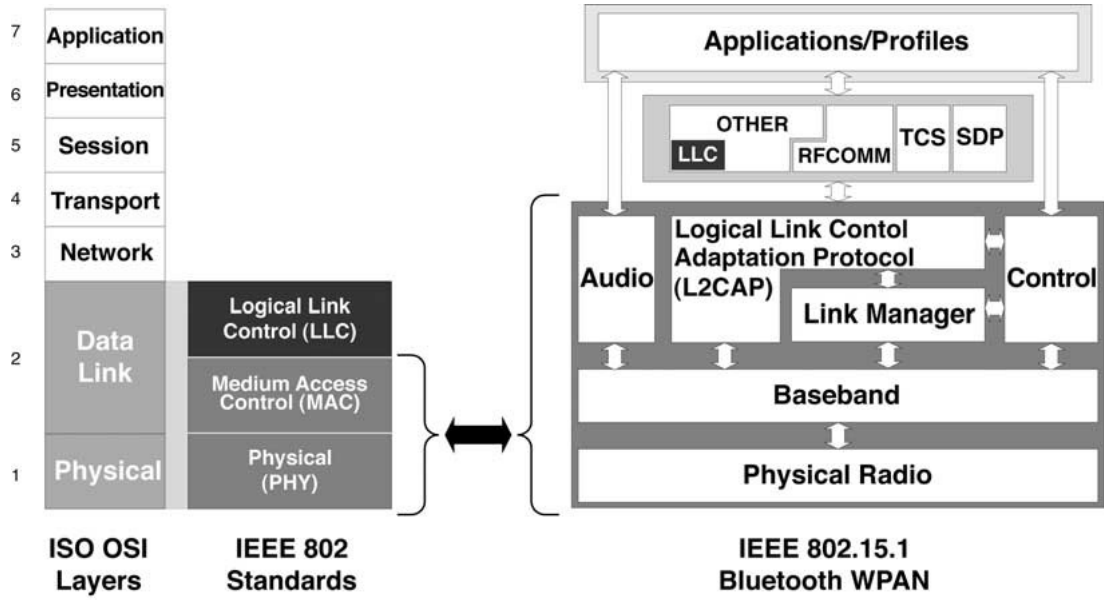


Figure 143—OSI and Bluetooth protocols

The following concepts are discussed in this clause:

a) **Data link layer:** The conceptual layer of control or processing logic existing in the hierarchical structure of a station that is responsible for maintaining control of the data link. The data link layer functions provide an interface between the station higher-layer logic and the data link. These functions include address/control field interpretation, channel access and command, PDU/response, PDU generation, sending, and interpretation.

b) **LLC sublayer:** The part of a data station that supports the logical link control functions of one or more logical links. The LLC generates command PDUs and response PDUs for sending and interprets received command PDUs and response PDUs. Specific responsibilities assigned to an LLC include the following:

   1) Initiation of control signal interchange

   2) Organization of data flow

   3) Interpretation of received command PDUs and generation of appropriate response PDUs

   4) Actions regarding error control and error recovery functions in the LLC sublayer

c) **MAC sublayer:** The part of a data station that supports the MAC functions that reside just below the LLC sublayer. The MAC procedures include framing/deframing data units, performing error checking, and acquiring the right to use the underlying physical medium.

d) **LLC sublayer service specifications to the mac sublayer:** The service specifications to the MAC sublayer provide a description of the services the LLC sublayer requires of the MAC sublayer. These services are defined to be independent of the form of the medium access methodology and the nature of the medium itself. All the above service specifications are given in the form of primitives that represent in an abstract way the logical exchange of information and control between the LLC sublayer and the identified service function (MAC sublayer). They do not specify or constrain the implementation of entities or interfaces.

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e) **Type of operation:** One type of data link control (DLC) operation. “Type 1” data link control operation provides a data-link-connectionless-mode service across a data link with minimum protocol complexity. This type of operation may be useful when higher layers provide any essential recovery and sequencing services so that these layers do not need replicating in the data link layer. In addition, this type of operation may prove useful in applications where it is not essential to guarantee the delivery of every data link layer data unit. This type of service is described in this section in terms of logical data links.

   With Type 1 operation, PDUs shall be exchanged between LLCs without the need for the establishment of a data link connection. In the LLC sublayer, these PDUs shall not be acknowledged, and there shall not be any flow control or error recovery in Type 1 operation.

f) **Class of operation:** One class of LLC operation. Class I provides data-link-connectionless-mode service only.

   Class I LLCs shall support Type 1 operation only. Class I service shall be applicable to individual, group, global, and null DSAP addressing and applications requiring no data link layer (DLL) acknowledgment or flow control procedures.

   The basic protocols described here are peer protocols for use in multistation, multiaccess environments. Because of the multistation, multiaccess environment, it shall be possible for a station to be involved in a multiplicity of peer protocol data exchanges with a multiplicity of different stations over a multiplicity of different logical data links and/or data link connections that are carried by a single PHY over a single physical medium. Each unique to–from pairing at the data link layer shall define a separate logical data link or data link connection with separate logical parameters and variables. Except where noted, the procedures described shall relate to each data link layer logical data link or data link connection separately and independently of any other logical data link or data link connection that may exist at the stations involved.

12.1.1 LLC sublayer service specifications (General)

This subclause covers the services required of, or by, the MAC sublayer. In general, the services of a layer (or sublayer) are the capabilities it offers a user in the next higher layer (or sublayer). To provide its service, a layer (or sublayer) builds its functions on the services it requires from the next lower layer (or sublayer). Figure 144 illustrates this notion of service hierarchy and shows the relationship of the two correspondent *N* users and their associated *N* layer (or sublayer) peer protocol entities.

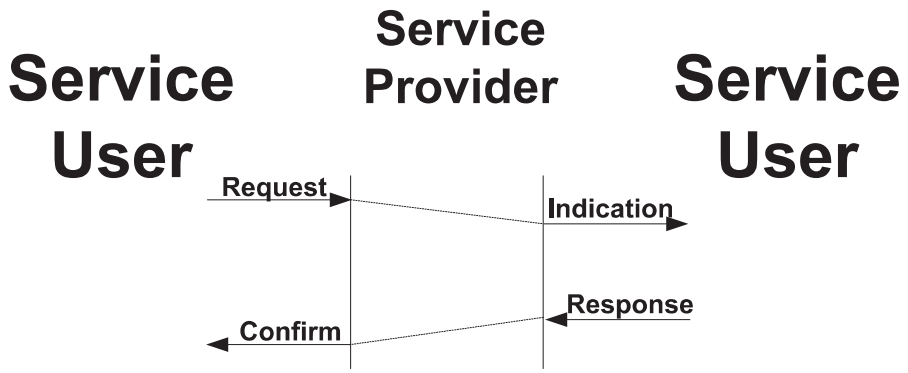


Figure 144—Service primitives

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Services are specified by describing the information flow between the *N* user and the *N* layer (or sublayer). This information flow is modeled by discrete, instantaneous events that characterize the provision of a service. Each event consists of passing a service primitive from one layer (or sublayer) to the other through an *N* layer (or sublayer) service access point associated with an *N* user. Service primitives convey the information required in providing a particular service. These service primitives are an abstraction in that they specify only the service provided rather than the means by which that service is provided. This definition of service is independent of any particular interface implementation.

Services are specified by describing the service primitives and parameters that characterize each service. A service may have one or more related primitives that constitute the activity that is related to that service. Each service primitive may have zero or more parameters that convey the information required to provide that service.

Primitives are of four generic types as follows:

a) **REQUEST:** The request primitive is passed from the *N* user to the *N* layer (or sublayer) to request that a service be initiated.

b) **INDICATION:** The indication primitive is passed from the *N* layer (or sublayer) to the *N* user to indicate an internal *N* layer (or sublayer) event that is significant to the *N* user. This event may be logically related to a remote service request or may be caused by an event internal to the *N* layer (or sublayer).

c) **RESPONSE:** The response primitive is passed from the *N* user to the *N*-layer (or sublayer) to complete a procedure previously invoked by an indication primitive.

d) **CONFIRM:** The confirm primitive is passed from the *N* layer (or sublayer) to the *N*-user to convey the results of one or more associated previous service request(s).

Possible relationships among primitive types are illustrated by the time-sequence diagrams shown in Figure 145. The figure also indicates the logical relationship of the primitive types. Primitive types that occur earlier in time and are connected by dotted lines in the diagrams are the logical antecedents of subsequent primitive types.

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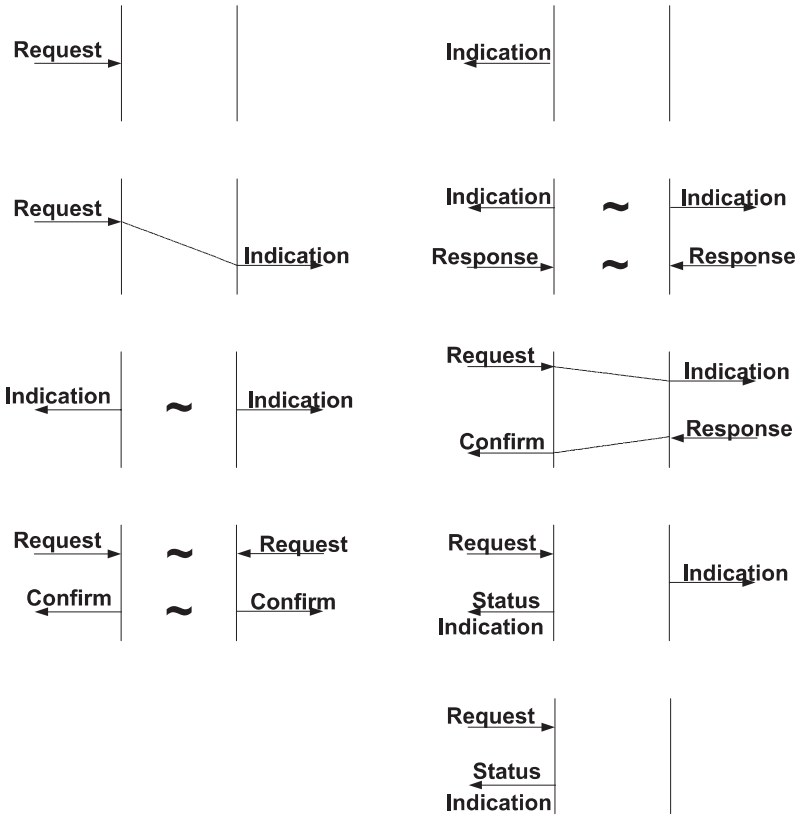


Figure 145—Sequence diagrams

12.2 LLC sublayer/MAC sublayer interface service specification

This subclause specifies the services required of the MAC sublayer by the LLC sublayer to allow the local LLC sublayer entity to exchange LLC data units with peer LLC sublayer entities. The services are described in an abstract way and do not imply any particular implementation or any exposed interface.

NOTE—Work is in progress to produce a single-service specification common to all the MAC sublayers. When this is available, it will be referenced in this Standard instead of the current MAC service text.

The interactions described are as follows:

— MA-UNITDATA request

— MA-UNITDATA indication

— MA-UNITDATA-STATUS indication

12.2.1 MA-UNITDATA request

12.2.1.1 Function

This primitive requests the transfer of an MSDU from a local LLC sublayer entity to a single peer LLC sublayer entity or multiple peer LLC sublayer entities in the case of group addresses.

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12.2.1.2 Semantics of the service primitive

The primitive shall provide parameters as follows:

MA-UNITDATA request (

source_address,
destination_address,
routing_information,
data,
priority,
service_class
)

The source_address parameter shall specify an individual MAC sublayer entity address. The destination_address parameter shall specify either an individual or a group MAC sublayer entity address. Together they shall contain sufficient information to create the source address (SA) and destination address (DA) fields that are appended to the LLC service data unit (SDU) by the local MAC sublayer entity as well as any physical layer address information (e.g., transmit frequency in broadband applications). The routing_information parameter specifies the route desired for the data unit transfer (a null value indicates that source routing is not to be used). The data parameter specifies the MAC service data unit to be transmitted by the MAC sublayer entity, which includes the DSAP, SSAP, C, and information (if present) fields as specified in Clause 3 of ISO/IEC 8802-2:1998(E), as well as sufficient information for the MAC sublayer entity to determine the length of the data unit. The priority parameter specifies the priority desired for the data unit transfer. The service_class parameter specifies the class of service desired for the data unit transfer.

12.2.1.3 When generated

This primitive is generated by the LLC sublayer entity to request that an MSDU be transferred to a peer LLC sublayer entity or entities. This can occur as a result of a request from higher layers of protocol or from an LSDU generated internally in the LLC sublayer, such as that required by Type 2 operation.

12.2.1.4 Effect on receipt

The receipt of this primitive shall cause the MAC sublayer entity to append all MAC-specified fields, including DA, SA, and any fields that are unique to the particular medium access method, and pass the properly formatted frame to the lower layers of protocol for transfer to the peer MAC sublayer entity or entities for subsequent transfer to the associated LLC sublayer(s).

12.2.1.5 Additional comments

A possible logical sequence of primitives associated with successful MAC service data unit transfer is illustrated in Figure 145.

12.2.2 MA-UNITDATA indication

12.2.2.1 Function

This primitive defines the transfer of an MSDU from the MAC sublayer entity to the LLC sublayer entity or entities in the case of group addresses. In the absence of errors, the contents of the data parameter are logically complete and unchanged relative to the data parameter in the associated MA-UNITDATA request primitive.

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12.2.2.2 Semantics of the service primitive

The primitive shall provide parameters as follows:

MA-UNITDATA indication (

source_address,
destination_address,
routing_information,
data,
reception_status,
priority,
service_class
)

The source_address parameter shall specify an individual address as specified by the SA field of the incoming frame. The destination_address parameter shall be either an individual or a group address as specified by the DA field of the incoming frame. The routing_information parameter specifies the route used for the data unit transfer (for MAC sublayers that do not support source routing, this field will be set to null). The data parameter specifies the MAC service data unit as received by the local MAC entity. The reception_status parameter indicates the success or failure of the incoming frame. The priority parameter specifies the priority desired for the data unit transfer. The service_class parameter specifies the class of service desired for the data unit transfer.

12.2.2.3 When generated

The MA-UNITDATA indication primitive is passed from the MAC sublayer entity to the LLC sublayer entity or entities to indicate the arrival of a frame at the local MAC sublayer entity. Frames are reported only if, at the MAC sublayer, they are validly formatted and received without error and their destination address designates the local MAC sublayer entity.

12.2.2.4 Effect on receipt

The effect on receipt of this primitive by the LLC sublayer is dependent on the validity and content of the frame.

12.2.2.5 Additional comments

If the local MAC sublayer entity is designated by the destination_address parameter of an MA-UNITDATA request primitive, the indication primitive will also be invoked by the MAC sublayer entity to the local LLC sublayer entity. This full-duplex characteristic of the MAC sublayer may be due to unique functionality within the MAC sublayer or full-duplex characteristics of the lower layers (e.g., all frames transmitted to the broadcast address will invoke MA-UNITDATA indication primitives at all stations in the network, including the station that generated the request).

12.2.3 MA-UNITDATA-STATUS indication

12.2.3.1 Function

This primitive has local significance and shall provide the LLC sublayer with status information for a previous associated MA-UNITDATA request primitive.

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12.2.3.2 Semantics of the service primitive

The primitive shall provide parameters as follows:

MA-UNITDATA-STATUS indication (

source_address,
destination_address,
transmission_status,
provided_priority,
provided_service_class
)

The source_address parameter shall be an individual MAC sublayer entity address as specified in the associated MA-UNITDATA request primitive. The destination_address parameter shall be either an individual or a group MAC sublayer entity address as specified in the associated MA-UNITDATA request primitive. The Transmission_Status parameter is used to pass status information back to the local requesting LLC sublayer entity. The types of status that can be associated with this primitive are dependent on the particular imple-mentation as well as the type of MAC sublayer that is used (e.g., “excessive collisions” may be a status returned by a CSMA/CD MAC sublayer entity). The provided_priority parameter specifies the priority that was used for the associated data unit transfer. The provided_service_class parameter specifies the class of service provided for the data unit transfer.

12.2.3.3 When generated

The MA-UNITDATA-STATUS indication primitive is passed from the MAC sublayer entity to the LLC sublayer to indicate the status of the service provided for a previous associated MA-UNITDATA request primitive.

12.2.3.4 Effect on receipt

The effect on receipt of this primitive by the LLC sublayer is dependent on the type of operation employed by the LLC sublayer entity.

12.2.3.5 Additional comments

It is assumed that sufficient information is available to the LLC sublayer entity to associate the status with the appropriate request.

12.3 Bluetooth interfaces

Figure 146 illustrates the events and actions performed by an implementation of the L2CAP layer. Client and server SAPs simply represent the initiator of the request and the acceptor of the request, respectively. An application-level client would both initiate and accept requests. The naming convention is as follows. The interface between two layers (vertical interface) uses the prefix of the lower layer offering the service to the higher layer, e.g., L2CA. The interface between two entities of the same layer (horizontal interface) uses the prefix of the protocol (adding a P to the layer identification), e.g., L2CAP. Events coming from above are called requests (Req), and the corresponding replies are called confirms (Cfm). Events coming from below are called indications (Ind), and the corresponding replies are called responses (Rsp). Responses that require further processing are called pending (Pnd). The notation for confirms and responses assumes positive replies. Negative replies are denoted by a “Neg” suffix such as L2CAP_ConnectCfmNeg.

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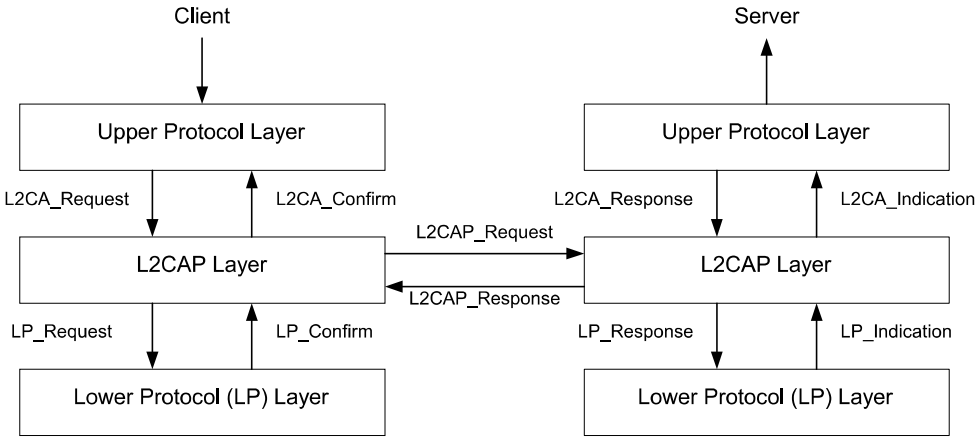


Figure 146—L2CAP actions and events

While requests for an action always result in a corresponding confirmation (for the successful or unsuccessful satisfaction of the action), indications do not always result in corresponding responses. This is especially true if the indications are informative about locally triggered events, e.g., seeing the LP_QoSViolationInd or L2CA_TimeOutInd.

12.3.1 Message Sequence chart of layer interactions

Figure 147 uses a message sequence chart to illustrate the normal sequence of events. The two outer vertical lines represent the L2CA interface on the initiator (the device issuing a request) and the acceptor (the device responding to the initiator's request). Request commands at the L2CA interface result in Requests defined by the protocol. When the protocol communicates the request to the acceptor, the remote L2CA entity presents the upper protocol with an Indication. When the acceptor's upper protocol responds, the response is packaged by the protocol and communicated back the to initiator. The result is passed back to the initiator's upper protocol using a confirm message.

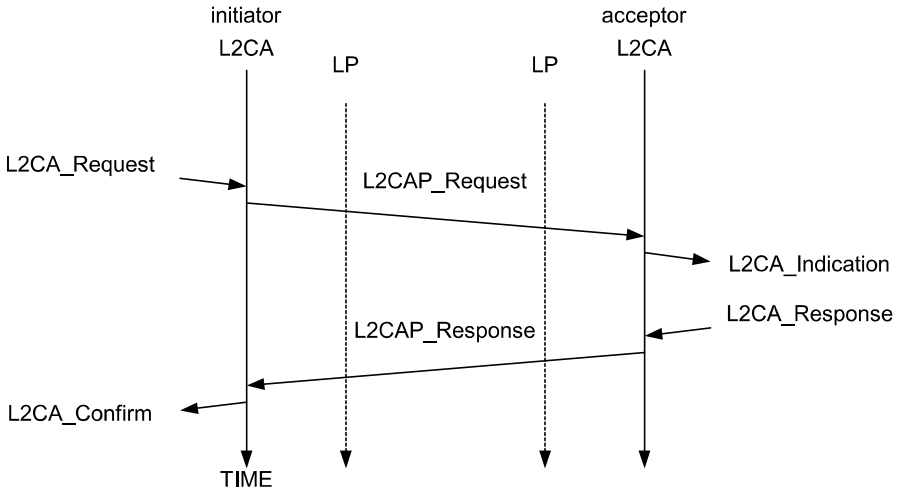


Figure 147—L2CA interaction

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12.3.2 Relationship of Bluetooth protocol entities to IEEE 802 constructs

Figure 148 shows a mapping of the IEEE 802 protocol concepts to the Bluetooth components described in this Standard. The PHY is all of the Radio portion and part of the Baseband. The MAC contains the L2CAP and the rest of the Baseband. The Link Manager, Link Manager Protocol, and HCI functions form the MAC Management function. The PHY Management functions, like synchonization and generation of various frequency hopping sequences generation, are incorporated within the Baseband.

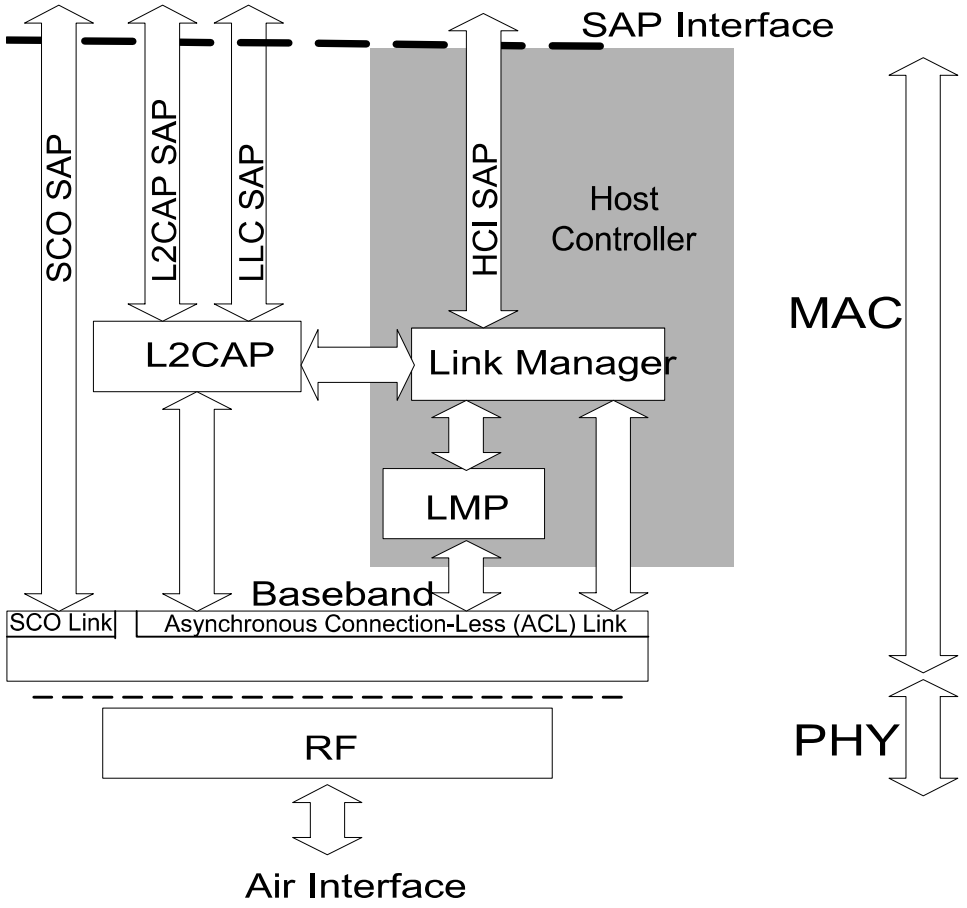


Figure 148—Bluetooth protocol entities mapped onto IEEE 802 constructs

12.3.2.1 Client SAP interface (Upper-layer) to L2CAP request event primitives (10.3.1.4):

L2CA_ConnectReq (10.3.1.4 and 10.7.3)
L2CA_ConfigReq (10.3.1.4 and 10.7.4)
L2CA_DisconnectReq (10.3.1.4 and 10.7.6)
L2CA_DataWrite (10.3.1.4 and 10.7.7)
L2CA_DataRead (10.7.9 and 10.7.8)
L2CA_GroupCreate (10.7.9)
L2CA_GroupClose (10.7.10)
L2CA_GroupAddMember (10.7.11)
L2CA_GroupRemoveMember (10.7.12)
L2CA_GroupMembership (10.7.13)
L2CA_Ping (10.7.14)
L2CA_InfoReq (implied by L2CA_GetInfo primitive 10.7.15)
L2CA_DisableCLT (10.7.16)
L2CA_EnableCLT (10.7.17)

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12.3.2.2 Server SAP interface (Upper-layer) to L2CAP response events primitives (10.3.1.4):

L2CA_ConnectRsp (10.3.1.4 and 10.7.3)
L2CA_ConnectRspNeg (10.3.1.4 implied by response parameter of the L2CA_ConnectRsp primitive)
L2CA_ConnectPnd (10.3.2.4 implied by response parameter of the L2CA_ConnectRsp primitive)
L2CA_ConfigRsp (10.3.1.4 and 10.7.5)
L2CA_ConfigRspNeg (10.3.1.4 implied by result parameter of the L2CA_ConfigRsp primitive)
L2CA_DisconnectRsp (10.3.1.4 implied by result parameter of the L2CA_Disconnect_Req primitive)
L2CA_DataWriteRsp (implied by result parameter of the L2CA_DataWrite primitive)
L2CA_DataReadRsp (implied by result parameter of the L2CA_DataRead primitive)
L2CA_GroupCloseRsp (implied by result parameter of the L2CA_GroupClose primitive)
L2CA_GroupAddMemberRsp (implied by result parameter of L2CA_GroupAddMember primitive)
L2CA_GroupRemoveMemberRsp (implied by result parameter of L2CA_GroupRemoveMember primitive)
L2CA_GroupMembershipRsp (implied by result parameter of L2CA_GroupMembership primitive)
L2CA_EchoRsp (implied by result parameter of L2CA_Ping primitive)
L2CA_InfoRsp (implied by L2CA_GetInfo primitive 10.7.15)
L2CA_DisableCLTRsp (implied by result parameter of L2CA_DisableCLT primitive)
L2CA_EnableCLTRsp (implied by result parameter of L2CA_EnableCLT primitive)

12.3.2.3 L2CAP to client SAP interface (Upper-layer) action primitives (10.3.2.4):

L2CA_ConnectCfm (10.3.2.4)
L2CA_ConnectCfmNeg (10.3.2.4)
L2CA_ConfigCfm (10.3.2.4)
L2CA_ConfigCfmNeg (10.3.2.4)
L2CA_DisconnectCfm (10.3.2.4)

12.3.2.4 L2CAP to server SAP interface (Upper-layer) event indication primitives (10.7.1):

L2CA_ConnectInd (10.3.2.4)
L2CA_ConfigInd (10.3.2.4)
L2CA_DisconnectInd (10.3.2.4)
L2CA_QosViolationInd (10.3.2.4)
L2CA_TimeOutInd (10.3.2.4)

12.3.2.5 HCI SAP primitives:

HCI_Inquiry (11.2.5.1)
HCI_Inquiry_Cancel (11.2.5.2)
HCI_Periodic_Inquiry_Mode (11.2.5.3)
HCI_Exit_Periodic_Inquiry_Mode (11.2.5.4)
HCI_Create_Connection (11.2.5.5)
HCI_Disconnect (11.2.5.6)
HCI_Add_SCO_Connection (11.2.5.7)
HCI_Accept_Connection_Request (11.2.5.8)
HCI_Reject_Connection_Request (11.2.5.9)
HCI_Link_Key_Request_Reply (11.2.5.10)
HCI_Link_Key_Request_Negative_Reply (11.2.5.11)
HCI_PIN_Code_Request_Reply (11.2.5.12)
HCI_PIN_Code_Request_Negative_Reply (11.2.5.13)
HCI_Change_Connection_Packet_Type (11.2.5.14)
HCI_Authentication_Requested (11.2.5.15)
HCI_Set_Connection_Encryption (11.2.5.16)
HCI_Change_Connection_Link_Key (11.2.5.17)
HCI_Master_Link_Key (11.2.5.18)
HCI_Remote_Name_Request (11.2.5.19)
HCI_Read_Remote_Supported_Features (11.2.5.20)
HCI_Read_Remote_Version_Information (11.2.5.21)
HCI_Read_Clock_Offest (11.2.5.22)
HCI_Hold_Mode (11.2.6.1)
HCI_Sniff_Mode (11.2.6.2)
HCI_Exit_Sniff_Mode (11.2.6.3)

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HCI_Park_Mode (11.2.6.4)
HCI_Exit_Park_Mode (11.2.6.5)
HCI_Qos_Setup (11.2.6.6)
HCI_Role_Discovery (11.2.6.7)
HCI_Switch_Role (11.2.6.8)
HCI_Read_Link_Policy_Settings (11.2.6.9)
HCI_Write_Link_Policy_Settings (11.2.6.10)
HCI_Set_Event_Mask (11.2.7.1)
HCI_Reset (11.2.7.2)
HCI_Set_Event_Filter (11.2.7.3)
HCI_Flush (11.2.7.4)
HCI_Read_PIN_Type (11.2.7.5)
HCI_Write_PIN_Type (11.2.7.6)
HCI_Create_New_Unit_Key (11.2.7.7)
HCI_Read_Stored_Link_Key (11.2.7.8)
HCI_Write_Stored_Link_Key (11.2.7.9)
HCI_Delete_Stored_Link_Key (11.2.7.10)
HCI_Change_Local_Name (11.2.7.11)
HCI_Read_Local_Name (11.2.7.12)
HCI_Read_Connection_Accept_Timeout (11.2.7.13)
HCI_Write_Connection_Accept_Timeout (11.2.7.14)
HCI_Read_Page_Timeout (11.2.7.15)
HCI_Write_Page_Timeout (11.2.7.16)
HCI_Read_Scan_Enable (11.2.7.17)
HCI_Write_Scan_Enable (11.2.7.18)
HCI_Read_Page_Scan_Activity (11.2.7.19)
HCI_Write_Page_Scan_Activity (11.2.7.20)
HCI_Read_Inquiry_Scan_Activity (11.2.7.21)
HCI_Write_Inquiry_Scan_Activity (11.2.7.22)
HCI_Read_Authentication_Enable (11.2.7.23)
HCI_Write_Authentication_Enable (11.2.7.24)
HCI_Read_Encryption_Mode (11.2.7.25)
HCI_Write_Encryption_Mode (11.2.7.26)
HCI_Read_Class_of_Device (11.2.7.27)
HCI_Write_Class_of_Device (11.2.7.28)
HCI_Read_Voice_Setting (11.2.7.29)
HCI_Write_Voice_Setting (11.2.7.30)
HCI_Read_Automatic_Flush_Timeout (11.2.7.31)
HCI_Write_Automatic_Flush_Timeout (11.2.7.32)
HCI_Read_Num_Broadcast_Retransmissions (11.2.7.33)
HCI_Write_Num_Broadcast_Retransmissions (11.2.7.34)
HCI_Read_Hold_Mode_Activity (11.2.7.35)
HCI_Write_Hold_Mode_Activity (11.2.7.36)
HCI_Read_Transmit_Power_level (11.2.7.37)
HCI_Set_Host_Controller_To_Host_flow_Control (11.2.7.40)
HCI_Host_Buffer_Size (11.2.7.41)
HCI_Host_Number_Of_Completed_Packets (11.2.7.42)
HCI_Read_Link_Supervision_Timeout (11.2.7.43)
HCI_Write_Link_Supervision_Timeout (11.2.7.44)
HCI_Read_Number_Of_Supported_IAC (11.2.7.45)
HCI_Read_Current_IAC_LAP (11.2.7.46)
HCI_Write_Current_IAC_LAP (11.2.7.47)
HCI_Read_Page_Scan_Period_Mode (11.2.7.48)
HCI_Write_Page_Scan_Period_Mode (11.2.7.49)
HCI_Read_Page_Scan_Mode (11.2.7.50)
HCI_Write_Page_Scan_Mode (11.2.7.51)
HCI_Read_Local_Version_Information (11.2.8.1)
HCI_Read_Local_Supported_Features (11.2.8.2)
HCI_Read_Buffer_Size (11.2.8.3)
HCI_Read_Country_Code (11.2.8.4)
HCI_Read_BD_ADDR (11.2.8.5)

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12.3.2.6 SCO SAP primitives:

SCO Protocol Data Unit Indications
SCO Protocol Data Unit Requests

12.3.2.7 Possible HCI events (11.3.1):

Inquiry Complete Event (11.3.2.1)
Inquiry Result Event (11.3.2.2)
Connection Complete Event (11.3.2.3)
Connection Request Event (11.3.2.4)
Disconnection Complete Event (11.3.2.5)
Authentication Complete Event (11.3.2.6)
Remote Name Request Complete Event (11.3.2.7)
Encryption Change Event (11.3.2.8)
Change Connection Link Key Complete Event (11.3.2.9)
Master Link Key Complete Event (11.3.2.10)
Read Remote Supported Features Complete Event (11.3.2.11)
Read Remote Version Information Complete Event (11.3.2.12)
QoS Setup Complete Event (11.3.2.13)
Command Complete Event (11.3.2.14)
Command Status Event (11.3.2.15)
Hardware Error Event (11.3.2.16)
Flush Occurred Event (11.3.2.17)
Role Change Event (11.3.2.18)
Number of Completed Packets Event (11.3.2.19)
Mode Change Event (11.3.2.20)
Return_Link_Keys Event (11.3.2.21)
PIN Code Request Event (11.3.2.22)
Link Key Request Event (11.3.2.23)
Link Key Notification Event (11.3.2.24)
Loopback Command Event (11.3.2.25)
Data Buffer Overflow Event (11.3.2.26)
Max Slots Change Event (11.3.2.27)
Read Clock Offset Complete Event (11.3.2.28)
Connection Packet Type Changed Event (11.3.2.29)
QoS Violation Event (11.3.2.30)
Page Scan Mode Change Event (11.3.2.31)
Page Scan Repetition Mode Change Event (11.3.2.32)

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Annex A

(normative)

Protocol implementation conformance statement (PICS Proforma)[19]

A.1 Introduction to PICS

A.1.1 Scope

The supplier of a protocol implementation that is claimed to conform to IEEE Std 802.15.1-2002 shall complete the following PICS proforma.

A completed PICS proforma is the PICS for the implementation in question. The PICS is a statement of which capabilities and options of the protocol have been implemented. The PICS can have a number of uses, including use by the following:

a) The protocol implementor, as a checklist to reduce the risk of failure to conform to the standard through oversight;

b) The supplier and acquirer, or potential acquirer, of the implementation, as a detailed indication of the capabilities of the implementation, stated relative to the common basis for understanding provided by the standard PICS proforma;

c) The user, or potential user, of the implementation, as a basis for initially checking the possibility of interoperating with another implementation (note that, while interoperating can never be guaranteed, failure to interoperate can often be predicted from incompatible PICS proforma);

d) A protocol tester, as the basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

This Annex is subdivided into subclauses for the following categories of information:

— Scope and structure of the PICS proforma (this subclause)

— Instructions for completing the PICS proforma

— Identification of the implementation

— Global statement of conformance

— Statement of capability and features support

[19] *Copyright release for PICS proformas*: Users of this standard may freely reproduce the PICS proforma in this annex so that it can be used for its intended purpose and may further publish the completed PICS.

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A.1.2 Definitions, abbreviations, and conventions

A.1.2.1 Definitions

A.1.2.1.1 implementation conformance statement (ICS): A statement made by the supplier of an implementation or system claimed to conform to a given specification, stating which capabilities have been implemented. The ICS can take several forms: protocol ICS, profile ICS.

A.1.2.1.2 implementation conformance statement (ICS) proforma: A document, in the form of a questionnaire, which when completed for an implementation or system becomes an ICS.

A.1.2.1.3 protocol implementation conformance statement (PICS): An implementation conformance statement (ICS) for an implementation or system claimed to conform to a given protocol specification.

A.1.2.2 Conventions

The PICS proforma and profile ICS contained in this Annex are comprised of information in tabular form. The following is a description of the different columns and their possible values.

A.1.2.2.1 Item column

The item column contains a number which identifies the item in the table.

A.1.2.2.2 Capability or feature column

The capability/feature column describes in free text each respective item. It implicitly means "is <capability> supported by the implementation?".

A.1.2.2.3 Status column

The following notations are used for the status column:

M or m	Mandatory—The feature is required to be supported.
O or o	Optional—The feature may be supported or not.
N/A or n/a	Not Applicable—In the given context, it is impossible to use the feature.
X or x	Prohibited (eXcluded)—There is a requirement not to use this feature in the given context.
O.i or o.i	Qualified Optional—For mutually exclusive or selectable options from a set. "i" is an integer which identifies an unique group of related optional items and the logic of their selection which is defined immediately following the table.
C.i or c.i	Conditional—The requirement on the feature ("M," "O," "X," or "N/A") depends on the support of other optional or conditional items. "i" is an integer identifying an unique conditional status expression which is defined immediately following the table.
I or i	Irrelevant (out-of-scope) feature outside the scope of the reference standard. No answer is requested form the supplier.

A.1.2.2.4 Reference column

The reference column makes reference to this document.

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A.1.2.2.5 Support column

The support column shall be filled in by the supplier of the implementation. The following common notations are used for the support column:

Y or y	Supported by the implementation
N or n	Not supported by the implementation
N/A, n/a or —	No answer required (allowed only if the status is N/A or conditional status)

A.1.2.2.6 Values allowed column

The values allowed column contains, if applicable, the type, the list, the range, or the length of values allowed. The following notations are used:

range of values	<min value> .. <max value> Example: 2 .. 18
list of values	<value1>, <value2>, …, <value N> Example: 2, 4, 6, 9
list of named values	<name1>(<val1>), <name2>(<val2>), … Example: reject(1), accept(2)
length	Size(<min size> .. <max size>) Example: Size(1 .. 8)

A.1.2.2.7 Values supported column

The values supported column is only present if the values allowed column is present. The value supported column shall be filled by the supplier of the implementation. In this column, the values or the ranges of values supported by the implementation shall be indicated.

A.1.2.2.8 Reference to items

For each possible item answer (answer in the support column) within the PICS proforma or profile ICS, a unique reference exists, which is used, for example, in the conditional expressions. It is defined as the table number, followed by the character "/" followed by the item number in the table.

Example: A.5/1 is the reference to the answer of item 1 in Table 5 of Annex A.

A.1.2.2.9 Prerequisite line

A prerequisite line takes the form: Prerequisite: <predicate>

A prerequisite line after a subclause title indicates that the whole subclause is not required to be completed if the predicate is FALSE.

A.1.3 Instructions for completing the proformas

The supplier of the implementation shall complete the relevant PICS proforma in each of the spaces provided. In particular, an explicit answer shall be entered, in each of the support column boxes provided, using the notation described in subclause.

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If necessary, the supplier may provide additional comments in space at the bottom of the tables or separately.

More detailed instructions are given at the beginning of the different subclauses of the PICS proforma and profile ICS proforma.

Also, the supplier of the implementation shall complete the summary template that shall be used as the front page for the completed PICS proforma and profile ICS proforma.

A.2 PICS proforma for RF

A.2.1 Identification of the implementation

Identification of the implementation under test (IUT) should be completed to provide as much detail as possible regarding version numbers and configuration options.

A person who can answer questions regarding information supplied in this PICS proforma should be named as the contact person.

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A.2.1.1 IUT identification

IUT name:

……..

……..

IUT version (hardware/software ID):

……..

IUT Supplier (if different from SUT)

……..

……..

A.2.2 Global statement of conformance

Are all mandatory features implemented? (Yes/No) ……

NOTE—Answering "No" to this question indicates nonconformance to the Bluetooth RF protocol specification. Nonsupported mandatory features are to be defined in the PICS, with an explanation of why the implementation is nonconforming, on pages attached to this PICS proforma.

A.2.3 Capability statement

This subclause contains the PICS proforma tables related to the capabilities for the Bluetooth RF protocol.

Table A.1—RF capabilities

Item	Capability	Reference	Status	Support [Yes] or [No]	Values Allowed	Values Supported
1	Power class (1, 2, or 3)	7.3	M		1 .. 3	
2	Power control	7.3	C.1		—	—
3	1-slot packet supported	7.3.3	M		—	—
4	3-slot packet supported	7.3.3	O		—	—
5	5-slot packet supported	7.3.3	O		—	—
	Supported hopping modes	7.2	—	—	—	—
6	79 channels	7.2	C.2		—	—
7	France (23 channels)	7.2	C.2		—	—

C.1: Mandatory to support if Power Class 1 is supported, optional to support if Power Class 2 or 3 is supported.
C.2: Mandatory to support at least one of the hopping modes.

Comments:

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A.3 PICS proforma for BB

A.3.1 Identification of the implementation

Identification of the IUT should be completed to provide as much detail as possible regarding version numbers and configuration options.

A person who can answer questions regarding information supplied in this PICS proforma should be named as the contact person.

A.3.1.1 IUT identification

IUT name:

……..

……..

IUT version (hardware/software ID):

……..

IUT Supplier (if different from SUT)

……..

……..

A.3.2 Global statement of conformance

Are all mandatory features implemented? (Yes/No) ……

NOTE—Answering “No” to this question indicates nonconformance to the Bluetooth Baseband protocol specification. Nonsupported mandatory features are to be defined in the PICS, with an explanation of why the implementation is nonconforming, on pages attached to this PICS proforma.

A.3.3 Capability statement

This subclause contains the PICS proforma tables related to the capabilities for the Bluetooth Baseband protocol.

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A.3.3.1 Physical Channel

Table A.2—Frequency band and RF channels

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support frequency band and RF channels for USA, Japan, and Europe (expect France), 79 channels	8.2.1	C.1	
2	Support frequency band and RF channels for France, 23 channels	8.2.1	C.1	

C.1 Mandatory to support at least one of the frequency band and RF channels.

Comments:

A.3.3.2 Physical links

Table A.3—Link types

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support of ACL link	8.3.3	M	
2	Support of SCO link	8.3.2	O	

Comments:

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Prerequisite for Table A.4: A.3/2 (Support of SCO link)

Table A.4—SCO link support

Item	Capability	Reference	Status	Support [Yes] or [No]	Values Allowed	Values Supported
1	SCO links to same slave	8.3.2	C.1		1 .. 3	
2	SCO links to different slaves	8.3.2	O		1 .. 3	
3	SCO links from same master	8.3.2	C.1		1 .. 3	
4	SCO links from different masters	8.3.2	O		2	

C.1: Mandatory to support at least one link.

Comments:

A.3.3.3 Packet types

Table A.5—Common packet types

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support of ID packet type	8.4.4.1, 8.4.4.1.1	M	
2	Support of NULL packet type	8.4.4.1, 8.4.4.1.2	M	
3	Support of POLL packet type	8.4.4.1, 8.4.4.1.3	M	
4	Support of FHS packet type	8.4.4.1, 8.4.4.1.4	M	
5	Support of DM1 packet type	8.4.4.1, 8.4.4.1.5, 8.4.4.3, 8.4.4.3.1	M	

Comments:

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Table A.6—ACL packet types

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support of DH1 packet type	8.4.4.3, 8.4.4.3.2	M	
2	Support of DM3 packet type	8.4.4.3, 8.4.4.3.3	O	
3	Support of DH3 packet type	8.4.4.3, 8.4.4.3.4	O	
4	Support of DM5 packet type	8.4.4.3, 8.4.4.3.5	O	
5	Support of DH5 packet type	8.4.4.3, 8.4.4.3.6	O	
6	Support of AUX1 packet type	8.4.4.3, 8.4.4.3.7	O	

Comments:

Prerequisite for Table A.7: A.3/2 (Support of SCO link)

Table A.7—SCO packet types

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support of HV1 packet type	8.4.4.2, 8.4.4.2.1	M	
2	Support of HV2 packet type	8.4.4.2, 8.4.4.2.2	O	
3	Support of HV3 packet type	8.4.4.2, 8.4.4.2.3	O	
4	Support of DV packet type	8.4.4.2, 8.4.4.2.4	M	

Comments:

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A.3.3.4 Access procedures

Table A.8—Page procedures

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Supports paging, 79 channels	8.10.6.3	C.1	
2	Supports page scan, 79 channels	8.10.6.2	C.1	
3	Supports paging, 23 channels	8.10.6.3	C.2	
4	Supports page scan, 23 channels	8.10.6.2	C.2	

C.1: Mandatory to support if A.2/1 (79 channels) is supported.
C.2: Mandatory to support if A.2/2 (23 channels) is supported.

Comments:

Table A.9—Paging schemes

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Supports paging scheme 0 (mandatory paging scheme)	8.10.6.1, Table 17, “Contents of page scan mode field”	M	
2	Supports paging scheme 1 (optional scan mode I)	Annex D.2.1	O	
3	Supports paging scheme 2 (optional scan mode II)	Nonstandardized paging mode (Not defined yet)	O	
4	Supports paging scheme 3 (optional scan mode III)	Nonstandardized paging mode (Not defined yet)	O	

Comments:

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Table A.10—Paging modes

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Supports paging mode R0	8.10.6.2, Table 23, "Relationship between scan interval, train repetition, and paging modes R0, R1, and R2"	C.1	
2	Supports paging mode R1	8.10.6.2, Table 23, "Relationship between scan interval, train repetition, and paging modes R0, R1, and R2"	C.1	
3	Supports paging mode R2	8.10.6.2, Table 23, "Relationship between scan interval, train repetition, and paging modes R0, R1, and R2"	C.1	

C.1: At least one of the paging modes shall be supported.

Comments:

Table A.11—Paging train repetition

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Supports *N*page ≥ 1	8.10.6.3, Table 24, "Relationship between train repetition, and paging modes R0, R1, and R2 when SCO links are present"	O	
2	Supports *N*page ≥ 128	8.10.6.3, Table 24, "Relationship between train repetition, and paging modes R0, R1, and R2 when SCO links are present"	O	
3	Supports *N*page ≥ 256	8.10.6.3, Table 24, "Relationship between train repetition, and paging modes R0, R1, and R2 when SCO links are present"	M	

NOTE—The master should use *N*page ≥ 256 unless it knows what SR mode the slave uses.

Comments:

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Table A.12—Inquiry procedures

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Supports inquiry, 79 channels	8.10.7.3	O	
2	Supports inquiry scan, 79 channels	8.10.7.2	O	
3	Supports inquiry, 23 channels	8.10.7.3	O	
4	Supports inquiry scan, 23 channels	8.10.7.2	O	
5	Supports the dedicated inquiry access code	8.4.2.1	O	

Comments:

A.3.3.5 Networking capabilities

Table A.13—Piconet capabilities

Item	Capability	Reference	Status	Support [Yes] or [No]	Values Allowed	Values Supported
1	Point-to-point connection	8.1	M		N/A	
2	Point-to-multipoint connections	8.1	O		2 .. 7	

Comments:

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Table A.14—Scatternet capabilities

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Act as master in one piconet and as slave in another piconet	8.1	O	
2	Act as slave in more than one piconet	8.1	O	

Comments:

A.3.3.6 Bluetooth audio

Prerequisite for Table A.15: A.3/2 (SCO link support)

Table A.15—Voice coding schemes

Item	Capability	Reference	Status	Support [Yes] or [No]
1	A-law	8.12.1	C.1	
2	μ-law	8.12.1	C.1	
3	CVSD	8.12.1	C.1	

C.1: It is mandatory to support at least one of the voice coding schemes.

Comments:

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A.4 PICS proforma for LMP

A.4.1 Identification of the implementation

Identification of the IUT should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

A person who can answer questions regarding information supplied in this PICS proforma should be named as the contact person.

A.4.1.1 IUT identification

IUT name:

……..

……..

IUT version (hardware/software ID):

……..

IUT Supplier (if different from SUT)

……..

……..

A.4.2 Global statement of conformance

Are all mandatory features implemented? (Yes/No) ……

NOTE—Answering “No” to this question indicates nonconformance to the Bluetooth Link Manager protocol specification. Nonsupported mandatory features are to be defined in the PICS, with an explanation of why the implementation is nonconforming, on pages attached to this PICS proforma.

A.4.3 Capability statement

This subclause contains the PICS proforma tables related to the capabilities for the Bluetooth Link Manager Protocol.

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A.4.3.1 General response messages

Table A.16—Response messages

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Accept message	9.3.1	M	
2	Reject message	9.3.1	M	

Comments:

A.4.3.2 Supported features (general statement)

Table A.17 refers to the values in the LMP feature request message. It is used within this PICS as a general statement that will be used as prerequisite for other tables.

Table A.17—Supported features

Item	Capability	Reference	Status	Support [Yes] or [No]
1	3-slot packet	9.3.22, 9.5.1.1	O	
2	5-slot packet	9.3.22, 9.5.1.1	O	
3	Encryption	9.3.6, 9.5.1.1	O	
4	Slot offset	9.3.8, 9.5.1.1	O	
5	Timing accuracy	9.3.9, 9.5.1.1	O	
6	Role switch (master/slave)	9.3.12, 9.5.1.1	O	
7	Hold mode	9.3.15, 9.5.1.1	O	
8	Sniff mode	9.3.16, 9.5.1.1	O	
9	Park mode	9.3.17, 9.5.1.1	O	
10	Power Control	9.3.18, 9.5.1.1	O	
11	Channel quality driven data rate	9.3.19, 9.5.1.1	O	
12	SCO link	9.3.21, 9.5.1.1	O	
13	RSSI	9.5.1.1	O	

Comments:

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A.4.3.3 Authentication

Table A.18—Authentication

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Initiate authentication before connection completed	9.3.2	O	
2	Initiate authentication after connection completed	9.3.2	O	
3	Respond to authentication request	9.3.2	M	

Comments:

A.4.3.4 Pairing

Table A.19—Pairing

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Initiate pairing before connection completed	9.3.3	O	
2	Initiate pairing after connection completed	9.3.3	O	
3	Respond to pairing request	9.3.3.1, 9.3.3.2, 9.3.3.3	M	
4	Use fixed PIN and request responder to initiator switch	9.3.3.2	C.1	
5	Use variable PIN	9.3.3.2	C.1	
6	Accept initiator to reponder switch	9.3.3.2	C.2	

C.1: Mandatory to support at least one of A.19/4 (Use fixed PIN and request responder to initiator switch) and A.19/5 (Use variable PIN).
C.2: Mandatory to support if A.19/5 (Use variable PIN) and (A.19/1 (Initiate pairing before connection completed) or A.19/2 (Initiate pairing after connection completed)) is supported.

Comments:

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A.4.3.5 Link keys

Table A.20—Link keys

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Creation of link key (Unit key)	9.3.3.4	C.1	
2	Creation of link key (Combination key)	9.3.3.4	C.1	
3	Initiate change of link key	9.3.4	O	
4	Accept change of link key	9.3.4	M	
5	Change to temporary key	9.3.5.1	C.2	
6	Make semipermanent link key the current link key	9.3.5.2	C.3	

C.1: Mandatory to support at least one of the key types.
C.2: Mandatory to support if A.21/4 (Point-to-point and broadcast encryption) is supported.
C.3: Mandatory to support if A.20/5 (Change to temporary key) is supported.

Comments:

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A.4.3.6 Encryption

Prerequisite for Table A.21: A.17/3 (Encryption supported)

Table A.21—Encryption

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Initiate encryption	9.3.6.1	O	
2	Accept encryption requests	9.3.6.1	O	
3	Point-to-point encryption	9.3.6.1	C.1	
4	Point-to-point and broadcast encryption	9.3.6.1	C.1	
5	Key size negotiation	9.3.6.1	C.2	
6	Start encryption	9.3.6.3	C.3	
7	Accept start of encryption	9.3.6.3	C.4	
8	Stop encryption	9.3.6.4	C.5	
9	Accept stop of encryption	9.3.6.4	C.6	

C.1: If A.21/1 (Initiate encryption) and/or A.21/2 (Accept encryption requests) is supported, then it is mandatory to support at least one of A.21/3 (point-to-point encryption) or A.21/4 (point-to-point and broadcast encryption).
C.2: Mandatory to support if A.21/1 (Initiate encryption) or A.21/2 (Accept encryption request) is supported.
C.3: Mandatory to support if support of A.21/1 (Initiate encryption) and acting as master.
C.4: Mandatory to support if support of A.21/2 (Accept encryption requests).
C.5: Mandatory to support if support of A.21/6 (Start encryption).
C.6: Mandatory to support if support of A.21/7 (Accept start of encryption).

Comments:

A.4.3.7 Information requests

Table A.22—Clock offset information

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request clock offset information	9.3.7	O	
2	Respond to clock offset requests	9.3.7	M	

Comments:

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Prerequisite for Table A.23: A.17/4 (Slot offset)

Table A.23—Slot offset information

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Send slot offset information	9.3.8	C.1	

C.1: Mandatory to support if support of A.28/1 (master/slave switch).

Comments:

Prerequisite for Table A.24: A.17/5 (Timing accuracy)

Table A.24—Timing accuracy information

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request timing accuracy information	9.3.9	O	
2	Respond to timing accuracy information requests	9.3.9	C.1	

C.1: Mandatory to support if support of A.17/5 (Timing accuracy) is stated in the feature request.

Comments:

Table A.25—LM version information

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request LM version information	9.3.10	O	
2	Respond to LM version information requests	9.3.10	M	

Comments:

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Table A.26—Feature support

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request supported features	9.3.11	C.1	
2	Respond to supported features requests	9.3.11	M	

C.1: Mandatory to support if any of the optional features in A.17/1 (3-slot packet), A.17/2 (5-slot packet), A.17/3 (Encryption), A.17/5 (Timing accuracy), A.17/7 (Hold mode), A.17/8 (Sniff mode), A.17/9 (Park mode), A.17/10 (Power control), A.17/11 (Channel quality driven data rate), or A.17/12 (SCO link) is requested by the IUT.

Comments:

Table A.27—Name information

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request name information	9.3.13	O	
2	Respond to name requests	9.3.13	M	

Comments:

A.4.3.8 Link handling

Prerequisite for Table A.28: A.17/6 (Role switch)

Table A.28—Role switch

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request master slave switch	9.3.12	O	
2	Accept master slave switch requests	9.3.12	C.1	

C.1: Mandatory to support if support of A.17/6 [Role switch (master/slave)] is stated in the feature request.

Comments:

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Table A.29—Detach

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Detach connection	9.3.14	M	

Comments:

Prerequisite for Table A.30: A.17/7 (Hold mode)

Table A.30—Hold mode

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Force hold mode	9.3.15, 9.3.15.2	O	
2	Request hold mode	9.3.15, 9.3.15.3	C.1	
3	Respond to hold mode requests	9.3.15, 9.3.15.3	C.2	
4	Accept forced hold mode	9.3.15.1, 9.3.15.2	M	

C.1: Mandatory to support if A.30/1 (Force hold mode) is supported.
C.2: Mandatory to either renegotiate or reject the hold request.

Comments:

Prerequisite for Table A.31: A.17/8 (Sniff mode)

Table A.31—Sniff mode

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request sniff mode	9.3.16, 9.3.16.1	O	
2	Respond to sniff mode requests	9.3.16.1	C.1	
3	Request un-sniff	9.3.16.2	C.2	
4	Accept un-sniff requests	9.3.16.2	M	

C.1: Mandatory to either renegotiate or reject the sniff request.
C.2: Mandatory to support if support of A.31/1 (Request sniff mode).

Comments:

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Prerequisite for Table A.32: A.17/9 (Park mode)

Table A.32—Park mode

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request park mode	9.3.17, 9.3.17.1, 9.3.17.2	O	
2	Respond to park mode requests	9.3.17, 9.3.17.1, 9.3.17.2	M	
3	Set up broadcast scan window	9.3.17.3	O	
4	Accept changes to the broadcast scan window	9.3.17.3	M	
5	Modify beacon parameters	9.3.17.4	O	
6	Accept modification of beacon parameters	9.3.17.4	M	
7	Request unpark using PM_ADDR	9.3.17.5	C.1	
8	Request unpark using BD_ADDR	9.3.17.5	C.1	
9	Slave requested unpark	9.3.17.5, 8.10.8.4.6	O	
10	Accept unpark using PM_ADDR	9.3.17.5	C.2	
11	Accept unpark using BD_ADDR	9.3.17.5	C.2	

C.1: If A.32/2 (Respond to park mode requests) is supported then at least one of A.32/7 (Request unpark using PM_ADDR) and A.32/8 (Request unpark using BD_ADDR) is mandatory to support.
C.2: Mandatory to support if A.32/2 (Respond to park mode requests) is supported.

Comments:

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Prerequisite for Table A.33: A.17/10 (Power control)

Table A.33—Power control

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request to increase power	9.3.18	C.1	
2	Request to decrease power	9.3.18	C.1	
3	Respond when max power reached	9.3.18	C.1	
4	Respond when min power reached	9.3.18	C.1	

C.1: Mandatory to support if support of A.17/10 (Power control) is stated in the feature request.

Comments:

Table A.34—Link supervision timeout

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Set link supervision timeout value	9.3.24	O	
2	Accept link supervision timeout setting	9.3.24	M	

Comments:

A.4.3.9 QoS

Prerequisite for Table A.35: A.17/11 (Channel quality driven data rate)

Table A.35—QoS

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Force change of QoS	9.3.20, 9.3.20.1	M	
2	Request change of QoS	9.3.20, 9.3.20.2	M	

Comments:

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A.4.3.10 SCO links

Prerequisite for Table A.36: A.17/12 (SCO link)

Table A.36—SCO links

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Initiate SCO links, as master	9.3.21, 9.3.21.1	O	
2	Initiate SCO links, as slave	9.3.21, 9.3.21.2	O	
3	Accept SCO links	9.3.21, 9.3.21.1, 9.3.21.2	O	
4	Remove SCO link	9.3.21, 9.3.21.5	C.1	
5	Negotiate SCO link parameters	9.3.21	C.2	

C.1: Mandatory to support if A.36/1 (Initiating SCO links, as master) or A.36/2 is supported (Initiating SCO links, as slave).
C.2: Mandatory to support if A.36/3 (Accept SCO links) or if support A.36/1 (Initiate SCO links, as master).

Comments:

A.4.3.11 Multislot packets

Table A.37—Multislot packets

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Accept maximum number of slots to be used	9.3.22	C.1	
2	Request maximum number of slots to be used	9.3.22	C.1	
3	Accept request of maximum number of slots to be used	9.3.22	C.1	

C.1: Mandatory to support if A.17/1 (3-slot packet) and/or A.17/2 (5-slot packet) is supported in the feature request.

Comments:

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A.4.3.12 Paging scheme

Table A.38—Paging scheme

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Request page mode to use	9.3.23, 9.3.23.1	O	
2	Accept suggested page mode	9.3.23, 9.3.23.1	O	
3	Request page scan mode to use	9.3.23, 9.3.23.2	O	
4	Accept suggested page scan mode	9.3.23, 9.3.23.2	O	

Comments:

A.4.3.13 Connection establishment

Table A.39—Connection establishment

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Create connection for higher layers	9.4	M	
2	Respond to requests to establish connections for higher layers	9.4	M	
3	Indicate that link setup is completed	9.4	M	

Comments:

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A.4.3.14 Test mode

Table A.40—Test mode

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Activate test mode	9.6.1	O	
2	Accept or reject activation of test mode if test mode is disabled	9.6.1	M	
3	Control test mode	9.6.2	O	
4	Accept to reject test mode control commands if test mode is disabled	9.6.2	M	

Comments:

A.5 PICS proforma for L2CAP

A.5.1 Identification of the implementation

Identification of the IUT should be filled in so as to provide as much detail as possible regarding version numbers and configuration options.

A person who can answer questions regarding information supplied in this PICS proforma should be named as the contact person.

A.5.1.1 IUT identification

IUT name:

……..

……..

IUT version (hardware/software ID):

……..

IUT Supplier (if different from SUT)

……..

……..

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A.5.2 Global statement of conformance

Are all mandatory features implemented? (Yes/No) ……

NOTE—Answering "No" to this question indicates non-conformance to the Bluetooth L2CAP specification. Nonsupported mandatory features are to be defined in the PICS, with an explanation of why the implementation is nonconforming, on pages attached to this PICS proforma.

A.5.3 Capability statement

This subclause contains the PICS proforma tables related to the capabilities for the Bluetooth L2CAP protocol.

A.5.3.1 General operation

Table A.41—General operation

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Use definitions of channel identifier	10.2.1 10.2.2	M	
2	Support of signal channel	10.2.2	M	
3	Support of connection oriented data channel	10.2.2	M	
4	Support of connectionless reception channel	10.2.2	O	
5	Support of a channel group	10.2.2	O	
6	Support of MTU size larger than DH1 packet payload size	10.2.4	O	
7	Support MTU size larger than the largest baseband packet	10.2.4	O	
8	Support of configuration process	10.6.4	M	

C.1: If DH1 baseband packets are in use, then mandatory.

Comments:

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A.5.3.2 Data packet format

Table A.42—Data packet format

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support of packet for connection oriented channel	10.4.1	M	
2	Support of packet for connectionless channel	10.4.2	O	

Comments:

A.5.3.3 Signalling commands

Table A.43—Signalling commands

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support of command reject	10.5.1	M	
2	Support of command connection request	10.5.2	M	
3	Support of command connection response	10.5.3	M	
4	Support of command configuration request	10.5.4	M	
5	Support of command configuration response	10.5.5	M	
6	Support of command disconnect request	10.5.6	M	
7	Support of command disconnect response	10.5.7	M	
8	Support of command echo request	10.5.8	M	
9	Support of command echo response	10.5.9	M	
10	Support of command information request	10.5.10	O	
11	Support of command information response	10.5.11	O	

Comments:

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A.5.3.4 Configuration parameter options

Table A.44—Configuration parameter options

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support of minimum MTU size	10.6.1	M	
2	Support of default MTU size	10.6.1	O	
3	Support of flush timeout value for reliable channel	10.6.2	M	
4	Support of QoS option field	10.6.3	M	
5	Support of flag field definitions for QoS	10.6.3	O	
6	Support of service type definitions for QoS	10.6.3	O	
7	Support of token bucket size definitions for QoS	10.6.3	O	
9	Support of peak bandwidth definitions for QoS	10.6.3	O	
10	Support of latency definitions for QoS	10.6.3	O	
11	Support of delay variation definitions for QoS	10.6.3	O	

Comments:

A.5.3.5 Timer events

Table A.45—Timer events

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support of RTX timer	10.3.1.5	M	
2	Support of ERTX timer	10.3.1.5	M	

Comments:

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A.6 Profile ICS proforma for GAP

A.6.1 Global statement of conformance

Are all mandatory features implemented? (Yes/No) ……

NOTE—Answering "No" to this question indicates nonconformance to the WPAN Bluetooth Generic Access Profile specification. Nonsupported mandatory features are to be defined in the Profile ICS, with an explanation of why the implementation is nonconforming, on pages attached to this Profile ICS proforma.

However, explicitly named capabilities in profiles based on the Bluetooth Generic Access Profile overrules the corresponding capabilities stated in this PICS. For capabilities left out in the PICS for a profile based on the Bluetooth Generic Access Profile, the status in this PICS applies.

A.6.2 Capability statement

This subclause contains the Profile ICS proforma tables related to the capabilities for the WPAN Bluetooth Generic Access Profile specification.

A.6.2.1 Modes

Table A.46—Modes

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Nondiscoverable mode	Annex C.4.1.1	C.1	
2	Limited-discoverable mode	Annex C.4.1.2	C.2	
3	General-discoverable mode	Annex C.4.1.3	C.2	
4	Nonconnectable mode	Annex C.4.2.1	O	
5	Connectable mode	Annex C.4.2.2	M	
6	Nonpairable mode	Annex C.4.3.1	O	
7	Pairable mode	Annex C.4.3.2	C.3	

C.1: If A.46/2 (Limited-discoverable mode) is supported, then mandatory, else optional.
C.2: At least one of A.46/2 (Limited-discoverable mode) or A.46/3 (General-discoverable mode) shall be supported.
C.3: If A.46/5 (Connectable mode) is supported, then mandatory, else optional.

Comments:

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A.6.2.2 Security aspects

Table A.47—Security aspects

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Non LMP authentication	Annex C.5.1	C.1	
2	Support of LMP authentication	Annex C.5.1	M	
3	Initiate LMP authentication	Annex C.5.2	C.2	
4	Security mode 1	Annex C.5.2.1	O	
5	Security mode 2	Annex C.5.2.2	C.3	
6	Security mode 3	Annex C.5.2.3	C.3	

C.1 : If A.47/4 (Security mode 1) is supported and A.47/5 (Security mode 2) and A.47/6 (Security mode 3) are not supported, then mandatory, else optional.
C.2 : If A.47/6 (Security mode 3) is supported, then mandatory, else optional.
C.3 : If A.47/4 (Security mode 1) is not the only security mode that is supported, then support for at least one of A.47/5 (Security mode 2) or A.47/6 (Security mode 3) is mandatory.

Comments:

A.6.2.3 Idle mode procedures

Table A.48—Idle mode procedures

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Initiation of general inquiry	Annex C.6.1	C.1	
2	Initiation of limited inquiry	Annex C.6.2	C.1	
3	Initiation of name discovery	Annex C.6.3	O	
4	Initiation of device discovery	Annex C.6.4	O	
5	Initiation of general bonding	Annex C.6.5	O	
6	Initiation of dedicated bonding	Annex C.6.5	O	

C.1: If A.48/5 is supported, then at least one of A.48/1 (Initiation of general inquiry) or A.48/2 (Initiation of limited inquiry) is mandatory, else optional.

Comments:

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A.6.2.4 Establishment procedures

Table A.49—Establishment procedures

Item	Capability	Reference	Status	Support [Yes] or [No]
1	Support link establishment as initiator	Annex C.7.1	M	
2	Support link establishment as acceptor	Annex C.7.1	M	
3	Support channel establishment as initiator	Annex C.7.2	O	
4	Support channel establishment as acceptor	Annex C.7.2	M	
5	Support connection establishment as initiator	Annex C.7.3	O	
6	Support connection establishment as acceptor	Annex C.7.3	O	

Comments:

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Annex B

(informative)

Formal description of IEEE Std 802.15.1-2002 operation

B.1 Introduction

This Annex describes the protocol behavior and abstract data structure of an integrated MAC sublayer (Baseband, Link Manager Protocol, and Logical Link Control and Adaptation Protocol) specification and description language (SDL) model, i.e., it explains the behavior of these protocols. It does not specify the exact coding of the frames, packets, messages, or the parameters contained herein. This revision is based upon Bluetooth v1.1 dated February 22, 2001.

B.1.1 SDL overview

SDL is an object-oriented, formal language defined by The International Telecommunications Union–Telecommunications Standardization Sector (ITU–T) (formerly Comité Consultatif International Telegraphique et Telephonique [CCITT]) as recommendation Z.100; referenced in subclause 2.3. The language is intended for the specification of complex, event-driven, real-time, and interactive applications involving many concurrent activities that communicate using discrete signals.

SDL is usually used in combination with other languages: MSC, ASN.1, and TTCN. The use of traditional SDL state models, MSCs, and ASN.1 is a powerful combination that covers most aspects of system engineering. These languages have been studied in the same group within the ITU, ITU Z.100 coupled with ITU Z.105 (10/01) [B6] and Z.107 (11/99) [B7] standards which define the use of SDL with ASN.1. The Z.109 (11/99) [B8] standard defines a Unified Modeling Language (UML) profile for SDL, and the Z.120 (11/99) [B9] standard defines Message Sequence Charts. The following SDL model is complemented by the Message Sequence Charts (MSCs) found in Annex G, which is also based on an ITU language ITU Z.120.

The SDL source is written using SDL-88, with one exception. Therefore, as long as SDL-92 and SDL-2000 are backward/forward compatible with SDL-88, then so is the SDL source. The exception is the use of the “choice” construct, which is currently specific to this vendor’s product and not part of the SDL-XX Recommendations. However, the construct is similar to the one used in the Abstract Syntax Notation Number 1 (ASN.1) [B10], which is now part of the SDL Recommendations.

NOTES:

1—The SDL definitions in this Annex should be usable with any SDL tool that supports the SDL-88, SDL-92, or SDL-2000 update of ITU-T Recommendation Z.100. More info: http://www.sdl-forum.org/Tools/Commercial.htm.

2—The SDL code in this Annex was generated using the Telelogic Tau SDL Suite (simultaneously on the Sun OS v5.6 and Windows 2000) v3.6; from Telelogic AB, Malmö, Sweden (+46 40 17 47 00; http://www.telelogic.se); USA office in Irvine, CA (+1 949 830 8022; http://www.telelogic.com). Subsequently the SDL models were tested (SDL analyzer and simulator) using the latest (Sep01) Telelogic Tau version, 4.2. SDL systems developed with Telelogic Tau SDL Suite can be integrated with any operating system or kernel for automatic generation of complete real-time applications.

3—The use of Telelogic’s product to prepare this Annex does not constitute an endorsement of Telelogic Tau SDL Suite by the IEEE LAN/MAN Standards Committee or by the IEEE.

4—All SDL behavior diagrams are 170 x 200 so that both headers and footers can be added to the Annex pages that contain these diagrams, as well as to satisfy the publishing margin requirements.

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B.1.2 IEEE Std 802.15.1-2002 SDL layout

The SDLs are designed in the following manner. As indicated in Figure B.1, there is one overall system block that contains all other blocks.

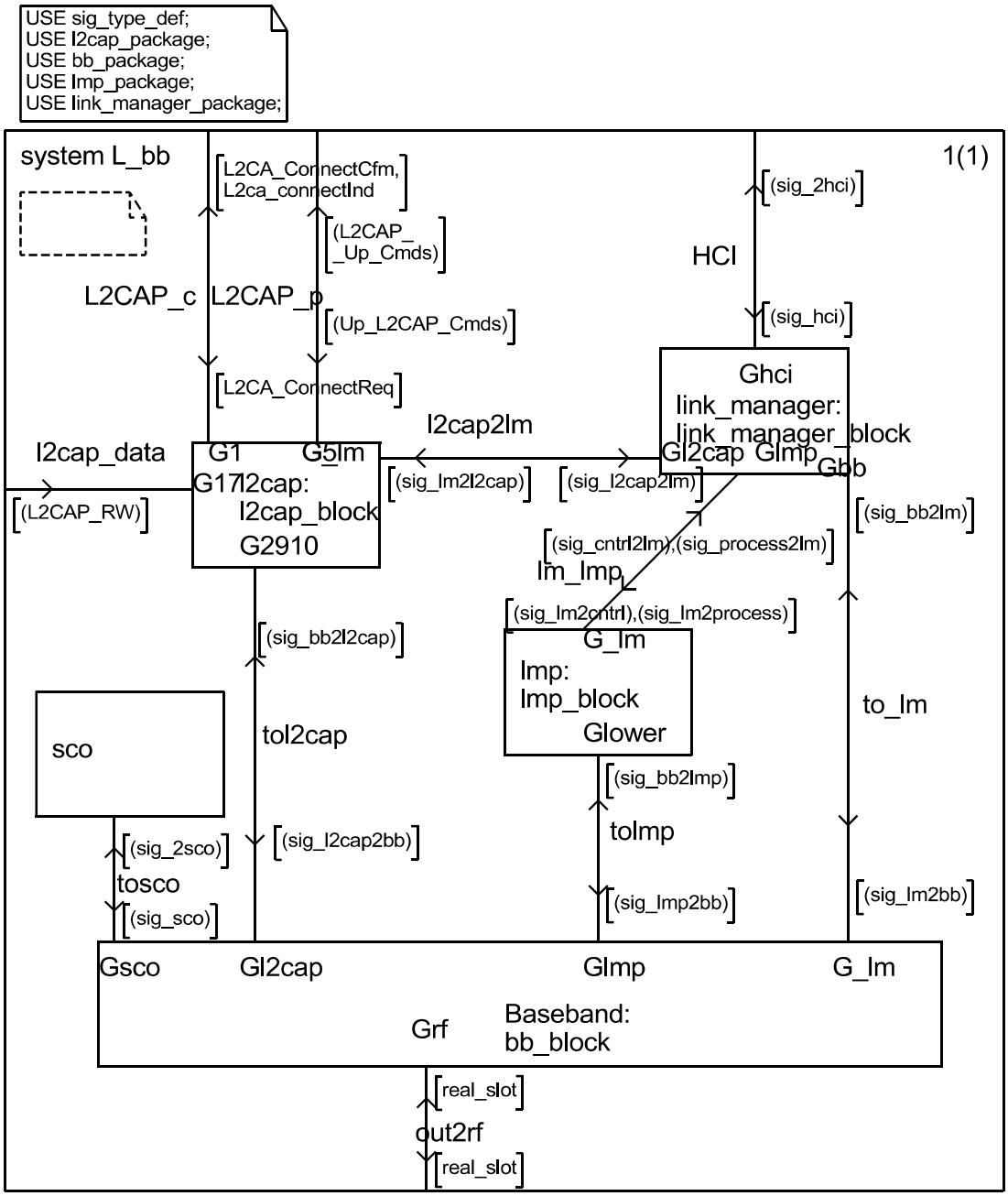


Figure B.1—IEEE Std 802.15.1-2002 overall system level block diagram

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This system block considers the upper SDL environment to consist of the commands/signals associated with the HCI, L2CAP, and SCO. The lower SDL environment consists of a real_slot (i.e., a Baseband packet). Figure B.1 is the highest architectural view of the SDL model of this specification. It contains the following viewable SDL Blocks (Baseband, LMP, L2CAP, Link Manager, and SCO) and their SDL channels and SDL signals or SDL signal lists that are associated with each SDL channel. An SDL signal list is just a group name for a list of SDL signals. It is basically used for readability, as there is no difference in logical function. The viewable difference between an SDL signal list and an SDL signal is that an SDL signal list is enclosed by "()" before being enclosed by "[]".

B.1.3 IEEE Std 802.15.1-2002 SDL model overview

This SDL model describes only the protocol behavior and abstract data structure. It is meant to explain the behavior (i.e., the interaction) of the protocols. It does not contain "code". In other words, the actual bit structure and coding is not supported. Also implementation issues, for example, database management, are not part of the requirements, but are used as an example, so that the SDL tool extensions such as the simulator and validator can be used.

The protocols modeled are Baseband, Link Manager (using the HCI), LMP, and the L2CAP. In Annex B.2 the Baseband block (and package) covers the Baseband section. In Annex B.3 the Link_Manager block (and package) covers the HCI. In Annex B.4 the LMP block (and package) covers the Link Manager Protocol section. In Annex B.5 the L2CAP block (and package) covers the Logical Link Control and Adaptation Protocol section. In Annex B.6 the Synchronous Connection-Oriented block is currently just a space holder. Lastly, in Annex B.7 an SDL package called "Signals" or sig_def_package contains all the signals, signallists, newtypes, and synonyms used by the entire system.

The first page of each process contains the signals (i.e., signallists) entering and leaving this process via SDL gates. The next page(s) contains all the variables and timers used within this process. The next page(s) contain all the procedures defined for this process in alphabetical order. The procedures are prefixed with terms that identify to which package the procedure belongs. The rest of the pages cover the protocol described by this process.

All variables are to be initialized in an "initialize" procedure. Some are set in an "implementation" procedure when the variable is truly an implementation decision. The goal is to identify which variables are needed and defined by the protocol with default values and those that are needed but whose values are an implementation decision.

B.1.3.1 IEEE Std 802.15.1-2002 SDL Baseband model overview

The Baseband model consists of three submodels. The first is the bb_phy SDL process that basically receives a Baseband packet either from RF (i.e., the environment) or an upper model (i.e., bb_controller or ACL_entity). When receiving a baseband packet from the RF, this model logically processes its header information and, if successful, passes it on to the appropriate upper model. When receiving from an upper model, this model logically encodes the received information into a Baseband packet with header information and passes it to the RF. The second submodel, bb_controller, handles the inquiry and page process and some global coordination of other SDL processes (e.g., ACL entity). The third submodel, ACL_entity, handles the procedures that are carried by the ACL. An instance of this model is created by the bb_controller when paging procedures are successfully completed.

B.1.3.2 IEEE Std 802.15.1-2002 SDL Link Manager model overview

The Link Manager model consists of three submodels. The first submodel, link_manager, defines a finite state machine (FSM) that coordinates the HCI commands and invokes internal behavior to complete the requested functional behavior. The Link Manager also coordinates all of the other major SDL blocks for this model. Note that the FSM is not describe in the text, so this is to be considered only as an example. The

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second submodel, lm_sco, is to provide the coodination of the SCO channels for control by the Link manager for loop back purposes. The third submodel, lm_acl, is to provide the coordination of the ACL channels for control by the Link Manager for loop back purposes.

B.1.3.3 IEEE Std 802.15.1-2002 SDL LMP model overview

The LMP model consists of three submodels. The first is the lmp_control2. The lmp_control2 coordinates the other submodels. The second submodel, lmp_p2, describes the LMP protocol behavior. The third submodel, lmp_codec, contains the logical coding and decoding of the LMP SDU and PDU.

B.1.3.4 IEEE Std 802.15.1-2002 SDL L2CAP model overview

The L2CAP model consists of six submodels. The first is the l2cap_control2 that coordinates the other submodels. The second submodel, l2cap_prc, describes the behavior of the L2CAP protocol. The third submodel, l2cap_codec, contains the logical coding and decoding of the L2CAP SDU and PDU. The fourth submodel, l2cap_rou, provides a routing function to distribute the received SDU to the proper upper model (i.e., signalling, connectionless, or connection oriented entity). The fifth submodel, l2cap_cl, is the model for the connectionless entity. The sixth submodel, l2cap_co, is the model for the connection oriented entity.

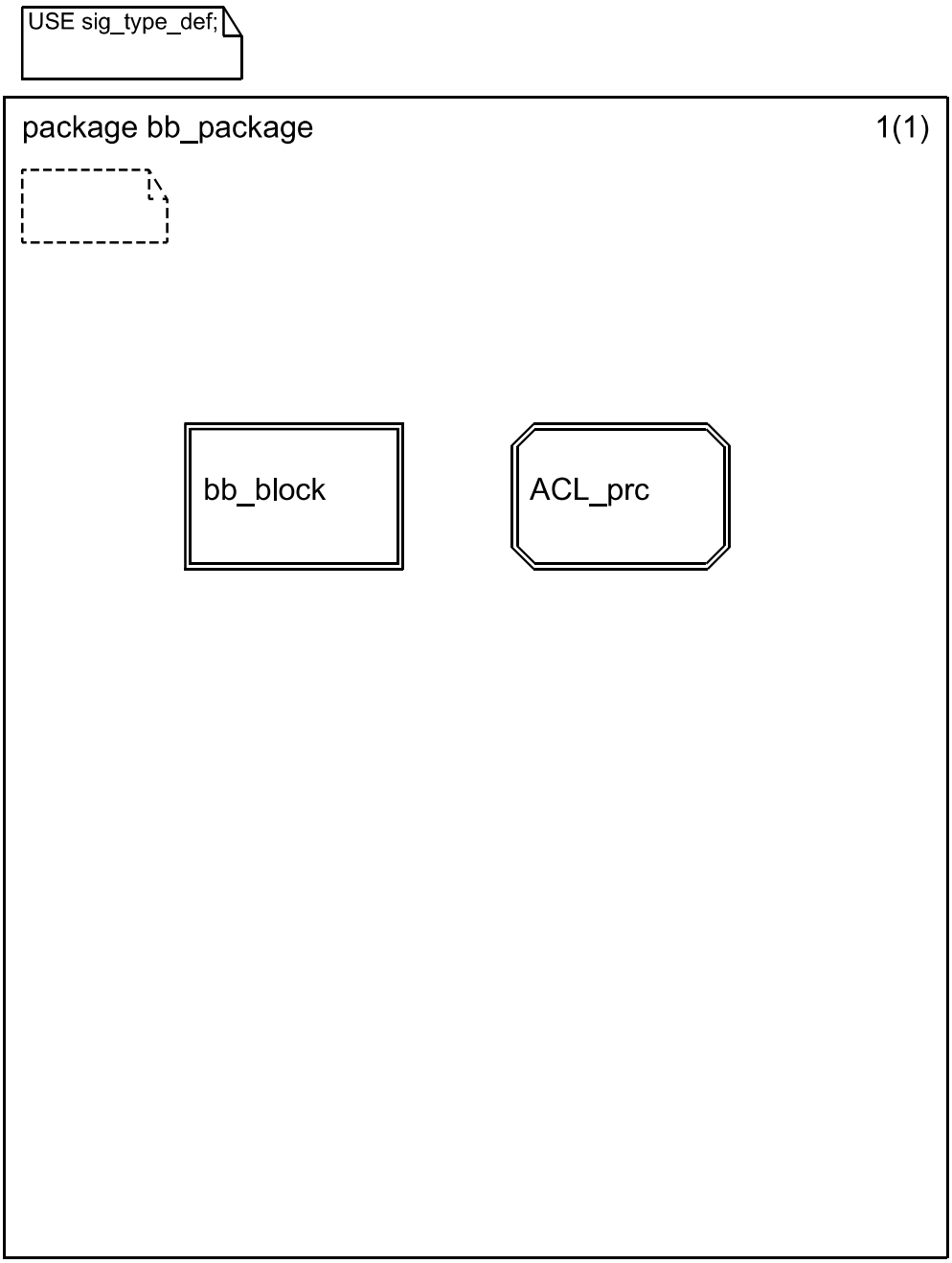
B.1.3.5 IEEE Std 802.15.1-2002 SDL signals overview

This subclause contains the SDL signals used by the SDL system, shown previously in Figure B.1. Subclause B.7.1 contains the only signal defined for the Baseband/RF (environment). Subclause B.7.2 through B.7.7 contain the signals and signal lists used within the Baseband block and between the Baseband block and the other blocks (i.e., SCO, LMP, L2CAP, Link Manager). Subclause B.7.8 through B.7.12 contain SDL newtypes for Baseband. Subclause B.7.13 through B.7.19 contain the signals and signal lists used within the LMP block and between the LMP block and Link Manager. Subclause B.7.20 through B.7.24 contain SDL newtypes for LMP. Subclause B.7.25 through B.7.28 contain the signals and signal lists for L2CAP. Subclause B.7.29 through B.7.30 contain the SDL newtypes for L2CAP. Subclause B.7.31 contains some database information. Subclause B.7.32 through B.7.41 contain the SDL signal and signal lists for the Link Manager block. Subclause B.7.42 contains SDL synonyms for error codes both used and not used. Subclause B.7.43 contains newtypes and some database information. Subclause B.7.44 contains more signals used by the Link Manager or between the Link Manager and Baseband.

