



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

I.366.1

(06/98)

SERIES I: INTEGRATED SERVICES DIGITAL NETWORK

Overall network aspects and functions – Protocol layer
requirements

Segmentation and Reassembly Service Specific Convergence Sublayer for the AAL type 2

ITU-T Recommendation I.366.1

(Previously CCITT Recommendation)

3/2

ITU-T I-SERIES RECOMMENDATIONS
INTEGRATED SERVICES DIGITAL NETWORK

GENERAL STRUCTURE

Terminology	I.110–I.119
Description of ISDNs	I.120–I.129
General modelling methods	I.130–I.139
Telecommunication network and service attributes	I.140–I.149
General description of asynchronous transfer mode	I.150–I.199

SERVICE CAPABILITIES

Scope	I.200–I.209
General aspects of services in ISDN	I.210–I.219
Common aspects of services in the ISDN	I.220–I.229
Bearer services supported by an ISDN	I.230–I.239
Teleservices supported by an ISDN	I.240–I.249
Supplementary services in ISDN	I.250–I.299

OVERALL NETWORK ASPECTS AND FUNCTIONS

Network functional principles	I.310–I.319
Reference models	I.320–I.329
Numbering, addressing and routing	I.330–I.339
Connection types	I.340–I.349
Performance objectives	I.350–I.359

Protocol layer requirements I.360–I.369

General network requirements and functions	I.370–I.399
--	-------------

ISDN USER-NETWORK INTERFACES

Application of I-series Recommendations to ISDN user-network interfaces	I.420–I.429
Layer 1 Recommendations	I.430–I.439
Layer 2 Recommendations	I.440–I.449
Layer 3 Recommendations	I.450–I.459
Multiplexing, rate adaption and support of existing interfaces	I.460–I.469
Aspects of ISDN affecting terminal requirements	I.470–I.499

INTERNETWORK INTERFACES I.500–I.599

MAINTENANCE PRINCIPLES I.600–I.699

B-ISDN EQUIPMENT ASPECTS

ATM equipment	I.730–I.739
Transport functions	I.740–I.749
Management of ATM equipment	I.750–I.799

For further details, please refer to ITU-T List of Recommendations.

ITU-T RECOMMENDATION I.366.1

SEGMENTATION AND REASSEMBLY SERVICE SPECIFIC CONVERGENCE SUBLAYER FOR THE AAL TYPE 2

Summary

This Recommendation specifies the Segmentation and Reassembly Service Specific Convergence sublayer of the ATM Adaptation Layer (AAL) type 2 which provides for the bandwidth-efficient transmission of low-rate, short, and variable length packets in delay sensitive applications. On one or more AAL type 2 user information streams, the Segmentation and Reassembly Service Specific Convergence sublayer may be deployed. In this Recommendation, the sublayer structure and the procedures for the segmentation and reassembly process, as well as the optional transmission error detection and assured data transfer, are defined in depth.

Source

ITU-T Recommendation I.366.1 was prepared by ITU-T Study Group 13 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 1st of June 1998.

FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

INTELLECTUAL PROPERTY RIGHTS

The ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. The ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, the ITU had received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

© ITU 1998

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

CONTENTS

Page

1	Scope	1
2	Normative References	1
3	Definitions	2
4	Abbreviations	2
5	General framework of the Segmentation and Reassembly Service Specific Convergence Sublayer	3
5.1	Structure of the Segmentation and Reassembly Service Specific Convergence sublayer	3
5.2	Primitives provided by AAL type 2 for higher layer	3
5.3	Information flow across the SEG-SSCS – AAL type 2 CPS boundary	3
5.4	The system and block structure of the Segmentation and Reassembly Service Specific Convergence Sublayer	5
6	Interaction with Management and Control Plane	8
6.1	Management plane	8
6.1.1	Management plane interaction with AAL type 2 CPS user plane	8
6.2	Control Plane	8
7	Service Specific Segmentation and Reassembly Sublayer (SSSAR)	8
7.1	Service provided by the SSSAR	8
7.2	Primitives between the SSSAR and SSSAR user entities	9
7.3	Format and coding of the SSSAR	9
7.4	Procedure of the SSSAR	9
7.4.1	SSSAR transmitter	11
7.4.2	SSSAR receiver	13
7.4.3	Summary of error indications to Layer Management by the SSSAR	14
8	Service Specific Transmission Error Detection sublayer (SSTED)	14
8.1	Service provided by the SSTED	14
8.2	Primitives between the SSTED and SSTED user entities	16
8.3	Format and coding of the SSTED	17
8.4	Procedure of the SSTED	18
8.4.1	SSTED transmitter	18
8.4.2	SSTED receiver	20
8.4.3	Summary of error indications to Layer Management by the SSTED	20
9	Service Specific Assured Data Transfer sublayer (SSADT)	20
9.1	Information about the service provided by the SSADT	23
9.2	Primitives between the SSADT and SSADT user entities	23
9.3	Format, coding, and procedure of the SSADT	23
9.4	Interaction with management plane	23
10	Summary of parameters and values for the Segmentation and Reassembly Service Specific Convergence sublayer	24



