Table 7-7—SENSOR_UNIT Descriptor (*continued*)

Offset (octets)	Length (octets)	Name	Description
122	2	base_demultiplexer	The index of the first SIGNAL_DEMULTIPLEXER descriptor.
124	2	number_of_multiplexers	The number of Signal Multiplexers within this Sensor Unit.
126	2	base_multiplexer	The index of the first SIGNAL_MULTIPLEXER descriptor.
128	2	number_of_transcoders	The number of Signal Transcoders within this Sensor Unit.
130	2	base_transcoder	The index of the frist SIGNAL_TRANSCODER descriptor.
132	2	number_of_control_blocks	The number of Control Blocks within this Sensor Unit.
134	2	base_control_block	The index of the first CONTROL_BLOCK descriptor.

7.2.6. STREAM_INPUT and STREAM_OUTPUT Descriptor

The STREAM_INPUT and STREAM_OUTPUT descriptor (shown in Table 7-8) describes an IEEE Std 1722-2011 sourced or sinked Stream.

The **object_name** field contains a name which may be user set through the use of a SET_NAME command. Since the inclusion of non-volatile memory is optional, being able to set the value of this field through the use of the SET_NAME command is optional.

The **object_name** field should be left blank (all zeros) by the manufacturer, with the manufacturer defined value being provided in a localized form via the **localized_description** field. By leaving this field blank an AVDECC Controller can determine if the user has overridden the name and can use this name rather than the localized name.

The **backup_talker_entity_id[0,1,2]**, **backup_talker_unique_id[0,1,2]**, **backedup_talker_entity_id** and **backedup_talker_unique_id** fields are provided for redundant failover advertising.

The **formats** field is variable length data and shall be accessed by using the **formats_offset** field as any fields added in the future will be added before the **formats** field.

The **redundant_streams** field is variable length data and shall be accessed by using the **redundant_offset** field. The **number_of_redundant_streams** field indicates how many entries (between 0 and 8) are present in the **redundant_streams** array. Each entry references a STREAM_INPUT or STREAM_OUTPUT descriptor within the current AVDECC Entity which sources or sinks a redundant copy of the audio data present in the stream described by the current descriptor.

Table 7-8—STREAM_INPUT and STREAM_OUTPUT Descriptor

Offset (octets)	Length (octets)	Name	Description
0	2	descriptor_type	The type of the descriptor. Always set to STREAM_INPUT or STREAM_OUTPUT.
2	2	descriptor_index	The index of the descriptor. This is the index of the Stream.
4	64	object_name	64-octet UTF-8 string containing a Stream name.
68	2	localized_description	The localized string reference pointing to the localized Stream name. See 7.3.6.
70	2	clock_domain_index	The descriptor_index of the Clock Domain providing the media clock for the Stream. See 7.2.9.
72	2	stream_flags	Flags describing capabilities or features of the Stream. See Table 7-9.
74	8	current_format	The Stream format of the current format, as defined in 7.3.2.
82	2	formats_offset	The offset from the start of the descriptor for the first octet of the formats. This field is 136 for this version of AEM.
84	2	number_of_formats	The number of formats supported by this audio Stream. The value of this field is referred to as N. The maximum value for this field is 47 for this version of AEM.
86	8	backup_talker_entity_id_0	The primary backup AVDECC Talker's Entity ID.
94	2	backup_talker_unique_id_0	The primary backup AVDECC Talker's Unique ID.
96	8	backup_talker_entity_id_1	The secondary backup AVDECC Talker's Entity ID.
104	2	backup_talker_unique_id_1	The secondary backup AVDECC Talker's Unique ID.
106	8	backup_talker_entity_id_2	The tertiary backup AVDECC Talker's Entity ID.
114	2	backup_talker_unique_id_2	The tertiary backup AVDECC Talker's Unique ID.
116	8	backedup_talker_entity_id	The Entity ID of the AVDECC Talker that this Stream is backing up.

