

Intel[®] NetStructure[™] SS7 Protocols SCCP Programmer's Manual

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REVISION HISTORY

ISSUE	DATE	BY	CHANGES
1	25-Jul-94	SRG	<ol style="list-style-type: none"> 1. Parameter names for user primitives changed. Sequence control, Return option and Message priority parameters added. 2. Use of ITU format messages dropped in favour of Name-Length-Data format, (which permit the use of additional local parameters). 3. Parameter changes to: Translation table configuration, N-COORD and global statistics messages. 4. MTP message structure added as an appendix. 5. Coding of primitive type octet in management messages changed to provide unique values for requests and indications.
2	18-Nov-94	SRG	<ol style="list-style-type: none"> 1. Parameter area of add & remove concerned resource message modified to include type of concerned resource. 2. Local sub-system heartbeat detection mechanism added. 3. Support for multiple SCCP instances at a single signalling point added including multiple instance broadcast indication message.
3	18-Apr-96	SFP	<ol style="list-style-type: none"> 1. Support for ANSI operation added as a run-time configuration option. 2. Selection between 24bit or 14 bit point codes now a run-time configuration option. 3. Hop counter parameter added to N-UNITDATA / N-NOTICE. 4. Management primitive format changed to support larger point codes.
4	12-Dec-97	RBP/ SFP	Connection Orientated operation API and configuration included.
5	20-Dec-00	YTA	<ol style="list-style-type: none"> 1. Correct offset and message sizes in message formats. 2. The options breakdown shown in the parameter area now includes ANSI settings. 3. Addition of detailed information on Global Title Translation.
6	24-Jul-03	ML/YA	<ol style="list-style-type: none"> 1. Branding changed To Intel® NetStructure™. 2. Details of supported SCCP Tracing now included.

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1. INTRODUCTION

The SCCP module is a portable software implementation of the Signalling System Number 7, Signalling Connection Control Part (SCCP). It supports classes 0, 1 and 2 operation in accordance with ITU-T recommendations Q.711 to Q.714 (1993), ANSI T1 (1992) and BTNR145 using run-time options to select the particular mode of operation required.

The module is available in two configurations, one supporting connectionless (Class 0 and 1) operation and the other supporting both connection-oriented (Class 2) and connectionless operation. Connectionless procedures are implemented according to ITU & ANSI recommendations. The SCCP management procedures and connection-oriented operation are implemented according to ITU-T recommendations.

This is the Programmer's Manual, intended for users developing their own application programs that will interface with and use the functionality provided by the SCCP module.

The module uses the services provided by the Message Transfer Part (MTP) to exchange signalling messages with remote signalling points. SCCP contains procedures to keep account of the current status and availability of Local Sub-Systems (LSS), Remote Signalling Points (RSP) and Remote Sub-Systems (RSS). It also performs global title translation and allows signalling to be routed to back-up signalling points or sub-systems in the event that the primary destination is inaccessible.

During Class 2 connection oriented service SCCP maintains a connection record for each active connection, allowing data messages to be routed on the basis of a connection id alone.

The SCCP module is event driven and uses standard structured message types. It is intended to be used in conjunction with the MTP module either on hardware platforms or on user supplied hardware. However the software is portable and the well-defined message structure and the independent nature of the module allows the SCCP module to be used with alternative MTP implementations if required.

This manual provides an overview of the internal operation of the SCCP module and defines the structure of all messages that can be sent to, or issued by, the module. It also describes all the configuration parameters.

2. ABBREVIATIONS

- CCITT The International Telegraph & Telephone Consultative Committee
- ITU-T The Telecommunication Standardisation Sector of the International Telecommunication Union (Formerly the CCITT)
- TCAP Transaction Capabilities Application Part
- SCCP Signalling Connection Control Part
- MTP Message Transfer Part
- LSS Local Sub-System
- RSP Remote Signalling Point
- RSS Remote Sub-System
- SIF Signalling Information Field
- SIO Service Information Octet
- ANSI American National Standards Institute
- GT Global Title
- GTT Global Title Translation
- MSB Most Significant Bit
- LSB Least Significant Bit

3. RELATED DOCUMENTATION

- ITU-T Recommendations Q.711, Q.712, Q.713, Q.714 & Q.791
- ANSI T1.112-1992
- U10SSS, Software Environment Programmer's Manual

4. FEATURE OVERVIEW

Key features of the SCCP module include:

- Software implementation of ITU-T Q.711-Q.714 (1993) and ANSI T1.112-1992.
- Support for Class 0 and Class 1 connectionless operation.
- Support for Class 2 connection oriented operation.
- Support for Type A User parts such as ISUP.
- Implementation of SCCP management procedures.
- Support for multiple congestion levels at signalling points and sub-systems.
- Support for multiple distributed SCCP instances at a single signalling point.
- Automatic detection of local sub-system failure.
- Monitoring and Measurements in accordance with ITU-T Q.791.
- Support for 'concerned' sub-systems and signalling points.
- Dynamic configuration of Global Title Translation tables.

5. GENERAL DESCRIPTION

5.1 Module Overview

The SCCP module implements the ITU-T recommendations Q.711 - Q.714 relating to classes 0, 1 and 2 and also the ITU-T SCCP management procedures.

The management procedures track the status and congestion level of Local Sub-Systems, Remote Signalling Points and Remote Sub-Systems. The total number of entities supported is fixed at compile time, a typical binary distribution allows for a total (LSS + RSP + RSS) up to 32. Each entity may be configured with up to 4 (also a compile time constant) concerned entities that receive notification whenever the status of the LSS, RSP or RSS changes.

The total number of simultaneous Class 2 connections that the module supports is also determined at compile time.

The module is normally run as a single process but may be run as a number of separate instances (distributed over multiple processors for example) with each instance co-operating with the others to exchange management messages relating to changes of availability of sub-systems and signalling points.

The module is event driven; it has a single input queue into which events from other modules (MTP, User, Management etc.) are written. The module processes each event in turn until the input queue is empty in which case it will do nothing until the next event is received. Output from the module is directed depending on the type of event to either the MTP module, the User module (on a per local sub-system basis), the Management module or the Maintenance module. In addition the module requires that a periodic timer tick notification be issued to it (using the input queue) typically every tenth of a second. (The timer tick message can either be generated by a timer module or using the services of the selected operating system).

5.2 SCCP Module Dimensions

The following capabilities of the SCCP module are determined at compile time.

- The maximum required number of Local Sub Systems (LSS).
- The maximum required number of Remote Signalling Points (RSP).
- The maximum required number of Remote Sub Systems (RSS).
- The maximum required number of concerned entities which each LSS, RSP or RSS may have.
- The maximum required number of simultaneous connections terminated at Local Sub Systems.

- The maximum required number of simultaneous connections for which the SCCP module acts as an intermediate node.
- The number of available connection identifier values used to associate user primitives with a particular connection.
- The maximum number of translation table entries supported.

5.3 Module Configuration

To allow the module to be as flexible as possible and to allow different users to achieve the required operation, there are a number of run-time configuration options and parameters that must be specified by the user. These configuration parameters are sent to the module's input event queue in the same manner as all other messages.

The first message that must be sent to the module is a global configuration message (any messages received prior to the global configuration message will be discarded). It contains the local point code for the module, the maximum length SIF field supported by the local MTP, the SIO value to use in outgoing messages and the module id for all modules that exchange messages with the SCCP.

Next the user should configure the local sub-systems using a configure sub-system resource message. This message contains the sub-system number, the user module id for that sub-system and the sub-system multiplicity indicator.

Before configuring a remote sub-system it is first necessary to load the remote signalling point configuration parameters into the SCCP module (in some cases the SCCP will only know of the remote signalling point and will not know details of specific remote sub-systems). The remote signalling point configuration is loaded using the configure sub-system resource message. The parameters are just the signalling point code.

Once a remote signalling point has been configured any sub-systems can be added using the configure sub-system resource message and specifying both the signalling point code and the sub-system number.

Once a resource (LSS, RSP or RSS) has been configured, any concerned sub-systems or signalling points for that resource can be configured using an add concerned resource message. Concerned entities may be freely added and removed at any time after the resource has been configured. (Note that there is a limit to the number of concerned entities that can be assigned to a resource).

5.4 Module Operation

When all signalling points and sub-systems have been configured the module is ready for operation. Changes of status of local sub-systems are notified to SCCP using a management request message (e.g. User In Service (UIS), User Out of Service (UOS)). Protocol messages (e.g. Unitdata messages) are issued to the SCCP from the local sub-systems.

Changes of status for remote signalling points and sub-systems are notified to the user using the management indication message whilst protocol messages (e.g. Unitdata or Unitdata Service) are notified to the user using the receive indication message.

5.5 Connection Identification

SCCP service class 2 provides connection-oriented operation. This permits the establishment of a logical connection between local and remote entities for the exchange of data. The SCCP module uses a logical connection identifier (connection id) to associate user primitives with a particular connection. This value has local significance only and is assigned when the connection is established. Data messages are then exchanged over a particular connection using this connection id rather than explicit addresses. The connection id is fixed for the duration of the connection and must be present in all user primitives passed over the connection.

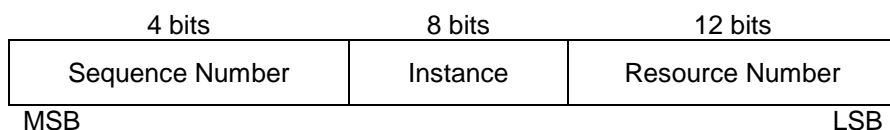
The connection id is conveyed in the MSG header id field of the SCP_MSG_TX_REQ and SCP_MSG_RX_IND messages sent and received by SCCP. The format of these messages is given in later sections of this document.

The range of values that may be used for the connection id is specified at module configuration, and ranges from **min_id** to **max_id**. SCCP is allocated a range of connection identifiers within these values for incoming connections, ranging from **base_id** to **top_id**.

The SCCP module selects connection identifiers for incoming connections in the range **base_id** to **top_id**. The connection id for an outgoing connection is selected by the local sub-system (user application), from the range **min_id** to **max_id**, but excluding any values between **base_id** and **top_id**. The application code is responsible for ensuring that each connection_id is used by only one local sub-system at any single point in time. This may be easily achieved by allocating a unique range of connection id values to each local sub-system.

5.6 Local connection reference

Peer SCCP entities use a connection reference to associate messages with a particular connection. The 3-byte local reference is generated automatically by the SCCP module in such a manner to ensure that the same value is not re-used until some time after the connection has terminated. The local connection reference is made up of three fields; the instance number, the connection id and a sequence number as shown in the following diagram:



The Instance Number allows SCCP to be distributed over a number of separate hardware platforms, each using a different instance number in the local connection reference.

The data associated with each active connection (such as address and state information) is stored in an internal resource allocated when the connection is initiated. The index of that resource appears in the 'Resource Number' field of the connection reference.

The Sequence Number is incremented by one for each connection that uses the same internal resource.

5.7 Global Title Translation

SCCP provides a facility called Global Title Translation (GTT). GTT is used to convert a Global title (GT) into an address that will allow SCCP to route a data packet to the correct destination. GTT is used perhaps when the point code scheme of one network is unknown to another network.

This may occur if two nodes need to communicate data to each other, but the nodes reside in different networks. The address information that the originating node would provide would be a Global Title (GT) which can be thought of as being an alias for at least a point code and possibly a subsystem number or another GT. SCCP using GTT is able to perform this translation, then MTP can use the point code to route to the next node if the destination has not been already reached.

Before GTT can be used, it is necessary to configure the translations that will be required. This is done by sending one or more Add Translation Request messages to the SCCP module (see section 10.7). In the simplest case, each message contains the GT ("target address") and the address to which the GT will be translated ("primary address"), which consists of a point code and optionally a subsystem number or GT. These translations are stored in a table in the SCCP module. When a message is received from MTP containing a GT, the table is searched to find an entry that matches the GT. If such an entry is found, the primary address is returned. If the point code (and the subsystem number, if present) contained in the address are configured on the system, the message is processed, otherwise it is routed on to the next signalling point. If no entry is found in the table a maintenance event is generated indicating that a routing failure has occurred.

A backup address can also be specified in the Add Translation Request message. This address would be used only if the point code in the primary address had been marked as prohibited (eg. a point code may be taken out of service for maintenance purposes. MTP will inform SCCP that the point code is unreachable).

The maximum number of global title translations that may be stored depends on the platform being used. Whether SCCP is running on a board or a SIU, the maximum number of combinations of numbering plan and translation type (part of the criteria for the addition of translations) is equal to 10. But on the SIU up to 150 translations are allowed per numbering plan and translation type. On the board only 40 are allowed per number plan and translation type combination.

