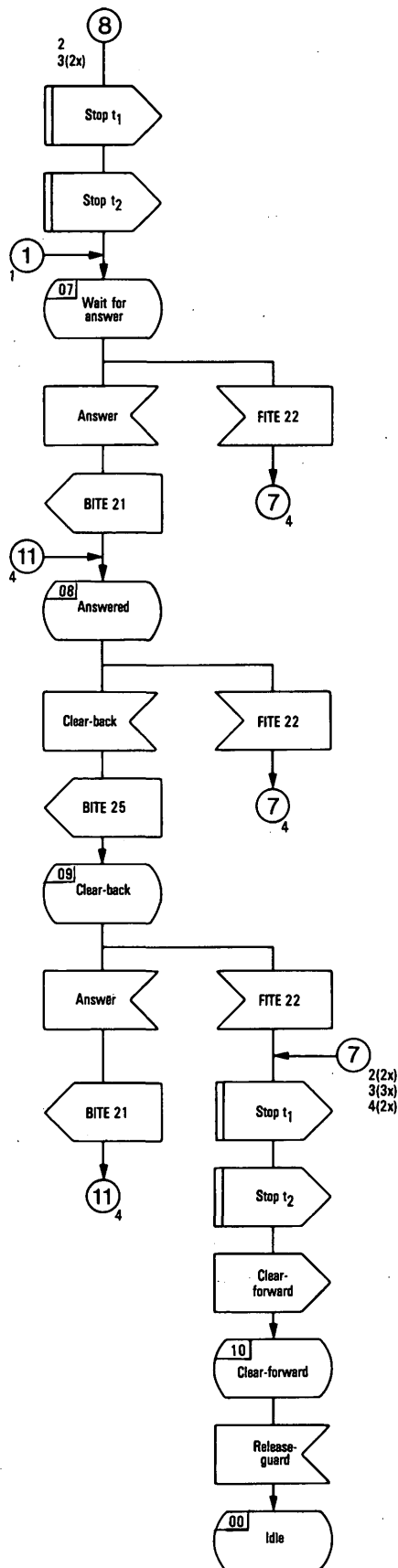
00 Idle

CCITT-50080

FIGURE 3/Q.626 (Sheet 4 of 4)
Outgoing Signalling System R2

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 4 TO R2

CCITT-48640
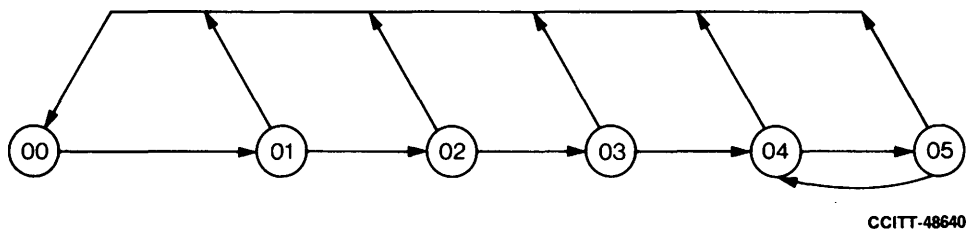
State number	State description	Sheet reference
00	Idle	1
01	Wait for CPCI-FITE	1
02	Wait for address-complete	1
03	Wait for answer	2
04	Answered	2
05	Clear-back	2

FIGURE 1/Q.634

State overview diagram for interworking of Signalling System No. 4 to R2

Procedures not shown

The following procedures, not directly relevant to interworking, are not shown in the logic procedures:

— Repeat attempt.

FIGURE 2/Q.634

Notes to interworking of Signalling System No. 4 to R2

00 Idle

Activate
interworking
No. 4/R2

01 Wait for
CPCI-FITE

FITE 1

FITEs 9-13,
17

FITE 22

Activate
outgoing
R2

00 Idle

Which
CPCI-FITE

9-13

17

FITEs 9-13

FITE 15

SPITE 22 — Yes

No

FITE 2

SPITE 21 — Yes

SPITE 21 — Yes

No

No

FITE 4

FITE 5

FITE 7

FITE 8

Any
FITE 1
stored — No

Yes

02 Wait for
address
complete

Ⓐ₂

FITE 1

Country
code
FITE — Yes

No

Yes

SPITE 22

No

FITE 1

Omit country
code FITE

A
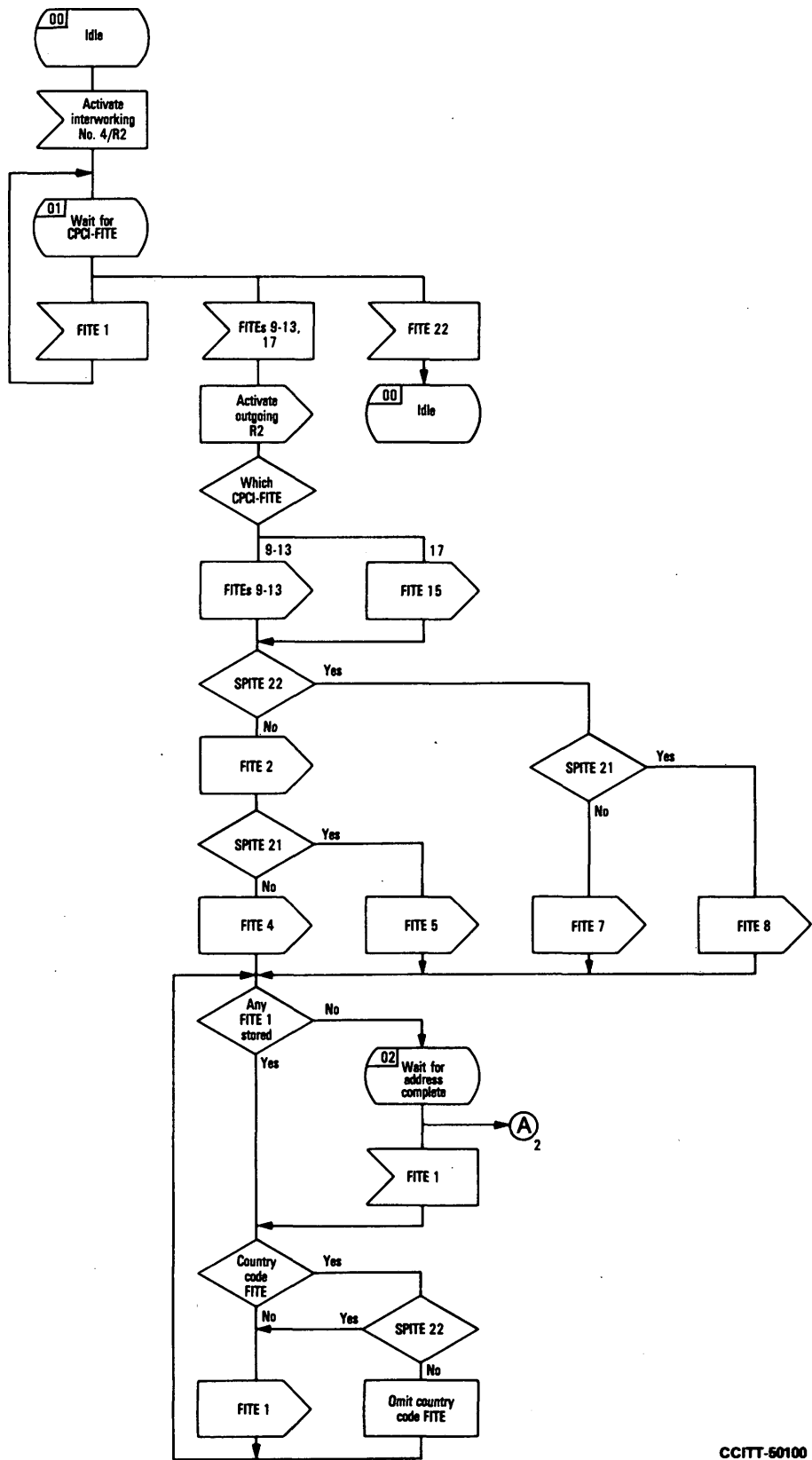
CCITT-60100

FIGURE 3/Q.634 (Sheet 1 of 2)
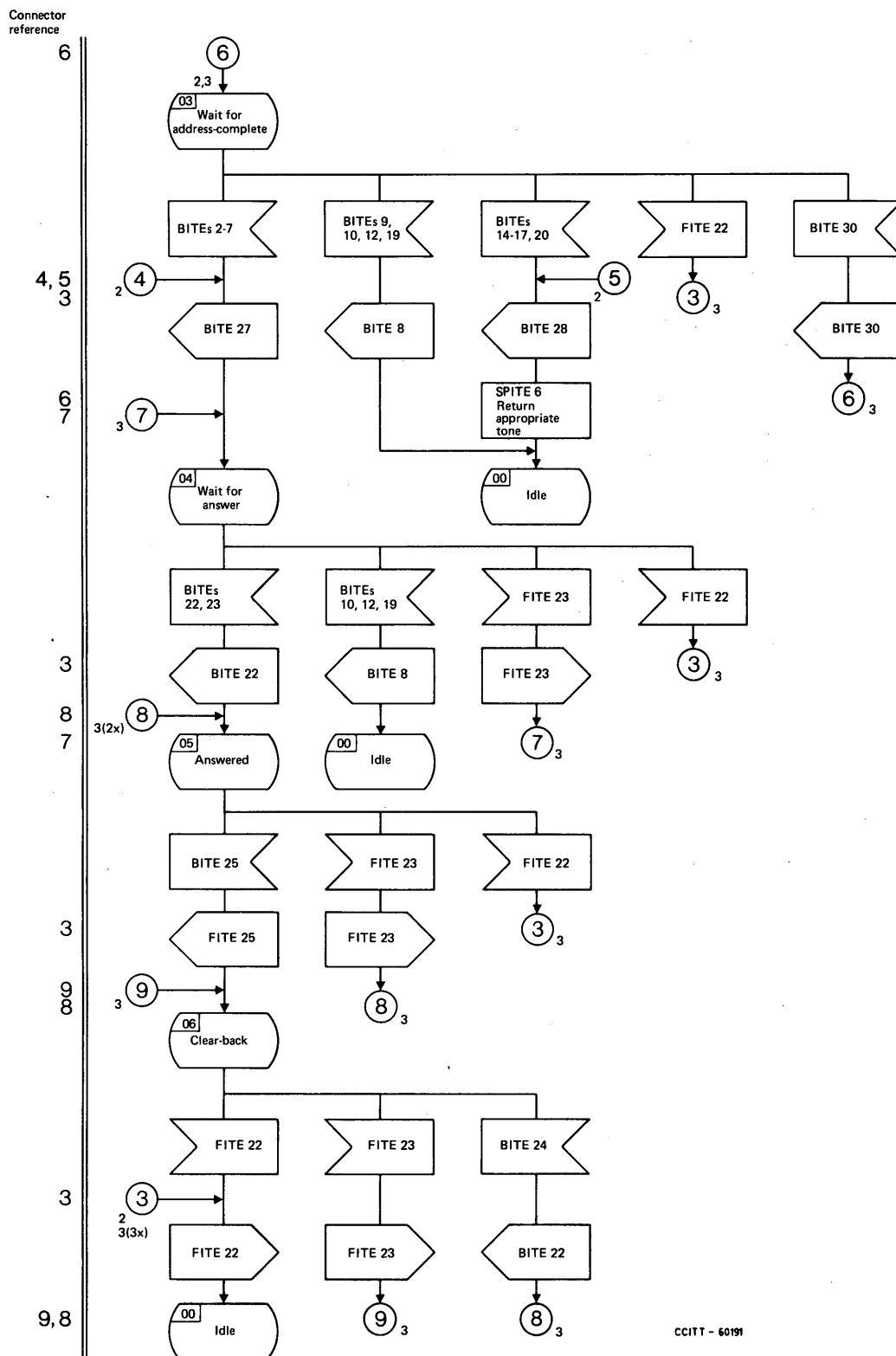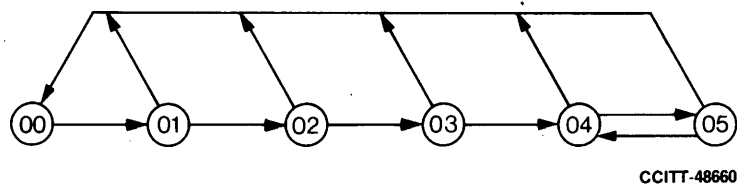Interworking of Signalling System No. 4 to R2
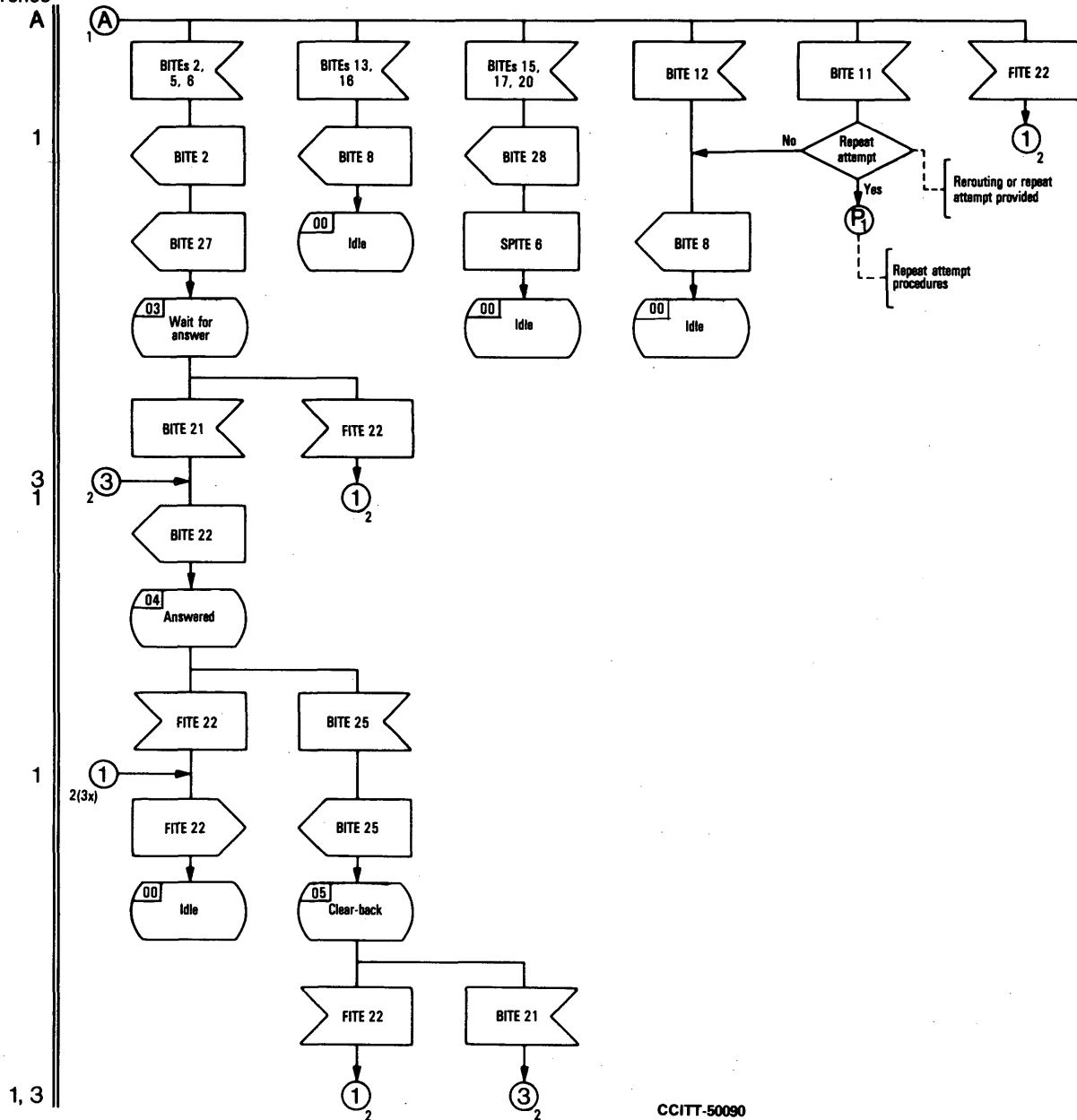
FIGURE 3/Q.634 (Sheet 2 of 2)

Interworking of Signalling System No. 4 to R2

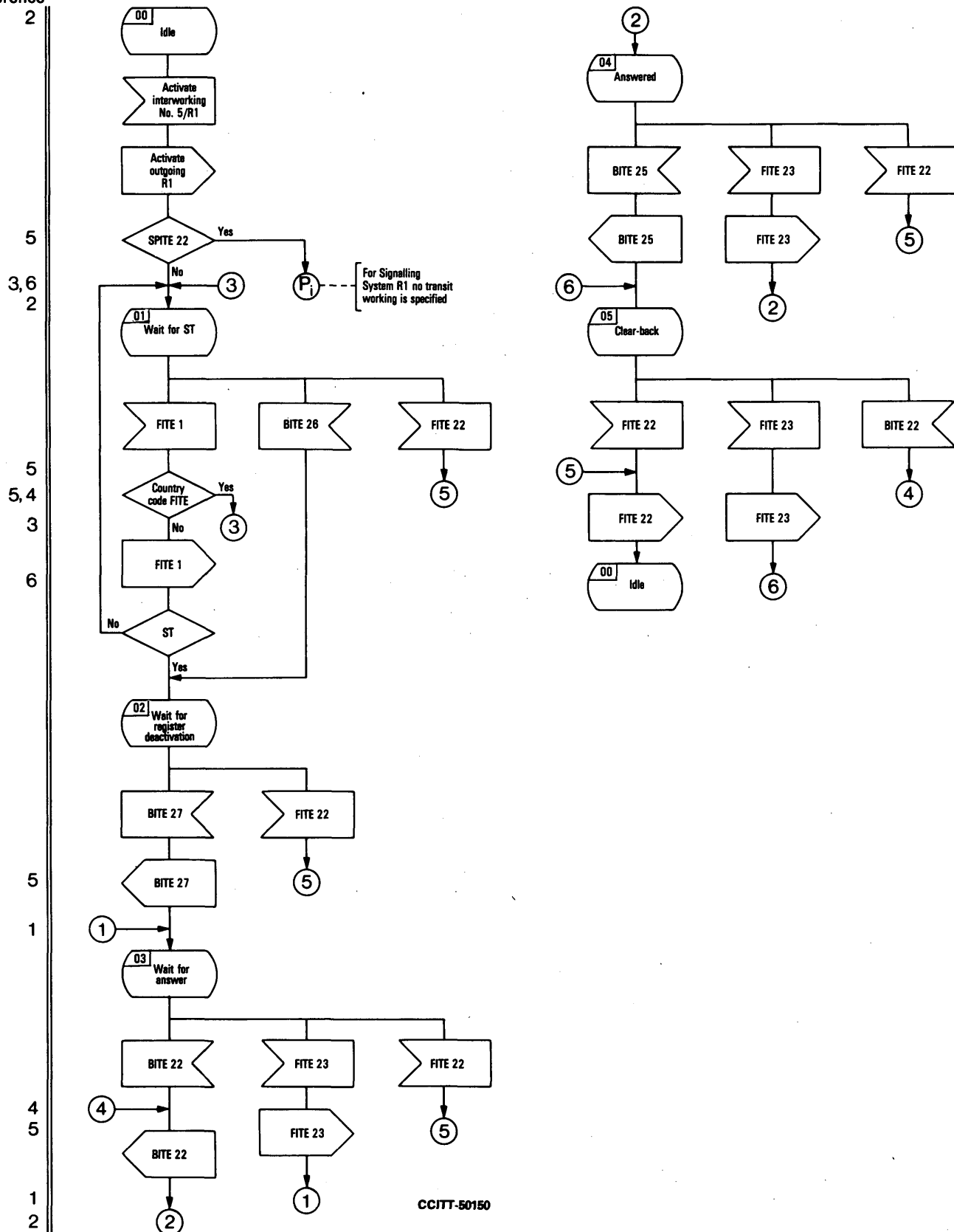## LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 5 TO No. 6
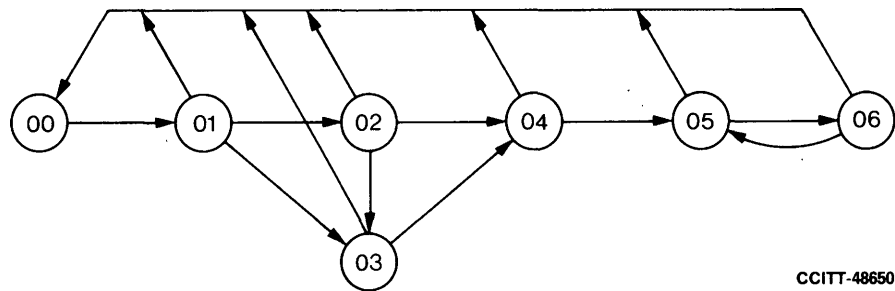
CCITT-48650

State number	State description	Sheet reference
00	Idle	1, 2, 3
01	Wait for CPCI-FITE	1
02	Wait for ST	2
03	Wait for address-complete	2
04	Wait for answer	3
05	Answered	3
06	Clear-back	3

FIGURE 1/Q.642

State overview diagram for interworking of Signalling System No. 5 to No. 6

Procedure not shown

P₁ — Procedure for repeat attempt.

