



Dialogic[®] SS7 Protocols
SUA Programmer's Manual

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Revision History

Issue	Date	Description
3	April 2008	Minor updates.
2	February 2008	Minor changes since the initial release.
1	December 2007	Initial release

Note: The latest release issue of this guide can be found at:
<http://www.dialogic.com/support/helpweb/signaling>

1 Introduction

This section contains:

- An overview of the manual and of the SUA module. See [Manual and Module Overview](#) below.
- Abbreviations used in this manual. See [Abbreviations](#) below.
- Related documentation. See [Related Documentation](#) on page 10.
- An overview of the features of the SUA module. See [Feature Overview](#) on page 10.
- A statement about what this manual covers. See [Applicability](#) on page 11.

1.1 Manual and Module Overview

The Dialogic® SS7 Protocols SUA module is a portable software implementation of the IETF SIGTRAN, SS7 SCCP User Adaptation Layer (SUA). This Programmer's Manual is intended for users who choose to develop their own application programs that will interface with and use the functionality provided by the SUA module.

The module uses the services provided by the Stream Control Transmission Protocol (SCTP) to exchange signaling messages with a number of SUA Signaling Gateway Processes (SGP) or remote SUA Application Server Processes (ASP). As such, it can be used as part of either an ASP or in an IPSP mode.

The SUA module is event driven and uses standard structured message types. It is intended to be used in conjunction with other Dialogic® SS7 Protocols such as SCTP and TCAP. This manual provides an overview of the internal operation of the SUA module, defines the structure of messages that can be sent to, or issued by, the module and also describes all the configuration parameters.

1.1 Abbreviations

The following table contains a list of abbreviations used in this manual.

Abbreviation	Description
AS	Application Server
ASP	Application Server Process
IETF	The Internet Engineering Task Force
ITU	The International Telecommunication Union (Previously CCITT)
IPSP	IP Signaling Point
L	Local (e.g. L_AS is Local Application Server)
M3UA	SS7 MTP3 User Adaptation Layer
MTP2	Message Transfer Part Layer 2
MTP3	Message Transfer Part Layer 3
DPC	Destination Point Code

Abbreviation	Description
OPC	Originating Point Code
R	Remote (e.g. R_AS is Remote Application Server)
SCTP	Stream Control Transmission Protocol
SG	Signaling Gateway
SGP	Signaling Gateway Process
SIGTRAN	The IETF Signaling Transport Group
SS7	Signaling System Number 7
SUA	SS7 SCCP User Adaptation Layer

1.2 Related Documentation

- *IETF RFC 3868 SUA-User Adaptation Layer.*
- *IETF RFC 2960 Stream Control Transmission Protocol.*
- *Dialogic® SS7 Programmer's Manual for SPC12S, SPC14 and CPM8.*
- *Dialogic® SCTP Programmer's Manual.*
- *Dialogic® Software Environment Programmer's Manual.*

1.3 Feature Overview

Features of the SUA module include:

- Implementation of IETF RFC 3868 Signaling Connection Control Part User Adaptation Layer (SUA).
- User interface common with other Dialogic® Signaling Protocols.
- Message-oriented interface.
- May be used as part of an ASP or IPSP node.
- Support for Connection-less SCCP services
- Full user control of ASP / AS Registration and Activation.
- Supports 14, 16 and 24 bit Point Codes for ITU-T and ANSI networks.
- Supports simultaneous connection to multiple networks.
- Supports SCCP User interface
- Supports Routes via multiple SGs.
- Debug tracing of messages exchanged with SCTP and SUA User
- Multiple local application servers.
- Multiple local application server processes.
- For each route, load-sharing across two SGPs or ASPs is supported.
- Routing based upon TCAP Transaction ID.
- Generation of DAUD messages.

- Single Exchange and Double Exchange registration.
- Controlled Changeover during network failures.
- Global Title Translation

1.4 Applicability

This documentation covers the Dialogic® SUA host binaries for use on Windows®, Linux and Solaris operating systems for both ASP and IPSP operation.

2 Functional Overview

This section provides a module overview (see [Module Overview](#) below).

In addition, it contains information about:

- [Modes of Operation](#). See [below](#).
- [Internal Data Structures](#). See [page 15](#).
- [Configuration Model](#). See [page 17](#).
- [Global Title Translation](#). See [page 19](#).
- [Message Interface](#). See [page 18](#).
- [Licensing](#). See [page 19](#).

2.1 Module Overview

The Dialogic® SUA module implements the SS7 SCCP-User Adaptation Layer as defined in the IETF RFC. The module interface is message-based. The module reads messages from a single message input queue and sends responses and indications to the message input queues of the other modules in the system.

This implementation may be used in either an ASP or IPSP mode of operation. Different services are offered by the module accordingly.

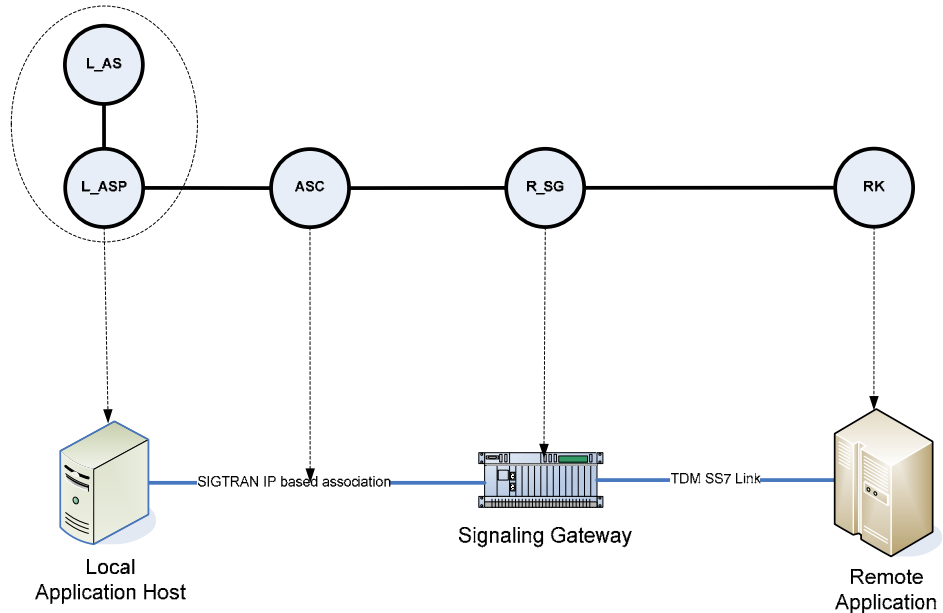
Irrespective of whether it is used as an ASP or IPSP the SUA module interfaces with SCTP using the User Primitives defined in the Dialogic® SCTP Programmer's Manual. These Primitives may be used to interface to another SCTP implementation if required.

2.2 Modes of Operation

The two main modes of operation for SUA are either when connected via a Signaling Gateway or directly to another peer end point. These are referred to in this documentation as either Application Server Process (ASP) or IP Signaling Point (IPSP) operation. The SUA protocol can also be used within a Signaling Gateway but this mode of operation is not supported.

2.2.1 ASP Operation

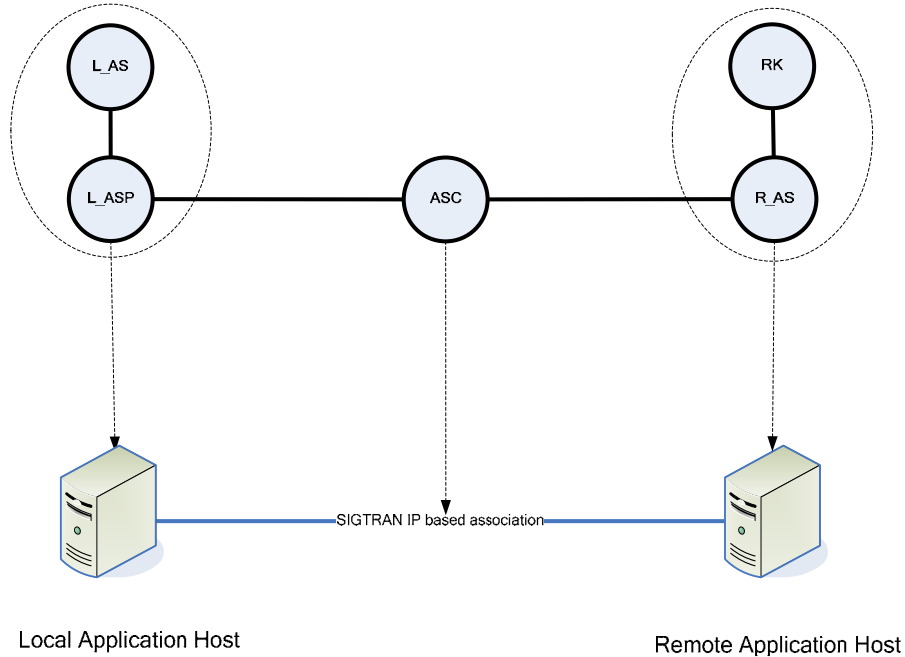
Figure 1. ASP Operation



When used as part of an ASP, SUA offers an SCCP Interface to its Users. It does not offer SCCP services directly; rather, it offers connection to Signaling Gateways where these services are offered. Because the interface is based on the ITU-T or ANSI recommended primitives, it allows easy interfacing of the SUA module to SCCP User Parts. Furthermore, the module will interface directly to other Dialogic® Signaling Protocol Modules. This allows existing applications running with a local MTP3/SCCP to be easily ported to running over SUA.

