

ECMA

Standardizing Information and Communication Systems

---

---

---

**Services for Computer Supported  
Telecommunications Applications  
(CSTA) Phase III**

---

---

**Volume 3**



ECMA

Standardizing Information and Communication Systems

---

---

---

**Services for Computer Supported  
Telecommunications Applications  
(CSTA) Phase III**

---

---

**Volume 3**



## Brief History

This Standard ECMA-269 defines Phase III of Services for Computer Supported Telecommunications Applications (CSTA) for OSI Layer 7 communication between a computing network and a telecommunications network. This Standard is part of a Suite of Standards and Technical Reports for Phase III of CSTA. All of the Standards and Technical Reports in the Suite are based on practical experience of ECMA member companies and each one represents a pragmatic and widely-based consensus.

The evolution of this Suite began with CSTA Phase I, which included only the CSTA Services and Protocol Standards (ECMA-179 and ECMA-180). In Phase II, Technical Report ECMA TR/68 was added illustrating how CSTA services and events may be used in typical call scenarios. That Technical Report reflected a common understanding of ECMA member companies.

Phase III of CSTA extends the previous Phase II Standards (ECMA-217 and ECMA-218) in major theme directions as well as numerous details. This incorporates technology based upon the *versit* CTI Encyclopedia (Version 1.0), which was contributed to ECMA by *versit*. Major areas of advancement include:

- New categories of services and events such as capabilities exchange, charging, media attachment services, call data recording (CDR), etc.
- Additional services and events for call and device control.
- Enhancement to existing services and events.
- Organization of services and events to reflect a grouping based on function (call control, device control, etc.).
- Use of a consistent template for services and events that includes initial/final connection state, connection state transitions, event monitoring sequences, etc.

The First Edition of Standard ECMA-269 was published in December 1997 and the Second Edition was published in June 1998.

This edition completes the planned Services for CSTA Phase III by extending the Second Edition in the following areas: ACD and ACD Agent Modeling, Call Associated Features, Call Detail Recording services, Capability Exchange services, Data Collection services, I/O Services, Logical Device Feature services, Physical Device Feature services, Media Attachment services, Maintenance events, Vendor Specific Extensions, and Voice services.

This ECMA Standard is contributed to ISO/IEC JTC1 under the terms of the fast-track procedure, for adoption as an ISO/IEC International Standard.

Adopted as 3rd Edition of Standard ECMA-269 by the General Assembly of December 1998.



## Table of Contents

<b>1</b>	<b>Scope</b>	<b>1</b>
<b>2</b>	<b>Conformance</b>	<b>1</b>
2.1	Switching Function	1
2.1.1	Conformant Services	1
2.1.2	Conformant Events	2
2.1.3	CSTA Profiles	2
2.1.4	Support of Service Requests And Manual Mode	2
2.2	Special Resource Function Conformance	2
2.2.1	Conformant Services	3
2.2.2	Conformant Events	3
2.2.3	Support of Service Requests And Manual Mode	3
2.3	Computing Function Conformance	3
<b>3</b>	<b>References</b>	<b>4</b>
3.1	ECMA References	4
3.2	ISO References	4
3.3	ITU-T References	4
<b>4</b>	<b>Definitions and Abbreviations</b>	<b>4</b>
<b>5</b>	<b>Functional Architecture</b>	<b>4</b>
<b>6</b>	<b>CSTA Operational Model</b>	<b>4</b>
6.1	Switching Sub-Domain Model	5
6.1.1	Switching Sub-Domain Name	6
6.1.2	Application Working Domain	6
6.1.3	Device	6
6.1.4	Call	27
6.1.5	Connection	31
6.1.6	Call State Definitions	35
6.1.7	Referencing Devices, Elements, Appearances and Device Configurations	36
6.1.8	Management of Dynamically-Assigned Identifiers	38
6.2	Special Resource Functions	38
6.2.1	Voice Unit	38
6.3	I/O Services	40
6.3.1	Data Path Definition	40
6.3.2	I/O Registration Services	41
6.3.3	Data Path States and Operational Model	41
6.3.4	I/O Services Example	42
6.4	Call Detail Record (CDR) Services	42
6.4.1	CDR Services Examples	42

6.5	Capabilities Exchange	44
6.5.1	Switching Function Capabilities	44
6.5.2	Device Capabilities	45
6.5.3	Dynamic Feature Availability	45
6.6	Switching Function Information Synchronization	45
6.6.1	Switching Function Level Information	46
6.6.2	Device Level Information	46
6.6.3	Call Level Information	46
6.7	Status Reporting Services	46
6.7.1	System Status	46
6.7.2	Monitoring	48
6.7.3	Snapshot Services	51
6.8	Additional Services, Features & Behaviour	51
6.8.1	Forwarding	51
6.8.2	Connection Failure	53
6.8.3	Recall	55
6.8.4	Call Back	55
6.8.5	External Calls	56
6.8.6	Tracking a Diverted Call	57
6.8.7	Media Stream Access	57
6.8.8	Routeing Services	60
6.8.9	Device Maintenance	65
6.8.10	Prompting	65
6.8.11	Telephony Tones Features	65
6.8.12	DTMF and Rotary Pulse Digits Features	65
6.8.13	Data Collection Services	66
<b>7</b>	<b>Association Establishment</b>	<b>66</b>
7.1	Implicit Association	66
7.2	Explicit Association	67
<b>8</b>	<b>Security Service</b>	<b>68</b>
<b>9</b>	<b>Generic Service Requirements</b>	<b>68</b>
9.1	Service Request	68
9.2	Service Response (Acknowledgements)	69
9.2.1	Positive Acknowledgement Models	69
9.2.2	Negative Acknowledgement	70
9.3	Diagnostic Error Definitions	70
9.3.1	Error Categories	70
9.3.2	Error Values	70
9.4	Vendor Specific Extensions	71
9.4.1	Private Data	71
9.4.2	Escape Services and Private Event	72



9.5	General Services and Event Functional Requirements	73
9.5.1	Services	73
9.5.2	Events	74
<b>10</b>	<b>CSTA Device Identifier Formats</b>	<b>75</b>
10.1	Device Identifier Formats	75
10.1.1	Diallable Digits	75
10.1.2	Switching Function Representation	76
10.1.3	Device Number	78
10.2	Functional Requirements	78
<b>11</b>	<b>Template Descriptions</b>	<b>79</b>
11.1	Service Template	79
11.1.1	Service Description	79
11.1.2	Service Request	79
11.1.3	Service Response	80
11.1.4	Operational Model	80
11.2	Event Template	80
11.2.1	Event Description	80
11.2.2	Event Parameters	81
11.2.3	Event Causes	81
11.2.4	Functional Requirements	81
11.3	Parameter Type Template	81
11.3.1	Parameter Type Description	81
11.3.2	Format	81
11.3.3	Functional Requirements	81
<b>12</b>	<b>Parameter Types</b>	<b>82</b>
12.1	Definitions	82
12.2	Defined Parameter Types	83
12.2.1	AccountInfo	84
12.2.2	AgentPassword	84
12.2.3	AuthCode	84
12.2.4	CallCharacteristics	84
12.2.5	CallQualifyingData	85
12.2.6	ChargingInfo	85
12.2.7	ConnectionInformation	86
12.2.8	ConnectionList	86
12.2.9	CorrelatorData	87
12.2.10	CSTAPrivateData	88
12.2.11	CSTASecurityData	88
12.2.12	ErrorValue	88
12.2.13	EventCause	98
12.2.14	LocalConnectionState	101

12.2.15	MediaCallCharacteristics	101
12.2.16	MediaServiceType	102
12.2.17	MonitorFilter	103
12.2.18	ServicesPermitted	104
12.2.19	SimpleCallState	104
12.2.20	SystemStatus	105
12.2.21	TimeInfo	106
12.2.22	UserData	106
12.3	Identifier Parameter Types	107
12.3.1	AgentID	108
12.3.2	AssociatedCalledDeviceID	108
12.3.3	AssociatedCallingDeviceID	108
12.3.4	AuditoryApparatusID	109
12.3.5	ButtonID	109
12.3.6	CalledDeviceID	109
12.3.7	CallingDeviceID	110
12.3.8	CDRCrossRefID	110
12.3.9	ConnectionID	110
12.3.10	DCollCrossRefID	112
12.3.11	DeviceID	112
12.3.12	DisplayID	112
12.3.13	EscapeRegisterID	112
12.3.14	HookswitchID	112
12.3.15	IOCrossRefID	113
12.3.16	IORegisterReqID	113
12.3.17	LampID	113
12.3.18	MediaServiceInstanceID	113
12.3.19	MediaStreamID	113
12.3.20	MessageID	114
12.3.21	MonitorCrossRefID	114
12.3.22	NetworkCalledDeviceID	114
12.3.23	NetworkCallingDeviceID	114
12.3.24	RedirectionDeviceID	115
12.3.25	RingerID	116
12.3.26	RouteingCrossRefID	116
12.3.27	RouteRegisterReqID	116
12.3.28	ServiceCrossRefID	116
12.3.29	SubjectDeviceID	117
12.3.30	SysStatRegisterID	117
<b>13</b>	<b>Capability Exchange Services</b>	<b>118</b>
13.1	Services	118
13.1.1	Get Logical Device Information	119
13.1.2	Get Physical Device Information	128
13.1.3	Get Switching Function Capabilities	132

13.1.4	Get Switching Function Devices	146
13.1.5	Switching Function Devices	148
<b>14</b>	<b>System Services</b>	<b>151</b>
14.1	Registration Services	151
14.1.1	Change System Status Filter	152
14.1.2	System Register	154
14.1.3	System Register Abort	157
14.1.4	System Register Cancel	158
14.2	Services	159
14.2.1	Request System Status	160
14.2.2	System Status	162
14.2.3	Switching Function Capabilities Changed	164
14.2.4	Switching Function Devices Changed	165
<b>15</b>	<b>Monitoring Services</b>	<b>166</b>
15.1	Services	166
15.1.1	Change Monitor Filter	167
15.1.2	Monitor Start	169
15.1.3	Monitor Stop	173
<b>16</b>	<b>Snapshot Services</b>	<b>174</b>
16.1	Services	174
16.1.1	Snapshot Call	175
16.1.2	Snapshot Device	178
16.1.3	Snapshot CallData	181
16.1.4	Snapshot DeviceData	183
<b>17</b>	<b>Call Control Services &amp; Events</b>	<b>185</b>
17.1	Services	185
17.1.1	Accept Call	186
17.1.2	Alternate Call	188
17.1.3	Answer Call	191
17.1.4	Call Back Call-Related	193
17.1.5	Call Back Message Call-Related	196
17.1.6	Camp On Call	199
17.1.7	Clear Call	201
17.1.8	Clear Connection	204
17.1.9	Conference Call	208
17.1.10	Consultation Call	211
17.1.11	Deflect Call	217
17.1.12	Dial Digits	220
17.1.13	Directed Pickup Call	223
17.1.14	Group Pickup Call	226
17.1.15	Hold Call	229

17.1.16	Intrude Call	231
17.1.17	Join Call	235
17.1.18	Make Call	239
17.1.19	Make Predictive Call	245
17.1.20	Park Call	250
17.1.21	Reconnect Call	253
17.1.22	Retrieve Call	255
17.1.23	Single Step Conference Call	257
17.1.24	Single Step Transfer Call	261
17.1.25	Transfer Call	264
17.2	Events	267
17.2.1	Bridged	268
17.2.2	Call Cleared	270
17.2.3	Conferenced	273
17.2.4	Connection Cleared	278
17.2.5	Delivered	282
17.2.6	Digits Dialed	286
17.2.7	Diverted	289
17.2.8	Established	293
17.2.9	Failed	297
17.2.10	Held	302
17.2.11	Network Capabilities Changed	304
17.2.12	Network Reached	307
17.2.13	Offered	311
17.2.14	Originated	315
17.2.15	Queued	318
17.2.16	Retrieved	322
17.2.17	Service Initiated	324
17.2.18	Transferred	327
<b>18</b>	<b>Call Associated Features</b>	<b>331</b>
18.1	Services	331
18.1.1	Associate Data	332
18.1.2	Cancel Telephony Tones	334
18.1.3	Generate Digits	336
18.1.4	Generate Telephony Tones	338
18.1.5	Send User Information	341
18.2	Events	343
18.2.1	Call Information	344
18.2.2	Charging	346
18.2.3	Digits Generated	347
18.2.4	Telephony Tones Generated	348
18.2.5	Service Completion Failure	351

<b>19</b>	<b>Media Attachment Services &amp; Events</b>	<b>354</b>
19.1	Services	354
19.1.1	Attach Media Service	355
19.1.2	Detach Media Service	359
19.2	Events	362
19.2.1	Media Attached	363
19.2.2	Media Detached	364
<b>20</b>	<b>Routeing Services</b>	<b>366</b>
20.1	Registration Services	366
20.1.1	Route Register	367
20.1.2	Route Register Abort	369
20.1.3	Route Register Cancel	370
20.2	Services	371
20.2.1	Re-Route	372
20.2.2	Route End	373
20.2.3	Route Reject	375
20.2.4	Route Request	377
20.2.5	Route Select	379
20.2.6	Route Used	381
<b>21</b>	<b>Physical Device Features</b>	<b>383</b>
21.1	Services	383
21.1.1	Button Press	384
21.1.2	Get Auditory Apparatus Information	385
21.1.3	Get Button Information	387
21.1.4	Get Display	389
21.1.5	Get Hookswitch Status	391
21.1.6	Get Lamp Information	392
21.1.7	Get Lamp Mode	394
21.1.8	Get Message Waiting Indicator	396
21.1.9	Get Microphone Gain	397
21.1.10	Get Microphone Mute	398
21.1.11	Get Ringer Status	399
21.1.12	Get Speaker Mute	401
21.1.13	Get Speaker Volume	402
21.1.14	Set Button Information	403
21.1.15	Set Display	404
21.1.16	Set Hookswitch Status	406
21.1.17	Set Lamp Mode	407
21.1.18	Set Message Waiting Indicator	409
21.1.19	Set Microphone Gain	410
21.1.20	Set Microphone Mute	412
21.1.21	Set Ringer Status	413
21.1.22	Set Speaker Mute	415

21.1.23	Set Speaker Volume	416
21.2	Events	418
21.2.1	Button Information	419
21.2.2	Button Press	420
21.2.3	Display Updated	421
21.2.4	Hookswitch	423
21.2.5	Lamp Mode	424
21.2.6	Message Waiting	425
21.2.7	Microphone Gain	426
21.2.8	Microphone Mute	427
21.2.9	Ringer Status	428
21.2.10	Speaker Mute	429
21.2.11	Speaker Volume	430
<b>22</b>	<b>Logical Device Features</b>	<b>431</b>
22.1	Services	431
22.1.1	Call Back Non-Call-Related	432
22.1.2	Call Back Message Non-Call-Related	433
22.1.3	Cancel Call Back	435
22.1.4	Cancel Call Back Message	436
22.1.5	Get Agent State	437
22.1.6	Get Auto Answer	439
22.1.7	Get Auto Work Mode	440
22.1.8	Get Caller ID Status	441
22.1.9	Get Do Not Disturb	442
22.1.10	Get Forwarding	444
22.1.11	Get Last Number Dialed	447
22.1.12	Get Routeing Mode	448
22.1.13	Set Agent State	449
22.1.14	Set Auto Answer	453
22.1.15	Set Auto Work Mode	455
22.1.16	Set Caller ID Status	457
22.1.17	Set Do Not Disturb	458
22.1.18	Set Forwarding	460
22.1.19	Set Routeing Mode	462
22.2	Events	463
22.2.1	Agent Busy	464
22.2.2	Agent Logged Off	465
22.2.3	Agent Logged On	466
22.2.4	Agent Not Ready	467
22.2.5	Agent Ready	469
22.2.6	Agent Working After Call	470
22.2.7	Auto Answer	472
22.2.8	Auto Work Mode	473
22.2.9	Call Back	474

22.2.10	Call Back Message	475
22.2.11	Caller ID Status	476
22.2.12	Do Not Disturb	477
22.2.13	Forwarding	478
22.2.14	Routeing Mode	480
<b>23</b>	<b>Device Maintenance Events</b>	<b>481</b>
23.1	Events	481
23.1.1	Back In Service	482
23.1.2	Device Capabilities Changed	483
23.1.3	Out Of Service	484
<b>24</b>	<b>I/O Services</b>	<b>485</b>
24.1	Registration Services	485
24.1.1	I/O Register	486
24.1.2	I/O Register Abort	488
24.1.3	I/O Register Cancel	489
24.2	I/O Services	490
24.2.1	Data Path Resumed	491
24.2.2	Data Path Suspended	492
24.2.3	Fast Data	493
24.2.4	Resume Data Path	495
24.2.5	Send Broadcast Data	496
24.2.6	Send Data	498
24.2.7	Send Multicast Data	500
24.2.8	Start Data Path	502
24.2.9	Stop Data Path	504
24.2.10	Suspend Data Path	505
<b>25</b>	<b>Data Collection Services</b>	<b>506</b>
25.1	Services	506
25.1.1	Data Collected	507
25.1.2	Data Collection Resumed	510
25.1.3	Data Collection Suspended	511
25.1.4	Resume Data Collection	512
25.1.5	Start Data Collection	513
25.1.6	Stop Data Collection	515
25.1.7	Suspend Data Collection	516
<b>26</b>	<b>Voice Unit Services &amp; Events</b>	<b>517</b>
26.1	Services	517
26.1.1	Concatenate Message	518
26.1.2	Delete Message	519
26.1.3	Play Message	520
26.1.4	Query Voice Attribute	522

26.1.5	Record Message	524
26.1.6	Reposition	526
26.1.7	Resume	528
26.1.8	Review	529
26.1.9	Set Voice Attribute	531
26.1.10	Stop	533
26.1.11	Suspend	534
26.1.12	Synthesize Message	536
26.2	Events	537
26.2.1	Play	538
26.2.2	Record	539
26.2.3	Review	540
26.2.4	Stop	541
26.2.5	Suspend Play	542
26.2.6	Suspend Record	543
26.2.7	Voice Attribute Changed	544
<b>27</b>	<b>Call Detail Record (CDR) Services</b>	<b>545</b>
27.1	Services	545
27.1.1	Call Detail Records Notification	546
27.1.2	Call Detail Records Report	547
27.1.3	Send Stored Call Detail Records	551
27.1.4	Start Call Detail Records Transmission	553
27.1.5	Stop Call Detail Records Transmission	555
<b>28</b>	<b>Vendor Specific Extensions Services &amp; Events</b>	<b>557</b>
28.1	Registration Services	557
28.1.1	Escape Register	558
28.1.2	Escape Register Abort	559
28.1.3	Escape Register Cancel	560
28.2	Services	561
28.2.1	Escape	562
28.2.2	Private Data Version Selection	563
28.3	Events	564
28.3.1	Private Event	565
<b>Annex A</b>	<b>Device Appearances (Normative)</b>	<b>567</b>
A.1	Standard Appearance	567
A.1.1	Selected-Standard Appearance	567
A.1.2	Basic-Standard Appearance	568
A.2	Bridged Appearance	568
A.2.1	Basic-Bridged	569
A.2.2	Exclusive-Bridged	570
A.2.3	Shared-Bridged	571



<b>Annex B ISDN User-User Information Element Encoding for CSTA (Normative)</b>	<b>575</b>
<b>Annex C Compatibility Bitmap Parameters Types (Normative)</b>	<b>577</b>
<b>Annex D Connection State Transition Examples (Informative)</b>	<b>627</b>



## 21 Physical Device Features

This section describes the feature capabilities as related to the device's physical element including descriptions of:

- Physical Device Feature services
- Physical Device Feature events

### General Functional Requirements

1. The device identifier supplied on each Physical Device Feature service shall be the device identifier associated with the device's physical element. Otherwise, the request is rejected with a negative acknowledgement.
2. Some switching functions may reject certain services if there is not a call at a device. For example, the Set Speaker Volume service may be rejected if there is no call at a device.

### 21.1 Services

**Table 21-1 Physical Device Feature Services Summary**

Physical Device Feature Service	Description	Pg.
21.1.1 Button Press	Simulates the activation of a specified button on a device.	384
21.1.2 Get Auditory Apparatus Information	Get information on one or all auditory apparatuses at a specified device.	385
21.1.3 Get Button Information	Get the button information for either a specified button or all buttons on a device.	387
21.1.4 Get Display	Get a snapshot of the contents of the physical device's display.	389
21.1.5 Get Hookswitch Status	Get the hookswitch status of a specified device.	391
21.1.6 Get Lamp Information	Get the lamp information for either a specified lamp or all lamps on a device.	387
21.1.7 Get Lamp Mode	Get the lamp mode status of a specified button on a device.	394
21.1.8 Get Message Waiting Indicator	Get the message waiting status at a specified device.	396
21.1.9 Get Microphone Gain	Get the microphone gain setting at a specified device.	397
21.1.10 Get Microphone Mute	Get the microphone mute status at a specified device.	398
21.1.11 Get Ringer Status	Get the ringer status (ringing/not ringing, ring count, ring pattern, ring volume) of one or all ringers associated with a device.	399
21.1.12 Get Speaker Mute	Get the speaker status of a specified device.	401
21.1.13 Get Speaker Volume	Get the speaker volume setting of a specified device.	402
21.1.14 Set Button Information	Set the button information of a specified button on a device.	403
21.1.15 Set Display	Set the display on a specified device.	404
21.1.16 Set Hookswitch Status	Set the hookswitch status of a specified device.	406
21.1.17 Set Lamp Mode	Set the lamp mode status of a specified button on a device.	407
21.1.18 Set Message Waiting Indicator	Set the message waiting status of a specified device.	409
21.1.19 Set Microphone Gain	Set the microphone gain setting of a specified device.	410
21.1.20 Set Microphone Mute	Set the microphone mute status of a specified device.	412
21.1.21 Set Ringer Status	Set the specified ringer to ring or not to ring. May also be used to set the ring pattern and ring volume of a ringer at a specified device.	413
21.1.22 Set Speaker Mute	Set the speaker mute status of a specified device.	415
21.1.23 Set Speaker Volume	Set the speaker volume setting of a specified device.	416

**21.1.1 Button Press**

C → S

The Button Press service allows a computing function to simulate the activation of a specified button at a specified device.

The button model is described in 6.1.3.1.3, “Button”, on page 11.

**21.1.1.1 Service Request**

**Table 21-2 Button Press—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device’s physical element.
button	ButtonID	M	Specifies the button on the device. See 12.3.5, “ButtonID”, on page 109 for reserved button assignments.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.1.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**21.1.1.2.1 Positive Acknowledgement**

**Table 21-3 Button Press—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.1.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.1.3 Operational Model**

**21.1.1.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.1.3.2 Device-Type Monitoring Event Sequences**

**Table 21-4 Button Press—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Button Press

**21.1.1.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**21.1.1.3.4 Functional Requirements**

1. A Button Press could initiate any potential call sequences, but these sequences would appear as manually initiated activities equivalent to a user pressing the given button on the set. Invoking a speed-dial button is an example of a common use for the Button Press service.

**21.1.2 Get Auditory Apparatus Information**

C → S

The Get Auditory Apparatus Information service provides information about one or more auditory apparatuses at a device.

**21.1.2.1 Service Request**

**Table 21-5 Get Auditory Apparatus Information—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
auditoryApparatus	AuditoryApparatusID	O	Specifies which auditory apparatus to query. If not provided, then information is obtained on all the auditory apparatuses associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.2.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**21.1.2.2.1 Positive Acknowledgement**

**Table 21-6 Get Auditory Apparatus Information—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
auditoryApparatusList	List of Structures	M	<p>Specifies information about the specified auditory apparatus or about all apparatuses associated with the device if no auditoryApparatus was provided in the request. Each entry contains the following:</p> <ul style="list-style-type: none"> <li>• auditoryApparatus (M) AuditoryApparatusID -This parameter indicates the auditory apparatus to which the other provided information applies.</li> <li>• auditoryApparatusType (M) Enumerated -This parameter indicates the auditory apparatus type. The complete set of possible values is: <ul style="list-style-type: none"> <li>• Speakerphone - Designates a logical hookswitch associated with a speakerphone.</li> <li>• Handset - Designates a physical hookswitch associated with a typical telephone handset that is operated (i.e., "opened" and "closed") by manually lifting the handset from, and replacing it in, a handset cradle.</li> <li>• Headset - Designates a logical hookswitch associated with a headset.</li> <li>• SpeakerOnlyPhone - Designates a logical hookswitch associated with a speaker-only phone.</li> <li>• Other - not one of the above values.</li> </ul> </li> <li>• speaker (M) Bitmap - Specifies information about the speaker associated with this auditory apparatus. Multiple bits may be set: <ul style="list-style-type: none"> <li>• present - If the bit is TRUE, then a speaker is associated with this auditory apparatus.</li> <li>• volumeSettable - If the bit is TRUE, then the speaker's volume can be set.</li> </ul> </li> </ul> <p>(continued)</p>

**Table 21-6 Get Auditory Apparatus Information—Positive Acknowledgement  
(continued)**

Parameter Name	Type	M/ O/C	Description
auditoryApparatusList (continued)	(continued)	M	<ul style="list-style-type: none"> <li>• volumeReadable - If the bit is TRUE, then the speaker's volume can be read.</li> <li>• muteSettable - If the bit is TRUE, then the speaker's mute status can be set.</li> <li>• muteReadable - If the bit is TRUE, then the speaker's mute status can be read.</li> <li>• microphone (M) Bitmap - Specifies information about the microphone associated with this auditory apparatus: <ul style="list-style-type: none"> <li>• present - If the bit is TRUE, then a microphone is associated with this auditory apparatus.</li> <li>• gainSettable - If the bit is TRUE, then the microphone's gain can be set.</li> <li>• gainReadable - If the bit is TRUE, then the microphone's gain can be read.</li> <li>• muteSettable - If the bit is TRUE, then the microphone's mute status can be set.</li> <li>• muteReadable - If the bit is TRUE, then the microphone's mute status can be read.</li> </ul> </li> <li>• hookswitch (M) Bitmap - Specifies information about the hookswitch associated with this auditory apparatus: <ul style="list-style-type: none"> <li>• hookswitchSettable - If the bit is TRUE, then the hookswitch status can be set.</li> <li>• hookswitchOnHook - If the bit is TRUE, then the hookswitch associated with this auditory apparatus is currently on-hook (hookswitchOnHook = TRUE) or off-hook (hookswitchOnHook = FALSE).</li> </ul> </li> <li>• hookswitchID (M) HookswitchID - Indicates the hookswitchID of the hookswitch which is associated with this auditory apparatus. Note that a given hookswitch can be associated with multiple auditory apparatuses.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.2.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

**21.1.2.3 Operational Model**

**21.1.2.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.2.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.2.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.3 Get Button Information**

C → S

The Get Button Information service provides information about the specified button or buttons on a device.

**21.1.3.1 Service Request**

**Table 21-7 Get Button Information—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
button	ButtonID	O	Specifies which button to query. If not provided, then information is obtained on all the buttons associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.3.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**21.1.3.2.1 Positive Acknowledgement**

**Table 21-8 Get Button Information—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
buttonList	List of Structures	M	Specifies information about the specified button or about all buttons associated with the device if no button was provided in the request. Each entry contains the following: <ul style="list-style-type: none"> <li>• button (M) ButtonID - Specifies the buttonID of the button described by this entry.</li> <li>• buttonLabel (O) Characters - The label by which a button may be referenced. The maximum length supported by the switching function is provided via the capabilities exchange services.</li> <li>• buttonLabelSettable (O) Boolean - If the bit is TRUE the button label can be set by the Set Button Information service.</li> <li>• buttonFunction (O) Characters - The function assigned to the button.</li> <li>• buttonAssociatedNumber (O) DeviceID - This indicates a number (in Diallable Digits format) associated with this button.</li> <li>• buttonAssociatedNumberSettable (O) Boolean - If the bit is TRUE a number can be associated with this button via the Set Button Information service.</li> <li>• buttonPressIndicator (O) Boolean - If the bit is TRUE (default) the button can be pressed via the Button Press service.</li> <li>• lampList (O) List of LampIDs - These are the lamps that are associated with the button. If the list is empty, then there are no lamps associated with this button.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.3.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

**21.1.3.3 Operational Model**

**21.1.3.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.3.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.3.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.



**21.1.4 Get Display**

C → S

The Get Display service provides a snapshot of the contents of the device's display.

The capabilities exchange services can be used to determine the number of displays associated with a device.

**21.1.4.1 Service Request**

**Table 21-9 Get Display—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
displayID	DisplayID	O	Specifies which display to query. If not provided, then information is obtained on all the displays associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.4.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**21.1.4.2.1 Positive Acknowledgement**

**Table 21-10 Get Display—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
displayList	List of Structures	M	<p>Specifies information about the specified display or about all displays associated with the device if no displayID was provided in the request. Each entry contains the following:</p> <ul style="list-style-type: none"> <li>displayID (M) DisplayID - This parameter indicates the display to which the other provided information applies.</li> <li>logicalRows (M) Value - The number of rows on the logical display.</li> <li>logicalColumns (M) Value - The number of columns on the logical display.</li> <li>physicalRows (C) Value - The number of rows on the physical display. When the number of physical Rows is equal to the number of logical Rows this parameter shall be omitted, otherwise it shall be present.</li> <li>physicalColumns (C) Value - The number of columns on the physical display. When the number of physicalColumns is equal to the number of logicalColumns this parameter shall be omitted, otherwise it shall be present.</li> <li>physicalBaseRowNumber (C) Value - The row number of the physical base, i.e. the logical row that appears at the first row of the physical display. When the number of physicalRows is equal to the number of logicalRows this parameter shall be omitted, otherwise it shall be present.</li> </ul> <p>(continued)</p>

**Table 21-10 Get Display—Positive Acknowledgement (continued)**

Parameter Name	Type	M/O/C	Description
displayList (continued)	(continued)	M	<ul style="list-style-type: none"> <li>• physicalBaseColumnNumber (C) Value - The column number of the physical base, i.e. the logical column that appears at the first column of the physical display. When the number of physicalColumns is equal to the number of logicalColumns this parameter shall be omitted, otherwise it shall be present.</li> <li>• characterSet (O) Enumerated - Specifies the character set which is being used to represent the text on the display. The complete set of possible values is: <ul style="list-style-type: none"> <li>• ASCII (default)</li> <li>• Unicode</li> <li>• Proprietary</li> </ul> </li> <li>• contentsOfDisplay (M) Characters - Specifies the text on display as a string of characters consisting of the text on each row of the display (including spaces) concatenated together.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.4.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.4.3 Operational Model**

**21.1.4.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.4.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.4.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.4.3.4 Functional Requirements**

1. The contentsOfDisplay parameter always contains the maximum number of characters on the display as indicated by the number of logicalRows and logicalColumns.