FIGURE 2/Q.642

Notes to interworking of Signalling System No. 5 to No. 6

Connector
reference
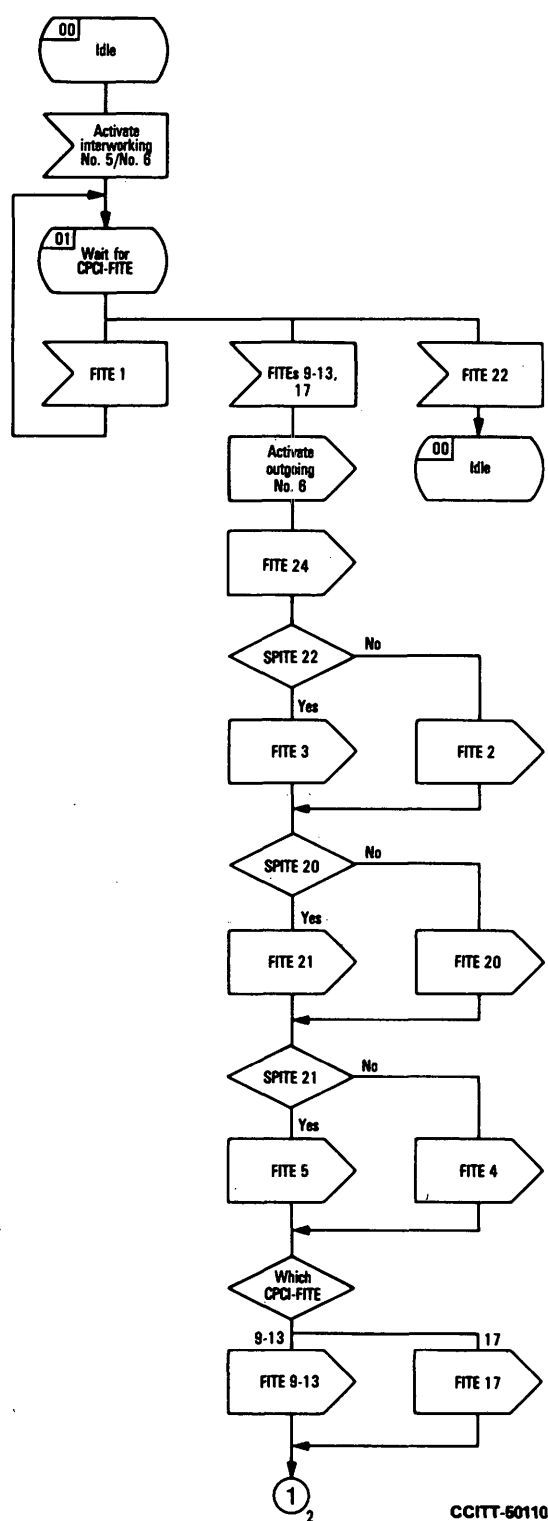
FIGURE 3/Q.642 (Sheet 1 of 3)
Interworking of Signalling System No. 5 to No. 6

1

1, 2

Any more
FITE 1

No

Yes

02 Wait for
ST

FITE 1

BITE 12

FITE 22

BITEs 2, 3

BITE 15

BITE 8

②₃

③₂

④₂

2, 3, 4

Country
code FITE

Yes

No

Yes

SPITE 22

00 Idle

BITEs
9, 10, 19

FITE 1

Omit
country code
FITE

Yes Repeat
attempt

No

1

ST-FITE

No

①₂

Ⓟ₁

BITE 8

Yes

03 Wait for
address-
complete

00 Idle

BITEs
2-7

BITE 12

BITEs
14-17, 20

BITEs 9,
10, 19

FITE 22

3, 4
2

₂③

④₂

Repeat
attempt

Yes

②₃

BITE 27

BITE 8

BITE 28

No

Ⓟ₁

5

⑤₃

SPITE 6
Return
appropriate
tone

BITE 8

00 Idle

CCITT - 50121

FIGURE 3/Q.642 (Sheet 2 of 3)

Interworking of Signalling System No. 5 to No. 6

FIGURE 3/Q.642 (Sheet 3 of 3)
Interworking of Signalling System No. 5 to No. 6

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 5 TO No. 7
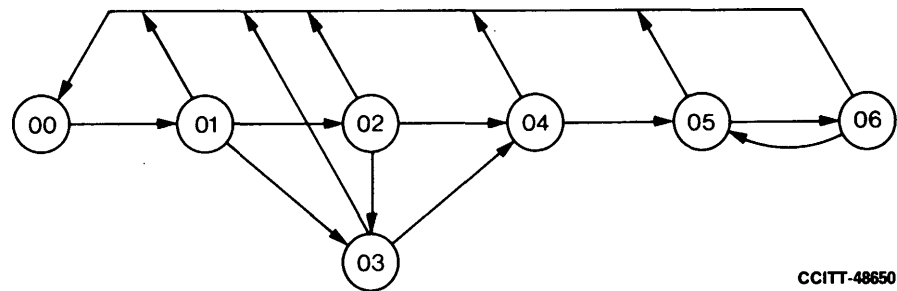
CCITT-48650

State number	State description	Sheet reference
00	Idle	1, 2, 3
01	Wait for CPCI-FITE	1
02	Wait for ST	2
03	Wait for address-complete	3
04	Wait for answer	3
05	Answered	3
06	Clear-back	3

FIGURE 1/Q.643

State overview diagram for interworking of Signalling System No. 5 to No. 7

FIGURE 2/Q.643

(Reserved for future notes)
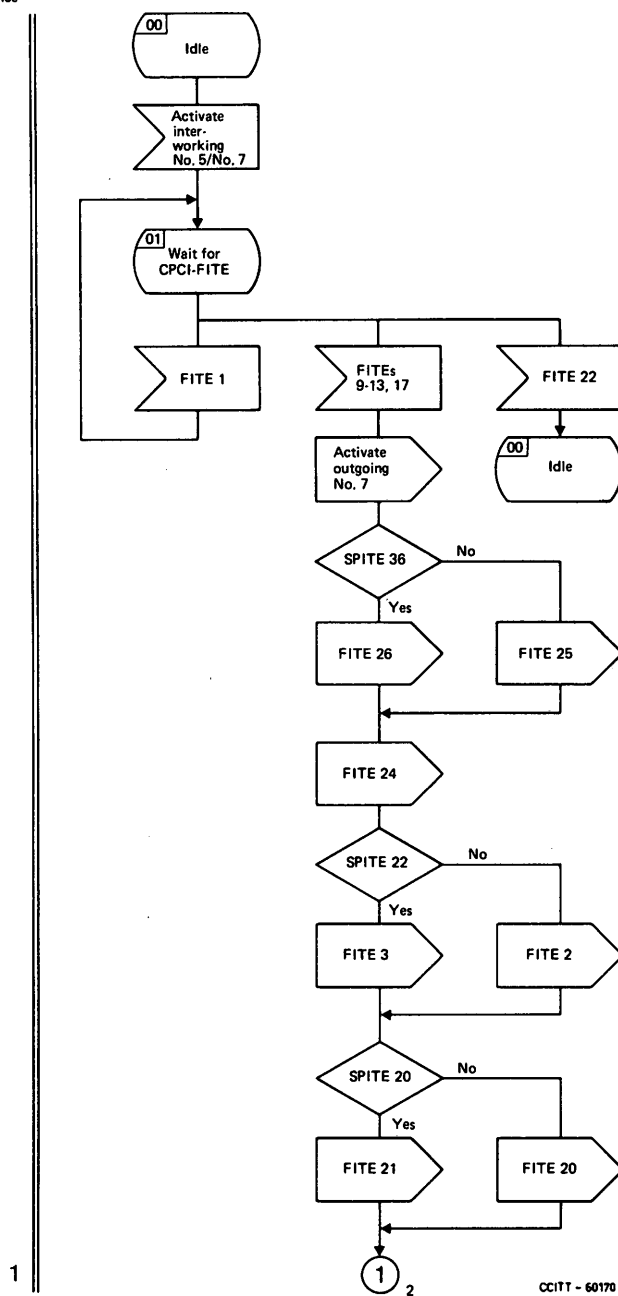
FIGURE 3/Q.643 (Sheet 1 of 3)

Interworking of Signalling System No. 5 to No. 7
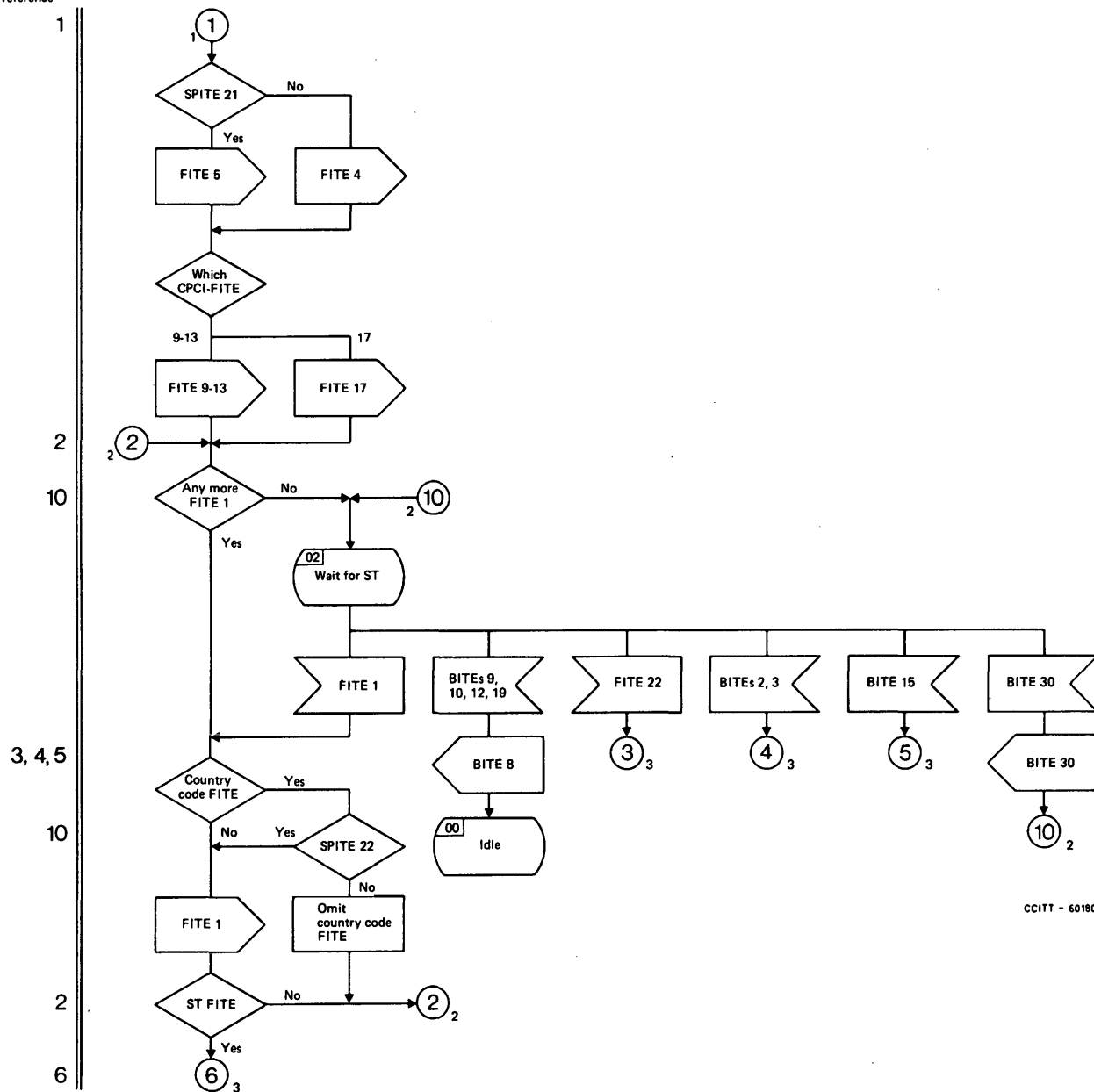
FIGURE 3/Q.643 (Sheet 2 of 3)

Interworking of Signalling System No. 5 to No. 7

FIGURE 3/Q.643 (Sheet 3 of 3)

Interworking of Signalling System No. 5 to No. 7

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 5 TO R1

CCITT-48660

State number	State description
00	Idle
01	Wait for ST
02	Wait for register deactivation
03	Wait for answer
04	Answered
05	Clear-back

FIGURE 1/Q.644

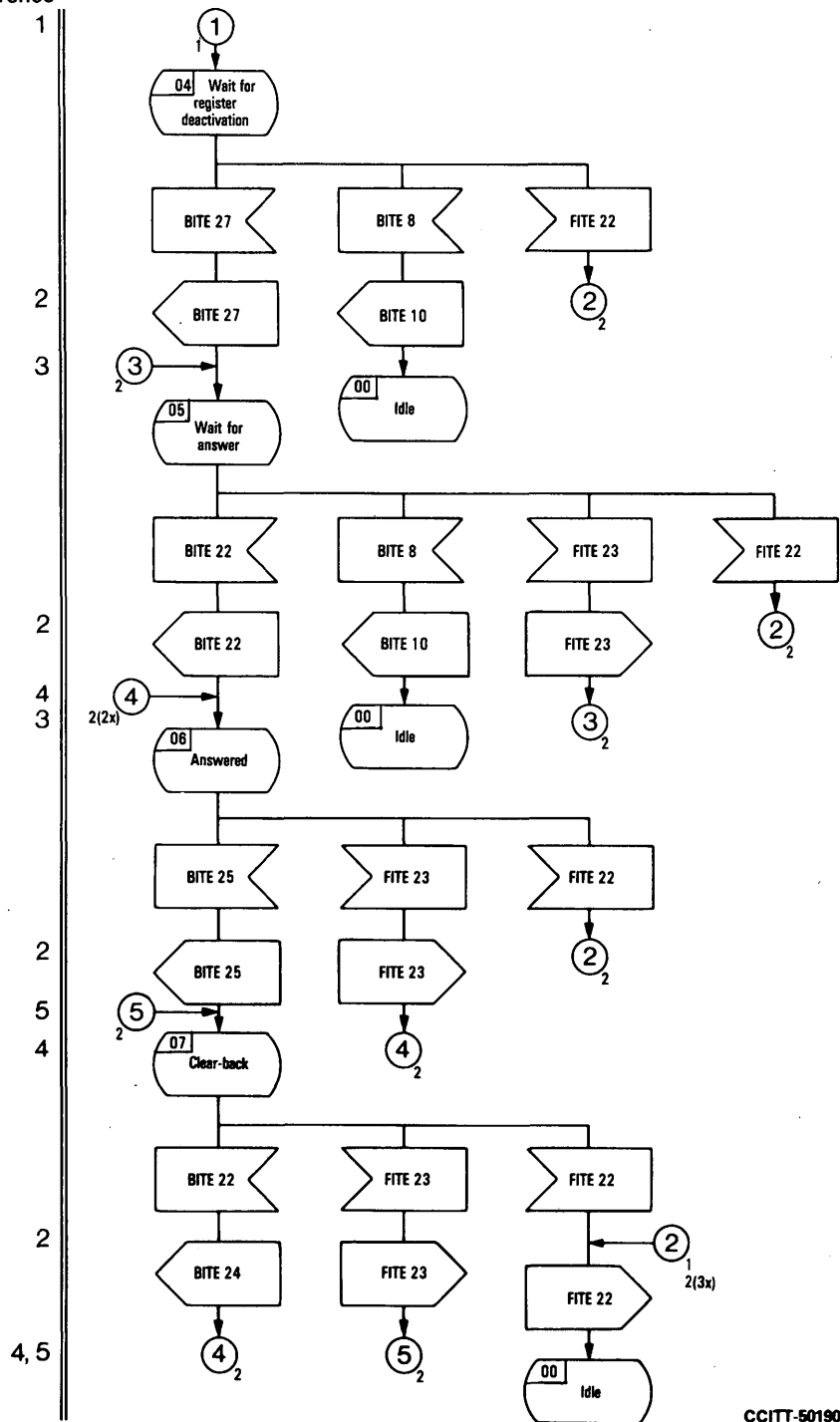**State overview diagram for interworking of Signalling System No. 5 to R1**

Procedures not shown

Procedure P_1 is not described because the procedure has not been specified in the Signalling System R1 specifications.

FIGURE 2/Q.644

Notes to interworking of Signalling System No. 5 to R1

FIGURE 3/Q.644

Interworking of Signalling System No. 5 to R1

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 5 TO R2
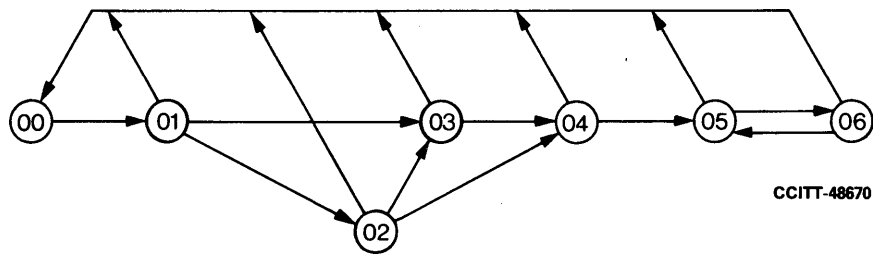
CCITT-48670

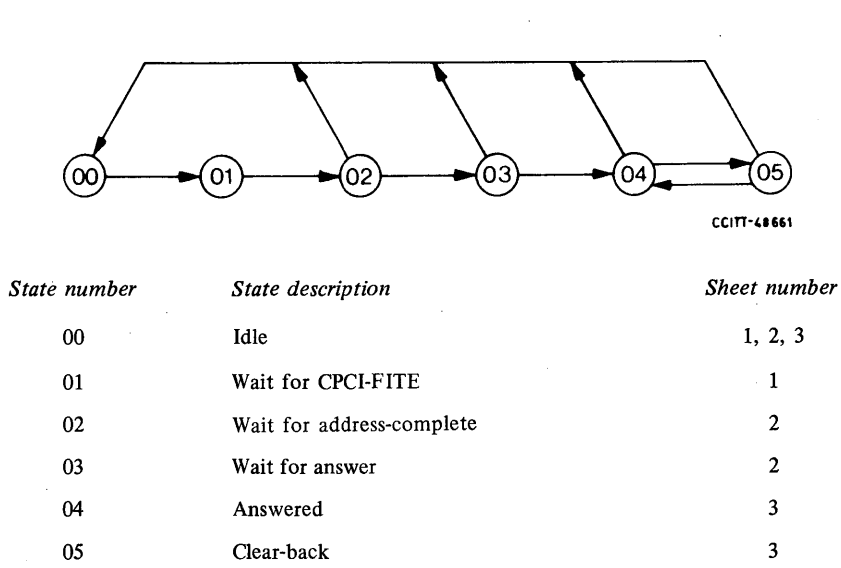| State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for calling party's category (CPCI)	1
02	Wait for ST	1
03	Wait for address-complete	2
04	Wait for answer	2
05	Answered	2
06	Clear-back	2