Documents

Document Sharing Hub

Annex A – Data unit naming convention	25
Appendix I – Protocol Implementation Conformance Statement (PICS) proforma	26
I.1 Introduction.....	26
I.1.1 Scope	26
I.1.2 Normative References	26
I.1.3 Definitions.....	26
I.1.4 Conformance statement	27
I.2 PICS proforma	27
I.2.1 Identification of the PICS proforma corrigenda	27
I.2.2 Instructions for completing the PICS proforma	27
I.2.3 Identification of the implementation	28
I.2.4 Global statement of conformance.....	29
I.2.5 Timers.....	30

Recommendation I.366.1**SEGMENTATION AND REASSEMBLY SERVICE SPECIFIC
CONVERGENCE SUBLAYER FOR THE AAL TYPE 2***(Geneva, 1998)***1 Scope**

This Recommendation specifies the Segmentation and Reassembly Service Specific Convergence sublayer for the AAL type 2 which provides for the bandwidth-efficient transmission of low-rate, short, and variable length packets in delay sensitive applications. On one or more AAL type 2 user information streams, the Segmentation and Reassembly Service Specific Convergence sublayer may be deployed. This Recommendation covers the specification of the sublayer structure, the frame structures of the various layered parts of this sublayer, and the mechanisms for the segmentation and reassembly process, as well as the optional transmission error detection and assured data transfer features.

With this Segmentation and Reassembly Service Specific Convergence sublayer applied for a Service Specific Convergence sublayer for the AAL type 2, it is possible to transport a packet size of more than the maximum length specified in the CPS and also to multiplex with low-rate and short length packets in delay sensitive application.

This Recommendation describes the interactions between the Segmentation and Reassembly Service Specific Convergence sublayer for the AAL type 2 and the next higher layer, between this Service Specific Convergence sublayer and the AAL type 2, and between this sublayer and Layer Management, as well as Segmentation and Reassembly Sublayer peer-to-peer operations.

2 Normative References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-Recommendations is regularly published.

- [1] ITU-T Recommendation I.361 (1995), *B-ISDN ATM layer specification*.
- [2] ITU-T Recommendation I.363.2 (1997), *B-ISDN ATM adaptation layer specification: type 2 AAL*.
- [3] ITU-T Recommendation Q.2110 (1994), *B-ISDN ATM adaptation layer – service specific connection oriented Protocol (SSCOP)*.
- [4] ITU-T Recommendation I.363.5 (1995), *B-ISDN ATM adaptation layer specification: type 5 AAL*.
- [5] ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic reference model: The basic model*.
- [6] ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic reference model: Conventions for the definition of OSI services*.

**Documents**

Document Sharing Hub

3 Definitions

This Recommendation is based upon the concepts developed in Recommendations X.200 [5] and X.210 [6]. Details of the data unit naming convention used in this Recommendation can be found in Annex A.

4 Abbreviations

This Recommendation uses the following abbreviations.