Table 7-8—STREAM_INPUT and STREAM_OUTPUT Descriptor (*continued*)

Offset (octets)	Length (octets)	Name	Description
124	2	backedup_talker_unique_id	The Unique ID of the AVDECC Talker that this Stream is backing up.
126	2	avb_interface_index	The descriptor_index of the AVB_INTERFACE from which this Stream is sourced or to which it is sinked.
128	4	buffer_length	The length in nanoseconds of the MAC's ingress or egress buffer as defined in IEEE Std 1722-2016 Figure 5.4. For a STREAM_INPUT this is the MAC's ingress buffer size and for a STREAM_OUTPUT this is the MAC's egress buffer size. This is the length of the buffer between the IEEE Std 1722-2016 reference plane and the MAC.
132	2	redundant_offset	The offset from the start of the descriptor for the first octet of the redundant_streams array. This field is 136 + 8*N for this version of AEM.
134	2	number_of_redundant_streams	The number of redundant streams supported by this audio Stream. The value of this field is referred to as R. The maximum value for this field is 8 for this version of AEM.
136	8*N	formats	Array of Stream formats of the supported formats, as defined in 7.3.2.
136+8*N	2*R	redundant_streams	Array of redundant STREAM_INPUT or STREAM_OUTPUT descriptor indices. The current version of AEM doesn't specify an ordering for the elements of this array.

7.2.6.1. Stream Flags

Table 7-9 shows the Stream Flags.

Table 7-9—Stream Flags

Bit	Field Value	Function	Meaning
15	0001_{16}	CLOCK_SYNC_SOURCE	Indicates that the Stream is a preferred clock synchronization source.
14	0002_{16}	CLASS_A	Indicates that the Stream supports streaming at Class A.
13	0004_{16}	CLASS_B	Indicates that the Stream supports streaming at Class B.
12	0008_{16}	SUPPORTS_ENCRYPTED	Indicates that the Stream supports streaming with encrypted PDUs.
11	0010_{16}	PRIMARY_BACKUP_SUPPORTED	Indicates that the backup_talker_entity_id_0 and the backup_talker_entity_id_0 fields are supported.
10	0020_{16}	PRIMARY_BACKUP_VALID	Indicates that the backup_talker_entity_id_0 and the backup_talker_entity_id_0 fields are valid.
9	0040_{16}	SECONDARY_BACKUP_SUPPORTED	Indicates that the backup_talker_entity_id_1 and the backup_talker_entity_id_1 fields are supported.
8	0080_{16}	SECONDARY_BACKUP_VALID	Indicates that the backup_talker_entity_id_1 and the backup_talker_entity_id_1 fields are valid.
7	0100_{16}	TERTIARY_BACKUP_SUPPORTED	Indicates that the backup_talker_entity_id_2 and the backup_talker_entity_id_2 fields are supported.
6	0200_{16}	TERTIARY_BACKUP_VALID	Indicates that the backup_talker_entity_id_2 and the backup_talker_entity_id_2 fields are valid.
0 to 5	—	—	Reserved for future use

NOTE—A preferred clock synchronization source is one that an AVDECC Controller will prefer above other clock sources when determining how to automatically connect a media clock within the network. Typically this flag is applied only to dedicated media clock Stream sources and sinks.

7.2.7. JACK_INPUT and JACK_OUTPUT Descriptor

The JACK_INPUT and JACK_OUTPUT descriptor (shown in Table 7-10) describes an Input or Output Jack.

The **object_name** field contains a name which may be user set through the use of a SET_NAME command. Since the inclusion of non-volatile memory is optional, being able to set the value of this field through the use of the SET_NAME command is optional.

The SET_SENSOR_FORMAT command may be protected by authentication. If this is the case then the AVDECC Entity responds with a NOT_AUTHENTICATED status response to an unauthenticated AVDECC Controller.

7.4.14. GET_SENSOR_FORMAT Command

The GET_SENSOR_FORMAT command is used to get the format of a sensor cluster.

