RP 160-1997
Revision of RP 160-1991

SMPTE RECOMMENDED PRACTICE

Three-Channel Parallel Analog Component High-Definition Video Interface

1 Scope

1.1 This practice defines the physical characteristics of an interface using three parallel channels for the interconnection of equipment operating with analog component HDTV signals. For ANSI/SMPTE 240M, the signals carried across this interface have a scanning structure of 1125 lines, 60.00 fields per second, 16:9 aspect ratio, and 2:1 interlace. This interface is also appropriate for HDTV signals having other scanning structures.

1.2 The intended uses of this interface are:

– to interconnect the elements of parallel analog HDTV video subsystems which use the same component sets within larger component islands or plants. Component HDTV editing and post-production suites are examples of such subsystems;

– to interconnect equipment into complete, self-contained HDTV analog component systems of relatively small size.

1.3 This practice applies to signals carried on the connectors described in 7.1 and may not apply to component signals carried on other types of connectors. The practice also defines the preferred component video signals across the interface, including their waveform structure and levels.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this practice are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

ANSI/SMPTE 240M-1995, Television — Signal Parameters — 1125-Line High-Definition Production Systems

3 Video signals

The signals carried across this interface may be those of either of two signal sets: a color set comprising E_R', E_G', and E_B' signals, or a color-difference set comprising E_Y', E_{P_B}', and E_{P_R}' signals. Definitions of the signal sets may be found in ANSI/SMPTE 240M and other relevant standards. Figures 1 and 2 illustrate the waveform structure, synchronizing signal, and video levels for these two component sets.

4 Impedance

Equipment using this interface shall have nominal 75-ohm input and output impedances.

5 Clamping and signal dc content

The clamp period shown in figures 1 and 2 may be used as a dc level clamp reference point. If an ac coupled system is employed, the average dc level of any signal specified herein shall not exceed ± 1 volt.

6 Component timing

The three component video signals (E_G', E_B', E_R') or (E_Y', E_{P_B}', E_{P_R}') should be simultaneous in real time.