FIGURE 1/Q.645

State overview diagram for interworking of Signalling System No. 5 to R2

FIGURE 2/Q.645

(Reserved for future notes)
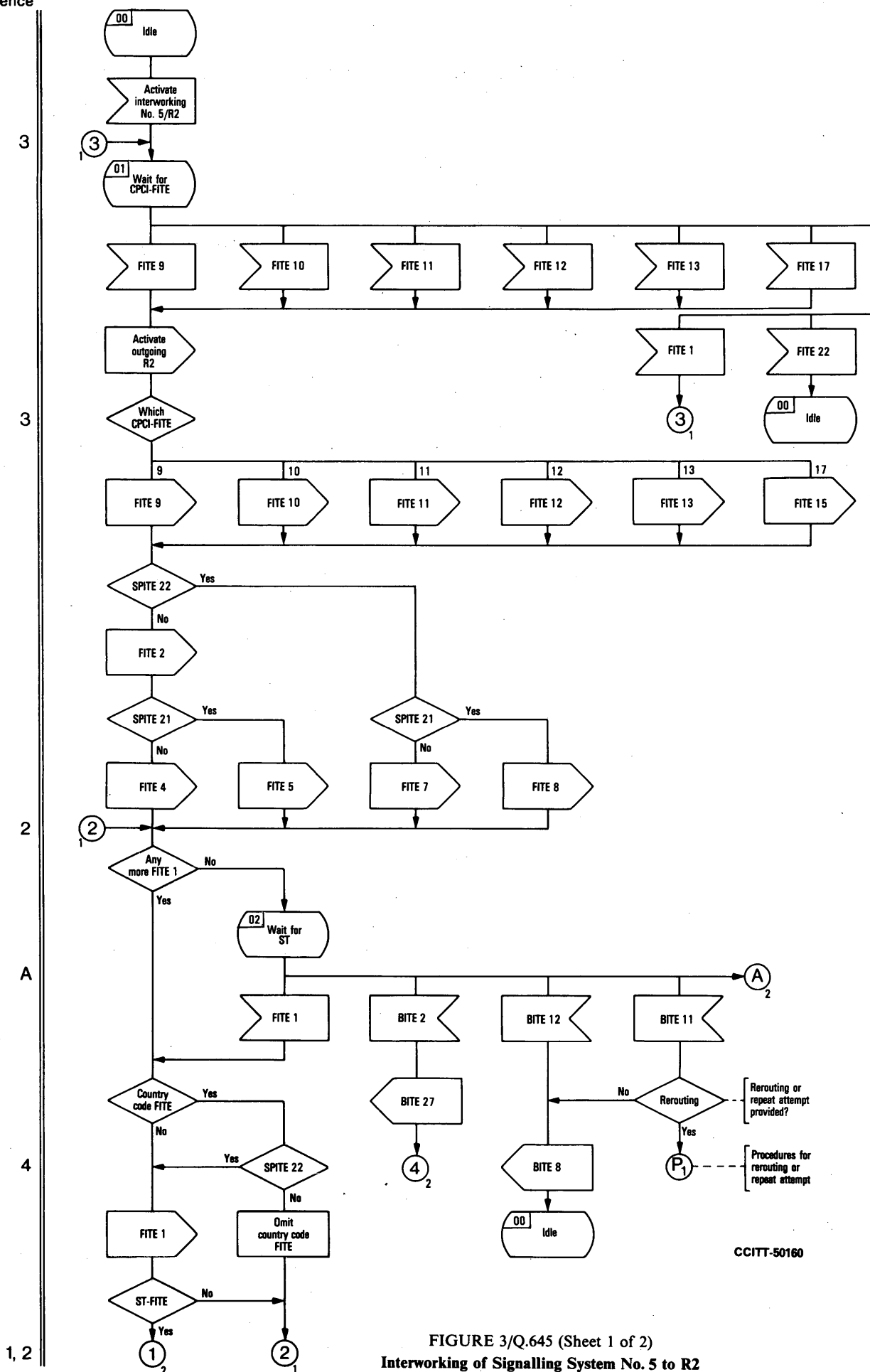
FIGURE 3/Q.645 (Sheet 1 of 2)
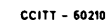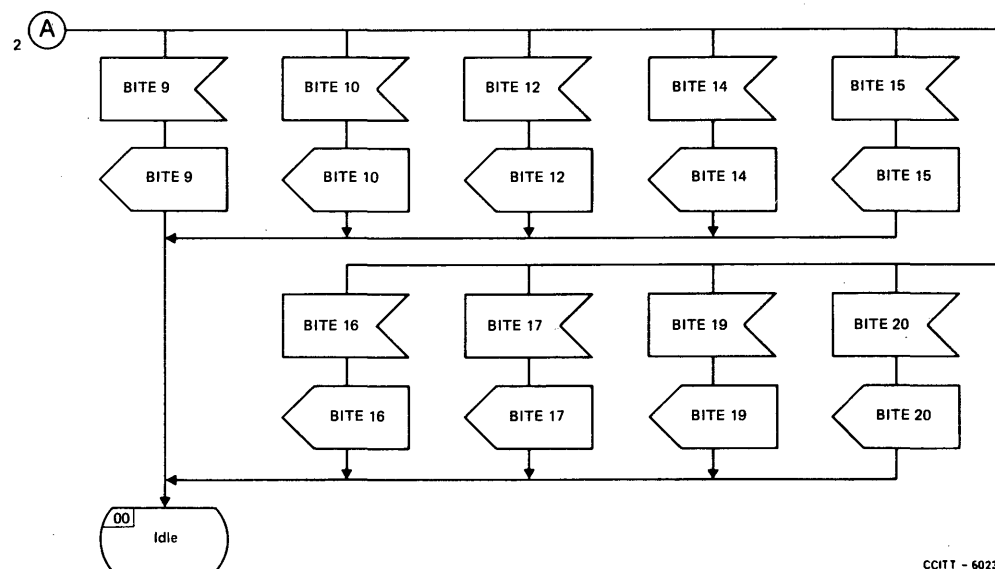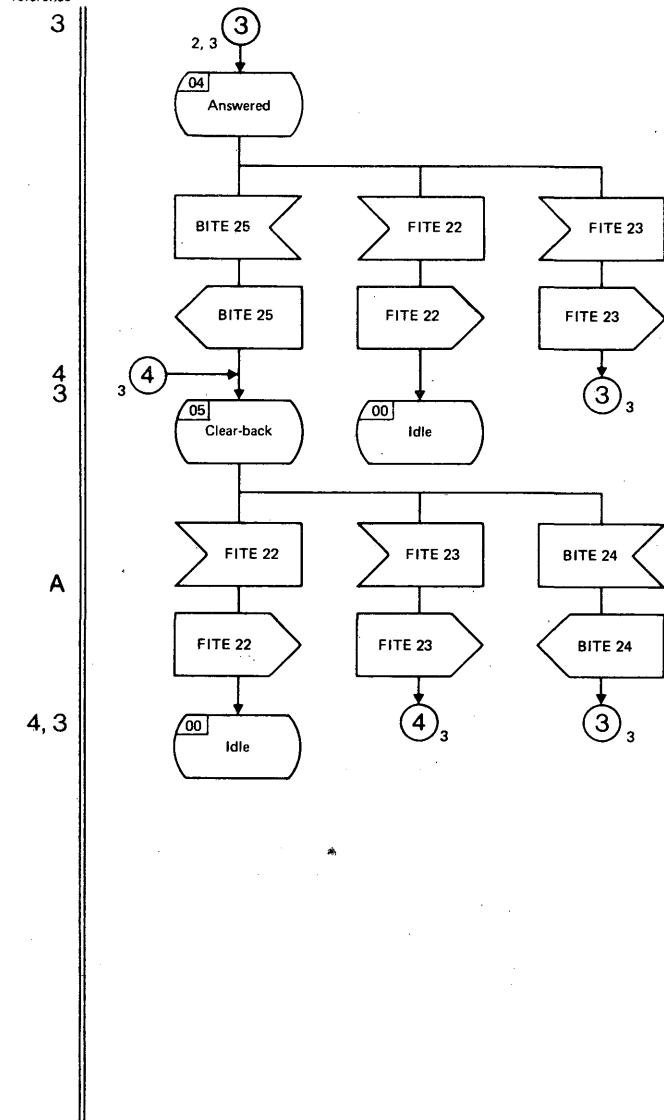Interworking of Signalling System No. 5 to R2

CCITT-50160

Note — Rerouting of repeat attempt provided?

FIGURE 3/Q.645 (Sheet 2 of 2)

Interworking of Signalling System No. 5 to R2

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 6 TO No. 5
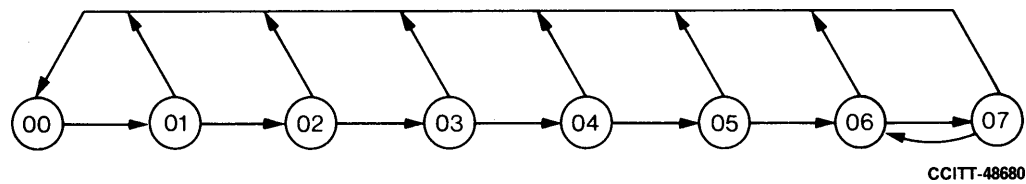
CCITT-48680

State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for CPCI-FITE	1
02	Wait for COT	1
03	Wait for address-complete	1
04	Wait for register deactivation	2
05	Wait for answer	2
06	Answered	2
07	Clear-back	2

FIGURE 1/Q.652

State overview diagram for interworking of Signalling System No. 6 to No. 5

FIGURE 2/Q.652

(Reserved for future notes)
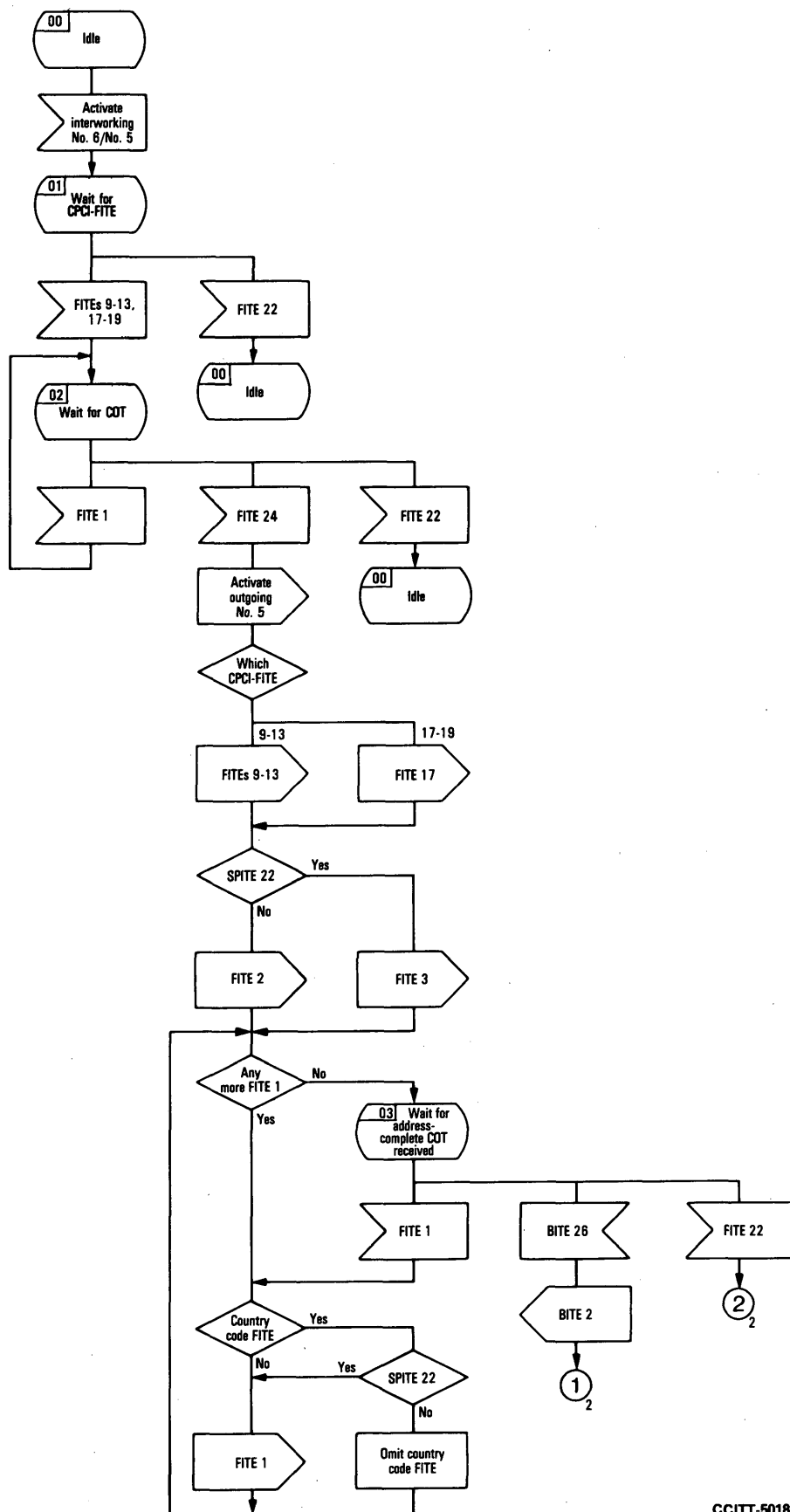
Connector reference

FIGURE 3/Q.652 (Sheet 1 of 2)
Interworking of Signalling System No. 6 to No. 5
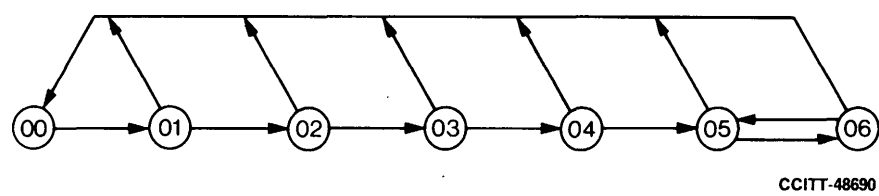
FIGURE 3/Q.652 (Sheet 2 of 2)
Interworking of Signalling System No. 6 to No. 5

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 6 TO No. 7

CCITT-48661

State number	State description	Sheet number
00	Idle	1, 2, 3
01	Wait for CPCI-FITE	1
02	Wait for address-complete	2
03	Wait for answer	2
04	Answered	3
05	Clear-back	3

FIGURE 1/Q.653

State overview diagram for interworking of Signalling System No. 6 to No. 7

FIGURE 2/Q.653

(Reserved for future notes)
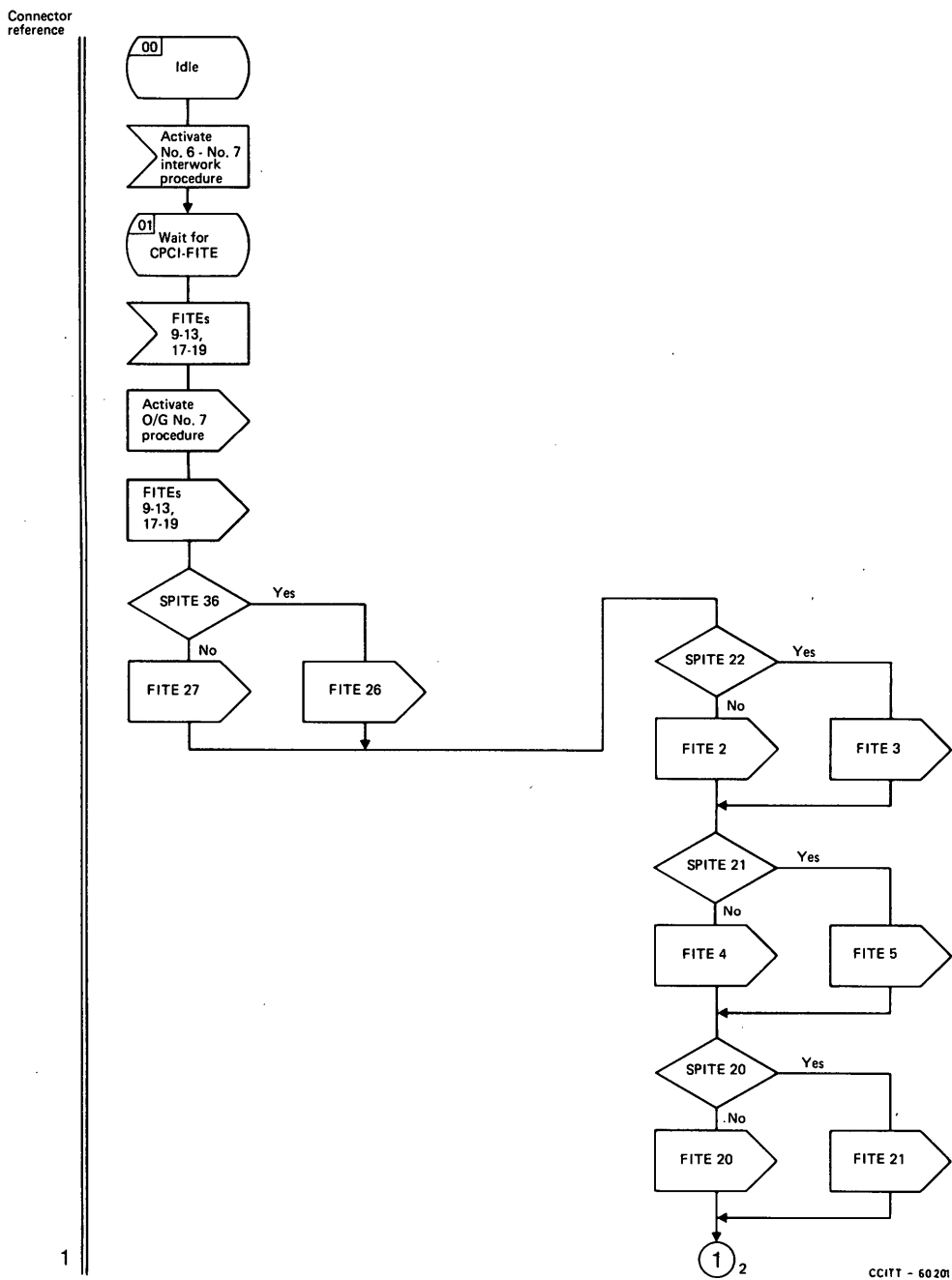
FIGURE 3/Q.653 (Sheet 1 of 3)

Interworking of Signalling System No. 6 to No. 7

FIGURE 3/Q.653 (Sheet 2 of 3)

Interworking of Signalling System No. 6 to No. 7

Connector
reference

3

2, 3 ③

| 04 |
| Answered |

BITE 25

FITE 22

FITE 23

BITE 25

FITE 22

FITE 23

4
3

3 ④

③₃

| 05 |
| Clear-back |

| 00 |
| Idle |

FITE 22

FITE 23

BITE 24

A

FITE 22

FITE 23

BITE 24

4, 3

| 00 |
| Idle |

④₃

③₃

2 Ⓐ

BITE 9

BITE 10

BITE 12

BITE 14

BITE 15

BITE 9

BITE 10

BITE 12

BITE 14

BITE 15

BITE 16

BITE 17

BITE 19

BITE 20

BITE 16

BITE 17

BITE 19

BITE 20

| 00 |
| Idle |

FIGURE 3/Q.653 (Sheet 3 of 3)

Interworking of Signalling System No. 6 to No. 7

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 6 TO R1

CCITT-48690

State number	State description
00	Idle
01	Wait for continuity check
02	Wait for address-complete
03	Wait for register deactivation
04	Wait for answer
05	Answered
06	Clear-back

FIGURE 1/Q.654

State overview diagram for interworking of Signalling System No. 6 to R1

Procedures not shown

Procedure P_1 is not described because no procedure is specified in the Signalling System R1 specifications.

FIGURE 2/Q.654

Notes to interworking of Signalling System No. 6 to R1
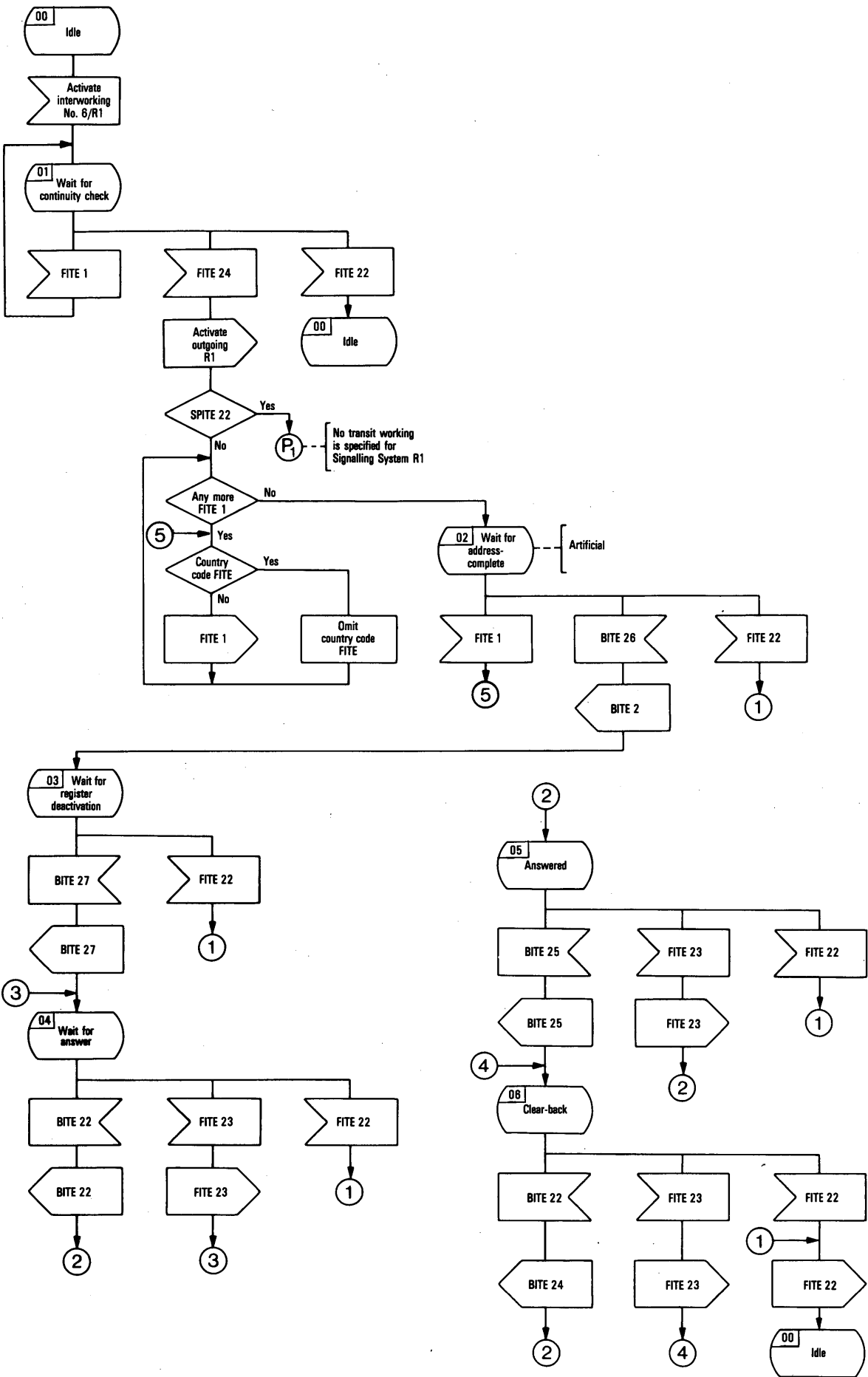
FIGURE 3/Q.654

Interworking of Signalling System No. 6 to R1

CCITT-50210

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 6 TO R2

State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for calling party's category (CPCI)	1
02	Wait for address-complete	1
03	Wait for answer, charge	2
04	Wait for answer, no charge	2
05	Answered	2
06	Clear-back	2

FIGURE 1/Q.655

State overview diagram for interworking of Signalling System No. 6 to R2

Procedures not shown

The following procedure, not directly relevant to interworking, is not shown in the logic:

P_1 — Procedure for repeat attempt.

