

Content Protection Issues

Content protection takes two forms on DVD-RW media. The first prevents the digital duplication of DVD Video source material that has been encrypted with the Content Scrambling System (CSS). The other prevents unauthorized recording of protected source material while using the video recording (VR) application layer. This second approach is accomplished through the use of Content Protection for Recordable Media (CPRM) on version 1.1 DVD-RW media. If a protected source title permits it, CPRM also provides a supplemental encryption mechanism to allow a single authorized copy to be made of “copy-once” content.

Content protection measures for DVD-RW include:

1. A pre-embossed area of the blank disc to physically prevent the recording of a CSS decryption key. This protects against digital bit-for-bit copies of encrypted titles onto a disc surface. Both versions 1.0 and 1.1 media contains a pre-embossed areas, but the embossing technique used on 1.0 media is unreadable by most video players and ROM drives and thus prevents physical playback compatibility with this version media. Version 1.1 media uses a readable pre-embossed area to allow better playback compatibility.
2. A media identification number, a CPRM component, located in the narrow burst cutting area (NBCA) at the inner radius. The media ID provides a unique serial number for each disc produced by media manufacturers. This can be used along with the media key block (see below) to generate newly encrypted content for titles that allow one copy to be made.
3. If a given program source permits it, CPRM can make one authorized, encrypted copy by using a media key block (MKB) that is embossed on the blank disc. The media key block provides an encryption element that allows a CPRM compliant recorder to re-encrypt video recording format (VR) content. A CPRM compliant, VR compatible player is needed to make use of this newly encrypted data.

Applications

It is technically possible to employ DVD-RW in two key environments: audio/video recording and computer data storage and retrieval. The DVD Forum is discussing use of the format in data applications at the time of this writing.

There are three fundamental advantages of optical disc technology, regardless of format. First is its ability to allow immediate random access to other files or program segments contained on a disc. A program element that might take several minutes to locate on videotape can be found in a few seconds on a DVD disc. Fast random access allows many powerful features such as rapid searches to different chapters and non-linear playback of program elements.

The second key advantage is the lack of physical contact between the disc and playback head, allowing continuous operation without media deterioration. Many commercial and professional applications of video and data storage require frequent retrievals of content, which can result in rapid deterioration of magnetic media. Some public exhibitions, for example, play video segments many times every hour for ten or twelve hours per day. Optical discs provide reliable operation with consistent quality due to the non-contact nature of the playback system.

The third key advantage is removability. Although this is not unique to optical disc technology, the ability to remove and replace discs adds a dimension of usability that captive media such as hard disk drives cannot match. Removable media can be stored offline or in a library system for later use, which effectively allows the recording device to have unlimited capacity. When a disc fills up, a new one can be inserted in seconds. When a hard drive fills up, something must be copied or deleted from it before further recording can be carried out.

DVD-RW media takes full advantage of these capabilities in video applications. Since the Video Recording (VR) application layer was intended to improve on the videotape model, there are many possible applications for DVD-RW wherever videotape is being used. This includes consumer video recording, as well as professional recording, production, editing, and use as a program transmission source.

Conclusion

Today there are many digital storage technologies available, each ostensibly providing the same basic capability of data storage and retrieval. The unprecedented success of the DVD Video format has reinforced the benefit of worldwide standards: the ability to use a storage medium in a variety of playback devices made by many manufacturers.

As with its DVD-R sibling, the DVD-RW format was developed with playback compatibility as its central mission. Pioneer believes that interchangeability between recorders and players is the most important attribute a writable DVD format can offer, because the ability to use content in many places is the essence of a removable storage medium. For this reason, the promise of the DVD-RW format is to be a fundamental enabler in the long-awaited transition from tape to disc.