



MHEG-5 Profile for South Africa

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Table of Contents

1	Introduction	4
1.1	Purpose	4
1.2	Scope	4
1.3	History	5
1.4	Terminology	5
1.5	Glossary	6
1.6	References	7
2	Specifications	8
2.1	Platform identification	8
2.2	Extensions	9
2.3	User input extension	9
2.4	Fonts extension	10
2.5	File System Acceleration extension.....	10
2.6	Language extension	11
2.7	NVM persistent storage.....	13
2.8	Presentation of MHEG and subtitles	14
2.9	Scheduled Event Info Extension	14
2.10	Native Reminder Extension.....	24
2.11	SA Host Settings Extension	26

1 Introduction

1.1 Purpose

The present document provides the detailed specification of the MHEG-5 engine required in compliant digital TV receivers. This specification defines "application domain" in the terms set out in Annex D of ISO/IEC 13522-5.

This document defines the following "application domain":

- "SouthAfricaProfile1"

The specification builds on ETSIEngineProfile1, as defined in [MHEG], adding the following facilities:

- Support for MHEG EPG,
- Support for HD Video and Graphics,
- Clarification on the simultaneous presentation of MHEG content and subtitle,
- Non volatile persistent storage,
- Extensions to support access to audio and subtitle language metadata,
- Support for file system acceleration.

1.2 Scope

As far as is practical the present document does not intend to create new specifications. Existing public standards and specifications are referenced and, if required, profiled. Where existing public standards and specifications do not meet the requirements local extensions have been defined.

1.3 History

Issue	Date	Descriptions
0.1	20090215	First draft for internal comment.
0.2	20090220	Draft to SABC for comment
0.3	20090327	Modified User Experience and User Input. Removed HD, IC and PVR. Update File System Acceleration. Added Fonts. Reformat
0.4	20090424	Revisions from MHEG Profile Meeting: <ul style="list-style-type: none"> • Single NVM partition, • User Input Register modified, • Fonts modified, • Language added, • Streams from memory added, • Unique id added, • Updated file system acceleration
0.5	20090508	Revisions from review: <ul style="list-style-type: none"> • Additional Engine Events, • Include all Bold font sizes
0.6	20090522	Added Native Timer extensions. Added EPG and Info keys to Input Registers. Editorial review.
2.0	20110707	Removed InputRegister, UniqueId, Native Timers and Streams from memory. Added InputMaskExtension.
2.0	20110715	Remove Arial font
2.0	20110721	InputMaskExtension corrigendum
2.1	20121026	Extension to support EIT schedule Added autoboot from AFS Included support for Radio mode
2.2	20131009	Removed auto-boot from AFS Added Special Groups to FSA extension section

Table 1-1 Version History

1.4 Terminology

“Shall” in this specification denotes a mandatory requirement.

“Should” in this specification denotes a requirement which is desirable but not mandatory.

“Will” in this specification indicates an assumption about existing states or future events.

“May” indicates an event or provision which is permitted, but not mandatory.

MHEG-5 Profile for South Africa 2.2

"Must" indicates that a third party must comply to ensure correct operation.

"Req" or "required" indicates a mandatory requirement.

"Opt" or "optional" indicates an optional feature or requirement.

1.5 Glossary

Term	Definition
AFD	Active Format Descriptor
AC-3	Dolby Digital (5.1 Channel)
Alphabetic	Characters that typically represent a component of a spoken word. For example the Latin derived characters used to represent English or the Cyrillic characters used to represent Russian.
CharacterSet	MHEG term defined as: Identification of the character set, or set of character sets, that shall be used by default for Text rendering. This Integer shall be encoded with a value representing the character set. The application domain shall define a range of CharacterSet and its semantics.
ContentHook	MHEG term defined as: Determine the encoding format of the data included or referenced by the Content attribute.
DTT	Digital Terrestrial Television
DVB	Digital Video Broadcast organisation
DVB-T	DVB-Terrestrial
EBU	European Broadcasting Union
EPG	Electronic Programme Guide
EIT	Event Information Table
ETSI	European Telecommunication Standards Institute
FTA	Free to Air
HD	High Definition
HDCP	High-Bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HDTV	High Definition Television
IRD	Integrated Receiver Decoder
iDTVs	Integrated Digital Televisions
JSON	Javascript Object Notation
MHEG-5	Multimedia and Hypermedia information coding Expert Group
MPEG	Moving Pictures Expert Group
NIT	Network Information Table
NVM	Non-Volatile Memory
OSD	Onscreen Display
RAM	Random Access Memory
SD	Standard Definition
SDTV	Standard Definition Television

