

Panasonic®

Digital Television Decoder Operating Instructions



TU-DST50



*The presence of the DTV certification mark indicates that this product will successfully receive digital television transmissions that conform to any and all of the video formats described in the ATSC Digital Television Standard.

TQB2AA0258
PRINTED IN USA

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Read these instructions completely before operating.

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Safety Instructions



The lightning flash with arrow head within a triangle is intended to tell the user that parts inside the product are a risk of electric shock to persons.



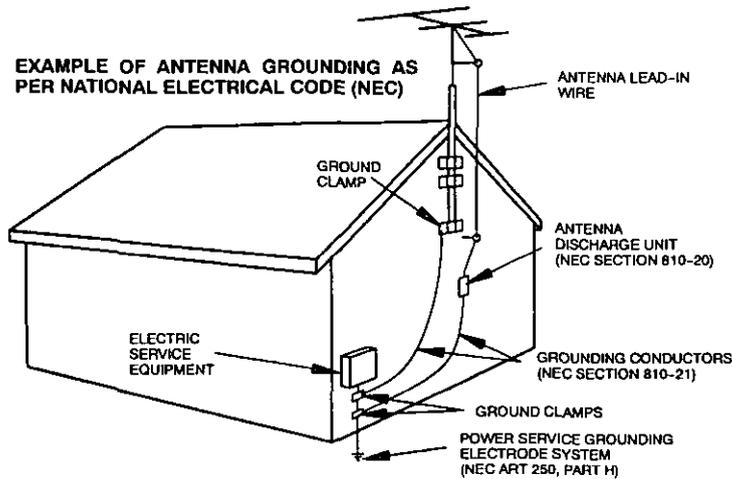
The exclamation point within a triangle is intended to tell the user that important operating and servicing instructions are in the papers with the appliance.

Note To CATV System Installer: This reminder is provided to call the CATV system installer's attention to article 820-40 of the National Electric Code that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

Safety Instructions For High Definition Television Decoder

1. Read and apply the operating instructions provided with your High Definition Television Decoder.
2. Read all of the instructions given here and retain them for later use.
3. Unplug this High Definition Television Decoder from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use attachments not recommended by the High Definition Television Decoder manufacturer as they may cause hazards.
5. Do not use this High Definition Television Decoder near water. For example: Avoid placing it near a bathtub, washbowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, etc.
6. Do not place this High Definition Television Decoder on an unstable cart, stand, or table. The High Definition Television Decoder may fall, causing serious injury to a child or adult and serious damage to the appliance. Use only with a cart or stand recommended by the manufacturer, or sold with the High Definition Television Decoder. Wall or shelf mounting should follow the manufacturer's instructions, and should use a mounting kit approved by the manufacturer.
- 6a. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.
7. Slots and openings in the cabinet and the back or bottom are provided for ventilation, and to insure reliable operation of the High Definition Television Decoder and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the High Definition Television Decoder on a bed, sofa, rug or other similar surface. This High Definition Television Decoder should never be placed near or over a radiator or heat register. This High Definition Television Decoder should not be placed in a built-in installation such as a bookcase unless proper ventilation is provided.
8. Operate only from the type of power source indicated on the marking label. If you are not sure of the type of power supplied to your home consult your television dealer or local power company. For High Definition Television Decoders designed to operate from battery power, refer to the operating instructions.
9. This High Definition Television Decoder is equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safe purpose of the polarized plug.
10. Do not allow anything to rest on the power cord. Do not locate this High Definition Television Decoder where the cord will be abused by persons walking on it.
11. Follow all warnings and instructions marked on the High Definition Television Decoder.
12. Do not overload wall outlets and extension cords as this can result in fire or electric shock.
13. Never push objects of any kind in to this High Definition Television Decoder through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind on the High Definition Television Decoder.





14. If an outside antenna is connected to the decoder equipment, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. In the U.S. Section 810 of the National Electrical Code, ANSI/NFPA 70, and in Canada Part 1 of the Canadian Electrical Code provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure.
15. For added protection for this High Definition Television Decoder during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna. This will prevent damage to the decoder due to lightning and power-line surges.
16. An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.
17. Unplug this High Definition Television Decoder from the wall outlet, and refer servicing to qualified service personnel under the following conditions:
 - a. When the power cord or plug is damaged or frayed.
 - b. If liquid has been spilled into the High Definition Television Decoder.
 - c. If the High Definition Television Decoder has been exposed to rain or water.
 - d. If the High Definition Television Decoder does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions as improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the High Definition Television Decoder to normal operation.
 - e. If the High Definition Television Decoder has been dropped or the cabinet has been damaged.
 - f. When the High Definition Television Decoder exhibits a distinct change in performance - this indicates a need for service.
18. Do not attempt to service this High Definition Television Decoder yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
19. When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards.
20. Upon completion of any service or repairs to this High Definition Television Decoder, ask the service technician to perform routine safety checks to determine that the decoder is in safe operating condition.
21. **WARNING: To prevent fire or shock hazard, do not expose this appliance to rain or moisture.**
22. **CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH A RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.**

NOTE: This equipment is designed to operate in the U.S.A. Canada and other countries where the broadcasting system and AC house current is exactly the same as in the U.S.A. and Canada.

Digital Television

In April 1997, the Federal Communications Commission (FCC) announced that by 2006, all television broadcasting will be digital. However, television stations are required to continue broadcasting regular TV signals along side the digital signals until 2006. Cable and satellite TV are not affected by the FCC ruling.

According to the FCC, digital broadcasting must be available from each of the four major networks in each of the top ten markets, covering 30% of households by May 1999. By the end of 1999, it must be available in the top 30 markets, covering 50% of households.

The FCC has allocated to each of the broadcasters a fixed amount of transmitting "space" for digital programming. At the highest resolution, High Definition (HDTV), one (1) or two (2) programs can be transmitted within this "space." At lower resolutions, Standard Definition (SDTV), several programs can be simultaneously transmitted. Broadcasters will choose their own broadcast formats. For example, they may choose to broadcast day programs in SDTV and night sports and movies in HDTV. Digital Television (DTV) broadcasting will deliver crystal-clear pictures, approaching the quality of 35mm movies, and compact disc (CD) sound.

HDTV (High Definition Television)

HDTV signal formats are 1080i (interlaced scan) and 720p (progressive scan). HDTV provides the highest resolution picture and audio in either stereo or 5.1 channel surround sound.

SDTV (Standard Definition Television)

SDTV signal formats are 480p and 480i. SDTV provides lower resolution, yet presents a very sharp clear picture. Lower resolution allows broadcasters to transmit multiple programs per channel.

Digital Broadcasting and Cable TV

The FCC has not mandated any standards for cable operators or satellite broadcasters at the time this manual is printed. Some cable companies have announced plans to introduce digital cable boxes into their markets. They may choose, however, to use the digital capability to increase the number of channels available or to provide data capability, such as high speed modem rather than transmit HDTV programming.

Contact your local cable provider to determine if digital cable is available and whether a cable box is needed for converting the signals.