FIGURE 2/Q.655

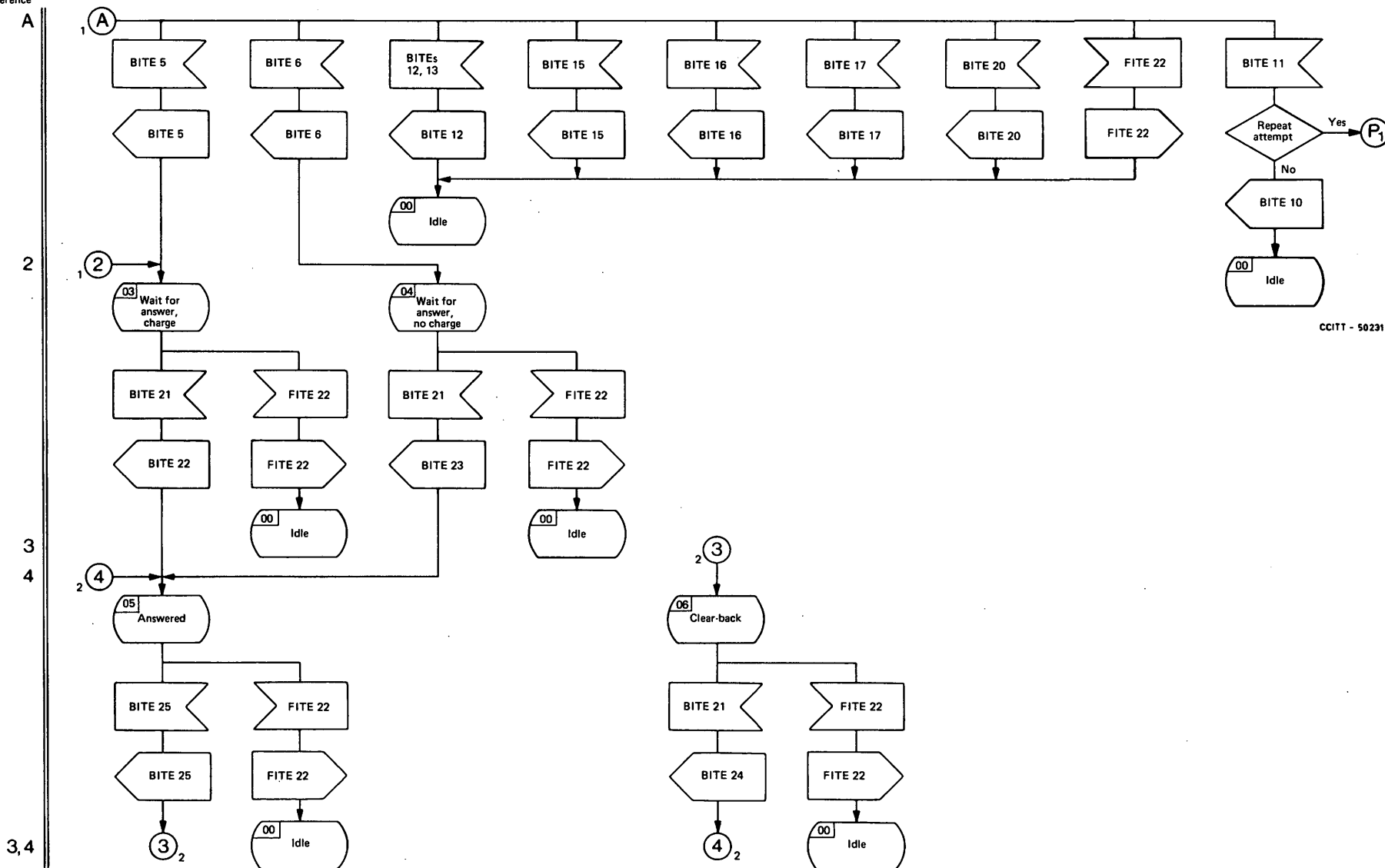**Notes to interworking of Signalling System No. 6 to R2**

Note − See Recommendation Q.261, § 4.1.2.
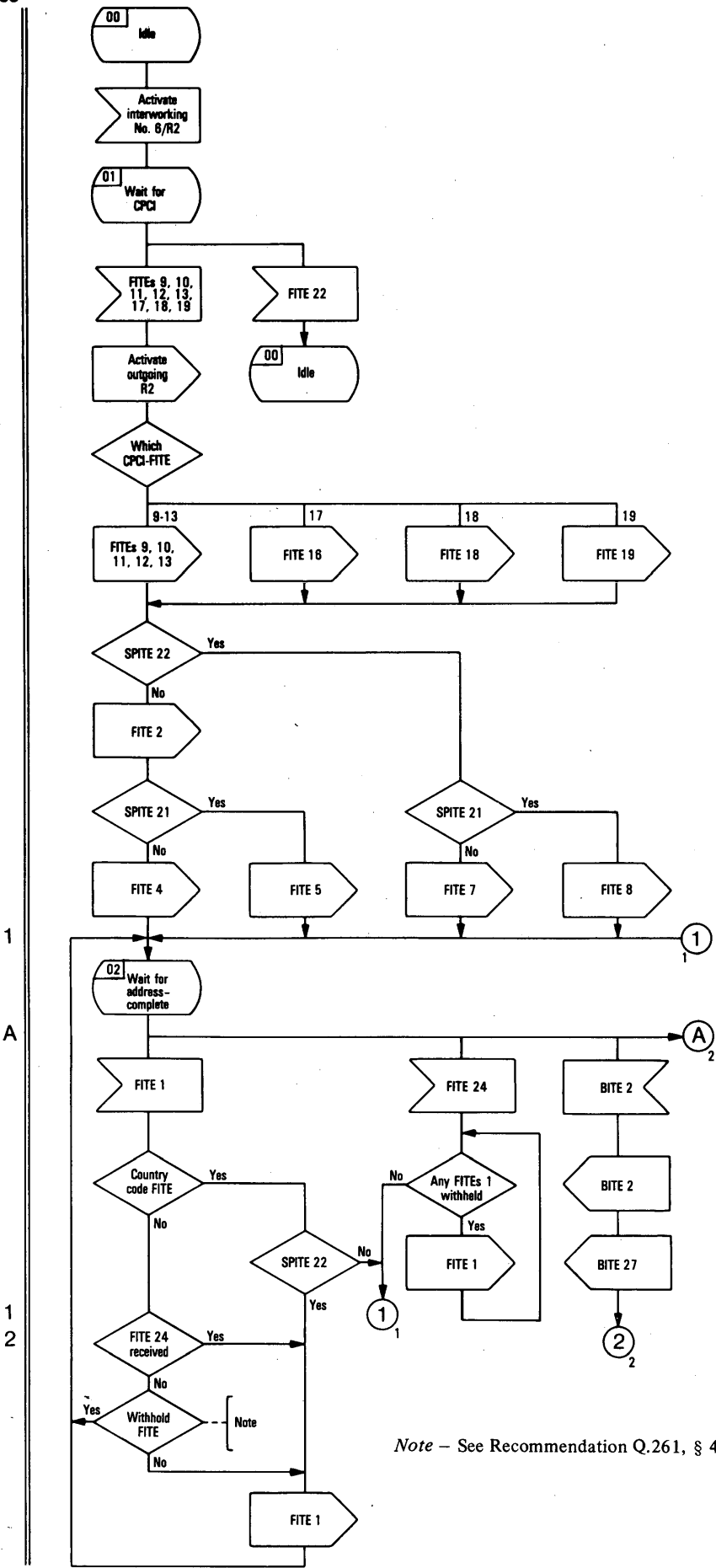
FIGURE 3/Q.655 (Sheet 1 of 2)

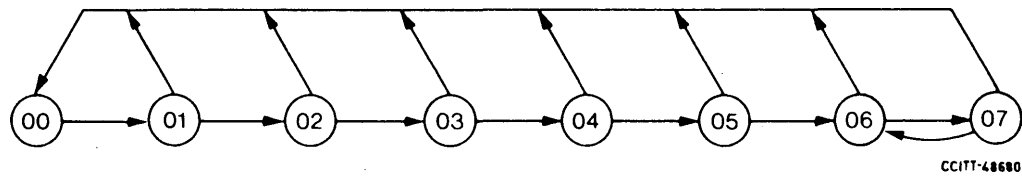**Interworking of Signalling System No. 6 to R2**

CCITT-50220

FIGURE 3/Q.655 (Sheet 2 of 2)

Interworking of Signalling System No. 6 to R2

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 7 TO No. 5

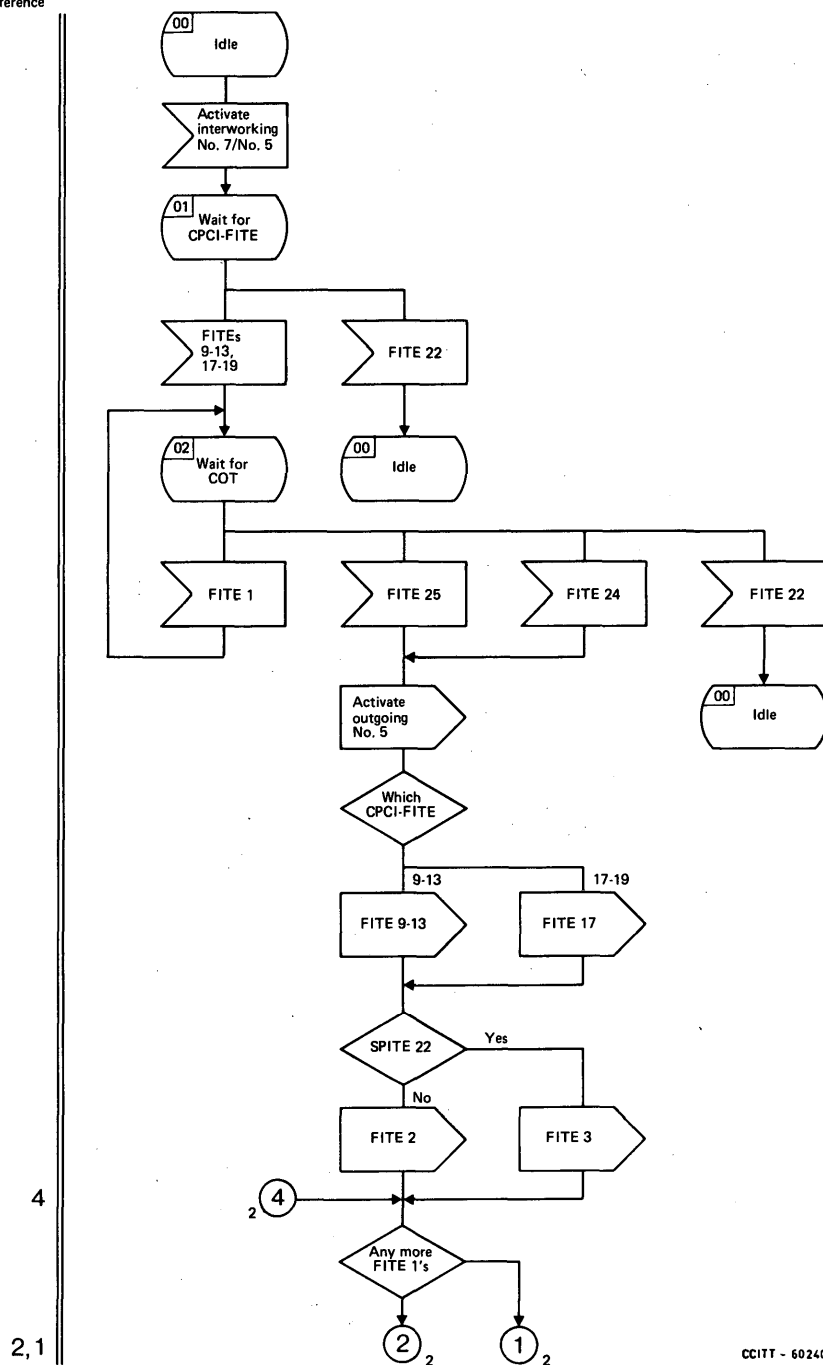| State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for CPCI-FITE	1
02	Wait for COT	1
03	Wait for address-complete	2
04	Wait for register deactivation	2
05	Wait for answer	2
06	Answered	2
07	Clear-back	2

FIGURE 1/Q.662

State overview diagram for interworking of Signalling System No. 7 to No. 5
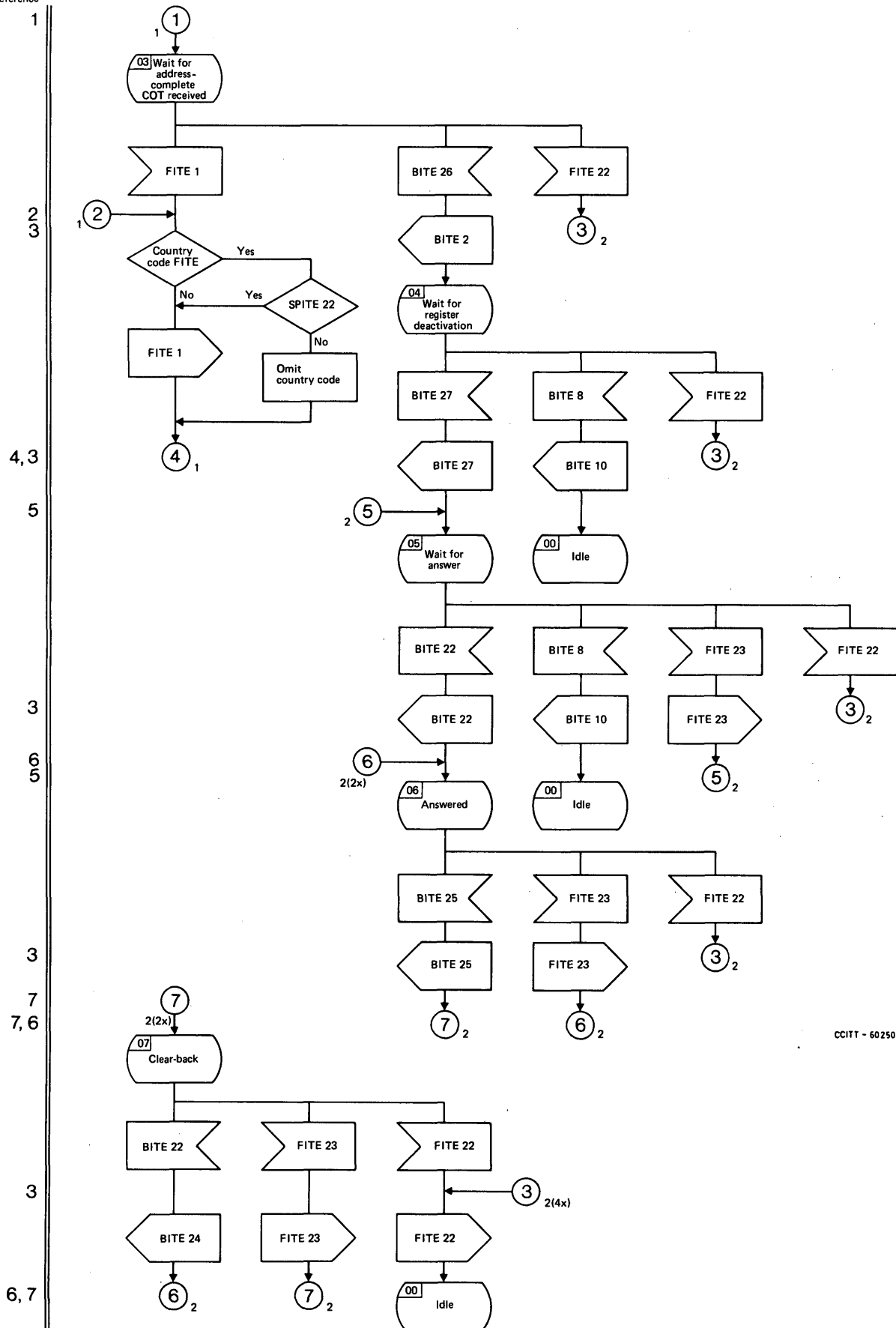
FIGURE 2/Q.662

(Reserved for future notes)

FIGURE 3/Q.662 (Sheet 1 of 2)

Interworking of Signalling System No. 7 to No. 5

FIGURE 3/Q.662 (Sheet 2 of 2)

Interworking of Signalling System No. 7 to No. 5

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 7 TO No. 6

CCITT-48661

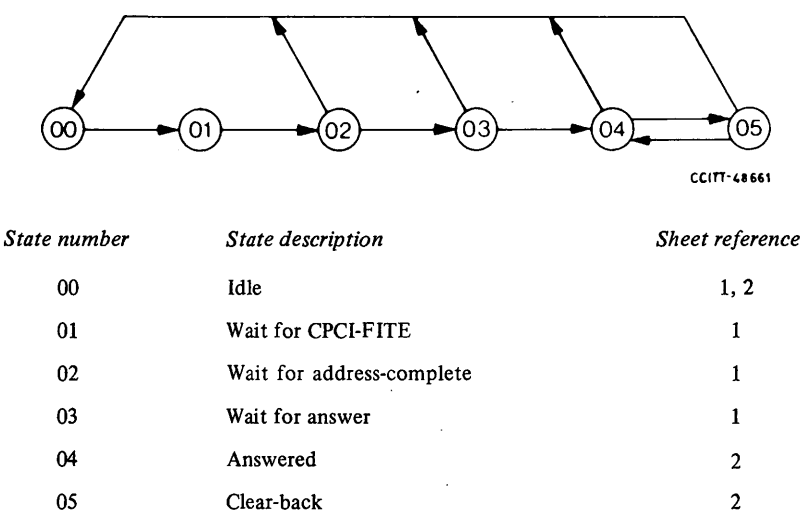| State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for CPCI-FITE	1
02	Wait for address-complete	1
03	Wait for answer	1
04	Answered	2
05	Clear-back	2

FIGURE 1/Q.663

State overview diagram for interworking of System No. 7 to No. 6

Procedures not shown

The following procedure, not directly relevant to interworking, is not shown in the logic:

P_1 — Procedure for repeat attempt.