2.2.2 IPSP Operation

Figure 2. IPSP Operation

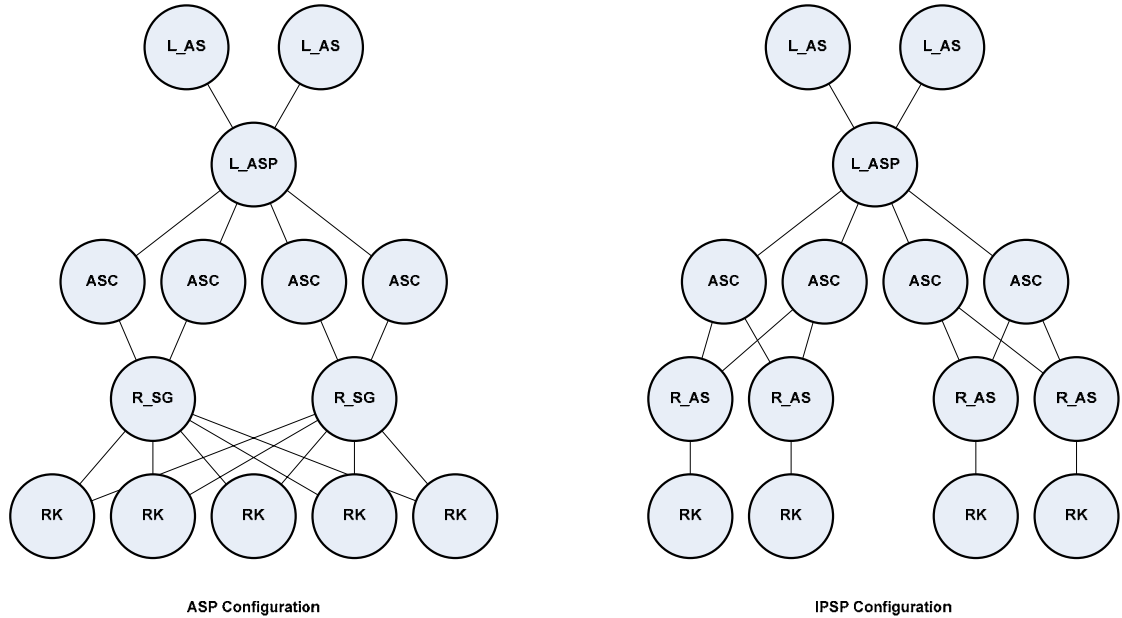


Allows two peer ASPs to communicate without the need for a Signaling Gateway. They communicate directly over IP, and no TDM-based SS7 messages are sent. The protocol message API for IPSP operation is the same as for ASP Operation. The differences are largely in configuration and management.

2.3 Internal Data Structures

This section describes the internal data structures used by the SUA module. This description is intended to assist the user in understanding the operation of the module. It is not necessary to acquire detailed knowledge of these structures in order to use the module.

Figure 3. Internal Data Structures



2.3.1 Global Data Structure

The entire data storage used by the module is contained in a single contiguous data structure. This structure contains global configuration settings, per ASP, AS, SG configuration, statistics and state. It also contains internal event queues, timer control structures and internal buffers for message processing.

2.3.2 Application Server (AS)

A logical grouping of one or more Application Server Processes, which together provide a specific service for a particular defined Routing Key. These may either be local or remote Application Servers and are referred to in this manual as either L_AS or R_AS respectively.

2.3.3 Application Server Process (ASP)

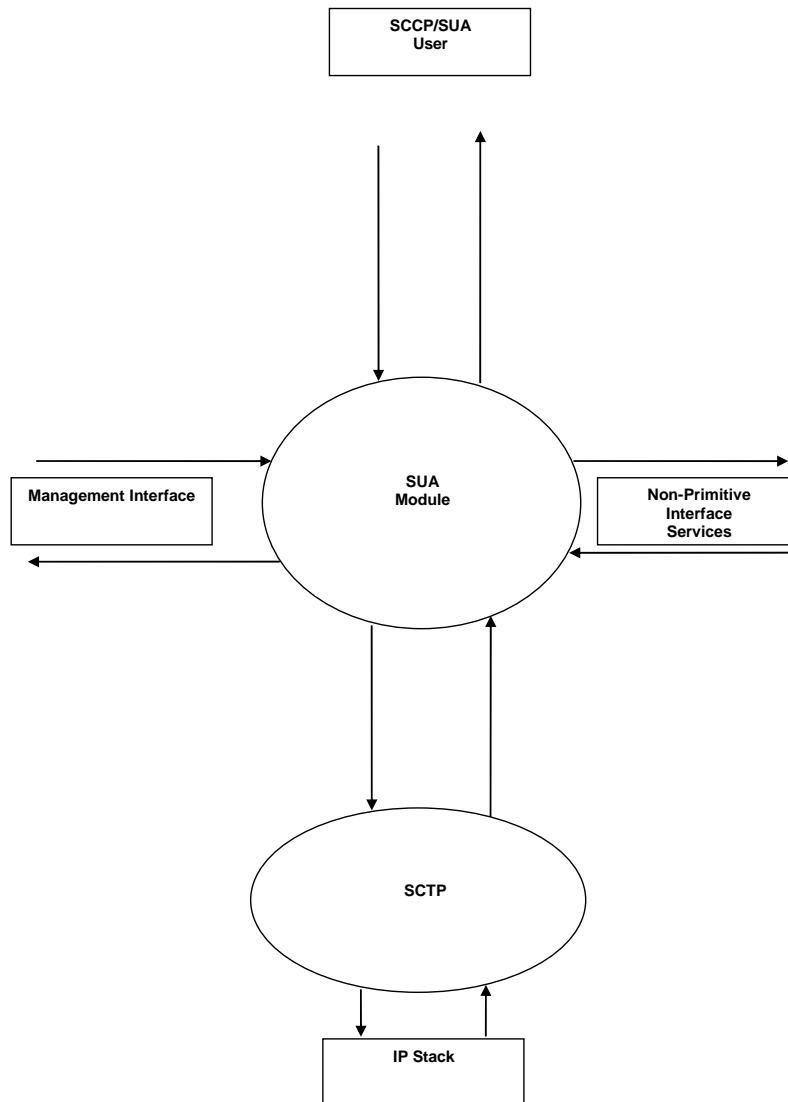
These can be considered to be processing resources on which services are offered by Logical Application Servers. An ASP has an SCTP end-point. An ASP may service one or more Application Servers.

2.3.4 Signaling Gateway (SG)

A logical entity that sits between a TDM SS7 network and an IP-based Sigtran network and allows messages to be carried between the networks.

2.5 Message Interface

Figure 5. Message Interface



SUA has four main message interfaces:

- **SCTP Interface:** User data messages to and from the SCTP user interface
- **SCCP/SUA User Interface:** User data messages to and from SCCP or SUA. SUA has been developed to match the existing interface of the SCCP module.
- **Management Interface:** Messages to control the state of configured entities
- **Non-primitive Interface:** Message to offer configuration, maintenance operations, status and statistics.

2.6 Global Title Translation

SUA can perform global title translation in the same manner as SCCP. The user interface is unchanged from the messages used to configure SCCP. The only change required is to the destination module id.

2.7 Licensing

The module can be enabled via a number of different licenses. Each license permits a different number of associations and a throughput to be used. The initial set of licenses supported by the module is given below.

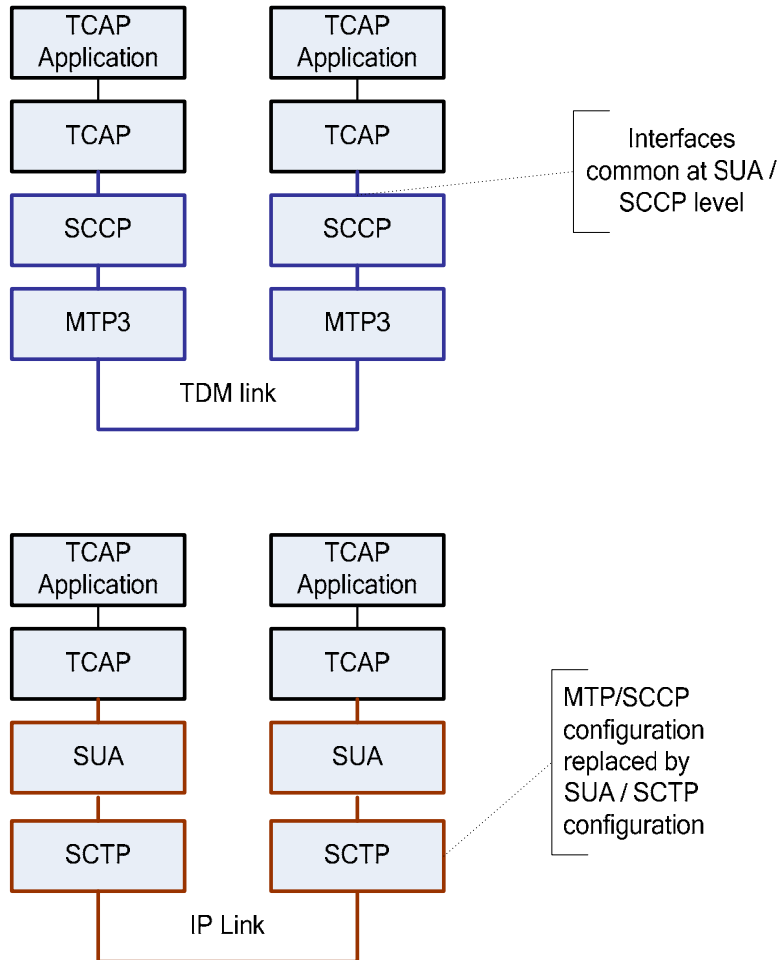
License	Number of associations	Throughput
SS7SBHSTSUAU	4 associations	4 link equivalent throughput (312 Kbps)
SS7SBHSTSUAS	16 associations	16 link equivalent throughput (1232 Kbps)
SS7SBHSTSUAR	32 associations	32 link equivalent throughput (2464 Kbps)
SS7SBHSTSUAL	64 associations	64 link equivalent throughput (4920 Kbps)

The module can also be run in trial mode to permit evaluation of the product. When run in this mode, the module will run for up to ten (10) hours with dimensioning equivalent to the SS7SBHSTSUAS license.

2.8 Migration to SUA from SCCP

The figure below shows the different module relationships between modules when used in a configuration based on either SCCP or SUA.

Figure 6. Different Module Relationships when used in a Configuration based on SCCP or SUA



TCAP Configuration

The migration of an application from use of SCCP to SUA requires little changes to the protocol messages. If using the Dialogic® TCAP module, then the configuration option TCPF_DTID_ON is required in order to permit distribution of traffic based on transaction id.

System Configuration

A new message queue for SUA will be required.

Sigtran Configuration

The other changes required are largely based on the different configuration requirements of the Sigtran protocols - in other words, the SUA and SCTP specific configuration message.

3 Interface to System Services

This section provides information about:

- [System Functions](#). See below.
- [Timer Operation](#). See below.

3.1 System Functions

In addition to the primitive interface and the management interface to the Dialogic® SUA module (which are described in later sections), the module requires a few basic system services to be supplied by the underlying operating system. This functionality is usually supplied by the appropriate Development package.

