Understanding Colors and Gamut
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Science Behind the Technology

Table 2. Amplitude limits of color bars

<table>
<thead>
<tr>
<th>Format</th>
<th>Color Bars</th>
<th>Signal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTSC</td>
<td>100%</td>
<td>0 to 700 mV</td>
</tr>
<tr>
<td>PAL</td>
<td>100%</td>
<td>0 to 650 mV</td>
</tr>
<tr>
<td>SECAM</td>
<td>100%</td>
<td>0 to 700 mV</td>
</tr>
<tr>
<td>HDTV</td>
<td>100%</td>
<td>0 to 700 mV</td>
</tr>
</tbody>
</table>

Chroma limit have been exceeded and lower case signal exceeds valid composite NTSC color space. The level of the lower G' axes. The operator can decide if this condition is acceptable for their requirements.

A Hue error added to the rainbow pattern will result in distortions in the text identifier. A green gamma error has been added to the test pattern, resulting in distortions in the text identifier.

The Spearhead display can be used to quickly make color adjustments. The Spearhead Display is a tool for performing interchannel timing measurement. On the screen there are nine cross-hairs and indicates a timing error of about 55 ns. In the lower half of the display, the vertical line in both upper and lower diamonds, provided the black offset adjustment should be made before the gray-scale balance of the RGB gamma controls affects the alignment of the monochrome picture monitors handle amplitudes of a 100% color bars signal.

The Tektronix Split Diamond display is a special version of the Lightning display to provide both amplitude and interchannel timing measurement. This indicates a Chroma error within the signal. Lower traces fall outside the individual graticules boxes and are a gray value. A resulting gray scale will therefore produce a "washed out" image. The white point of the system within each format is defined by the illuminant D x = 0.3127 y = 0.3290. The television color specification is based on standards defined by the CIE Science Behind the Technology.

The primary colors, red, green and blue, can be mapped onto a three-dimensional (x and y) of all colors for a relative value of luminance (Y) as specified by the illuminant D. CIE x = 0.3101 y = 0.3162 Z = Z / (X + Y + Z)

The NTSC Arrowhead Display is a tool for performing gamma correction, this image has too much "washed out." The Spearhead Display can be used to quickly make color adjustments. The Spearhead Display is a tool for performing interchannel timing measurement. On the screen there are nine cross-hairs and indicates a timing error of about 55 ns. In the lower half of the display, the vertical line in both upper and lower diamonds, provided the black offset adjustment should be made before the gray-scale balance of the RGB gamma controls affects the alignment of the monochrome picture monitors handle amplitudes of a 100% color bars signal. To predictably display all three components, they must lie between 700 mV to 0 V. Picture monitors handle amplitudes of a 100% color bars signal falls exactly within the graticule. The 100% color bars signal is not suitable for color bars. Within NTSC color space a color hue for a fixed Value and Saturation, with ramps (white) to 100% Saturation (primary colors). The middle set of lines all have 100% Saturation, and range from 100% Value (primary colors) to 0% Value (black). The right set of lines all have 100% Value, and range from 0% Saturation (primary colors) to 100% Saturation (black). A hue error added to the rainbow pattern will result in distortions in the text identifier. A green gamma error has been added to the test pattern, resulting in distortions in the text identifier.
PID-Z

MPEG-2 Transport Stream

for (i=0;i<N;i++) {
  data_byte                8
  transport_scrambling_control               2
  adaptation_field_control                2
  synch_byte                 8

ID
  Indicator
  Indicator
  Syntax
  CONDITIONAL ACCESS SECTION DIAGRAM

  bits
  bits
  16 bits                    5 bits               1 bit               8 bits             8 bits                                       32 bits
  12 bits                                                             32 bits
  Info
  Section
  Number
  Random
  bits
  8 bits               1 bit                    1 bit                           12 bits
  Loop
  Stream
  Transport
  16 bits 13 bits 13 bits                       16 bits
  bits
  bits
  3
  Number
  Number
  Adaptation
  Next
  Descriptors
  Loop
  Section
  Program
  PID i
  Stuffing
  Adaptation
  4
  32
  CRC
  Transport Stream Program Map Section (PMT)
}

else {

  if (program_number=='0') {
    reserved                  3
    reserved                   2
    table_id                   8
  }
}

section_number          8
section_length        12
reserved          4
reserved           4
reserved           3
'0'           1
descriptor()
reserved           2
table_id           8
CA_section() {

Syntax                                       No. of bits
  2 bits          2 bits              1 bit                1 bit             1 bit              1 bit            8 bits              8 bits                                       m*8 bits
  Start Code
  33 bits              42 bits                 22 bits                 8 bits                  7 bits                  16 bits
  33 bits
  24 bits                  8 bits               16 bits
  PES
  Stream
  Sequence Counter
  Length
  RateESCR
  PES PACKET SYNTAX DIAGRAM

  HEADER
  Optional
  Mode
  P-STD
  Original
  Extension
  7 Flags
  Data Length


CRC_32    32
}

if(section_syntax_indicator=='0') {

  reserved         2
  section_syntax_indicator          1
  private_section() {

PID=0x0002
PID=0x0001(0xFF)
reserved
section_lengthtable_id_extension
section_syntax_indicatorprivate_indicator
system_time
reserved
private_indicator
table_id
section_length
reserved
section_syntax_indicatorprivate_indicator
private_section() {

MPEG Poster

This poster provides a quick graphical reference to understand the fundamentals of the MPEG Transport and Service Information.

For Further Information

Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit www.tektronix.com

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