Receiving Digital Broadcasts

Most households will be able to receive a digital broadcast by regular antenna with VHF/UHF reception capability. However, like regular TV signals, it will depend on location, terrain and environmental factors. Outdoor or attic antennas will generally be more effective than a set-top antenna. For cable, check with your local cable provider to find out if they will carry the DTV signal in your area.

Digital Picture Formats

DTV supports eighteen (18) Advanced Television Systems Committee (ATSC)* display formats, which are variations of the four (4) following formats: 1080i (interlaced), 720p (progressive), 480p (progressive) and 480i (interlaced). The larger the number, the higher the resolution of the picture.

Interlaced Scan

For interlaced pictures, the odd number lines (picture information) are scanned, creating field 1, then the even number lines are scanned, creating field 2. The two fields are interlaced to provide the entire image (one frame). This process takes 1/30th of a second and is invisible to the human eye.

Progressive Scan

For progressive pictures, all lines in an entire frame are scanned sequentially in 1/60th of a second. With progressive scan, you will generally not see the thin black horizontal scan lines (venetian blind effect) associated with an interlaced picture.

Digital Audio

For all HDTV formats, Dolby** Digital surround sound (also commonly referred to as AC-3** or DD 5.1) is the audio standard. AC-3 will provide CD-quality sound. The system provides 3 separate audio channels for the front speakers (left, center, right), 2 channels for the rear surround sound speakers, plus one channel for subwoofer sound. You will need an external audio system capable of decoding the AC-3 encoded sound to get the full surround sound effect. Otherwise, it can be connected directly to your TV or audio system using only the stereo (left/right) audio outputs.

Note: *The stereo audio outputs are Dolby Surround compatible. You can connect a Dolby Surround Pro Logic** decoder (not included) to the stereo audio outputs and receive surround sound.*

*The ATSC is responsible for digital television development and standards.

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Panasonic Digital Set-Top Box model TU-DST50

Current Conventional Televisions

Panasonic's digital set-top box (STB) model TU-DST50 uses a Panasonic-developed single chip which will allow current televisions (with A/V inputs) to display digitally broadcast programs. The STB, which receives only digital signals, has the ability to convert the digital broadcast into National Television System Committee (NTSC)* signals (480i) that a conventional television can display. The picture and sound quality will be similar to small dish digital satellite systems today. Most conventional televisions will not be able to display HDTV programs in their original format.

DTV-Compatible Televisions

The STB, by using component video connections, will allow DTV-compatible televisions to produce pictures with incredible resolution. Component video consists of three (3) primary color signals: red, green and blue that together convey all necessary picture information. The three (3) component signals have been translated into luminance (Y) and two color difference signals (P_B , P_R), each on a separate wire. The STB, depending on the capabilities of the DTV-compatible television, will give you the choice of HDTV or SDTV format.

Audio/Visual Features

The STB contains two vital links to the future of TV. The optical Dolby Digital (AC-3) output connection provides the highest quality surround sound when attached to an external AC-3 decoder/receiver. A digital interface connection allows the STB to be attached to a Panasonic digital VHS (D-VHS) VCR.

DTV-Compatible Monitor/Receiver Capability

HDTV-Compatible (1080i/720p)

HDTV-compatible TV models process and display high definition output from the Panasonic STB as a 1080i or 720p format. When DTV broadcasts are available in your viewing area, your HDTV monitor/receiver will be compatible using the STB. It will display the 16:9 wide screen aspect ratio format.

SDTV-Compatible (480p/480i)

SDTV-compatible TV models process and display standard definition output from the Panasonic STB as a 480p or 480i format. When DTV broadcasts are available in your viewing area, your SDTV monitor/receiver will be compatible using the STB. It will display the incoming SDTV format.

*NTSC is the current television system used in the U.S. It uses analog (non-digital) signals.

Congratulations

Your Panasonic digital set-top box (STB) features state-of-the-art technology for high-quality picture and sound with complete audio/video output jacks for your home theater system. DTV signals are displayed in either an interlaced or progressive format, providing a clear, crisp picture. When connected to the STB, your HDTV-compatible monitor/receiver can display high-definition (HDTV) 1080i or 720p format and standard definition (SDTV) 480p or 480i format. Your new STB is designed to give you many years of enjoyment.

Customer Record

The model and serial number of this product are located on the back of the STB. You should note the model and serial number in the space provided and retain as a permanent record of your purchase. This will aid in identification in the event of theft or loss. Product registration is available on-line at: www.prodreg.com/panasonic.

Model Number	<input type="text"/>
Serial Number	<input type="text"/>

Care and Cleaning

Set-Top Box (Turn STB Off)

- For STB, avoid excessive moisture and wipe dry.
- Avoid bumping or scraping the STB.

Remote Control

- For Remote Control, use a soft cloth dampened with water or a mild detergent solution. Avoid excessive moisture and wipe dry.
- Do not use benzene, thinner or other petroleum based products.

Specifications

Power Source	120V AC, 60Hz
Channel Capability	VHF/UHF - 2-69* CATV - 1-125*
Digital Interface	To Panasonic D-VHS VCR only
Digital Audio Output	AC-3 Fiber Optic
Video Output Jacks	1V _{p-p} , 75 Ohm, Phono Jack Type
Audio Output Jacks	0-2.0V rms 4.7k Ohm
S-Video Output Jacks	S-Video (Y-C) Connector
DTV Output (Y, P_B, P_R)	75 Ohm, Phono Jack Type

Specifications are subject to change without notice or obligation.

*The digital tuning system allows channel numbers up to 999 to be displayed. The total channel capability, however, remains as stated.

Important Notes

STB Location

This unit can be used as part of an entertainment center. Consult your dealer for available options.

- Avoid excessive sunlight or bright lights.
- Keep away from excessive heat or moisture. Inadequate ventilation may cause internal component failure.
- Fluorescent lighting may reduce Remote Control transmitting range.

Connecting Cables

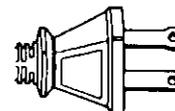
Component video cables (Y, P_B, P_R) are provided for connection to a DTV-compatible monitor/receiver. Shielded audio and video cables (not provided) should be used for all other connections between components. For best results:

- Use 75 Ohm coaxial shielded cables.
- Check type of output and input connectors on your components.
- Determine required cable lengths.

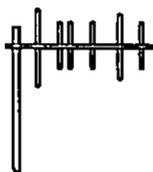
AC Power Supply Cord

CAUTION: TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT OF AC OUTLET AND FULLY INSERT. DO NOT USE A PLUG WITH A RECEPTACLE OR OTHER OUTLET UNLESS THE BLADE CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

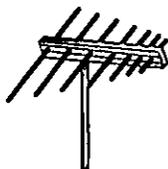
Polarized Plug



Antenna Installation and Orientation



Yagi



Log Periodic



Reflector

In many areas, an indoor antenna can be used to received DTV signals. Certain conditions, however, may create a situation where an outdoor antenna is required. Tall buildings, large metal objects (e.g., a water tower) or hills may block the line-of-sight to the TV station and interfere with DTV signal reception. Keep the following in mind when installing and orienting your outdoor antenna. For additional information about antennas, see the Consumer Electronics Manufacturing Association (CEMA) website at www.cemacity.org or ask your local dealer.