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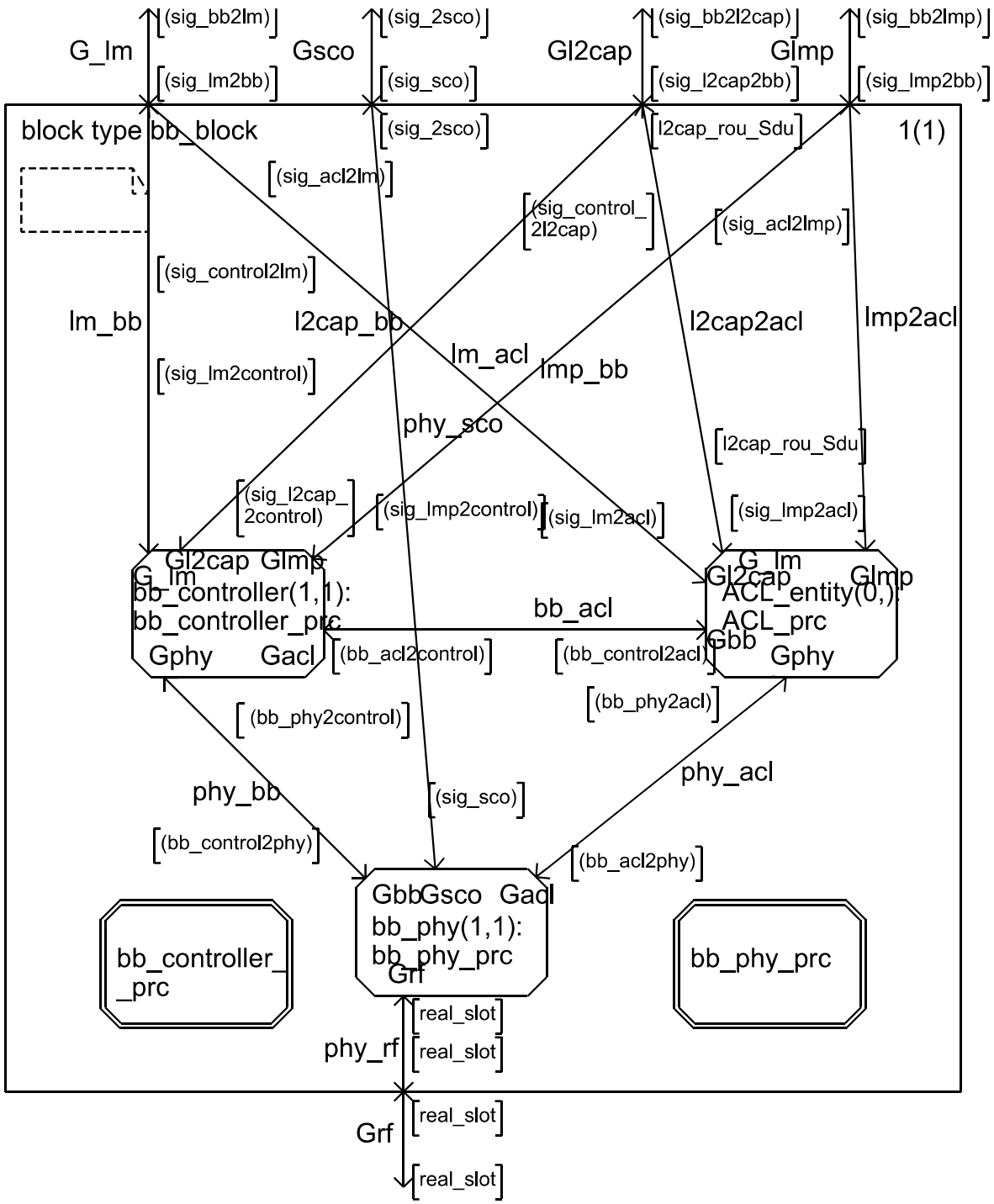
B.2 Baseband

B.2.1 bb_package-1



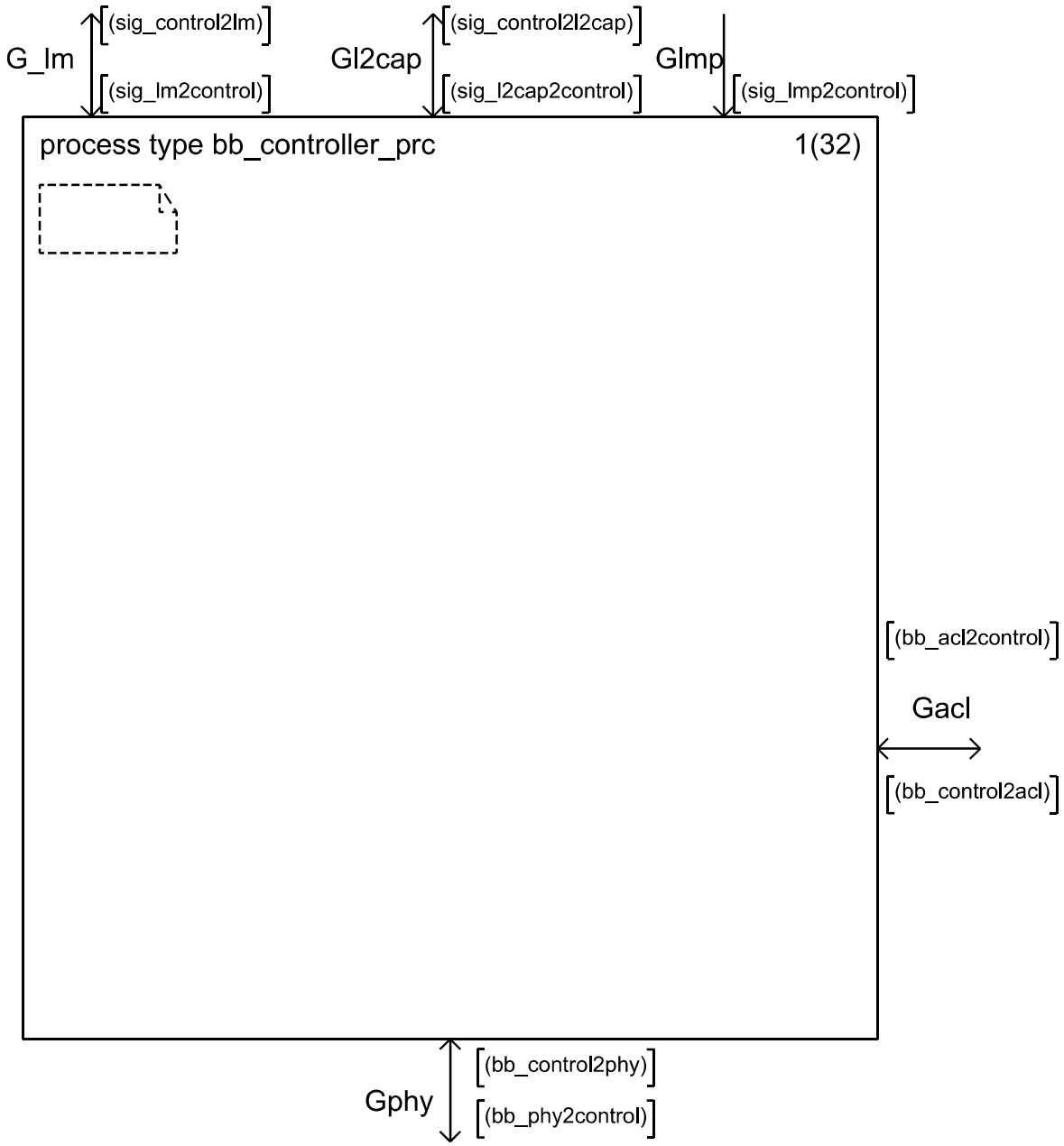
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B.2.2 bb_block-1



