

Product Specification Document  
Multimedia HDD Player



C O N F I D E N T I A L

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### 1. Introduction

The C2 Universal Multimedia Player (or “Multimedia Player”) supports true multi-format media decoding and encoding.

After installing an internal SATA HDD, user can copy the movies, music and photo from PC to it. Then enjoy the multimedia entertainment content with family at TV screen with great consumer electronics device user experience.

This device supported many media formats include video (RM/RMVB, H.264, MPEG-2/4, DivX, XviD, FLV, WMV), music (MP3, WMA, OGG, AAC, RA), and photo (JPG/GIF/BMP) decoding.

The most distinguished feature it has is that it supports video clips from Youtube (FLV video), RMVB from Real Networks, and decode up to 12 million pixels high definition photo in 2 seconds.

Furthermore, with firmware upgrading feature, user can enjoy more media formats.

It has PVR feature to record real time TV or DVD program with at DVD quality, i.e. D1 (720x576/720x480) resolution.

### 2. System Requirements

#### 2.1 Device Configurations

- 300MHz CC1100 Media Processor
- 128M bytes DDRII SDRAM
- 8M bytes SPI Flash Memory (12M bytes SPI Flash Optional)
- SATA connector for internal HDD
- RJ45 connector (Optional)
- USB2.0 OTG x 2
- Linux OS with kernel 2.6.14
- Boot time: less than 15 seconds

#### 2.2 PC Requirements

- Minimum Intel Processor III 500MHz, 128MB RAM or Equivalent
- Operating System: Win2000, WinXP, Linux, Mac OS
- USB 1.1 or USB 2.0 connection

#### 2.3 TV Requirements

- Video/Audio input, standard Composite RCA input

- Optional Component input (recommended for high quality video, and it's required for HD video/photo output) and home theatre for digital audio (SPDIF) input

### 3. Interface

#### 3.1 Front panel

- Infrared Receiver
- Status LED
  - Blue LED (Power/HDD): Power (On/Off), HDD activity (Fast Flash, Read/Write)
  - Red LED (Standby): Standby (On/Off), Record ( flash, in progress)
- Buttons
  - Direction Navigation (4 keys, Up, Down, Left, Right)
  - Play/Pause Key (1 Key)
  - Copy (1 Key)
  - TV Mode Switching (1 Key, VGA/CVBS/YPbPr)

#### 3.2 Rear panel

- USB (Mini B) for device (use cc1100 port B)
- USB A type (Host)
- DC Power In (12V for 3.5"/5V for 2.5")
- Analogue A/V Out (Component and VGA sharing, A/V Jack)
- Analogue A/V In (A/V Jack)
- SPDIF/Ear Phone Out
- Power ON/OFF Switch
- Ethernet Port (RJ45) (Optional)

#### 3.3 Form Factor

##### 3.3.1 Based board

Wide: 109mm

Length: Flexible (recommend 109mm)

##### 3.3.2 Daughter board

Wide: 890mm

Length: Flexible

### 4. Remote Control

Key functions and operations of the remote control are defined as below.

- Home
- Subtitle (DivX and MP3 playback, External subtitle/Lyric, On/Off)

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- Thumbnail (only for Picture mode)
- Play single, play all, and trick mode keys (Pause, FF, FB, Resume)
- Zoom (video and Picture mode)
- Volume (only for music/audio)
- Mute (video and music mode)
- Direction Navigation (Up, Down, Left, Right)
- Enter (Directory, file open)
- File Edit
- File information
- Repeat (video and music)
- Recording (instant recording)
- Setup: go to setup menu
- TV mode (Video output switching: VGA/CVBS/YPbPr)
- Photos copy
- Photo rotate
- Standby
- Power

[Remote Operation will be max level compatible with PVR]