## 21.1.5 Get Hookswitch Status

C → S

This Get Hookswitch Status service provides the hookswitch status of one or more hookswitches associated with a specified device. The hookswitch status indicates which hookswitches are present on a device and which hookswitches are currently off-hook.

### 21.1.5.1 Service Request

**Table 21-11 Get Hookswitch Status—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
hookswitch	HookSwitchID	O	Specifies which hookswitch to query. If not provided, then information is obtained on all the hookswitches associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 21.1.5.2 Service Response

This service follows the atomic acknowledgement model for this service request.

#### 21.1.5.2.1 Positive Acknowledgement

**Table 21-12 Get Hookswitch Status—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
hookswitchStatusList	List of Structures	M	Specifies information about the specified hookswitch or about all hookswitches associated with the device if no hookswitch was provided in the request. Each entry contains the following: <ul style="list-style-type: none"> <li>hookswitch (M) HookswitchID - Indicates the hookswitch whose status is reported.</li> <li>hookswitchOnHook (M) Boolean - Indicates the state of the hookswitch. The complete set of possible values is: <ul style="list-style-type: none"> <li>TRUE - Indicates that the switch is onhook.</li> <li>FALSE - Indicates that the switch is offhook.</li> </ul> </li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 21.1.5.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

### 21.1.5.3 Operational Model

#### 21.1.5.3.1 Connection State Transitions

There are no connection state changes due to this service.

#### 21.1.5.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 21.1.5.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

**21.1.6 Get Lamp Information**

C → S

The Get Lamp Information service provides information about the specified lamp(s) on a device and if the specified lamp(s) is currently lit.

**21.1.6.1 Service Request**

**Table 21-13 Get Lamp Information—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
lamp	LampID	O	Specifies which lamp to query. If not provided, then information is obtained on all the lamps associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.6.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**21.1.6.2.1 Positive Acknowledgement**

**Table 21-14 Get Lamp Information—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
lampList	List of Structures	M	<p>Specifies information about the specified lamp or about all lamps associated with the device if no lamp was provided in the request. Each entry contains the following:</p> <ul style="list-style-type: none"> <li>• lamp (M) LampID - Indicates the lampID of this lamp.</li> <li>• lampLabel (O) Characters - The label by which a lamp may be referenced. The maximum length supported by the switching function is provided via the capabilities exchange services.</li> <li>• button (O) ButtonID -Specifies a button that is associated with this lamp. If not present, then a button is not associated with this lamp.</li> <li>• lampColor (O) Value - A value from 0 - 100 specifying the color of the lamp. The meaning of the following values are pre-assigned:                             <ul style="list-style-type: none"> <li>• 0 - no color</li> <li>• 1 - Red</li> <li>• 2 - Yellow</li> <li>• 3 - Green</li> <li>• 4 - Blue</li> <li>• 5 - Unknown (the switching function cannot determine the color of the lamp) (default if this parameter is not present).</li> </ul> </li> </ul> <p>All other values (6-100) are switching function specific.</p>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.6.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

**21.1.6.3 Operational Model**

**21.1.6.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.6.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.6.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.6.3.4 Functional Requirements**

1. If the computing function requests all lamps associated with a given device, then this will include both lamps with or without buttons associated with them.

### 21.1.7 Get Lamp Mode

C → S

The Get Lamp Mode service provides the lamp mode status.

#### 21.1.7.1 Service Request

**Table 21-15 Get Lamp Mode—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
lamp	LampID	O	Specifies which lamp to query. If not provided, then information is obtained on all the lamps associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 21.1.7.2 Service Response

This service follows the atomic acknowledgement model for this service request.

**21.1.7.2.1 Positive Acknowledgement**

**Table 21-16 Get Lamp Mode—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
lampModeList	List of Structures	M	<p>Specifies information about the specified lamp or about all lamps associated with the device if no lamp was provided in the request. Each entry contains the following:</p> <ul style="list-style-type: none"> <li>lamp (M) LampID - Indicates the lampID of this lamp.</li> <li>lampMode (M) Enumerated - Specifies how the lamp is lit. The complete set of possible values is: <ul style="list-style-type: none"> <li>brokenflutter - Superposition of wink and flutter.</li> <li>flutter - Fast on and off.</li> <li>off - Lamp is off.</li> <li>steady - Lamp is continuously lit.</li> <li>wink - Lamp is winking.</li> </ul> </li> <li>lampBrightness (O) Enumerated - Indicates the intensity of lamp if the lamp is on (as indicated by lampMode parameter). Actual visible brightness levels are lamp-dependent. The complete set of possible values is: <ul style="list-style-type: none"> <li>Unspecified/Normal (default)</li> <li>Dim</li> <li>Bright</li> </ul> </li> <li>lampColor (O) Value - A value from 0 - 100 specifying the color of the lamp. The meaning of the following values are pre-assigned: <ul style="list-style-type: none"> <li>0 - no color</li> <li>1 - Red</li> <li>2 - Yellow</li> <li>3 - Green</li> <li>4 - Blue</li> <li>5 - Unknown (the switching function cannot determine the color of the lamp) (default if this parameter is not present).</li> <li>All other values (6-100) are switching function specific.</li> </ul> </li> <li>button (O) ButtonID - Specifies a button that is associated with this lamp. If not present, then a button is not associated with this lamp.</li> </ul>
lamp	LampID	O	Specifies the lamp identifier associated with the lamp.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.7.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.7.3 Operational Model**

**21.1.7.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.7.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.7.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.8 Get Message Waiting Indicator**

C → S

The Get Message Waiting Indicator service provides the message waiting feature status at a specified device. The message waiting feature is typically used to notify a user (typically via a dedicated lamp on a phone device) when messages are available.

**21.1.8.1 Service Request**

**Table 21-17 Get Message Waiting Indicator—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device’s physical element.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.8.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**21.1.8.2.1 Positive Acknowledgement**

**21.1.8.2.2 Get Message Waiting Indicator—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
messageWaitingOn	Boolean	M	Specifies the value of the requested feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Message waiting off.</li> <li>• TRUE - Message waiting on.</li> </ul>
deviceForMessage	DeviceID	O	Specifies the device where the message is waiting.
lampsPresent	Boolean	O	Specifies the value of the requested feature, based on the messageWaitingOn parameter. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Lamp is not present.</li> <li>• TRUE - Lamp is present.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.8.2.3 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.8.3 Operational Model**

**21.1.8.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.8.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.8.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.



## 21.1.9 Get Microphone Gain

C → S

The Get Microphone Gain service provides the microphone gain setting (input level) for a microphone associated with a particular auditory apparatus at a specified device.

### 21.1.9.1 Service Request

**Table 21-18 Get Microphone Gain—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
auditoryApparatus	AuditoryApparatusID	O	Specifies which auditory apparatus to query. If not provided, then information is obtained on all the auditory apparatuses associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 21.1.9.2 Service Response

This service follows the atomic acknowledgement model for this service request.

#### 21.1.9.2.1 Positive Acknowledgement

**Table 21-19 Get Microphone Gain—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
microphoneGainList	List of Structures	M	Specifies information about the specified auditory apparatus or about all auditory apparatuses associated with the device if no auditoryApparatus was provided in the request. Each entry contains the following: <ul style="list-style-type: none"> <li>auditoryApparatus (M) AuditoryApparatusID - Specifies the auditory apparatus that the microphone belongs to.</li> <li>micGainAbs (O) Value - Specifies the microphone gain. A value of 0 indicates silence, and 100 indicates maximum gain. The granularity and quantization of the values 1 through 99 are device specific. If this component is not provided, the absolute gain value is unknown.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 21.1.9.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

### 21.1.9.3 Operational Model

#### 21.1.9.3.1 Connection State Transitions

There are no connection state changes due to this service.

#### 21.1.9.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 21.1.9.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

### 21.1.10 Get Microphone Mute

C → S

The Get Microphone Mute service provides the microphone mute feature status of a microphone associated with an auditory apparatus at a specified device.

While a device's microphone is muted, no audio information is transmitted over the device microphone. This feature is used when it is desired to prevent the other party(s) in a call from hearing a conversation through the device.

#### 21.1.10.1 Service Request

**Table 21-20 Get Microphone Mute—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
auditoryApparatus	AuditoryApparatusID	O	Specifies which auditory apparatus to query. If not provided, then information is obtained on all the auditory apparatuses associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 21.1.10.2 Service Response

This service follows the atomic acknowledgement model for this service request.

##### 21.1.10.2.1 Positive Acknowledgement

**Table 21-21 Get Microphone Mute—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
microphoneMuteList	List of Structures	M	Specifies information about the specified auditory apparatus or about all auditory apparatuses associated with the device if no auditoryApparatus was provided in the request. Each entry contains the following: <ul style="list-style-type: none"> <li>auditoryApparatus (M) AuditoryApparatusID - Specifies the auditory apparatus that the microphone belongs to.</li> <li>microphoneMuteOn (M) Boolean - Specifies whether the microphone is muted or not. The complete set of possible values is: <ul style="list-style-type: none"> <li>FALSE - Microphone is activated.</li> <li>TRUE - Microphone is muted.</li> </ul> </li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 21.1.10.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

#### 21.1.10.3 Operational Model

##### 21.1.10.3.1 Connection State Transitions

There are no connection state changes due to this service.

##### 21.1.10.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

##### 21.1.10.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

### 21.1.11 Get Ringer Status

C → S

The Get Ringer Status service provides the ringer status of one or all ringers associated with a specific device.

This allows a computing function to determine if a ringer is engaged in a ringing cycle, the number of ring cycles that it has been ringing, and the ring pattern and ring volume settings.

#### 21.1.11.1 Service Request

**Table 21-22 Get Ringer Status—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
ringer	RingerID	O	Specifies which ringer to query. If not provided, then information is obtained on all the ringers associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 21.1.11.2 Service Response

This service follows the atomic acknowledgement model for this service request.

##### 21.1.11.2.1 Positive Acknowledgement

**Table 21-23 Get Ringer Status—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
ringerStatusList	List of Structures	M	<p>Specifies information about the specified ringer or about all ringers associated with the device if no ringer was provided in the request. Each entry contains the following components:</p> <ul style="list-style-type: none"> <li>• ringer (M) RingerID - Indicates the ringerID.</li> <li>• ringMode (M) Enumerated - Indicates if the ringer is in a ringing cycle. The complete set of possible values is: <ul style="list-style-type: none"> <li>• ringing - The ringer is ringing (provided when either the ringer is physically ringing or is in the “quiet phase” of a ring cycle)</li> <li>• not ringing - The ringer is not being rung.</li> </ul> </li> <li>• ringCount (O) Value - Indicates the value (0..100) of the number of complete ring cycles that the ringer has been, or was, ringing.</li> <li>• ringPattern (O) Value - Indicates the value of the ringing pattern of the ringer. The meaning of ringing patterns and the number of supported patterns is device specific. <p>The ring pattern is associated with the ringer until reset by the switching function or until reset by the Set Ringer Status service.</p> </li> <li>• ringVolAbs (O) Value - Indicates the absolute volume level (0..100) of the ringer. The ring volume is associated with the ringer until reset by the switching function or until reset by the Set Ringer Status service. A value of 0 indicates silence, and 100 indicates maximum volume. The granularity and quantization of the values 1 through 99 are device specific. If this component is not provided, the absolute ringer volume is unknown. Note that the relationship between the ringer volume and loudness is ringer specific.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.

**Table 21-23 Get Ringer Status—Positive Acknowledgement (continued)**

<b>Parameter Name</b>	<b>Type</b>	<b>M/ O/C</b>	<b>Description</b>
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.11.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.11.3 Operational Model**

**21.1.11.3.1 Connection State Model Transitions**

There are no connection state changes due to this service.

**21.1.11.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.11.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.12 Get Speaker Mute**

C → S

The Get Speaker Mute service provides the speaker mute feature status for speakers associated with one or more auditory apparatuses at a specified device.

While a device’s speaker is muted, no audio information is transmitted over the speaker.

**21.1.12.1 Service Request**

**Table 21-24 Get Speaker Mute—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device’s physical element.
auditoryApparatus	AuditoryApparatusID	O	Specifies which auditory apparatus to query. If not provided, then information is obtained on all the auditory apparatuses associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.12.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**21.1.12.2.1 Positive Acknowledgement**

**Table 21-25 Get Speaker Mute—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
speakerMuteList	List of Structures	M	Specifies information about the specified auditory apparatus or about all auditory apparatuses associated with the device if no auditoryApparatus was provided in the request. Each entry contains the following: <ul style="list-style-type: none"> <li>auditoryApparatus (M) AuditoryApparatusID - Specifies the auditory apparatus to which this speaker belongs.</li> <li>speakerMuteOn (M) Boolean - Specifies whether the speaker mute setting is on or not. The complete set of possible values is: <ul style="list-style-type: none"> <li>FALSE - Mute is off (i.e., speaker is activated).</li> <li>TRUE - Mute is on (i.e., speaker is muted).</li> </ul> </li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.12.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.12.3 Operational Model**

**21.1.12.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.12.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.12.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.13 Get Speaker Volume**

C → S

The Get Speaker Volume service provides the speaker volume setting for the speakers associated with one or more auditory apparatuses at a specified device.

**21.1.13.1 Service Request**

**Table 21-26 Get Speaker Volume—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device’s physical element.
auditoryApparatus	AuditoryApparatusID	O	Specifies which auditory apparatus to query. If not provided, then information is obtained on all the auditory apparatuses associated with the device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.13.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**21.1.13.2.1 Positive Acknowledgement**

**Table 21-27 Get Speaker Volume—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
speakerVolumeList	List of Structures	M	Specifies information about the specified auditory apparatus or about all auditory apparatuses associated with the device if no auditoryApparatus was provided in the request. Each entry contains the following: <ul style="list-style-type: none"> <li>auditoryApparatus (M) AuditoryApparatusID - Specifies the auditory apparatus to which this speaker belongs.</li> <li>speakerVolAbs (O) Value - Specifies the absolute speaker volume. A value of 0 indicates silence, and 100 indicates maximum volume. The granularity and quantization of the values 1 through 99 are device specific. If this component is not provided, the absolute speaker volume is unknown.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.13.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.13.3 Operational Model**

**21.1.13.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.13.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.13.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**21.1.14 Set Button Information**

C → S

The Set Button Information service allows a computing function to set the information for a specified button at a specified device.

**21.1.14.1 Service Request**

**Table 21-28 Set Button Information—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
button	ButtonID	M	Specifies the button to be set.
buttonLabel <sup>1</sup>	Characters (64)	C	Specifies the label by which a button may be referenced. The maximum length supported by the switching function is provided via the capabilities exchange services.
buttonAssociatedNumber	DeviceID	C	Specifies a diallable string (in diallable digit format, such as a speed-dial number) to be associated with the button.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

1. At least one of the following parameters must be provided: buttonLabel, buttonAssociatedNumber.

**21.1.14.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**21.1.14.2.1 Positive Acknowledgement**

**Table 21-29 Set Button Information—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.14.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

**21.1.14.3 Operational Model**

**21.1.14.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.14.3.2 Device-Type Monitoring Event Sequences**

**Table 21-30 Set Button Information—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Button Information

**21.1.14.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**21.1.15 Set Display**

C → S

The Set Display service allows the computing function to set a display associated with a device.

The Get Display service can be used to determine the size of a specific display. The capabilities exchange services can be used to determine the number of displays associated with a device.

**21.1.15.1 Service Request**

**Table 21-31 Set Display—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
displayID	DisplayID	C	Specifies which display on the physical device needs to be set. If the device has only one display this parameter may be omitted, but it may also be filled in (specifying the one and only displayID). If the device has more than one display this parameter shall be present.
physicalBaseRowNumber	Value	O	The row number of the physical base, i.e. the logical row that appears at the first row of the physical display. This parameter may be omitted or may be present when it needs to be changed. The parameter shall be omitted when it is not relevant because the number of physical rows is equal to the number of logical rows.
physicalBaseColumnNumber	Value	O	The column number of the physical base, i.e. the logical column that appears at the first column of the physical display. This parameter may be omitted or may be present when it needs to be changed. This parameter shall be omitted when it is not relevant because the number of physical columns is equal to the number of logical columns.
contentsOfDisplay	Characters (240)	M	Specifies the text to place on the display as a string of characters consisting of the text on each row of the display (including spaces) concatenated together. If a null string is sent, the display will be cleared.
offset	Value	O	This parameter specifies the offset, in number-of-characters (not bytes in the characters-to-be-displayed message string), where text is to start on the display. Allowed values are from zero (default) to (MaxNbrOfLogicalColumns * MaxNbrOfLogicalRows - 1). Non-printable characters (e.g. Carriage Return (CR), Line Feed (LF), and Tab) are counted in determining offsets and the message length.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.15.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.



**21.1.15.2.1 Positive Acknowledgement**

**Table 21-32 Set Display—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.15.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.15.3 Operational Model**

**21.1.15.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.15.3.2 Device-Type Monitoring Event Sequences**

**Table 21-33 Set Display—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Display Updated

**21.1.15.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**21.1.15.3.4 Functional Requirements**

1. If the characters in the contentsOfDisplay parameter overflow the display space, they will be truncated.
2. This service will only affect the areas of the display which are overlaid with the characters in the contentsOfDisplay parameter. The Set Display service overwrites existing display contents on a character-position by character-position basis. (Character positions which are before or after the character positions of the to-be-displayed characters are not affected.)
3. The contentsOfDisplay parameter will be interpreted as being in the same character set as that provided by the switching function in the Get Display service.
4. Characters in the contentsOfDisplay parameter that do not have associated symbols in the display’s current character set appear as spaces. Characters with special attributes like highlighting shall have their own symbols represented in the display’s current character set.
5. If the contentsOfDisplay parameter consists of a null string, the display will be cleared from the offset position to the end of the display
6. The display area available to the Set Display service may be larger than the visible display area. For example, the display may use paging or scrolling to bring portions of the display into view. All display services and events reference the entire display size rather than only the simultaneously-visible size. Similarly, any formatting or display manipulation to sequentially present multiple pages of information are the responsibility of the switching function and display.
7. When the physicalBaseRowNumber and/or the physicalBaseColumnNumber parameters are provided in the service request with values that are different from the current values, the switching function can either accept the service and modify the relative positions of the logical and physical displays (i.e., scrolling) or it can reject the service if it does not support this capability as indicated by the capability exchange services.

**21.1.16 Set Hookswitch Status**

C → S

The Set Hookswitch Status service allows the computing function to activate and deactivate (i.e., go offhook/onhook) an auditory apparatus (e.g. speakerphone, handset, headset) at a specified device.

**21.1.16.1 Service Request**

**Table 21-34 Set Hookswitch Status—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
hookswitch	HookswitchID	M	Specifies the hookswitch whose status is to be set.
hookswitchOnHook	Boolean	M	Specifies the state of the hookswitch. The complete set of possible values is: <ul style="list-style-type: none"> <li>• TRUE - The switch is onhook.</li> <li>• FALSE - The switch is offhook.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.16.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**21.1.16.2.1 Positive Acknowledgement**

**Table 21-35 Set Hookswitch Status—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.16.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

**21.1.16.3 Operational Model**

**21.1.16.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.16.3.2 Device-Type Monitoring Event Sequences**

**Table 21-36 Set Hookswitch Status—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Hookswitch

**21.1.16.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**21.1.17 Set Lamp Mode**

C → S

The Set Lamp Mode service allows a computing function to control how a specified lamp is lit at a specified device.

**21.1.17.1 Service Request**

**Table 21-37 Set Lamp Mode—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
lamp	LampID	M	Specifies the LampID of the lamp on the device.
lampMode	Enumerated	M	Specifies how the lamp associated with the specified device should be lit. The complete set of possible values is: <ul style="list-style-type: none"> <li>• brokenflutter - Superposition of wink and flutter.</li> <li>• flutter - Fast on and off.</li> <li>• off - Lamp is off.</li> <li>• steady - Lamp is continuously lit.</li> <li>• wink - Lamp is winking.</li> </ul>
lampBrightness	Enumerated	O	Indicates intensity of lamp when the lamp is on (as indicated by lampMode parameter). Actual visible brightness levels are lamp-dependent. The complete set of possible values is: <ul style="list-style-type: none"> <li>• Unspecified/Normal (default)</li> <li>• Dim</li> <li>• Bright</li> </ul>
lampColor	Value	O	Specifies the color of the lamp. The meaning of the following values are pre-assigned: <ul style="list-style-type: none"> <li>• 0 - no color</li> <li>• 1 - Red</li> <li>• 2 - Yellow</li> <li>• 3 - Green</li> <li>• 4 - Blue</li> <li>• 5 - not used</li> <li>• All other values (6-100) are switching function specific.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.17.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**21.1.17.2.1 Positive Acknowledgement**

**Table 21-38 Set Lamp Mode—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.17.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

### 21.1.17.3 Operational Model

#### 21.1.17.3.1 Connection State Transitions

There are no connection state changes due to this service.

#### 21.1.17.3.2 Device-Type Monitoring Event Sequences

**Table 21-39 Set Lamp Mode—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Lamp Mode

#### 21.1.17.3.3 Call-Type Monitoring Event Sequences

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**21.1.18 Set Message Waiting Indicator**

C → S

The Set Message Waiting Indicator service allows a computing function to control the status of the message waiting feature at a specified device. The message waiting feature is typically used to notify a user (typically via a dedicated lamp on a phone device) when messages are available.

**21.1.18.1 Service Request**

**Table 21-40 Set Message Waiting Indicator—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device’s physical element.
messageWaitingOn	Boolean	M	Specifies the setting of the message waiting feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>• OFF - Message waiting off.</li> <li>• ON - Message waiting on.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.18.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**21.1.18.2.1 Positive Acknowledgement**

**Table 21-41 Set Message Waiting Indicator—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.18.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.18.3 Operational Model**

**21.1.18.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.18.3.2 Device-Type Monitoring Event Sequences**

**Table 21-42 Set Message Waiting Indicator—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Message Waiting

**21.1.18.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

### 21.1.19 Set Microphone Gain

C → S

The Set Microphone Gain service allows the computing function to control the microphone gain setting (input level) of the microphone associated with one auditory apparatus at a specified device.

#### 21.1.19.1 Service Request

**Table 21-43 Set Microphone Gain—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
auditoryApparatus	AuditoryApparatusID	M	Specifies the auditory apparatus at the designated device on which to set the feature.
microphoneGain	Choice Structure	M	Specifies the gain as an absolute gain value or that the gain should be incremented or decremented by a switch specified increment. It may be one of the following possible choices: <ul style="list-style-type: none"> <li>micGainAbs (Value) - Specifies a value from 0 through 100. 0 indicates silence, and 100 indicates maximum gain. The granularity and quantization of the values 1 though 99 are device specific</li> <li>micGainInc (Enumerated) - Specifies if the gain is to be incremented or decremented by a switch specified amount. The complete set of possible values is: <ul style="list-style-type: none"> <li>increment - the gain value is incremented</li> <li>decrement - the gain value is decremented.</li> </ul> </li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 21.1.19.2 Service Response

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

##### 21.1.19.2.1 Positive Acknowledgement

**Table 21-44 Set Microphone Gain—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 21.1.19.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

#### 21.1.19.3 Operational Model

##### 21.1.19.3.1 Connection State Transitions

There are no connection state changes due to this service.

### 21.1.19.3.2 Device-Type Monitoring Event Sequences

**Table 21-45 Set Microphone Gain—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Microphone Gain

### 21.1.19.3.3 Call-Type Monitoring Event Sequences

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**21.1.20 Set Microphone Mute**

C → S

The Set Microphone Mute service allows the computing function to control the microphone mute status of the microphone associated with one auditory apparatus at a specified device.

While a device’s microphone is muted, no audio information is transmitted over the microphone. This is used when it is desired to prevent the other device(s) in a call from hearing a conversation.

**21.1.20.1 Service Request**

**Table 21-46 Set Microphone Mute—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device’s physical element.
auditoryApparatus	AuditoryApparatusID	M	Specifies the auditory apparatus at the designated device on which to set the feature.
microphoneMuteOn	Boolean	M	Specifies the microphone mute setting of a particular microphone. The complete set of possible values is: <ul style="list-style-type: none"> <li>• OFF - Microphone is activated.</li> <li>• ON - Microphone is muted.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.20.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**21.1.20.2.1 Positive Acknowledgement**

**Table 21-47 Set Microphone Mute—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.20.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.20.3 Operational Model**

**21.1.20.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.20.3.2 Device-Type Monitoring Event Sequences**

**Table 21-48 Set Microphone Mute—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Microphone Mute

**21.1.20.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.



**21.1.21 Set Ringer Status**

C → S

The Set Ringer Status service allows the computing function to control ringing of a specified ringer on a device. It also allows a computing function to control the ring pattern and ring volume settings only during the ringing cycle that is being initiated with this service (i.e. does not permanently change the configuration or programming of the ringer attributes).

**21.1.21.1 Service Request**

**Table 21-49 Set Ringer Status—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
ringer	RingerID	M	Specifies the ringer to be set.
ringMode <sup>1</sup>	Enumerated	C	Indicates if the ringer should be rung or not rung. The complete set of possible values is: <ul style="list-style-type: none"> <li>ringing - The ringer should be rung.</li> <li>not ringing - The ringer should not be rung.</li> </ul>
ringPattern <sup>1</sup>	Value	C	Indicates the value of the ringing pattern of the ringer. The meaning of the ringing patterns and the number of supported patterns is device specific. This parameter is only valid when ringMode has a value of ringing and has no effect on the ringPattern used during subsequent call related ringing. If ringMode has a value of Ringing then ringPattern is Mandatory.
ringVolume <sup>1</sup>	Choice Structure	C	Indicates the volume level of the ringer. May specify either an absolute value or may specify that the volume should be incremented or decremented by a switch specified increment. It may be one of the following possible choices: <ul style="list-style-type: none"> <li>ringVolAbs (Value) - Specifies a value from 0 through 100. 0 indicates silence, and 100 indicates maximum volume. The granularity and quantization of the values 1 through 99 are device specific</li> <li>ringVolInc (Enumerated) - Specifies if the volume is to be incremented or decremented by a switch specified amount. The complete set of possible values is:                             <ul style="list-style-type: none"> <li>increment - the volume is incremented</li> <li>decrement - the volume is decremented.</li> </ul> </li> </ul> Note that the relationship between the ringer volume and loudness is ringer specific.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

1. At least one of the following parameters in the service request described above shall be provided in the service request: ringMode, ringPattern, ringVolume.

**21.1.21.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**21.1.21.2.1 Positive Acknowledgement**

**Table 21-50 Set Ringer Status—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.21.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.21.3 Operational Model**

**21.1.21.3.1 Connection State Model Transitions**

There are no connection state changes due to this service.

**21.1.21.3.2 Device-Type Monitoring Event Sequences**

**Table 21-51 Set Ringer Status—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Ringer Status

**21.1.21.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**21.1.21.3.4 Functional Requirements**

1. Note that some switching functions do not allow the computing function to directly control ringing of a device. (Switching functions will ring a device to indicate that a call has arrived at a device, for example.)

**21.1.22 Set Speaker Mute**

C → S

The Set Speaker Mute service allows a computing function to control the speaker mute status of the hookswitch components at a specified device.

While a device’s speaker is muted, no audio information is transmitted over the speaker.

**21.1.22.1 Service Request**

**Table 21-52 Set Speaker Mute—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device’s physical element.
auditoryApparatus	AuditoryApparatusID	M	Specifies the auditory apparatus at the designated device on which to set the feature.
speakerMuteOn	Boolean	M	Specifies the speaker mute setting of a particular speaker at a device. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Mute is off (i.e., speaker is activated).</li> <li>• TRUE - Mute is on (i.e., speaker is muted).</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.22.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**21.1.22.2.1 Positive Acknowledgement**

**Table 21-53 Set Speaker Mute—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.22.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**21.1.22.3 Operational Model**

**21.1.22.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**21.1.22.3.2 Device-Type Monitoring Event Sequences**

**Table 21-54 Set Speaker Mute—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Speaker Mute

**21.1.22.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**21.1.23 Set Speaker Volume**

C → S

The Set Speaker Volume service allows the computing function to control the speaker volume of the speaker associated with one auditory apparatus at a specified device.