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B.2.3 bb_controller_prc-1



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B.2.4 bb_controller_prc-2

process type bb_controller_prc 2(32)



```
TIMER
   inqrespTO, inquiryTO, newconnectionTO, pagerespTO, pageTO,
   Tinquiryscan, Tpagescan, Trand, Tw_inquiry_scan, Tw_page_scan,
   T_slot, T125ms;

DCL cal, hold_time, inqLngth, ival, irval, isval, ncTOval,
      prval, psval, pval, tisval, tpsval
   Duration;

DCL LAP             IAC_t;

DCL bt_device     bt_entity;

DCL fhs_pyld       fhs_payload;

DCL opcode         Command_Opcode;

DCL am, ar, hh, i, new, Npage, n_page, oclk_offst, opg_scn_md, phase,
      pg_scn_md, pm, prev_st, scan_enable, trigger_threshold
   Integer;

DCL osr               sr_values;

DCL pg_scn_prd_md    sp_values;

DCL device_type          role_type;

DCL first_visit, more_ACLs, opt_scanpage
   boolean;

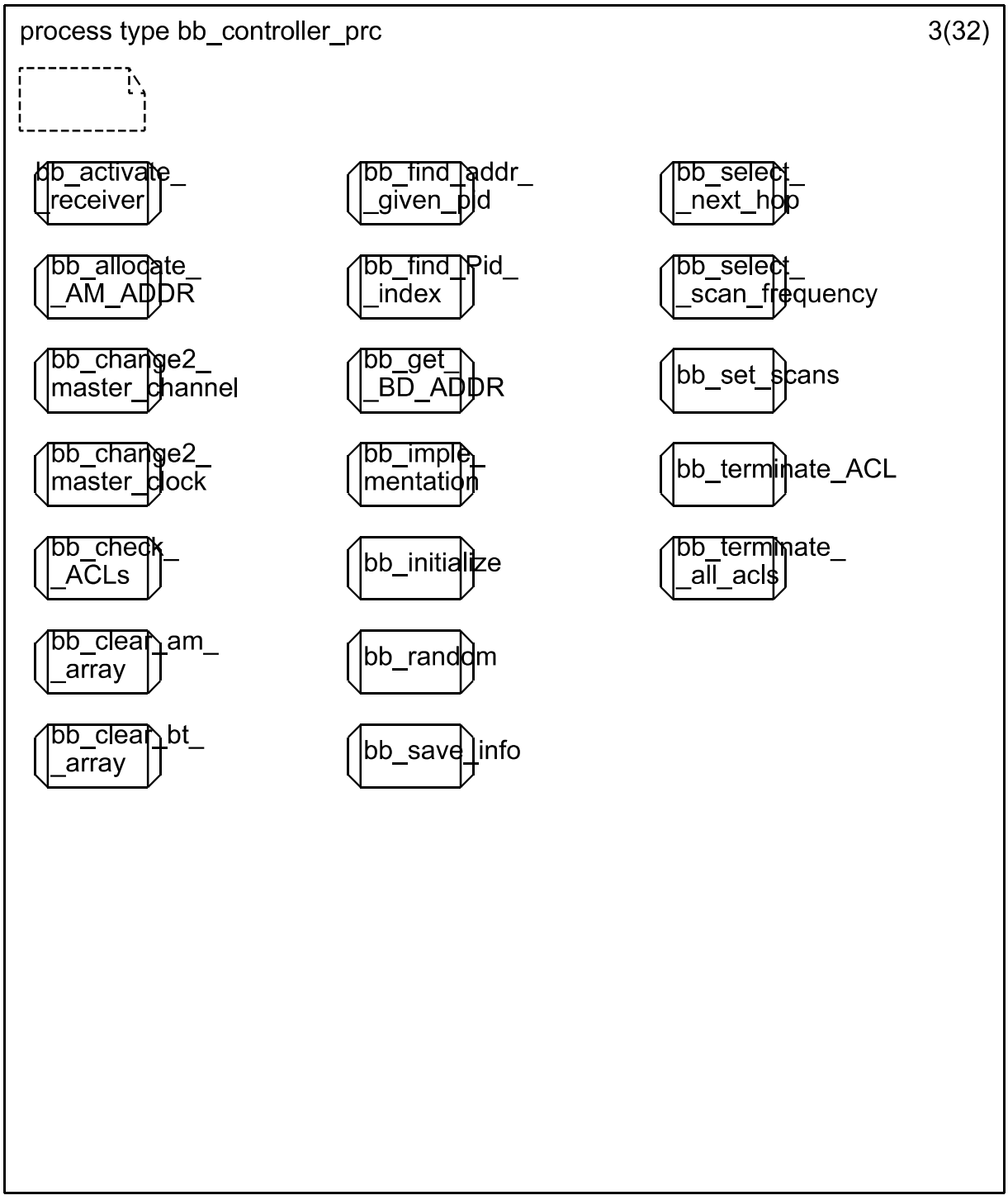
DCL co_id, ii, lmp_pid, l2cap_pid
    Pid;

DCL addr          Address_type;

DCL am_tab       AM_array;
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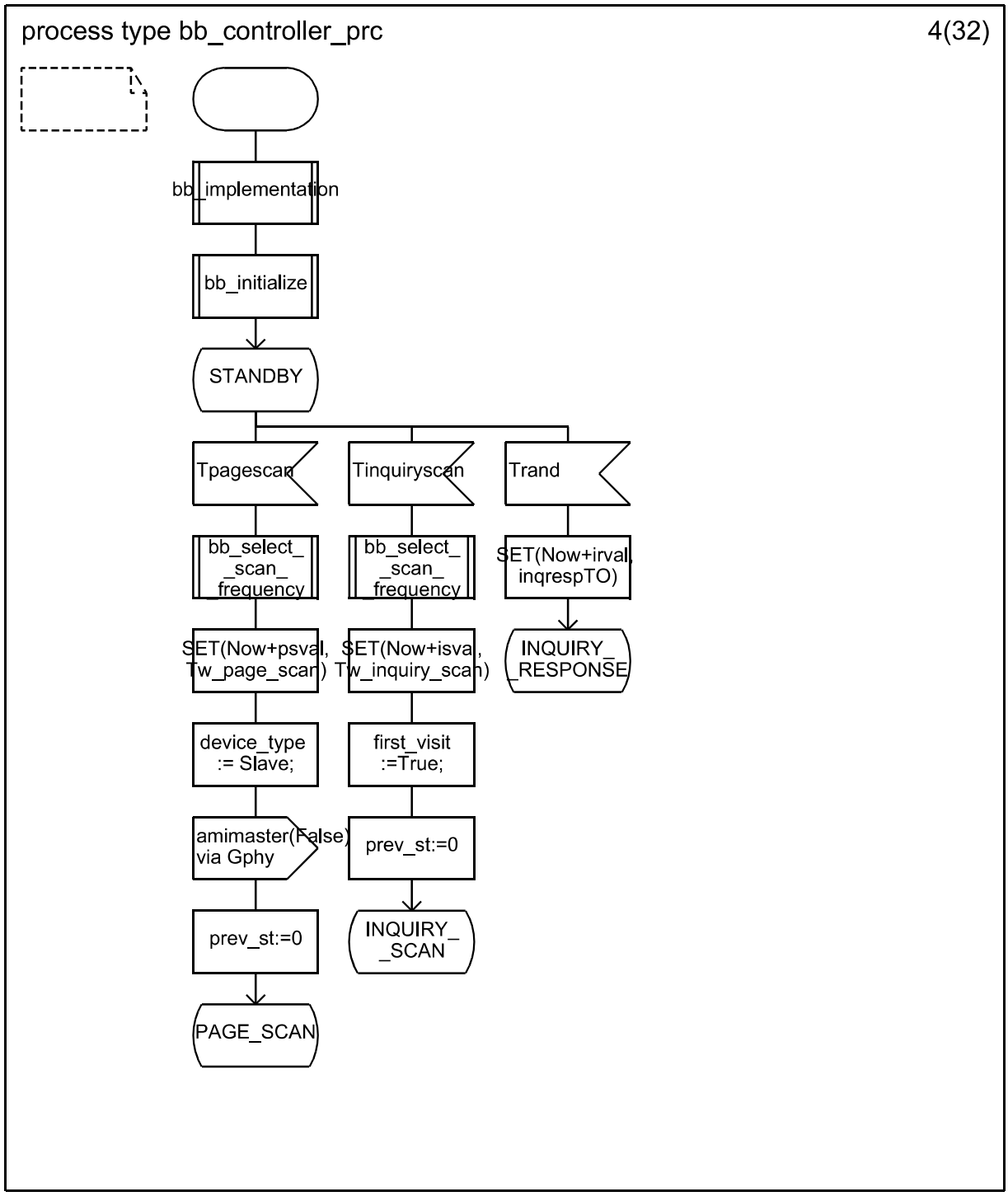

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B.2.5 bb_controller_prc-3



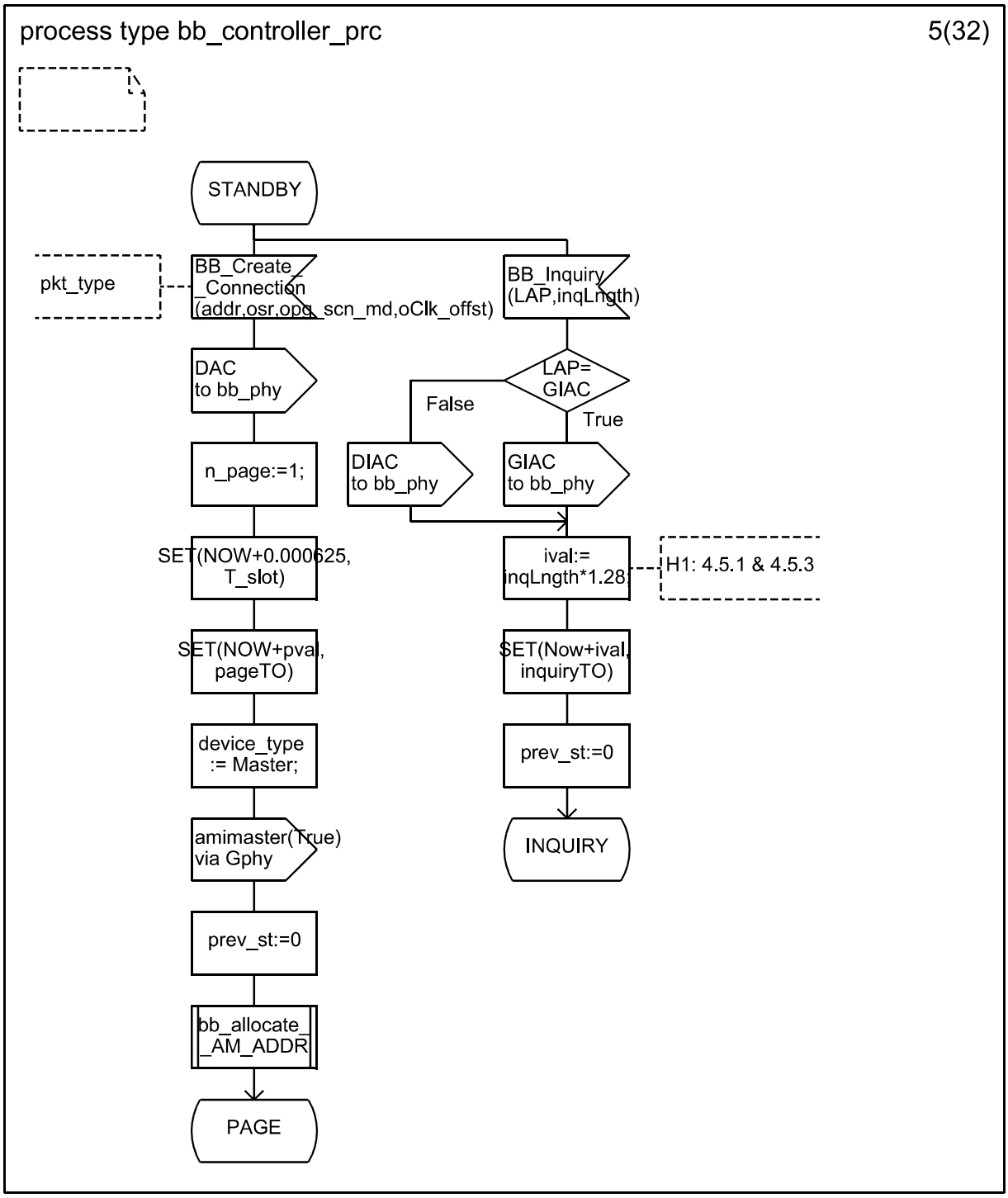
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B.2.6 bb_controller_prc-4



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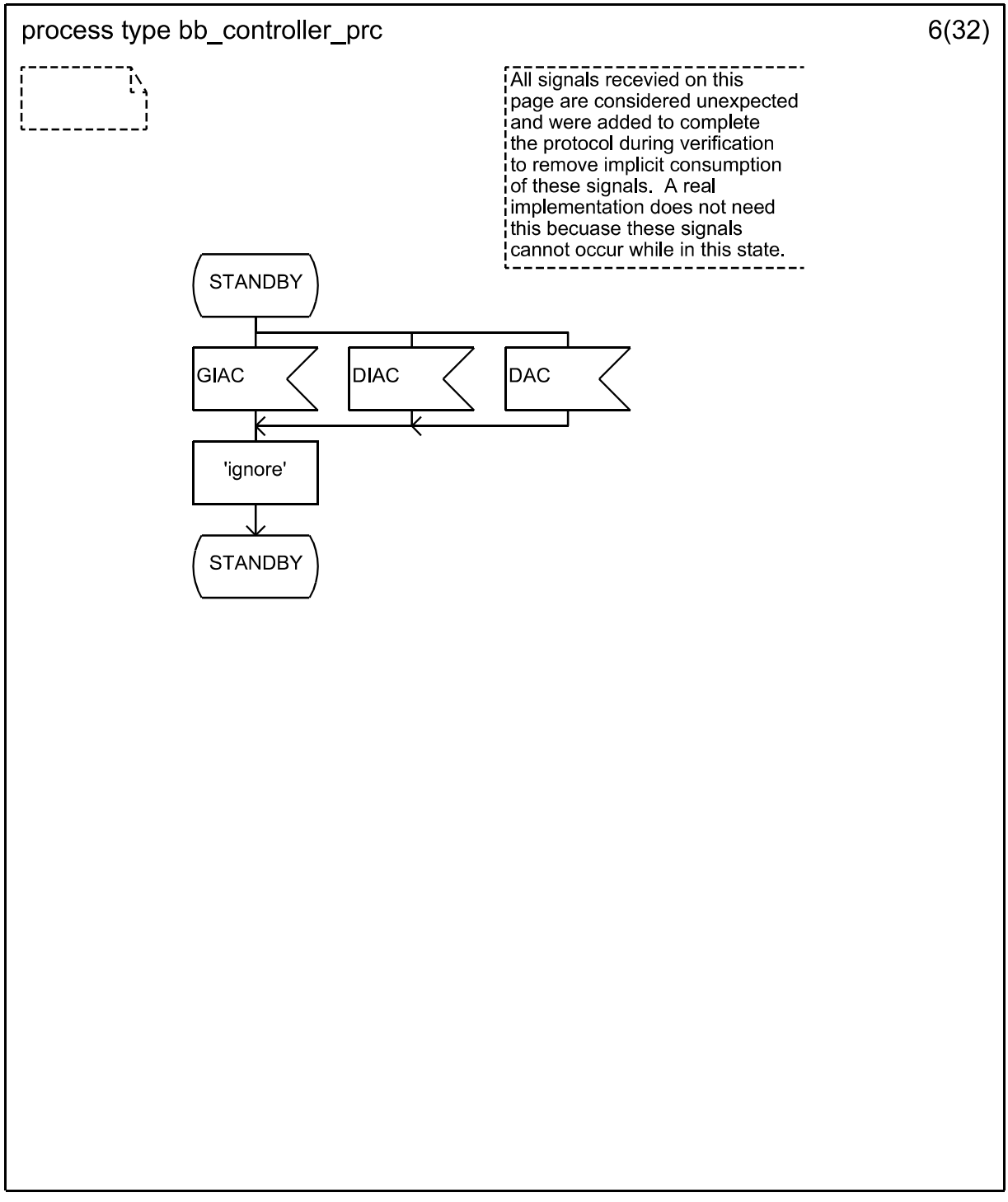
B.2.7 bb_controller_prc-5



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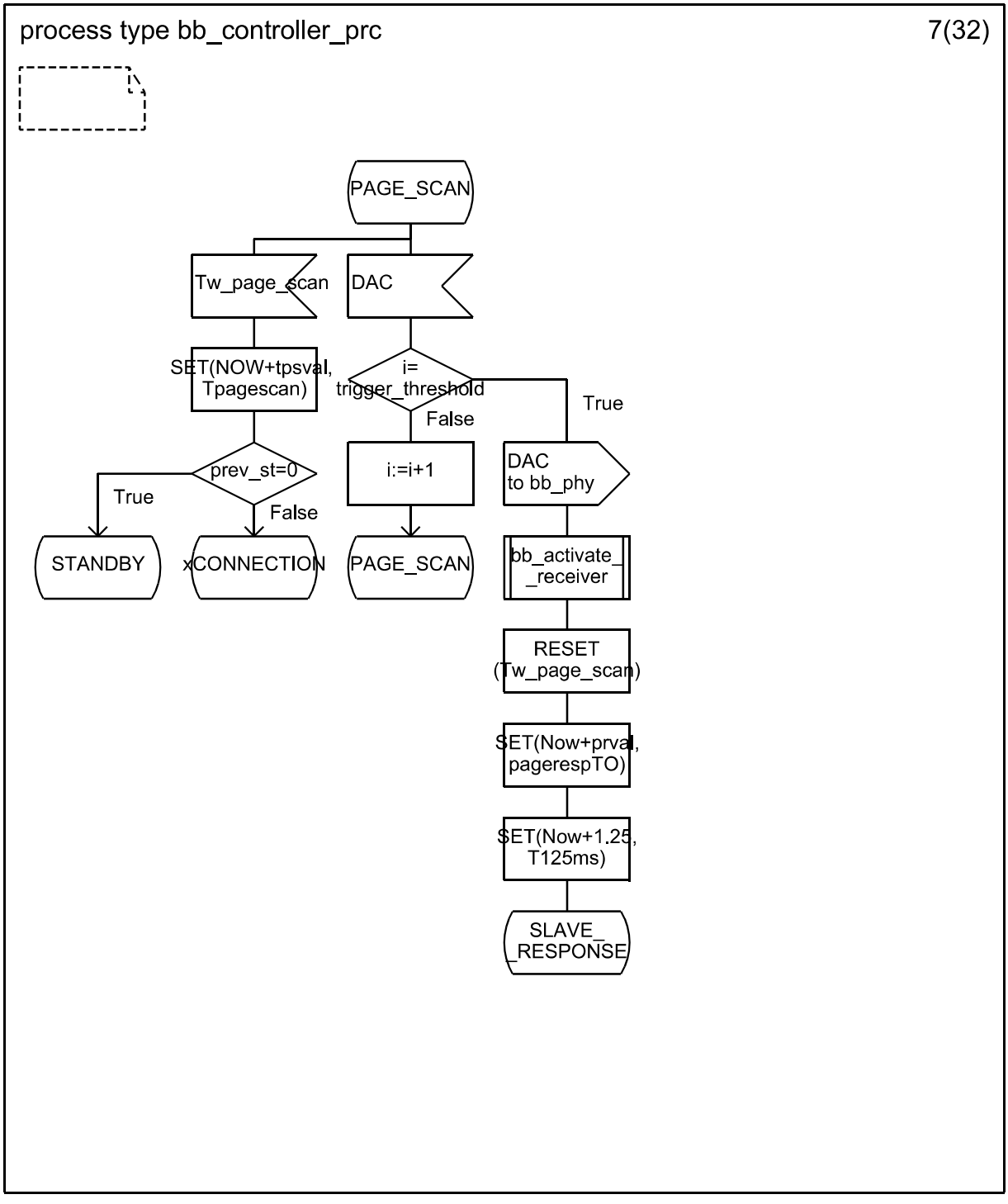
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B.2.8 bb_controller_prc-6



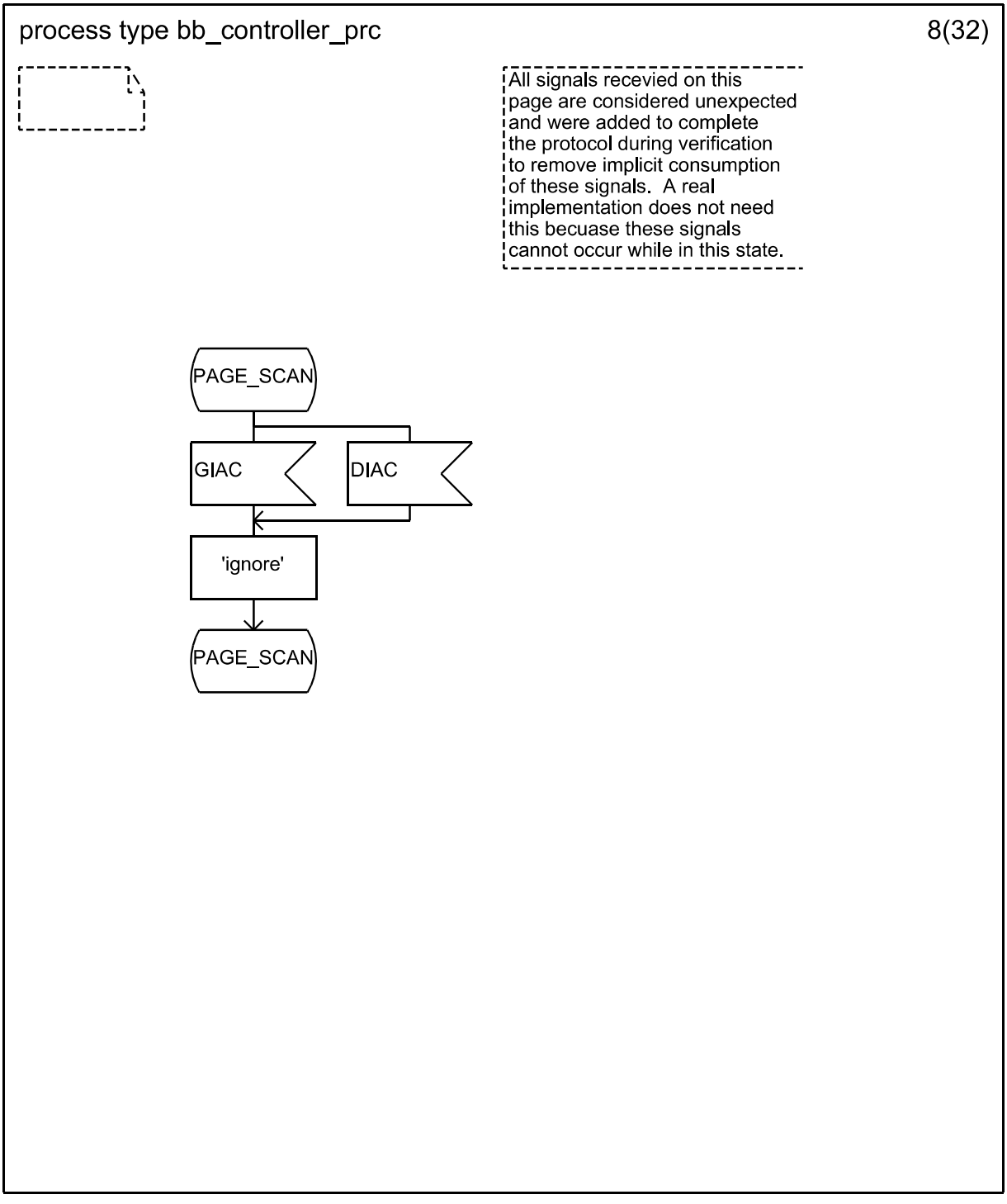
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B.2.9 bb_controller_prc-7



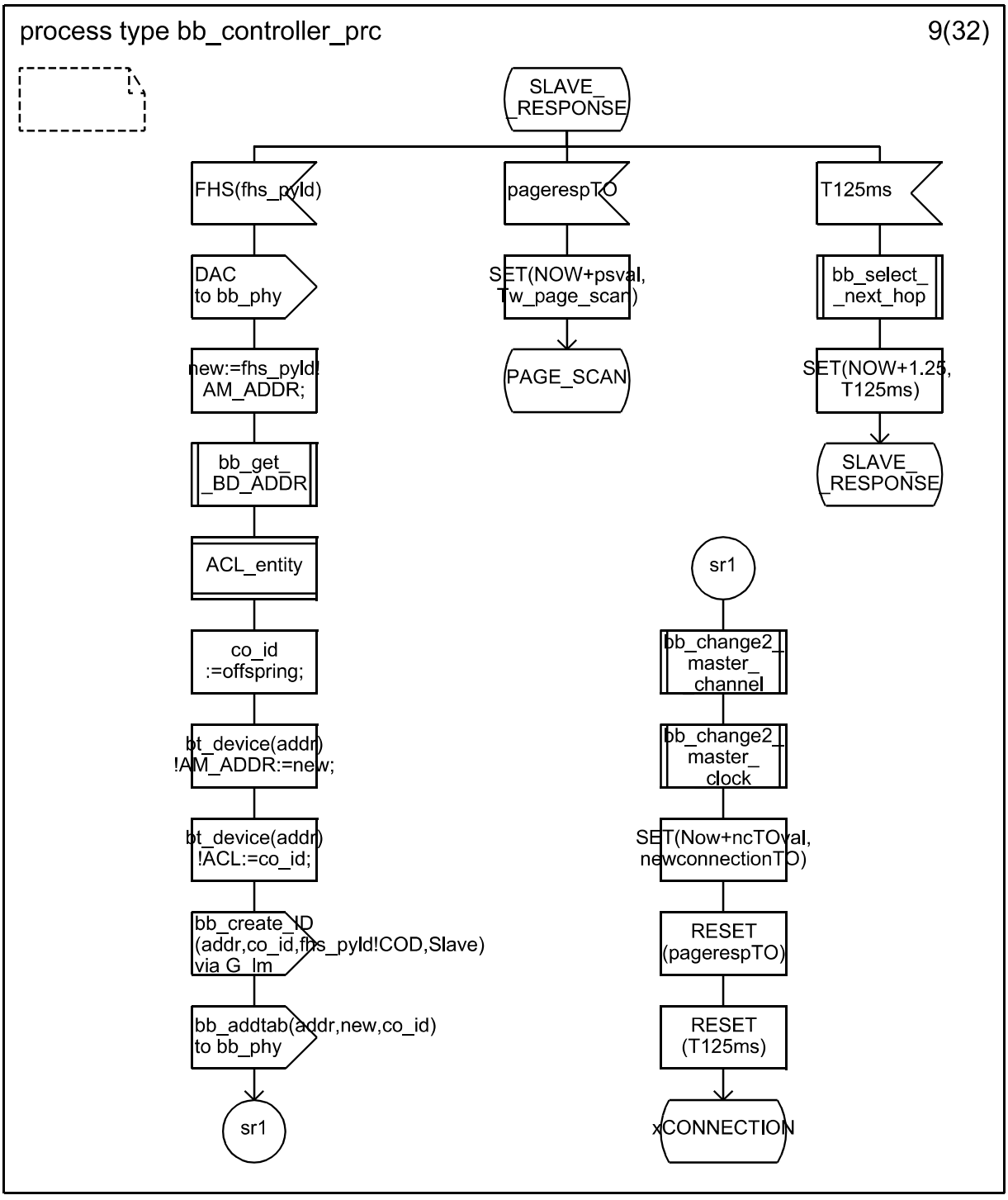
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B.2.10 bb_controller_prc-8



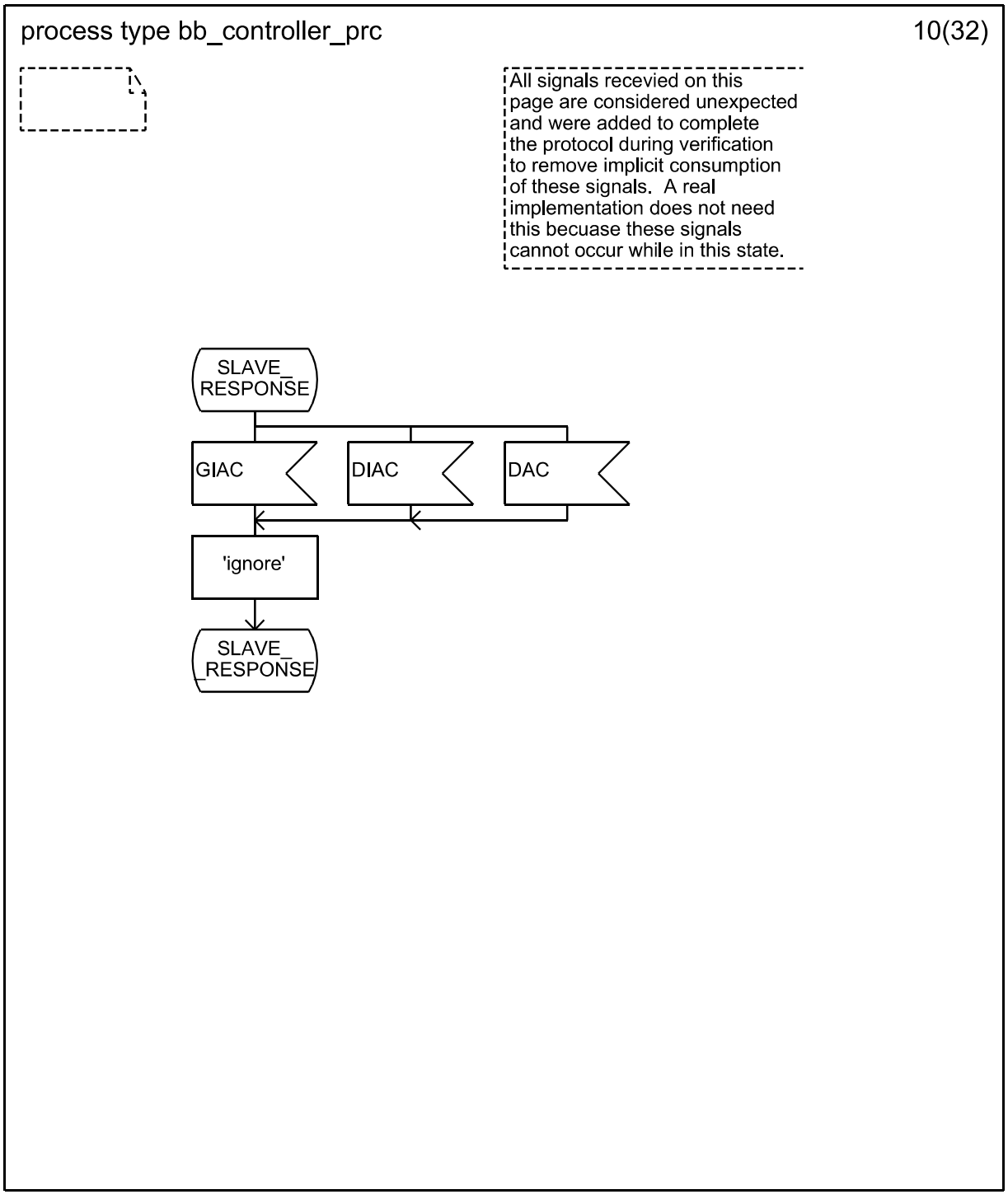
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B.2.11 bb_controller_prc-9



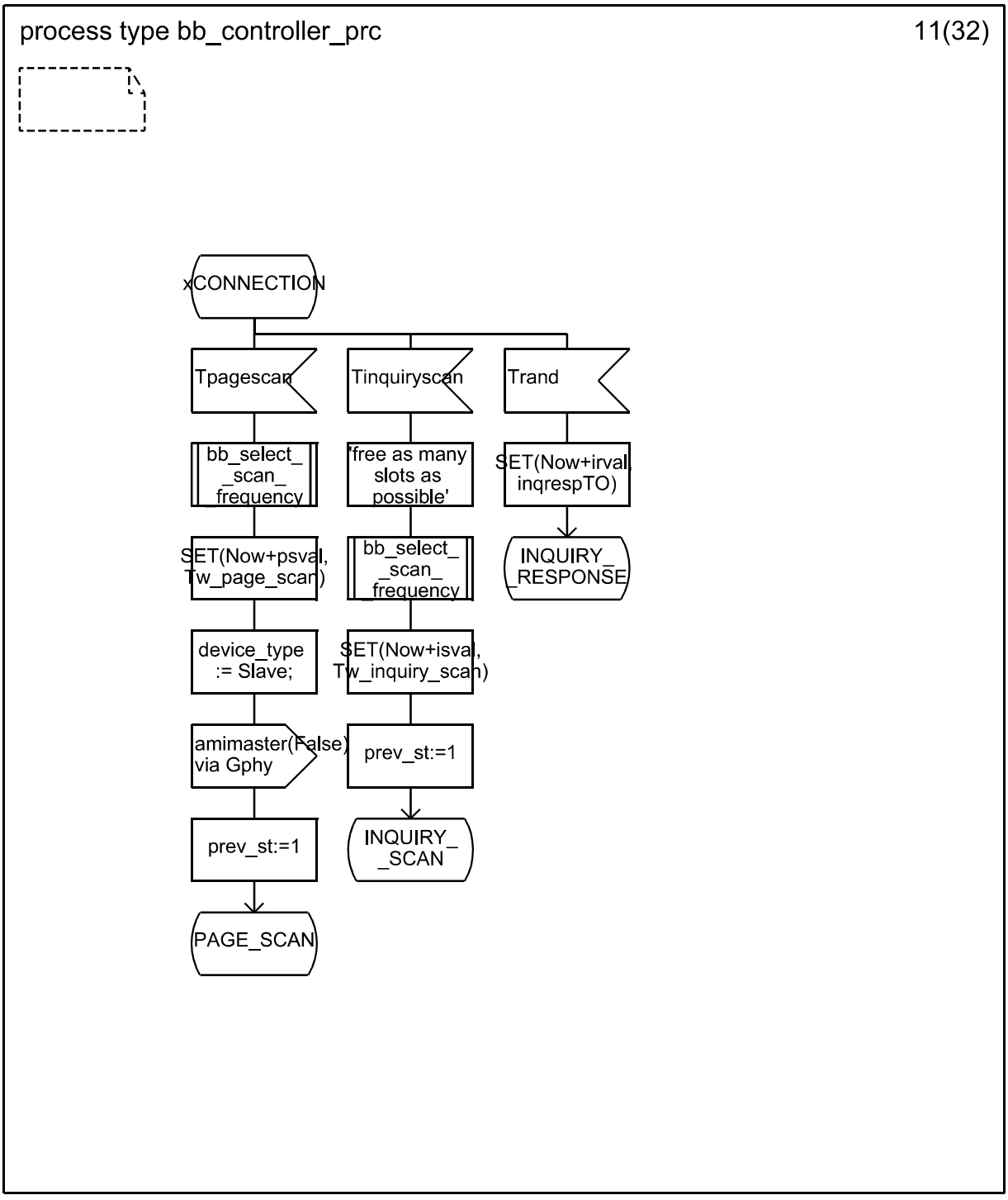
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B.2.12 bb_controller_prc-10



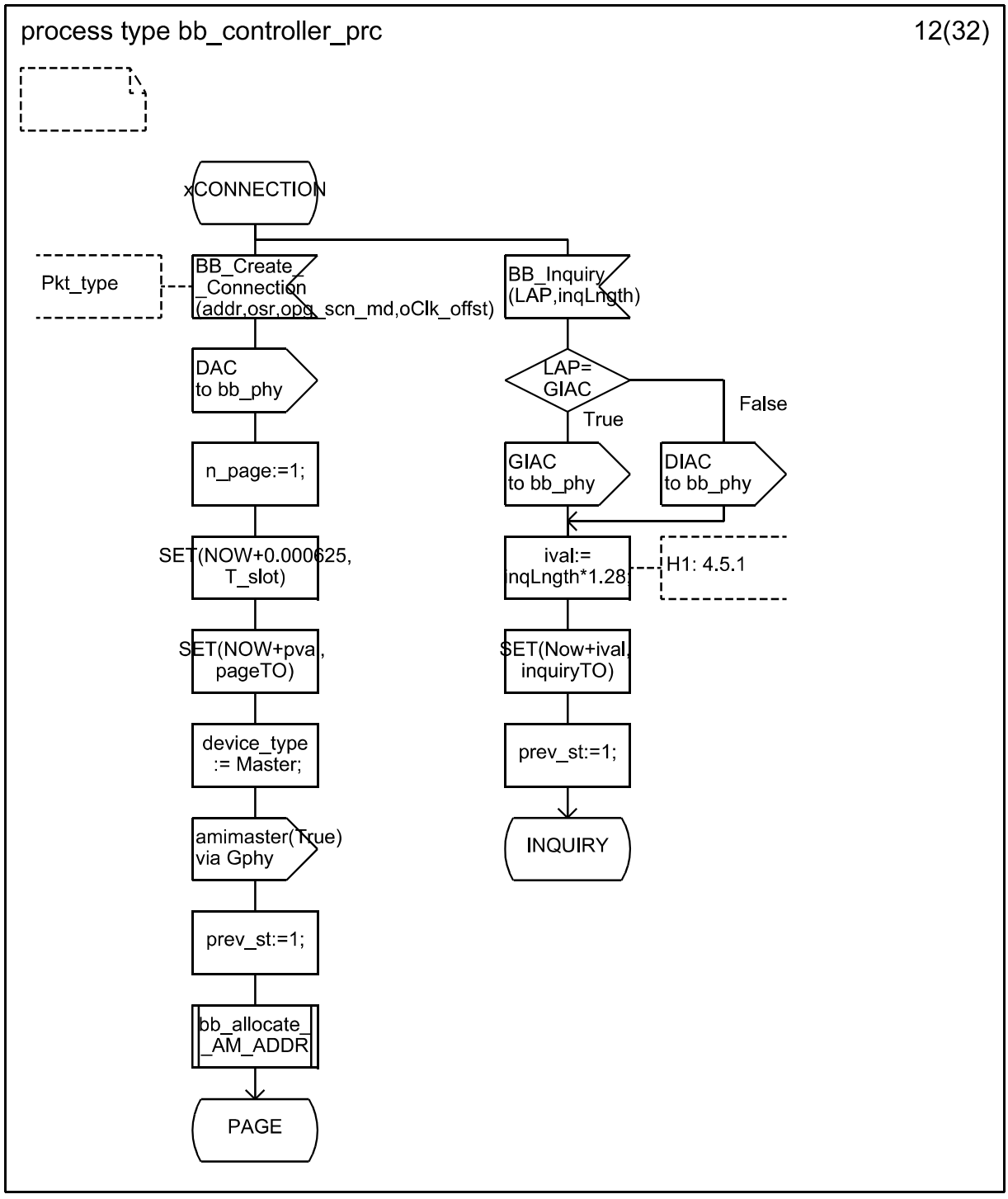
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B.2.13 bb_controller_prc-11



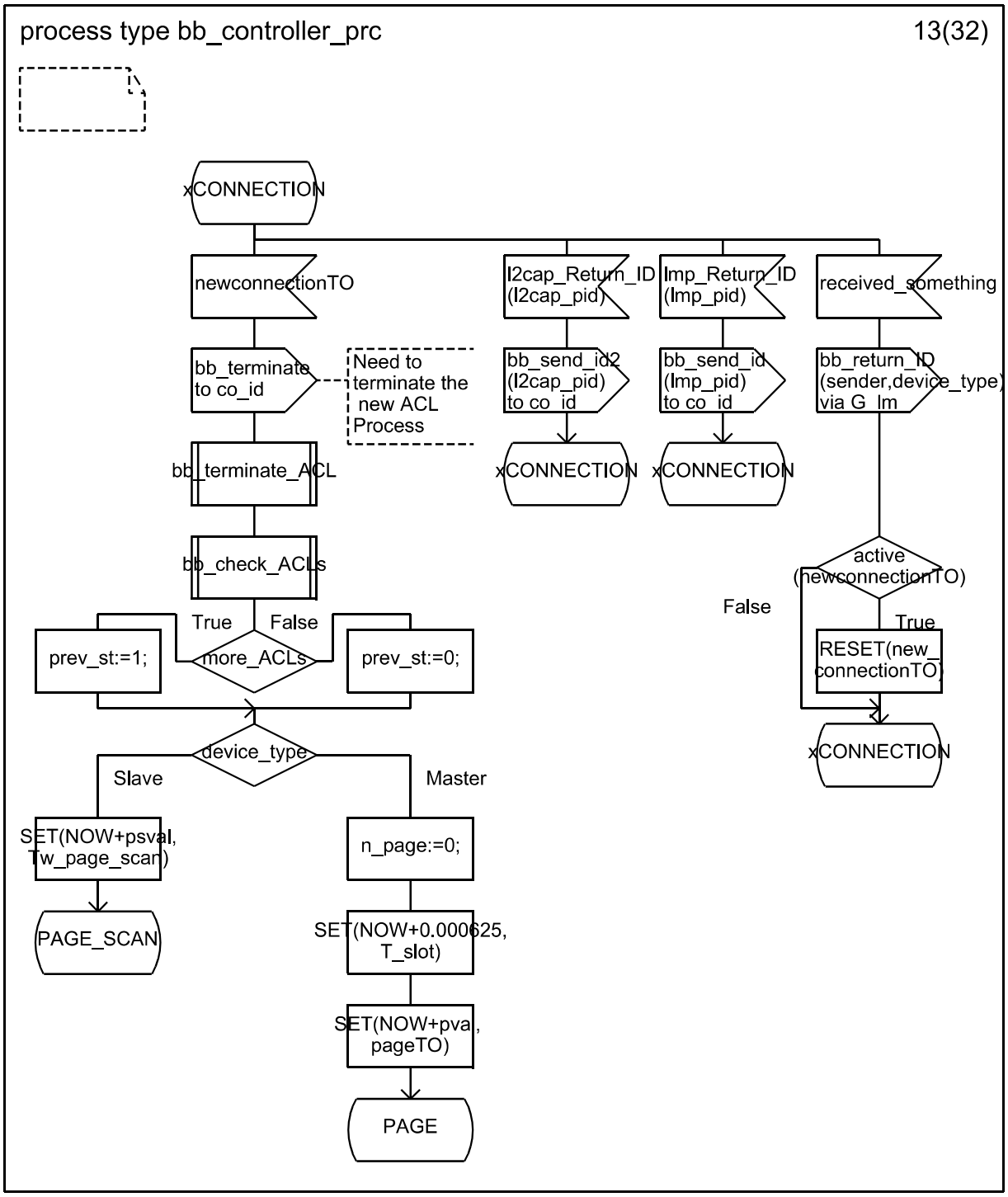
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B.2.14 bb_controller_prc-12



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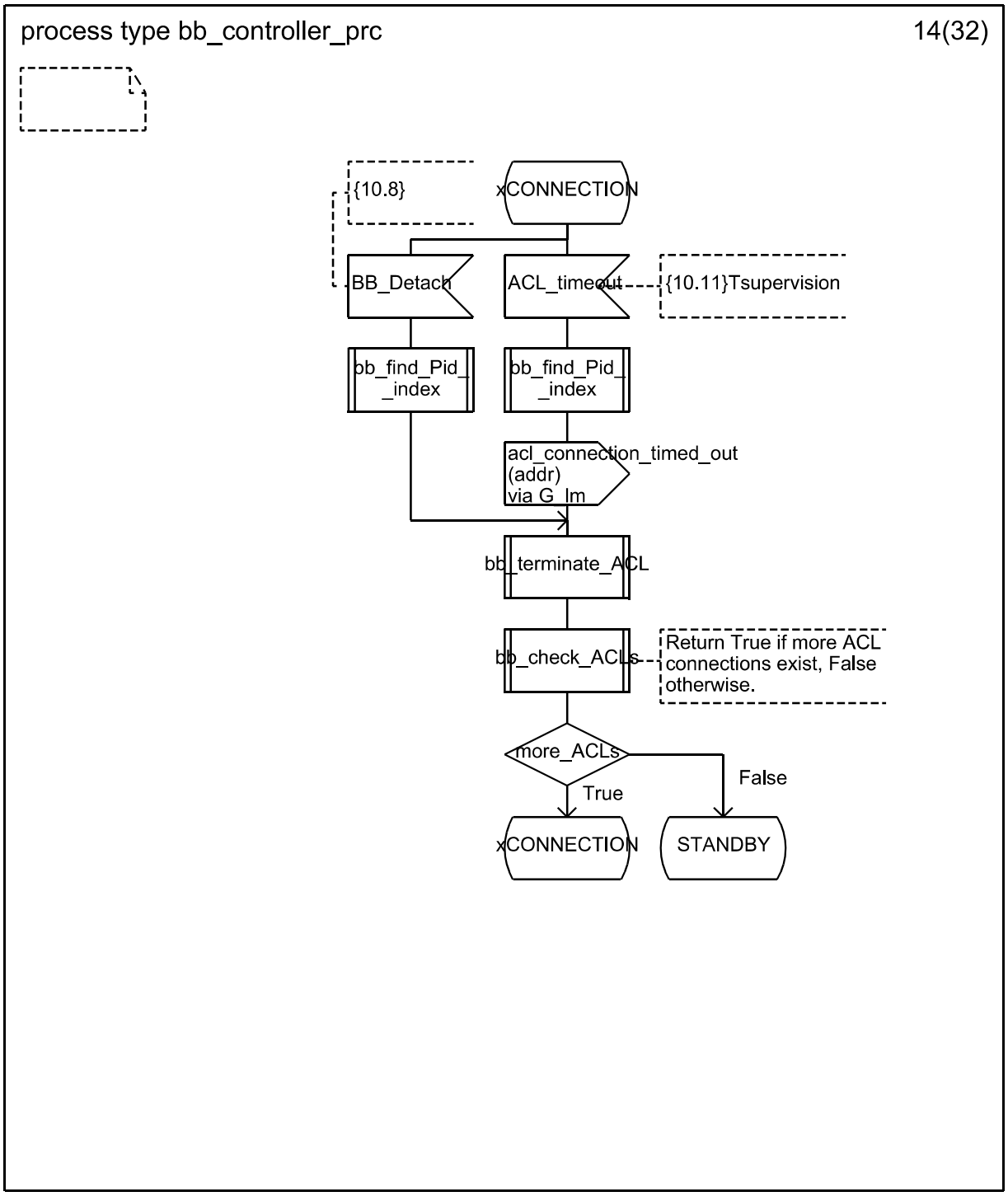
B.2.15 bb_controller_prc-13



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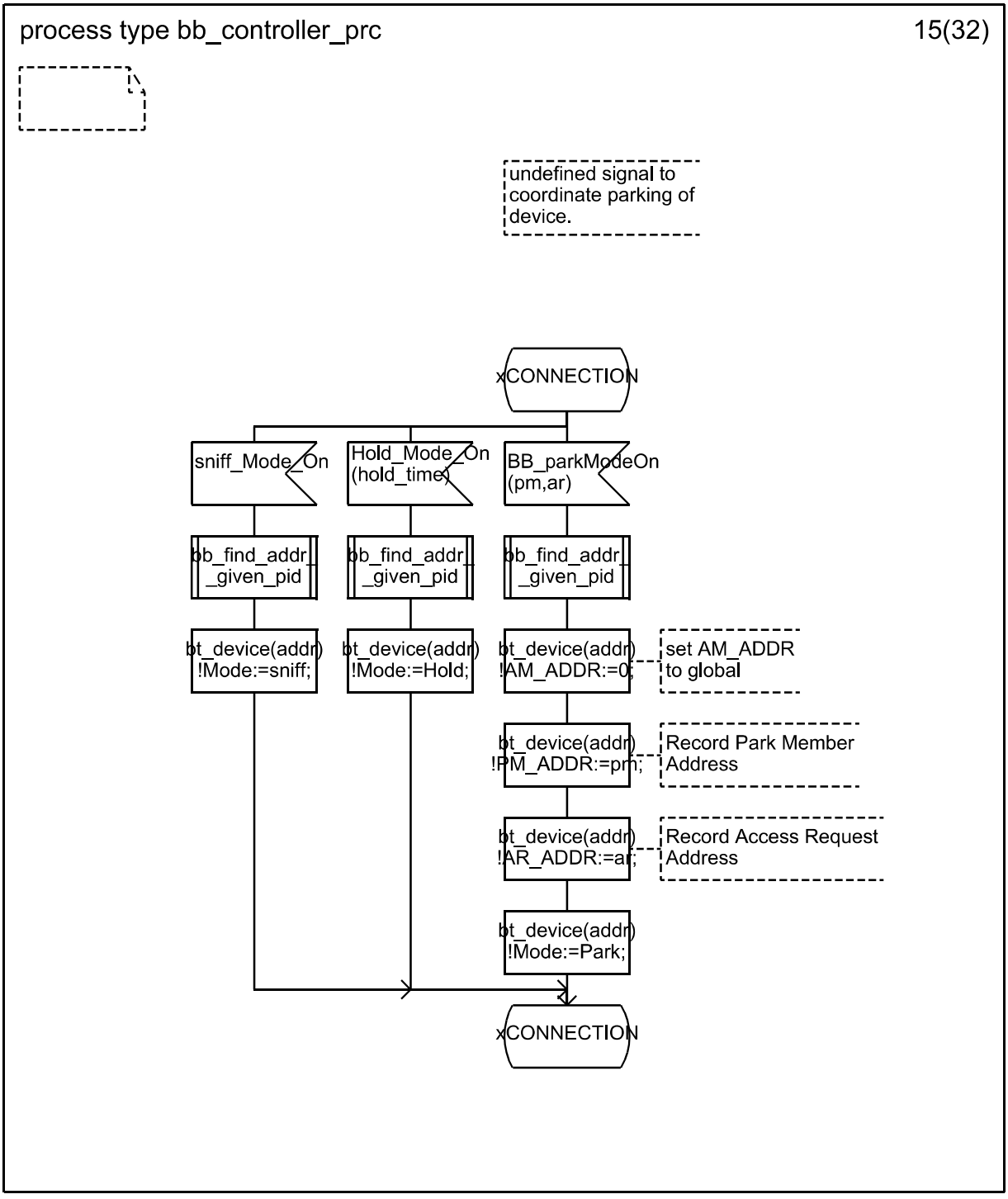
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B.2.16 bb_controller_prc-14



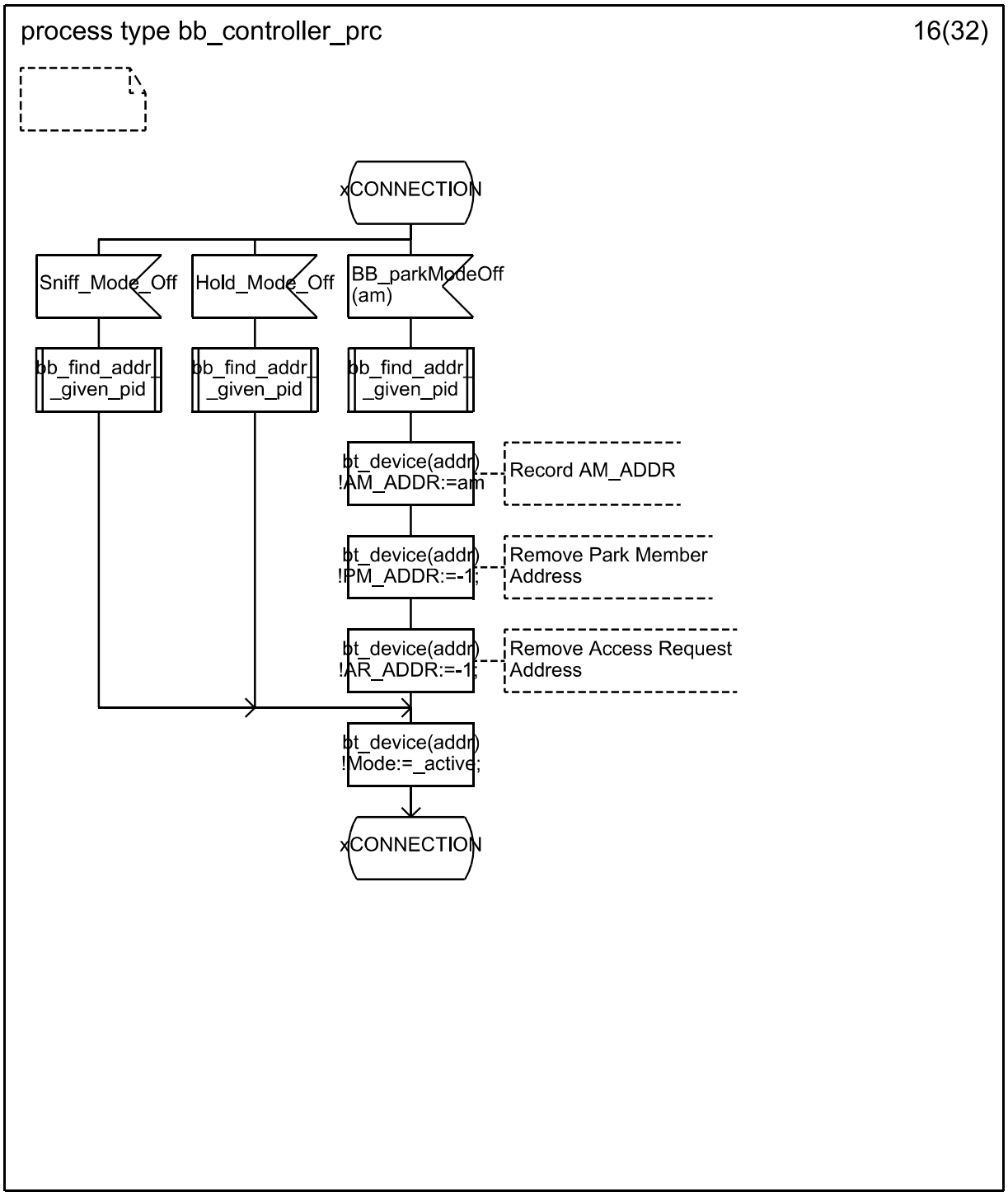
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B.2.17 bb_controller_prc-15



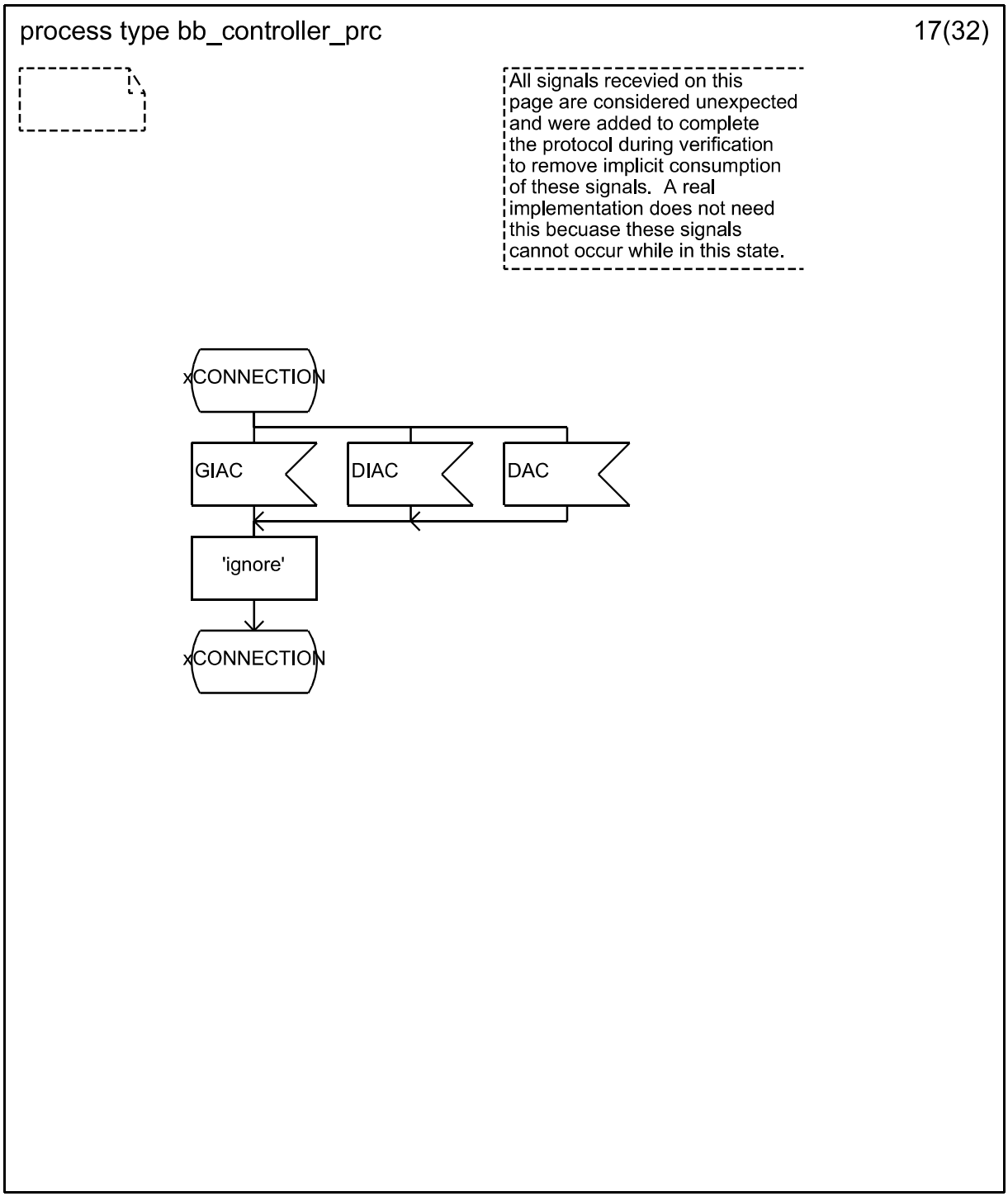
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B.2.18 bb_controller_prc-16



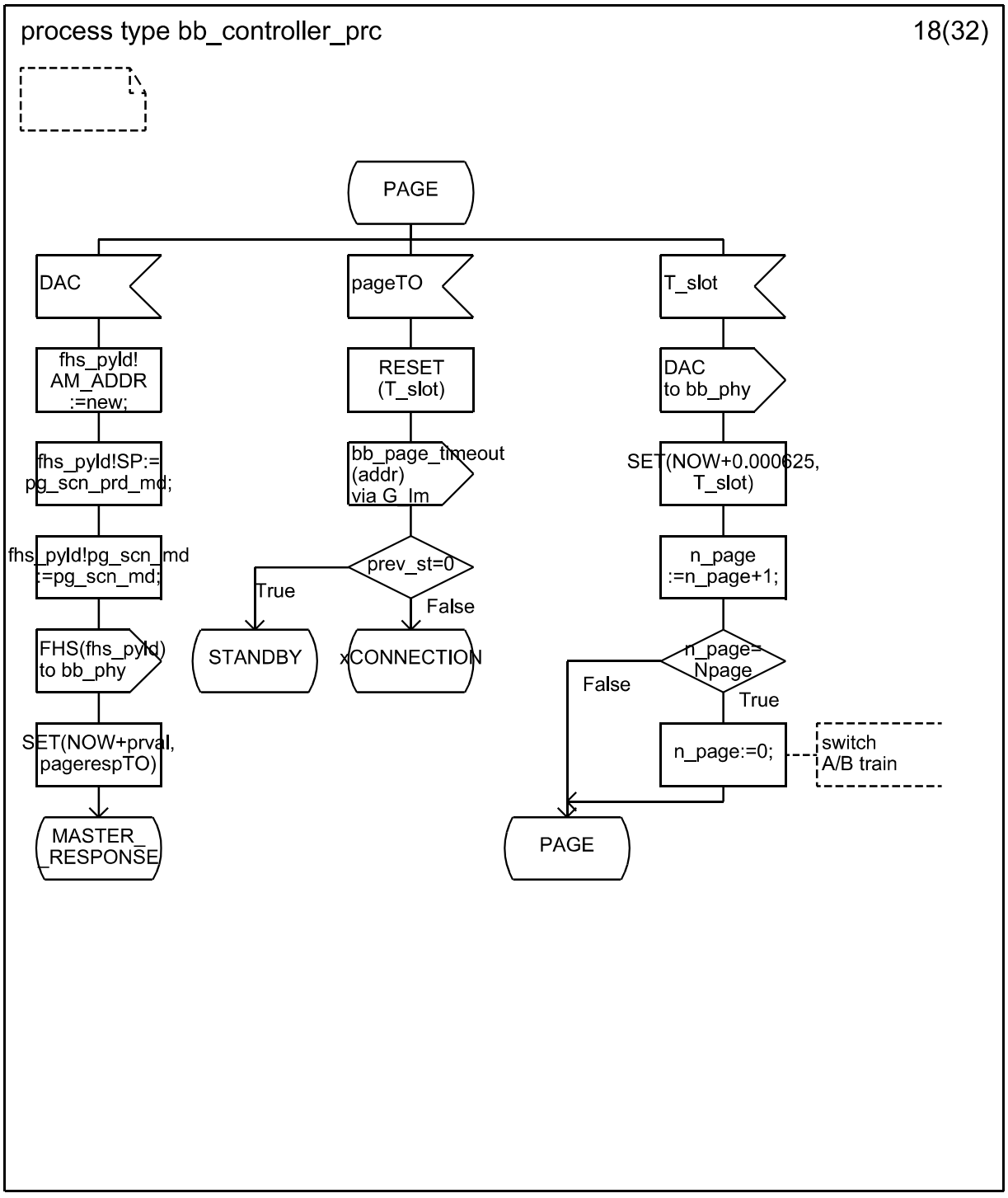
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B.2.19 bb_controller_prc-17



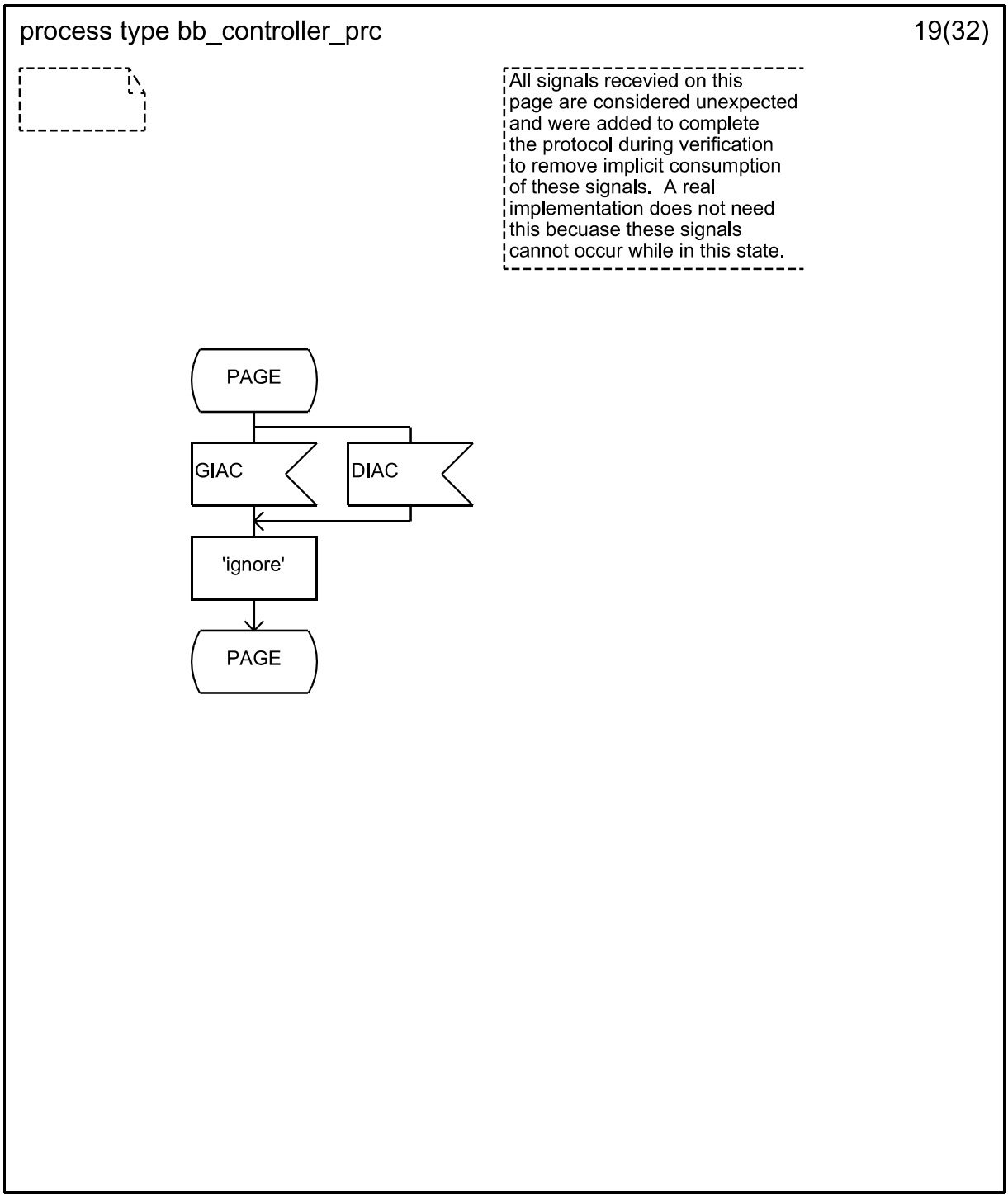
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B.2.20 bb_controller_prc-18



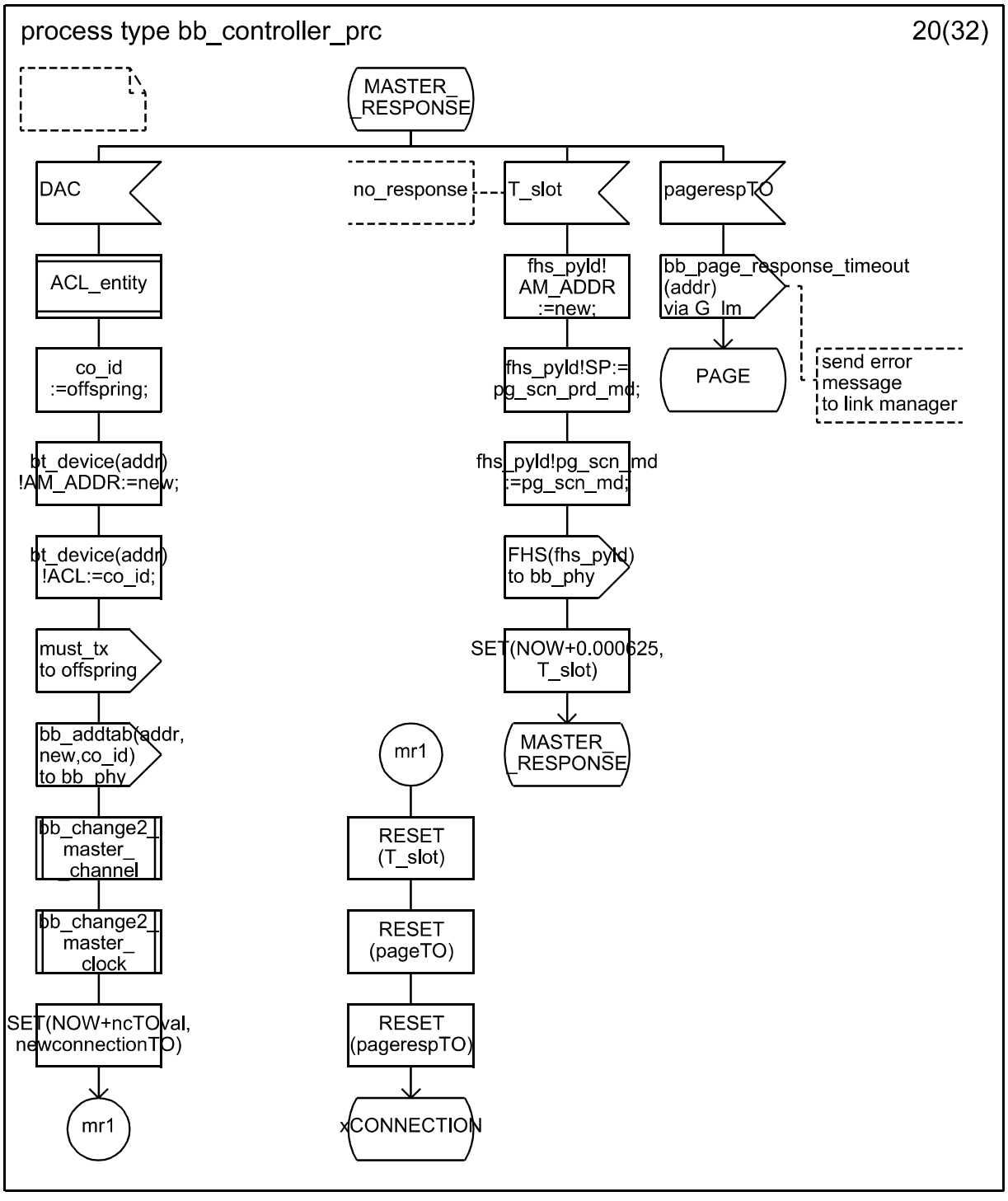
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B.2.21 bb_controller_prc-19



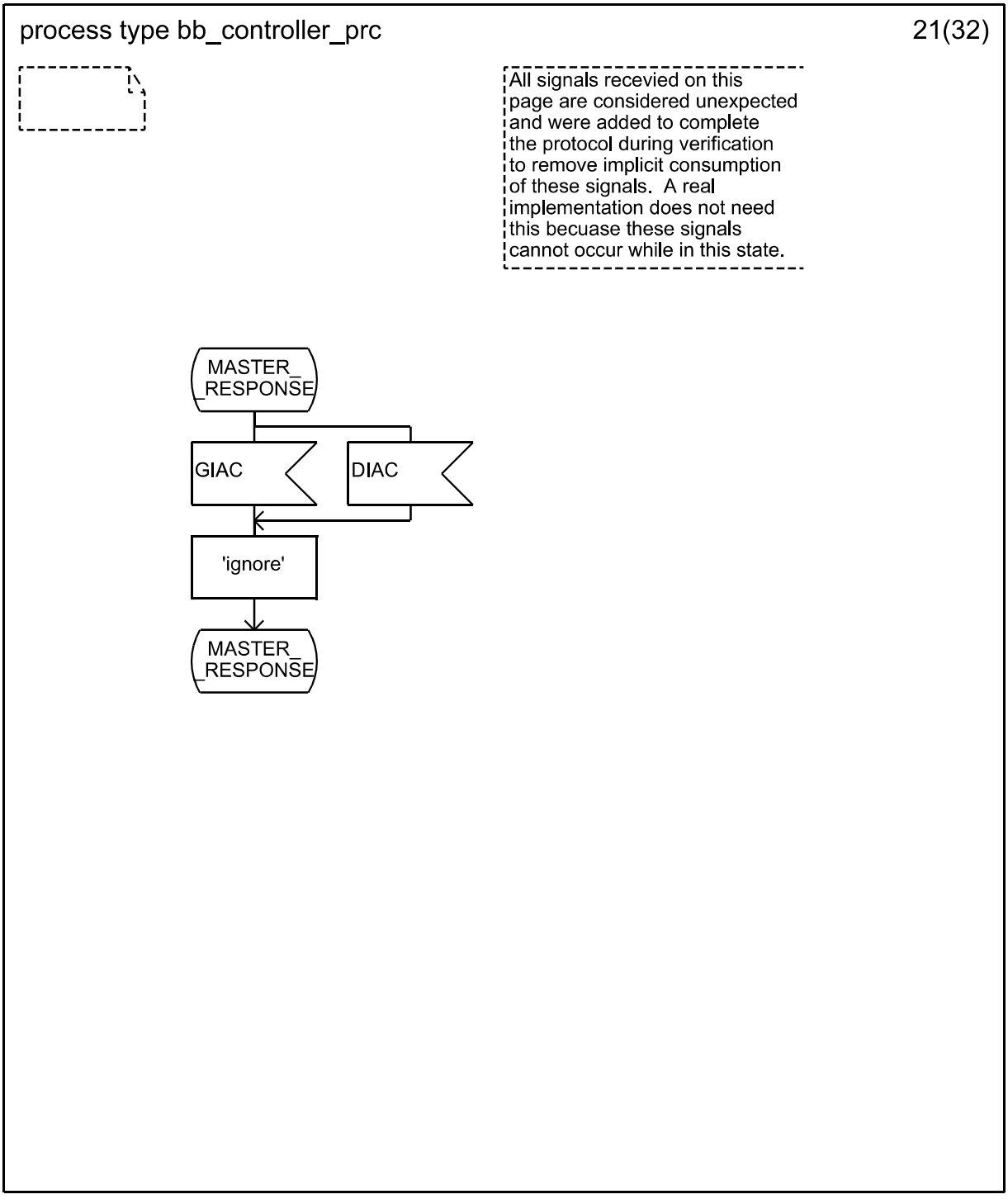
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B.2.22 bb_controller_prc-20



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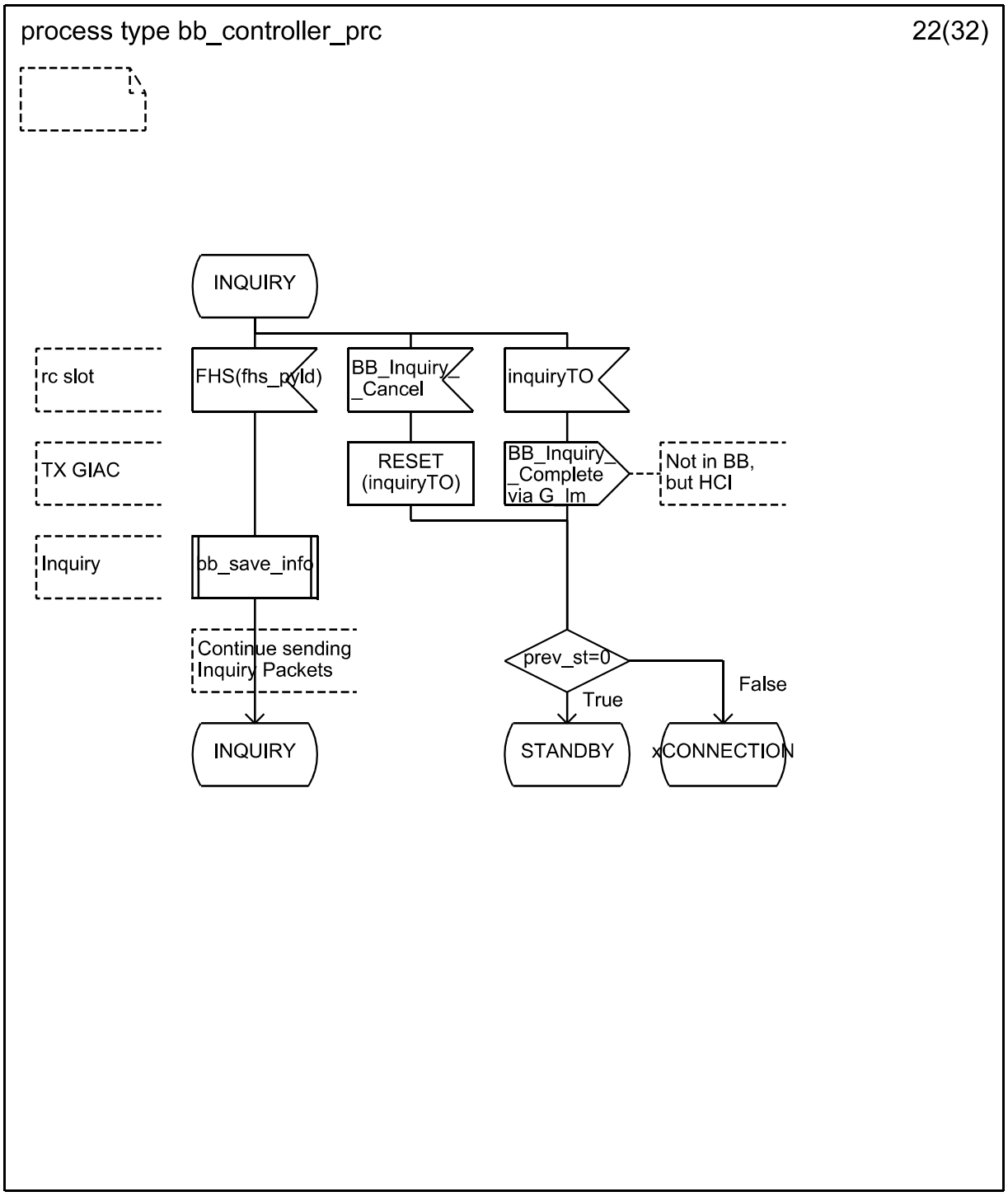
B.2.23 bb_controller_prc-21



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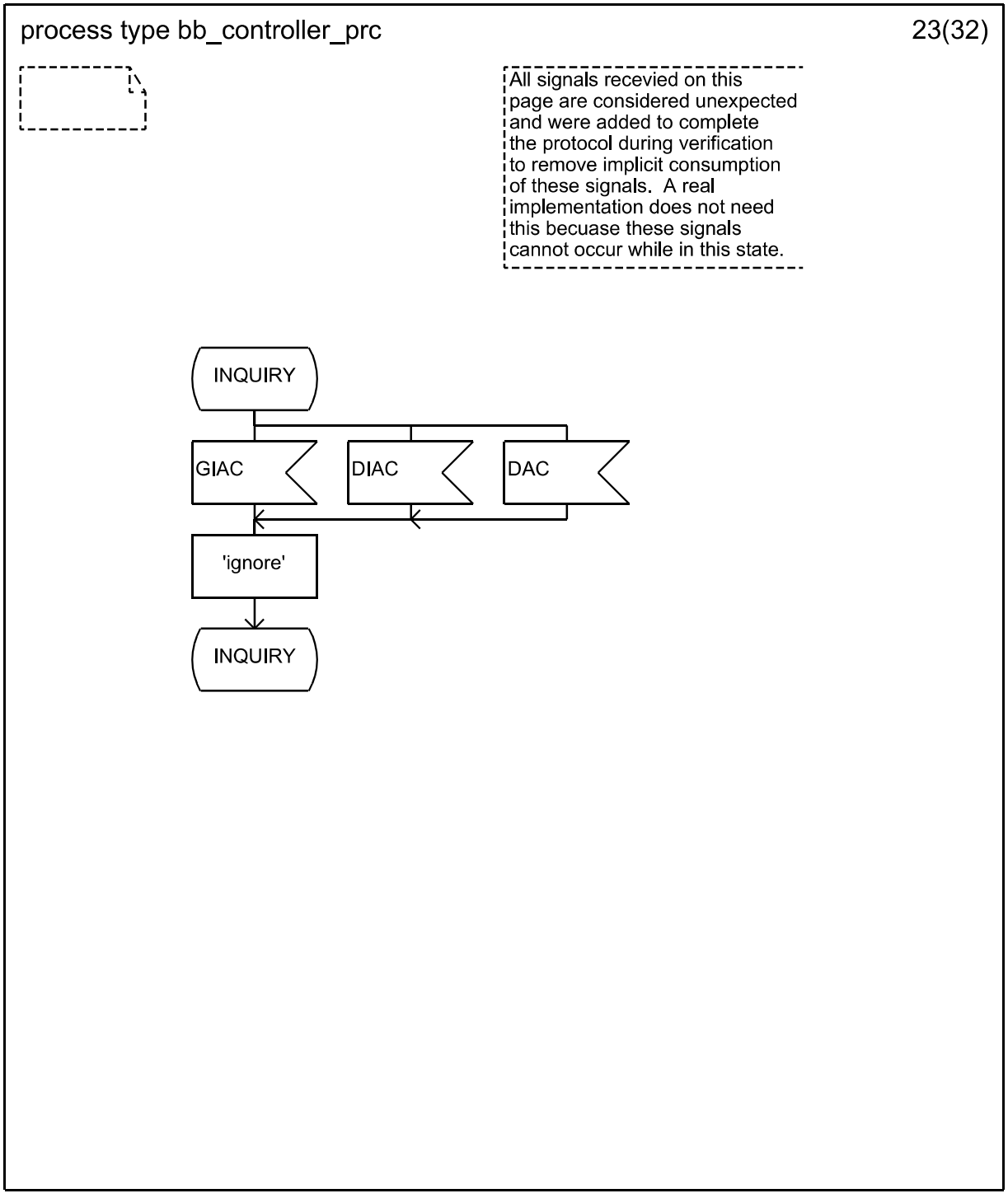
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B.2.24 bb_controller_prc-22



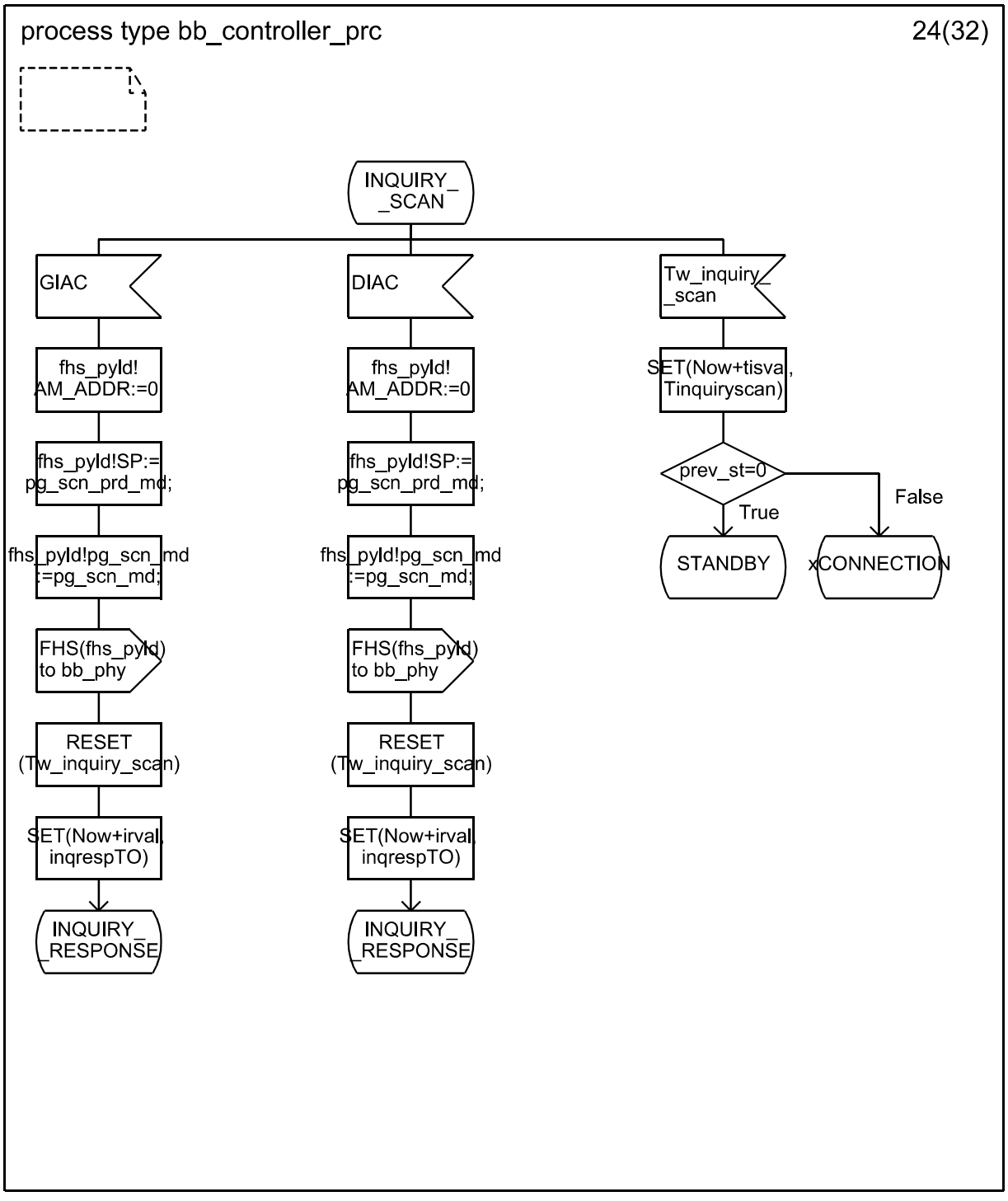
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B.2.25 bb_controller_prc-23



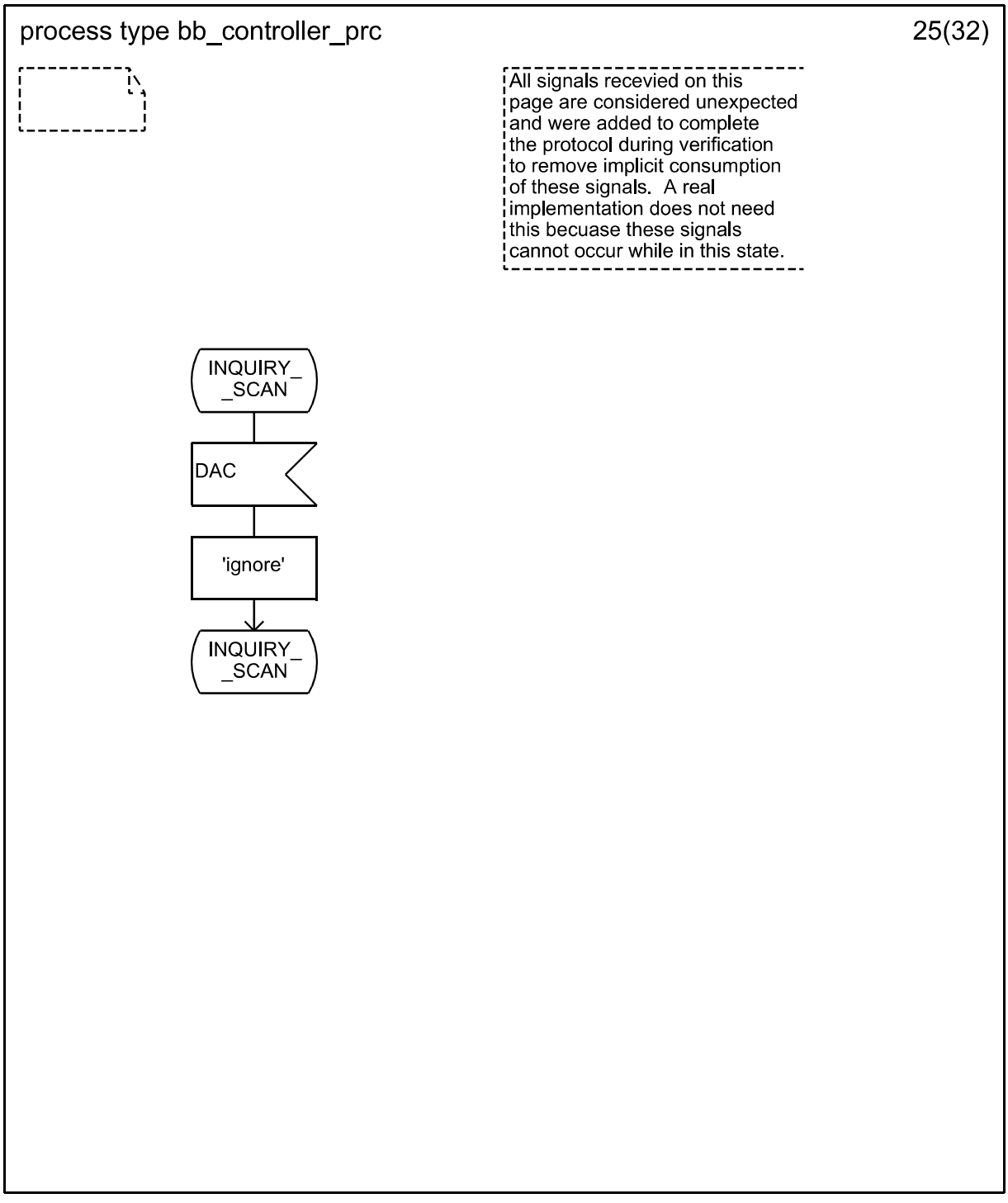
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B.2.26 bb_controller_prc-24



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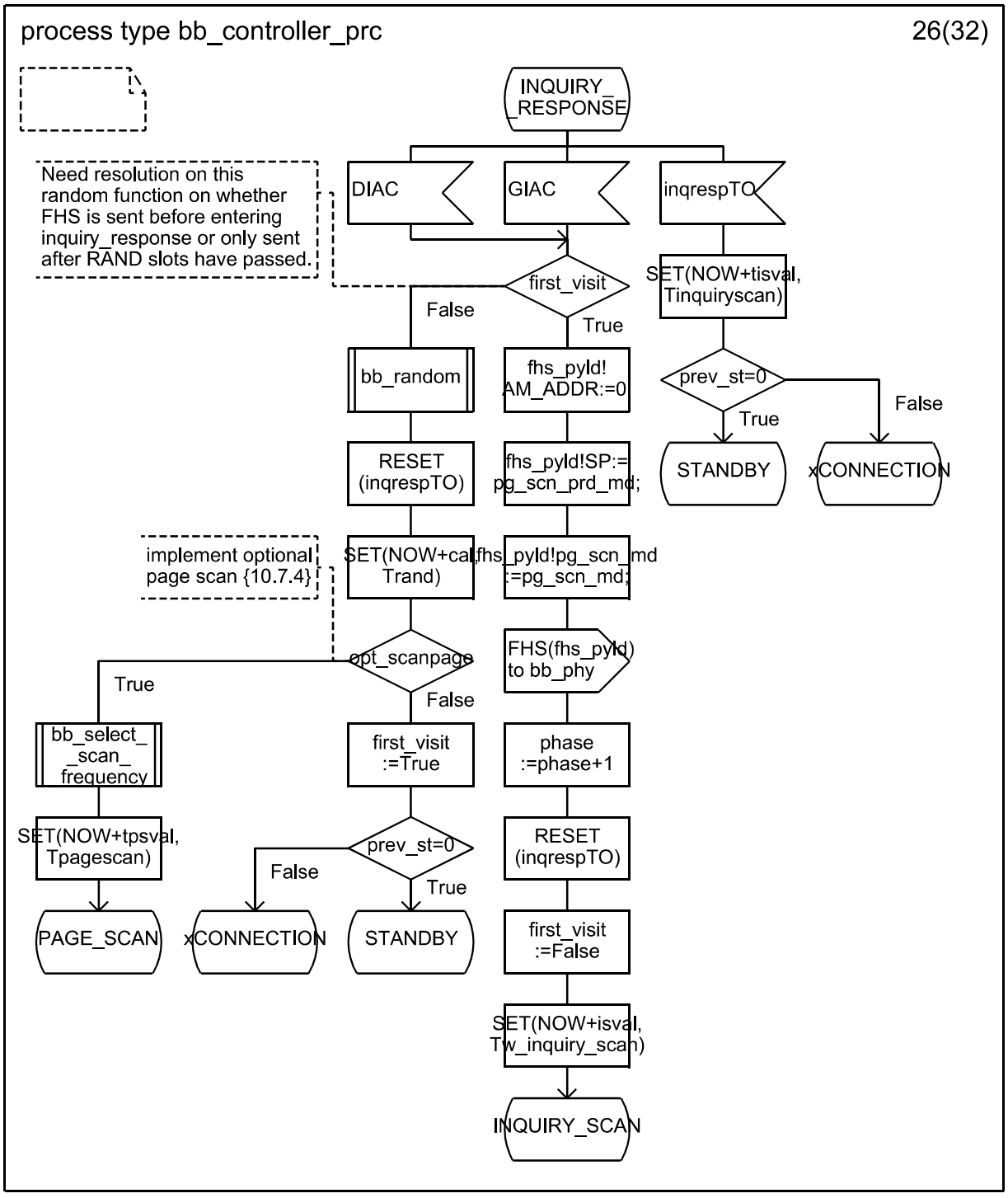
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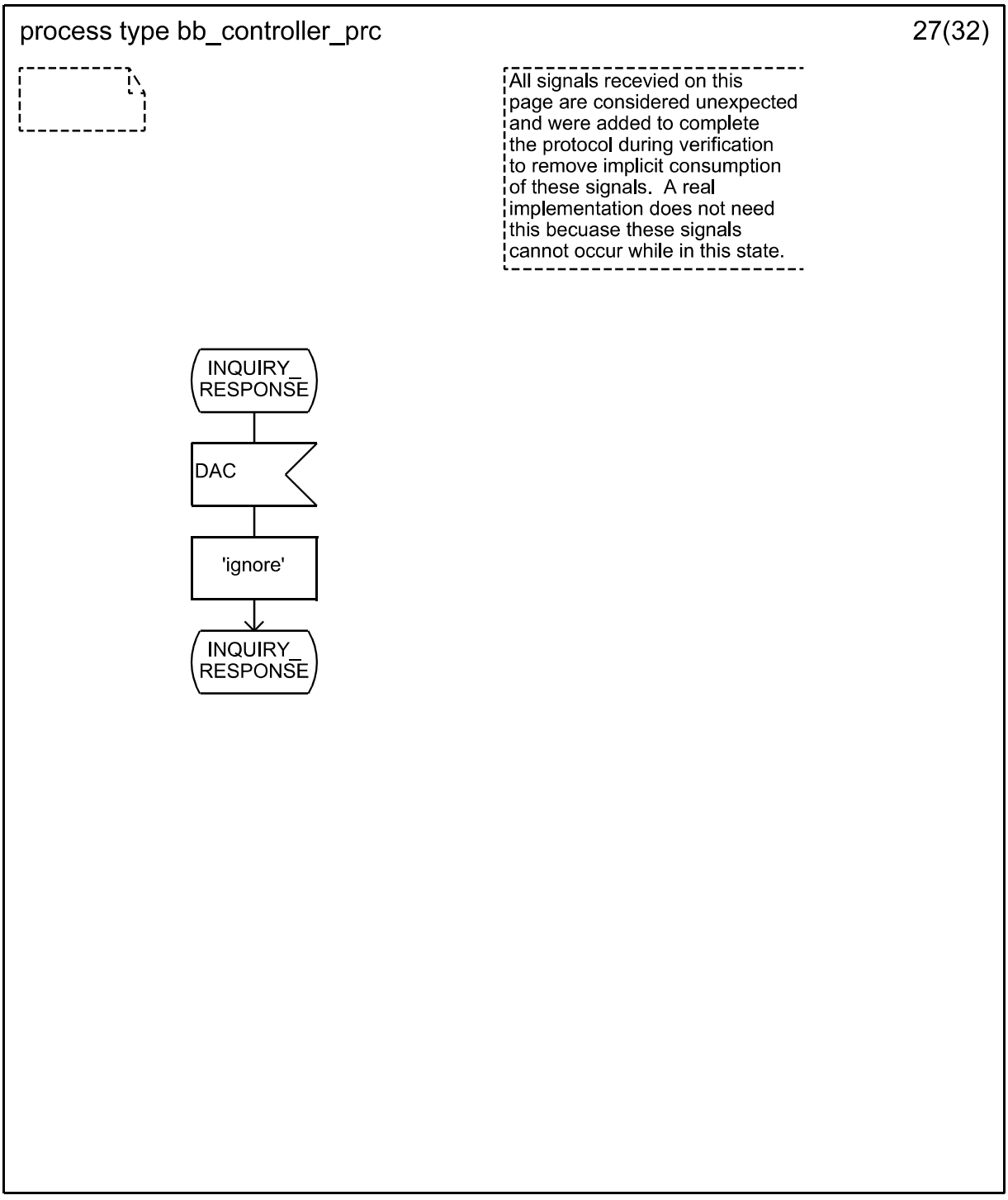
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B.2.28 bb_controller_prc-26



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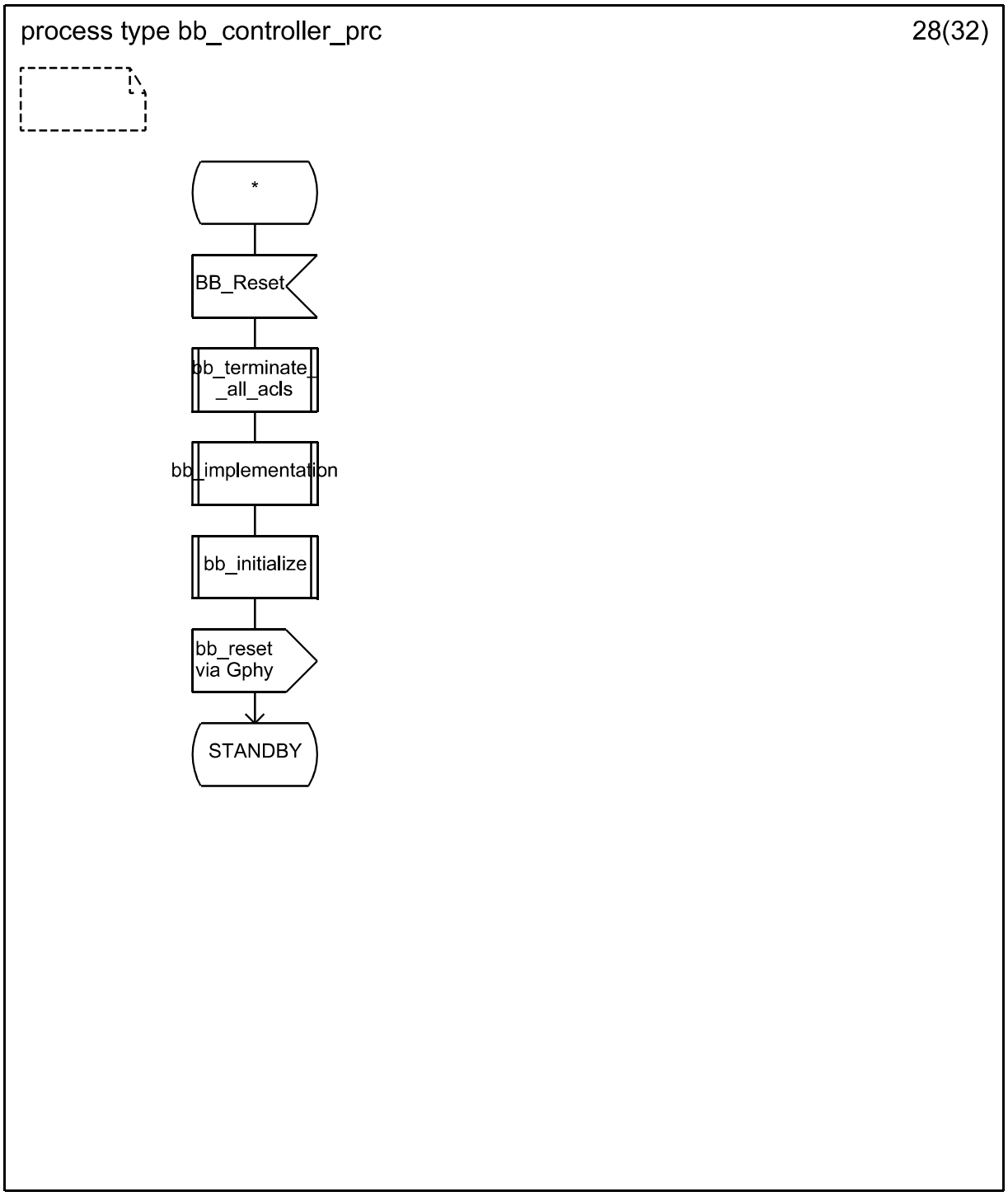
B.2.29 bb_controller_prc-27



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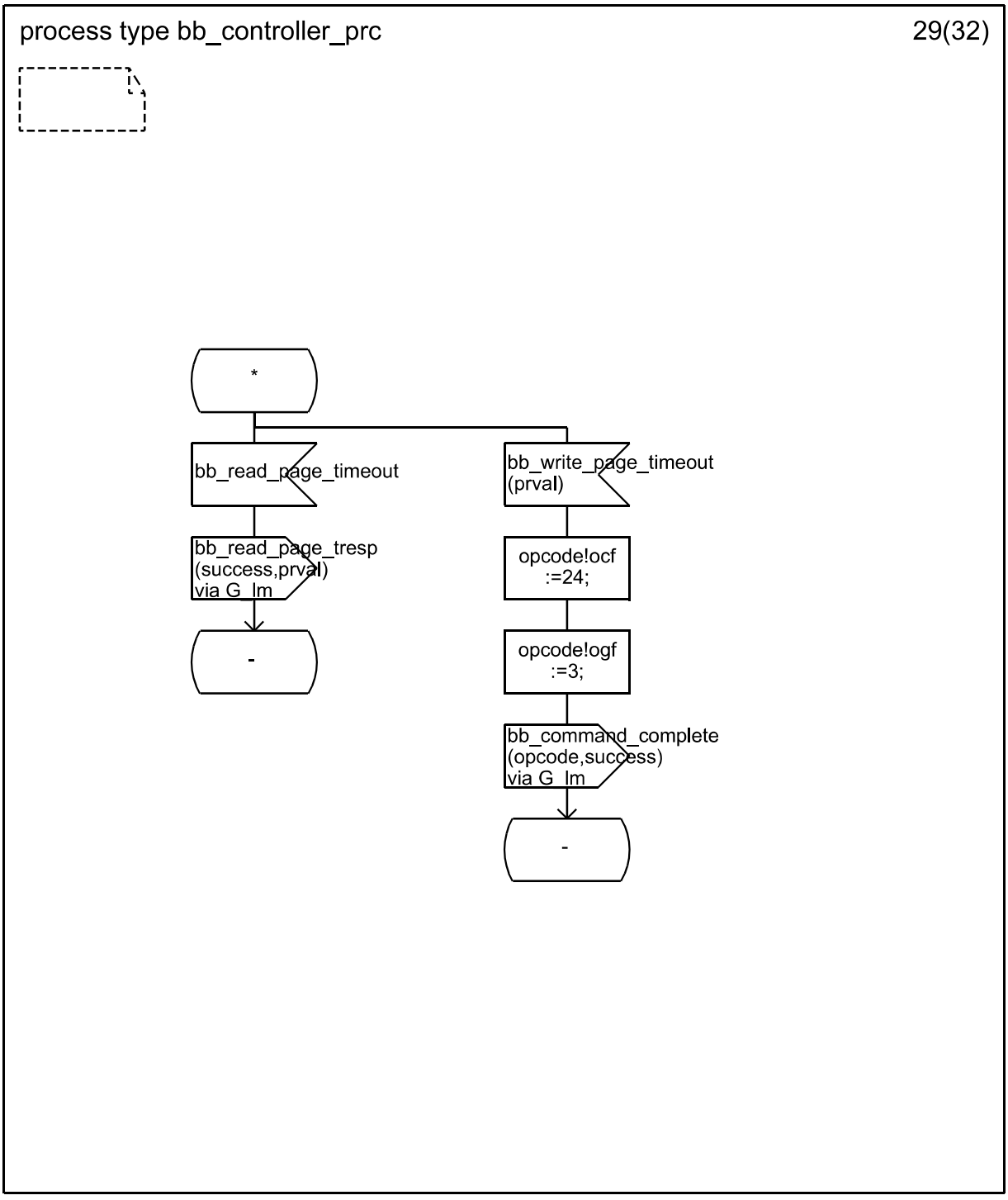
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B.2.30 bb_controller_prc-28



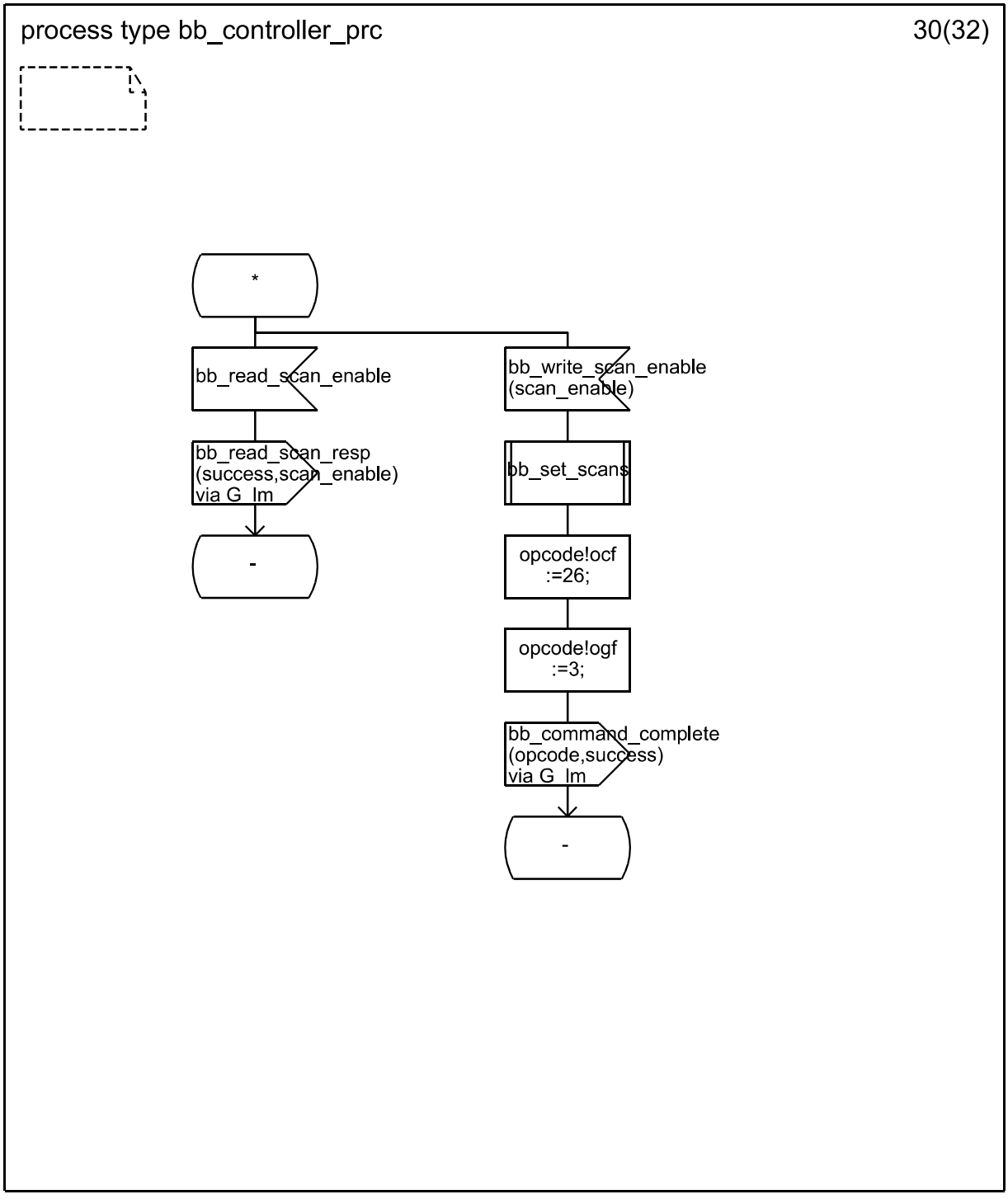
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B.2.31 bb_controller_prc-29



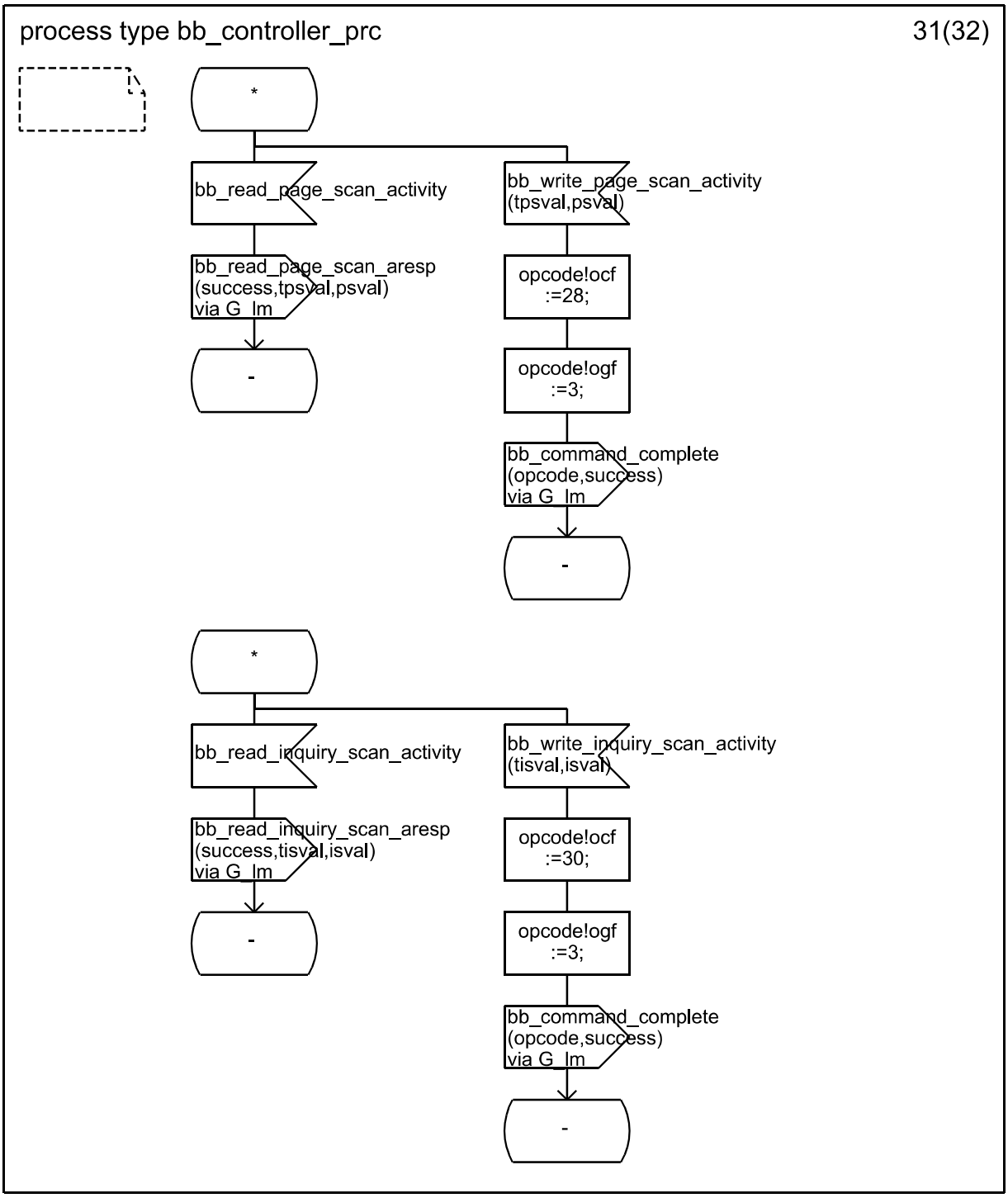
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B.2.32 bb_controller_prc-30



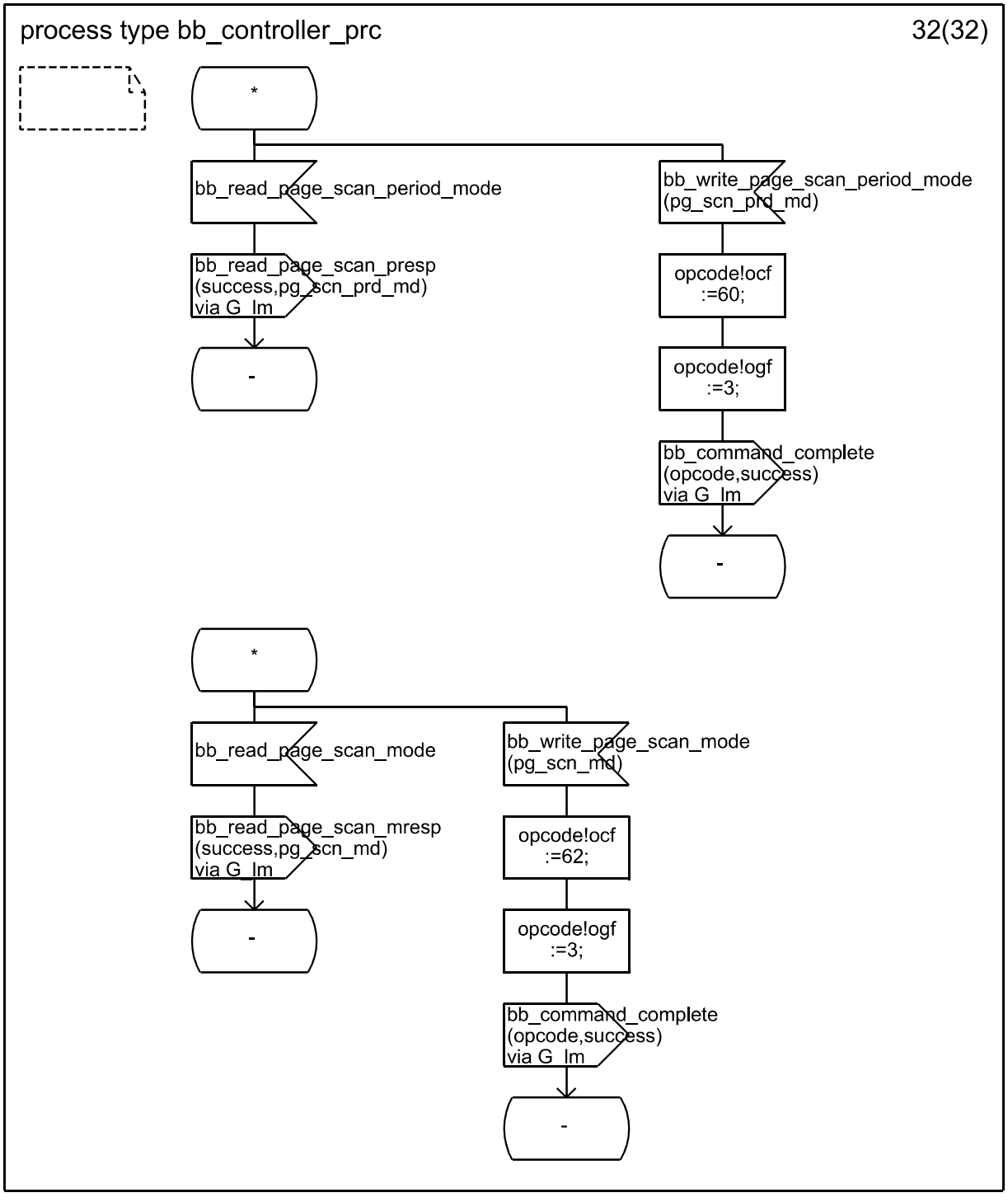
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B.2.33 bb_controller_prc-31



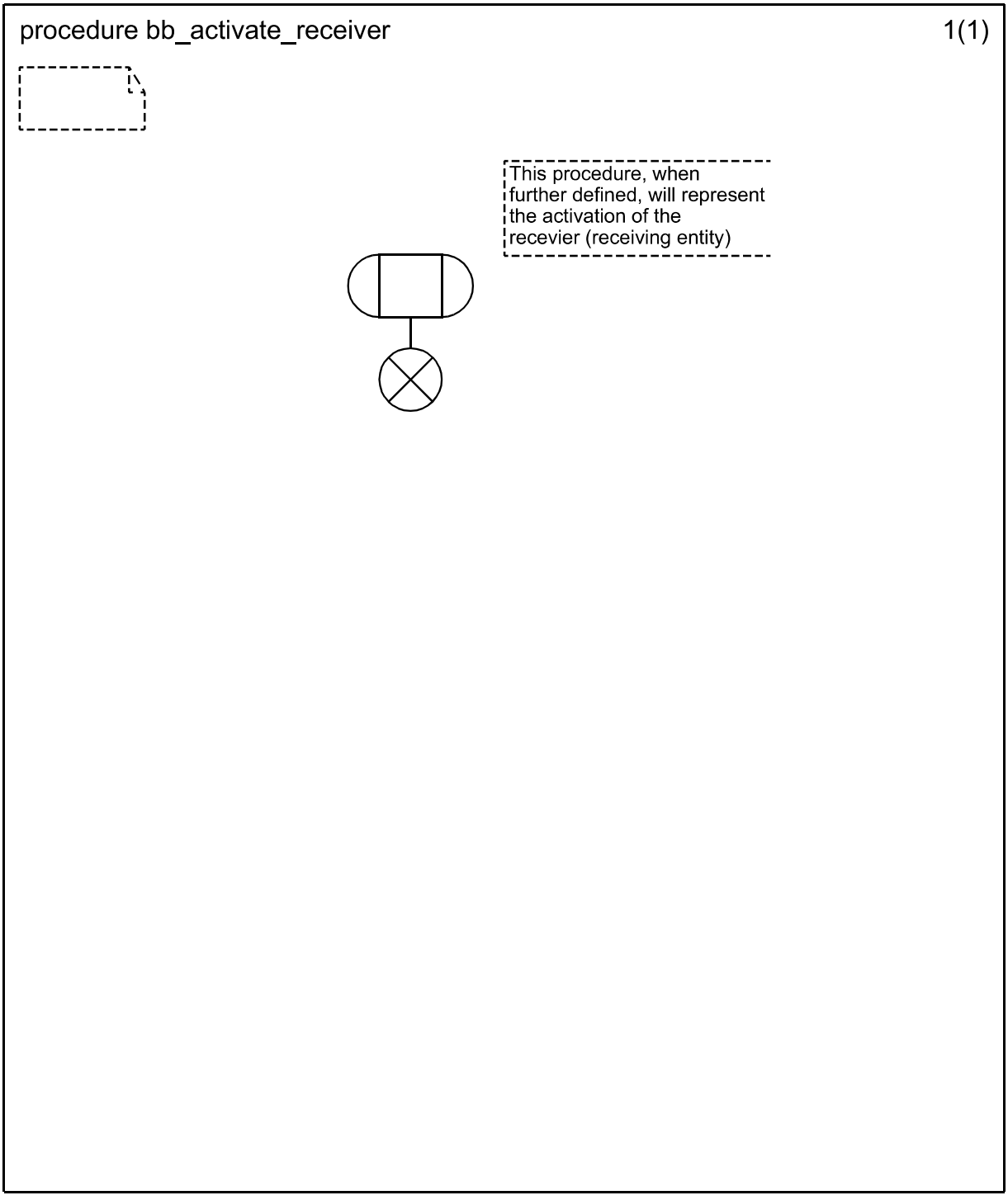
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B.2.34 bb_controller_prc-32



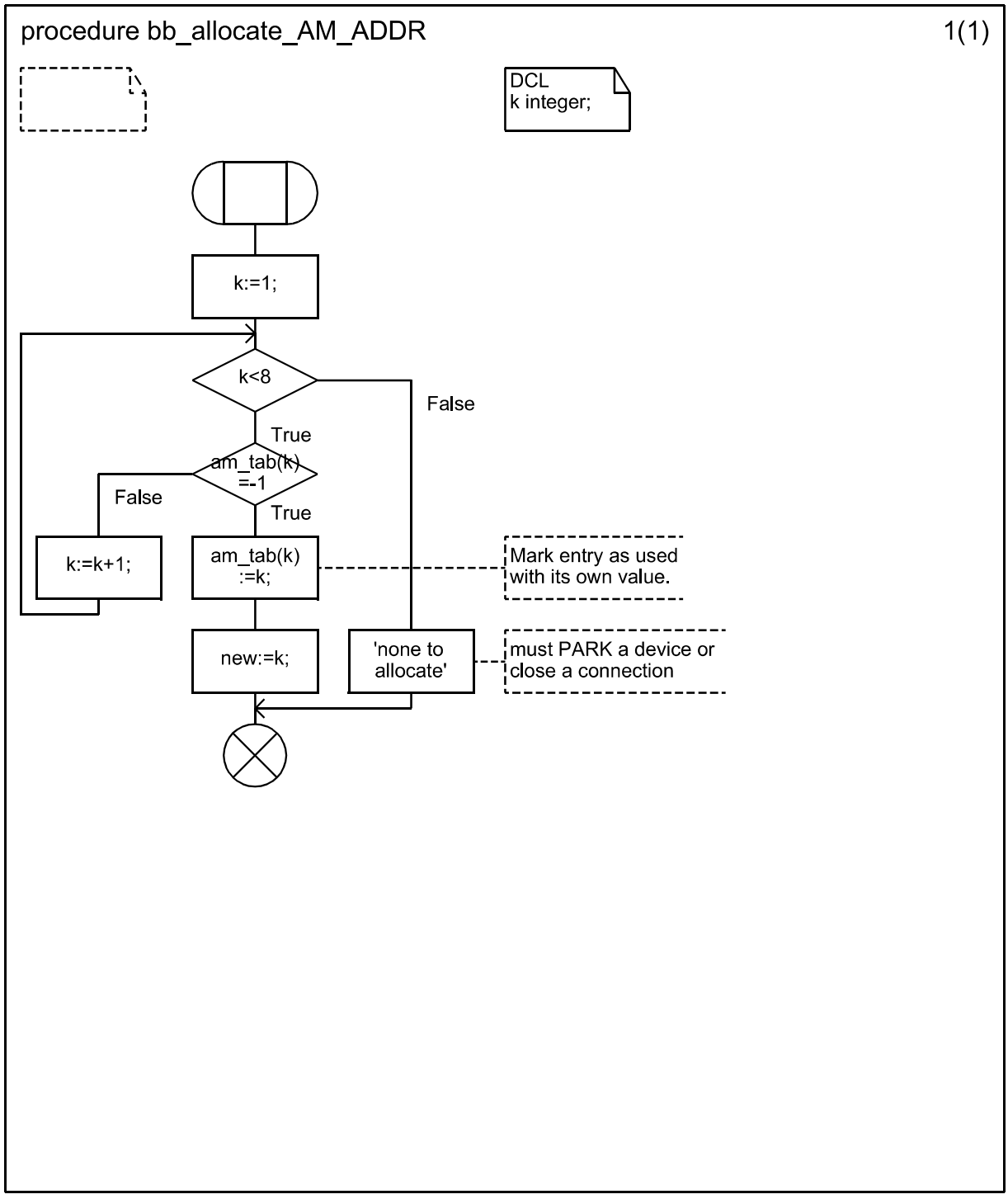
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B.2.35 bb_activate_receiver-1



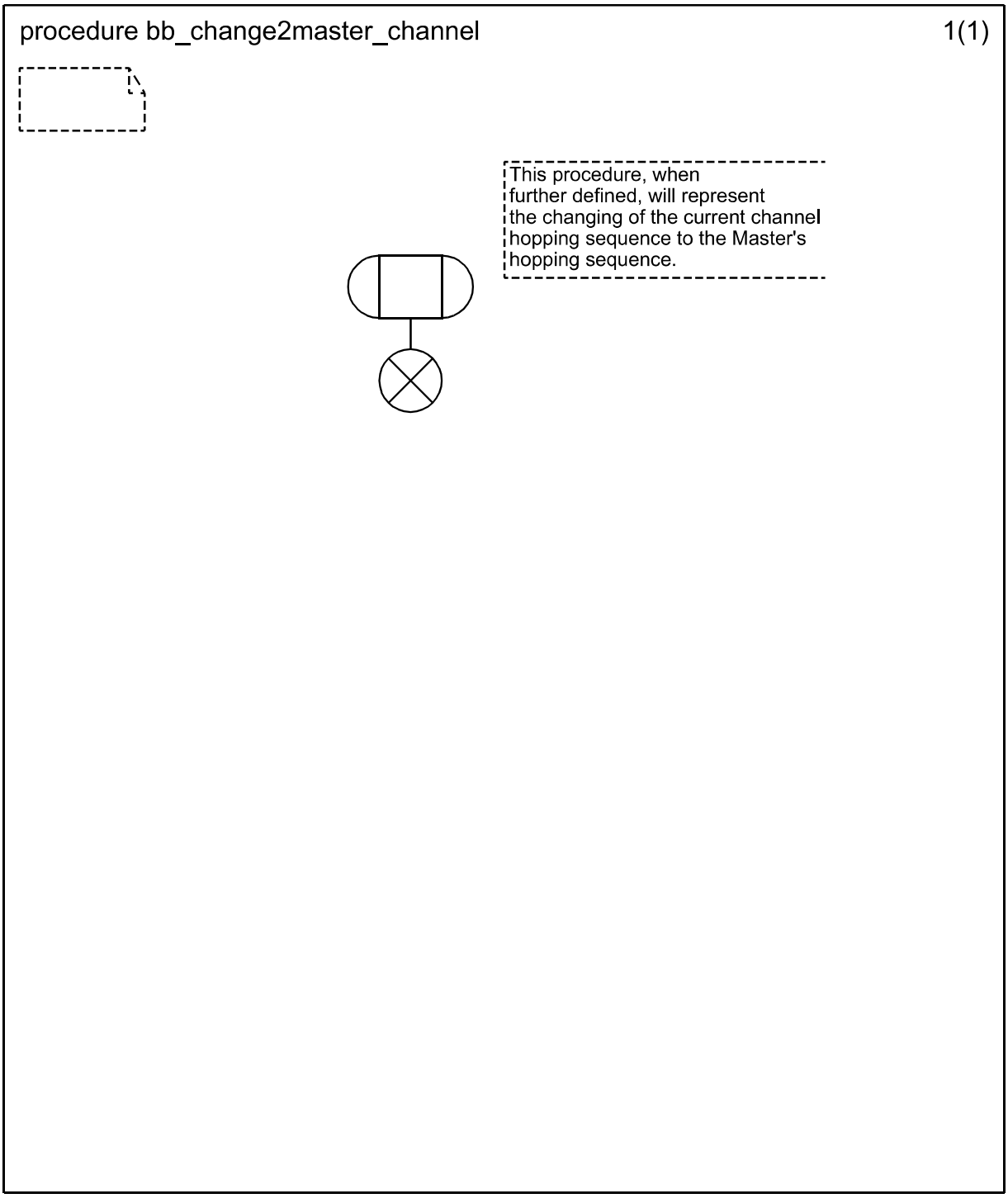
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B.2.36 bb_allocate_AM_ADDR-1



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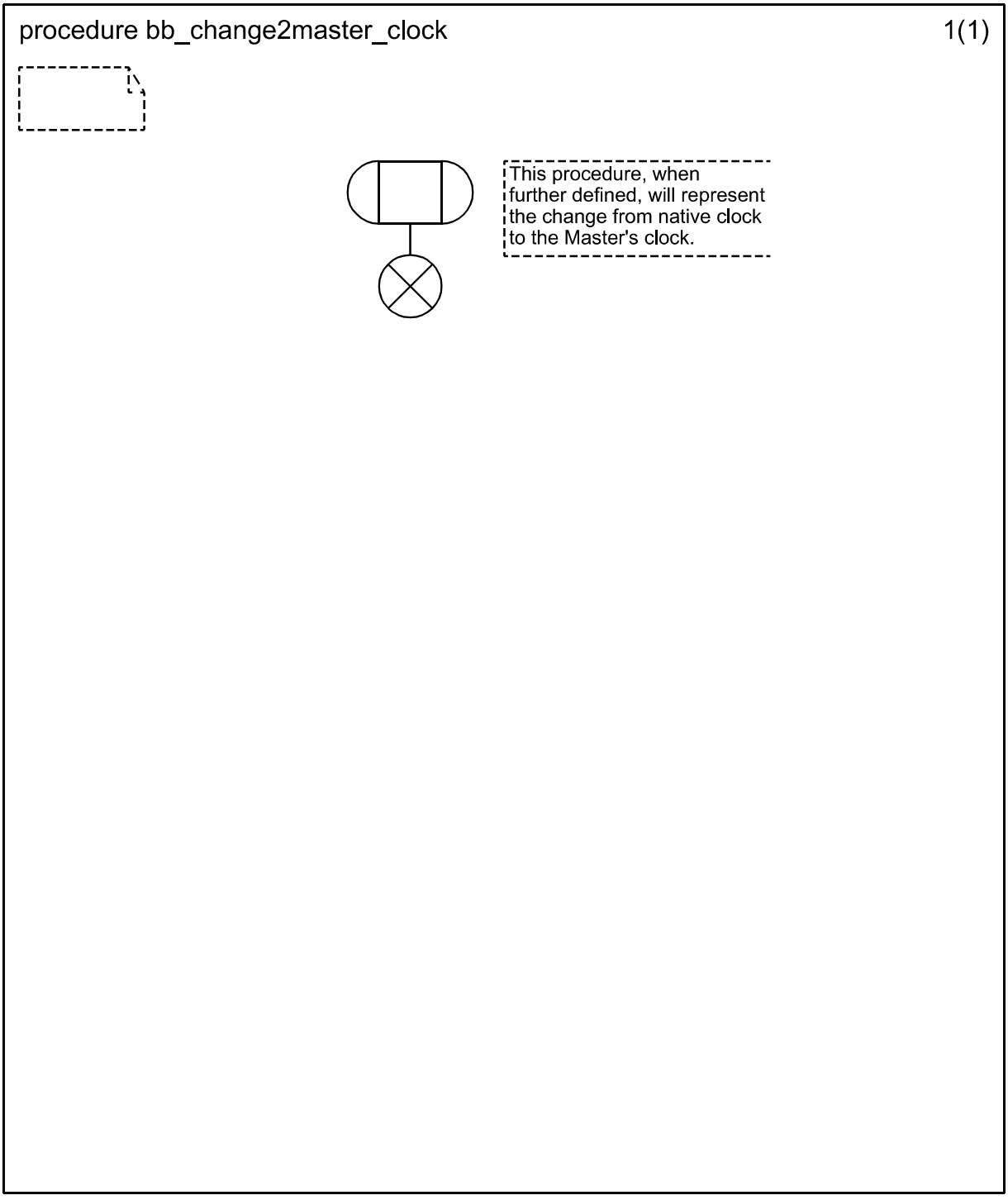
B.2.37 bb_change2master_channel-1



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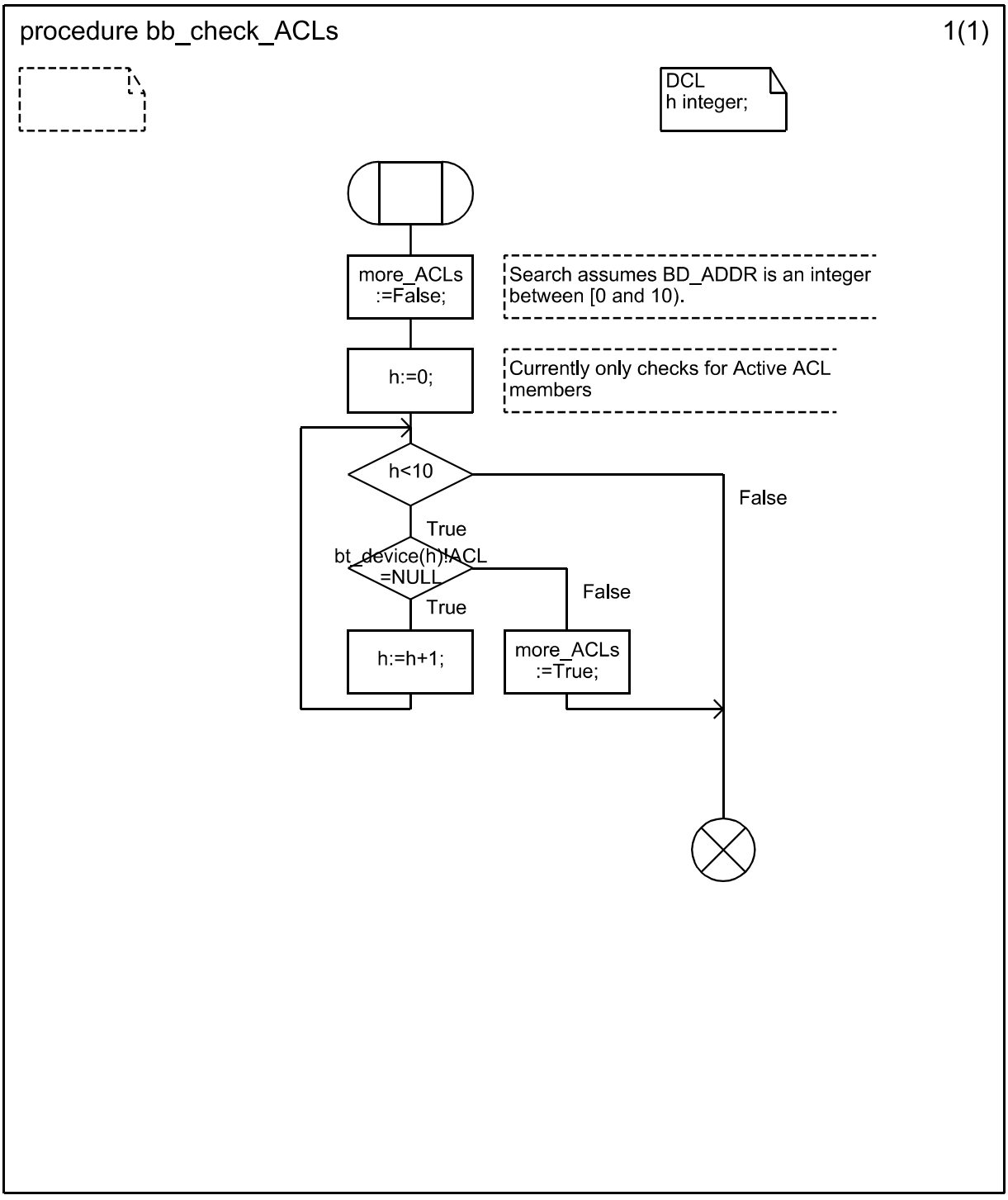
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B.2.38 bb_change2master_clock-1



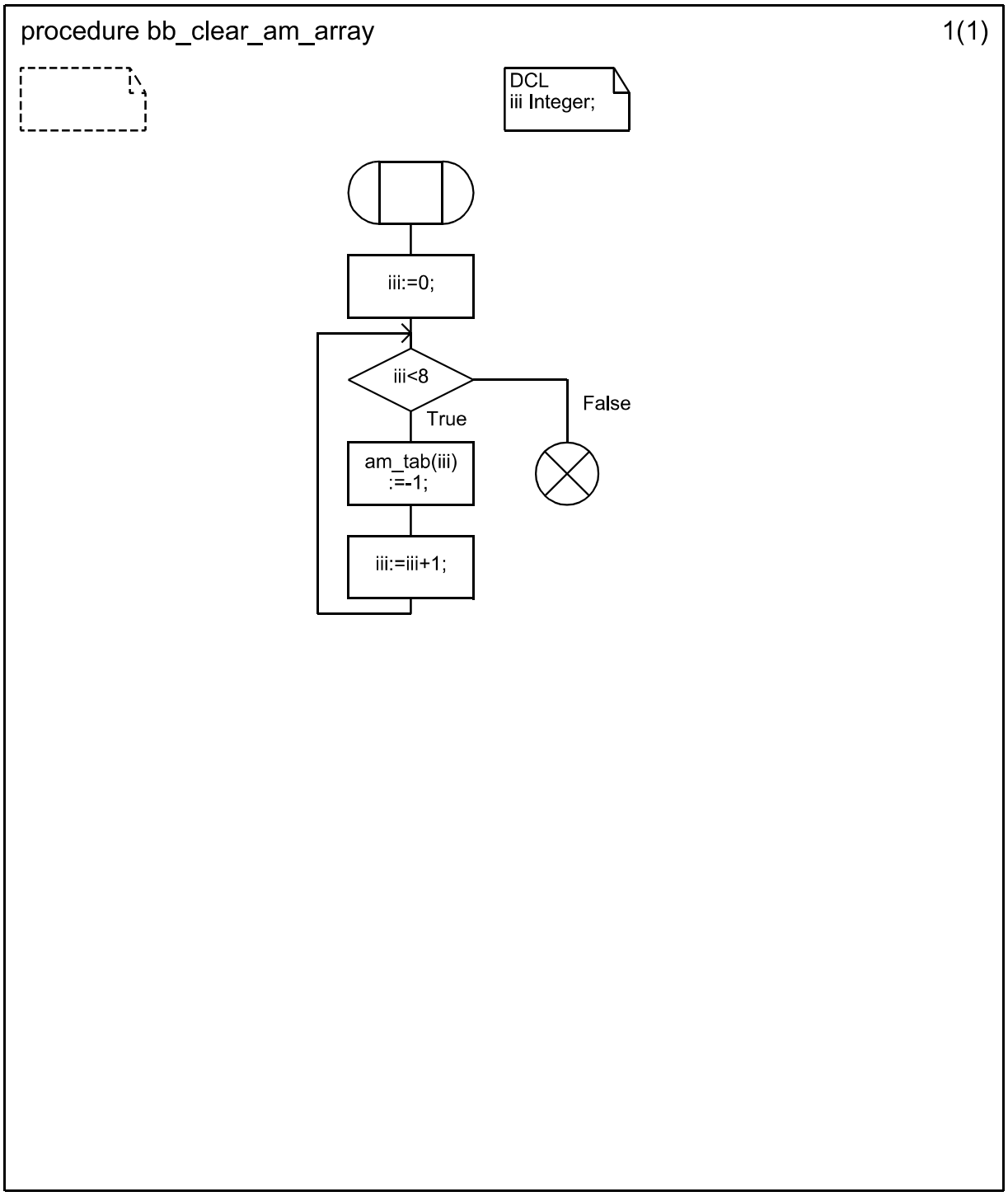
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B.2.39 bb_check_ACLs-1



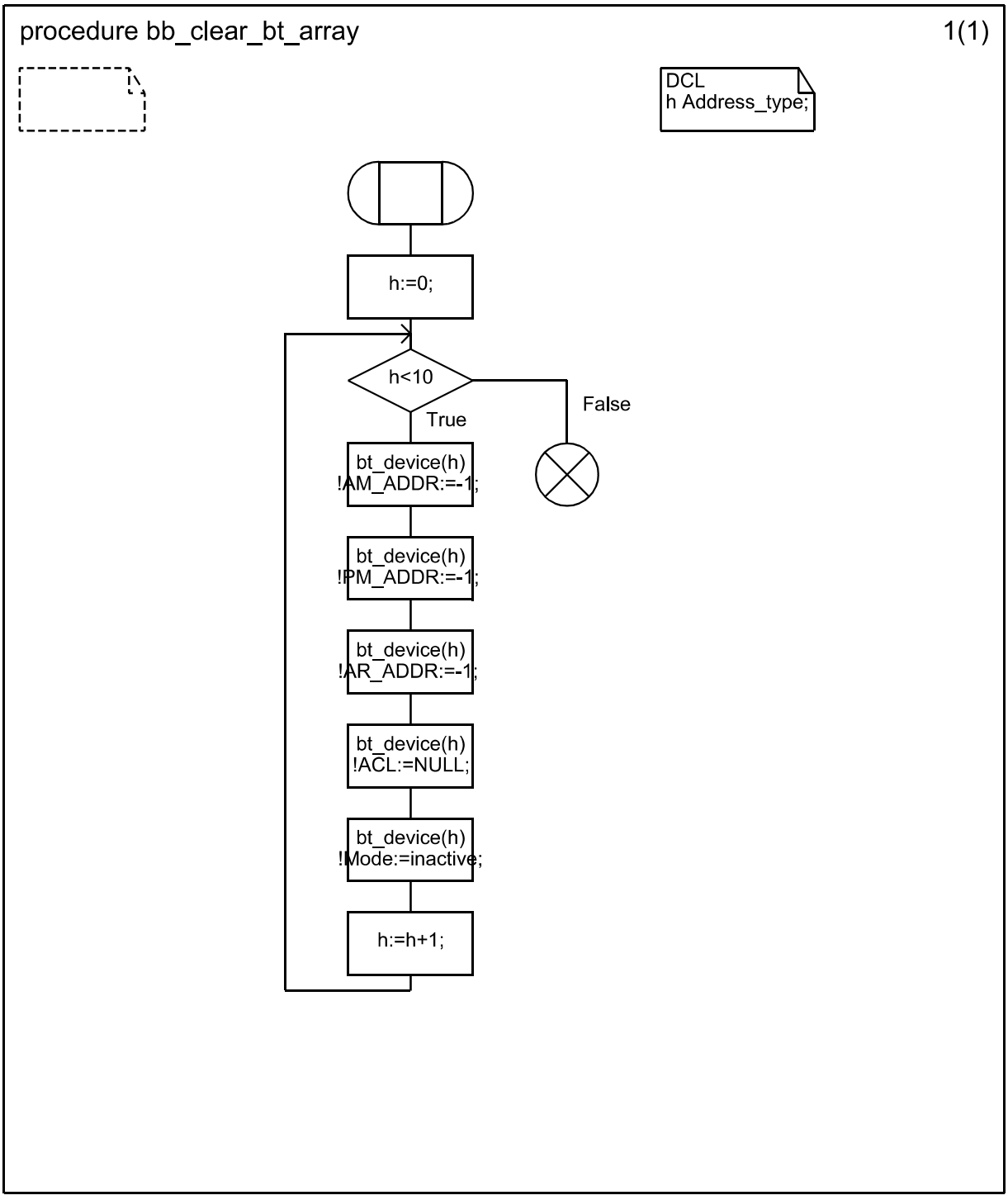
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B.2.40 bb_clear_am_array-1



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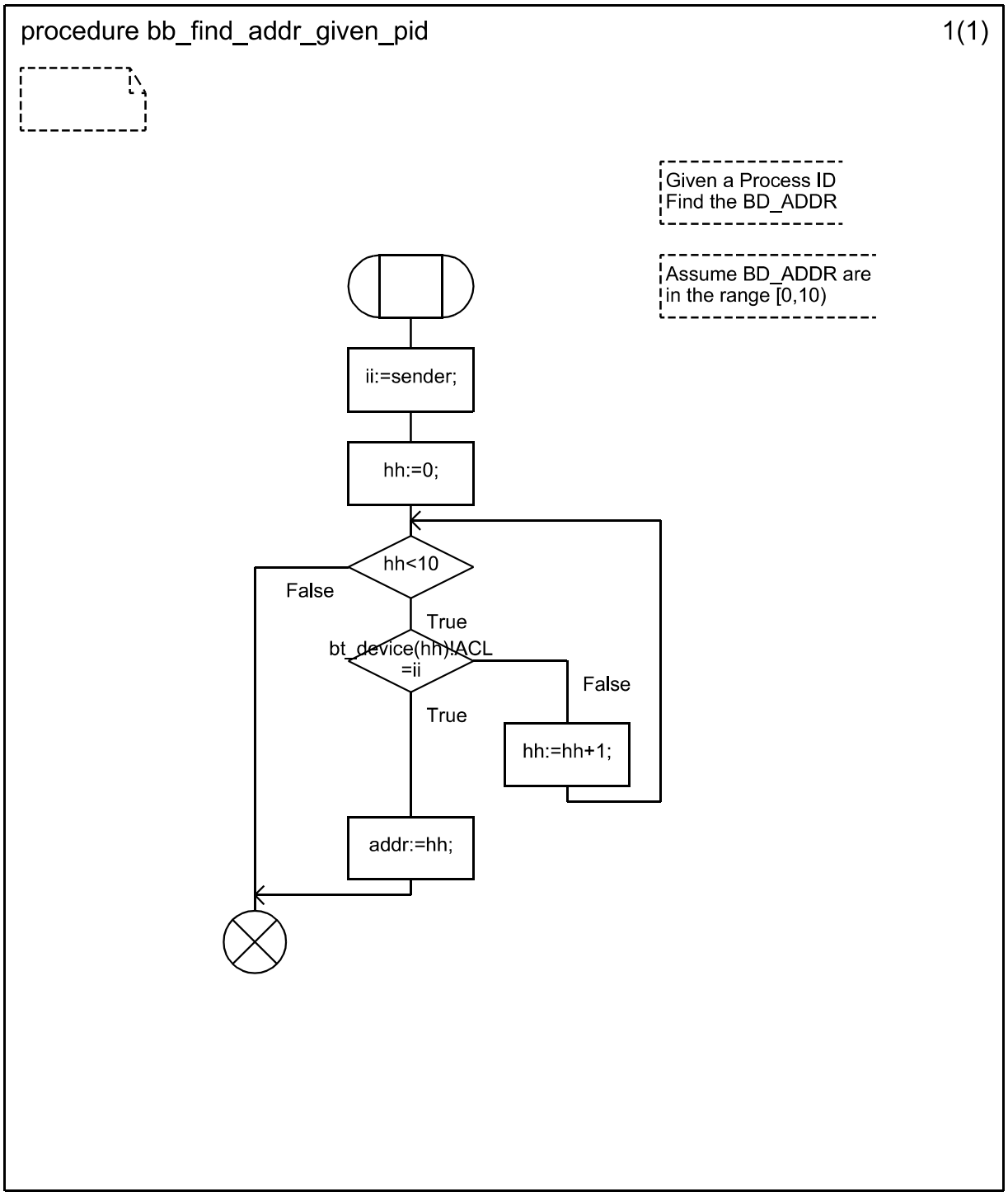
B.2.41 bb_clear_bt_array-1



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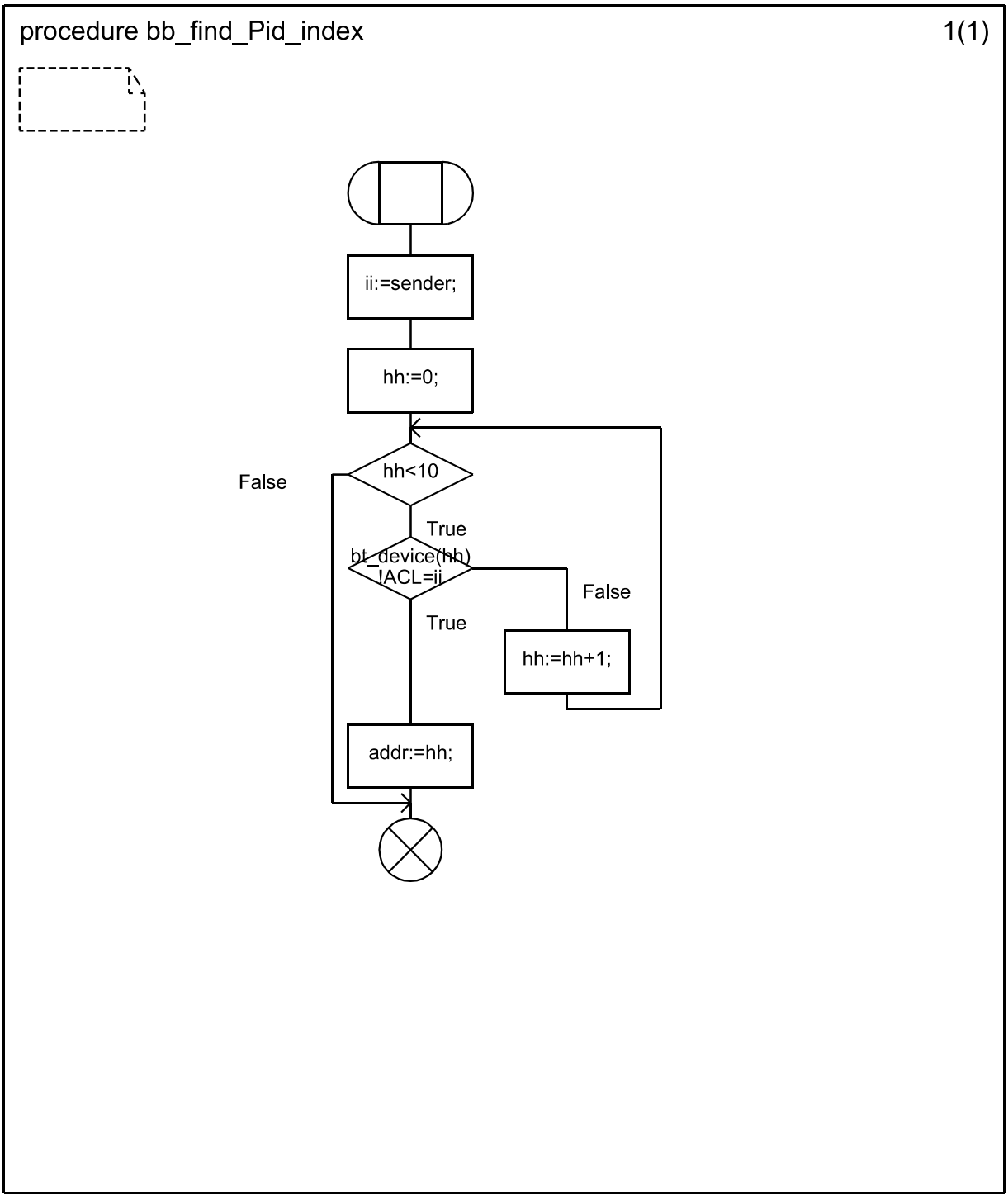
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B.2.42 bb_find_addr_given_pid-1



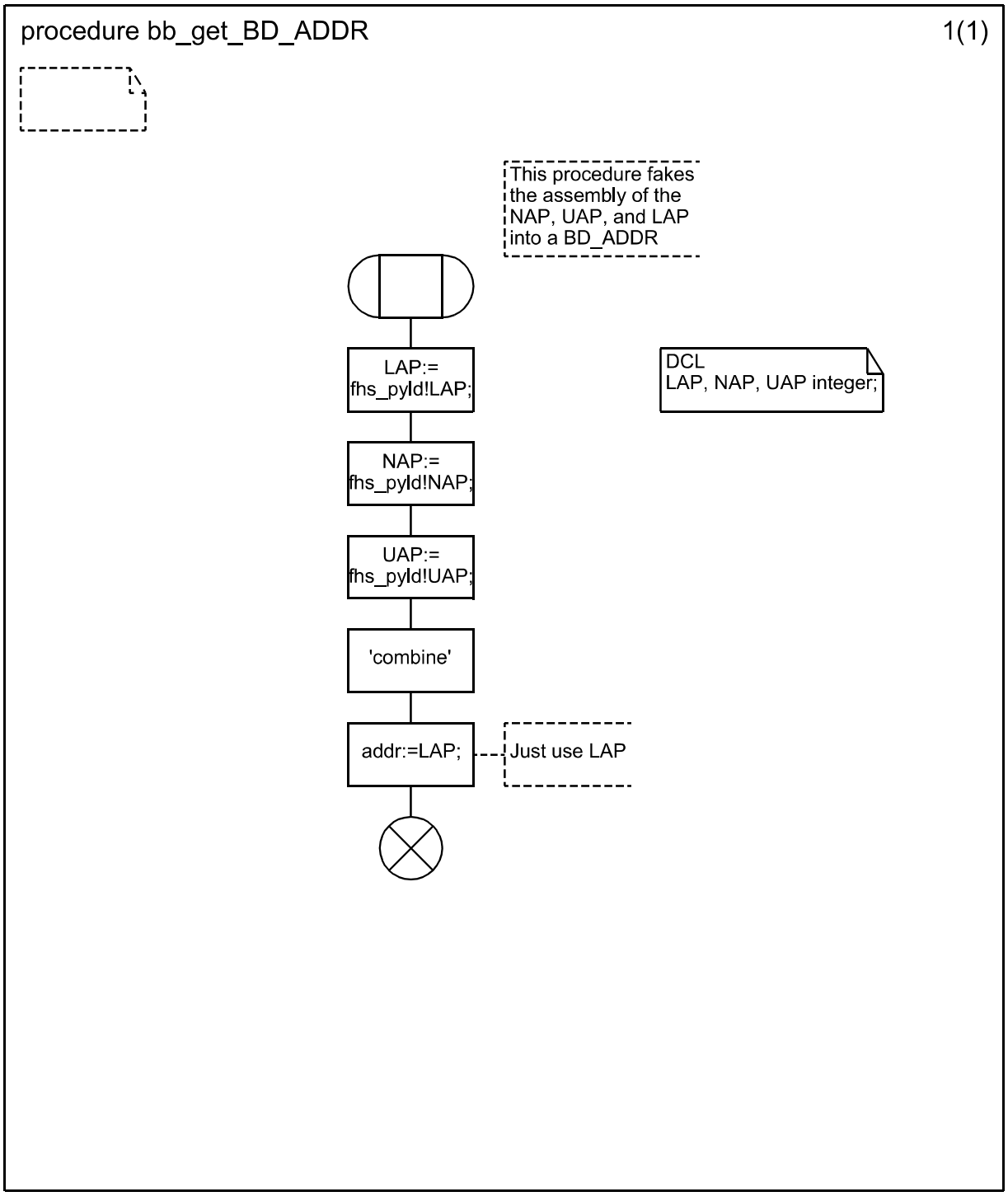
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B.2.43 bb_find_Pid_index-1



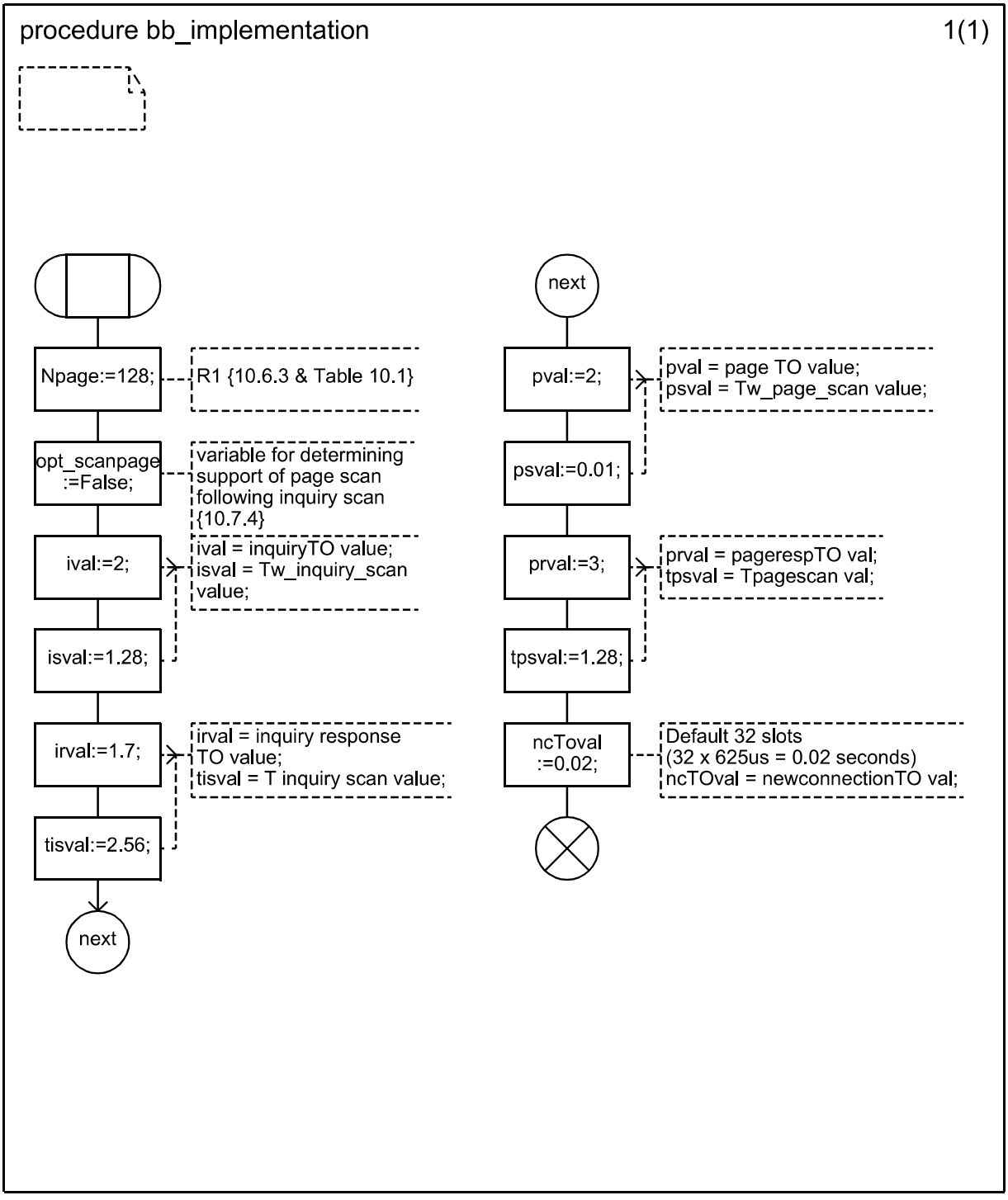
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B.2.44 bb_get_BD_ADDR-1



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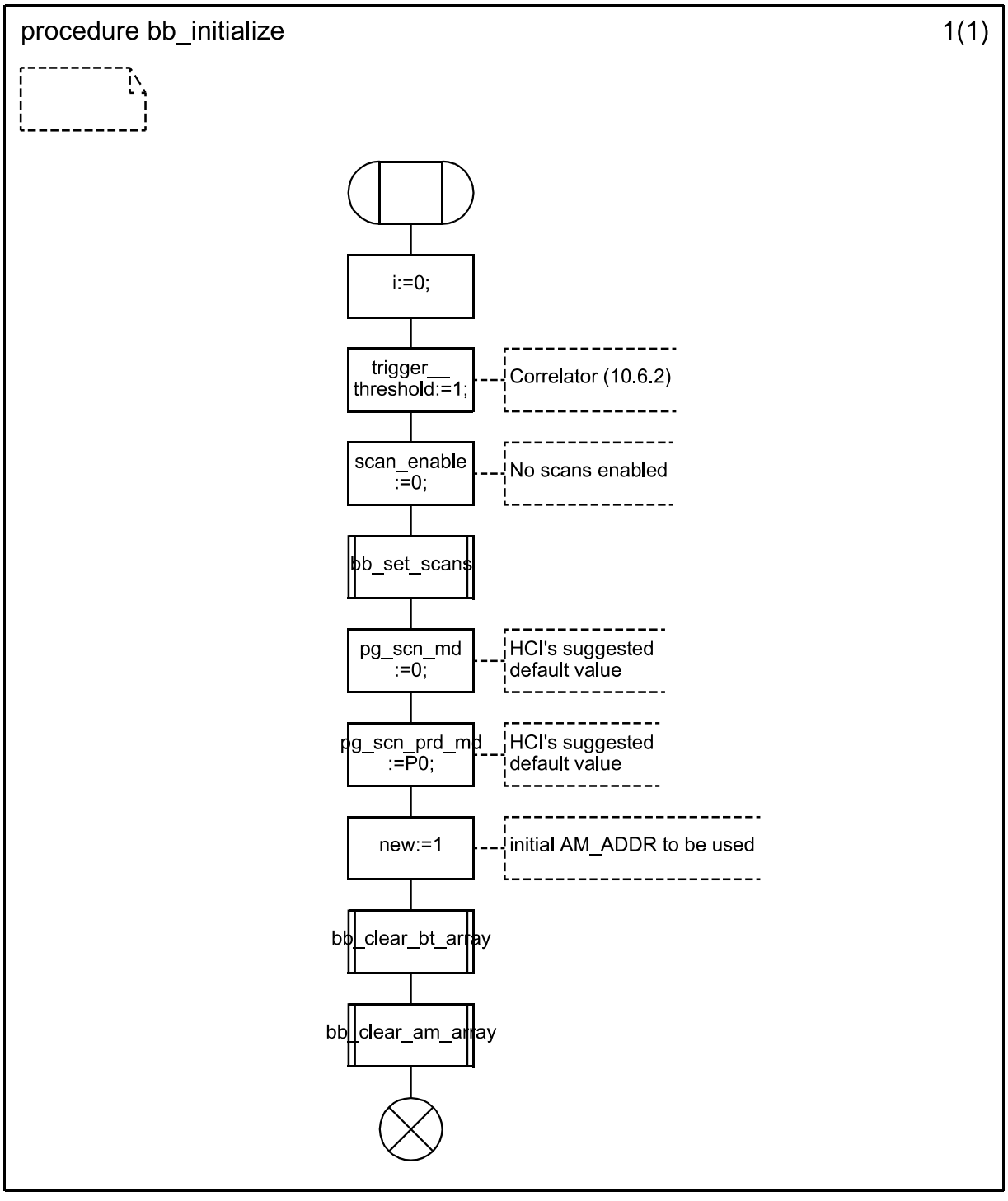
B.2.45 bb_implementation-1



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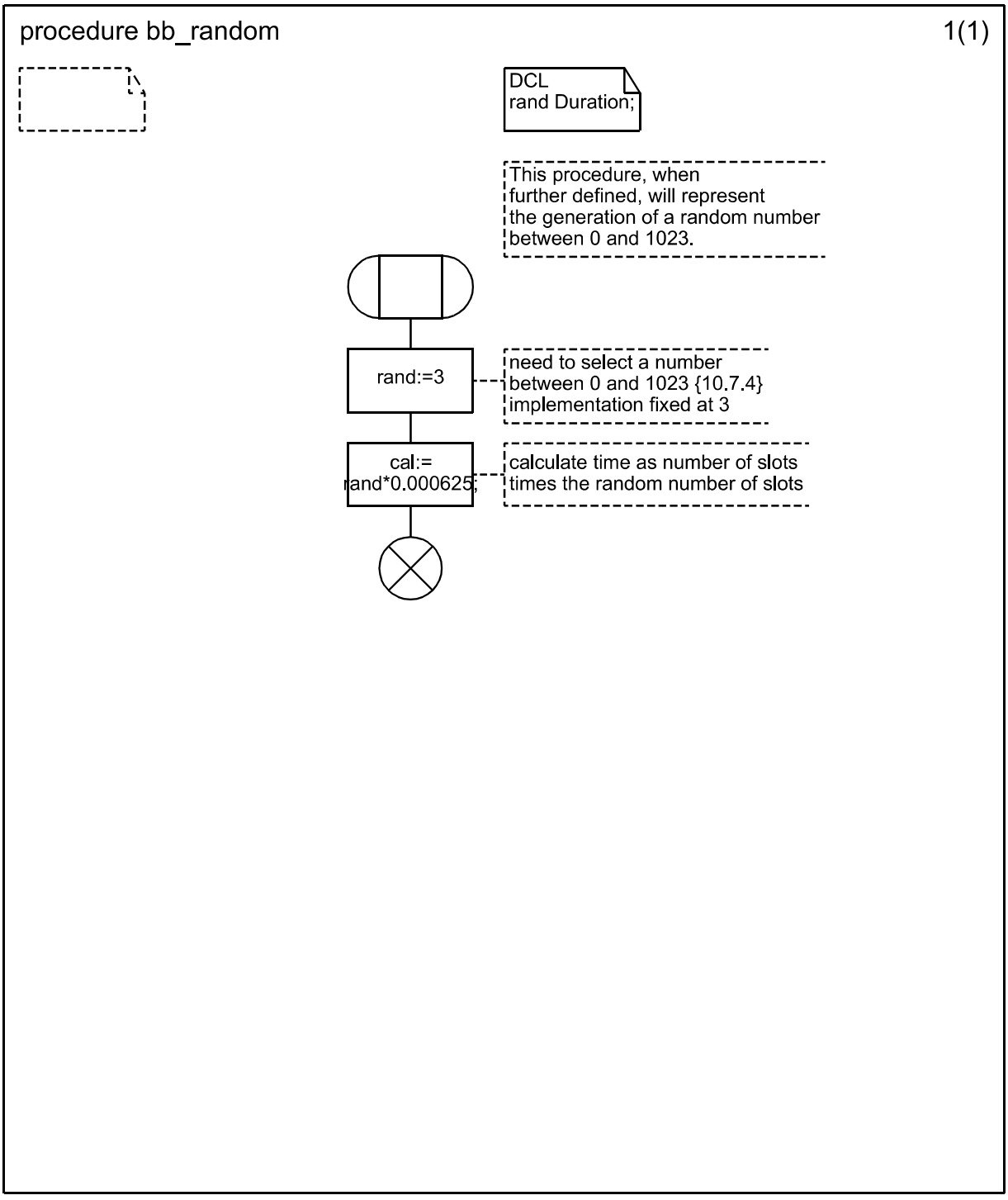
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B.2.46 bb_initialize-1



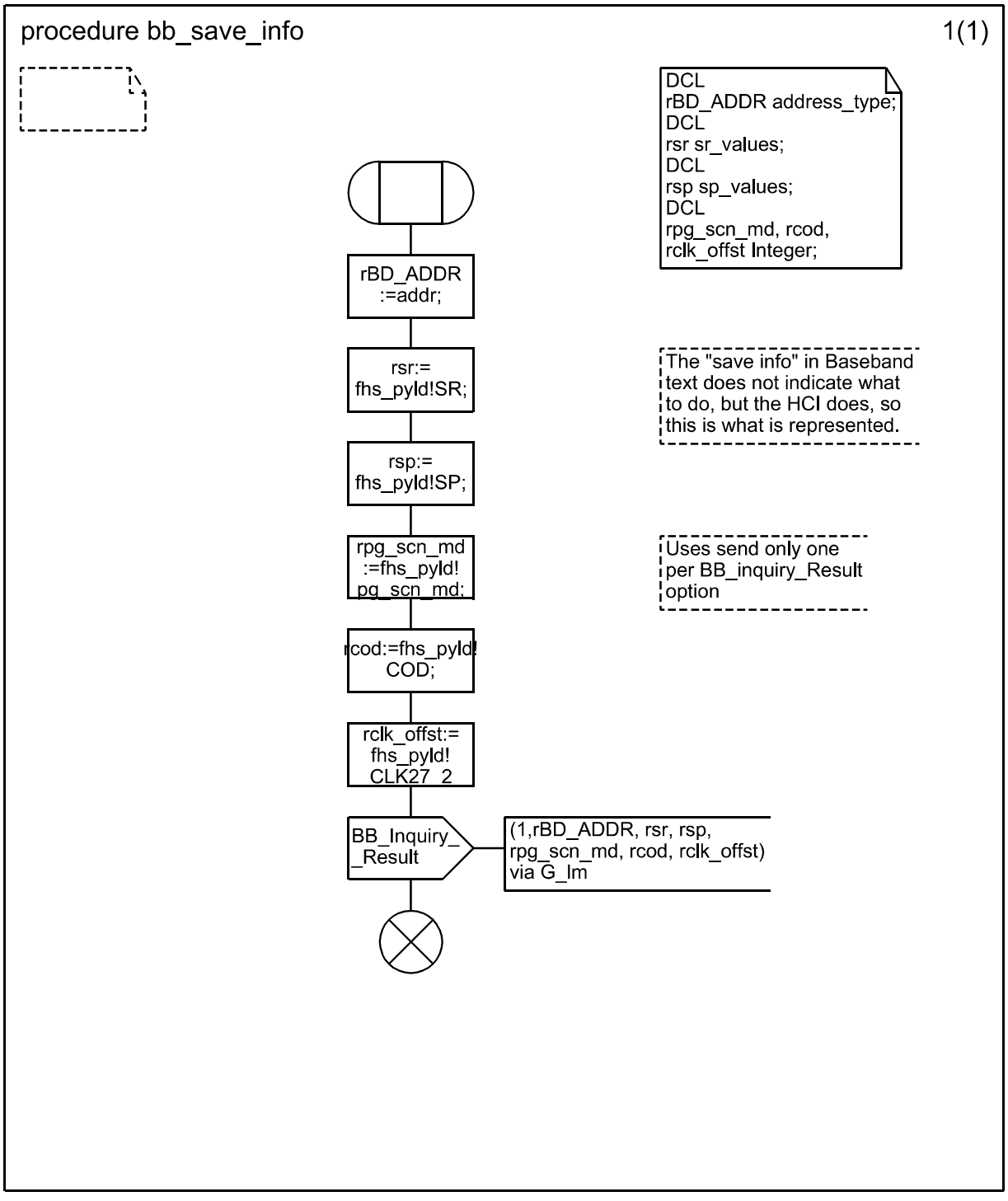
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B.2.47 bb_random-1



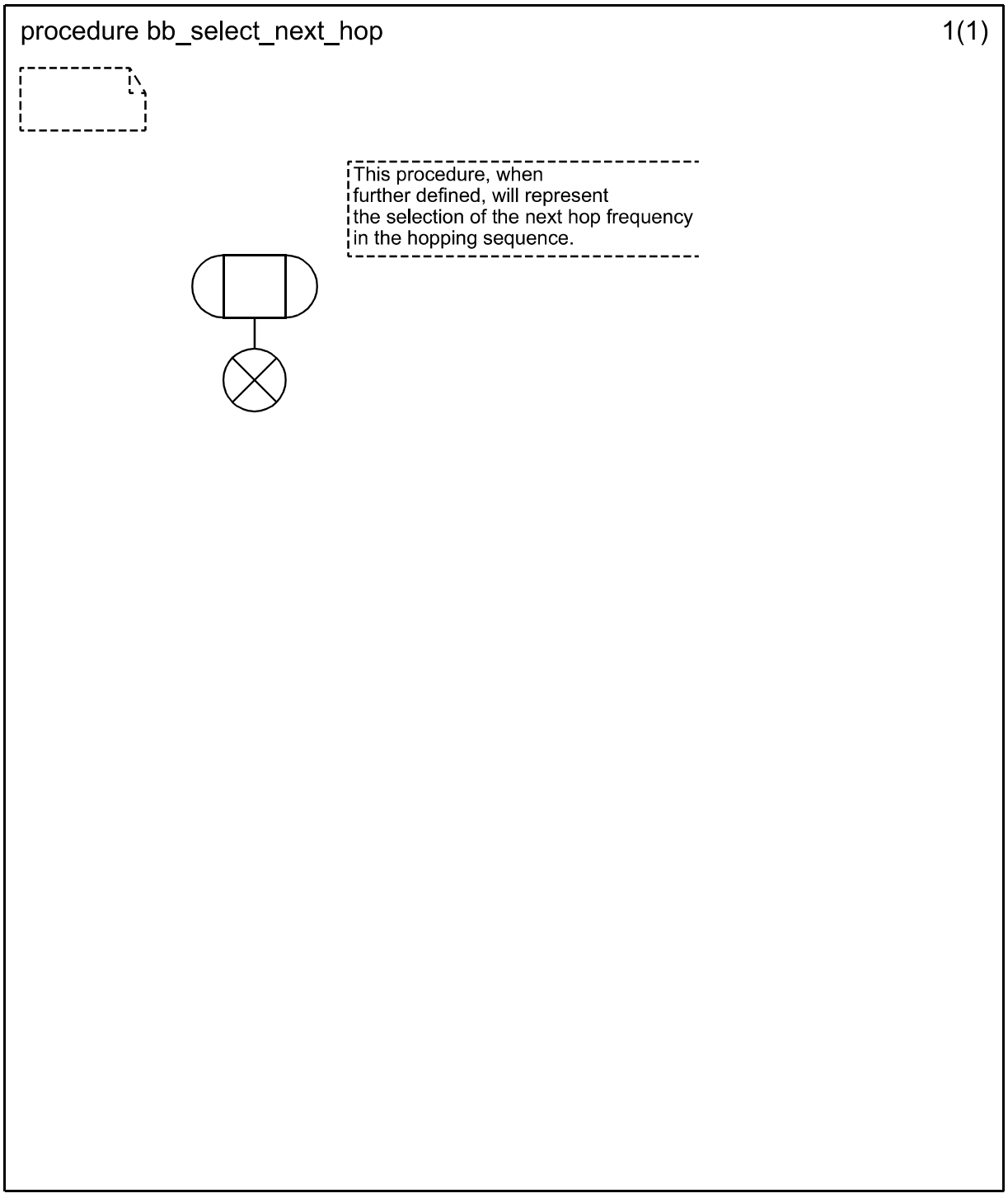
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B.2.48 bb_save_info-1



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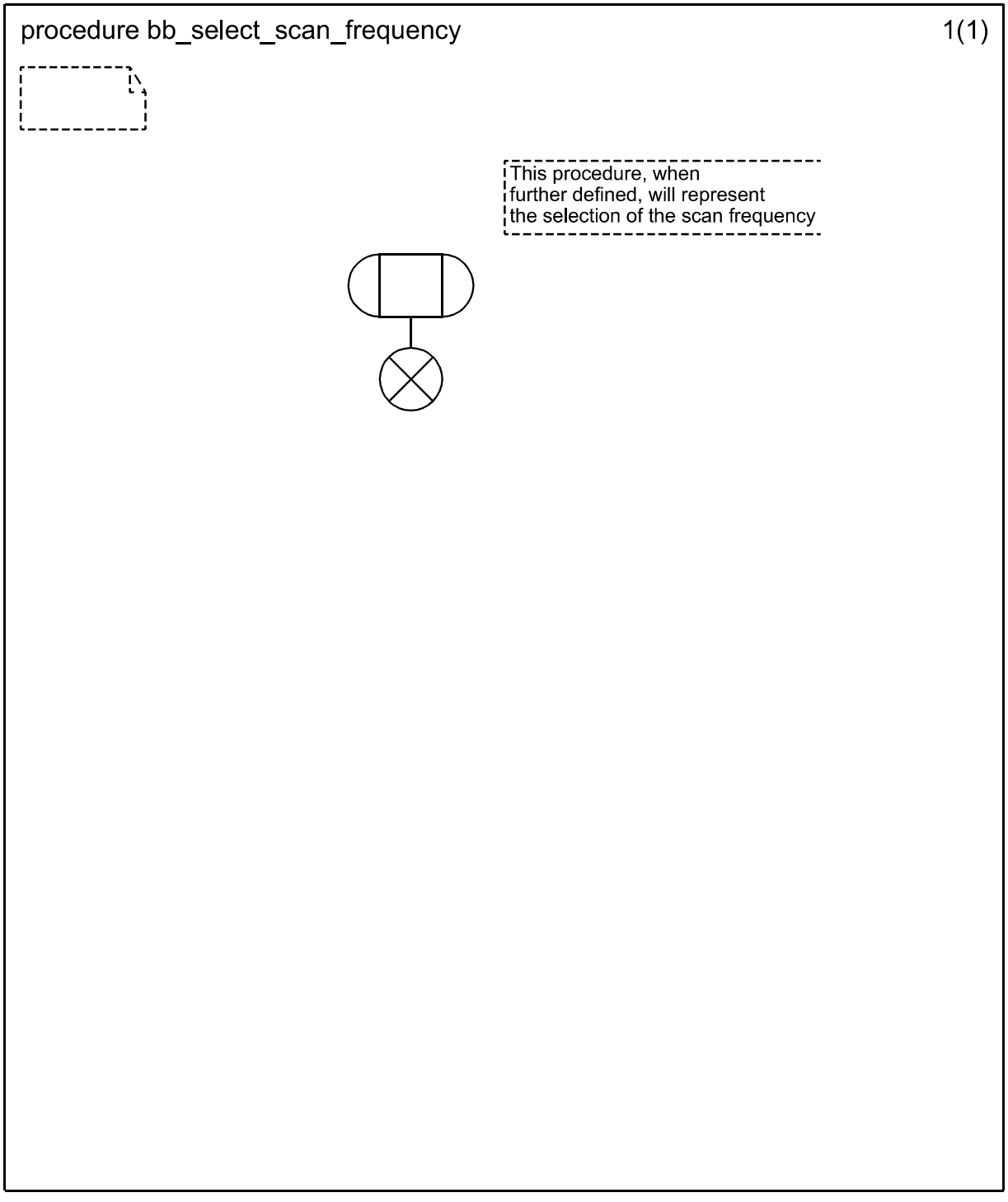
B.2.49 bb_select_next_hop-1



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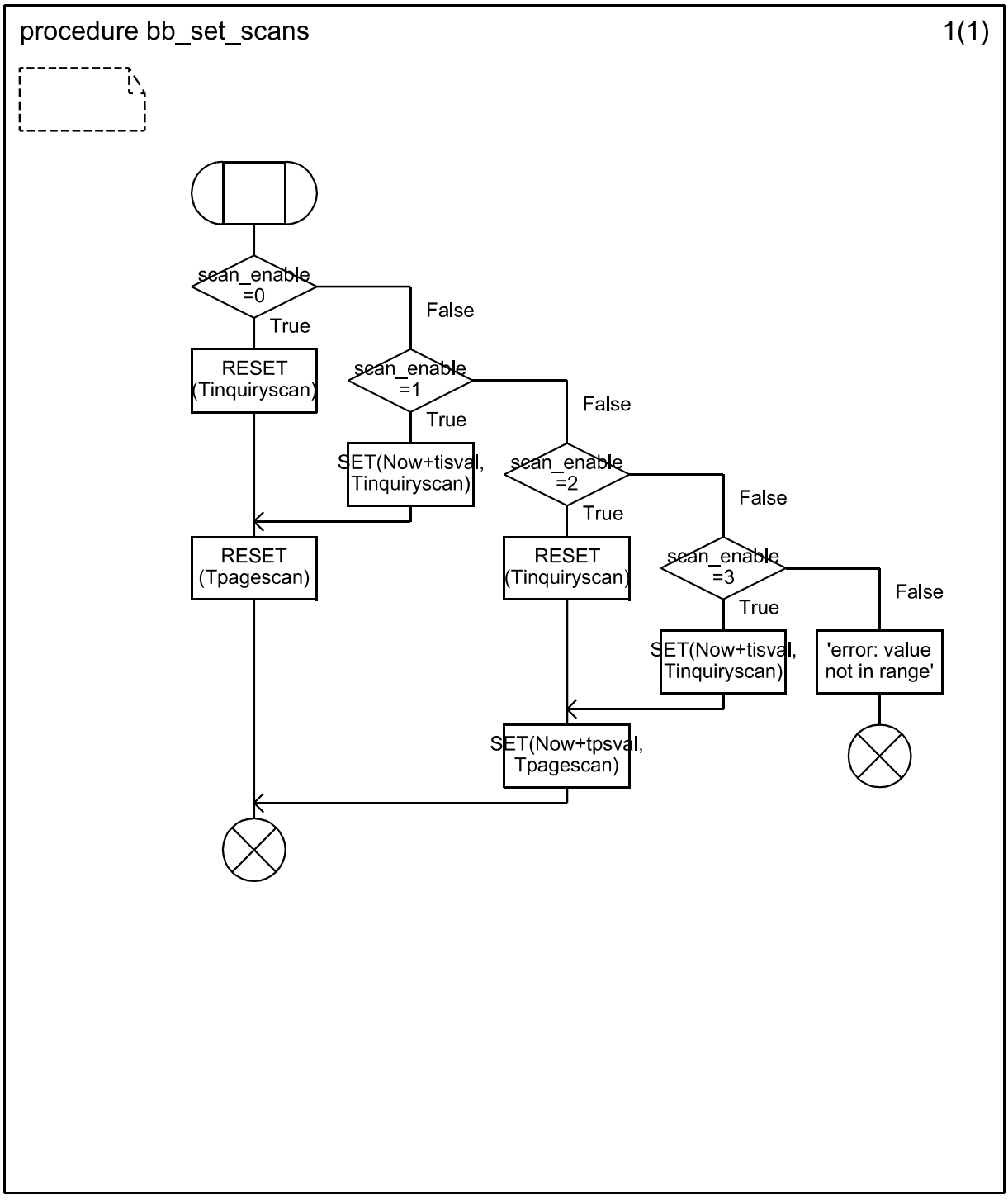
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B.2.50 bb_select_scan_frequency-1



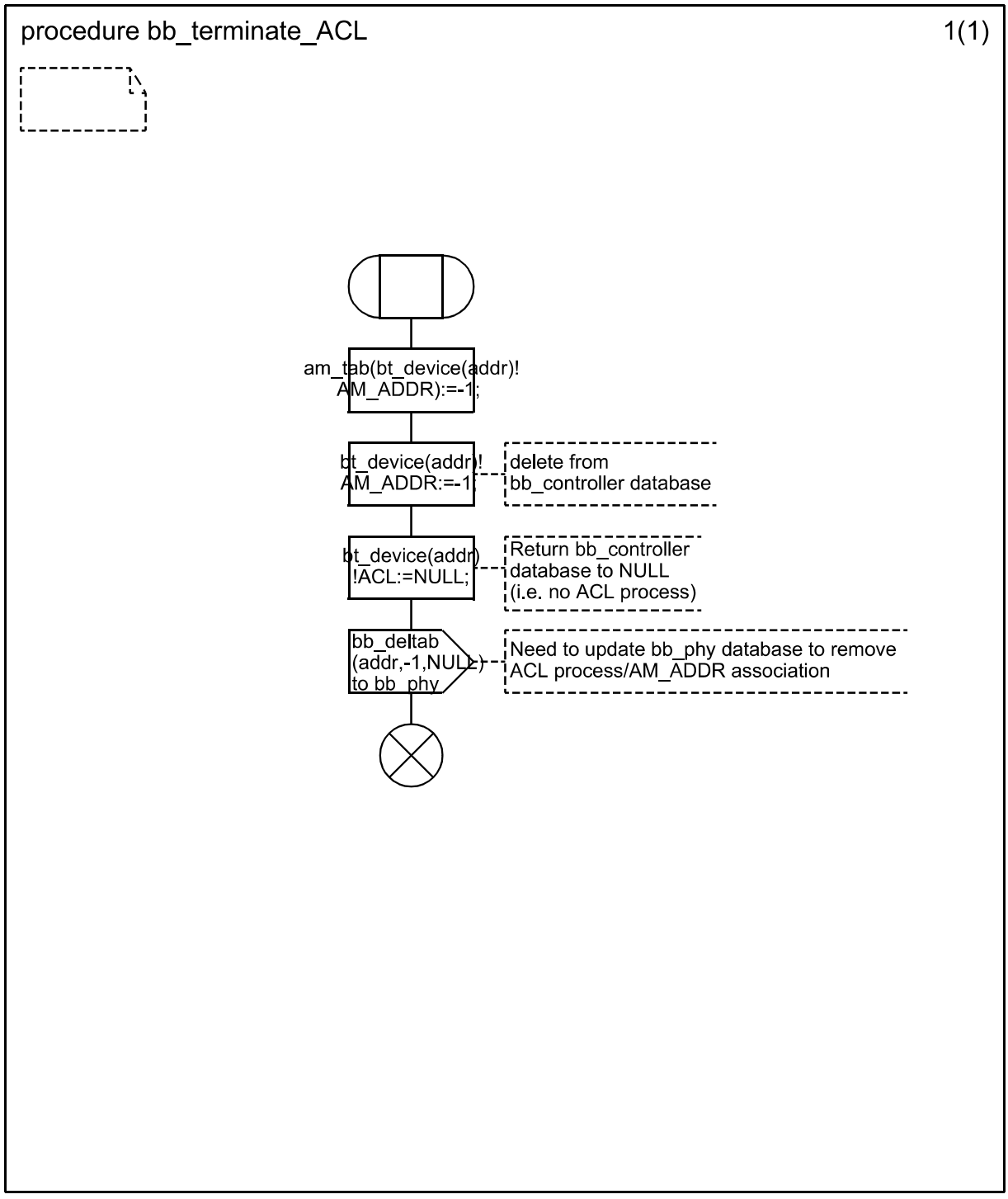
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B.2.51 bb_set_scans-1



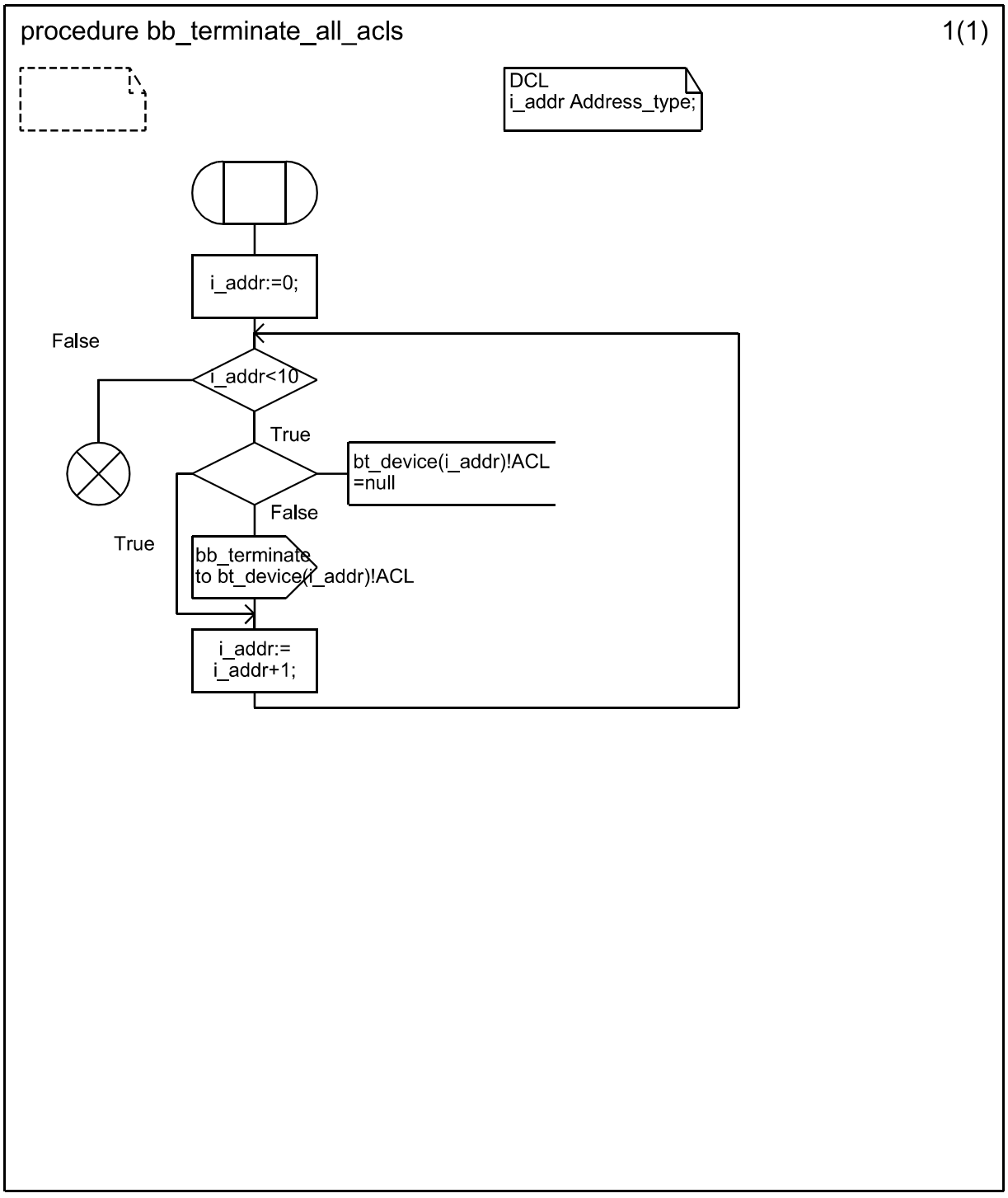
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B.2.52 bb_terminate_ACL-1



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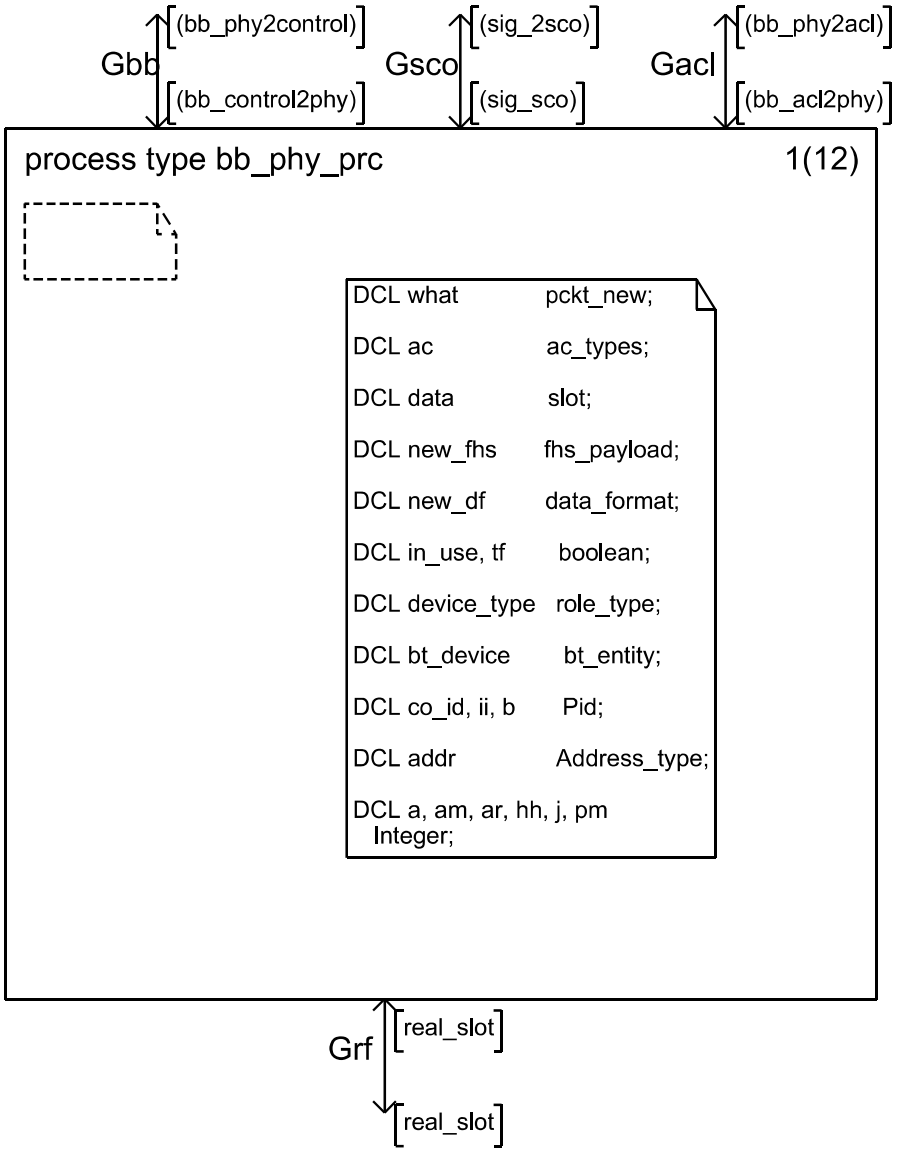
B.2.53 bb_terminate_all_acls-1



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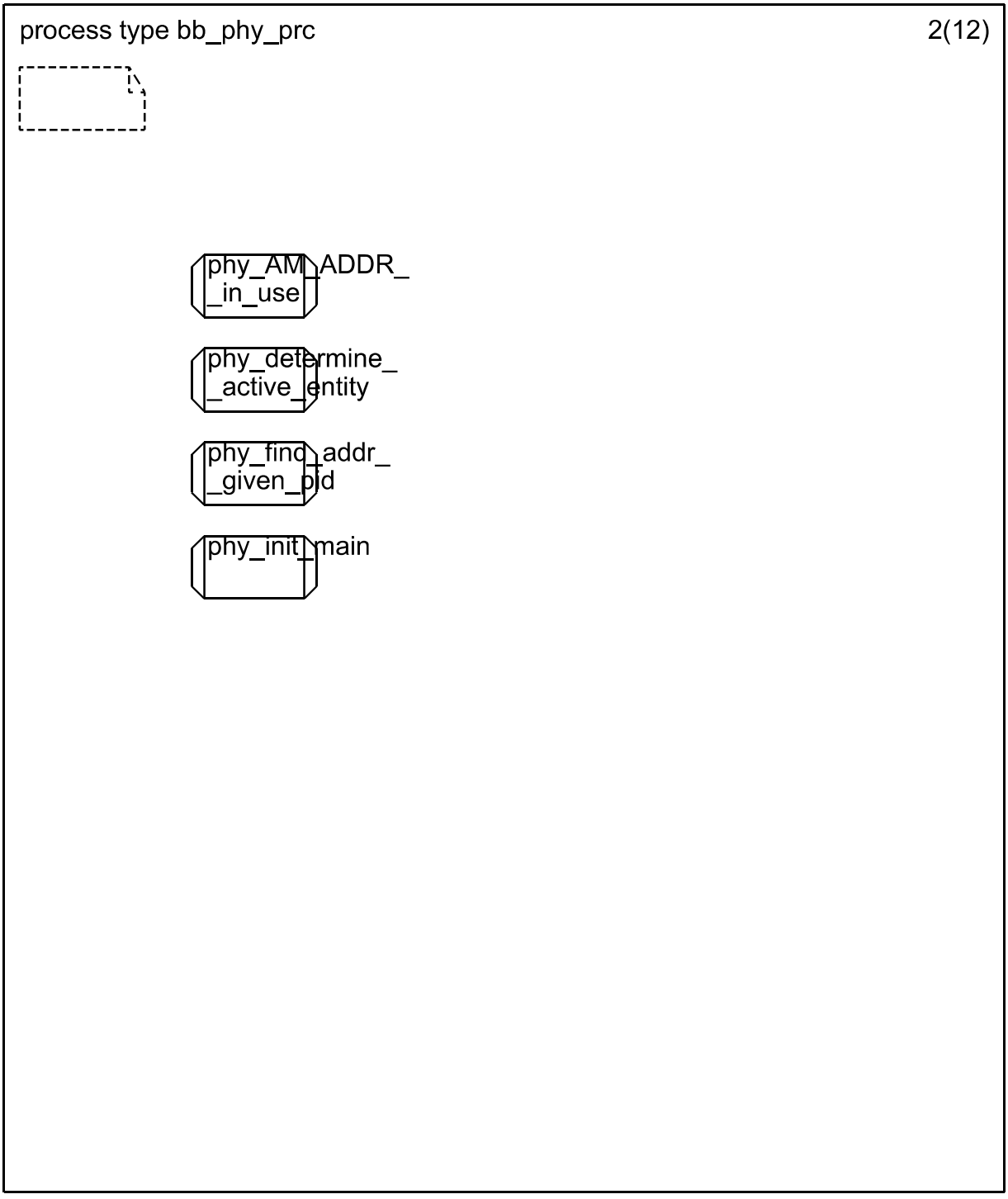
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Page 562 of 1169

B.2.54 bb_phy_prc-1



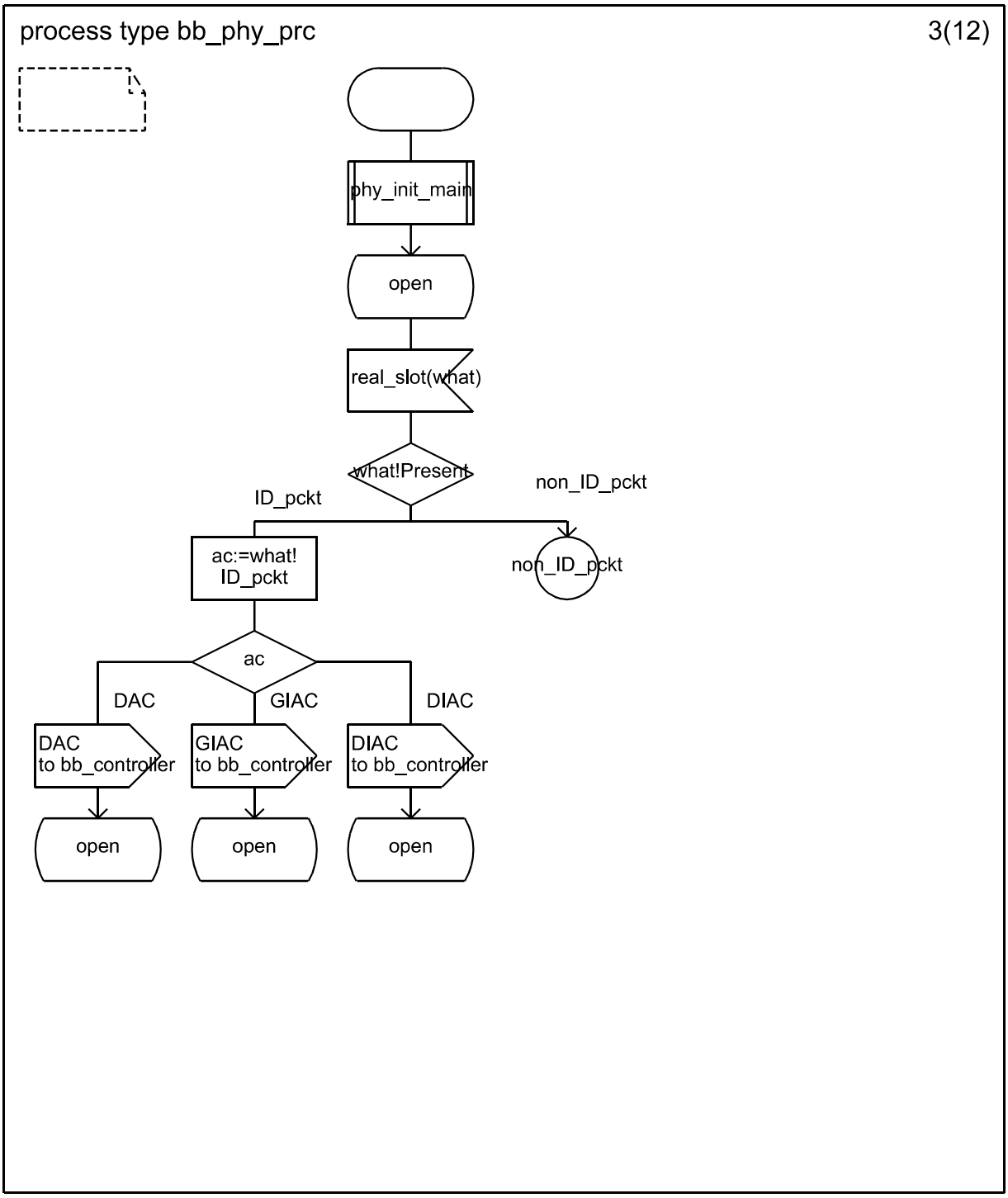
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B.2.55 bb_phy_prc-2



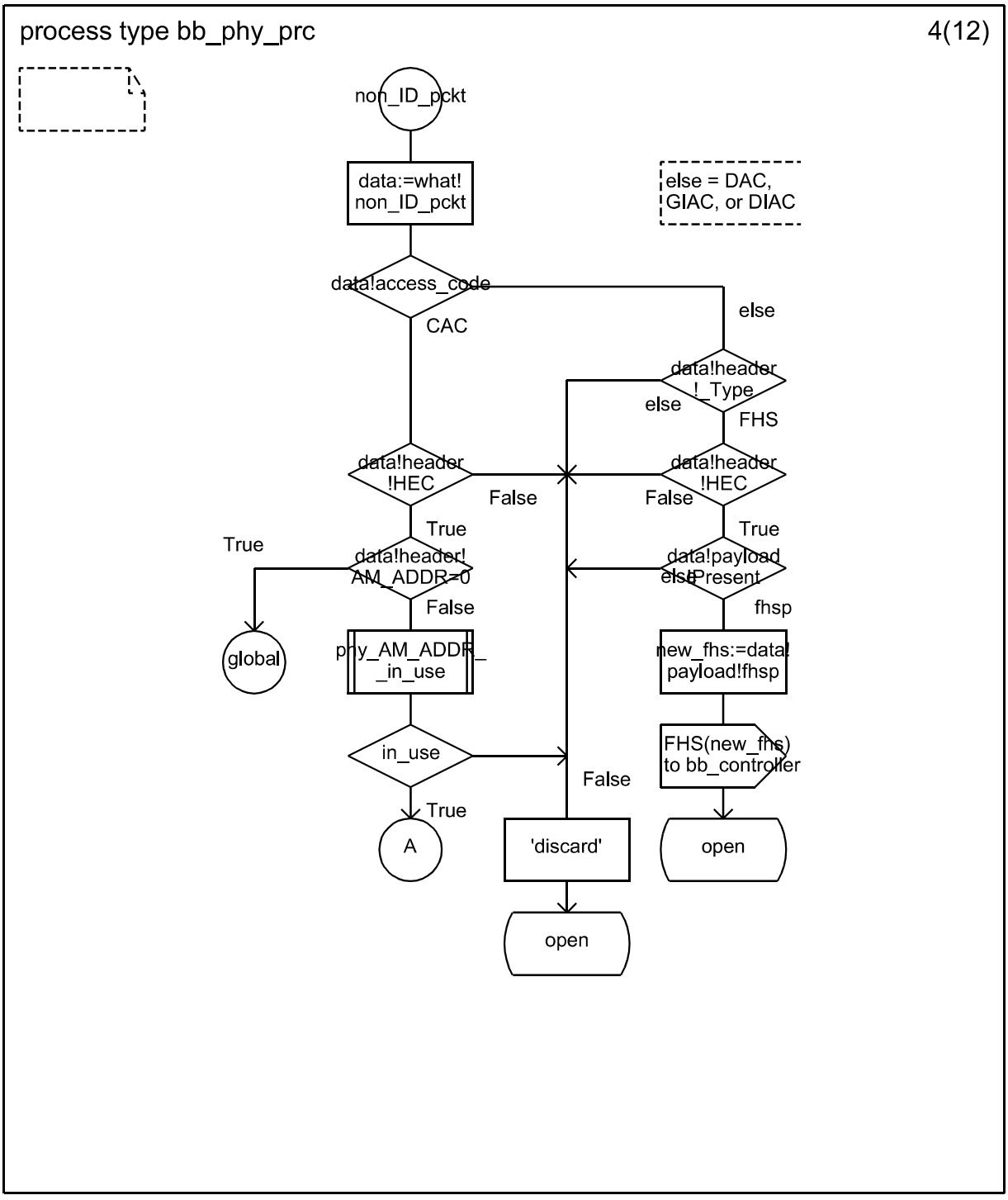
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B.2.56 bb_phy_prc-3



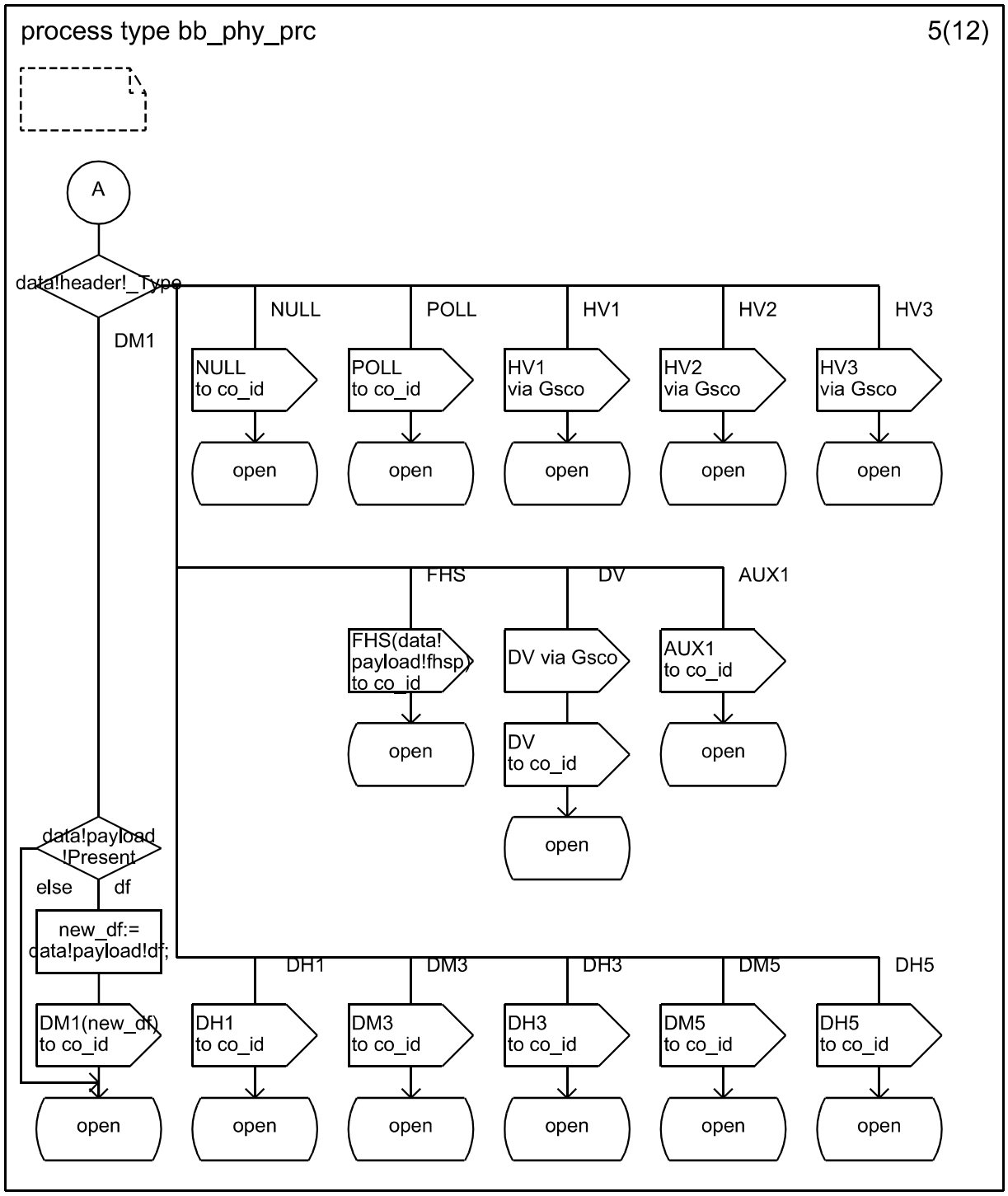
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B.2.57 bb_phy_prc-4



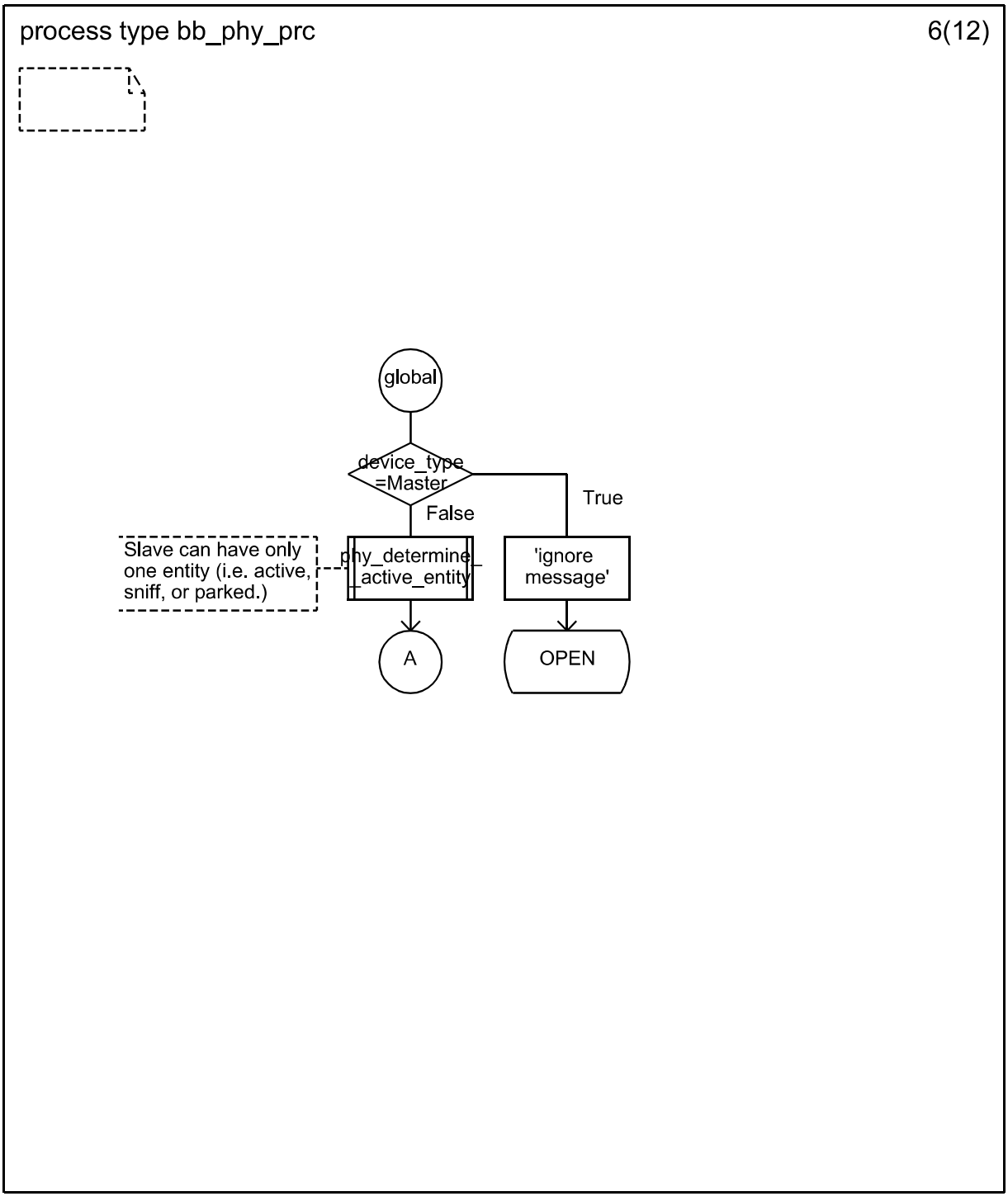
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B.2.58 bb_phy_prc-5



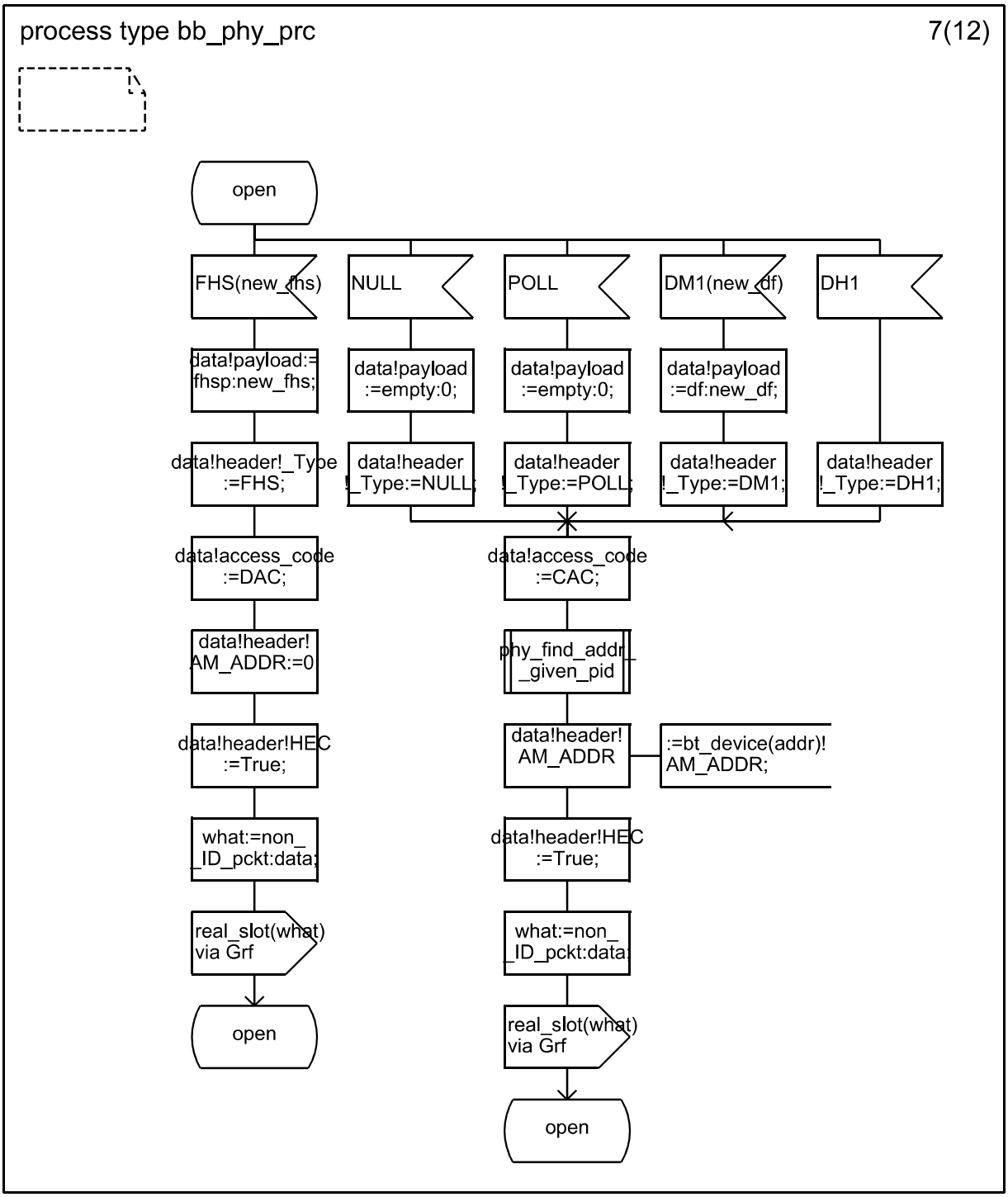
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B.2.59 bb_phy_prc-6



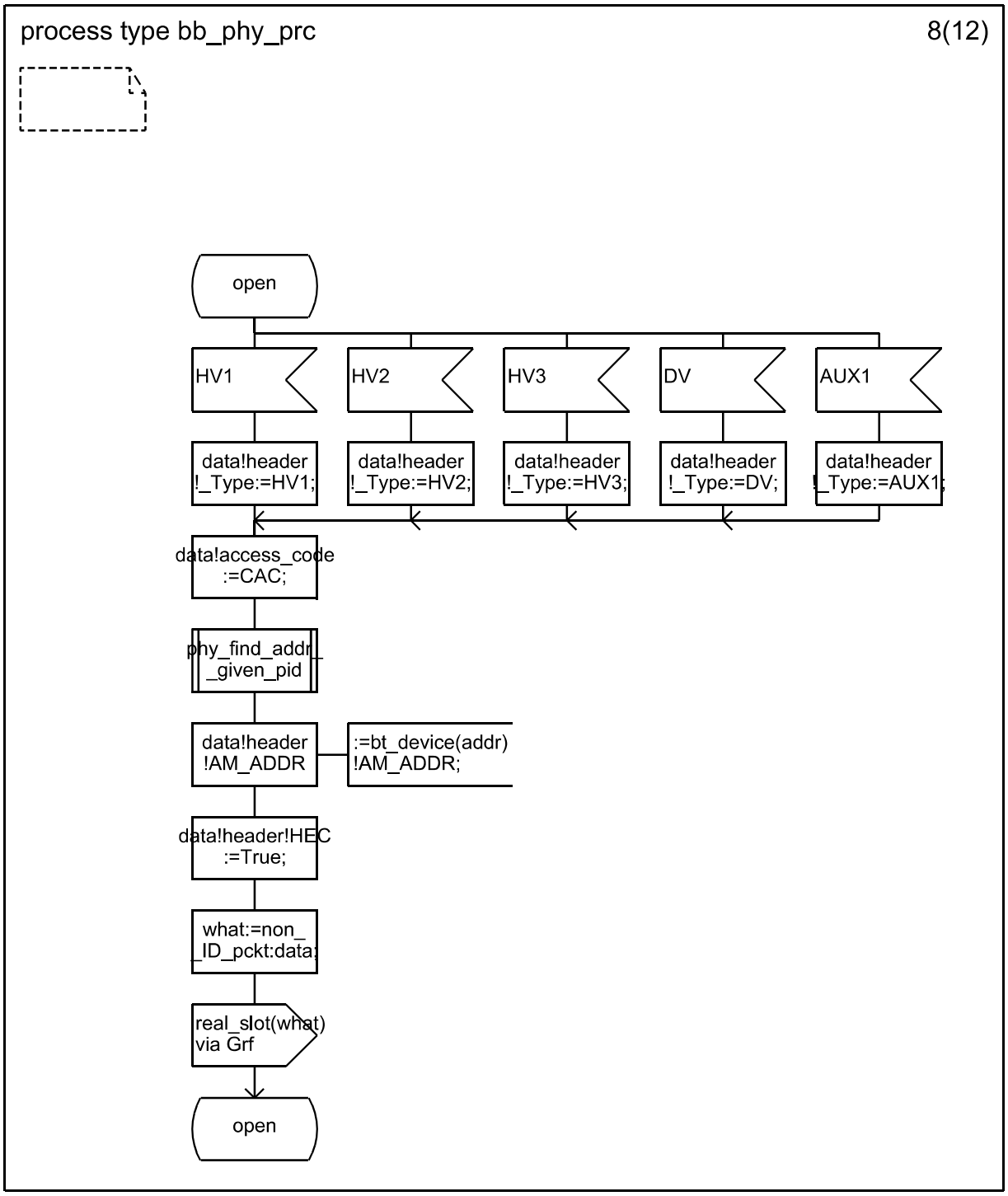
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B.2.60 bb_phy_prc-7



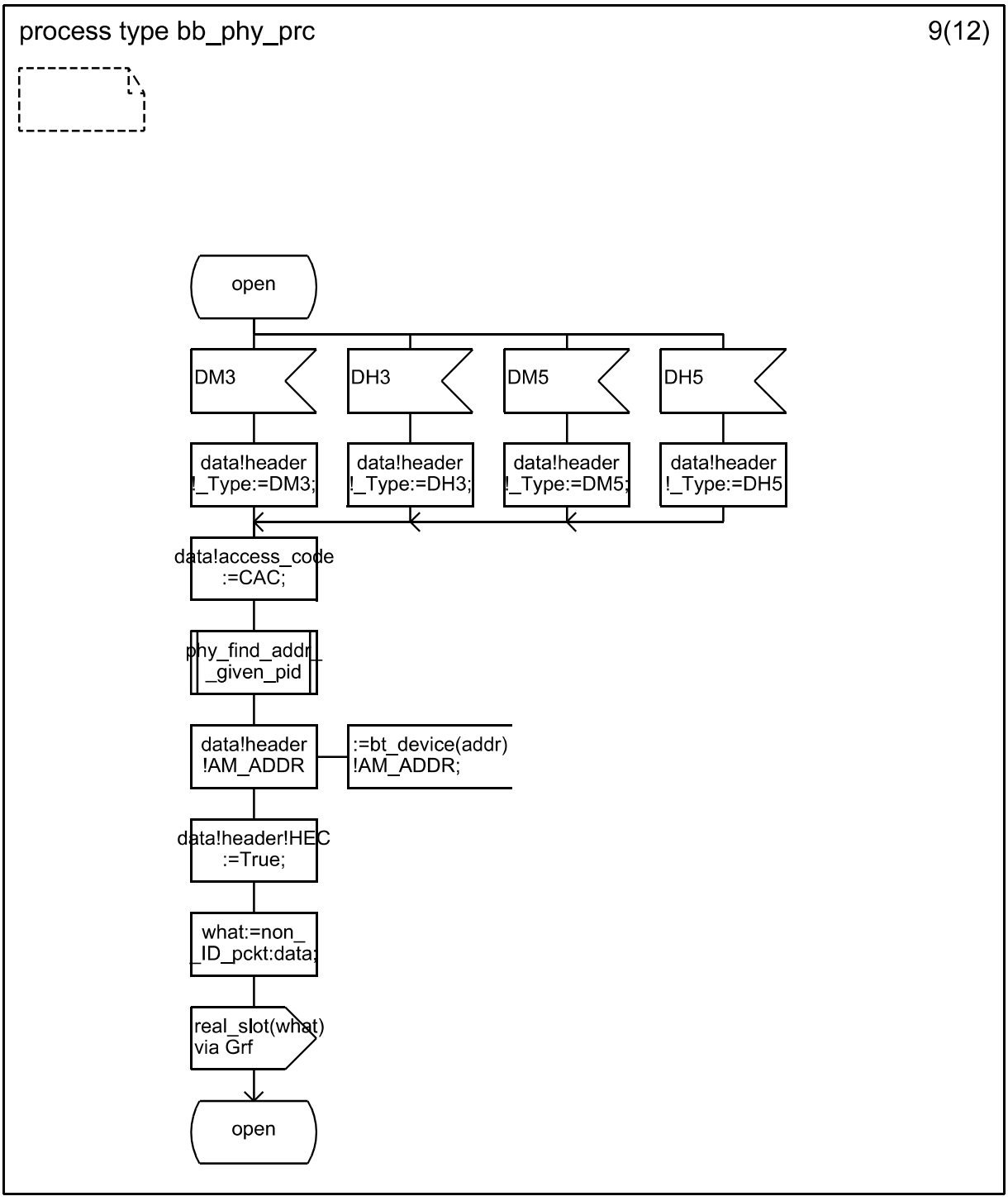
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B.2.61 bb_phy_prc-8



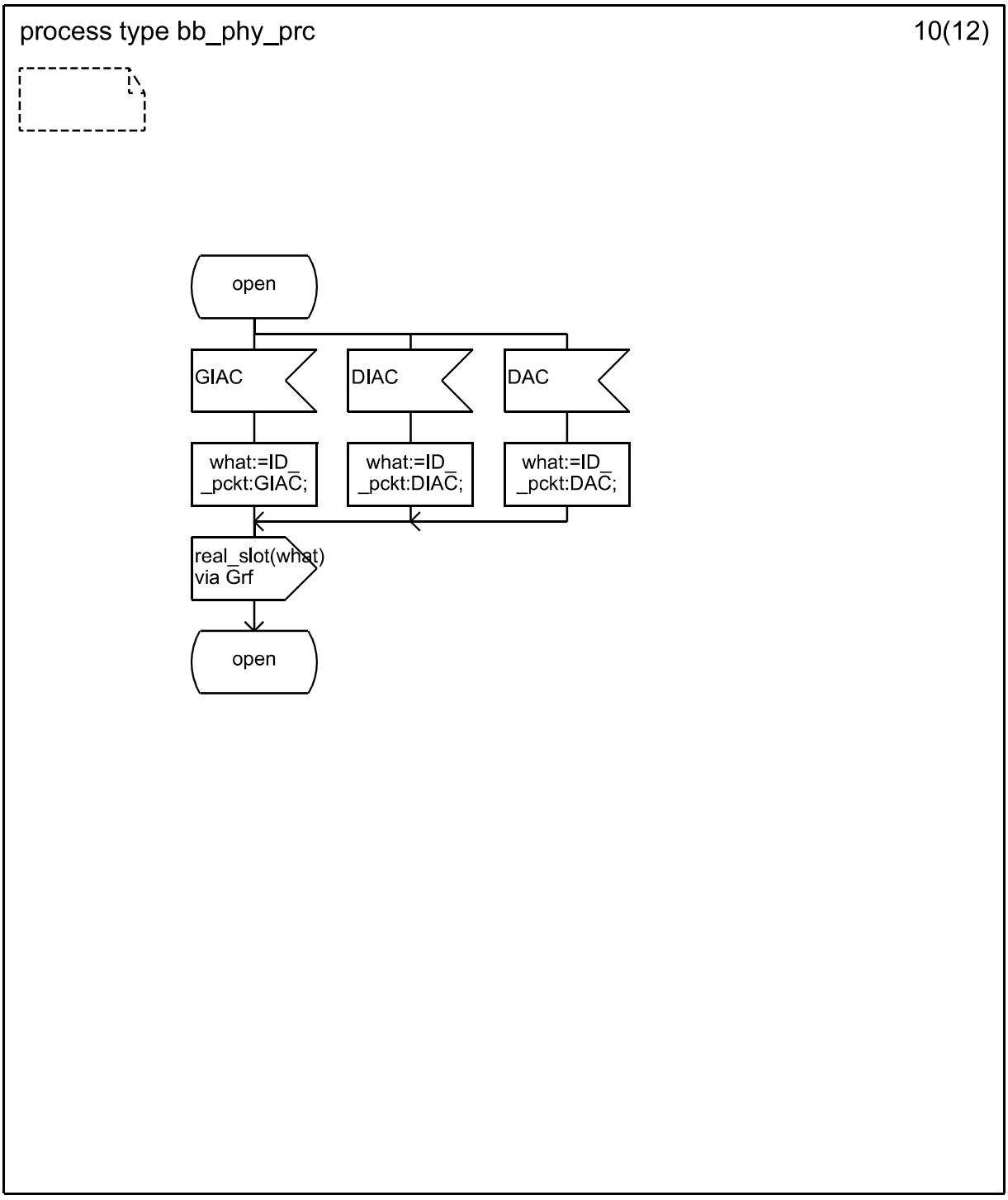
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B.2.62 bb_phy_prc-9



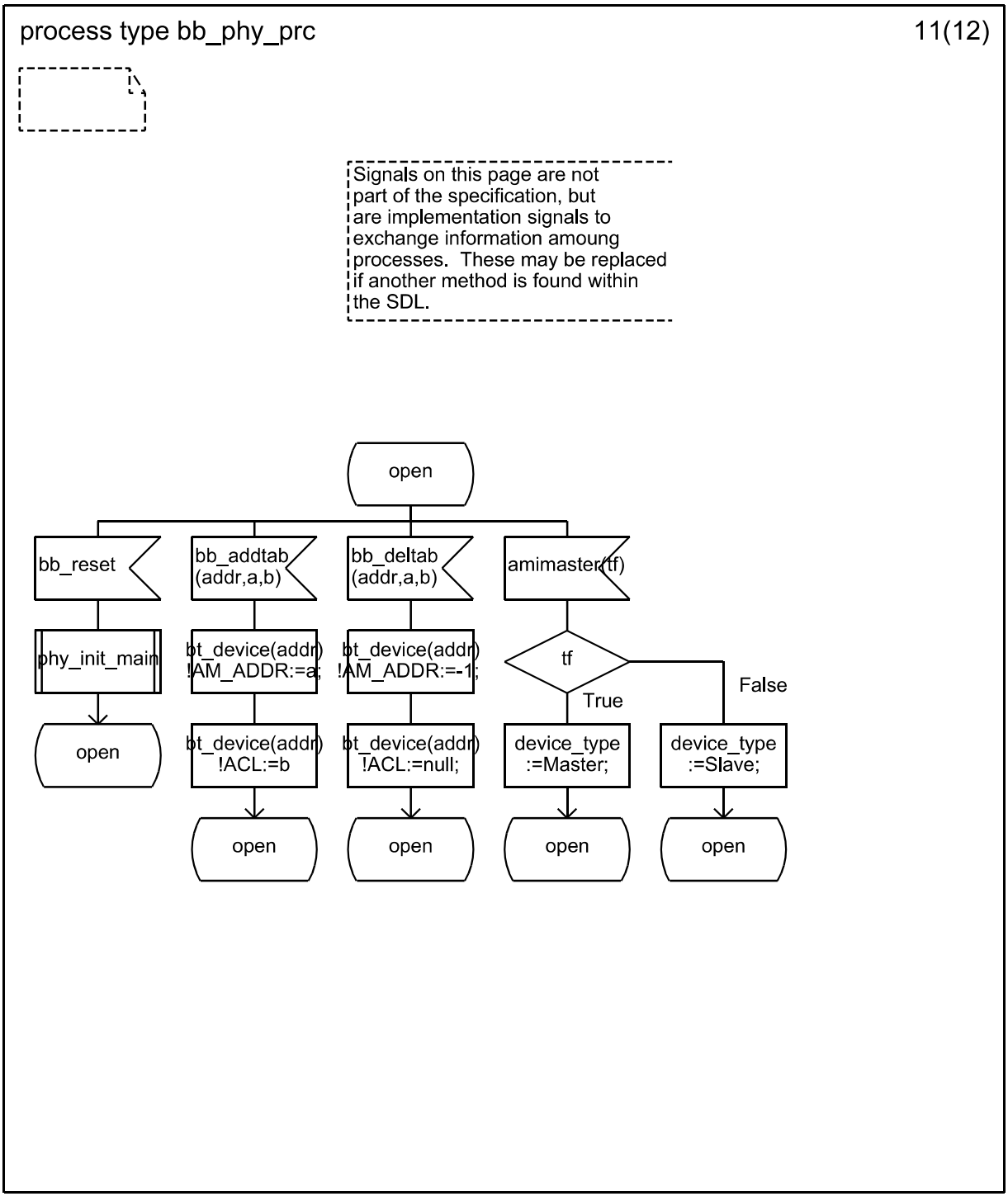
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B.2.63 bb_phy_prc-10



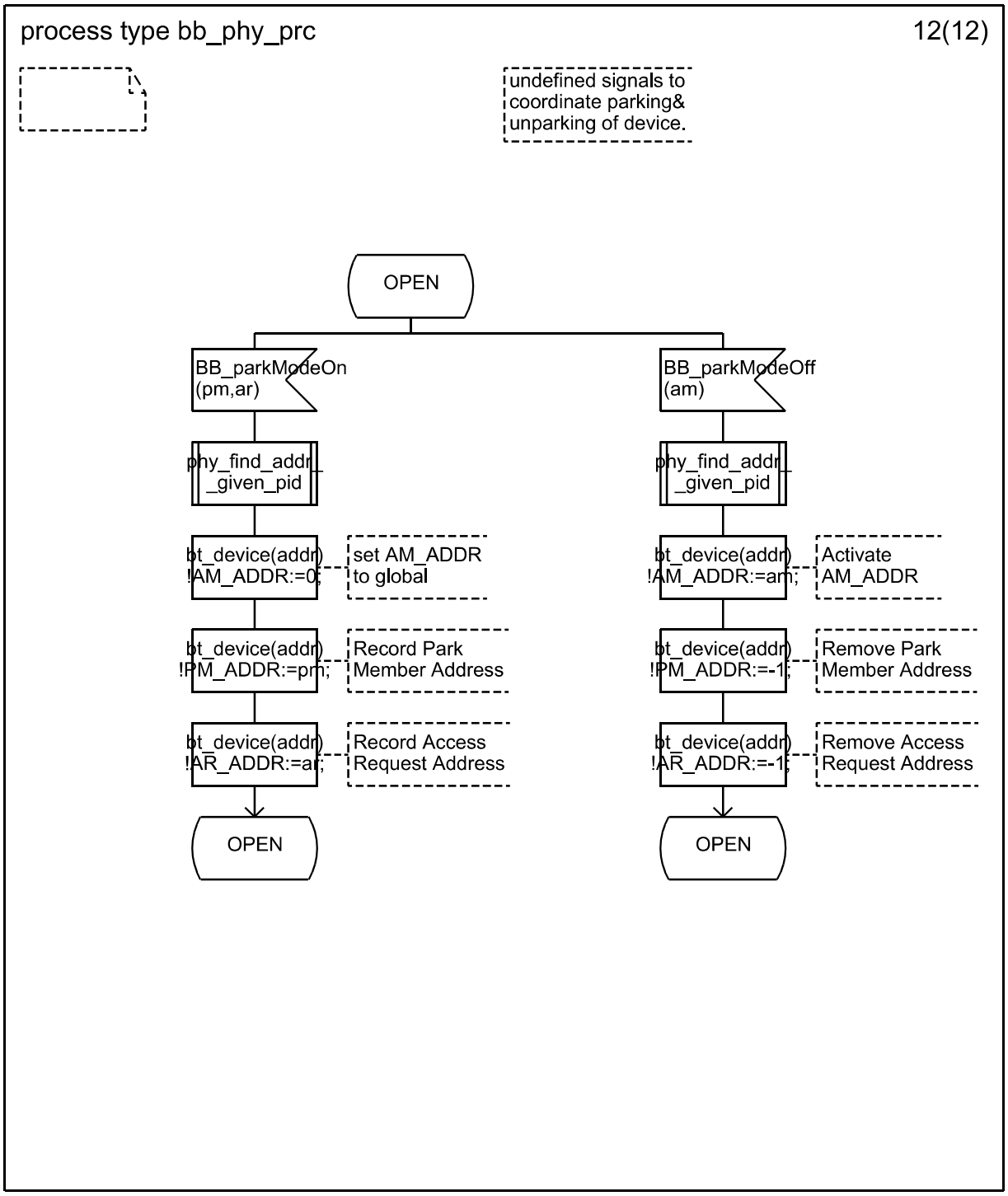
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B.2.64 bb_phy_prc-11



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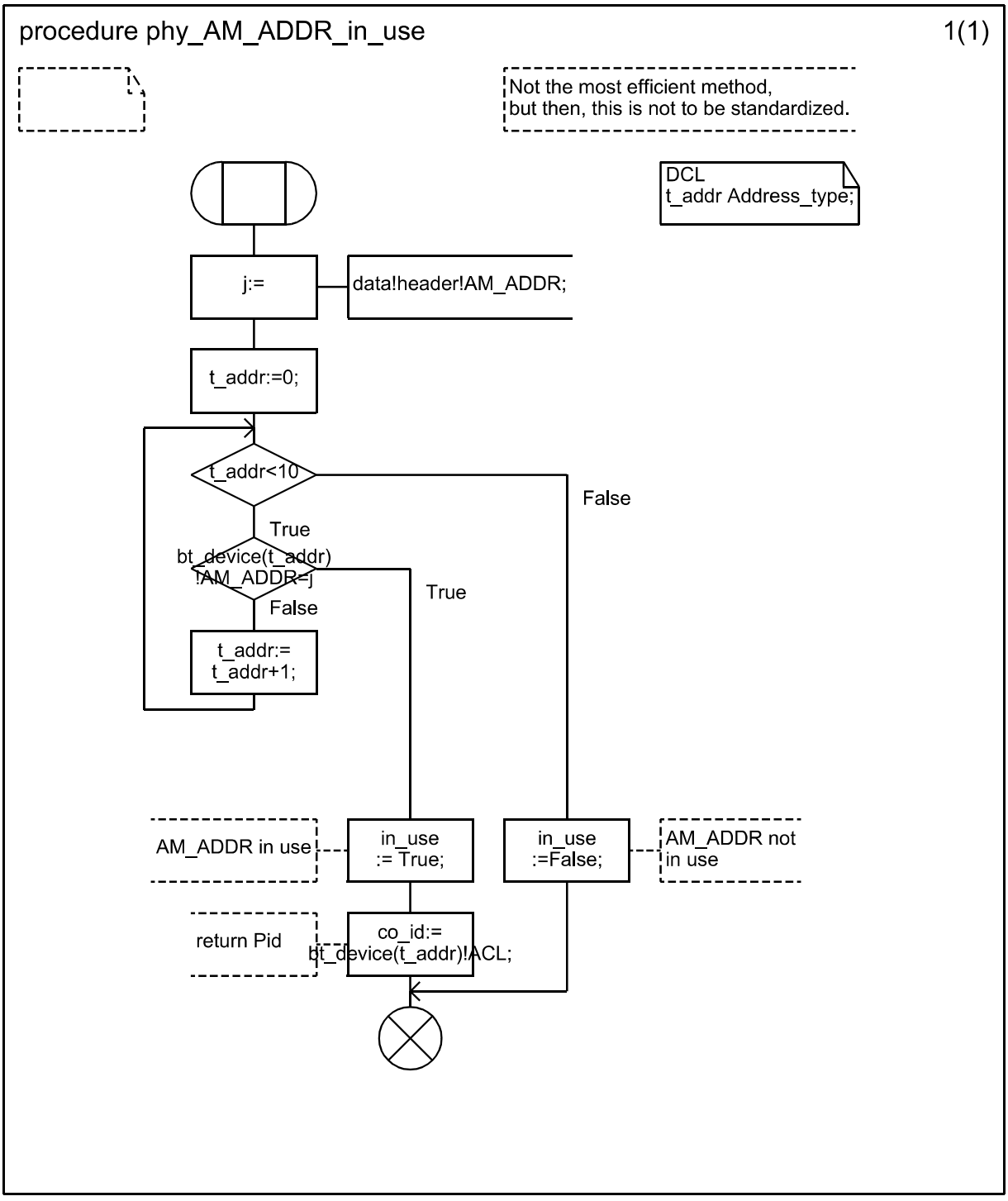
B.2.65 bb_phy_prc-12



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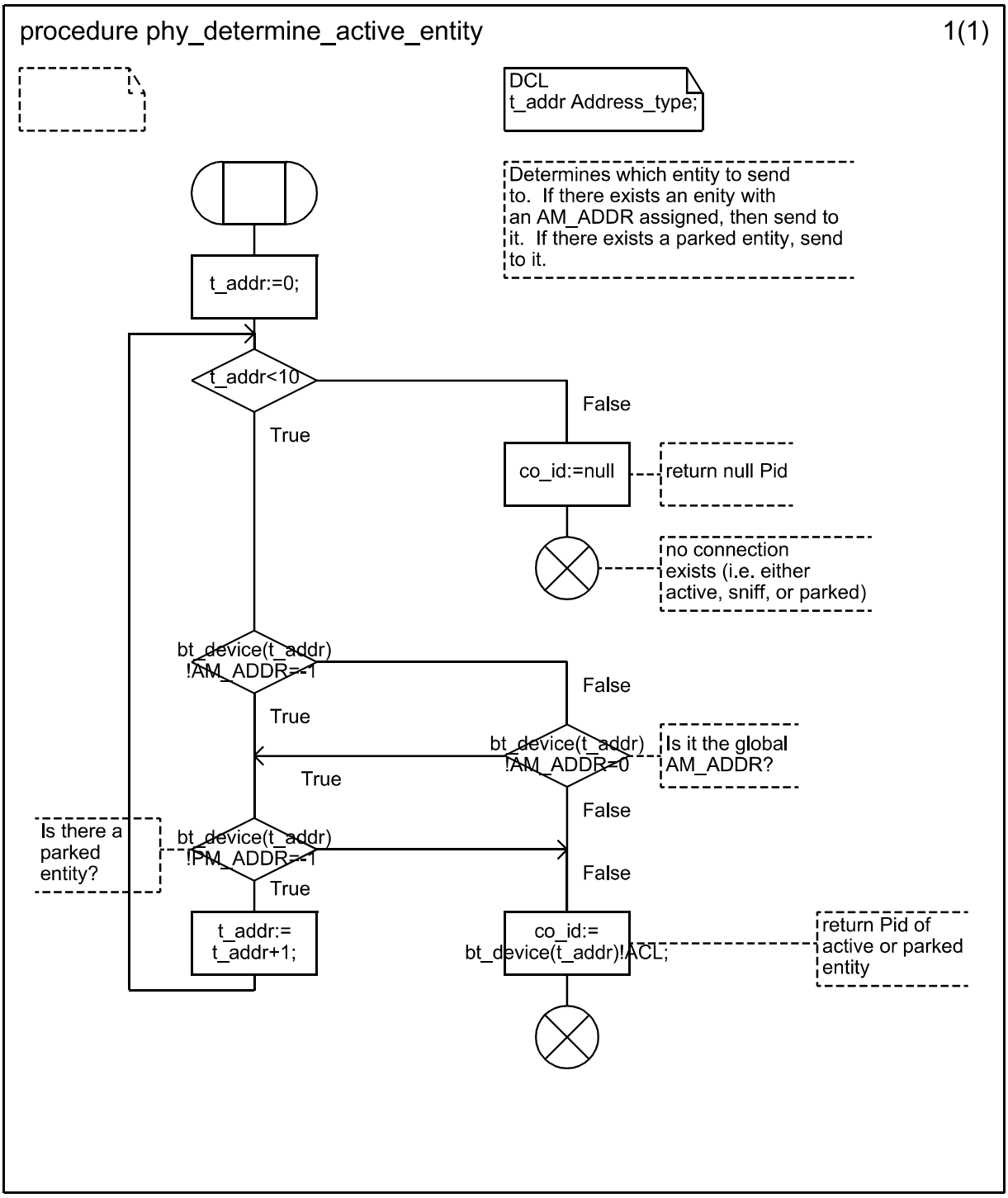
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B.2.66 phy_AM_ADDR_in_use-1



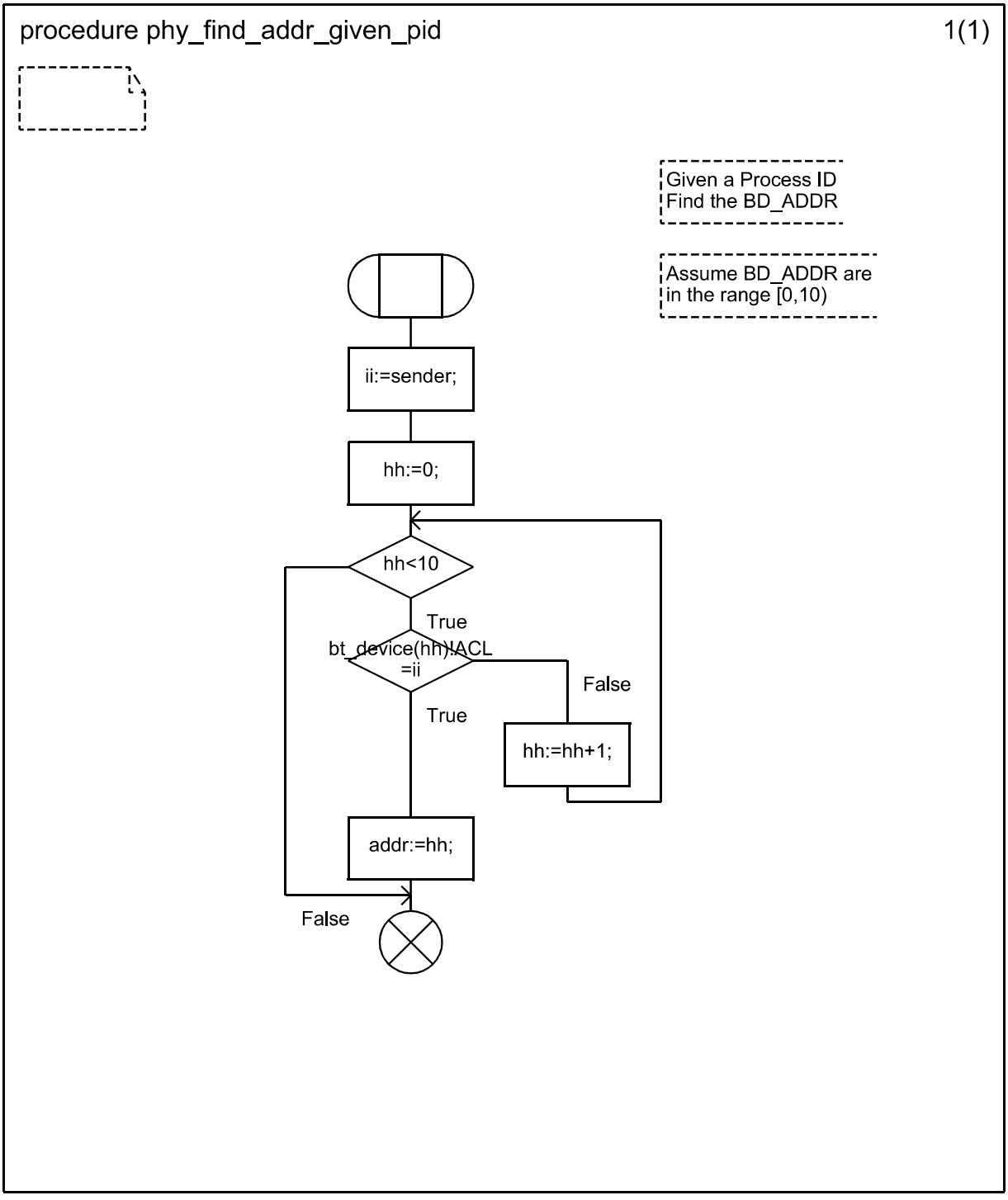
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B.2.67 phy_determine_active_entity-1



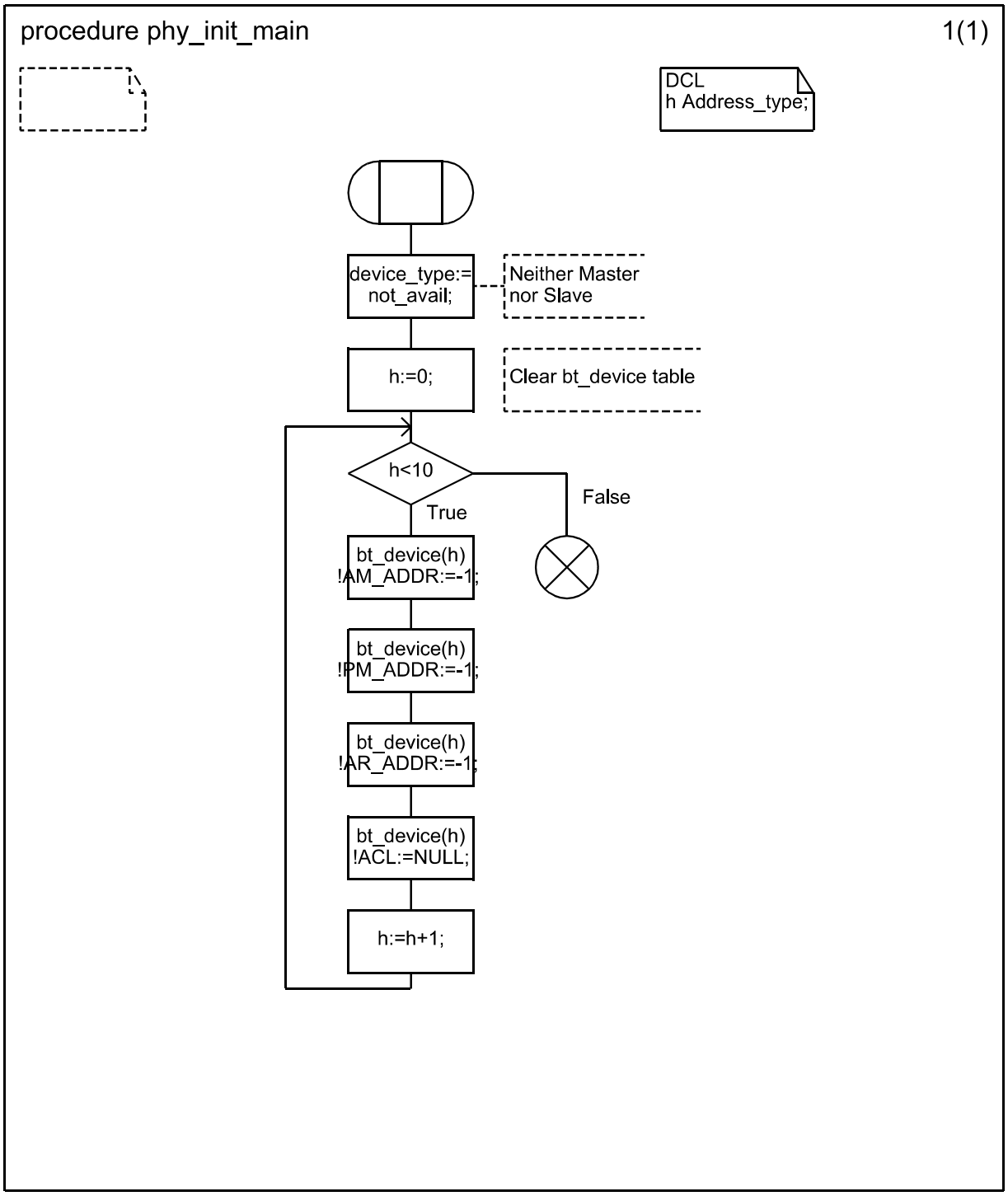
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B.2.68 phy_find_addr_given_pid-1



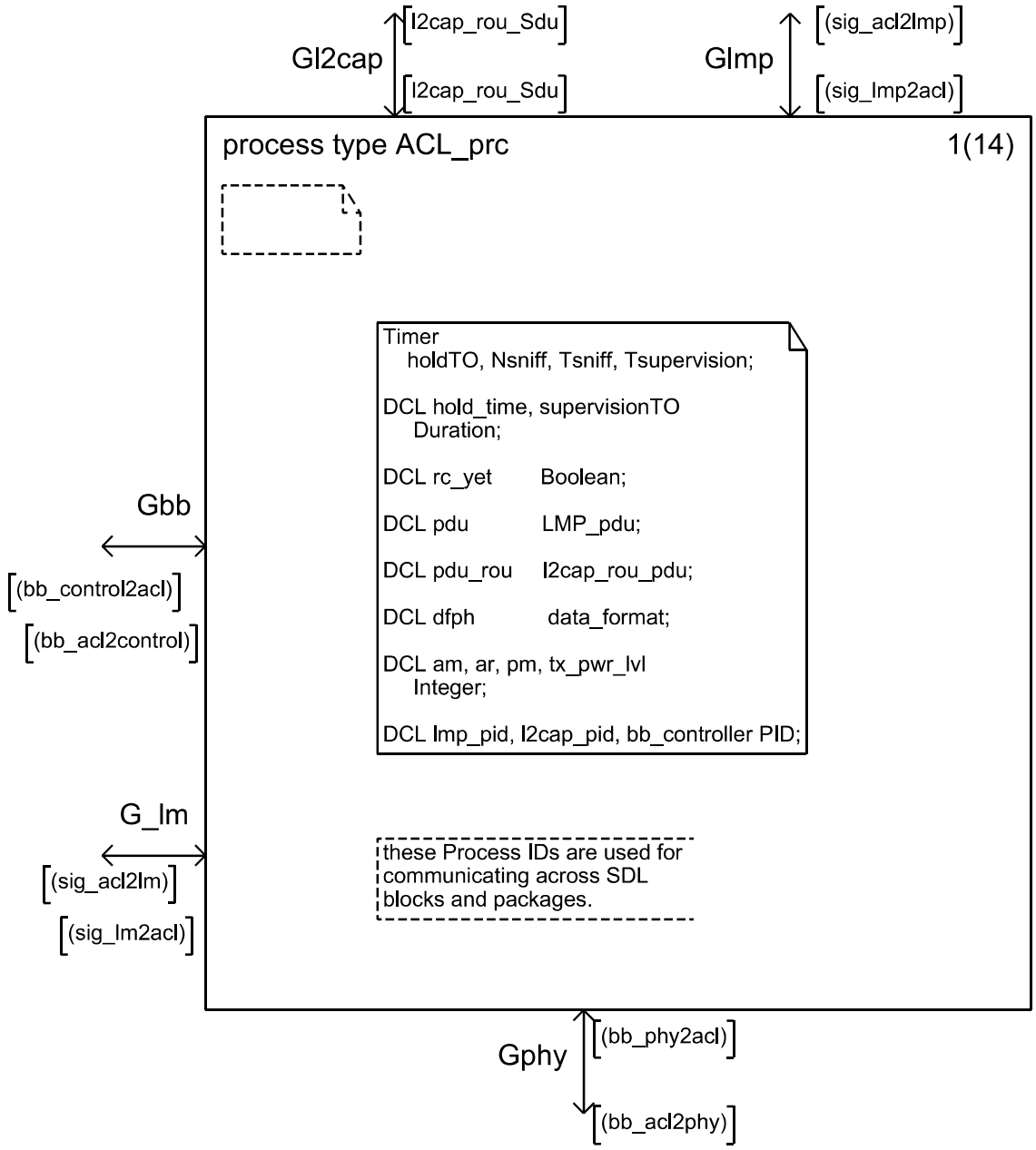
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B.2.69 phy_init_main-1



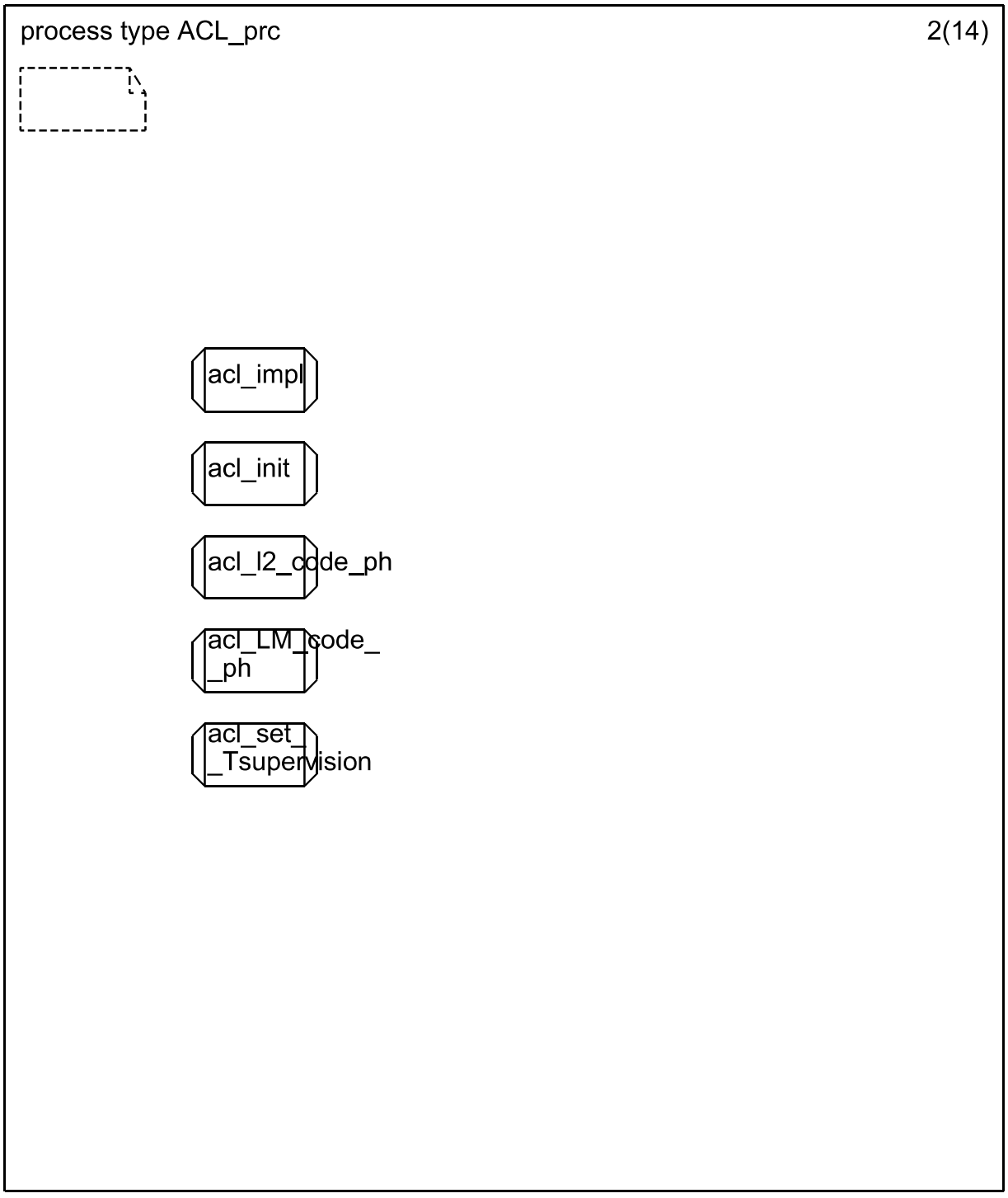
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B.2.70 ACL_prc-1



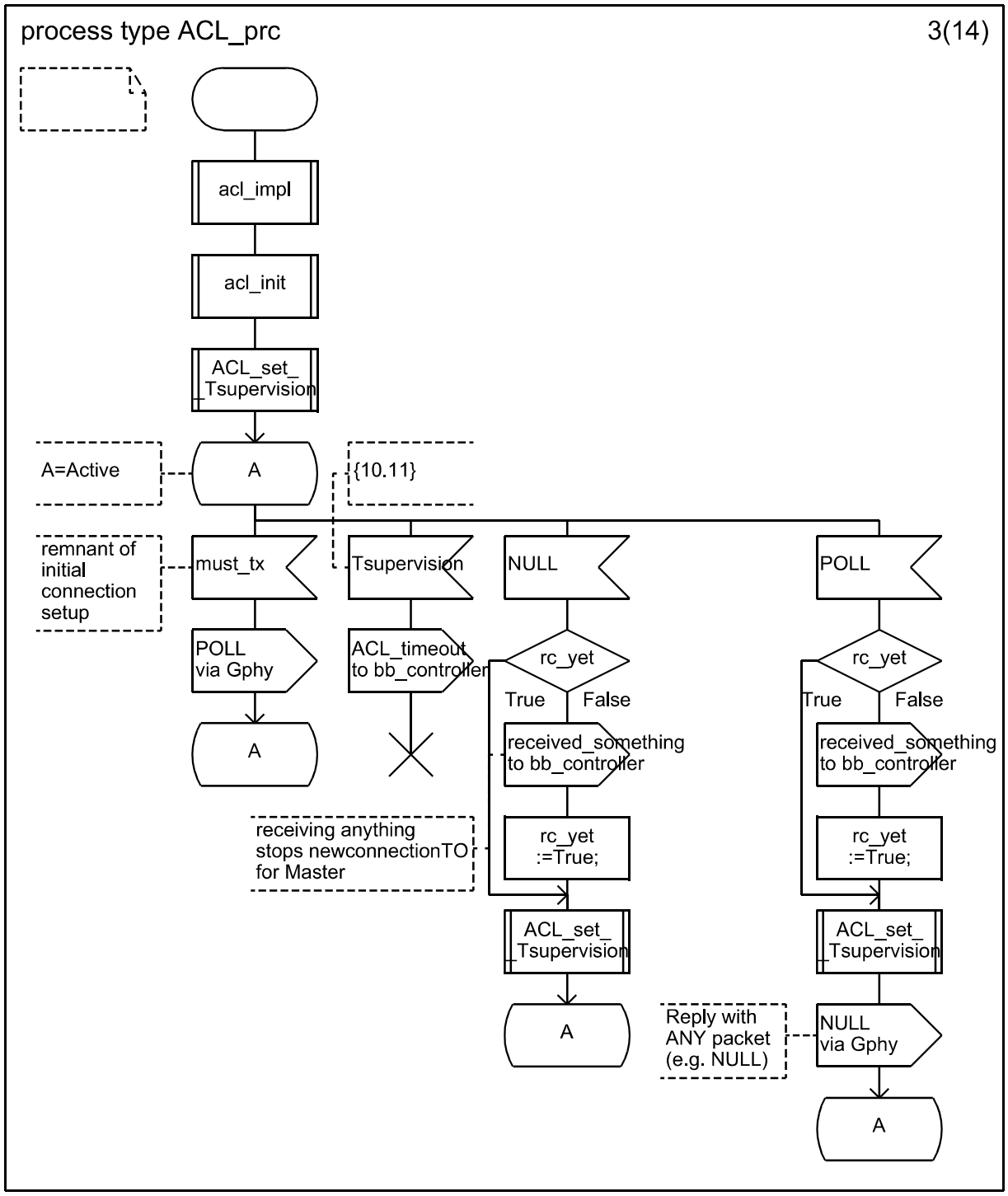
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B.2.71 ACL_prc-2



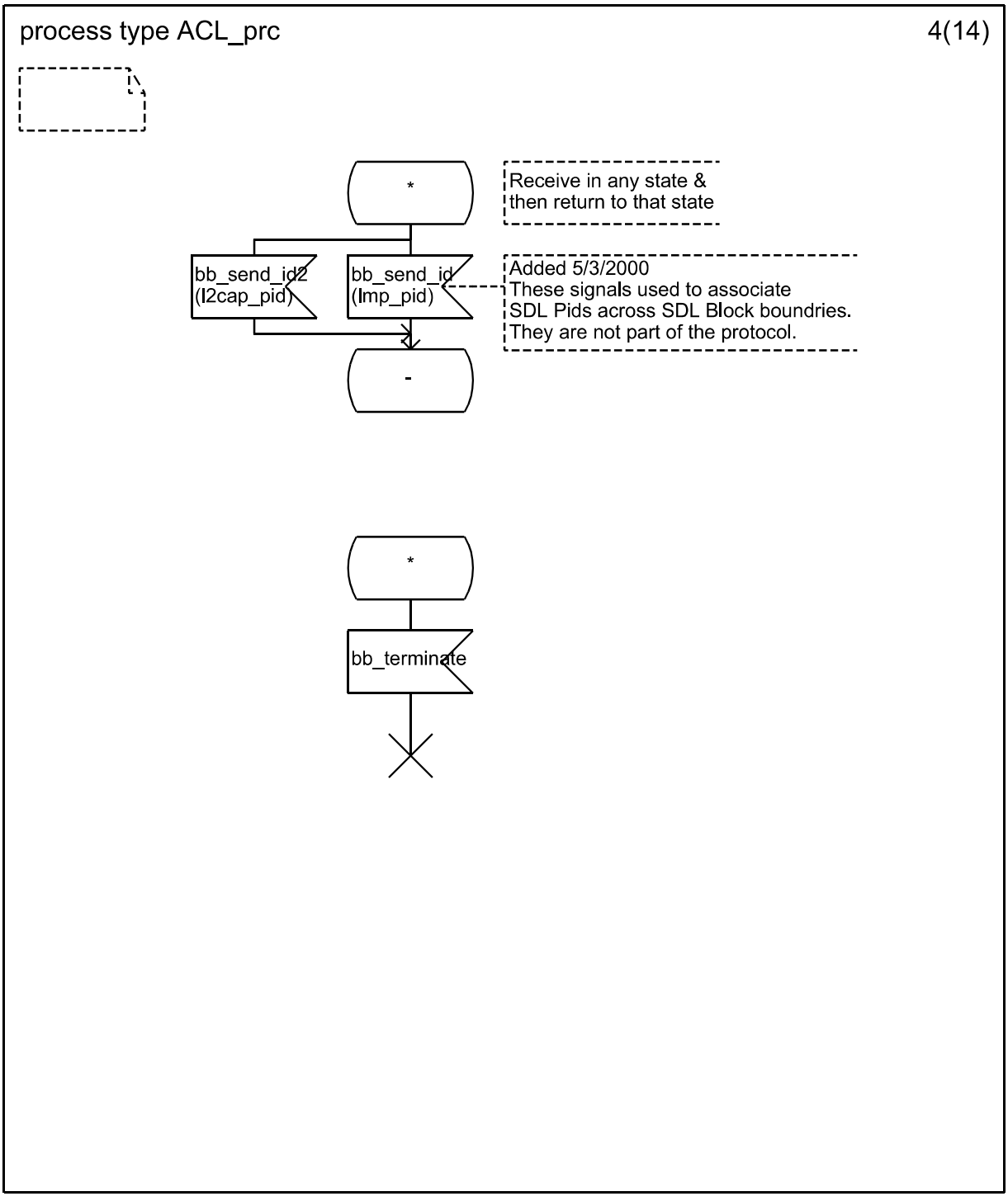
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B.2.72 ACL_prc-3



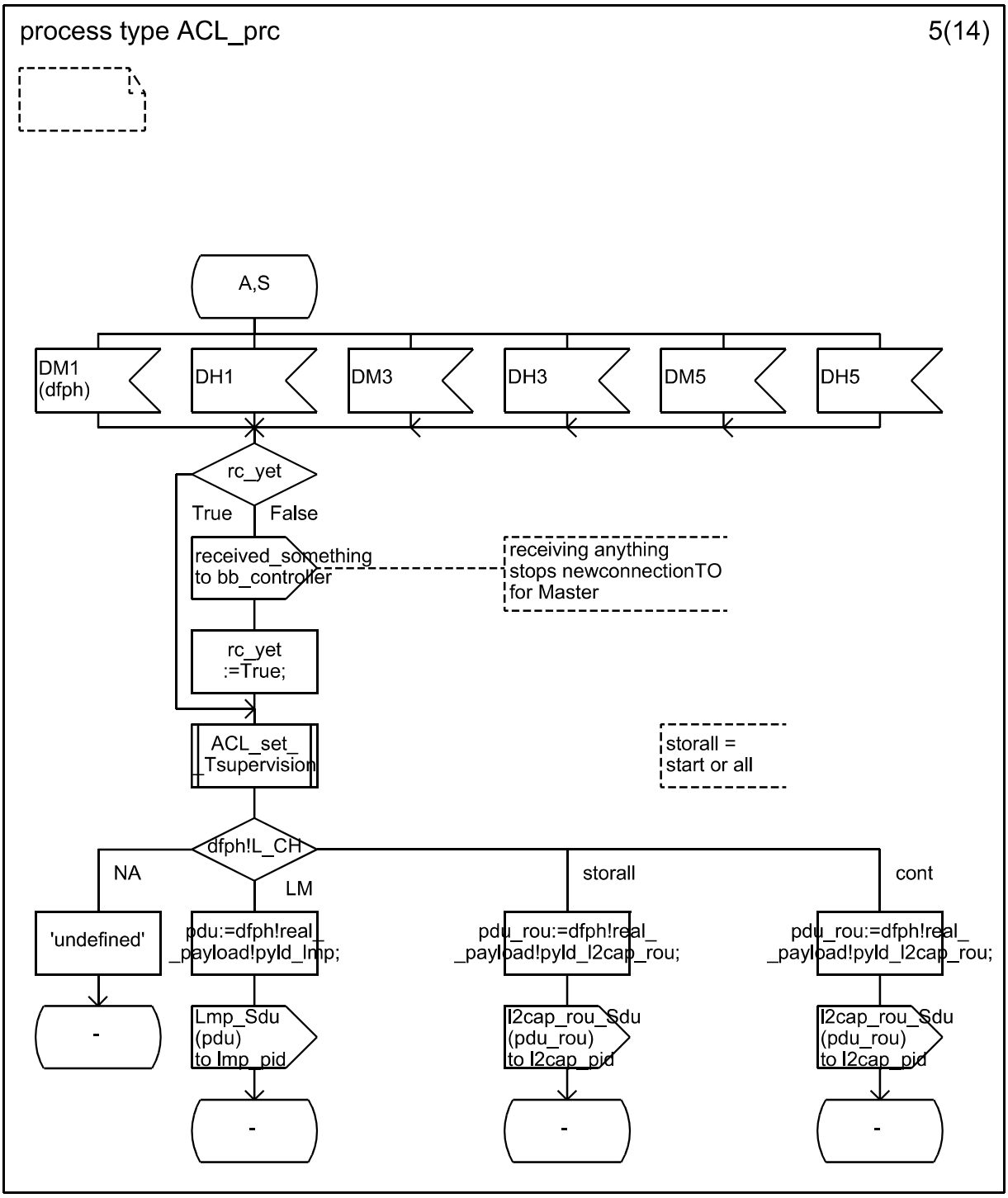
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B.2.73 ACL_prc-4



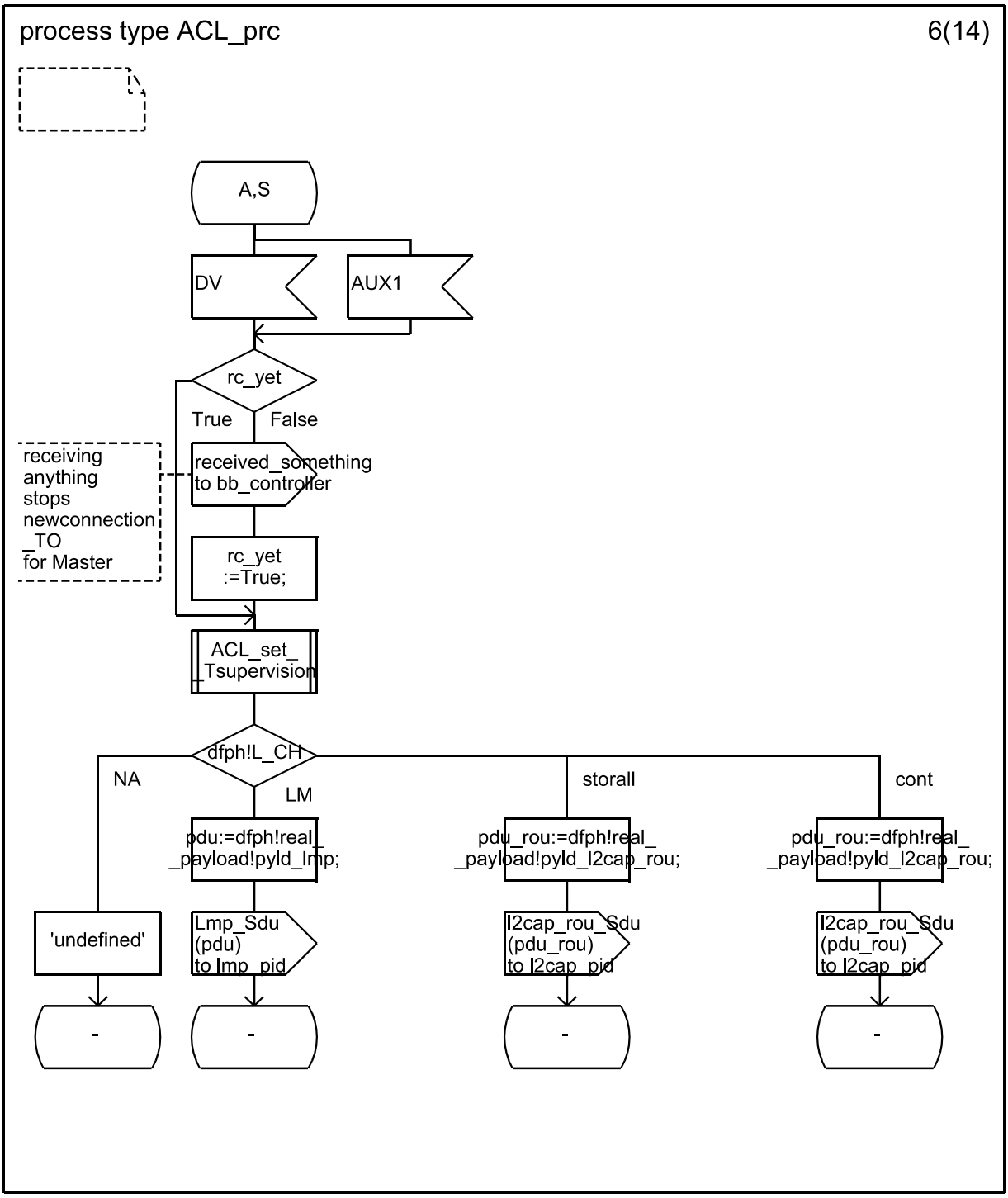
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B.2.74 ACL_prc-5



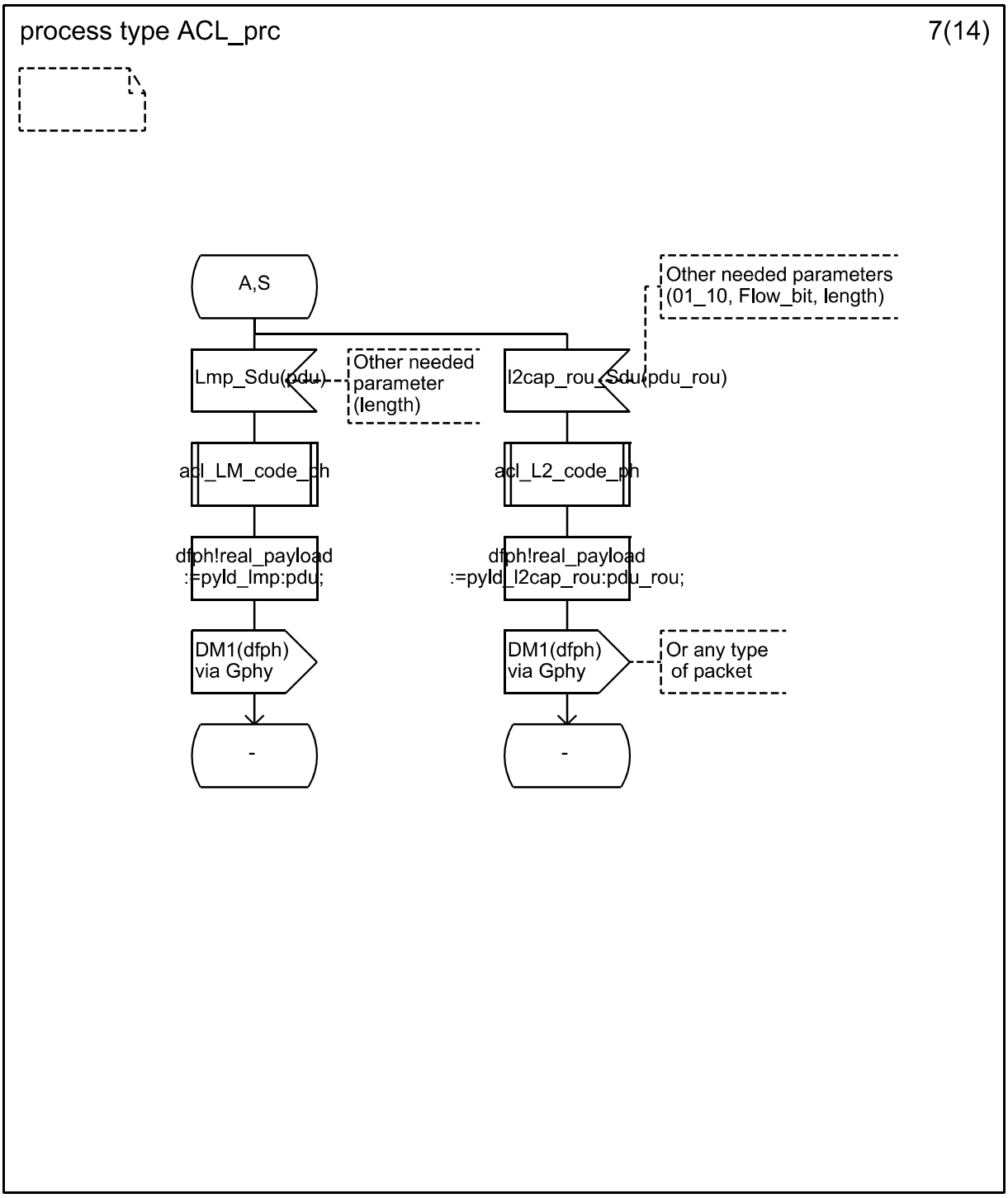
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B.2.75 ACL_prc-6



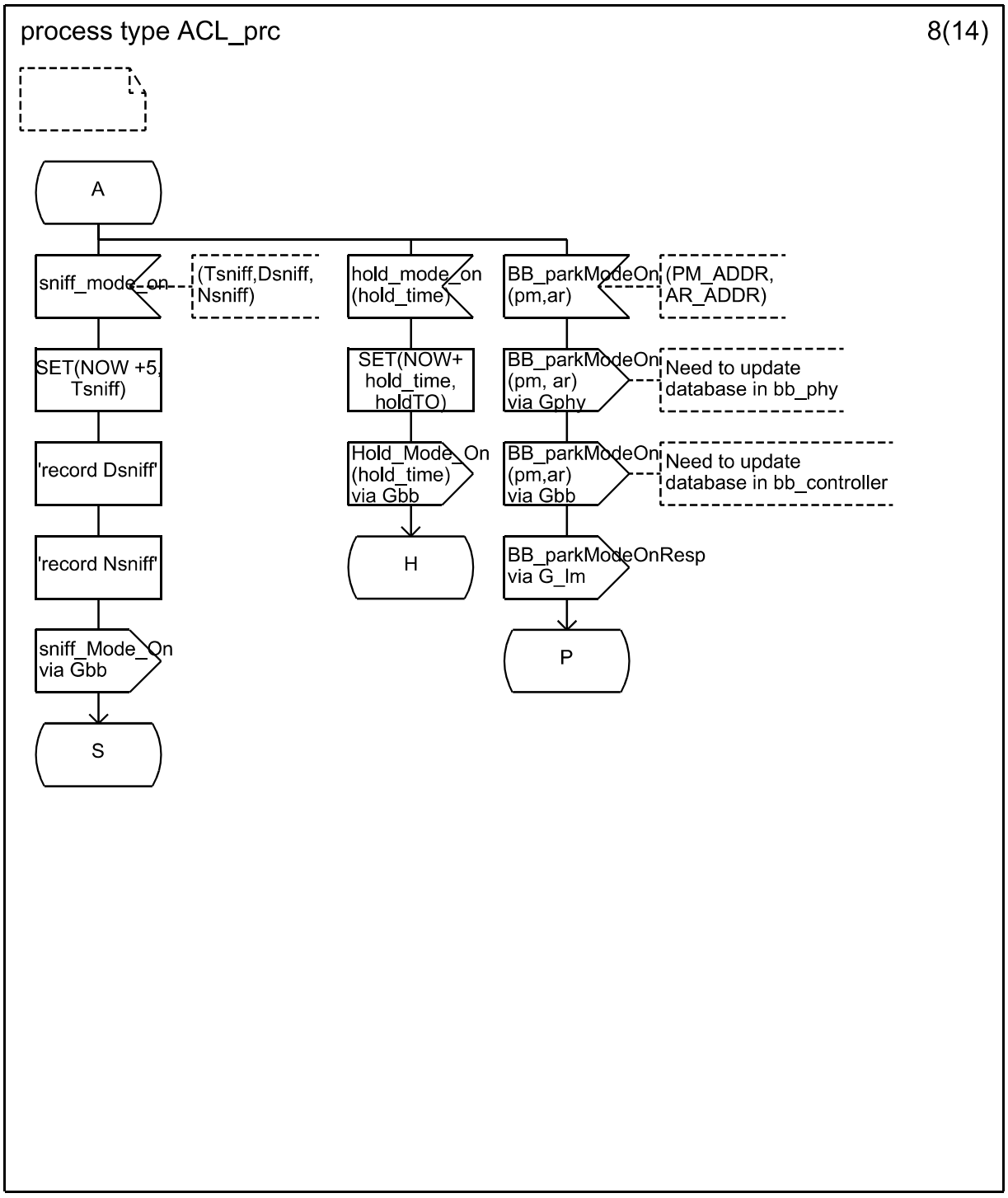
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B.2.76 ACL_prc-7



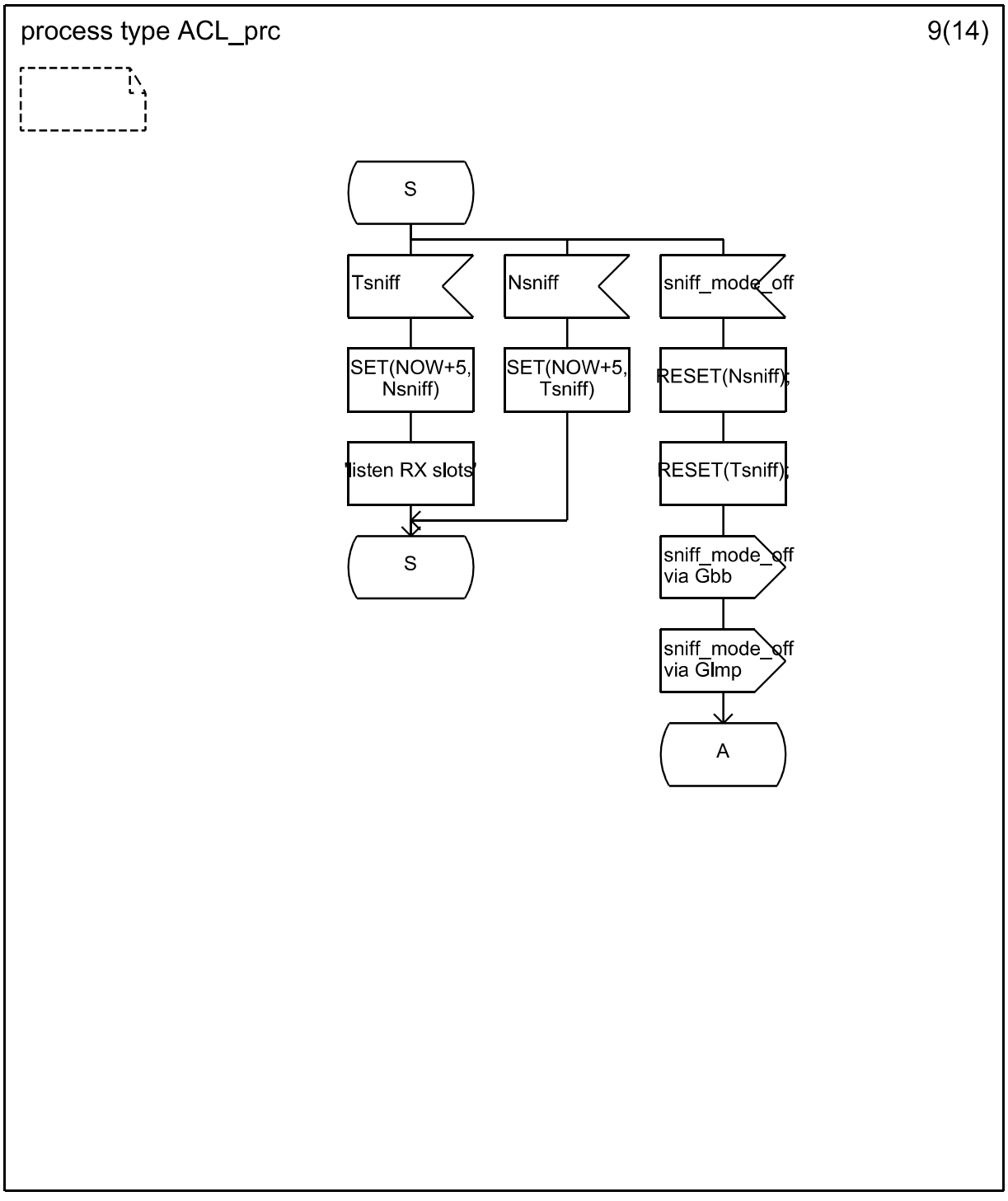
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B.2.77 ACL_prc-8



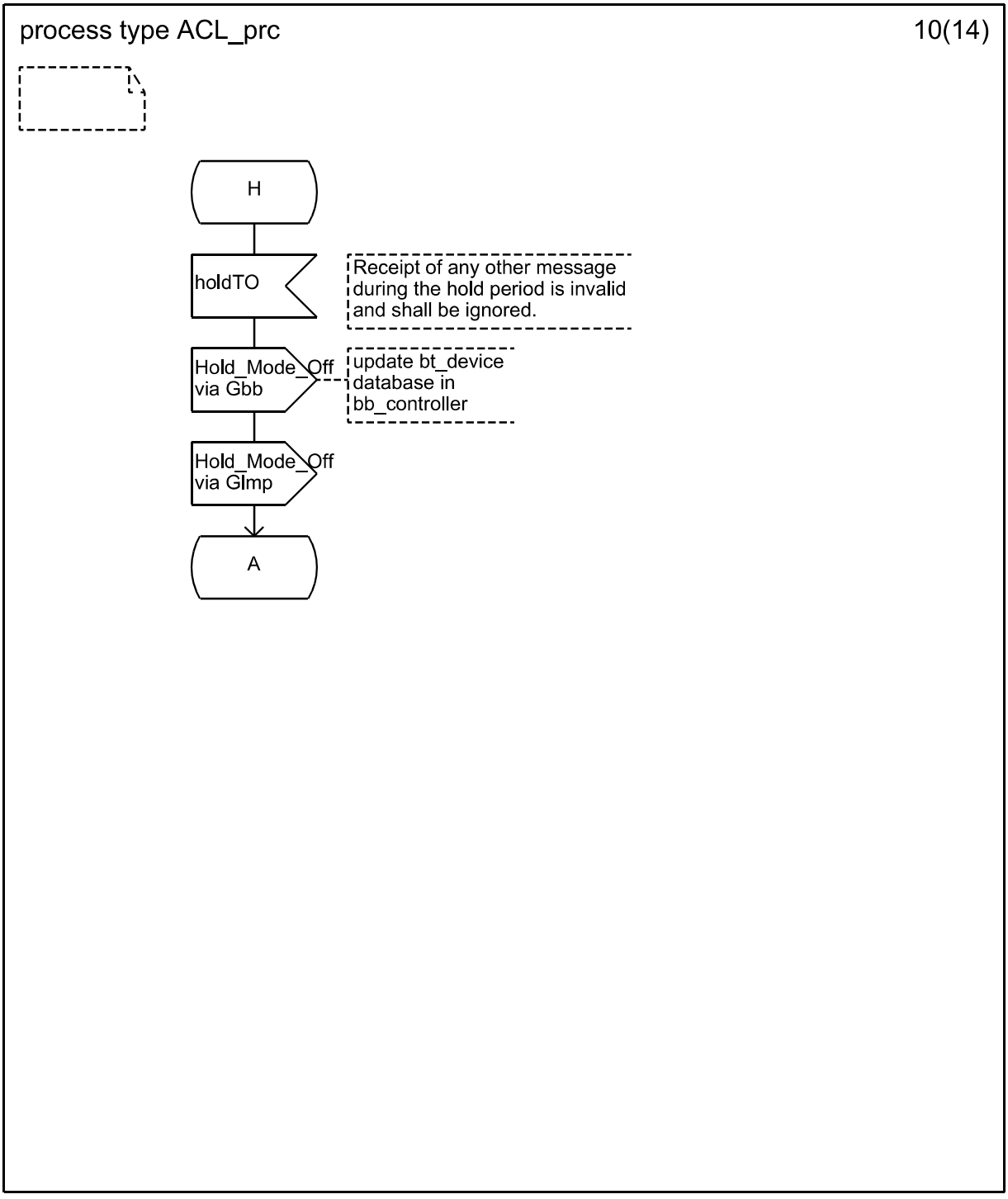
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B.2.78 ACL_prc-9



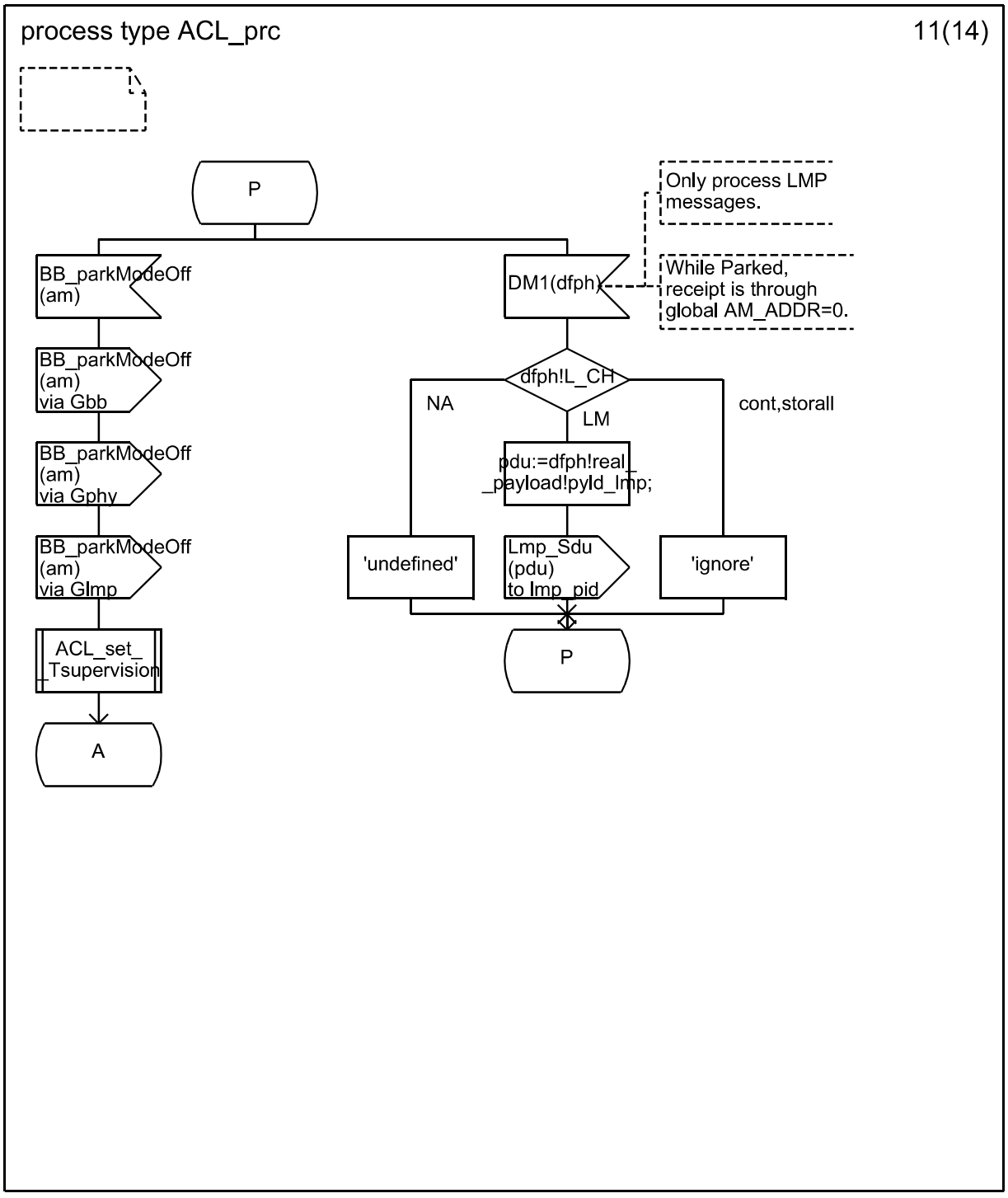
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B.2.79 ACL_prc-10



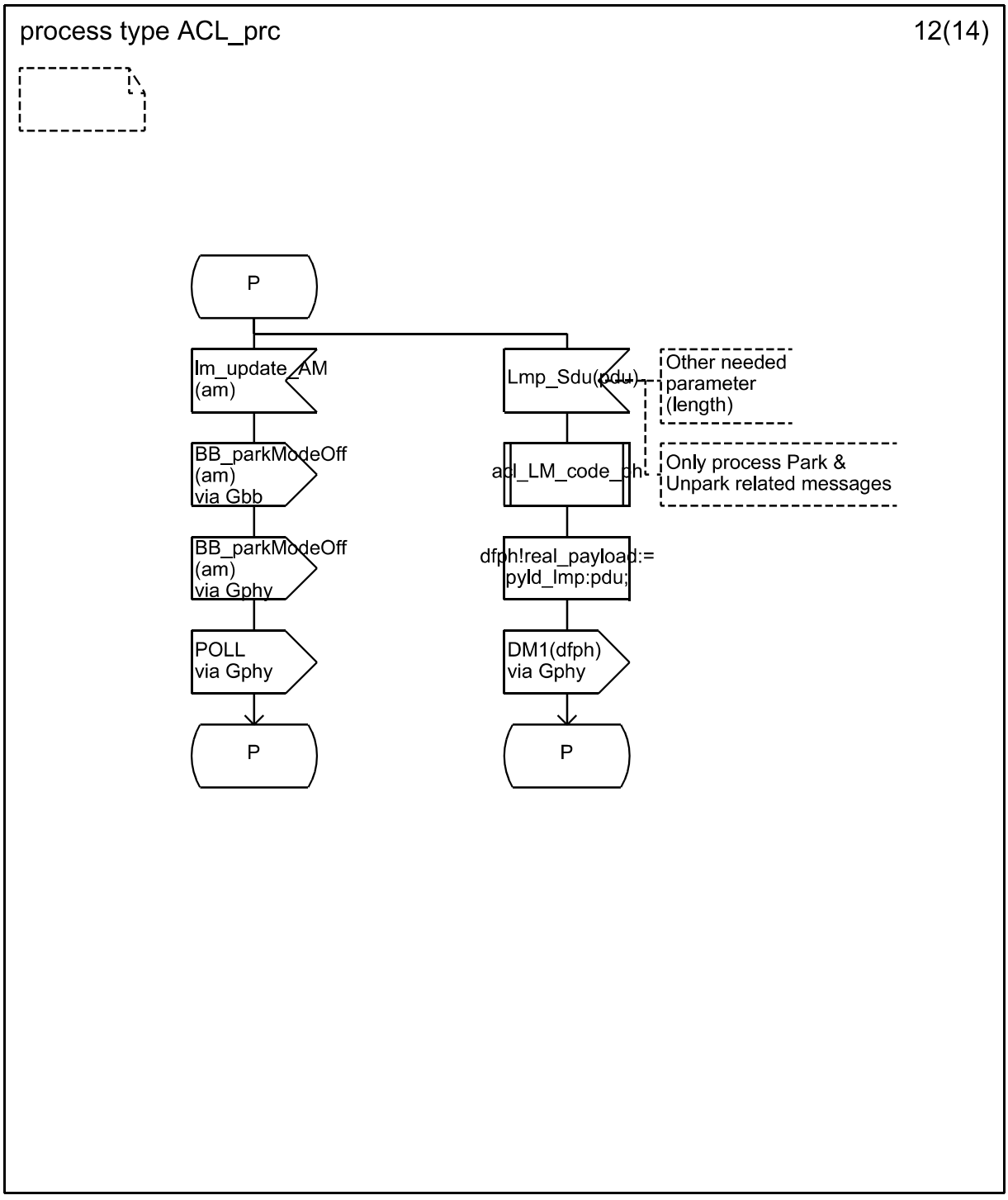
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B.2.80 ACL_prc-11



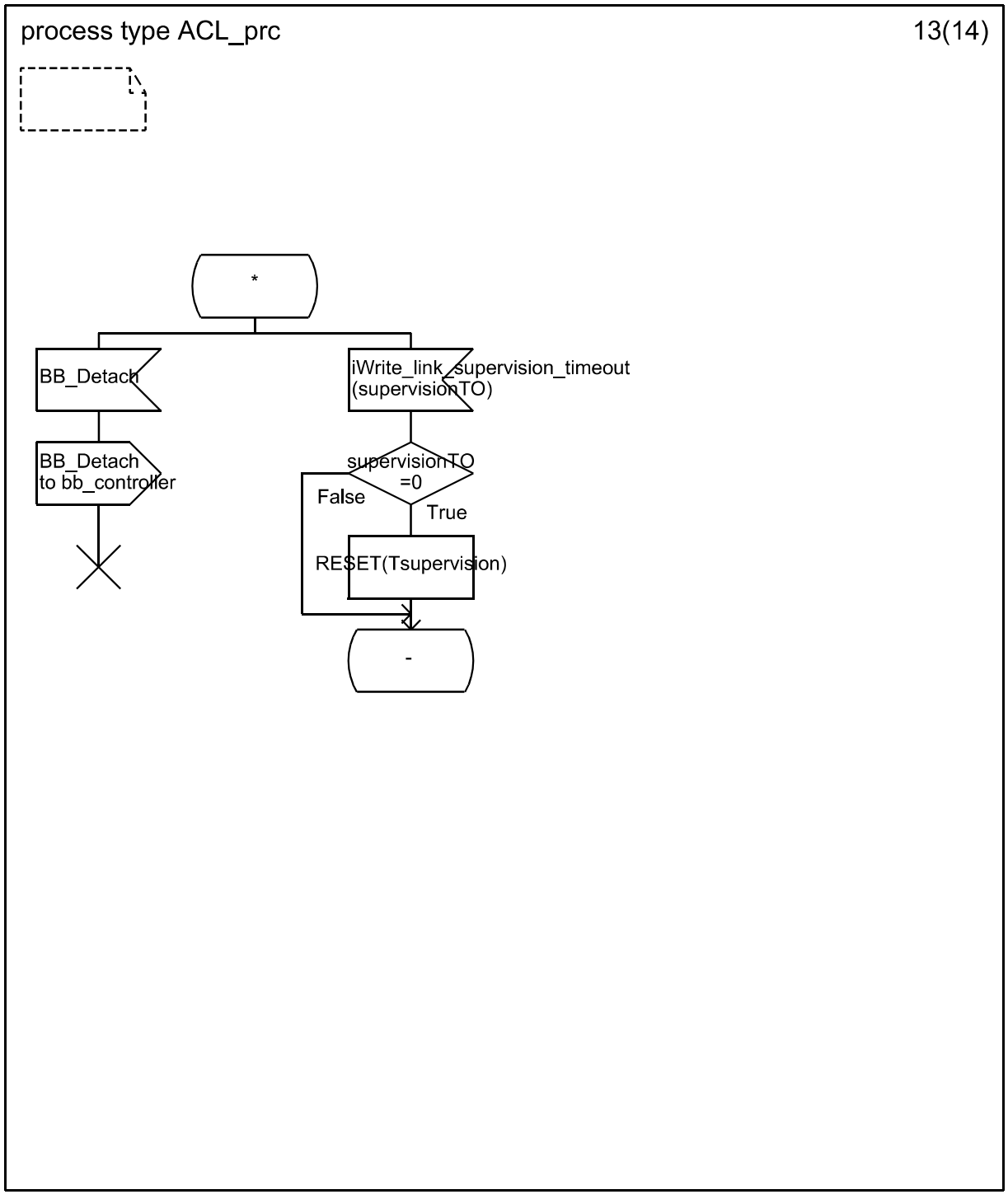
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B.2.81 ACL_prc-12



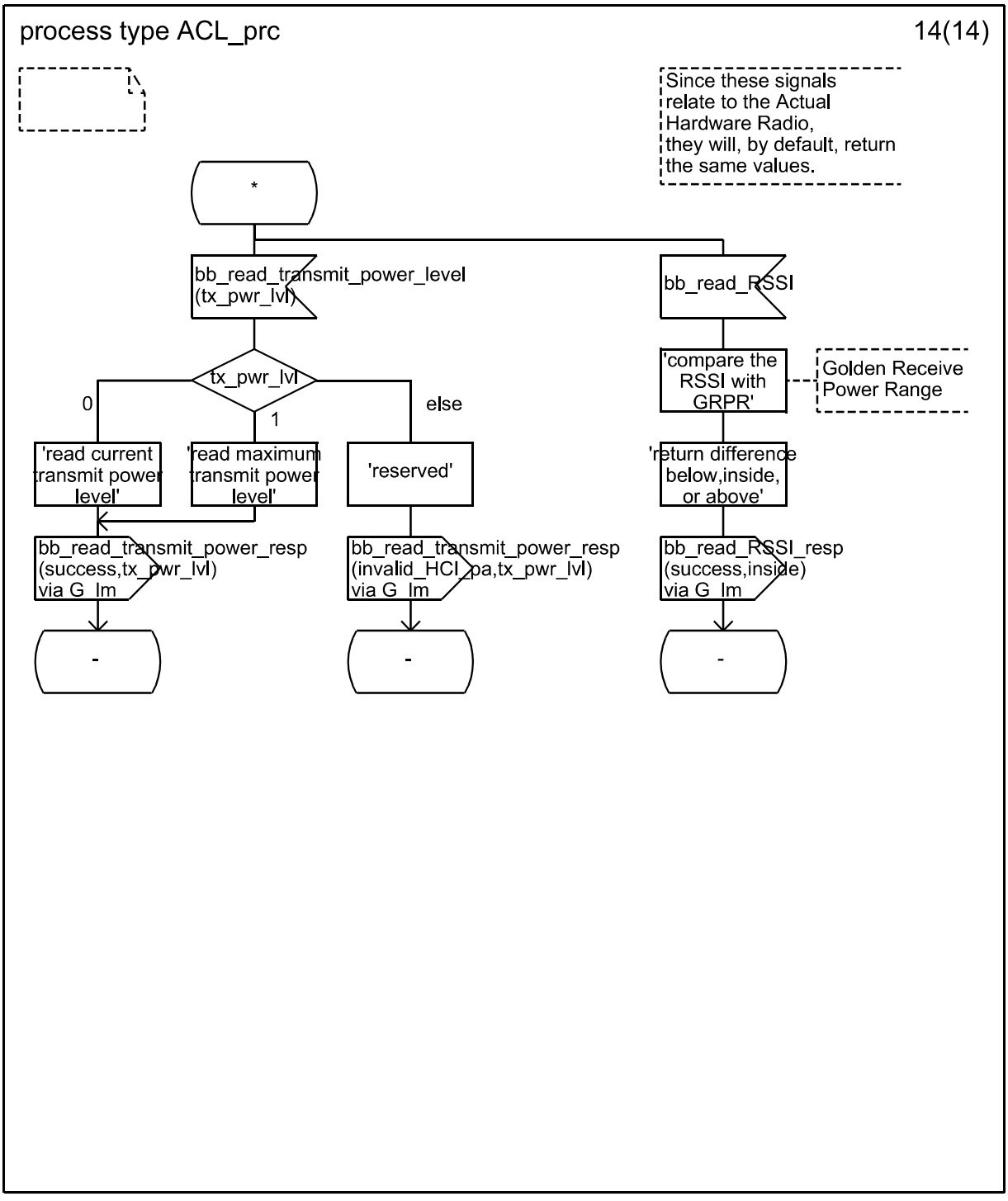
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B.2.82 ACL_prc-13



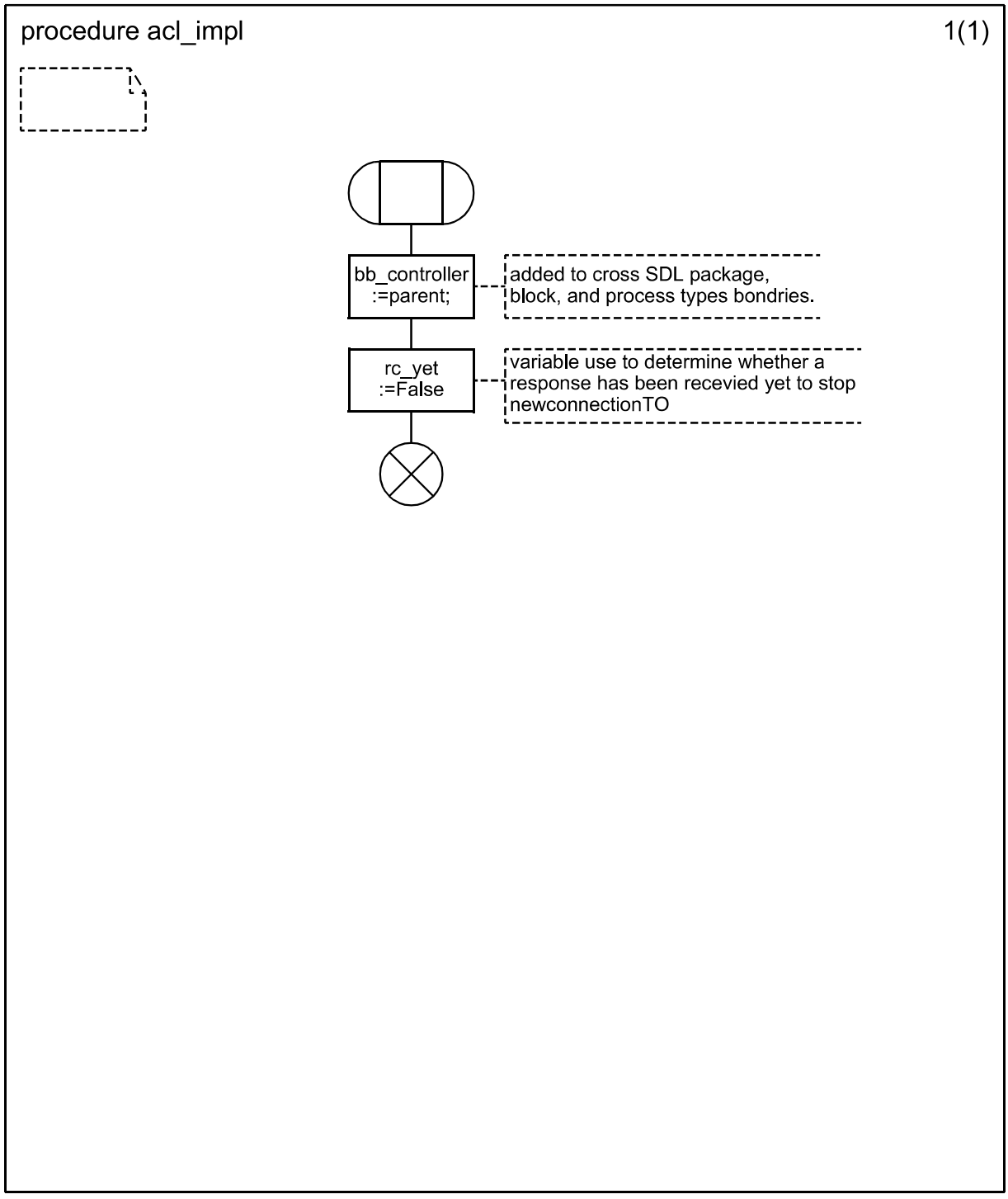
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B.2.83 ACL_prc-14



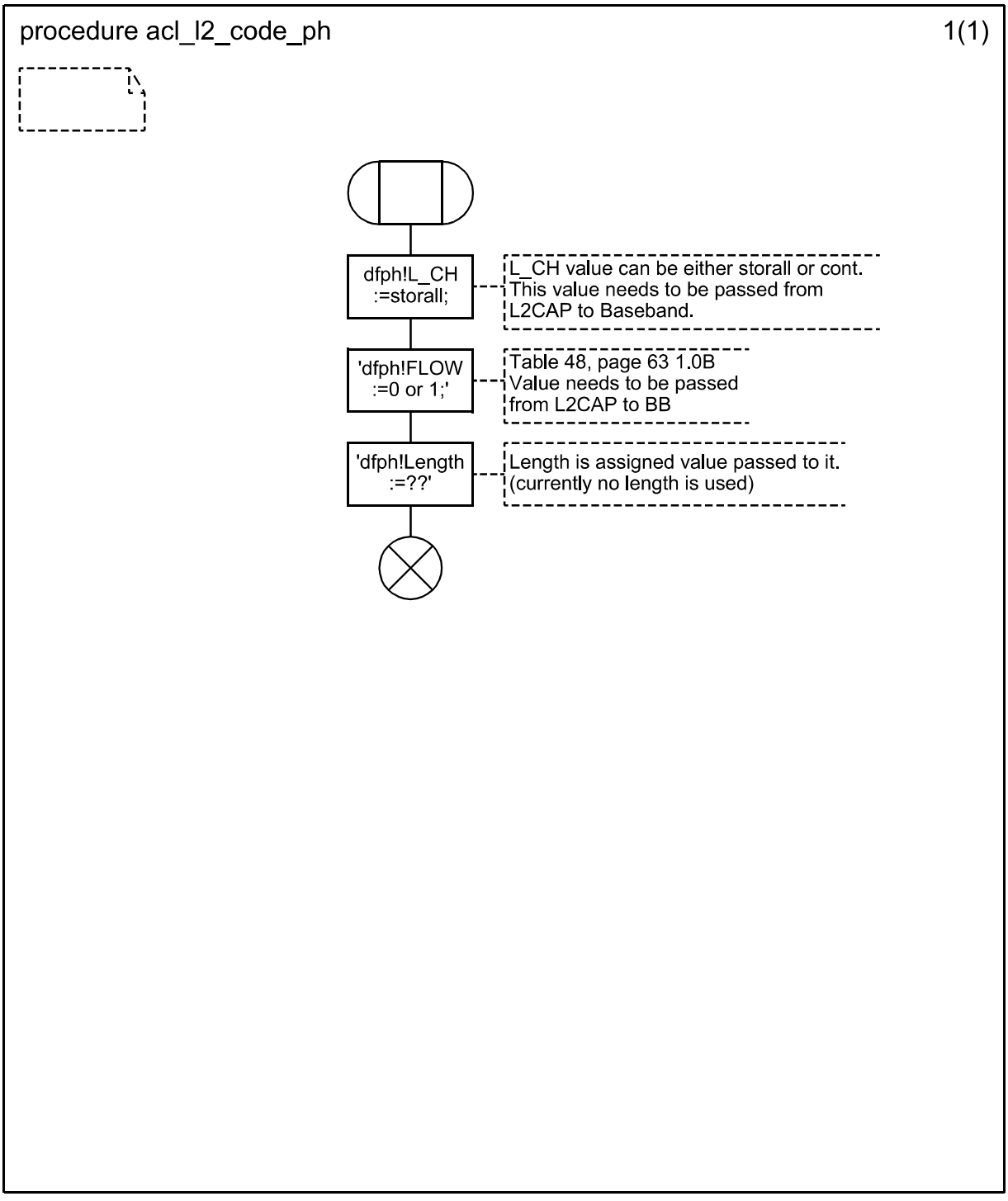
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B.2.84 acl_impl-1



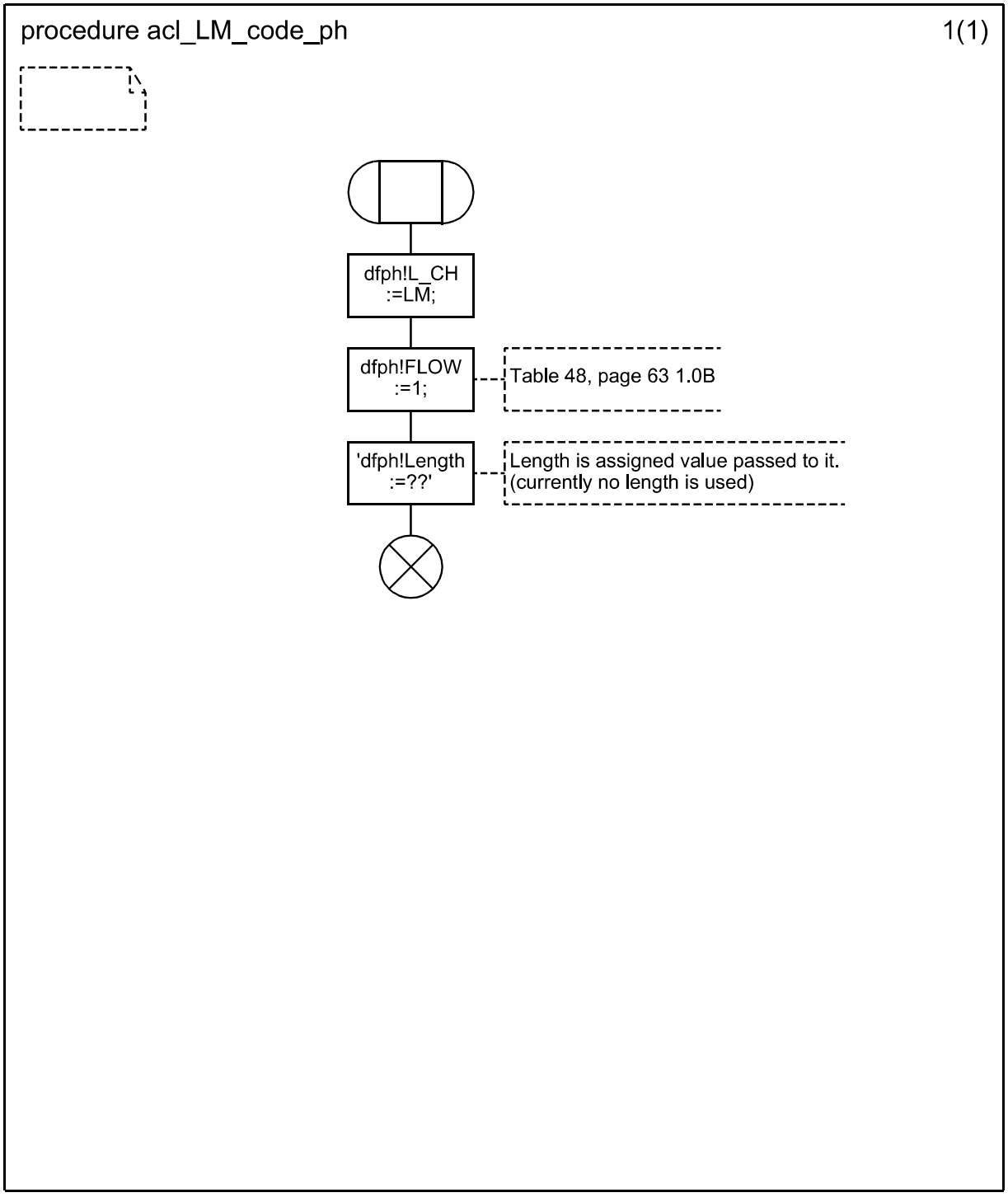
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B.2.85 acl_l2_code_ph-1



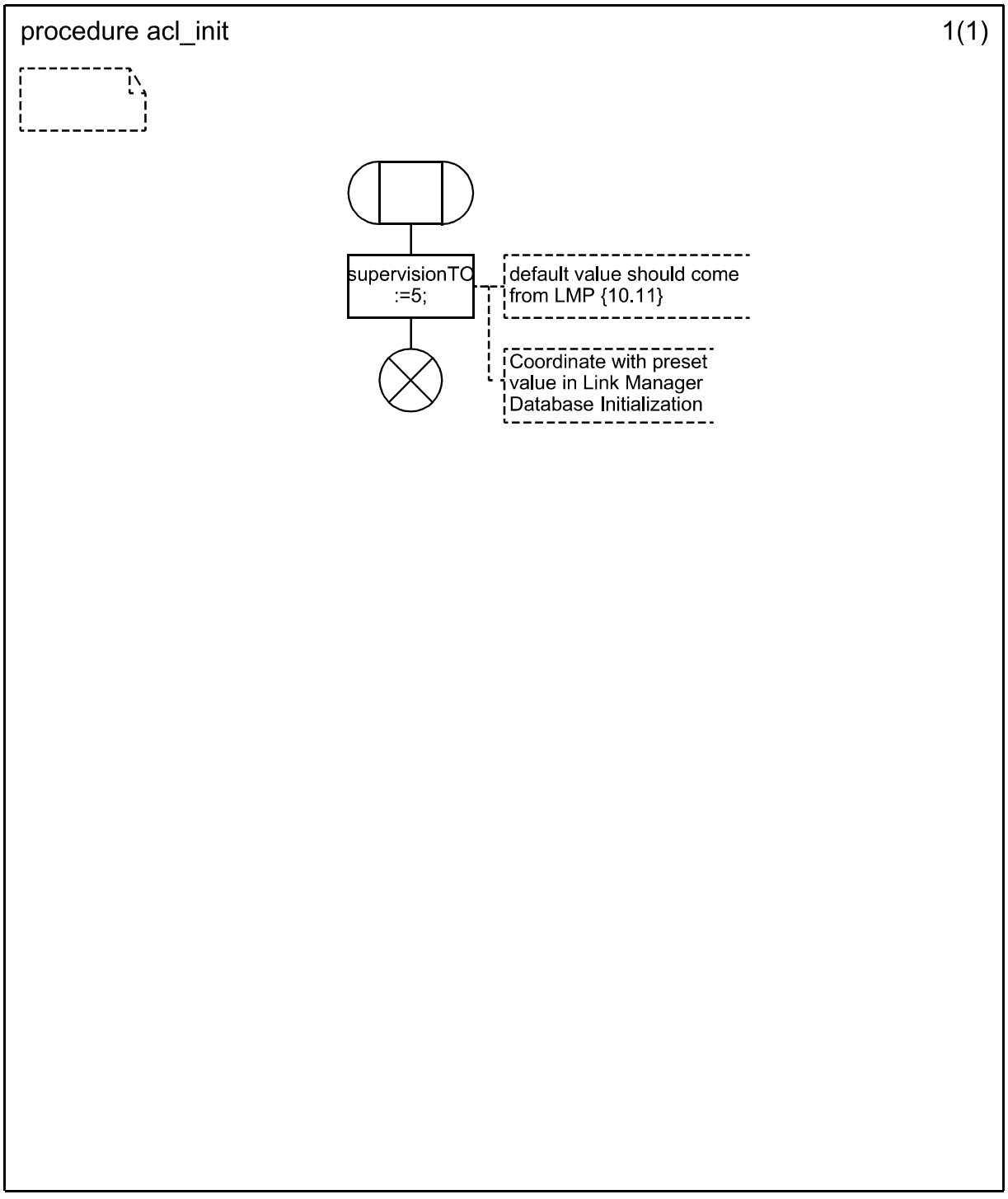
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B.2.86 acl_LM_code_ph-1



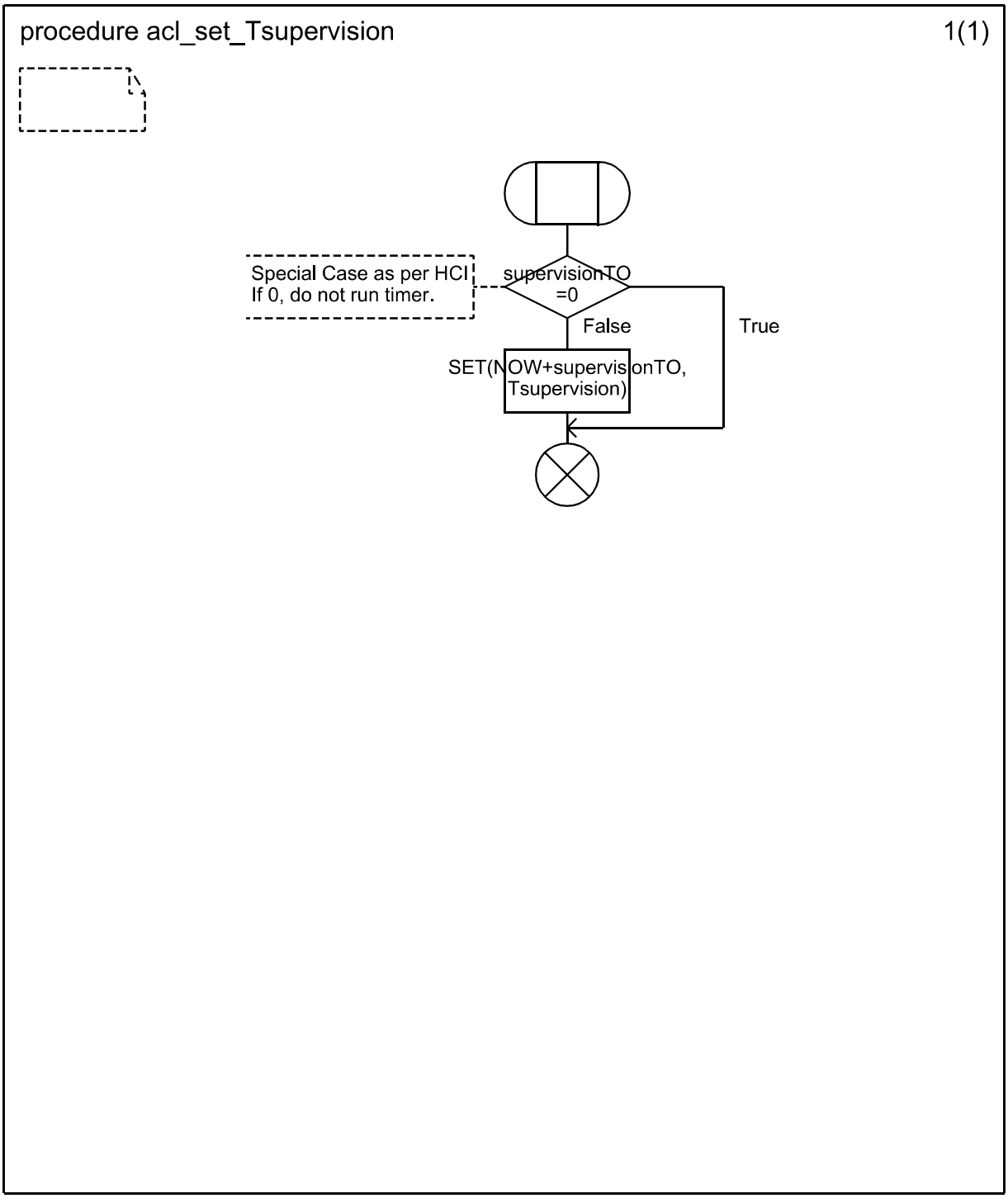
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B.2.87 acl_init-1



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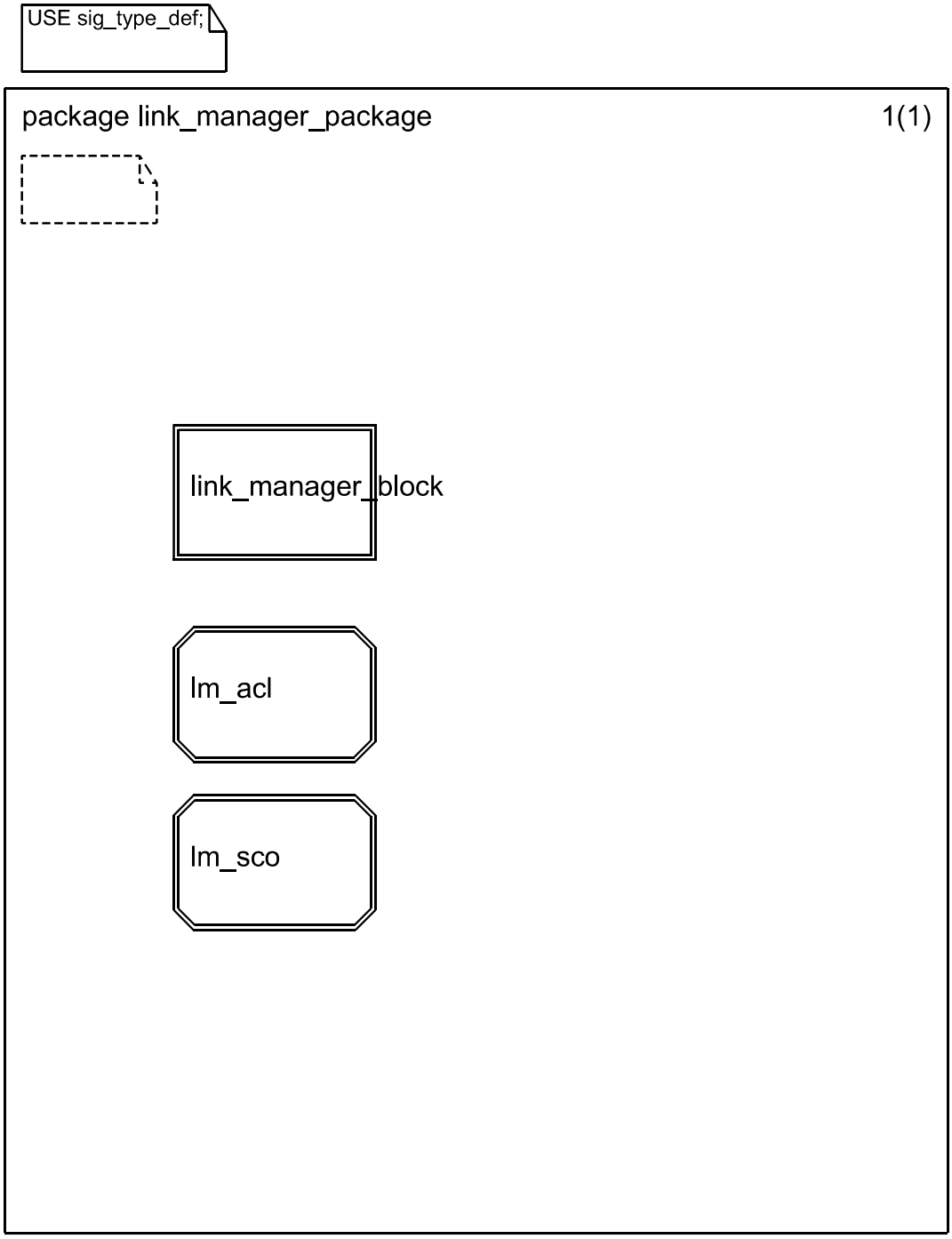
B.2.88 acl_set_Tsupervision-1



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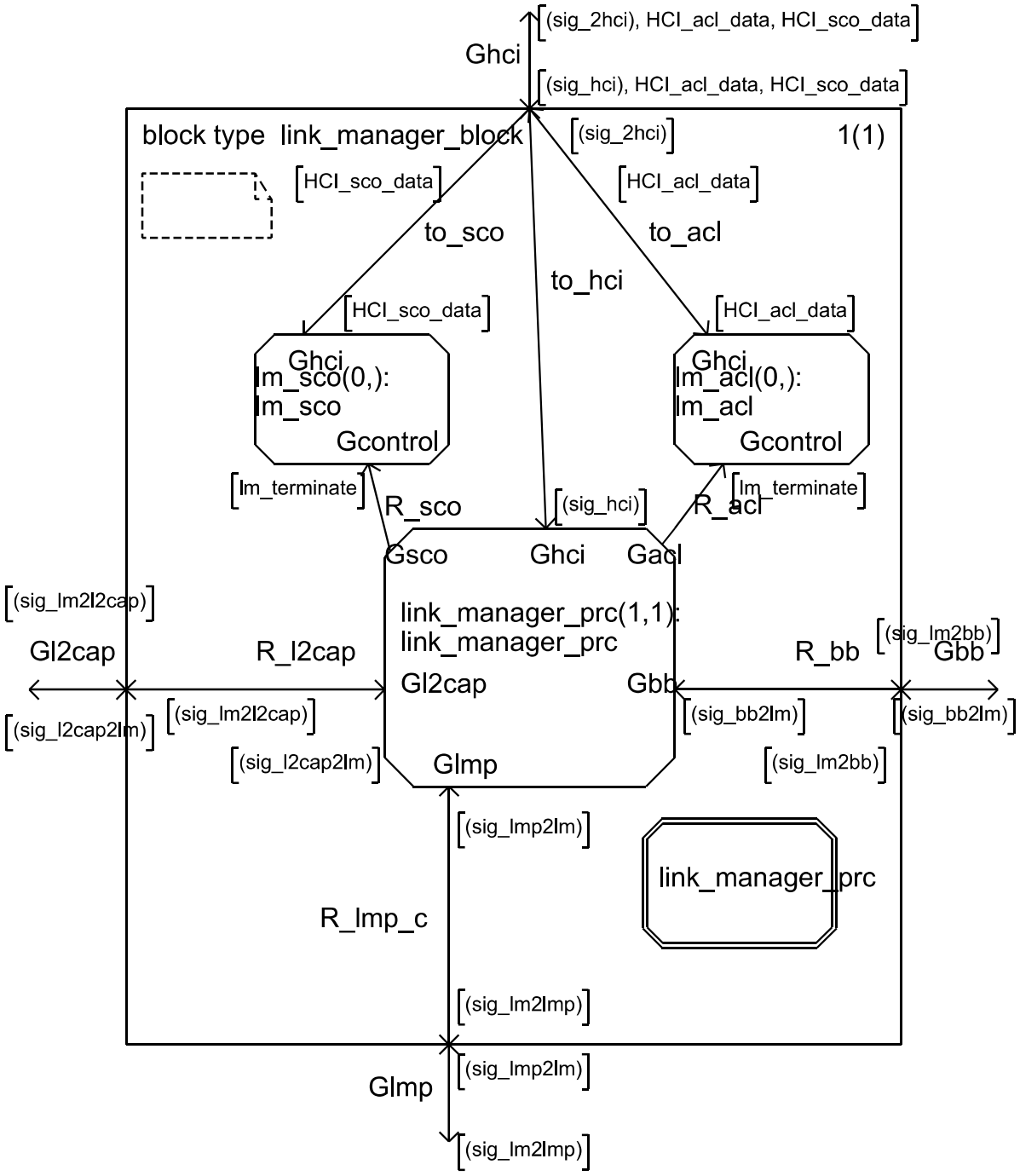
B.3 LM

B.3.1 link_manager_package-1



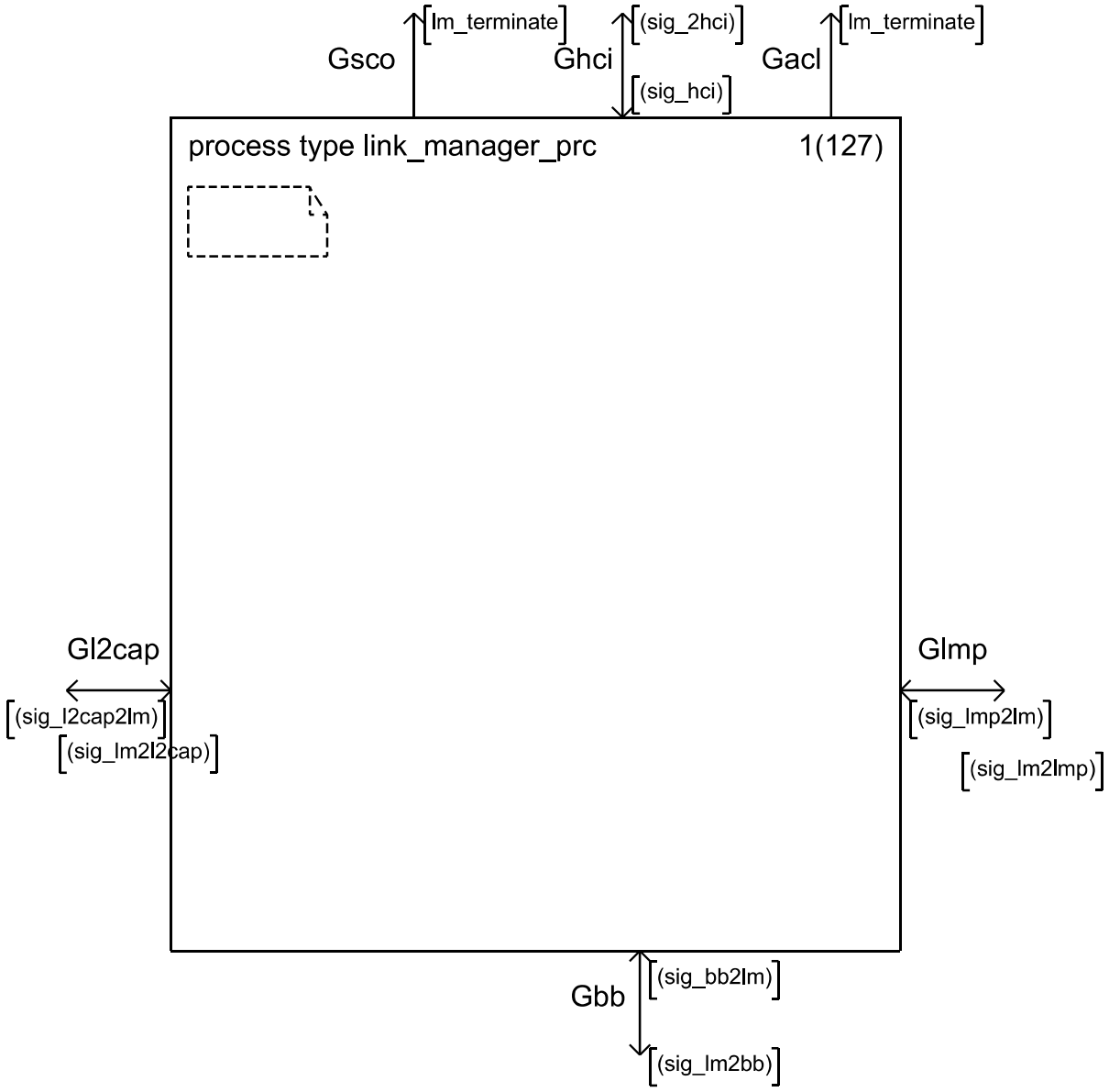
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B.3.2 link_manager_block-1



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B.3.3 link_manager_prc-1



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B.3.4 link_manager_prc-2

process type link_manager_prc 2(127)