The GET_SENSOR_FORMAT command returns the format for the currently active configuration.

7.4.14.1. Command Format

The GET_SENSOR_FORMAT command AECPDU format is shown in Figure 7-45.

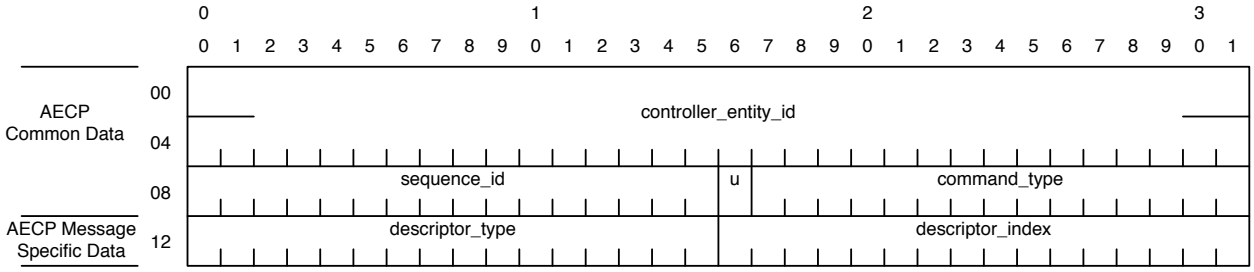

Figure 7-45—GET_SENSOR_FORMAT Command Format

The **command_type** field is set to GET_SENSOR_FORMAT.

The **descriptor_type** and **descriptor_index** fields are set to the descriptor type and index of the sensor cluster for which the sensor format is being fetched. **descriptor_type** is set to SENSOR_CLUSTER.

7.4.14.2. Response Format

The GET_SENSOR_FORMAT command and response share the same AECPDU format as shown in Figure 7-44.

The **command_type** field is set to GET_SENSOR_FORMAT.

The **descriptor_type** and **descriptor_index** fields are set to the descriptor type and index of the sensor cluster for which the sensor format is being fetched. **descriptor_type** is set to SENSOR_CLUSTER.

The **sensor_format** field is set to the current sensor format. The layout of **sensor_format** is described in 7.3.11.

7.4.14.3. Restrictions

The GET_SENSOR_FORMAT command may be protected by authentication. If this is the case then the AVDECC Entity responds with a NOT_AUTHENTICATED status response to an unauthenticated AVDECC Controller.

7.4.15. SET_STREAM_INFO Command

The SET_STREAM_INFO command is used to set the current values of the dynamic information of the stream, such as the stream ID, destination MAC, etc.

The SET_STREAM_INFO command acts on a STREAM_INPUT or STREAM_OUTPUT descriptor in the current configuration. An AVDECC Entity may propagate the information change onto corresponding descriptors in other configurations but an AVDECC Controller cannot assume that this will happen.

On success this command also sends an unsolicited notification.

7.4.15.1. Command and Response Format

The SET_STREAM_INFO command and response uses the AECPDU format as shown in Figure 7-46.