FIGURE 2/Q.663

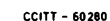Notes to interworking of System No. 7 to No. 6

FIGURE 3/Q.663 (Sheet 1 of 2)
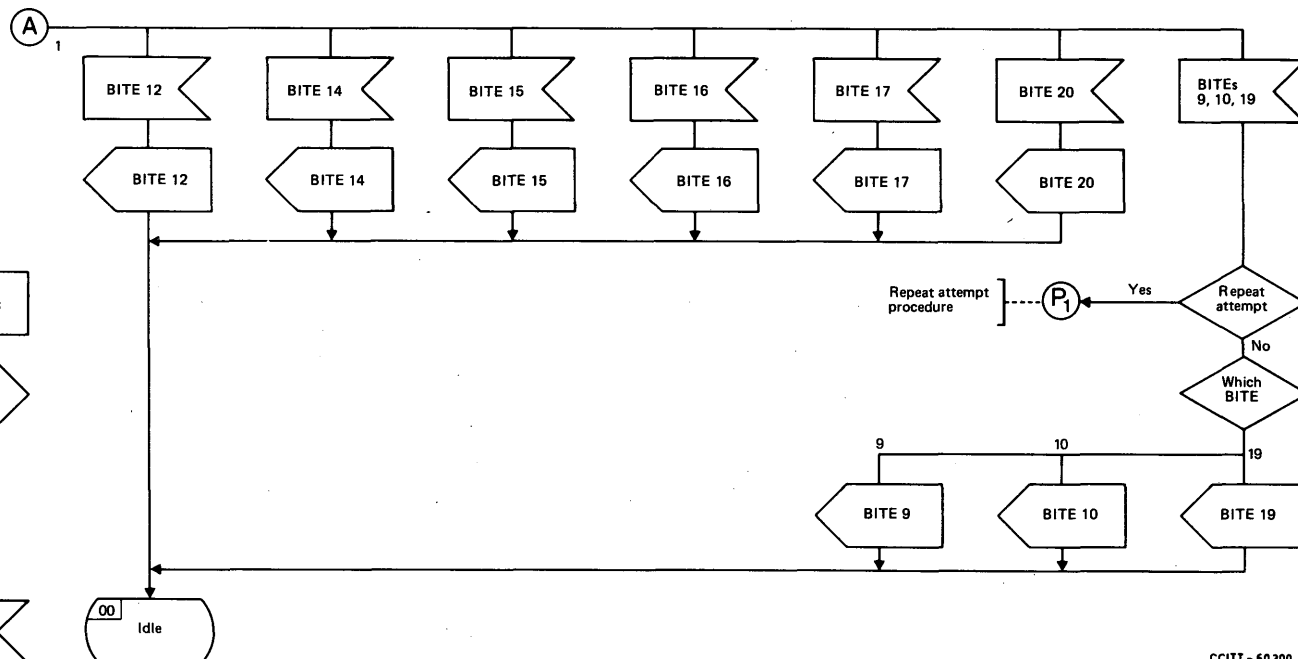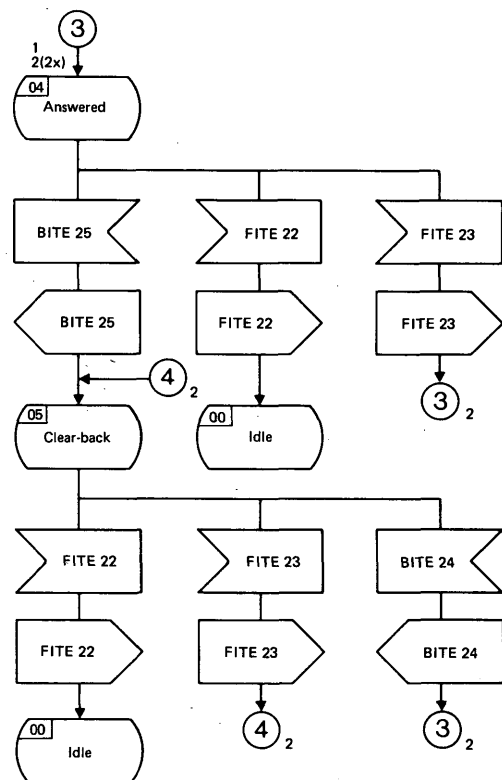
Interworking of Signalling System No. 7 to No. 6

CCITT – 60260

Connector
reference

A

3

(3)

1
2(2x)

| 04 |
Answered

BITE 25   FITE 22   FITE 23

BITE 25   FITE 22   FITE 23

(4)₂

| 05 |
Clear-back

| 00 |
Idle

(3)₂

FITE 22   FITE 23   BITE 24

FITE 22   FITE 23   BITE 24

| 00 |
Idle

(4)₂   (3)₂

4
3

4,3

(A)
1

BITE 12   BITE 14   BITE 15   BITE 16   BITE 17   BITE 20   BITEs
9, 10, 19

BITE 12   BITE 14   BITE 15   BITE 16   BITE 17   BITE 20

Repeat attempt
procedure   (P₁)   Yes   Repeat
attempt

No

Which
BITE

9   10   19
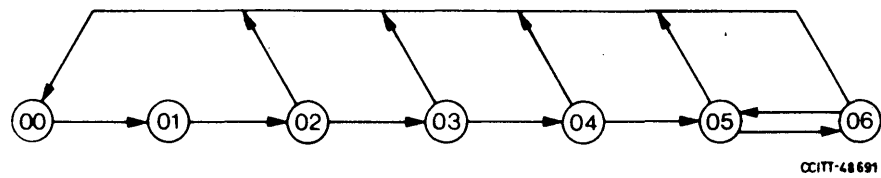
BITE 9   BITE 10   BITE 19

| 00 |
Idle

CCITT - 60300

FIGURE 3/Q.663 (Sheet 2 of 2)

Interworking of Signalling System No. 7 to No. 6

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 7 TO No. 7

State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for CPCI-FITE	1
02	Wait for continuity FITE	1
03	Wait for address-complete	1
04	Wait for answer	1
05	Answered	2
06	Clear-back	2

FIGURE 1/Q.664

State overview diagram for interworking of Signalling System No. 7 to No. 7

FIGURE 2/Q.664

(Reserved for future notes)

① 1(2x)

02 Wait for continuity FITE

FITE 26 FITE 27 FITE 25 FITE 1 FITE 22

FITE 1

FITE 22

① 1

00 Idle

1

SPITE 36 Yes

No

FITE 27 FITE 26

SPITE 36 Yes

No

FITE 25 FITE 26

② 1

2

2

② 1(2x), 2

00 Wait for address-complete

A (A) 2

00 Idle

Activate No. 7 - No. 7 interworking procedure

01 Wait for CPCI-FITE

FITEs 9-13, 17-19

2, 2

BITE 2 BITEs 3-7 FITE 1 FITE 24

BITE 2 BITEs 3-7 FITE 1 FITE 24

② 1 ② 1

BITE 27

③ 1

04 Wait for answer

Activate O/G No. 7 procedure

FITEs 9-13, 17-19

3

SPITE 22 Yes

No

FITE 2 FITE 3

4, 4, 3

BITE 22 BITE 23 BITEs 10,12,19 FITE 22 FITE 23

BITE 22 BITE 23 BITEs 10, 12, 19 FITE 22 FITE 23

④ 2 ④ 2 00 Idle 00 Idle ③ 1

SPITE 21 Yes

No

FITE 4 FITE 5

CCITT - 60321

SPITE 20 Yes

No

FITE 20 FITE 21

1

① 1

FIGURE 3/Q.664 (Sheet 1 of 2)
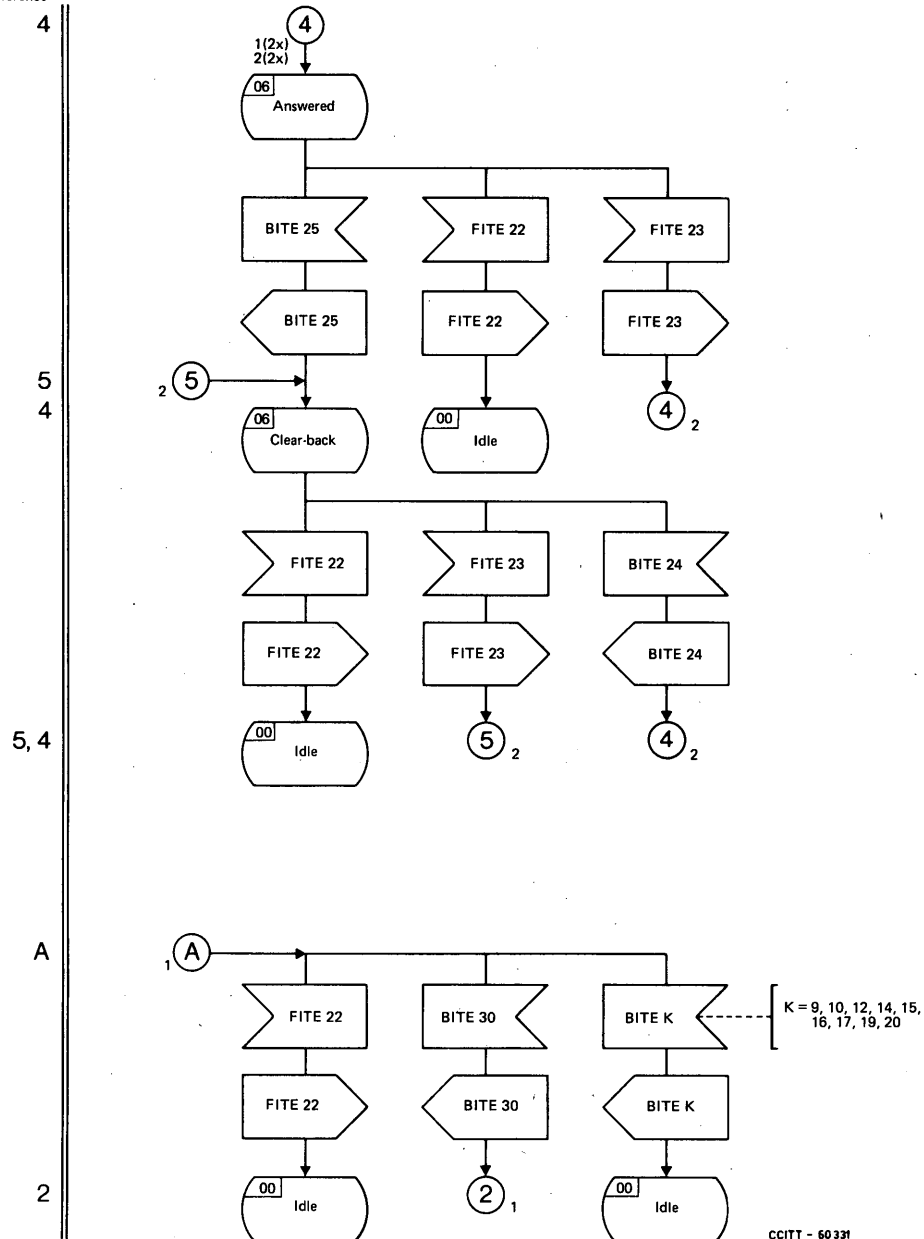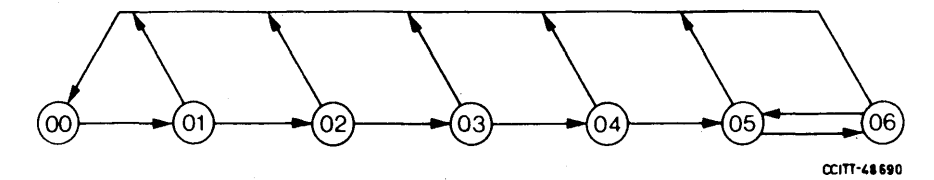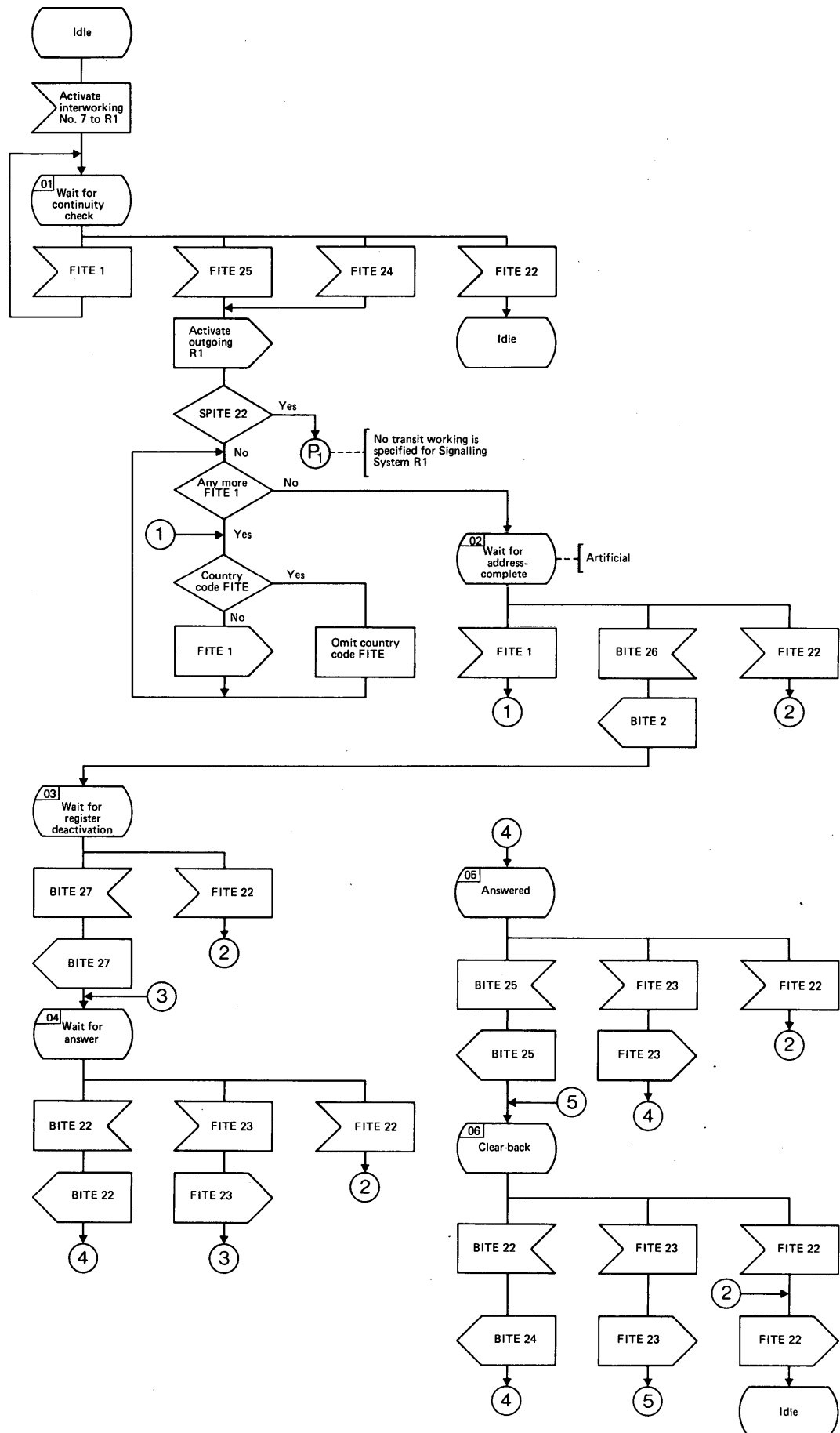
Interworking of Signalling System No. 7 to No. 7

FIGURE 3/Q.664 (Sheet 2 of 2)

Interworking of Signalling System No. 7 to No. 7

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 7 TO R1

CCITT-48690

State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for continuity check	1
02	Wait for address-complete	1
03	Wait for register deactivation	1
04	Wait for answer	2
05	Answered	2
06	Clear-back	2

FIGURE 1/Q.665

State overview diagram for interworking of Signalling System No. 7 to R1

Procedures not shown

P_i — No transit working is defined for R1.

FIGURE 2/Q.665

Note to the interworking of Signalling System No. 7 to R1

FIGURE 3/Q.665

Interworking of Signalling System No. 7 to R1

CCITT-60 352

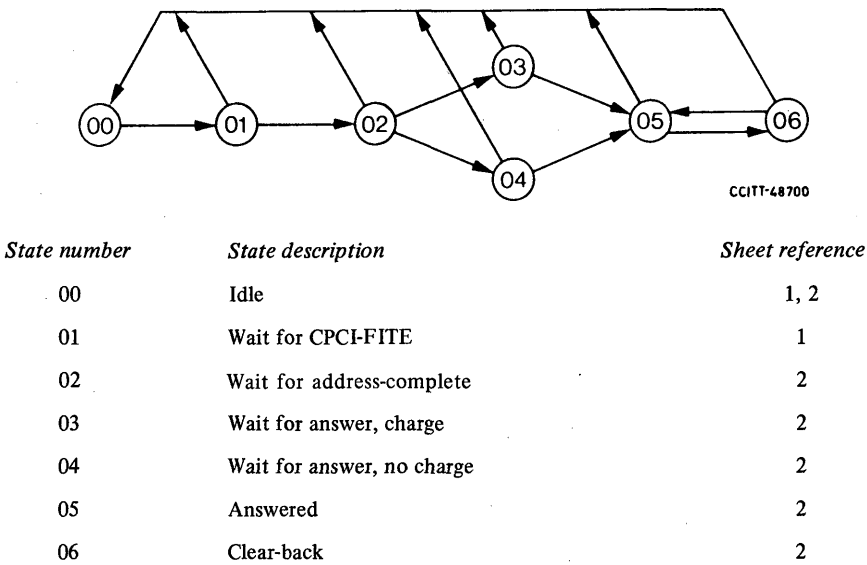## LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM No. 7 TO R2

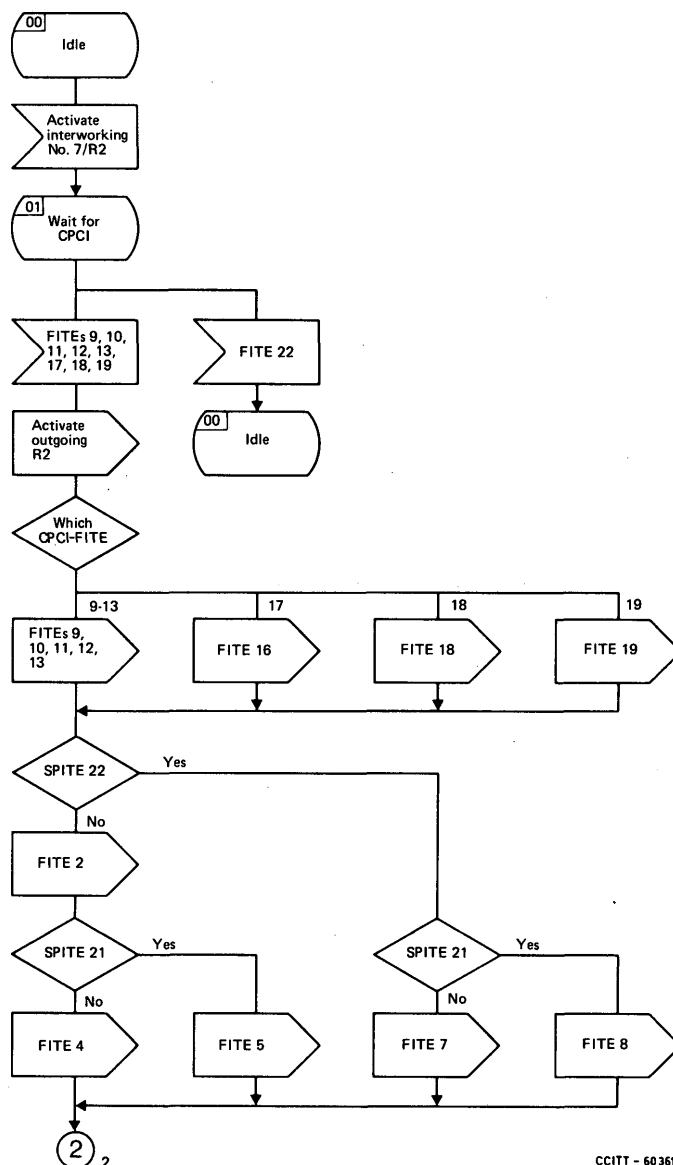| State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for CPCI-FITE	1
02	Wait for address-complete	2
03	Wait for answer, charge	2
04	Wait for answer, no charge	2
05	Answered	2
06	Clear-back	2

FIGURE 1/Q.666

State overview diagram for interworking of Signalling System No. 7 to R2

FIGURE 2/Q.666

(Reserved for future use)

FIGURE 3/Q.666 (Sheet 1 of 2)

Interworking of Signalling System No. 7 to R2

2

⟨2⟩

1, 2(2x)

|02| Wait for
address-
complete

A

FITE 1   FITE 25   FITE 24   BITE 2   BITE 5   BITE 6

Country
code FITE   Yes

No   Any
FITE
withheld

No

Yes

BITE 2   BITE 5   BITE 6

SPITE 22   No   FITE 1

FITE
24 or 27
Revd   Yes   Yes

No

2 ③

BITE 27 |03| Wait for
answer charge |04| Wait for
answer
no-charge

Yes   Withhold
FITE   Note

No

⟨2⟩₂   ③₂

BITE 21   FITE 22

FITE 1   BITE 22   FITE 22

④
2(2x)

⟨2⟩₂ |05| Answered |00| Idle

BITE 25   FITE 22   BITE 21   FITE 22

BITE 25   FITE 22   BITE 23   FITE 22

|06| Clear-back |00| Idle   ④₂ |00| Idle

BITE 21   FITE 22

BITE 24   FITE 22

Note — Sufficient FITEs must be withheld to
prevent an address-complete signal being received
before (continuity) has been established when
this is performed.