For more advanced pattern matching, the GTT mask may also be specified. This allows greater flexibility and also means that many more translations can be performed without having to configure each one. Specifying a GT mask causes the match to be made on a subset of the digits. The remaining digits may either be removed or transferred from the target address to the translation output. This could be used to match on a prefix or area code, and for the removal or addition of prefix digits, for example.

5.7.1 Example configurations of address pattern matching

In the following table, address indicators, sub-system number and point code have been excluded for clarity. The backup translation is optional and has not been shown in the table below. The digit 'x' indicates 'any digit'.

Operation	Global Title	Primary translation	GTT mask	Address signals output from GTT function #
Translate '9876543' to the number '3456789'	9876543	3456789	0000000	3456789
Translate '01234xxxx' to the number '12345678'	012340000	12345678	000001111	12345678
Translate 'xxxx567' to the number '12345678'	0000567	12345678	1111000	12345678
Translate the number '9876xxxxx' by removing the prefix digits '9876'	987600000	no digits	000022222	xxxxx
Replace the prefix digits '1234' from a 7 digit number '1234xxx' with '321'	1234000	321	0000222	321xxx

This will also include a point code (as a minimum) and optionally a sub-system number.

5.7.2 Handling of nature of address

Numbers input to the translation function may be supplied as 'national', 'international' or 'subscriber'. In order to correlate each different form of the same number, it may be necessary to 'normalise' the target address and table entries, by the addition of a national (area) or international prefix, to make all numbers international.

This functionality is not supported by the current implementation. Different forms of the same number are treated as different addresses. No correlation is made between the target address and table entry nature of address indicator.

5.8 Constant definitions

To assist the user when writing an application, a 'C' language header file (*scp_inc.h*) is available containing all the definitions and constants necessary to interface with the TCAP module. This file contains definitions for all the mnemonics listed in this Programmer's Manual.

6. INTERFACE TO SYSTEM SERVICES

6.1 System Functions

In addition to the primitive interface and the management interface to the SCCP 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:

GCT_send	Sends a message to another task.
GCT_receive	Accept next message from input event queue, blocking the task if no message is ready.
GCT_grab	As receive but not blocking if the event queue is empty.

Though not used directly by the SCCP module the following functions are required for message allocation for inter-task communication :

getm	Allocate a message from the system.
relm	Release a message back to the system.

6.2 Timer Operation

In order to provide internal implementation of the SCCP 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 SCCP module:

KEEP_TIME	Issued by SCCP to initialise the timer services.
REMOVE_TIME	Issued by SCCP to give up timer services.
TM_EXP	Issued by the timer module to notify of timeout.

The format of these messages is described in the Software Environment Programmer's Manual.

The user should note that whilst the timer functionality is usually provided by the given Intel[®] NetStructure[™] SS7 Protocol modules, the timer functionality required by the SCCP module is very basic (just a single message being issued on a periodic basis). In most cases it is a trivial exercise to implement this functionality using the users own choice of operating environment if required.

7. INTERFACE TO MESSAGE TRANSFER PART

The SCCP module communicates with the Message Transfer Part (MTP) using the following primitives, all of which are defined in ITU-T Recommendation Q.704:

MTP-TRANSFER-REQ	Transmit request to MTP.
MTP-TRANSFER-IND	Receive indication from MTP.
MTP-PAUSE	Point code unavailable indication from MTP.
MTP-RESUME	Point code available indication from MTP.
MTP-STATUS	Signalling point congested or remote user unavailable indication from MTP.

The message format used to convey these primitives is defined in the Programmer's Manual for the product in use.

The SCCP module is usually used in conjunction with the MTP module. However, the use of primitives in accordance with Q.704 ensures that it can also be integrated with other MTP implementations as and when required.

To provide further flexibility the SCCP module supports the use of either T_FRAMES or R_FRAMES or the use of MSGs for MTP-TRANSFERS between the SCCP and MTP. T_FRAMES and R_FRAMES are most useful when the SCCP is running on the same processor as the MTP, whilst MSGs are generally used when the SCCP is running on a different processor to the MTP or in conjunction with an MTP other than the module.

A configuration option allows the user to select between sending T_FRAMES or sending MSGs. Receipt of both R_FRAMES and MSGs is supported in either mode.

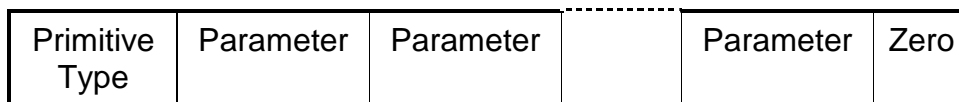
8. INTERFACE TO USER APPLICATION

All primitives at the application interface (i.e. between the SCCP module and the Local Sub-System) are passed by sending messages between the modules. The following messages are used:

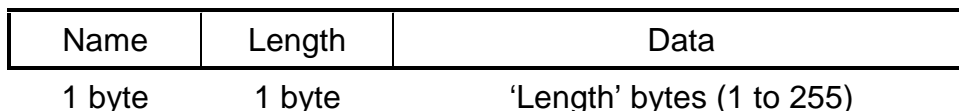
SCCP-TRANSMIT-REQ Conveys primitive from local sub-system to SCCP.
SCCP-RECEIVE-IND Conveys primitive from SCCP to local sub-system.

The basic structure of each message (irrespective of the SCCP primitive contained within it) is the same. The message contains a message header, the length of the user data and the user data itself. The message must be contained in a single buffer which should be allocated by the sending module (using the **getm** function) and either released (using the **relm** function) or passed to another module by the receiving module. The **getm** and **relm** functions are described in Section 6.

The data in the parameter area contains the primitive type and the primitive parameters. The first byte in the parameter area is the primitive type octet and the last byte is a zero byte to indicate that there are no further parameters in the parameter area. All parameters associated with the primitive are placed between the primitive type code and the final (zero) byte. Therefore the parameter area is formatted as follows:



The parameters may be placed in any order. The first byte of a parameter is the parameter name, the second byte is the length of the parameter data to follow (excluding the parameter name and the length byte itself), this is followed by the parameter data. The encoding of the parameter data aligns exactly with the parameter format specified in the appropriate ITU-T recommendation whenever possible. Therefore each parameter is formatted as follows:



Within each message there are mandatory parameters which must always be present and optional parameters which may or may not be present. In some cases optional parameters may have default values that are inserted by the SCCP module if not provided by the user as described in the parameter specification.

The following sections define the message format and content of the parameter area for each of the messages exchanged between the SCCP module and the local sub-system.

8.1 Message Specifications

8.1.1 SCCP-Transmit Request

Synopsis:

Protocol message sent from the local sub-system user to the SCCP module for transmission to the network.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_TX_REQ (0xc740)	
id	connection_id (see below)	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	Number of bytes of user data	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type octet.
1	len - 2	Parameters in Name-Length-Data format.
len - 1	1	Set to zero indicating end of message

Description:

This message is used by the application to send primitives to SCCP for transmission to the network. Message data is formatted in Name-Length-Data format.

All User primitives for classes 0, 1, and 2 specified by the ITU-T in recommendation Q.711 are supported.

Primitives used with Connection Oriented services must have the connection id of the connection to which the primitive refers in the id field of the message header.

The id field must be set to zero for primitives that refer to connectionless services.

This message also transports the User part type A interface elements REQUEST type 1 and REQUEST type 2.

Certain primitives and primitive parameters have been specified by the ITU-T for further study. The SCCP module permits the inclusion of these elements but will ignore their contents. The affected elements appear shaded.

Parameter area contents:

The primitive type octet is coded as follows:

Primitive	Mnemonic	Value (Decimal)	Value (Hex)
N-UNITDATA request	SCPPT_N_UNITDATA_REQ	1	1
N-CONNECT request	SCPPT_N_CONNECT_REQ	4	4
N-CONNECT response	SCPPT_N_CONNECT_RESP	6	6
N-DATA request	SCPPT_N_DATA_REQ	8	8
N-EXPEDITED-DATA request #	SCPPT_N_EXP_DATA_REQ	10	A
N-RESET request #	SCPPT_N_RESET_REQ	12	C
N-RESET response #	SCPPT_N_RESET_RESP	14	E
N-DISCONNECT request	SCPPT_N_DISCONNECT_REQ	16	10
N-INFORM request	SCPPT_N_INFORM_REQ	18	12
REQUEST_TYPE_1	SCPPT_REQUEST_TYPE_1	20	14
REQUEST_TYPE_2	SCPPT_REQUEST_TYPE_2	22	16

This primitive (class 3) is not currently supported and will be discarded if issued by the user.

Parameter formats are defined in section 8.2.

The following tables list the parameters associated with each transmit request primitive and shows whether the parameter is MANDATORY (in which case the message will be discarded if the parameter is omitted) or OPTIONAL (in which case the parameter may be omitted).

Primitive	Parameters	Status
N-UNITDATA request	SCPPN_CALLED_ADDR	MANDATORY
	SCPPN_CALLING_ADDR	MANDATORY
	SCPPN_SEQ_CTRL	OPTIONAL
	SCPPN_RET_OPT	OPTIONAL
	SCPPN_MSG_PRI	OPTIONAL
	SCPPN_USER_DATA	MANDATORY
	SCPPN_HOP_COUNTER	OPTIONAL

If the Hop Counter parameter is present, an Extended Unitdata Message (XUDT) will be issued to the network. If this parameter is not present, a Unitdata message (UDT) will be issued.

Primitive	Parameters	Status
N-CONNECT request	SCPPN_CALLED_ADDR	MANDATORY
	SCPPN_CALLING_ADDR	MANDATORY
	SCPPN_EXP_DATA #	OPTIONAL
	SCPPN_USER_DATA	OPTIONAL
	SCPPN_MSG_PRI	OPTIONAL
	SCPPN_FLOW_CNTRL #	OPTIONAL
	SCPPN_CREDIT #	OPTIONAL
	SCPPN_CONF_SELECT	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

This parameter (class 3) is not currently supported and will be discarded if issued by the user.

Primitive	Parameters	Status
N-CONNECT response	SCPPN_RESP_ADDR	OPTIONAL
	SCPPN_EXP_DATA #	OPTIONAL
	SCPPN_USER_DATA	OPTIONAL
	SCPPN_MSG_PRI	OPTIONAL
	SCPPN_FLOW_CNTRL #	OPTIONAL
	SCPPN_CREDIT #	OPTIONAL
	SCPPN_CONF_SELECT	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

This parameter (class 3) is not currently supported and will be discarded if issued by the user.

Primitive	Parameters	Status
N-DATA request	SCPPN_USER_DATA	MANDATORY
	SCPPN_MSG_PRI	OPTIONAL
	SCPPN_CONFIRM_REQ	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

Primitive	Parameters	Status
N-EXPEDITED-DATA request #	SCPPN_USER_DATA	MANDATORY
	SCPPN_MSG_PRI	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

This primitive (class 3) is not currently supported and will be discarded if issued by the user.

Primitive	Parameters	Status
N-RESET request #	SCPPN_REASON_RESET	OPTIONAL
	SCPPN_MSG_PRI	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

Primitive	Parameters	Status
N-RESET response #	SCPPN_MSG_PRI	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

This primitive (class 3) is not currently supported and will be discarded if issued by the user.

Primitive	Parameters	Status
N-DISCONNECT request	SCPPN_RESP_ADDR	OPTIONAL
	SCPPN_REASON_DISCONNECT	OPTIONAL
	SCPPN_USER_DATA	OPTIONAL
	SCPPN_MSG_PRI	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

Interface Element	Parameters	Status
REQUEST type 1	SCPPN_EXP_DATA #	OPTIONAL
	SCPPN_FLOW_CNTRL #	OPTIONAL
	SCPPN_CREDIT #	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL
	SCPPN_CONF_SELECT	OPTIONAL

This parameter (class 3) is not currently supported and will be discarded if issued by the user.

Interface Element	Parameters	Status
REQUEST type 2	SCPPN_REPLY_REQ	OPTIONAL
	SCPPN_REFUSE_IND	OPTIONAL
	SCPPN_SOURCE_REF	MANDATORY
	SCPPN_OPC	MANDATORY
	SCPPN_PRO_CLASS	OPTIONAL
	SCPPN_CREDIT #	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

This parameter (class 3) is not currently supported and will be discarded if issued by the user.