MHEG-5 Profile for South Africa 2.2

SI	Service Information
STB	Set-Top-Box
Transport Stream	A stream format defined in [MPEG SYS]
TS	Transport Stream
UTF	Unicode Transformation Format

1.6 References

Reference	Version	Description
MHEG7	ES 202 184 v2.3.1 (2013-03)	MHEG-5 Broadcast Profile
ISO 639-2		Codes for the representation of names of languages.
ISO 8859-1		Information technology – 8 bit single byte coded graphic character sets – Part 1: Latin alphabet No. 1
ISO/IEC 13522-5	ISO/IEC 13522-5:1997	Information technology -- Coding of multimedia and hypermedia information -- Part 5: Support for base-level interactive applications
UI	090225-sabc-specv5b	
SI	EN300468 V1.12.1	DVB Specification for Service information (SI) in DVB Systems
SI Guidelines	TS101211 V1.12.1	Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)
SAROP	3.1 (June 2012)	RULES OF OPERATION FOR THE DTT NETWORK IN SOUTH AFRICA

2 Specifications

The present document specifies ETSIEngineProfile1 plus extensions from [MHEG] and locally defined extensions. Extensions defined in [MHEG] but not included in this document are not required. Unless stated otherwise, specifications follow those defined in [MHEG].

Note: No features specified in [MHEG] are removed or modified so as to fail conformance tests defined for [MHEG]. This specification defines additions to [MHEG]. Some features (e.g. additional input registers) require invocation by the MHEG application before they become active. For example, additional input registers require attributes to be set in the application. Without such activation the receiver shall conform to [MHEG] and shall pass the conformance tests specified for [MHEG].

2.1 Platform identification

2.1.1 International profile string

The following table defines a set of “international profile strings” associated with this specification.

Profile name	Version	International Profile String ¹
UK MHEG	1.0.6	
South Africa Profile	001.000.000	INTZA001000000

Table 2-1 List of profiles supported by receivers compliant with this profile

2.1.2 UniversalEngineProfile GetEngineSupport feature string

The UniversalEngineProfile (UEP()) GetEngineSupport feature string is defined in [MHEG]. It allows version information about the platform to be interrogated. This clause extends this behaviour allowing the “international profile string” for each of the international profiles that the receiver supports to be interrogated in addition to those defined by [MHEG].

Receivers conformant to this specification shall support at least the following profile names:

- South Africa Profile

2.1.3 WhoAmI resident program

The WhoAmI (WAI()) resident program is defined in [MHEG]. It returns a string that contains a space separated set of sub-strings. This clause extends this resident program so that the string returned contains additional space separated sub-strings. The additional sub-strings are the “international profile string” for each of the international profiles that the receiver supports.

¹ Receivers that support a profile shall return the feature string as part of the value returned by the WhoAmI resident program and shall return 'true' when the feature string is tested using the UniversalEngineProfile resident program.

MHEG-5 Profile for South Africa 2.2

Receivers conformant to this specification shall support at least the following profile names:

- South Africa Profile

2.2 Extensions

In addition to the ETSIEngineProfile1 defined in [MHEG], receivers shall support the following extensions defined in [MHEG]:

- HDVideoExtension (clause 12.11).
- HDGraphicsPlaneExtension (clause 12.11.1).
- LifecycleExtension (clause 8.1.7).
- ServiceInformationExtension (clause 11.14)

Receivers which support the MHEG-5 Interaction Channel shall support the following extensions:

- InteractionChannelExtension (clause 15.1.2 and table 11.14)
- ICStreamingExtension (clause 11.5.4 and table 11.15)
- ICEncryptedStreamExtension (clause 15.16)

Receivers shall also support the extensions and clarifications defined in the following clauses.