The following functions are required for inter-task communication:

Function	Description
GCT_send	Sends a message to another task.
GCT_receive	Accepts next message from input event queue, blocking the task if no message is ready.
GCT_grab	As for GCT_receive but not blocking if no message is ready.

The following functions are required for allocation of inter-task messages:

Function	Description
getm	Allocate a message.
relm	Release a message.

3.2 Timer Operation

In order to provide internal implementation of the SUA protocol timers, the module needs to receive a periodic timer tick message. This is usually achieved using either the Enhanced Driver Module or the Timer module, in which case the following messages are used by the SUA module:

Message	Description
KEEP_TIME	Issued by the module to initialize the timer services
TM_EXP	Issued by the timer module to notify of time-out.

4 Message Reference

The interface to the user application is a superset of messages defined for the Dialogic® SCCP Protocol Message API, with the addition of SUA specific configuration and management messages.

The list of messages defined and inherited from other protocol modules is given in:

- [Section 5: External Message Definitions: SCTP Interface on page 75.](#)
- [Section 6: External Message Definitions: SCCP Interface on page 77.](#)

In this section

This section contains information about:

- [Return Codes.](#) See [below](#).
- [Configuration Messages.](#) See [page 26](#).
- [Management Messages.](#) See [page 42](#).
- [Maintenance Messages.](#) See [page 46](#).
- [Status Messages.](#) See [page 48](#).
- [Statistics Messages.](#) See [page 63](#).
- [Other Messages.](#) See [page 70](#).

4.1 Return Codes

Unless otherwise noted, when the SUA module returns a confirmation message containing a status value the status will be one of the following:

Mnemonic	Value	Description
SDE_MSG_OK	0x00	Success.
SDE_BAD_ID	0x01	Inappropriate or invalid id in request message.
SDE_BAD_STATE	0x02	Message received in wrong state.
SDE_BAD_SIG	0x03	Bad signal received.
SDE_UNEX_SIG	0x04	Unexpected signal received.
SDE_BAD_MSG	0x05	Unsupported message received.
SDE_BAD_PARAM	0x06	Invalid parameters contained in message.
SDE_NO_RESOURCES	0x07	Insufficient internal message resources.
SDE_INVALID_NC	0x08	Invalid Network Context.
SDE_INVALID_VERSION	0x09	Message version is invalid.
SDE_BAD_MSG_LEN	0x0b	Invalid message length.
SDE_LICENCE_ERR	0x0e	Command failed due to a licensing restriction.
SDE_INTERNAL_ERR	0x0f	Command failed due to an internal error.

4.2 Configuration Messages

This section contains information about the following messages:

- Module Configuration Message. See below.
- Bind Routing Key Configuration. See page 38.
- Local Application Server Process Configuration. See page 28.
- Association Configuration. See page 29.
- Bind Local Application Server Configuration. See page 33.
- Local Application Server Configuration. See page 31.
- Bind Remote Application Server Configuration. See page 35.
- Remote Application Server Configuration. See page 34.
- Remote Signaling Gateway Configuration. See page 36.
- Routing Key Configuration. See page 37.
- Bind Routing Key Configuration. See page 38.
- Trace Mask Configuration Request See page 39.

4.2.1 Module Configuration Message

Synopsis

Module-wide configuration message identifying default module IDs and resource allocation.

Message Format

Message Header	
Field Name	Meaning
type	SUA_MSG_CONFIG (0x739c)
id	0
src	Originating module ID
dst	SUA_TASK_ID
rsp_req	Sending layer's bit must be set
hclass	0
status	0
err_info	0
len	19

Parameter Area		
Offset	Size	Name
0	1	sctp_mod_id
1	1	mgt_mod_id
2	1	trace_mod_id
3	2	max_assocs
5	2	Reserved (set to 0)
7	2	max_routes
9	4	max_gtt
13	1	maint_mod_id
14	3	reserved (set to 0)
17	2	max_throughput

Description

This message is used to configure the SUA module for operation. It should be the first message sent to the module (any messages received before a valid configuration message will be discarded) and should only be issued once.

The message contains parameters relating to the environment in which the module is operating, such as the identity of other modules with which it needs to communicate.

Parameters

sctp_mod_id

Module identifier for the SCTP module being used

mgt_mod_id

Module identifier defining the destination for all management indications

trace_mod_id

Module identifier defining the destination for all traced messages

max_assocs

Set to configure the maximum number of associations to be used.

max_routes

Set to configure the maximum number of routes expected.

max_gtt

Set to configure the maximum number of Global Title Translations required.

maint_mod_id

Module identifier defining the destination for all maintenance indications. If zero the mgt_mod_id will be used.

max_throughput

Set to zero (0) to permit the module to run at the licensed rate.

4.2.2 Local Application Server Process Configuration

Synopsis

Message used to configure a Local Application Server Process.

Message Format

Message Header		
Field Name	Meaning	
Type	SUA_MSG_CFG_LASP (0x739d)	
id	L_ASP id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	4	
Parameter Area		
Offset	Size	Name
0	4	asp_identifier

Description

This message configures the Local Application Server Process. The id field of the message header will define the logical identifier to be used in other configuration messages. This message must be sent prior to configuring associations or Local Application Servers.

Parameters

asp_identifier

Transmitted to the remote SGP or ASP and used to identify this ASP in NOTIFY messages.

4.2.3 Association Configuration

Synopsis

Message used to configure an Association for use with SUA.

Message Format

Message Header		
Field Name	Meaning	
Type	SUA_MSG_CFG_ASC (0x739e,)	
Id	Asc ID	
Src	Originating module ID	
Dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
Hclass	0	
Status	0	
err_info	0	
Len	14	
Parameter Area		
Offset	Size	Name
0	2	sctp_ASC_id
2	2	default_nc
4	2	lasp_id
6	2	lsgp_id
8	2	rsg_id
10	4	options

Description

This message configures the SUA level parameters required to operate a previously configured SCTP association. The Local Application Server Process and, where applicable, the Remote Signaling Gateways must already be configured.

Parameters

sctp_ASC_id

Used to specify the logical identifier used by SCTP for this association.

default_nc

Sets the default network context for the association.

lasp_id

Used to specify the Local Application Server Process attached to the association.

lsgp_id

Not required for ASP or IPSP operation. Set to 0.

rsg_id

Used to specify the Remote Signaling Gateway at the remote end of the association.

options

A bit field to allow one or more per-association options to be set.

Bit	Mnemonic	Description
0	SUA_CFG_ASC_OPTIONS_R_ASP	There is an ASP on the remote end. Set to 1 for IPSP operation. If not set, then ASP to SG operation is assumed.
1	SUA_CFG_ASC_OPTIONS_SE_MODE	Operate in single-exchange mode (for IPSP) Set to 1 for single exchange registration. If not set, then double exchange registration is used.
2	SUA_CFG_ASC_OPTIONS_L_ASP_PRESENT	Set if the local side is an ASP

4.2.4 Local Application Server Configuration

Synopsis

Message used to configure a Local Application Server.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_CFG_LAS (0x739f)	
id	L_AS Id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	17	
Parameter Area		
Offset	Size	Name
0	4	rc
4	1	tr_mode
5	1	user_mod_id
6	2	lasp_id
8	1	tid_start
9	1	tid_end
10	2	tid_value
12	4	options
16	1	format

Description

This message configures the Local Application Server and attaches it to a Local Application Server Process. It also configures the properties sent to Remote Application Server to permit them to load-share traffic appropriately. The Local Application Server Process must already have been configured.

Parameters

rc

Routing Context.

tr_mode

The traffic mode parameter can take one of three values specified below. This instructs the Remote AS how to distribute traffic to the Local AS.

Value	Mnemonic	Description
0	SUA_CFG_LAS_TR_MODE_OVERRIDE	Traffic should be sent to the L_ASP which last sent an ASP Activate.
1	SUA_CFG_LAS_TR_MODE_LOADSHARE	Traffic should be load-shared amongst L_ASP
2	SUA_CFG_LAS_TR_MODE_BROADCAST	Traffic should be sent to all associated L_ASP

user_mod_id

Module to which traffic for this L_AS should be sent. This is typically TCAP (0x14).

lasp_id

Set to match the id field of the Local ASP configuration message.

tid_start

Indicates the start of the bits in the destination transaction id which should be used for load-sharing. To enable transaction id based distribution the option SUA_CFG_LAS_OPTIONS_TID_PRESENT should also be set.

tid_end

Indicates the last bit in the destination transaction id which should be used for load-sharing. To enable transaction id based distribution the option SUA_CFG_LAS_OPTIONS_TID_PRESENT should also be set.

tid_value

Indicates the value that should be used to indicate the L_ASP on the L_AS. To enable transaction id based distribution the option SUA_CFG_LAS_OPTIONS_TID_PRESENT should also be set.

options

A bit field specifying to allow one or more per-L_AS options to be set.

Bit	Mnemonic	Description
0	SUA_CFG_LAS_OPTIONS_BIND_ALL	Bind to all associations automatically
1	SUA_CFG_LAS_OPTIONS_TID_PRESENT	Set to 1 to request the Transaction id based distribution.

format

Definition of L_AS address format. This parameter should be set to the same value as for TCAP Configuration Message.

Value	Mnemonic	Description
0	SUA_CFG_LAS_ADDR_FMT_DEFAULT	Default: ITU-T format, 14 bit point codes (same as 1 below)
1	SUA_CFG_LAS_ADDR_FMT_ITU14	ITU-T format, 14 bit point codes
2	SUA_CFG_LAS_ADDR_FMT_ITU24	ITU-T format, 24 bit point codes
3	SUA_CFG_LAS_ADDR_FMT_ANSI14	ANSI format, 14 bit point codes
4	SUA_CFG_LAS_ADDR_FMT_ANSI24	ANSI format, 24 bit point codes

4.2.5 Bind Local Application Server Configuration

Synopsis

Bind a Local Application Server to an association.

Note: This command is not required if the SUA_CFG_LAS_OPTIONS_BIND_ALL flag is specified in the [Local Application Server Configuration on page 31](#).

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_CFG_BIND_LAS (0x73a0)	
id	L_AS id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	asc_id

Description

Binds together previously configured association and Local Application Server entities.

Parameters

asc_id

Identifier of the association to be bound.

4.2.6 Remote Application Server Configuration

Synopsis

Configures a Remote Application Server.