```
DCL  acl_lngth, allw_rs, AM_ADDR, AR_ADDR, Authentication, bad, bb_stts, Class, clk_offst, cod, code,
       conn_count, count, country_code, crrnt_lpbck_md, DB, Delay_Variation, dlt_all_flg, dummy1,
       dummy2, flags, Failed_Contact_Counter, Flow_Control, Hold_Mode, key_flg, Link_Quality,
       Loopback_mode, L_BD_ADDR, L_HCI_Revision, L_HCI_Version, L_LMP_SubVersion,
       L_LMP_Version, L_Manufacturer_Name, R_LMP_SubVersion, R_LMP_Version,
       R_Manufacturer_Name, Latency, lm_SCO_count, MAX_conn, Max_nmbr_k, Max_Period_Length,
       max_slots, Min_Period_Length, NB, nbc, nmbr, nmbr_conn, Nmbr_Current, Nmbr_hndls,
       Nmbr_k_done, Nmbr_k_2write, Num_Broadcast_Re, Num_responses, Num_Support,
       Peak_Bandwidth, pg_scn_md, PM_ADDR, pn_cd, pn_cd_lngth, Policy_int, rd_all_flg, rq_max_slots,
       rsn, scan_enable, SCO_Flow_Control, sco_lngth, total_acl_pckts, total_sco_pckts, tx_pwr_lvl,
       Voice, w
   Integer;