2.3 User input extension

In addition to the "Base remote control functions" defined in [MHEG] clause 11.6.1, receivers shall support the InputMaskExtension defined in [MHEG] clause 11.16.

The remote control defined in [UI] may not include all the keys defined in [MHEG] clause 11.6.1 however the MHEG-5 engine shall still support the eventData values associated with these keys.

Receivers shall also support additional EngineEvents as defined in clause 2.3.1.

2.3.1 Engine Events

Additional engine events are generated when the user activates the keys defined in Table 2-2 and there is an active scene object. The events are raised independently of the InputEvent register selected at the current moment or whether any interactible has the InteractionStatus of True.

If a key press causes both EngineEvent and UserInput event then the EngineEvent shall be raised first.

EventData		Notes
Name	Value	
InfoKeyFunction	105	Generated when the user activates the Info key and there is an active scene object.
EPGKeyFunction	300	Generated when the user activates the EPG key and there is an active scene object.

Table 2-2 UserInput Engine Events

2.4 Fonts extension

In addition to the embedded font defined in [MHEG] clause 13.3 “Fonts” and clause 13.5 “Text rendering”, receivers shall support the DownloadableFontExtension defined in [MHEG] clause 13.13.1.

2.5 File System Acceleration extension

Receivers shall support the File System Acceleration extension as defined in [MHEG] clause 11.17 with the following clarification, addition and exception.

- Receivers shall provide at least 32MB of memory for the File System Acceleration cache.
- Receivers shall support the handling of Special Groups as defined in clause 2.5.1
- The use_from_carousel flag of the stored groups descriptor, defined in [MHEG] clause 11.17.3, is deprecated. File groups shall always be accessible directly from the carousel, i.e. receivers shall behave as if the flags value is '1'.

2.5.1 Special Groups

A group is considered to be special if both its owner id and group id are within the ranges defined in Table 2-3.

Owner id	Group id
0x0000 – 0x0003	0x0000 – 0x0009

Table 2-3 Special group ranges

Special groups shall have the following attributes:

Protected: Receivers shall take extra care when updating protected groups. If an update procedure fails to complete (e.g. due to a power cycle during the update), the receiver shall be able to revert to using the last version of the protected group until another update completes successfully.

MHEG-5 Profile for South Africa 2.2

Guideline: Since it is implied that two versions of a protected group may be stored transiently during an update, and given that receivers may only provide the minimum size of for File System Acceleration cache (32MB), application authors need to ensure that the size of a protected group plus the size of the new version of the group is not greater than the available flash, in order to avoid situations where a group cannot be updated due to lack of cache memory.

Accessible Offline: Normally, a group is accessible only if it's signalled in the current service. However, "accessible offline" groups shall be accessible by the engine at all times, including when the receiver is not attached to any carousel. This allows for an application to be run directly from cache without the need to follow the normal boot process described in clause 9.3.1 of [MHEG].

2.6 Language extension

Receivers shall support the Language extension defined in this clause. The Language extension can be used to access the user's preferred audio and subtitle language as well as the audio and subtitle languages associated with an event. Audio and subtitle languages are identified by a language code, a 24 bit field as specified by [ISO 639-2] and using a 3 character code as specified by [ISO 8859-1].

2.6.1 LNG_GetPreferredLangs

Synopsis Returns the current preferred audio and subtitle languages.

Arguments GPL(audio, subs)

in/out/in-out	type	name	comment
out	GenericOctetString	audio	3 char language code identifying the current preferred audio language. If no preferred option is set the string "und" shall be returned.
out	GenericOctetString	subs	3 char language code identifying the current preferred subtitles language. If no preferred option is set the string "und" shall be returned.

Table 2-3 LNG_GetPreferredLangs arguments

Description

The resident program retrieves the current user preferences for audio and subtitle languages.