④₂ |00| Idle

A   Ⓐ₂

BITE 11   BITEs
12, 13   BITE 15   BITE 16   BITE 17   BITE 20   FITE 22

BITE 10   BITE 12   BITE 15   BITE 16   BITE 17   BITE 20   FITE 22

CCITT - 60381

|00| Idle

FIGURE 3/Q.666 (Sheet 2 of 2)

Interworking of Signalling System No. 7 to R2

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM R1 TO No. 5

CCITT-48710
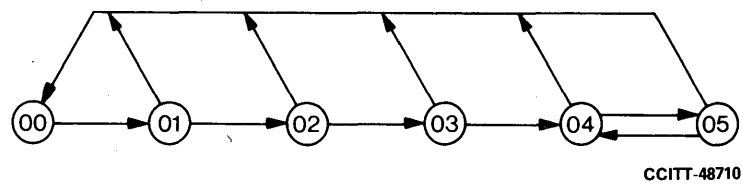
State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for ST	1
02	Wait for register deactivation	1
03	Wait for answer	2
04	Answered	2
05	Clear-back	2

FIGURE 1/Q.671

State overview diagram for interworking of Signalling System R1 to No. 5
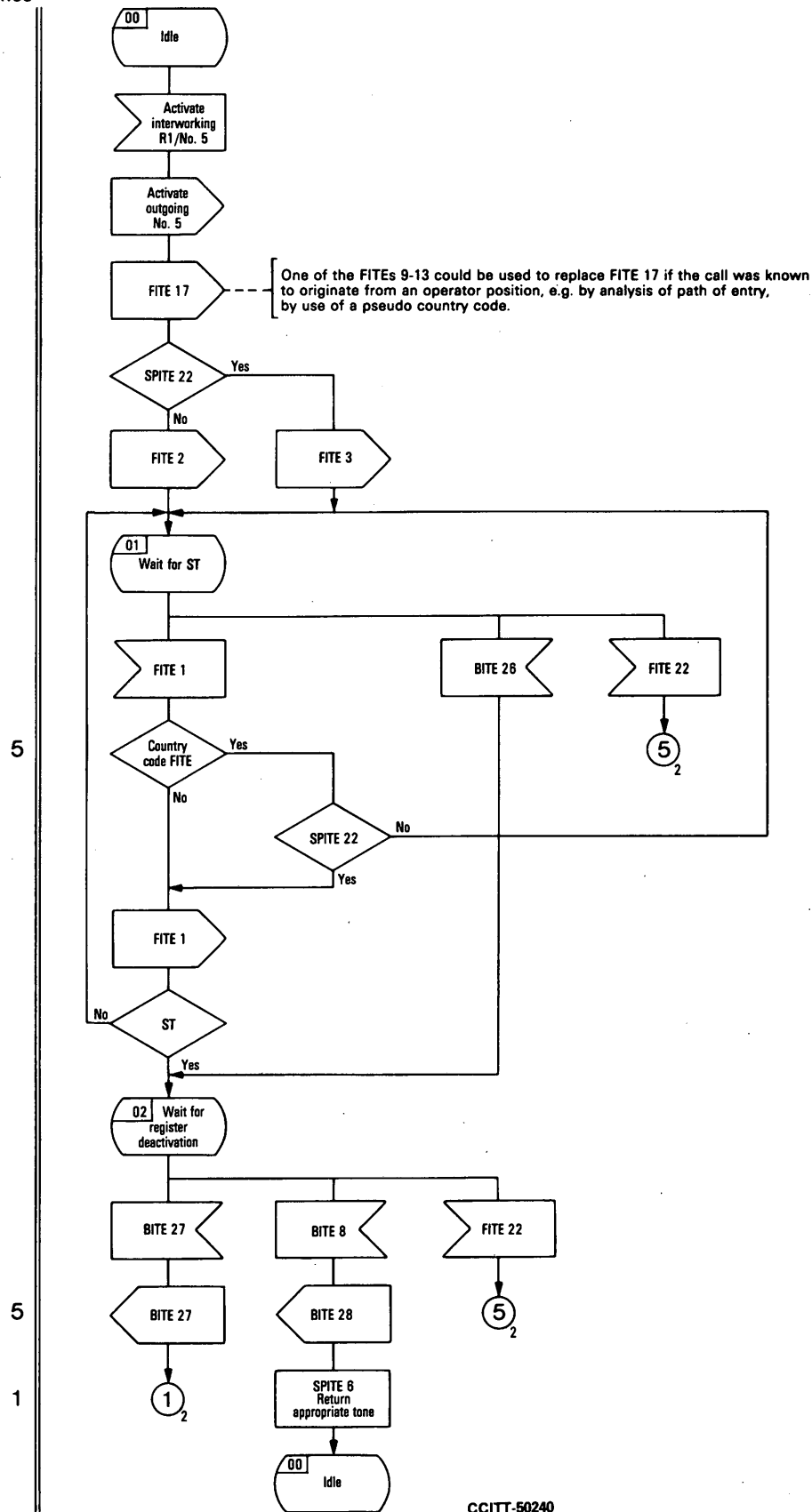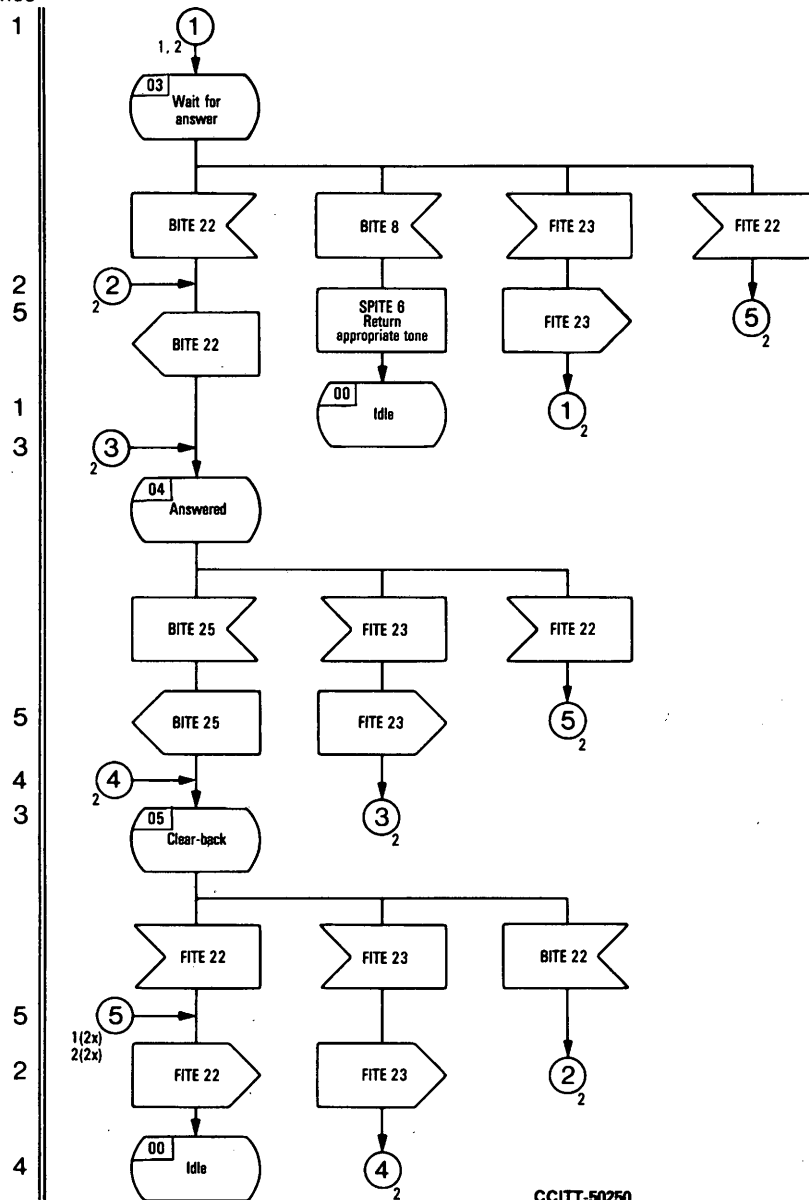
FIGURE 2/Q.671

(Reserved for future notes)

One of the FITEs 9-13 could be used to replace FITE 17 if the call was known
to originate from an operator position, e.g. by analysis of path of entry,
by use of a pseudo country code.

CCITT-50240

FIGURE 3/Q.671 (Sheet 1 of 2)
Interworking of Signalling System R1 to No. 5

FIGURE 3/Q.671 (Sheet 2 of 2)
Interworking of Signalling System R1 to No. 5

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM R1 TO No. 6
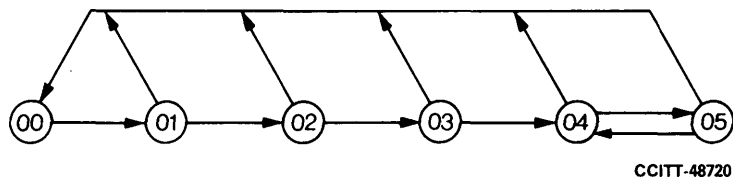
CCITT-48720

State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for ST	1
02	Wait for address-complete	2
03	Wait for answer	2
04	Answered	2
05	Clear-back	2

FIGURE 1/Q.672

State overview diagram for interworking of Signalling System R1 to No. 6

Procedures not shown

The following procedure, not directly relevant to interworking, is not shown in the logic procedures:

P_1 — Procedure for repeat attempt.

FIGURE 2/Q.672
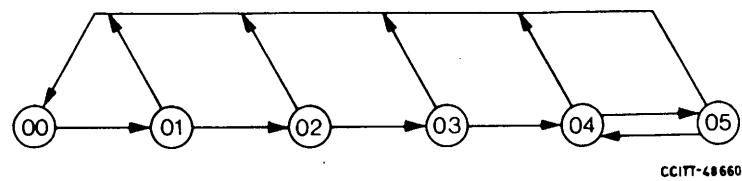
Notes to interworking of Signalling System R1 to No. 6

One of the FITEs 9-13 (18, 19) could be used to replace FITE 17 if the call was known
to originate from an operator position (priority call, data call) e.g. by analysis of
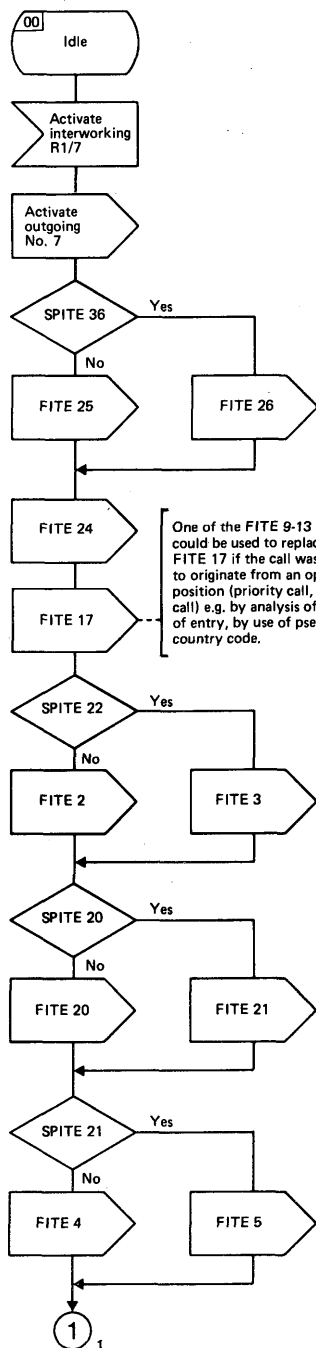path of entry, by use of a pseudo country code

CCITT-50260
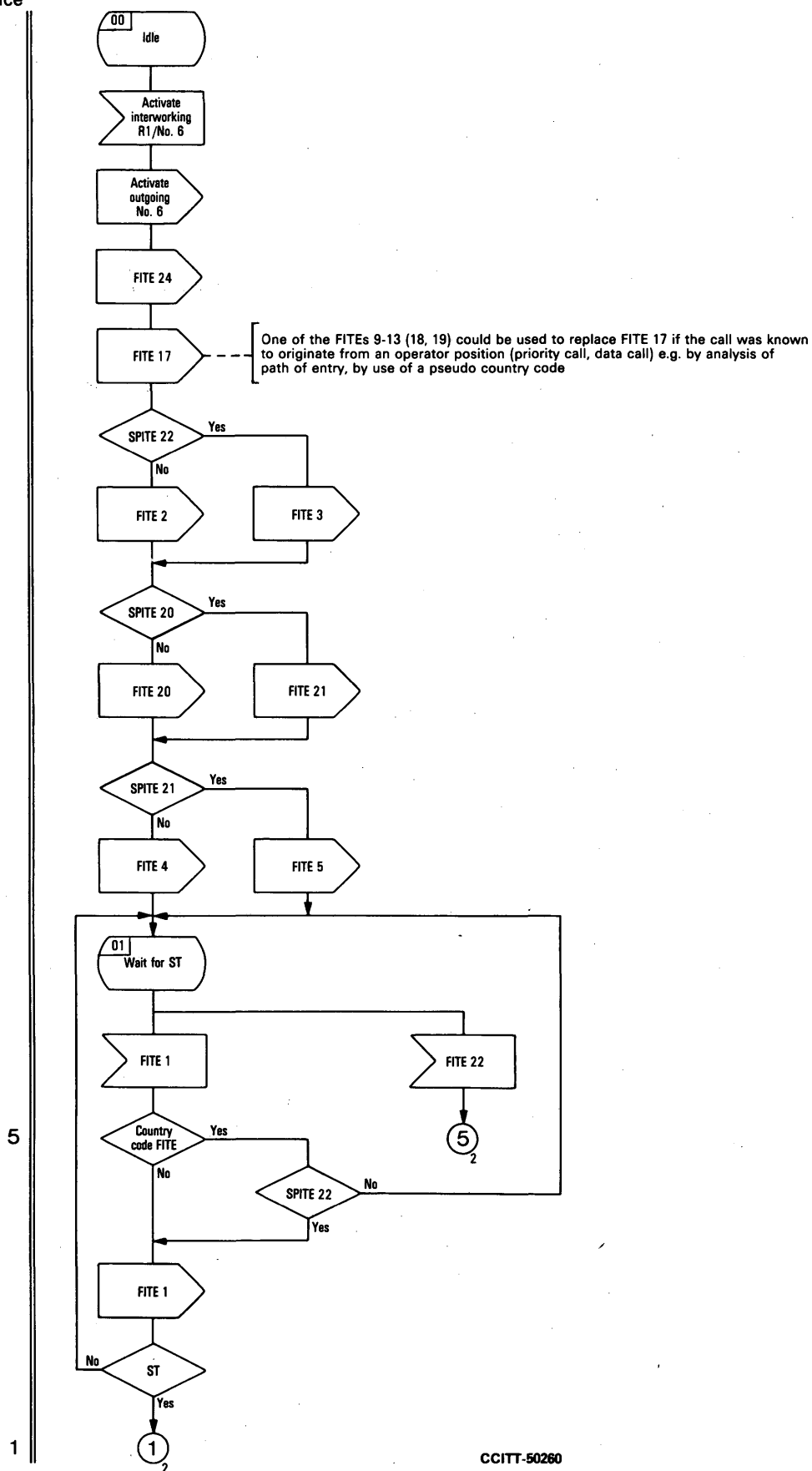
FIGURE 3/Q.672 (Sheet 1 of 2)
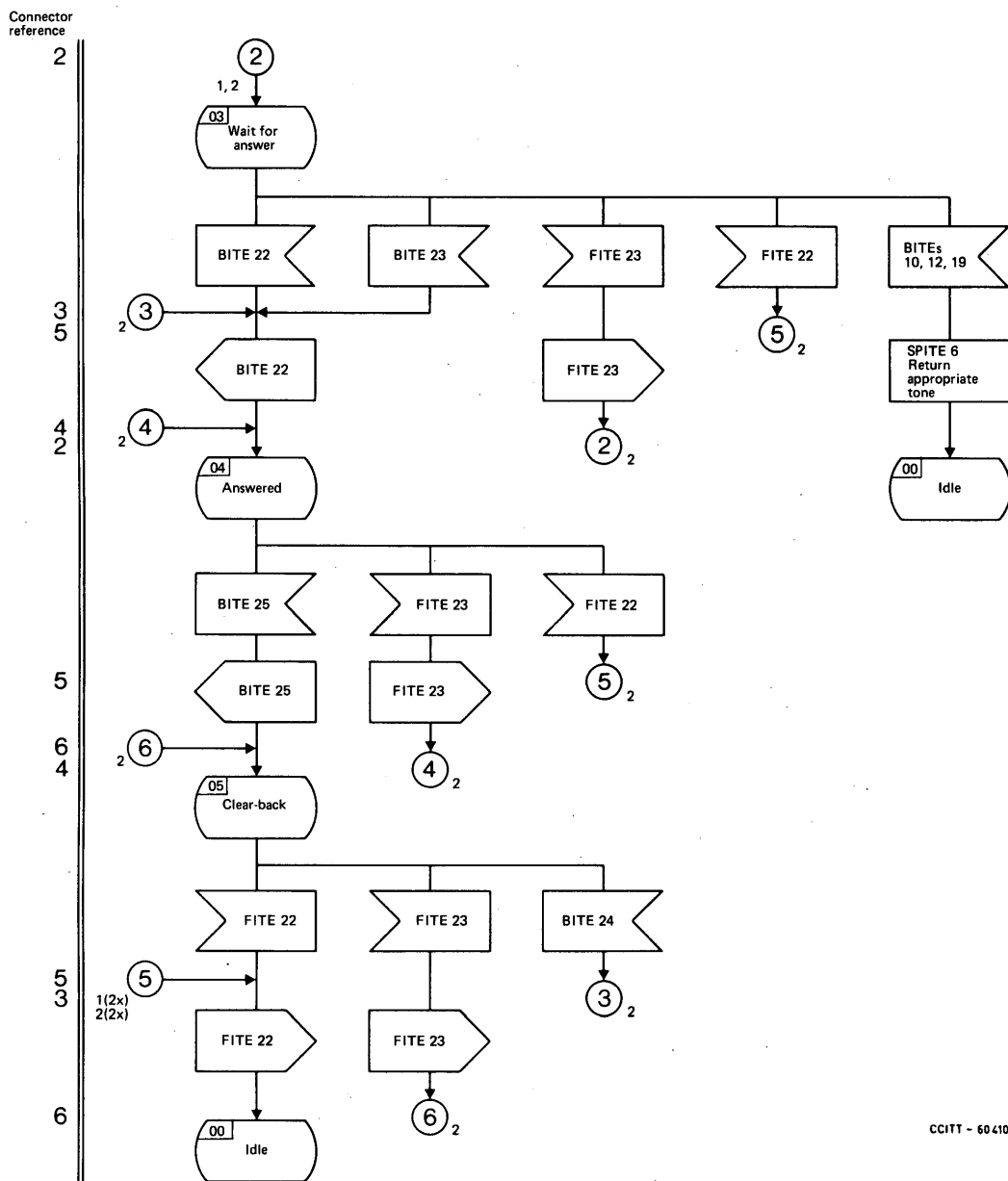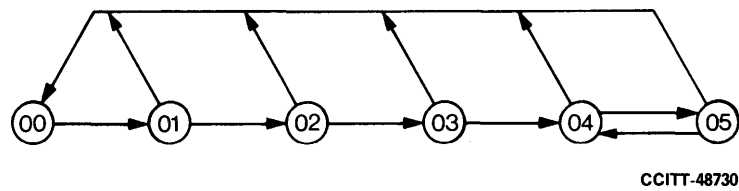
Interworking of Signalling System R1 to No. 6

FIGURE 3/Q.672 (Sheet 2 of 2)

Interworking of Signalling System R1 to No. 6

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM R1 TO No. 7

CCITT-48660

State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for ST	1
02	Wait for address-complete	1
03	Wait for answer	2
04	Answered	2
05	Clear-back	2

FIGURE 1/Q.673

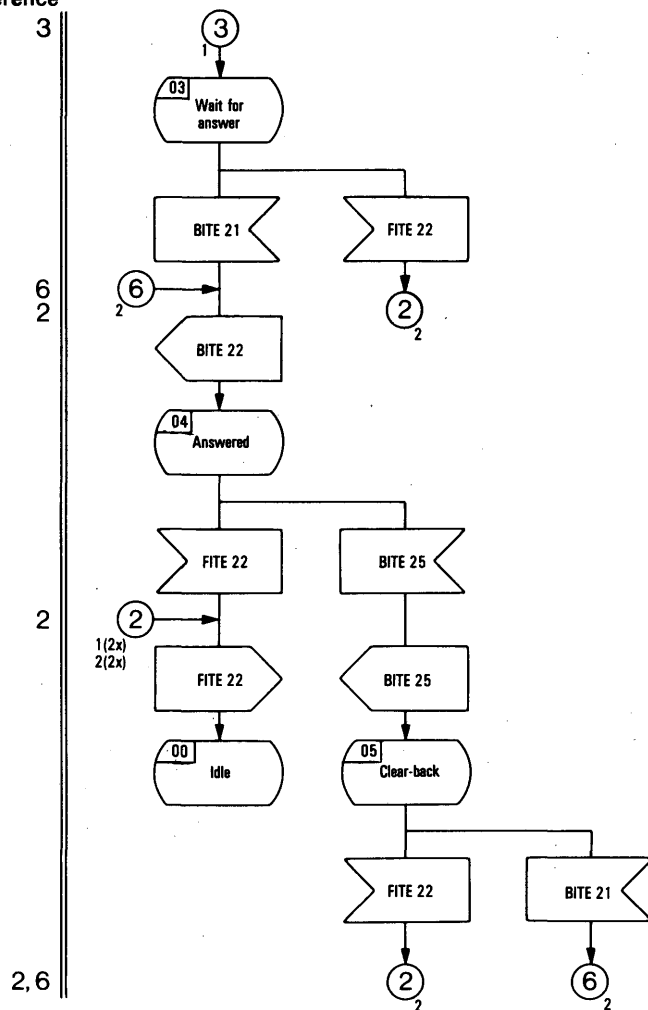State overview diagram for interworking of Signalling System R1 to No. 7

FIGURE 2/Q.673

Notes to interworking of Signalling System R1 to No. 7

(Reserved for future notes)

Connector
reference

1(2x)

01 Wait for ST

FITE 1

FITE 23

BITE 30

5₂

Country
code FITE — Yes

No

SPITE 22 — No

Yes

1₁

FITE 1

No

ST signal

7₁

Yes

02 Wait for
address-
complete

BITEs 2,
3, 4, 5,
6, 7

BITEs 9, 10,
12, 14, 15,
16, 17, 19, 20

FITE 22

BITE 30

BITE 27

BITE 28

5₂

FITE 30

2₂

SPITE 6
Return
appropriate
tone

7₁

00 Idle

CCITT - 60401

00 Idle

Activate
interworking
R1/7

Activate
outgoing
No. 7

SPITE 36 — Yes

No

FITE 25

FITE 26

FITE 24

One of the FITE 9-13 (18, 19)
could be used to replace the
FITE 17 if the call was known
to originate from an operator
position (priority call, data
call) e.g. by analysis of path
of entry, by use of pseudo
country code.