AAL	ATM Adaptation Layer
AAL-SDU	AAL Service Data Unit
ATM	Asynchronous Transfer Mode
CI	Congestion Indication
CPS	Common Part Sublayer
CPS-INFO	CPS Interface Data
CPS-UUI	CPS-User-to-User Indication
LP	Loss Priority
LSB	Least Significant Bit
MSB	Most Significant Bit
PICS	Protocol Implementation Conformance Statement
SAP	Service Access Point
SDL	Specification and Description Language
SDU	Service Data Unit
SEG-SSCS	Segmentation and Reassembly Service Specific Convergence Sublayer
SSADT	Service Specific Assured Data Transfer sublayer
SSADT-SDU	SSADT Service Data Unit
SSCOP	Service Specific Connection Oriented Protocol (see Recommendation Q.2110 [3])
SSCS	Service Specific Convergence Sublayer
SSSAR	Service Specific Segmentation and Reassembly sublayer
SSSAR-INFO	SSSAR Interface Data
SSSAR-PDU	SSSAR Protocol Data Unit
SSSAR-SDU	SSSAR Service Data Unit
SSSAR-UUI	SSSAR User-to-User Indication
SSTED	Service Specific Transmission Error Detection sublayer
SSTED-CI	SSTED Congestion Indication
SSTED-INFO	SSTED Interface Data
SSTED-LP	SSTED Loss Priority
SSTED-PDU	SSTED Protocol Data Unit
SSTED-SDU	SSTED Service Data Unit
SSTED-UU	SSTED User-to-User indication field
SSTED-UUI	SSTED User-to-User Indication

5 General framework of the Segmentation and Reassembly Service Specific Convergence Sublayer

5.1 Structure of the Segmentation and Reassembly Service Specific Convergence sublayer

The Segmentation and Reassembly Service Specific Convergence sublayer is subdivided into the Service Specific Segmentation and Reassembly sublayer (SSSAR), the Service Specific Transmission Error Detection sublayer (SSTED), and the Service Specific Assured Data Transfer sublayer (SSADT) as shown in Figure 1.

The minimum service provided by this sublayer is a segmentation and reassembly function as specified in clause 7. Optionally, a transmission error detection mechanism as specified in clause 8 may be deployed. When transmission errors are detected, the reassembled SDU is not delivered to the user. Also optionally, the user of the transmission error detection mechanism may be a further mechanism for assured data transfer specified in clause 9.

NOTE – A corrupted data delivery option is for further study.

5.2 Primitives provided by AAL type 2 for higher layer

The primitives that cross the AAL type 2 SAP are dependent on the optional mechanisms that are selected. If neither the Service Specific Transmission Error Detection sublayer nor the Service Specific Assured Data Transfer sublayer is selected, the primitives for the AAL are equivalent to the SSSAR primitives (see 7.2) but identified as AAL-UNITDATA.request and AAL-UNITDATA.indication consistent with the primitive naming convention at a SAP.

On the other hand, if the transmission error detection mechanisms are selected but not the assured data transfer mechanism, the primitives for the AAL are equivalent to the SSTED primitives (see 8.2) but identified as AAL-UNITDATA.request and AAL-UNITDATA.indication consistent with the primitive naming convention at a SAP.

If both mechanisms, i.e. the transmission error detection and the assured data transfer mechanism are selected, the primitives defined in clause 9 make the service of the AAL type 2 available to its users.