Message Format

Message Header	
Field Name	Meaning
Type	SUA_MSG_CFG_RAS (0x73a1)
id	R_AS id
src	Originating module ID
dst	SUA_TASK_ID
rsp_req	Sending layer's bit must be set
hclass	0
status	0
err_info	0
len	0

Description

Configures a Remote Application Server and defines the R_AS id in the id field of the message. This id must be used in the SUA_MSG_CFG_BIND_RAS message. This message is not required for ASP-SG operation.

Parameters

No parameters defined.

4.2.7 Bind Remote Application Server Configuration

Synopsis

Binds a Local Application Server to a Remote Application Server via an Association.

Message Format

Message Header		
Field Name	Meaning	
Type	SUA_MSG_CFG_BIND_RAS (0x73a2)	
Id	R_AS id	
Src	Originating module ID	
Dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
Hclass	0	
Status	0	
err_info	0	
Len	13	
Parameter Area		
Offset	Size	Name
0	2	asc_id
2	2	l_as_id
4	4	Rc
8	1	tr_mode
9	4	Reserved

Description

This message joins Local and Remote Application Servers. The Application Servers and association must have already been configured. This message is not required for ASP-SG operation.

Parameters

asc_id

Identifier of the association to be bound.

l_as_id

The identifier of the Local AS.

rc

Routing Context.

tr_mode

A bit-field to indicate which modes of operation should be supported.

Bit	Mnemonic	Description
0	SUA_CFG_BIND_RAS_TR_MODE_OVERRIDE	Permit sending to last Activated ASP
1	SUA_CFG_BIND_RAS_TR_MODE_LOADSHARE	Permit load-sharing across ASP
2	SUA_CFG_BIND_RAS_TR_MODE_BROADCAST	Permit sending to all ASP

A value of 0x7 is recommended and will therefore permit all traffic modes to be used.

4.2.8 Remote Signaling Gateway Configuration

Synopsis

Configures a Remote Signaling Gateway.

Message Format

Message Header	
Field Name	Meaning
type	SUA_MSG_CFG_RSG (0x73a3)
id	R_SG id
src	Originating module ID
dst	SUA_TASK_ID
rsp_req	Sending layer's bit must be set
hclass	0
status	0
err_info	0
len	0

Description

Message used to configure a Remote Signaling Gateway which must later be bound to a Routing Key. This message is not required for IPSP operation.

Parameters

No parameters defined.

4.2.9 Routing Key Configuration

Synopsis

Defines a routing key for a local AS

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_CFG_RK (0x73a4)	
id	Routing Key id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	13	
Parameter Area		
Offset	Size	Name
0	4	Spc
4	2	Nc
6	1	Ssn
7	2	l_as_id
9	2	Options

Description

This message defines the network properties for a set of traffic. This can later be used to bind to a Remote Application Server or Remote Signaling Gateway to permit correct routing.

Parameters

spc

Signaling Point-code

nc

Network Context

ssn

Sub-system number

l_as_id

Defines the Local Application Server to which this Routing Key is attached.

Note: The routing tables are per-Local Application Server.

options

A bit field specifying to allow one or more per-Routing Key options to be set.

Bit	Mnemonic	Description
0	SUA_CFG_RK_OPTIONS_LOADSHARE	Set to 1 to instruct SUA to load-share traffic

4.2.10 Bind Routing Key Configuration

Synopsis

Binds a previously configured Routing Key to a Remote Application Server or a Remote Signaling Gateway.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_CFG_BIND_RK (0x73a5)	
id	RK id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	6	
Parameter Area		
Offset	Size	Name
0	2	r_sm_id
4	4	options

Description

This message binds a Remote Signaling Gateway (or, for IPSP operation, a Remote Application Server) to a Routing key. This links the traffic defined by the Routing Key to the remote entity which should be sent the traffic.

Parameters

r_sm_id

This should either be the value of r_as_id or r_sg_id. For IPSP, the Routing Key should be bound to a R_AS; therefore, the r_as_id should be used. For ASP-SG operation, the r_sg_id should be used to indicate the Remote Signaling Gateway.

options

A bit field specifying to allow one or more options to be set.

Bit	Mnemonic	Description
0	SUA_CFG_BIND_RK_OPTIONS_RAS	Set to 1 for binding to an R_AS. Set to 0 if binding to an R_SG

4.2.11 Trace Mask Configuration Request

Synopsis

Configures the Trace Masks, which allow specific events to be sent to the Trace Module.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_CFG_TRACE_MASK (0x73a6)	
id	0	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	12	
Parameter Area		
Offset	Size	Name
0	4	op_evt_mask
4	4	ip_evt_mask
8	4	mgmt_evt_mask

Description

Message used to configure SUA to send a trace message to the trace module whenever a specific message type is sent or received. The trace module is identified in the SUA configuration request message.

Parameters

op_evt_mask

The output event mask. This is a 32bit value with bits set to 1 to cause a trace message to be sent to the trace module whenever a message is issued by SUA for the event indicated.

Bit	Mnemonic	Message(s) Traced
0	SUAOEM_SCP_RX_IND	SCP_MSG_RX_IND
1	SUAOEM_SCTP_TX_REQ	SCTP_MSG_TX_REQ
2	SUAOEM_SCP_SCMG_IND	SCP_MSG_SCMG_IND
3	SUAOEM_SCTP_SHUTDOWN	SCTP_MSG_SHUTDOWN
4	SUAOEM_STATUS_IND	SUA_MSG_ASC_STATUS_IND SUA_MSG_LASP_STATUS_IND SUA_MSG_RASP_STATUS_IND SUA_MSG_LAS_STATUS_IND SUA_MSG_RAS_STATUS_IND SUA_MSG_RK_STATUS_IND SUA_MSG_STATUS_IND
5	SUAOEM_SCTP_ACTIVATE	SCTP_MSG_ACTIVATE
6	SUAOEM_SCTP_ABORT	SCTP_MSG_ABORT
7	SUAOEM_MGT_LIC_EVENT	MGT_MSG_LIC_EVENT
8	SUAOEM_ERROR_IND	SUA_MSG_ERROR_IND
9-31	Reserved	Should be set to zero

ip_evt_mask

The input event mask. This is a 32bit value with bits set to 1 to cause a trace message to be sent to the trace module whenever a message is received by SUA for the event indicated.

Bit	Mnemonic	Message(s) Traced
0	SUAIEM_SCP_TX_REQ	SCP_MSG_TX_REQ
1	SUAIEM_SCTP_RX_IND	SCTP_MSG_RX_IND
2	SUAIEM_SCTP_STATUS_CHANGE	SCTP_MSG_STATUS_CHANGE
3-5	Reserved	Should be set to zero
6	SUAIEM_SCTP_CONG_STATUS	SCTP_MSG_CONG_STATUS
5-31	Reserved	Should be set to zero

mgmt_evt_mask

The management event mask. This is a 32bit value with bits set to 1 to cause a trace message to be sent to the trace module whenever a management message is sent or received by SUA for the event indicated.

Bit	Mnemonic	Message(s) Traced
0	SUAMEM_SUA_CFG	SUA_MSG_CFG_LASP SUA_MSG_CFG_ASC SUA_MSG_CFG_LAS SUA_MSG_CFG_BIND_LAS SUA_MSG_CFG_RAS SUA_MSG_CFG_BIND_RAS SUA_MSG_CFG_RSG SUA_MSG_CFG_RK SUA_MSG_CFG_BIND_RK
1	SUAMEM_SUA_ASC	SUA_MSG_ACT_ASC SUA_MSG_DEACT_ASC
2	SUAMEM_SUA_ASP	SUA_MSG_DEACT_ASP SUA_MSG_ACT_ASP
3	SUAMEM_SCP_GTT	SCP_MSG_GTT_ADD SCP_MSG_GTT_REM SCP_MSG_GTT_MOD SCP_MSG_GTT_GET SCP_MSG_R_GTT SCP_MSG_R_GTT_MASK SCP_MSG_GTT_TEST SCP_MSG_GLST_ADD SCP_MSG_GLST_MOD SCP_MSG_GLST_REM
4	SUAMEM_R_STATUS	SUA_MSG_R_ASC_STATUS SUA_MSG_R_LASP_STATUS SUA_MSG_R_RASP_STATUS SUA_MSG_R_LAS_STATUS SUA_MSG_R_RAS_STATUS
5	SUAMEM_R_STATS	SUA_MSG_R_SERVER_STATS SUA_MSG_R_RK_STATS SUA_MSG_R_ASSOC_STATS SUA_MSG_R_STATS
6-31	Reserved	Should be set to zero

4.3 Management Messages

This section contains information about the following messages:

- [Activate Association](#). See below.
- [Activate Local Application Server Process](#). See page 43.
- [Deactivate Association](#). See page 44.
- [Deactivate Local Application Server Process](#). See page 45.

4.3.1 Activate Association

Synopsis

Activates a previously configured Association.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_ACT_ASC (0xc3ae)	
id	Association id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	4	
Parameter Area		
Offset	Size	Name
0	4	options

Description

Activates the association which must already have been configured. Typically, the Local Application Server Process must also be activated.

Parameters

options

A bit field specifying to allow one or more options to be set.

Bit	Mnemonic	Description
0	SUA_ACT_ASC_OPTIONS_stay_up	Set to 1 to cause the association to be brought back into service where possible without further management intervention.

4.3.2 Activate Local Application Server Process

Synopsis

Activates a previously configured Application Server Process for a particular Local AS.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_ACT_ASP (0xc3af)	
id	L_AS id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	4	
Parameter Area		
Offset	Size	Name
0	4	Options

Description

Requests activation of the Local ASP for the specified Local AS.

Parameters

options

A bit field specifying to allow one or more options to be set.

Bit	Mnemonic	Description
0	SUA_ACT_ASP_OPTIONS_stay_up	Set to 1 to instruct SUA to attempt to bring the ASP back into service without further intervention.

4.3.3 Deactivate Association

Synopsis

Deactivate an Association.

Message Format

Message Header	
Field Name	Meaning
type	SUA_MSG_DEACT_ASC (0xc3b0)
id	Association id
src	Originating module ID
dst	SUA_TASK_ID
rsp_req	Sending layer's bit must be set
hclass	0
status	0
err_info	0
len	0

Description

Message sent to deactivate an association.

Parameters

No parameters defined.

4.3.4 Deactivate Local Application Server Process

Synopsis

Deactivate the Local Application Server Process for a particular Local AS.