Item	Button	File Browser Mode	Player Mode	Recorder Mode
1	Power	Power OFF	Power OFF	Power OFF
2	Standby	Standby	Standby	Standby
3	1	1 - .:/@	Go to item 1	N/A
4	2	2 - ABC	Go to item 2	N/A
5	3	3 - DEF	Go to item 3	N/A
6	4	4 - GHI	Go to item 4	N/A
7	5	5 - JKL	Go to item 5	N/A
8	6	6 - MNO	Go to item 6	N/A
9	7	7 - PQRS	Go to item 7	N/A
10	8	8 - TUV	Go to item 8	N/A
11	9	9 - WXYZ	Go to item 9	N/A
12	0	0 - Space	Go to item 0	N/A
13	CLEAR	Backspace	N/A	N/A
14	SELECT	Caps/Num	N/A	N/A
15	TV MODE	Toggle video output	N/A	N/A
16	SETUP	Go to setup page	Go to setup page	To setup page
17	MUTE	Mute sound	Mute sound	N/A
18	VOLUME	N/A	Volume +/-	N/A
19	UP	Up	Previous clip	N/A
20	DOWN	Down	Next clip	N/A
21	LEFT	Left	Scroll up 1 page	N/A
22	RIGHT	Right	Scroll down 1 page	N/A

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23	ENTER	Enter/Select icon	N/A	N/A
24	RETURN	Return to previous screen	N/A	N/A
25	MENU	Tab (select next menu)	Go to home	Go to home
26	Record/Pause	N/A	N/A	Record/Pause
27	PLAY	Select icon	Play	N/A
28	REPEAT	Go to main screen	N/A	N/A
29	STOP	N/A	Stop playback	Finish Record
30	FWD	N/A	Fast Forward	N/A
31	BWD	N/A	Fast Backward	N/A
32	INFO	N/A	Display current file info	N/A
33	PAUSE/STEP	N/A	Play/Pause	Pause/Resume
34	SLOW FWD	N/A	Slow motion (MPEG)	N/A
35	SEARCH	N/A	Go to by time search	N/A
36	EDIT	File rename	N/A	N/A
37	SUBTITLE	N/A	Subtitle ON or OFF (DivX/MP3)	N/A
38	AUDIO	N/A	Stereo/mono audio output	N/A
39	SHUFFLE	N/A	Repeat mode	N/A
40	ROTATE	N/A	Rotate photo	N/A
41	ZOOM	N/A	Zoom mode (Movie/Photo)	N/A
42	9PIC	N/A	Thumbnail (Photo)	N/A
43	COPY	Copy Photo from DSC	N/A	N/A
44	BACKGROUND	N/A	Turn on Background music(Photo)	

## 5. System Setup

### 5.1 Internal SATA HDD Installation

This Multimedia Player has HDD enclosure function, which has build in SATA interface and support a 2.5" or 3.5" SATA hard disk drive.

### 5.2 Important Folder

#### System Folder

The Multimedia Player will create a system folder (name "CCSystem", hider property) in the internal HDD, first partition. It's used to save some user configurations and systems files. User should not delete it.

#### External Font Folder

Folder name is "CCFONTS".

### 5.3 TV/Monitor Setup

This unit supports standard Composite Video and L/R Audio input for recording. The video output supports standard Composite AV (480i quality), and Component video output (YPbPr, up to 720p or 1080i quality). The audio output supports analogue RCA L/R audio and digital SPDIF audio.

This unit support VGA output with 640x480, 800x600 and 1024x768 resolution.

### 5.4 Using System Setup Menu Item

Refer to [Chapter 6 Menu Functions](#) to setup right configurations

## 6. Menu Functions

### 6.1 Main Menu

There are 6 items/selections in the main menu.

- Movie
- Music
- Photo
- TV
- Setting
- Maintenance

The main menu support navigation buttons, Play button and Enter buttons.

User selects "movie", "music" or "photo" item will enter player mode.

User selects "TV" item will enter recorder mode.

### 6.2 Movie menu – player mode

By using the navigation buttons and the PLAY/ENTER on the remote control, user can select the movie to play.

Use the INFO button during playback for further details of your present movie, including progress, resolution, and bitrates.

Other supported user operations include pause/resume, fast forward, back forward.

### 6.3 Music menu – player mode

By using the navigation buttons and the PLAY/ENTER on the remote control, user can select the music file to play.