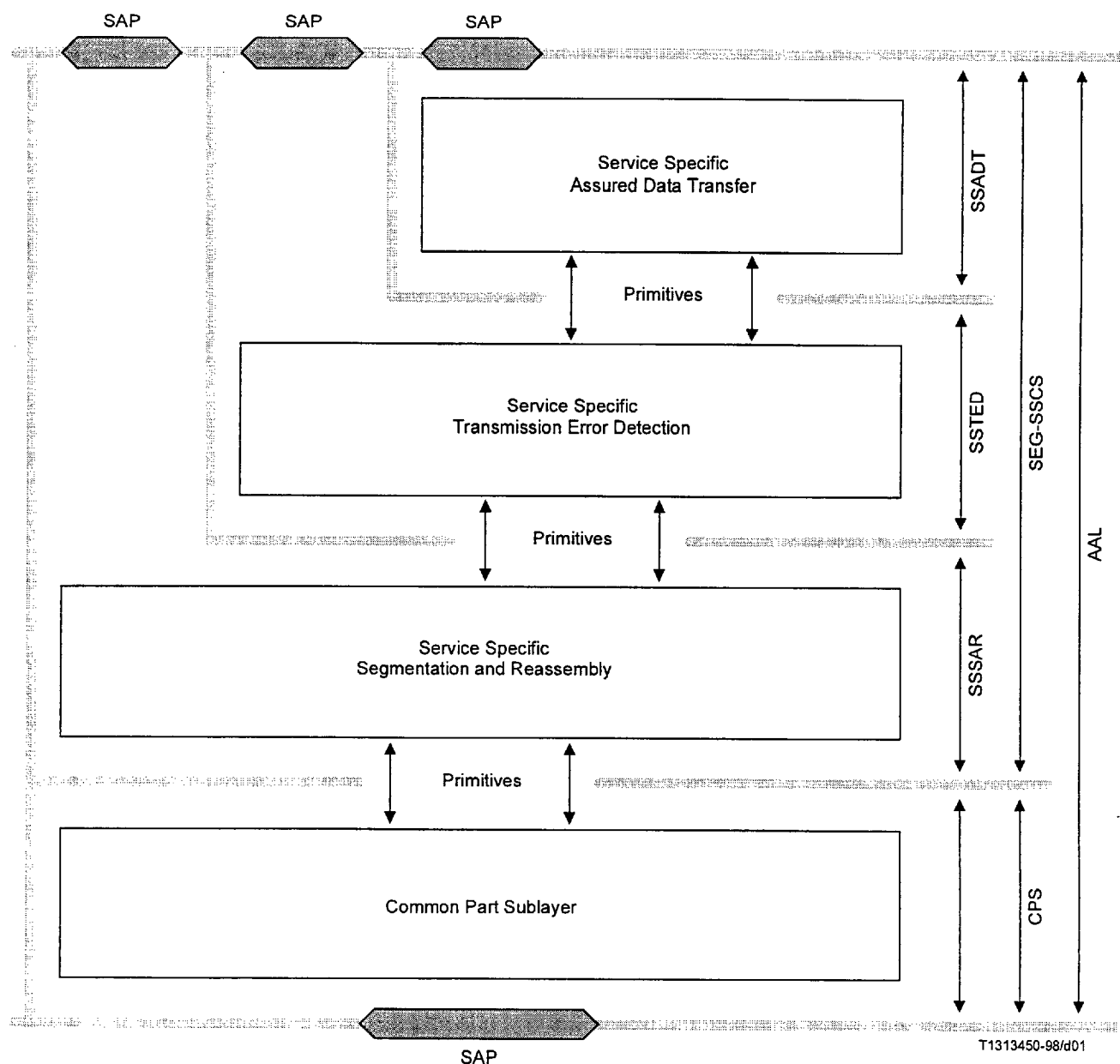
5.3 Information flow across the SEG-SSCS – AAL type 2 CPS boundary

The Segmentation and Reassembly sublayer for the AAL type 2 makes use of the Common Part Sublayer services as defined in Recommendation I.363.2 [2]. The primitives that cross the boundary between the two sublayers are also defined in Recommendation I.363.2 [2]; they are summarized in Table 1. In the event of any difference between the following summary and the definitions in Recommendation I.363.2, the definitions in Recommendation I.363.2 take precedence.

Table 1/I.366.1 – Primitives and parameters of the Common Part Sublayer

Parameter	CPS-UNITDATA. request	CPS-UNITDATA. indication	Comments
CPS-Interface Data (CPS-INFO)	m	m	1 ... 45 (default) or 1 ... 64 octets of CPS user data
CPS-User-to-User Indication (CPS-UUI)	m	m	5 bits of CPS user information (Note)
m Parameter mandatory – Parameter not present NOTE – Only values "0" ... "27" are permitted.			

NOTE – Further parameters might be needed if the corrupted data delivery option is selected, however, this option is for further study.