2.6.2 LNG_GetAudioLangs

Synopsis Returns a list of available audio languages for the specified event.

Arguments GAu(serviceIndex, eventIndex, audioLangs)

in/out/in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific integer identifying a service. This value shall be consistent with the values returned by SI_GetServiceIndex in[MHEG]
in	GenericInteger	eventIndex	A zero based index to the events on the specified service, 0 being the current event, 1 being the next event.
out	GenericOctetString	audioLangs	A space separated list of 3 char language codes. Each code corresponds to an audio stream that is available to the event as signalled by the EIT _{pf} .

Table 2-4 LNG_GetAudioLangs arguments

Description

The resident program retrieves a list of audio languages available to an event as defined by the EIT_{pf}.

2.6.3 LNG_GetSubtitleLangs

Synopsis Returns a list of available subtitle languages for the specified event.

Arguments GSb(serviceIndex, eventIndex, subsLangs)

in/out/in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific integer identifying a service. This value shall be consistent with the values returned by SI_GetServiceIndex in[MHEG]
in	GenericInteger	eventIndex	A zero based index to the events on the specified service, 0 being the current event, 1 being the next event.
out	GenericOctetString	subsLangs	A space separated list of 3 char language codes. Each code corresponds to a subtitle stream that is available to the event as signalled by the EIT _{pf} .

Table 2-5 LNG_GetSubtitleLangs arguments

Description

The resident program retrieves a list of subtitle languages available to an event as defined by the EIT_{pf}.

2.6.4 LNG_GetADLangs

Synopsis: Returns a list of available Audio Description languages for the specified event.

Arguments: GAD(serviceIndex, eventIndex, adLangs)

in/out/in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific integer identifying a service. This value shall be consistent with the values returned by SI_GetServiceIndex in[MHEG]
in	GenericInteger	eventIndex	A zero based index to the events on the specified service, 0 being the current event, 1 being the next event.
out	GenericOctetString	adLangs	A space separated list of 3 char language codes. Each code corresponds to a audio description stream that is available to the event as signalled by the EIT _{pr} .

Table 2-6 LNG_GetADLangs

2.6.5 Engine Events

Additional engine events are generated when the user changes the preferred Audio or Subtitle language as defined in Table 2-7.

EventData		Notes
Name	Value	
AudioLangPrefChanged	301	Generated when the user changes the preferred Audio language.
SubtitleLangPrefChanged	302	Generated when the user changes the preferred Subtitle language.

Table 2-7 Language Engine Events

2.7 NVM persistent storage

In addition to the RAM-based persistent store as defined in [MHEG], receivers shall support a persistent store that is non-volatile.

The data area may be used by platform-wide applications and service or broadcaster-specific applications. The data area shall be able to store a minimum of 512k bytes of data.

2.7.1 Accessing the store

The NVM store shall be accessed with the StorePersistent and ReadPersistent elementary actions. The file name used to access this storage shall be of the form "nvm://<name>". It is the responsibility of the broadcasters to arrange a practise for the use of <name> such that there is no accidental collision of file names. The <name> part shall be at most 8 bytes in length.

The rules for writing to and reading from the NVM store shall be as defined in [MHEG] for the RAM-based store. This includes the policy for deleting older files to make room for new ones.

2.8 Presentation of MHEG and subtitles

Receivers shall support the simultaneous presentation of MHEG-5 applications and DVB subtitles. The rules for management of subtitle presentation by an MHEG application are described in [MHEG].

2.9 Scheduled Event Info Extension

2.9.1 Overview

The *ScheduledEventInfoExtension* provides access to EIT_{schedule} and EIT_{p/f} information in the broadcast. The extension allows applications to iterate services and events and access information relating to them.

The Event Iterator allows an application to scan the EIT_{schedule} such that it may obtain event ids and use these to access EIT information. The Event Iterator can be considered as a global, single instance EIT reader. Setting or incrementing the Iterator moves the position within the EIT schedule. The Event Iterator can be set to a particular service, date and time and incremented to the event chronologically following.