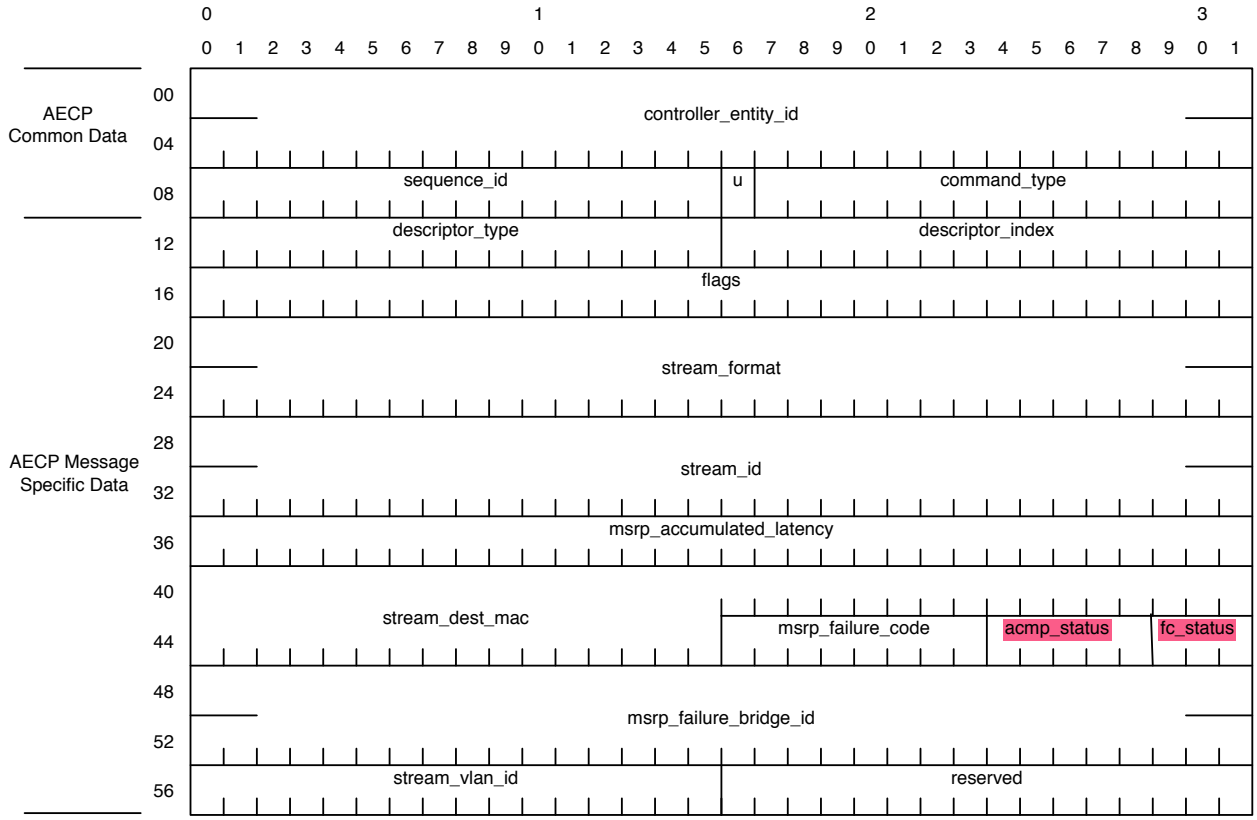

Figure 7-46—SET_STREAM_INFO Command and Response and GET_STREAM_INFO Response Format

The **command_type** field is set to SET_STREAM_INFO.

The **descriptor_type** and **descriptor_index** fields are set to the descriptor type and index of the stream for which the stream format is being fetched. **descriptor_type** is set to either STREAM_INPUT or STREAM_OUTPUT.

The **flags** field is set to an appropriate combination of the flags in Table 7-131 to indicate which fields have values to be set. The lower 16 bits of the **flags** maps directly to the **flags** field of ACMP, see 8.2.1.17. However since FAST_CONNECT, SAVED_STATE and STREAMING_WAIT are not settable, they are ignored in the command.

The **stream_format** field in a command is the new stream format to be set to if STREAM_FORMAT_VALID is set in the **flags** field of the command or zero (0) otherwise. The **stream_format** field in a response is the current stream format. The layout of **stream_format** is described in 7.3.2.

The **stream_id** field is used for the AVDECC Controller to set the stream_id of the stream. When the STREAM_ID_VALID flag is set in a command then this field contains the stream_id that the stream is to be set to. In the response the STREAM_ID_VALID flag is set if the stream has an ID and the value is placed into the **stream_id** field.