- Choose an antenna with directional receiving characteristics such as a Yagi, log periodic, or reflector antenna. Avoid loop, wire bowtie, rabbit-ear and omni-directional antennas.
- Use good grade 75 Ohm coax (round) cable to connect the antenna to the STB. Do not use 300 Ohm flat twin-lead cable.
- Place the antenna away from large metal objects. If using an indoor antenna, remember that aluminum siding and foil-covered insulation can greatly reduce the signal strength inside your house.
- Point the antenna in the direction of the TV station. Allow a 4-6 second delay in tuning. Watch for a program to appear on the TV. If the signal indicator is "NOT FOUND" or if a program comes and goes, try a slightly different position for the antenna. Slowly raising or lowering the antenna by a few feet may help.
- Avoid standing in front of the antenna while adjusting its position. Move a few feet to the rear to avoid changing the signal characteristics.
- If you are located in an area serviced by two (2) different DTV stations in different directions, you may need an antenna rotator to receive signals from both stations.

Antenna/Cable Connection

For proper reception, an antenna or cable connection is required.

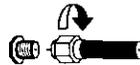
Antenna Connection

For proper reception of VHF/UHF channels, a directional antenna is required (see previous page). For best reception, an outdoor antenna is recommended.

Procedure

- Connect the antenna cable from your antenna.
- Select ANTENNA, in the Roller Guide Menu™ SET UP Menu under Input (see Getting Started section, Step 7).

Incoming Cable from Home Antenna



75 Ohm VHF/UHF
on back of STB

Cable Connection

Before connecting your cable to the STB, contact your local cable provider and ask the following questions:

- Is DTV available through your cable service?
- What type of cable do you have? Standard Cable TV Signals (Cable STD), Harmonic Related Carrier (Cable HRC) or Incremental Related Carrier (Cable IRC).
- Do you need a separate cable box to receive DTV signals?

Procedure

- Connect the cable wire provided by your local cable provider.
- Select one of the following in the Roller Guide Menu™ SET UP Menu under Input (see Getting Started section, Step 7).
 - Cable STD - Standard Cable TV Signals
 - Cable HRC - Harmonic Related Carrier
 - Cable IRC - Incremental Related Carrier

Incoming Cable from Cable Provider



75 Ohm VHF/UHF
on back of STB

Note: The Panasonic DTV set-top box is able to receive DTV signals from your local cable provider **only if they are transmitted in the 8VSB modulation format approved by the FCC for DTV transmission.** Also, your cable provider may elect to transmit in the 8VSB format for only a limited period of time. **Please contact your cable provider to determine if 8VSB modulation is available.**

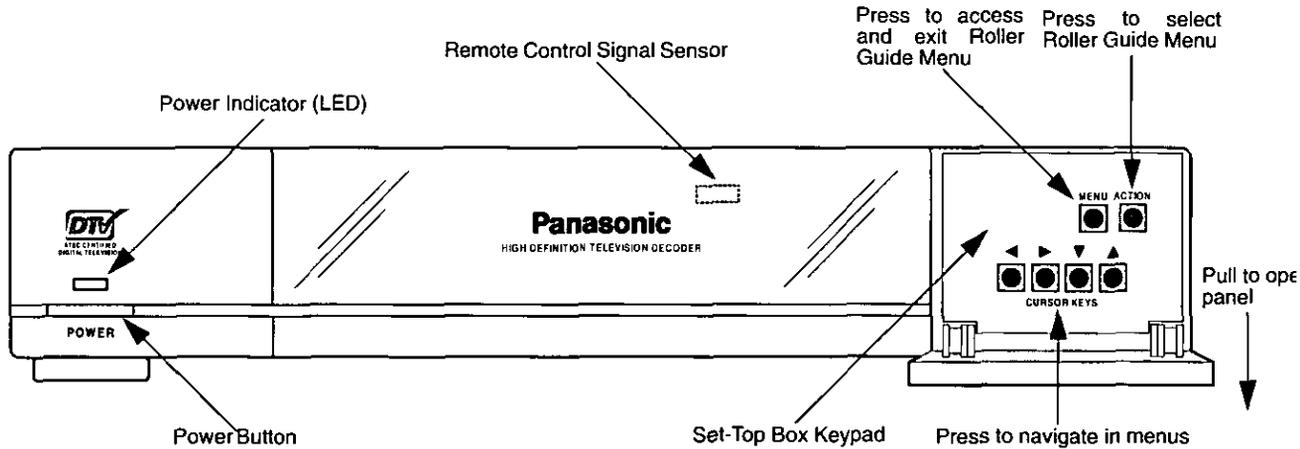
* Roller Guide Menu is a trademark of Panasonic Consumer Electronics Company. U.S. Patent Pending.

FRONT AND REAR VIEW OF THE SET-TOP BOX

Front and Rear View of the Set-Top Box

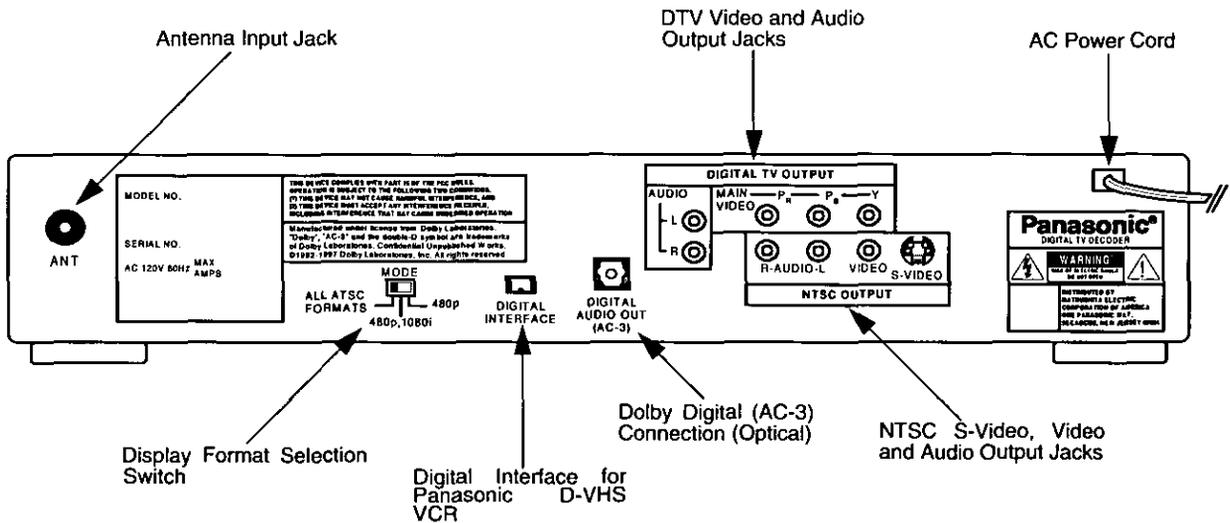
Front Panel

The following is a labeled illustration of the front panel of the STB.



Rear Panel

The following is a labeled illustration of the rear panel of the STB.



Note: Refer to the Table of Contents for page numbers.

*Such as CT-32XF55, CT-36DV60, PT-56WG80, PT-56WXF90 and other future models.