**21.1.23.1 Service Request**

**Table 21-55 Set Speaker Volume—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device's physical element.
auditoryApparatus	AuditoryApparatusID	M	Specifies the auditory apparatus containing the speaker whose volume is to be set.
speakerVolume	Choice Structure	M	Specifies the speaker volume as an absolute value or that the volume should be incremented or decremented by a switch specified increment. It may be one of the following possible choices: <ul style="list-style-type: none"> <li>• speakerVolAbs (Value) - Specifies a value from 0 through 100. 0 indicates silence, and 100 indicates maximum volume. The granularity and quantization of the values 1 through 99 are device specific</li> <li>• speakerVolInc (Enumerated) - Specifies if the volume is to be incremented or decremented by a switch specified amount. The complete set of possible values is:                             <ul style="list-style-type: none"> <li>• increment - the volume is incremented</li> <li>• decrement - the volume is decremented.</li> </ul> </li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.23.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**21.1.23.2.1 Positive Acknowledgement**

**Table 21-56 Set Speaker Volume—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**21.1.23.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, "ErrorValue", on page 88.

**21.1.23.3 Operational Model**

**21.1.23.3.1 Connection State Transitions**

There are no connection state changes due to this service.

### 21.1.23.3.2 Device-Type Monitoring Event Sequences

**Table 21-57 Set Speaker Volume—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Speaker Volume

### 21.1.23.3.3 Call-Type Monitoring Event Sequences

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

### 21.1.23.3.4 Functional Requirements

1. Some switching functions may reset the speaker volume after each call.
2. Some switching functions reject the setting of the speaker volume if there is not an active call at a device.

## 21.2 Events

**Table 21-58 Physical Device Feature Event Summary**

<b>Physical Device Feature Event</b>	<b>Description</b>	<b>Pg.</b>
21.2.1 Button Information	The information associated with a button on a device has changed.	419
21.2.2 Button Press	A button has been pressed.	420
21.2.3 Display Updated	The contents of a device's display has changed.	421
21.2.4 Hookswitch	A hookswitch status has changed.	423
21.2.5 Lamp Mode	The lamp mode status of a particular lamp has changed.	424
21.2.6 Message Waiting	The message waiting status has changed.	425
21.2.7 Microphone Gain	The microphone gain setting has changed for one of the hookswitches.	426
21.2.8 Microphone Mute	The microphone mute status has changed for one of the hookswitches.	427
21.2.9 Ringer Status	The ringer attribute associated with a device has changed.	428
21.2.10 Speaker Mute	The speaker mute status has changed for one of the hookswitches.	429
21.2.11 Speaker Volume	The speaker volume setting has changed for one of the hookswitches.	430

### 21.2.1 Button Information

The Button Information event indicates that information associated with a button has changed.

This event may be generated in any one of the following ways:

- The button information has changed manually through the telephone keypad or through a management feature.
- A computing function, on behalf of a user, has invoked the Set Button Information service.

#### 21.2.1.1 Event Parameters

**Table 21-59 Button Information—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Specifies the device where the button information feature was changed.
button	ButtonID	M	Specifies the button on the device.
buttonLabel <sup>1</sup>	Characters (64)	C	Specifies the label by which the button may be referenced.
buttonAssociatedNumber	DeviceID	C	Specifies a number (in diallable string format) associated with the button.
buttonPressIndicator	Boolean	C	Specifies if the button can be pressed via the Button Press service. The complete set of possible values is: <ul style="list-style-type: none"> <li>• TRUE - the button can be pressed</li> <li>• FALSE - the button can not be pressed</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

1. At least one of the following parameters shall be provided: buttonLabel, buttonAssociatedNumber, buttonPressIndicator.

### 21.2.2 Button Press

The Button Press event indicates that a button has been pressed.

This event may be generated in any one of the following ways:

- The button has been pressed manually.
- A computing function, on behalf of a user, has invoked the Button Press service.

#### 21.2.2.1 Event Parameters

**Table 21-60 Button Press—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Specifies the device where the button press feature was changed.
button	ButtonID	M	Specifies the button that was pressed.
buttonLabel <sup>1</sup>	Characters (64)	C	Specifies the label by which the button may be referenced.
buttonAssociatedNumber	DeviceID	C	Indicates a number (in diallable string format) associated with the button.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

1. At least on of the following parameters must be provided: buttonLabel, buttonAssociatedNumber.

#### 21.2.2.2 Functional Requirements

1. The Button Press event is only provided when the button is physically pressed or when the Button Press service is used. It is not to be used to track the function that the button represents.



### 21.2.3 Display Updated

The Display Updated event indicates that the contents of one of the displays associated with a device has changed.

The capabilities exchange services can be used to determine the number of displays associated with a device.

#### 21.2.3.1 Event Parameters

**Table 21-61 Display Updated—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Specifies the device where the display information was changed.
displayID	DisplayID	O	Specifies the display to which the other provided information applies. When there is exactly one display this parameter may be omitted, but it may then also be present containing the one and only displayID. When there is more than one display this parameter shall be present.
logicalRows	Value	M	The number of rows on the logical display.
logicalColumns	Value	M	The number of columns on the logical display.
physicalRows	Value	C	The number of rows on the physical display. When the number of physical Rows is equal to the number of logical Rows this parameter shall be omitted, otherwise it shall be present.
physicalColumns	Value	C	The number of columns on the physical display. When the number of physicalColumns is equal to the number of logicalColumns this parameter shall be omitted, otherwise it shall be present.
physicalBaseRowNumber	Value	C	The row number of the physical base, i.e. the logical row that appears at the first row of the physical display. When the number of physicalRows is equal to the number of logicalRows this parameter shall be omitted, otherwise it shall be present.
physicalBaseColumnNumber	Value	C	The column number of the physical base, i.e. the logical column that appears at the first column of the physical display. When the number of physicalColumns is equal to the number of logicalColumns this parameter shall be omitted, otherwise it shall be present.
characterSet	Enumerated	O	Specifies the character set which is being used to represent the text on the display. The complete set of possible values is: <ul style="list-style-type: none"> <li>• ASCII (default)</li> <li>• Unicode</li> <li>• Proprietary</li> </ul>
contentsOfDisplay	Characters (240)	M	Specifies the text on display as a string of characters consisting of the text on each row of the display (including spaces) concatenated together.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 21.2.3.2 Functional Requirements

1. The contentsOfDisplay parameter always contains the maximum number of characters on the display as indicated by the number of logicalRows and logicalColumns.

2. The character set for a specific display associated with a given device is fixed so the value returned in `characterSet` shall always be the same for a given device. The same applies to `logicalRows`, `logicalColumns`, `physicalRows`, and `physicalColumns`.
3. Only display contents in areas that are controlled or readable by the switching function are modeled as part of the physical device's display. Areas that are under local-station or user control only may or may not, depending upon the switching function, be considered part of the physical device's display.
4. When the switching function supports the Display Updated event for a given device, then anytime one of the displays associated with that device is updated by the switching function, the Display Updated event is generated. In a Display Updated event, the entire contents of the specified display is provided. The computing function may compare the received display snapshots to track specific changes in the display.
5. This event is generated when a display update has been completed by the switching function. The determination of when completion occurs (or even whether the display has changed at all) is switching-function specific if the display change has not been changed via the Set Display service. For example, depending upon the switching function, it could occur on a character-by-character basis (though this is not recommended or when the entire new display contents have been sent (recommended)). Similarly, it is switching-function dependent whether locally-controlled (i.e., by the station device itself) or frequently-changed information (such as clock times) are modeled as part of the physical device's display and if so, at what interval the Display Updated event is generated.
6. If the Set Display service is used to update the display, then the update is considered complete (for purposes of generating this event) when the Set Display's completion criteria are fulfilled.

## 21.2.4 Hookswitch

The Hookswitch event indicates that the hookswitch status (on-hook/off-hook) has changed.

This event may be generated in any one of the following ways:

- The computing function has invoked the Set Hookswitch Status service.
- The hookswitch status has been changed manually.
- The computing function has invoked a call control service that indirectly affected the hookswitch.

### 21.2.4.1 Event Parameters

**Table 21-62 Hookswitch—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Specifies the device where the feature was changed.
hookswitch	HookswitchID	M	Specifies the hookswitch at the device where the feature was invoked.
hookswitchOnHook	Boolean	M	Specifies the state of the hookswitch. The complete set of possible values is: <ul style="list-style-type: none"> <li>• On-hook - The switch is open and the hookswitch is inactive.</li> <li>• Off-hook - The switch is closed and the hookswitch is active.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 21.2.5 Lamp Mode

The Lamp Mode event indicates that the lamp mode status has changed for a device.

This event may be generated in any one of the following ways:

- A feature associated with the lamp has changed status because of a manual button depression.
- A computing function, on behalf of a user, has invoked the Set Lamp Mode service.

#### 21.2.5.1 Event Parameters

**Table 21-63 Lamp Mode—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Specifies the device where the lamp mode status was changed.
lamp	LampID	M	Specifies the lamp identifier of the lamp on the device.
lampLabel <sup>1</sup>	Characters (64)	C	Specifies the label by which the lamp may be referenced.
lampMode	Enumerated	M	Specifies the lamp mode. The complete set of possible values is: <ul style="list-style-type: none"> <li>• brokenflutter - Superposition of wink and flutter.</li> <li>• flutter - Fast on and off.</li> <li>• off - Lamp is off.</li> <li>• steady - Lamp is continuously lit.</li> <li>• wink - Lamp is winking.</li> </ul>
lampBrightness	Enumerated	O	Indicates the intensity of the lamp if it is on (as indicated by lampMode parameter). Actual visible brightness levels are lamp-dependent. The complete set of possible values is: <ul style="list-style-type: none"> <li>• Unspecified/Normal (default)</li> <li>• Dim</li> <li>• Bright</li> </ul>
lampColor	Value	O	<ul style="list-style-type: none"> <li>• Indicates the color of the lamp. The meaning of the following values are pre-assigned:                             <ul style="list-style-type: none"> <li>• 0 - no color</li> <li>• 1 - Red</li> <li>• 2 - Yellow</li> <li>• 3 - Green</li> <li>• 4 - Blue</li> <li>• 5 - Unknown (the switching function cannot determine the color of the lamp) (default if this parameter is not present).</li> <li>• All other values (6-100) are switching function specific.</li> </ul> </li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

1. At least one of the following parameters shall be provided: lampLabel, lampBrightness, lampColor.

## 21.2.6 Message Waiting

The Message Waiting event indicates that the message waiting status has been changed for a device.

This event may be generated in any one of the following ways:

- The message waiting feature has been changed on the telephone.
- A computing function, on behalf of a user, has invoked the Set Message Waiting service.

### 21.2.6.1 Event Parameters

**Table 21-64 Message Waiting—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
targetDevice	SubjectDeviceID	M	Specifies the device where the message waiting feature has changed.
deviceForMessage	DeviceID	O	Specifies the device where the message is waiting.
messageWaitingOn	Boolean	M	Specifies the setting of the message waiting feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Message waiting off.</li> <li>• TRUE - Message waiting on.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 21.2.7 Microphone Gain

The Microphone Gain event indicates that the microphone gain setting associated with an auditory apparatus at a specified device has been changed.

This event may be generated in any one of the following ways:

- The microphone gain setting has been adjusted on the telephone.
- A computing function, on behalf of a user, has invoked the Set Microphone Gain service.

#### 21.2.7.1 Event Parameters

**Table 21-65 Microphone Gain—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
invokingDevice	SubjectDeviceID	M	Specifies the device where the feature was invoked.
auditoryApparatus	AuditoryApparatusID	M	Specifies the auditory apparatus containing the microphone whose gain has changed.
microphoneGain	Choice Structure	M	Specifies the gain as an absolute gain value or that the gain has been incremented or decremented by a switch specified increment. It may be one of the following possible choices: <ul style="list-style-type: none"> <li>• micGainAbs (Value) - Specifies a value from 0 through 100. 0 indicates silence, and 100 indicates maximum gain. The granularity and quantization of the values 1 through 99 are device specific</li> <li>• micGainInc (Enumerated) - Specifies if the gain was incremented or decremented by a switch specified amount. The complete set of possible values is: <ul style="list-style-type: none"> <li>• increment - the gain value was incremented</li> <li>• decrement - the gain value was decremented.</li> </ul> </li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

## 21.2.8 Microphone Mute

The Microphone Mute event indicates that the microphone mute status for a microphone associated with an auditory apparatus at a specified device has changed.

This event may be generated in any one of the following ways:

- The microphone mute feature has been invoked manually on the telephone.
- A computing function, on behalf of a user, has invoked the Set Microphone Mute service.

### 21.2.8.1 Event Parameters

**Table 21-66 Microphone Mute—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
invokingDevice	SubjectDeviceID	M	Specifies the device where the feature was invoked.
auditoryApparatus	AuditoryApparatusID	M	Specifies the auditory apparatus where the mute status was changed.
microphoneMuteOn	Boolean	M	Specifies whether the microphone is muted or not. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Microphone is activated.</li> <li>• TRUE - Microphone is muted.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 21.2.9 Ringer Status

This event indicates that a ringer status associated with a device has changed.

This event may be generated in any one of the following ways:

- The ringer status has been changed via the Set Ringer Status service.
- The switching function has changed the ringer status.

Note that this event only indicates the status of a ringer. Call control events such as the Delivered event should be used to determine call activity at a device.

#### 21.2.9.1 Event Parameters

**Table 21-67 Ring Status—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Specifies the device where the ring status was changed.
ringer	RingerID	M	Specifies the ringer associated with the device.
ringMode <sup>1</sup>	Enumerated	C	Indicates if the ringer is in an active ring cycle. The complete set of possible values is: <ul style="list-style-type: none"> <li>• ringing - The ringer is ringing (provided when either the ringer is physically ringing or is in the “quiet phase” of a ring cycle).</li> <li>• not ringing - The ringer is not in an active ring cycle.</li> </ul>
ringCount <sup>1</sup>	Value (0...100)	C	Indicates the number of complete ring cycles that the ringer has been ringing.
ringPattern <sup>1</sup>	Value	C	Indicates the ringing pattern of the ringer. The meaning of the ringing pattern and the number of ringing patterns is device specific.
ringVolume <sup>1</sup>	Choice Structure	C	Indicates the ring volume as an absolute value or that the volume was incremented or decremented by a switch specified increment. The ring volume is associated with the ringer until reset by the switching function or until reset by the Set Ringer Status service.  It may be one of the following possible choices: <ul style="list-style-type: none"> <li>• ringVolAbs (Value) - Specifies a value from 0 through 100. 0 indicates silence, and 100 indicates maximum volume. The granularity and quantization of the values 1 though 99 are device specific</li> <li>• ringVolInc (Enumerated) - Specifies if the volume was incremented or decremented by a switch specified amount. The complete set of possible values is: <ul style="list-style-type: none"> <li>• increment - the volume was incremented</li> <li>• decrement - the volume was decremented.</li> </ul> </li> </ul> Note that the relationship between the ringer volume and loudness is ringer specific.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

1. At least one of the following parameters shall be provided: ringMode, ringCount, ringPattern, ringVolume.



### 21.2.10 Speaker Mute

The Speaker Mute event indicates that the speaker mute status of a speaker associated with an auditory apparatus in a specified device has changed.

This event may be generated in any one of the following ways:

- The Speaker Mute feature has been invoked manually on the telephone.
- The computing function has invoked the Set Speaker Mute service.

#### 21.2.10.1 Event Parameters

**Table 21-68 Speaker Mute—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
invokingDevice	SubjectDeviceID	M	Specifies the device where the feature was invoked.
auditoryApparatus	AuditoryApparatusID	M	Specifies the auditory apparatus containing the speaker whose mute status has changed.
speakerMuteOn	Boolean	M	Specifies whether the speaker mute setting is on or not. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Mute is off (i.e., speaker is activated).</li> <li>• TRUE - Mute is on (i.e., speaker is muted).</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 21.2.11 Speaker Volume

The Speaker Volume event indicates that the speaker volume setting of a speaker associated with an auditory apparatus at a specified device has changed.

This event may be generated in any one of the following ways:

- The speaker volume feature has been invoked manually on the telephone.
- The computing function has invoked the Set Speaker Volume service.

#### 21.2.11.1 Event Parameters

**Table 21-69 Speaker Volume—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
invokingDevice	SubjectDeviceID	M	Specifies the device where the feature was invoked.
auditoryApparatus	AuditoryApparatusID	M	Specifies the auditory device containing the speaker whose volume has changed.
speakerVolume	Choice Structure	M	Specifies the speaker volume as an absolute value or that the volume was incremented or decremented by a switch specified increment. It may be one of the following possible choices: <ul style="list-style-type: none"> <li>• speakerVolAbs (Value) - Specifies a value from 0 through 100. 0 indicates silence, and 100 indicates maximum volume. The granularity and quantization of the values 1 through 99 are device specific</li> <li>• speakerVolInc (Enumerated) - Specifies if the volume was incremented or decremented by a switch specified amount. The complete set of possible values is: <ul style="list-style-type: none"> <li>• increment - the volume was incremented</li> <li>• decrement - the volume was decremented.</li> </ul> </li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

## 22 Logical Device Features

This clause describes the feature capabilities as related to a logical device. It including the specification of:

- Logical Device Feature services
- Logical Device Feature events

### 22.1 Services

**Table 22-1 Logical Device Feature Services Summary**

Logical Device Feature Service	Description	Pg.
22.1.1 Call Back Non-Call-Related	Requests that the switching function originate a call back call between two devices.	432
22.1.2 Call Back Message Non-Call-Related	Requests that the switching function leave a pre-defined message requesting that the target device call the originating device.	433
22.1.3 Cancel Call Back	Cancels a previous (or all) Call Back feature at a device.	435
22.1.4 Cancel Call Back Message	Cancels a previous (or all) Call Back Message feature at a device.	436
22.1.5 Get Agent State	Get the agent state of a specified device.	437
22.1.6 Get Auto Answer	Get the auto-answer status of a specified device	439
22.1.7 Get Auto Work Mode	Get the auto-work mode status of a specified device.	440
22.1.8 Get Caller ID Status	Get the Caller ID status of a specified device.	441
22.1.9 Get Do Not Disturb	Get the do not disturb status of a specified device.	442
22.1.10 Get Forwarding	Get the forwarding status of a specified device.	444
22.1.11 Get Last Number Dialed	Get the last number dialed at a specified device.	447
22.1.12 Get Routeing Mode	Get the routeing mode at a specified device.	448
22.1.13 Set Agent State	Set the agent state of a specified device.	449
22.1.14 Set Auto Answer	Set the auto-answer status of a specified device	453
22.1.15 Set Auto Work Mode	Set the auto-work mode status of a specified device	455
22.1.16 Set Caller ID Status	Set the Caller ID Status at the specified device.	457
22.1.17 Set Do Not Disturb	Set the do not disturb status of a specified device.	458
22.1.18 Set Forwarding	Set the forwarding status of a specified device.	462
22.1.19 Set Routeing Mode	Set the routeing mode of a specified device.	462

**22.1.1 Call Back Non-Call-Related**

C → S

The Call Back Non-Call-Related service allows a computing function to request that the switching function originate a call back call between two devices.

As an example, the service might be used when a device is busy so that a call between an originating device and a target device can be attempted when a device becomes free.

**22.1.1.1 Service Request**

**Table 22-2 Call Back Non-Call-Related—Service Request**

Parameter Name	Type	M/O/C	Description
originatingDevice	deviceID	M	Specifies the originating device for the call back call.
targetDevice	deviceID	M	Specifies the target device for the call back call.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.1.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**22.1.1.2.1 Positive Acknowledgement**

**Table 22-3 Call Back Non-Call-Related—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.1.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**22.1.1.3 Operational Model**

**22.1.1.3.1 Connection State Transitions**

There are no connection state transitions due to this service.

**22.1.1.3.2 Device-Type Monitoring Event Sequences**

**Table 22-4 Call Back Non-Call-Related—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (originatingDevice)	Call Back

**22.1.1.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**22.1.1.3.4 Functional Requirements**

1. Only one Call Back service request (Call-Related or Non-Call-Related) can be outstanding for any originating and target device pair. It is a switching function option (as indicated by the capability exchange services) if additional Call Back service requests (Call-Related or Non-Call-Related) for that pair result in a positive or negative acknowledgement from the switching function.
2. To cancel a Call Back, the computing function shall issue the Cancel Call Back service, alternatively, the Call back should be manually canceled.

**22.1.2 Call Back Message Non-Call-Related**

C → S

The Call Back Message Non-Call-Related service allows a computing function to instruct the switching function to leave a pre-defined message requesting that the target device call the originating device.

**22.1.2.1 Service Request**

**Table 22-5 Call Back Message Non-Call-Related—Service Request**

Parameter Name	Type	M/O/C	Description
originatingDevice	deviceID	M	Specifies the originating device for the call back message.
targetDevice	deviceID	M	Specifies the target device for the call back message.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.2.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**22.1.2.2.1 Positive Acknowledgement**

**Table 22-6 Call Back Message Non-Call-Related—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.2.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**22.1.2.3 Operational Model**

**22.1.2.3.1 Connection State Transitions**

There are no connection state transitions due to this service.

**22.1.2.3.2 Device-Type Monitoring Event Sequences**

**Table 22-7 Call Back Message Non-Call-Related—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (originatingDevice)	Call Back Message

**22.1.2.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**22.1.2.3.4 Functional Requirements**

1. Only one Call Back service request (Call-Related or Non-Call-Related) can be outstanding for any originating and target device pair. It is a switching function option (as indicated by the capability exchange services) if additional Call Back Message service requests (Call-Related or Non-Call-Related) for that pair result in a positive or negative acknowledgement from the switching function
2. To cancel a Call Back Message, the computing function shall issue the Cancel Call Back Message service, alternatively the Call Back should be manually canceled.

3. The Call Back Message service (Call-Related or Non-Call-Related) differs from the Call Back service in that with the Call Back Message service, no originating device will not call back the target device. Instead, this service leaves a message at the target device.
4. The switching function defines the message left at the target device. A computing function cannot use the service to specify the message content or how the switching function will notify the user (e.g., text message, voice message, indicator only).

### 22.1.3 Cancel Call Back

C → S

The Cancel Call Back service allows the computing function to cancel a previous (or all) Call Back feature at a device.

Note that this service cancels call backs that were created with either call related or non-call related Call Back features.

#### 22.1.3.1 Service Request

**Table 22-8 Cancel Call Back—Service Request**

Parameter Name	Type	M/O/C	Description
originatingDevice	DeviceID	M	The DeviceID of the device who initiated the original Call Back service.
targetDevice	DeviceID	M	The DeviceID of the target of the original Call Back service. If the switching function supports clearing of all Call Back features (as indicated by the capability exchange services) and a null format DeviceID (a DeviceID with 0 characters) is provided, all of the Call Back features at the originatingDevice are cancelled.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Non-standardized information.

#### 22.1.3.2 Service Response

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

##### 22.1.3.2.1 Positive Acknowledgement

**Table 22-9 Cancel Call Back—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Non-standardized information.

##### 22.1.3.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

#### 22.1.3.3 Operational Model

##### 22.1.3.3.1 Connection State Transitions

There are no connection state transitions due to this service.

##### 22.1.3.3.2 Device-Type Monitoring Event Sequences

**Table 22-10 Cancel Call Back—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (originatingDevice)	Call Back

##### 22.1.3.3.3 Call-Type Monitoring Event Sequences

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

##### 22.1.3.3.4 Functional Requirements

1. The originating and target DeviceIDs shall be known to the switching function.

**22.1.4 Cancel Call Back Message**

C → S

The Cancel Call Back Message service allows the computing function to cancel a previous (or all) Call Back Message feature at a device.

Note that this service cancels call back messages that were created with either call related or non-call related Call Back Message features.

**22.1.4.1 Service Request**

**Table 22-11 Cancel Call Back Message—Service Request**

Parameter Name	Type	M/O/C	Description
originatingDevice	DeviceID	M	The DeviceID of the party who initiated the original Call Back Message service.
targetDevice	DeviceID	M	The DeviceID of the target of the original Call Back Message service. If the switching function supports clearing of all Call Back Message features (as indicated by the capability exchange services) and a null format DeviceID (a DeviceID with 0 characters) is provided, all of the Call Back Message features at the originatingDevice are cancelled.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.4.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**22.1.4.2.1 Positive Acknowledgement**

**Table 22-12 Cancel Call Back Message—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.4.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**22.1.4.3 Operational Model**

**22.1.4.3.1 Connection State Transitions**

There are no connection state transitions due to this service.

**22.1.4.3.2 Device-Type Monitoring Event Sequences**

**Table 22-13 Cancel Call Back Message—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (originatingDevice)	Call Back Message

**22.1.4.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**22.1.4.3.4 Functional Requirements**

1. The originating and target DeviceIDs shall be known to the switching function.



## 22.1.5 Get Agent State

C → S

The Get Agent State service provides the agent state at a specified device.

### 22.1.5.1 Service Request

**Table 22-14 Get Agent State—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the DeviceID of the device on which the agent state is being queried.
acdGroup	DeviceID	O	Specifies the ACD group to which the associated state applies. If provided, this DeviceID parameter will limit response data to only the group specified by the parameter.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.1.5.2 Service Response

This service follows the atomic acknowledgement model for this request.

#### 22.1.5.2.1 Positive Acknowledgement

**Table 22-15 Get Agent State—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
agentStateList	List of Structures	M	<p>This parameter specifies a list of agent identifiers, and/or their corresponding agent states and ACD groups for a given device. This list parameter has a maximum list size of 32 entries. Each entry contains the following components:</p> <ul style="list-style-type: none"> <li>agentID (C) AgentID - Indicates the agentID of the agent with respect to the associated ACD device or ACD group. This component shall be provided if there are multiple agentIDs associated with the agent device.</li> <li>loggedOnState (M) Boolean - Indicates the logged on state of the agent. The complete set of possible values is: <ul style="list-style-type: none"> <li>TRUE - Agent is logged on.</li> <li>FALSE - Agent is not logged on.</li> </ul> </li> <li>agentInfo (O) List of Structures - A specific agent may be associated with one or more agent states. The following components are associated with each agent state: <ul style="list-style-type: none"> <li>acdGroup (C) DeviceID - This component is mandatory in an entry when there is more than one entry in the list.</li> <li>agentState (M) Enumerated- The complete set of possible values is Busy, Not Ready, Null, Ready, and Working After Call.</li> <li>pendingAgentState (C) Enumerated - Indicates the pending agent state if the agentState is Busy or Working After Call. This component shall be provided if the switching function is delaying the transition to the pendingAgentState until the agent is no longer Busy or Working After Call, otherwise the parameter is optional. The possible complete set of possible values is: Working After Call, Not Ready, Ready, Null.</li> <li>agentStateCondition (O) Enumerated - Indicates the agent state condition associated with the agent state. The complete set of possible values is: Forced Pause, Other.</li> </ul> </li> </ul>

**Table 22-15 Get Agent State—Positive Acknowledgement (continued)**

<b>Parameter Name</b>	<b>Type</b>	<b>M/ O/C</b>	<b>Description</b>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.5.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**22.1.5.3 Operational Model**

**22.1.5.3.1 Connection State Transitions**

There are no connection state transitions due to this service.

**22.1.5.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**22.1.5.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**22.1.5.3.4 Functional Requirements**

None.

## 22.1.6 Get Auto Answer

C → S

The Get Auto Answer service provides the auto-answer feature status at a specified device.

The auto-answer feature is used to automatically connect to (answer) a call when it arrives at a device, without manual intervention (hands-free mode).

The service specifies the number of rings at the device before the device is auto-answered.

### 22.1.6.1 Service Request

**Table 22-16 Get Auto Answer—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the DeviceID of the device on which the auto-answer status is being queried.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.1.6.2 Service Response

This service follows the atomic acknowledgement model for this request.

#### 22.1.6.2.1 Positive Acknowledgement

**Table 22-17 Get Auto Answer—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
autoAnswerOn	Boolean	M	Specifies the value of the requested feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>FALSE - auto answer is not enabled at the device</li> <li>TRUE - auto answer is enabled at the device</li> </ul>
numberOfRings	Value	O	Indicates the number of rings before a call is auto-answered.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.1.6.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

### 22.1.6.3 Operational Model

#### 22.1.6.3.1 Connection State Transitions

There are no connection state transitions due to this service.

#### 22.1.6.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 22.1.6.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 22.1.6.3.4 Functional Requirements

1. The auto-answer feature is different than the auto-originate feature:
  - a. Auto-originate (specified as the autoOriginate parameter in some Call Control services such as the Make Call service) is used to connect the originating device to the call. It applies only to the originating device (not to the called device) for the specified call.
  - b. auto-answer applies to all calls that arrive at a device when the device is being called by another device. Auto-answer is a mode that exists until it is changed. The auto-answer mode may be changed via the Set Auto Answer service.

### 22.1.7 Get Auto Work Mode

The Get Auto Work Mode service provides the auto-work mode feature status at a specified device.

The auto-work feature is used to automatically transition an agent state to the WorkingAfterCall state (from the Busy state) after an agent is finished with a call. The feature may also automatically transition the agent state from WorkingAfterCall (to Ready, for example) after a certain amount of time.

#### 22.1.7.1 Service Request

**Table 22-18 Get Auto Work Mode—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the DeviceID of the device on which the auto-work mode status is being queried. The DeviceID may refer to an ACD device, ACD group, or to an Agent.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.1.7.2 Service Response

This service follows the atomic acknowledgement model for this request.

##### 22.1.7.2.1 Positive Acknowledgement

**Table 22-19 Get Auto Work Mode—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
autoWorkOn	Boolean	M	Specifies the value of the requested feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Auto-work mode off.</li> <li>• TRUE - Auto-work mode on.</li> </ul>
autoWorkInterval	Value	O	Indicates the number of seconds that the agent state remains in the AfterCallWork state.  The value of zero indicates that the auto work mode feature does not automatically cause the transition of the agent state from WorkingAfterCall (i.e., the transition must be done manually or via the Set Agent State service)
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 22.1.7.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.11, “ErrorValue”, on page 65.

