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AV/C Command for Device Diagnostics 1.0

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Abstract:
This specification defines a common unit command that requests that an audio/video device
execute its built-in diagnostics and report the results to the requestor. This document does not
specify what functionality the device should test or how the diagnostics should be performed.
This command makes use of the Function Control Protocol (FCP) defined by IEC-61883, Digital
Interface for Consumer Electronic Audio/Video Equipment, for the transport of audio/video
command requests and responses.

Keywords:
AV/C, Diagnostics, Self-test.
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Editor, 1394 Trade Association
Regency Plaza Suite 350
2350 Mission College Blvd.
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1. Overview

1.1 Scope

This document specifies an AV/C common unit control command for requesting that a device execute its built-in diagnostics. The results are reported back to the requestor in the response. The requestor can vary the format of the response, but it will minimally include a simple pass/fail indicator.

It is outside the scope of this document to specify the functionality that the diagnostics test or specify how to perform the tests.
2. References

The following standards contain provisions, which through reference in this document constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.


3. Definitions

3.1 Keywords and Definitions

This specification uses the following keywords and terms:

3.1.1 expected: A key word used to describe the behavior of the hardware or software in the design models assumed by this standard. Other hardware and software design models may also be implemented.

3.1.2 may: A key word that indicates flexibility of choice with no implied preference.

3.1.3 shall: A key word indicating a mandatory requirement. Designers are required to implement all such mandatory requirements.

3.1.4 should: A key word indicating flexibility of choice with a strongly preferred alternative. Equivalent to the phrase is recommended.

3.1.5 byte: Eight bits of data, used as a synonym for octet.


3.1.7 octet: Eight bytes of data. Not to be confused with an octet, which has been commonly used to describe eight bits of data. In this document, the term byte, rather than octet, is used to describe eight bits of data.

3.1.8 pass/fail result: a diagnostic test result that indicates only whether or not the test succeeded or failed.

3.2 Acronyms and Abbreviations

This specification uses the following acronyms and abbreviations:

AV/C Audio/video control, as in the AV/C Digital Interface Command Set.
4. Command for Device Diagnostics

4.1 SELF-TEST Command

Device diagnostics is initiated through a single AV/C command, SELF-TEST. The SELF-TEST command is used to request that a device execute its built-in diagnostic self tests and report the results. This specification defines two formats for the response. Additional formats may be defined in the future. The format of the response is selected by the requestor through the response_format field defined below. At a minimum, all response formats include a pass/fail indicator.

It is outside the scope of this document to specify the functionality that the diagnostics test or specify how to perform the tests.

The SELF-TEST command is summarized in the table below:

<table>
<thead>
<tr>
<th>Opcode</th>
<th>Value</th>
<th>C</th>
<th>S</th>
<th>N</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELF-TEST</td>
<td>27_{16}</td>
<td>O</td>
<td>-</td>
<td>-</td>
<td>Perform self-test and report results</td>
</tr>
</tbody>
</table>

The general format of the SELF-TEST control command is as follows:

```
opcode [msb] SELF-TEST (27_{16}) [lsb]
operand[0] reserved_zero [msb]
operand[1] response_format [msb]
operand[2] (msb) response_format_dependent [lsb]
operand[n] [lsb]
```

Figure 4.1 – SELF-TEST command frame

The value of the opcode field is 27_{16}. (Common Unit command)

The response_format specifies the format of the response. This field may take one of the values defined in Table 4.2.
Table 4.2 – Definition of response_format field

<table>
<thead>
<tr>
<th>Value</th>
<th>response_format</th>
</tr>
</thead>
<tbody>
<tr>
<td>00&lt;sub&gt;16&lt;/sub&gt;</td>
<td>Simple diagnostics</td>
</tr>
<tr>
<td>01&lt;sub&gt;16&lt;/sub&gt; - 0D&lt;sub&gt;16&lt;/sub&gt;</td>
<td>Reserved for future specification</td>
</tr>
<tr>
<td>FE&lt;sub&gt;16&lt;/sub&gt;</td>
<td>Vendor_dependent diagnostics</td>
</tr>
<tr>
<td>FF&lt;sub&gt;16&lt;/sub&gt;</td>
<td>Reserved for future specification</td>
</tr>
</tbody>
</table>

The response_format value 0 specifies that this command will contain only a pass/fail indication of the test results in the response.