Resident Programs provides access to event information by passing the service index and event id. The Resident Programs in the *ScheduledEventInfoExtension* **shall not** block if the EIT cache is not populated at the time of calling, instead returning immediately with an error where appropriate.

2.9.2 Authoring Guideline

The dynamic nature of EIT means that event ids returned from the Event Iterator may become stale, i.e. the event to which it points has been flushed from the EIT cache. When accessing Event Info Resident Programs with a stored event id, applications should check the result to ensure the event id is still valid.

Application authors should also be aware that programme overrun may cause EIT_{schedule} to become out of sync with EIT_{p/f}. If the application is displaying information about the present or following events, then the most accurate source is likely to be SI_GetEventInfo as defined by [MHEG] clause 14.11.1.2 and PFEI_GetComponentInfo/Data described by this extension.

2.9.3 SEI_GetNumberOfServices

Synopsis Returns the number of services in the service list.

MHEG-5 Profile for South Africa 2.2

Invocation Call

Arguments GNS(number)

in/out/ in-out	type	name	comment
out	GenericInteger (IndirectReference to an IntegerVariable)	number	Returns the number of services in the service list. The returned number shall only include visible services, i.e. services with the visible_service_flag in the service_attribute_descriptor set to 1 as defined by [SAROP].

Table 2-8 SEI_GetNumberOfServices

2.9.4 SEI_GetNextServiceIndex

Synopsis Returns the index of the next or previous service in the service list.

Invocation Call

Arguments NSI(serviceIndex, up-down, type)

in/out/ in-out	type	name	comment
in-out	GenericInteger (IndirectReference to an IntegerVariable)	serviceIndex	<p>The input value is the index of the service from which to determine the next service index.</p> <p>The returned value is the index of the next visible service in the service list. The receiver shall skip services with the visible_service_flag in the service_attribute_descriptor set to 0 as defined by [SAROP].</p> <p>If the input value of index is -1, the index of the first visible service in the service list is returned.</p> <p>If the input value of index is the last service in the list then -1 is returned.</p>
in	GenericInteger	up_down	Integer indicating if the next service to return is up or down in the list from the input value. A value of 1 indicates up and a value of -1 indicates down.
in	GenericInteger	type	Integer indicating the type of the service to return, where 0 means any service, 1 means TV and data services, and 2 means radio services.

Table 2-9 SI_GetNextServiceIndex

2.9.5 SEI_GetServiceRunningStatus

Synopsis Returns the running status of the specified service.

Invocation Call

Arguments GSR(serviceIndex, runningStatus)

in/out/ in-out	type	name	comment
in	GenericInteger	serviceIndex	The index of the service to return the running status.
out	GenericInteger (IndirectReference to an IntegerVariable)	runningStatus	Returns the running status of the service as indicated by the running_status field in the SDT.

Table 2-10 SEI_GetServiceRunningStatus

2.9.6 SEI_GetChannelNumber

Synopsis Returns the channel number assigned by the receiver to the specified service.

Invocation Call

Arguments GCN(serviceIndex, channelNum)

in/out/ in-out	type	name	comment
in	GenericInteger	serviceIndex	The index of the service to return the channel number.
out	GenericInteger (IndirectReference to an IntegerVariable)	channelNum	The channel number assigned to the service by the receiver as defined by [SAROP]

Table 2-11 SEI_GetChannelNumber

2.9.7 SEI_SetEventIterator

Synopsis Sets the position of the Event Iterator to the specified service, date and time.

Invocation Call, Never Fork

Arguments SEv(serviceIndex, startDate, startTime, eventId)

in/out/ in-out	type	name	comment
in	GenericInteger	serviceIndex	The index of the service on which to set the Event Iterator.
in	GenericInteger	startDate	The start date at which to set the Event Iterator. The coding of this is identical to that used by the GetCurrentDate resident program as defined in [MHEG] clause 11.10.4.2.
in	GenericInteger	startTime	The start time at which to set the Event Iterator. The coding of this is identical to that used by the GetCurrentDate resident program as defined in [MHEG] clause 11.10.4.2.
out	GenericInteger (IndirectReference to an IntegerVariable)	eventId	Returns the unique event identifier for the event in the EIT _{schedule} that the Event Iterator has been set to. When set to an event signalled by the current EIT _{p/fr} , the Resident Programs shall return the id of the event in the EIT _{schedule} and not EIT _{p/f} . If there is no EIT information cached for the given time and date then the receiver shall return the event id of the first event in the cache after the specified date and time. If there are no such events then the receiver shall return -1.