8.1.2 SCCP-Receive Indication

Synopsis:

Protocol message issued by SCCP to the local sub-system user to indicate receipt of a message by SCCP.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_RX_IND (0x8742)	
id	connection_id (see below)	
src	SCP_TASK_ID	
dst	Local sub-system module_id	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	Number of bytes of user data	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type octet.
1	len - 2	Parameters in Name-Length-Data format.
len - 1	1	Set to zero indicating end of message

Description:

This message is used by SCCP to advise the application of primitives received from the network by SCCP. Message data is formatted in Name-Length-Data format.

All User primitives in classes 0, 1 and 2 specified by the ITU-T in recommendation Q.711 are supported.

Primitives used with Connection Orientated services must have the connection id of the connection to which the primitive refers in the id field of the message header.

The id field is set to zero for primitives that refer to connectionless services

Certain primitives and primitive parameters have been specified by the ITU-T for further study. The SCCP module permits the inclusion of these elements but will ignore their contents. The affected elements appear shaded.

Parameter area contents:

The primitive type octet is coded as follows:

Primitive	Mnemonic	Value (Decimal)	Value (Hex)
N-UNITDATA indication	SCPPT_N_UNITDATA_IND	2	2
N-NOTICE indication	SCPPT_N_NOTICE_IND	3	3
N-CONNECT indication	SCPPT_N_CONNECT_IND	5	5
N-CONNECT confirmation	SCPPT_N_CONNECT_CONF	7	7
N-DATA indication	SCPPT_N_DATA_IND	9	9
N-EXPEDITED-DATA indication #	SCPPT_N_EXP_DATA_IND	11	B
N-RESET indication #	SCPPT_N_RESET_IND	13	D
N-RESET confirmation #	SCPPT_N_RESET_CONF	15	F
N-DISCONNECT indication	SCPPT_N_DISCONNECT_IND	17	11
N-INFORM indication	SCPPT_N_INFORM_IND	19	13
REPLY	SCPPT_REPLY	21	15

This primitive (class 3) is not currently supported and will not be issued to the user.

Parameter formats are defined in section 8.2.

The following tables list the parameters associated with each receive indication primitive and shows whether the parameter is MANDATORY (in which case it will always be present in messages issued by SCCP), or OPTIONAL (in which case the parameter may or may not be present depending on the circumstances).

Primitive	Parameters	Status
N-UNITDATA indication	SCPPN_SEQ_CTRL	OPTIONAL
	SCPPN_RET_OPT	OPTIONAL
	SCPPN_CALLED_ADDR	MANDATORY
	SCPPN_CALLING_ADDR	MANDATORY
	SCPPN_USER_DATA	MANDATORY
	SCPPN_HOP_COUNTER	OPTIONAL

Primitive	Parameters	Status
N-NOTICE indication	SCPPN_REASON_FOR_RET	MANDATORY
	SCPPN_CALLED_ADDR	MANDATORY
	SCPPN_CALLING_ADDR	MANDATORY
	SCPPN_USER_DATA	MANDATORY
	SCPPN_HOP_COUNTER	OPTIONAL

If the Hop Counter parameter will only be present as a result of receiving either an Extended Unitdata (XUDT) message or an Extended Unitdata Service (XUDTS) message.

Primitive	Parameters	Status
N-CONNECT indication	SCPPN_CALLED_ADDR	MANDATORY
	SCPPN_CALLING_ADDR	MANDATORY
	SCPPN_EXP_DATA #	OPTIONAL
	SCPPN_USER_DATA	OPTIONAL
	SCPPN_FLOW_CNTRL #	OPTIONAL
	SCPPN_CREDIT #	OPTIONAL
	SCPPN_CONF_SELECT	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL
Primitive	Parameters	Status
N-CONNECT confirmation	SCPPN_RESP_ADDR	OPTIONAL
	SCPPN_EXP_DATA #	OPTIONAL
	SCPPN_USER_DATA	OPTIONAL
	SCPPN_FLOW_CNTRL #	OPTIONAL
	SCPPN_CREDIT #	OPTIONAL
	SCPPN_CONF_SELECT	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

This parameter (class 3) is not currently supported and will not be issued to the user.

Primitive	Parameters	Status
N-DATA indication	SCPPN_USER_DATA	MANDATORY
	SCPPN_SEGMENTING	OPTIONAL
	SCPPN_CONFIRM_REQ	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

Primitive	Parameters	Status
N-EXPEDITED-DATA indication #	SCPPN_USER_DATA	MANDATORY
	SCPPN_CONNECT_ID	OPTIONAL

Primitive	Parameters	Status
N-RESET indication #	SCPPN_ORIGINATOR	OPTIONAL
	SCPPN_REASON_RESET	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

Primitive	Parameters	Status
N-RESET confirmation #	SCPPN_CONNECT_ID	OPTIONAL

This primitive (class 3) is not currently supported and will not be issued to the user.

Primitive	Parameters	Status
N-DISCONNECT indication	SCPPN_ORIGINATOR	OPTIONAL
	SCPPN_RESP_ADDR	OPTIONAL
	SCPPN_REASON_DISCONNECT	OPTIONAL
	SCPPN_USER_DATA	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

Interface Element	Parameters	Status
REPLY	SCPPN_SOURCE_REF	MANDATORY
	SCPPN_PRO_CLASS	OPTIONAL
	SCPPN_CREDIT	OPTIONAL
	SCPPN_CONNECT_ID	OPTIONAL

Parameters of the REPLY element are directly equivalent to those included in the Connection Request (CR) SCCP message normally issued by SCCP to a remote node to establish a connection.

8.2 Parameter Definitions

8.2.1 Parameter Names

The following parameter names are defined for use in messages between the local sub-system and SCCP. The parameters are used in TRANSMIT REQUEST messages, RECEIVE INDICATION messages and global title configuration messages as detailed in the appropriate message specifications.

Parameter	Mnemonic	Value (Decimal)	Value (Hex)
Return option	SCPPN_RET_OPT	1	1
Sequence control	SCPPN_SEQ_CTRL	2	2
Message priority	SCPPN_MSG_PRI	3	3
Calling address	SCPPN_CALLING_ADDR	4	4
Called address	SCPPN_CALLED_ADDR	5	5
User data	SCPPN_USER_DATA	6	6
Reason for return	SCPPN_REASON_FOR_RET	7	7
Target address	SCPPN_TARGET_ADDR	8	8
Primary address	SCPPN_PRIMARY_ADDR	9	9
Backup address	SCPPN_BACKUP_ADDR	10	A
Hop Counter	SCPPN_HOP_COUNTER	11	B
Expedited Data Selection #	SCPPN_EXP_DATA	12	C
Protocol Class	SCPPN_PRO_CLASS	13	D
Flow Control #	SCPPN_FLOW_CNTRL	14	E
Flow Control Window Size #	SCPPN_CREDIT	15	F
Responding Address	SCPPN_RESP_ADDR	16	10
Reset Reason	SCPPN_REASON_RESET	17	11
Disconnect Reason	SCPPN_REASON_DISCONNECT	18	12
Connection Identification	SCPPN_CONNECT_ID	19	13

Class 3 parameter is not currently supported and is discarded by SCCP.

Parameter	Mnemonic	Value (Decimal)	Value (Hex)
Receipt Confirmation Selection	SCPPN_CONF_SELECT	20	14
Confirmation request	SCPPN_CONFIRM_REQ	21	15
Originator	SCPPN_ORIGINATOR	22	16
Source Local Reference	SCPPN_SOURCE_REF	23	17
Originator Point Code	SCPPN_OPC	24	18
REPLY request	SCPPN_REPLY_REQ	25	19
Connection refuse indication	SCPPN_REFUSE_IND	26	1A
More Data Segments	SCPPN_SEGMENTING	27	1B
GTT Mask	SCPN_GTT_MASK	28	1C

8.2.2 Parameter Format

The data section of each parameter (where possible) is encoded in the same manner as the corresponding parameter in messages transferred over the network in accordance with ITU-T Recommendation Q.713 - *SCCP Formats and Codes* and ANSI T1.112.3. Parameters of local significance not defined in these recommendations are defined in this document.

The coding for each parameter type is given in the following tables:

Parameter name	SCPPN_BACKUP_ADDR
Parameter length	Variable, in the range 3 to 18
Parameter data	Backup translation address parameter encoded in accordance with the Q.713 or ANSI T1-112.3 definition of <i>Called Party Address</i> commencing with the address indicator and signalling point code and optionally containing sub-system number and global title.

Parameter name	SCPPN_CALLED_ADDR
Parameter length	Variable, in the range 2 to 18
Parameter data	<i>Called Party Address</i> parameter encoded in accordance with the Q.713 or ANSI T1-112.3 definition of <i>Called Party Address</i> commencing with the address indicator and containing optionally signalling point code, sub-system number and global title.

Parameter name	SCPPN_CALLING_ADDR
Parameter length	Variable, in the range 2 to 18
Parameter data	<i>Calling Party Address</i> parameter encoded in accordance with the Q.713 or ANSI T1-112.3 definition of <i>Calling Party Address</i> commencing with the address indicator and containing optionally signalling point code, sub-system number and global title.

Parameter Name	SCPPN_CREDIT
Parameter Length	Fixed : set to 1
Parameter Data	Indicates the proposed or selected Credit (window size). Coded in accordance with the ITU Q.713 and ANSI T1-112.3 definition of "Credit" <i>Note: the SCCP module currently ignores this parameter.</i>

Parameter Name	SCPPN_EXP_DATA
Parameter Length	Fixed, set to 1
Parameter Data	Specifies if the sub-system requires the use of expedited data during a connection. Single octet set either 0 or 1 as follows: 0 = <i>Sub-system may use expedited data</i> 1 = <i>Sub-system may not use of expedited data</i> <i>Note: the SCCP module currently ignores this parameter.</i>

Parameter Name	SCPPN_FLOW_CNTRL
Parameter Length	Fixed : set to 1
Parameter Data	Controls the level of service during connection orientated operation. Single octet coded as follows: 0 = <i>Use class 2 service, flow control is not required.</i> 1 = <i>Use class 3 service, flow control is required.</i> Omitting this parameter is equivalent to selecting <i>Use class 2 service; flow control is not required.</i> <i>Note: the SCCP module currently ignores this parameter.</i>

Parameter name	SCPPN_GTT_MASK
Parameter length	Variable, in the range 1 to 11
Parameter data	Digit pattern consisting of an array of digits in the same format as the 'address signals' field of the target address global title

	<p>(SCPN_TARGET_ADDR). The digit values define the behaviour of the translation function on that digit position.</p> <p>Omitting this parameter is equivalent to specifying <i>match all digit positions, replace target address with primary or backup translation</i>.</p>
--	--

Parameter data format :

	8	7	6	5	4	3	2	1
Octet 1	2nd digit			1st digit				
Octet 2	4th digit			3rd digit				
Octet m	filler '0' (if necessary)			nth digit				

The following values are supported in the GTT mask :

Value	Pattern Matching Algorithm	Translation Function
0	The target address digit in this position must match the corresponding digit position in the table entry.	The corresponding digit in the 'address signals' of the primary or backup translation will replace the target address digit.
1	Ignore this digit position in the target address when matching to this table entry.	The corresponding digit in the 'address signals' of the primary or backup translation will replace the target address digit.
2	Ignore this digit position in the target address when matching to this table entry.	The digit in this position in the target address will be added to the end of the 'address signals' in the primary or backup translation.

Parameter name	SCPPN_HOP_COUNTER
Parameter length	Fixed, set to 1
Parameter data	Hop counter parameter, used to detect the number of SCCP relay points a message passes through to prevent 'looping' of messages.

Parameter name	SCPPN_MSG_PRI
Parameter length	Fixed, set to 1
Parameter data	Single octet set to 0, 1, 2 or 3 to indicate the priority assigned to the message. If the parameter is omitted a default priority of 2 is assumed. The parameter is only applicable when the SCCP module is used in conjunction with other SCCP nodes in the network which support multiple message priorities.

Parameter Name	SCPPN_OPC
Parameter Length	Fixed , Set to 2 (Configuration option SCPF_24PC = 0) Set to 3 (Configuration option SCPF_24PC = 1)
Parameter Data	The local point code conveyed to the Type A User Part for transmission embedded in the user protocol. <i>Note: the SCCP module currently ignores this parameter.</i>

Parameter Name	SCPPN_ORIGINATOR
Parameter Length	Fixed , Set to 1
Parameter Data	Parameter indicates the source of the disconnection or connection refusal. Single octet coded as follows: <i>0xff = Undefined</i> <i>0 = Network Service User</i> <i>1 = Network Service Provider</i>

Parameter name	SCPPN_PRIMARY_ADDR
Parameter length	Variable, in the range 3 to 18
Parameter data	Primary translation address parameter encoded in accordance with the Q.713 or ANSI T1-112.3 definition of <i>Called Party Address</i> commencing with the address indicator and signalling point code and optionally containing sub-system number and global title.

