



# Hitachi 42HDT20

## 16:9 Plasma HDTV Monitor

BILL CUSHMAN



### A Versatile Monitoring System

The Hitachi 42HDT20 Plasma Television is a 42-inch 16:9 HDTV Monitor and Audio Video Control Center (AVC20). It integrates a high-definition plasma display with two tuners and an extremely flexible audio/video control center, an audio system, and an elegant on-screen user interface. It is both easy to use and has the versatility needed to integrate all components found in most home theatre systems.

### Description

This Hitachi Plasma Television System consists of two separate pieces, which greatly simplifies installation and increases hookup flexibility for complex systems. The display unit is a 42-inch diagonal 16:9 (1.78:1) thin plasma screen that can be hung on a wall using the optional wall mounting bracket (WM20) or table mounted using the supplied stand. It measures 40 9/16 inches wide, 25 1/16 inches high, and 3 9/16 inches deep. The mounting stand adds about three

inches to the overall height. The supplied loudspeakers add about eight inches to the overall width. The display unit with stand and loudspeakers weighs 86 pounds. The audio/video control unit is a silver rectangular box measuring 16 15/16 inches wide, 4 3/4 inches high, and 11 1/16 inches deep, weighing 9 pounds. The two units hook together with a single 9-foot monitor connection cable, but a 32-foot cable is also available as an accessory. Both the display and the control unit have individual 6-foot power cords. The styling is simple and elegant. The actual picture is surrounded by about 1 1/2 inches of black border with silver edge trim matching the support stand and control unit. The top of the control unit is covered with ventilation holes that must remain unobstructed.

The 42-inch plasma screen is a 1024 x 1024 pixel array incorporating AiIS (Alternate Lighting of Surfaces) technology. This technology eliminates horizontal non-picture lines by creating vertical channels of phosphor material, thus eliminating the rigid grid of enclosed pixels that create an obvious screen door effect on many plasma displays.

AiIS alternately illuminates each complete video field eliminating the uneven brightness inherent in normal CRT displays. AiIS results in cooler operation, which eliminates fan noise, reduces power consumption, and is claimed to increase longevity.

The audio/video control center has five video inputs and two RGB inputs. Four of the video inputs accept composite video, three inputs accept S-video, and two inputs accept component video including HDTV (480i, 480p, 720p, 1080i). Each video input includes left and right audio inputs. One of the video inputs (non-component) is located on the front panel as a convenience for hookup of external camcorders. The RGB1 input uses a standard HD-15 connector (sometimes referred to as a VGA connector) and accepts standard and HDTV video formats and most common (VGA, SVGA, XGA) computer formats. The RGB2 input is a DVI input incorporating HDCP copy decryption. There is no IEEE 1394 input. One external monitor output is provided. The control center contains two NTSC tuners and has two RF inputs using F connectors. An RF output is provided for easy hookup to an external



cable box. One headphone output is provided.

The multi-component preprogrammed remote control contains 50 keys plus a thumb stick x-y motion pad. All system operations are controlled using the remote. No user controls (except Power) are located on either the display unit or the control box. The remote is a little over 9 inches long, about 2 1/4 inches wide, and about 1 inch thick. It is finished in silver matching the display and control unit. Most keys are backlit and are different shapes and colors to allow easy identification visually or by feel. The case is contoured to fit easily and comfortably in either hand.

## Aspect Ratio Choices

When watching normal NTSC television or DVDs five aspect ratio choices are available on the display. They are 16:9 Standard, 4:3 Standard, 4:3 Expanded, 4:3 Zoom 1, and 4:3 Zoom 2. The names chosen are extremely logical and much less confusing than any other television I have encountered, which use terms such as Full, Theater1, Normal, etc. All aspect ratio choices are easily selected by repeatedly pushing the Aspect button on the remote.

The 16:9 Standard mode is ideal for material recorded in 16:9 aspect ratio (Enhanced or "Anamorphic" DVD should be displayed in this mode). When displaying material recorded in 4:3 aspect ratio, one of the four 4:3 aspect ratio modes is appropriate.

The 4:3 Standard mode displays a complete 4:3 image centered in the 16:9 display, with gray bars on each side. This mode is used for viewing regular programming with normal geometry and no cropping.

The 4:3 Expanded mode expands the 4:3 image to full screen width and expands height slightly with some cropping at the top and bottom. It is an excellent mode for watching normal 4:3 broadcasts while filling the whole screen. I used this mode virtually all the time when watching standard broadcasts.