Message Format

Message Header	
Field Name	Meaning
type	SUA_MSG_DEACT_ASP (0xc3b1)
id	L_AS id
src	Originating module ID
dst	SUA_TASK_ID
rsp_req	Sending layer's bit must be set
hclass	0
status	0
err_info	0
len	0

Description

Message sent to deactivate a Local Application Server Process for the specified Local AS.

Parameters

No parameters defined.

4.4 Maintenance Messages

This section contains information about the following messages:

- Maintenance Event Indication. See below.

4.4.1 Maintenance Event Indication

Synopsis

Sent by SUA to the Maintenance Module to indicate an event

Message Format

Message Header		
Field Name	Meaning	
Type	SUA_MSG_MAINT_IND (0x03b8)	
id	0	
src	SUA_TASK_ID	
dst	Maintenance module	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	Maintenance event code (on page 47)	
err_info	0	
len	variable (0 to 8)	
Parameter Area		
Offset	Size	Name
0	4	spc
4	1	ssn
5	2	nc
7	1	cong

Description

This message is sent to indicate when a routing failure or other error has occurred preventing the message being routed to its destination.

Parameters

spc

Signaling Point-code

nc

Network Context

ssn

Sub-system number

cong

congestion status

Maintenance event code

The table below lists all of the maintenance indications together with the list of parameters present in that indication.

Table 1. Maintenance Event Codes

Maintenance event	code	Parameters			
RETC_NO_TRANS_ADDR_TYPE	0				
RETC_NO_TRANS_ADDR_VAL	1				
RETC_SS_CONGESTION	2	pc	ssn	nc	cong
RETC_SS_FAILURE	3	pc	ssn	nc	
RETC_UNEQUIPPED_USER	4	pc	ssn	nc	
RETC_NETWORK_FAILURE	5	pc	ssn	nc	
RETC_NETWORK_CONGESTION	6	pc	ssn	nc	cong
RETC_UNQUALIFIED	7	pc	ssn	nc	
RETC_MSG_TRANSPORT_ERR	8	pc	ssn	nc	

4.5 Status Messages

This section contains information about the following messages:

- Read Association Status Request. See below.
- Read Local Application Server Process Status Request. See page 49.
- Read Remote Application Server Process Status Request. See page 50.
- Read Local Application Server Status Request. See page 51.
- Read Remote Application Server Status Request. See page 52.
- Error Message Indication. See page 53.
- Notify Indication. See page 55.
- Association Status Indication. See page 56.
- Local Application Server Process Status Indication. See page 57.
- Remote Application Server Process Status Indication. See page 58.
- Local Application Server Status Indication. See page 59.
- Remote Application Server Status Indication. See page 60.
- Routing Key Status Indication. See page 61.

4.5.1 Read Association Status Request

Synopsis

Sent to the module to request an updated response to be returned giving Association status.

Message Format

Message Header	
Field Name	Meaning
type	SUA_MSG_R_ASC_STATUS (0x6395)
id	Association id
src	Originating module ID
dst	SUA_TASK_ID
rsp_req	Sending layer's bit must be set
hclass	0
status	Association status
err_info	0
len	0

Description

The message can be sent to the module and will be returned updated with the status of the association.

Association status

Value	Meaning
1	IDLE
2	ESTABLISHED
3	CLOSED
9	CONGESTION ABATE
10	CONGESTION ONSET
11	CONGESTION DISCARD

Parameters

No parameters defined.

4.5.2 Read Local Application Server Process Status Request

Synopsis

Sent to the module to request an updated response to be returned giving Local Application Server Process status.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_R_LASP_STATUS (0x6396)	
id	L_ASP id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	status

Description

The message will be returned with the data updated in the parameter area of the message.

Parameters

status

Value	Meaning
1	IDLE
5	DOWN
6	ACTIVE
7	INACTIVE

4.5.3 Read Remote Application Server Process Status Request

Synopsis

Sent to the module to request an updated response to be returned giving Remote Application Server Process status.

Message Format

Message Header		
Field Name	Meaning	
Type	SUA_MSG_R_RASP_STATUS (0x6397)	
Id	0	
Src	Originating module ID	
Dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
Hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	status

Description

The message will be returned with the data updated in the parameter area of the message.

Parameters

status

Value	Meaning
1	IDLE
5	DOWN
4	UP

4.5.4 Read Local Application Server Status Request

Synopsis

Sent to the module to request an updated response to be returned giving Local Application Server status.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_R_LAS_STATUS (0x6398)	
id	L_AS id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	status

Description

The message will be returned with the data updated in the parameter area of the message.

Parameters

status

Value	Meaning
1	IDLE
5	DOWN
6	ACTIVE
7	INACTIVE

4.5.5 Read Remote Application Server Status Request

Synopsis

Sent to the module to request an updated response to be returned giving Local Application Server status.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_R_RAS_STATUS (0x6399)	
id	0	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	status

Description

The message will be returned with the data updated in the parameter area of the message.

Parameters

status

Value	Meaning
1	IDLE
5	DOWN
6	ACTIVE
7	INACTIVE
8	PENDING

4.5.6 Error Message Indication

Synopsis

M-ERROR indication due to ERR message received or an error occurring.

Message Format

Message Header		
Field Name	Meaning	
Type	SUA_MSG_ERROR_IND (0x03b3)	
Id	SCTP Association ID	
Src	SUA_TASK_ID	
Dst	Management module ID	
Rsp_req	Sending layer's bit must be set	
hclass	0	
status	Error type (see Table 3: Error Codes on page 54)	
Err_info	0	
Len	8	
Parameter Area		
Offset	Size	Name
0	4	Param1
4	4	Param2

Description

This indication is sent on receiving an SUA Management ERROR message from an SUA peer or a locally occurring error

Parameters

Param1

Parameter 1 – see [Table 2: Parameter Values below](#) for values

Param2

Parameter 1 – see [Table 2: Parameter Values below](#) for values

Table 2. Parameter Values

Error type	Param 1	Param2
ERR_SCTP_MSG_LENGTH (1)	0	0
ERR_SCTP_INVALID_VERSION (3)	RX'd Message version	0
ERR_SCTP_INVALID_MSG_TYPE (4)	RX'd Message type	0
ERR_INFO (7)	RX'd Error code (see Table 3: Error Codes below)	RC
SUA_MGMT_ERR_LONG_MSG_GETM_FAILED (9) (Generated on first occurrence only)	Length of message for failed request	0

Table 3. Error Codes

Error Code	Description
0x01	Invalid Version
0x03	Unsupported Message Class
0x04	Unsupported Message Type
0x05	Unsupported Traffic Handling Mode
0x06	Unexpected Message
0x07	Protocol Error
0x09	Invalid Stream Identifier
0x0d	Refused - Management Blocking
0x0e	ASP Identifier Required
0x0f	Invalid ASP Identifier
0x11	Invalid Parameter Value
0x12	Parameter Field Error
0x13	Unexpected Parameter
0x14	Destination Status Unknown
0x15	Invalid Network Appearance
0x16	Missing Parameter
0x19	Invalid Routing Context

Error Code	Description
0x1a	No Configured AS for ASP
0x1c	Invalid load-sharing label

4.5.7 Notify Indication

Synopsis

N-NOTIFY indication due to NTFY message received

Message Format

Message Header		
Field Name	Meaning	
Type	SUA_MSG_STATUS_IND (0x03b4)	
id	SCTP Association ID	
src	SUA_TASK_ID	
dst	Management module ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	8	
Parameter Area		
Offset	Size	Name
0	4	Param1
4	4	Param2

Description

This indication is sent on receiving an SUA Management NOTIFY message from an SUA peer.

Parameters

Param1

Status type of message (see [Table 4 Status Type](#) on page 56)

Param2

Routing context (where present)

Table 4. Status Type

Status type	Description
0x00010002	AS Inactive
0x00010003	AS Active
0x00010004	AS Pending
0x00020001	Insufficient ASP resources active in AS
0x00020002	Alternate ASP Active
0x00020003	ASP failure

4.5.8 Association Status Indication

Synopsis

Indicates an Association changed state.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_ASC_STATUS_IND (0x0390)	
id	Association id	
src	SUA_TASK_ID	
dst	Management Module	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	status

Description

Message sent to the management module to indicate a state change in a previously configured association.

Parameters

status

Value	Meaning
1	IDLE
2	ESTABLISHED
3	CLOSED
9	CONGESTION ABATE
10	CONGESTION ONSET
11	CONGESTION DISCARD

4.5.9 Local Application Server Process Status Indication

Synopsis

Indicates a Local ASP changed state.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_LASP_STATUS_IND (0x0391)	
id	L_ASP id	
src	SUA_TASK_ID	
dst	Management Module	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	status

Description

Message sent to the management module to indicate a state change in a previously configured Local ASP.

Parameters

status

Value	Meaning
1	IDLE
5	DOWN
6	ACTIVE
7	INACTIVE

4.5.10 Remote Application Server Process Status Indication

Synopsis

Indicates a Remote ASP changed state.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_RASP_STATUS_IND (0x0392)	
id	R_ASP id	
src	SUA_TASK_ID	
dst	Management Module	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	status

Description

Message sent to the management module to indicate a state change in a previously configured Remote ASP.

Parameters

status

Value	Meaning
1	IDLE
5	DOWN
4	UP

4.5.11

Local Application Server Status Indication

Synopsis

Sent by the module to indicate a Local AS has changed state.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_LAS_STATUS_IND (0x0393)	
id	L_AS id	
src	SUA_TASK_ID	
dst	Management Module	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	status

Description

Message sent to the management module to indicate a state change in a previously configured Local AS.

Parameters

status

Value	Meaning
1	IDLE
5	DOWN
6	ACTIVE
7	INACTIVE

4.5.12 Remote Application Server Status Indication

Synopsis

Sent by the module to indicate Remote AS has changed state.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_RAS_STATUS_IND (0x0394)	
id	R_AS id	
src	SUA_TASK_ID	
dst	Management Module	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	2	
Parameter Area		
Offset	Size	Name
0	2	status

Description

Message sent to the management module to indicate a state change in a previously configured Remote AS.