Parameter Name	SCPPN_PRO_CLASS
Parameter Length	Fixed : set to 1
Parameter Data	<p>Parameter used in the User Part Type A interface elements REQUEST Type 2 and REPLY.</p> <p>This is a parameter of the SCCP message "Connection Request" conveyed to the Type A user for transmission embedded in the user protocol.</p> <p>Coded as the SCCP parameter "Protocol Class" specified in ITU-T Q.713 & ANSI T1.112</p>

Parameter Name	SCPPN_REFUSE_IND
Parameter Length	Fixed , Set to 1
Parameter Data	<p>Indicates the status of connection establishment on the Type A User Part interface. Single octet coded as follows:</p> <p>0 = <i>Connection establishment is proceeding normally.</i></p> <p>1 = <i>Connection establishment has failed.</i></p> <p>Omitting this parameter indicates <i>Connection establishment is proceeding normally.</i></p> <p><i>Note: the SCCP module currently ignores this parameter.</i></p>

Parameter Name	SCPPN_REPLY_REQ
Parameter Length	Fixed , Set to 1
Parameter Data	<p>Indicates if the Type A User Part expects a response to a REQUEST Type 2. Single octet coded as follows:</p> <p>0 = <i>No REPLY required.</i></p> <p>1 = <i>REPLY required.</i></p> <p>Omitting this parameter indicates <i>No REPLY required.</i></p> <p><i>Note: the SCCP module currently ignores this parameter.</i></p>

Parameter Name	SCPPN_REASON_DISCONNECT
Parameter Length	Fixed , Set to 1
Parameter Data	<p>Indicates the reason for the release of a connection. Single octet coded as follows :</p> <p><u>Disconnection</u></p> <p>0 = <i>Normal Condition</i></p> <p>1 = <i>End User Congestion</i></p> <p>2 = <i>End User Failure</i></p> <p>3 = <i>SCCP User originated</i></p> <p>4 = <i>Abnormal Condition of transient nature</i></p> <p>5 = <i>Abnormal Condition of non-transient nature</i></p> <p>6 = <i>Access failure</i></p> <p>7 = <i>Access Congestion</i></p> <p>8 = <i>Subsystem Congestion</i></p> <p>9 = <i>Abnormal Condition</i></p> <p>10 = <i>Invalid State</i></p> <p>11 = <i>Release in progress</i></p> <p><u>Connection refusal</u></p> <p>12 = <i>Destination address unknown (non-transient condition)</i></p> <p>13 = <i>Destination inaccessible (non transient condition)</i></p> <p>14 = <i>Destination inaccessible</i></p> <p>15 = <i>End user originated</i></p> <p>16 = <i>End user congestion</i></p> <p>17 = <i>End user failure</i></p> <p>18 = <i>SCCP user originated</i></p> <p>19 = <i>QOS unavailable (non transient condition)</i></p> <p>20 = <i>QOS unavailable (transient condition)</i></p> <p>21 = <i>Access failure</i></p> <p>22 = <i>Access congestion</i></p> <p>23 = <i>Sub-system congestion</i></p> <p>24 = <i>Reason unspecified (transient)</i></p> <p>25 = <i>Reason unspecified (non - transient)</i></p> <p>26 = <i>Incompatible information in NSDU</i></p> <p>27 = <i>Local Error</i></p>

	<p>28 = <i>Invalid State</i> 29 = <i>No translation</i> 30 = <i>In restart phase</i> 31 = <i>Non-transient condition</i> 32 = <i>Transient condition</i></p>
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Parameter name	SCPPN_REASON_FOR_RET
Parameter length	Fixed, set to 1
Parameter data	<p>Single octet indicating the reason for message return as contained in the <i>Return Cause</i> field of the received <i>Unitdata Service</i> message.</p> <p>In addition to the values listed in Q.713 the following values may be generated locally: 252 = Formatted sif exceeds max_sif. 253 = Formatted sif exceeds 272 octets (where sif is the Signalling Information Field and max_sif is a configuration parameter).</p>

Parameter Name	SCPPN_REASON_RESET
Parameter Length	Fixed , Set to 1
Parameter Data	<p>Indicates the reason for the invocation of the reset procedure. Single octet coded as follows :</p> <p>0 = <i>Unspecified</i> 1 = <i>User Synchronisation</i> 2 = <i>Network Congestion</i> 3 = <i>Undefined</i></p>

Parameter Name	SCPPN_RESP_ADDR
Parameter Length	Variable in the range 1 to 18
Parameter Data	<p>Coded in accordance with the ITU Q.713 and ANSI T1-112.3 definition of "Called Party Address" commencing with the address indicator and containing optionally: Signal Point Code, Sub-System Number and Global Title.</p>

Parameter name	SCPPN_RET_OPT
Parameter length	Fixed, set to 1
Parameter data	<p>Single octet set to either 0 or 1 as follows: 0 = <i>Discard Message on error</i> 1 = <i>Return Message on error</i></p> <p>Omitting the return option parameter is equivalent to selecting <i>Discard Message on error</i>.</p>

Parameter Name	SCPPN_SEGMENTING
Parameter Length	Fixed , Set to 1
Parameter Data	<p>Indicates if more data segments are to follow. Single octet coded as follows: 0 = <i>Last data segment.</i> 1 = <i>Further data segments follow.</i></p> <p>Omitting this parameter indicates <i>last data segment</i>.</p>

Parameter name	SCPPN_SEQ_CTRL
Parameter length	Fixed, set to 1
Parameter data	<p>Single octet in the range 0 to 31. Used to determine the SLS value in messages sent to the network. The presence of this parameter indicates that class 1 operation is selected, otherwise class 0 operation is assumed.</p>

Parameter Name	SCPPN_SOURCE_REF
Parameter Length	Fixed , Set to 3
Parameter Data	<p>This is the connection identifier conveyed to the Type A User Part for transmission embedded in the user protocol.</p> <p><i>Note: the SCCP module currently ignores This parameter.</i></p>

Parameter name	SCPPN_TARGET_ADDR
Parameter length	Variable, in the range 2 to 18
Parameter data	Target address for loading into the Global Title Translation table encoded in accordance with the Q.713 or ANSI T1-112.3 definition of <i>Called Party Address</i> commencing with the address indicator and containing global title and optionally signalling point code and sub-system number.

Parameter name	SCPPN_USER_DATA
Parameter length	Variable, in the range 1 to 255
Parameter data	Variable length data containing SCCP-user data to be transferred transparently between the SCCP user functions.

8.2.3 Data Segmentation

Data blocks exchanged between SCCP and local sub-systems are segmented into blocks no bigger than 255 octets. An N-DATA primitive request from a local sub-system must be sent for each 255-octet block.

A parameter, SCPPN_SEGMENTING, indicates if more segments are to follow.

8.2.4 Address information ordering

In the called, calling, responding, primary, backup and target address parameters, the ordering of the address information depends on the mode of operation selected at run-time by the SCPF_ANSI option.

If configured for ANSI operation, address information ordering is as follows:

Address indicator
Sub-system number (if present)
Point code (if present)
Global title (if present)

Otherwise the default CCITT (ITU-T) format is used as follows:

Address indicator
Point code (if present)
Sub-system number (if present)
Global title (if present)

8.2.5 Quality of Service

The Quality of service required for the transfer of data is indicated by the primitive type and parameters used to exchange the data with peer SCCP entities.

Use of N-UNITDATA primitives indicate Class 0 or Class 1 operation, the Sequence Control parameter optionally specifying Class 1 (return message on routing failure).

Use of the connection-oriented primitives indicate Class 2 or Class 3 operation. Class 3 operation is requested by including the Flow Control parameter. The required Class 3 flow control window size is specified using the Credit parameter.

9. MANAGEMENT INTERFACE

The management interface allows the user to interface with the SCCP Management (SCMG) entity within the SCCP module. The interface is message based and uses the same message structure (MSG) as described in the previous section but the coding of the parameter area is different.

Two messages are currently defined, one for management requests from the user and the other for management indications from the SCCP module. The following management primitives are supported:

Management primitives issued to SCCP:

N-STATE Request	User In Service (UIS)
N-STATE Request	User Out of Service (UOS)
N-STATE Request	User congestion
N-COORD Request	User withdrawal request (UOR)
N-COORD Response	User withdrawal grant (UOG)

Management primitives issued by SCCP:

N-STATE Indication	User In Service (UIS)
N-STATE Indication	User Out of Service (UOS)
N-COORD Indication	User withdrawal indication (UOR)
N-COORD Confirmation	User withdrawal confirmation (UOG)
N-PCSTATE Indication	Signalling point accessible
N-PCSTATE Indication	Signalling point inaccessible
N-PCSTATE Indication	Signalling point congested

9.1 Management Request

Synopsis:

SCCP Management Request from User.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_SCMG_REQ (0xc744)	
id	Local sub-system number	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
hclass	0	
status	0	
err_info	0	
len	Number of bytes in parameter area	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type (N-STATE-REQ or N-COORD-REQ)
1	len-1	Variable length data containing the SCMG format identifier, the affected SSN, the affected PC the Sub-system multiplicity indicator and the congestion level. Some fields only exist for certain message types. The tables below detail the structure of the parameter area for individual management primitives.

Description:

This message is used by the application sub-system to notify the SCCP of changes in the status of the sub-system and to request and grant permission for a sub-system to be taken out of service using the co-ordinated state change procedure. Receipt of a management request by the SCCP causes the status of the local sub-system to be updated and in most cases one or more management messages to be issued to the network.

Confirmation Message:

The module sending the message can optionally request that the SCCP module return a confirmation when the message has been processed. This is achieved by setting the sending layer's bit in the **rsp_req** field, which will cause a confirmation message of the same format to be returned. The **status** field in this message is zero on success or an error code otherwise.

Parameter Description:

The coding of the parameter field is based on the coding specified in Table 22/Q.713 but includes an additional field at the beginning to indicate the primitive type. The usage of the various parameter fields for each management message is listed below in tabular form:

9.1.1 N-STATE User In Service (UIS)

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-STATE-REQ (1)
1	1	Format id - Sub-system Allowed SSA (1)
2	[4#] 6	Not used, must be set to zero

9.1.2 N-STATE User Out of Service (UOS)

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-STATE-REQ (1)
1	1	Format id - Sub-system Prohibited SSP (2)
2	[4#] 6	Not used, must be set to zero

9.1.3 N-STATE User Congestion

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-STATE-REQ (1)
1	1	Format id - Sub-system Congested SSC (7)
2	[3#] 5	Not used, must be set to zero
[5#] 7	1	Congestion Level (0, 1, 2 or 3)

9.1.4 N-COORD User withdrawal request (UOR)

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive Type - N-COORD-REQ (3)
1	1	Format id - Sub-system Out of Service request SOR (4)
2	1	Not used, must be set to zero
3	[2#] 4	Point code of replicate sub-system (note least significant byte first as per Q.713)
[5#] 7	1	Not used, must be set to zero

9.1.5 N-COORD User withdrawal grant (UOG)

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-COORD-REQ (3)
1	1	Format id - Sub-system Out of Service Grant SOG (5)
2	1	Sub-system number of system being withdrawn
3	[2#] 4	Point code of system being withdrawn (note least significant byte first as per Q.713)
[5#] 7	1	Not used, must be set to zero

Note: [#] shows the offset and size value for backward compatibility with earlier software releases. This format will only be used when the 'Use extended Management Primitive Format' run-time option (SCPF_XMPRIM) has NOT been selected. The non-extended primitive format encodes the least significant 16 bits of the point code in two octets according to Q.713, with the least significant byte first.

9.2 Management Indication

Synopsis:

Message issued by SCCP Management to local sub-system.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_SCMG_IND (0x8745)	
id	Local sub-system number	
src	SCP_TASK_ID	
dst	LSS module_id	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	Number of bytes in parameter area	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type octet.
1	len-1	Variable length data containing the SCMG format identifier, the affected SSN, the affected PC the Sub-system multiplicity indicator and the congestion level. Some fields only exist for certain message types. The tables below detail the structure of the parameter area for individual management primitives.