The 4:3 Zoom 1 mode is ideal for letterbox movies recorded in 4:3 aspect ratio (Non-enhanced/non-anamorphic DVDs). This mode expands the 4:3 image to full width while maintaining the correct geometry, which crops the top and bottom of the original image. Because letterbox movies have black bars at the top and the bottom, no picture information is lost using this mode on 4:3 letterbox movies.

The 4:3 Zoom 2 mode expands the 4:3 image to greater than full width (additional side cropping) and expands it vertically more than 4:3 Zoom 1. There is some geometric distortion (vertical stretching). This mode is for people who hate black bars on

2:35:1 ratio movies and would choose to have minor geometric distortion and cropping, rather than see black bars. I personally would never use this mode, but I have met many people who would appreciate its availability.

Although all aspect ratio choices are available when watching normal NTSC material using the video inputs, some modes are not available using other inputs or other formats. Even the aspect ratio mode names are different using the RGB inputs and computer or HDTV signals.

When feeding a VGA, SVGA, or XGA computer signal to the RGB1 input, the only choices are Full and Normal. The Normal mode displays the standard 4:3 computer image centered in the 16:9 display with gray bars on each side. The Full mode displays 4:3 images stretched horizontally to fill the full screen width. There is no overscan when displaying the computer formats.

When displaying HDTV, either 1080i or 720p, the only aspect ratio choice is Full. All HDTV is recorded in 16:9 aspect ratio, so no user selectable choice is necessary. This avoids confusion.

When displaying 480p using the RGB1 input, the aspect ratio choices are Full, Real, and Normal. The RGB1 input does not accept 480i signals.

## Signal Compatibility

The unit is compatible with almost all signals likely to be encountered in a typical enhanced home theater/multimedia environment. The YPbPr component inputs worked perfectly with 480i, 480p, 720p, and 1080i. Either tri-level or bi-level sync was acceptable on 720p, but 1080i could not be displayed using bi-level sync (non-standard, but produced by some RGB to Component converters like the Audio Authority 960).

When feeding RGBHV signals to the RGB1 input either positive or negative sync was acceptable. Virtually all computer formats are supported, as are HDTV formats. I did not test the RGB2 input, which is the DVI input featuring HDCP.

## Menus And User Interface

All user menus and operational choices are complete, extremely easy to use, and intuitive. In addition, the internal firmware is free from programming bugs and operational quirks. This should be a common occurrence, but unfortunately, with today's complex sets, many have undesirable operational quirks. Hitachi is to be congratulated for the excellent and bug-free user interface.

There are four video picture modes,

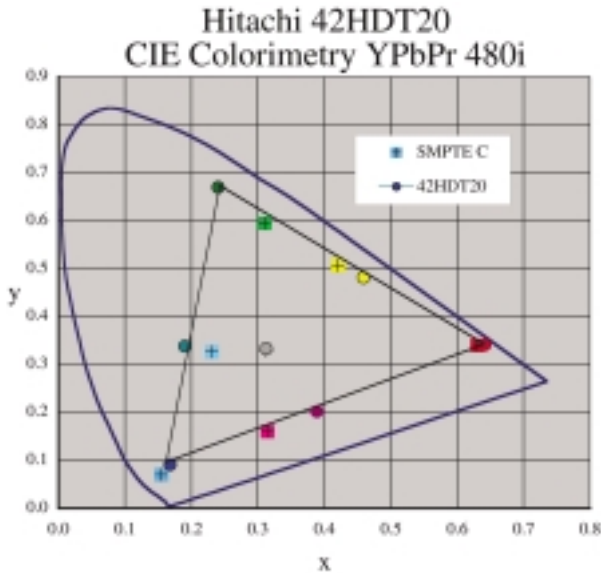
Sports, Movies, News, and Music. Each input can be assigned any one of these modes, and each mode has different preset values for Contrast, Brightness, etc. The video settings in each mode are global. In addition to the normal controls for Contrast, Brightness, Color, Tint, and Sharpness, there is a selection for Color System. The choices are Auto, SDTV/DVD, or HDTV. The advanced settings are Auto Contrast, Noise Reduction, Black Level Expansion, and Black Side Panel. Color Temperature choices are High, Medium, and Standard (D65). The Auto Channel Set for the NTSC tuners worked well, and the Channel Manager made it very easy to add or delete channels. Channel ID is available to enter the call letters or description on every channel. The remote contains a button called INFO, which displays all essential information such as channel or input selected, picture mode, and aspect ratio. Several picture-in-picture choices are provided and all worked well.