Features of the Set-Top Box

Channel and Program Tuning

Channel and program tuning in digital television is very different from current conventional television. In DTV, up to six (6) multiple programs can exist within a single 6 MHz channel. These programs behave as subchannels within the single channel. When tuning to a channel, the STB will also tune to a program. Your STB will indicate the channel and program through the on-screen Channel Banner display.

Channel and Program Tuning

The STB allows channel and program selection in the following ways:

- Direct Tuning (0 ~ 9 keys) - Tunes directly to a channel or program.
- Channel Up/Down Tuning (▲ or ▼ buttons) - Tunes to the next or previous available channel or program.
- Next Program Tuning (PROG button) - Tunes to the next program within a single 6 MHz channel.
- Rapid Tuning (R-TUNE button) - Switches between the last two remembered channels or programs.

Next Program Tuning

The **PROG** button on the remote control allows you to select programs within a single 6 MHz channel. Each time the **PROG** button is pressed, the STB will move to the next available program within the channel.

Note: Only programs within the current 6 MHz channel can be selected using the **PROG** button. If only one (1) program appears, it indicates only one (1) program is available.

Channel Tuning Using Certain Panasonic Televisions

Some Panasonic television models* will automatically switch between using the STB or the TV to tune channels.

DTV

When the remote control is in DTV mode and either the 0 ~ 9 numeric keypad or the Channel Up/Down (▲ or ▼ buttons) is used, the television will automatically switch to DTV input. Channel tuning will be done through the STB.

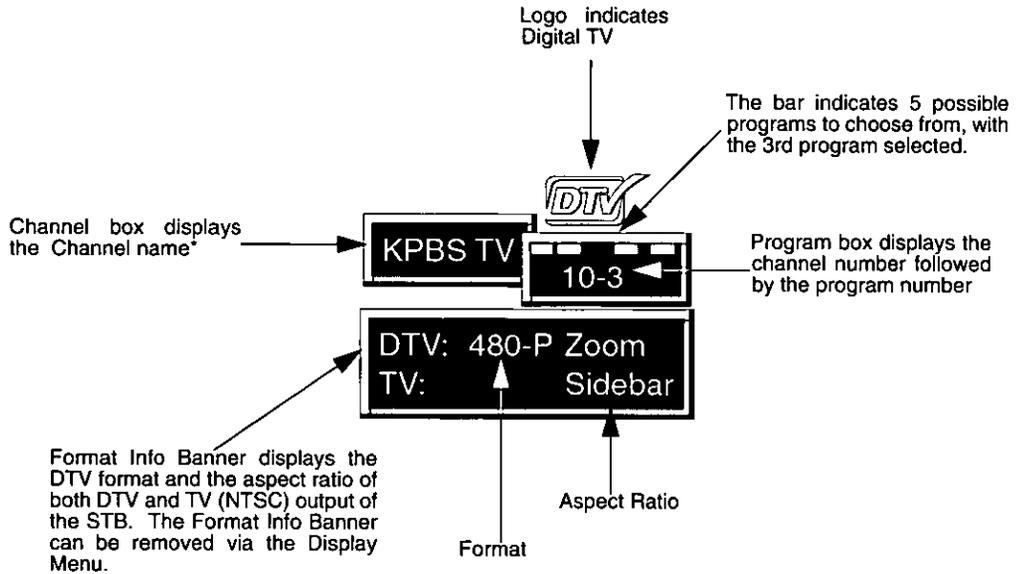
TV

When the remote control is in TV mode and either the 0 ~ 9 numeric keypad or the Channel Up/Down (▲ or ▼ buttons) is used, the television will automatically switch to TV input. Channel tuning will be done through the TV.

FEATURES OF THE SET-TOP BOX

Channel Banner

The Channel Banner is used by all tuning methods to show you which channel and program you are currently viewing or selecting. The banner will appear in the upper right hand side of your TV screen.



*Channel box with Channel name may not appear in all situations.

Unavailable Channel Selection

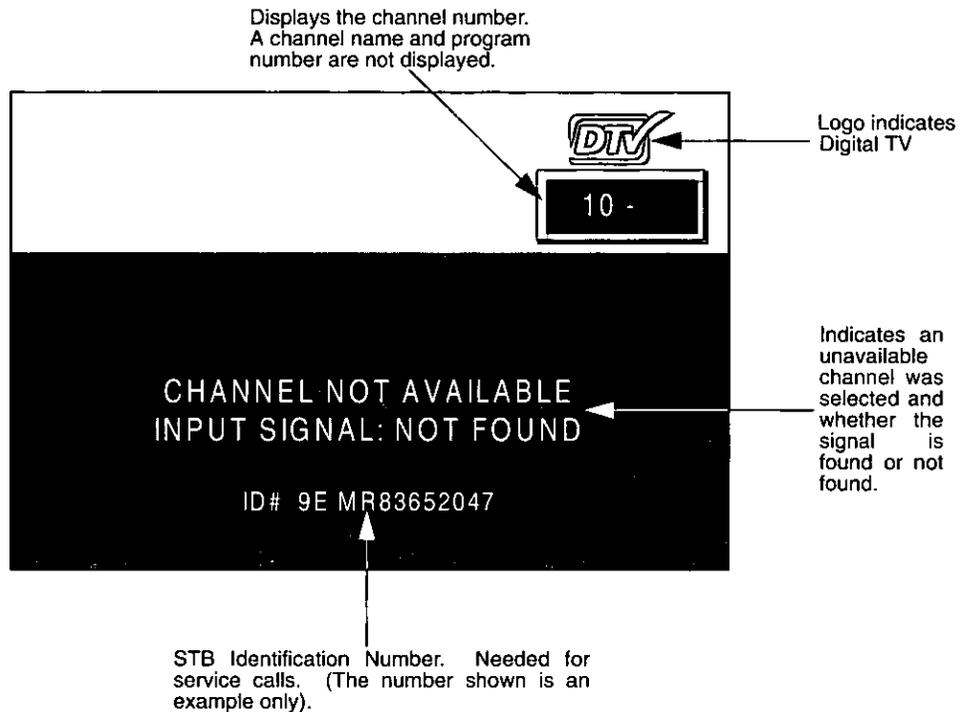
The unavailable channel selection screen is displayed when you select an unavailable channel. The following is a list of some possible situations where an unavailable channel selection may occur.

- Tuning to a channel that is not transmitting any programs.
- Tuning to a channel that stopped broadcasting programs.
- The signal strength of the RF signal is insufficient to obtain consistent error free data.

Found or Not Found Input Signals

The unavailable channel selection screen also indicates whether the input signal is found or not found.

- Found signal (FOUND) - The tuner has found a signal, however, insufficient and/or erroneous data is being received.
- Not Found signal (NOT FOUND) - The tuner has not found a signal, therefore, data cannot be received.



Note: The screen remains displayed for 60 seconds, then is replaced by a blank screen.

FEATURES OF THE SET-TOP BOX

ATSC Display Formats

The STB converts all eighteen (18) ATSC display formats available in DTV into viewable programming. The display formats are variations on the four (4) formats, 1080i, 720p, 480p and 480i. The following table shows the four (4) formats, their resolutions and aspect ratios.