The response_format value FE<sub>16</sub> specifies that this command will include vendor-dependent diagnostics response information as well as a pass/fail indication of the test results.

The format of response_format_dependent field is dependent on the value of the response_format field. This field is not used by any of the defined response formats and is intended for future specification.

The general format of the SELF-TEST response is as follows:

```
<table>
<thead>
<tr>
<th>msb</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>lsb</th>
</tr>
</thead>
<tbody>
<tr>
<td>opcode</td>
<td>SELF-TEST (27&lt;sub&gt;16&lt;/sub&gt;)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[0]</td>
<td>reserved_zero</td>
<td>pf</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[1]</td>
<td>response_format</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[2] (msb)</td>
<td>response_format_dependent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[n]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

Figure 4.2 – SELF-TEST response frame

The response_format and response_format_dependent fields are as defined above.

The pf (pass/fail) field indicates whether the device diagnostics were successfully in their execution. A value of 0 indicates success and a value of 1 indicates failure.

The reserved_zero field is reserved for future specification. When the bits in this field are defined, they must be defined such that a value of 0 for each of the bits indicates success.

### 4.2 Simple Diagnostics

Simple diagnostics provide only pass/fail results after executing the device diagnostics.

The command format for the simple diagnostics form of the SELF-TEST command is as follows:

```
<table>
<thead>
<tr>
<th>msb</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>lsb</th>
</tr>
</thead>
<tbody>
<tr>
<td>opcode</td>
<td>SELF-TEST (27&lt;sub&gt;16&lt;/sub&gt;)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[0]</td>
<td>reserved_zero</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[1]</td>
<td>response_format = 0&lt;sub&gt;16&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

Figure 4.3 – SELF-TEST Simple Diagnostics command frame

The response format for the simple diagnostics form of the SELF-TEST command is as follows:
4.3 Vendor_dependent Diagnostics

Vendor_dependent diagnostics provide additional vendor-specified results as well as pass/fail results after executing the device diagnostics.

The command format for the vendor_dependent form of the SELF-TEST command is as follows:

<table>
<thead>
<tr>
<th>msb</th>
<th></th>
<th></th>
<th></th>
<th>lsb</th>
</tr>
</thead>
<tbody>
<tr>
<td>opcode</td>
<td>SELF-TEST (27&lt;sub&gt;16&lt;/sub&gt;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[0]</td>
<td>reserved_zero</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[1]</td>
<td>response_format = 0&lt;sub&gt;16&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.5 – SELF-TEST Vendor_dependent command frame

The response format for the vendor_dependent form of the SELF-TEST command is as follows:

<table>
<thead>
<tr>
<th>msb</th>
<th></th>
<th></th>
<th></th>
<th>lsb</th>
</tr>
</thead>
<tbody>
<tr>
<td>opcode</td>
<td>SELF-TEST (27&lt;sub&gt;16&lt;/sub&gt;)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[0]</td>
<td>reserved_zero</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[1]</td>
<td>response_format = FE&lt;sub&gt;16&lt;/sub&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[2]</td>
<td>(msb)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[3]</td>
<td>company_ID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[4]</td>
<td>(lsb)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[5]</td>
<td>(msb)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[6]</td>
<td>vendor_dependent_version_ID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[7]</td>
<td>(lsb)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[8]</td>
<td>vendor_dependent_response_data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operand[n]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.6 – SELF-TEST Vendor_dependent response frame

The company_ID field shall contain the 24-bit unique ID obtained from the IEEE Registration Authority Committee (RAC).

The vendor_dependent_version_ID field shall contain a version identifier defined by the company specified by the company_ID field and is used in combination with the company_ID field to indicate the format of the vendor_dependent_response_data field. This field is used to allow a single company to specify multiple formats for the vendor_dependent_response_data field.

The format and meaning of the vendor_dependent_response_data is specified by the company identified by the company_ID field.

The remaining fields are as described above.