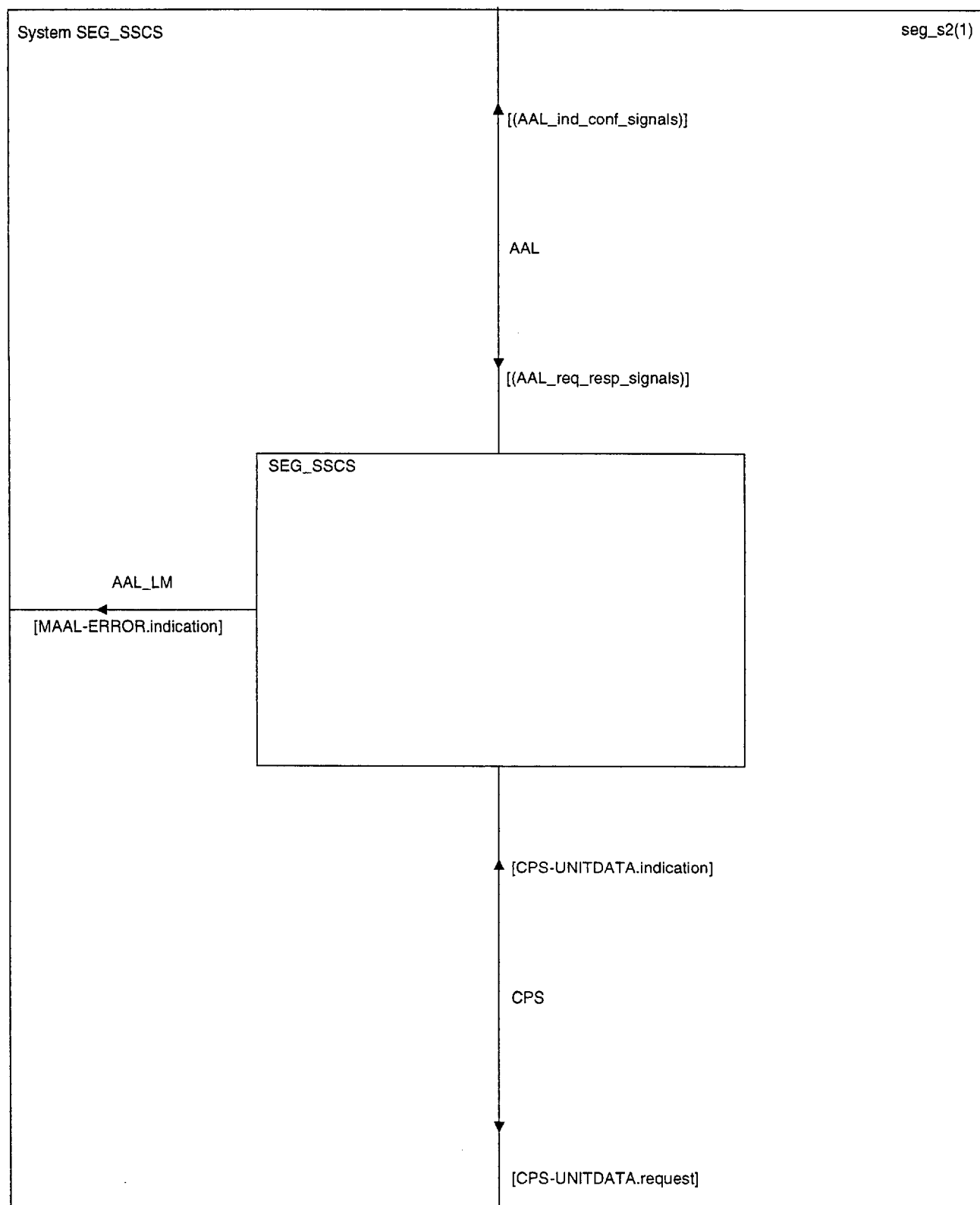
- AAL ATM Adaptation Layer
 CPS Common Part Sublayer (Rec. I.363.2)
 SAP Service Access Point
 SEG-SSCS Segmentation and Reassembly Service Specific Convergence Sublayer (Rec. I.366.1)
 SSADT Service Specific Assured Data Transfer sublayer
 SSSAR Service Specific Segmentation and Reassembly sublayer
 SSTED Service Specific Transmission Error Detection sublayer

NOTE – The Segmentation and Reassembly Convergence sublayer is one example of a Service Specific Convergence Sublayer (SSCS).