DCL Beacon_Max_Interval, Beacon_Min_Interval, Clock_Offset, Conn_Accept_Timeout, Dsniff,
      dummy4, FlushTO, hold_time, Hold_Mode_Max_Interval, Hold_Mode_Min_Interval, Inquiry_Length,
      Intrvl, isival, iswval, link_supervision_timeout, period, poll_interval, prval, psival,  pswval, rand,
      rConn_Accept_Timeout, Sniff_Attempt, Sniff_Max_Interval, Sniff_Min_Interval, Sniff_Timeout,
      Tb, test3, token_rate_out, Tsniff
  duration;

DCL DH1_rate, DH3_rate, DH5_rate, DM1_rate, DM3_rate, DM5_rate, dummy, token_rate,
       dummy3, test4
   real;

DCL bb_id, Cnnctn_Hndl, hndlt, lmp_codec_id, lmp_id, lmp_pid, l2cap_id, QoSCnnctn_hndl
    PID;

DCL able_to_store_all, acl_buffer, auth_pending, auto_accept, dec_received, event_type, initiator,
       HCI_init,temp_conn, out_name_req, snd_stat, l2cap_init, QOS, sco_buffer
   boolean;

DCL Current_Role, New_Role, rdt, Role
    Role_Type;

DCL BD_ADDR, idx_addr, rBD_ADDR, t_addr
    Address_type;

DCL lm_db     HCI_tab;

DCL pt         Packet_type;

DCL paging_Scheme, pm, rq_paging_Scheme
    Paging_mode;

DCL dt, Toggle
    Decision_type;
```


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B.3.5 link_manager_prc-3

process type link_manager_prc 3(127)



```
DCL lmpsttst    lmp_status_type;

DCL lnkt, lnk_t
    link_type;

DCL encrym, Encryption
    encryption_mode;

DCL L_encrypt_enable, encrypt_enable
    encryption_enable_type;

DCL link_key       key_content;

DCL con_hand    Handle_type;

DCL crrntmdt       mode_type;

DCL opcode       Command_Opcode;

DCL LAP          IAC_t;

DCL paging_scheme_settings, rq_paging_scheme_settings, sr
   sr_values;

DCL pg_scn_prd_md, sp    sp_values;

DCL service_level        service_type;

DCL local_name, name_val, null_name, remote_name
   charstring;

DCL  pckt_tp_list Packet_Array;

DCL L_features, R_features, unknown_features
    LMP_features;

DCL outflow flow_type;

DCL evnt_msk Event_Mask;

DCL pn_tp PIN_Type;

DCL link_key_pair Link_Key_Pair_Array;

DCL CH_pckt_pr CH_pckt_pair_array;

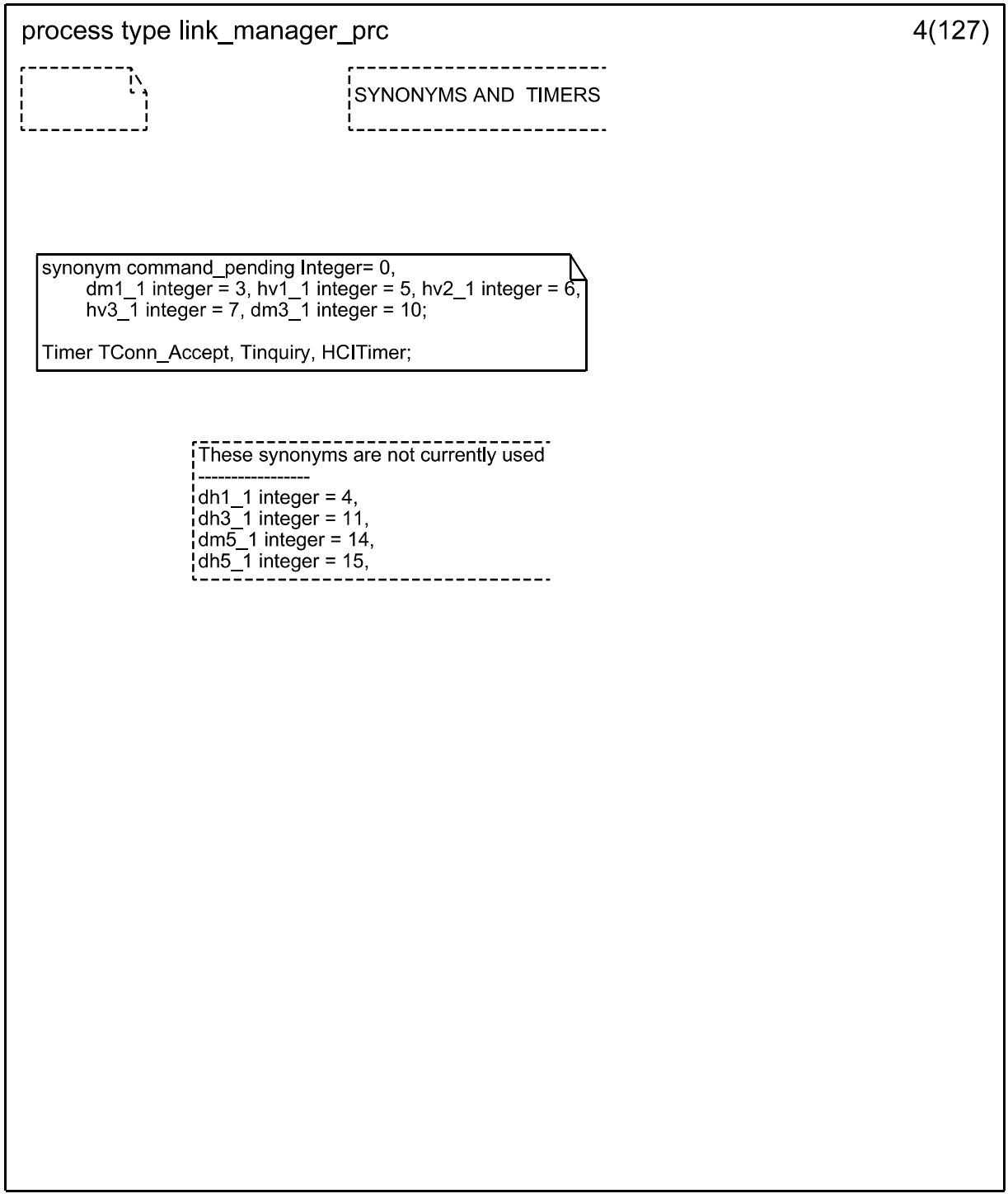
DCL IAC_LAP IAC_LAP_Array;

DCL rssival RSSI_type;
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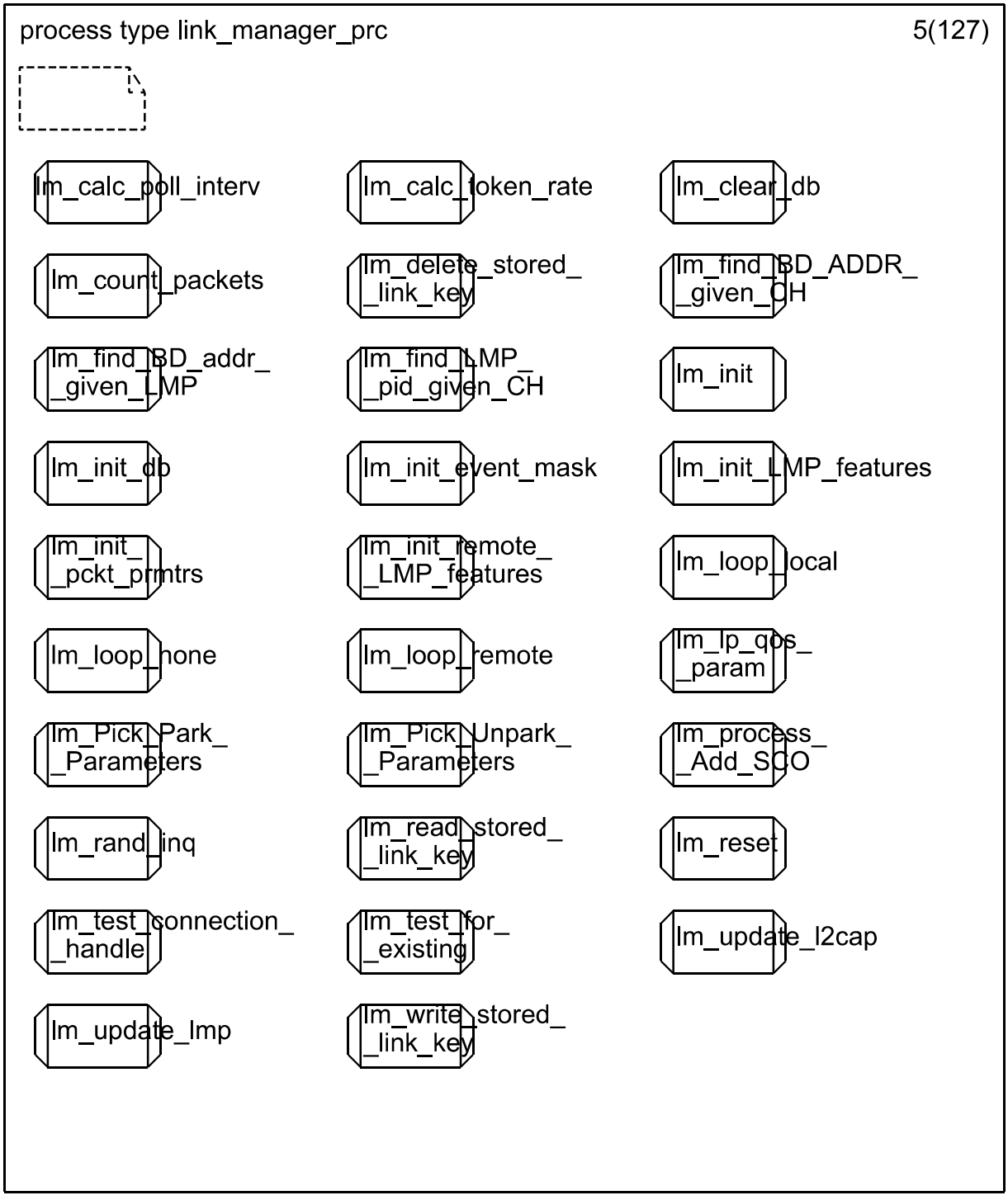
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B.3.6 link_manager_prc-4



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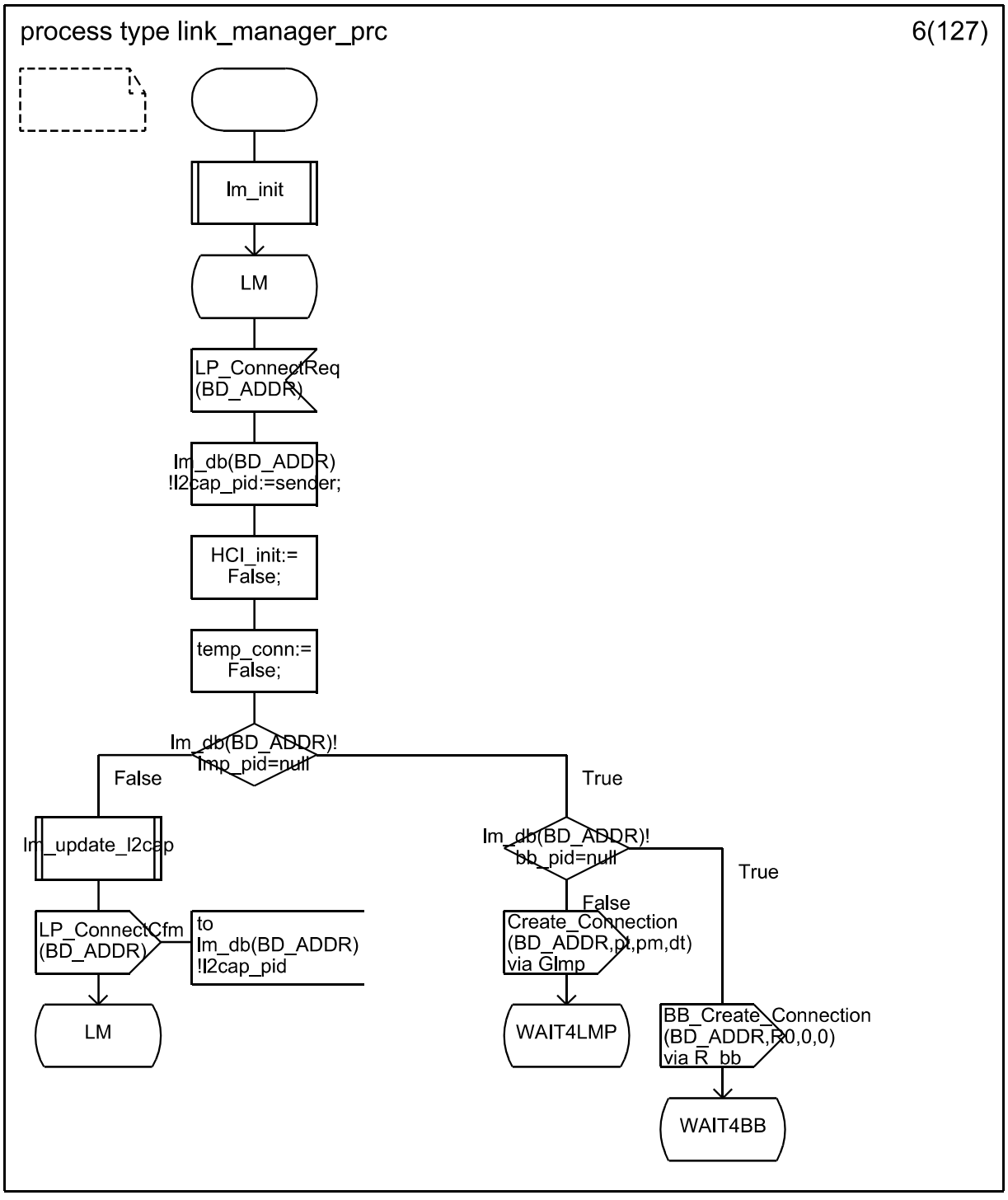
B.3.7 link_manager_prc-5



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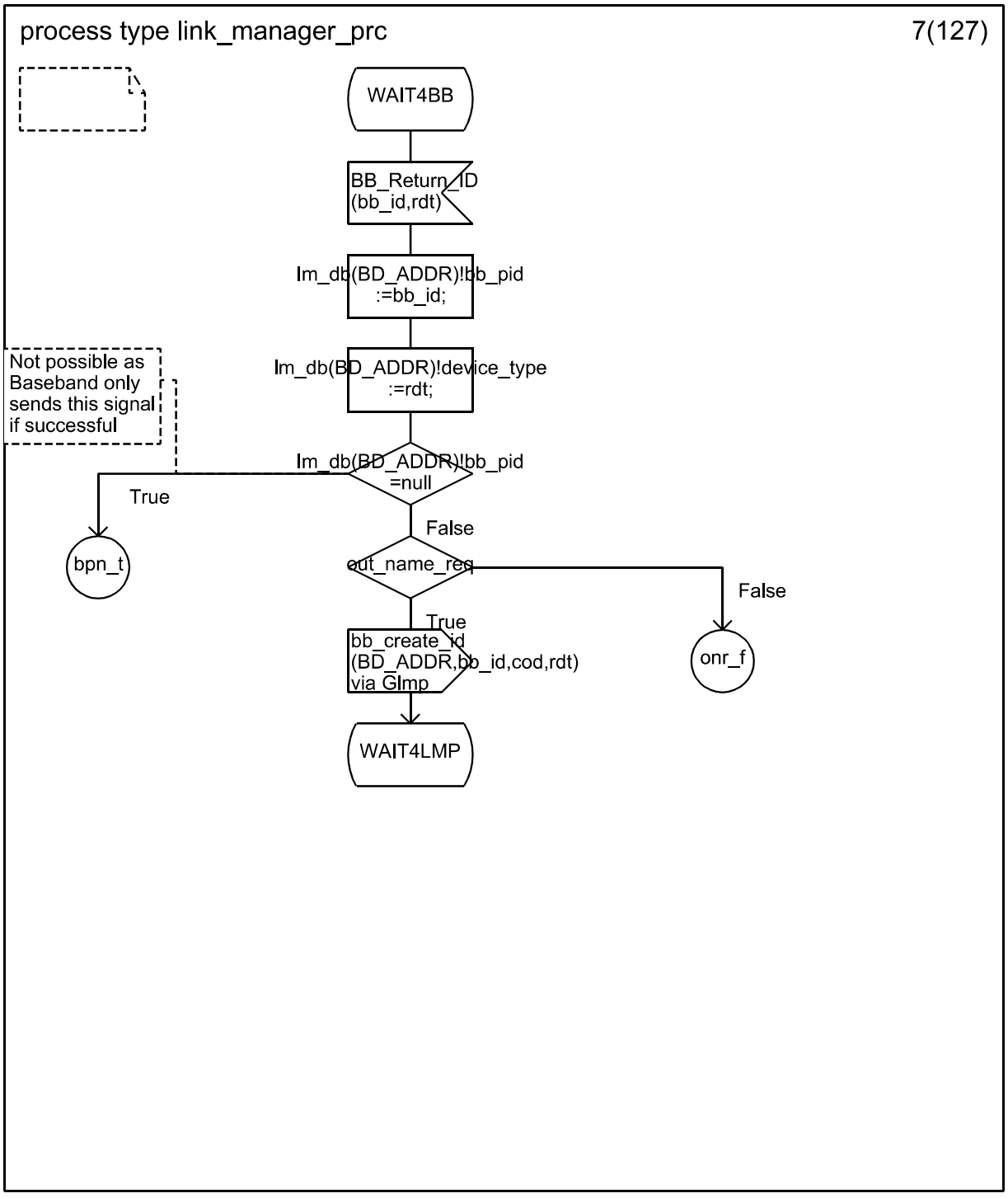
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B.3.8 link_manager_prc-6



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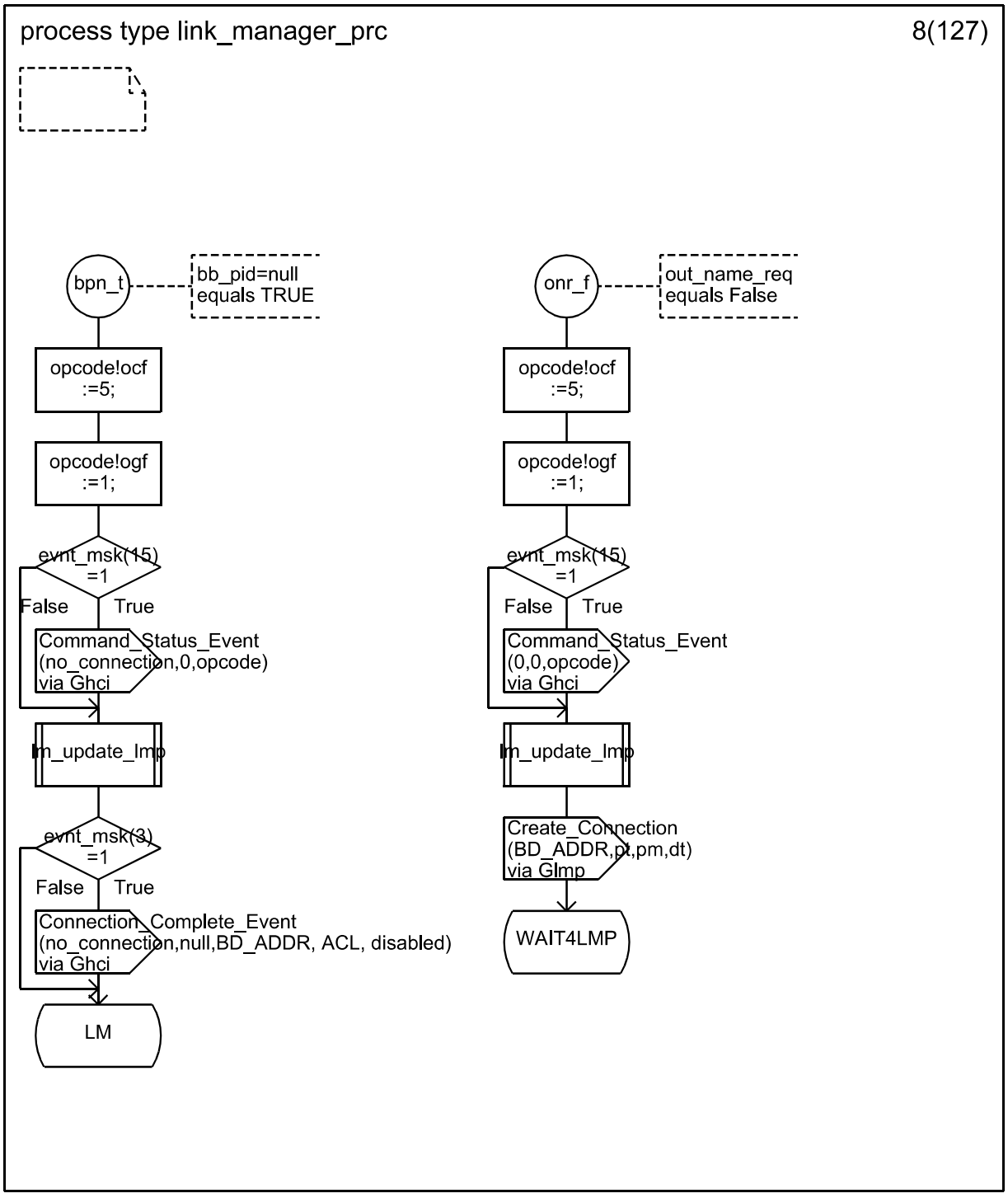
B.3.9 link_manager_prc-7



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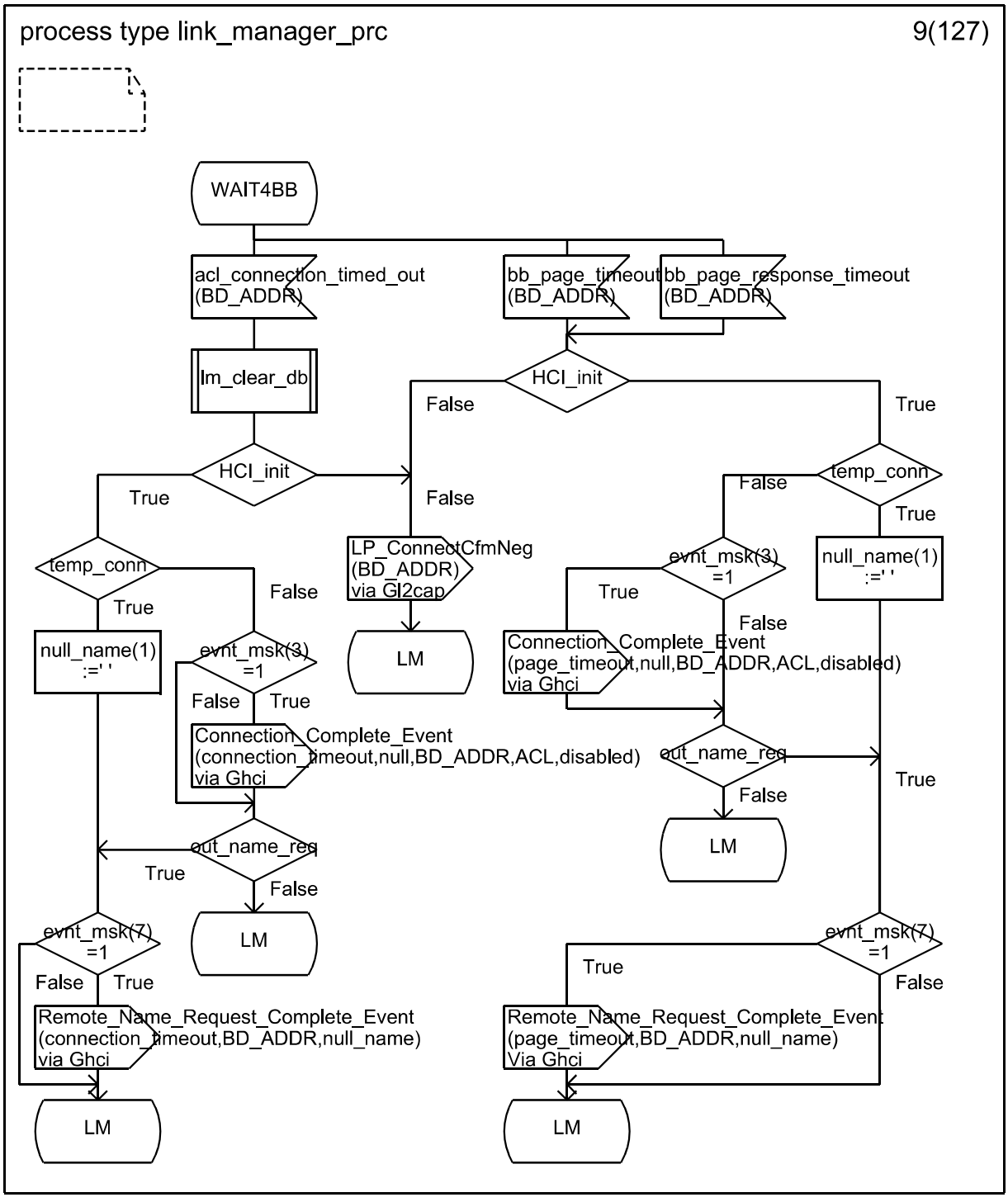
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B.3.10 link_manager_prc-8



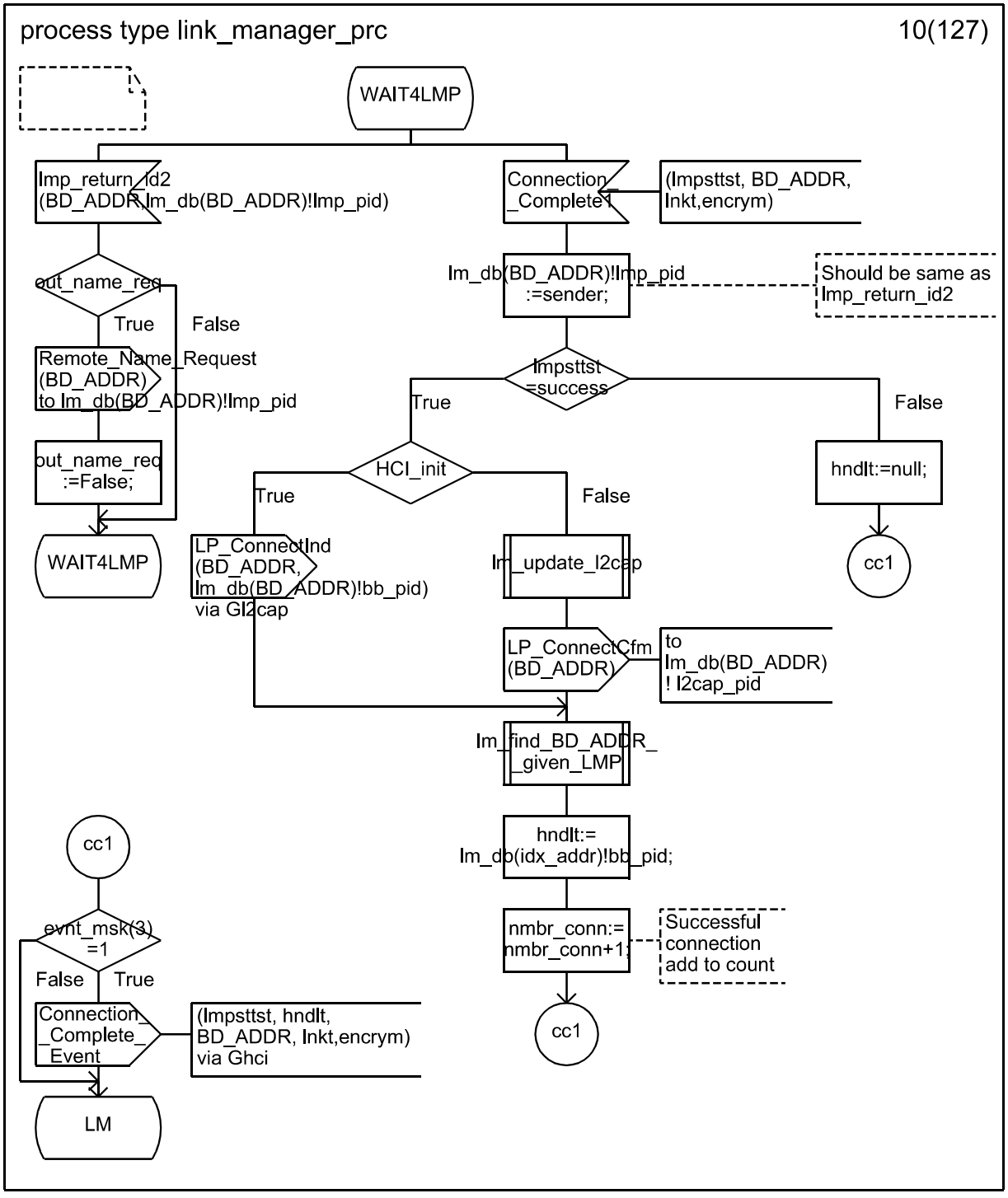
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B.3.11 link_manager_prc-9



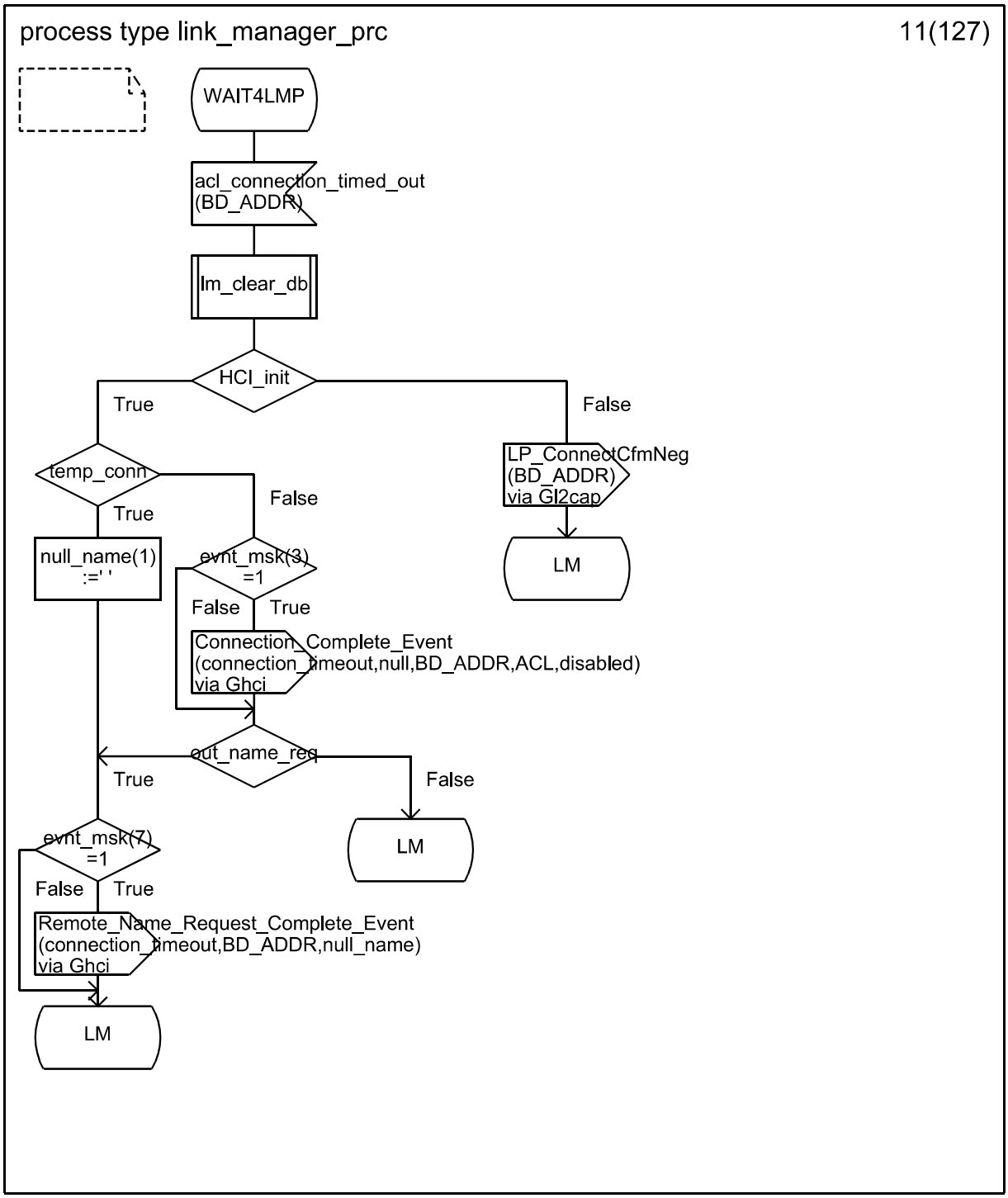
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B.3.12 link_manager_prc-10



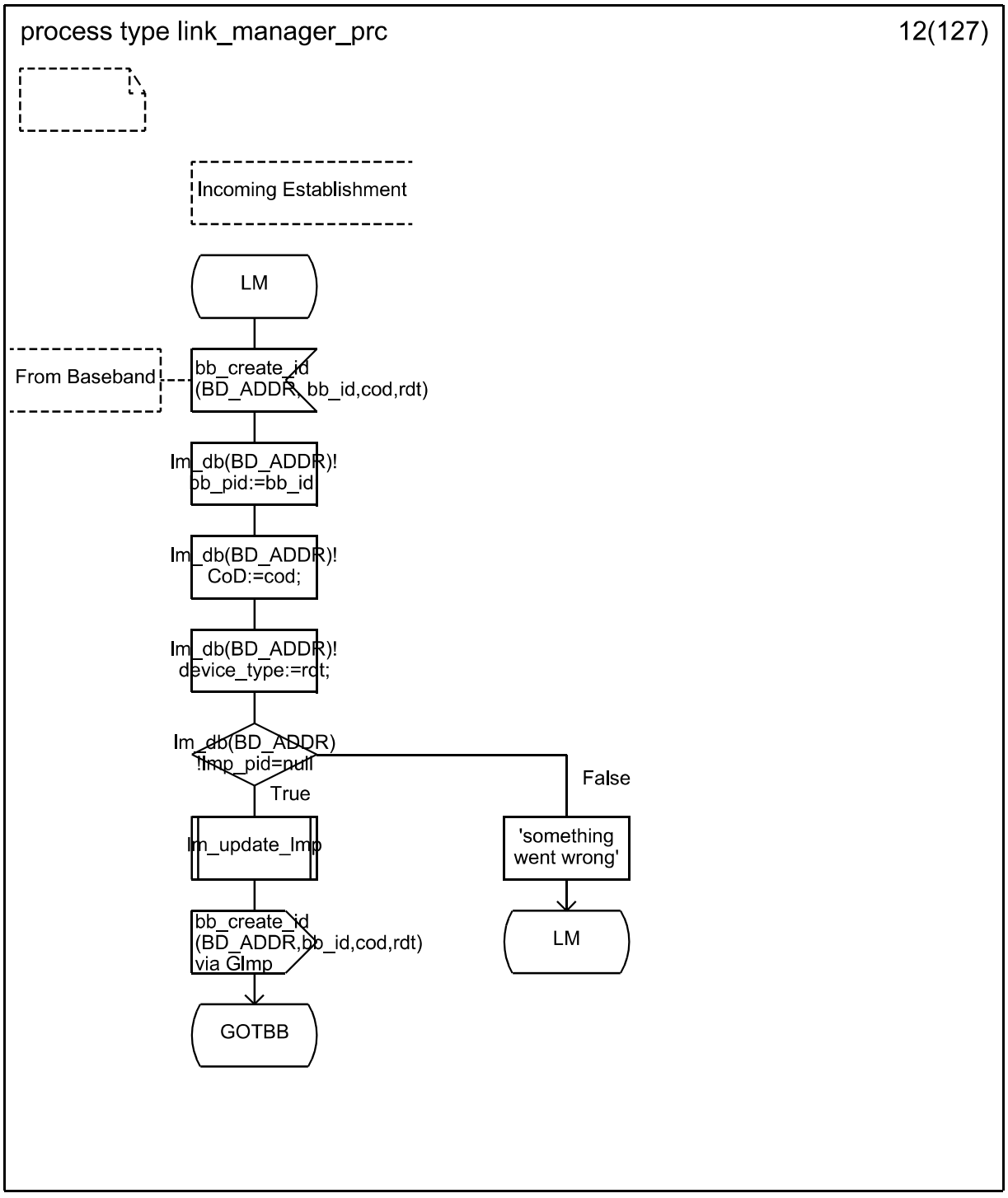
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B.3.13 link_manager_prc-11



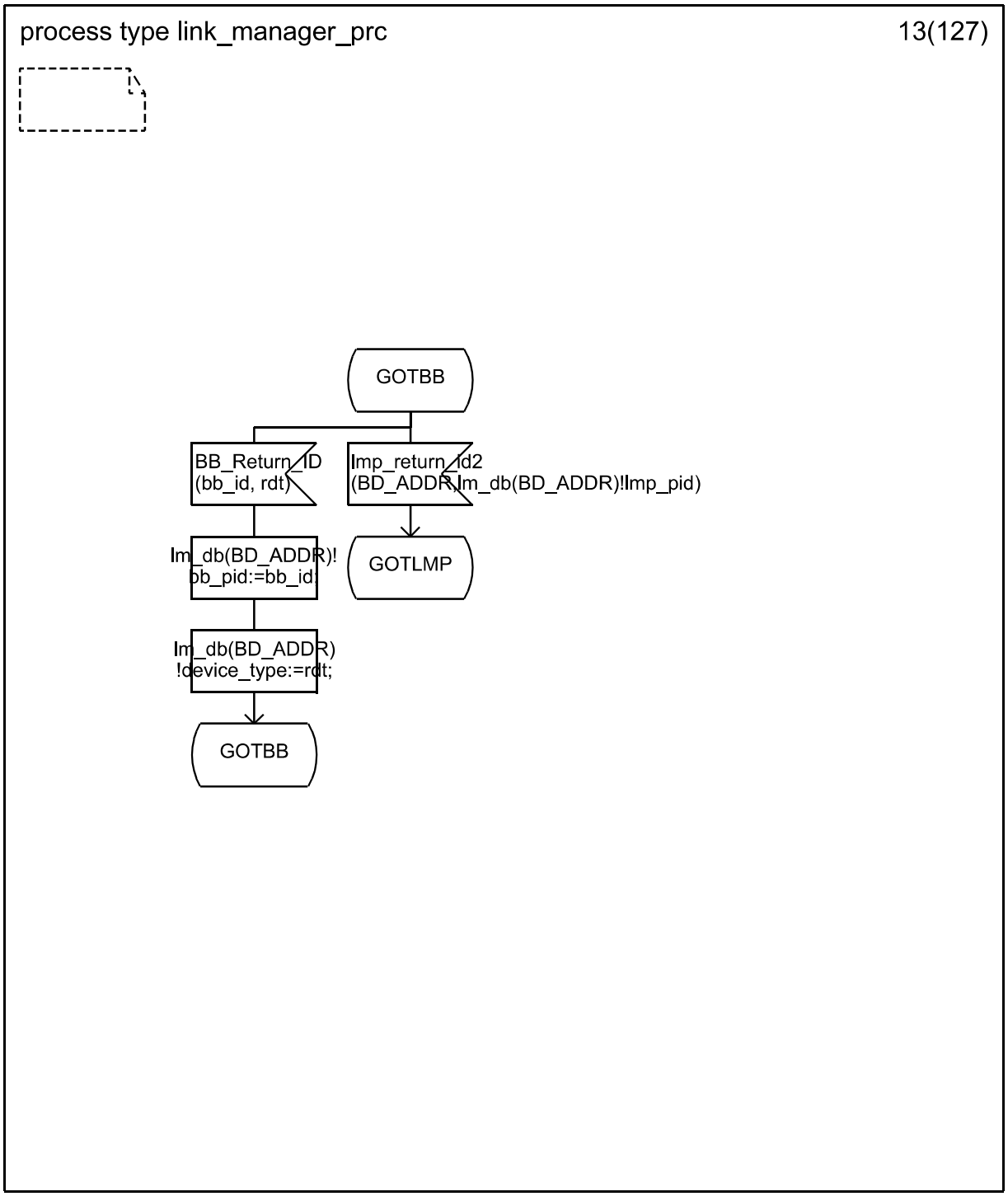
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B.3.14 link_manager_prc-12



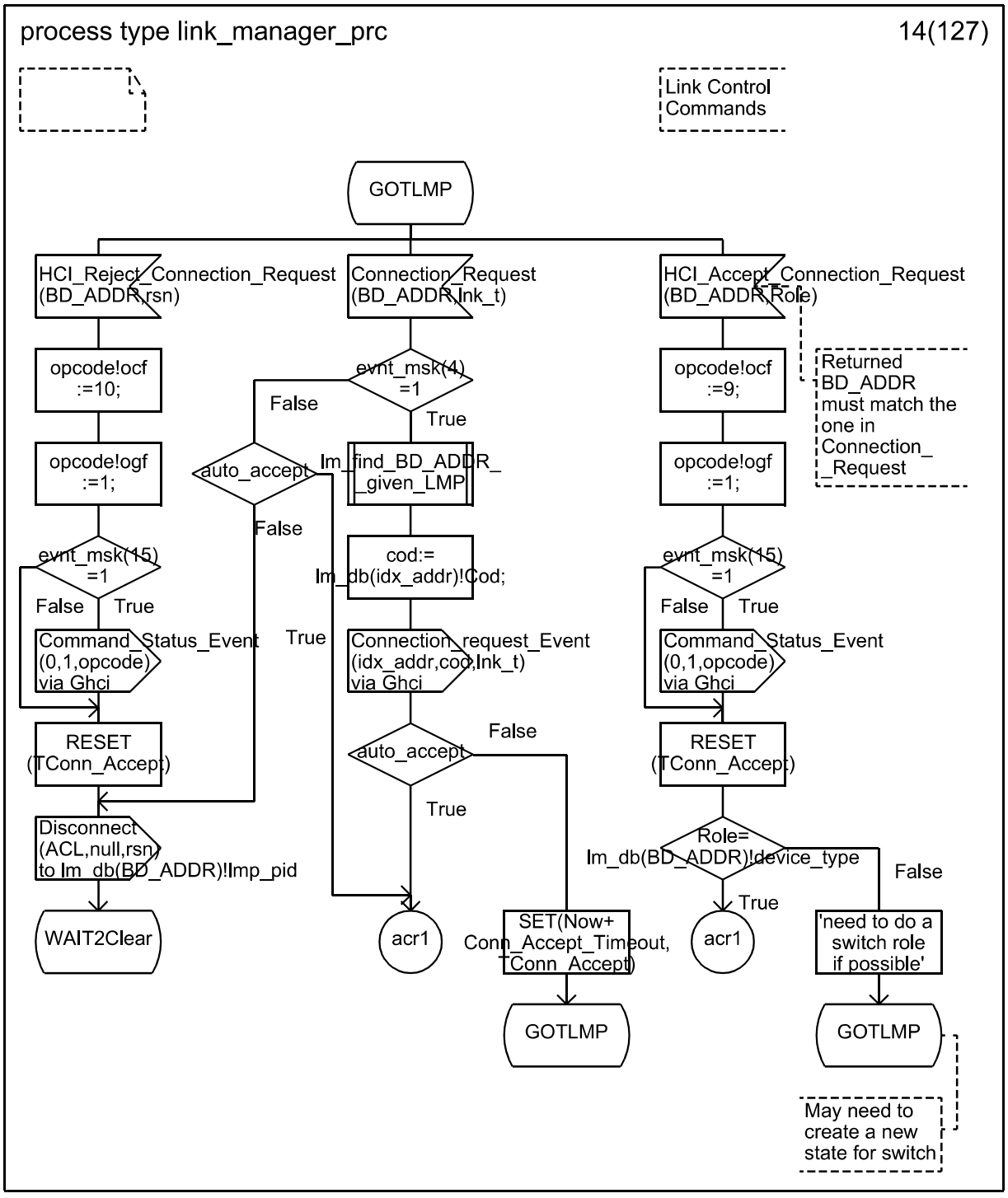
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B.3.15 link_manager_prc-13



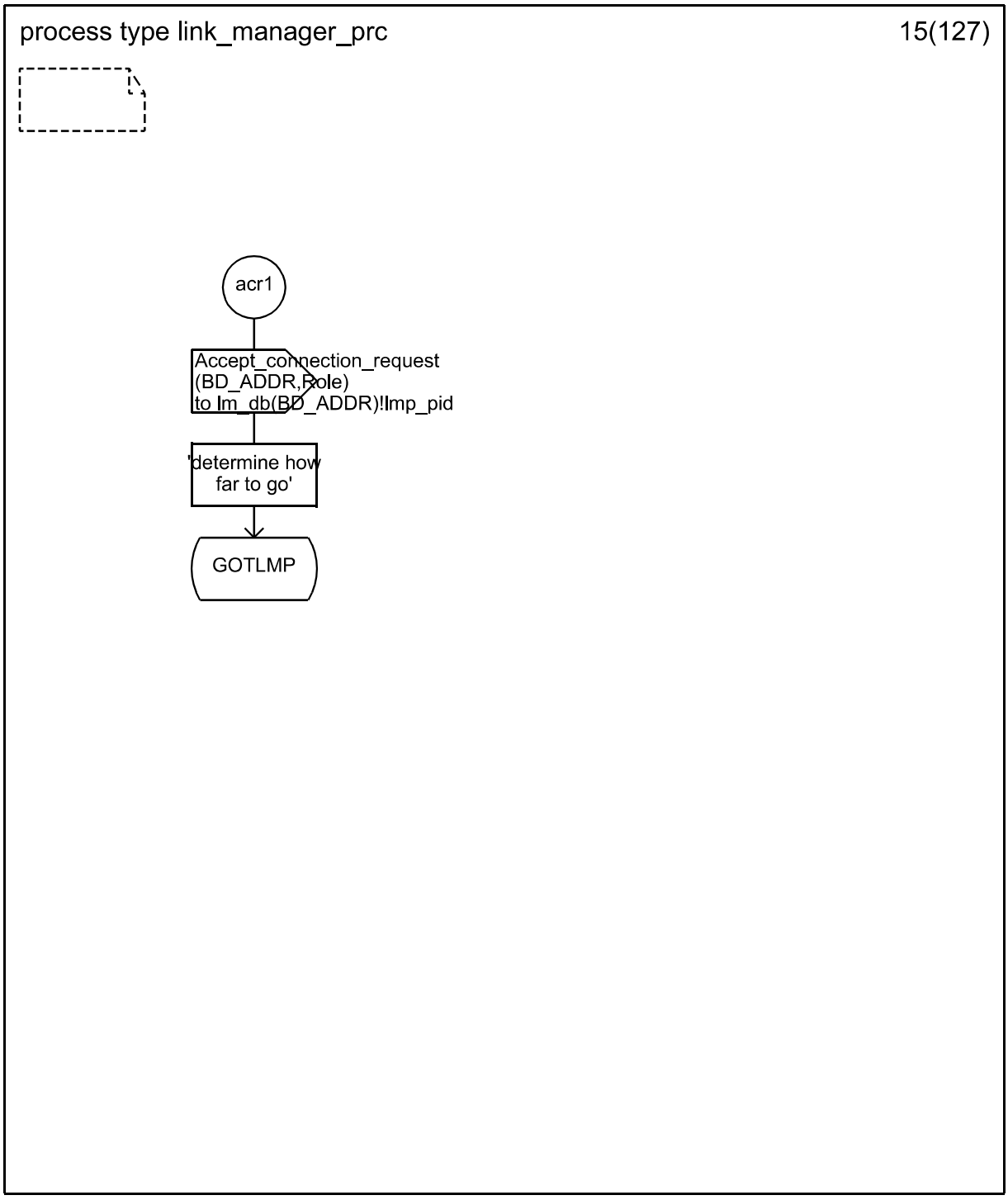
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B.3.16 link_manager_prc-14



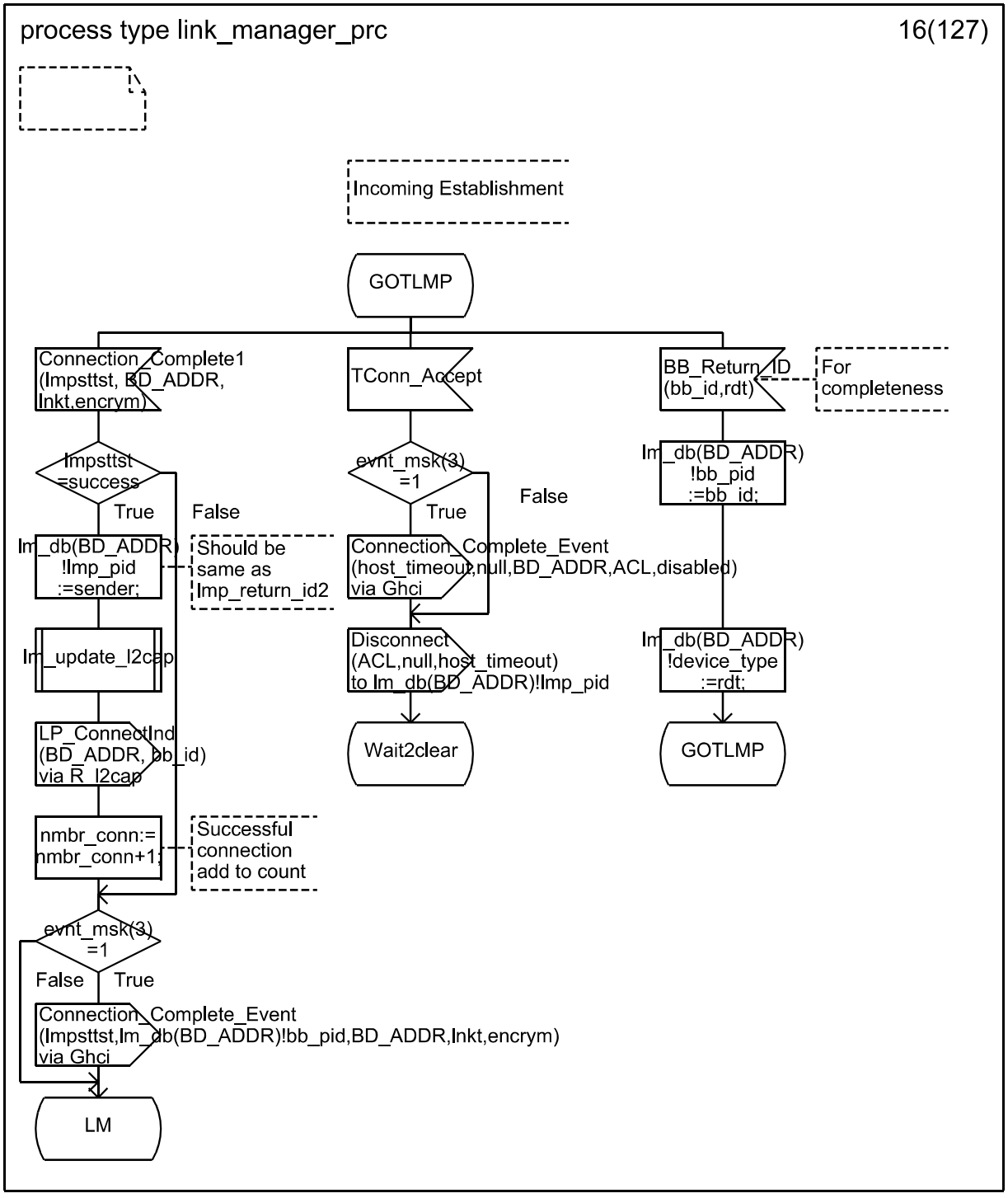
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B.3.17 link_manager_prc-15



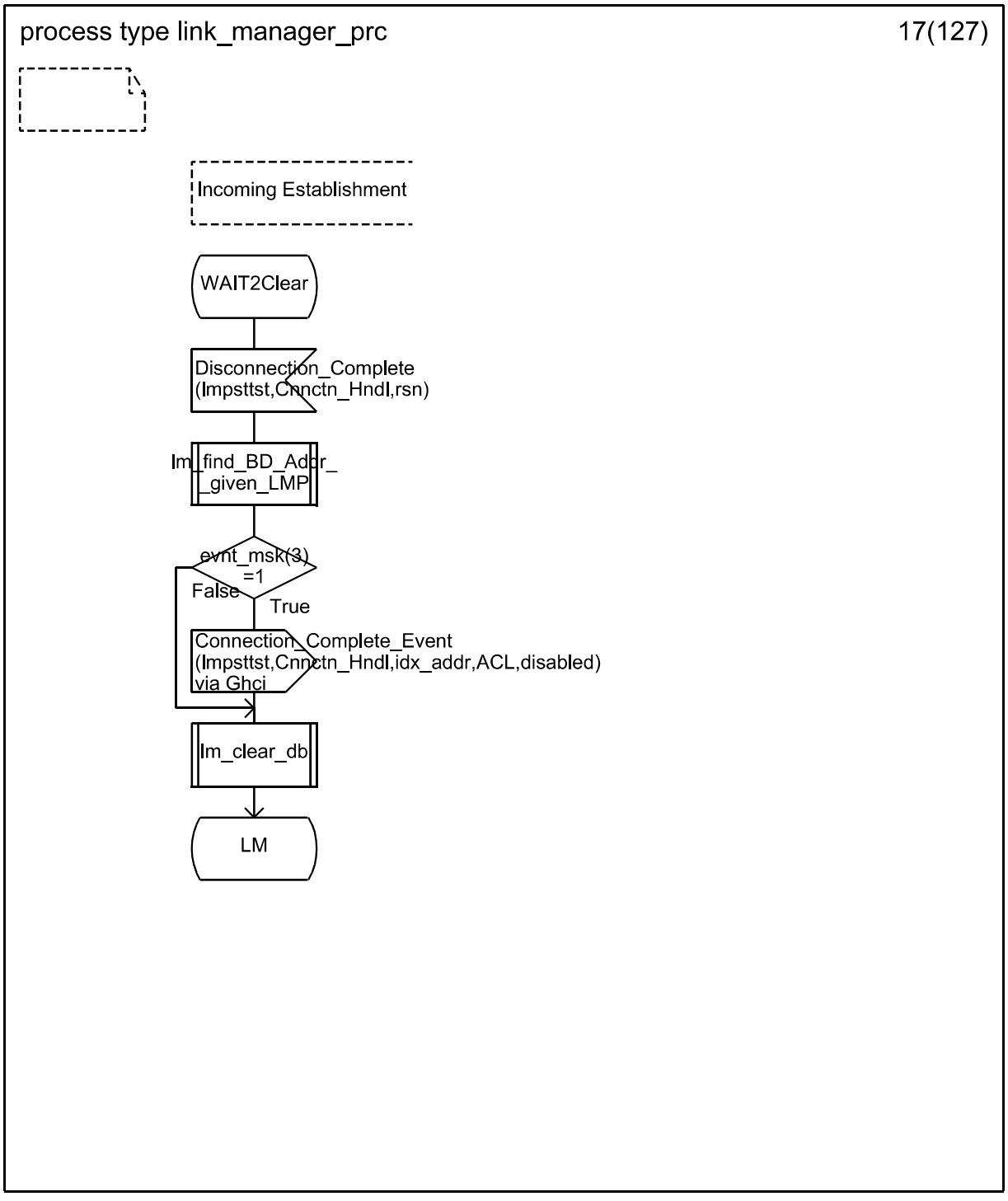
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B.3.18 link_manager_prc-16



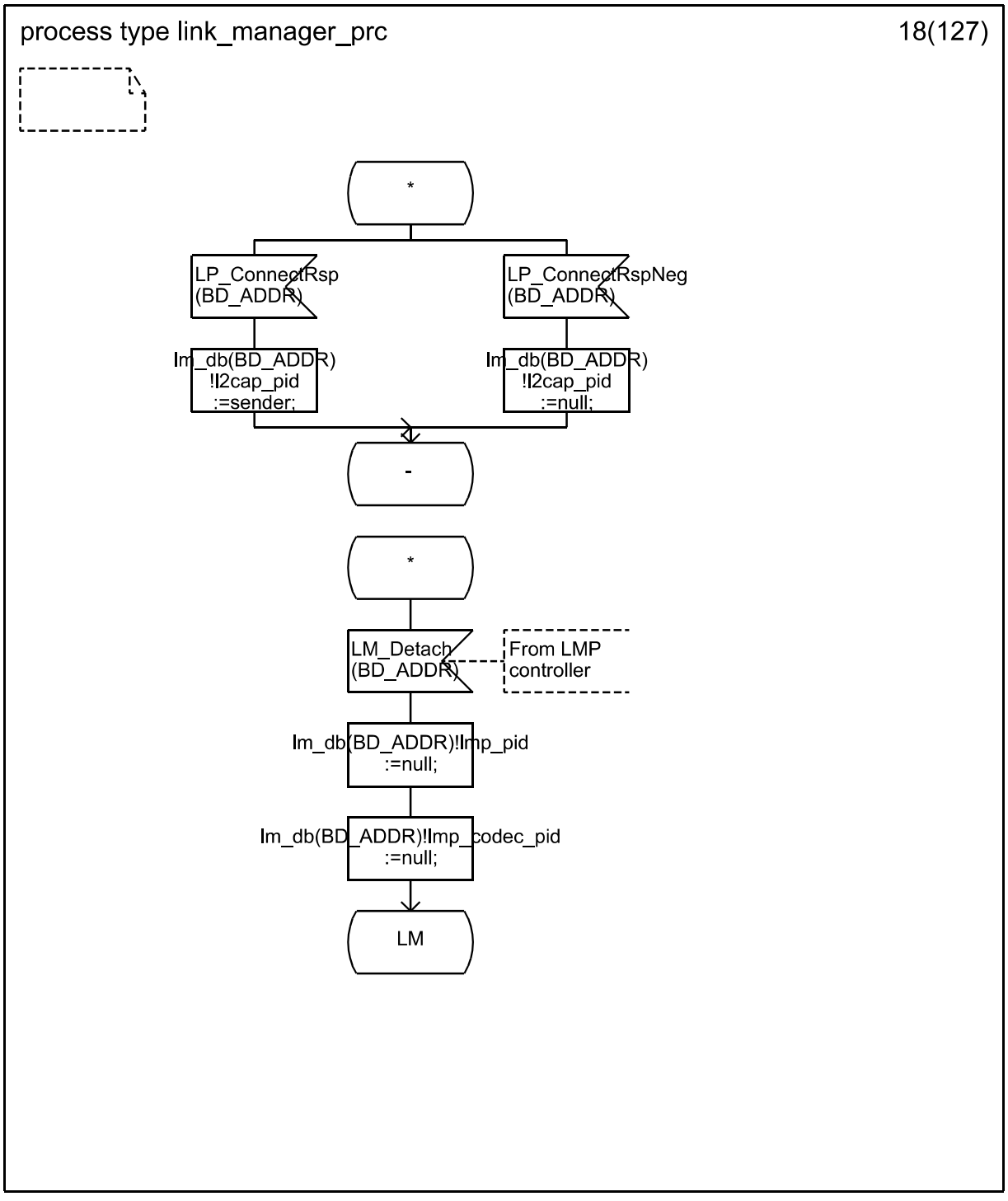
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B.3.19 link_manager_prc-17



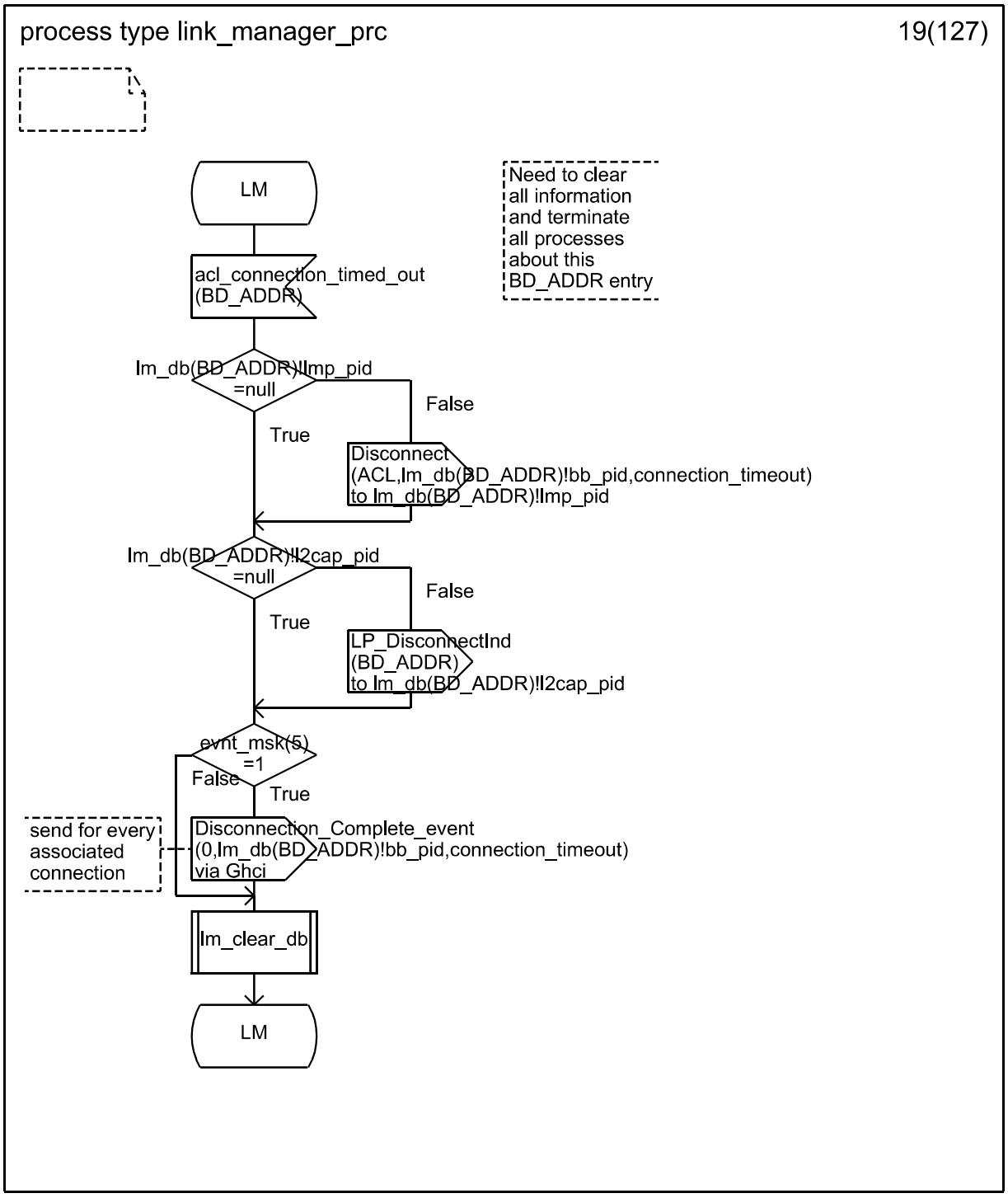
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B.3.20 link_manager_prc-18



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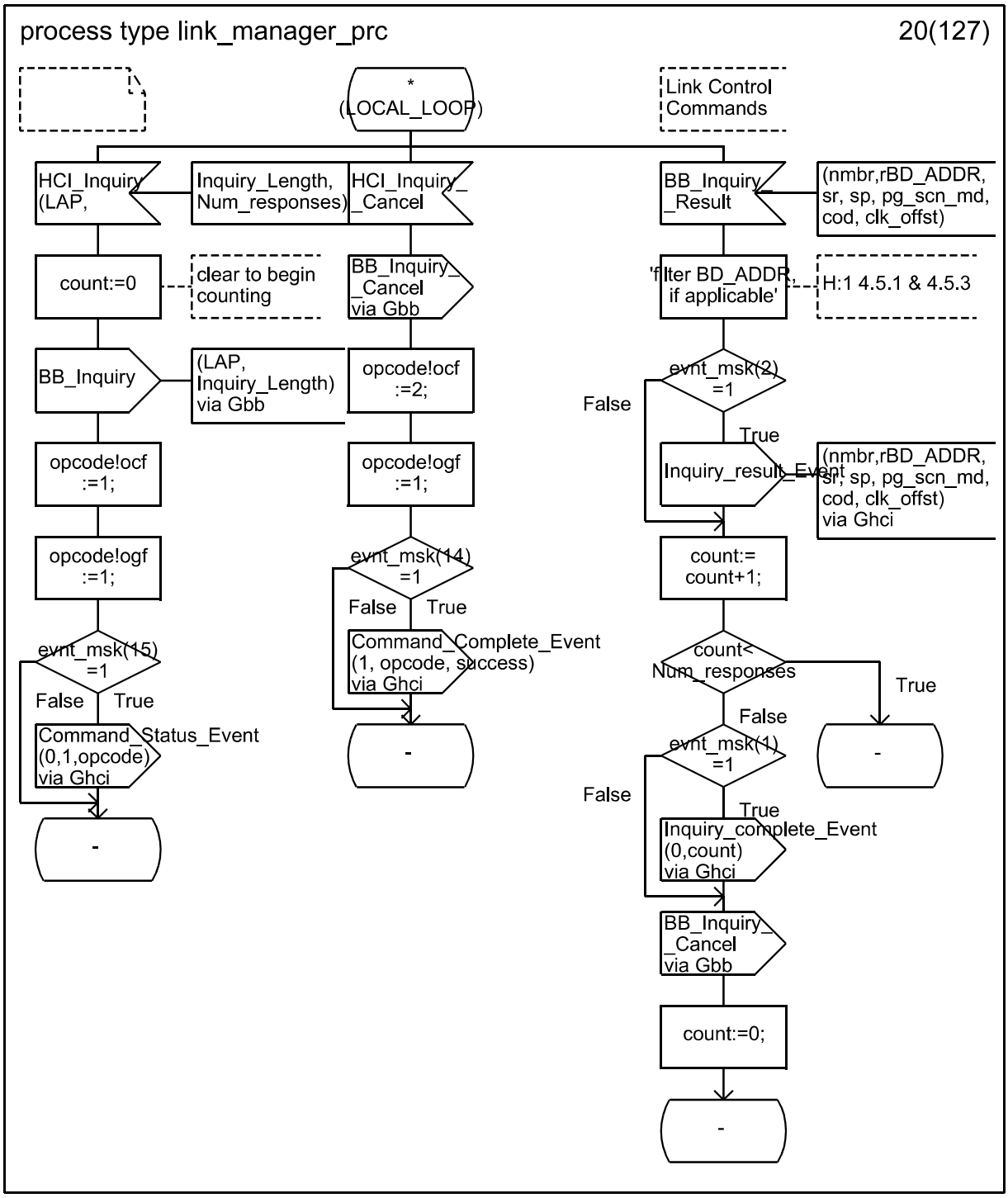
B.3.21 link_manager_prc-19