Table 2-12 SEI_SetEventIterator

2.9.8 SEI_IncrementEventIterator

Synopsis Increments the Event Iterator to the event chronologically following the event to which it is currently set and returns the event id.

Invocation Call, Never Fork

Arguments IEI(eventId)

in/out/ in-out	type	name	comment
out	GenericInteger (IndirectReference to an IntegerVariable)	eventId	Returns the unique event identifier for the event to which the Event Iterator is set. If there is no event chronologically following the current event in the EIT cache then the receiver shall return the event id of the first event in the cache occurring after the current event. If there are no such events then the receiver shall return -1. If the Event Iterator has gone stale, i.e. if the event to which the Event Iterator is currently set is no longer in the EIT cache, the receiver shall return -1.

Table 2-13 SEI_IncrementEventIterator

2.9.9 SEI_GetScheduledEventInfo

Synopsis Returns event information for a specified service index and event id.

Invocation Call, Never Fork

Arguments GSE(serviceIndex, eventId, result, eventName, shortDescription, parentalRating, startDate, startTime, duration, category, freeNotCA)

MHEG-5 Profile for South Africa 2.2

in/out/ in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific identifier for the service signalling the event.
in	GenericInteger	eventId	The unique identifier for the event to return information.
out	GenericBoolean (IndirectReference to an BooleanVariable)	result	Returns True if the receiver can access the event in the EIT cache otherwise returns False.
out	GenericOctetString (IndirectReference to an OctetStringVariable)	eventName	Returns the name of the event extracted from the EIT short event descriptor. A zero length string may be returned if this information is not available.
	GenericOctetString (IndirectReference to an OctetStringVariable)	shortDescription	Returns the short description of the event extracted from the EIT short event descriptor. A zero length string may be returned if this information is not available.
out	GenericInteger (IndirectReference to an IntegerVariable)	parentalRating	Returns the parental rating for the event extracted from the EIT parental rating descriptor. The value zero is returned if no rating is available.
out	GenericInteger (IndirectReference to an IntegerVariable)	startDate	Returns the start date for the event. The coding of this is identical to that used by the GetCurrentDate resident program as defined in [MHEG] clause 11.10.4.2.
out	GenericInteger (IndirectReference to an IntegerVariable)	startTime	Returns the start time for the event. The coding of this is identical to that used by the GetCurrentDate resident program as defined in [MHEG] clause 11.10.4.2.
out	GenericInteger (IndirectReference to an IntegerVariable)	duration	Returns the duration of the event in seconds.
out	GenericOctetString (IndirectReference to an OctetStringVariable)	category	Returns the content nibbles from the DVB SI content descriptor. The encoding rules are identical as those for the SI_GetEventInfo resident program as defined in [MHEG] clause 11.14.
out	GenericBoolean (IndirectReference to an BooleanVariable)	freeNotCA	This returned boolean indicates if the event is CA controlled or not (true indicates free). This does not imply a CA query has been performed (so it does not inform about the entitlement to access the event).

Table 2-14 SEI_GetScheduledEventInfo

2.9.10SEI_GetComponentInfo

Synopsis Returns information from the EIT_{schedule} about the component streams for a specified service index and event id. The information returned is extracted from Component Descriptors in the EIT_{schedule} as defined in [SI] clause 6.2.8.

