

ANSI/CEA Standard

Remote Control Command Pass-through Standard for Home Networking

ANSI/CEA-931-C

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(Formulated under the cognizance of the CEA's **R7 Home Network Committee.**)

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FOREWORD

Users of this standard should be aware that ongoing standardization work in the 1394 Trade Association may have a future impact on this standard. The CEA has stated its intention to harmonize its standards with those developed within the 1394 Trade Association, and likewise the TA has indicated its willingness to coordinate standards development with CEA.

This standard was developed under the auspices of the CEA R7 Home Network Committee.

CEA-931-C supersedes CEA-931-B

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Remote Control Command Pass-through Standard for Home Networking

1. INTRODUCTION

This specification defines a standardized method for communication of certain basic operational functions between devices in a home network¹. The functions are those typically associated with a device's front panel controls or remote commander. Functions associated with the operation of "IR blaster"² arrangements are also accommodated by this method.

Normative requirements are specified here for two distinct types of interfaces and their associated lower-layer protocols. One set is based on IEEE 1394 and A/VC commands and the other on devices supporting HTTP 1.1 over IP.

2. OVERVIEW AND SCOPE

Machine-to-machine control usually involves modeling the behavior of various elements (sometimes called sub-functions or subunits) within audio/video devices. For this discussion, we use the term "unit" to refer to an audio/video component such as a DVD player or satellite set-top receiver. Any given unit may include within it one or more different subunits. For example, an A/V Receiver may include audio processing subunits (such as amplifiers and filters), audio/video switching subunits, as well as a tuner subunit.

A unit may include DVD playback functionality for example. A fully-featured machine-machine interface (MMI) to the DVD playback unit would involve a device control model (DCM) of the DVD disk player subunit. Device control models typically support control of all aspects of the device and monitoring of the status of all aspects of operation. Full DCM-based device control protocols are often very complex because many devices are themselves complex.

Although it does involve commands sent from one machine to another in the home network, this standard takes a simpler approach to solve a simpler problem. This standard may be used to build a remote control unit that is capable of operating any device in the home network that is compliant with the standard. Traditionally, a so-called "universal remote" is a device that emulates the IR pulses needed to control various devices. It must be configured to emit the appropriate codes, or learn them by sampling the output of a remote one wishes to emulate. With the present standard, the function of the universal remote is accomplished by translating, in a controller device such as a DTV, IR codes received from that device's native remote into standard commands on the network bus. The operations defined here apply equally well to devices in the same room as to devices in other rooms accessible via the network.

We consider a home network to be made up of various types of interconnected Audio/Video devices. Some are sources of A/V data; others take in A/V data and process it for output or

¹ While the commands are specified here in terms of protocols built on the IEEE-1394 standard and on HTTP over IP, the commands could be transported via other standards including other physical layer protocols as they travel from source device to receiving device in the network.

² IR Blasters involve infrared emitters on or connected to one device that are programmed to emit infrared pulses emulating the remote control codes recognized by another device. The emitter is placed in proximity of the device to be controlled. Functions such as tuning and operation of a recording device can be performed using an IR Blaster approach.