### 22.1.7.3 Operational Model

#### 22.1.7.3.1 Connection State Transitions

There are no connection state transitions due to this service.

#### 22.1.7.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 22.1.7.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 22.1.7.3.4 Functional Requirements

1. When an agent state transitions to WorkingAfterCall state due to the auto work feature, the state may be terminated before the auto work timer expires by changing the agent state manually or via the Set Agent State service.

**22.1.8 Get Caller ID Status**

C → S

The Get Caller ID Status service provides the Caller ID status at the specified device. When the status is set to TRUE, the device’s Caller ID will be provided on all calls originating from it. When the status is set to FALSE, the switching function will not provide the device’s Caller ID on calls, which originate from it, to the called device.

**22.1.8.1 Service Request**

**Table 22-20 Get Caller ID Status—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the DeviceID of the device on which the Caller ID status feature is being queried.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.8.2 Service Response**

This service follows the atomic acknowledgement model for this request.

**22.1.8.2.1 Positive Acknowledgement**

**Table 22-21 Get Caller ID Status—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
callerIDProvided	Boolean	M	Specifies the value of the requested feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Caller ID is not provided on calls originating from this device.</li> <li>• TRUE - Caller ID is provided on calls originating from this device.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.8.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**22.1.8.3 Operational Model**

**22.1.8.3.1 Connection State Transitions**

There are no connection state transitions due to this service.

**22.1.8.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**22.1.8.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**22.1.9 Get Do Not Disturb**

C → S

The Get Do Not Disturb service provides the do not disturb feature status at a specified device.

The do not disturb feature is used to prevent incoming calls at a device.

**22.1.9.1 Service Request**

**Table 22-22 Get Do Not Disturb—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the DeviceID of the device on which the do not disturb feature is being queried.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.9.2 Service Response**

This service follows the atomic acknowledgement model for this request.

**22.1.9.2.1 Positive Acknowledgement**

**Table 22-23 Get Do Not Disturb—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
doNotDisturbOn	Boolean	M	Specifies the value of the requested feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Do not disturb feature is not enabled.</li> <li>• TRUE - Do not disturb feature is enabled.</li> </ul>
callOrigination	Bitmap	O	Specifies a bitmap where each bit represents a different type of call origination on which the do not disturb feature is to be honoured. The following is the list of bits (multiple bits may be set): <ul style="list-style-type: none"> <li>• Internal - Calls originating from within the switching sub-domain.</li> <li>• External - Calls originating from outside the switching sub-domain.</li> </ul> If this parameter is not supported, the type of call origination on which do not disturb is honoured is switching function specific (as indicated in the capability exchange services). If this parameter is supported, but not provided by the switching function, then the default value for the bitmap is all bits ON (all types of call origination are honoured).
callingDeviceList	List of DeviceIDs	O	Specifies the calling device(s) from which the do not disturb feature is to be honoured (i.e., calls originating from this device will not be delivered).  If this parameter is supported but not provided, then the do not disturb feature is being processed without regard to the calling device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.9.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**22.1.9.3 Operational Model**

**22.1.9.3.1 Connection State Transitions**

There are no connection state transitions due to this service.

**22.1.9.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**22.1.9.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

### 22.1.10 Get Forwarding

C → S

The Get Forwarding service provides the forwarding feature status at a specified device. The status returned may consist of one or more forwarding types that are active at the specified device based on user defined conditions.

The forwarding feature is used to redirect calls that arrive at a specified device to an alternate destination.

#### 22.1.10.1 Service Request

**Table 22-24 Get Forwarding—Service Request**

Parameter Name	Type	M/ O/C	Description
device	DeviceID	M	Specifies the device on which to query.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.1.10.2 Service Response

This service follows the atomic acknowledgement model for this request.



22.1.10.2.1 Positive Acknowledgement

Table 22-25 Get Forwarding—Positive Acknowledgement

Parameter Name	Type	M/O/C	Description
forwardList	List of Structures	M	<p>The list contains one structure per forwardingType/forwardDN combination. The structure has the following components:</p> <ul style="list-style-type: none"> <li>• forwardingType (C) Enumerated. Specifies the type of forwarding. It shall be provided for user specified settings and it is optional for switching function default settings (see Functional Requirement #1). The “internal” and “external” types refer to the type of call origination (for example an external call) that will be forwarded if it matches a forwarding type (for example forwardImmExt) enabled at the device. The complete set of possible values is: <ul style="list-style-type: none"> <li>• forwardImmediate</li> <li>• forwardBusy</li> <li>• forwardDND</li> <li>• forwardNoAns</li> <li>• forwardBusyInt</li> <li>• forwardBusyExt</li> <li>• forwardDNDInt</li> <li>• forwardDNDExt</li> <li>• forwardNoAnsInt</li> <li>• forwardNoAnsExt</li> <li>• forwardImmInt</li> <li>• forwardImmExt</li> </ul> </li> <li>• forwardStatus (M) Boolean. Indicates the status of the forwarding type. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - the forwarding type is deactivated.</li> <li>• TRUE - the forwarding type is active.</li> </ul> </li> <li>• forwardDN (C) DeviceID. Specifies the destination to which calls are forwarded. It shall be provided for user specified settings and it is optional for switching function default settings (see Functional Requirement #1).</li> <li>• forwardDefault (O) Enumerated. Specifies that the provided forwardingType and/or the forwardDN is a default setting. If the forwardDefault parameter is supported by the switching function and it is not present, the information is not a default setting. The complete set of possible values is: <ul style="list-style-type: none"> <li>• defaultForwardingTypeAndForwardDN</li> <li>• defaultForwardingType</li> <li>• defaultForwardDN</li> </ul> <p>See Functional Requirement #2.</p> </li> <li>• ringCount (O) Value (1...100). It specifies the number of times that the device rings prior to forward no answer. See Functional Requirement 3.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

22.1.10.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

22.1.10.3 Operational Model

#### **22.1.10.3.1 Connection State Transitions**

There are no connection state transitions due to this service.

#### **22.1.10.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

#### **22.1.10.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

#### **22.1.10.3.4 Functional Requirements**

1. There are two possible levels of forwarding settings (see 6.8.1, “Forwarding”, on page 51) that can be supported by a switching function. (refer to the capability exchange services for the levels supported by an implementation):
  - switching function default settings - a single set of forwarding type/forwarding destination combinations that can be activated/deactivated as a set.
  - user specified settings - individual forwarding type/forwarding destination combinations that can be activated/deactivated one at a time.
2. The forwardDefault component in the forwardList indicates if information in the forwardList is the default information associated with the device (in the case where the forwarding settings have never been changed, for example) and what forwarding level the information is associated with. The possible values for forwardDefault are:
  - defaultForwardingTypeAndForwardDN - indicates that the information is associated with the switching function default settings.
  - defaultForwardingType - indicates that forwardingType is a default value associated with user specified settings.
  - defaultForwardDN - indicates that forwardDN is a default value associated with user specified settings.
3. When supported, RingCount is provided for the following forwarding types:
  - forwardingType (forwardNoAns)
  - forwardingType (forwardNoAnsInt)
  - forwardingType (forwardNoAnsExt)

**22.1.11 Get Last Number Dialed**

C → S

The Get Last Number Dialed service provides the last number dialed at a specified device.

**22.1.11.1 Service Request**

**Table 22-26 Get Last Number Dialed—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the DeviceID of the device on which the last number is being queried.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.11.2 Service Response**

This service follows the atomic acknowledgement model for this request.

**22.1.11.2.1 Positive Acknowledgement**

**Table 22-27 Get Last Number Dialed—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
numberDialed	DeviceID	M	Indicates the last number dialed. “Unknown” is provided if the switching function cannot accurately provide the information.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.11.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**22.1.11.3 Operational Model**

**22.1.11.3.1 Connection State Transitions**

There are no connection state transitions due to this service.

**22.1.11.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**22.1.11.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**22.1.11.3.4 Functional Requirements**

1. The last number dialed may be a manually dialed number or may be the originally called device provided in services such as Consultation Call, Make Call, and Make Predictive Call, whichever occurred most recently.

### 22.1.12 Get Routeing Mode

C → S

The Get Routeing Mode service indicates if a device is able to make routeing requests to the computing function.

For example, devices that are able to make routeing requests will request instructions (see 20.2.4, “Route Request”, on page 377) when a call arrives at the device.

#### 22.1.12.1 Service Request

**Table 22-28 Get Routeing Mode—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the DeviceID of the device on which the routeing mode is being queried.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.1.12.2 Service Response

This service follows the atomic acknowledgement model for this request.

##### 22.1.12.2.1 Positive Acknowledgement

**Table 22-29 Get Routeing Mode—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
routeingMode	Boolean	M	Indicates the routeing mode of the device. The complete set of possible values is: <ul style="list-style-type: none"> <li>• TRUE - the device will request routeing instructions when a call arrives at the device.</li> <li>• FALSE - the device will not request routeing instructions.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 22.1.12.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

#### 22.1.12.3 Operational Model

##### 22.1.12.3.1 Connection State Transitions

There are no connection state transitions due to this service.

##### 22.1.12.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

##### 22.1.12.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

##### 22.1.12.3.4 Functional Requirements

1. The routeing mode may be set by using the “Set Routeing Mode” on page 462 service or it may be set by the switching function based upon configuration information, for example.

### 22.1.13 Set Agent State

C → S

The Set Agent State service requests a new agent state at a specified device. In the case where an ACD agent is involved with an ACD call, the transition to the requested state may or may not occur until the current connection transitions to the null state.

#### 22.1.13.1 Service Request

Table 22-30 Set Agent State—Service Request

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the DeviceID for the ACD agent for which the state is to be changed. The device may also be an ACD device or an ACD group device if allowed by the switching function, as indicated by the capability exchange services.
requestedAgentState	Enumerated	M	Specifies the requested agent state. The complete set of possible values is: <ul style="list-style-type: none"> <li>loggedOn - Requests that the agent be logged on.</li> <li>loggedOff - Requests that the agent be logged off.</li> <li>notReady - Requests that the agent be placed into the notReady agent state.</li> <li>ready - Requests that the agent be placed into the ready state.</li> <li>workingAfterCall - Requests that the agent be placed into the workingAfterCall state.</li> </ul> Note that the list of values in this parameter is different from the list of values in the agentState parameter in the Get Agent State service.
agentID	AgentID	C	Specifies the agent identifier. This parameter must be provided if there are multiple agentIDs associated with the device.
password	AgentPassword	O	Specifies the agent password. This parameter can only be provided when the requestedAgentState is loggedOn or loggedOff. Note that the switching function may omit this information in subsequent events for security reasons, etc. This parameter type is a character string. The maximum length supported by the switching function is provided via the capabilities exchange services.
group	DeviceID	C	Specifies the agent ACD group that the agent is logging in or out of. The presence or absence of this parameter indicates the type of agent log on model. Refer to the modeling concepts in 6.1.3.7, "Agent", on page 24 for the when this parameter must be provided.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.1.13.2 Service Response

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

### 22.1.13.2.1 Positive Acknowledgement

**Table 22-31 Set Agent State—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
pendingAgentState	Enumerated	C	Indicates the agent state that the agent will transition to after the agent state is no longer Busy or Working After Call. The complete set of possible values is: <ul style="list-style-type: none"> <li>Working After Call</li> <li>Not Ready</li> <li>Ready</li> <li>Null</li> </ul> This parameter shall be provided if the switching function is delaying the transition to the pendingAgentState until the agent is no longer Busy or Working After Call, otherwise the parameter is optional.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.1.13.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

### 22.1.13.3 Operational Model

#### 22.1.13.3.1 Connection State Transitions

There are no connection state transitions due to this service.

#### 22.1.13.3.2 Device-Type Monitoring Event Sequences

**Table 22-32 Set Agent State—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	The event corresponding to the value of the requestedAgentState parameter (i.e., Agent Logged Off, Agent Logged On, Agent Not Ready, Agent Ready, Agent Working After Call).  Note that if the current agent state is Busy or WorkingAfterCall, then (depending upon the switching function, as indicated by the capability exchange services) the transition to the requestedAgentState may be delayed until the agent is no longer Busy or WorkingAfterCall. See Functional requirement #1.

#### 22.1.13.3.3 Call-Type Monitoring Event Sequences

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

#### 22.1.13.3.4 Functional Requirements

1. If the device parameter in the service request is an ACD device or an ACD group, (if allowed by the switching function, as indicated by the capability exchange services), then the service shall be applied to all member/associated devices as if the service were applied to each member/associated device individually. If the device parameter in the service request is an ACD group or ACD device and the switching function does not allow such a device in this service, it shall reject the service request.
2. If this service is issued while the agent is Busy or WorkingAfterCall, the transition to the requestedAgentState may be delayed (depending upon the switching function, as indicated by the capability exchange services) until the agent is no longer Busy or in Agent Working After Call. If the switching function delays the transition in this manner, and if there is a monitor on the Agent Busy or the Agent Working After Call event, the switching function shall generate a Agent Busy or Agent Working After Call event with the pendingAgentState parameter that reflects the requestedAgentState.
3. If there is a pendingAgentState while the agent state is Busy or WorkingAfterCall, and a Set Agent State is received, the switching function shall override the previous pendingAgentState with the new

requestedAgentState and generate an Agent Busy or an Agent Working After Call event that reflects the new pendingAgentState. If the switching function is unable to override the previous pendingAgentState, it shall reject the service request.

Tables 22-33 through Table 22-36 illustrate various examples of agent log on/off.

In these tables, the notation G1 and G2 refers to an ACD group and the number in parenthesis refers to the acdGroup parameter in the agent events.

The agent log on models are described in 6.1.3.7, “Agent”, on page 24.

**Table 22-33 Agent Logs On and Then Logs Off an ACD Device Without Entering an ACD Group**

Action	Agent Events	Agent Logged On State	Agent State	Comment
pre ACD		False	G1: - G2: -	Agent is not yet associated with an ACD device.
Agent logs on to an ACD device	Agent Logged On ()	True	G1: - G2: -	Agent becomes associated with the activities of the ACD device but is not associated with an ACD group.
Agent logs off of an ACD device	Agent Logged Off ()	False	G1: - G2: -	Agent logs off the ACD device.

**Table 22-34 Agent Logs On to an ACD Device and then Logs On to Two ACD Groups (Explicit/Two Step Model)**

Action	Events	Logged On State	Agent State	Comment
pre ACD		False	G1: - G2: -	Agent is not yet associated with an ACD device.
Agent logs on to an ACD device	Agent Logged On ()	True	G1: - G2: -	Agent becomes associated with the activities of the ACD device but is not yet associated with an ACD group.
Agent logs on to an ACD group	Agent Logged On (G1) Agent Not Ready (G1)	True	G1:NotReady G2: -	Agent logs on to ACD group 1 and becomes associated with the activities of the ACD group.
Agent logs on to another ACD group	Agent Logged On (G2) Agent Not Ready (G2)	True	G1:NotReady G2:NotReady	Agent logs on to ACD group 2 and becomes available for ACD group 2 activity.
Agent logs off of an ACD group	Agent Logged Off (G2)	True	G1:NotReady G2: -	Agent logs off of just ACD Group 2, stays in ACD Group 1.
Agent logs off another ACD group	Agent Logged Off (G1)	True	G1: - G2: -	Agent logs off of last ACD Group 1, stays logged on to the ACD device.
Agent logs off an ACD device	Agent Logged Off ()	False	G1: - G2: -	Agent logs off the ACD device.

**Table 22-35 Agent Logs On to an ACD Group Directly (Explicit/One Step Model)**

Action	Events	Logged On State	Agent State	Comment
pre ACD		False	G1: - G2: -	Agent is not yet associated with an ACD device.
Agent logs on to ACD group 2	Agent Logged On () optional Agent Logged On (G2) Agent Not Ready (G2)	True	G1: - G2: NR	Agent logs on to ACD Group 2 directly. Note that the “Agent Logged On ()” event is optional.
Agent logs off.	Agent Logged Off (G2) optional Agent Logged Off ()	False	G1: - G2: -	Agent logs off the ACD device. Note that the “Agent Logged Off (G2)” event is optional.

**Table 22-36 Agent Logs On to the ACD Device and is Automatically Logged On to ACD Groups (Implicit/One Step Model)**

Action	Events	Logged On State	Agent State	Comment
pre ACD		False	G1: - G2: -	Agent is not yet associated with an ACD device.
Agent logs on to an ACD group (ACD group not specified)	Agent Logged On () optional Agent Logged On (G1) Agent Logged On (G2) Agent Not Ready (G1) Agent Not Ready (G2)	True	G1:NotReady G2:NotReady	Agent logs on to ACD and is automatically logged onto groups by the system. Note that the “Agent Logged On ()” event is optional.
Agent logs off.	Agent Logged Off (G1) optional Agent Logged Off (G2) optional Agent Logged Off ()	False	G1: - G2: -	Agent logs off ACD device. Note that the “Agent Logged Off (G1)” and the “Agent Logged Off (G2)” events are optional.



### 22.1.14 Set Auto Answer

C → S

The Set Auto Answer service allows the computing function to control the auto-answer feature at a specified device. The auto-answer feature is used to automatically connect to (answer) a call when it arrives at a device, without manual intervention (handsfree operation).

#### 22.1.14.1 Service Request

**Table 22-37 Set Auto Answer—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device on which to set the feature.
autoAnswerOn	Boolean	M	Specifies the requested value of the auto-answer feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Auto-answer off.</li> <li>• TRUE - Auto-answer on.</li> </ul>
numberOfRings	Value	O	Indicates the number of rings before a call is auto-answered. If not provided (and the parameter is supported), the default will be zero (0).
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.1.14.2 Service Response

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

##### 22.1.14.2.1 Positive Acknowledgement

**Table 22-38 Set Auto Answer—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 22.1.14.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

#### 22.1.14.3 Operational Model

##### 22.1.14.3.1 Connection State Transitions

There are no connection state transitions due to this service.

##### 22.1.14.3.2 Device-Type Monitoring Event Sequences

**Table 22-39 Set Auto Answer—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Auto Answer

##### 22.1.14.3.3 Call-Type Monitoring Event Sequences

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

##### 22.1.14.3.4 Functional Requirements

1. The auto-answer feature is different than the auto-originate feature:

- auto-originate (specified as the autoOriginate parameter in some Call Control services such as the Make Call service) is used to connect the originating device to the call. It applies only to the originating device (not to the called device) for the specified call.
- auto-answer applies to all calls that arrive at a device when the device is being called by another device. Auto-answer is a mode that exists until it is changed. The auto-answer mode may be changed via the Set Auto Answer service.

### 22.1.15 Set Auto Work Mode

C → S

The Set Auto Work Mode service allows the computing function to control the auto-work feature at a specified device. The auto-work feature is used to automatically transition an agent state to the WorkingAfterCall state (from the Busy state) after an agent has finished with a call. The feature may also automatically transition the agent state from WorkingAfterCall (to Ready, for example) after a certain amount of time.

#### 22.1.15.1 Service Request

**Table 22-40 Set Auto Work Mode —Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the DeviceID for the ACD agent for which the auto work mode is to be changed. The device may also be an ACD device or an ACD group device if allowed by the switching function, as indicated by the capability exchange services.
autoWorkOn	Boolean	M	Specifies the requested value of the auto-work feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Auto-work off.</li> <li>• TRUE - Auto-work on.</li> </ul>
autoWorkInterval	Value (0..6000)	O	Indicates the number of seconds that the agent state remains in the WorkingAfterCall state.  The value of zero indicates that the auto work mode feature does not automatically cause the transition of the agent state out of the WorkingAfterCall state (i.e., the transition must be done manually or via the Set Agent State service).  If this parameter is not provided, a switching function default value is used.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.1.15.2 Service Response

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

##### 22.1.15.2.1 Positive Acknowledgement

**Table 22-41 Set Auto Work Mode—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 22.1.15.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.11, “ErrorValue”, on page 65.

#### 22.1.15.3 Operational Model

##### 22.1.15.3.1 Connection State Transitions

There are no connection state transitions due to this service.

### 22.1.15.3.2 Device-Type Monitoring Event Sequences

Table 22-42 Set Auto Work Mode—Device-Type Monitoring Event Sequences

Monitored Device	Event
D1 (device)	Auto Work Mode

### 22.1.15.3.3 Call-Type Monitoring Event Sequences

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

### 22.1.15.3.4 Functional Requirements

1. Note that this service is different from the Set Agent State service in that the Set Agent State service causes a transition to a specified agent state (WorkingAfterCall, for example). The Set Auto Work Mode service controls how the switch automatically transitions to/from the WorkingAfterCall state after an agent completes a call.
2. When an agent state transitions to WorkingAfterCall due to the auto-work feature, the WorkingAfterCall state may be terminated before the auto work timer expires by setting the agent to another agent state manually or via the Set Agent State service.
3. If the Auto Work Mode is disabled while the agent state is already in the WorkingAfterCall state, the agent state shall remain in the WorkingAfterCall state until changed (e.g., manually or via the Set Agent State service).
4. The setting of the value of the auto-work mode feature as a result of this service is persistent (i.e., it remains as specified in the service request until it is changed manually or by the Set Agent State service).

**22.1.16 Set Caller ID Status**

C → S

This Set Caller ID Status service sets the Caller ID Status at the specified device. When the status is set to TRUE, the device’s Caller ID will be provided on all calls originating from it. When the status is set to FALSE, the switching function will not provide the device’s Caller ID on calls, which originate from it, to the called device.

**22.1.16.1 Service Request**

**Table 22-43 Set Caller ID Status—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device on which to query.
callerIDProvided	Boolean	M	Specifies whether this device’s caller ID value is being provided on outbound calls. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Caller ID is not to be provided on call(s) originating from this device.</li> <li>• TRUE - Caller ID is to be provided on call(s) originating from this device.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.16.2 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**22.1.16.2.1 Positive Acknowledgement**

**Table 22-44 Set Caller ID Status—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.16.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**22.1.16.3 Operational Model**

**22.1.16.3.1 Connection State Transitions**

There are no connection state transitions due to this service.

**22.1.16.3.2 Device-Type Monitoring Event Sequences**

**Table 22-45 Set Caller ID Status—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Caller ID Status

**22.1.16.3.3 Call-Type Monitoring Event Sequences**

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

**22.1.17 Set Do Not Disturb**

C → S

The Set Do Not Disturb service allows the computing function to control the do not disturb feature at a specified device. The do not disturb feature is typically used to prevent a specified device from being alerted.

**22.1.17.1 Service Request**

**Table 22-46 Set Do Not Disturb—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device on which to set the feature.
doNotDisturbOn	Boolean	M	Specifies whether the do not disturb feature is enabled. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE- Do not disturb feature is not enabled.</li> <li>• TRUE- Do not disturb feature is enabled.</li> </ul>
callOrigination	Bitmap	O	Specifies a bitmap where each bit represents a different type of call origination on which the do not disturb feature is to be honoured. The following is the list of bits (multiple bits may be set): <ul style="list-style-type: none"> <li>• Internal - Calls originating from within the switching sub-domain.</li> <li>• External - Calls originating from outside the switching sub-domain.</li> </ul> If this parameter is not supported, the type of call origination on which do not disturb is honoured is switching function specific (as indicated in the capability exchange services). If this parameter is supported, but not provided by the computing function, then the default value for the bitmap is all bits on (all types of call origination are honoured).
callingDeviceList	List of DeviceIDs	O	Specifies the calling device(s) from which the do not disturb feature is to be honoured (i.e., calls originating from this device will not be delivered). If this parameter is supported but not provided, then the do not disturb feature shall be processed without regard to the calling device.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.17.1.1 Service Response**

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

**22.1.17.1.2 Positive Acknowledgement**

**Table 22-47 Set Do Not Disturb—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**22.1.17.1.3 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

## 22.1.17.2 Operational Model

### 22.1.17.2.1 Connection State Transitions

Existing connected and held calls are not affected. Calls that are alerting or queued when this feature is turned on may be affected in that the newly-activated feature may be applied to them by the switching function.

### 22.1.17.2.2 Device-Type Monitoring Event Sequences

Table 22-48 Set Do Not Disturb—Device-Type Monitoring Event Sequences

Monitored Device	Event
D1 (device)	Do Not Disturb

### 22.1.17.2.3 Call-Type Monitoring Event Sequences

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

### 22.1.17.2.4 Functional Requirements

1. If a device is called that has do not disturb activated, depending upon the Forwarding type activated at the device, the call may be forwarded to an alternate destination.

22.1.18 Set Forwarding

C → S

The Set Forwarding service allows the computing function to control the forwarding feature at a specified device based on user defined conditions. The forwarding feature is used to redirect calls that arrive at a specified device to an alternate destination.

This service allows only one user-specified setting (forwarding type/forward-destination combination) to be changed per service invocation.

22.1.18.1 Service Request

Table 22-49 Set Forwarding—Service Request

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device on which to set the feature.
forwardingType	Enumerated	C	<p>Specifies the type of forwarding. The “internal” and “external” types refer to the type of call origination (for example an external call) that will be forwarded if it matches a forwarding type (for example, forwardImmExt) enabled at the device. The complete set of possible values is:</p> <ul style="list-style-type: none"> <li>• forwardImmediate</li> <li>• forwardBusy</li> <li>• forwardDND</li> <li>• forwardNoAns</li> <li>• forwardBusyInt</li> <li>• forwardBusyExt</li> <li>• forwardDNDInt</li> <li>• forwardDNDExt</li> <li>• forwardNoAnsInt</li> <li>• forwardNoAnsExt</li> <li>• forwardImmInt</li> <li>• forwardImmExt</li> </ul> <p>This parameter shall be provided for user specified forwarding settings and shall not be provided for switching function default settings. See Functional Requirement #1.</p>
activateForward	Boolean	M	<p>Indicates the status of the forwarding type. The complete set of possible values is:</p> <ul style="list-style-type: none"> <li>• FALSE - Deactivate forwarding</li> <li>• TRUE - Activate forwarding.</li> </ul>
forwardDN	DeviceID	C	<p>Specifies the device to which new calls are forwarded.</p> <p>This parameter shall be provided for user specified forwarding settings when activateForward is TRUE (it is optional when FALSE).</p> <p>It shall not be provided for switching function default settings. See Functional Requirement #1.</p>
ringCount	Value (1...100)	O	<p>Specifies the number of times a device should ring prior to forwarding no answer.</p> <p>See Functional Requirement #2.</p>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.



### 22.1.18.2 Service Response

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

#### 22.1.18.2.1 Positive Acknowledgement

**Table 22-50 Set Forwarding—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.1.18.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

### 22.1.18.3 Operation Model

#### 22.1.18.3.1 Functional Requirements

1. To activate or deactivate user specified settings, the computing function shall specify the forwardingType. To activate or deactivate switching function default settings, the computing function shall not specify the forwardingType. The computing function should use the capabilities exchange services to determine which level(s) of forwarding settings are supported by the switching function.
2. If ringCount is specified, the activateForward shall be TRUE and the forwardingType or default value shall be one of the following values:
  - forwardingType (forwardNoAns)
  - forwardingType (forwardNoAnsInt)
  - forwardingType (forwardNoAnsExt)
3. If multiple user-specified settings need to be set and if activation of multiple settings is supported by the switching function (as indicated through the capabilities exchange services), multiple Set Forwarding service requests can be used to activate multiple settings for the same device.

### 22.1.19 Set Routeing Mode

C → S

The Set Routeing Mode service allows the computing function to control the routeing mode at a specified device.

The routeing mode indicates if a device is able to make routeing requests to the computing function.

For example, if the routeing mode is set, a device may request routeing instructions (see 20.2.4, “Route Request”, on page 377) from the computing function when a call arrives at the device.

#### 22.1.19.1 Service Request

**Table 22-51 Set Routeing Mode—Service Request**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device on which to set the feature.
routeingMode	Boolean	M	Specifies the routeing mode of the device. The complete set of possible values is: <ul style="list-style-type: none"> <li>• TRUE - the device will request routeing instructions from the computing function when a call arrives at the device.</li> <li>• FALSE - the device will not request routeing instructions.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.1.19.2 Service Response

The capability exchange services describe the type of acknowledgement model (atomic or multi-step) that the switching function supports for this service request.

##### 22.1.19.2.1 Positive Acknowledgement

**Table 22-52 Set Routeing Mode—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 22.1.19.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

#### 22.1.19.3 Operational Model

##### 22.1.19.3.1 Connection State Transitions

There are no connection state transitions due to this service.

##### 22.1.19.3.2 Device-Type Monitoring Event Sequences

**Table 22-53 Set Routeing Mode—Device-Type Monitoring Event Sequences**

Monitored Device	Event
D1 (device)	Routeing Mode

##### 22.1.19.3.3 Call-Type Monitoring Event Sequences

If the monitor object is a device, if supported, the monitoring event sequence is the same as the Device-Type Monitoring event sequence.

##### 22.1.19.3.4 Functional Requirements

1. Some switching functions may change the routeing mode of a device without using this service. This may occur based upon configuration information in the switching function or for other reasons.