Invocation Call, Never Fork

Arguments SCI (serviceIndex, eventId, key, result, value)

in/out/ in-out	type	name	Comment
in	GenericInteger	serviceIndex	A receiver specific identifier for the service signalling the event.
in	GenericInteger	eventId	The unique identifier for the event to return information.
in	GenericOctetString	key	<p>A string identifying the feature for which availability of a component is to be returned.</p> <p>Defined values are:</p> <p>“Subtitles”: value will return true if any subtitle stream is present, else false.</p> <p>“AudioDesc”: value will be true if Audio Description is available, else false.</p> <p>“AltLang”: value will return true if the service contains audio streams with more than one audio language available, else false.</p> <p>“Dolby”: value will return true if any audio stream is Dolby Digital or Dolby Digital Plus (AC-3 or E-AC-3), else false.</p> <p>“HD”: value will return true if the video component is either MPEG-2 high definition video, or H.264, else false</p> <p>Input strings are case sensitive.</p>
out	GenericBoolean (IndirectReference to an BooleanVariable)	result	Returns True if the receiver could access the event in the EIT cache otherwise returns False.
out	GenericBoolean (IndirectReference to a BooleanVariable)	value	Returns the availability of a component for the feature given by key.

Table 2-15 SEI_GetComponentInfo

2.9.11 SEI_GetComponentData

Synopsis Returns the Component Descriptor data from the EIT_{schedule} for a specified service index and event id. The data returned is extracted from Component Descriptors as defined in [SI] clause 6.2.8.

Invocation Call, Never Fork

Arguments SCD(serviceIndex, eventId, result, strCont, contType, lang)

in/out/in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific identifier for the service signalling the event.
in	GenericInteger	eventId	The unique identifier for the event to return information.
out	GenericBoolean (IndirectReference to an BooleanVariable)	result	Returns True if the receiver could access the event in the EIT cache otherwise returns False.
out	GenericOctetString (IndirectReference to an OctetStringVariable)	strCont	Returns a space separated list of 1 char hex values in ascii representing the values of stream_content for each component of the event.
out	GenericOctetString (IndirectReference to an OctetStringVariable)	contType	Returns a space separated list of 2 char hex values in ascii representing the values of component_type for each component of the event.
out	GenericOctetString (IndirectReference to an OctetStringVariable)	lang	Returns a space separated list of 3 char ascii strings representing the values of language for each component of the event.

Table 2-16 SEI_GetComponentData

2.9.12 PFEI_GetEventId

Synopsis Returns the eventId from EIT_{porf} of the present or following event for the specified service index.

Invocation Call, Never Fork

Arguments GID(serviceIndex, porf, result, eventId)

in/out/ in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific identifier for the service signalling the event.
in	GenericInteger	porf	Identifies the event component info to return. 0 = present, 1 = following.
out	GenericBoolean (IndirectReference to an BooleanVariable)	result	Returns True if the receiver could access the event in the EIT cache otherwise returns False.
out	GenericInteger (IndirectReference to a IntegerVariable)	eventId	Returns the value eventId carried in EIT _{p/f} for the event specified in porf.

Table 2-17 PFEI_GetEventId

2.9.13 PFEI_GetComponentInfo

Synopsis Returns information from EIT_{p/f} about the component streams for a specified service index and event id. The information returned is extracted from Component Descriptors as defined in [SI] clause 6.2.8.

Invocation Call, Never Fork

Arguments PCI(serviceIndex, porf, key, result, value)

in/out/in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific identifier for the service signalling the event.
in	GenericInteger	porf	Identifies the event component info to return. 0 = present, 1 = following.
in	GenericOctetString	key	<p>A string identifying the feature for which availability of a component is to be returned.</p> <p>Defined values are:</p> <p>"Subtitles": value will return true if any subtitle stream is present, else false.</p> <p>"AudioDesc": value will be true if Audio Description is available, else false.</p> <p>"AltLang": value will return true if the service contains audio streams with more than one audio language available, else false.</p> <p>"Dolby": value will return true if any audio stream is Dolby Digital or Dolby Digital Plus (AC-3 or E-AC-3), else false.</p> <p>"HD": value will return true if the video component is either MPEG-2 high definition video, or H.264, else false</p> <p>Input strings are case sensitive.</p>
out	GenericBoolean (IndirectReference to an BooleanVariable)	result	Returns True if the receiver could access the event in the EIT cache otherwise returns False.
out	GenericBoolean (IndirectReference to a BooleanVariable)	value	Returns the availability of a component for the feature given by key.