Description:

This message is used by SCCP management to notify the local sub-system of a change in the status of other sub-systems (local and remote) and signalling points, to indicate a request from a sub-system to be withdrawn, or a confirmation that a local-sub-system can be withdrawn using the co-ordinated state change procedure.

Parameter Description:

The coding of the parameter field is based on the coding specified in Table 22/Q.713 but includes an additional field at the beginning to indicate the primitive type. The usage of the various parameter fields for each management message is listed below in tabular form:

9.2.1 N-STATE User In Service (UIS)

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-STATE-IND (2)
1	1	Format id - Sub-system Allowed SSA (1)
2	1	Affected sub-system number
3	[2#] 4	Affected point code (note least significant byte first as per Q.713)
[5#] 7	1	Sub-system multiplicity indicator

9.2.2 N-STATE User Out of Service (UOS)

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-STATE-IND (2)
1	1	Format id - Sub-system Prohibited SSP (2)
2	1	Affected sub-system number
3	[2#] 4	Affected point code (note least significant byte first as per Q.713)
[5#] 7	1	Sub-system multiplicity indicator

9.2.3 N-COORD User withdrawal indication (UOR)

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-COORD-IND (4)
1	1	Format id - Sub-system Out of Service Request UOR (4)
2	1	Affected sub-system number (i.e. the sub-system that is being withdrawn)
3	[2#] 4	Affected point code (note least significant byte first as per Q.713). This is the point code of the system requesting to be withdrawn.
[5#] 7	1	Sub-system multiplicity indicator

9.2.4 N-COORD User withdrawal confirmation (UOG)

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-COORD-IND (4)
1	1	Format id - Sub-system Out of Service Grant SOG (5)
2	[3#] 5	Not used, must be set to zero
[5#] 7	1	Sub-system multiplicity indicator

9.2.5 N-PCSTATE Signalling Point Allowed

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-PCSTATE-IND (5)
1	1	Format id - Signalling Point Allowed (128)
2	1	Not used, set to zero
3	[2#] 4	Affected point code (note least significant byte first as per Q.713)
[5#]7	1	Not used, set to zero

9.2.6 N-PCSTATE Signalling Point Prohibited

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-PCSTATE-IND (5)
1	1	Format id - Signalling Point Prohibited (129)
2	1	Not used, set to zero
3	[2#] 4	Affected point code (note least significant byte first as per Q.713)
[5#] 7	1	Not used, set to zero

9.2.7 N-PCSTATE Signalling Point Congested

PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	Primitive type - N-PCSTATE-IND (5)
1	1	Format id - Signalling Point Congested (130)
2	1	Not used, set to zero
3	[2#]	Affected point code (note least significant byte first as per Q.713)
[5#] 7	1	Congestion level (0, 1, 2 or 3)

Note: [#] shows the offset and size value for backward compatibility with earlier software releases. This format will only be used when the 'Use extended Management Primitive Format' run-time option (SCPF_XMPRIM) has NOT been selected. The non-extended primitive format encodes the least significant 16 bits of the point code in two octets according to Q.713, with the least significant byte first.

10. NON-PRIMITIVE INTERFACE

In addition to the primitive interface for passing protocol messages and management messages between the SCCP module and the user modules, the SCCP module supports a non-primitive interface for implementation specific functionality.

The non-primitive interface is used to support requests by the user for configuration and diagnostic purposes and to allow SCCP to report protocol based and software error events to the local system management module.

This section describes the formats of all the messages used in the non-primitive interface.

When the SCCP module returns a confirmation message containing a status value the status will be one of the following:

Mnemonic	Value	Description
SCPE_BAD_ID	1	Inappropriate or invalid id in request message
SCPE_BAD_MSG	5	Inappropriate or unrecognised message type .
SCPE_BAD_PARAM	6	Invalid parameters contained in message.
SCPE_NO_RESOURCES	7	Insufficient internal resources.

Refer to section 5.3 Module Configuration for details on how configuration messages are used.

10.1 Configuration Request

Synopsis:

Message used to configure the SCCP module for operation.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_CONFIG (0x7740)	
id	0	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
hclass	0	
status	0	
err_info	0	
len	60	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	cnf_ver - must be set to one
1	1	sio - Service Information Octet value
2	2	options
4	1	module_id - SCCP module id
5	1	mtp_id - MTP module id
6	1	mngt_id - Management module id
7	1	maint_id - Maintenance module id
8	4	point_code - Local point code
12	2	max_sif
14	1	sccp_instance
15	1	smb_id - Broadcast module id
16	2	smb_flags - Broadcast flags
18	2	num_uc - Required number of User connections
20	2	uc_onset - Onset of congestion point for user connections

Description:

This message is used to configure the SCCP 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 SCCP module is operating such as the identity of other modules with which it needs to communicate. It also contains run-time options (such as the local point code, the service information octet (SIO) and the maximum SIF capability of the local MTP).

OFFSET	SIZE	NAME
22	2	uc_abmt - Congestion abatement point for active user connections
24	2	num_ic - Required number of intermediate node connections
26	2	ic_onset - Onset of congestion point for intermediate node connections
28	2	ic_abmt - Congestion abatement point for intermediate node connections
30	2	num_data - Required total number of Class 3 data forms.
32	2	data_onset - Onset of congestion point for class 3 data messages.
34	2	data_abmt - Congestion abatement point for class 3 data messages
36	2	num_edata - Required total number of Class 3 expedited data forms.
38	2	edata_onset - Onset of congestion point for class 3 expedited data messages.
40	2	edata_abmt - Congestion abatement point for class 3 expedited data messages
42	2	ext_options - Extended bit mapped options.
44	2	base_id - Base connection id used by SCCP.
46	2	top_id - Max. connection id used by SCCP.
48	2	min_id - Base connection id in system.
50	2	max_id - Max. connection id in system.
52	1	isup_id - ISUP (Type A User Part) module ID
53	7	Reserved

sio

The value used for the Service Information Octet in all messages sent to the network (eg. 0x83 for national networks)

options

Run time options assigned according to the following table:

Bit	Mnemonic	Description
0	SCPF_TFRM	If set to 1, messages sent to the MTP use the T_FRAME format, otherwise they use the MSG format (set bit if running SCCP on the board)
1	SCPF_PLIST	Must be set to 1
2	SCPF_ROI	If set to 1 SCCP will include the return option and sequence control parameters in N-UNITDATA Indications to the user, otherwise these fields will not be included.
3	SCPF_SMB	If set to 1 SCCP will use the SCCP Management Broadcast (SMB) mechanism to communicate with other SCCP instances at the same signalling point, otherwise the SCCP module is configured as a single instance.
4	SCPF_MPRI	If set to 1, management messages will be assigned priority values in accordance with BTNR 145/ ANSI T1.111. Set to 1 for ANSI operation.
5	SCPF_XUDT	If set to 1, XUDT and XUDTS messages received from the network will be recognised and conveyed to the user, otherwise these messages will be discarded. Set to 1 for ANSI operation.
6	SCPF_24PC	If set to 1, 24 bit point codes will be used, otherwise 14 bit point codes will be used. Set to 1 for ANSI operation.
7	SCPF_PRI_BA	If set to 1, message priority is encoded in the MTP-label SSF bits BA, otherwise message priority is encoded in accordance with BTNR145. Set to 1 for ANSI operation.
8	SCPF_XMPRIM	If set to 1, extended format management primitives will be used. <i>This bit should be set for application software conforming to this release of the Programmer's Manual.</i>
9	SCPF_PC_CABT	If set to 1, the SCCP module will expect to be informed of changes in signalling point congestion level by the MTP. Otherwise, a congestion abatement timer, Tx will be used to control signalling point congestion abatement. Set to 1 for ANSI operation.

options (continued)

Bit	Mnemonic	Description
10	SCPF_ANSI	If set to 1, ANSI specific operation is enabled. Typically, for operation in accordance with ANSI T1.112-1992 bits 4,5,6,7,8,9,10,11 and 12 all need to be set. Set to 1 for ANSI operation.
11	SCPF_TOE	If set to 1, a connection will be terminated on receipt of any unexpected SCCP message, otherwise unexpected messages are discarded This operation is required for ANSI operation.
12	SCPF_TFR	If set to 1 the internal connection reference is frozen after the termination of a connection for the duration of timer Tfr. This operation is required for ANSI operation.
13	SCPF_ACK_ALL	This option controls the behaviour of class 3 flow control. If set to 1 all incoming data messages are acknowledged automatically by the Data Acknowledgement message. Otherwise, the Data Acknowledgement message is only sent after the number of buffered data messages equals the "credit" set by the user. (i.e. the flow control window is full). <i>Note: This option setting is currently ignored.</i>
14	SCPF_TCONN_INC	Controls the operation of timer T_conn_inc for incoming connections. If set to 1, this timer is started on receipt of a Connection Request from a remote SCCP node. If a valid N-CONNECT response is not issued by the user within this time, the connection refusal procedure is automatically initiated. (Connection Refused is returned to the remote SCCP and N-DISCONNECT to the local sub-system). If set to zero, this functionality is disabled.
15	SCPF_XOP	Set to indicate that the ext_options field contains additional configuration options. The use of this bit is not currently enforced.

module_id

SCCP module id – typically 0x33.

mtp_id

All MTP-TRANSFER-REQ messages are sent to this module.

mngt_id

Module identifier defining the destination for all management indications

maint_id

Module identifier defining the destination for all maintenance indications

point_code

The source point code to be used in messages sent by SCCP module to the network.

max_sif

The maximum length for the Signalling Information Field (SIF) supported by the MTP. Usually set to either 62 or 272.

sccp_instance

The instance number of this SCCP module. This field is used to allow multiple instances of the SCCP module to run at a single signalling point. Each instance exchanges SCCP management messages with the other instances using the SCCP Management Broadcast mechanism (SMB) to ensure that all instances are aware of the current state of all sub-system resources.

smb_id

Broadcast module id

smb_flags

Flags relating to the SCCP Management Broadcast mechanism. For further details refer to Intel Corporation.

num_uc

Maximum number of simultaneous user connections (connections terminating at this SCCP node) that the module is required to support. This value is compared to a compile time constant to determine if the module has sufficient internal resources to handle the requested number of user connections.

uc_onset

User Connection congestion onset. User connection congestion will be indicated to the maintenance process when the total number of active user connections exceeds this value.

uc_abmt

User Connection congestion abatement. User connection congestion abatement is indicated to the maintenance process when the total number of active connections SCCP users control returns below this value.

num_ic

Maximum number of simultaneous intermediate node connections that the module is required to support. This value is compared with a compile time constant to ensure that the module has sufficient resources to handle the requested number of intermediate node connections.

ic_onset

Intermediate node congestion onset. Intermediate node congestion is indicated to the maintenance process when the total number of active intermediate node connections exceeds this value.

ic_abmt

Intermediate node congestion abatement point. Intermediate node congestion will be indicated to the maintenance process when the total number of active intermediate node connections SCCP returns below this value.

num_data

Maximum number of buffers required for storing class 3 data messages under flow control. This value is compared with a compile time constant to ensure that the module has sufficient resources to handle the requested number of class 3 data buffers.

Note: This parameter must currently be set to zero.

data_onset

Class 3 data congestion will be indicated to the maintenance process when the total number of active class 3 data buffers exceeds this value.

Note: This parameter must currently be set to zero.

data_abmt

Class 3 data congestion abatement will be indicated the maintenance process when the total number of active class 3 data buffers returns below this value.

Note: This parameter must currently be set to zero.

num_edata

Maximum number of buffers required for storing class 3 expedited data messages under flow control. This value is compared with a compile time constant to ensure that the module has sufficient resources to handle the requested number of class 3 expedited data buffers.

Note: This parameter must currently be set to zero.

edata_onset

Expedited data congestion will be indicated to the maintenance process when the total number of active expedited data buffers SCCP exceeds this value.

edata_abmt

Expedited data congestion abatement will be indicated the maintenance module when the total number of active expedited data buffers returns below this value.

ext_options

Further bit mapped options shown in the following table.