DTV Format	Resolution	Aspect Ratio
1080i 720p	High Definition	16:9
480p 480i	Standard Definition	16:9 or 4:3

Display Format Selection

The STB allows you to choose a display format based on the capability of your TV or monitor. To select the appropriate display format, use the MODE switch on the rear panel of the STB. The MODE switch affects only the Y, P_B, P_R digital output. NTSC output is not affected by the MODE switch.

Note: This section applies to DTV-compatible televisions only.

All ATSC Formats

If your TV is capable of displaying all four (4) formats, 1080i, 720p, 480p and 480i, then set the MODE switch to ALL ATSC FORMATS.

Input Format (from antenna/cable)	Output Format (to TV)
1080i	1080i
720p	720p
480p	480p
480i	480i

480p, 1080i

If your TV is capable of displaying 1080i and 480p formats, then set the MODE switch to 480p, 1080i.

Input Format (from antenna/cable)	Output Format (to TV)
1080i	1080i
720p 480p 480i	480p

480p

If your TV is capable of displaying 480p format only, then set the MODE switch to 480p.

Input Format (from antenna/cable)	Output Format (to TV)
1080i 720p 480p 480i	480p

Aspect Ratio Selection

The STB changes the normal aspect ratio (picture display shape) in response to the source signal and monitor format of your TV. You can also change the aspect ratio for your personal viewing preference. To select an aspect ratio, press the **ASPECT** button on your remote control and the STB will cycle to the next available aspect ratio choice. The following table shows the available aspect ratios.

Monitor Format		
Source Signal	16:9	4:3
16:9	Full (No Scaling)	Full - Zoom - Letbox (Letterbox) - Shrink
4:3	Full - Zoom - Sidebar - Expand	Full (No Scaling)

Full Aspect

16:9 or 4:3 picture will be displayed in the center of the viewing screen at full screen width and height.

Zoom Aspect

The picture will be expanded uniformly (width and height) to fill the viewing screen. The picture will be cropped, either horizontally or vertically to fit the viewing screen. The cropped portion of the original picture will be lost from view.

Note: To properly view Closed Captioning, the STB may, in some cases, change the aspect ratio from Zoom to Full.

Letbox (Letterbox) Aspect

Video formats with aspect ratios greater than 16:9 will be displayed at the proper width, so no video information is lost. Bars will appear above and below the picture.

Shrink Aspect

The source aspect ratio will be maintained and the picture will shrink into full view on the screen.

Sidebar Aspect

4:3 pictures will be viewed on a wide aspect TV screen with vertical bars on both sides of the picture.

Expand Aspect

4:3 pictures will be viewed on a wide aspect TV screen with the picture digitally "stretched" to fill the screen.

Note: See following page for illustrations of the various aspect ratios.

ASPECT RATIO FORMATS

Source Signal	16:9 MONITOR FORMAT				4:3 MONITOR FORMAT			
	FULL	ZOOM	SIDEBAR	EXPAND	FULL	ZOOM	LETTERBOX	SHRINK
16 9		—	—	—				
4 3						—	—	—

The 16:9 and 4:3 pictures represent the incoming source signals received by the STB.

These pictures show the different aspect ratios available with a 16:9 monitor format.

- The top picture shows the 16:9 monitor format available when the STB receives a 16:9 source signal.
- The bottom pictures show the 16:9 monitor formats available when the STB receives a 4:3 source signal.

These pictures show the different aspect ratios available with a 4:3 monitor format.

- The top pictures show the 4:3 monitor formats available when the STB receives a 16:9 source signal.
- The bottom picture shows the 4:3 monitor format available when the STB receives a 4:3 source signal.

Digital Interface for Panasonic D-VHS VCR

The digital interface on the STB allows the transfer high speed digital data between devices. With the digital interface, there is no need to first convert digital data into analog, eliminating the loss of data integrity. The digital interface on the STB allows you to connect a Panasonic digital VHS (D-VHS) VCR only.

Digital VHS (D-VHS)

The D-VHS VCR records the digital data directly onto tape without digital-to-analog conversion. The recorded data from the tape then needs to be decoded for playback through the STB. The STB provides everything necessary to use a Panasonic D-VHS VCR. The digital interface allows the STB to control the D-VHS VCR and even turn on and simultaneously start recording through the TIMER feature.

Dolby Digital (AC-3) Audio

Dolby Digital (AC-3) 5.1 channel surround sound delivers CD-quality sound. AC-3 provides five discrete full-bandwidth channels for front left, front right, center, surround left and surround right, plus a LFE (Low Frequency Effect) subwoofer channel.

External Dolby Decoder (Optional)

For a full Home Theater sound experience, an external AC-3 decoder and multichannel amplifier must be connected to the STB.

Stereo Output

The internal decoder converts compressed audio data, up to 5.1 channels, into two CD-quality stereo audio outputs, delivering stereo sound.

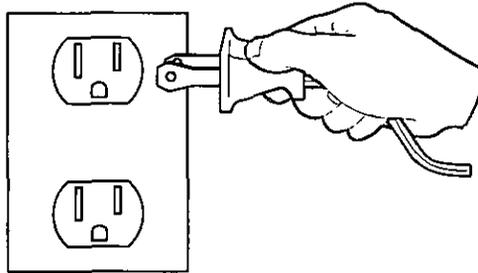
Note: *The stereo audio outputs are Dolby Surround compatible. You can connect a Dolby Surround Pro Logic decoder (not included) to the stereo audio outputs and receive surround sound.*

GETTING STARTED

Getting Started

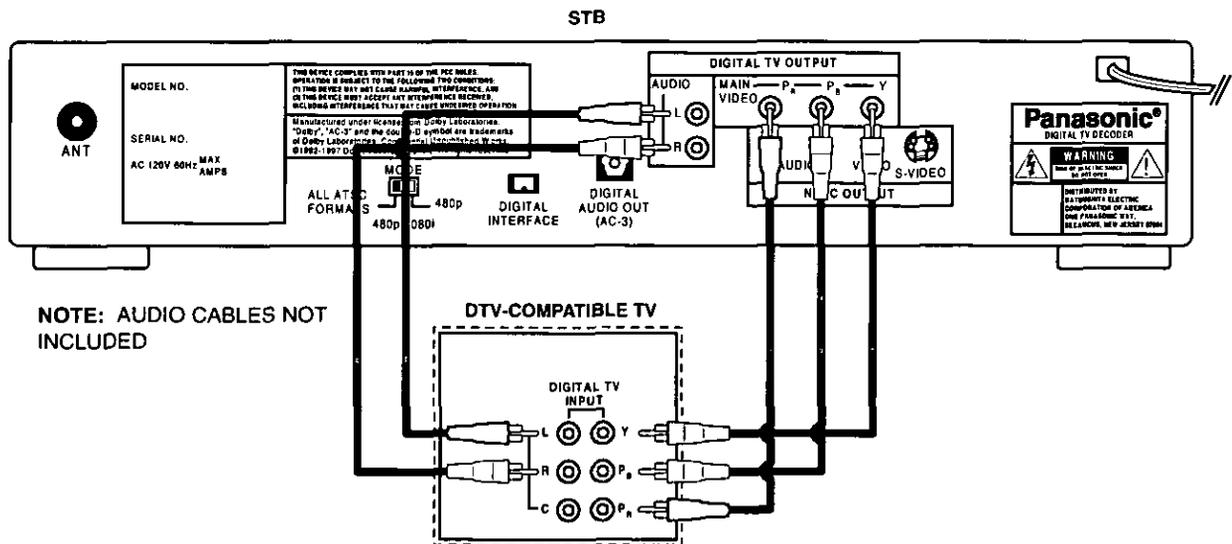
Step 1. Connect AC Power Cord

Plug the AC power cord into a grounded outlet. Do not turn on any devices until you have finished making all necessary connections.