FITE 17

SPITE 22 — Yes

No

FITE 2

FITE 3

SPITE 20 — Yes

No

FITE 20

FITE 21

SPITE 21 — Yes

No

FITE 4

FITE 5

1₁

FIGURE 3/Q.673 (Sheet 1 of 2)

Interworking of Signalling System R1 to No. 7
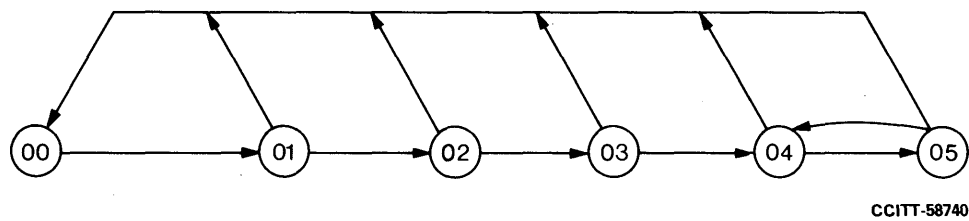
FIGURE 3/Q.673 (Sheet 2 of 2)

Interworking of Signalling System R1 to No. 7

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM R1 TO R2

State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for ST-FITE	1
02	Wait for address-complete	1
03	Wait for answer	2
04	Answered	2
05	Clear-back	2

FIGURE 1/Q.674

State overview diagram for interworking of Signalling System R1 to R2

Procedures not shown

The following procedure not directly relevant to interworking, is not shown in the logic procedures:

P_1 — Procedure for repeat attempt.

FIGURE 2/Q.674

Notes to interworking of Signalling System R1 to R2

FIGURE 3/Q.674 (Sheet 1 of 2)

Interworking of Signalling System R1 to R2

FIGURE 3/Q.674 (Sheet 2 of 2)
Interworking of Signalling System R1 to R2

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM R2 TO No. 4

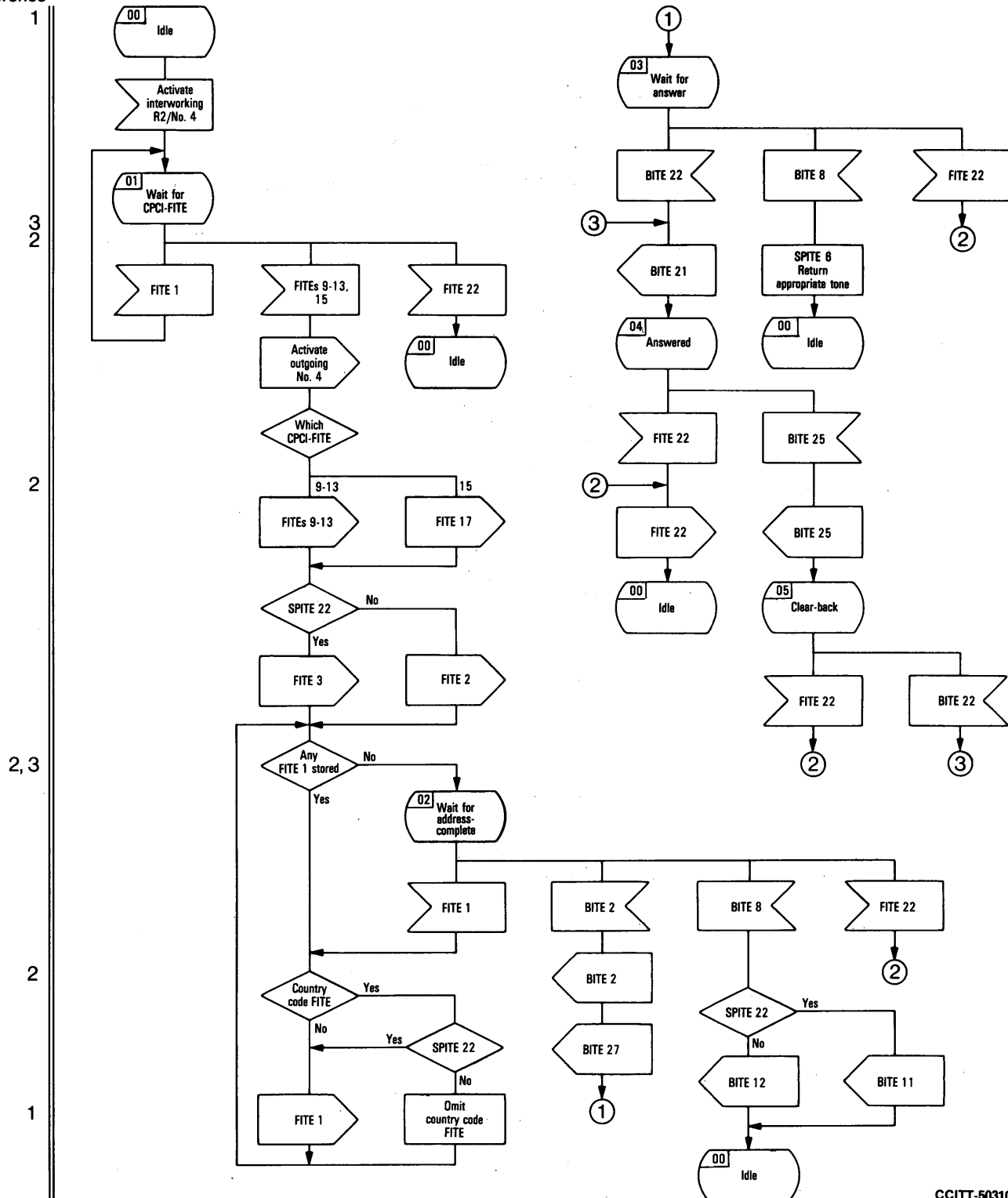CCITT-58740

State number	State description
00	Idle
01	Wait for CPCI-FITE
02	Wait for address-complete
03	Wait for answer
04	Answered
05	Clear-back

FIGURE 1/Q.681

State overview diagram for interworking of Signalling System R2 to No. 4
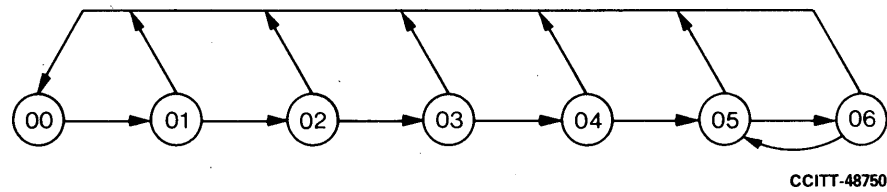
FIGURE 2/Q.681

(Reserved for future notes)

FIGURE 3/Q.681

Interworking of Signalling System R2 to No. 4

CCITT-50310

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM R2 TO No. 5
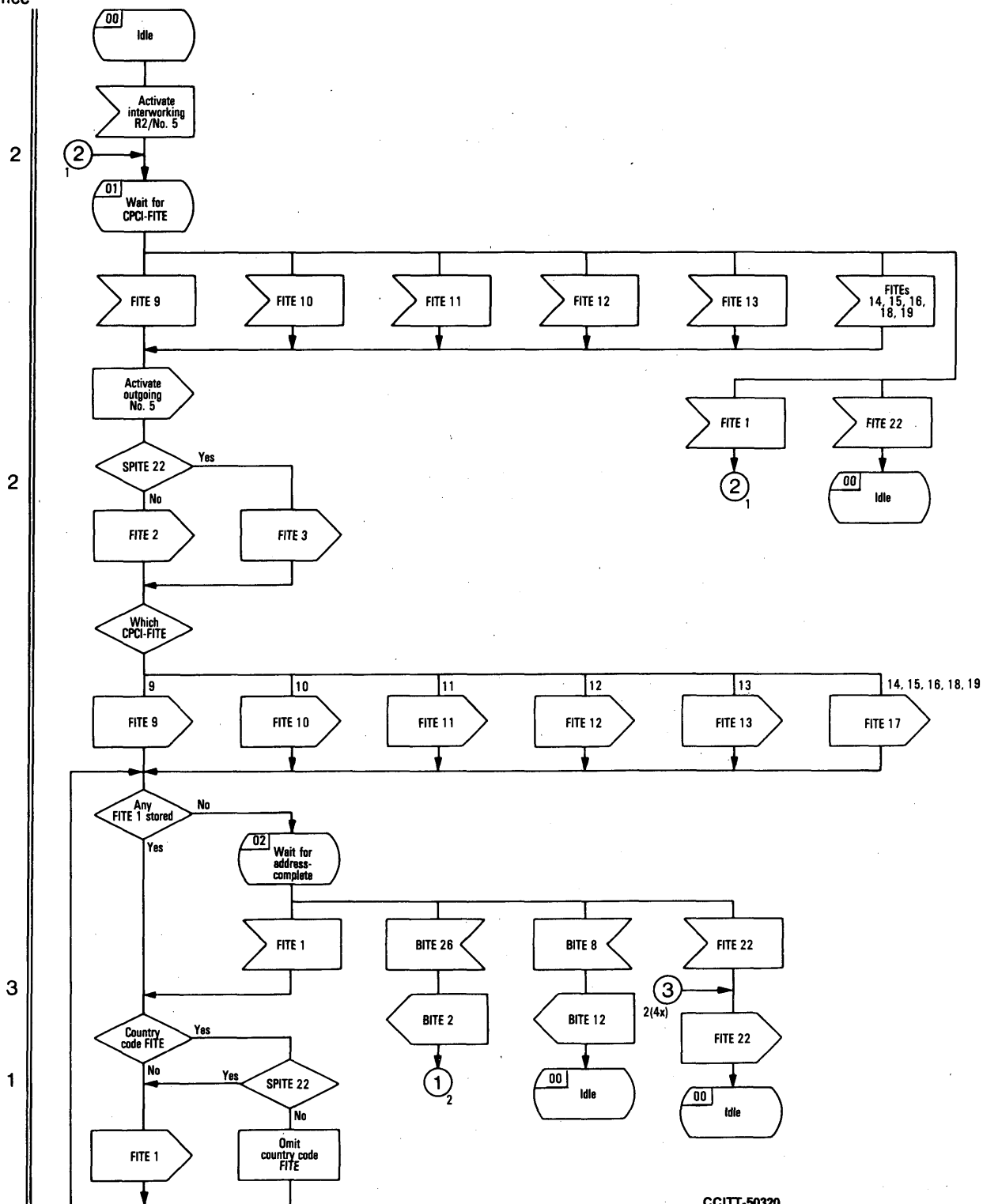

CCITT-48750

State number	State description	Sheet reference
00	Idle	1, 2
01	Wait for CPCI-FITE	1
02	Wait for address-complete	1
03	Wait for register deactivation	2
04	Wait for answer	2
05	Answered	2
06	Clear-back	2

FIGURE 1/Q.682
State overview for interworking of Signalling System R2 to No. 5

FIGURE 2/Q.682
(Reserved for futures notes)

CCITT-50320

FIGURE 3/Q.682 (Sheet 1 of 2)
Interworking of Signalling System R2 to No. 5

Connector
reference
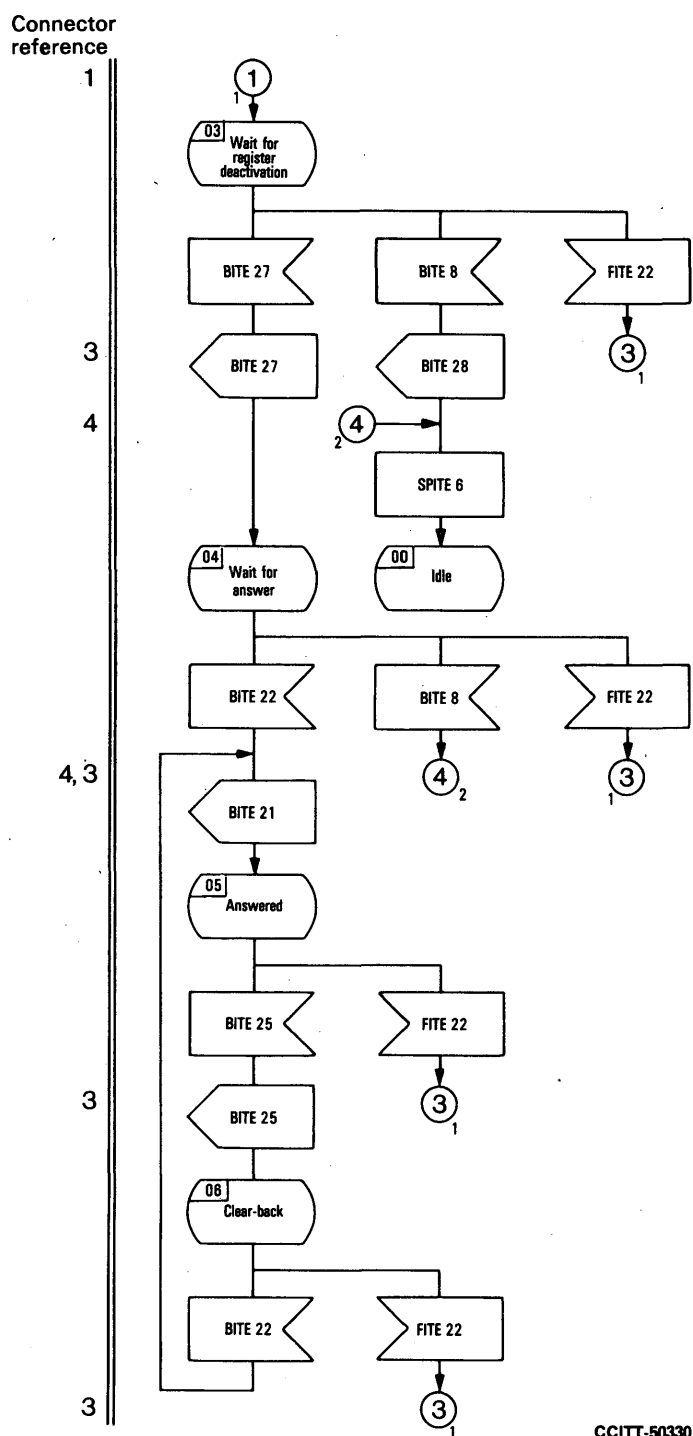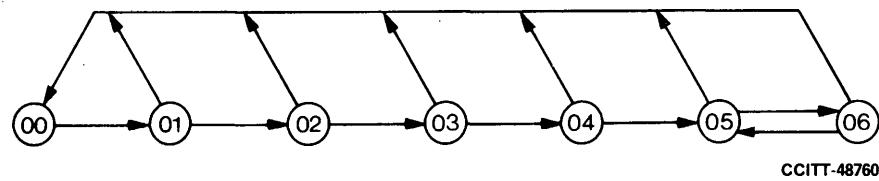
1

③ ①

④ ②

④ ②

③ ①

③ ①

③ ①

③ ①

CCITT-50330

FIGURE 3/Q.682 (Sheet 2 of 2)
Interworking of Signalling System R2 to No. 5

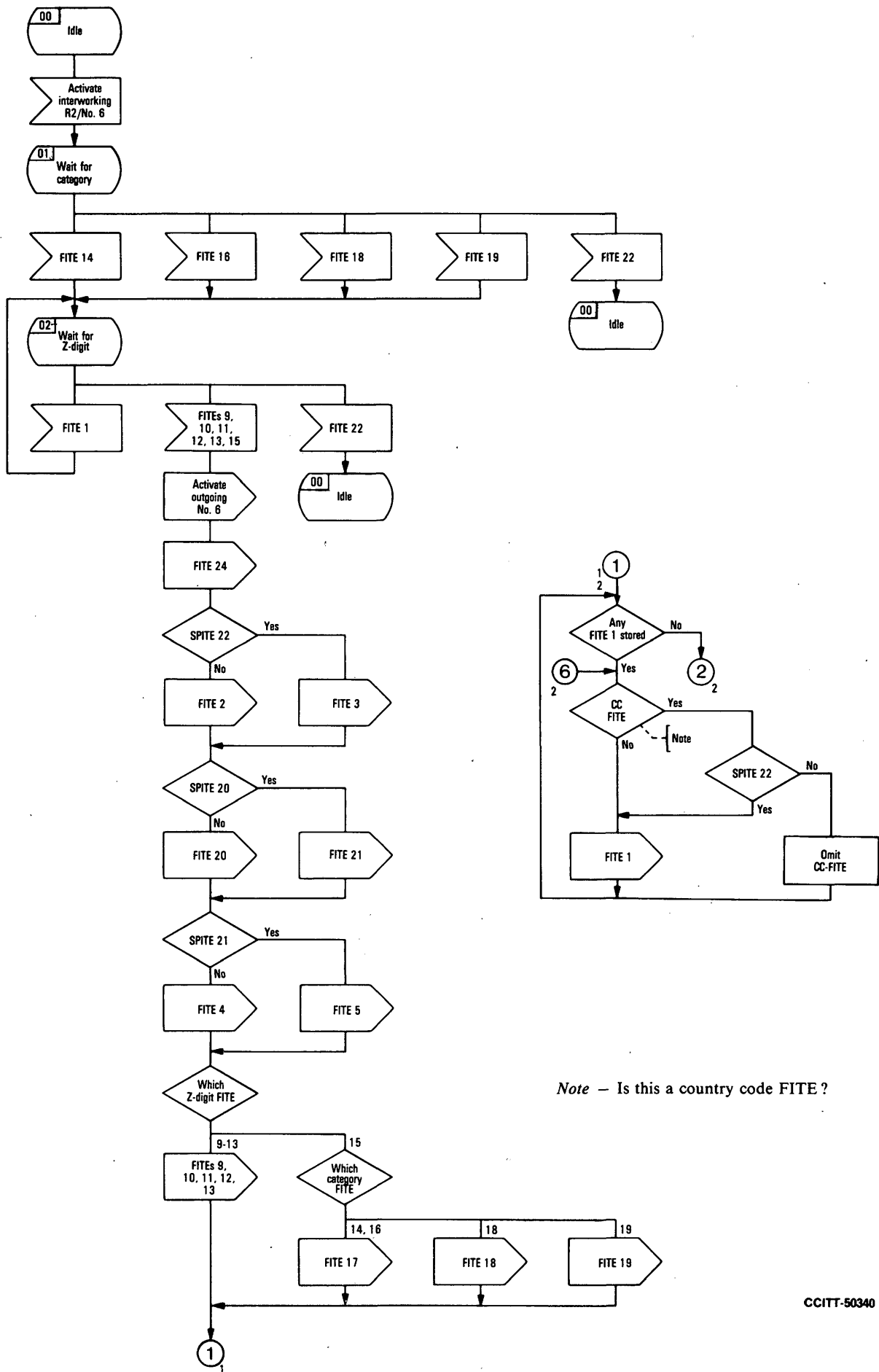## LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM R2 TO No. 6

CCITT-48760

State number	*State description*	*Sheet reference*
00	Idle	1, 2
01	Wait for calling party's category	1
02	Wait for Z-digit	1
03	Wait for address-complete	2
04	Wait for answer	2
05	Answered	2
06	Clear-back	2

FIGURE 1/Q.683

State overview diagram for interworking of Signalling System R2 to No. 6

FIGURE 2/Q.683

(Reserved for future notes)

Idle

00

Activate
interworking
R2/No. 6

01 Wait for
category

FITE 14   FITE 16   FITE 18   FITE 19   FITE 22

00 Idle

02 Wait for
Z-digit

FITE 1   FITEs 9,
10, 11,
12, 13, 15   FITE 22

Activate
outgoing
No. 6

00 Idle

FITE 24

SPITE 22   Yes

No

FITE 2   FITE 3

SPITE 20   Yes

No

FITE 20   FITE 21

SPITE 21   Yes

No

FITE 4   FITE 5

Which
Z-digit FITE

9-13   15

FITEs 9,
10, 11, 12,
13   Which
category
FITE

14, 16   18   19

FITE 17   FITE 18   FITE 19

1

1
2   1

Any
FITE 1 stored   No

6   Yes   2

2   2

CC
FITE   Yes

No   Note

SPITE 22   No

Yes

FITE 1   Omit
CC-FITE

Note — Is this a country code FITE?