Bit	Mnemonic	Description
0	SCPXF_NO_CGP	If set, the local point code will not be added to the calling party address. If not set, the local point code will be inserted into the calling party address. Note: The point code will not be inserted if the SCPXF_DEL_CGPC is set.
1	SCPXF_INCL_CDPC	If set, any point code present in the called party address will be included. If not set, any point code in the called party address will be removed.
2	SCPXF_DEL_CGPC	If set, this option will remove any point code present in the calling party address. If not set, the behaviour determined by the SCPXF_NO_CGP option will be followed. Note: This option is typically used in conjunction with SCPXF_CG_RTE_GT.
3	SCPXF_CG_RTE_GT	If set and a GT is present, this option will change the routing indicator to 'Route on GT'. If not set or no GT is present, then the address will not be changed. Note: This option is typically used in conjunction with SCPXF_DEL_CGPC.

base_id

The first connection id that may be used by the SCCP module for incoming connections. The subsequent **top_id - base_id** connection id's are used solely by SCCP for incoming connections. Local sub-systems must not use values within this range for outgoing connections.

top_id

The highest connection id that the SCCP module may use for incoming connections. Depending on the setting of **base_id** and **top_id**, this value may be assigned for use with either an outgoing or incoming connection.

min_id

The first connection id. Depending on the setting of **base_id** and **top_id**, this value may be assigned for use with either an outgoing or incoming connection.

max_id

The last connection id present in the system. The total number of requested connection id's is **max_id - min_id**. This is compared to a compile time constant to ensure that the SCCP module has sufficient internal resources to handle the requested number of connection id's.

isup_id

Module id of the Type A ISDN user Part.

10.2 Configure Timers Request

Synopsis:

Message used to configure the SCCP module timer values.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_CNF_TIM (0x7748)	
id	0	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
class	0	
status	0	
err_info	0	
len	40 (or zero, see below)	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	tim_ver - must be set to one
1	1	Reserved for future use, must be set to zero
2	2	T_stat_info timer value
4	2	T_coord_chg timer value
6	2	T_ignore_sst timer value
8	2	Tx timer value
10	2	Ts timer value
12	2	T_hbt timer value
14	2	T_bpa (broadcast propagation allowance)
16	2	T_conn (connection timer)
18	2	T_ias (transmit inactivity timer)
20	2	T_iar (receive inactivity timer)
22	2	T_rel (release timer)
24	2	T_rpt_rel (repeat release timer)
26	2	T_int (interval timer)
28	2	T_reset (reset timer)
30	2	T_fr (local ref freeze timer - ANSI only)
32	2	T_conn_inc (incoming connection timer, T_CONN_INT option only)
34	2	T_guard (restart guard timer)
36	4	Reserved for future use, must be set to zero

Description:

This message is used to configure the SCCP management timers. The message can be issued at any time after the SCM_MSG_CONFIG message. Timer values are in multiples of the SCCP timer tick period which should usually be 100ms. The new timer values take effect when the timer is next started.

The timers may be set to their default values (shown in the following table which assumes a tick period of 100ms) by sending a message with the parameter length set to zero.

Timer	Default value (in timer ticks)	Equivalent value (in seconds)
T_stat_info	300	30
T_coord_chg	50	5
T_ignore_sst	10	1
Tx	20	2
Ts	20	2
T_hbt	300	30
T_bpa	10	1
T_conn	1200	120
T_ias	1200	120
T_iar	3600	360
T_rel	200	20
T_rpt_rel	200	20
T_int	600	60
T_reset	200	20
T_fr	6000	600
T_conn_inc	1200	120
T_guard	9600	960

T_stat_info

SCCP management timer, delay between requests for sub-system status information.

T_coord_chg

SCCP management timer, maximum time allowed for a SOG to be received in response to a SOR before the co-ordinated state change is aborted.

T_ignore_sst

SCCP management timer, time period after receiving SOG during which any received SST messages will be discarded.

Tx

SCCP management timer signalling point congestion abatement timer. Time between reducing the congestion of a signalling point by one level.

Ts

SCCP management sub-system congestion abatement timer. Time between reducing the congestion of a sub-system by one level.

T_hbt

Local sub-system heartbeat detection timer. When the local sub-system heartbeat mechanism is enabled this timer is started each time a UIS request is received from the local sub-system. If the timer expires the local sub-system is marked as prohibited.

T_bpa

Broadcast propagation allowance. This timer value is used in conjunction with the distributed SCCP broadcast mechanism which allows multiple instances of the SCCP module to run at a single signalling point. It represents the additional time by which management timers are extended when running at the non-controlling SCCP instance. The parameter is only applicable if the distributed SCCP broadcast mechanism is enabled and otherwise should be set to zero.

T_conn

Waiting for connection confirm timer. A connection attempt is terminated if a connection confirm is not received in response to a connection request within this time.

T_ias

Transmit inactivity timer. Periodic "Inactivity Test" IT messages are sent to the remote SCCP when no other messages have been sent on the connection for the timer duration.

T_iar

Receive inactivity timer. The connection is terminated if no messages are received from the remote SCCP node for the duration of this timer.

T_rel

Release timer. Used to re-send the "connection released" RLSD message to the remote SCCP node in the event that a "release confirm" RLC message is not received in response.

T_rpt_rel

On the initial expiry of "T_rel" the timer is restarted with duration "T_rpt_rel" and RLSD subsequently sent at "T_rpt_rel" intervals.

T_int

On the initial expiry of "T_rel" timer "T_int" is started. This is used to terminate the connection if "release confirm" RLC is not received.

T_reset

Reset timer. This timer controls class 3 flow control reset. The connection is terminated on expiry of this timer if the remote SCCP node fails to confirm the reset.

Note: This parameter must currently be set to zero.

T_fr

Local reference freeze timer. This timer is required for ANSI operation only and is used to determine the period for which the internal SCCP “connection reference” must be “frozen” to prevent its re-use. This mechanism ensures that connections do not erroneously handle messages bearing the “connection reference” of a previous connection under error conditions.

The internal structure of the SCCP module guards against connection reference re-use.

T_conn_inc

Incoming connection timer. This optional timer is started on receipt of a Connection Request from a remote SCCP node. If a valid N-CONNECT response is not issued by the user within this time, the connection refusal procedure is automatically initiated. (Connection Refused is returned to the remote SCCP and N-DISCONNECT to the local sub-system). If this timer is not used, connection resources within the SCCP module may become permanently assigned to incoming connections if no N-CONNECT-Response primitive is issued by local sub-systems response to an incoming N-CONNECT-Indication. After a prolonged period, these resources may become exhausted.

T_guard

Restart Guard timer. This timer operates during the SCCP node restart when the validity of the connection data is unknown. During this period, any existing connections may be terminated by remote SCCP nodes by use of the inactivity test. All received messages (except RLSD) are discarded. Once this timer expires, a Maintenance Indication is issued and the SCCP module resumes normal operation.

10.3 Configure Sub-System Resource Request

Synopsis:

Message used to configure local-sub-systems, remote sub-systems and remote signalling points in the SCCP module.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_CNF_SSR (0x7741)	
id	0	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
hclass	0	
status	0	
err_info	0	
len	40	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	cnf_ver - must be set to zero
1	1	ssr_type - Resource type: LSS, RSP or RSS
2	1	Module_id - Local sub-system module_id
3	1	mult_ind - Multiplicity Indicator
4	4	spc – Signalling point code
8	1	ssn – Sub-system number
9	1	mgmt_id – Per subsystem management module
10	2	ssr_flags - Run time options (see below)
12	4	pc_mask – RSP point code mask
16	24	Reserved for future use, must be set to zero

Description:

This message is used to configure all the resources known to the SCCP module. One resource is configured each time the message is issued. Before a remote sub-system can be configured the remote signalling point must be made known to the SCCP module.

Resources can be removed (using the **SCP_MSG_END_SSR** message) and re-configured without needing to re-start or re-configure the module as a whole. However before attempting to remove a local sub-system it must be marked as prohibited.

The point code mask (**pc_mask**) is used to provide partial point code matching during message routing. Bits set to 1 in the mask will not be used in point code comparison for this RSP, ie. a message with a dpc which when masked match this RSP, the message will be routed to this point code. SCCP will always look for a full match before looking for a partial match.

ssr_type

The type of sub-system resource to which the message refers, either local sub-system, remote sub-system or remote signalling point. This field is coded as shown in the table below, the remaining fields in the parameter area have different meanings depending on the value of this field.

module_id

The module id of the local sub-system user module. Used only for configuring local sub-systems, otherwise it must be set to zero. Typically the value would be 0x14 indicating TCAP.

mult_ind

The sub-system multiplicity indicator. This is a configuration parameter (relating only to local sub-systems). It is used by the SCCP module whenever it issues an SCCP management message to the network which relates to the local sub-system.

spc

Signalling Point Code of the remote signalling point or remote sub-system.

ssn

Sub-system number of either the local sub-system or the remote sub-system.

The following table shows the parameters used to configure each type of resource:

Parameter	RSP	RSS	LSS
ssr_type	1	2	3
module_id	0	0	module_id
mult_ind	0	0	mult_ind
spc	spc	spc	0
ssn	0	ssn	ssn

mgmt_id

Module id to which management indications for this sub-system should be sent. If this parameter is set to zero, management indications will be sent to the configured SCCP user module.

ssr_flags

Run time options assigned according to the following table:

Bit	Mnemonic	Description
0	SSRF_HBT	Local sub-system heartbeat detection enable. If set to 1, the SCCP module will expect to receive UIS requests from the local sub-system on a periodic basis whilst the LSS is available. If no UIS message is received for a period determined by the timer T_{hbt} then SCCP will assume that the LSS is no longer available. If set to 0 the heartbeat detection mechanism is disabled. This bit must always be set to zero if the resource is not a LSS.
1	SSRF_NAT	If this bit is not set then the SSR is assumed to be international. For national, set bit.
2 - 15		Reserved for future use, must be set to zero

pc_mask

Remote signalling point code mask.

10.4 End Sub-System Resource Request

Synopsis:

Message used to remove local-sub-systems, remote sub-systems and remote signalling points from the SCCP module configuration.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_END_SSR (0x7742)	
id	0	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
hclass	0	
status	0	
err_info	0	
len	40	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	cnf_ver - must be set to zero
1	1	ssr_type - Resource type: LSS, RSP or RSS
2	1	module_id - Local sub-system module_id
3	1	mult_ind - Multiplicity Indicator
4	4	spc - Signalling point code
8	1	ssn - Sub-system number
9	1	Reserved for future use, must be set to zero
10	2	ssr_flags - must be set to zero
12	28	Reserved for future use, must be set to zero

Description:

This message is used to remove previously configured resources from the SCCP module. One resource is released each time the message is issued.

Resources can be removed and re-configured (using the **SCP_MSG_CNF_SSR** message) without needing to re-start or re-configure the module as a whole. However before attempting to remove a local sub-system it must be marked as prohibited.

The parameter area is the same as for the **SCP_MSG_CNF_SSR** message

(see previous section). The following table shows the parameters used to end each type of resource:

Parameter	RSP	RSS	LSS
ssr_type	1	2	3
module_id	0	0	0
mult_ind	0	0	0
spc	spc	spc	0
ssn	0	ssn	ssn

10.5 Add Concerned Resource Request

Synopsis:

Message used to add a concerned resource to either a local-sub-system, remote sub-system or remote signalling point in the SCCP module.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_ADD_CONC (0x7743)	
id	0	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
hclass	0	
status	0	
err_info	0	
len	32	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	cnf_ver - must be set to zero
1	1	ssr_type - Resource type (LSS/RSP/RSS)
2	4	ssr_spc - Signalling point code
6	1	ssr_ssn - Sub-system number
7	1	conc_type - Concerned type (LSS/RSP)
8	4	conc_spc - Concerned signalling point code
12	1	conc_ssn - Concerned sub-system number
13	19	Reserved for future use, must be set to zero

Description:

This message is used to add 'concerned' resources to any of the resources already configured within the SCCP module. The concerned resource (which must be either a local sub-system or a remote signalling point but NOT a remote sub-system) will receive notification whenever the status of the other resource changes.

Concerned resources can be freely added and removed subject to not exceeding the maximum number of concerned entities for any resource.

ssr_type

The type of the SSR resource which is to be monitored by the concerned resource. This resource must already have been configured using the Configure Sub-System Request message. Values are as defined for **SCP_MSG_CNF_SSR** message.

ssr_spc

The signalling point code of the resource which is to be monitored. This field is only used when the **ssr_type** is RSP or RSS and should otherwise be set to zero.

ssr_ssn

The sub-system number of the resource which is to be monitored. This field is only used when the **ssr_type** is LSS or RSS and should otherwise be set to zero.

conc_type

The type of the concerned resource. The concerned resource must be either a Local sub-system (LSS) or a Remote signalling point (RSP) and should already have been made known to the SCCP module using the Configure Sub-System Request message.

conc_spc

The signalling point code of the concerned resource that will be notified when the status of **ssr_spc**, **ssr_ssn** changes. This field is only used when **conc_type** is RSP and should otherwise be set to zero.

conc_ssn

The sub-system number code of the concerned resource that will be notified when the status of **ssr_spc**, **ssr_ssn** changes. This field is only used when **conc_type** is LSS and should otherwise be set to zero.