## 22.2 Events

**Table 22-54 Logical Device Feature Event Summary**

<b>Logical Device Feature Event</b>	<b>Description</b>	<b>Pg.</b>
22.2.1 Agent Busy	An agent is occupied with serving an ACD call.	464
22.2.2 Agent Logged Off	An agent has logged off of an ACD group or an ACD device.	465
22.2.3 Agent Logged On	An agent has logged on to an ACD group or an ACD device.	466
22.2.4 Agent Not Ready	An agent is unavailable and cannot receive incoming ACD calls.	467
22.2.5 Agent Ready	An agent is available for an ACD call.	469
22.2.6 Agent Working After Call	An agent is involved with after call work and cannot receive ACD calls.	470
22.2.7 Auto Answer	The auto-answer status has changed.	472
22.2.8 Auto Work Mode	The auto-work mode status has changed.	473
22.2.9 Call Back	The call back feature status has changed.	474
22.2.10 Call Back Message	The call back message status has changed.	475
22.2.11 Caller ID Status	The Caller ID status has been changed for a device.	476
22.2.12 Do Not Disturb	The do not disturb status has changed.	477
22.2.13 Forwarding	The forwarding status has changed.	478
22.2.14 Routeing Mode	The routeing mode status has changed.	480

### 22.2.1 Agent Busy

The Agent Busy event indicates that an agent has entered the Busy state. In this state an agent is involved with an existing ACD call at a device, even if that call is on hold at the device. It also implies that the agent may be able to accept non-ACD calls. Calls between agents, calls between supervisors and agents and private calls may or may not cause this transition.

An example of when this event is generated is when an agent is connected to an ACD call.

#### 22.2.1.1 Event Parameters

**Table 22-55 Agent Busy—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
agentDevice	SubjectDeviceID	M	Indicates the device at which the agent entered the Agent Busy state.
agentID	AgentID	C	Indicates the agent identifier. This parameter shall be provided if there are multiple agentIDs associated with the agent device.
acdGroup	DeviceID	C	Indicates the acd group. This parameter shall be provided if the event is associated with an ACD group activity otherwise it shall not be provided. See 6.1.3.7.5, “Agent State Models”, on page 26.
pendingAgentState	Enumerated	C	Indicates the agent state that the agent will transition to after the agent state is no longer Busy. The complete set of possible values is: <ul style="list-style-type: none"> <li>• Working After Call</li> <li>• Not Ready</li> <li>• Ready</li> <li>• Null</li> </ul> This parameter shall be provided if the switching function is delaying the transition to the pendingAgentState until the agent is no longer Busy, otherwise the parameter is optional.
cause	EventCause	O	Indicates a reason for the event.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.2.1.2 Event Causes

**Table 22-56 Agent Busy—Event Causes**

Event Cause	Description	Associated Features
Normal	An agent is connected to an ACD call.	Any feature

#### 22.2.1.3 Functional Requirements

1. This event can be reported in conjunction with either a monitor on the ACD device, ACD group or the device associated with the agent. For more details on ACD and the agent, see 6.1.3.7, “Agent”, on page 24 and 6.1.3.4.3, “ACD Device Category”, on page 21.
2. Call Control events provide information on involvement with both ACD and non-ACD calls.

## 22.2.2 Agent Logged Off

The Agent Logged Off event indicates that an agent has logged off an ACD device or an ACD group.

Typical examples of when this event may be generated are:

- An agent logs off using the telephone.
- An agent is logged off via the Set Agent State service.
- A supervisor logs off an agent on behalf of the agent.
- A logged on device leaves a switching sub-domain or becomes an invalid device in a switching sub-domain (is deconfigured, for example).

### 22.2.2.1 Event Parameters

**Table 22-57 Agent Logged Off—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
agentDevice	SubjectDeviceID	M	Indicates the device where the agent logged off.
agentID	AgentID	C	Indicates the agent identifier. This parameter shall be provided if there are multiple agentIDs associated with the agent device.
acdGroup	DeviceID	C	Indicates the ACD group from which the agent logged off. This parameter shall be provided if the agent is logging off of an ACD group. See 6.1.3.7, “Agent”, on page 24.
agentPassword	AgentPassword	O	Indicates the agent password. Note that the switching function may omit this information for security reasons, etc.
cause	EventCause	O	Indicates a reason for the event.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.2.2.2 Event Causes

**Table 22-58 Agent Logged Off—Event Causes**

Event Cause	Description	Associated Features
Normal	An agent has logged off an ACD group or ACD device.	Any feature

### 22.2.3 Agent Logged On

The Agent Logged On event indicates that an agent is logged-on at a particular device to an ACD device or ACD group and is ready to contribute to the activities of the ACD device or ACD group. It does not indicate that the agent is ready to accept ACD calls.

Typical examples of when this event may be generated are:

- The agent logged on using the telephone.
- The agent logged on using the Set Agent State service.
- During system start-up, if the agent is configured for logging on automatically.

#### 22.2.3.1 Event Parameters

**Table 22-59 Agent Logged On—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
agentDevice	SubjectDeviceID	M	Indicates the device where the agent logged on.
agentID	AgentID	C	Indicates the agent identifier. This parameter shall be provided if there are multiple agentIDs associated with the agent device.
acdGroup	DeviceID	C	Indicates the ACD group to which the agent logged on. This parameter shall be provided if the agent is logging on to an ACD group. See 6.1.3.7, “Agent”, on page 24.
agentPassword	AgentPassword	O	Indicates the agent password that was used for logging on. Note that the switching function may omit this information for security reasons, etc.
cause	EventCause	O	Indicates a reason for the event.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.2.3.2 Event Causes

**Table 22-60 Agent Logged On—Event Causes**

Event Cause	Description	Associated Features
Normal	An agent has logged on to an ACD group or ACD device.	Any feature

#### 22.2.3.3 Functional Requirements

1. This event can be reported in conjunction with either a monitor on the ACD group or the ACD device associated with the agent. For more details on ACD and the agent, see 6.1.3.7, “Agent”, on page 24 and 6.1.3.4.3, “ACD Device Category”, on page 21.
2. Call Control events provide information on involvement with both ACD and non-ACD calls.

## 22.2.4 Agent Not Ready

The Agent Not Ready event indicates that an agent has entered the Agent Not Ready state. In this state an agent is logged-on at a particular device to an ACD device or ACD group but is not prepared to handle calls that the ACD distributes. While in this state an agent may receive calls that are not ACD calls.

Typical examples of when this event may be generated are:

- An agent logs on using the telephone and is placed into the Not Ready agent state.
- An agent invokes the Agent Not Ready feature on the telephone.
- The agent invoked Agent Not Ready by using the Set Agent State service.
- A supervisor invokes the Agent Not Ready feature on behalf of the agent.

### 22.2.4.1 Event Parameters

**Table 22-61 Agent Not Ready—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
agentDevice	SubjectDeviceID	M	Indicates the device at which the agent entered the Agent Not Ready state.
agentID	AgentID	C	Indicates the agent identifier. This parameter shall be provided if there are multiple agentIDs associated with the agent device.
acdGroup	DeviceID	C	Indicates the ACD group from which the agent logged on. This parameter shall be provided if the event is associated with an ACD group activity otherwise it shall not be provided. See 6.1.3.7.5, “Agent State Models”, on page 26.
cause	EventCause	O	Indicates a reason for the event.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.2.4.2 Event Causes

**Table 22-62 Agent Not Ready—Event Causes**

Event Cause	Description	Associated Features
Auto Work	The event is due to the auto-work feature.	Auto-work
Normal	An agent cannot receive incoming ACD calls but is still logged on to an ACD group or ACD device (a more specific cause cannot be provided).	Any feature
Forced Pause	The agent entered a periodic non-working condition. This usually occurs because of regulations that requires agents to have a certain amount of time between handling successive ACD calls.	ACD call
Forced Transition	The agent state is Not Ready due to activity in another ACD device or an ACD group.	ACD call

### 22.2.4.3 Functional Requirements

1. This event can be reported in conjunction with either a monitor on the ACD device, ACD group, or the device associated with the agent. For more details on ACD and the agent, see 6.1.3.7, “Agent”, on page 24 and 6.1.3.4.3, “ACD Device Category”, on page 21.

2. Call Control events provide information on involvement with both ACD and non-ACD calls.



### 22.2.5 Agent Ready

The Agent Ready event indicates that an agent has entered the Ready state. In this state, an agent is logged-on at a particular device to an ACD device or ACD group and is prepared to handle ACD calls even though it may be involved with non-ACD calls.

Typical examples of when this event may be generated are:

- An agent auto-work timer expires. (This is a configuration option.)
- An agent invokes the Agent Ready feature on the telephone.
- The agent invoked Agent Ready by using the Set Agent State service.
- A supervisor invokes the Agent Ready feature on behalf of the agent.

#### 22.2.5.1 Event Parameters

**Table 22-63 Agent Ready—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
agentDevice	SubjectDeviceID	M	Indicates the device at which the agent entered the Agent Ready state.
agentID	AgentID	C	Indicates the agent identifier. This parameter shall be provided if there are multiple agentIDs associated with the agent device.
acdGroup	DeviceID	C	Indicates the ACD group from which the agent logged on. This parameter shall be provided if the event is associated with an ACD group activity otherwise it shall not be provided. See 6.1.3.7.5, “Agent State Models”, on page 26.
cause	EventCause	O	Indicates a reason for the event.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.2.5.2 Event Causes

**Table 22-64 Agent Ready—Event Causes**

Event Cause	Description	Associated Features
Auto Work	The event is due to the auto-work feature.	Auto-work
Normal	An agent may receive ACD calls.	Any feature

#### 22.2.5.3 Functional Requirements

1. This event can be reported in conjunction with either a monitor on the ACD device, ACD group or the device associated with the agent. For more details on ACD and the agent, see 6.1.3.7, “Agent”, on page 24 and 6.1.3.4.3, “ACD Device Category”, on page 21.
2. Call Control events provide information on involvement with both ACD and non-ACD calls.

### 22.2.6 Agent Working After Call

The Agent Working After Call event indicates that an agent has entered the Working After Call state. In this state an agent is no longer connected to an ACD call but is still occupied with work related to a previous ACD call. In this state, an agent cannot receive ACD calls but may be able to receive non-ACD calls. The agent may be performing administrative duties (e.g., updating a business order form) for a previous call, or may be involved with a non-ACD call.

Typical examples of when this event may be generated are:

- An agent completes an ACD call and goes into the workingAfterCall state. (This is a configuration option.)
- An agent invokes the Working After Call feature on the telephone.
- An agent invoked workingAfterCall state by using the Set Agent State service.

#### 22.2.6.1 Event Parameters

**Table 22-65 Agent Working After Call—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
agentDevice	SubjectDeviceID	M	Indicates the device at which the agent entered the workingAfterCall state.
agentID	AgentID	C	Indicates the agent identifier. This parameter shall be provided if there are multiple agentIDs associated with the agent device.
acdGroup	DeviceID	C	Indicates the ACD group from which the agent logged on. This parameter shall be provided if the event is associated with an ACD group activity otherwise it shall not be provided. See 6.1.3.7.5, “Agent State Models”, on page 26.
pendingAgentState	Enumerated	C	Indicates the agent state that the agent will transition to after the agent state is no longer WorkingAfterCall. The complete set of possible values is: <ul style="list-style-type: none"> <li>• Not Ready</li> <li>• Ready</li> <li>• Null</li> </ul> This parameter shall be provided if the switching function is delaying the transition to the pendingAgentState until the agent is no longer AfterCallWork, otherwise the parameter is optional.
cause	EventCause	O	Indicates a reason for the event.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.2.6.2 Event Causes

**Table 22-66 Agent Working After Call—Event Causes**

Event Cause	Description	Associated Features
Auto Work	The event is due to the auto-work feature.	Auto-work
Normal	An agent is no longer connected to the ACD call but is still occupied with work related to the call.	Any feature

### **22.2.6.3 Functional Requirements**

1. This event can be reported in conjunction with either a monitor on the ACD device, ACD group or the device associated with the agent. For more details on ACD and the agent, see 6.1.3.7, “Agent”, on page 24 and 6.1.3.4.3, “ACD Device Category”, on page 21.
2. Call Control events provide information on involvement with both ACD and non-ACD calls.

### 22.2.7 Auto Answer

The Auto Answer event indicates that the auto answer status has changed (On/Off) for a device.

Typical examples of when this event may be generated are:

- The auto-answer feature has been changed on the telephone.
- The computing function, on behalf of a user, has invoked the Set Auto Answer service.

#### 22.2.7.1 Event Parameters

**Table 22-67 Auto Answer—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
invokingDevice	SubjectDeviceID	M	Indicates the device where the auto answer status has changed.
autoAnswerOn	Boolean	M	Indicates the status of the feature. Shall be one of the following: <ul style="list-style-type: none"><li>• FALSE - Auto-answer feature is not enabled.</li><li>• TRUE - Auto-answer feature is enabled (on).</li></ul>
numberOfRings	Value	O	Indicates the number of rings before a call is auto answered.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

## 22.2.8 Auto Work Mode

The Auto Work Mode event indicates that the auto work mode feature has changed for a specific device.

The auto-work feature is used to automatically transition an agent state to the WorkingAfterCall state (from the Busy state) after an agent is finished with a call. The feature may also automatically transition the agent state from WorkingAfterCall (to Ready, for example) after a certain amount of time.

Typical examples of when this event may be generated are:

- The auto-work mode feature has been changed on the telephone.
- The computing function, on behalf of a user, has invoked the Set Auto Work Mode service.

### 22.2.8.1 Event Parameters

**Table 22-68 Auto Work Mode—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
invokingDevice	SubjectDeviceID	M	Indicates the device where the auto work mode status has changed.
autoWorkOn	Boolean	M	Indicates the status of the feature. It shall be one of the following: <ul style="list-style-type: none"> <li>• FALSE - Auto-work mode off.</li> <li>• TRUE - Auto-work mode on.</li> </ul>
autoWorkInterval	Value	M	Indicates the number of seconds that the agent state remains in the AfterCallWork state.  The value of zero indicates that the auto work mode feature does not automatically cause the transition of the agent state from WorkingAfterCall (i.e., the transition must be done manually or via the Set Agent State service)
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.2.9 Call Back

The Call Back event indicates that a call back feature has been set or cancelled between two devices.

Typical examples of when this event may be generated are:

- A call back was set or a pending call back was cancelled manually from a phone.
- The computing function, on behalf of a user, set or cancelled a call back.

#### 22.2.9.1 Event Parameters

**Table 22-69 Call Back—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
originatingDevice	SubjectDeviceID	M	Indicates the DeviceID of the originating device when the call back relationship was established.
targetDevice	SubjectDeviceID	M	Indicates the DeviceID of the target device when the call back relationship was established.
callBackSetCancelled	Boolean	M	Indicates whether a call back was set or cancelled. Shall be one of the following: <ul style="list-style-type: none"> <li>• FALSE - Call Back was cancelled.</li> <li>• TRUE - Call Back was set.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.2.10 Call Back Message

The Call Back Message event indicates that a call back message feature has been set or cancelled between two devices.

Typical examples of when this event may be generated are:

- A call back message was set or a pending call back message was cancelled manually from a phone.
- The computing function, on behalf of a user, set or cancelled a call back message.

#### 22.2.10.1 Event Parameters

**Table 22-70 Call Back Message—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
originatingDevice	SubjectDeviceID	M	Indicates the DeviceID of the “return-call-to” device when the call back message relationship was established).
targetDevice	SubjectDeviceID	M	Indicates the DeviceID of the target device at which the call back message was lodged.
callBackMsgSetCancelled	Boolean	M	Indicates whether a call back message was set or cancelled. Shall be one of the following: <ul style="list-style-type: none"> <li>• FALSE - Call Back Message was cancelled.</li> <li>• TRUE - Call Back message was set.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.2.11 Caller ID Status

The CallerID Status event indicates that the caller ID status has been changed for a device.

Typical examples of when this event may be generated are:

- The Caller ID status change has been invoked on the telephone.
- The computing function, on behalf of a user, has invoked the Set Caller ID Status service.

#### 22.2.11.1 Event Parameters

**Table 22-71 Caller ID Status—Event Parameters**

Parameter Name	Type	M/O/C	Description
device	DeviceID	M	Specifies the device on which to set the feature.
callerIDProvided	Boolean	M	Specifies the value of the requested feature. The complete set of possible values is: <ul style="list-style-type: none"><li>• FALSE - Caller ID is not to be provided on calls originating from this device.</li><li>• TRUE - Caller ID is to be provided on calls originating from this device.</li></ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.



## 22.2.12 Do Not Disturb

The Do Not Disturb event indicates that the do not disturb feature has been changed for a device.

Typical examples of when this event may be generated are:

- The do not disturb feature has been changed on the telephone.
- The computing function, on behalf of a user, has invoked the Set Do Not Disturb service.

### 22.2.12.1 Event Parameters

**Table 22-72 Do Not Disturb—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Indicates the device where the do not disturb feature was changed.
doNotDisturbOn	Boolean	M	Indicates the status of the feature. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - Do not disturb feature is not enabled.</li> <li>• TRUE - Do not disturb feature is enabled.</li> </ul>
callOrigination	Bitmap	O	Specifies a bitmap where each bit represents a different type of call origination on which the do not disturb feature is to be honoured. The following is the list of bits (multiple bits may be set): <ul style="list-style-type: none"> <li>• Internal - Calls originating from within the switching sub-domain.</li> <li>• External - Calls origination from outside the switching sub-domain.</li> </ul> <p>If this parameter is not supported, the type of call origination on which do not disturb is honoured is switching function specific.</p>
callingDeviceList	List of DeviceIDs	O	Specifies the calling device(s) from which the do not disturb feature is to be honoured (i.e., calls originating from this device will not be delivered). <p>If this parameter is supported but not provided, then the do not disturb feature is being processed without regard to the calling device.</p>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.2.13 Forwarding

The Forwarding event indicates that the forwarding feature has been changed for a device.

Typical examples of when this event may be generated are:

- The forwarding feature has been changed on the telephone.
- The computing function, on behalf of a user, has invoked the Set Forwarding service.

#### 22.2.13.1 Event Parameters

**Table 22-73 Forwarding—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Indicates the device where the forwarding feature was changed.
forwardingType	Enumerated	O	Indicates the type of forwarding. It shall be provided for user specified settings and it is optional for switching function default settings (see Functional Requirement #3). The “internal” and “external” types refer to the type of call origination (for example an external call) that will be forwarded if it matches a forwarding type (for example forwardImmExt) enabled at the device. The complete set of possible values is: <ul style="list-style-type: none"> <li>• forwardImmediate</li> <li>• forwardBusy</li> <li>• forwardNoAns</li> <li>• forwardDND</li> <li>• forwardBusyInt</li> <li>• forwardBusyExt</li> <li>• forwardNoAnsInt</li> <li>• forwardNoAnsExt</li> <li>• forwardImmInt</li> <li>• forwardImmExt</li> <li>• forwardDNDInt</li> <li>• forwardDNDExt</li> </ul>
forwardStatus	Boolean	M	Indicates the status of the forwarding type. The complete set of possible values is: <ul style="list-style-type: none"> <li>• FALSE - the forwarding type is deactivated</li> <li>• TRUE - the forwarding type is active</li> </ul>
forwardTo	DeviceID	O	Specifies the destination to which calls are forwarded. It shall be provided for user specified settings and it is optional for switching function default settings (see Functional Requirement #3).
forwardDefault	Enumerated	O	Specifies that provided forwardingType and/or the forwardDN is a default setting. If the forwardDefault parameter is supported by the switching function and it is not present, the forwarding information is not a default setting. The complete set of possible values is: <ul style="list-style-type: none"> <li>• defaultForwardingTypeAndForwardDN</li> <li>• defaultForwardingType</li> <li>• defaultForwardDN.</li> </ul> See Functional Requirement #4.

**Table 22-73 Forwarding—Event Parameters (continued)**

Parameter Name	Type	M/O/C	Description
ringCount	Value (1...100)	O	Specifies the number of times a device should ring prior to forwarding no answer. See Functional Requirement #5.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 22.2.13.2 Functional Requirements

1. Only a single forwardingType parameter is provided per Forwarding event. If multiple forwarding types are changed for the same device, the switching function provides multiple Forwarding events.
2. This event is only generated when forwarding status is changed, not when forwarding occurs.
3. There are two possible levels of forwarding settings (see 6.8.1, “Forwarding”, on page 51) that can be supported by a switching function. (refer to the capability exchange services for the levels supported by an implementation):
  - switching function default settings - a single set of forwarding type/forwarding destination combinations that can be activated/deactivated as a set.
  - user specified settings - individual forwarding type/forwarding destination combinations that can be activated/deactivated one at a time.
4. The forwardDefault parameter indicates if either the forwardingType or the forwardDN parameters is default information associated with the device (in the case where the forwarding settings have never been changed, for example) and what forwarding level the information is associated with. The possible values for forwardDefault are:
  - defaultForwardingTypeAndForwardDN - indicates that the information is associated with the switching function default settings.
  - defaultForwardingType - indicates that forwardingType is a default value associated with user specified settings.
  - defaultForwardDN - indicates that forwardDN is a default value associated with user specified settings.
5. RingCount, if supported, is only specified when one of the following forwarding types is provided:
  - forwardNoAns
  - forwardNoAnsInt
  - forwardNoAnsExt

### 22.2.14 Routeing Mode

The Routeing Mode event indicates that the routeing mode has been changed for a device.

Typical examples of when this event may be generated are:

- The computing function, on behalf of a user, has invoked the Set Routeing Mode service.
- The switching function has changed the routeing mode for a device.

#### 22.2.14.1 Event Parameters

**Table 22-74 Routeing Mode—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Indicates the device where the routeing mode was changed.
routeingMode	Boolean	M	Indicates the routeing mode of the device. The complete set of possible values is: <ul style="list-style-type: none"> <li>• TRUE - the device will request routeing instructions (when a call arrives at the device, for example)</li> <li>• FALSE - the device will not request routeing instructions.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 22.2.14.2 Functional Requirements

1. This event is only generated when the routeing mode is changed, not when a call arrives at the device or when the Route Request service is issued.

**23 Device Maintenance Events**  
**23.1 Events**

**Table 23-1 Device Maintenance Events Summary**

<b>Device Maintenance Event</b>	<b>Description</b>	<b>Pg.</b>
23.1.1 Back In Service	Indicates that the device has been returned to service.	482
23.1.2 Device Capabilities Changed	Indicates that the device level information has changed.	483
23.1.3 Out Of Service	Indicates that the device has entered a maintenance state (i.e., has been taken out of service).	484

### 23.1.1 Back In Service

The Back In Service event indicates that the device has been returned to service and is operating normally.

#### 23.1.1.1 Event Parameters

**Table 23-2 Back In Service—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Indicates the device that is back in service.
cause	EventCause	O	Specifies a reason for the event.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 23.1.1.2 Event Causes

**Table 23-3 Back In Service—Event Causes**

Event Cause	Description	Associated Features
Normal	The device is back in service.	Maintenance

#### 23.1.1.3 Functional Requirements

1. If the Device Capabilities Changed Event is supported by the switching function (as indicated by the capability exchange services) then the Back In Service event does not imply that the capabilities of the out-of-service device have changed - only that the device is back in service.

### 23.1.2 Device Capabilities Changed

The Device Capabilities Changed event indicates that device level information that can be obtained with the capability exchange services (e.g. the Get Physical Device Information and/or Get Logical Device Information services) has changed.

The current device level capability information can be obtained by issuing a Get Physical Device Information and/or a Get Logical Device Information service.

#### 23.1.2.1 Event Parameters

**Table 23-4 Device Capabilities Changed—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Indicates the device whose information has changed.
cause	EventCause	O	Specifies a reason for the event.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 23.1.2.2 Event Causes

**Table 23-5 Device Capabilities Changed—Event Causes**

Event Cause	Description	Associated Features
Normal	Device information has changed.	Maintenance, Capabilities Exchange

#### 23.1.2.3 Functional Requirements

1. The Device Capabilities Changed event shall be generated whether or not the device level capability information has been previously obtained via the capability exchange services.

### 23.1.3 Out Of Service

The Out Of Service event indicates that the device has entered a maintenance state (i.e., has been taken out of service) and can no longer accept calls and some categories of CSTA service requests (Call Control services, for example).

#### 23.1.3.1 Event Parameters

**Table 23-6 Out Of Service—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
device	SubjectDeviceID	M	Indicates the device that has been taken out of service.
cause	EventCause	O	Specifies a reason for the event.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 23.1.3.2 Event Causes

**Table 23-7 Out Of Service—Event Causes**

Event Cause	Description	Associated Features
Forced	Another dependent resource has caused this device to go out of service.	Maintenance
Maintenance	The device has been taken out of service for maintenance.	Maintenance
Normal	The device has been taken out of service (a more specific cause is not available).	Maintenance

#### 23.1.3.3 Functional Requirements

1. This event is generated when any logical and physical element associated with a particular device configuration becomes out of service. For devices with both logical and physical elements, separate Out Of Service events may be generated when the logical and physical elements become out of service.
2. When a device becomes out of service, existing monitors are not removed (e.g., existing MonitorCrossRefIDs remain valid). However:
  - It may not be possible (as specified in the capability exchange services) to start a new monitor on an out of service device. If a monitor cannot be started because the a device is out of service, the Monitor Start service will result in a negative acknowledgment (with an error code of Device Out Of Service).
  - Event flows over an existing monitors may be reduced (or even completely stopped except for the Back In Service event).
  - Snapshot services (such as Snapshot Device) may result in a negative acknowledgment (with an error code of Device Out Of Service) if attempted on an out of service device.
3. If the Device Capabilities Changed Event is supported by the switching function (as indicated by the capability exchange services) then the Out Of Service event does not imply that the capabilities of the out of service device have changed - only that the device is out of service.



## 24 I/O Services

This section includes:

- I/O Registration services
- I/O services

### 24.1 Registration Services

**Table 24-1 I/O Registration Services Summary**

<b>I/O Registration Service</b>	<b>Description</b>	<b>Pg.</b>
24.1.1 I/O Register	Registers the computing function as an I/O server for a specified device or for the entire switching function.	486
24.1.2 I/O Register Abort	Specifies that the switching function has terminated an I/O server registration.	488
24.1.3 I/O Register Cancel	Unregisters the computing function as an I/O server.	489

**24.1.1 I/O Register**

C → S

The I/O Register service is used to register the computing function as an I/O server for a specific device or as an I/O server for all devices within the switching sub-domain. The computing function may be required to register for I/O services before it can receive I/O service requests for a device from the switching function. A computing function may register to be the I/O server for more than one I/O device.

Note that I/O registration is not used when the data path session is generated by the computing function.

**24.1.1.1 Service Request**

**Table 24-2 I/O Register—Service Request**

Parameter Name	Type	M/O/C	Description
ioDevice	DeviceID	C	Specifies the device for which the computing function requests to be the I/O server. This parameter is mandatory if the switching function does not support the option of registering for all devices in the switching sub-domain. Otherwise, the parameter is optional and if not present, indicates the registration is to be for all devices in the switching sub-domain.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.1.1.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**24.1.1.2.1 Positive Acknowledgement**

**Table 24-3 I/O Register—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
ioRegisterReqID	IORegisterReqID	M	Specifies the I/O registration request identifier for this registration.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.1.1.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**24.1.1.3 Operational Model**

**24.1.1.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**24.1.1.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.1.1.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.1.1.3.4 Functional Requirements**

1. The ioRegisterReqID parameter returned in the positive acknowledgement is used to identify the registration over which I/O service requests will be sent. The subsequent I/O services that are related to this request contain this parameter. The ioRegisterReqID is also used when cancelling the I/O registration.
2. If the ioDevice parameter on the service request is not provided and this option is supported, then the registration request is for all devices within the switching sub-domain. Some switching function implementations may not support the capability to register for all devices with a single I/O Register request (i.e., with the ioDevice parameter not provided), in which case the switching function will send a negative

acknowledgement to the I/O Register request. The capabilities exchange services can be used by the computing function to determine if registering for all devices within the switching sub-domain is supported.

3. The number of simultaneous registrations allowed for the same device is switching function dependent. When the limit is reached, I/O register requests for the same device will result in negative acknowledgements from the switching function.

**24.1.2 I/O Register Abort**

S → C

This service is used by the switching function to asynchronously cancel an active I/O registration. This service invalidates a current I/O registration.

**24.1.2.1 Service Request**

**Table 24-4 I/O Register Abort—Service Request**

Parameter Name	Type	M/O/C	Description
ioRegisterReqID	IORegisterReqID	M	Specifies the I/O registration request identifier for the I/O registration that was aborted.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.1.2.2 Service Response**

There are no service completion conditions for this service.

**24.1.2.2.1 Positive Acknowledgement**

There is no positive acknowledgement associated with this service.

**24.1.2.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**24.1.2.3 Operational Model**

**24.1.2.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**24.1.2.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.1.2.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.1.2.3.4 Functional Requirements**

1. The switching function may issue this service at any time when it can no longer maintain the I/O registration (e.g. when the associated device goes out of service).

**24.1.3 I/O Register Cancel**

C → S

The I/O Register Cancel service is used to cancel a previous I/O registration. This request terminates the I/O registration and the computing function receives no further I/O services requests for that I/O registration once it receives the positive acknowledgement to the I/O Register Cancel request.

**24.1.3.1 Service Request**

**Table 24-5 I/O Register Cancel—Service Request**

Parameter Name	Type	M/O/C	Description
ioRegisterReqID	IORegisterReqID	M	Specifies the I/O registration to be cancelled.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.1.3.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**24.1.3.2.1 Positive Acknowledgement**

**Table 24-6 I/O Register Cancel—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.1.3.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**24.1.3.3 Operational Model**

**24.1.3.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**24.1.3.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.1.3.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.1.3.3.4 Functional Requirements**

1. The computing function shall continue to process I/O requests from the device until it receives a positive acknowledgement for the I/O Register Cancel service request. The switching function shall not send any further I/O service requests for a registration once it has sent the positive acknowledgement.