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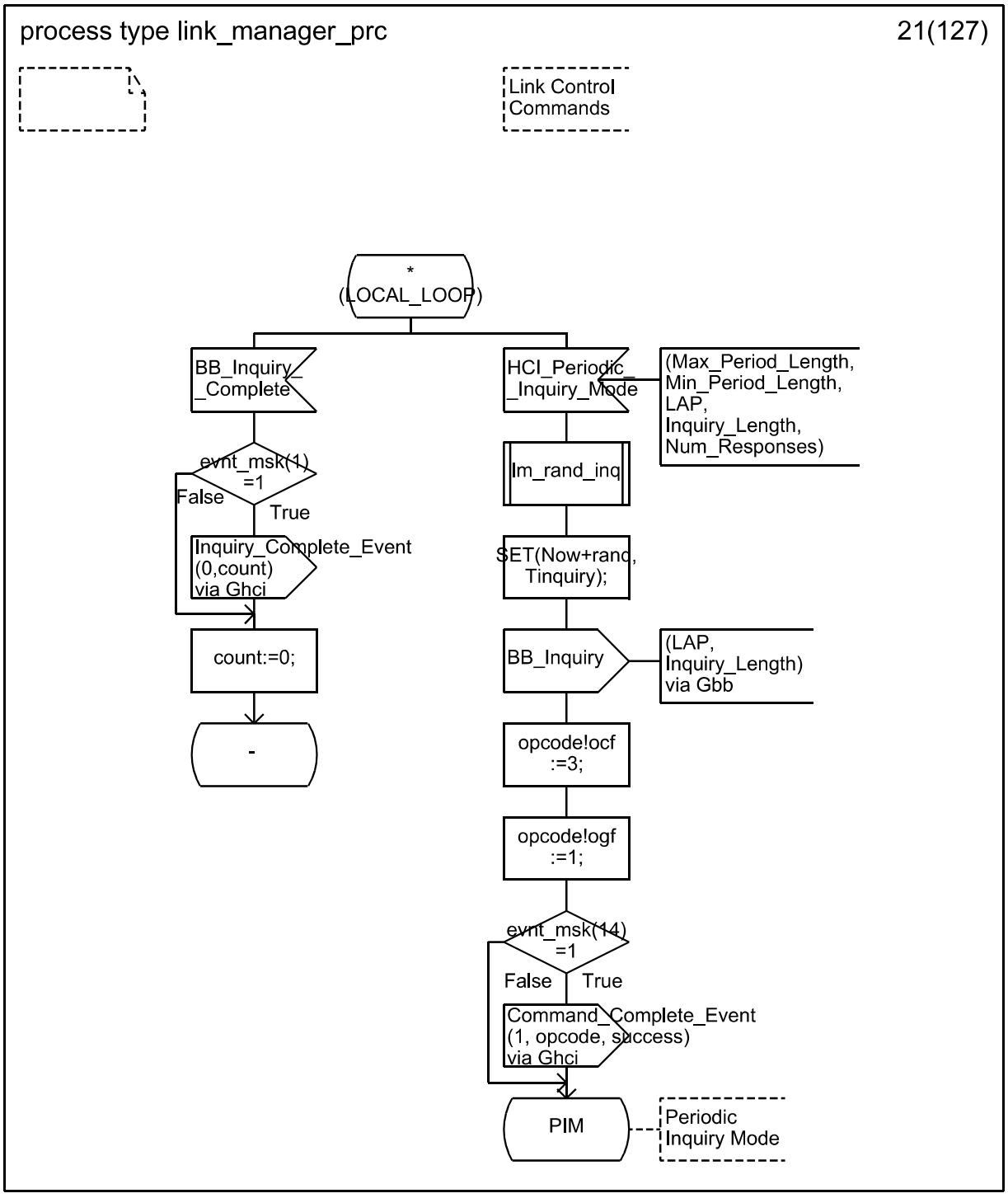
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B.3.22 link_manager_prc-20



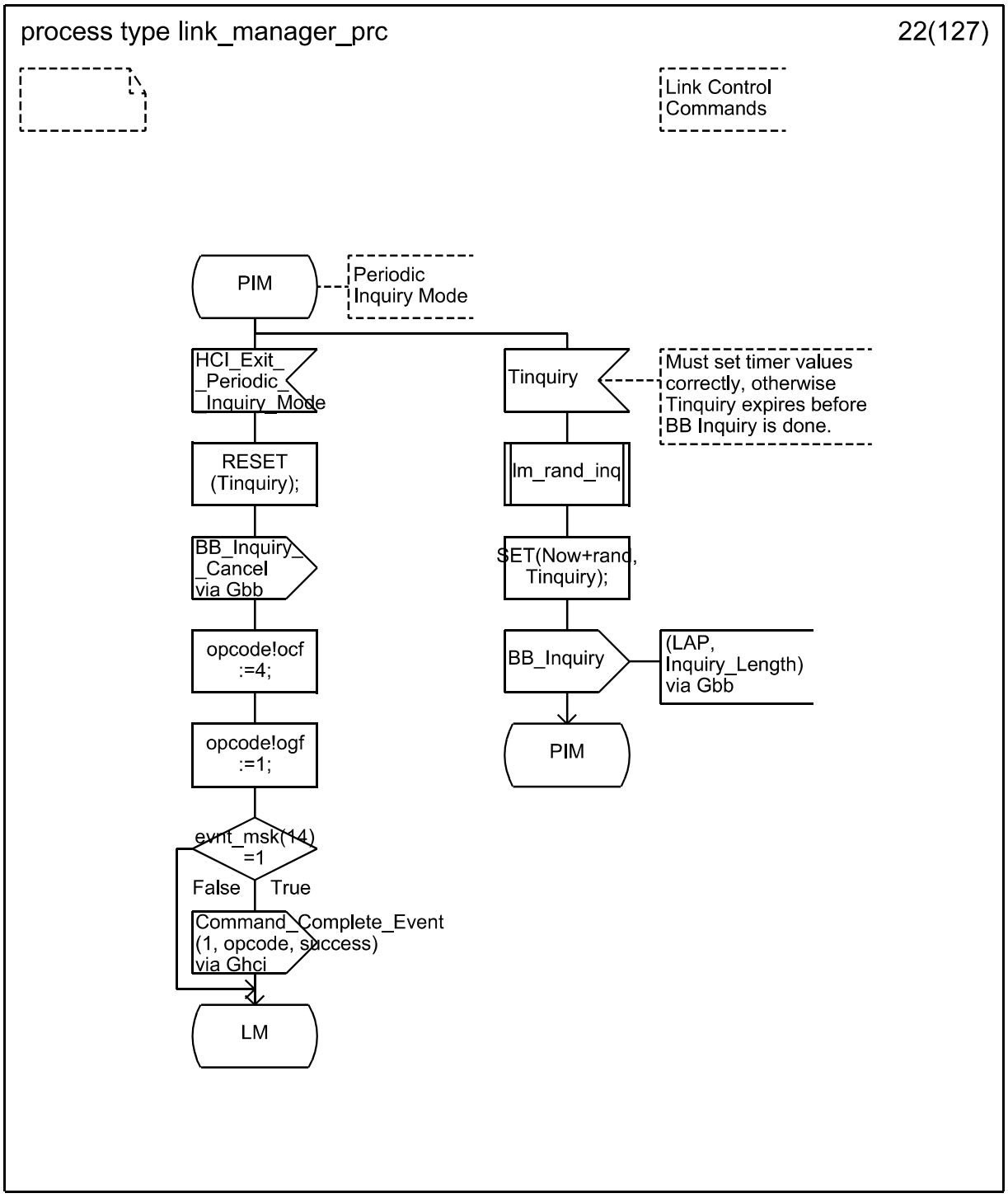
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B.3.23 link_manager_prc-21



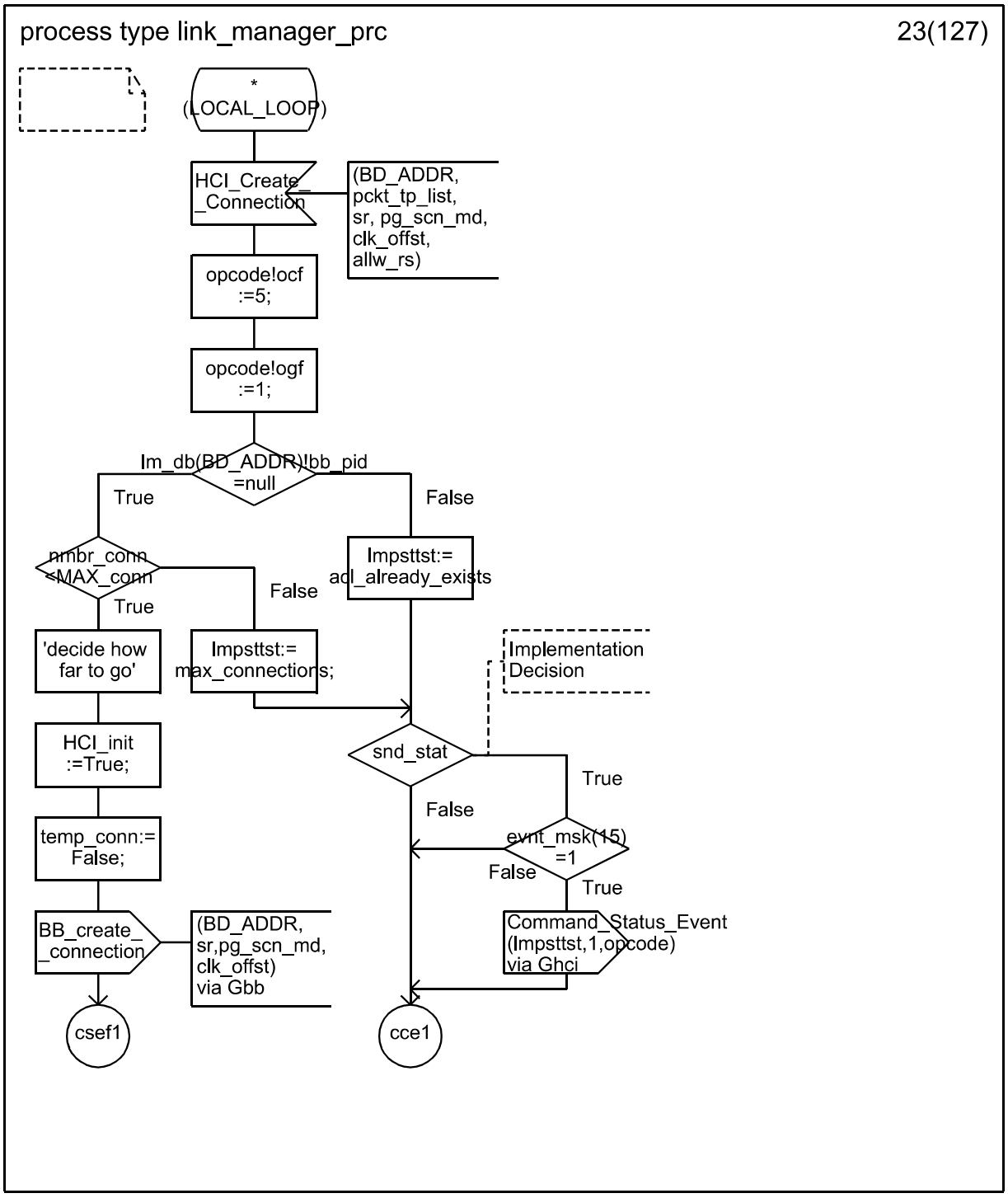
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B.3.24 link_manager_prc-22



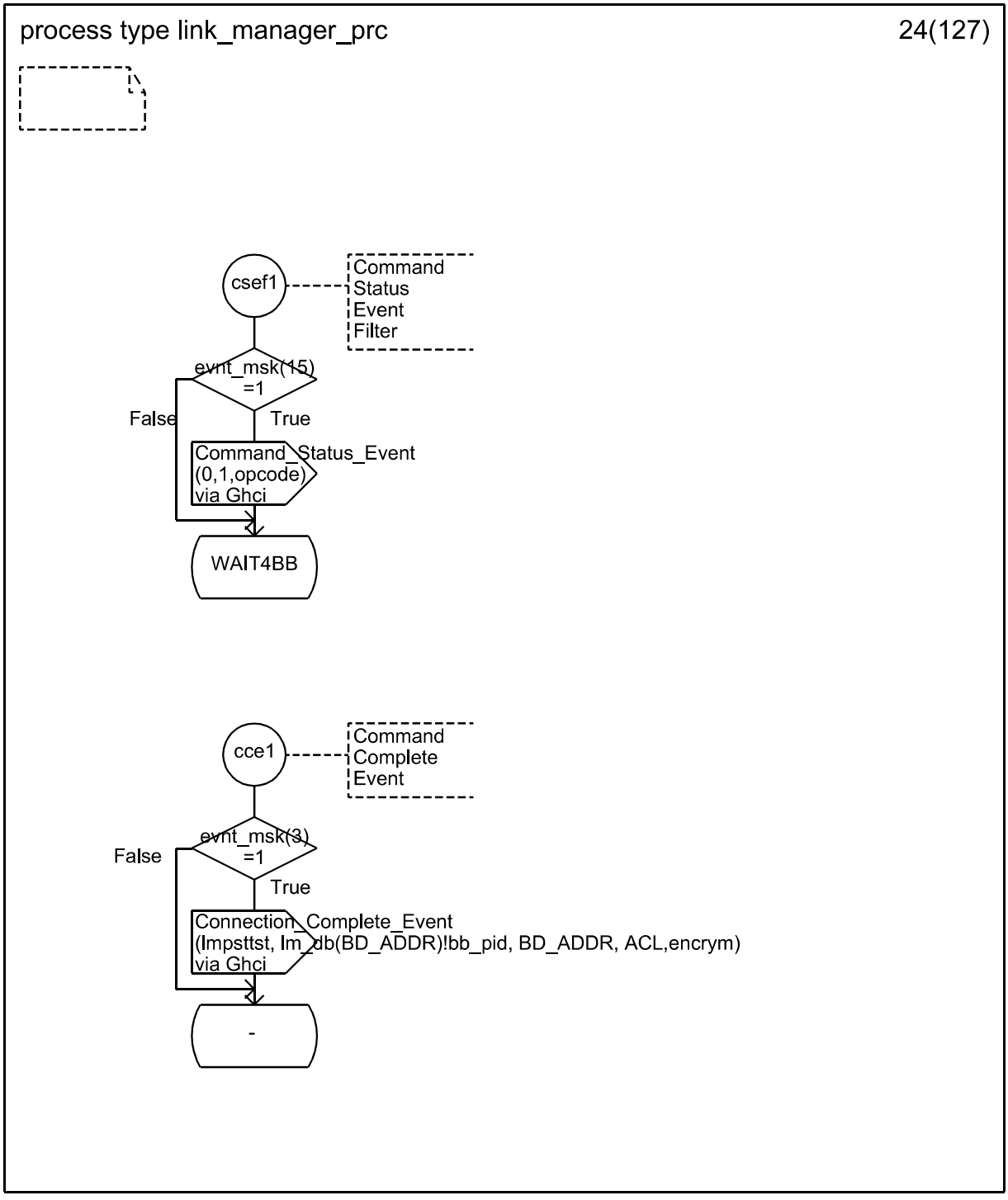
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B.3.25 link_manager_prc-23



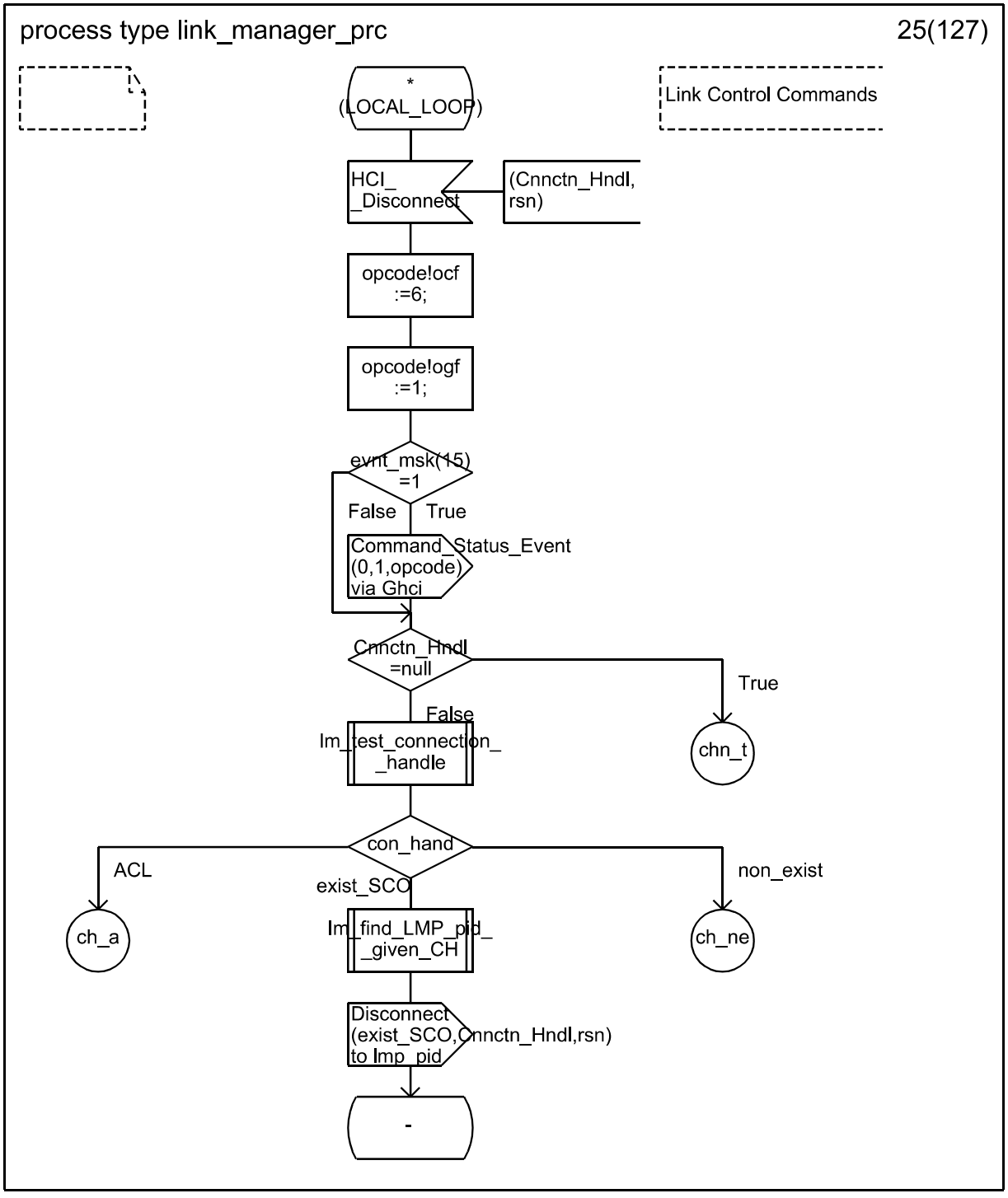
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B.3.26 link_manager_prc-24



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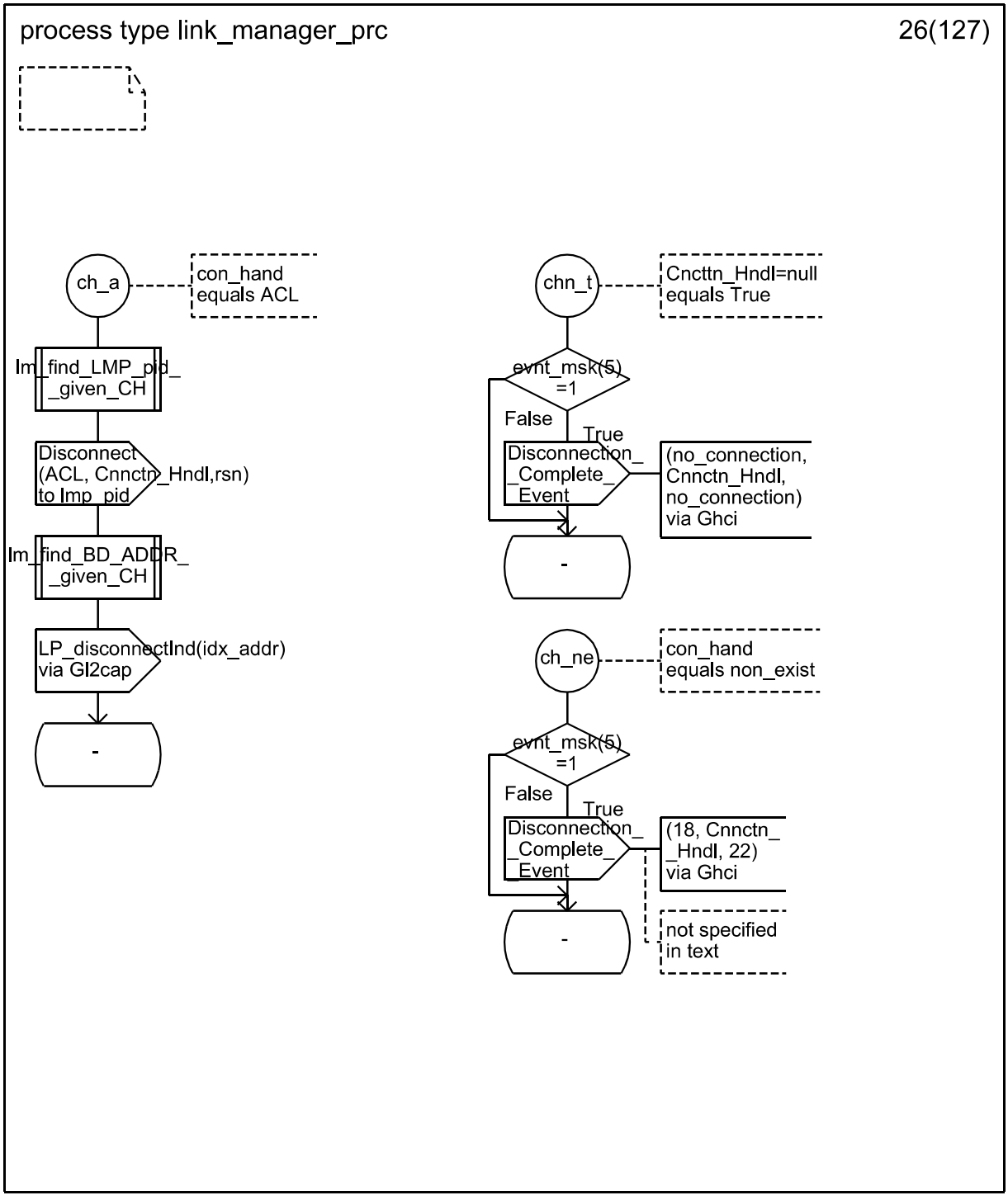
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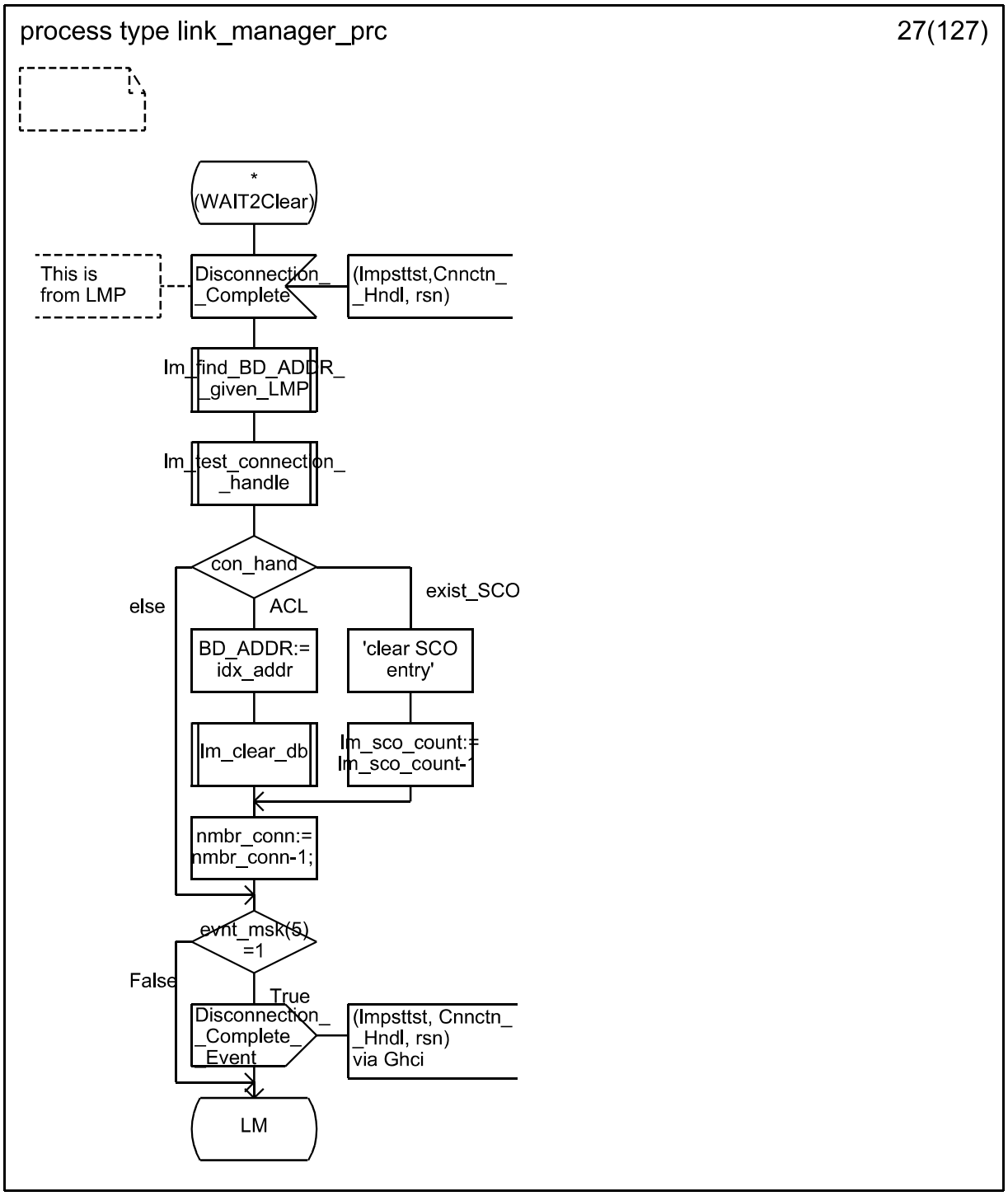
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B.3.28 link_manager_prc-26



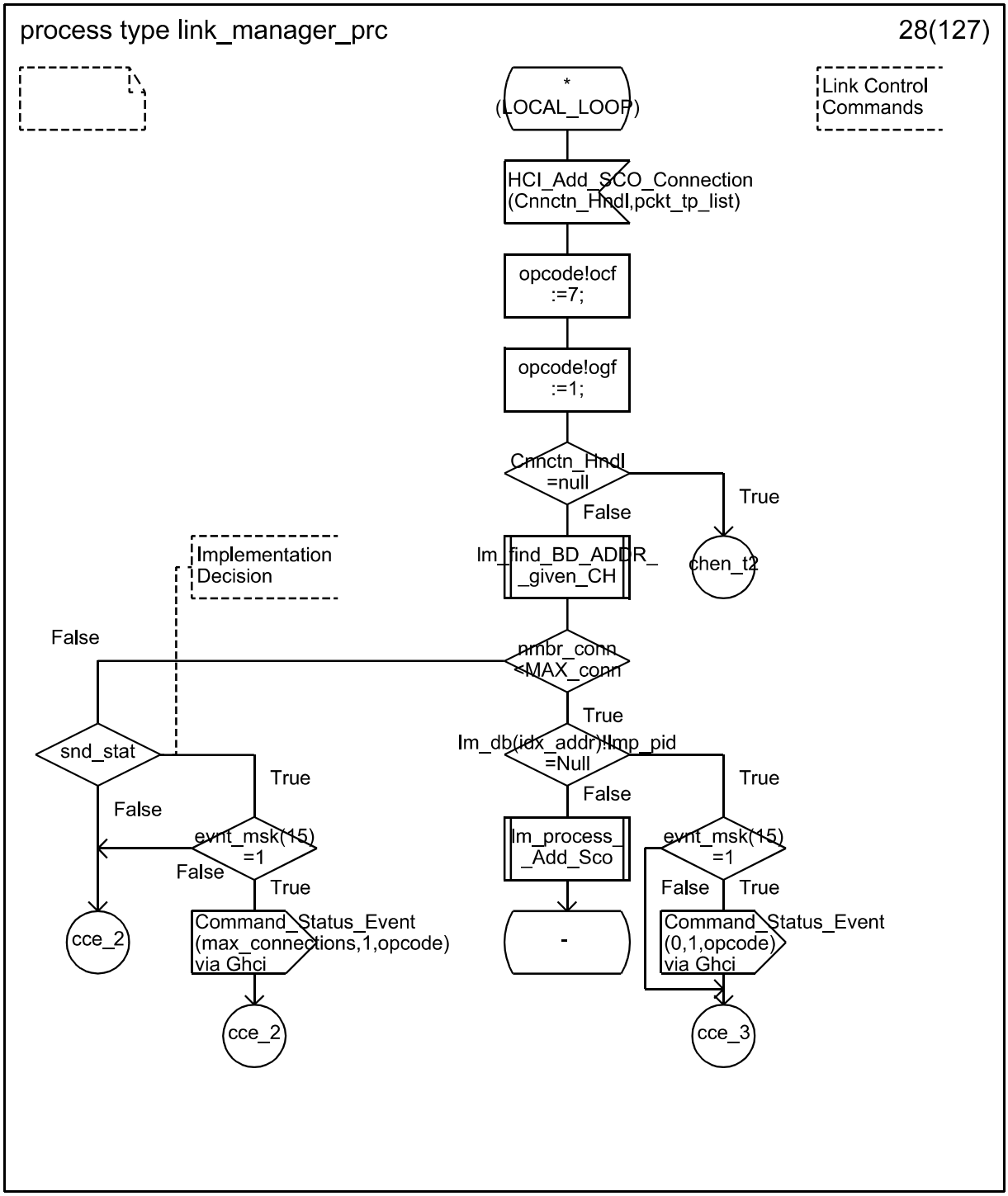
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B.3.29 link_manager_prc-27



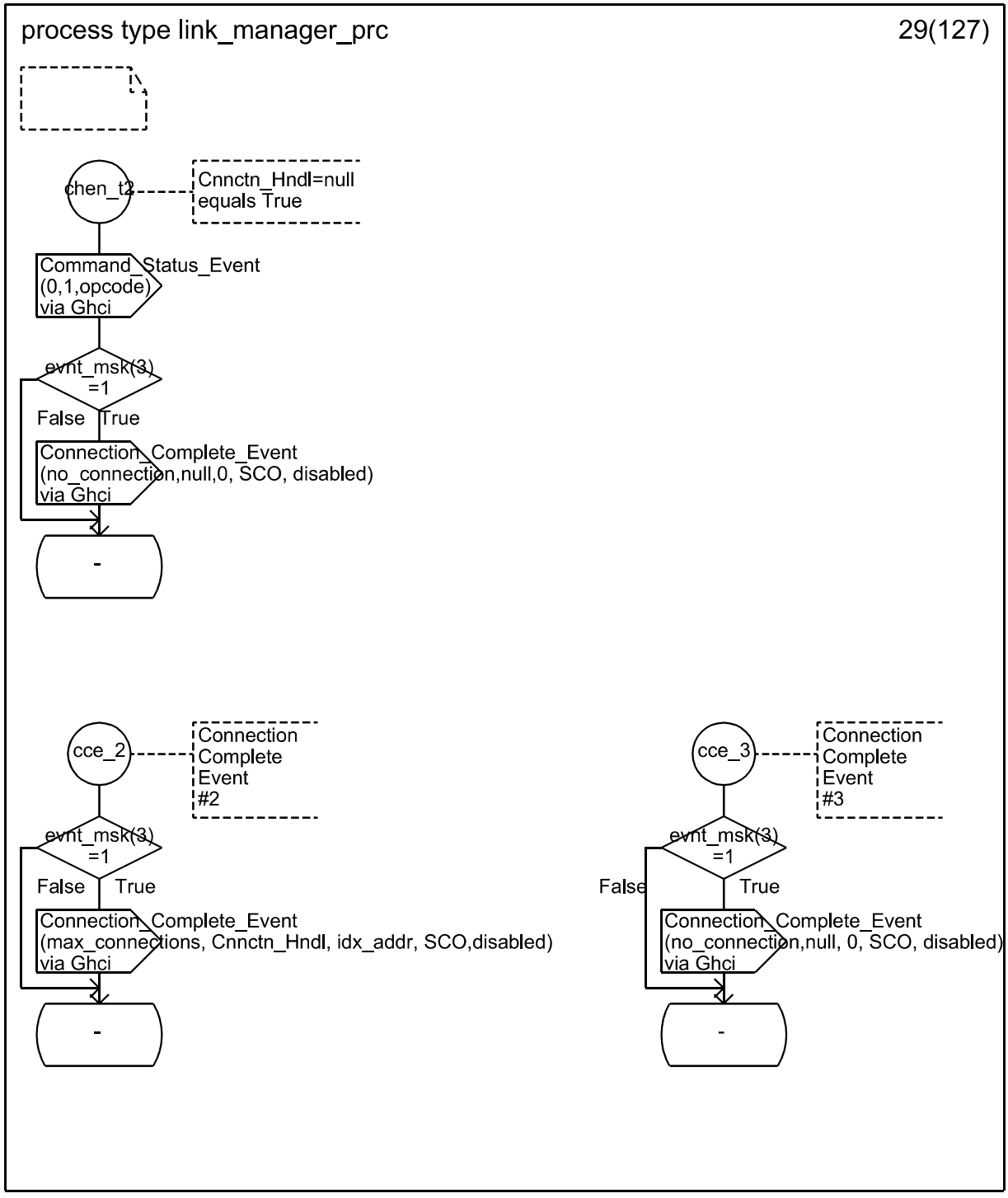
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B.3.30 link_manager_prc-28



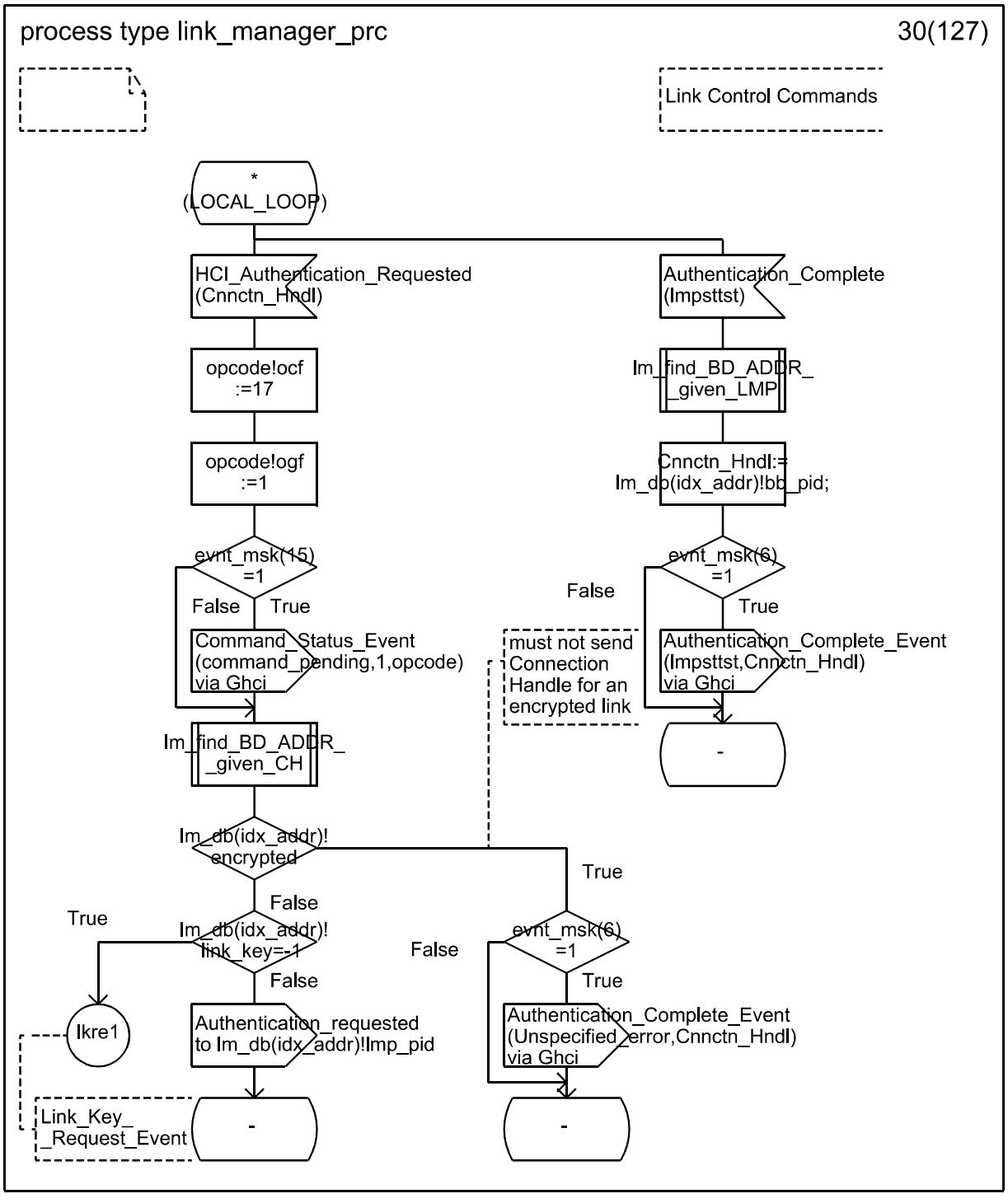
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B.3.31 link_manager_prc-29



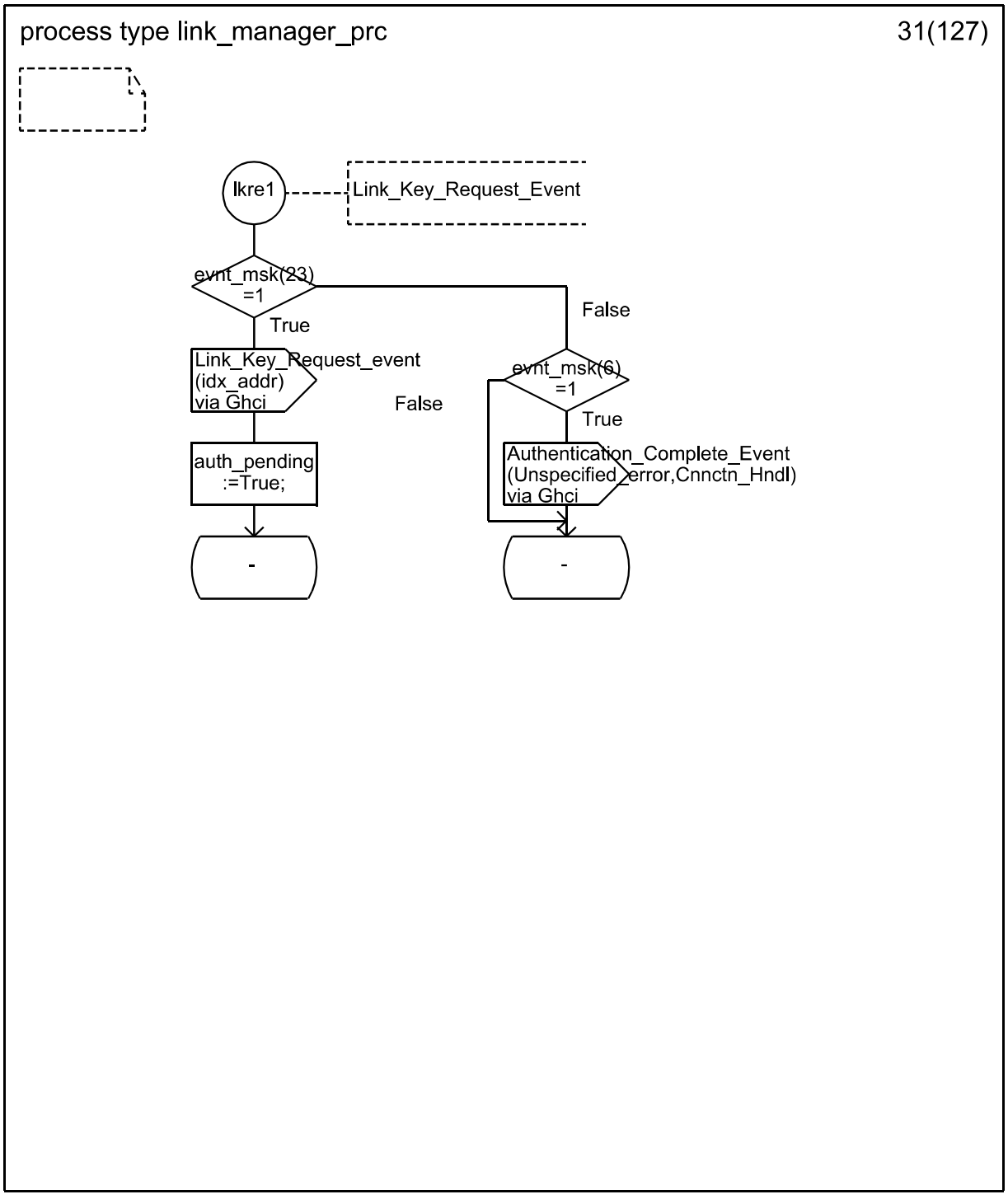
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B.3.32 link_manager_prc-30



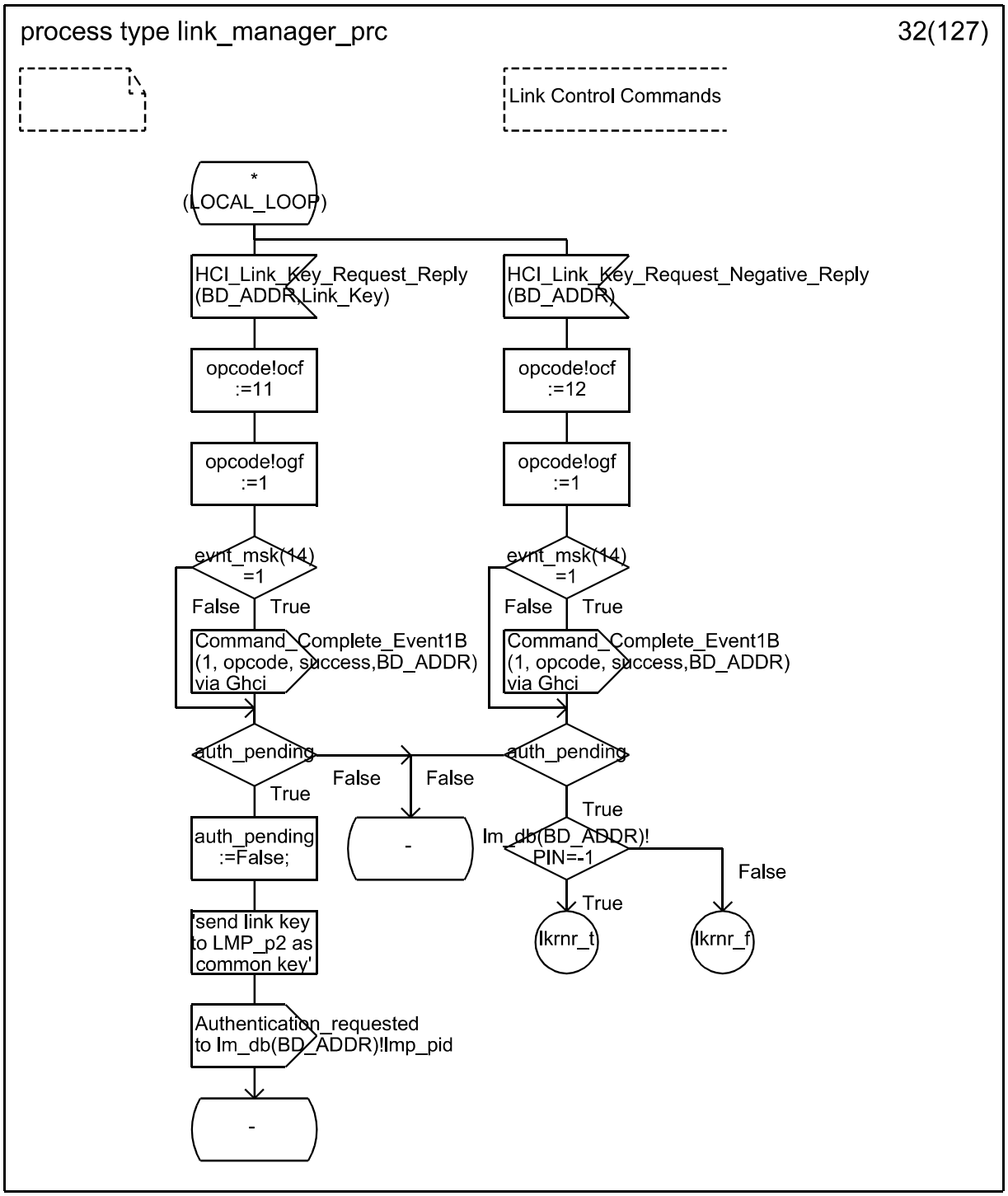
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B.3.33 link_manager_prc-31



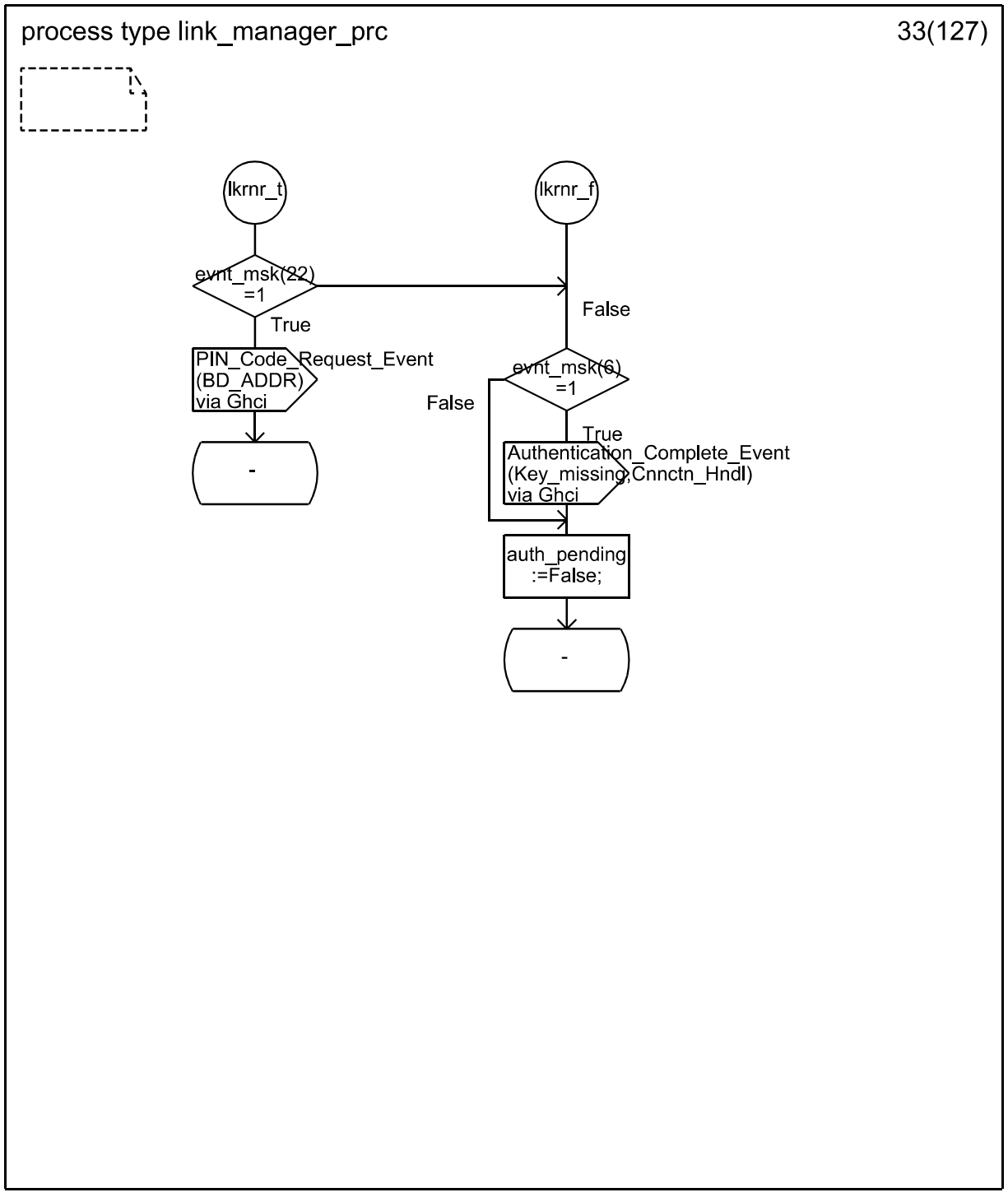
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B.3.34 link_manager_prc-32



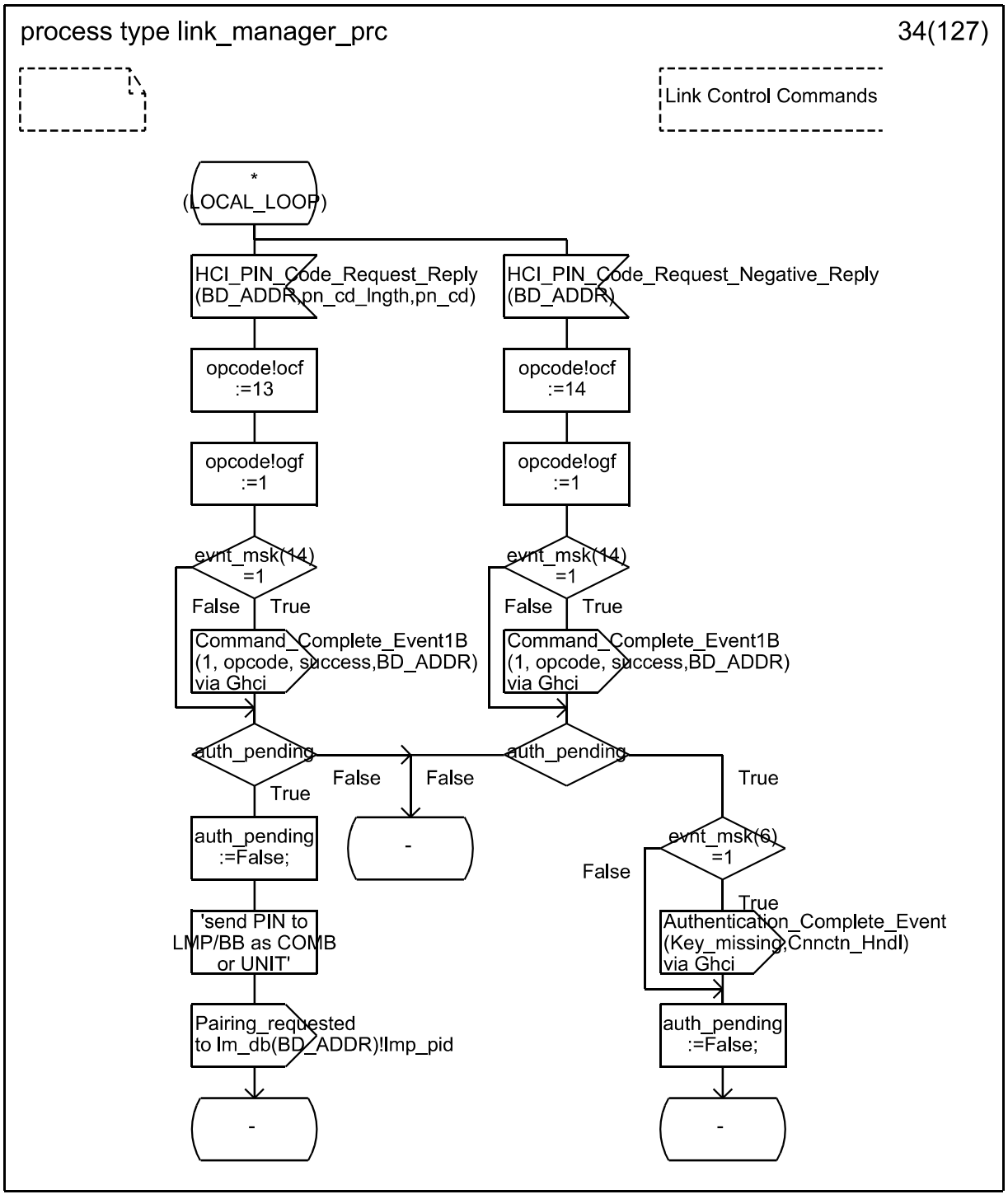
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B.3.35 link_manager_prc-33



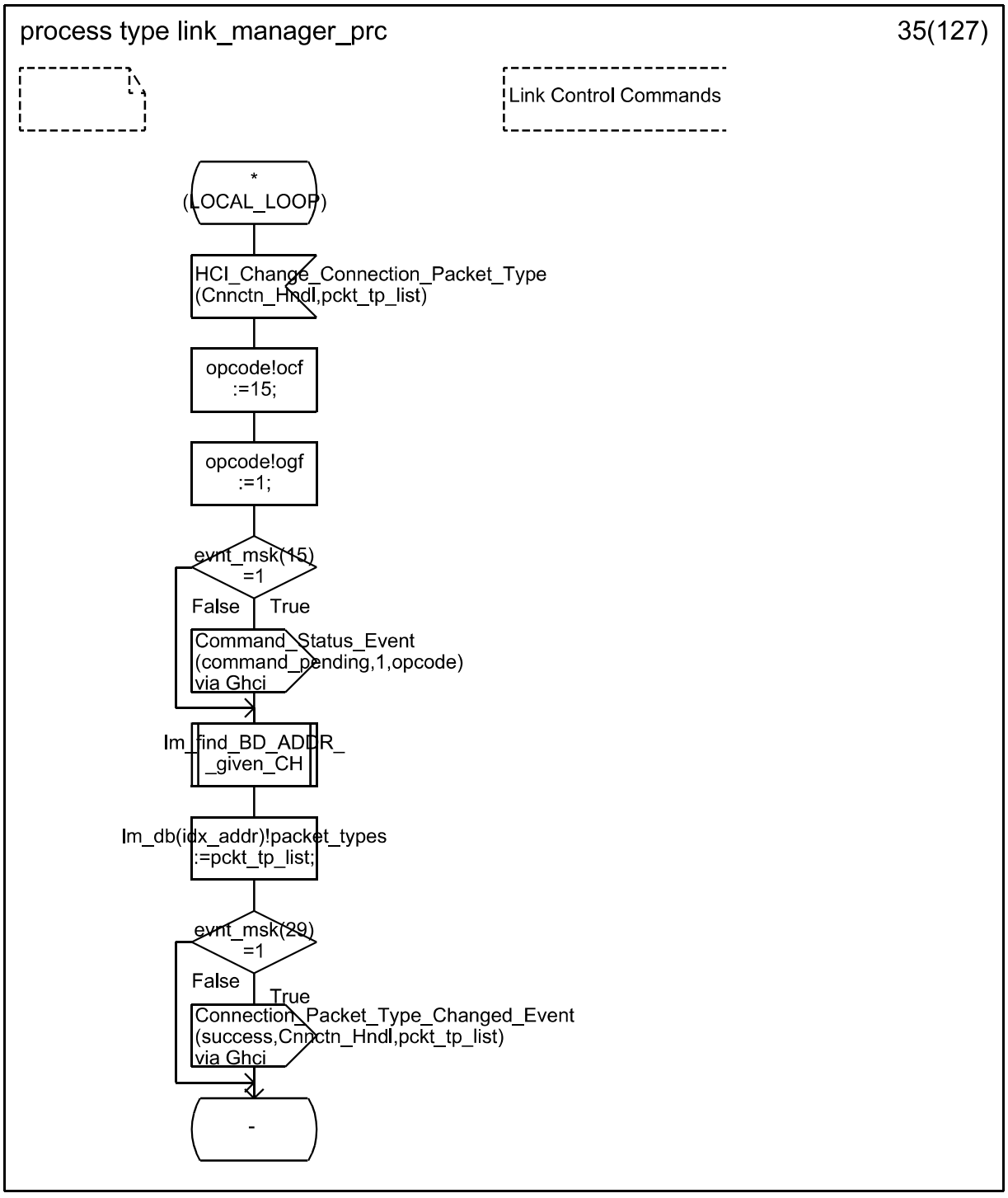
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B.3.36 link_manager_prc-34



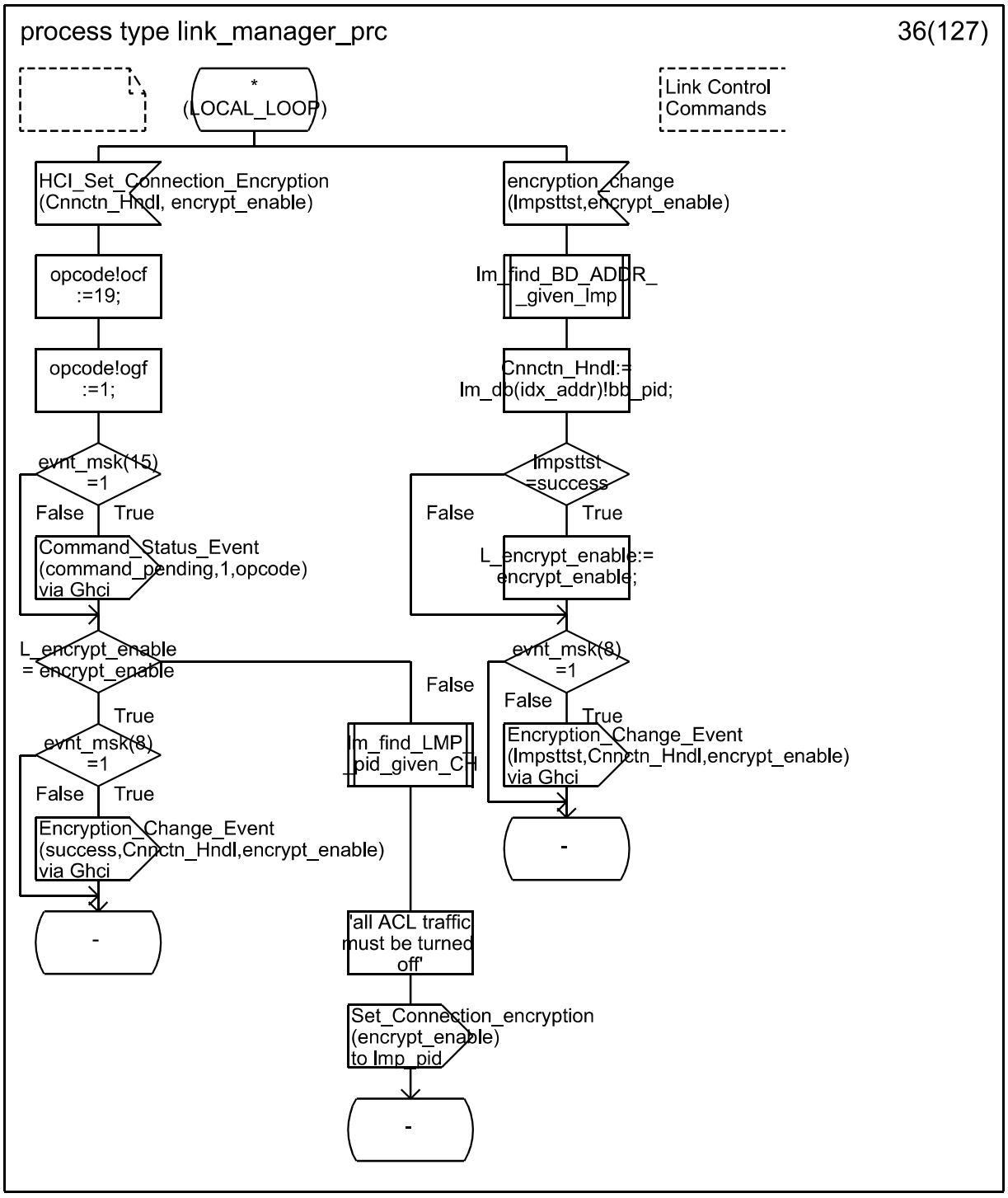
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B.3.37 link_manager_prc-35



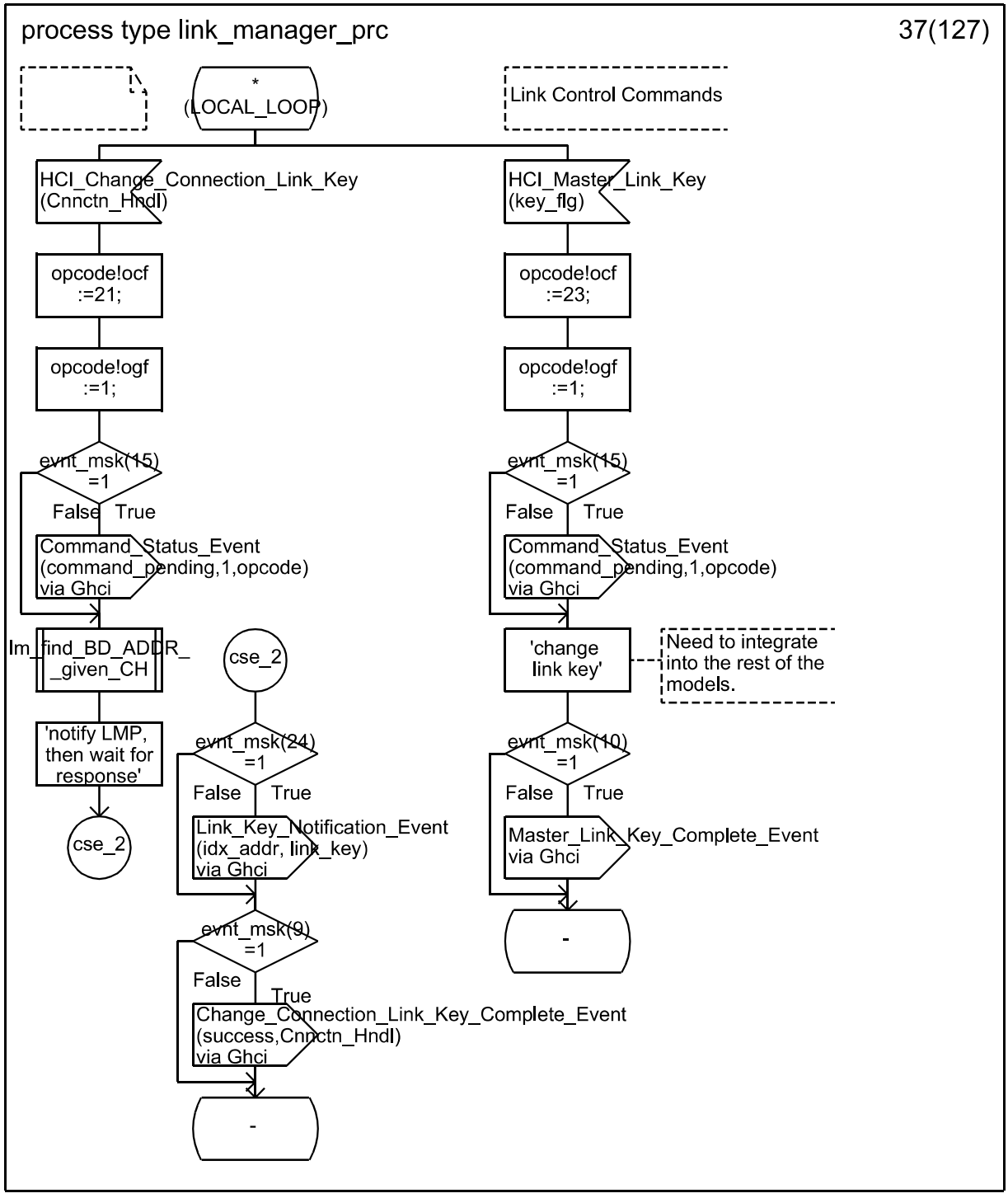
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B.3.38 link_manager_prc-36



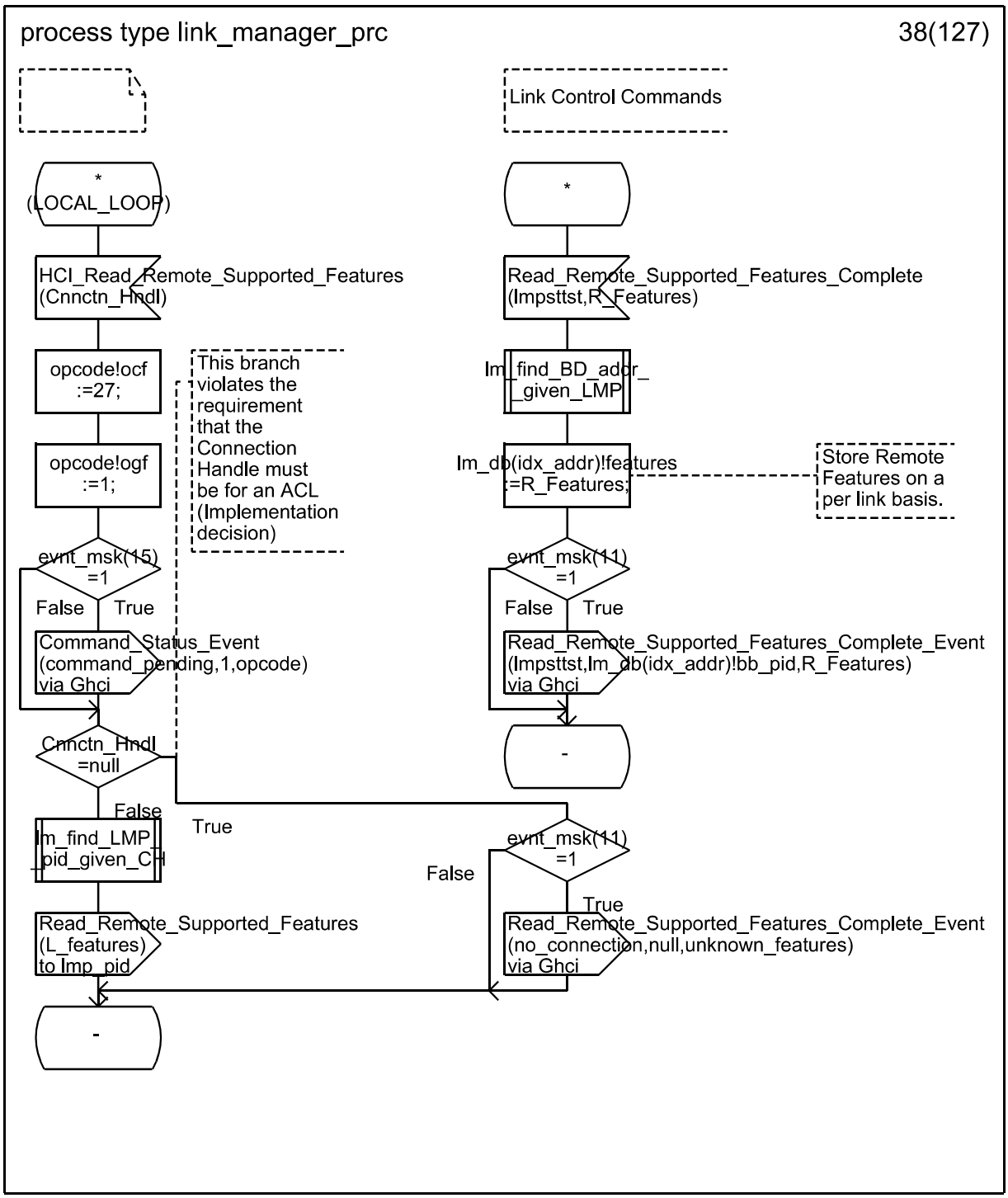
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B.3.39 link_manager_prc-37



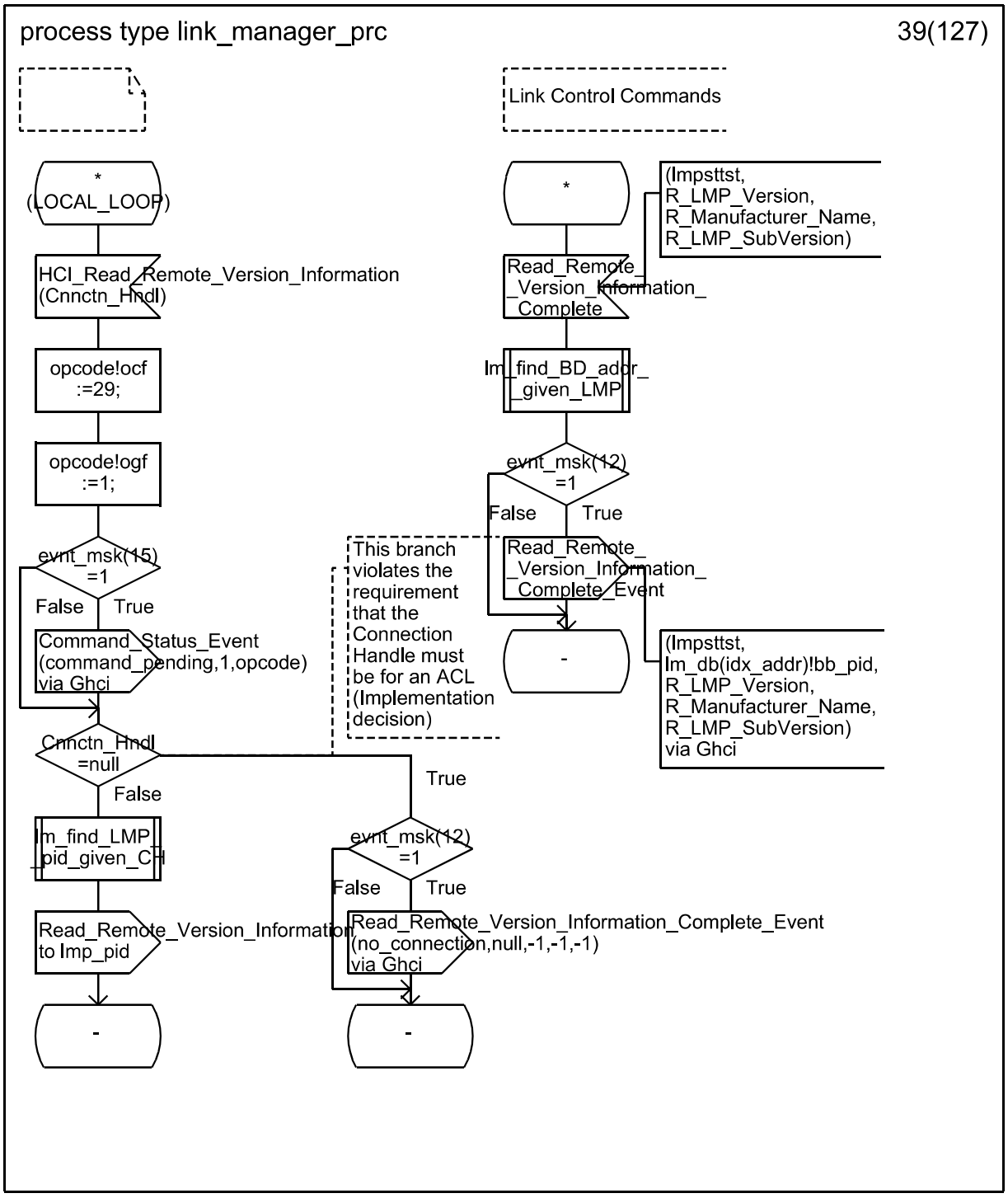
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B.3.40 link_manager_prc-38



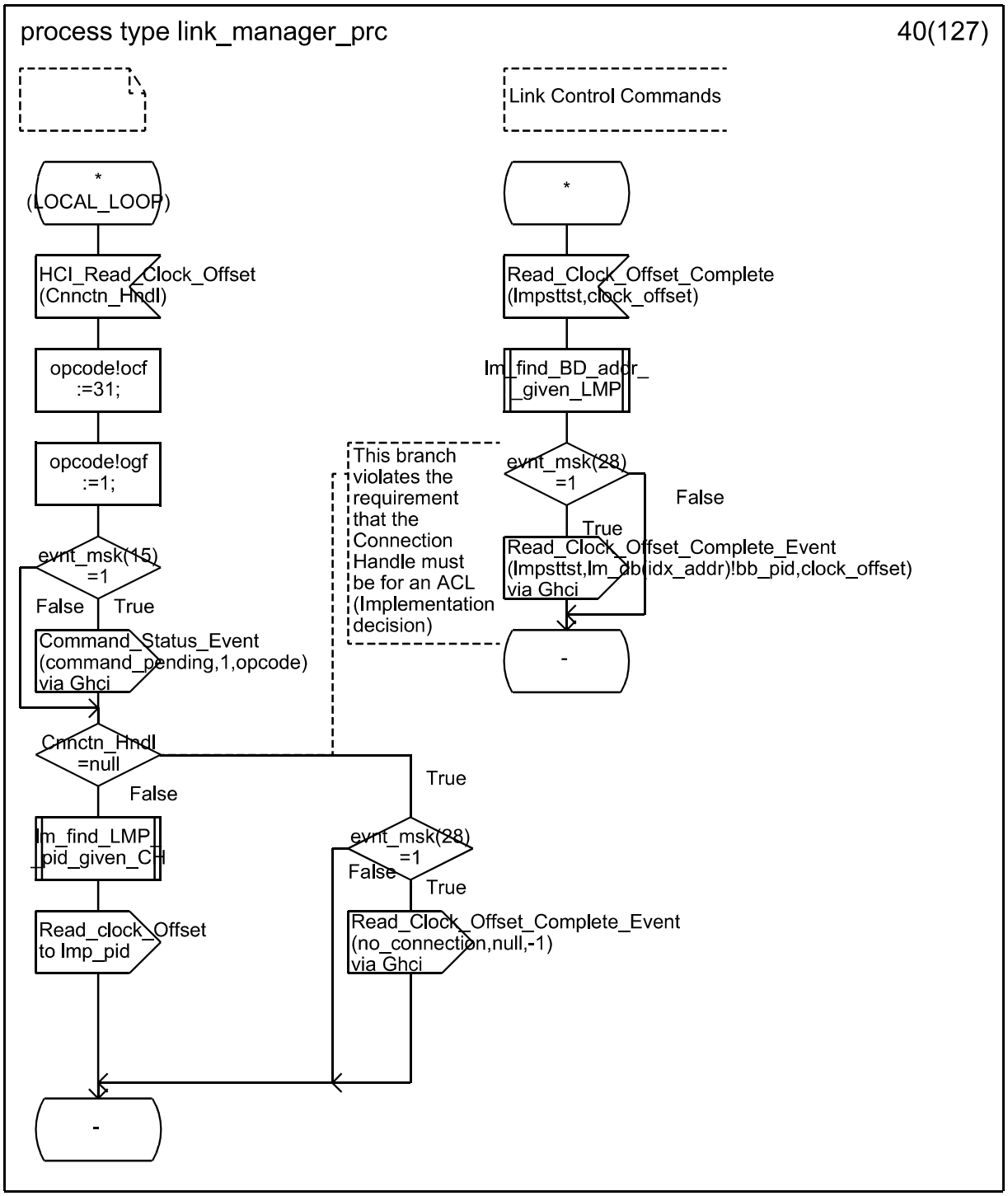
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B.3.41 link_manager_prc-39



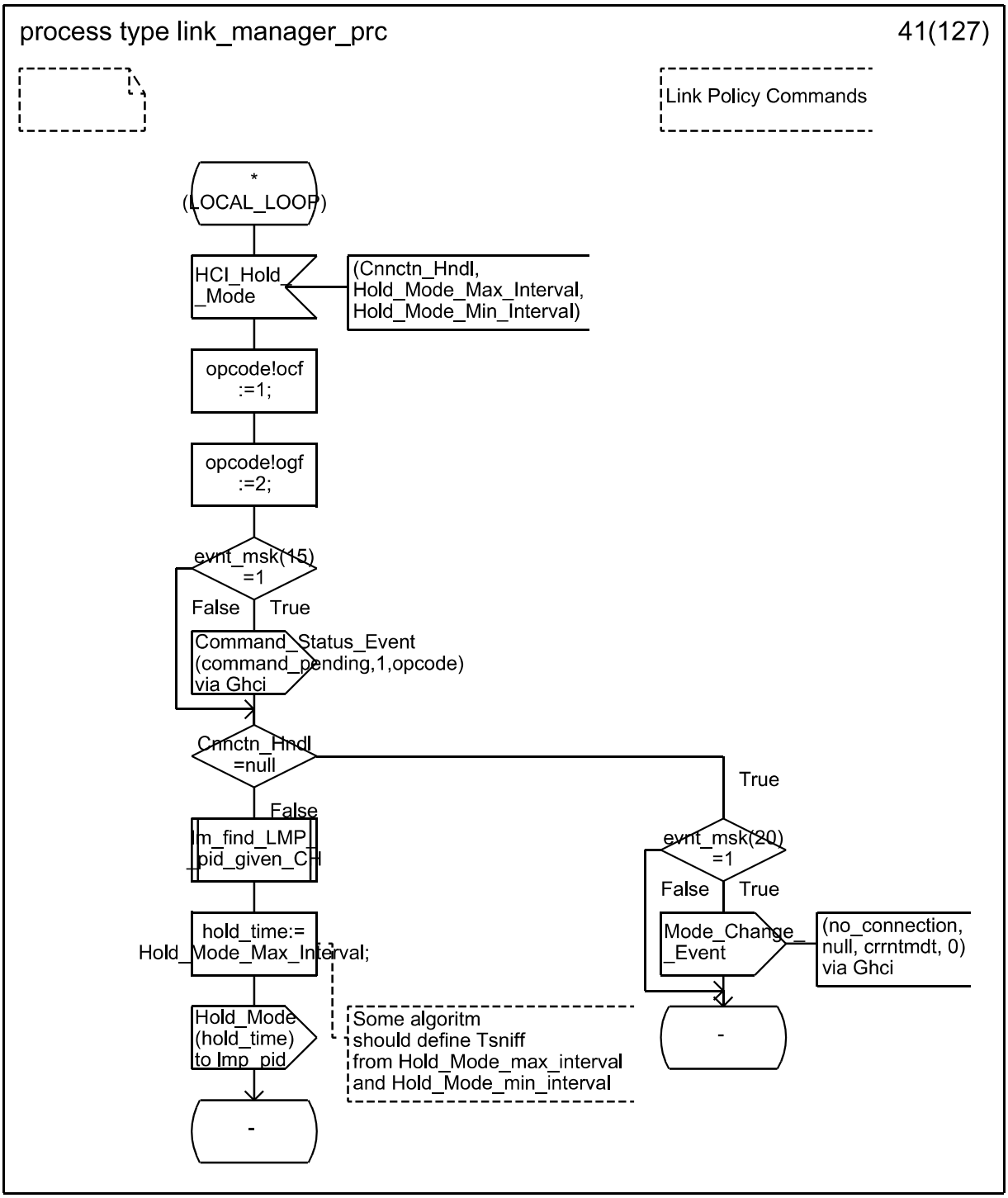
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B.3.42 link_manager_prc-40



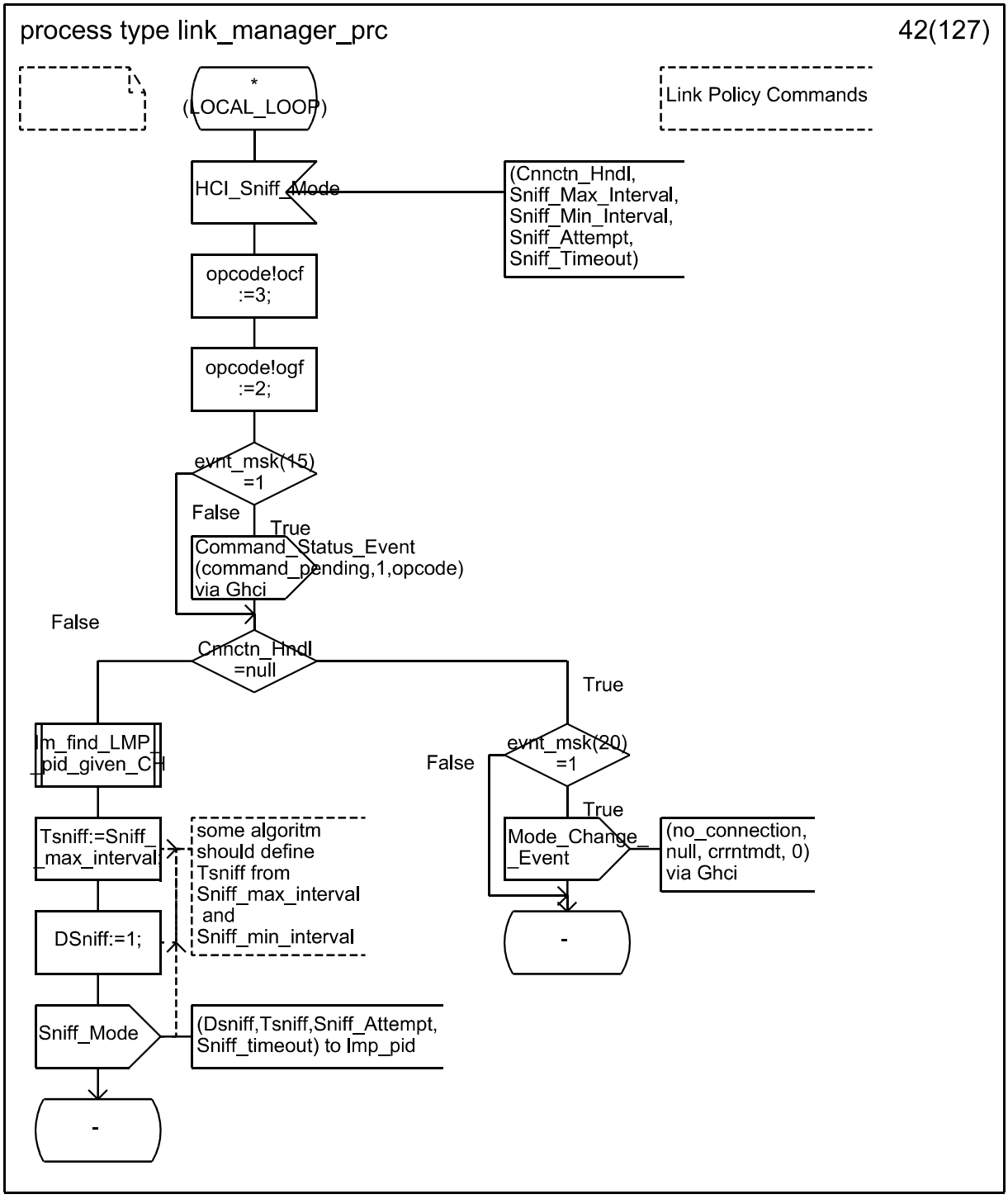
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B.3.43 link_manager_prc-41



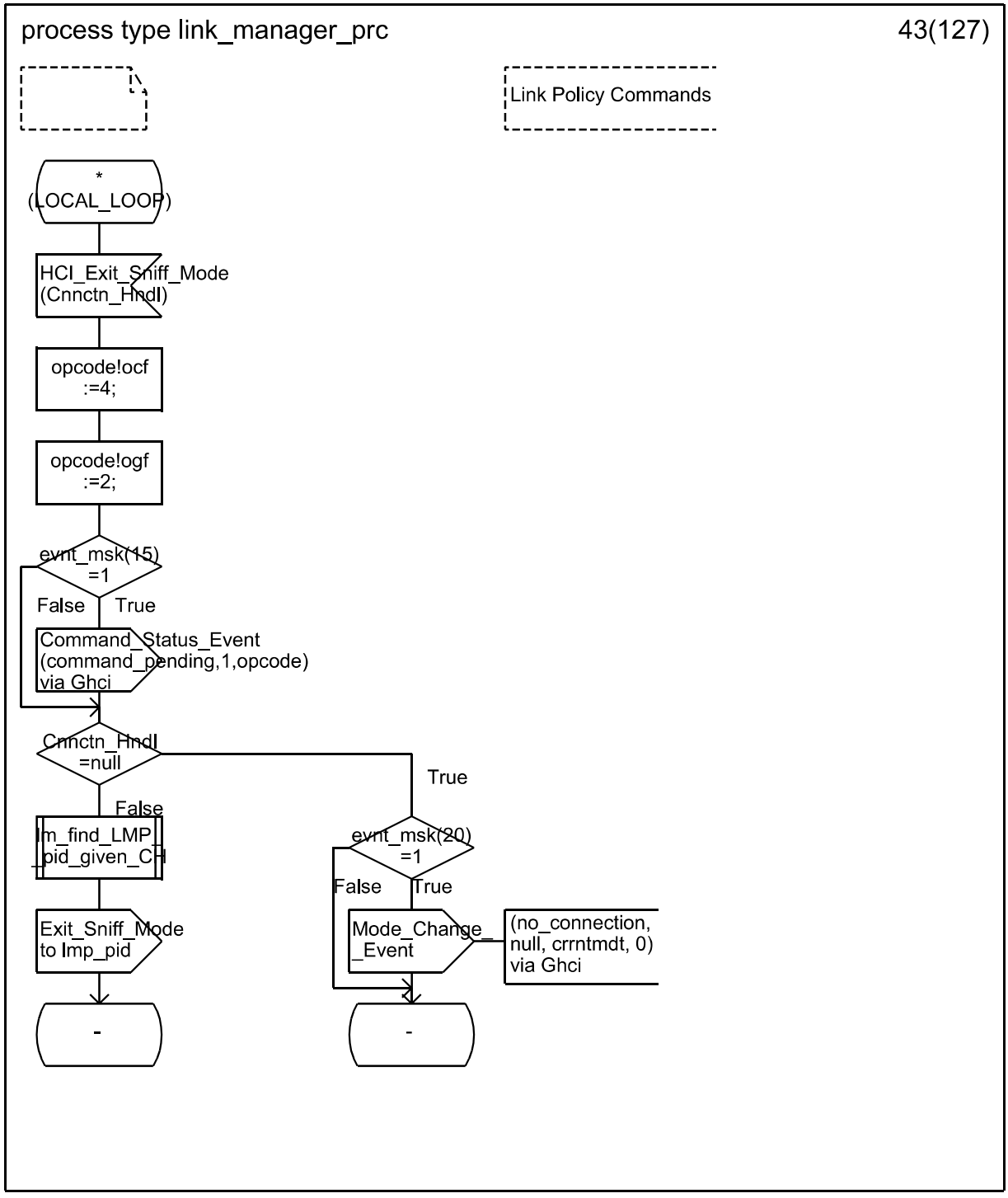
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B.3.44 link_manager_prc-42



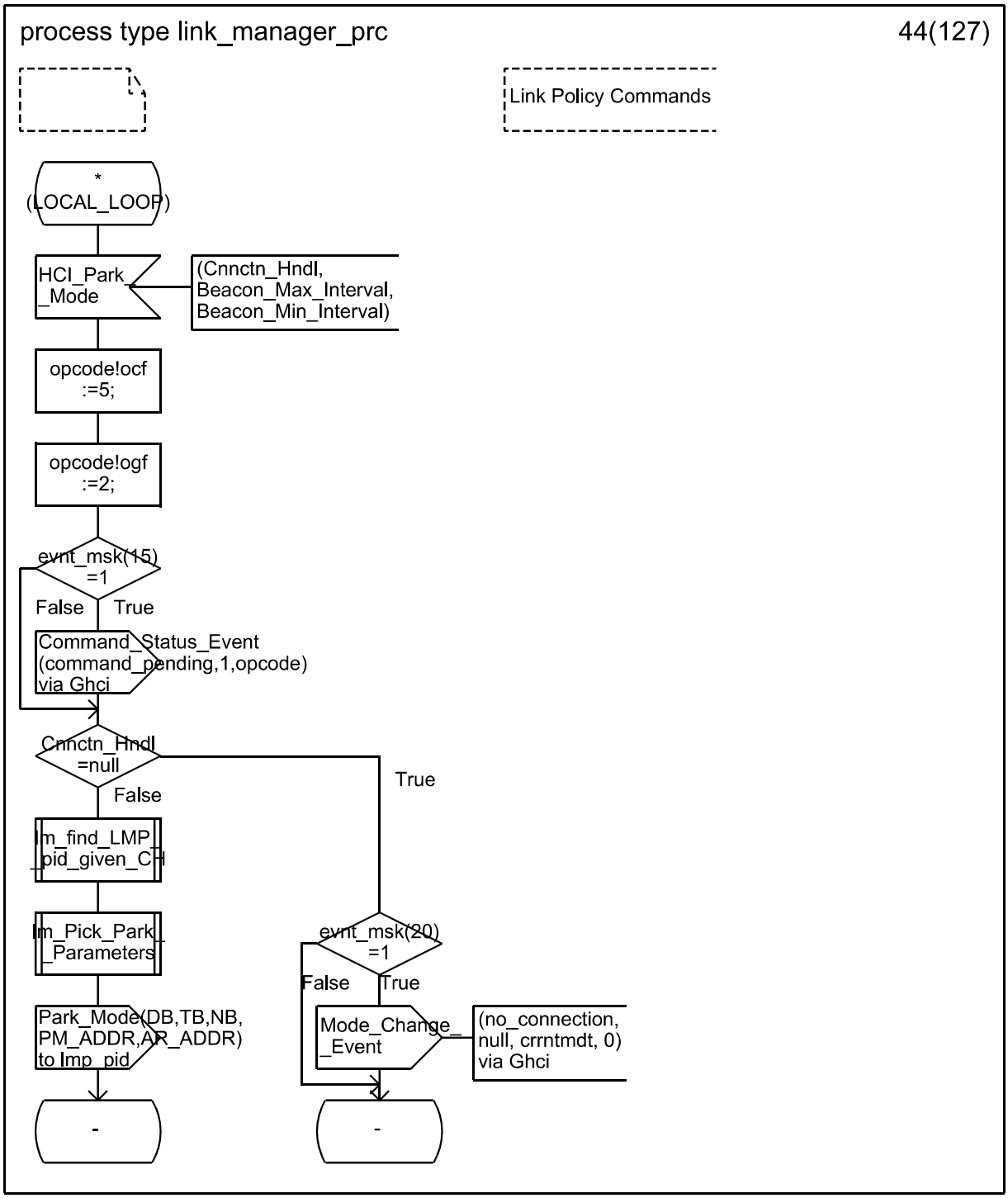
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B.3.45 link_manager_prc-43



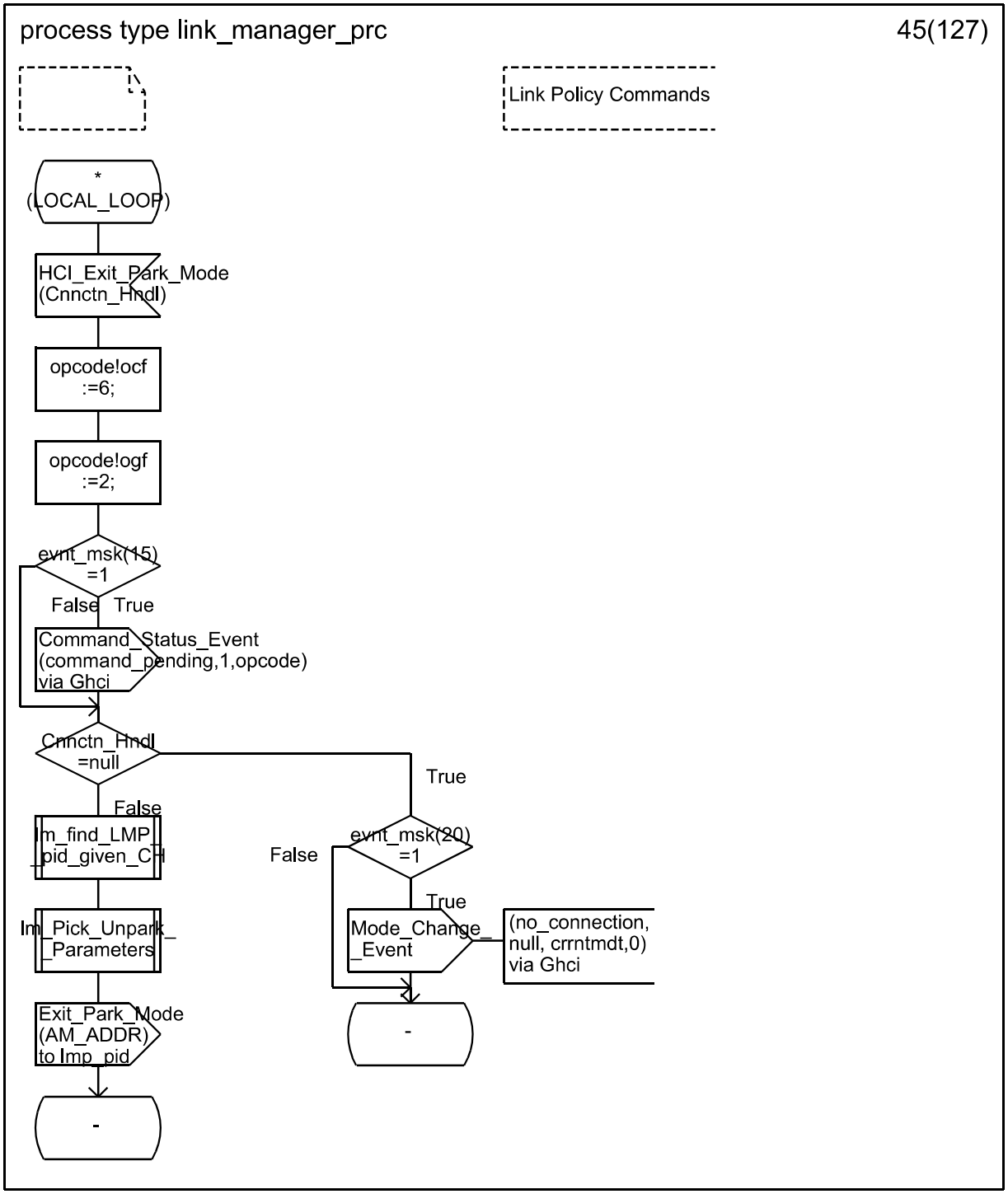
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B.3.46 link_manager_prc-44