Use the INFO button during playback for further details of the present song.

Other supported user operations include pause/resume, fast forward, back forward.

### 6.4 Photo menu – player mode

By using the navigation buttons and the PLAY/ENTER on the remote control, user can select the digital photo to display.

Press the THUMBNAILS button to turn on the image preview on the central of TV screen.

Press the ROTATE button during playback to rotate current photo 90 degree in clockwise direction.

### 6.5 TV menu – recorder mode

This mode will turn on composite video input interface, and display the input video signals (may from TV tuner, DVD output) in the TV screen.

By using the RECORD buttons on the remote control, user can record current program into internal HDD.

By pressing RECORD button or PAUSE button, user can pause the recording.

By pressing STOP button, the recording progress is stopped. A video file will be created in the internal HDD.

### 6.6 Setting menu

It's an important step under **system setup**. Correctly configure the setting menu is the way to make the device work well. It contains below sub-menu items or parameters.

#### System Laugage

This device supports multilingual UI and operation environment.

- Simplified Chinese
- English
- French (require external font)
- German (require external font)
- Others (Optional)

Except for Simplified Chinese and English, other languages are enabled by external font.

#### Video Setting

- Select video output mode PAL/NTSC, Composite/Component/VGA
- Select output resolution (480i/480p/720p/1080i). VGA is 640x480/800x600/1024x768.
- Press the TV Mode button repeatedly could toggle among different modes. If user accidentally saved the wrong video output and only see a blank screen, that make user see the video output again.

#### Audio Setting

- Stereo output – enable analogue stereo audio output
- SPDIF output – enable Coaxial SPDIF digital audio output



- Mono output (L/R) – select either left or right audio track output

### Photo Setting

- Slide show - configure the transition time for photo slideshow

### Operations

- Use the navigation buttons to select your audio setting and press the OK/ENTER button to activate it.
- Save ICON: save user configurations
- Cancel ICON: discard the changes
- Restore Factory Setting ICON

## 6.7 Maintenance menu

### Firmware Update

- Displays current firmware version
- User copies the new firmware file to internal HDD root directory. The firmware has the naming convention as C2UMP.xxx (e.g. C2UMP.a01, a01 means version)
- The firmware update is activated via menu item “Firmware Upgrading”.
  - A warning message and confirm message will be displayed.
- User must make sure power in won't be interrupted during firmware upgrading.

## 7. USB Connection

This multimedia player support USB OTG function, i.e. its USB interface can work under both USB host and USB client mode.

### 7.1 USB Client Mode

When the multimedia player connects to PC, it will automatically work under USB client mode. In this mode, there isn't TV output signal.

By using the PC, user can do device installation/setup, file copy between device and PC under this mode. Maximum read/write transfer rate up to 25M bytes per second (200Mbps).



If the device installs with 2.5" SATA HDD and the PC/Laptop can provide enough current via USB, the device will be powered by USB interface, i.e. no external DC in power is needed in this mode.

### 7.1.1 Device Installation

Once user installs internal HDD into this multimedia player device, user can create partitions and format the drive by connecting it to a PC via USB.

In Windows PC (Windows 2000, Windows XP, and Windows Vista), the supported operation will be:

1. Connecting multimedia player to PC via USB interface
2. Multimedia Player will work under USB OTG device/client mode
3. Using windows OS device manager, ( select the USB drive ) user can create one or multiple partitions
4. Format the USB device using FAT16, FAT32 (recommended for best performance), or NTFS (if there is file with size exceeds 4G bytes).
5. If format using FAT32, the maximum single partition size will be 32GB. Support larger hard disk needs create multiple partitions
6. User needs to follow **safe device removal procedure** before disconnecting the USB cable between PC and multimedia player.

In Linux PC or Macintosh PC will support similar operation/function.

[TBD]

### 7.1.2 File Operation


The multimedia player supports similar file level manipulations as other USB storage devices.

- File copy from PC to multimedia player or vice versa
- File or directory creation
- File or directory delete
- Searching, file info display, disk space display etc.