Table 2-18 PFEI_GetComponentInfo

2.9.14 PFEI_GetComponentData

Synopsis Returns the Component Descriptor data from the EIT_{p/f} for a specified service index and event id. The data returned is extracted from Component Descriptors as defined in [SI] clause 6.2.8.

Invocation Call, Never Fork

Arguments PCD(serviceIndex, porf, result, strCont, contType, lang)

in/out/ in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific identifier for the service signalling the event.
in	GenericInteger	porf	Identifies the event component data to return. 0 = present, 1 = following.
out	GenericBoolean (IndirectReference to an BooleanVariable)	result	Returns True if the receiver could access the event in the EIT cache otherwise returns False.
out	GenericOctetString (IndirectReference to an OctetStringVariable)	strCont	Returns a space separated list of 1 char hex values in ascii representing the values of stream_content for each component of the event.
out	GenericOctetString (IndirectReference to an OctetStringVariable)	contType	Returns a space separated list of 2 char hex values in ascii representing the values of component_type for each component of the event.
out	GenericOctetString (IndirectReference to an OctetStringVariable)	lang	Returns a space separated list of 3 char ascii strings representing the values of language for each component of the event.

Table 2-19 PFEI_GetComponentData

2.10 Native Reminder Extension

2.10.1 REM_SetNativeReminder

Synopsis Sets a native reminder for the given event on the given service.

Invocation Call

Arguments SNR(serviceIndex, eventId, result)

in/out/ in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific identifier for the service.
in	GenericInteger	eventId	The unique event identifier on the given serviceIndex of the event to set a reminder for.
out	GenericBoolean (IndirectReference to an BooleanVariable)	result	Returns True if the receiver could access the event in the EIT cache otherwise returns False.

Table 2-20 REM_SetNativeReminder

2.10.2 REM_GetNativeReminder

Synopsis Returns whether a native reminder has been set for the given event on the given service.

Invocation Call

Argument GNR(serviceIndex, eventId, set)

in/out/ in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific identifier for the service.
in	GenericInteger	eventId	The unique event identifier on the given serviceIndex of the event to return the reminder setting for.
out	GenericBoolean (IndirectReference to a BooleanVariable)	set	Returns boolean indicating if a reminder has been set for the given eventId and service.

Table 2-21 REM_GetNativeReminder

2.10.3 REM_CancelNativeReminder

Synopsis Cancels any native reminder set for the given event on the given service.

Invocation Call

Argument CNR(serviceIndex, eventId)

in/out/ in-out	type	name	comment
in	GenericInteger	serviceIndex	A receiver specific identifier for the service.
in	GenericInteger	eventId	The unique event identifier of the event to cancel the reminder for.

Table 2-22 REM_CancelNativeReminder

2.11 SA Host Settings Extension

2.11.1 SA_GetHostSetting

Synopsis Returns information about the host settings.

Invocation Call

Arguments GHS(key, value)

in/out/ in-out	type	name	comment
in	GenericOctetString	key	<p>A string identifying the setting to be returned.</p> <p>Defined values are:</p> <p>"BannerTransparency": return value is a GenericInteger representing the banner transparency as a percentage 0-100, where 100 is fully transparent.</p> <p>"BannerTimeout": return value is a GenericInteger representing the banner timeout in seconds.</p> <p>"OSDLanguage": return value is a GenericOctetString representing the OSD menu three character code as defined by [ISO 639-2].</p> <p>"ServiceMode": return value is a GenericInteger representing the service mode, where 0 means TV including data only services, 1 means Radio and 3 means All Services.</p> <p>Input strings are case sensitive.</p>
out	GenericInteger or GenericOctetString (IndirectReference to a Variable)	value	Returns the current value of the setting given by key.

Table 2-23 SA_GetHostSetting