Parameters

status

Value	Meaning
1	IDLE
5	DOWN
6	ACTIVE
7	INACTIVE
8	PENDING

4.5.13 Routing Key Status Indication

Synopsis

Sent by the module to indicate a Routing key has changed state.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_RK_STATUS_IND (0x0395)	
id	Routing Key id	
src	SUA_TASK_ID	
dst	Management Module	
rsp_req	0	
hclass	0	
status	RK status	
err_info	0	
len	8	
Parameter Area		
Offset	Size	Name
0	4	spc
4	1	ssn
5	2	nc
7	1	cong

Description

Message sent to the management module to indicate a state change in a previously configured Routing Key. The status field will be set to one of the following values:

Value	Meaning
0	IDLE
1	AVAILABLE
2	UNAVAILABLE

Parameters**spc**

Signaling Point Code

ssn

Sub-system number

nc

Network Context

cong

Congestion status

4.6 Statistics Messages

This section contains information about the following messages:

- Read Server Statistics. See below.
- Read Routing Key Statistics. See page 64.
- Read Association Statistics. See page 65.

4.6.1 Read Server Statistics

Synopsis

Sent to the module to request an updated response to be returned giving Server statistics.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_R_SERVER_STATS (0x639a)	
id	R_sg_id or R_as_id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0	
err_info	0	
len	8	
Parameter Area		
Offset	Size	Name
0	4	data_tx
4	4	data_rx

Description

The returned message will be updated with the following information:

Parameters

data_tx

Transmitted data since last statistics reset.

data_rx

Received data since last statistics reset.

4.6.2 Read Routing Key Statistics

Synopsis

Sent to the module to request an updated response to be returned giving Routing Key statistics.

Message Format

Message Header		
Field Name	Meaning	
type	SUA_MSG_R_RK_STATS (0x639b)	
id	Routing key id	
src	Originating module ID	
dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	0 or 1	
err_info	0	
len	8	
Parameter Area		
Offset	Size	Name
0	4	data_tx
4	4	Discarded

Description

The returned message will be updated with the following information for the Routing Key. Set the status field to 1 to reset the statistics.

Parameters

data_tx

Count of transmitted data since last statistics reset.

discarded

Count of transmitted data discarded since last statistics reset.

4.6.3 Read Association Statistics

Synopsis

Sent to the module to request an updated response to be returned giving association statistics.

Message Format

Message Header		
Field Name	Meaning	
Type	SUA_MSG_R_ASSOC_STATS (0x63b5)	
Id	Association ID	
Src	Originating module ID	
Dst	SUA_TASK_ID	
rsp_req	Sending layer's bit must be set	
hclass	0	
status	Non zero on error	
err_info	0	
len	152	
Parameter Area		
Offset	Size	Name
0	4	data_tx
4	4	asp_up_tx
8	4	asp_up_ack_tx
12	4	asp_dn_tx
16	4	asp_dn_ack_tx
20	4	asp_ac_tx
24	4	asp_ac_ack_tx
28	4	asp_ia_tx
32	4	asp_ia_ack_tx
36	4	error_tx
40	4	notify_tx
44	4	duna_tx
48	4	dava_tx
52	4	daud_tx
56	4	scon_tx
60	4	dupu_tx
64	4	drst_tx

Parameter Area		
Offset	Size	Name
68	4	beat_tx
72	4	beat_act_tx
76	4	data_rx
80	4	asp_up_rx
84	4	asp_up_ack_rx
88	4	asp_dn_rx
92	4	asp_dn_ack_rx
96	4	asp_ac_rx
100	4	asp_ac_ack_rx
104	4	asp_ia_rx
108	4	asp_ia_ack_rx
112	4	error_rx
116	4	notify_rx
120	4	duna_rx
124	4	dava_rx
128	4	daud_rx
132	4	scon_rx
136	4	dupu_rx
140	4	drst_rx
144	4	beat_rx
148	4	beat_act_rx

Description

Allows the user to retrieve statistics on the traffic carried on a per association basis.

Parameters

data_tx

Number of data packets TX'd via this association

asp_up_tx

Number of ASP UP messages TX'd via this association

asp_up_ack_tx

Number of ASP UP ACK messages TX'd via this association

asp_dn_tx

Number of ASP DOWN messages TX'd via this association

asp_dn_ack_tx

Number of ASP DOWN ACK messages TX'd via this association

asp_ac_tx

Number of ASP ACTIVE messages TX'd via this association

asp_ac_ack_tx

Number of ASP ACTIVE ACK messages TX'd via this association

asp_ia_tx

Number of ASP INACTIVE messages TX'd via this association

asp_ia_ack_tx

Number of ASP INACTIVE ACK messages TX'd via this association

error_tx

Number of ERROR messages TX'd via this association

notify_tx

Number of NOTIFY messages TX'd via this association.

duna_tx

Number of DUNA messages TX'd via this association

dava_tx

Number of DAVA messages TX'd via this association

daud_tx

Number of DAUD messages TX'd via this association

scon_tx

Number of SCON messages TX'd via this association

dupu_tx

Number of DUPU messages TX'd via this association

drst_tx

Number of DRST messages TX'd via this association

beat_tx

Number of BEAT messages TX'd via this association

beat_act_tx

Number of BEAT ACK messages TX'd via this association

data_rx

Number of data packets RX'd via this association

asp_up_rx

Number of ASP UP messages RX'd via this association

asp_up_ack_rx

Number of ASP UP ACK messages RX'd via this association

asp_dn_rx

Number of ASP DOWN messages RX'd via this association

asp_dn_ack_rx

Number of ASP DOWN ACK messages RX'd via this association

asp_ac_rx

Number of ASP ACTIVE messages RX'd via this association

asp_ac_ack_rx

Number of ASP ACTIVE ACK messages RX'd via this association

asp_ia_rx

Number of ASP INACTIVE messages RX'd via this association

asp_ia_ack_rx

Number of ASP INACTIVE ACK messages RX'd via this association

error_rx

Number of ERROR messages RX'd via this association

notify_rx

Number of NOTIFY messages RX'd via this association

duna_rx

Number of DUNA messages RX'd via this association

dava_rx

Number of DAVA messages RX'd via this association

daud_rx

Number of DAUD messages RX'd via this association

scon_rx

Number of SCON messages RX'd via this association

dupu_rx

Number of DUPU messages RX'd via this association

drst_rx

Number of DRST messages RX'd via this association

beat_rx

Number of BEAT messages RX'd via this association

beat_act_rx

Number of BEAT ACK messages RX'd via this association

4.7 Other Messages

This section contains information about the following messages:

- Read Revision Request. See below.
- License Event Indication. See page 71.
- Request Licensing State. See page 72.

4.7.1 Read Revision Request

Synopsis

Message used by SUA to indicate an implementation-specific, software-related event to the local management module.

Message Format

Message Header			
Field Name	Meaning		
type	GEN_MSG_MOD_IDENT (0x6111)		
id	0		
src	Originating module ID		
dst	SUA_TASK_ID		
rsp_req	Sending layer's bit must be set		
hclass	0		
status	0		
err_info	0		
len	28		
Parameter Area			
Offset	Size	Name	Description
0	2	type	Currently undefined
2	1	maj_rev	Major version number
3	1	min_rev	Minor version number
4	24	text	Null terminated string giving textual module identity

Description

This message is provided to request a reply indicating the software version for module under test. The parameter areas are filled in by the SUA module and do not need to be included by the user. On receipt of this request, the module returns the message with status "SUCCESS" to the sender including the information requested.

4.7.2 License Event Indication

Synopsis

Sent to Layer Management to indicate a license-related event.

Message Format

Message Header		
Field Name	Meaning	
type	MGT_MSG_LIC_EVENT (0x0f23)	
id	0	
src	SUA_TASK_ID	
dst	Layer Management	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	8	
Parameter Area		
Offset	Size	Name
0	4	Protocol Type
4	2	Event Type
6	2	Event Indication

Description

This message is sent by SUA to layer management to indicate that a license-related event has occurred. In the case of throughput, it indicates throughput congestion onset, abatement, or the beginning of enforcement.

Parameters

Protocol Type

This will be set to 4 to indicate SUA.

Event Type

Event Type	Description
0	Undefined
1	Throughput
2	Link/Associations
3	Session/Dialog

Event Indication

Throughput Event indication	Description
0	ABATE
1	CONGESTION
2	ENFORCEMENT

Link Associations

None currently defined.

Session/Dialog

None currently defined.

4.7.3 Request Licensing State

Synopsis

Sent by Layer Management to request the current license state.

Message Format

Message Header		
Field Name	Meaning	
Type	MGT_MSG_R_LIC_STATUS (0x6f22)	
Id	0	
Src	Layer Management	
Dst	SUA_TASK_ID	
rsp_req	Set appropriate response required bit	
Hclass	0	
Status	Set to 1 if module not enforcing licensing	
err_info	0	
Len	56	
Parameter Area		
Offset	Size	Name
0	4	Version
4	4	Licensed Protocol
8	4	Licensed Throughput Rate
12	4	Licensed Links
16	4	Licensed Sessions
20	4	Licensed Options
24	4	Configured Throughput Rate
28	4	Configured Maximum Links

Parameter Area		
32	4	Configured Maximum Sessions
36	4	Configured Options
40	4	Current Throughput Credit
44	4	Current Active Links
48	4	Current Active Sessions
52	4	Cong State

Description

Can be sent to the SUA module to request the message to be returned with the parameter area updated with a number of license related data values.

Parameters

The version parameters and licensed protocol parameters should be set by the user. The rest of the parameters are set by the module in the reply.

Version

Set to 0.

Licensed Protocol

Identifies the protocol being licensed. For SUA, this is set to 4.

Licensed Throughput

The throughput permitted by the installed license(s) (Units Kbytes/s).

Licensed Links

Number of links or associations permitted by the installed license(s).

Licensed Sessions

Number of simultaneous sessions or dialogs permitted by the installed license(s). (Note: This is not used by SUA).

Licensed Options

Not used by SUA.

Configured Throughput

Maximum throughput requested in the SUA Configuration message.

Configured Maximum Links

Maximum number of associations which have been configured.

Configured Maximum Sessions

Not used by SUA.

Configured Options

Not used by SUA

Current Throughput Credit

Number of bytes that can be received from the network or that can be sent to a User by SUA before enforcement mechanisms are triggered (Units of Bytes).

Current Active Links

Current number of associations configured.

Current Active Sessions

Not used by SUA.

Throughput Congestion State

Value	State	Description
0	UNCONG	
1	CONG	

5 External Message Definitions: SCTP Interface

The Dialogic® SUA module interfaces to the Dialogic® SCTP module. The following primitives defined in the Dialogic® SCTP Programmer's Manual are used:

5.1 Primitives from SUA to SCTP

SCTP_MSG_ACTIVATE	Servers wait for incoming assoc / Client attempt association
SCTP_MSG_SHUTDOWN	Gracefully close down association
SCTP_MSG_TX_REQ	Transmit a data packet
SCTP_MSG_ABORT	Abort an association

5.2 Primitives from SCTP to SUA

SCTP_MSG_STATUS_CHANGE	Association status change
SCTP_MSG_RX_IND	SCTP received data transfer indication
SCTP_MSG_CONG_STATUS	Change in the congestion status of the association

6 External Message Definitions: SCCP Interface

This section contains information about SCCP:

- Management Messages. See below.
- Protocol Messages. See page 82.
- Global Title Translation Messages. See page 82.