## 24.2 I/O Services

**Table 24-7 I/O Services Summary**

<b>I/O Service</b>	<b>Description</b>	<b>Pg.</b>
24.2.1 Data Path Resumed	The Data Path Resumed service provides information that a previously suspended data path has been resumed.	491
24.2.2 Data Path Suspended	The Data Path Suspended service provides information that a data path has been suspended.	492
24.2.3 Fast Data	The Fast Data service starts a data path for only the duration of sending one data message.	493
24.2.4 Resume Data Path	The Resume Data Path requests the switching function to resume a currently suspended data path.	495
24.2.5 Send Broadcast Data	The Send Broadcast Data service writes to all open data paths for a given application association and data path type.	496
24.2.6 Send Data	The Send Data service writes data to a specified data path.	498
24.2.7 Send Multicast Data	The Send Multicast Data service writes to multiple data paths.	500
24.2.8 Start Data Path	The Start Data Path service starts a data path on the specified object.	502
24.2.9 Stop Data Path	The Stop Data Path service terminates an existing data path.	504
24.2.10 Suspend Data Path	The Suspend Data Path suspends a specified data path but does not destroy the data path.	505

**24.2.1 Data Path Resumed**

S → C

The Data Path Resumed service provides information that a previously suspended data path has been resumed.

**24.2.1.1 Service Request**

**Table 24-8 Data Path Resumed—Service Request**

Parameter Name	Type	M/O/C	Description
ioCrossRefID	IOCrossRefID	M	Specifies the cross reference identifier associated with the data path and whether the computing function or switching function started the data path.
ioRegisterReqID	IORegisterReqID	C	Specifies the I/O register request identifier associated with the registration for I/O services.  This parameter is mandatory if the switching function supports I/O registration and the I/O Data Path was requested from the switching function, and shall not be provided otherwise.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.1.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**24.2.1.2.1 Positive Acknowledgement**

**Table 24-9 Data Path Resumed—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.1.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**24.2.1.3 Operational Model**

**24.2.1.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**24.2.1.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.1.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.1.3.4 Functional Requirements**

1. This service allows the switching function to inform the computing function that the switching function has resumed a previously suspended data path.

## 24.2.2 Data Path Suspended

S → C

The Data Path Suspended service provides information that a data path has been suspended.

### 24.2.2.1 Service Request

**Table 24-10 Data Path Suspended—Service Request**

Parameter Name	Type	M/O/C	Description
ioCrossRefID	IOCrossRefID	M	Specifies the cross reference identifier associated with the data path and whether the computing function or switching function started the data path.
ioRegisterReqID	IORegisterReqID	C	Specifies the I/O register request identifier associated with the registration for I/O services.  This parameter is mandatory if the switching function supports I/O registration and the I/O Data Path was requested from the switching function, and shall not be provided otherwise.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 24.2.2.2 Service Response

This service follows the atomic acknowledgement model for this service request.

#### 24.2.2.2.1 Positive Acknowledgement

**Table 24-11 Data Path Suspended—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 24.2.2.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

### 24.2.2.3 Operational Model

#### 24.2.2.3.1 Connection State Transitions

There are no connection state changes due to this service.

#### 24.2.2.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 24.2.2.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 24.2.2.3.4 Functional Requirements

1. This service allows the switching function to inform the computing function that the switching function has suspended a data path. The Resume Data Path service may then be used to resume the flow of data on the data path.



24.2.3 Fast Data

C ↔ S

The Fast Data service transfers data to/from a specified CSTA object. The services results in a data path to be created for only the duration of sending information contained in the Fast Data service request.

24.2.3.1 Service Request

Table 24-12 Fast Data—Service Request

Parameter Name	Type	M/O/C	Description
ioRegisterReqID	IORegisterReqID	C	Specifies the I/O register request identifier associated with the registration for I/O services.  This parameter is mandatory if the switching function supports I/O registration and the I/O Data Path was requested from the switching function, and shall not be provided otherwise.
object	Choice Structure	M	Specifies the object with which a data path should be initiated. This shall be one of the following choices: <ul style="list-style-type: none"> <li>• Device (DeviceID) - specifies the device upon which the data path is to be started.</li> <li>• Call (ConnectionID) - specifies the call (connection) upon which the data path is to be started.</li> </ul>
dataPathType	Enumerated	O	Specifies the data-type of the data path. The complete set of possible values is: <ul style="list-style-type: none"> <li>• text - a digitally encoded text stream</li> <li>• voice - a digitally encoded voice stream</li> </ul>
displayAttributes	Structure	O	Specifies information about the display to be updated. This parameter may only be provided if the ioData is being sent to a display on a device. The list contains the following components: <ul style="list-style-type: none"> <li>• displayID (C) DisplayID - Specifies which display on the physical device needs to be updated. If the device has only one display this component may be omitted, but it may also be filled in (specifying the one and only displayID). If the device has more than one display and the service will be used to update a display, than this component shall be provided.</li> <li>• physicalBaseRowNumber (O) Value - Specifies the row number of the physical base, i.e. the logical row that appears at the first row of the physical display. This parameter may be omitted or may be present when it needs to be changed. The parameter shall be omitted when it is not relevant because the number of physical rows is equal to the number of logical rows.</li> <li>• physicalBaseColumnNumber (O) Value - Specifies the column number of the physical base, i.e. the logical column that appears at the first column of the physical display. This parameter may be omitted or may be present when it needs to be changed. This parameter shall be omitted when it is not relevant because the number of physical columns is equal to the number of logical columns.</li> <li>• offset (O) Value - This component specifies the offset, in number-of-characters (not bytes in the ioData message string), where text is to start on the display. Allowed values are from zero (default) to (MaxNbrOfLogicalColumns * MaxNbrOfLogicalRows - 1). Non-printable characters (e.g. Carriage Return (CR), Line Feed (LF), and Tab) are counted in determining offsets and the message length.</li> </ul>
ioData	Characters (240)	M	Specifies the data to be sent.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.

**Table 24-12 Fast Data—Service Request (continued)**

Parameter Name	Type	M/O/C	Description
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.3.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**24.2.3.2.1 Positive Acknowledgement**

**Table 24-13 Fast Data—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.3.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**24.2.3.3 Operational Model**

**24.2.3.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**24.2.3.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.3.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.3.3.4 Functional Requirements**

1. This service is functionally similar to the sequence of service requests: “Start Data Path, Send Data, Stop Data Path”.
2. To send object-dependent data (e.g. to present information on a device’s display) via the Fast Data service, CSTA applications should know the characteristics of the target object.
3. When the physicalBaseRowNumber and/or the physicalBaseColumnNumber parameters are provided in the service request with values that are different from the current values, the switching function can either accept the service and modify the relative positions of the logical and physical displays (i.e., scrolling) or it can reject the service if it does not support this capability as indicated by the capability exchange services.

**24.2.4 Resume Data Path**

C → S

The Resume Data Path requests the switching function to resume a currently suspended data path.

**24.2.4.1 Service Request**

**Table 24-14 Resume Data Path—Service Request**

Parameter Name	Type	M/O/C	Description
ioCrossRefID	IOCrossRefID	M	Specifies the cross reference identifier associated with the data path and whether the computing function or switching function started the data path.
ioRegisterReqID	IORegisterReqID	C	Specifies the I/O register request identifier associated with the registration for I/O services.  This parameter is mandatory if the switching function supports I/O registration and the I/O Data Path was requested from the switching function, and shall not be provided otherwise.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.4.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**24.2.4.2.1 Positive Acknowledgement**

**Table 24-15 Resume Data Path—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.4.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**24.2.4.3 Operational Model**

**24.2.4.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**24.2.4.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.4.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.4.3.4 Functional Requirements**

1. If the data path is already resumed, this service may or may not be rejected (as indicated by the capability exchange services).
2. Some implementations may send the Data Path Resumed service as the result of this service (as indicated by the capability exchange services).

24.2.5 Send Broadcast Data

C → S

The Send Broadcast Data service writes to all open data paths for a given application association and data path type.

24.2.5.1 Service Request

Table 24-16 Send Broadcast data—Service Request

Parameter Name	Type	M/O/C	Description
ioData	Characters (240)	M	Specifies the data to be sent.
dataPathType	Enumerated	O	Specifies the data-type of the data path. The complete set of possible values is: <ul style="list-style-type: none"> <li>text - a digitally encoded text stream</li> <li>voice - a digitally encoded voice stream</li> </ul>
displayAttributes	List of Values	O	Specifies information about the display to be updated. This parameter may only be provided if the ioData is being sent to displays on devices. The list contains the following components: <ul style="list-style-type: none"> <li>physicalBaseRowNumber (O) Value - Specifies the row number of the physical base, i.e. the logical row that appears at the first row of the physical display. This parameter may be omitted or may be present when it needs to be changed. The parameter shall be omitted when it is not relevant because the number of physical rows is equal to the number of logical rows.</li> <li>physicalBaseColumnNumber (O) Value - Specifies the column number of the physical base, i.e. the logical column that appears at the first column of the physical display. This parameter may be omitted or may be present when it needs to be changed. This parameter shall be omitted when it is not relevant because the number of physical columns is equal to the number of logical columns.</li> <li>offset (O) - This component specifies the offset, in number-of-characters (not bytes in the ioData message string), where text is to start on the display. Allowed values are from zero (default) to (MaxNbrOfLogicalColumns * MaxNbrOfLogicalRows - 1). Non-printable characters (e.g. Carriage Return (CR), Line Feed (LF), and Tab) are counted in determining offsets and the message length.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

24.2.5.2 Service Response

This service follows the atomic acknowledgement model for this service request.

24.2.5.2.1 Positive Acknowledgement

Table 24-17 Send Broadcast Data—Positive Acknowledgement

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

24.2.5.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

### **24.2.5.3 Operational Model**

#### **24.2.5.3.1 Connection State Transitions**

There are no connection state changes due to this service.

#### **24.2.5.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

#### **24.2.5.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

#### **24.2.5.3.4 Functional Requirements**

1. This service transfers data from the computing function to all CSTA objects for which an appropriate data path exists.
2. The response to this service request only indicates that the service request was received correctly, that none of the enumerated error conditions has been encountered, and that processing of the data is proceeding on the assumption that the data is otherwise correct.
3. To send object-dependent data (e.g. to present information on a device's display) via the Send Broadcast Data service, the switching function should know the characteristics of the target object. This service may be used, for example, to send information to all video displays and audio channels.
4. When the `physicalBaseRowNumber` and/or the `physicalBaseColumnNumber` parameters are provided in the service request with values that are different from the current values, the switching function can either accept the service and modify the relative positions of the logical and physical displays (i.e., scrolling) or it can reject the service if it does not support this capability as indicated by the capability exchange services.

24.2.6 Send Data

The Send Data service sends data to a specified data path.

This is a bi-directional service.

24.2.6.1 Service Request

Table 24-18 Send Data—Service Request

Parameter Name	Type	M/O/C	Description
ioCrossRefID	IOCrossRefID	M	Specifies the cross reference identifier associated with the data path and whether the computing function or switching function started the data path.
ioRegisterReqID	IORegisterReqID	C	Specifies the I/O register request identifier associated with the registration for I/O services.  This parameter is mandatory if the switching function supports I/O registration and the I/O Data Path was requested from the switching function, and shall not be provided otherwise.
displayAttributes	List of Values	O	Specifies information about the display to be updated. This parameter may only be provided if the ioData is being sent to a display on a device. The list contains the following components: <ul style="list-style-type: none"> <li>• physicalBaseRowNumber (O) Value - Specifies the row number of the physical base, i.e. the logical row that appears at the first row of the physical display. This parameter may be omitted or may be present when it needs to be changed. The parameter shall be omitted when it is not relevant because the number of physical rows is equal to the number of logical rows.</li> <li>• physicalBaseColumnNumber (O) Value - Specifies the column number of the physical base, i.e. the logical column that appears at the first column of the physical display. This parameter may be omitted or may be present when it needs to be changed. This parameter shall be omitted when it is not relevant because the number of physical columns is equal to the number of logical columns.</li> <li>• offset (O) - This parameter specifies the offset, in number-of-characters (not bytes in the ioData message string), where text is to start on the display. Allowed values are from zero (default) to (MaxNbrOfLogicalColumns * MaxNbrOfLogicalRows - 1). Non-printable characters (e.g. Carriage Return (CR), Line Feed (LF), and Tab) are counted in determining offsets and the message length.</li> </ul>
ioData	Characters (240)	M	Specifies the data to be sent.  When writing to a display on a device, this specifies the data to place on the display as a string of characters consisting of the text on each row of the display (including spaces) concatenated together. If a null string is sent, the display will be cleared.

**Table 24-18 Send Data—Service Request (continued)**

Parameter Name	Type	M/O/C	Description
ioCause	EventCause	O	Specifies the reason why data is being sent. The complete set of possible values is: <ul style="list-style-type: none"> <li>terminationCharacterReceived - the specified termination character was received.</li> <li>characterCountReached - the specified number of characters was reached.</li> <li>timeout - a timeout occurred.</li> <li>switchingFunctionTerminated - the switching function terminated collection before other termination conditions were encountered.</li> </ul> Note that even though ioCause parameter is used in a service, the EventCause parameter type is used to represent the reason why the data is being sent.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.6.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**24.2.6.2.1 Positive Acknowledgement**

**Table 24-19 Send Data—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.6.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**24.2.6.3 Operational Model**

**24.2.6.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**24.2.6.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.6.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.6.3.4 Functional Requirements**

1. The response to this service request only indicates that the request was received correctly, that none of the enumerated error conditions have been encountered, and that processing of the data is proceeding on the assumption that the data is otherwise correct.
2. To send object-dependent data (e.g. to present information on a device’s display) via the Send Data service, the computing function should know the characteristics of the target object. This service may, for example, be used to send information to a display or an audio channel on a device.
3. When the physicalBaseRowNumber and/or the physicalBaseColumnNumber parameters are provided in the service request with values that are different from the current values, the switching function can either accept the service and modify the relative positions of the logical and physical displays (i.e., scrolling) or it can reject the service if it does not support this capability as indicated by the capability exchange services.

## 24.2.7 Send Multicast Data

C → S

The Send Multicast Data service writes to multiple data paths specified in the service request.

### 24.2.7.1 Service Request

**Table 24-20 Send Multicast Data—Service Request**

Parameter Name	Type	M/O/C	Description
ioCrossRefIDList	List of IOCrossRefID	M	Specifies the list of I/O Cross Reference Identifiers that should receive the data.
ioData	Characters (240)	O	Specifies the data to be sent.
displayAttributes	List of Values	O	Specifies information about the display to be updated. This parameter may only be provided if the ioData is being sent displays on devices. The list contains the following components: <ul style="list-style-type: none"> <li>physicalBaseRowNumber (O) Value - Specifies the row number of the physical base, i.e. the logical row that appears at the first row of the physical display. This parameter may be omitted or may be present when it needs to be changed. The parameter shall be omitted when it is not relevant because the number of physical rows is equal to the number of logical rows.</li> <li>physicalBaseColumnNumber (O) Value - Specifies the column number of the physical base, i.e. the logical column that appears at the first column of the physical display. This parameter may be omitted or may be present when it needs to be changed. This parameter shall be omitted when it is not relevant because the number of physical columns is equal to the number of logical columns.</li> <li>offset (O) - This component specifies the offset, in number-of-characters (not bytes in the ioData message string), where text is to start on the display. Allowed values are from zero (default) to (MaxNbrOfLogicalColumns * MaxNbrOfLogicalRows - 1). Non-printable characters (e.g. Carriage Return (CR), Line Feed (LF), and Tab) are counted in determining offsets and the message length.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 24.2.7.2 Service Response

This service follows the atomic acknowledgement model for this service request.

#### 24.2.7.2.1 Positive Acknowledgement

**Table 24-21 Send Multicast Data—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 24.2.7.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

### 24.2.7.3 Operational Model

#### 24.2.7.3.1 Connection State Transitions

There are no connection state changes due to this service.



**24.2.7.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.7.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.7.3.4 Functional Requirements**

1. This service sends data from the computing function to one or more CSTA objects.
2. The response to this service request only indicates that the request was received correctly, that none of the enumerated error conditions has been encountered, and that processing of the data is proceeding on the assumption that the data is otherwise correct.
3. To send object-dependent data (e.g. to present information on a device's display) via the Send Multicast Data Service, the computing function should know the characteristics of the target objects. This service may be used, for example, to send information to multiple displays and audio channels.
4. When the `physicalBaseRowNumber` and/or the `physicalBaseColumnNumber` parameters are provided in the service request with values that are different from the current values, the switching function can either accept the service and modify the relative positions of the logical and physical displays (i.e., scrolling) or it can reject the service if it does not support this capability as indicated by the capability exchange services.

**24.2.8 Start Data Path**

C ↔ S

The Start Data Path service starts a data path on the specified object.

This is a bi-directional service.

**24.2.8.1 Service Request**

**Table 24-22 Start Data Path—Service Request**

Parameter Name	Type	M/O/C	Description
ioRegisterReqID	IORegisterReqID	C	Specifies the I/O register request identifier associated with the registration for I/O services.  This parameter is mandatory if the switching function supports I/O registration and the I/O Data Path was requested from the switching function, and shall not be provided otherwise.
object	Choice Structure	M	Specifies the object to which a data path should be initiated. The complete set of possible objects is: <ul style="list-style-type: none"> <li>• Device (DeviceID) - specifies the device upon which the data path is to be started.</li> <li>• Call (ConnectionID) - specifies the call (connection) upon which the data path is to be started.</li> </ul>
dataPathDirection	Enumerated	O	Specifies the direction of the data path. The complete set of possible values is: <ul style="list-style-type: none"> <li>• from the computing function to the identified object</li> <li>• from the identified object to the computing function</li> <li>• bi-directional between the computing function and the identified object.</li> </ul>
dataPathType	Enumerated	O	Specifies the data-type of the data path. The complete set of possible values is: <ul style="list-style-type: none"> <li>• text - a digitally encoded text stream</li> <li>• voice - a digitally encoded voice stream</li> </ul>
displayID	DisplayID	C	Specifies which display on the physical device needs to be updated. If the device has only one display this parameter may be omitted, but it may also be filled in (specifying the one and only displayID). If the device has more than one display and the data path will be used to update a display, than this parameter shall be provided.
numberOfCharsToCollect	Value	O	Specifies the number of characters to collect before sending collected characters on the data path.
terminationCharacter	Character(1)	O	Specifies an ASCII (IA5) character that, if received, causes the switching function to send collected characters on the data path.
timeout	Value	O	Specifies a duration in seconds such that characters will be sent on the data path.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.8.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**24.2.8.2.1 Positive Acknowledgement**

**Table 24-23 Start Data Path—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
ioCrossRefID	IOCrossRefID	M	Specifies the cross reference identifier associated with the data path that has been created.
numberOfCharsToCollect	Value	O	Specifies the number of characters to collect before sending collected characters on the data path.
terminationCharacter	Character(1)	O	Specifies an ASCII (IA5) character that, if received, causes the switching function to send collected characters on the data path.
timeout	Value	O	Specifies a duration in seconds such that characters will be sent on the data path.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.8.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**24.2.8.3 Operational Model**

**24.2.8.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**24.2.8.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.8.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.8.3.4 Functional Requirements**

1. Starting a device’s data path means that the computing function has requested control of the device either on its own initiative or at the request of a device user. When a computing function that has a data path association with a device starts a data path, data may be collected by the switching function prior to informing the computing function of an invocation request. Whether or not this “automatic starting” of a data path occurs is implementation specific.
2. If a termination condition, as specified by the terminationCharacter parameter, is encountered, then data is returned to the requesting client and data collection continues until the termination condition is encountered again or until the data path is explicitly stopped.

**24.2.9 Stop Data Path**

S ↔ C

The Stop Data Path service terminates an existing data path.

This is a bi-directional service.

**24.2.9.1 Service Request**

**Table 24-24 Stop Data Path—Service Request**

Parameter Name	Type	M/O/C	Description
ioCrossRefID	IOCrossRefID	M	Specifies the cross reference identifier associated with the data path to be terminated.
ioRegisterReqID	IORegisterReqID	C	Specifies the I/O register request identifier associated with the registration for I/O services.  This parameter is mandatory if the switching function supports I/O registration and the I/O Data Path was requested from the switching function, and shall not be provided otherwise.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.9.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**24.2.9.2.1 Positive Acknowledgement**

**Table 24-25 Stop Data Path—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**24.2.9.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**24.2.9.3 Operational Model**

**24.2.9.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**24.2.9.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.9.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**24.2.9.3.4 Functional Requirements**

1. It is not necessary for a suspended data path to be resumed for this service to be carried out.

### 24.2.10 Suspend Data Path

The Suspend Data Path suspends a specified data path but does not destroy the data path.

This is a bi-directional service.

#### 24.2.10.1 Service Request

**Table 24-26 Suspend Data Path—Service Request**

Parameter Name	Type	M/O/C	Description
ioCrossRefID	IOCrossRefID	M	Specifies the cross reference identifier associated with the data path to be suspended.
ioRegisterReqID	IORegisterReqID	C	Specifies the I/O register request identifier associated with the registration for I/O services.  This parameter is mandatory if the switching function supports I/O registration and the I/O Data Path was requested from the switching function, and shall not be provided otherwise.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 24.2.10.2 Service Response

This service follows the atomic acknowledgement model for this service request.

##### 24.2.10.2.1 Positive Acknowledgement

**Table 24-27 Suspend Data Path—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 24.2.10.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

#### 24.2.10.3 Operational Model

##### 24.2.10.3.1 Connection State Transitions

There are no connection state changes due to this service.

##### 24.2.10.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

##### 24.2.10.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

##### 24.2.10.3.4 Functional Requirements

1. The sender informs its peer that the data path should be suspended, but not destroyed. The Resume Data Path service may then be used to resume the flow of data on the data path.
2. This service allows the consumer of the data path to start and stop the flow of data. It is expected that no flow control of the data that has been suspended will occur. That is, if a data path is suspended the consumer is not provided with the data between the time the data path was suspended and the time it was resumed.

## 25 Data Collection Services

This clause includes the data collection services.

### 25.1 Services

**Table 25-1 Data Collection Services Summary**

<b>Data Collection Service</b>	<b>Description</b>	<b>Pg.</b>
25.1.1 Data Collected	The Data Collected service provides information (e.g., telephony tones, DTMF digits) that was received over a connection as part of the data collection.	507
25.1.2 Data Collection Resumed	The Data Collection Resumed service provides information that a previously suspended data collection has been resumed.	510
25.1.3 Data Collection Suspended	The Data Collection Suspended service provides information that a data collection has been suspended.	511
25.1.4 Resume Data Collection	The Resume Data Collection service requests the switching function to resume a currently suspended data collection.	512
25.1.5 Start Data Collection	The Start Data Collection service starts data collection on a connection.	513
25.1.6 Stop Data Collection	The Stop Data Collection service terminates an existing data collection.	515
25.1.7 Suspend Data Collection	The Suspend Data Collection service suspends a specified data collection but does not destroy the data collection.	516

**25.1.1 Data Collected**

S → C

The Data Collected service sends data that was received over a connection to the computing function.

**25.1.1.1 Service Request**

**Table 25-2 Data Collected—Service Request**

Parameter Name	Type	M/O/C	Description
dcollCrossRefID	DcollCrossRefID	M	Specifies the cross reference identifier associated with the data collection.
digitsData	Structure	C	<p>Specifies the collected DTMF/rotary pulse digit information. This parameter shall be provided if the dcollType specified in the Start Data Collection service is digits, otherwise it shall not be provided. This parameter consists of the following components:</p> <ul style="list-style-type: none"> <li>• digitsDetected (M) Characters(64) - Specifies the ASCII (IA5) sequence of DTMF/rotary pulse digits detected.</li> <li>• digitsDuration (O) List of Values - Specifies the list of corresponding digit durations. If this component is provided, a digit duration shall be provided for each detected digit. This component may only be provided for DTMF digits.</li> <li>• digitsPauseDuration (O) List of Values - Specifies the list of corresponding pauses between the last digit and this one. If this component is provided, a pause duration shall be provided for each detected digit</li> </ul>

**Table 25-2 Data Collected—Service Request (continued)**

Parameter Name	Type	M/ O/C	Description
telTonesData	Structure	C	<p>Specifies the collected telephony tones information. This parameter shall be provided if the dcollType specified in the Start Data Collection service is telephony tones, otherwise it shall not be provided. This parameter consists of the following component:</p> <ul style="list-style-type: none"> <li>• toneDetected (M) Enumerated - Specifies the telephony tone detected. The complete set of possible values is: <ul style="list-style-type: none"> <li>• beep</li> <li>• billing</li> <li>• busy</li> <li>• carrier</li> <li>• confirmation</li> <li>• dial</li> <li>• faxCNG</li> <li>• hold</li> <li>• howler</li> <li>• intrusion</li> <li>• modemCNG</li> <li>• park</li> <li>• record warning (indicates call may be being recorded)</li> <li>• reorder</li> <li>• ringback</li> <li>• silence</li> <li>• SIT VC</li> <li>• SIT IC</li> <li>• SIT RO</li> <li>• SIT NC</li> <li>• other</li> </ul> </li> <li>• toneFrequency (O) Value - Specifies the switching function determined frequency, in Hz., of the detected tone. This component shall not be provided if the toneDetected is anything other than “other”.</li> <li>• toneDuration (O) Value - Specifies the duration, in milliseconds, of the detected tone. This component shall not be provided if the toneDetected is anything other than “other”.</li> <li>• tonePauseDuration (O) Value - Specifies the duration, in milliseconds, of the pause between the last tone and this one. This component shall not be provided if the toneDetected is anything other than “other”.</li> </ul>
connectionInfo	ConnectionInformation	O	<p>Specifies the connection information associated with the connection. If this parameter is not present, then the connection information is switching function specific.</p>



**Table 25-2 Data Collected—Service Request (continued)**

Parameter Name	Type	M/O/C	Description
dcollCause	Enumerated	O	Specifies the reason why data is being sent. The complete set of possible values is: <ul style="list-style-type: none"> <li>flushCharReceived - the specified flush character was received (for digits collection only)</li> <li>charCountReached - the specified number of characters was reached (for digits collection only)</li> <li>timeout - a timeout occurred.</li> <li>sfTerminated - the switching function terminated collection before other termination conditions were encountered.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.1.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**25.1.1.2.1 Positive Acknowledgement**

**Table 25-3 Data Collected—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.1.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**25.1.1.3 Operational Model**

**25.1.1.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**25.1.1.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.1.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.1.3.4 Functional Requirements**

None.

**25.1.2 Data Collection Resumed**

S → C

The Data Collection Resumed service provides information that a previously suspended data collection has been resumed.

**25.1.2.1 Service Request**

**Table 25-4 Data Collection Resumed—Service Request**

Parameter Name	Type	M/O/C	Description
dcollCrossRefID	DcollCrossRefID	M	Specifies the cross reference identifier associated with the data collection.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.2.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**25.1.2.2.1 Positive Acknowledgement**

**Table 25-5 Data Collection Resumed—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.2.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**25.1.2.3 Operational Model**

**25.1.2.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**25.1.2.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.2.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.2.3.4 Functional Requirements**

1. This services allows the switching function to inform the computing function that the switching function has resumed a previously suspended data collection.

**25.1.3 Data Collection Suspended**

S → C

The Data Collection Suspended service provides information that a data collection has been suspended.

**25.1.3.1 Service Request**

**Table 25-6 Data Collection Suspended—Service Request**

Parameter Name	Type	M/O/C	Description
dcollCrossRefID	DcollCrossRefID	M	Specifies the cross reference identifier associated with the data collection.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.3.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**25.1.3.2.1 Positive Acknowledgement**

**Table 25-7 Data Collection Suspended—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.3.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**25.1.3.3 Operational Model**

**25.1.3.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**25.1.3.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.3.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.3.3.4 Functional Requirements**

1. This services allows the switching function to inform the computing function that the switching function has suspended a data collection. The Resume Data Collection service may then be used to resume the flow of data on the data collection.

**25.1.4 Resume Data Collection**

C → S

The Resume Data Collection requests the switching function to resume a currently suspended data collection.

**25.1.4.1 Service Request**

**Table 25-8 Resume Data Collection —Service Request**

Parameter Name	Type	M/O/C	Description
dcollCrossRefID	DcollCrossRefID	M	Specifies the cross reference identifier associated with the data collection.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.4.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**25.1.4.2.1 Positive Acknowledgement**

**Table 25-9 Resume Data Collection —Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.4.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**25.1.4.3 Operational Model**

**25.1.4.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**25.1.4.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.4.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.4.3.4 Functional Requirements**

1. This service resumes a suspended data collection. If the data collection is not suspended, this service shall be rejected.

### 25.1.5 Start Data Collection

C → S

The Start Data Collection service is used to collect information such as DTMF/rotary pulse digits and telephony tones from a connection at a specified device.

Data Collection may be started on either an existing connection or on the first connection that appears at a device after the service request has been acknowledged.

Data Collection continues until the Stop Data Collection service is used to terminate the collection or until the connection over which data is being collected is cleared. This connection is either an existing connection or the first connection that appears at a device after the service request has been acknowledged.

The service request specifies criteria that specify when the collection of DTMF/rotary pulse digits is reported via the Data Collected service.