Approved June 1, 1997

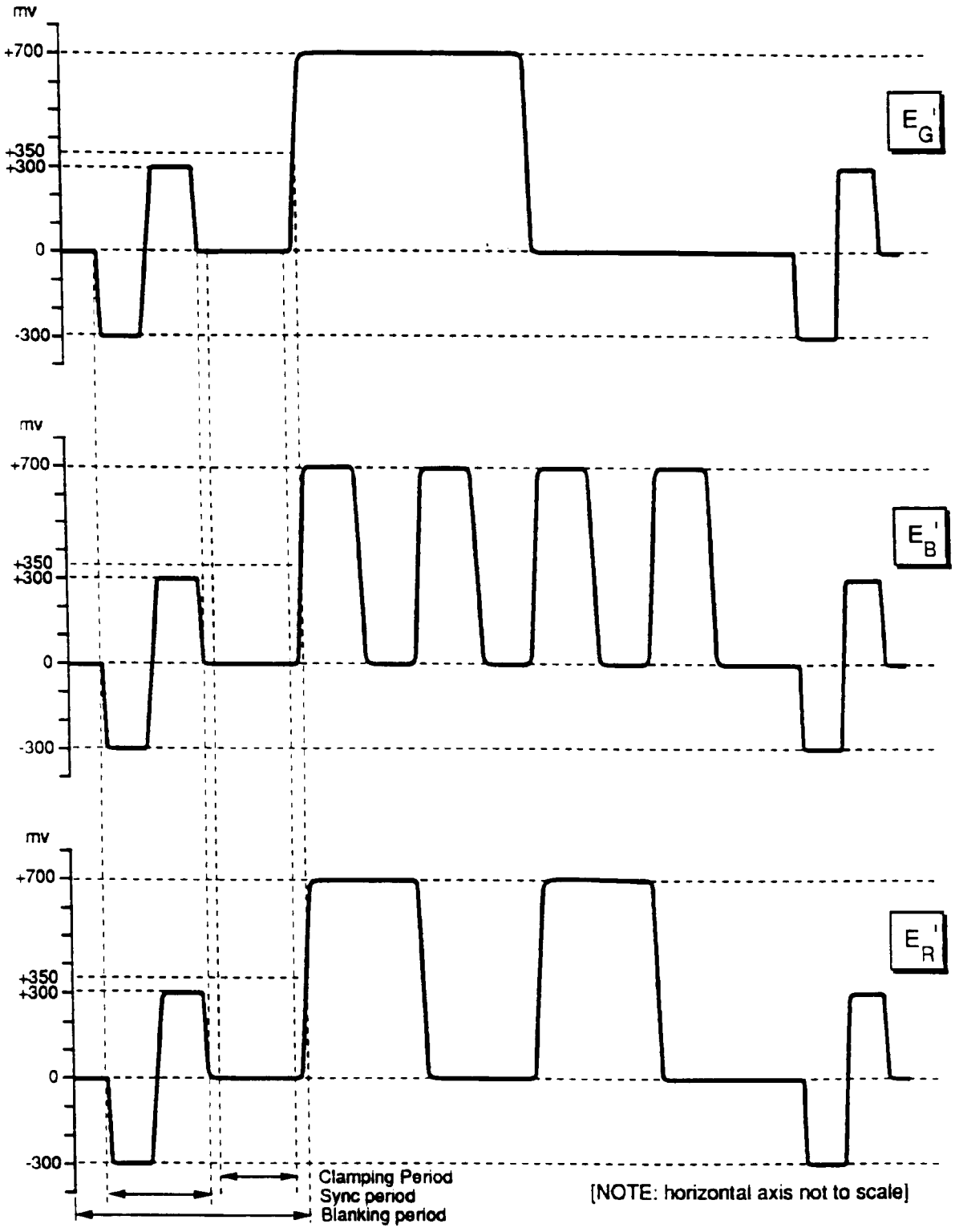


Figure 1 – Waveform structure and levels of E_G', E_B', E_R' signals for 100% color bars