The **msrp_accumulated_latency** field's use depends on if the command is sent to a STREAM_INPUT or a STREAM_OUTPUT. If it is sent to a STREAM_INPUT then the **msrp_accumulated_latency** field is set to zero (0) in the command and ignored and is set to the **accumulated_latency** of the stream's MSRP Talker Advertise in the response. If it is sent to a STREAM_OUTPUT then the **msrp_accumulated_latency** field is set to the maximum of all of the **msrp_accumulated_latency** values read from all of the known listeners in the command and is set to the last set value if it has been set since the stream was connected or the appropriate default value for the streams traffic class (2 ms for Class A and 50ms for Class B) if it has not been set since the stream was connected. The MSRP_ACC_LAT_VALID flag is set only when this field contains a valid accumulated latency.

The **stream_dest_mac** field is used for the AVDECC Controller to set the destination MAC address of the stream. When the STREAM_DEST_MAC_VALID flag is set in a command then this field contains the assigned destination MAC address the stream is to use. A destination MAC of zero (00-00-00-00-00-00) in the command restores the destination MAC to automatic behavior (that is it will revert back to using MAAP or self assigned addresses). In the response the **stream_dest_mac** field is set the destination MAC address of the stream which has either been previously set or dynamically allocated or zero (00-00-00-00-00-00) if there is no address. In the response the STREAM_DEST_MAC_VALID flag is set only when this field contains a valid destination address.

The **msrp_failure_bridge_id** and **msrp_failure_code** fields use depends on if the command is sent to a STREAM_INPUT or a STREAM_OUTPUT. If it is sent to a STREAM_INPUT then the **msrp_failure_bridge_id** and **msrp_failure_code** fields are set to zero (0) in the command and ignored and is set to the **failure_bridge_id** and **failure_code** of the stream's MSRP Talker Failed in the response. If it is sent to a STREAM_OUTPUT then the **msrp_failure_bridge_id** and **msrp_failure_code** fields may be set to the the worst of the **msrp_failure_bridge_id** and **msrp_failure_code** values read from all of the known listeners in the command and is set to the last set value if it has been set since the stream was connected. The MSRP_FAILURE_VALID flag is set only when these fields contain failure information.

The **stream_vlan_id** field is used for the AVDECC Controller to set the VLAN ID of the stream. When the STREAM_VLAN_ID_VALID flag is set in a command then this field contains the assigned VLAN that the stream is to use. A VLAN ID of zero (0) in the command restores the VLAN ID being used by the stream to the VLAN ID specified in the SRP Domain attribute for the traffic class. In the response the **stream_vlan_id** field is set to the VLAN ID being used by the stream or zero (0) if there is no VLAN. In the response the STREAM_VLAN_ID_VALID flag is set only when this field contains a valid VLAN ID.

Table 7-131—flags field

Bit	Field Value	Function	Meaning
31	00000001_{16}	CLASS_B	Indicates that the Stream is Class B instead of Class A (default 0 is class A)
30	00000002_{16}	FAST_CONNECT	Fast Connect Mode, the Stream was connected in Fast Connect Mode or is presently trying to connect in Fast Connect Mode
29	00000004_{16}	SAVED_STATE	Connection has saved ACMP state.
28	00000008_{16}	STREAMING_WAIT	The Stream is presently in STREAMING_WAIT, either it was connected with STREAMING_WAIT flag set or it was stopped with STOP_STREAMING command.
27	00000010_{16}	SUPPORTS_ENCRYPTED	Indicates that the Stream supports streaming with encrypted PDUs.

Table 7-131—flags field (*continued*)