10.6 End Concerned Resource Request

Synopsis:

Message used to remove a concerned resource from either a local-sub-system, remote sub-system or remote signalling point in the SCCP module.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_END_CONC (0x7744)	
Id	0	
Src	Sending module_id	
Dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
Hclass	0	
Status	0	
err_info	0	
Len	32	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	cnf_ver - must be set to zero
1	1	ssr_type - Resource type (LSS/RSP/RSS)
2	4	ssr_spc - Signalling point code
6	1	ssr_ssn - Sub-system number
7	1	conc_type - Concerned type (LSS/RSP)
8	4	conc_spc - Concerned signalling point code
12	1	conc_ssn - Concerned sub-system number
13	19	Reserved for future use, must be set to zero

Description:

This message is used to remove 'concerned' resources from the list of concerned entities already configured for a resource within the SCCP module.

Concerned resources can be freely added and removed subject to not exceeding the maximum number of concerned entities for any resource.

Parameter types as defined for the **SCP_MSG_CONC_ADD** message.

10.7 Add Translation Request

Synopsis:

Message used to add a translation to the SCCP global title translation table.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_GTT_ADD (0x7745)	
id	0	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
hclass	0	
status	0	
err_info	0	
len	Number of bytes in parameter area	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	len - 1	Variable length data in Name-Length-Data format containing <i>Target address</i> , <i>Primary address</i> and optionally <i>Backup address</i> and <i>GTT Mask</i> . The format of each parameter is described in section 8.2.
len - 1	1	Set to zero indicating end of message

Description:

This message is used to add a primary and (optionally) a backup translation for the specified global title to the SCCP global title translation table.

The parameter area contains between two and four parameters in **Name-Length-Data** format. The *Target address* is the global title to be entered into the Global Title Translation Table. The *Primary address* is the primary translation for the global title. The *GTT Mask* is a digit pattern used to define the behaviour of the translation. The *Backup address* (if present) is the back-up translation for the global title. The back-up translation will be used whenever the primary address is marked as prohibited.

10.8 Modify Translation Request

Synopsis:

Message used to modify a translation in the SCCP global title translation table.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_GTT_MOD (0x7747)	
id	0	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
hclass	0	
status	0	
err_info	0	
len	Number of bytes in parameter area	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	len - 1	Variable length data in Name-Length-Data format containing <i>Target address</i> plus either <i>Primary address</i> , <i>Backup address</i> , <i>GTT Mask</i> or all three. The format of each parameter is described in section 8.2.
len - 1	1	Set to zero indicating end of message

Description:

This message is used to modify an existing global title translation table entry.

The parameter area is the same as for the **SCP_MSG_GTT_ADD** message. The *Target address* must already exist in the translation table, otherwise an error status will be returned.

The existing translations in the translation table will be replaced by the new addresses supplied. Note that it is possible to modify the primary translation, the backup translation, or *GTT Mask* or all three. If the *Primary address* is not supplied then the existing primary translation is retained. If the *Backup address* is not supplied then the existing backup translation is retained

10.9 End Translation Request

Synopsis:

Message used to remove a translation from the SCCP global title translation table.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_GTT_REM (0x7746)	
id	0	
src	Sending module_id	
dst	SCP_TASK_ID	
rsp_req	used to request a confirmation	
hclass	0	
status	0	
err_info	0	
len	Number of bytes in parameter area	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	len - 1	Variable length data in Name-Length-Data format containing <i>Target address</i> to be removed from the global title translation table. The format of the parameter is described in section 8.2.
len - 1	1	Set to zero indicating end of message

Description:

This message is used to remove a translation from the in the SCCP Global Title Translation Table.

The parameter area contains the global title to be removed from the translation table.

10.10 Read SCCP Global Statistics Request

Synopsis:

Message used to read the global statistics maintained by the SCCP module.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_R_STATS (0x6752)	
id	0	
src	Sending module_id	
dst	SCP_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	92	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	version - must be set to zero.
1	3	Reserved for future use, must be set to zero
4	4	rtf_ttype - Table 7/Q.791 para 7.1
8	4	rtf_tval - Table 7/Q.791 para 7.2
12	4	rtf_net_fail - Table 7/Q.791 para 7.3
16	4	rtf_net_cong - Table 7/Q.791 para 7.4
20	4	rtf_ss_fail - Table 7/Q.791 para 7.5
24	4	rtf_ss_cong - Table 7/Q.791 para 7.6
28	4	rtf_uu - Table 7/Q.791 para 7.7
32	4	rtf_sif_err - length exceeds max_sif
36	4	rtf_too_long - max. length exceeded
40	4	rtf_unknown - Table 7/Q.791 para 7.9
44	4	stx_err - Table 7/Q.791 para 7.8
48	4	sor_grant - Table 8/Q.791 para 8.6
52	4	sor_deny - Table 8/Q.791 para 8.7
56	4	udts_tx - Table 9/Q.791 para 9.1
60	4	udts_rx - Table 9/Q.791 para 9.2
64	4	num_msg - Table 9/Q.791 para 9.3
continued		

continued		
68	4	lss_msg - Table 9/Q.791 para 9.4
72	4	num_gtt - Table 9/Q.791 para 9.5
76	4	txm_cl0 - Table 9/Q.791 para 9.6
80	4	txm_cl1 - Table 9/Q.791 para 9.6
84	4	rxm_cl0 - Table 9/Q.791 para 9.7
88	4	rxm_cl1 - Table 9/Q.791 para 9.7

Description:

This message allows the user to read the global Q.791 statistics from the SCCP module. The message should be issued by the user with the version initialised as shown above and all other fields set to zero. The message returned by the SCCP module will contain all the statistics.

The SCCP module automatically maintains a number of counters to record the number of occurrences of particular events in accordance with ITU-T recommendation Q.791. The values of the counters of global scope within the SCCP module can be read using this message. The counters can optionally be reset to zero following the read operation.

If the **status** field is set to 1 the counters will all be reset. If it is not required to reset the counters then the **status** field should be set to zero and the counters will continue to accumulate from the current count after the read operation.

Confirmation Message:

The module sending the message must set the sending layer's bit in the **rsp_req** field to cause a confirmation message containing the statistics to be returned.

10.11 Read SCCP SSR Statistics Request

Synopsis:

Message used to read the sub-system resource status and statistics maintained by the SCCP module.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_R_SSR_STATS (0x6753)	
id	0	
src	Sending module_id	
dst	SCP_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	32	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	version - must be set to zero.
1	1	ssr_type - set by sending module.
2	4	spc - set by sending module.
6	1	ssn - set by sending module.
7	1	state - returned by SCCP
8	1	cong_level - returned by SCCP
9	4	bss_msg - Table 9/Q.791, para 9.8.
13	19	Reserved for future use, must be set to zero

Description:

This message allows the user to read the global Q.791 statistics from the SCCP module.

The SCCP module automatically maintains a number of counters to record the number of occurrences of particular events in accordance with ITU-T recommendation Q.791. The values of the counters relating to a particular sub-system within the SCCP module can be read using this message. In addition the current state (Prohibited/Allowed) and congestion level is returned. The count of messages sent to a back-up sub-system can optionally be reset to zero following the read operation by setting the **status** field to 1. Otherwise the counter the **status** field should be set to zero and the counter will continue to accumulate from the current count after the read operation.

Confirmation Message:

The module sending the message must set the sending layer's bit in the **rsp_req** field to cause a confirmation message containing the status and statistics to be returned.

ssr_type

As defined for **SCP_MSG_CNF_SSR** message.

spc

The signalling point code of the resource.

ssn

The sub-system number of the resource.

state

The current availability state of the sub-system resource from the following table.

Mnemonic	Value	Meaning
SCPSSRS_PROHIBITED	0	Sub-system resource Prohibited
SCPSSRS_ALLOWED	1	Sub-system resource Allowed

cong_level

The current congestion level associated with the resource, (either 0, 1, 2 or 3).

bss_msg

The number of messages destined for the sub-system resource that were sent (or attempted to be sent) to backup sub-systems due to the resource being unavailable.

10.12 Read SCCP RAM Request

Synopsis:

Message used for diagnostic purposes to return the address of the SCCP modules internal data storage area.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_R_RAM (0x6750)	
id	0	
src	Sending module_id	
dst	SCP_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	Base address of SCCP module's global RAM structure written by SCCP module in response message.

Description:

This message is provided solely for diagnostic purposes to allow the user to locate the base address of the SCCP modules internal data structure.

10.13 Read SCCP SSR Request

Synopsis:

Message used for diagnostic purposes to return the address of a sub-system resource structure in the SCCP module.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_R_SSR (0x6751)	
id	ssr_id (i.e. 0 ... 1 less than number of SSRs)	
src	Sending module_id	
dst	SCP_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	Base address of sub-system resource structure written by SCCP module in response message.

Description:

This message is provided solely for diagnostic purposes to allow the user to locate internal data structures within the SCCP module.

10.14 Restart Request

Synopsis:

Message used to invoke the SCCP connection orientated restart process.

Message Format:

MESSAGE HEADER	
FIELD NAME	MEANING
type	SCP_MSG_RESTART (0x 7749)
id	0
src	Sending module_id
dst	SCP_TASK_ID
rsp_req	Sending layer's bit must be set
hclass	0
status	0
err_info	0
len	0

Description:

This message is provided to allow the user application to invoke the restart procedure within the SCCP module.

This may be invoked after a failure when the state of existing connections is not known. The restart process sets all existing SCCP connections inactive without exchange of messages with peer SCCP entities. Remote SCCP nodes which are still maintaining connections with the local node should detect the inactivity and release their connections. The user application should not use connection-oriented services until restart is complete. The SCCP module will discard any connection-oriented primitive requests during this time.

A maintenance indication is sent to the user when the restart procedure is complete. The user application (local sub-system) is responsible for re-establishing any lost connections.

Connectionless operation is not affected by restart.

10.15 Multiple Instance Broadcast Indication

Synopsis:

Message used to convey SCCP management status between multiple instances of the SCCP module running at the same signalling point.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	SCP_MSG_SMB_IND (0x0763)	
id	0	
src	SCP_TASK_ID	
dst	smb_id	
rsp_req	0	
hclass	0	
status	sccp_instance of sending SCCP module	
err_info	0	
len	Variable up to maximum of 64	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	len	Variable length data used to convey status information between multiple instances of the module. This data is of significance only to the SCCP module.

Description:

This message is used when the SCCP protocol is running as a number of distributed instances at a single signalling point. The message is issued by one instance to the smb_id module which should broadcast the message to all other instances of the SCCP module. The content of the message has no significance outside the SCCP module and is therefore not described in this document.

10.16 SCCP Trace Mask Request

Synopsis:

Message used to configure SCCP 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 SCCP configuration request message.

Message Format:

MESSAGE HEADER		
FIELD NAME		MEANING
fvne		SCP MSG TRACE MASK (0x5754)
id		0
src		Sending module ID
dst		SCP TASK ID
rsp req		Used to request a confirmation
hclass		0
status		0
err info		0
reserved		0
len		12
PARAMETER AREA		
OFFSET	SIZE	NAME
0	4	op evt mask - Output event trace mask
4	4	ip evt mask - Input event trace mask
8	4	non prim mask - Non-primitive trace mask

op_evt_mask

The output event trace mask. This is a 32-bit value with bits set to 1 to cause a trace message to be sent to the system trace module when SCCP sends the associated protocol message.

31	30	29	28	27	26	25	24
0	0	0	0	0	0	0	0
23	22	21	20	19	18	17	16
0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8
0	0	0	0	0	0	0	0
7	6	5	4	3	2	1	0
0	0	0	0	0	0	MTP	USER
						TX REQ	RX IND

USER_RX_IND – UDT message sent from SCCP to SCCP user.
MTP_TX_REQ – Message sent from SCCP to MTP.

ip_evt_mask

The input event trace mask. This is a 32-bit value with bits set to 1 to cause a trace message to be sent to the system trace module when SCCP receives the associated protocol message.

31	30	29	28	27	26	25	24
0	0	0	0	0	0	0	0
23	22	21	20	19	18	17	16
0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8
0	0	0	0	0	0	0	0
7	6	5	4	3	2	1	0
0	0	0	0	0	MTPSTT	MTP	USER
				_	_IND	RX IND	TX_REQ

USER_TX_REQ – A primitive from SCCP-User to SCCP.