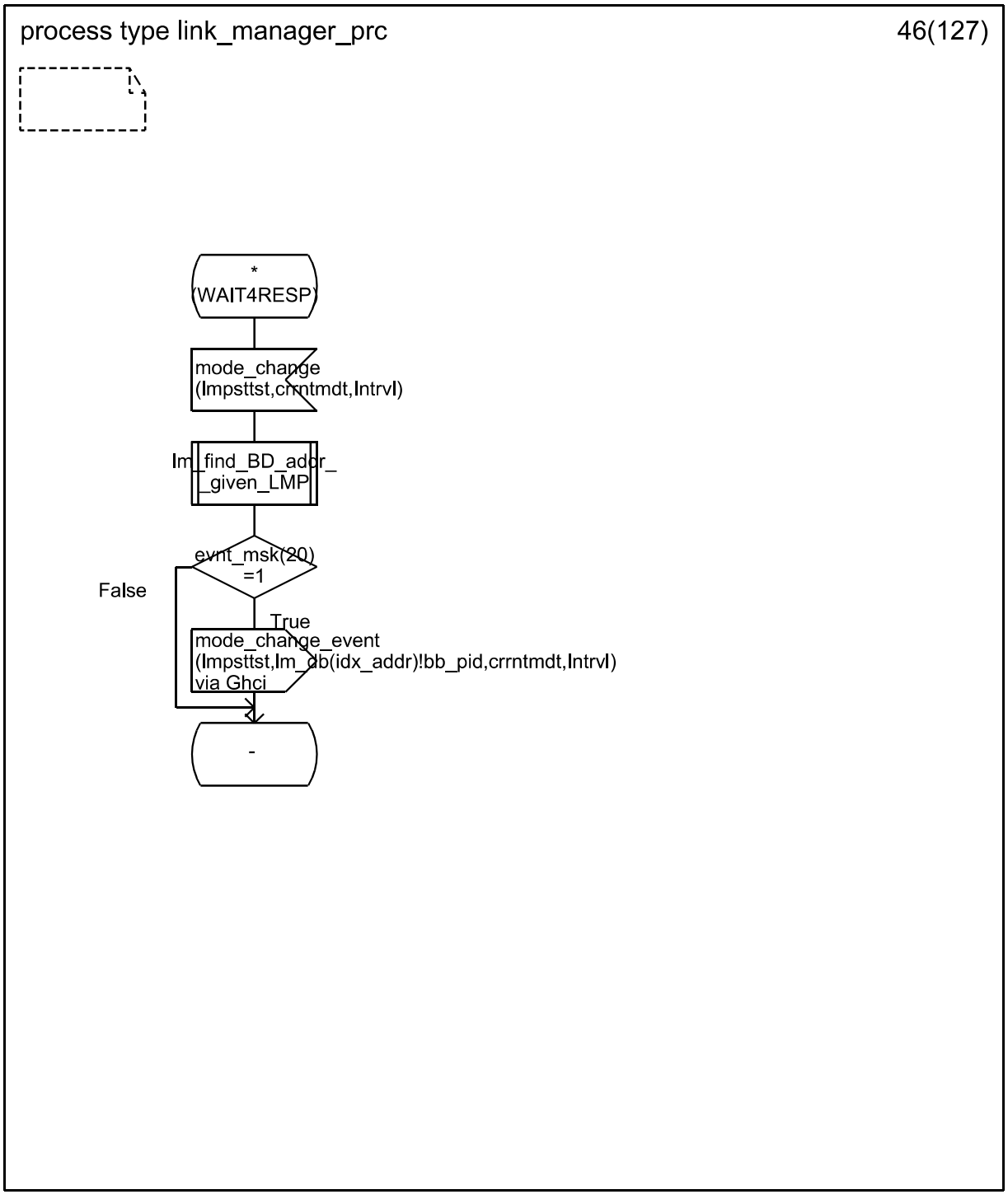
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B.3.47 link_manager_prc-45



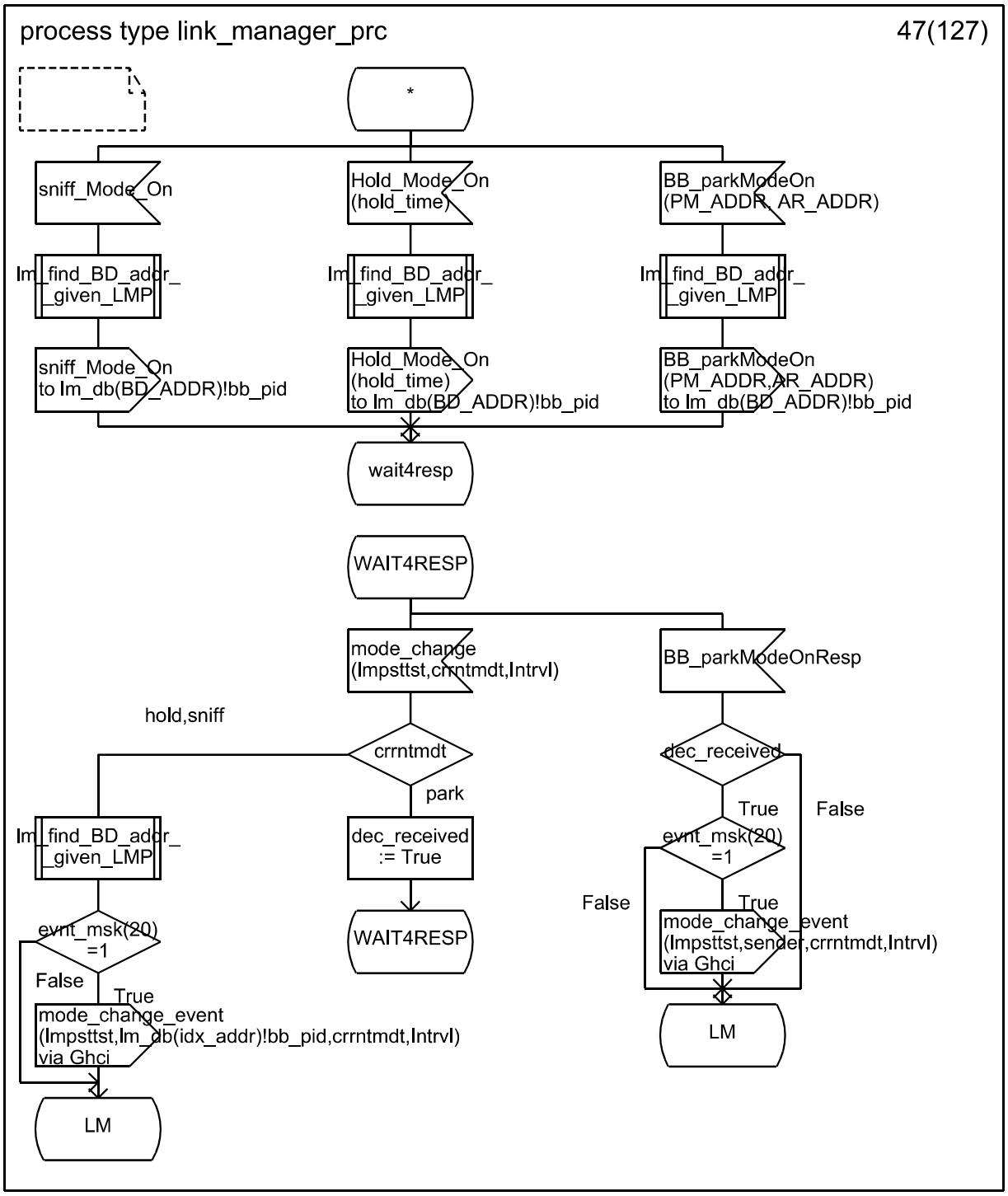
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B.3.48 link_manager_prc-46



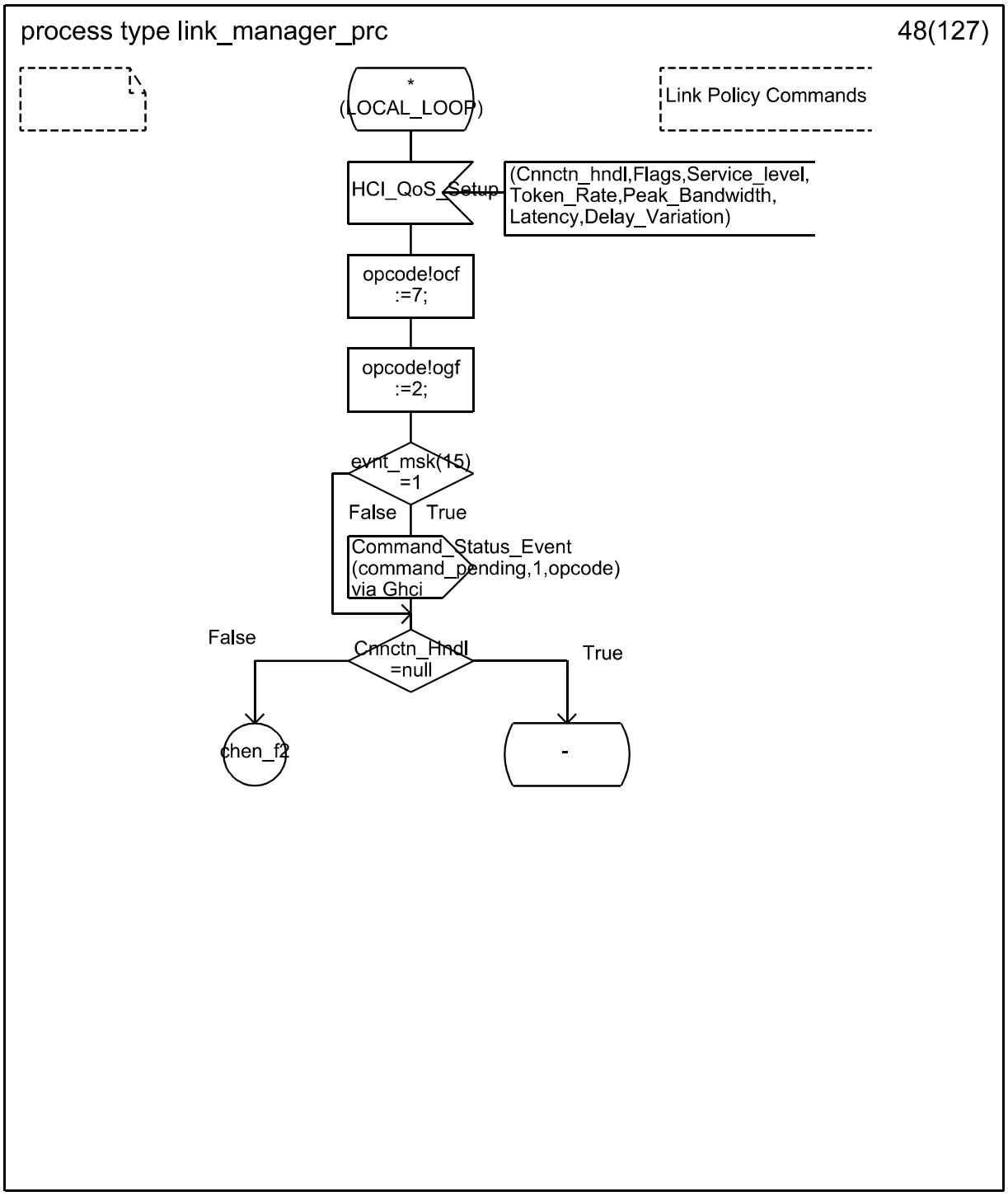
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B.3.49 link_manager_prc-47



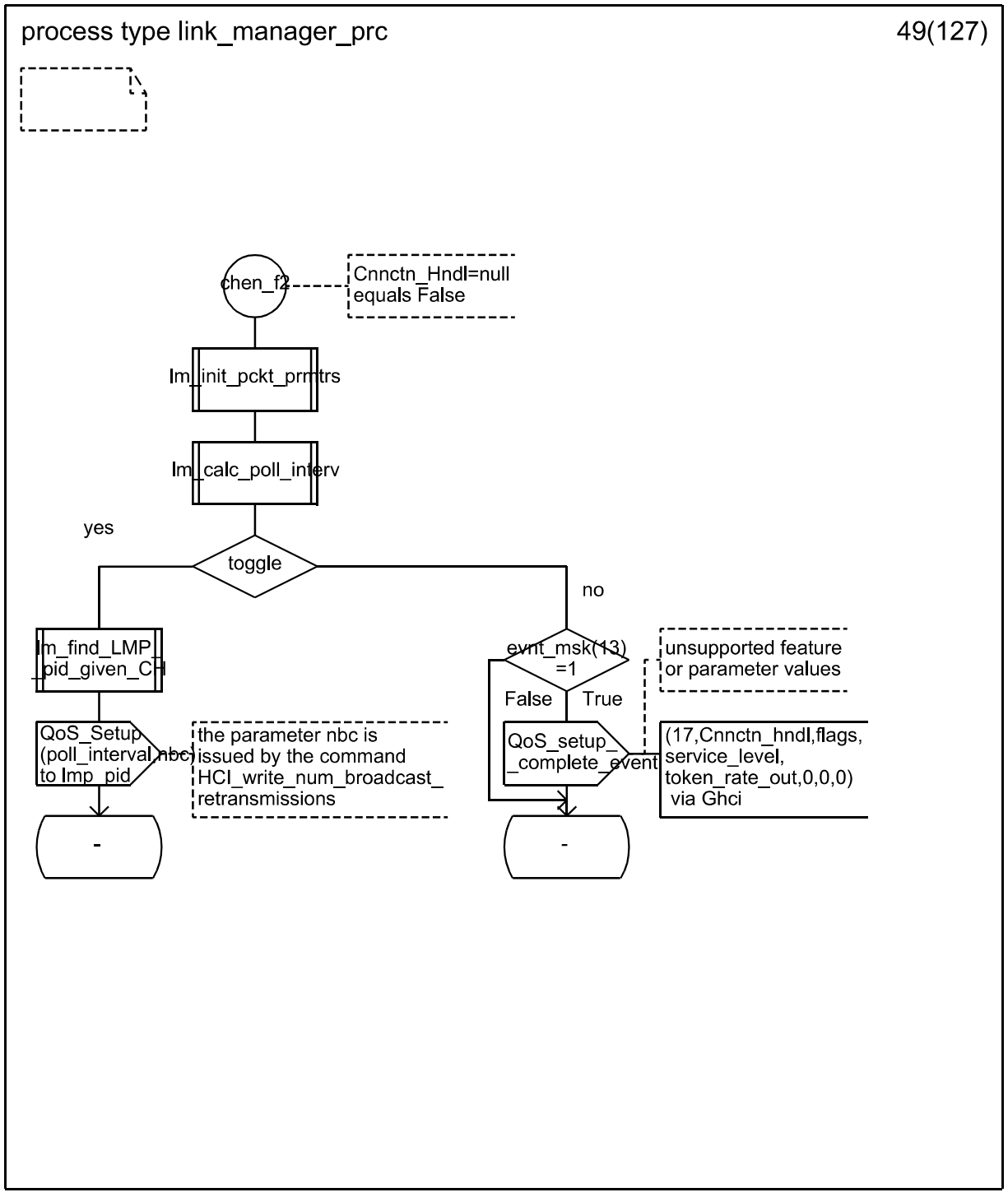
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B.3.50 link_manager_prc-48



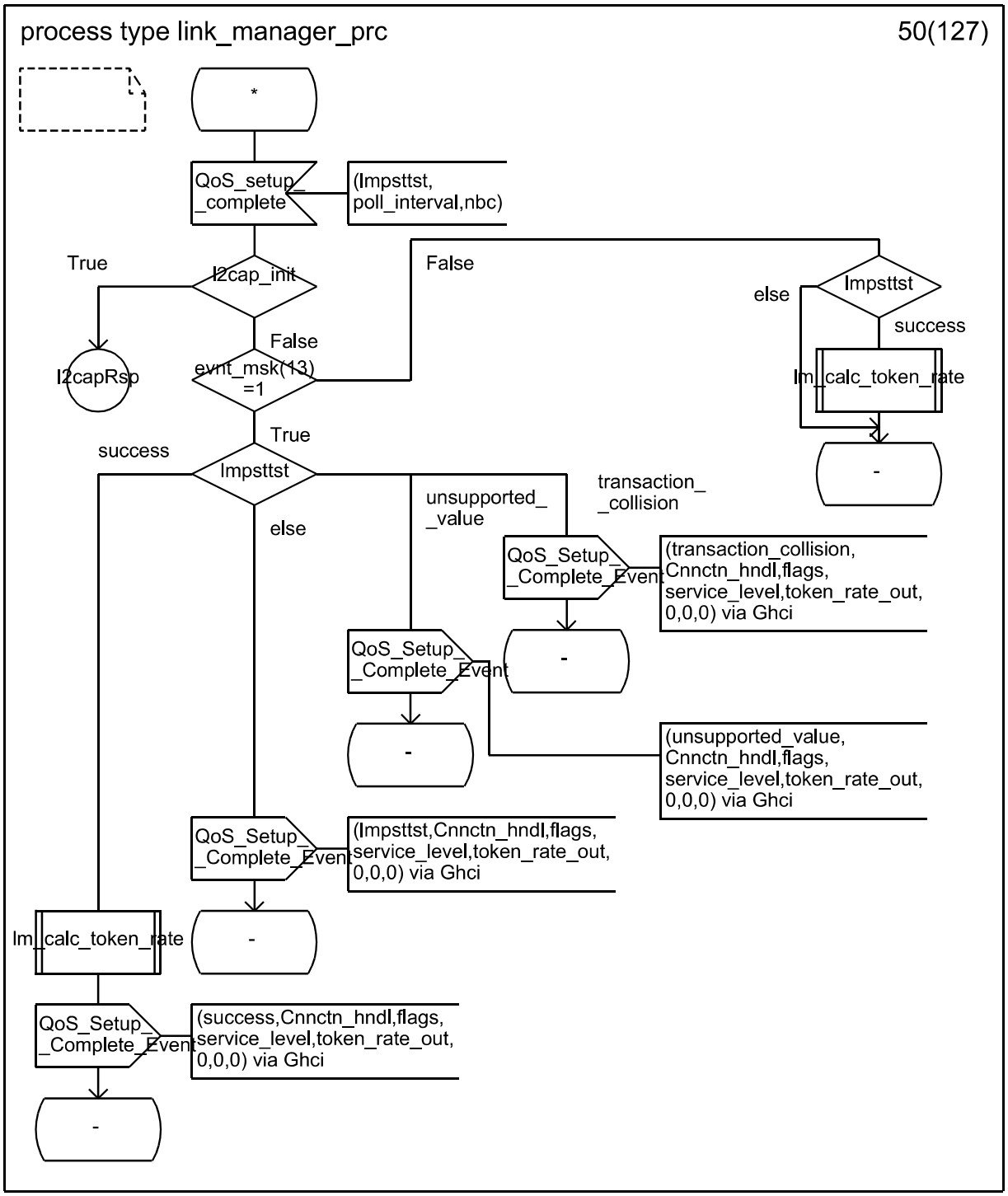
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B.3.51 link_manager_prc-49



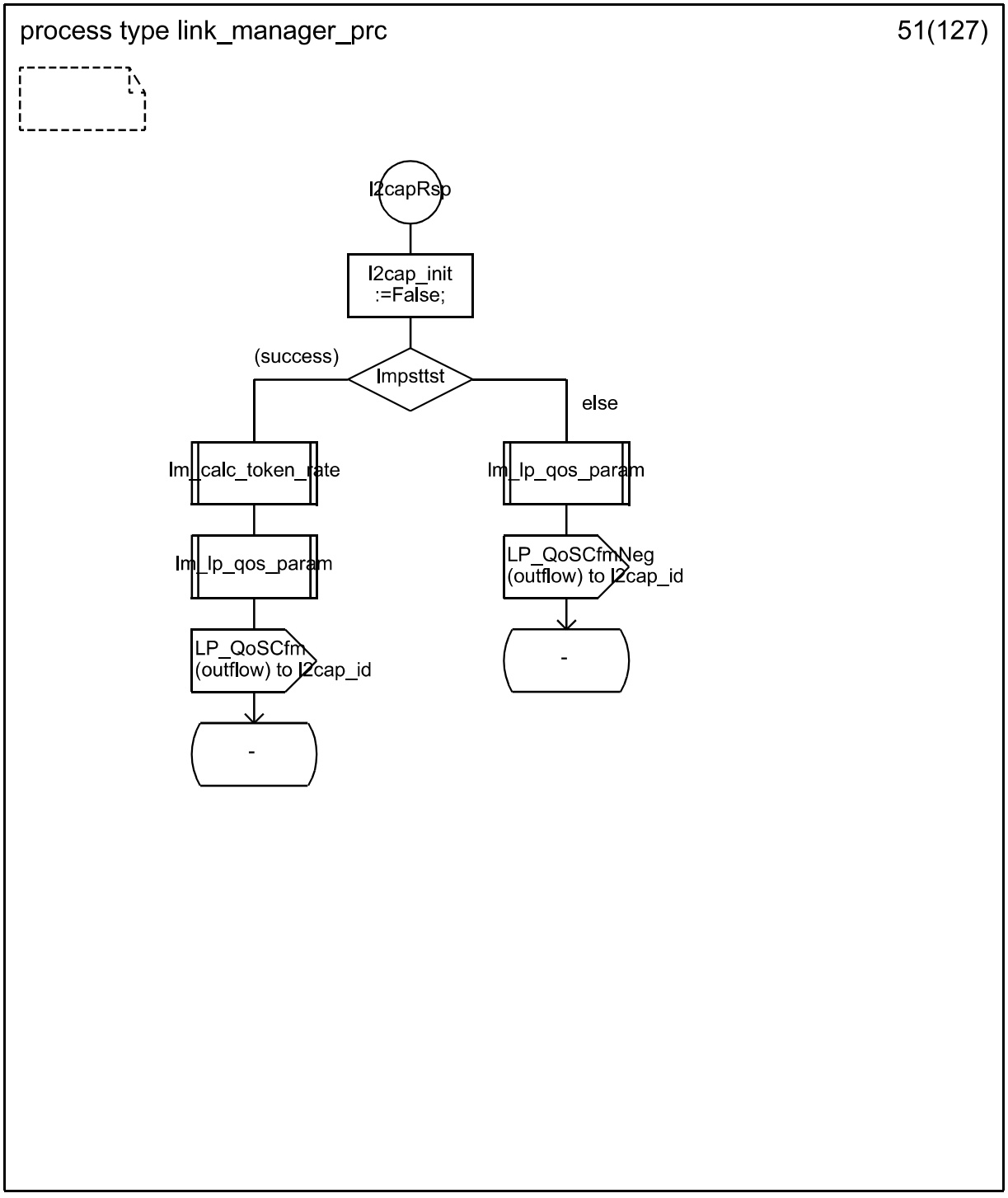
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B.3.52 link_manager_prc-50



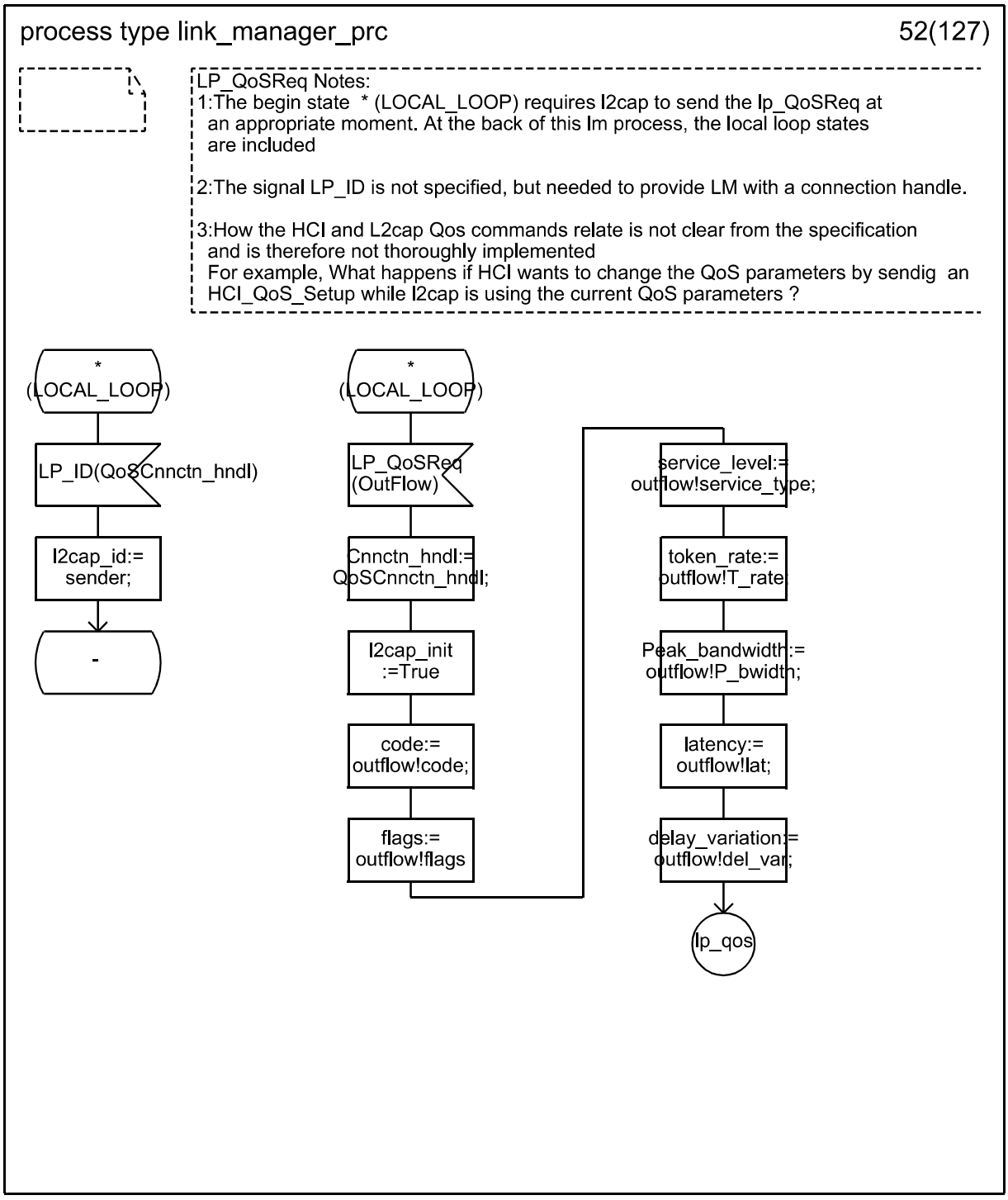
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B.3.53 link_manager_prc-51



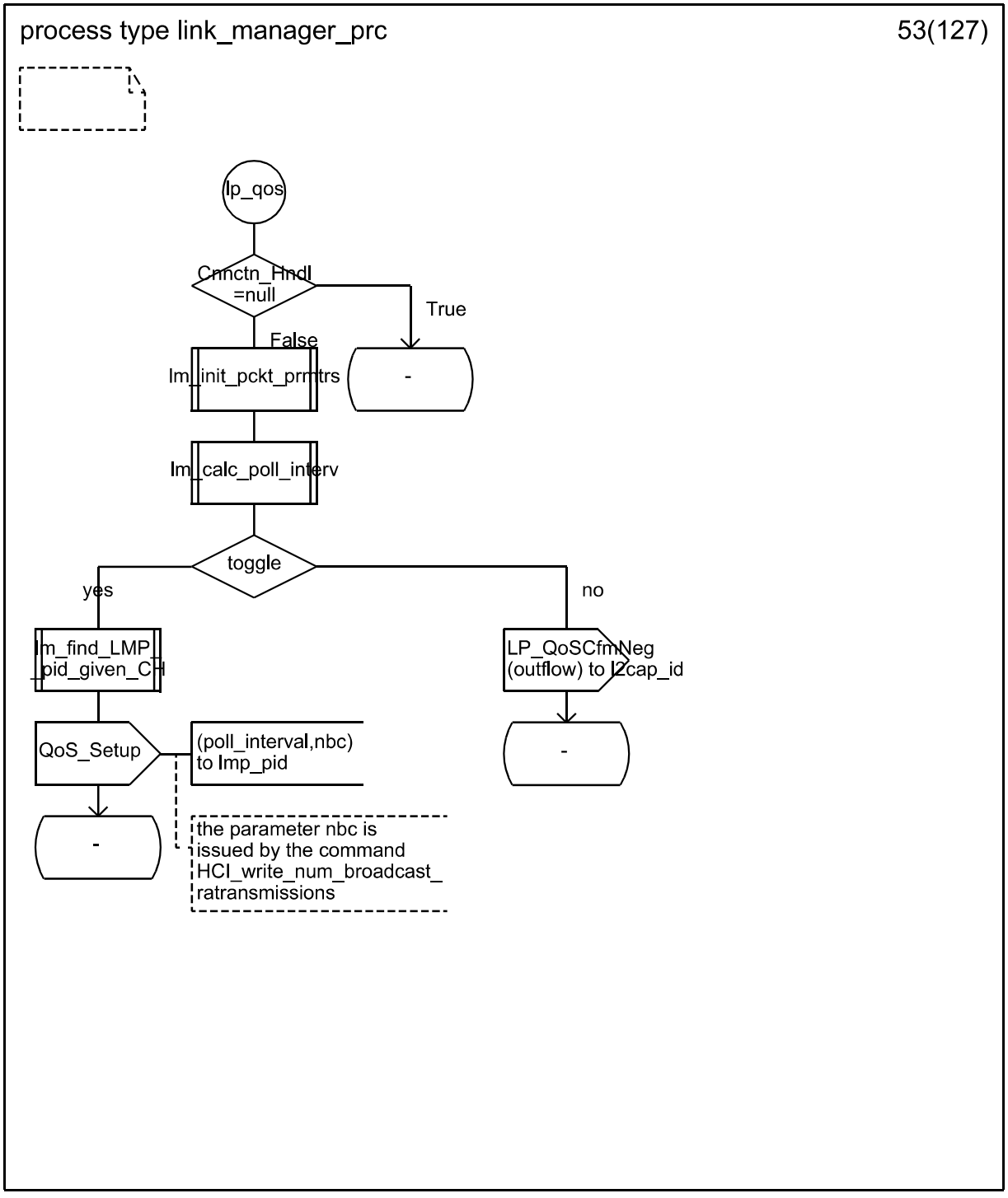
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B.3.54 link_manager_prc-52



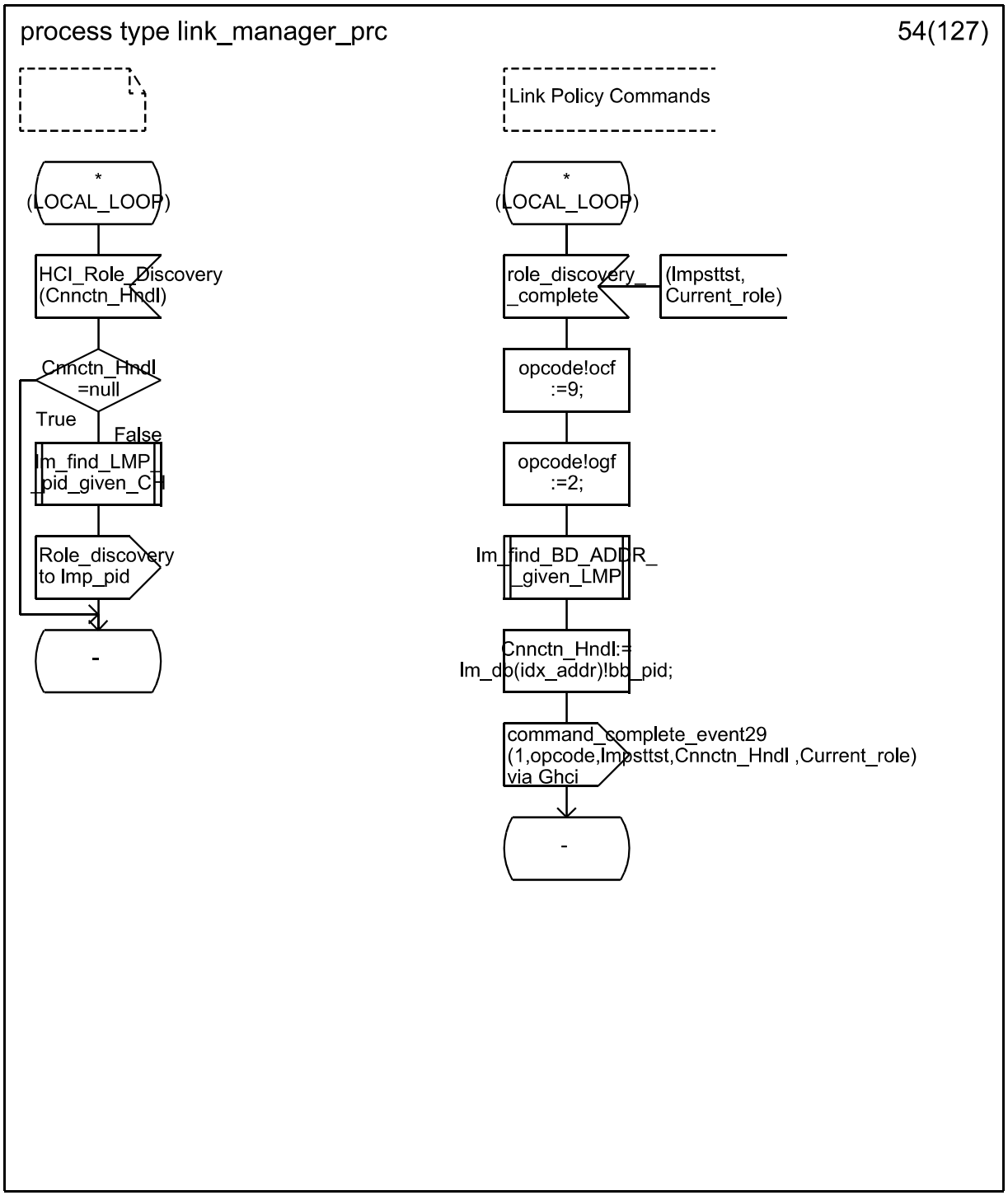
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B.3.55 link_manager_prc-53



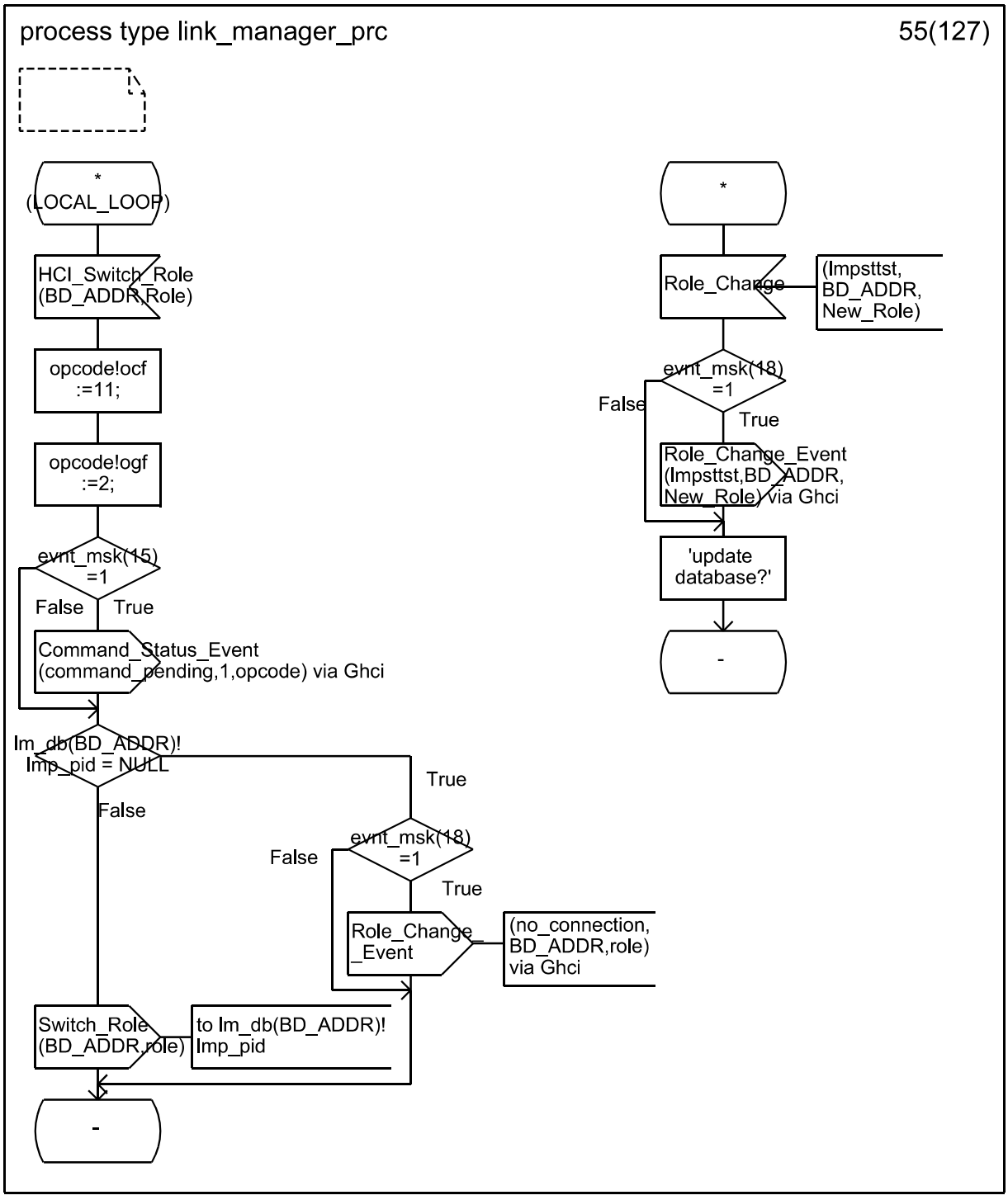
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B.3.56 link_manager_prc-54



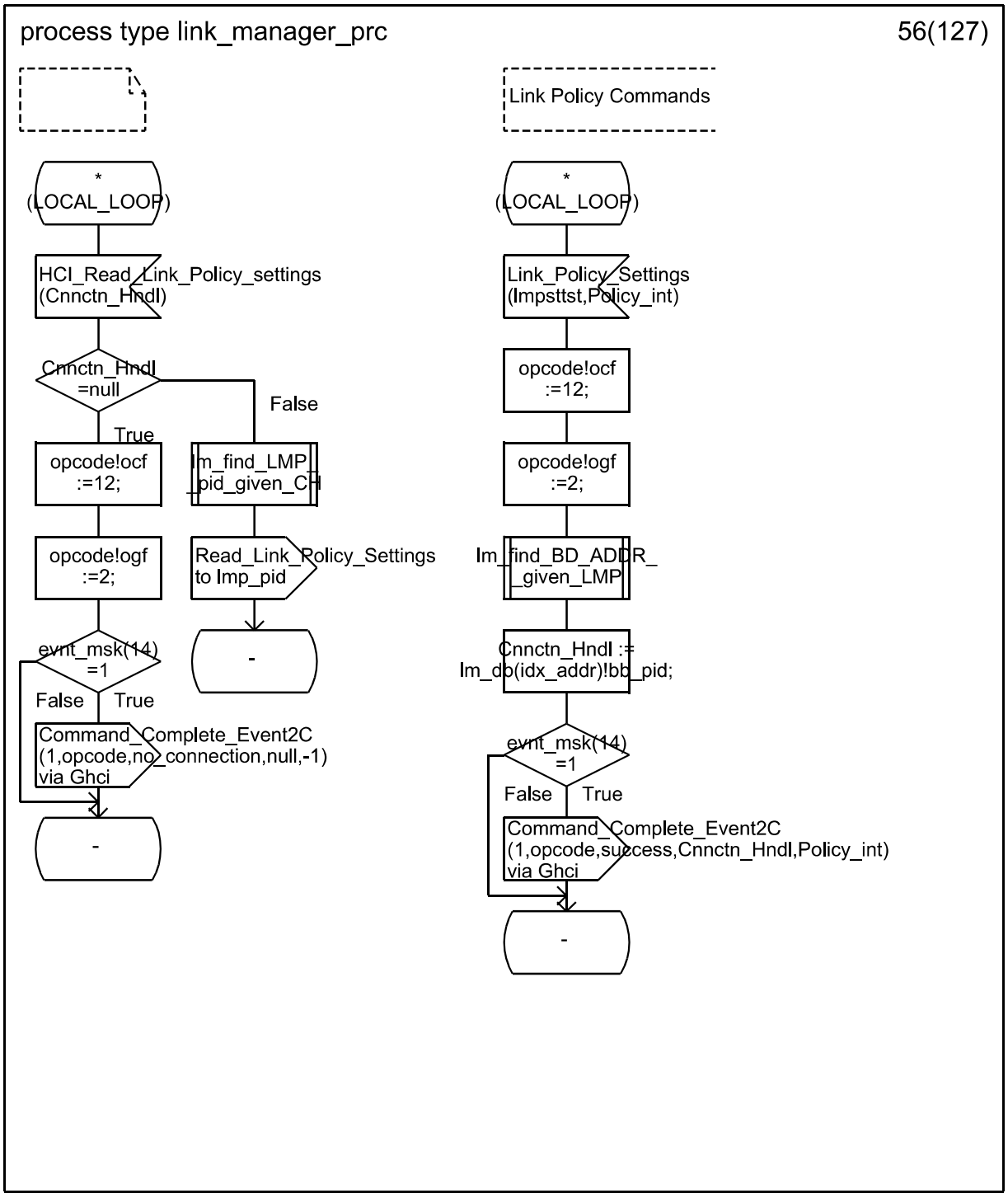
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B.3.57 link_manager_prc-55



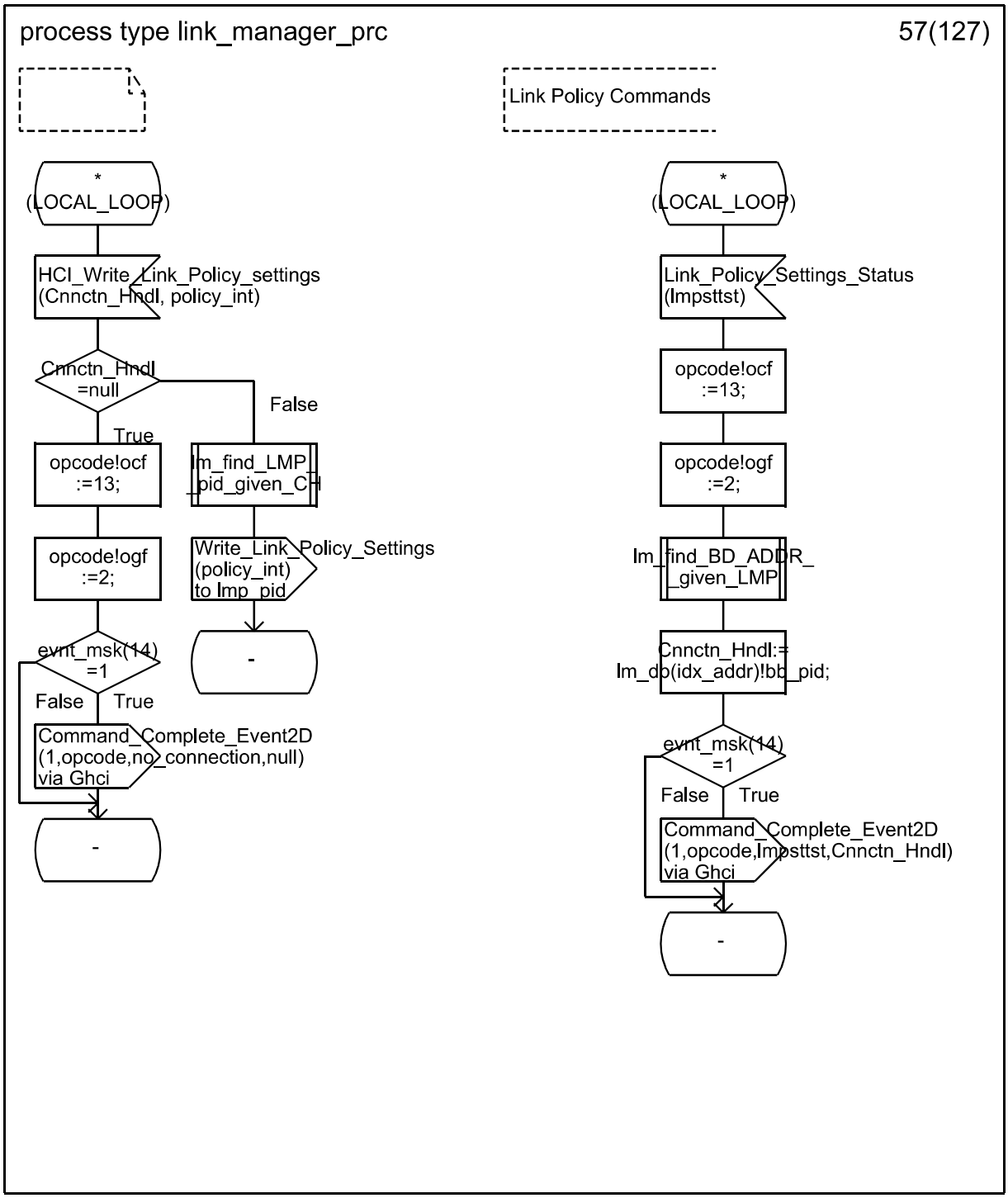
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B.3.58 link_manager_prc-56



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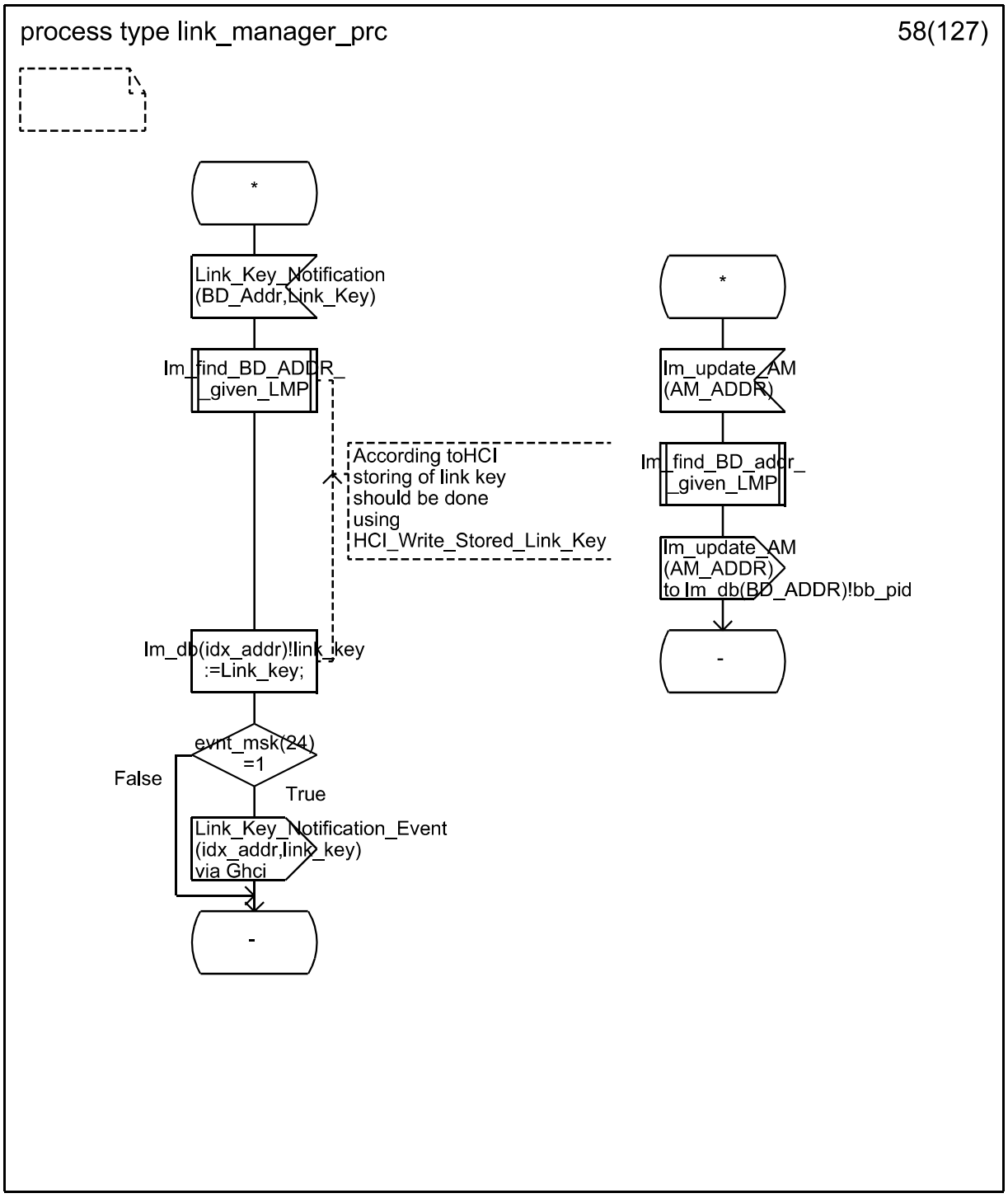
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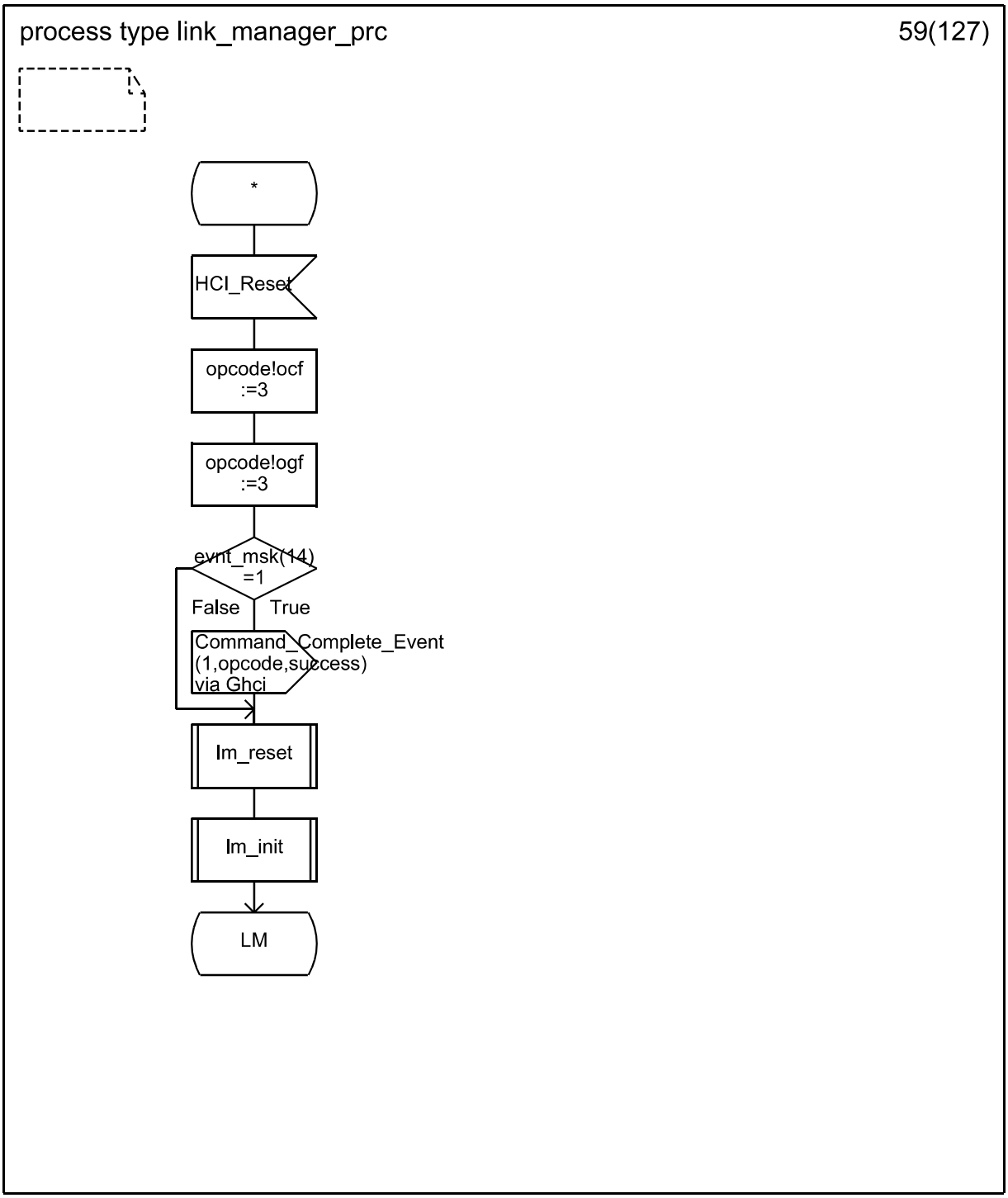
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B.3.60 link_manager_prc-58



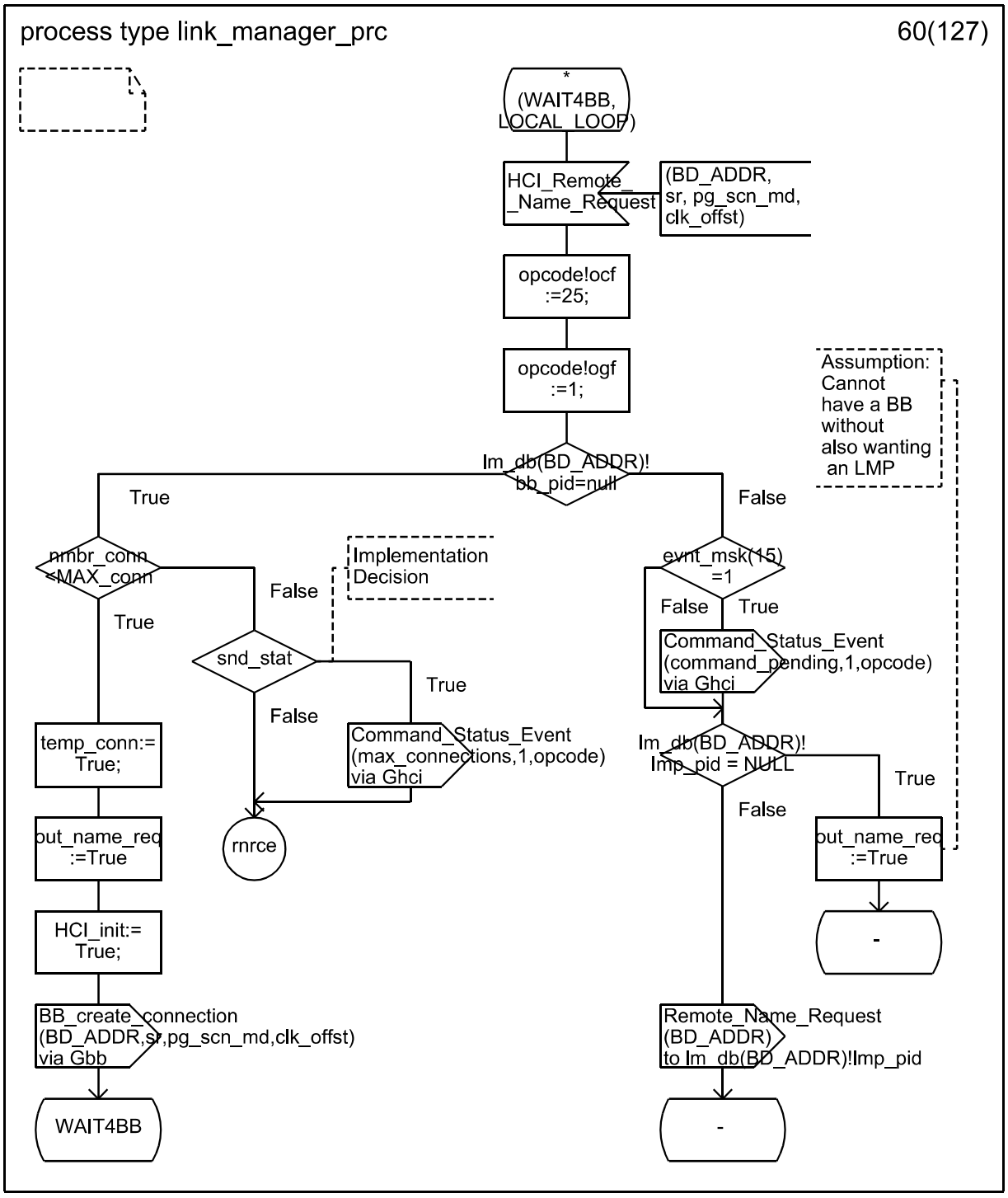
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B.3.61 link_manager_prc-59



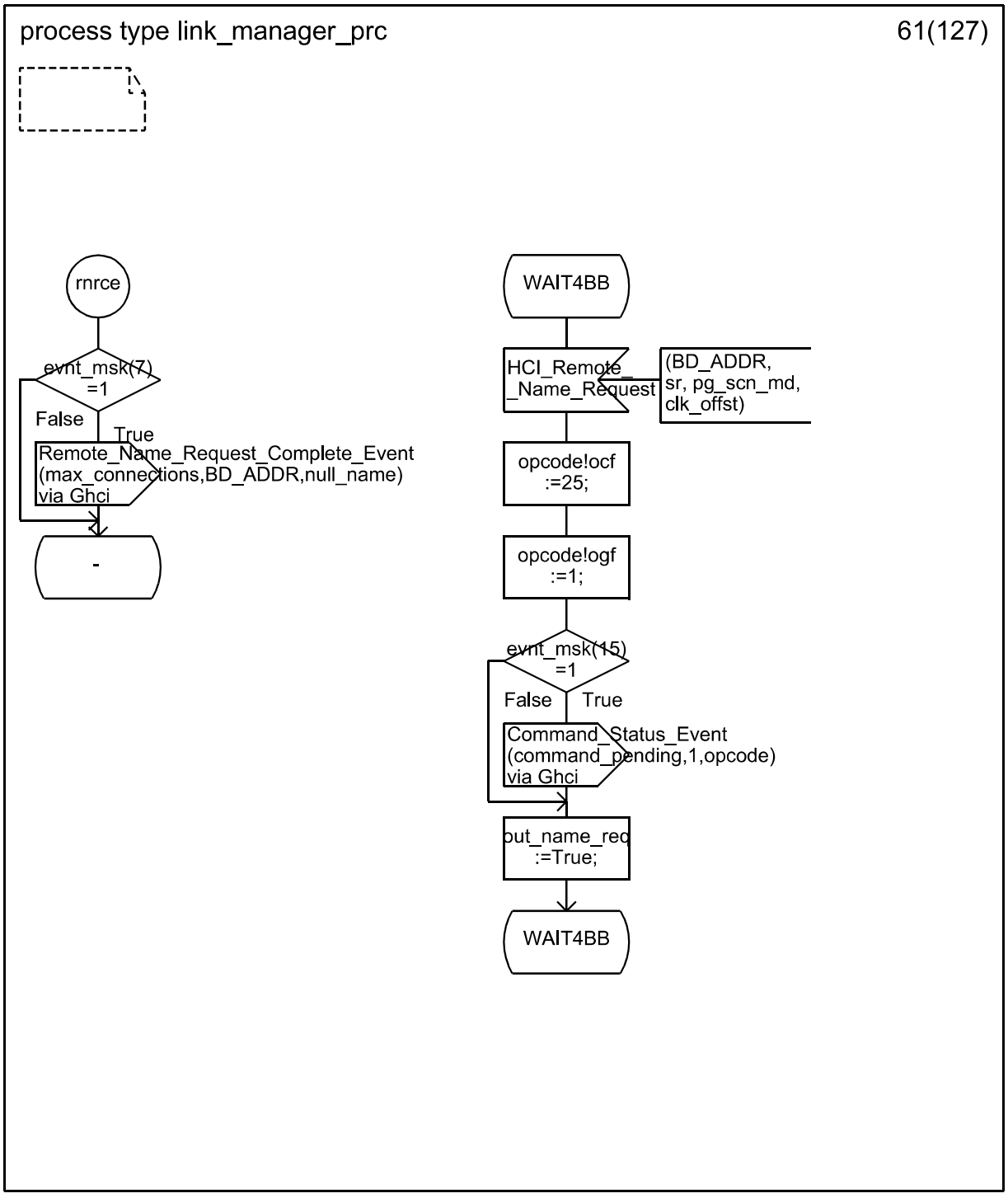
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B.3.62 link_manager_prc-60



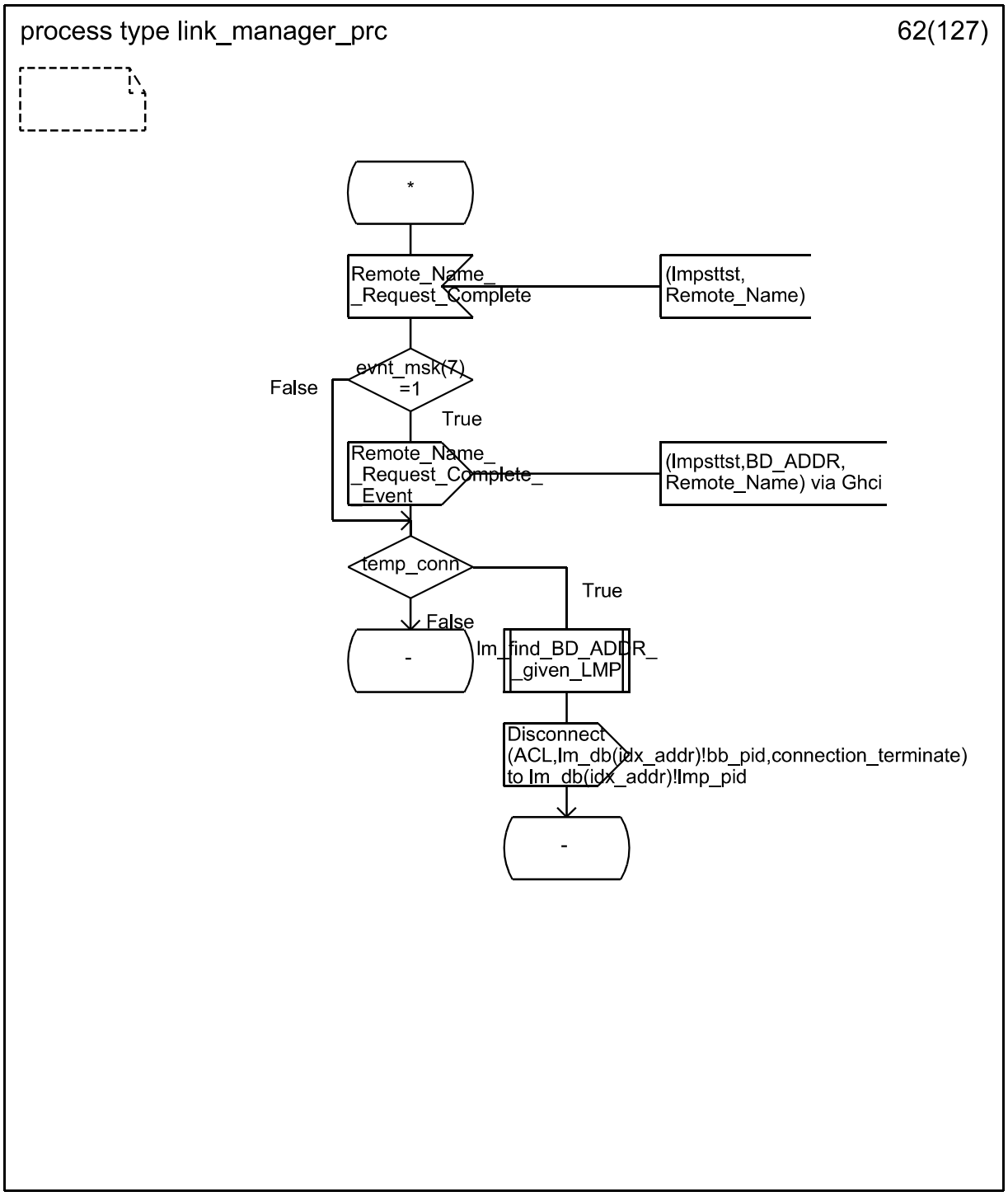
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B.3.63 link_manager_prc-61



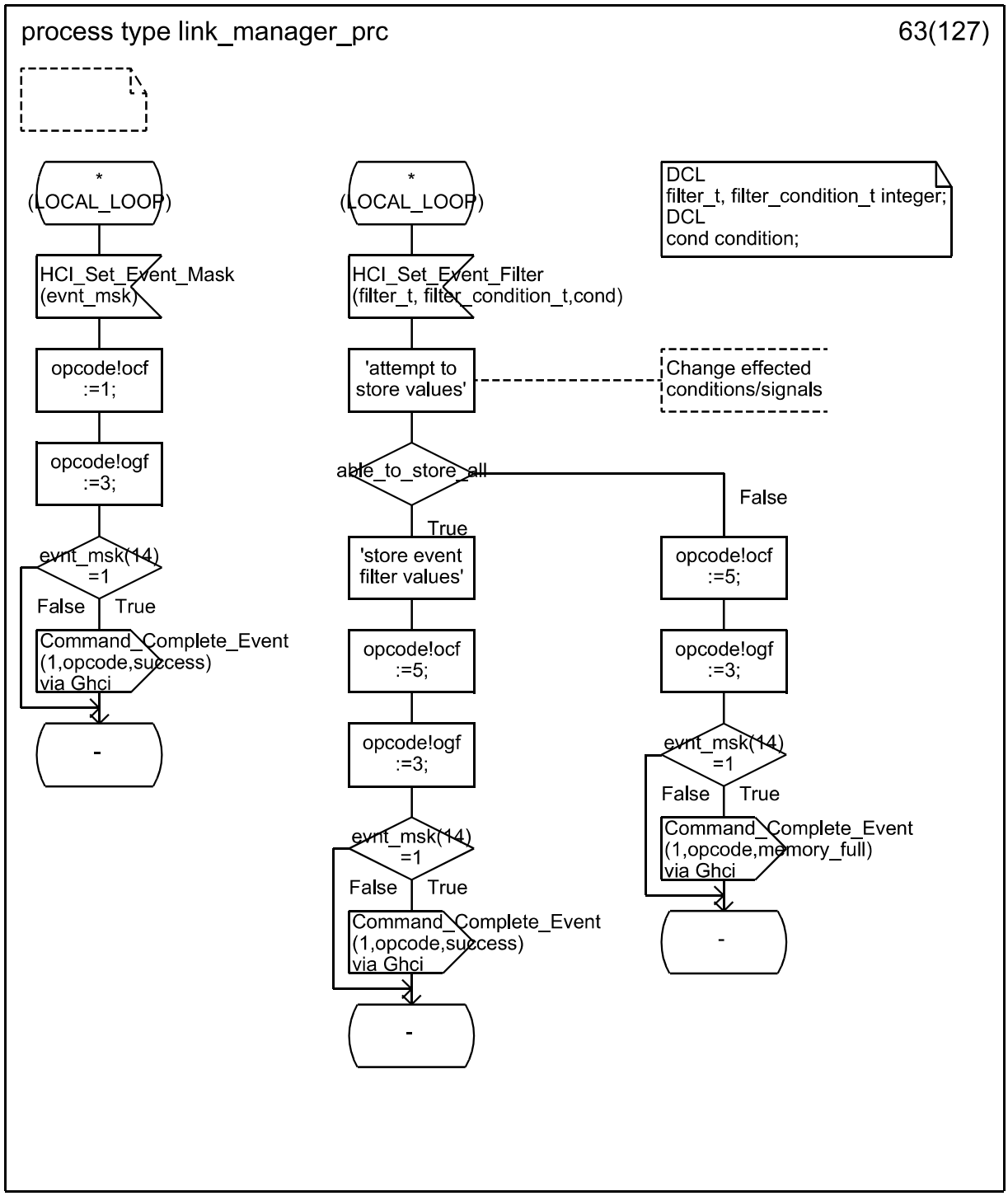
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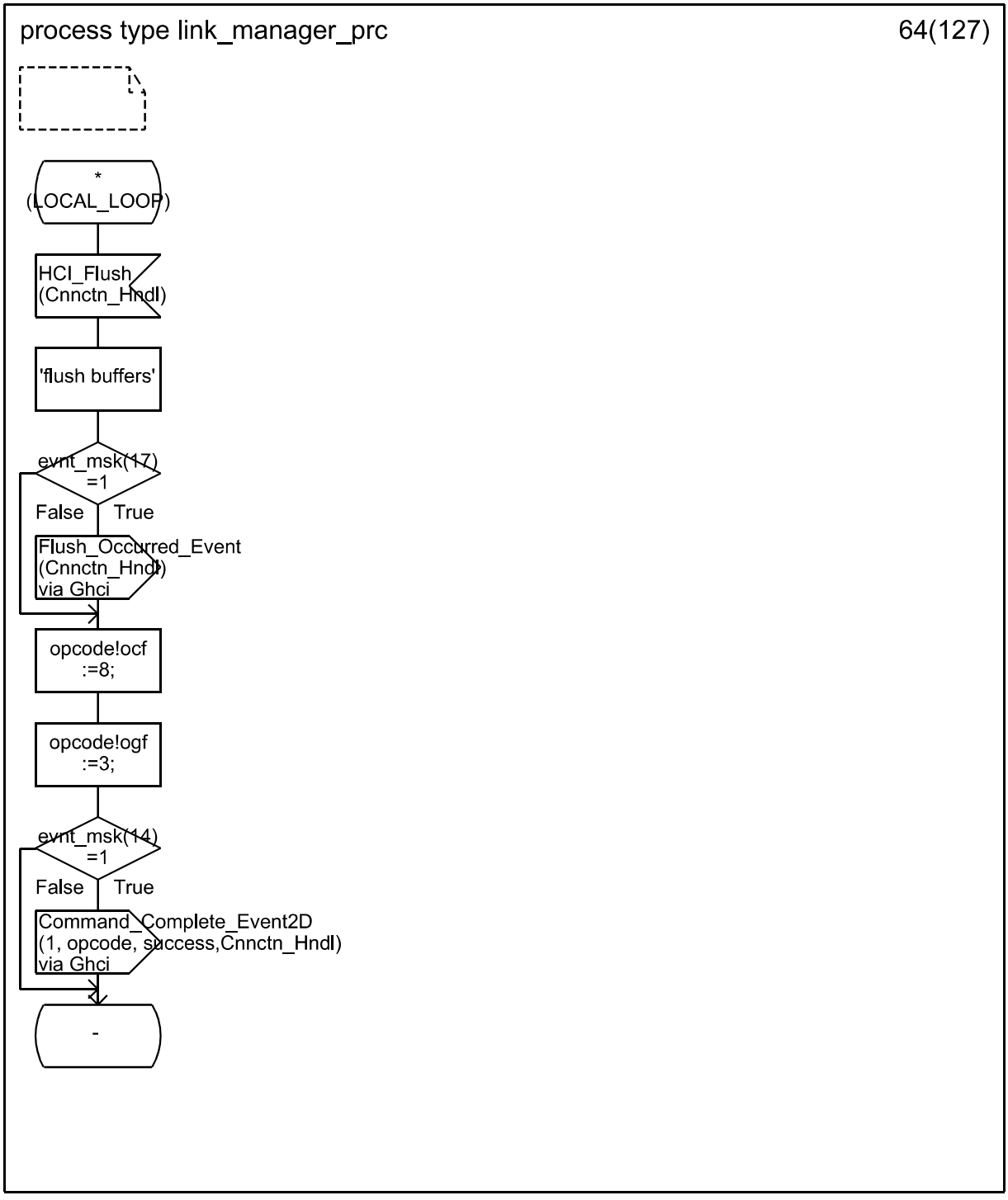
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B.3.65 link_manager_prc-63



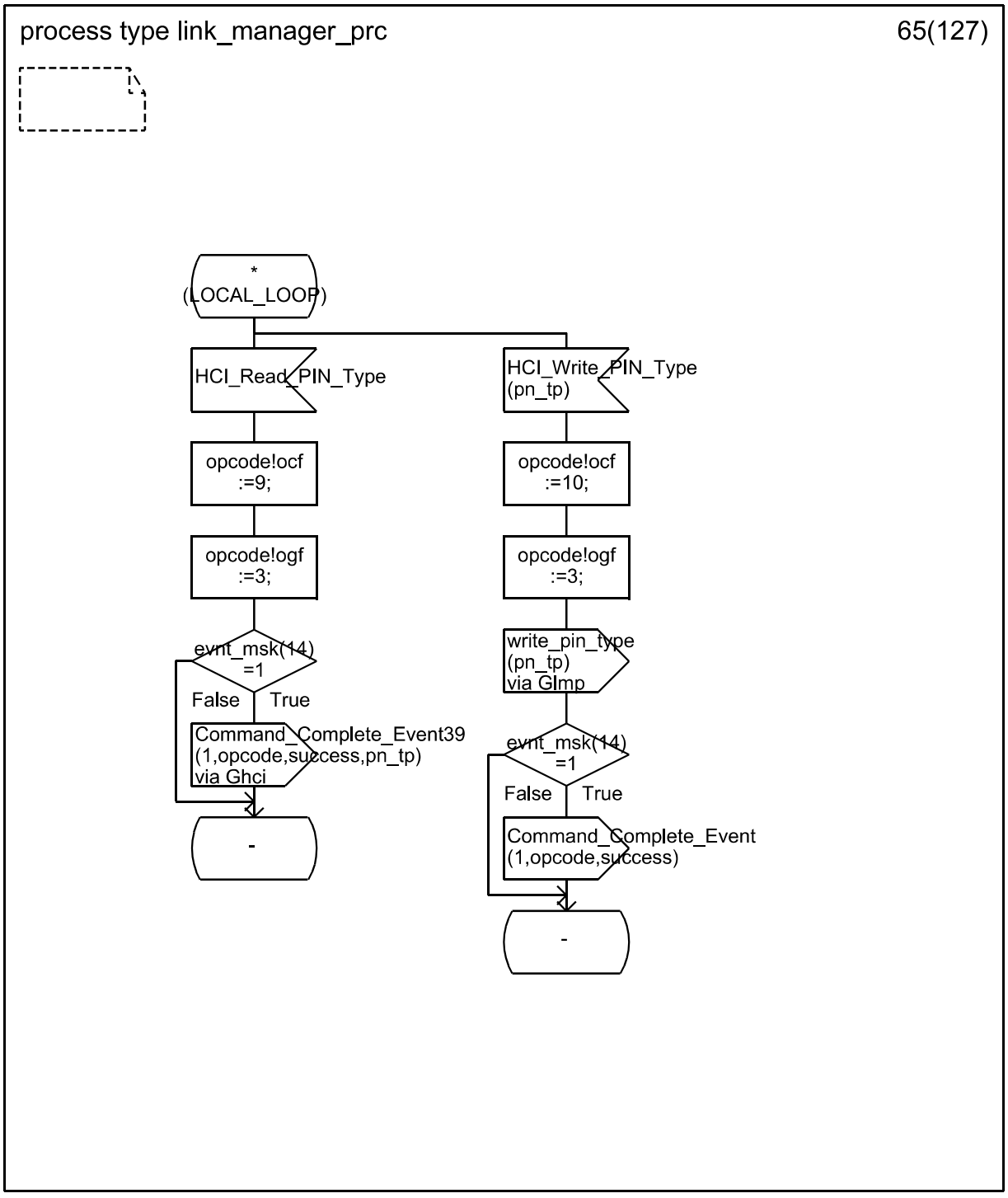
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B.3.66 link_manager_prc-64



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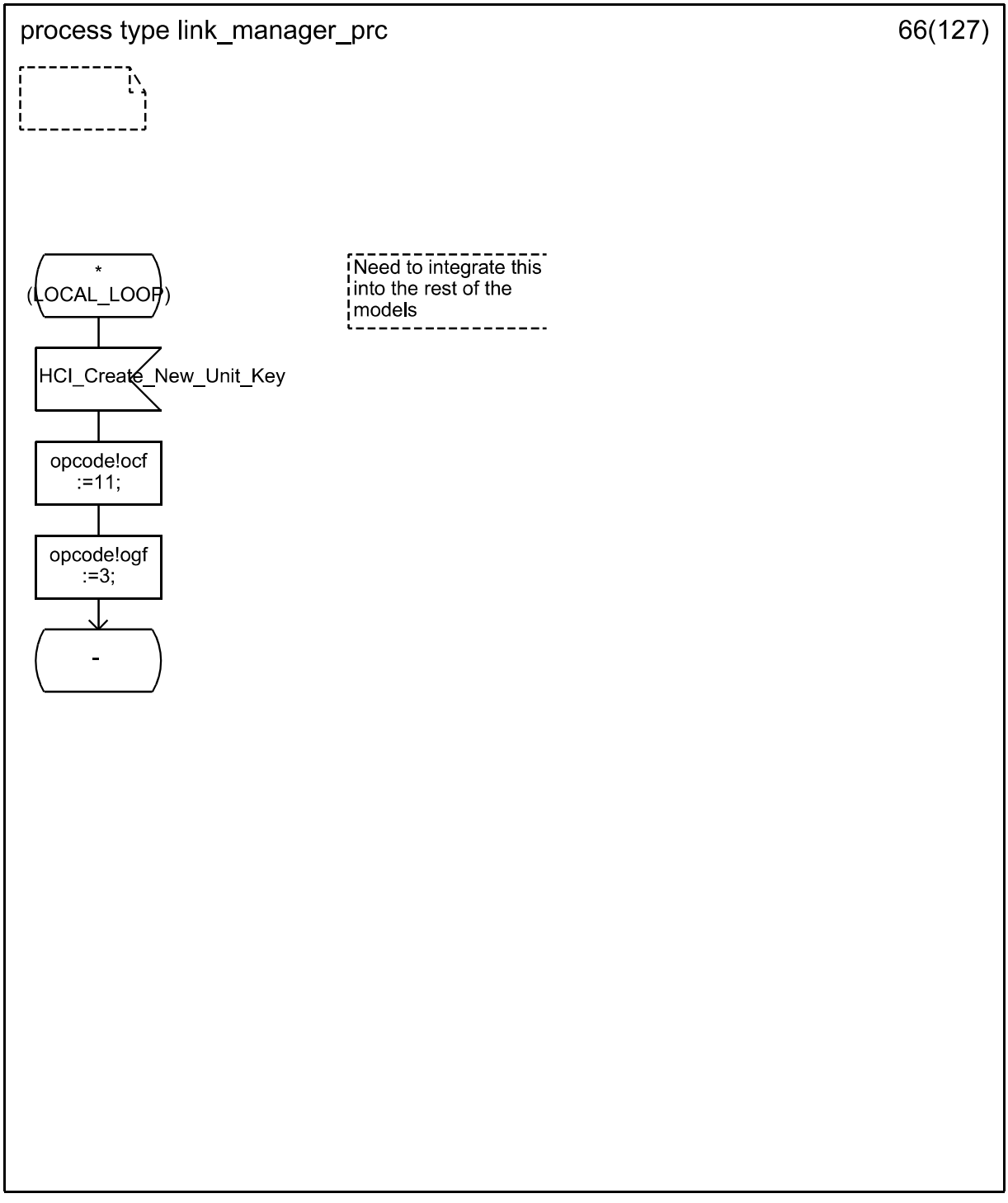
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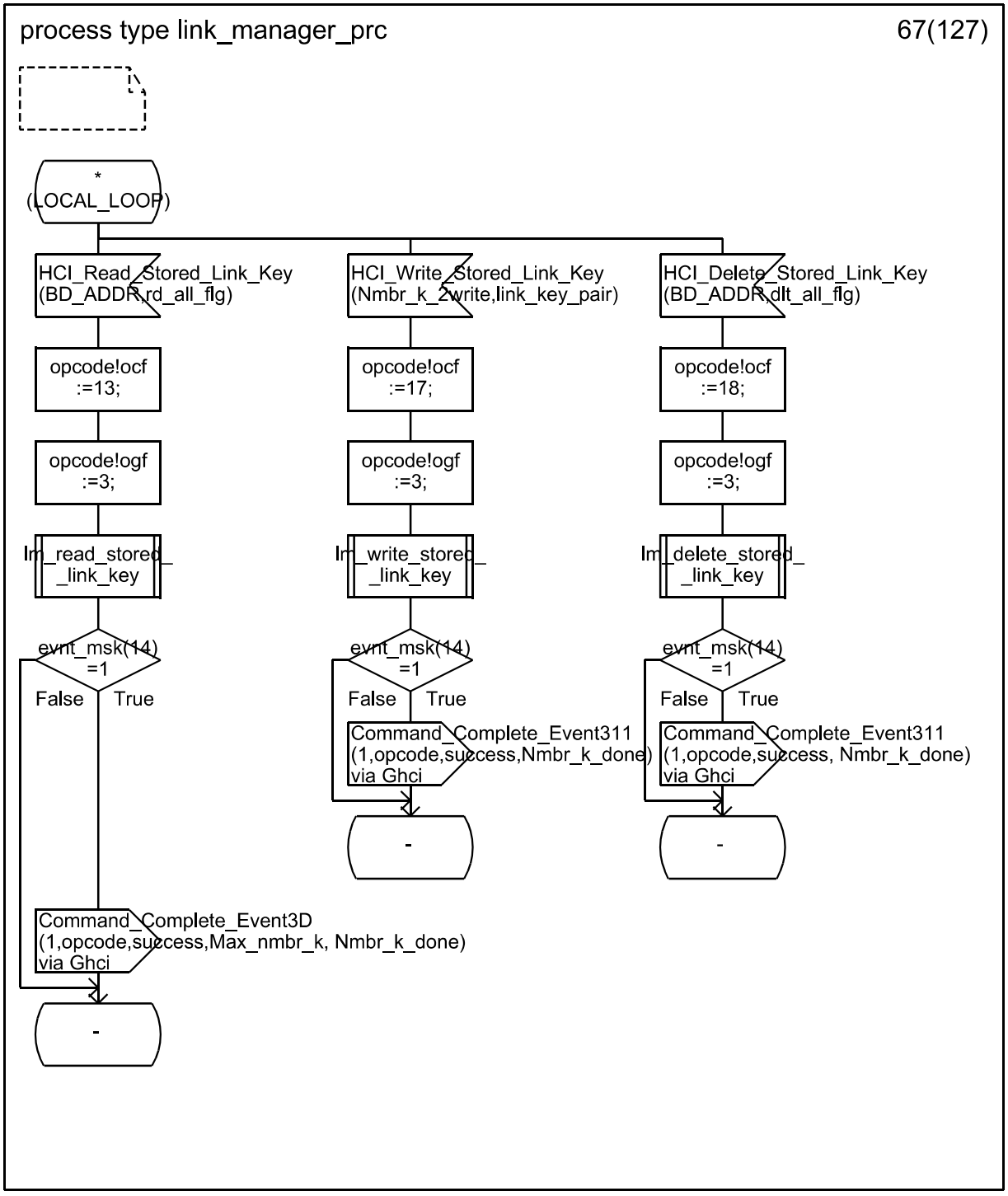
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B.3.68 link_manager_prc-66



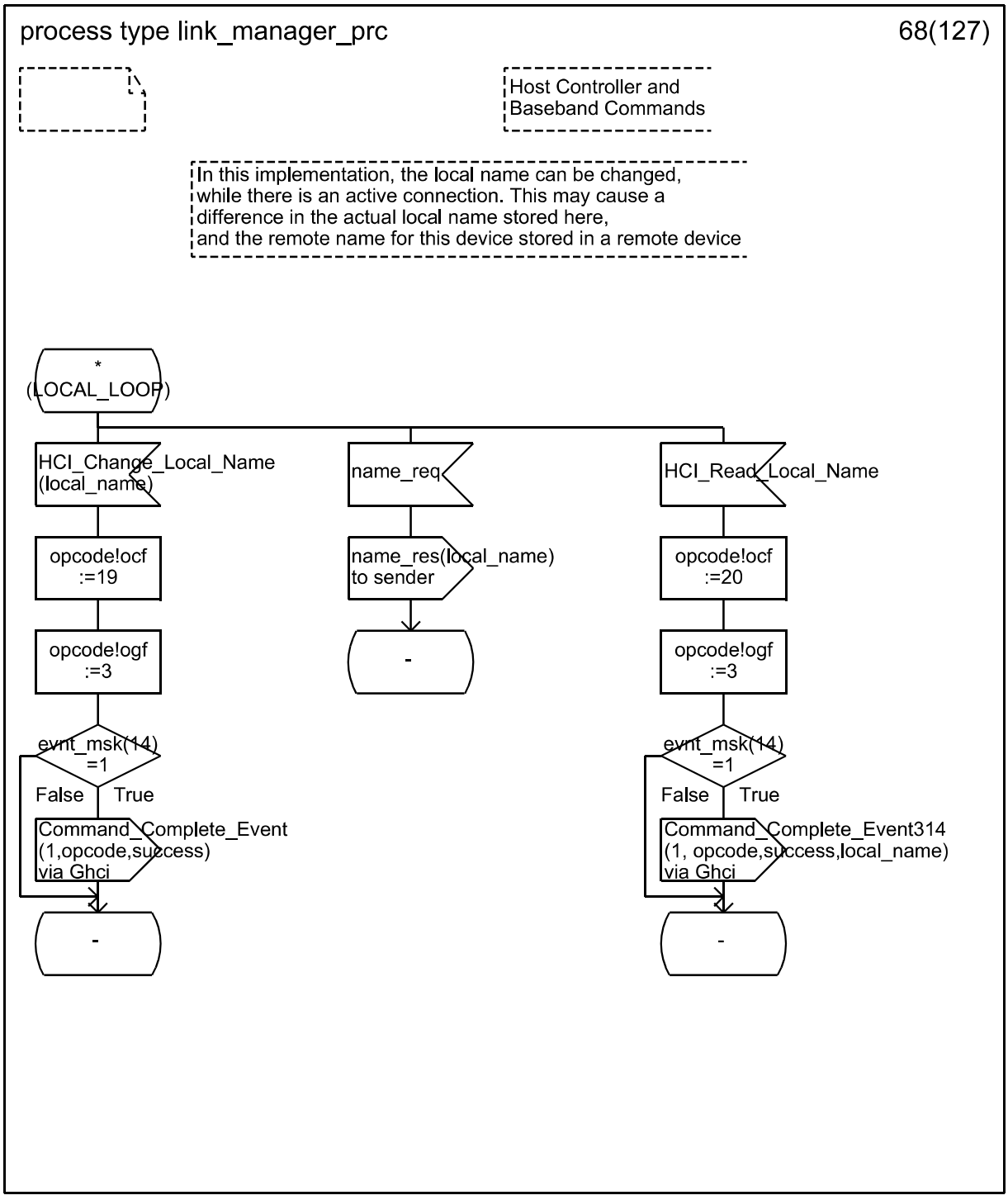
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B.3.69 link_manager_prc-67



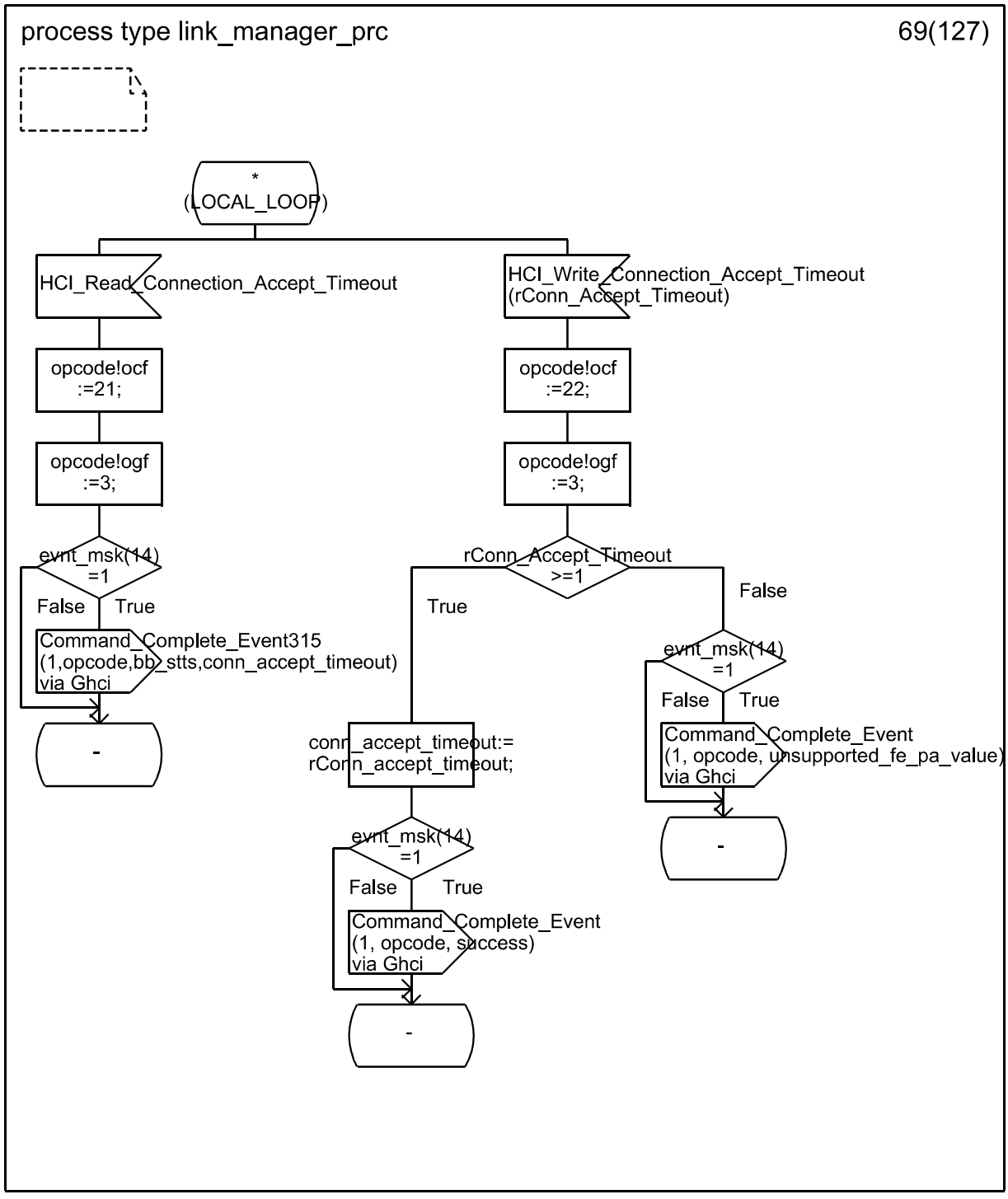
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B.3.70 link_manager_prc-68



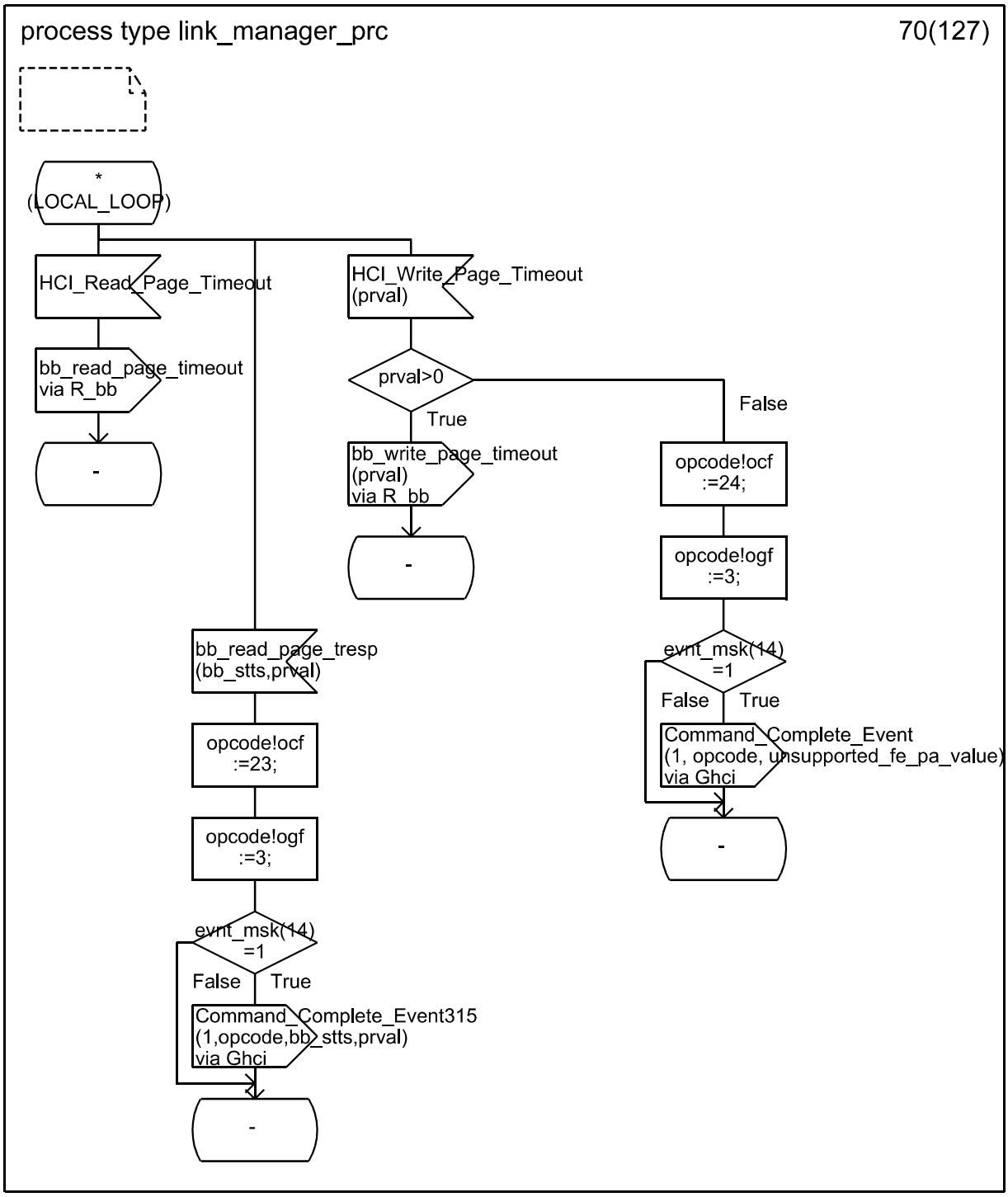
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B.3.71 link_manager_prc-69



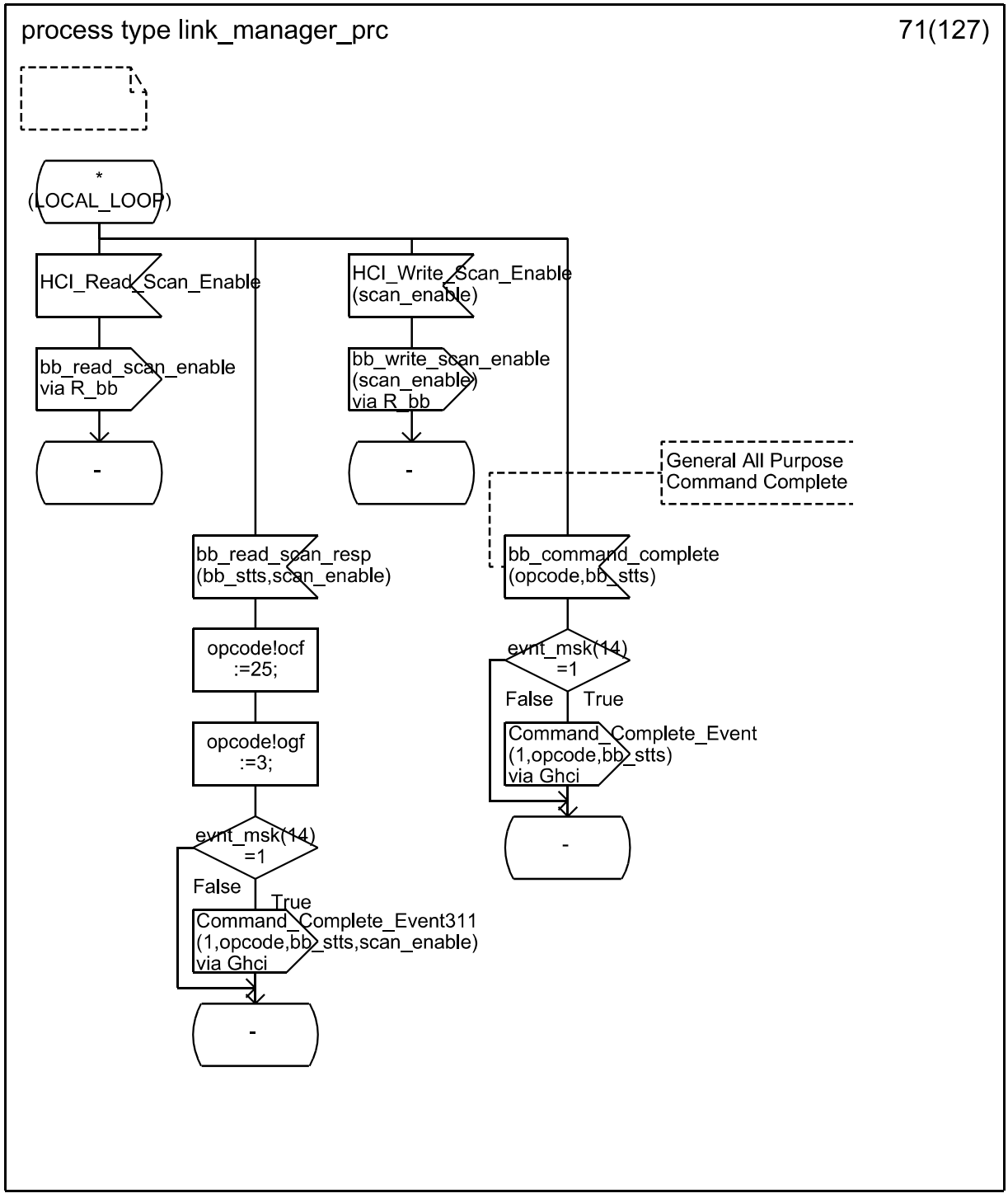
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B.3.72 link_manager_prc-70



