

# ANSI/CEA Standard

## Command-Driven Analog IR-Synchronized Active Eyewear

ANSI/CEA-2038

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**CEA**<sup>®</sup>  
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(Formulated under the cognizance of the CEA **R4 Video Systems Committee.**)

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## **FOREWORD**

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

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## CONTENTS

<b>1 Scope</b> .....	<b>1</b>
<b>1.1 Overview</b> .....	<b>1</b>
<b>2 General</b> .....	<b>2</b>
<b>2.1 Definitions</b> .....	<b>2</b>
<b>2.2 Symbols and Abbreviations</b> .....	<b>3</b>
<b>2.3 Compliance Notation</b> .....	<b>3</b>
<b>3 System Description</b> .....	<b>3</b>
<b>4 System Requirements</b> .....	<b>4</b>
<b>4.1 IR Wavelength</b> .....	<b>4</b>
<b>4.2 Command Encoding Carrier Frequency</b> .....	<b>4</b>
<b>4.3 Command Timing &amp; Sequencing</b> .....	<b>5</b>
<b>4.3.1 Overview</b> .....	<b>5</b>
<b>4.3.2 Command Timing</b> .....	<b>6</b>
<b>4.3.3 Command Sequencing</b> .....	<b>6</b>
<b>4.4 Command Codes</b> .....	<b>7</b>
<b>4.5 Emitter Requirements</b> .....	<b>8</b>
<b>4.6 Eyewear Requirements</b> .....	<b>8</b>
<b>5 Optical Specification</b> .....	<b>9</b>

## FIGURES

<b>Figure 1: Block diagram of active eyewear system</b> .....	<b>3</b>
<b>Figure 2: Carrier timing</b> .....	<b>4</b>
<b>Figure 3 : Polarization Axis</b> .....	<b>9</b>
<b>Figure 4: Mode 1 Eyewear Shutdown</b> .....	<b>11</b>
<b>Figure 5: Mode 2 Symmetrical Single 3D with Short Closed Duty Timing</b> .....	<b>13</b>
<b>Figure 6: Mode 3 Symmetrical Single 3D with Long Closed Duty timing</b> .....	<b>14</b>
<b>Figure 7: Mode 4 Swap Single 3D</b> .....	<b>16</b>
<b>Figure 8: Mode 5 Symmetrical Dual 2D with Short Close Duty Timing</b> .....	<b>18</b>
<b>Figure 9: Mode 6 Symmetrical Dual 2D with Long Close Duty Timing</b> .....	<b>19</b>
<b>Figure 10: Mode 7 Swap Dual 2D</b> .....	<b>21</b>
<b>Figure 11: Mode 8 Single 2D with Short Close Duty Timing</b> .....	<b>23</b>
<b>Figure 12: Mode 9 Single 2D with Long Close Duty Timing</b> .....	<b>24</b>
<b>Figure 13: Mode 10 Half Single 2D</b> .....	<b>26</b>
<b>Figure 14: Mode 11 Symmetrical Dual 3D with Short Close Duty Timing</b> .....	<b>28</b>
<b>Figure 15: Mode 12 Symmetrical Dual 3D with Long Close Duty Timing</b> .....	<b>29</b>
<b>Figure 16: Mode 13 Swap Dual 3D</b> .....	<b>31</b>
<b>Figure 17: Mode 14 Symmetrical Quad 2D with Short Close Duty Timing</b> .....	<b>33</b>
<b>Figure 18: Mode 15 Symmetrical Quad 2D with Long Close Duty Timing</b> .....	<b>34</b>
<b>Figure 19: Mode 16 Asymmetrical Dual 2D or Single 3D with Short Close Duty Timing</b> .....	<b>36</b>
<b>Figure 20: Mode 17 Asymmetrical Dual 2D or Single 3D with Long Close Duty Timing</b> .....	<b>37</b>
<b>Figure 21: Valid Lens Timing Cases</b> .....	<b>39</b>
<b>Figure 22: Invalid Lens Timing Cases</b> .....	<b>40</b>

## TABLES

<b>Table 1: Operating Mode Summary .....</b>	<b>5</b>
<b>Table 2: Command Sequence Summary .....</b>	<b>7</b>
<b>Table 3: Command Encoding.....</b>	<b>8</b>
<b>Table 4: Command Summary Table .....</b>	<b>38</b>

## 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).