CCITT-50340

FIGURE 3/Q.683 (Sheet 1 of 2)

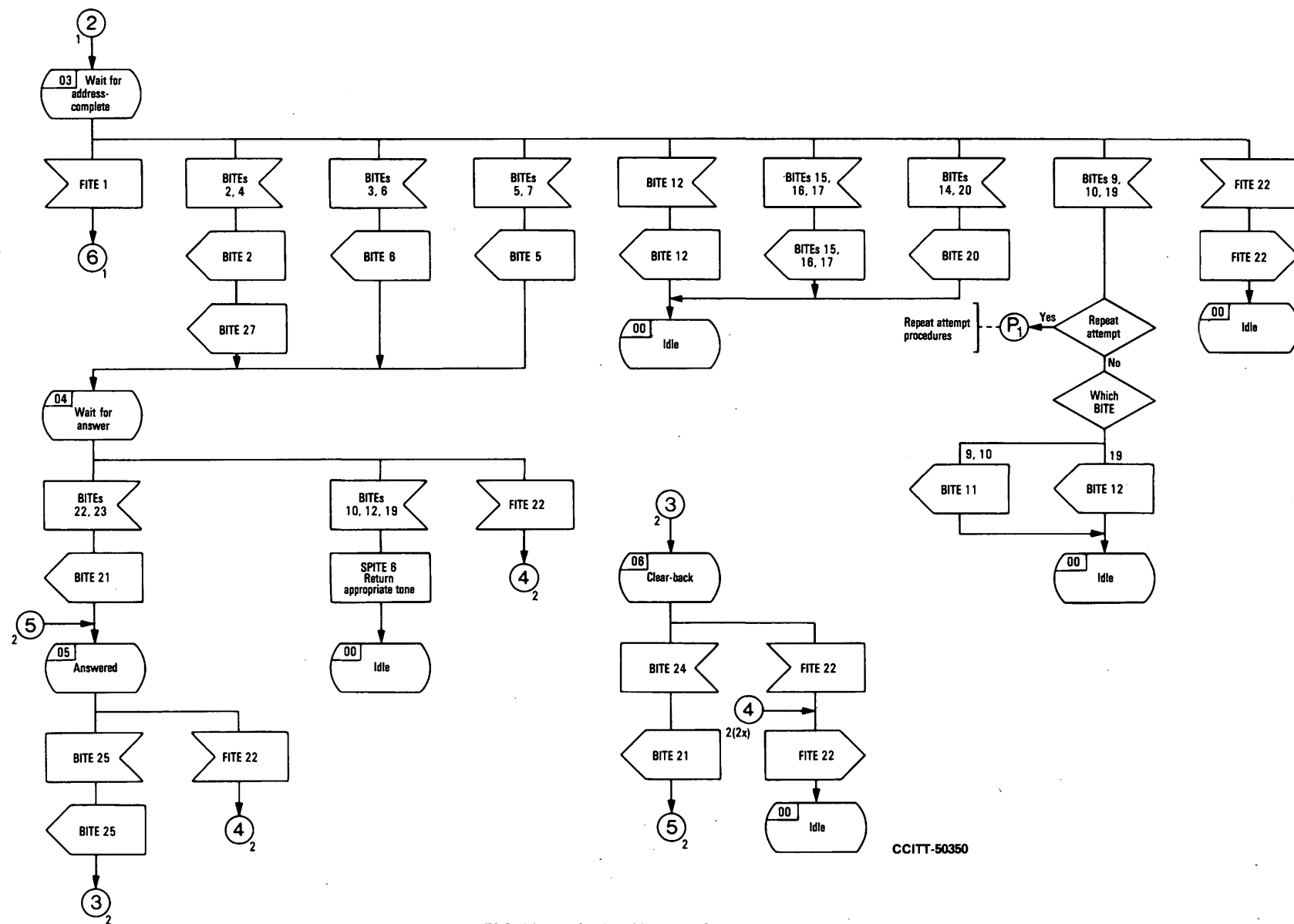**Interworking of Signalling System R2 to No. 6**
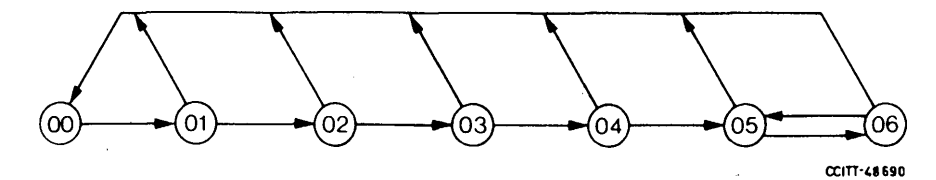
Connector reference labels: 1, 6, 2, 1

FIGURE 3/Q.683 (Sheet 2 of 2)
Interworking of Signalling System R2 to No. 6

CCITT-50350

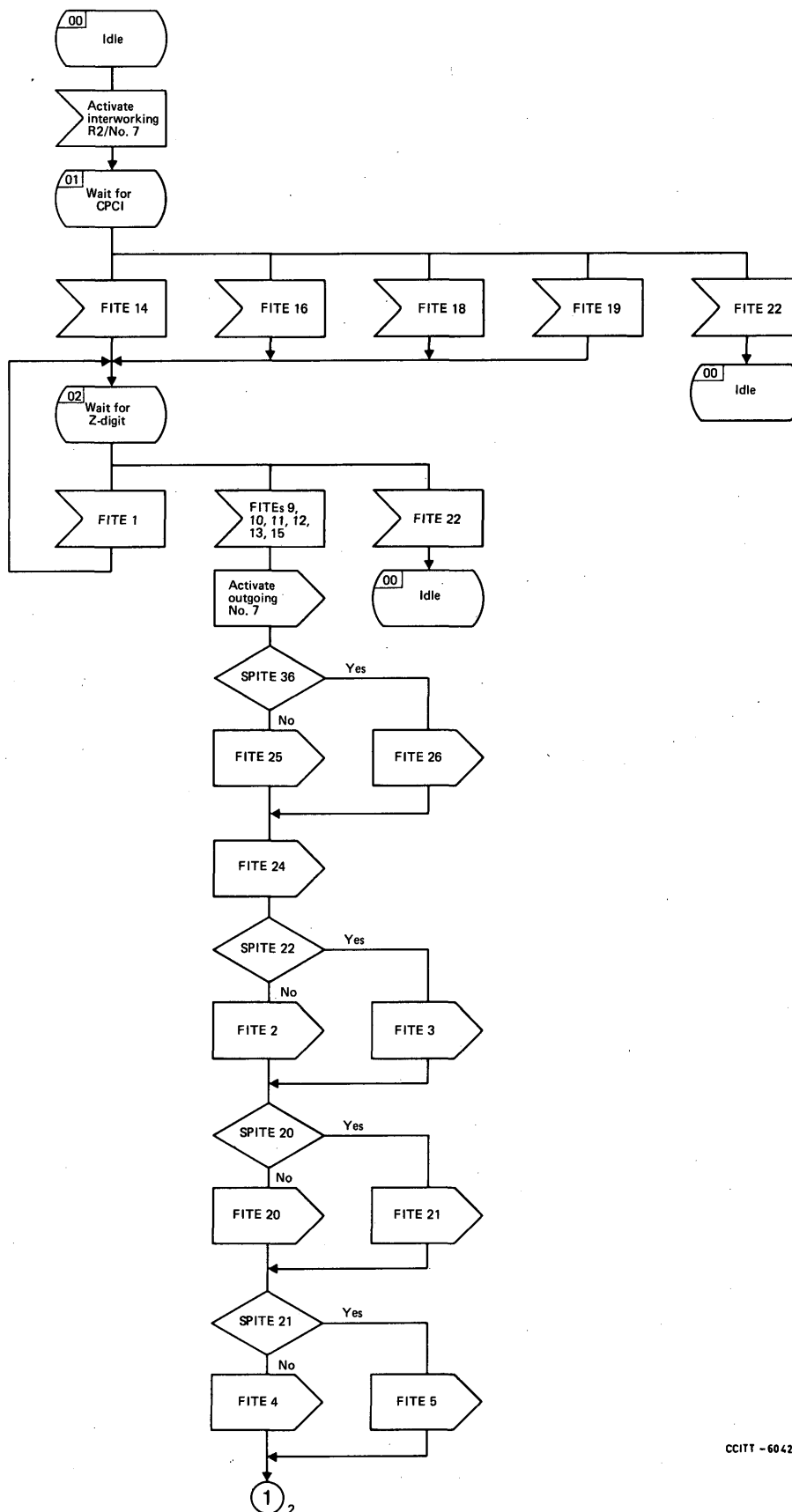## LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM R2 TO No. 7

CCITT-48690

State number	State description	Sheet reference
00	Idle	1, 2, 3
01	Wait for CPCI-FITE	1
02	Wait for Z-digit	1
03	Wait for address-complete	2
04	Wait for answer	2
05	Answered	2
06	Clear-back	3

FIGURE 1/Q.684

State overview diagram for interworking of Signalling System R2 to No. 7

FIGURE 2/Q.684

(Reserved for future notes)

FIGURE 3/Q.684 (Sheet 1 of 3)

Interworking Signalling System R2 to No. 7

CCITT −60421
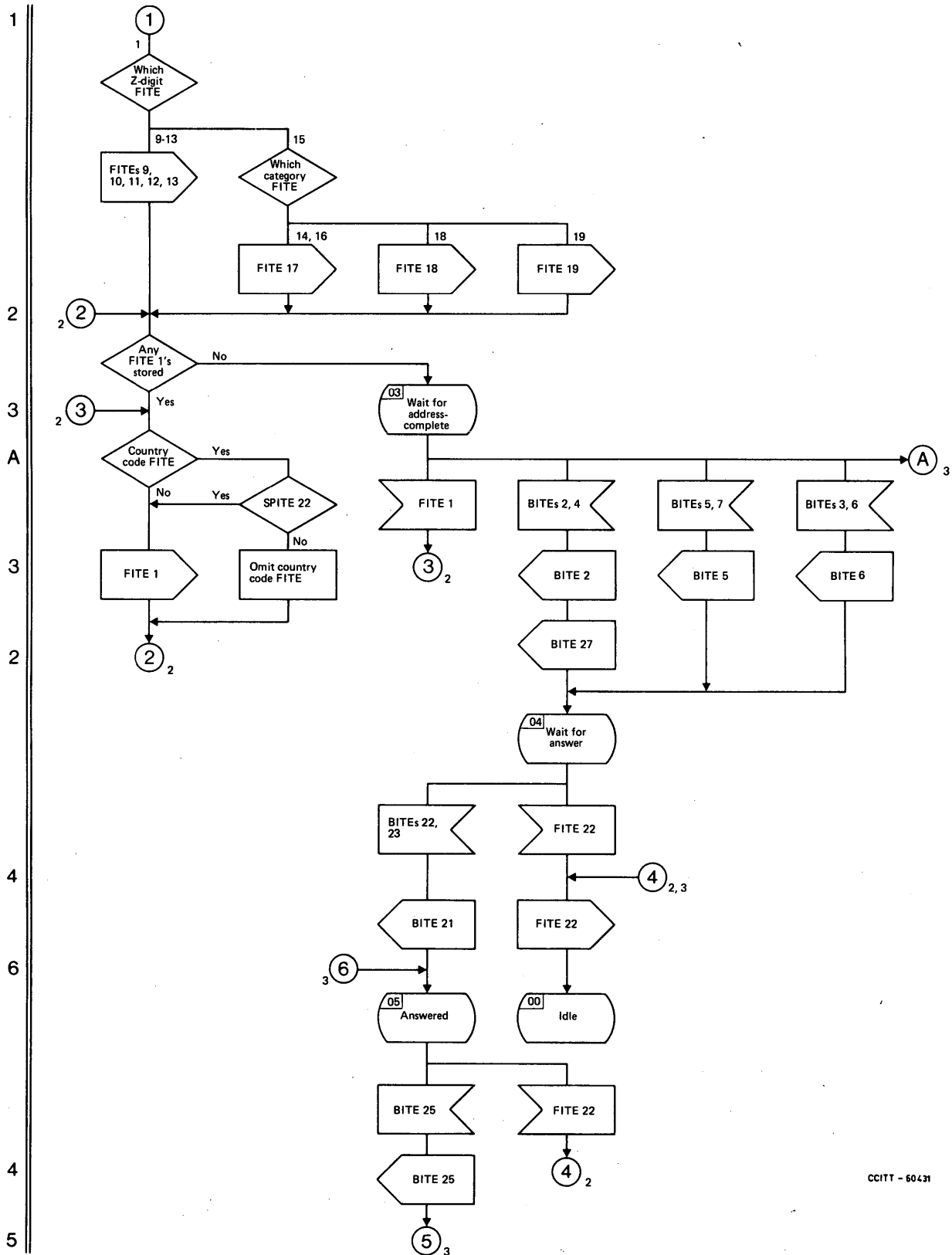
1

①
1

Which
Z-digit
FITE

9-13

15

FITEs 9,
10, 11, 12, 13

Which
category
FITE

14, 16

18

19

FITE 17

FITE 18

FITE 19

2

②
2

Any
FITE 1's
stored

No

3

②
2 ③

Yes

A

Country
code FITE

Yes

No

Yes

SPITE 22

No

3

FITE 1

Omit country
code FITE

2

②
2

03
Wait for
address-
complete

Ⓐ
3

FITE 1

BITEs 2, 4

BITEs 5, 7

BITEs 3, 6

③
2

BITE 2

BITE 5

BITE 6

BITE 27

04
Wait for
answer

BITEs 22,
23

FITE 22

4

BITE 21

FITE 22

④
2, 3

6

3 ⑥

05
Answered

00
Idle

BITE 25

FITE 22

4

BITE 25

④
2

5

⑤
3

CCITT - 60431

FIGURE 3/Q.684 (Sheet 2 of 3)

Interworking Signalling System R2 to No. 7

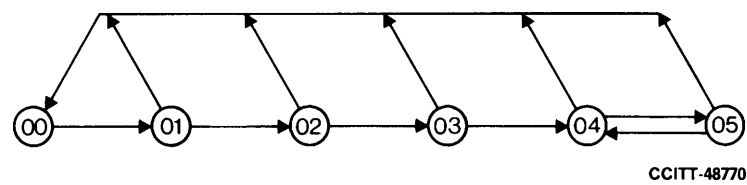Connector
reference
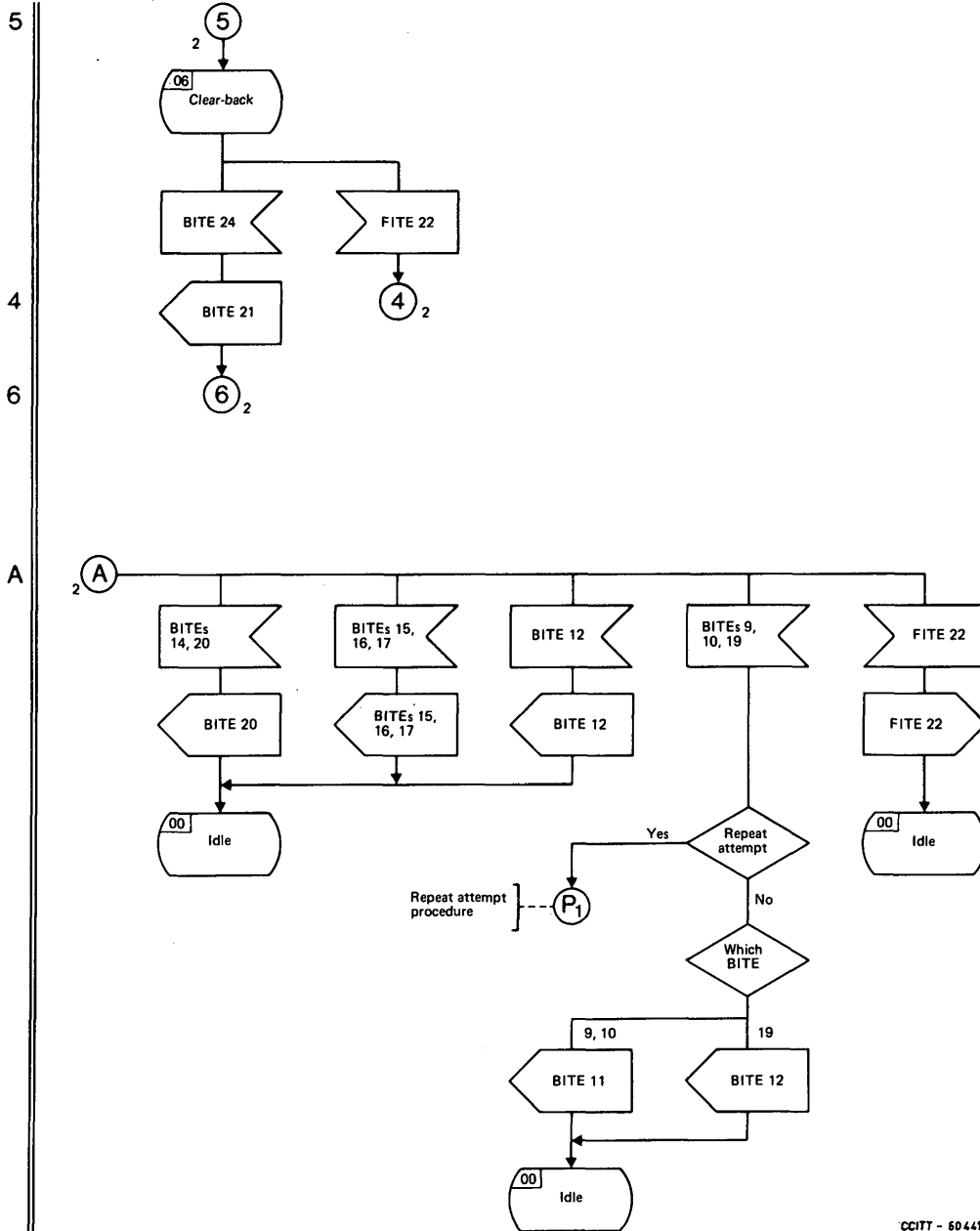
FIGURE 3/Q.684 (Sheet 3 of 3)

Interworking Signalling System R2 to No. 7

LOGIC PROCEDURES FOR INTERWORKING OF SIGNALLING SYSTEM R2 TO R1

CCITT-48770

State number	State description	Sheet reference
00	Idle	1
01	Wait for address-complete	1
02	Wait for register deactivation	1
03	Wait for answer	1
04	Answered	1
05	Clear-back	1

FIGURE 1/Q.685

State overview diagram for interworking of Signalling System R2 to R1

Procedures not shown

Procedure P_1 is not described because no procedure is specified at present in the Signalling System R1 specifications.

FIGURE 2/Q.685

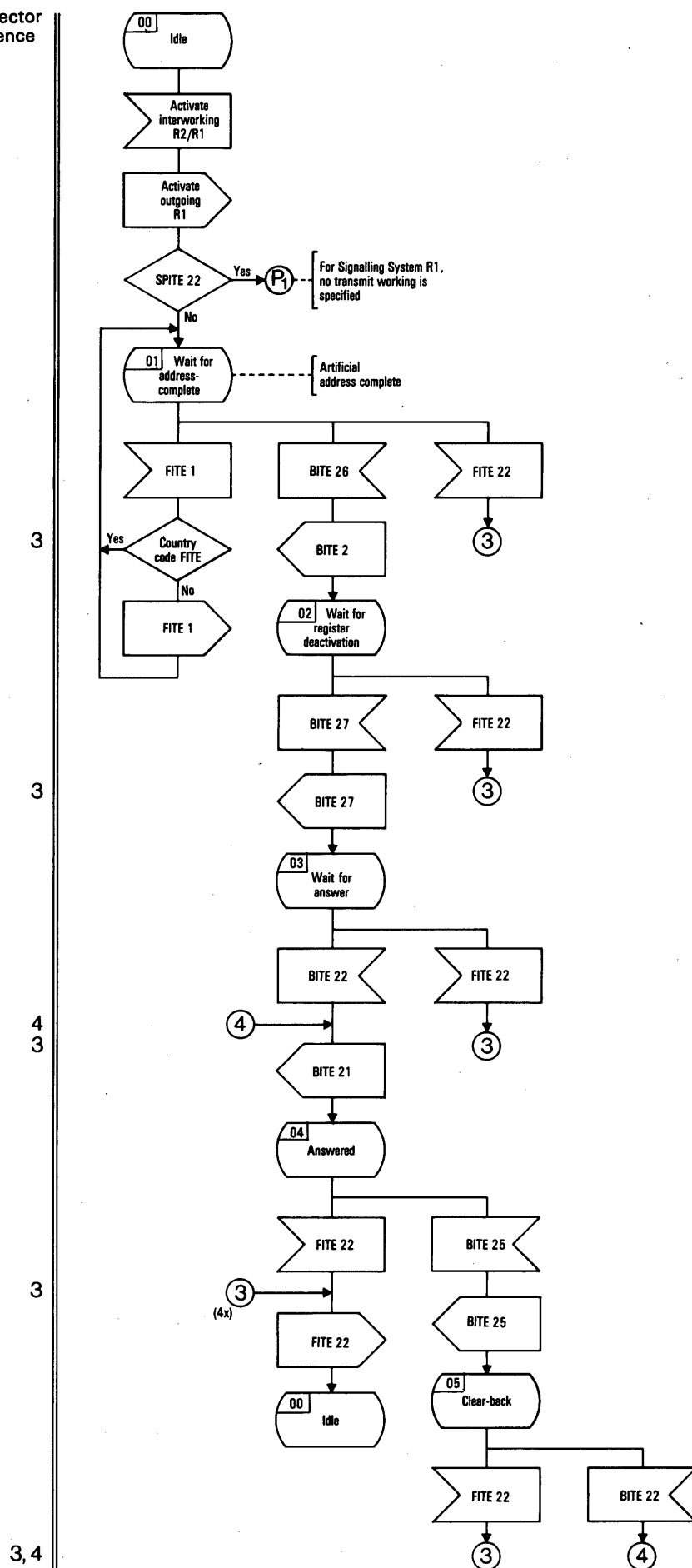**Notes to interworking of Signalling System R2 to R1**

FIGURE 3/Q.685

Interworking of Signalling System R2 to R1

CCITT-50360