#### 25.1.5.1 Service Request

**Table 25-10 Start Data Collection —Service Request**

Parameter Name	Type	M/O/C	Description
object	Choice Structure	M	Specifies the object to which a data collection should be initiated. This shall be one of the following choices: <ul style="list-style-type: none"> <li>device (DeviceID) - specifies the device upon which the data collection is to be started. Data collection occurs on the next connection at this device and is stopped when this connection is cleared. If there are one or more calls at this device and this choice is selected, then this service request shall be rejected.</li> <li>call (ConnectionID) - specifies a specific call (connection) upon which the data collection is to be started.</li> </ul>
dataCollType	Enumerated	O	Specifies the data-type of the data collection. The complete set of possible values is: <ul style="list-style-type: none"> <li>digits - DTMF/rotary pulse digits</li> <li>telephonyTones - telephony tones</li> </ul>
digitsReportingCriteria	Structure	O	Specifies the criteria associated with the reporting of the DTMF/rotary pulse digits. This value may be provided only when the dataCollType value is Digits. This parameter consists of the following components: <ul style="list-style-type: none"> <li>numChars (C) Value - specifies the number of characters to collect before sending the Data Collected service with the collected digit characters.</li> <li>flushChar (C) Character(1) - specifies an ASCII (IA5) character that, if detected, causes any previously unreported digit characters (including this character) to be sent in the Data Collected service.</li> <li>timeout (C) Value - specifies a duration, in milliseconds, when any previously unreported digit characters are sent in the Data Collected service.</li> </ul> <p>If this parameter is provided, at least one component must be provided.</p>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 25.1.5.2 Service Response

This service follows the atomic acknowledgement model for this service request.

**25.1.5.2.1 Positive Acknowledgement**

**Table 25-11 Start Data Collection —Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
dcolCrossRefID	DcolCrossRefID	M	Specifies the cross reference identifier associated with the data collection that has been created.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.5.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**25.1.5.3 Operational Model**

**25.1.5.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**25.1.5.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.5.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.5.3.4 Functional Requirements**

1. The Start Data Collection service collects information (e.g., DTMF digits, telephony tones) that is received over a connection at a device (i.e. information that has been sent over a connection from another device in the call).
2. The Data Collected service is used to report the collected information. When DTMF/rotary pulse digits are being collected, it is sent when one of the reporting criteria, as specified in the digitsReportingCriteria parameter, is satisfied. When telephony tones are being collected, the Data Collected service is sent after a single telephony tone is collected.
3. The purpose of the Start Data Collection service is to detect digits and tones *sent to* the specified device. However, it cannot be presumed that the source of the digits and tones can be determined by the collection device in every situation (e.g., analog lines).
4. If the digitsReportingCriteria is not provided, the number of digits (for digits collection) that need to be detected before the Data Collected service is generated is switching function specific.
5. For telephonyTones collection, the detected tone is reported via the Data Collected service as soon as the switching function has recognized the tone.
6. If the switching function receives a subsequent request for this service with the object parameter specified as call (connection), and data collection has already started due to a previous Start Data Collection service, the switching function shall respond with a negative acknowledgement specifying an error code of “Feature Already Set”.

**25.1.6 Stop Data Collection**

S ↔ C

The Stop Data Collection service terminates an existing data collection.

**25.1.6.1 Service Request**

**Table 25-12 Stop Data Collection —Service Request**

Parameter Name	Type	M/O/C	Description
dcollCrossRefID	DcollCrossRefID	M	Specifies the cross reference identifier associated with the data collection to be terminated.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.6.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**25.1.6.2.1 Positive Acknowledgement**

**Table 25-13 Stop Data Collection —Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.6.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**25.1.6.3 Operational Model**

**25.1.6.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**25.1.6.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.6.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.6.3.4 Functional Requirements**

1. It is not necessary for a suspended data collection to be resumed for the data collection to be stopped.

**25.1.7 Suspend Data Collection**

S ↔ C

The Suspend Data Collection suspends a specified data collection but does not destroy the data collection.

**25.1.7.1 Service Request**

**Table 25-14 Suspend Data Collection —Service Request**

Parameter Name	Type	M/O/C	Description
dcollCrossRefID	DcollCrossRefID	M	Specifies the cross reference identifier associated with the data collection to be suspended.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.7.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**25.1.7.2.1 Positive Acknowledgement**

**Table 25-15 Suspend Data Collection —Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**25.1.7.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**25.1.7.3 Operational Model**

**25.1.7.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**25.1.7.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.7.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**25.1.7.3.4 Functional Requirements**

1. The sender informs its peer that the data collection should be suspended, but not destroyed. The Resume Data Collection service may then be used to resume the flow of data on the data collection.
2. This service allows the consumer of the data collection to start and stop the flow of data. It is expected that no flow control of the data that has been suspended will occur. That is, if a data collection is suspended the consumer is not provided with the data between the time the data collection was suspended and the time it was resumed.



## 26 Voice Unit Services & Events

This clause specifies Voice Unit services and events.

### 26.1 Services

**Table 26-1 Voice Unit Services Summary**

<b>Voice Service</b>	<b>Description</b>	<b>Pg.</b>
26.1.1 Concatenate Message	The Concatenate Message service combines multiple messages, in the sequence provided, into a single resulting message.	518
26.1.2 Delete Message	The Delete Message service deletes a specified voice message.	519
26.1.3 Play Message	The Play Message service plays a voice message on a particular Connection.	520
26.1.4 Query Voice Attribute	The Query Voice Attribute obtains the current value of a specified voice attribute for a specified message.	522
26.1.5 Record Message	The Record Message service starts recording a voice message from a specified connection.	524
26.1.6 Reposition	The Reposition service moves the current position pointer forward or backward a specified number of milliseconds in a message.	526
26.1.7 Resume	The Resume service restarts the playing or recording of a previously suspended message at its current position.	528
26.1.8 Review	The Review service plays a portion of a voice message during a recording session.	529
26.1.9 Set Voice Attribute	The Set Voice Attribute service sets a voice attribute for a specified connection and message.	531
26.1.10 Stop	The Stop service stops playing or recording of a message and resets the position pointer to the beginning of the message.	533
26.1.11 Suspend	The Suspend service temporarily stops the playing or recording of the current message and leaves the position pointer at its current location.	534
26.1.12 Synthesize Message	The Synthesize Message service constructs a voice message from a text message.	536

### 26.1.1 Concatenate Message

C → S

The Concatenate Message service combines multiple messages (original messages), in the sequence provided, into a single resulting message. The concatenated message consists of copies of the original messages. The concatenated message has a single set of attributes (e.g., coder, message ID). The original messages are neither deleted nor otherwise changed.

This Service provides a unique Message Identifier for the resulting (concatenated) message that shall remain valid until the resulting message is deleted.

#### 26.1.1.1 Service Request

**Table 26-2 Concatenate Message—Service Request**

Parameter Name	Type	M/O/C	Description
messagesToConcatenate	List of MessageID	M	Specifies the list of MessageIDs of the messages to be concatenated. The list shall contain at least two MessageIDs.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 26.1.1.2 Service Response

This service follows the atomic acknowledgement model for this service request.

##### 26.1.1.2.1 Positive Acknowledgement

**Table 26-3 Concatenate Message—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
concatenatedMessage	MessageID	M	Specifies the resulting Message Identifier.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 26.1.1.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

#### 26.1.1.3 Operational Model

Refer to Figure 6-19, “Voice Unit Operational Model,” on page 39 for the operational model.

##### 26.1.1.3.1 Connection State Transitions

There are no connection state changes due to this service.

##### 26.1.1.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

##### 26.1.1.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

##### 26.1.1.3.4 Functional Requirements

1. The original messages are preserved by this function.
2. The Message Identifier of the resulting message returned by this service is valid until the resulting message is deleted.
3. If the Voice Unit is unable to concatenate the messages (e.g., because it is not possible to convert all of the original messages to a common encoding), the request shall be rejected.
4. The order of the original messages is preserved in the resulting concatenated message.

**26.1.2 Delete Message**

C → S

The Delete Message service deletes a specified message.

**26.1.2.1 Service Request**

**Table 26-4 Delete Message—Service Request**

Parameter Name	Type	M/O/C	Description
messageToBeDeleted	MessageID	M	Specifies the message to be deleted.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.2.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.2.2.1 Positive Acknowledgement**

**Table 26-5 Delete Message—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.2.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**26.1.2.3 Operational Model**

**26.1.2.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**26.1.2.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.2.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.2.3.4 Functional Requirements**

None.

**26.1.3 Play Message**

C → S

The Play Message service plays a voice message on a particular connection.

The service may also specify termination conditions, which if encountered, causes message playback to stop.

**26.1.3.1 Service Request**

**Table 26-6 Play Message—Service Request**

Parameter Name	Type	M/O/C	Description
messageToBePlayed	MessageID	M	Specifies the message to be played.
overConnection	ConnectionID	M	Specifies the connection on which the message is to be played.
duration	Value	O	Specifies the length of time to play the message (in milliseconds).
termination	Bitmap	O	Specifies the list of conditions that cause the playback to terminate. This may include one or more of the following actions: <ul style="list-style-type: none"> <li>• duration exceeded (this value can only be provided if the duration parameter is provided)</li> <li>• DTMF digit (external to the message being played) detected</li> <li>• end of message detected</li> <li>• speech (external to the message being played) detected</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.3.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.3.2.1 Positive Acknowledgement**

**Table 26-7 Play Message—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.3.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**26.1.3.3 Operational Model**

Refer to Figure 6-19, “Voice Unit Operational Model,” on page 39 for the operational model.

**26.1.3.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**26.1.3.3.2 Device-Type Monitoring Event Sequences**

**Table 26-8 Play Message—Device-Type Monitoring Event Sequences**

Monitored Device	Connection	Event	Event Cause
D1	D1C1 (overConnection)	Play	Normal

### 26.1.3.3.3 Call-Type Monitoring Event Sequences

**Table 26-9 Play Message—Call-Type Monitoring Event Sequences**

Monitored Call	Connection	Event	Event Cause
C1	D1C1 (overConnection)	Play	Normal

### 26.1.3.3.4 Functional Requirements

1. The Play Message service plays a designated message until the reception of a valid Stop service request or a Suspend service request or until the end of the message or other specified termination condition is detected.
2. If the duration parameter is set to zero, then the message will go immediately to the Suspend Play State.
3. This service may provide media conversion (as indicated by the capability exchange services).
4. It is implementation dependent if only one message can be played on a connection at one time. When multiple messages are played at one time, the audio shall be mixed.
5. If a message on a given connection is suspended, the Play service (for the same message) shall be rejected.

**26.1.4 Query Voice Attribute**

C → S

The Query Voice Attribute service obtains the current value of a specified voice attribute for a specified message.

**26.1.4.1 Service Request**

**Table 26-10 Query Voice Attribute—Service Request**

Parameter Name	Type	M/O/C	Description
messageToQuery	MessageID	M	Specifies the message whose attribute is to be queried.
attributeToQuery	Enumerated	M	Specifies the attribute to be queried. The complete set of possible values is: <ul style="list-style-type: none"> <li>• encoding algorithm - requests the encoding algorithm used for the specified message</li> <li>• sampling rate - requests the sampling rate used for the specified message</li> <li>• duration - requests the duration (in milliseconds) of the specified message</li> <li>• file name - requests the (implementation-specific) name of the specified message</li> <li>• current position* - requests the value of the position pointer (in milliseconds after the beginning of the message)</li> <li>• current speed* - requests the current playing speed of the specified message</li> <li>• current volume* - requests the current playing volume of the specified message</li> <li>• current level* - requests the current recording level of the specified message</li> <li>• current state* - requests the current state of the specified message.</li> </ul> * indicates that this attribute can only be requested if the connection parameter is provided
connection	ConnectionID	O	Specifies the connection of the message whose attribute is being queried.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.4.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.4.2.1 Positive Acknowledgement**

**Table 26-11 Query Voice Attribute—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
attribute	Choice Structure	M	<p>Specifies the value of the specified attribute. May be one of the following (choice depends upon the attribute specified in the service request):</p> <ul style="list-style-type: none"> <li>• encodingAlgorithm (Enumerated) - encoding algorithm used for the specified message. The complete set of possible values is: <ul style="list-style-type: none"> <li>• ADPCM6K</li> <li>• ADPCM8K</li> <li>• muLawPCM6k</li> <li>• aLawPCM6K</li> </ul> </li> <li>• samplingRate (Value) used for the specified message</li> <li>• duration (Value) in milliseconds of the specified message</li> <li>• filename (Characters) implementation specific name of the specified message</li> <li>• currentPosition (Value) in the message (milliseconds from the beginning of the message)</li> <li>• currentSpeed (Value) of the message (represents the percentage of normal speed, with 100% being normal speed and the slowest reportable speed being 1%)</li> <li>• currentVolAbs (Value 0..100) - absolute play volume of the message (100 indicating maximum volume and 0 indicating silence)</li> <li>• currentGain (Value 0..100) gain at which the message was recorded (100 indicating maximum level and 0 indicating minimum level)</li> <li>• current state (Enumerated) - a Voice Unit state. The complete set of possible states is (see Figure 6-19, “Voice Unit Operational Model,” on page 39 for a description of the states): <ul style="list-style-type: none"> <li>• stop</li> <li>• play</li> <li>• record</li> <li>• suspend play</li> <li>• suspend record</li> <li>• review</li> </ul> </li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.4.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**26.1.4.3 Operational Model**

**26.1.4.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**26.1.4.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.4.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.5 Record Message**

C → S

The Record Message service starts recording a new message from a specified connection.

This service provides a message identifier for the resulting message.

**26.1.5.1 Service Request**

**Table 26-12 Record Message—Service Request**

Parameter Name	Type	M/O/C	Description
callToBeRecorded	ConnectionID	M	Specifies the connection from which the message is to recorded.
samplingRate	Value	O	Specifies the sampling rate to be used for recording
encodingAlgorithm	Enumerated	O	Specifies the encoding algorithm to be used for recording. The complete set of possible values is: <ul style="list-style-type: none"> <li>• ADPCM6K</li> <li>• ADPCM8K</li> <li>• muLawPCM6k</li> <li>• aLawPCM6K</li> </ul>
maxDuration	Value	O	Specifies the maximum message time to record (in milliseconds).
termination	Bitmap	O	Specifies the list of actions that causes the recording to terminate. This may include one or more of the following actions: <ul style="list-style-type: none"> <li>• duration exceeded</li> <li>• DTMF digit detected</li> <li>• end of data detected</li> <li>• speech detected</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.5.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.5.2.1 Positive Acknowledgement**

**Table 26-13 Record Message—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
resultingMessage	MessageID	M	Specifies the resulting Message Identifier.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.5.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**26.1.5.3 Operational Model**

Refer to Figure 6-19, “Voice Unit Operational Model,” on page 39 for the operational model.

**26.1.5.3.1 Connection State Transitions**

There are no connection state changes due to this service.



**26.1.5.3.2 Device-Type Monitoring Event Sequences**

**Table 26-14 Record Message—Device-Type Monitoring Event Sequences**

Monitored Device	Connection	Event	Event Cause
D1	D1C1 (callToBeRecorded)	Record	Normal

**26.1.5.3.3 Call-Type Monitoring Event Sequences**

**Table 26-15 Record Message—Call-Type Monitoring Event Sequences**

Monitored Call	Connection	Event	Event Cause
C1	D1C1 (callToBeRecorded)	Record	Normal

**26.1.5.3.4 Functional Requirements**

1. If the sampling rate or encoding algorithm are not specified or cannot be provided, then the Voice Unit may use its default sampling rate and/or encoding algorithm.

**26.1.6 Reposition**

C → S

The Reposition service moves the position pointer forward or backward a specified number of milliseconds in a message.

This service also allows the position pointer to be set to the start or to the end of the message.

**26.1.6.1 Service Request**

**Table 26-16 Reposition—Service Request**

Parameter Name	Type	M/O/C	Description
connection	ConnectionID	M	Specifies the connection on which the message is to be repositioned.
periodOfReposition	Choice Structure	M	Specifies how the pointer should be repositioned. This shall be one of the following choices: <ul style="list-style-type: none"> <li>• start of message</li> <li>• end of message</li> <li>• relative position from current pointer (Value) - a positive value moves the message pointer forward (toward the end of the message), a negative value moves the message pointer backward (towards the beginning of the message).</li> </ul>
messageToReposition	MessageID	C	Specifies the message whose pointer is to be repositioned. This parameter is mandatory if there are multiple active messages on the specified connection, otherwise the parameter is optional.  If this parameter is not provided, the service applies to the currently active message on the specified connection.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.6.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.6.2.1 Positive Acknowledgement**

**Table 26-17 Reposition—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.6.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**26.1.6.3 Operational Model**

Refer to Figure 6-19, “Voice Unit Operational Model,” on page 39 for the operational model.

**26.1.6.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**26.1.6.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.6.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.6.3.4 Functional Requirements**

1. Moving forward and backward within the indicated message on the indicated connection is accomplished by using positive or negative values for the period, respectively.
2. An attempt to move backward beyond the beginning of a message moves to the start of the message. An attempt to move forward beyond the end of the message moves to the end of the message.

**26.1.7 Resume**

C → S

The Resume service restarts the playing or recording of a previously suspended message at the current position.

**26.1.7.1 Service Request**

**Table 26-18 Resume—Service Request**

Parameter Name	Type	M/O/C	Description
connection	ConnectionID	M	Specifies the connection on which the message is to be resumed.
messageToResume	MessageID	C	Specifies the message to be resumed. This parameter is mandatory if there are multiple suspended messages on the specified connection, otherwise the parameter is optional. If this parameter is not provided, the service applies to the currently suspended message on the specified connection.
duration	Value	O	Specifies the length of time for playback or recording (in milliseconds).
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.7.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.7.2.1 Positive Acknowledgement**

**Table 26-19 Resume—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.7.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**26.1.7.3 Operational Model**

Refer to Figure 6-19, “Voice Unit Operational Model,” on page 39 for the operational model.

**26.1.7.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**26.1.7.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.7.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.7.3.4 Functional Requirements**

1. The position pointer in the message may have been changed by using the Reposition service.

**26.1.8 Review**

C → S

The Review service plays a portion of a voice message during a recording session, until either the end of the portion is reached or a Suspend service request is issued. When this service completes, the position reached becomes the value of the position pointer.

This service does not affect the current position unless a suspend occurs before the review completes.

**26.1.8.1 Service Request**

**Table 26-20 Review—Service Request**

Parameter Name	Type	M/O/C	Description
connection	ConnectionID	M	Specifies the connection on which the message is to be reviewed.
periodToReview	Choice Structure	M	Specifies the length of the message to be reviewed. This shall be one of the following choices: <ul style="list-style-type: none"> <li>start of message - specifies that the message shall be reviewed from the beginning of the message.</li> <li>length of review (Value) - specifies the length in milliseconds that the message pointer should be moved towards the beginning of the message before being reviewed.</li> </ul>
messageToReview	MessageID	C	Specifies the message to be reviewed. This parameter is mandatory if there are multiple active messages on the specified connection, otherwise the parameter is optional. If this parameter is not provided, the service applies to the currently active message on the specified connection.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.8.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.8.2.1 Positive Acknowledgement**

**Table 26-21 Review—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.8.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**26.1.8.3 Operational Model**

Refer to Figure 6-19, “Voice Unit Operational Model,” on page 39 for the operational model.

**26.1.8.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**26.1.8.3.2 Device-Type Monitoring Event Sequences**

**Table 26-22 Review Message—Device-Type Monitoring Event Sequences**

Monitored Device	Connection	Event	Event Cause
D1	D1C1 (connection)	Review	Normal

### 26.1.8.3.3 Call-Type Monitoring Event Sequences

**Table 26-23 Review Message—Call-Type Monitoring Event Sequences**

Monitored Call	Connection	Event	Event Cause
C1	DIC1 (connection)	Review	Normal

### 26.1.8.3.4 Functional Requirements

1. The Review service cannot be issued while the Voice Unit is already in the Review state.

**26.1.9 Set Voice Attribute**

C → S

The Set Voice Attribute service sets a voice attribute for a specified connection and message.

The voice attributes that can be set include playing speed, playing volume, and recording gain.

**26.1.9.1 Service Request**

**Table 26-24 Set Voice Attribute—Service Request**

Parameter Name	Type	M/O/C	Description
connection	ConnectionID	M	Specifies the Connection on which the voice attribute should be set.
attributeToSet	Choice Structure	M	Specifies the attribute to be set. This shall be one of the following choices: <ul style="list-style-type: none"> <li>• currentSpeed (Value) - sets the playing speed of the message (represents the percentage of normal speed, with 100% being normal speed and the slowest reportable speed being 1%)</li> <li>• currentVolume (Choice Structure) - sets the playing volume of the message. May specify either an absolute value or may specify that the volume should be incremented or decremented by a implementation specified increment. It may be one of the following possible choices:                             <ul style="list-style-type: none"> <li>• currentVolAbs (Value) - Specifies a value from 0 through 100. 0 indicates silence, and 100 indicates maximum volume. The granularity and quantization of the values 1 through 99 are device specific</li> <li>• currentVolInc (Enumerated) - Specifies if the volume is to be incremented or decremented by a switch specified amount. The complete set of possible values is: increment - the volume is incremented or decrement - the volume is decremented.</li> </ul> </li> <li>• currentGain (Value 0..100) - sets the recording gain of the message (100 indicating maximum level and 0 indicating minimum level)</li> </ul>
message	MessageID	C	Specifies the message whose voice attribute is to be set. This parameter is mandatory if there are multiple active messages on the specified connection, otherwise the parameter is optional.  If this parameter is not provided, the service applies to the currently active message on the specified connection.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.9.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.9.2.1 Positive Acknowledgement**

**Table 26-25 Set Voice Attribute—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.9.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

### 26.1.9.3 Operational Model

#### 26.1.9.3.1 Connection State Transitions

There are no connection state changes due to this service.

#### 26.1.9.3.2 Device-Type Monitoring Event Sequences

**Table 26-26 Set Voice Attribute —Device-Type Monitoring Event Sequences**

Monitored Device	Connection	Event	Event Cause
D1	D1C1 (connection)	Voice Attribute Changed	Normal

#### 26.1.9.3.3 Call-Type Monitoring Event Sequences

**Table 26-27 Set Voice Attribute —Call-Type Monitoring Event Sequences**

Monitored Call	Connection	Event	Event Cause
C1	D1C1 (connection)	Voice Attribute Changed	Normal

#### 26.1.9.3.4 Functional Requirements

1. This service can only be used to set one attribute per service request. If multiple attributes need to be set for the same message, multiple service requests shall be used.



**26.1.10 Stop**

C → S

The Stop service stops playing or recording of a message and resets the position pointer to the beginning of the message.

**26.1.10.1 Service Request**

**Table 26-28 Stop—Service Request**

Parameter Name	Type	M/O/C	Description
connection	ConnectionID	M	Specifies the connection on which the message is to be stopped.
messageToBeStopped	MessageID	C	Specifies the message to be stopped. This parameter is mandatory if there are multiple active messages on the specified connection, otherwise the parameter is optional.  If this parameter is not provided, the service applies to the currently active message on the specified connection.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.10.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.10.2.1 Positive Acknowledgement**

**Table 26-29 Stop—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.10.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**26.1.10.3 Operational Model**

Refer to Figure 6-19, “Voice Unit Operational Model,” on page 39 for the operational model.

**26.1.10.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**26.1.10.3.2 Device-Type Monitoring Event Sequences**

**Table 26-30 Stop Message—Device-Type Monitoring Event Sequences**

Monitored Device	Connection	Event	Event Cause
D1	D1C1 (connection)	Stop	Normal

**26.1.10.3.3 Call-Type Monitoring Event Sequences**

**Table 26-31 Stop Message—Call-Type Monitoring Event Sequences**

Monitored Call	Connection	Event	Event Cause
C1	D1C1 (connection)	Stop	Normal

**26.1.10.3.4 Functional Requirements**

1. While the message is stopped, the position pointer in the message can be modified via the Reposition service.

## 26.1.11 Suspend

C → S

The Suspend service temporarily stops the playing or recording of the current message and sets the position pointer to be the current position.

### 26.1.11.1 Service Request

**Table 26-32 Suspend—Service Request**

Parameter Name	Type	M/O/C	Description
connection	ConnectionID	M	Specifies the connection on which the message is to be suspended.
message	MessageID	C	Specifies the message to be suspended. This parameter is mandatory if there are multiple active messages on the specified connection, otherwise the parameter is optional. If this parameter is not provided, the service applies to the currently active message on the specified connection.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 26.1.11.2 Service Response

This service follows the atomic acknowledgement model for this service request.

#### 26.1.11.2.1 Positive Acknowledgement

**Table 26-33 Suspend—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 26.1.11.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

### 26.1.11.3 Operational Model

Refer to Figure 6-19, “Voice Unit Operational Model,” on page 39 for the operational model.

#### 26.1.11.3.1 Connection State Transitions

There are no connection state changes due to this service.

#### 26.1.11.3.2 Device-Type Monitoring Event Sequences

**Table 26-34 Suspend Message—Device-Type Monitoring Event Sequences**

Monitored Device	Connection	Event	Event Cause
D1	DIC1 (connection)	Suspend Play (if suspended while playing)	Normal
		Suspend Record (if suspended while recording)	Normal

### 26.1.11.3.3 Call-Type Monitoring Event Sequences

**Table 26-35 Suspend Message—Call-Type Monitoring Event Sequences**

Monitored Call	Connection	Event	Event Cause
C1	D1C1 (connection)	Suspend Play (if suspended while playing)	Normal
		Suspend Record (if suspended while recording)	Normal

### 26.1.11.3.4 Functional Requirements

1. While the message is suspended, the position pointer in the message can be changed by using the Reposition service.
2. The Voice Unit shall continue to play or record the message starting at its position pointer upon receiving the Resume service request.

**26.1.12 Synthesize Message**

C → S

The Synthesize Message service constructs a voice message from a text stream.

This service returns the Message Identifier of the constructed message in the positive acknowledgement.

The Synthesize Message service is a “text to speech” function.

**26.1.12.1 Service Request**

**Table 26-36 Synthesize Message—Service Request**

Parameter Name	Type	M/O/C	Description
textToBeSynthesized	Characters	M	Specifies the text to be converted to voice.
control	List	O	Specifies the control information to be used in construction the voice message. This includes the following: <ul style="list-style-type: none"> <li>• gender (M) Enumerated - The complete set of possible values is:                             <ul style="list-style-type: none"> <li>• male voice</li> <li>• female voice</li> </ul> </li> <li>• language (M) Characters - This is a character string specifying the language.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.12.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**26.1.12.2.1 Positive Acknowledgement**

**Table 26-37 Synthesize Message—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
synthesizedMessage	MessageID	M	Specifies the Message ID that was constructed.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**26.1.12.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**26.1.12.3 Operational Model**

**26.1.12.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**26.1.12.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.12.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**26.1.12.3.4 Functional Requirements**

None.

## 26.2 Events

**Table 26-38 Voice Unit Events Summary**

<b>Voice Unit Event</b>	<b>Description</b>	<b>Pg.</b>
26.2.1 Play	The Play event indicates that a message is being played.	538
26.2.2 Record	The Record event indicates that a message is being recorded.	539
26.2.3 Review	The Review event indicates that a message is being reviewed.	540
26.2.4 Stop	The Stop event indicates that a message play or record operation on a connection has stopped.	541
26.2.5 Suspend Play	The Suspend Play event indicates that a message is suspended in play.	542
26.2.6 Suspend Record	The Suspend Record event indicates that a message is suspended during record.	543
26.2.7 Voice Attribute Changed	The Voice Attribute changed event indicates that one or more attributes of a message has changed.	544

## 26.2.1 Play

The Play event indicates that a message is being played.

### 26.2.1.1 Event Parameters

**Table 26-39 Play—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
connection	ConnectionID	M	Indicates the connection on which the message is being played.
message	MessageID	M	Indicates the message that is being played.
length	Value	O	Indicates the length of the message in milliseconds.
currentPosition	Value	O	Indicates the number of milliseconds from the start of the message.
speed	Value	O	Indicates the current playing speed of the message (represents the percentage of normal speed, with 100% being normal speed and the slowest reportable speed being 1%)
cause	EventCause	O	Indicates the reason for the event.
servicesPermitted	ServicesPermitted	O	Specifies a list of services that can be applied to the local connection.
security	CSTASecurityData	O	Indicates timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Indicates the non-standardized information attached to the event.

### 26.2.1.2 Event Causes

**Table 26-40 Play—Event Causes**

Event Cause	Description	Associated Features
Next Message	The next message within a sequence of messages is being played (in the case where concurrent play operations are queued, for example).	Play Message
Normal	A message is being played (a more specific cause cannot be provided).	Play Message

**26.2.2 Record**

The Record event indicates that a message is being recorded.

**26.2.2.1 Event Parameters**

**Table 26-41 Record—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
connection	ConnectionID	M	Indicates the connection on which the message is being recorded.
message	MessageID	M	Indicates the message that is being recorded.
length	Value	O	Indicates the length of the message in milliseconds.
currentPosition	Value	O	Indicates the number of milliseconds from the start of the message.
cause	EventCause	O	Indicates the reason for the event.
servicesPermitted	ServicesPermitted	O	Specifies a list of services that can be applied to the local connection.
security	CSTASecurityData	O	Indicates timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Indicates the non-standardized information attached to the event.

**26.2.2.2 Event Causes**

**Table 26-42 Record—Event Causes**

Event Cause	Description	Associated Features
Normal	A message is being recorded (a more specific cause cannot be provided).	Record Message

### 26.2.3 Review

The Review event indicates that a previously recorded message is being reviewed.

#### 26.2.3.1 Event Parameters

**Table 26-43 Review—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
connection	ConnectionID	M	Indicates the connection on which the message is being reviewed.
message	MessageID	M	Indicates the message that is being reviewed.
length	Value	O	Indicates the length of the message in milliseconds.
currentPosition	Value	O	Indicates the number of milliseconds from the start of the message.
cause	EventCause	O	Indicates the reason for the event.
servicesPermitted	ServicesPermitted	O	Specifies a list of services that can be applied to the local connection.
security	CSTASecurityData	O	Indicates timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Indicates the non-standardized information attached to the event.

#### 26.2.3.2 Event Causes

**Table 26-44 Review—Event Causes**

Event Cause	Description	Associated Features
Normal	A message is being reviewed (a more specific cause cannot be provided).	Review Message



## 26.2.4 Stop

The Stop event indicates that a play or record operation for a message on a connection has been stopped.

