# DICOM Correction Proposal Form

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| Tracking Information - Administration Use Only | |
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| Correction Proposal Number | 202 |
| STATUS | Assigned |
| Date of Last Update | July 31, 2000 |
| Person Assigned | Ellie Avraham |
| Submitter Name | |
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| Correction Number | CP-202 |
|---|---|
| Log Summary: Presentation Lut Descriptor | |
| Type of Modification: Correction & Clarification | Name of Standard<br>PS 3.3 & PS 3.4 - 1999 |
| Rationale for Correction:<br>A requirement is added to basic print to restrict the number of elements in the optional Presentation LUT sequence to 2^(bits stored). This ensures consistency between multiple print devices and eliminates potential image quality issues due to interpolation of the specified LUT points.<br>Additionally, the Print Presentation Lut descriptor is more precisely defined for part 3 and 4. | |
| Sections of document affected:<br>PS 3.3-1999, Section C.11.4 and PS 3.4-1999, Section H.4.9.2.1.1 | |
| Correction Wording:<br>See below. | |

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*Amend PS 3.4-1999 Section H.4.9.2.1.1 Table H.4-23 Lut Descriptor, element (0028,3002) Description.*

**Table H.4-23**
**N-CREATE ATTRIBUTE LIST**

| Attribute name | Tag | Usage SCU/SCP |
|---|---|---|
| Presentation LUT Sequence | (2050,0010) | MC/M (Required if Presentation LUT Shape (2050,0020) is not present. Not allowed otherwise.) |
| >LUT Descriptor | (0028,3002) | MC/M (Required if sequence is present. The first value (number of entries in the LUT) shall be equal to 256 if Bits Stored = 8 4096 if Bits Stored = 12. The second value shall be equal to 0. The third value (number of ~~bytes~~ bits for each LUT entry) shall be 10-16.) ~~Note: The number of bytes that is sent via this LUT will be $2^n$, where n is the third value.~~ See H.4.9.2.1.1.1 for further explanation. |
| >LUT Explanation | (0028,3003) | U/U |
| >LUT Data | (0028,3006) | MC/M (Required if sequence is present) |
| Presentation LUT Shape | (2050,0020) | MC/M (Required if Presentation LUT Sequence (2050,0010) is not present. Not allowed otherwise.) SCPs shall support the Enumerated Values IDENTITY and LIN OD |

*Add PS 3.4-1999 Section H.4.9.2.1.1.1 Lut Descriptor, Description.*

#### H.4.9.2.1.1.1 LUT Descriptor

The three values of the LUT Descriptor (0028,3002) describe the format of the data in LUT Data (0028,3006).

The first value is the number of entries in the lookup table. The first value shall either equal 256 if Bits Stored (0028,0101) equals 8 or the first value shall equal 4096 if Bits Stored (0028,0101) equals 12.

The second value is the first input value mapped, and shall always be 0. The Value Representation of the second value is always US. This input value is mapped to the first entry in the LUT. Subsequent input values are mapped to the subsequent entries in the LUT Data up to an input value equal to number of entries + first value mapped - 1 which is mapped to the last entry in the LUT Data. There are no input values greater than number of entries + first value mapped.

The third value specifies the number of bits for each entry in the LUT Data. It shall be between 10 and 16 inclusive. The LUT Data shall be stored in a format equivalent to 16 bits allocated where the high bit is equal to bits stored - 1, where bits stored is the third value.

Note: Since the LUT Descriptor (0028,3002) Attribute is multi-valued, in an Explicit VR Transfer Syntax, only one value representation (US or SS) may be specified. Since all three values are always by definition interpreted as unsigned, the explicit VR actually used will always be US.

LUT Data (0028,3006) contains the LUT entry values, which are P-Values.

The output range is from 0 to $2^n$-1 where n is the third value of LUT Descriptor. This range is always unsigned.

This range specifies the output range of the P-Values.

*Amend PS 3.3-1999 Section C.11.4, Table C.11-4 Lut Descriptor, element (0028,3002) Description.*

**C.11.4 Presentation LUT Module**

Table C.11-4 specifies the Attributes that describe the Presentation LUT.

**Table C.11-4**
**Presentation LUT Module**

| Attribute name | Tag | Description |
|---|---|---|
| Presentation LUT Sequence | (2050,0010) | Defines a sequence of Presentation LUTs. Only a single item shall be included in this sequence. |
| >LUT Descriptor | (0028,3002) | Specifies the format of the LUT Data in this Sequence.<br>See C.11.4.1 for further explanation.<br>Required if Presentation LUT Sequence (2050,0010) is sent. |
| >LUT Explanation | (0028,3003) | Free form text explanation of the meaning of the LUT. |
| >LUT Data | (0028,3006) | LUT Data in this Sequence. |
| Presentation LUT Shape | (2050,0020) | Specifies pre-defined Presentation LUT shapes.<br>Enumerated Values :<br>IDENTITY = input to the Presentation LUT is in P-Values, no further translation is necessary.<br>LIN OD = input to Presentation LUT is in linear optical density over the range of Min Density (2010,0120) and Max Density (2010,1030).<br>Note: LIN OD is only defined for hardcopy devices and is not applicable to softcopy devices. |

*Add PS 3.3-1999 Section C.11.4.1 LUT Descriptor*

### C.11.4.1 LUT Descriptor

The three values of the LUT Descriptor (0028,3002) describe the format of the data in LUT Data (0028,3006).

The first value is the number of entries in the lookup table. When the number of table entries is equal to $2^{16}$ then this value shall be 0. For basic print, the first value shall either equal 256 if Bits Stored (0028,0101) equals 8 or the first value shall equal 4096 if Bits Stored (0028,0101) equals 12.

The second value is the first input value mapped, and shall always be 0. The Value Representation of the second value is always US. This input value is mapped to the first entry in the LUT. Subsequent input values are mapped to the subsequent entries in the LUT Data up to an input value equal to number of entries + first value mapped - 1 which is mapped to the last entry in the LUT Data. There are no input values greater than number of entries + first value mapped.

The third value specifies the number of bits for each entry in the LUT Data. It shall be between 10 and 16 inclusive. The LUT Data shall be stored in a format equivalent to 16 bits allocated where the high bit is equal to bits stored - 1, where bits stored is the third value.

Note: Since the LUT Descriptor (0028,3002) Attribute is multi-valued, in an Explicit VR Transfer Syntax, only one value representation (US or SS) may be specified. Since all three values are always by definition interpreted as unsigned, the explicit VR actually used will always be US.

LUT Data (0028,3006) contains the LUT entry values, which are P-Values.

The output range is from 0 to $2^n$-1 where n is the third value of LUT Descriptor. This range is always unsigned.

This range specifies the output range of the P-Values.