Step 2. Set-Top Box Connection to DTV-Compatible TV

Follow this diagram when connecting the STB to a DTV-compatible TV.



NOTE: AUDIO CABLES NOT INCLUDED

DTV-COMPATIBLE TV SETUP

Procedure

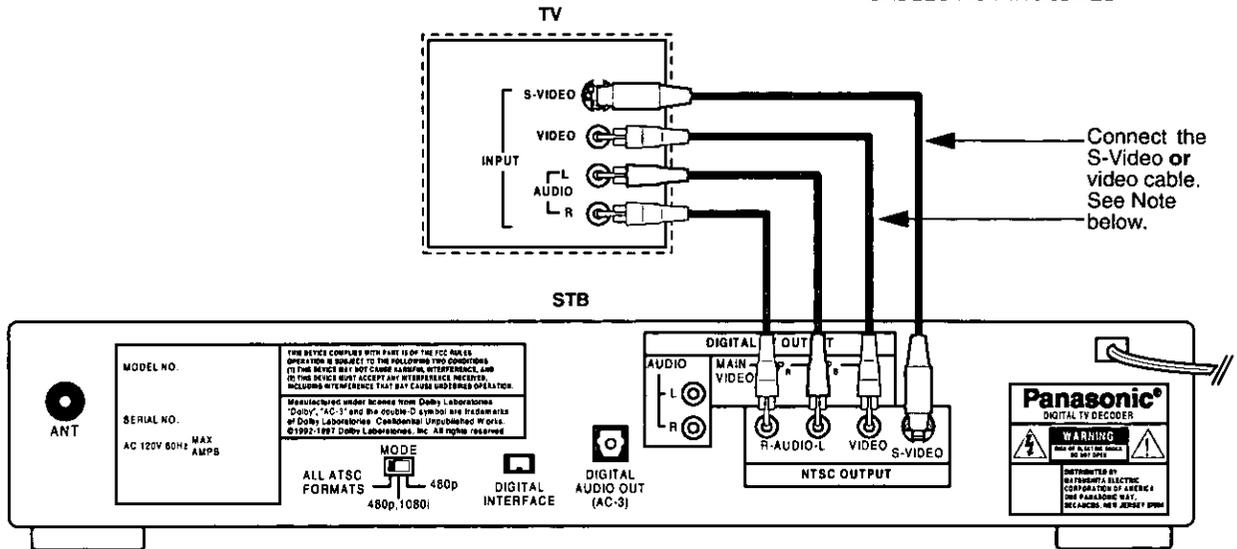
- Connect video cables from the Y, P_B, P_R digital TV video output jacks on the STB to the Y, P_B, P_R digital TV video input jacks on the DTV-compatible TV.
- Connect audio cables from the left and right digital TV audio output jacks on the STB to the left and right digital TV audio input jacks on the TV.

Note: There are three video inputs, Y, P_B, P_R. Separate component video inputs provide luminance and color difference signals.

Step 2a. Set-Top Box Connection to Conventional TV

Follow this diagram when connecting the STB to a conventional TV.

NOTE: S-VIDEO, VIDEO AND AUDIO CABLES NOT INCLUDED



CONVENTIONAL TV SETUP

Procedure

- Connect video cable from the NTSC video output jack on the STB to the video input jack on the TV.

OR

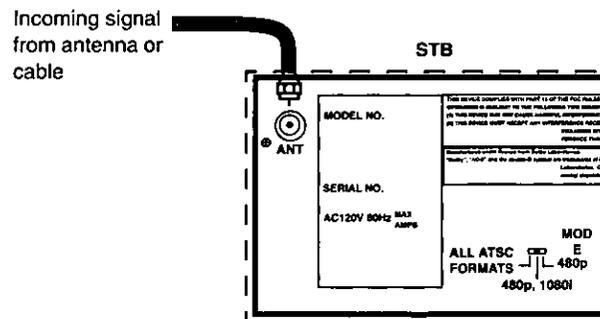
- Connect S-Video cable from the NTSC S-Video output jack on the STB to the S-Video input jack on the TV.

Note: Connect either the S-Video or video input/output.

- S-Video will provide better picture quality.
- If both S-Video and video are connected, S-Video will override video.
- Connect audio cables from the left and right NTSC audio output jacks on the STB to the left and right audio input jacks on the TV.