MTP_RX_IND – Incoming messages from MTP to SCCP.

MTP_STT_IND – MTP status indications.

non_prim_mask

The non-primitive trace mask. This is a 32-bit value with bits set to 1 to cause a trace message to be sent to the system trace module when SCCP receives the associated non-primitive message.

31	30	29	28	27	26	25	24
0	0	0	0	0	0	0	0
23	22	21	20	19	18	17	16
0	0	0	0	0	0	0	0
15	14	13	12	11	10	9	8
0	0	0	0	0	0	0	0
7	6	5	4	3	2	1	0
0	0	0	0	0	_0	UNK	MGT
						MSG	_MSG

MGT_MSG – All management messages will be traced.

UNK_MSG – All unexpected messages will be traced.

10.17 Trace Event Indication

Synopsis:

The MAP trace event masks are used to enable and disable tracing of all protocol and non primitive messages received or sent by MAP. The traced messages are reported as event indications as shown below:

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	MGT_MSG_TRACE_EV (0x0003)	
id	0	
src	SCCP module id	
dst	Trace module id	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	18 + length of traced data	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	1	source module id
1	1	destination module id
2	2	id
4	2	type
6	2	status
8	4	timestamp
12	4	pointer to the message being traced
16	2	data length
18	0 .. 280	data - Data taken from the contents of the MSG parameter area.

10.18 Maintenance Event Indication

Synopsis:

Message used by SCCP to indicate a protocol related event to the local maintenance module.

Message Format:

MESSAGE HEADER	
FIELD NAME	MEANING
type	SCP_MSG_MAINT_IND (0x0761)
id	See below
src	SCP_TASK_ID
dst	Maintenance module id
rsp_req	Sending layer's bit must be set
hclass	0
status	Maintenance event code (see below)
err_info	0
len	0

Description:

This message is used by SCCP to indicate a protocol related event to the maintenance module in accordance with Q.791

The **Maintenance event code** contained in the **status** field of the message indicates the type of event. Possible values are listed in the following table which also lists the meaning of the **id** field in each case:

Mnemonic	Code	id	Description
SCPEV_RTF_TTYPE	1	0	Routing failure, no translation for specified global title type
SCPEV_RTF_TVAL	2	0	Routing failed, no translation for specified address.
SCPEV_RTF_NET_FAIL	3	0	Routing failed, network failure.
SCPEV_RTF_NET_CONG	4	0	Routing failed, network congestion.
SCPEV_RTF_SS_FAIL	5	0	Routing failed, sub-system failure.
SCPEV_RTF_SS_CONG	6	0	Routing failed, sub-system congestion.
SCPEV_RTF_UU	7	0	Routing failed, unequipped user. (sub-system).
SCPEV_RTF_SIF_ERR	8	0	Routing failed, formatted message is greater than the max_sif value specified in the configuration message but less than the maximum permitted by the protocol.
SCPEV_RTF_TOO_LONG	9	0	Routing failed, formatted message length greater than that permitted by the protocol.
SCPEV_RTF_UNKNOWN	10	0	Routing failed, reason unknown.
SCPEV_STX_ERR	11	0	Message received from MTP containing syntax error.
SCPEV_SOR_GRANT	12	sub-system id	Sub-system out of service granted.
SCPEV_SOR_DENY	13	sub-system id	Sub-system out of service denied (T_coord_chg timer expiry).
SCPEV_CONN_FAIL	14	connection id	Indicates the connection has failed due to loss of received messages from the remote node. This connection is now in "maintenance blocking" state.
SCPEV_RESET_FAIL	15	connection id	Indicates that a permanent connection has failed due failure to reset. This connection is now in the "maintenance blocking" state.
SCPEV_RESTART_IND	16	0	Indicates that the restart procedure has completed. Local sub-systems may now use the connection orientated services.

10.19 Management Event Indication

Synopsis:

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

Message Format:

MESSAGE HEADER	
FIELD NAME	MEANING
type	MGT_MSG_EVENT_IND (0x0008)
id	0
src	SCP_TASK_ID
dst	Management module id
rsp_req	Used to request a confirmation
hclass	0
status	ERR_NO_SDLSIG (0x2e)
err_info	0
len	0

Description:

This message is issued by the SCCP module to notify system management of various software events which under normal operating conditions should not occur. These events may be due to lack of system resources or errors within the software.

10.20 Software Event Indication

Synopsis:

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

Message Format:

MESSAGE HEADER	
FIELD NAME	MEANING
type	SCP_MSG_ERROR_IND (0x0762)
id	See below
src	SCP_TASK_ID
dst	Management module id
rsp_req	Used to request a confirmation
hclass	0
status	Software event code (see below)
err_info	0
len	0

Description:

This message is issued by the SCCP module to notify system management of various software events which under normal operating conditions should not occur. These events may be due to lack of system resources or errors within the software. The Software event code contained in the status field of the message indicates the type of event. Possible values are listed in the following table which also lists the meaning of the id field in each case.

Mnemonic	Value	id	Description
SCPSWE_SCPM_LOW	3	0	The internal pool of scpm message buffers is running short of entries. If this fault persists, the software should be re-built with more scpm messages in the pool
SCPSWE_NO_SCPM	4	0	The pool of scpm message buffers has been exhausted. If this occurs then correct operation of the module is not guaranteed.
SCPSWE_BAD_MSG	5	Message type	An unsupported (inter-module) message type has been received by the module.

Mnemonic	Value	id	Description
SCPSWE_TIM_START_ERR	8	Timer identifier	An attempt was made to re-use an active timer resource.
SCPSWE_FMT_ERR	9	0	Format error in user primitive.
SCPSWE_TALLOC_ERR	10	0	TFRAME allocation error
SCPSWE_UC_ERROR	11	0	The resources for connections available to the user are exhausted
SCPSWE_IC_ERROR	12	0	The resources available for intermediate node connections are exhausted
SCPSWE_DATA_ERROR	13	0	The available class 3 data buffers are exhausted. Data messages may be discarded.
SCPSWE_EDATA_ERROR	14	0	The available class 3 expedited data buffers are exhausted Expedited data messages may be discarded
SCPSWE_UC_CONG	15	0	The number of resources for connections available to the user is running low
SCPSWE_UC_ABMT	16	0	The number of resources for connections available to the user has recovered
SCPSWE_IC_CONG	17	0	The number of resources available for intermediate node connections is running low
SCPSWE_IC_ABMT	18	0	The number of resources available for intermediate node connections has recovered
SCPSWE_DATA_CONG	19	0	The number of class 3 data buffers available for queuing transmit data is running low.
SCPSWE_DATA_ABMT	20	0	The number of class 3 data buffers available for queuing transmit data has recovered.
SCPSWE_EDATA_CONG	21	0	The number of class 3 expedited data buffers available for queuing transmit expedited data is running low.
SCPSWE_EDATA_ABMT	22	0	The number of class 3 expedited data buffers available for queuing transmit expedited data has recovered.

10.21 Read Revision Request

Synopsis:

Message used by SCCP 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	SCCP_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
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 SCCP 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.

APPENDIX A

A.1 Timer Services

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

A.2 Keep Time

Synopsis:

This message is issued by SCCP to request the timer module to issue a periodic timer tick (TIM_MSG_TM_EXP) message to the SCCP module.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	TIM_MSG_KEEP_TIME (0x7006)	
id	0	
src	SCCP module id (SCP_TASK_ID)	
dst	Timer module ID (0x00)	
rsp_req	0	
hclass	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 and are discarded when received by the timer module
4	2	Resolution

resolution

The number of operating system ticks between timer expiry messages being issued to the SCCP module. This parameter is set internally within the SCCP code.

A.3 Time Expiry

Synopsis:

Periodic timer tick message issued by the timer module.

Message Format:

MESSAGE HEADER		
FIELD NAME	MEANING	
type	TIM_MSG_TM_EXP (0xc002)	
id	index of timer in table	
src	Timer module ID (0x00)	
dst	SCCP module id (SCP_TASK_ID)	
rsp_req	0	
hclass	0	
status	0	
err_info	0	
len	4	
PARAMETER AREA		
OFFSET	SIZE	NAME
0	4	reserved – must be set to zero

All application messages contain a common header that is used to determine the message type, the source and destination module identities and status information. This header structure is defined in 'C' as follows, the meaning of each field is also described:

APPENDIX B

B.1 Message Type Reference

The following table provides a reference of all the message types used by the SCCP module.

Value	Mnemonic	Description
0x0761	SCP_MSG_MAINT_IND	Maintenance Event Indication
0x0762	SCP_MSG_ERROR_IND	Software Event Indication
0x0763	SCP_MSG_SMB_IND	Multiple Instance Broadcast Indication
0x2111		Confirmation to GEN_MSG_MOD_IDENT (0x6111)
0x2750		Confirmation to SCP_MSG_R_RAM (0x6750)
0x2751		Confirmation to SCP_MSG_R_SSR (0x6751)
0x2752		Confirmation to SCP_MSG_R_STATS (0x6752)
0x2753		Confirmation to SCP_MSG_R_SSR_STATS (0x6753)
0x3006		Confirmation to TIM_MSG_KEEP_TIME (0x7006)
0x3740		Confirmation to SCP_MSG_CONFIG (0x7740)
0x3741		Confirmation to SCP_MSG_CNF_SSR (0x7741)
0x3742		Confirmation to SCP_MSG_END_SSR (0x7742)
0x3743		Confirmation to SCP_MSG_ADD_CONC (0x7743)
0x3744		Confirmation to SCP_MSG_END_CONC (0x7744)
0x3745		Confirmation to SCP_MSG_GTT_ADD (0x7745)
0x3746		Confirmation to SCP_MSG_GTT_REM (0x7746)
0x3747		Confirmation to SCP_MSG_GTT_MOD (0x7747)
0x3748		Confirmation to SCP_MSG_CNF_TIM (0x7748)
0x3749		Confirmation to SCP_MSG_RESTART (0x7749)
0x6111	GEN_MSG_MOD_IDENT	Message sent to SCCP and returned containing minor and major revision numbers and text id of the module – Read Revision Request
0x6750	SCP_MSG_R_RAM	Provides diagnostic information to allow user to locate the base address of the SCCP modules global RAM structure – Read SCCP RAM Request
0x6751	SCP_MSG_R_SSR	Provides diagnostic information to allow user to locate the base address of the SCCP modules sub-system resource structure – Read SCCP SSR Request
0x6752	SCP_MSG_R_STATS	Allows user to read Q.791 stats. from the SCCP module – Read SCCP SSR Statistics Request
0x6753	SCP_MSG_R_SSR_STATS	Allows user to read Q.791 stats. from the SCCP module – Read SCCP Global Statistics Request

Value	Mnemonic	Description
0x7006	TIM_MSG_KEEP_TIME	This message is issued by SCCP to request a periodic timer tick (TIM_MSG_TM_EXP) message to the SCCP module
0x7740	SCP_MSG_CONFIG	SCCP configuration – Configuration Request
0x7741	SCP_MSG_CNF_SSR	Configure Sub-system Resource Request
0x7742	SCP_MSG_END_SSR	Used to remove configured resources from SCCP module – End Sub-system Resource Request
0x7743	SCP_MSG_ADD_CONC	Add a concerned resource to any already configured resources in the SCCP module – Add Concerned Resource Request
0x7744	SCP_MSG_END_CONC	Remove a concerned resource from the SCCP module – End Concerned Resource Request
0x7745	SCP_MSG_GTT_ADD	Used to add a primary and possibly a backup translation for a specific GT to the GTT table – Add Translation request
0x7746	SCP_MSG_GTT_REM	Remove a translation from the GTT table – End Translation request
0x7747	SCP_MSG_GTT_MOD	Modify an existing GTT table entry – Modify Translation Request
0x7748	SCP_MSG_CNF_TIM	Used to configure SCCP management timers – Configure Timers Request
0x7749	SCP_MSG_RESTART	Provided to allow user application to invoke the restart procedure within the SCCP module – Restart Request
0x8742	SCP_MSG_RX_IND	Receive indication to user – SCCP Receive Indication
0x8745	SCP_MSG_SCMG_IND	Used by SCCP management to notify local sub-systems about the change of state of other sub-systems whether local or remote – Management Indication
0xc002	TIM_MSG_TM_EXP	Periodic timer tick message issued by the timer module
0xc740	SCP_MSG_TX_REQ	Transmit request from user – SCCP Transmit Request
0xc744	SCP_MSG_SCMG_REQ	Used by application sub-system to notify SCCP in change of sub-system status – Management Request