Bit	Field Value	Function	Meaning
26	00000020_{16}	ENCRYPTED_PDU	Indicates that the Stream is using encrypted PDUs.
25	00000040_{16}	TALKER_FAILED	Indicates that the Listener has registered an SRP Talker Failed attribute for the Stream.
10 to 24	—	—	Reserved for future use
9	00400000_{16}	REGISTERING	For a STREAM_INPUT, indicates that the Listener is registering a Talker Advertise or Talker Failed attribute for the stream. For a STREAM_OUTPUT, indicates that the Talker is declaring a Talker Advertise or Talker Failed attribute and registering a matching Listener attribute for the stream.
8	00800000_{16}	REGISTERING_VALID	Indicates that the value of the REGISTERING flag is valid. This may only be set in a response.
7	01000000_{16}	FC_STATUS_VALID	Indicates that the **fc_status** and **acmp_status** fields are valid. This may only be set in a response.
6	02000000_{16}	STREAM_VLAN_ID_VALID	Indicates that the **stream_vlan_id** field is valid.
5	04000000_{16}	CONNECTED	The Stream has been connected with ACMP. This may only be set in a response.
4	08000000_{16}	MSRP_FAILURE_VALID	The values in the msrp_failure_code and msrp_failure_bridge_id fields are valid.
3	10000000_{16}	STREAM_DEST_MAC_VALID	The value in the stream_dest_mac field is valid.
2	20000000_{16}	MSRP_ACC_LAT_VALID	The value in the msrp_accumulated_latency field is valid.
1	40000000_{16}	STREAM_ID_VALID	The value in the stream_id field is valid.
0	80000000_{16}	STREAM_FORMAT_VALID	The value in stream_format field is valid and is to be used to change the Stream Format if it is a SET_STREAM_INFO command.

7.4.15.2. Restrictions

Setting the info of a stream can only happen on a stream which is not streaming. If the stream is currently streaming then the AVDECC Entity responds with a STREAM_IS_RUNNING status.

If the AVDECC Entity has been locked or acquired by another AVDECC Controller then the AVDECC Entity responds with an ENTITY_LOCKED or ENTITY_ACQUIRED status response.

The SET_STREAM_INFO command may be protected by authentication. If this is the case then the AVDECC Entity responds with a NOT_AUTHENTICATED status response to an unauthenticated AVDECC Controller.

7.4.16. GET_STREAM_INFO Command

The GET_STREAM_INFO command is used to get the current values of the dynamic information of the stream, such as MSRP accumulated latency, stream ID, destination MAC, etc.

The GET_STREAM_INFO command returns the values for the currently active configuration.

7.4.16.1. Command Format

The GET_STREAM_INFO command uses the AECPDU format as shown in Figure 7-47.

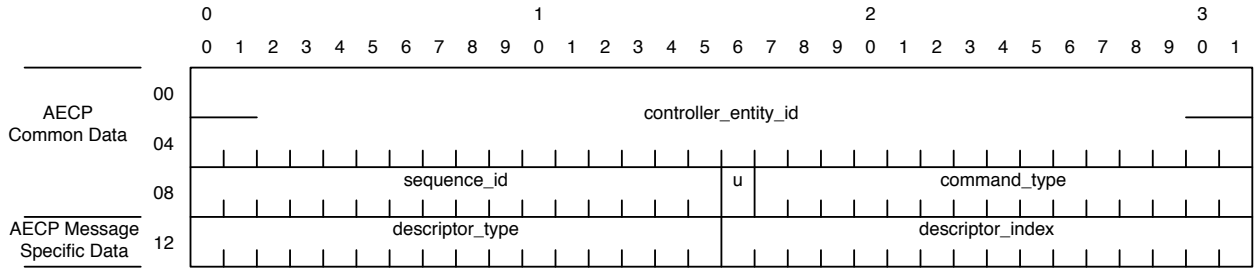

Figure 7-47—GET_STREAM_INFO Command Format

The **command_type** field is set to GET_STREAM_INFO.

The **descriptor_type** and **descriptor_index** fields are set to the descriptor type and index of the stream for which the stream info is being fetched. **descriptor_type** is set to either STREAM_INPUT or STREAM_OUTPUT.

7.4.16.2. Response Format

The GET_STREAM_INFO response uses the AECPDU format as shown in Figure 7-46.

The **command_type** field is set to GET_STREAM_INFO.

The **descriptor_type** and **descriptor_index** fields are set to the descriptor type and index of the stream for which the stream info is being fetched. **descriptor_type** is set to either STREAM_INPUT or STREAM_OUTPUT.