6.1 Management Messages

This section contains information about the following messages:

- Read Global Q.752 (previously Q.791) Statistics. See below.
- Management Indication. See page 80.

6.1.1 Read Global Q.752 (previously Q.791) Statistics

Synopsis

This message is used to retrieve (and optionally reset) statistics from SUA in an SCCP compatible format

Message Format

Message Header	
Field Name	Meaning
Type	SUA_MSG_R_STATS (0x63b6)
Id	0
Src	Originating module ID
Dst	SUA_TASK_ID
Rsp_req	Sending layer's bit must be set
hclass	0
status	1 to reset all statistics, otherwise 0
Err_info	0
Len	100

Parameter Area		
Offset	Size	Name
0	1	version
1	3	padding
4	4	rtf_ttype
8	4	rtf_val
12	4	rtf_net_fail
16	4	rtf_net_cong
20	4	rtf_ss_fail
24	4	rtf_ss_cong
28	4	rtf_ss_fail
32	4	rtf_sif_error
36	4	rtf_too_long
40	4	rtf_unknown
44	4	stx_err
48	4	sor_grant
52	4	sor_deny
56	4	udts_tx
60	4	udts_rx
64	4	num_msg
68	4	lss_msg
72	4	num_gtt
76	4	txm_cl0
80	4	txm_cl1
84	4	rxm_cl0
88	4	rxm_cl1
92	4	long_msg
96	4	long_msg_err

Description

The returned message will be updated with the following information. Set the status field to 1 to reset the statistics.

Parameters

Version

message version (currently zero)

rtf_ttype

Routing Failure – No translation for address of such nature

rtf_tval

Routing Failure – No translation for this specific address

rtf_net_fail

Routing Failure – Network Failure (Point Code not available)

rtf_net_cong

Routing Failure – Network Congestion

rtf_ss_fail

Routing Failure – Subsystem Failure (unavailable)

rtf_ss_cong

Routing Failure – Subsystem Congestion

rtf_uu

Routing Failure – Unequipped user (Subsystem)

sif_err

length exceeds max sif

too_long

max length exceeded

rtf_unknown

Routing Failure – Reason unknown

stx_err

Syntax error detected

sor_grant

Subsystem out-of-service request granted

sor_deny

Subsystem out-of-service request denied

udts_tx

UDTS messages sent

udts_rx

UDTS messages received

num_msg

Total messages handled (from local or remote subsystems)

lss_msg

Total messages intended for local subsystems

num_gtt

Total messages requiring global title translation

txm_cl0

Total messages originating (for connectionless class 0 only)

txm_cl1

Total messages originating (for connectionless class 1 only)

rxm_cl0

Total messages received (for connectionless class 0 only)

rxm_cl1

Total messages received (for connectionless class 1 only)

long_msg

Total long messages successfully allocated

long_msg_err

Total long messages failed to allocate

6.1.2 Management Indication

Synopsis

Sent by SUA to local Sub-System in an SCCP compatible format.

Message Format

Message Header	
Field Name	Meaning
Type	SCP_MSG_SCMG_IND (0x8745)
id	Local Sub-system number
src	SUA_TASK_ID
dst	User module ID
rsp_req	Sending layer's bit must be set
hclass	0
status	0
err_info	0
len	10

Parameter Area		
Offset	Size	Name
0	1	primitive type
1	1	format id
2	1	ssn
3	4	spc
7	1	cong
8	2	nc

Description

This message is used by SUA to notify the local sub-system of a change in the status of remote sub-systems and signaling points.

Parameters

Primitive type

Type of message (see [Table 5: Primitive Types and Format Identifiers](#) below)

Format id

Format identifier (see [Table 5: Primitive Types and Format Identifiers](#) below)

ssn

Sub-system number (when present).

spc

Signaling Point-code - least significant byte first as per Q.713

cong

congestion status (when present)

nc

Network context

Table 5. Primitive Types and Format Identifiers

Primitive type	Format ID	Parameters			
N-STATE indication (2)	SSA (1)	ssn	spc	0	nc
	SSP (2)	ssn	spc	0	nc
	SSC (7)	ssn	spc	cong	nc
N-PCSTATE indication (5)	SPA (128)	0	spc	0	nc
	SPP (129)	0	spc	0	nc
	SPC (130)	0	spc	cong	nc

6.2 Protocol Messages

SCP_MSG_TX_REQ (SCCP_N_UNITDATA_REQ)

SCP_MSG_RX_IND (SCCP_N_UNITDATA_IND, SCCP_N_NOTICE_IND)

6.3 Global Title Translation Messages

SCP_MSG_GTT_ADD

SCP_MSG_GTT_REM

SCP_MSG_GTT_MOD

SCP_MSG_GTT_GET

SCP_MSG_R_GTT

SCP_MSG_R_GTT_MASK

SCP_MSG_GTT_TEST

SCP_MSG_GLST_ADD

SCP_MSG_GLST_MOD

SCP_MSG_GLST_REM

Messages are used in a compatible way to the messages defined in the Dialogic® SCCP Programmer's Manual.

7 Example Configurations

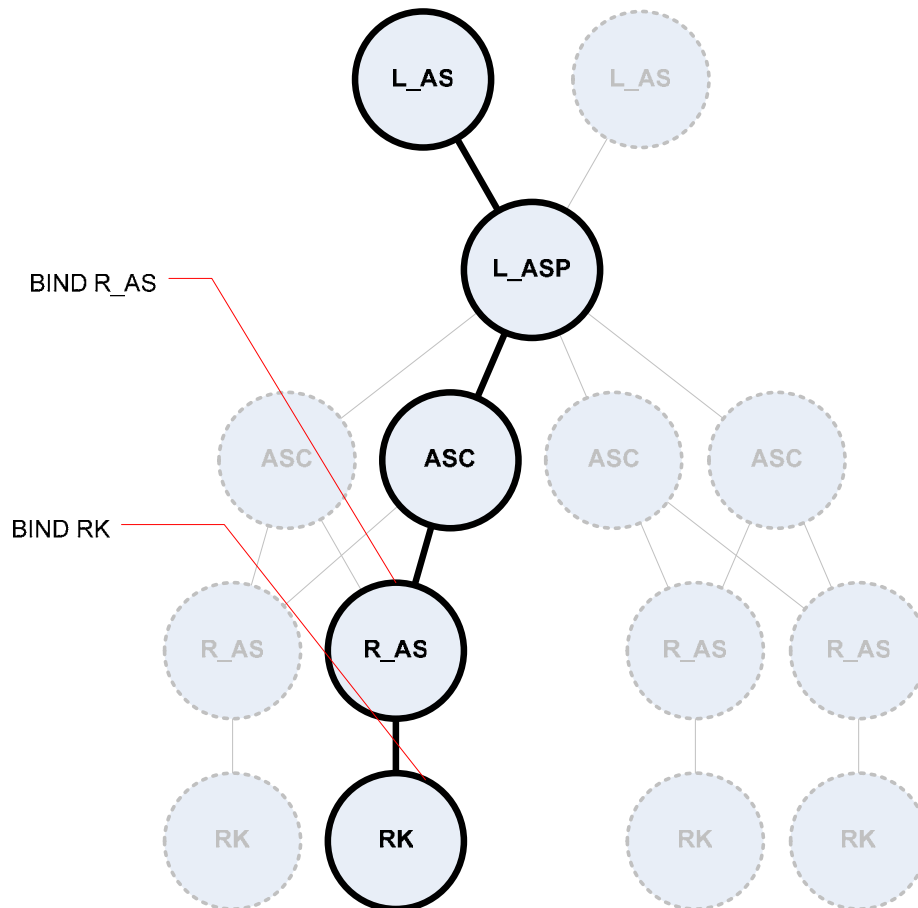
This section contains information about:

- IPSP Peer-to-Peer. See below.
- ASP to Signaling Gateway. See page 86.

7.1 IPSP Peer-to-Peer

This section describes a simple configuration to support IPSP Operation (Peer-to-Peer). The figure below shows all of the entities that require configuration. In addition, there are messages required to bind certain entities together. Each of these entities and the binds requires a separate configuration message, examples of which are given below.

Figure 7. IPSP Configuration



The example configuration messages below cover a single Local ASP and Local AS connected via a single SCTP association to a Remote AS routed to by the specified Routing Key.

```
*SUA_MSG_CONFIG
M-t739c-fcf-dc3-r8000-p d1 ef ef 0010 0000 0010 00000010 00
000000 0000

*SUA_MSG_CFG_LASP
M-t739d-fcf-dc3-r8000-i0000-p 00000000

*SUA_MSG_CFG_LAS
M-t739f-fcf-dc3-r8000-i0000-p 00000000 00 14 0000 00 00 0000
00000001 00

*SUA_MSG_CFG_RAS
M-t73a1-fcf-dc3-r8000-i0000-p

*SUA_MSG_CFG_ASC
M-t739e-fcf-dc3-r8000-i0000-p 0000 0000 0000 0000 0000 00000005

*SUA_MSG_CFG_RK
M-t73a4-fcf-dc3-r8000-i0000-p 00000002 0000 08 0000 00000000

*SUA_MSG_CFG_BIND_RAS
M-t73a2-fcf-dc3-r8000-i0000-p 0000 0000 00000000 07 00000000

*SUA_MSG_CFG_BIND_RK
M-t73a5-fcf-dc3-r8000-i0000-p 0000 00000001

*SUA_MSG_ACT_ASC
M-tc3ae-fcf-dc3-r8000-i0000-p 00000001
```

SUA_MSG_CONFIG

Configures a simple system with 16 associations, servers and routes. No GTTs are used.

Parameter	Value	Meaning
Id	0 (In header)	
sctp_mod_id	0xd1	
mgt_mod_id	0xef	
trace_mod_id	0xef	
max_assocs	16	
reserved	0	
max_routes	16	
max_gtt	16	
maint_mod_id	0	Use mgt_mod_id for maintenance messages
reserved	0	None
max_throughput	0	Support maximum for license

SUA_MSG_CFG_LASP

Configure a Local ASP with an id of 0.

