ANSI/CTA Standard

Command–Driven Analog IR-Synchronized Active Eyewear

ANSI/CTA-2038

(Formerly ANSI/CEA-2038)

November 2012

ANSI Accredited Standards Developer

Consumer Technology Association™

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(Formulated under the cognizance of the CTA **R4 Video Systems Committee**.)

Published by
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Technology & Standards Department
www.cta.tech

FOREWORD

This standard was developed under the auspices of the Consumer Electronics Association (CEA) R4 Video Systems Committee.

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CONTENTS

FIGURES

TABLES

Command–Driven Analog IR-Synchronized Active Eyewear

1 Scope

CEA-2038 defines a standard method of Infrared (IR) emitter-to-eyewear signaling that provides a basis for interoperability between time-multiplexed (including stereographic and dual-mode) display systems manufactured by different manufacturers for use in the home. The method synchronizes eyewear with display refresh timing by controlling the activity of the eyewear shutters using a standardized unidirectional IR emitter-to-eyewear signal, having standardized wavelength, carrier frequency, burst patterns, codes, timing, frequency range, and maximum distance. The method allows display manufacturers to optimize the duty cycle and switching points of the eyewear to suit the characteristics of each display model or technology. Therefore, improvements in display technology are reflected in the timing of the signals generated by the display/emitter and modifications to standard eyewear are not required. Likewise, improvements in eyewear technology do not impact the design of standard display/emitter devices. The method avoids conflict with legacy emitter-to-eyewear signaling systems so that eyewear may be designed to interoperate with legacy systems as well. The method addresses interference and susceptibility issues relating to other IR devices that might also be found in a typical home environment. The method supports a wide range of display types – including LCD, PDP, and DLP. In the case of LCD displays, the method supports both continuous and LED back-lit displays.

1.1 Overview

In stereographic and dual-mode display systems, a display renders dual image content in a time-multiplexed manner, which requires viewer's eyes to be blocked from viewing the display's screen at specific points in time. In the stereographic use case, a viewer (or n viewers) wear(s) active eyewear in order to view 3D content rendered by the display. In this use case, content may sometimes switch between 3D and 2D material (e.g. during a commercial break). In the dual-mode use case, two viewers wear active eyewear - each seeing an independent 2D gaming image rendered by the display.

The eyewear is synchronized with the display's refresh timing using a standardized unidirectional IR synchronizing signal, which is the subject of this standard. The IR synchronizing signal comes from an emitter, which may be separate-from or integrated-into the display. Eyewear does not necessarily interoperate between systems, hence the primary motivation for this standard.

For reliable operation, eyewear must not be susceptible to local interference from the rendered picture on the display's screen, sunlight, modulated and unmodulated infrared light sources (whether they be fluorescent, LED, neon, 3-wavelength types), IR headphones, IR remote controls, or IR data interfaces such as IrDA. Eyewear may also be susceptible to local interference from emitters associated with other displays in retail, tradeshow, and gamefest environments.

The emitter should not interfere with local IR headphone, IR remote control, or IR data interfaces (e.g. IrDA).