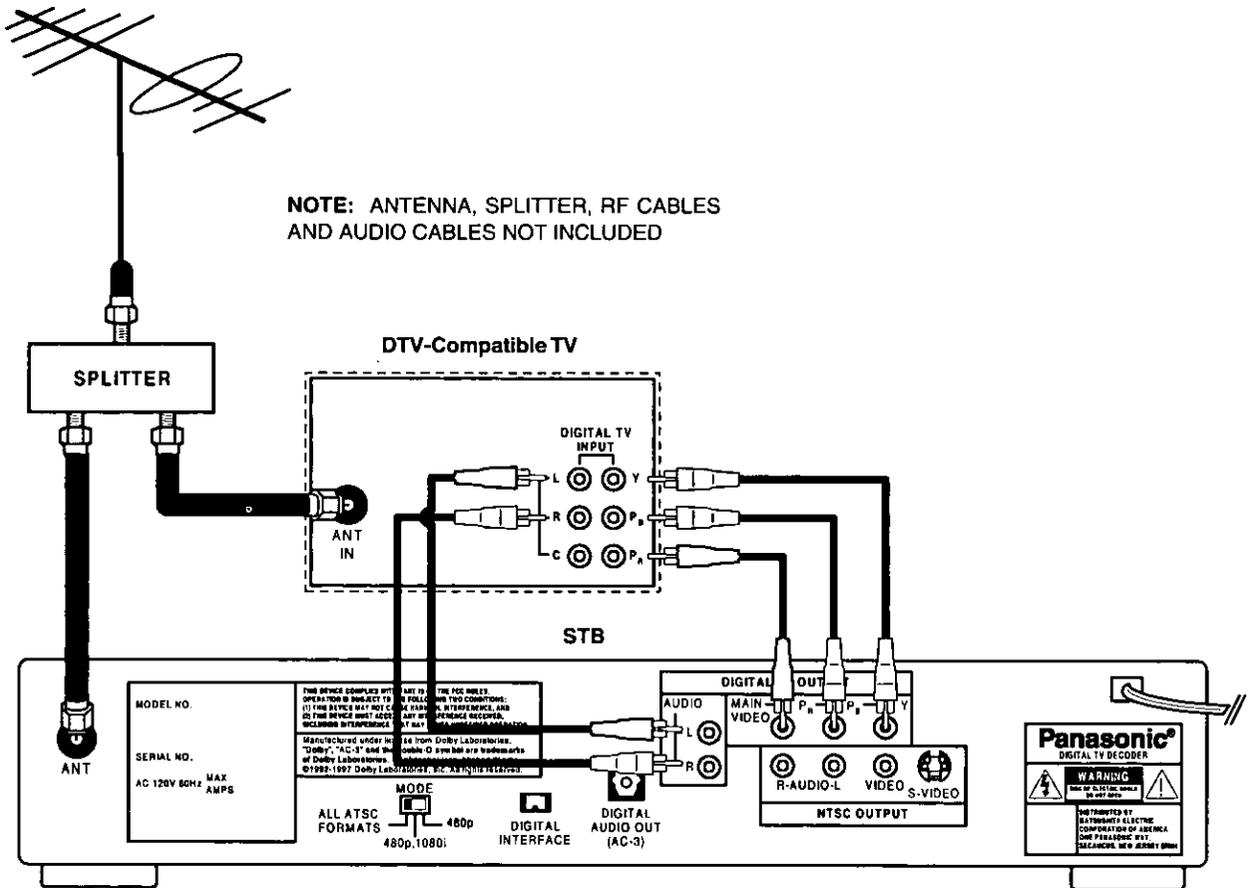
Step 3. Antenna/Cable Connection

Connect the antenna or cable wire to the ANT (Antenna) jack on the rear panel of the STB.



Step 3a. Digital TV/Standard TV Reception with DTV-Compatible TV

Follow this diagram if you have a DTV-compatible TV, no cable service and you want to receive digital channels through the STB and standard channels through the TV. An additional antenna may be required depending on which frequencies your current antenna can receive.



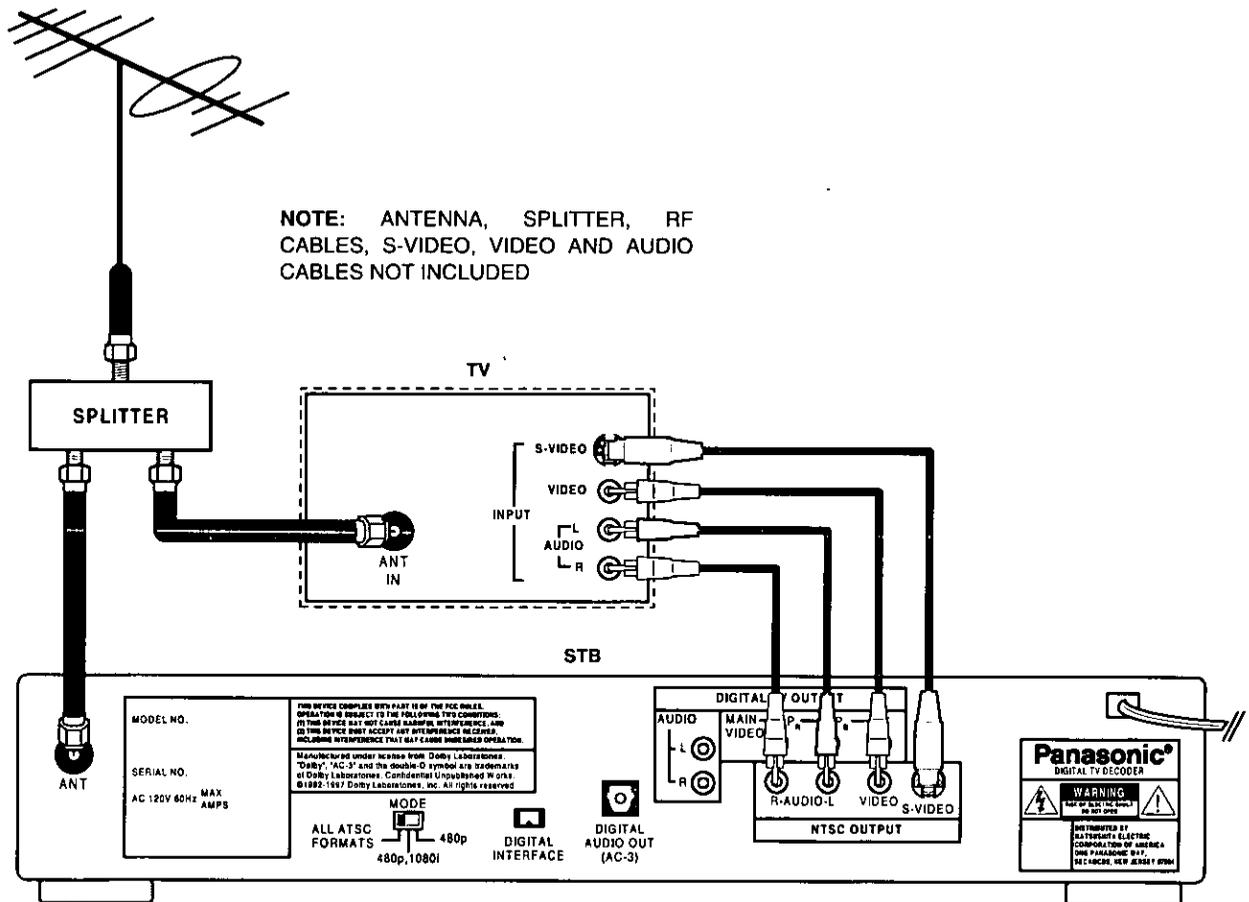
DIGITAL TV/STANDARD TV RECEPTION WITH DTV-COMPATIBLE TV SETUP

Procedure

- Connect the antenna cable to a splitter.
- Connect the splitter outputs to the STB and DTV-compatible TV ANT (antenna) jacks using standard RF cables with coaxial connectors.
- Follow directions in Getting Started section to connect the STB to a DTV-compatible TV.

Step 3b. Digital TV/Standard TV Reception with Conventional TV

Follow this diagram if you have a conventional TV, no cable service and you want to receive digital channels through the STB and standard channels through the TV. An additional antenna may be required depending on which frequencies your current antenna can receive.