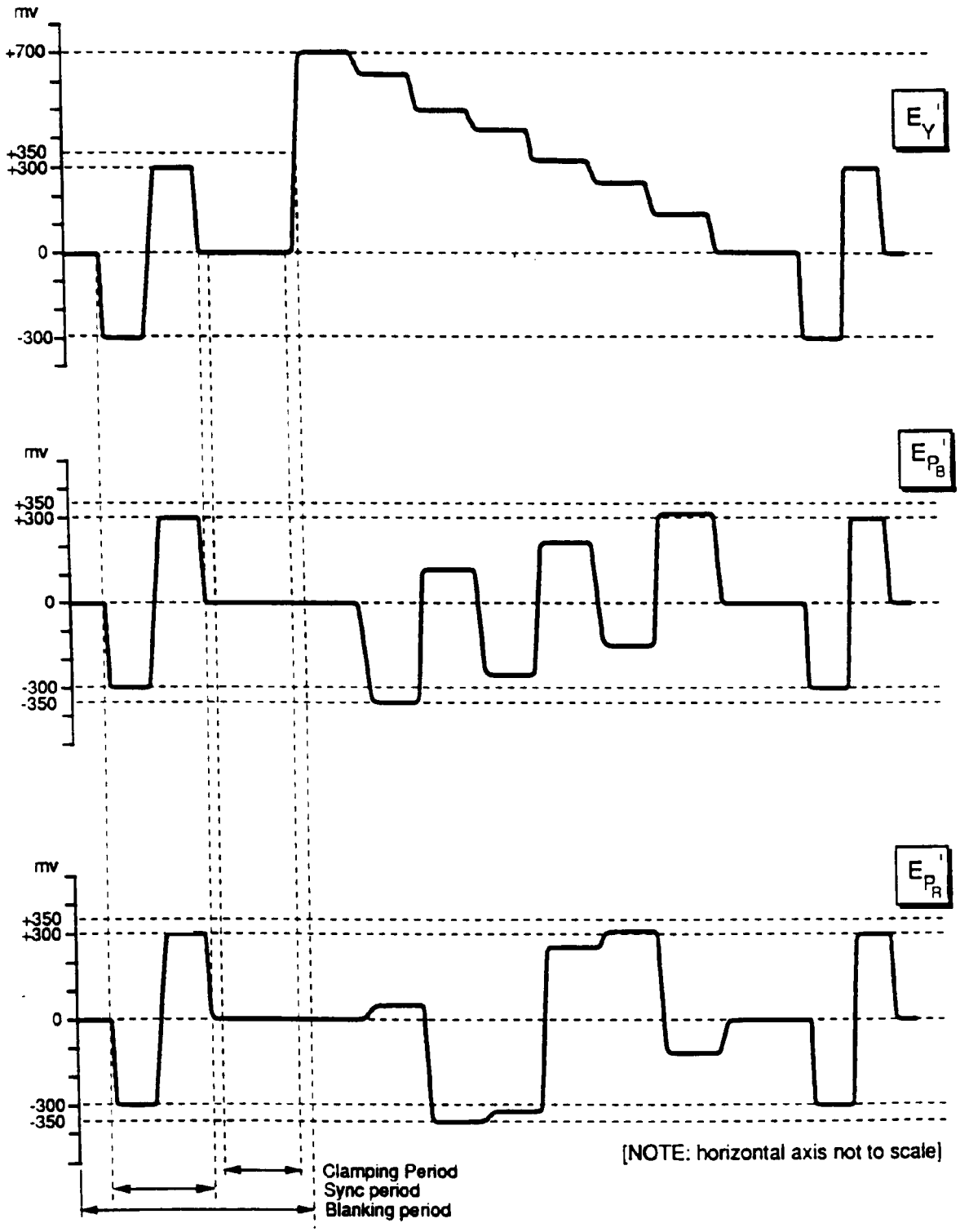


Figure 2 – Waveform structure and levels of E_Y', E_{P_B}' and E_{P_R}' signals for 100% color bars