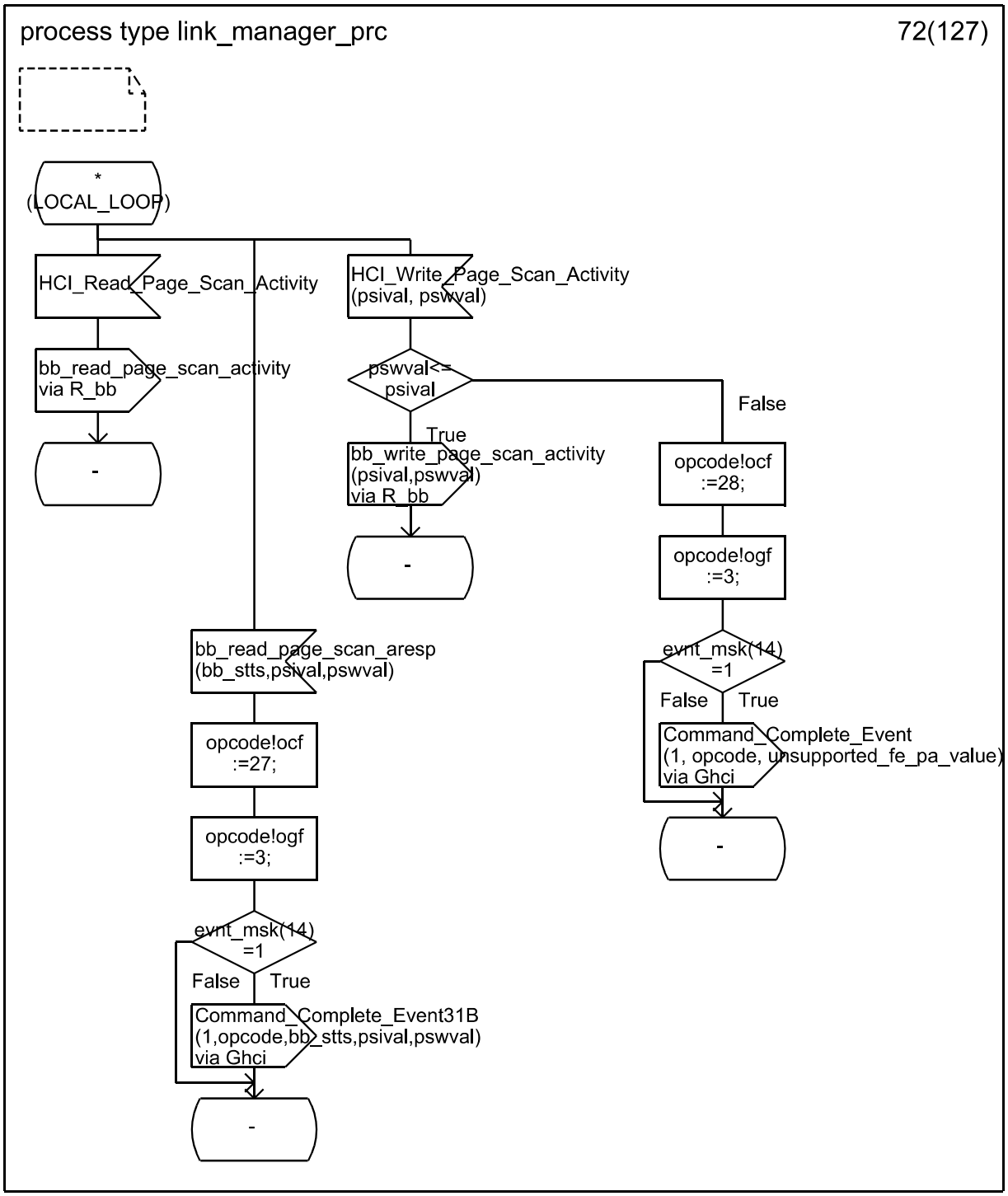
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B.3.73 link_manager_prc-71



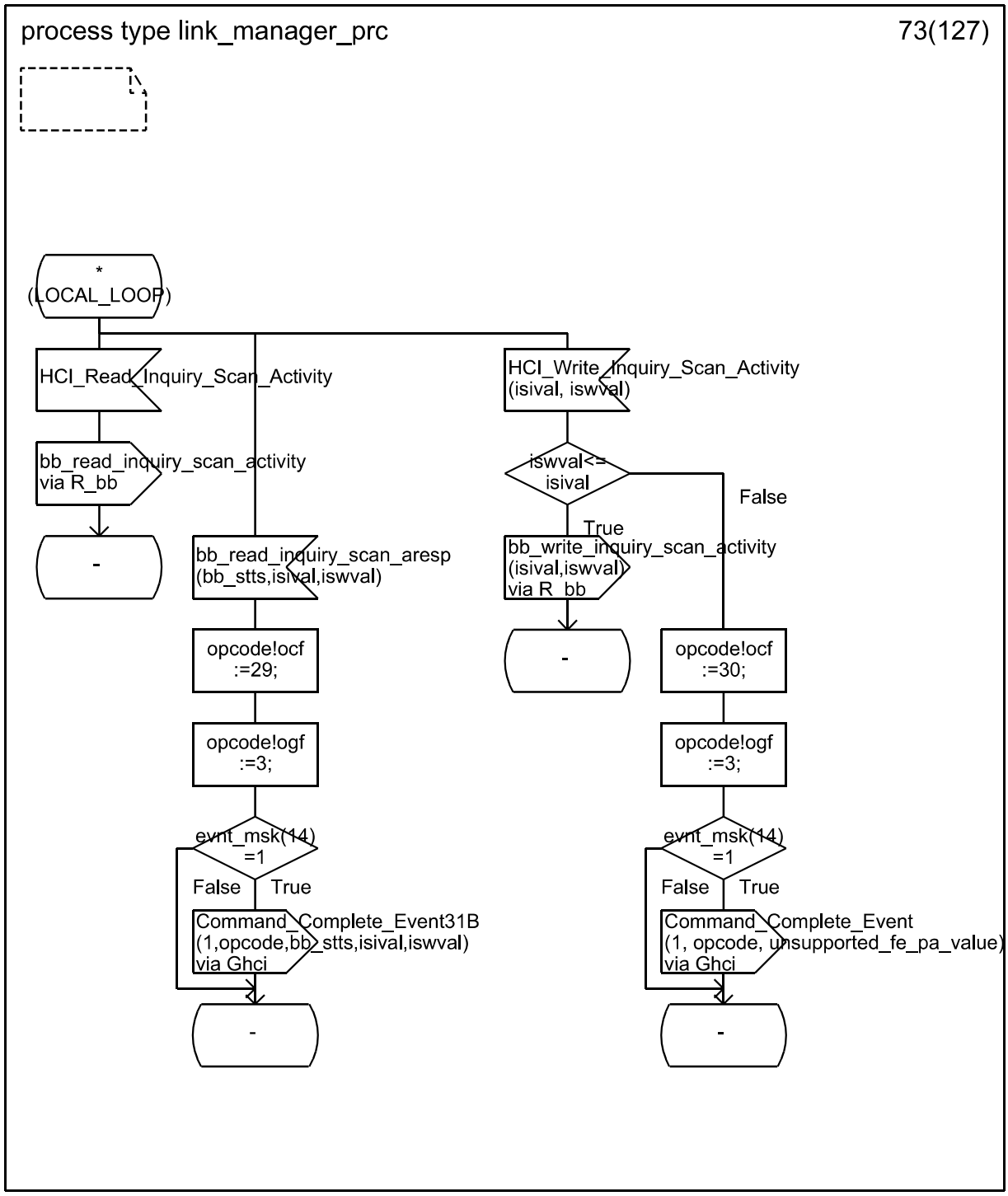
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B.3.74 link_manager_prc-72



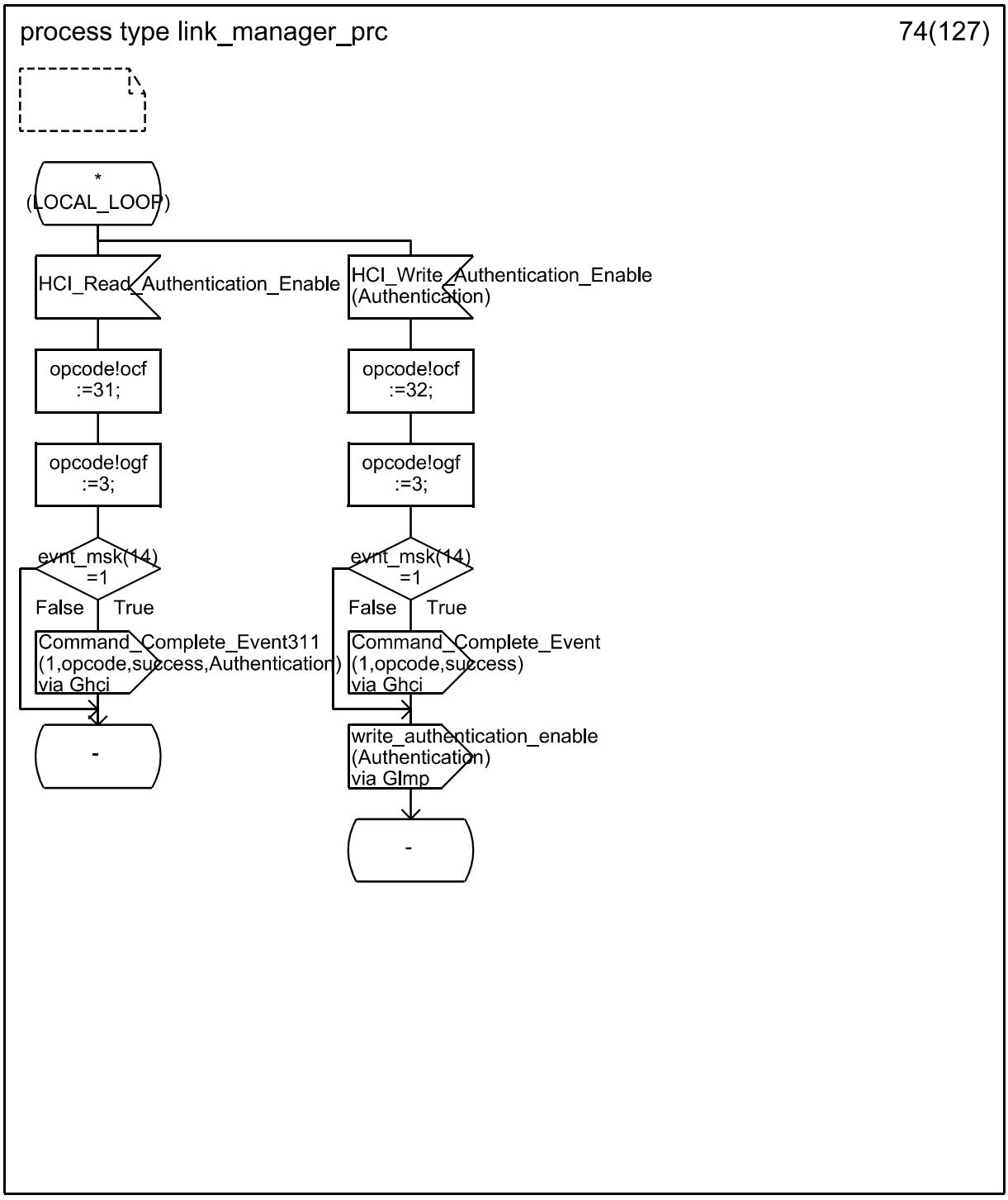
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B.3.75 link_manager_prc-73



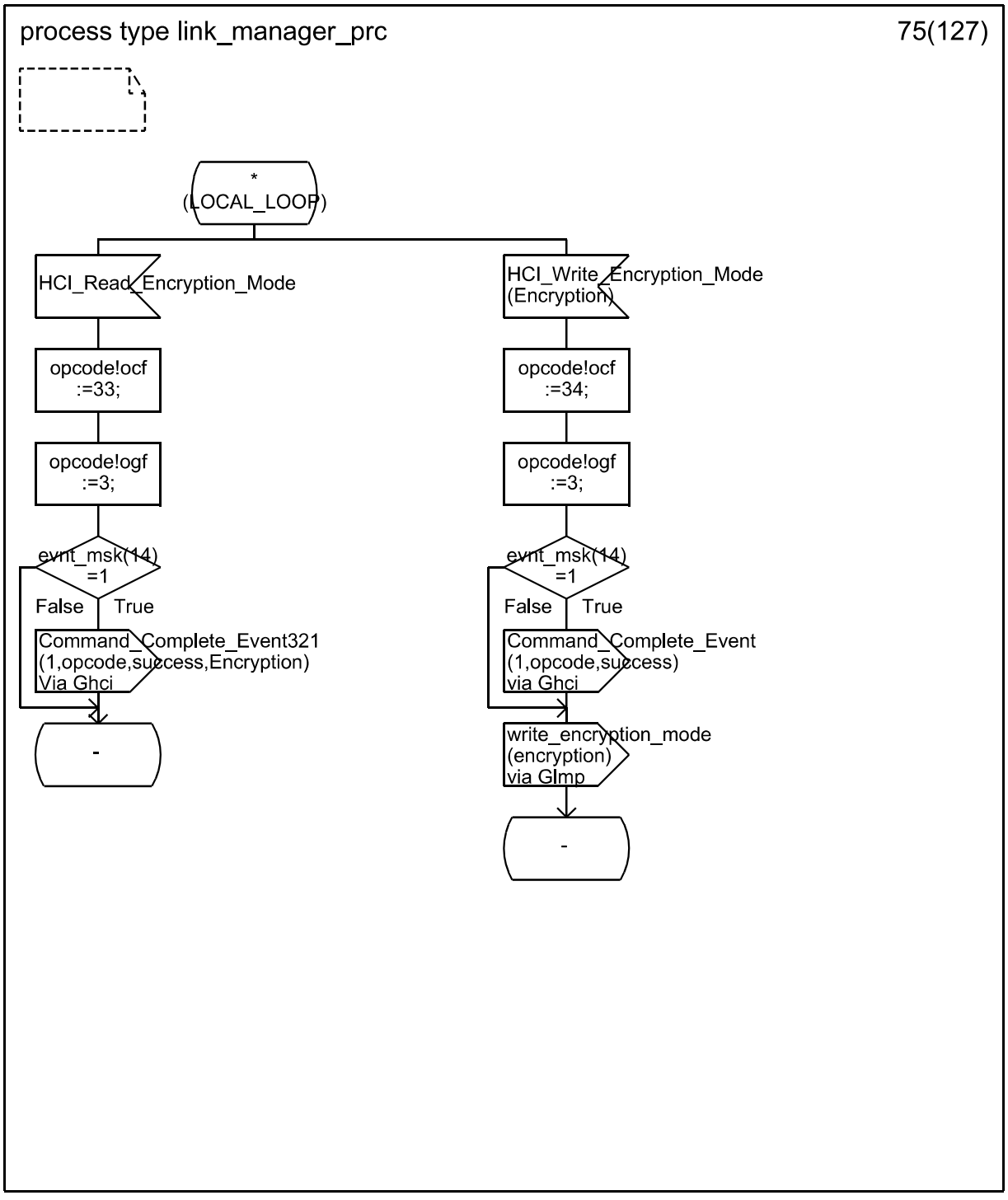
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B.3.76 link_manager_prc-74



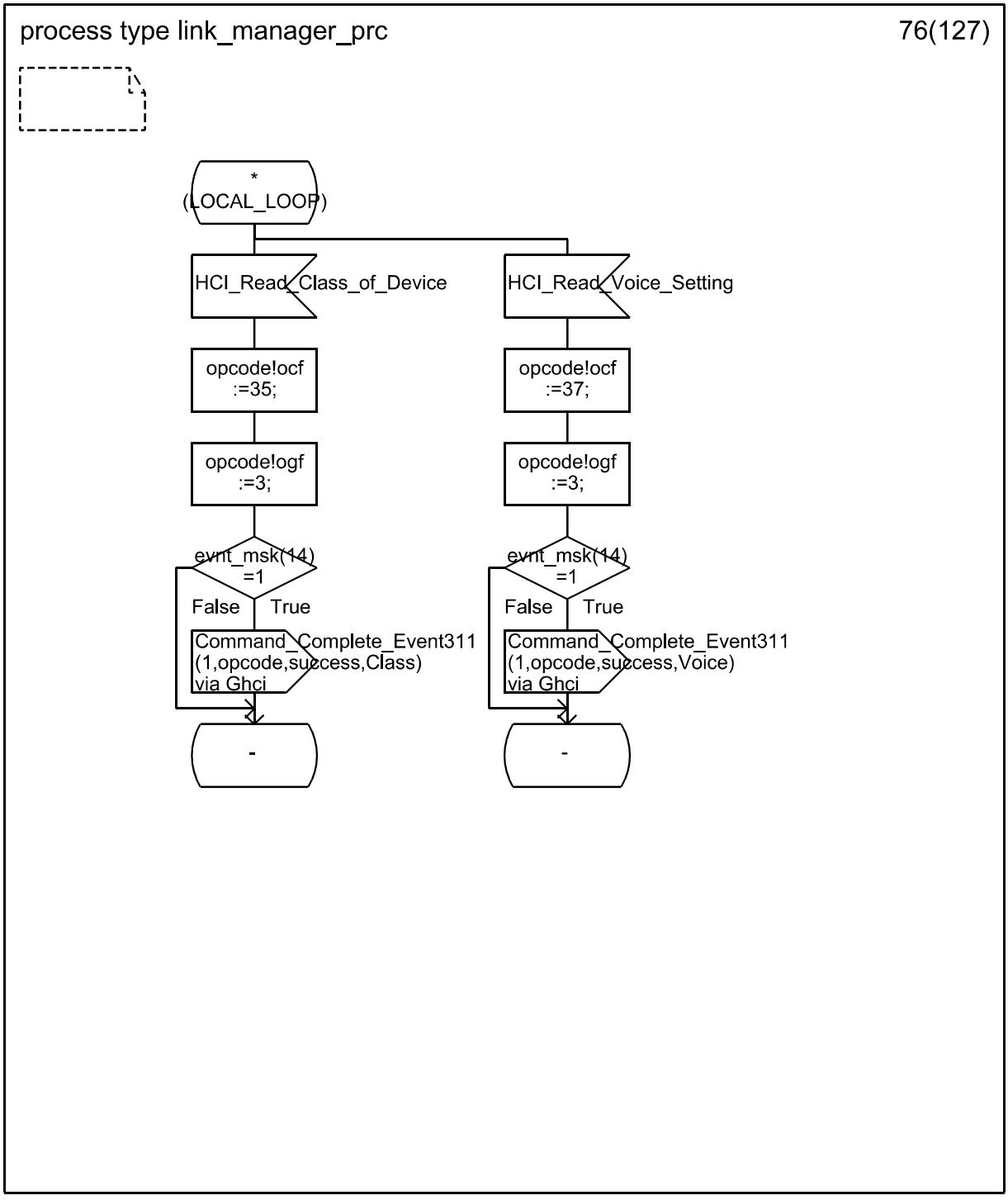
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B.3.77 link_manager_prc-75



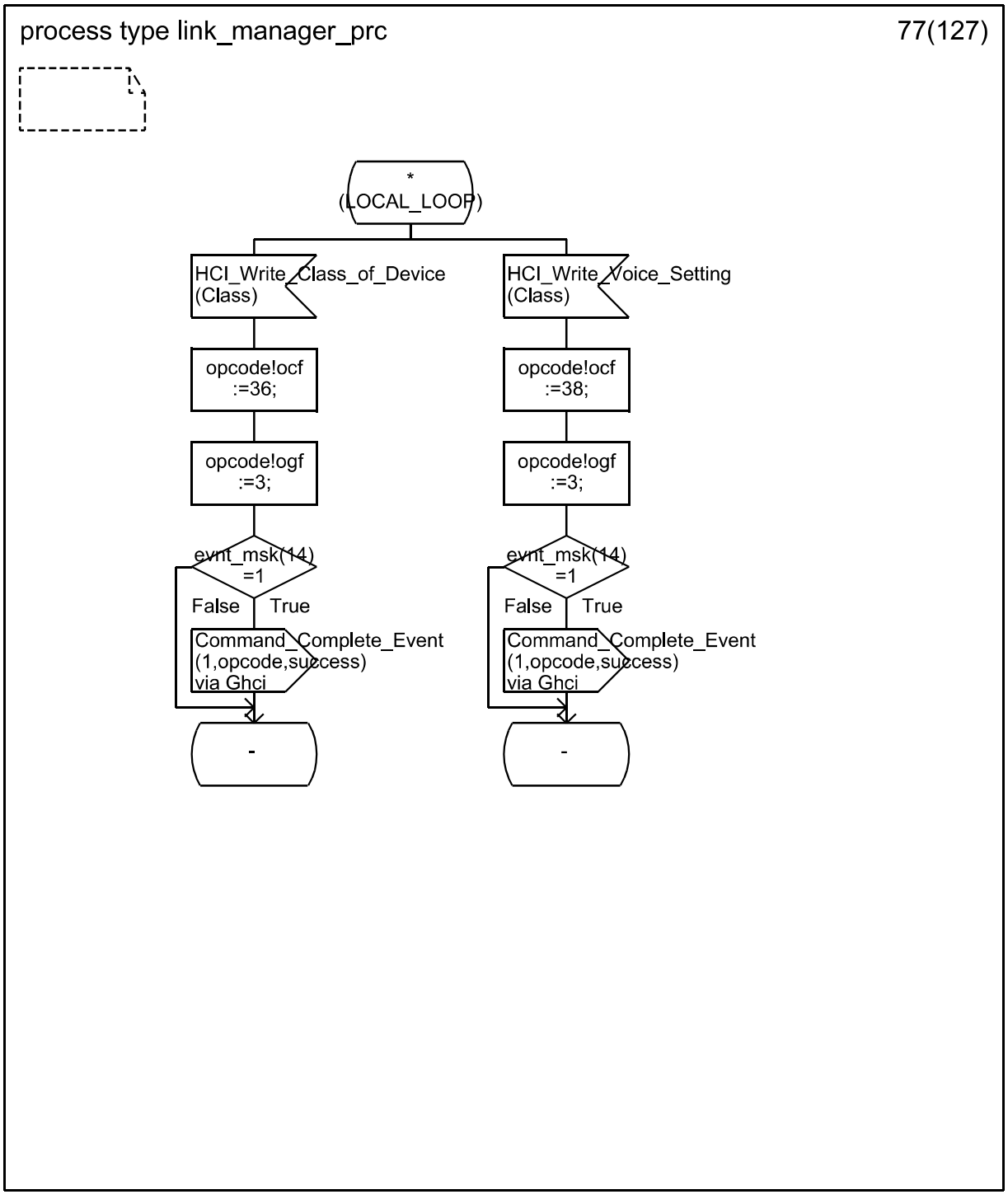
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B.3.78 link_manager_prc-76



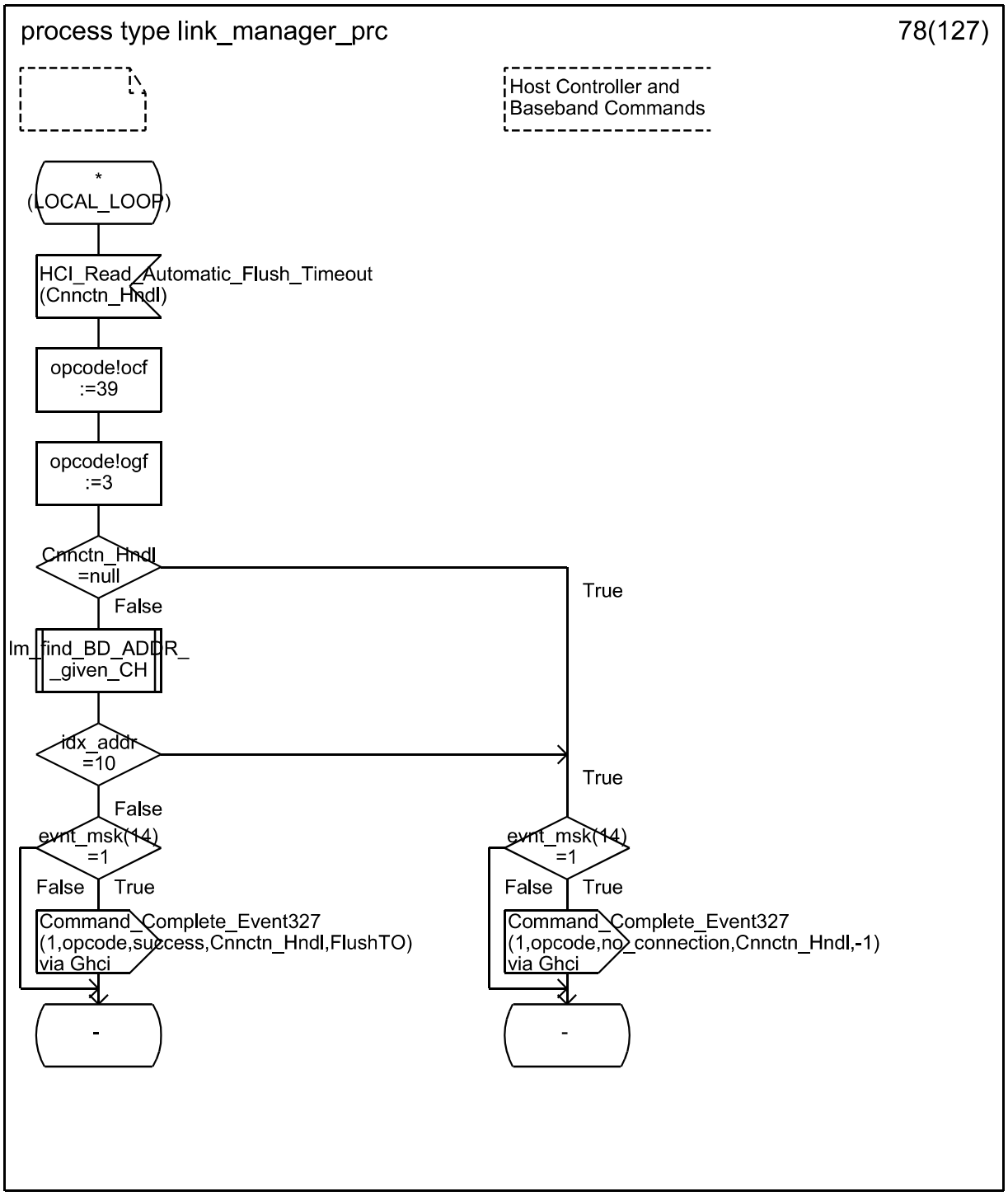
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B.3.79 link_manager_prc-77



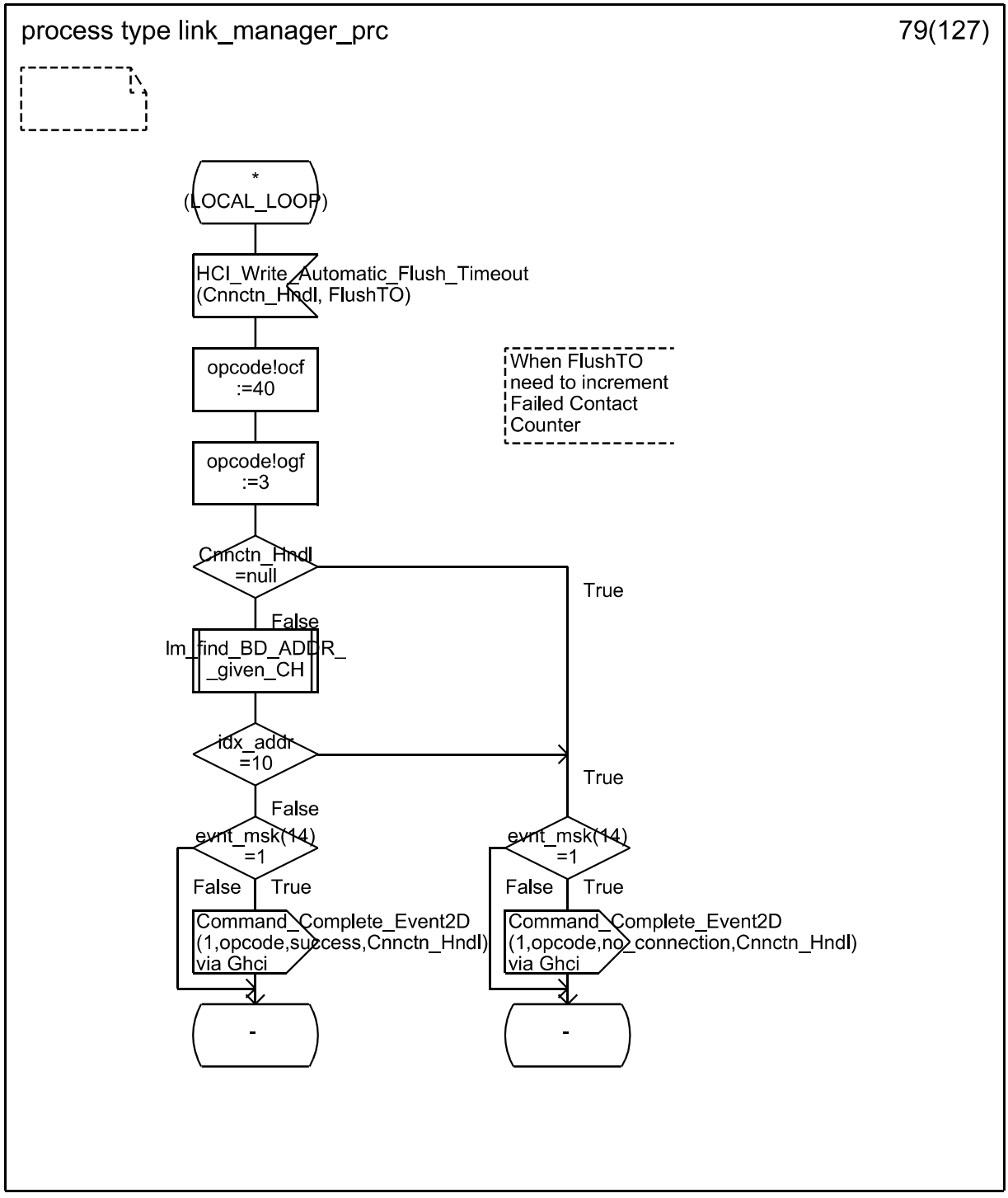
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B.3.80 link_manager_prc-78



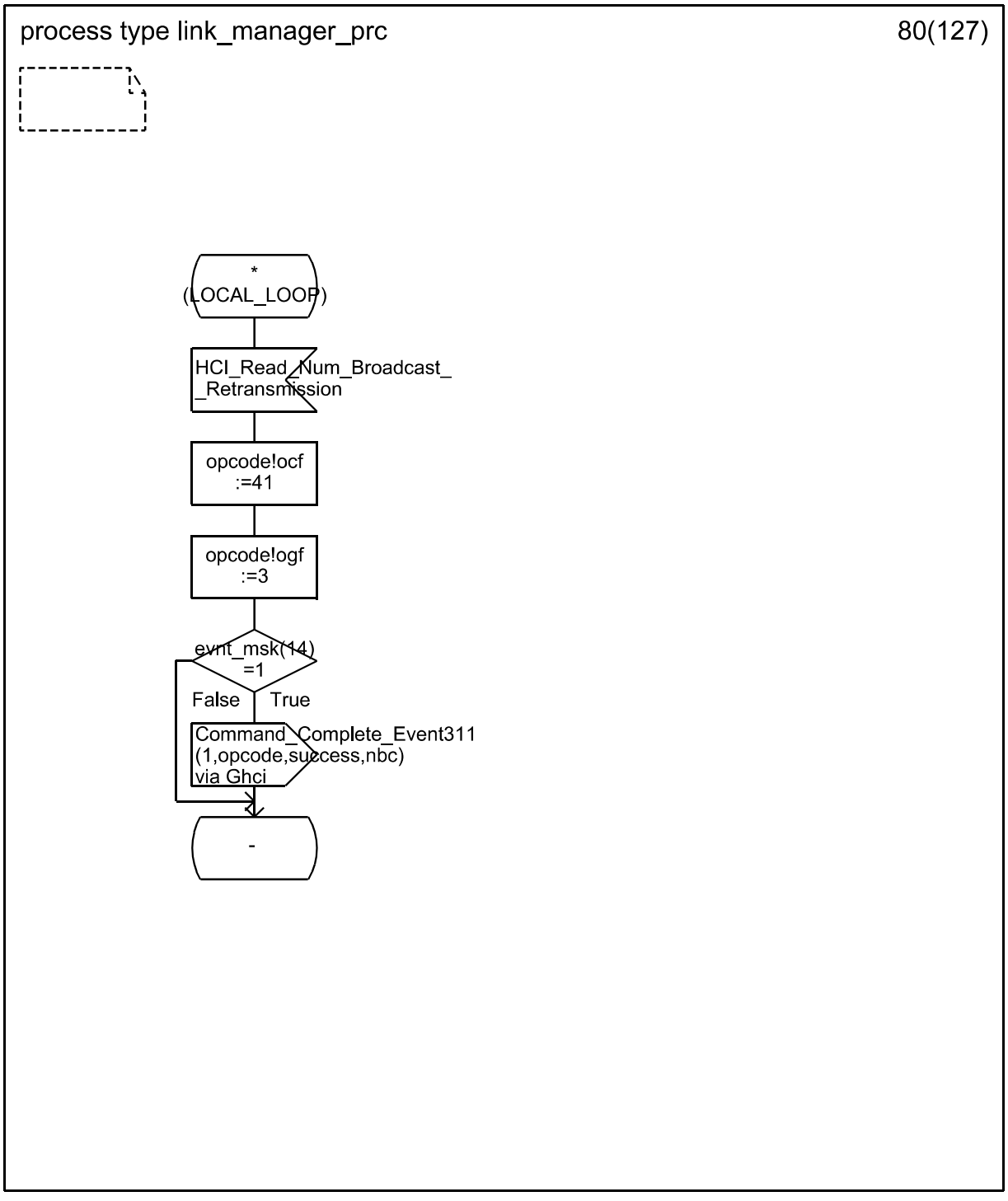
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B.3.81 link_manager_prc-79



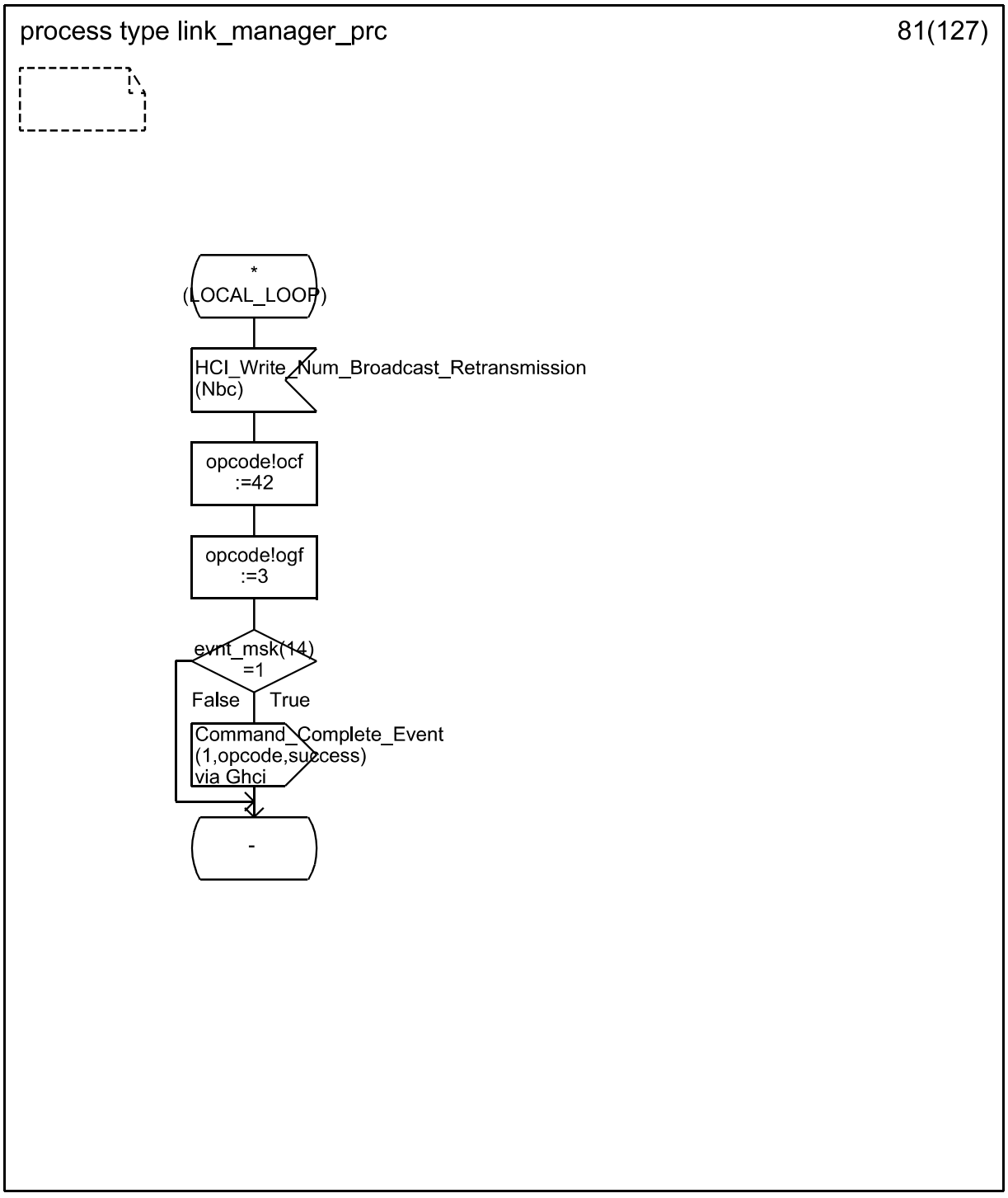
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B.3.82 link_manager_prc-80



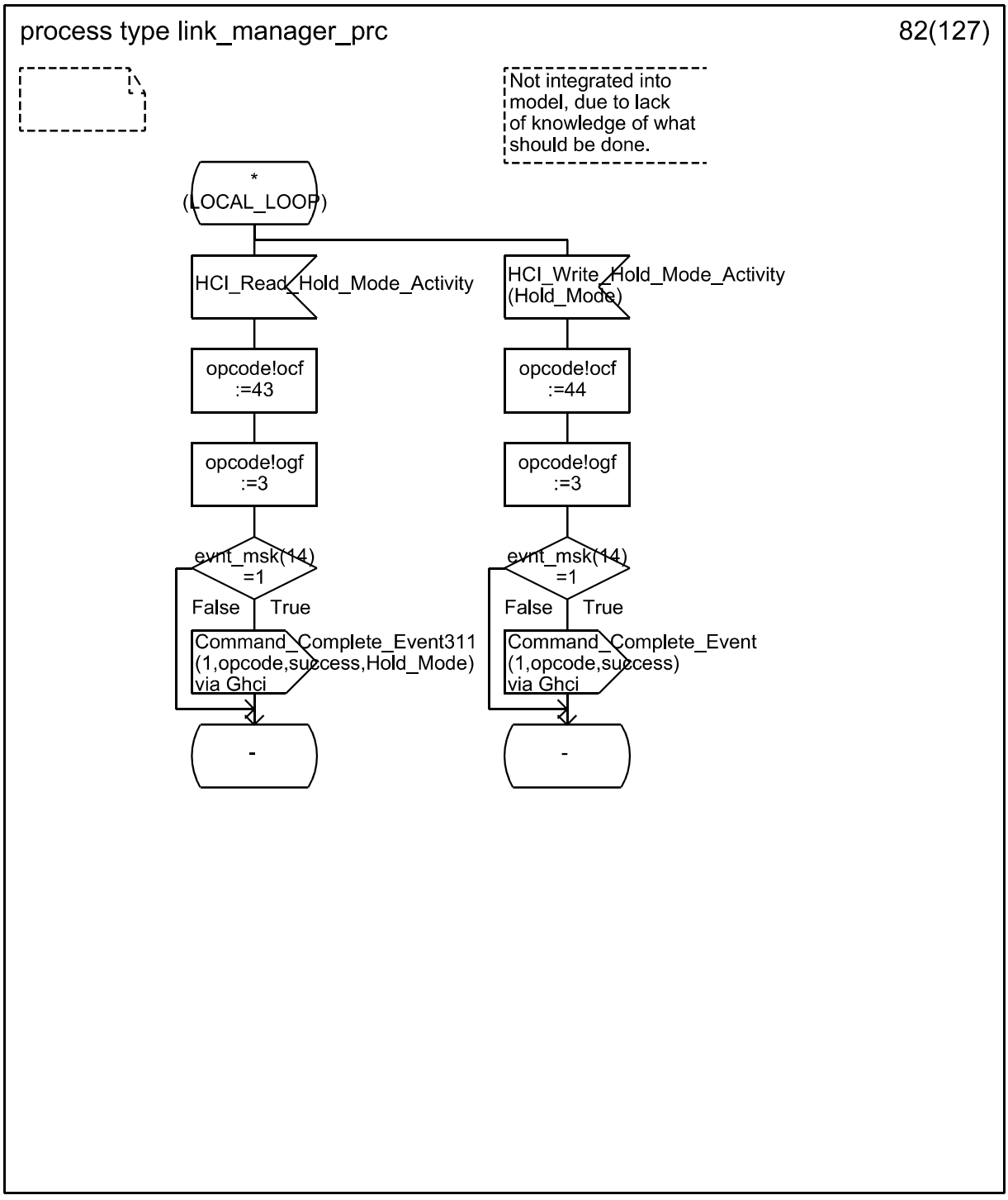
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B.3.83 link_manager_prc-81



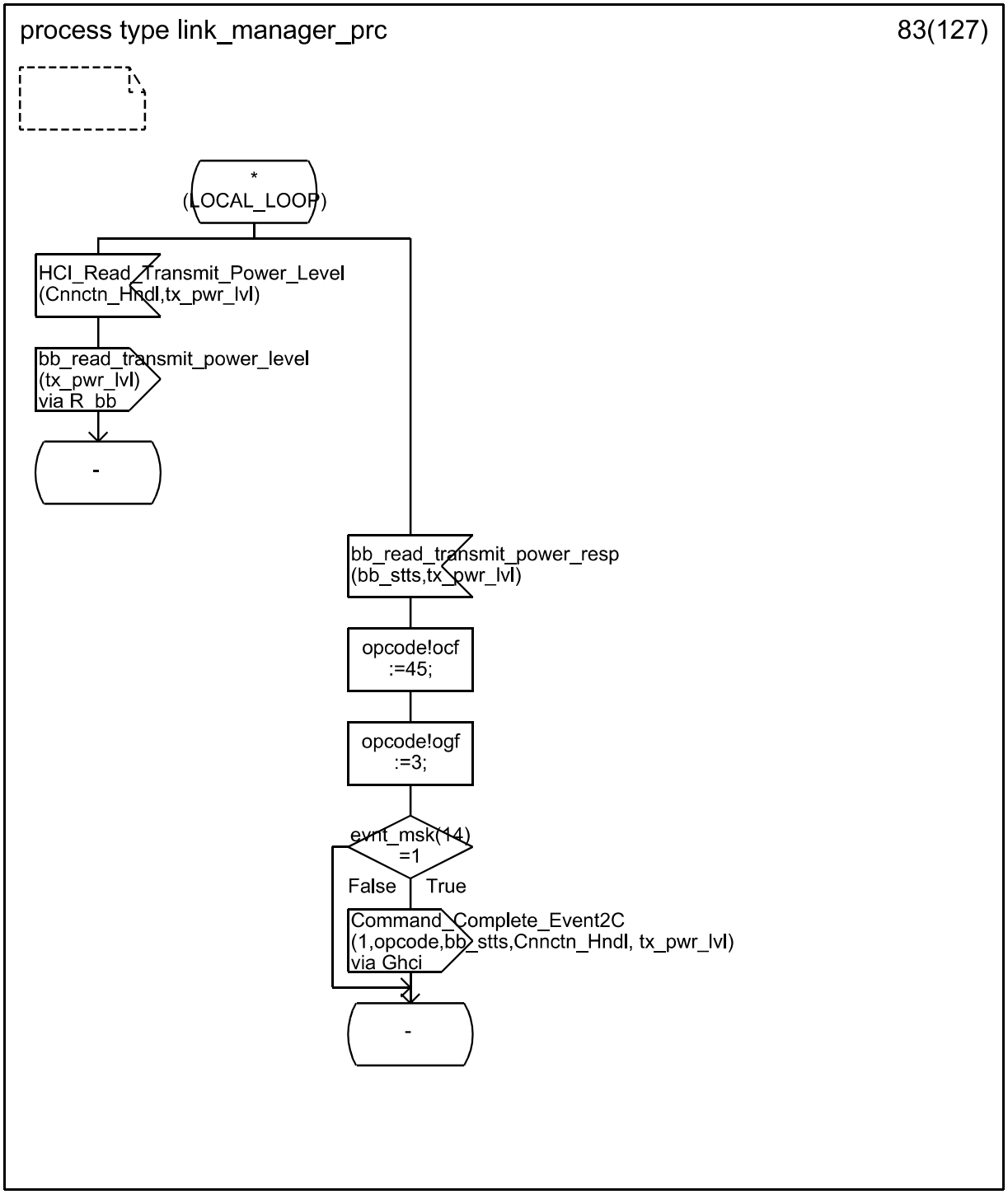
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B.3.84 link_manager_prc-82



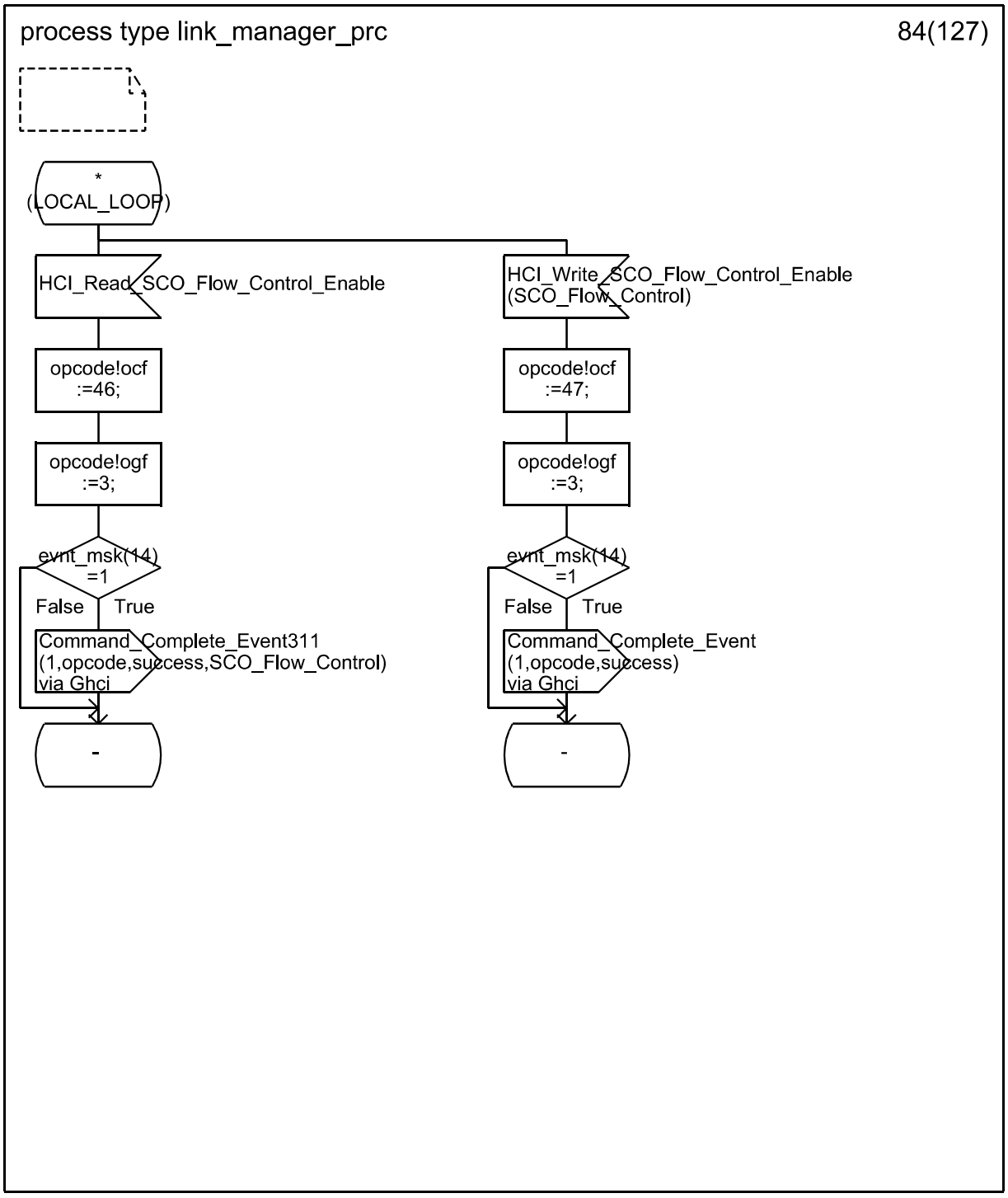
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B.3.85 link_manager_prc-83



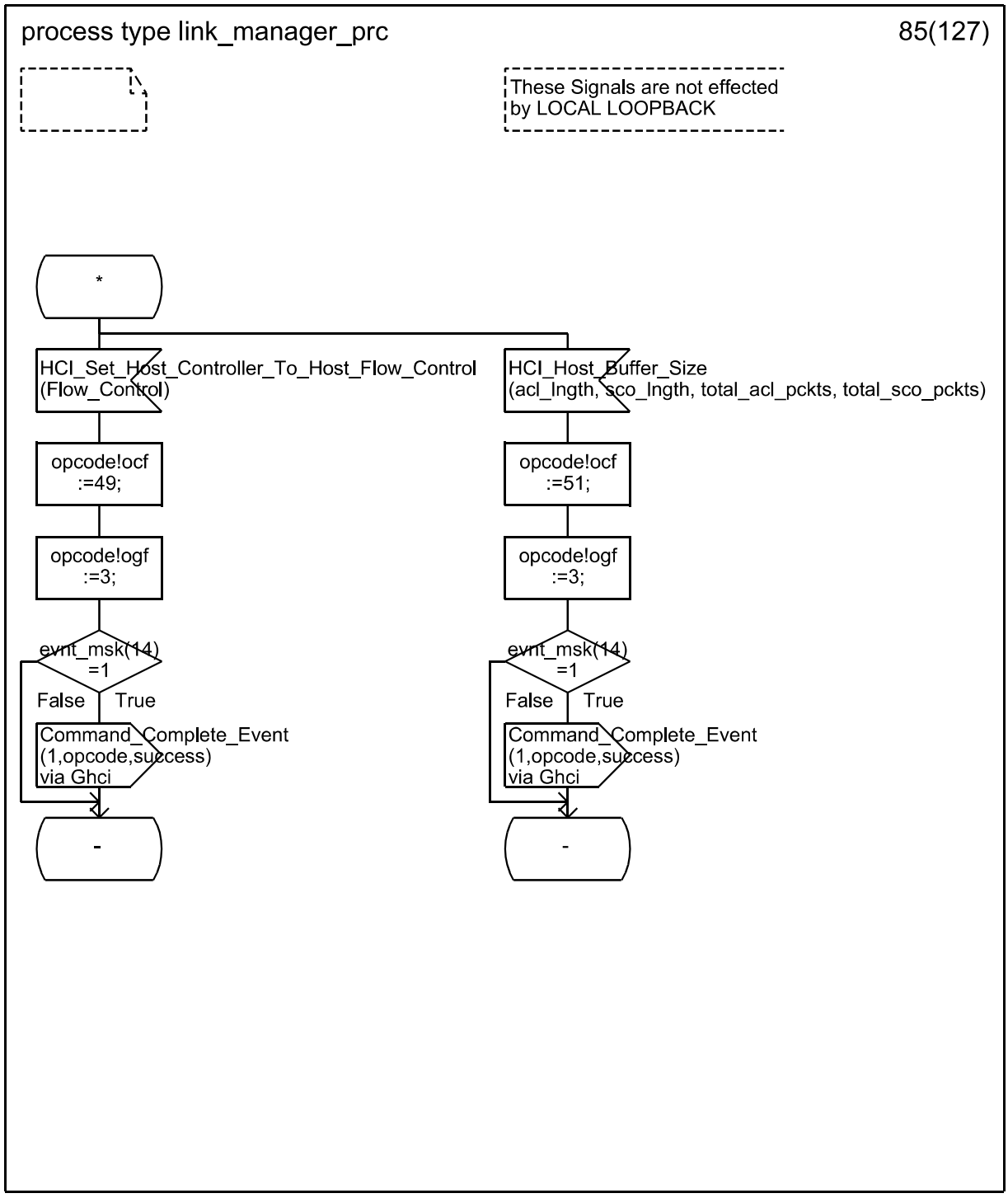
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B.3.86 link_manager_prc-84



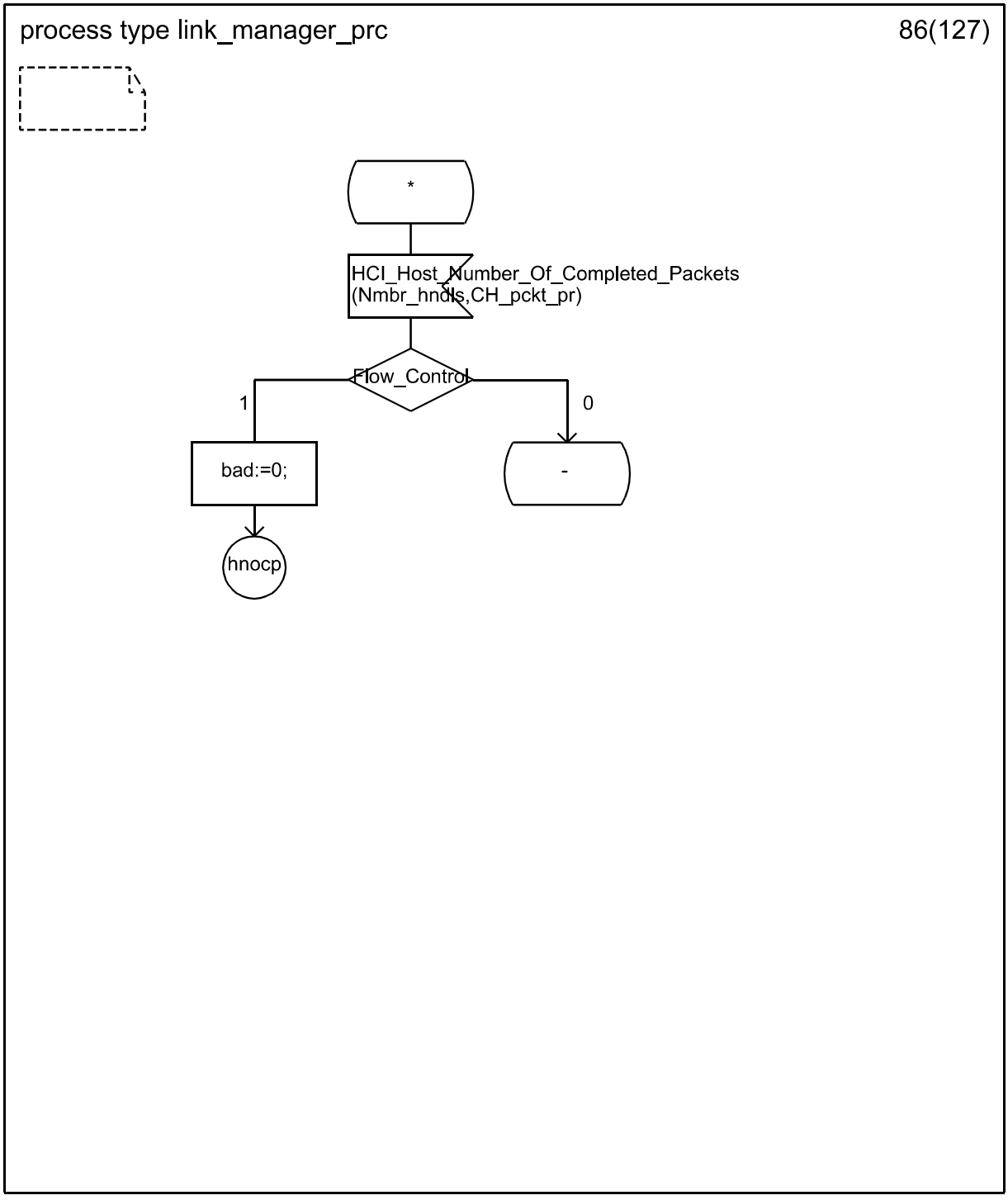
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B.3.87 link_manager_prc-85



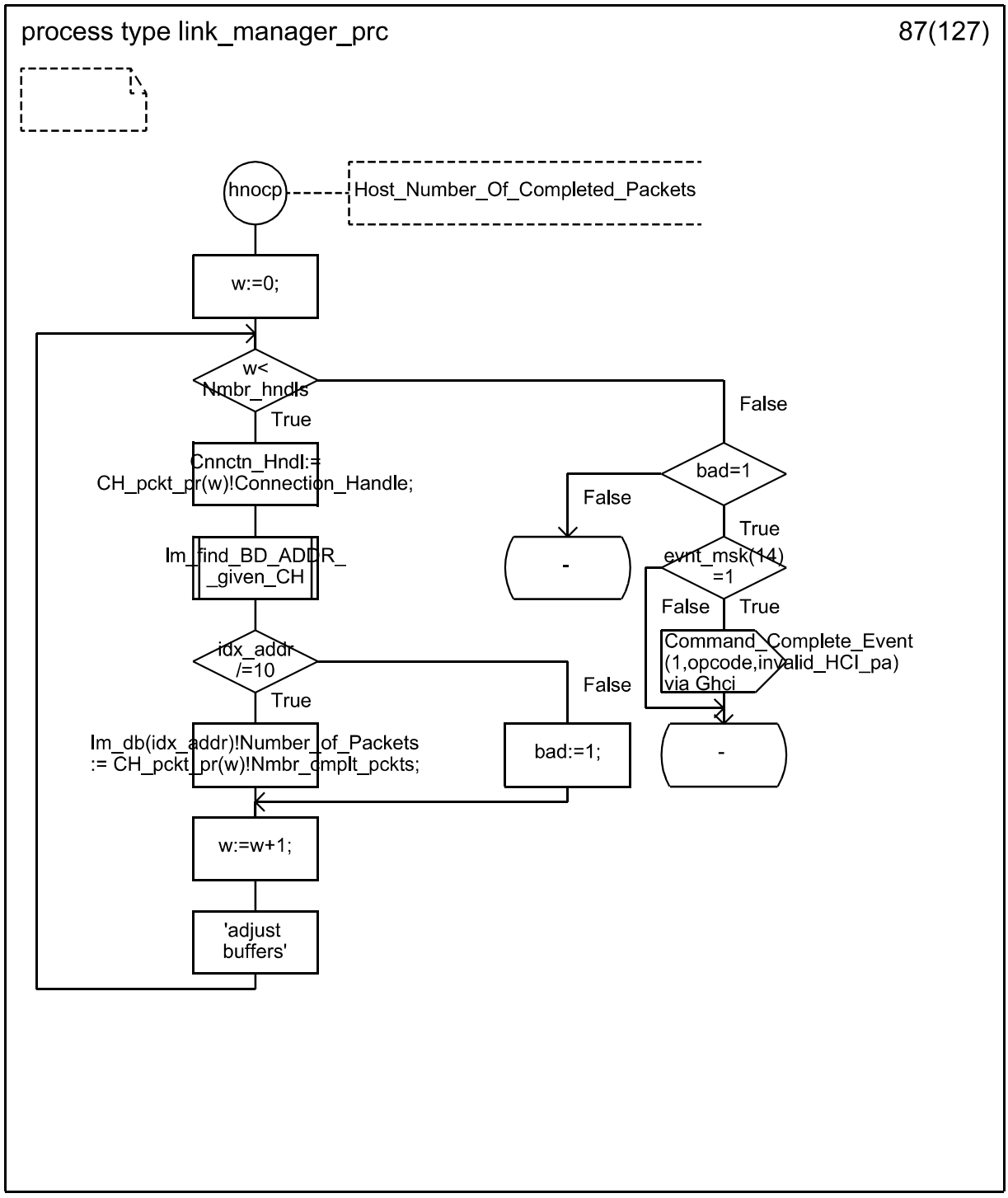
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B.3.88 link_manager_prc-86



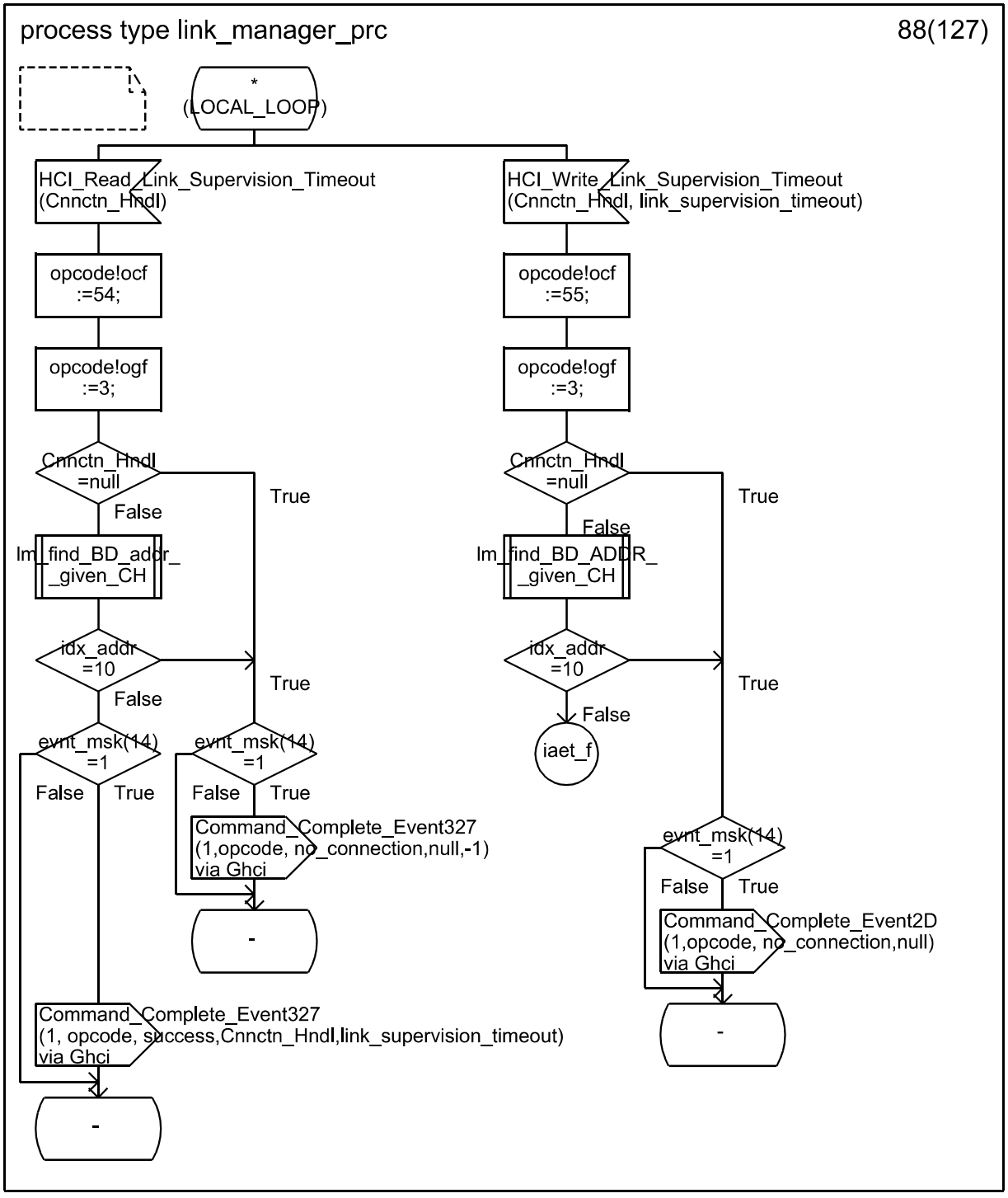
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B.3.89 link_manager_prc-87



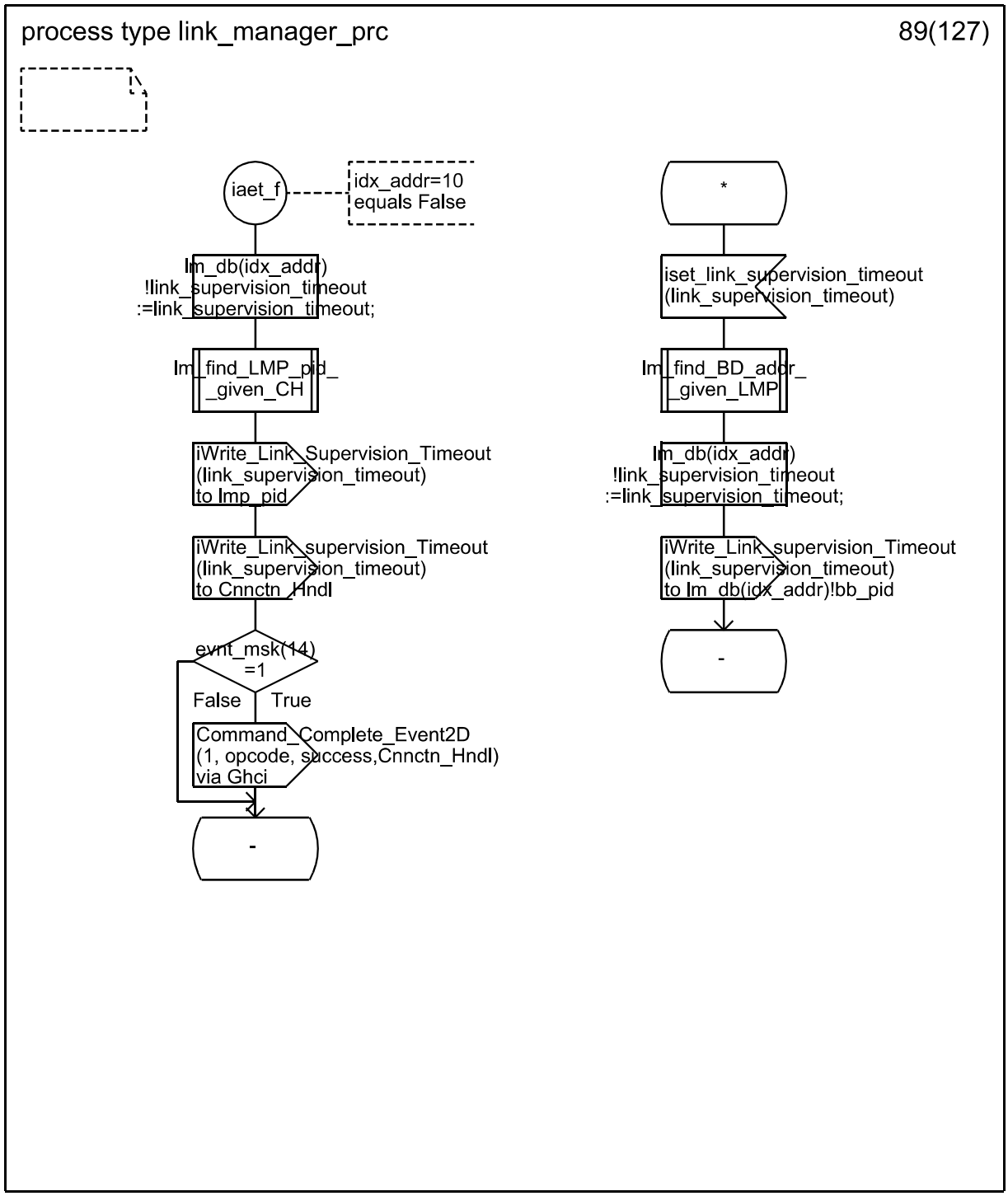
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B.3.90 link_manager_prc-88



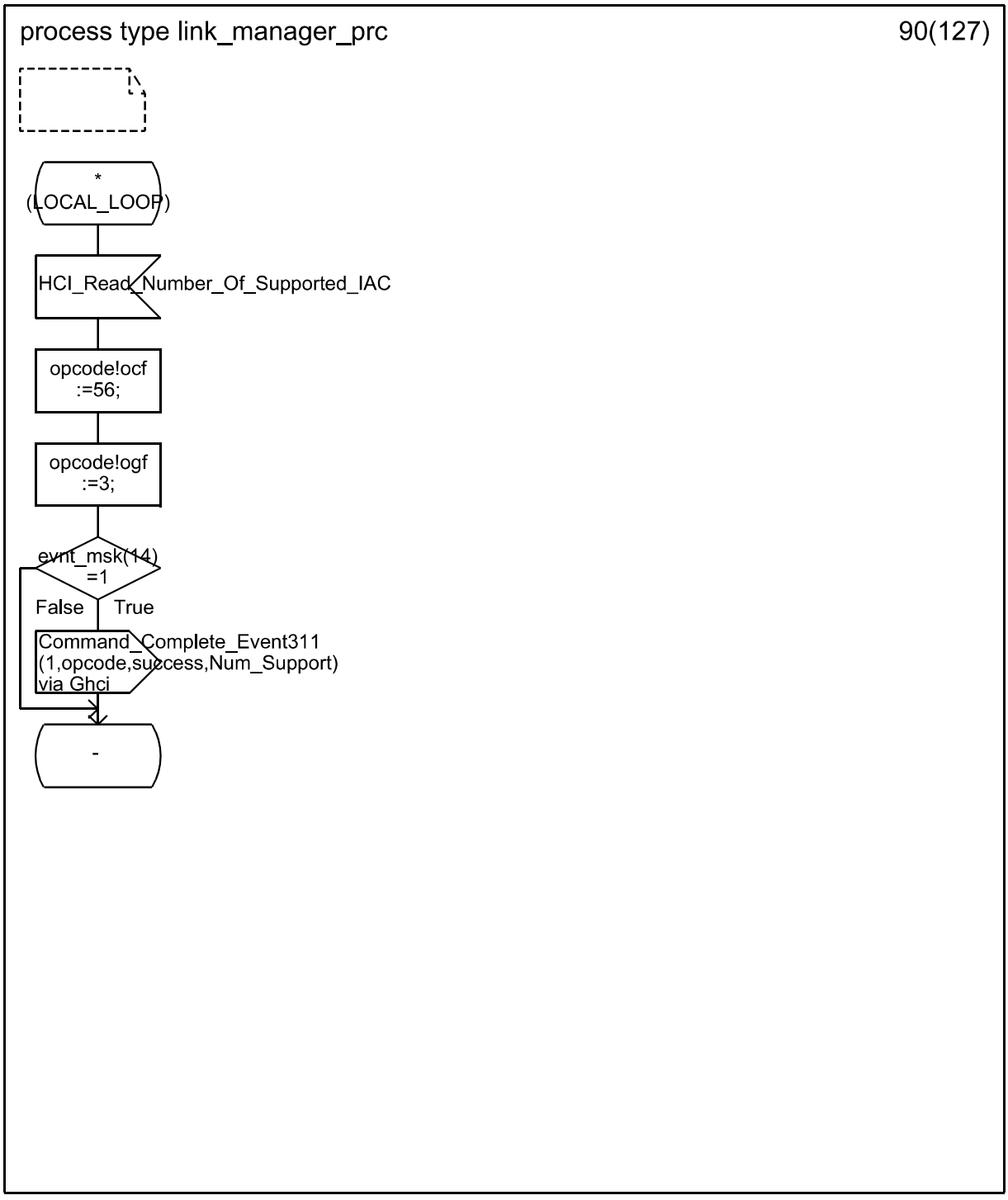
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B.3.91 link_manager_prc-89



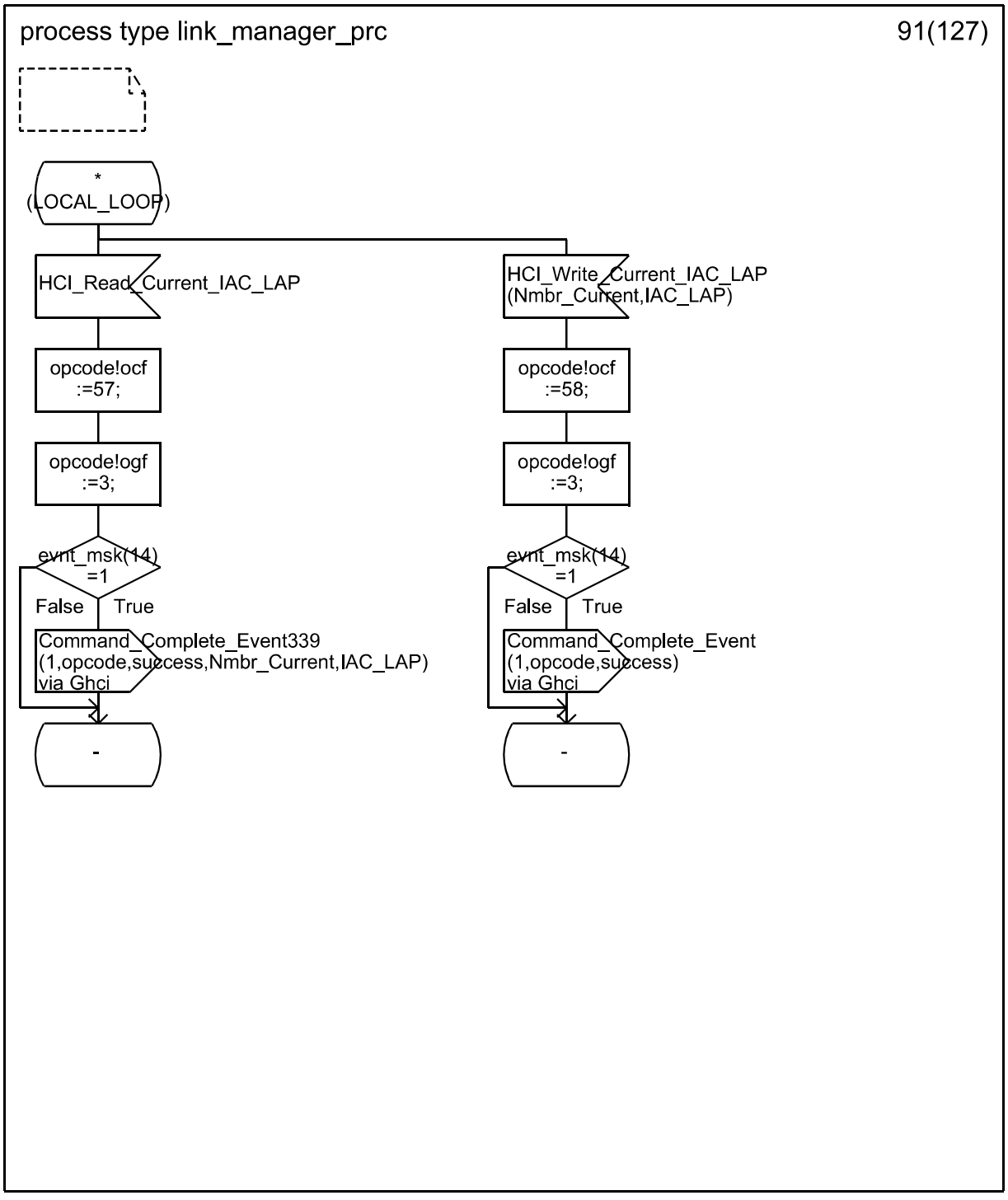
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B.3.92 link_manager_prc-90



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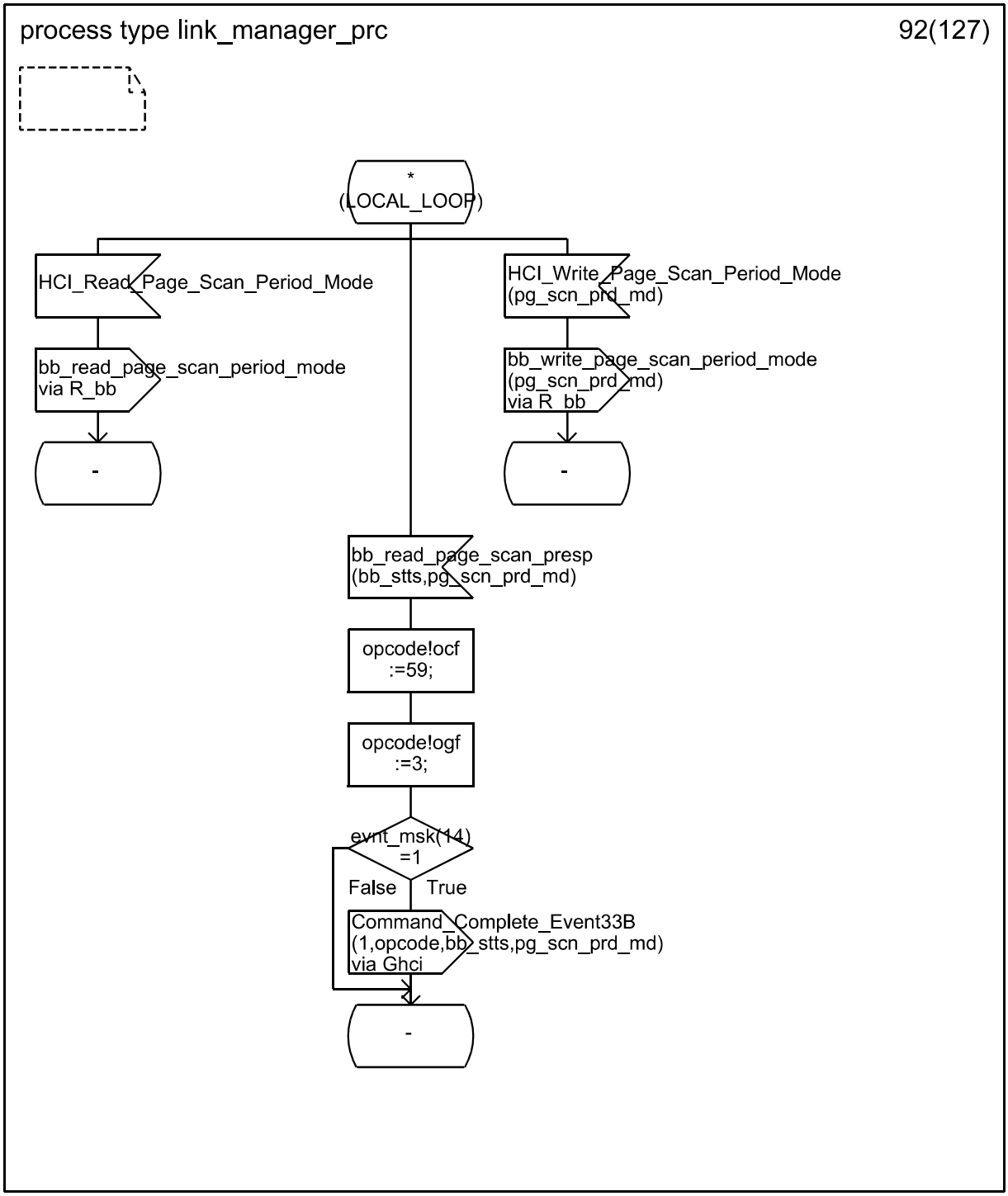
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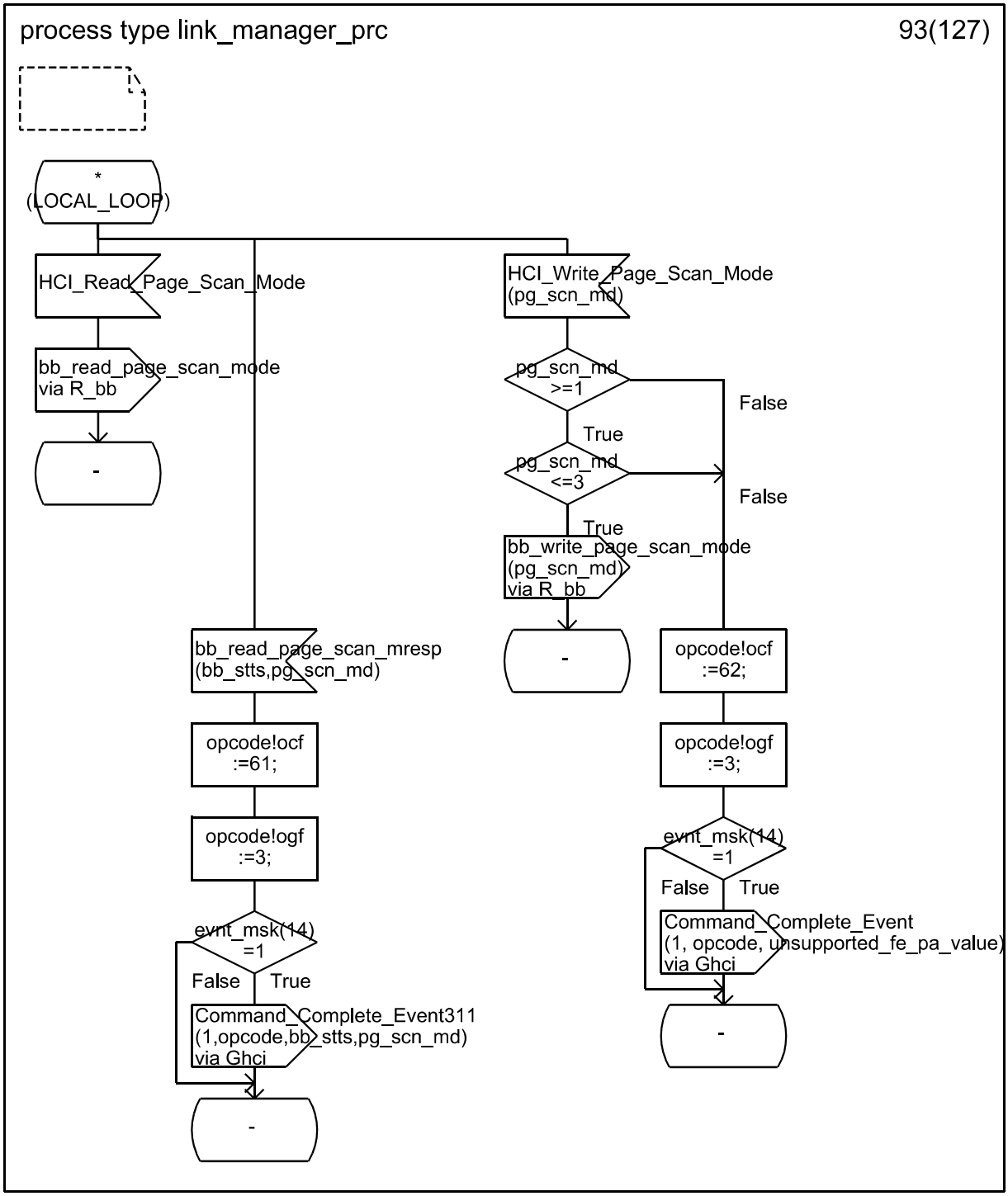
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B.3.94 link_manager_prc-92



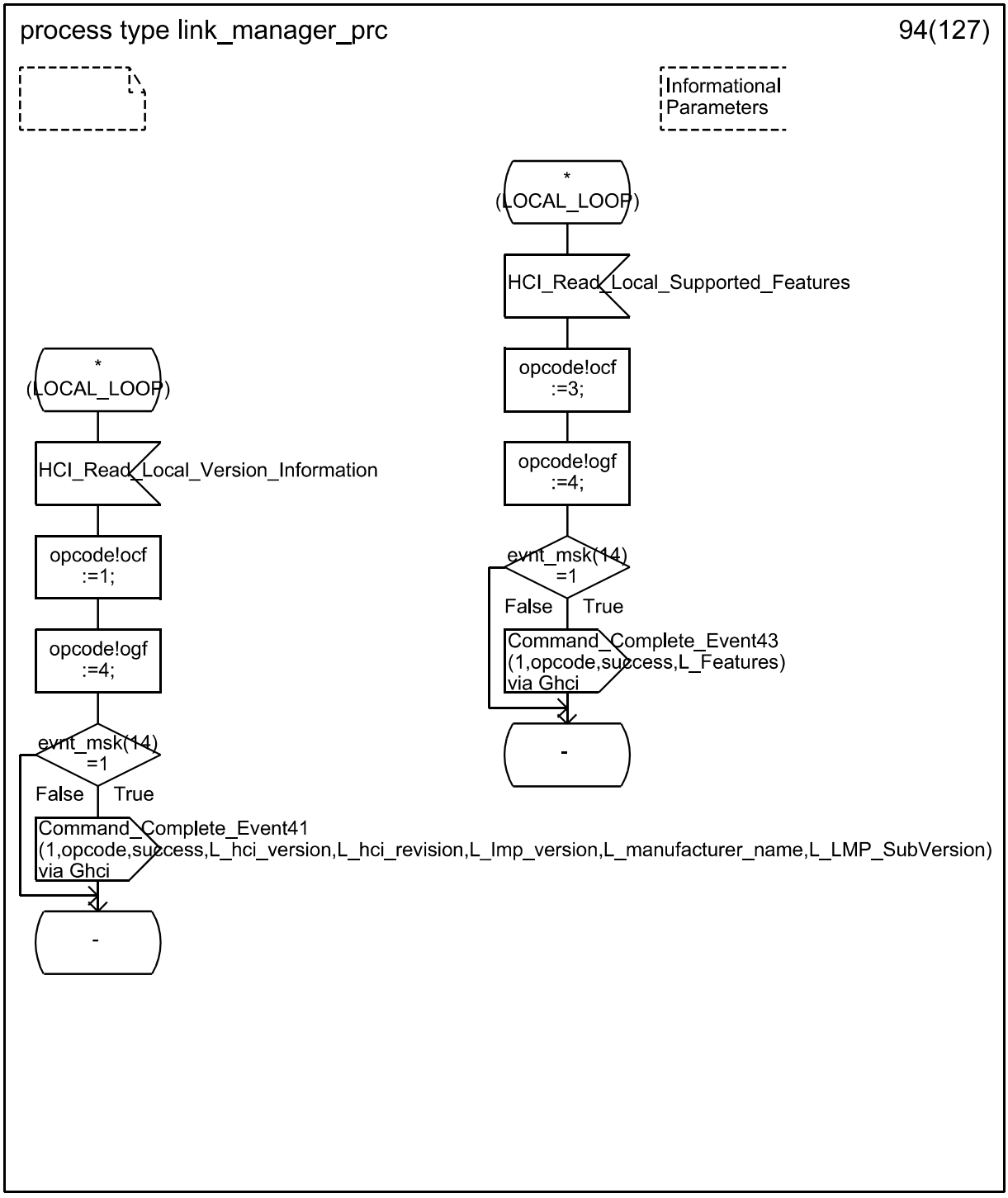
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B.3.95 link_manager_prc-93



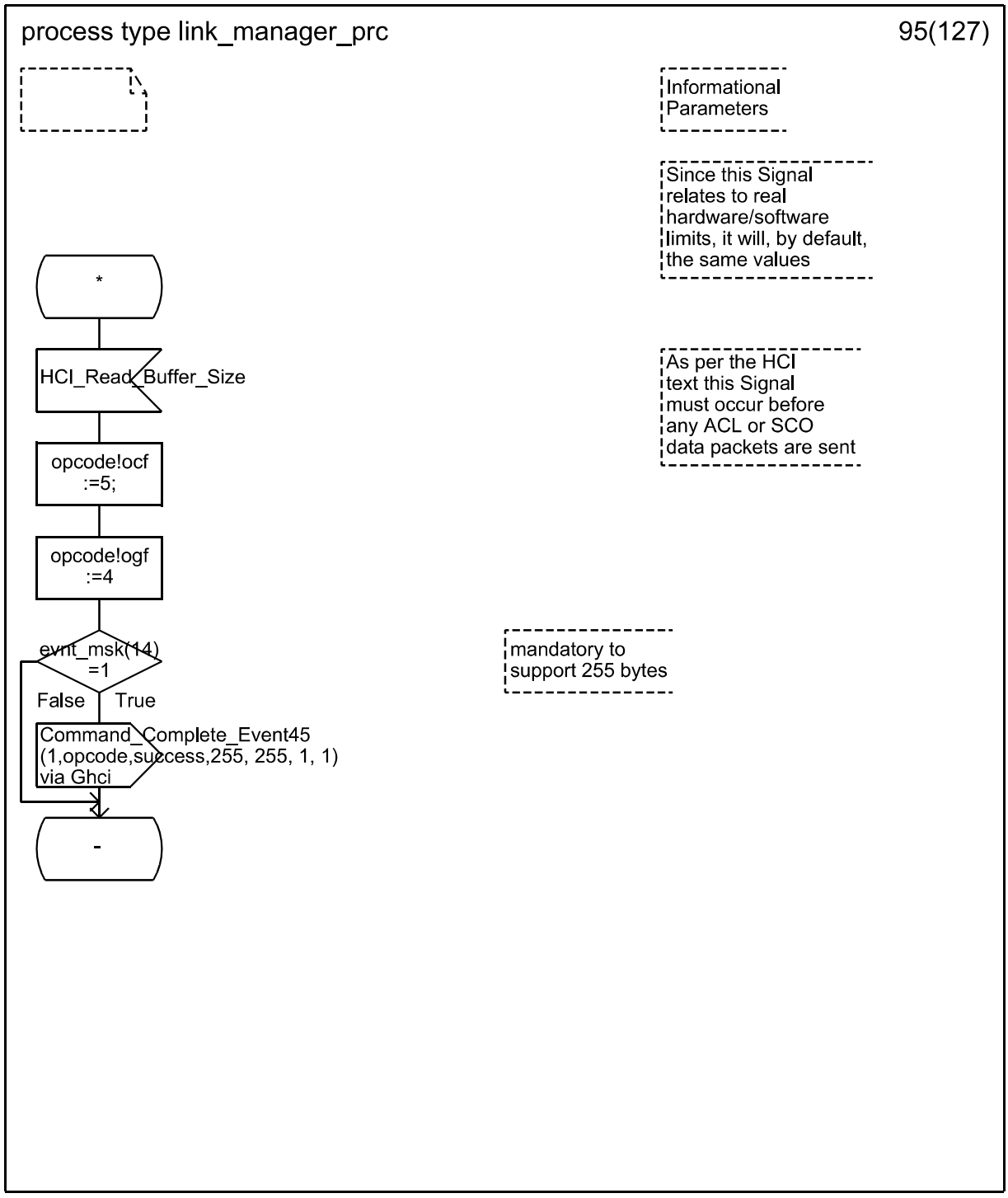
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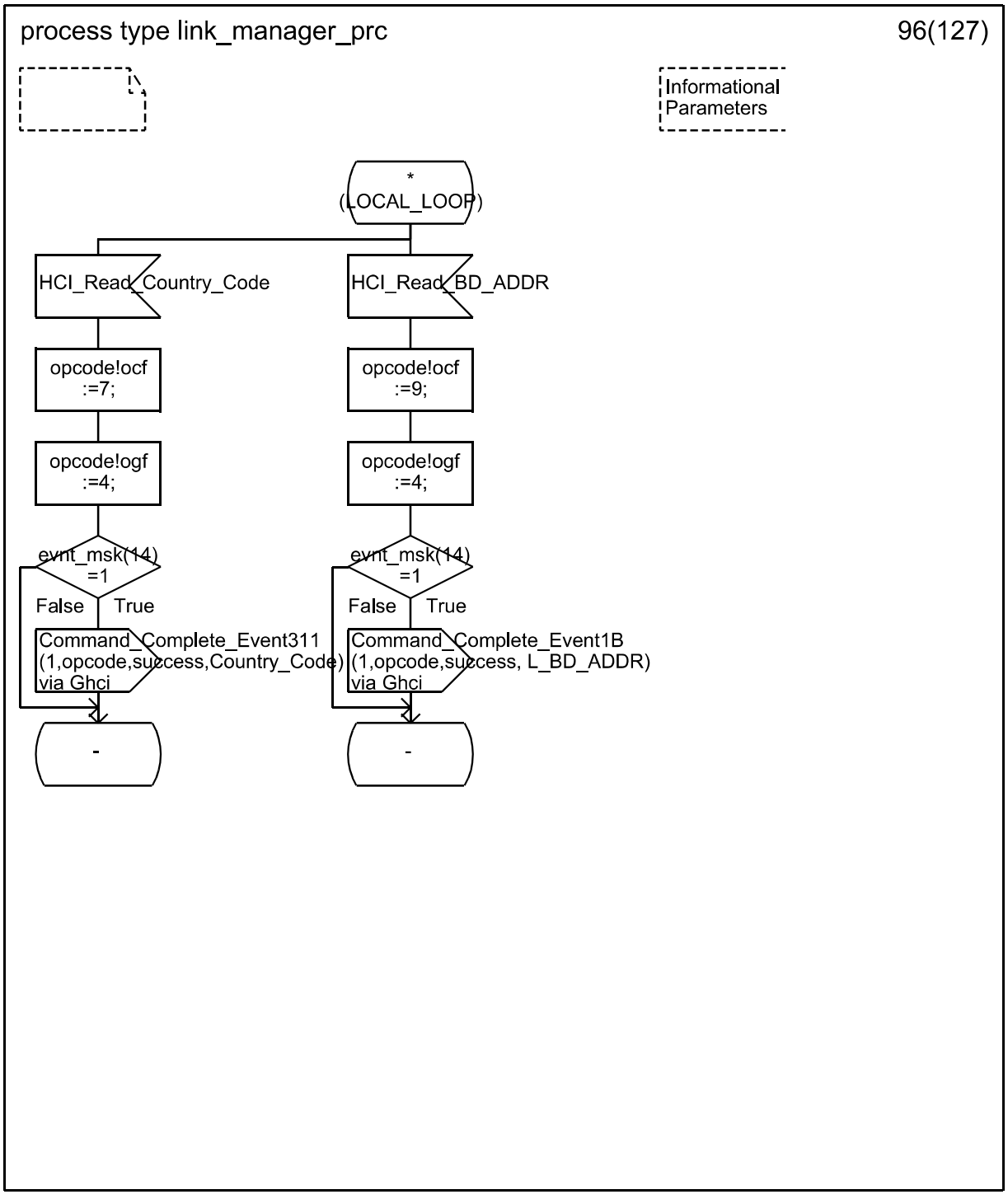
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B.3.97 link_manager_prc-95



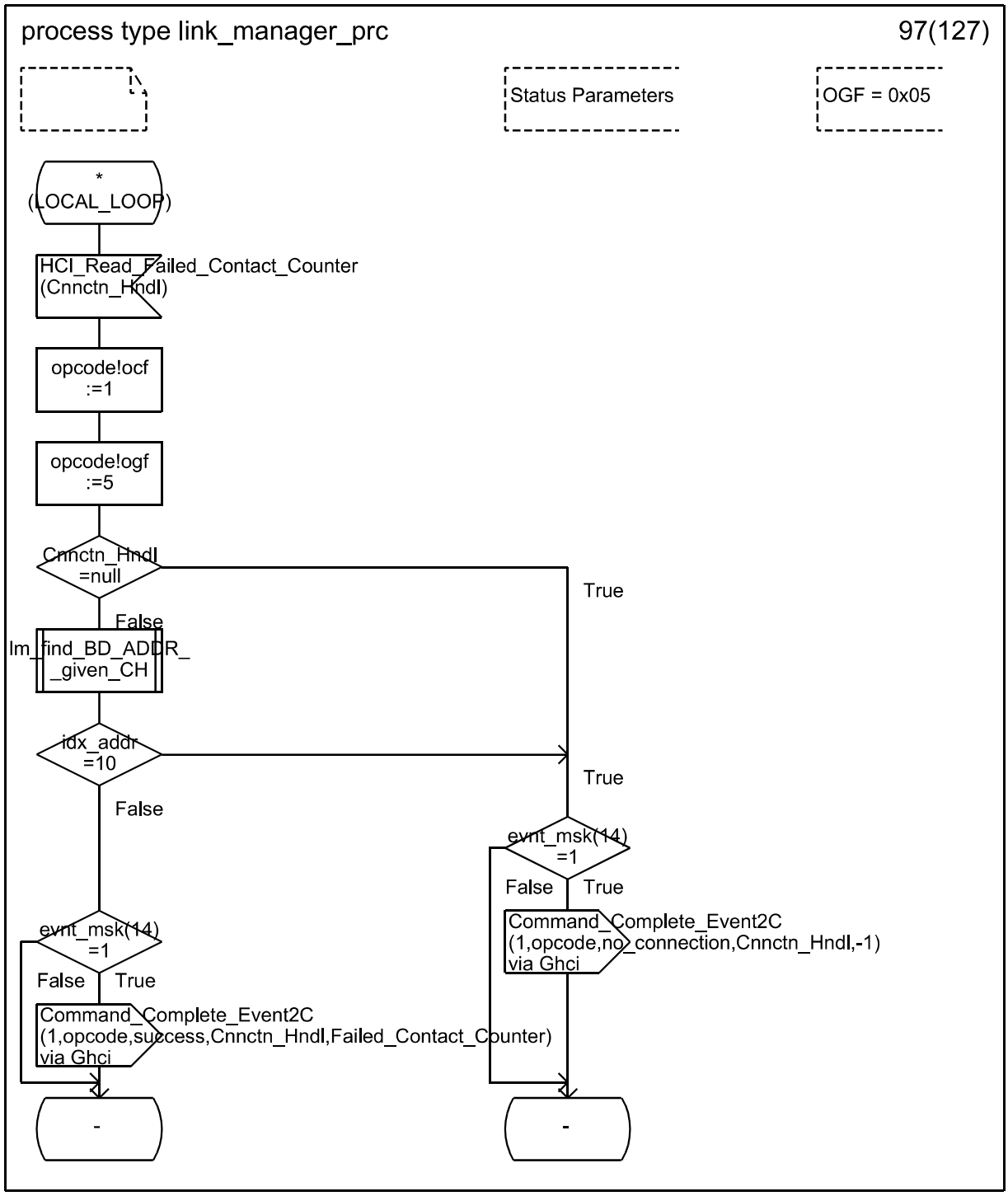
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