## Technical Performance

The factory color temperature and gray-scale tracking to the NTSC and HDTV standard of D65 (6500K) was exceptional when set to the Standard color temperature. The color temperature from 20 to 100 IRE ranged from a high of 6485 to a low of 6254. More important than simple color temperature, the x and y color coordinates were almost perfect with a maximum observed error of 0.004. Hitachi has set a standard that all manufacturers should strive to achieve.

Maximum light output using a 100 IRE window pattern was 55 foot-Lamberts (fL) using the standard color temperature of D65. Using a full field pattern, the maximum light output was between 20 and 25 foot-Lamberts. Both measurements are much better than most CRT or RPTV televisions. To avoid compression of high video level signals with full field patterns it was necessary to set Contrast to 30 or less.

The chroma performance on both composite video and S-video was exceptionally good. Chroma response on both inputs extended beyond 1.5 MHz, 50 percent better than commonly observed. This could be easily seen on the three chroma patterns at the bottom of the Snell & Wilcox zone plate on *Video Essentials*. The red and cyan bars above the legend 1.5 (MHz) were clearly visible in color, rather than dissolving into a murky brown, as is seen on many other sets. In addition, the circuits appeared to use chroma enhancement. The edges of color bars were very clean and devoid of smear, delivering clean edge transitions very close to that achieved on the component inputs.



The 3D comb filter had excellent performance. On static images there was no cross color or cross luminance. Even when motion was present and the filter switches into a 2D mode, performance was excellent, with only a minimum of cross color and no dot crawl. This excellent performance will benefit all regular television programs, which originate as composite video.

Color decoding on all video inputs had significant red push. This was disappointing considering the exceptional grayscale performance, and caused both magenta and yellow to be too red, and highly saturated reds to almost glow. Skin tones, and the whole picture took on a red cast. When using the RGB inputs color was accurate, as was expected. The red color primary was slightly orange as is common in many consumer television sets. The green primary was very deep and saturated, not the more typical yellow green so often used. The blue primary was shifted significantly toward cyan, and this error was very noticeable in direct comparison to a monitor with accurate blue.

Resolution was more than adequate for DVD, but not for HDTV. On 1080i, one-pixel-wide lines were reproduced with approximately twice the normal width. HDTV Multiburst patterns showed significant aliasing when reproducing a burst with each line 2 pixels wide at 1080i. Undesirable enhancement was observed on 720p unless the sharpness was set to 0. Normally sharpness could be set to about 30 for best results. The chroma response on HDTV patterns was adequate.

On-off contrast ratio measured 460:1 using a 100 IRE window pattern with Contrast set to maximum. The minimum

absolute black level was 0.12 fL, and black was shifted toward blue-green. An actual contrast ratio of 300:1 was more typical with the controls set for normal viewing.

All inputs were free from chroma delay, ringing, or excessive noise.

## Picture Quality

Viewing normal DVDs or satellite programming, the Hitachi 42-inch plasma delivered a picture that was sharp, colorful, and free from video noise. The display did not exhibit any of the faults such as poor geometry, excessive edge

enhancement, blooming, or color smear that plague popular CRT televisions. Overscan on video inputs was excellent at 2.5 percent. Geometry (as expected) was perfect. Screen reflections from normal room lighting were minimal. The high maximum light output made the set very tolerant of high ambient light levels. The high absolute black level made dark movies look washed out, but this was rarely noticeable on regular television shows.

Broadcasts received using the built-in NTSC tuners were clean and very free from any color smear. Fine detail, such as finely striped coats or ties, were pleasantly free from color moiré, as long as the person remained still. This is the result of the excellent chroma performance and fine 3D comb filter.

HDTV pictures were always better than the best DVDs, but never possessed the stunning sharpness and open window quality of high-resolution front projectors. The HDTV performance was comparable to most consumer CRTs and RPTVs.

Program material from both film and

video sources were deinterlaced satisfactorily. The 3:2 cadence of film based material was recognized and the deinterlacer selected inverse telecine properly, even with problem DVDs. The "Montage Of Images" on *Video Essentials* (which switches from film to video sources repeatedly) was reproduced without any major problems.

Image latency was often observed. Any time the broadcast had an on-screen logo, or when picture-in-picture was used, remnants of the original image could be seen when that image was followed by a black screen. This effect could last for hours if no other material was viewed. Fortunately, when a normal picture was displayed, the effect quickly faded away. This was not a permanent image burn-in but rather, a temporary condition that always went away.

Overall this monitor delivered a satisfying picture on virtually all programs. I did not test the outboard loudspeakers, but they can be used as a center channel in multi-channel installations.