### 26.2.4.1 Event Parameters

**Table 26-45 Stop—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
connection	ConnectionID	M	Indicates the connection of the stopped message.
message	MessageID	M	Indicates the message that is being stopped.
length	Value	O	Indicates the length of the message in milliseconds.
currentPosition	Value	O	Indicates the number of milliseconds from the start of the message.
cause	EventCause	O	Indicates the reason for the event.
servicesPermitted	ServicesPermitted	O	Specifies a list of services that can be applied to the local connection.
security	CSTASecurityData	O	Indicates timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Indicates the non-standardized information attached to the event.

### 26.2.4.2 Event Causes

**Table 26-46 Stop—Event Causes**

Event Cause	Description	Associated Features
DTMF Digit Detected	A DTMF digit was detected during a play or record operation.	Play Message, Record Message, Review Message
End of Message Detected	The end of the message was detected during a play or record operation.	Play Message, Record message
Message Duration Exceeded	The maximum permitted time duration for a play or record operation was detected.	Play Message, Record Message
Message Size Exceeded	The maximum permitted size of the message was detected during a recording operation.	Record Message
Normal	A message has stopped playing or recording (a more specific cause cannot be provided).	Stop Message, Play Message, Record Message
No Speech Detected	A period of silence was detected during a record operation.	Record Message
Speech Detected	Speech (or non-silence) was detected while a message was playing.	Play Message, Review Message

## 26.2.5 Suspend Play

The Suspend Play event indicates that a message is suspended in play.

### 26.2.5.1 Event Parameters

**Table 26-47 Suspend Play—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
connection	ConnectionID	M	Indicates the connection of the suspended message.
message	MessageID	M	Indicates the message that is being suspended.
length	Value	O	Indicates the length of the message in milliseconds.
currentPosition	Value	O	Indicates the number of milliseconds from the start of the message.
cause	EventCause	O	Indicates the reason for the event.
servicesPermitted	ServicesPermitted	O	Specifies a list of services that can be applied to the local connection.
security	CSTASecurityData	O	Indicates timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Indicates the non-standardized information attached to the event.

### 26.2.5.2 Event Causes

**Table 26-48 Suspend Play—Event Causes**

Event Cause	Description	Associated Features
DTMF Tone Detected	A DTMF tone was detected during a play operation.	Play Message
Normal	A message has suspended playing (a more specific cause cannot be provided).	Play Message
Speech Detected	Speech (or non-silence) was detected while a message was playing.	Play Message

## 26.2.6 Suspend Record

The Suspend Record event indicates that a message is suspended during recording.

### 26.2.6.1 Event Parameters

**Table 26-49 Suspend Record—Event Parameters**

Parameter Name	Type	M/ O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
connection	ConnectionID	M	Indicates the connection of the suspended message.
message	MessageID	M	Indicates the message that is being suspended.
length	Value	O	Indicates the length of the message in milliseconds.
currentPosition	Value	O	Indicates the number of milliseconds from the start of the message.
cause	EventCause	O	Indicates the reason for the event.
servicesPermitted	ServicesPermitted	O	Specifies a list of services that can be applied to the local connection.
security	CSTASecurityData	O	Indicates timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Indicates the non-standardized information attached to the event.

### 26.2.6.2 Event Causes

**Table 26-50 Suspend Record—Event Causes**

Event Cause	Description	Associated Features
DTMF Tone Detected	A DTMF tone was detected during a record operation.	Record Message
Message Size Exceeded	The maximum permitted size of the message was detected during a recording operation.	Record Message
Normal	A message has stopped recording (a more specific cause cannot be provided).	Record Message
No Speech Detected	A period of silence was detected during a record operation.	Record Message

## 26.2.7 Voice Attribute Changed

The Voice Attribute changed event indicates that one or more attributes of a message has changed.

### 26.2.7.1 Event Parameters

**Table 26-51 Voice Attribute Changed—Event Parameters**

Parameter Name	Type	M/O/C	Description
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
connection	ConnectionID	M	Indicates the connection for the message whose attribute has changed.
message	MessageID	M	Indicates the message that has changed.
playVolume	Choice Structure	O	Indicates the current play volume as an absolute value or that the volume was incremented or decremented by a switch specified increment.  It may be one of the following possible choices: <ul style="list-style-type: none"> <li>playVolAbs (Value) - Specifies a value from 0 through 100. 0 indicates silence, and 100 indicates maximum volume. The granularity and quantization of the values 1 through 99 are device specific</li> <li>playVolInc (Enumerated) - Specifies if the volume was incremented or decremented by a switch specified amount. The complete set of possible values is: <ul style="list-style-type: none"> <li>increment - the volume was incremented</li> <li>decrement - the volume was decremented.</li> </ul> </li> </ul>
recordingGain	Value (0..100)	O	Indicates the current recording level (100 indicating maximum gain and 0 indicating minimum gain)
speed	Value	O	Indicates the current playing speed of the message (represents the percentage of normal speed, with 100% being normal speed and the slowest reportable speed being 1%)
currentPosition	Value	O	Indicates the number of milliseconds from the start of the message.
cause	EventCause	O	Indicates the reason for the event.
security	CSTASecurityData	O	Indicates timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Indicates the non-standardized information attached to the event.

### 26.2.7.2 Event Causes

**Table 26-52 Voice Attribute Changed—Event Causes**

Event Cause	Description	Associated Features
Normal	A voice attribute of a message has changed.	Set Voice Attribute

## 27 Call Detail Record (CDR) Services

This clause specifies the Call Detail Record (CDR) services.

### 27.1 Services

**Table 27-1 CDR Services Summary**

<b>Service</b>	<b>Description</b>	<b>Pg.</b>
27.1.1 Call Detail Records Notification	The Call Detail Records Notification service notifies the computing function that it should obtain the CDR information that has been stored by the switching function (by using the Send Stored Call Detail Records service).	546
27.1.2 Call Detail Records Report	The Call Detail Records Report service provides CDR information to the computing function.	547
27.1.3 Send Stored Call Detail Records	The Send Stored Call Detail Records service initiates the transfer of stored CDR information to the computing function.	551
27.1.4 Start Call Detail Records Transmission	The Start Call Detail Records Transmission service starts the transmission of CDR information.	553
27.1.5 Stop Call Detail Records Transmission	The Stop Call Detail Records Transmission service cancels a previously initiated Call Detail Records Transmission.	555

**27.1.1 Call Detail Records Notification**

S → C

The Call Detail Records Notification service notifies the computing function that it should obtain the CDR information that has been stored in the switching function.

The Send Stored Call Detail Records service should be used to obtain the CDR information.

**27.1.1.1 Service Request**

**Table 27-2 Call Detail Records Notification—Service Request**

Parameter Name	Type	M/O/C	Description
cdrCrossRefID	CDRCrossRefID	M	Specifies the CDR cross reference identifier.
cdrReason	Enumerated	O	Specifies the reason for sending the service. The complete set of possible values is: <ul style="list-style-type: none"> <li>• timeout - a timeout has occurred in the switching function</li> <li>• thresholdReached - a threshold reached condition has occurred in the switching function</li> <li>• other - any other reason</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**27.1.1.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**27.1.1.2.1 Positive Acknowledgement**

**Table 27-3 Call Detail Records Notification—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**27.1.1.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**27.1.1.3 Operational Model**

**27.1.1.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**27.1.1.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**27.1.1.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**27.1.1.3.4 Functional Requirements**

1. This service is used if a previous Start Call Detail Records Transmission service has specified that the switching function should store CDR information until requested by the computing function (transferMode of transferOnRequest or transferOnThresholdReached) and when a threshold reached condition or a timeout has occurred in the switching function, as indicated in the cdrReason parameter.

**27.1.2 Call Detail Records Report**

S → C

The Call Detail Records Report service provides call detail information for one or more calls.

This information may be used to derive charging information, statistic purposes, etc.

**27.1.2.1 Service Request**

**Table 27-4 Call Detail Records Report—Service Request**

Parameter Name	Type	M/O/C	Description
cdrCrossRefID	CDRCrossRefID	M	Specifies the CDR cross reference identifier.
numberOfRecordsSent	Value (1..128)	M	Specifies the number of call detail records that are provided in this service.
cdrInfo	List of Structures	M	<p>Specifies a list CDR information. Each entry in the list consists of the following components:</p> <ul style="list-style-type: none"> <li>• recordNumber (O) Value (1..128) - Indicates the record number, if more that one record is sent.</li> <li>• recordCreationTime (M) TimeInfo - Indicates the time that the CDR record was created.</li> <li>• callingDevice (O) CallingDeviceID - Indicates the calling device.</li> <li>• calledDevice (O) CalledDeviceID - Indicates the called device.</li> <li>• associatedCallingDevice (O) AssociatedCallingDeviceID - Indicates the Network Interface Device (trunk, for example) associated with the calling device.</li> <li>• associatedCalledDevice (O) AssociatedCalledDeviceID - Indicates the Network Interface Device (trunk, for example) associated with the called device.</li> <li>• networkCallingDevice (O) NetworkCallingDeviceID - Indicates the calling device that was provided by the network.</li> <li>• networkCalledDevice (O) NetworkCalledDeviceID - Indicates the called device that was provided by the network.</li> <li>• callCharacteristics (O) CallCharacteristics - Indicates the high level characteristics of the call (ACD, for example).</li> <li>• mediaCallCharacteristics (O) MediaCallCharacteristics - Specifies the media class (voice, digital data, etc.), connection rate, etc. of the call.</li> <li>• chargedDevice (O) Choice Structure- Indicates the charged device. Shall be one of the following choices: <ul style="list-style-type: none"> <li>• operator (DeviceID) - Indicates the DeviceID of the attendant</li> <li>• nonOperator (DeviceID) - Indicates the non-attendant DeviceID</li> </ul> </li> <li>• recordedCall (O) ConnectionID - Indicates the call for which the call details are recorded.</li> <li>• nodeNumber (O) List of Values - Indicates the originating node within a switching network. This consists of a list of values corresponding to areas: <ul style="list-style-type: none"> <li>• area0 (O) - area0</li> <li>• area1 (O) - area1</li> <li>• area2 (O) - area2</li> </ul> </li> <li>• tariffTable (O) Value - Indicates the table to be used according to the network type characteristics (PSTN, ISDN, etc.)</li> </ul>

**Table 27-4 Call Detail Records Report—Service Request (continued)**

Parameter Name	Type	M/ O/C	Description
(continued)	(continued)		<ul style="list-style-type: none"> <li>• connectionStart (O) TimeInfo - Indicates the date and time that the connection was created.</li> <li>• connectionEnd (O) TimeInfo - Indicates the date and time that the connection ended.</li> <li>• connectionDuration (O) Value - Indicates the duration of the connection, in tenths of seconds.</li> <li>• accessCode (O) Value - Indicates the dialled access number (e.g. to differentiate between business or private external calls)</li> <li>• carrier (O) Value - Indicates the network that was used.</li> <li>• selectedRoute (O) Value - Indicates the route that was used.</li> <li>• billingIdentifier (O) Enumerated - Indicates the type of charging. The complete set of possible values is:               <ul style="list-style-type: none"> <li>• normalCharging</li> <li>• reverseCharging</li> <li>• creditCardCharging</li> <li>• callForwarding</li> <li>• callDeflection</li> <li>• callTransfer</li> <li>• other</li> </ul> </li> <li>• chargingInfo (O) ChargingInfo - Indicates the value of charging or currency units charged to a device in a call.</li> <li>• supplServiceInfo (O) Bitmap - Indicates the features (supplementary services) used. Multiple bits may be set. The possible values are:               <ul style="list-style-type: none"> <li>• normalCall</li> <li>• consultationCall</li> <li>• transferCall</li> <li>• callCompletion</li> <li>• callForwarding</li> <li>• callDiversion</li> <li>• conferencing</li> <li>• intrusion</li> <li>• userUserInfo - indicates that user related information was exchanged during the call (e.g., public ISDN User to User signalling was used)</li> <li>• other</li> </ul> </li> </ul>



**Table 27-4 Call Detail Records Report—Service Request (continued)**

Parameter Name	Type	M/ O/C	Description
(continued)	(continued)		<ul style="list-style-type: none"> <li>• reasonForTerm (O) Enumerated - Indicates the reason that the connection was terminated. The complete set of possible values is:               <ul style="list-style-type: none"> <li>• normalClearing</li> <li>• unsuccessfulCallAttempt</li> <li>• abnormalTermination</li> <li>• callTransferred</li> <li>• other</li> </ul> </li> <li>• authCode (O) AuthCode - Indicates the authorization code used to authorize the call.</li> <li>• accountInfo (O) AccountInfo - Indicates the account code used for the call.</li> <li>• deviceCategory (O) Enumerated - Indicates the device category (station, ACD device, etc.) of the charged device. The complete set of possible values is:               <ul style="list-style-type: none"> <li>• ACD</li> <li>• Group</li> <li>• Network Interface (e.g., trunk, CO line)</li> <li>• Park</li> <li>• Routeing Device</li> <li>• Station (default)</li> <li>• Voice Unit</li> <li>• Other</li> </ul> </li> <li>• namedDeviceTypes (O) Enumerated - Indicates the named device type of the charged device. The complete set of possible values are:               <ul style="list-style-type: none"> <li>• ACD</li> <li>• ACD Group</li> <li>• Button</li> <li>• Button Group</li> <li>• Conference Bridge</li> <li>• Line</li> <li>• Line Group</li> <li>• Operator</li> <li>• Operator Group</li> <li>• Parking Device</li> <li>• Station</li> <li>• Station Group</li> <li>• Trunk</li> <li>• Trunk Group</li> <li>• Other</li> <li>• Other Group</li> </ul> </li> <li>• operatorDevice (O) DeviceID - Indicates the operator involved with the call.</li> </ul>

**Table 27-4 Call Detail Records Report—Service Request (continued)**

Parameter Name	Type	M/O/C	Description
lastStoredCDRReportSent	Boolean	C	<p>Specifies if this Call Detail Records Report is the last stored Call Detail Records Report that is being sent by the switching function as a result of a Send Stored Call Detail Records service. The complete set of possible values is:</p> <ul style="list-style-type: none"> <li>• True - this CDR report is the last stored report that is being sent. After this CDR report is sent, the switching function shall store additional CDR information until the information is requested via another Send Stored Call Detail Records service.</li> <li>• False - this CDR report is not the last stored report being sent. More stored CDR reports will be sent by the switching function.</li> </ul> <p>This parameter shall be provided if this service is the result of a Send Stored Call Detail Records service, otherwise it shall not be provided.</p>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**27.1.2.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**27.1.2.2.1 Positive Acknowledgement**

**Table 27-5 Call Detail Records Report—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**27.1.2.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**27.1.2.3 Operational Model**

**27.1.2.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**27.1.2.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**27.1.2.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**27.1.2.3.4 Functional Requirements**

1. This service is sent by the switching function when:
  - a Start Call Detail Records Transmission service has indicated the transferMode of transferAtEndOfCall in which case the value of the numberRecords parameter is one, or
  - a Start Call Detail Records Transmission service has indicated the transferMode of transferOnRequest or transferOnThresholdReached and a Send Stored Call Detail Records service has requested that the stored CDR records be sent.

### 27.1.3 Send Stored Call Detail Records

C → S

The Send Stored Call Detail Records service initiates the en-bloc transfer of CDR information from the switching function for call records that have been stored by the switching function.

The service allows CDR information to be requested for a specific time period.

#### 27.1.3.1 Service Request

**Table 27-6 Send Stored Call Detail Records—Service Request**

Parameter Name	Type	M/O/C	Description
cdrCrossRefID	CDRCrossRefID	M	Specifies the CDR cross reference identifier.
timePeriod	List of TimeInfo	O	Specifies the time interval for which CDR information is being requested. This parameter consists of the following components: <ul style="list-style-type: none"> <li>beginningOfCDR (M) - specifies the start time</li> <li>endOfCDR (M) - specifies the end time</li> </ul> The time interval refers to the time that the CDR record was created (i.e., the recordCreationTime in the Call Detail Records Report service).
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 27.1.3.2 Service Response

This service follows the atomic acknowledgement model for this service request.

##### 27.1.3.2.1 Positive Acknowledgement

**Table 27-7 Send Stored Call Detail Records—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

##### 27.1.3.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

#### 27.1.3.3 Operational Model

##### 27.1.3.3.1 Connection State Transitions

There are no connection state changes due to this service.

##### 27.1.3.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

##### 27.1.3.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

##### 27.1.3.3.4 Functional Requirements

1. If the transferMode parameter in the Start Call Detail Records Transmission service has indicated transferOnRequest or transferOnThresholdReached, a Send Call Detail Records service request shall be sent when the computing function wants to retrieve the stored call detail information. It shall also be sent if the switching function has indicated, via the Call Detail Records Notification service, that the computing function should obtain the stored CDR information because of a threshold reached condition or timeout, for example.
2. If this service is positively acknowledged, the CDR information is sent to the computing function via the Call Detail Records Report service.

3. If the timePeriod parameter is not supported by the switch, all recorded Call Detail Records should be transmitted, which have not been previously transmitted to the computing function.

**27.1.4 Start Call Detail Records Transmission**

C → S

The Start Call Detail Records Transmission service starts the collection, and optionally the transmission, of Call Detail Records.

The switching function either starts transmitting call detail information at the end of each call (or call segment) or it stores the CDR information until it is requested, as specified in the service request.

**27.1.4.1 Service Request**

**Table 27-8 Start Call Detail Records Transmission—Service Request**

Parameter Name	Type	M/O/C	Description
transferMode	Enumerated	M	Specifies the mode of transmission. The complete set of possible modes is: <ul style="list-style-type: none"> <li>• transferAtEndOfCall - specifies that the requested information shall be sent after the end of each call or call segment.</li> <li>• transferOnRequest - specifies that the requested information shall be stored in the switching function then sent en-bloc on explicit request.</li> <li>• transferOnThresholdReached - specifies that the requested information shall be stored in the switching function then sent en-bloc on explicit request, or when the switching function has determined that a threshold (high water mark) has been reached.</li> </ul>
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**27.1.4.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**27.1.4.2.1 Positive Acknowledgement**

**Table 27-9 Start Call Detail Records Transmission Service—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
cdrCrossRefID	CDRCrossRefID	M	Specifies the CDR cross reference identifier.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**27.1.4.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**27.1.4.3 Operational Model**

**27.1.4.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**27.1.4.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**27.1.4.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**27.1.4.3.4 Functional Requirements**

1. The cdrCrossRefID parameter is used to correlate subsequent CDR services back to the Start Call Detail Records Transmission service.

2. If the transferMode parameter is specified as transferAtEndOfCall, the switching function shall send the CDR information after the end of a call or call segment (after a call is transferred, for example).
3. If the transferMode parameter is specified as transferOnRequest, the switching function shall store the CDR information until explicitly requested via the Send Stored Call Detail Records service.
4. If the transferMode parameter is specified as transferOnThresholdReached, the switching function shall store the CDR information until explicitly requested via the Send Stored Call Detail Records service or when the switching function has determined that a threshold has been reached.

## 27.1.5 Stop Call Detail Records Transmission

S ↔ C

The Stop Call Detail Records Transmission service is used to cancel a previously initiated Start Call Detail Records Transmission service.

A positive acknowledgement to the service request indicates that the CDR cross reference identifier used in the Start Call Detail Records Transmission service has become invalid.

Either the computing function or the switching function may issue the service.

### 27.1.5.1 Service Request

**Table 27-10 Stop Call Detail Records Transmission—Service Request**

Parameter Name	Type	M/O/C	Description
cdrCrossRefID	CDRCrossRefID	M	Specifies the CDR cross reference identifier.
cdrTermReason	Enumerated	O	Specifies the reason to terminate call detail reports. The possible values are: <ul style="list-style-type: none"> <li>• endOfDataDetected</li> <li>• errorDetected</li> <li>• thresholdReached</li> <li>• other</li> </ul> This parameter shall not be provided if the service request is sent from the computing function.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

### 27.1.5.2 Service Response

This service follows the atomic acknowledgement model for this service request.

#### 27.1.5.2.1 Positive Acknowledgement

**Table 27-11 Stop Call Detail Records Transmission Service—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

#### 27.1.5.2.2 Negative Acknowledgement

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

### 27.1.5.3 Operational Model

#### 27.1.5.3.1 Connection State Transitions

There are no connection state changes due to this service.

#### 27.1.5.3.2 Device-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 27.1.5.3.3 Call-Type Monitoring Event Sequences

There are no events generated as a result of this service.

#### 27.1.5.3.4 Functional Requirements

1. The computing function may issue the Stop Call Detail Records Transmission service when it no longer wants to receive CDR information.
2. The switching function shall issue the service when it terminates a Call Detail Records Transmission and may supply a reason that the transmission was stopped.

3. Once the request has been positively acknowledged, the Call Detail Records Reports shall cease to be sent and the cdrCrossRefID shall be invalid.



## 28 Vendor Specific Extensions Services & Events

This clause consists of:

- Escape Registration Services
- Escape Services
- Private Events

### 28.1 Registration Services

**Table 28-1 Escape Registration Services Summary**

<b>Escape Registration Service</b>	<b>Description</b>	<b>Pg.</b>
28.1.1 Escape Register	Registers the computing function for escape services with the switching function.	558
28.1.2 Escape Register Abort	Indicates that the switching function has terminated an escape service registration.	559
28.1.3 Escape Register Cancel	Unregisters the computing function for escape services with the switching function.	560

**28.1.1 Escape Register**

C → S

The Escape Register service is used by the computing function to register to receive escape services from the switching function. The computing function may be required to register for escape services before it can receive any Escape service requests from the switching function.

**28.1.1.1 Service Request**

**Table 28-2 Escape Register—Service Request**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**28.1.1.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**28.1.1.2.1 Positive Acknowledgement**

**Table 28-3 Escape Register—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
escapeRegisterID	EscapeRegisterID	M	Specifies the escape registration identifier for this registration.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**28.1.1.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**28.1.1.3 Operational Model**

**28.1.1.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**28.1.1.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.1.1.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.1.1.3.4 Functional Requirements**

1. The escapeRegisterID parameter returned in the positive acknowledgement is used to identify the registration over which escape services will be sent. The escapeRegisterID is also used when cancelling the escape registration.
2. The number of simultaneous escape registrations allowed is switching function dependent. When the limit is reached, subsequent Escape Register service requests shall result in negative acknowledgements from the switching function.

**28.1.2 Escape Register Abort**

S → C

The Escape Register Abort service is used by the switching function to asynchronously cancel an active escape registration. This service invalidates a current escape registration.

**28.1.2.1 Service Request**

**Table 28-4 Escape Register Abort—Service Request**

Parameter Name	Type	M/O/C	Description
escapeRegisterID	EscapeRegisterID	M	Specifies the escape registration identifier for the escape registration that was aborted.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**28.1.2.2 Service Response**

There are no service completion conditions for this service.

**28.1.2.2.1 Positive Acknowledgement**

There is no positive acknowledgement defined for this service.

**28.1.2.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**28.1.2.3 Operational Model**

**28.1.2.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**28.1.2.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.1.2.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.1.2.3.4 Functional Requirements**

1. The switching function may issue this service at any time when it can no longer maintain the escape registration (e.g. when the vendor-specific extensions are no longer available).
2. The computing function may send a negative acknowledgement to this service request, but no positive acknowledgement is defined.

**28.1.3 Escape Register Cancel**

C → S

The Escape Register Cancel service is used to cancel a previous escape registration. This request terminates the escape registration and the computing function receives no further escape service requests for that escape registration once it receives the positive acknowledgement to the Escape Register Cancel request.

**28.1.3.1 Service Request**

**Table 28-5 Escape Register Cancel—Service Request**

Parameter Name	Type	M/O/C	Description
escapeRegisterID	EscapeRegisterID	M	Specifies the escape registration identifier for which the escape registration is to be cancelled.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**28.1.3.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**28.1.3.2.1 Positive Acknowledgement**

**Table 28-6 Escape Register Cancel—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**28.1.3.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**28.1.3.3 Operational Model**

**28.1.3.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**28.1.3.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.1.3.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.1.3.3.4 Functional Requirements**

1. The computing function shall continue to process outstanding escape service requests from the switching function until it receives a positive acknowledgement for the Escape Register Cancel service request. The switching function shall not send any further escape service requests for a registration once it has sent the positive acknowledgement.

## 28.2 Services

**Table 28-7 Escape Services Summary**

<b>Escape Service</b>	<b>Description</b>	<b>Pg.</b>
28.2.1 Escape	Provides a mechanism to send a non-standardized feature.	562
28.2.2 Private Data Version Selection	Provides the switching function with the selected version for private data.	563

**28.2.1 Escape**

C ↔ S

The Escape service is used by an implementation to send a non-standardized (implementation specific) feature using the CSTA protocol. This service shall not be used for features that can be invoked with standardized services.

The Escape service allows an implementation to “escape” from standard operations in order to exploit some special feature of an implementation. This mechanism also allows manufacturers to experiment with new features that may, at a later date, become standardized.

**28.2.1.1 Service Request**

**Table 28-8 Escape—Service Request**

Parameter Name	Type	M/O/C	Description
escapeRegisterID	EscapeRegisterID	C	Specifies the escape registration identifier associated with the escape registration for this request.  This parameter is mandatory if the switching function is issuing the request and supports escape registration, and shall not be provided otherwise.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	M	Specifies the non-standardized information.

**28.2.1.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**28.2.1.2.1 Positive Acknowledgement**

**Table 28-9 Escape—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**28.2.1.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**28.2.1.3 Operational Model**

**28.2.1.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**28.2.1.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.2.1.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.2.1.3.4 Functional Requirements**

1. The privateData parameter in the service request shall be used to provide the non-standardized feature information (feature specific parameters, for example).
2. The privateData parameter in the positive acknowledgement shall be used, if necessary, to provide feature specific response information.
3. Although there are no connection state transitions or events specified by this service, the non-standardized feature requested via this service may cause some implementation-specific connection state change(s) or event(s) to occur.
4. The Escape service shall use ASN.1 (Abstract Syntax Notation) Object Identifiers.

**28.2.2 Private Data Version Selection**

C → S

The Private Data Version Selection service provides the switching function with the selected version for Private Data.

**28.2.2.1 Service Request**

**Table 28-10 Private Data Version Selection—Service Request**

Parameter Name	Type	M/O/C	Description
privateDataVersion	Value	M	Represents the version number to be used for future Private Data. A value of 0 means Private Data is not to be used.

**28.2.2.2 Service Response**

This service follows the atomic acknowledgement model for this service request.

**28.2.2.2.1 Positive Acknowledgement**

**Table 28-11 Private Data Version Selection—Positive Acknowledgement**

Parameter Name	Type	M/O/C	Description
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	O	Specifies non-standardized information.

**28.2.2.2.2 Negative Acknowledgement**

The negative acknowledgement error codes are described in 12.2.12, “ErrorValue”, on page 88.

**28.2.2.3 Operational Model**

**28.2.2.3.1 Connection State Transitions**

There are no connection state changes due to this service.

**28.2.2.3.2 Device-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.2.2.3.3 Call-Type Monitoring Event Sequences**

There are no events generated as a result of this service.

**28.2.2.3.4 Functional Requirements**

1. The computing function shall choose one of the private data version number(s) supported by the switching function (or if it does not want the switching function to provide private data, it should provide a value of 0). The computing function may obtain the list of private data versions:
  - a. in the response to the Get Switching Function Capability service and
  - b. in the ACSE Association Information provided by the switching function.
2. This service should not be issued before the first Get Switching Function Capabilities acknowledgement has been received by the computing function, unless the switching function has provided its supported private data version numbers in the ACSE Association Information.

## 28.3 Events

**Table 28-12 Private Events Summary**

<b>Private Event</b>	<b>Description</b>	<b>Pg.</b>
28.3.1 Private Event	Provides a mechanism to send implementation-specific extended information event.	565



**28.3.1 Private Event**

The Private Event is used by an implementation to send unsolicited, non-standardized (implementation specific) event information using the CSTA protocol. The Private Event shall not be used to convey event information that can be reported with standardized events.

The Private Event allows an implementation to exploit some special feature of an implementation.

**28.3.1.1 Event Parameters**

**Table 28-13 Private Event—Event Parameters**

<b>Parameter Name</b>	<b>Type</b>	<b>M/ O/C</b>	<b>Description</b>
monitorCrossRefID	MonitorCrossRefID	M	Associates the event to an established monitor.
security	CSTASecurityData	O	Specifies timestamp information, message sequence number, and security information.
privateData	CSTAPrivateData	M	Specifies the non-standardized information.

**28.3.1.2 Functional Requirements**

1. The privateData parameter shall be used to provide the non-standardized event information (feature specific parameters, for example).
2. The type of monitors (i.e., device-type or call-type) for which this event is reported is switching function implementation specific.







Printed copies can be ordered from:

**ECMA**  
114 Rue du Rhône  
CH-1204 Geneva  
Switzerland

Fax: +41 22 849.60.01  
Internet: documents@ecma.ch

Files can be downloaded from our FTP site, **ftp.ecma.ch**, logging in as **anonymous** and giving your E-mail address as **password**. This Standard is available from library **ECMA-ST** as an Acrobat PDF file (file E269-PDF.PDF). File E269-EXP.TXT gives a short presentation of the Standard.

Our web site, <http://www.ecma.ch>, gives full information on ECMA, ECMA activities, ECMA Standards and Technical Reports.

**ECMA**

**114 Rue du Rhône  
CH-1204 Geneva  
Switzerland**

**This Standard ECMA-269 is available free of charge in printed form and as a file.**

**See inside cover page for instructions**