SUA_MSG_CFG_LAS

Configures a Local AS with id 0.

SUA_MSG_CFG_RAS

Configure a Remote AS with an id of 0

SUA_MSG_CFG_ASC

Configure an association with Local ASP id of 0 to connect to a remote node in an IPSP-to-IPSP configuration.

SUA_MSG_CFG_RK

Configure the routing key for destination point code of 2 and sub-system number of 8.

SUA_MSG_CFG_BIND_RAS

Bind the Remote AS to the association.

SUA_MSG_CFG_BIND_RK

Bind the Routing Key defined above to the Remote AS id 0.

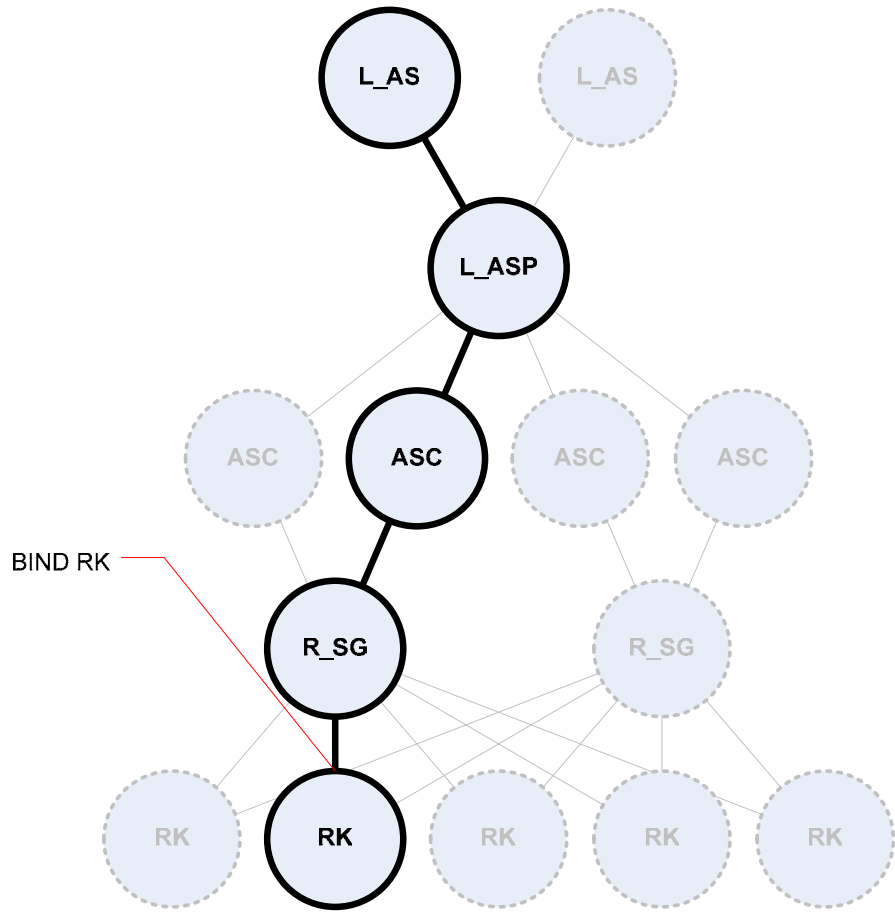
SUA_MSG_ACT_ASC

Activate the association (id 0).

7.2

ASP to Signaling Gateway

This section describes a simple configuration to support ASP Operation.



ASP Configuration

```

*SUA_MSG_CONFIG
M-t739c-fcf-dc3-r8000-p d1 ef ef 0010 0000 0010 00000000 00
000000 0000

*SUA_MSG_CFG_LASP
M-t739d-fcf-dc3-r8000-i0000-p 00000000

*SUA_MSG_CFG_LAS
M-t739f-fcf-dc3-r8000-i0000-p 00000000 00 14 0000 00 00 0000
00000001 00

*SUA_MSG_CFG_RSG
M-t73a3-fcf-dc3-r8000-i0000-p

*SUA_MSG_CFG_ASC
M-t739e-fcf-dc3-r8000-i0000-p 0000 0000 0000 0000 0000 00000004

*SUA_MSG_CFG_RK
M-t73a4-fcf-dc3-r8000-i0000-p 00000002 0000 08 0000 00000000

*SUA_MSG_CFG_BIND_RK
M-t73a5-fcf-dc3-r8000-i0000-p 0000 00000000

*SUA_MSG_ACT_ASC
M-tc3ae-fcf-dc3-r8000-i0000-p 00000001

```

SUA_MSG_CONFIG

Configures a simple system with 16 associations, servers and routes. No GTTs are used.

Parameter	Value	Meaning
Id	0 (In header)	
sctp_mod_id	0xd1	
mgt_mod_id	0xef	
trace_mod_id	0xef	
max_assocs	16	
reserved	0	
max_routes	16	
max_gtt	0	Support maximum available
maint_mod_id	0	Use mgt_mod_id for maintenance messages
reserved	0	None
max_throughput	0	Support maximum for license

SUA_MSG_CFG_LASP

Configure a Local ASP with an id of 0.

SUA_MSG_CFG_LAS

Configures a Local AS with id 0.

SUA_MSG_CFG_RSG

Configure a Remote Signaling Gateway with an id of 0

SUA_MSG_CFG_ASC

Configure an association with Local ASP id of 0 to connect to a remote node in an ASP-to-SG configuration.

SUA_MSG_CFG_RK

Configure the routing key for destination point code of 2 and sub-system number of 8.

SUA_MSG_CFG_BIND_RK

Bind the Routing Key defined above to the Remote SG id 0.

SUA_MSG_ACT_ASC

Activate the association (id 0).

Appendix A: Message Types

A.1 Message Type Table

The following table lists, by message type, the messages described in this manual.

Message Type	Mnemonic	Description
0x0390	SUA_MSG_ASC_STATUS_IND	Indicates an Association changed state
0x0391	SUA_MSG_LASP_STATUS_IND	Indicates a Local ASP changed state
0x0392	SUA_MSG_RASP_STATUS_IND	Indicates a Remote ASP changed state
0x0393	SUA_MSG_LAS_STATUS_IND	Indicates a Local AS changed state
0x0394	SUA_MSG_RAS_STATUS_IND	Indicates a Remote AS changed state
0x0395	SUA_MSG_RK_STATUS_IND	Indicates a touting key changed state
0x03b3	SUA_MSG_ERROR_IND	Indicates an SUA Management ERROR message has been received from an SUA peer or that a locally occurring error has been received..
0x03b4	SUA_MSG_STATUS_IND	Indicates an SUA Management NOTIFY message has been received from an SUA peer.
0x03b8	SUA_MSG_MAINT_IND	Indicates a routing failure or other error that is preventing the message being routed to its destination.
0x6395	SUA_MSG_R_ASC_STATUS	Requests the status of an Association
0x6396	SUA_MSG_R_LASP_STATUS	Requests the status of a Local ASP
0x6397	SUA_MSG_R_RASP_STATUS	Requests the status of a Remote ASP
0x6398	SUA_MSG_R_LAS_STATUS	Requests the status of a Local AS
0x6399	SUA_MSG_R_RAS_STATUS	Requests the status of a Remote AS
0x639a	SUA_MSG_R_SERVER_STATS	Requests the statistics kept for a Server
0x639b	SUA_MSG_R_RK_STATS	Requests the statistics for a particular Routing Key
0x63b5	SUA_MSG_R_ASSOC_STATS	Requests updated response returned giving association statistics.
0x63b6	SUA_MSG_R_STATS	Retrieves statistics from SUA in an SCCP compatible format
0x739c	SUA_MSG_CONFIG	System Configuration Message identifying default module Ids and resource allocation.
0x739d	SUA_MSG_CFG_LASP	Local ASP Configuration
0x739e	SUA_MSG_CFG_ASC	Association Configuration
0x739f	SUA_MSG_CFG_LAS	Declares a Local Application Server

Message Type	Mnemonic	Description
0x73a0	SUA_MSG_CFG_BIND_LAS	Binds a Local AS to an Association
0x73a1	SUA_MSG_CFG_RAS	Declares a Remote Application Server to communicate with
0x73a2	SUA_MSG_CFG_BIND_RAS	Binds a Remote AS to an Association
0x73a3	SUA_MSG_CFG_RSG	Declares a Remote SG
0x73a4	SUA_MSG_CFG_RK	Defines a routing key for a local AS
0x73a5	SUA_MSG_CFG_BIND_RK	Binds a Routing Key to a RAS or RSG
0x8745	SCP_MSG_SCMG_IND	Notifies of a change in the status of remote sub-systems and signaling points.
0xc3ae	SUA_MSG_ACT_ASC	Activates an SCTP Association
0xc3af	SUA_MSG_ACT_ASP	Activates a Local AS
0xc3b0	SUA_MSG_DEACT_ASC	Deactivates an SCTP Association
0xc3b1	SUA_MSG_DEACT_ASP	Deactivates a Local AS

Appendix B: Additional Services

This appendix contains information about:

- **Timer Services.** See below.

B.1 Timer Services

The notion of time in the Dialogic® SUA module is based on a periodic timer tick received from the timer module every 100ms. This 'tick' is used to run all SUA protocol timers. This appendix details the messages formats which are used by the SUA module to control timer services.

B.1.1 Keep Time

Synopsis

Message sent to request the timer module to issue a periodic timer tick (TM_EXP) message to the SUA module.

Message Format

Message Header		
Field Name	Meaning	
type	KEEP_TIME (0x7006)	
id	0	
src	Sending module's ID	
dst	Timer module ID	
rsp_req	0	
class	0	
status	0	
err_info	0	
len	6	
Parameter Area		
Offset	Size	Name
0	4	Reserved; should be set to zero if issued by the user.
4	2	resolution

Parameter Description

resolution

The number of operating system ticks between timer expiry messages being issued to the SUA module. This parameter is set from the timer_res parameter in the SUA module configuration message.

B.1.2 Timer Expiry

Synopsis

Periodic timer tick message issued by the timer module.

Message Format

Message Header		
Field Name	Meaning	
type	TM_EXP (0xc002)	
id	index of timer in table	
src	Timer module ID	
dst	Destination module ID	
rsp_req	0	
class	0	
status	0	
err_info	0	
len	4	
Parameter Area		
Offset	Size	Name
0	4	reserved – must be set to zero