The **flags** field is set to an appropriate combination of the flags in Table 7-131 to indicate which fields have values to be set. The lower 16 bits of the **flags** maps directly to the **flags** field of ACMP, see 8.2.1.17.

The **stream_format** field is set to the current format of the stream. This is equivalent to the **current_format** field of the addressed descriptor. The layout of **stream_format** is described in 7.3.2.

The **stream_id** field is set to the current id of the stream, or zero (0) if the stream is not connected and has not had a stream_id set. The **flags** field indicates if this is valid.

The **msrp_accumulated_latency** field's use depends on if the command is sent to a STREAM_INPUT or a STREAM_OUTPUT. If it is sent to a STREAM_INPUT then the **msrp_accumulated_latency** field is set to the **accumulated_latency** of the stream's MSRP Talker Advertise if connected or zero (0) otherwise. If it is sent to a STREAM_OUTPUT then the **msrp_accumulated_latency** field is set to the last set value if it has been set since the stream was connected or the appropriate default value for the streams traffic class (2 ms for Class A and 50ms for Class B) if it has not been set since the stream was connected. The MSRP_ACC_LAT_VALID flag is set only when this field contains a valid accumulated latency.

The **stream_dest_mac** field is set the destination MAC address of the stream which has either been previously set or dynamically allocated or zero (00-00-00-00-00-00) if there is no address. The STREAM_DEST_MAC_VALID flag is set only when this field contains a valid destination address.

The **msrp_failure_bridge_id** and **msrp_failure_code** fields use depends on if the command is sent to a STREAM_INPUT or a STREAM_OUTPUT. If it is sent to a STREAM_INPUT then the **msrp_failure_bridge_id** and **msrp_failure_code** fields are set to the **failure_bridge_id** and **failure_code** of the stream's MSRP Talker Failed if the stream has received an MSRP Talker Failed otherwise they contain zero (0). If it is sent to a STREAM_OUTPUT then the **msrp_failure_bridge_id** and **msrp_failure_code** fields are set to the last set value if it has been set since the stream was connected or zero (0) otherwise. The MSRP_FAILURE_VALID flag is set only when these fields contain failure information.

The **stream_vlan_id** field is set to the VLAN ID of the stream or zero (0) if the stream is not connected. The STREAM_VLAN_ID_VALID flag is set only when this field contains a valid VLAN ID.

The **fc_status** and **acmp_status** fields are used to report the status of the Fast Connect process for a Listener's STREAM_INPUT. The FC_STATUS_VALID flag is set only when these fields contain valid data.

The **fc_status** field is 3 bits wide and its possible values are described in Table 7-132.

Table 7-132—fast_connect_status field

Value	Name	Description
0	DISABLED	There are no saved Fast Connect parameters associated with the STREAM_INPUT.
1	WAITING	The Listener is using ADP discovery to listen for the Talker to appear on the network.
2	QUERYING	The Listener is querying the Talker to obtain the SRP parameters for the stream.
3	COMPLETE	The Listener has completed the Fast Connect process.
4 to 7	—	Reserved for future use.

The **acmp_status** field is 5 bits wide, and its value is only defined when the **fc_status** field is set to QUERYING. In this case, it contains the value from the status field (see Table 8-2) of the most recent CONNECT_TX_RESPONSE message received by the Listener for this STREAM_INPUT.

7.4.16.3. Restrictions

The GET_STREAM_INFO command may be protected by authentication. If this is the case then the AVDECC Entity responds with a NOT_AUTHENTICATED status response to an unauthenticated AVDECC Controller.

7.4.17. SET_NAME Command

The SET_NAME command is used to set the value of a name field within a descriptor. For descriptors with multiple names, this sets only one specified name per command.

On success this command also sends an unsolicited notification.

7.4.17.1. Command and Response Format

The SET_NAME command and response uses the AECPDU format as shown in Figure 7-48.