### 7.1.3 Safe Device removal Procedure

It's very important that user follows safe removal procedure so as to make sure read/write operation correctly completed.

Below is the normal operation procedure the system is designed.

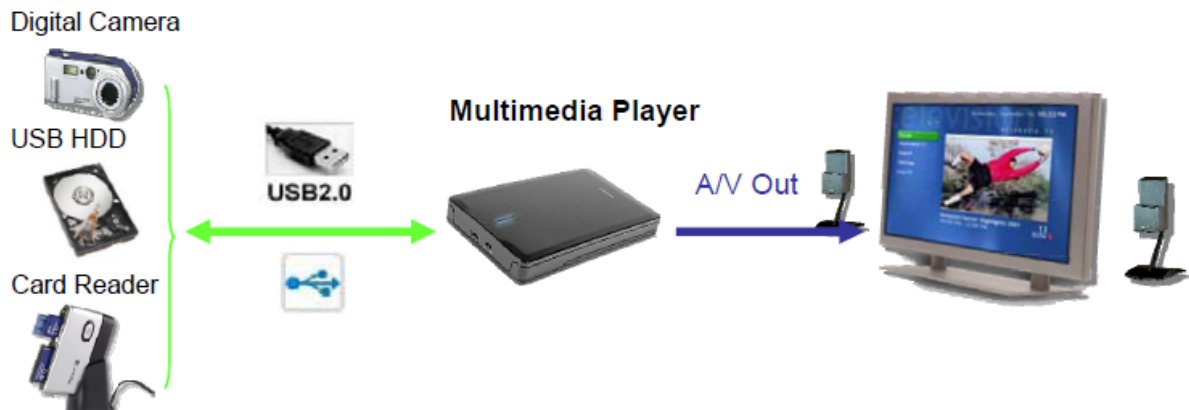
- Click on system tray icon  "Safety Remove Hardware", select right "USB Mass Storage Device", and click on "Stop".
- When PC system notify it's safe to remove the USB device, then disconnect USB cable between Multimedia Player and PC.

## 7.2 USB Host Mode

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When the multimedia player connects to TV, it will work under USB Host mode. User can connect other USB client devices including USB HDD, Digital Camera and Card Reader to multimedia player. , file copy between device and PC under this mode.

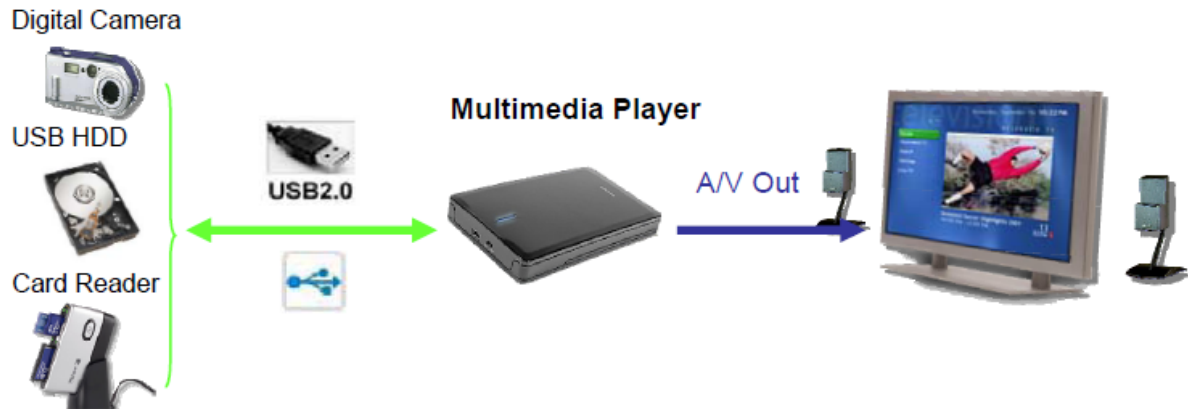


The multimedia player will provide up to 2 USB2.0 connectors for external USB devices (mass storage)

- USB mobile hard disk
- Photo copy from Digital Camera
  - As other mass storage device and using File Manager/Browser.
  - If Digital Camera supports PTP (Picture Transfer Protocol), the multimedia player will automatically import the photos from DC to internal HDD storage, under the directory "my photos". A new directory will be created using a sequential number (e.g. PIC001) to store the imported picture files. User can rename the folder name using under File Browser mode.
- MMC/SD/SDHC/MS/CF/XD card can be supported via USB card reader.
- Transfer speed up to 25M bytes per seconds (200Mbps).
- USB hub is not supported

### 8. TV connection

This device will work as multimedia player when user connects it to TV set.