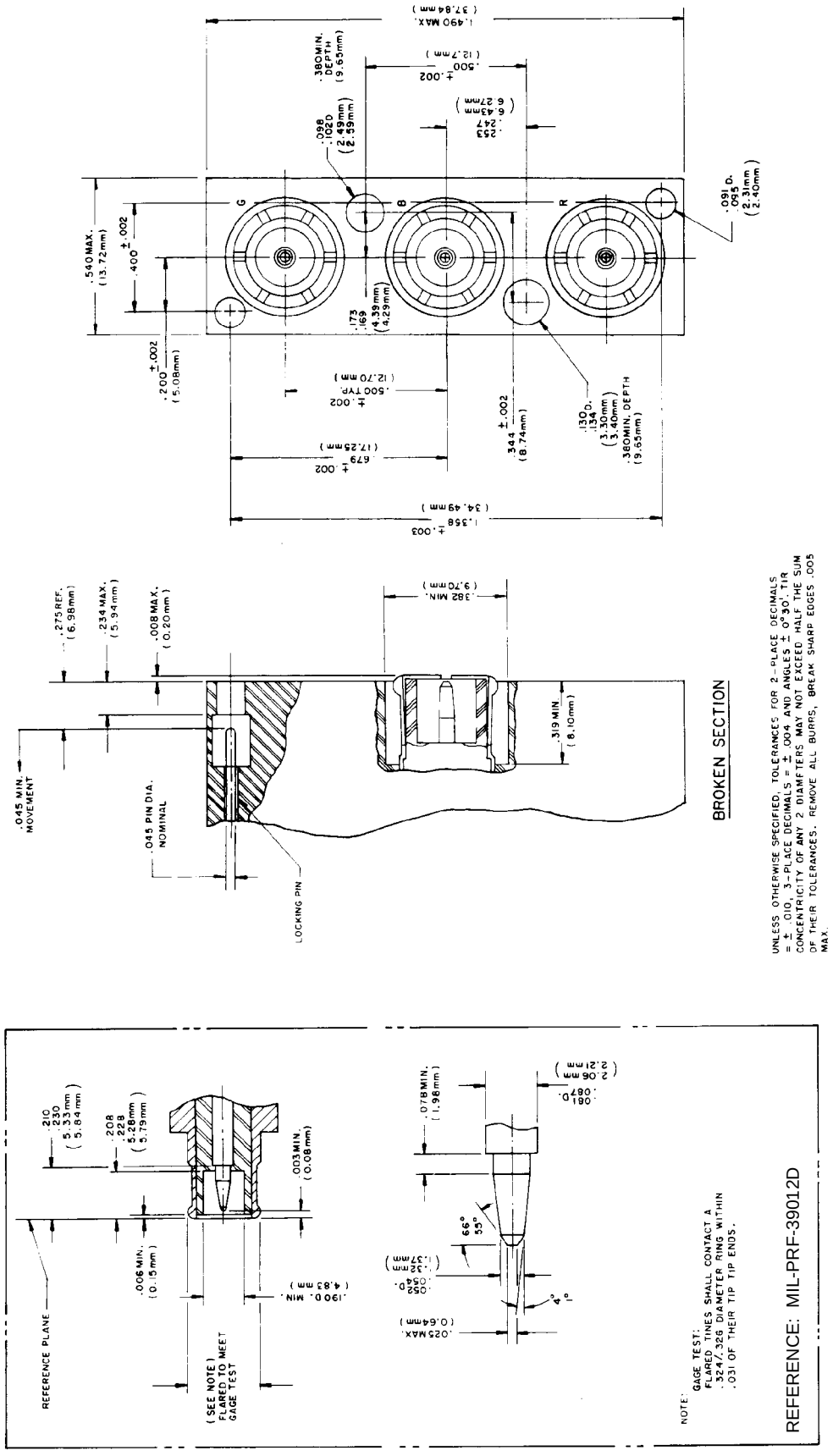
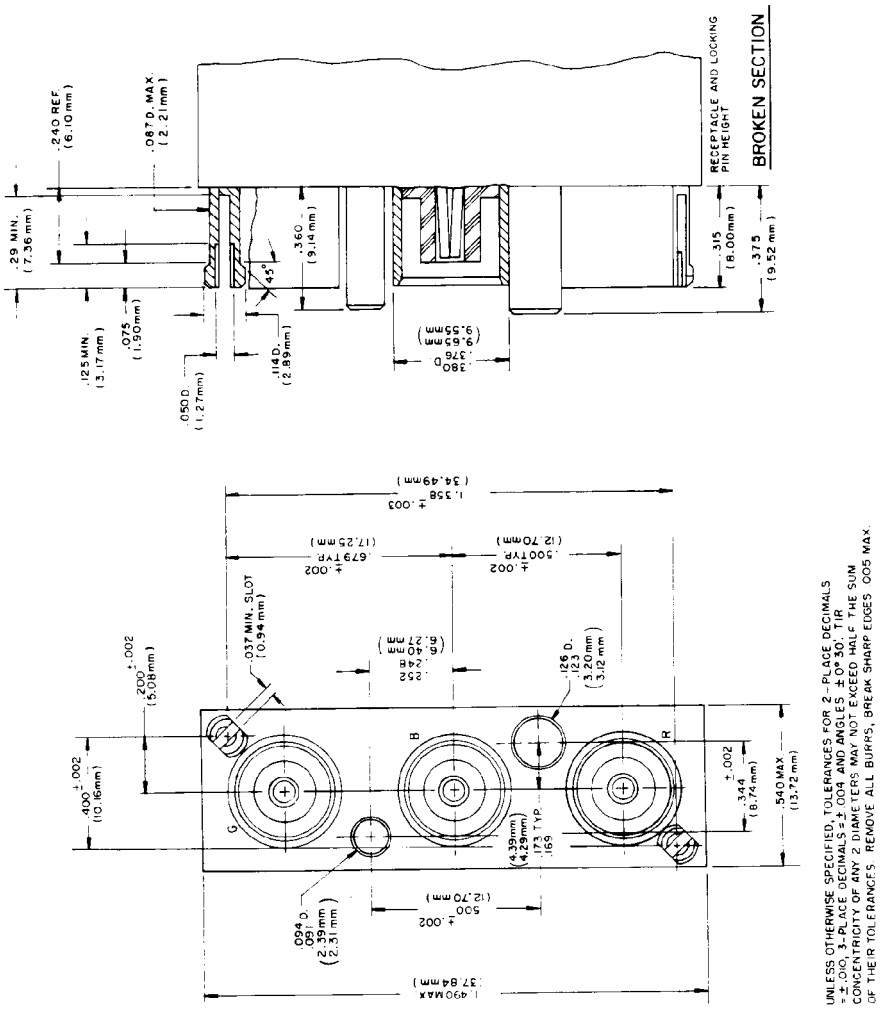