## Summary

The Hitachi 42HDT20 Plasma Television is ideal for the person that wants a high tech big screen TV that they can hang on the wall and feed with almost any source available. The user interface and grayscale tracking are exceptional. A large number of inputs and the ability to integrate computer and videos sources are very desirable in creating a fun multimedia system, which can be enjoyed by the whole family. ■

### Hitachi 42-Inch 16:9 HDTV Monitor And Audio Video Control Center (AVC20)

#### Convenience

- Two-Piece Television System
- 2 NTSC Tuner Audio Video Control (AVC) Center
- Slim-Design Plasma Display Panel with Stand
- Elegant One-Wire AVC Connection
- Silent Operation without Fans
- New Easy-to-Use On-Screen Menu Control (3-Language)
- New AV Network Infra-Red (IR) System
- Controls up to 4 Components
- Easy-to-Use On-Screen Commands
- Control Hidden Components
- Set-Up Wizard Guides Installation
- Digital Window Two-Tuner Split Screen (1)
- Digital Window HD Split Screen
- Digital Window Picture-in-Picture (1)
- Illuminated & Preprogrammed Remote Control
- Automatic Power On/Off via Signal Detection
- Menu Control Keys Accessible from AVC Center
- Picture Enhancement for RGB Sources

### Hitachi 42HDT20

#### Grayscale Tracking 480i YPbPr Input

IRE	Factory Color Temp
20	6458
30	6477
40	6364
50	6358
60	6437
70	6254
80	6485
90	6383
100	6265



- Closed Captioned Decoder (CC)

#### Picture

- 1080i HDTV Format (4)
- ALiS (Alternate Lighting of Surfaces) Technology
- VirtualHD
- 1080i/720p/540p (3) /480p/480i Processing
- 3:2 Film Correction
- 8 Point Video Motion Detection
- High-Contrast MBP Pure-Color Glass Shield
- Wide Viewing Angle: More than 160°
- 3 Color Temperature Presets: Standard (6500K), Medium (7500K), Cool (9200K)
- Multiple Screen Modes (2) (4:3 Expanded, 4:3 Standard, 4:3 Zoom1, 4:3 Zoom2, 16:9 Standard)
- 4MB 10-bit 3D Y/C Comb Filter
- Picture Modes (News, Sports, Movies, Music)
- Computer Display: VGA, (SVGA, XGA, SXGA-scaled)

#### Sound

- Dual 3-inch Woofers with 1-inch Silk Dome Tweeter (L&R Detachable)
- MTS Stereo/SAP with dbx<sup>®</sup>
- SRS TruBass and Matrix Surround
- Subwoofer Output
- 12W + 12W
- Soft Mute (50% & 100%)

#### Inputs/Outputs

- Audio Video Control Center
- Inputs RGB1, RGB2, VIDEO 1-5
- Wideband Component Video Inputs YPbPr, Two Sets (1080i, 720p, 540p3, 480p, 480i)
- RGB1, Analog
- RGB2, Digital (DVI w/HDCP) 1
- Four Composite Video
- Three S-Video
- Two Antenna (RF) Inputs
- Converter Box Output
- Audio Output
- Monitor Output
- Headphone Output

#### Specifications

- Multi-Scanning 24-80KHz (h), 50-75Hz (v)
- Pixel Pitch 0.90 (h) x 0.51 (v) mm
- FCC Class B for Consumer Use
- Power Requirements 108-132V, 60Hz
- AVC Power Consumption (watts/amps) 35/0.75
- Display Power Consumption TBD
- 1024 x 1024 Display Resolution

#### Dimensions

Monitor Without Stand (WHD in inches): 40-9/16 (1030mm) x 25-1/16 (636mm) x 3-9/16 (89mm)  
 Weight (with stand and loudspeakers) in Pounds: 86 (38.8kg)  
 Audio Video Control Center (WHD in inches): 16-15/16 (430mm) x 4-3/4 (120mm) x 11-1/16 (280mm)

Weight In Pounds: 9 (4kg)  
 Price: \$ 8,995

- (1) Digital Window Features are not available with RGB Inputs
- (2) Screen Mode Availability Varies by Input Format
- (3) RGB Input Only
- (4) 1024 Viewable

Manufactured In Japan For:

Hitachi America Ltd.  
 Home Electronics Division  
 P.O. Box 3900  
 Peoria, Illinois 61612  
 Tel: 800 HITACHI  
[www.hitachi.com](http://www.hitachi.com)