### 8.1 Installation

The connection between the multimedia player and TV set (NTSC or PAL) uses the AV cable.

Video signal support

- Composite
- Component (recommended for high quality video output)
- VGA

Audio signal supports:

- Stereo (Left/Right) analogue audio
- SPDIF digital audio (for connecting to amplifier)

The external DC power supply is needed for the device works fully functional at TV connection mode.

- 5V for 2.5" HDD device
- 12V for 3.5" HDD device

Video output mode

- NTSC or PAL
- Dynamic output resolution switching
- Composite 480i, 576i
- Component 480i/p, 576i/p
- Component 720p
- Scale to full-screen (default)
- Display 4:3 content on 16:9 display or display 16:9 content on 4:3 display
  - Dynamic aspect-ratio switching
- Zoom In and Zoom Out

### 8.2 Player Mode Operation

- **Movie playback mode**

Users can play real time movies from internal HDD or external USB mass storage.

This device supports below video format:

- ✓ MPEG-1 (VCD)
  - File format: DAT
- ✓ MPEG-2 (up to 720p)
  - File format: VOB, MPG, MPEG
- ✓ MPEG-4 (SP, ASP w/o multi-point GMC), up to 720p
  - File format: AVI, MP4
- ✓ DivX 3/4/5
  - File format: AVI
  - Subtitle : SRT, SUB
- ✓ XviD
  - File format: AVI
- ✓ VC-1 (SP/MP)
  - File format: ASF, WMV
- ✓ H.264
  - File format: AVI, MKV
- ✓ RM/RMVB (Real 8/9)
  - File format: RM, RMVB
- ✓ VP6(FLV)
  - File format: FLV

### User operations:

- ✓ Playback, pause/stop, play mode, slow motion, fast motion, seek, previous, next, info banner

- **Music playback mode**

Playback music from internal HDD or external USB mass storage

- ✓ MP3, WAV, WMA, AAC-LC, OGG Vorbis, RA, AC-3
- ✓ MP3 subtitle (.LRC).
  - The .lrc file needs be same name as MP3 music file, and user must store it in same directory as MP3 music file
  - Support bitrates from 24 to 320kbps
- ✓ WMA supports bitrates from 16k to 384kbps

- **Photo playback mode**

Playback photos from internal HDD or external USB mass storage

- ✓ JPEG, PNG, GIF, BMP
- ✓ Resolution up to 12 million pixels
- ✓ slide show
- ✓ Music background
- ✓ Photo preview

- ✓ Thumbnail/9PIC

### 8.3 Recorder mode

When user selects TV icon, the system will enter recorder mode. Device will take "Composite In" as video input interface.

The instant recording is supported in this mode.

Recording format

- Video: MPEG-4, up to D1 @ 30fps
- Audio: MP3, Stereo, 48KHz, up to 196kbps
- File format: .AVI file
- Bit rates: Configurable, up to 4Mbps
- Location: the recorded file is stored in recorded directory.
- File name: C2000x.AVI. The later recorded file, the larger number in the file name.

Operations

- Press record button to encode analogue TV or A/V in programs into internal hard disk.
- Press record button again or press pause/resume button to pause/resume the encoding
- There is 3 level recording quality
  - Configured via system setup menu
  - HQ = D1 (720x480, 30fps), MQ (720x480, 30fps, low bit rates), LQ =CIF(360x240, 30fps)

The recorded file could be playback by this device or Windows media player on PC.

### 8.2.2 Standby mode

If device works at Player or File Browser mode, user press STANDBY button, TV output will be stopped.