Figure 3 - Plug interface



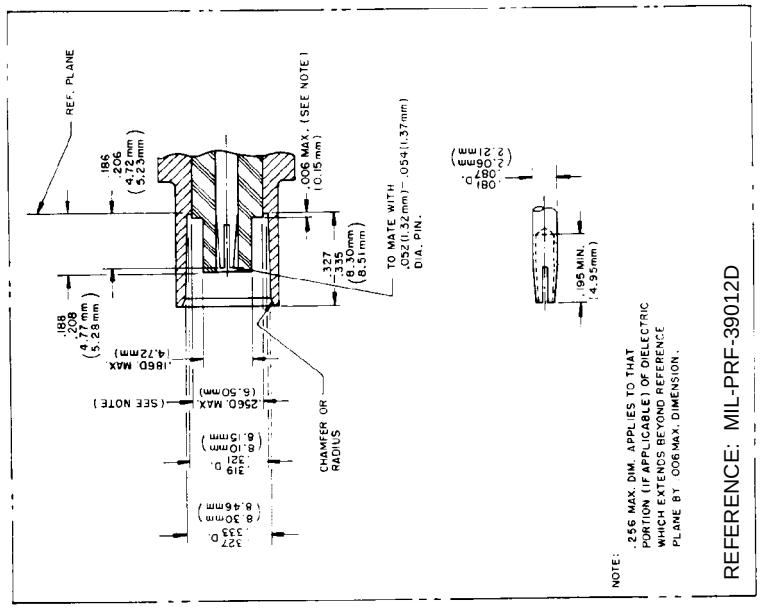


Figure 4 - -Socket interface

7 Connector and cable

Two different connector implementations are permissible under this practice. The preferred implementation incorporates a single multiconductor cable and keyed connector arrangement carrying all three parallel signals. The secondary implementation utilizes three separate cables with BNC connectors carrying the three parallel signals. This clause describes the preferred implementation.

7.1 Connector

The connector consists of three BNC inserts mounted in a rectangular housing. Latching is accomplished by two latch posts and receptacles, internal to the connector. Additional posts are utilized for polarizing and reinforcing purposes.

This practice defines the dimensions and tolerances necessary to permit the interchange of plug and socket connectors that contain the three BNC inserts.

The plug interface is described in figure 3, and the socket interface in figure 4. The BNC pin and socket are derived from MIL-PRF-39012D and are described in figures 3 and 4.

Individual insert positions in each mating connector shall be marked with G, B, and R, respectively, as shown in figures 3 and 4. These position identifications correspond to the cable coding.

7.2 Cable

The recommended cable consists of three individual, insulated, coded, coaxial cables, all housed in a nonmetallic jacket.

7.2.1 Cable selection considerations

HDTV component sets as specified, for example, in ANSI/SMPTE 240M, are wideband signals. In choosing the coaxial cable to implement this interface, the user should take account of the following:

– 30-MHz bandwidth for each video component signal;

– Differential timing between each of the three coaxial cables (this refers specifically to the tolerance in cable transit time);

– Crosstalk among the three coaxial cables;

– A cable with nominal impedance of 75 ohms is recommended;

– Return loss of the cable.

7.2.2 Cable color coding

Each individual coax within this cable shall be uniquely coded to identify the signal to be carried upon it. The coding shall be:

Coax coding	Signal carried
Color green or letter G	E_G' or E_Y'
Color blue or letter B	E_B' or E_{PB}'
Color red or letter R	E_R' or E_{PR}'

Annex A (informative)
Bibliography

SMPTE 253, Television -- Three-Channel RGB Analog Video Interface

MIL-PRF-39012D, General Specification for Coaxial, Radio Frequency Connectors