Figure 1/I.366.1 – Structure of the Segmentation and Reassembly Convergence sublayer

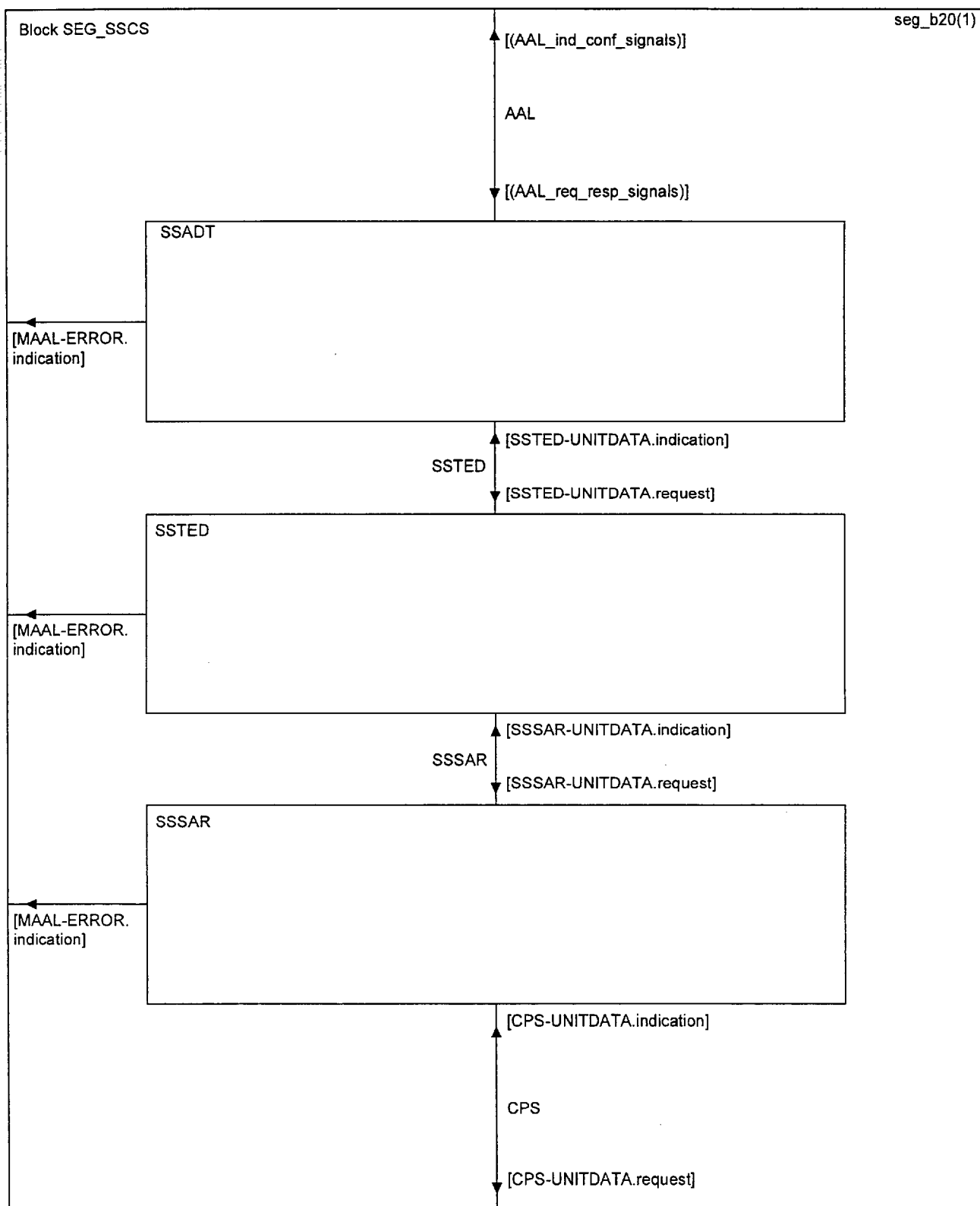
5.4 The system and block structure of the Segmentation and Reassembly Service Specific Convergence Sublayer

The SDL system diagram of the Segmentation and Reassembly Service Specific Convergence sublayer is shown in Figure 2 and the SDL block structure in Figure 3. SDL symbol repertoire is given in Figure 4.



T1311420-97/d02

Figure 2/I.366.1 – SDL system of the Segmentation and Reassembly Service Specific Convergence sublayer of the AAL type 2



T1311430-97/d03

Figure 3/I.366.1 – SDL block structure of the Segmentation and Reassembly Service Specific Convergence sublayer of the AAL type 2