If device works at recorder mode and the recording is in progress, user press STANDBY button will stop recording, the file saving operation will be accomplished before entering standby mode.

Under STANDBY mode, press STANDBY button will activate TV output, and resume to former status.

## 9. File Manager

### 9.1 File manager General Operation

- File Play: Press ENTER button will play the selected item (movie/music/photo)
- File browser

- File/Directory Navigation ( scroll up and scroll down file by file, PAGE +/- buttons to scroll up and down the list 7 files at the time.)
- Press ENTER to play a single file, press PLAY ALL button to playback all the files in that particular directory.
- File Editor
  - After selecting a file/directory, user press EDIT button to rename, delete the selected file/directory.
  - File/Directory rename
  - File/Directory Delete
  - Playlist creation
- File Information
  - After selecting a media file (music, movie, photo), the media file information will be display at the right side of screen.
  - Remaining disk space showing
  - File size display

## 10. Others

### External font file support

French and German will be supported via external font file.

User needs copy the font file to FONTS directory in the internal HDD.

## 10. Specifications

Storage	
<b>Internal Storage</b>	2.5"/3.5" SATA-I or SATA-II HDD (1.5Gb/s or 3.0Gb/s)
<b>USB Mass Storage</b>	USB Mobile HDD
	USB Card Reader (SD/MMC/MS/CF/SDHC/XD)
	Digital Camera
Playback Formats	
<b>Video</b>	Real Media 8/9/10, D1 @ 30fps (.RM, .RMVB)
	Flash Video scale to D1 @ 30fps (.FLV)
	MPEG-1 (.MPG or .DAT)
	MPEG-2 up to 25Mbps and 720p (.MPG, .MPEG, .VOB)
	MPEG-4 SP/ASP, 720p @ 30fps (.AVI, .MP4)
	DivX 3.11/4/5, D1 @ 30fps (.AVI)
	XviD D1 @ 30fps (.AVI)
	WMV7/8 SP/MP, D1 @ 30fps (.ASF, .WMV)
	WMV9/VC-1 SP/MP, D1 @ 30fps (.ASF, .WMV)
	H.264 BP/MP, D1 @ 30fps (.AVI, .MKV)
	AVI audio codec: MP3, AC3, ADPCM, WMA, Ogg
	Subtitles: SUB (MicroDVD format), SRT (SubRIP format)
<b>Audio</b>	MPEG-1 Layer 3, 24~320kbps (.MP3)
	Ogg Vorbis (.OGG)
	AC3

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	Microsoft PCM Wave (.WAV)
	Real Audio 8/10 (.RA)
	Advance Audio Coding LC (.AAC)
	Microsoft Windows Media Audio, 16~384kbps (.WMA)
	Subtitle: LRC(.LRC)
<b>Photo</b>	JPEG up to 12 mega pixels (.JPG)
	GIF (.GIF)
	PNG (.PNG)
	BMP (.BMP)
<b>Record Format</b>	
<b>Video</b>	MPEG-4 D1@30fps (NTSC/PAL), MP3 Stereo
	Quality setting at 3 level (HQ/MQ/LQ)
	AVI file format (.AVI)
<b>Audio</b>	MP3, 2 Channel
<b>Hardware</b>	
<b>A/V Input</b>	Composite, RCA L/R
<b>Video Output</b>	Composite (D1)
	YPbPr (Up to 720p)
	VGA (640x480, 800x600, 1024x768)
<b>Audio Output</b>	RCA L/R
	SPDIF
<b>USB 2.0</b>	2 x OTG high speed
<b>Power</b>	External Power Adapter (UL, cUL)
	Input: DC +5V/2A (2.5"), +12V/2A (3.5")
	Output: DC +5V/2A (2.5") +12V/2A (3.5")
<b>Operation Temperature</b>	0 ~ 40°C
<b>Others</b>	
<b>File System</b>	FAT16
	FAT32
	NTFS
	HFS+
	EXT2/3
	VFAT
<b>Language</b>	Chinese/English/French/German