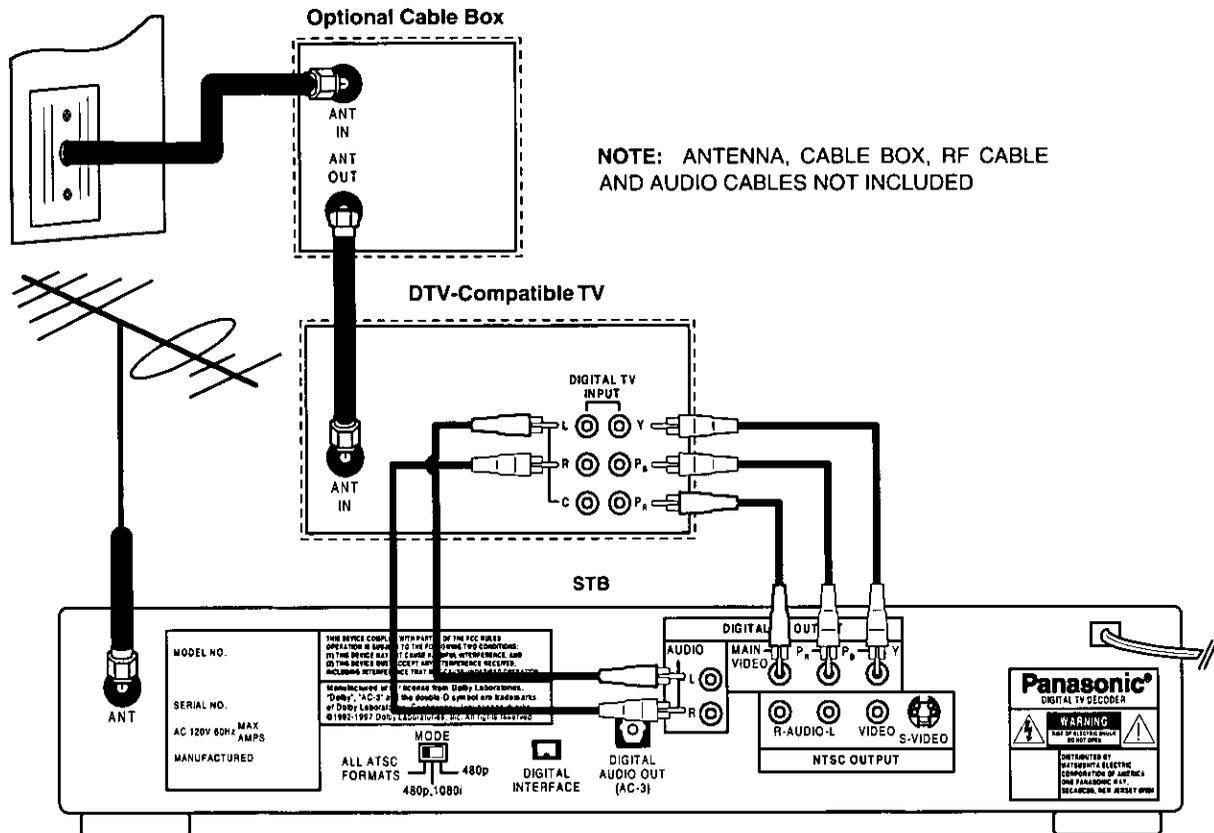
DIGITAL TV/STANDARD TV RECEPTION WITH CONVENTIONAL TV SETUP

Procedure

- Connect the antenna cable to the splitter.
- Connect the splitter outputs to the STB and TV ANT (antenna) jacks using standard RF cables with coaxial connectors.
- Follow directions in Getting Started section to connect the STB to a conventional TV.

Step 3c. Digital TV/Cable Reception with DTV-Compatible TV

Follow this diagram if you have a DTV-compatible TV, cable service and you want to receive digital channels through the STB and cable channels through the cable box (or through the TV if you have no cable box).



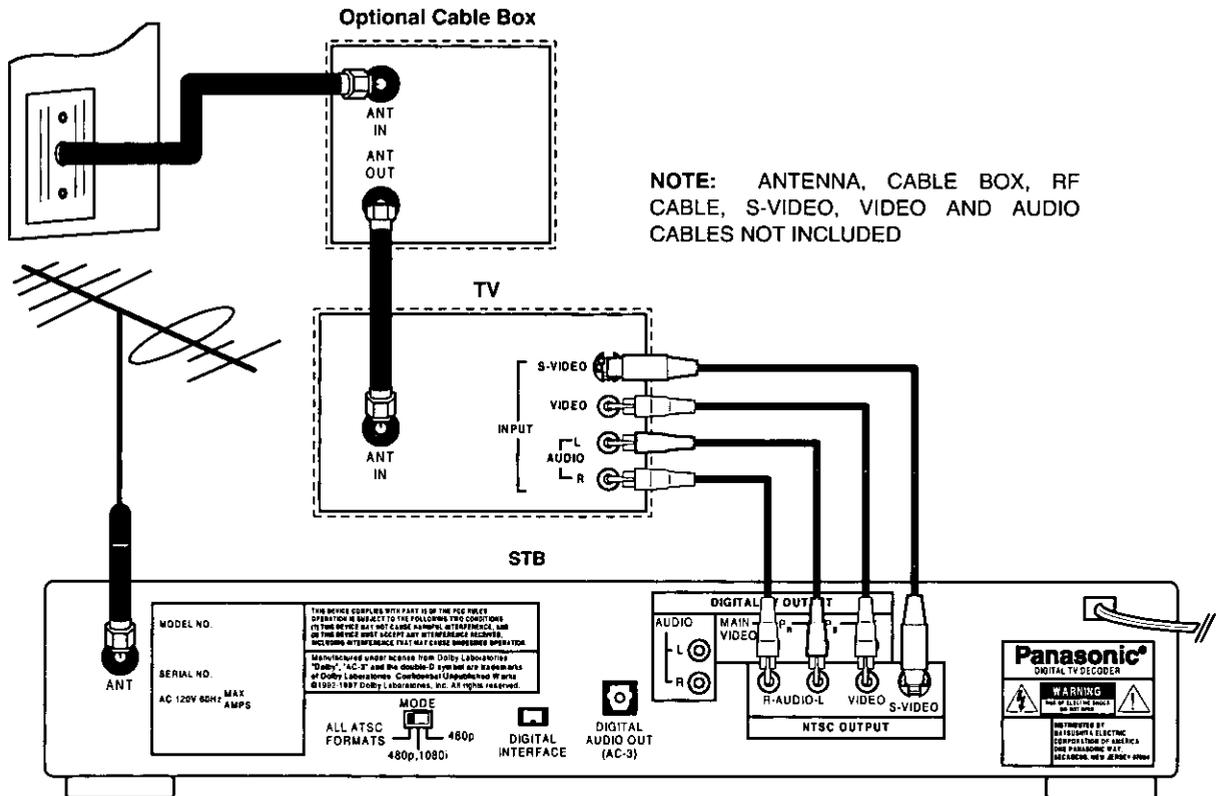
DIGITAL TV/CABLE RECEPTION WITH DTV-COMPATIBLE TV SETUP

Procedure

- Connect the antenna cable to the STB ANT (antenna) jack.
- If using a cable box, connect the cable wire from the wall jack to the cable box ANT (antenna) IN jack using a standard RF cable with a coaxial connector. Connect the cable box ANT (antenna) OUT jack to the DTV-compatible TV ANT (antenna) IN jack using a RF cable.
- If not using a cable box, connect the cable wire from the wall jack to the DTV-compatible TV ANT (antenna) IN jack using a RF cable (not shown).
- Follow directions in Getting Started section to connect the STB to a DTV-compatible TV.

Step 3d. Digital TV/Cable Reception with Conventional TV

Follow this diagram if you have a conventional TV, cable service and you want to receive digital channels through the STB and cable channels through the cable box (or through the TV if you have no cable box).



DIGITAL TV/CABLE RECEPTION WITH CONVENTIONAL TV SETUP

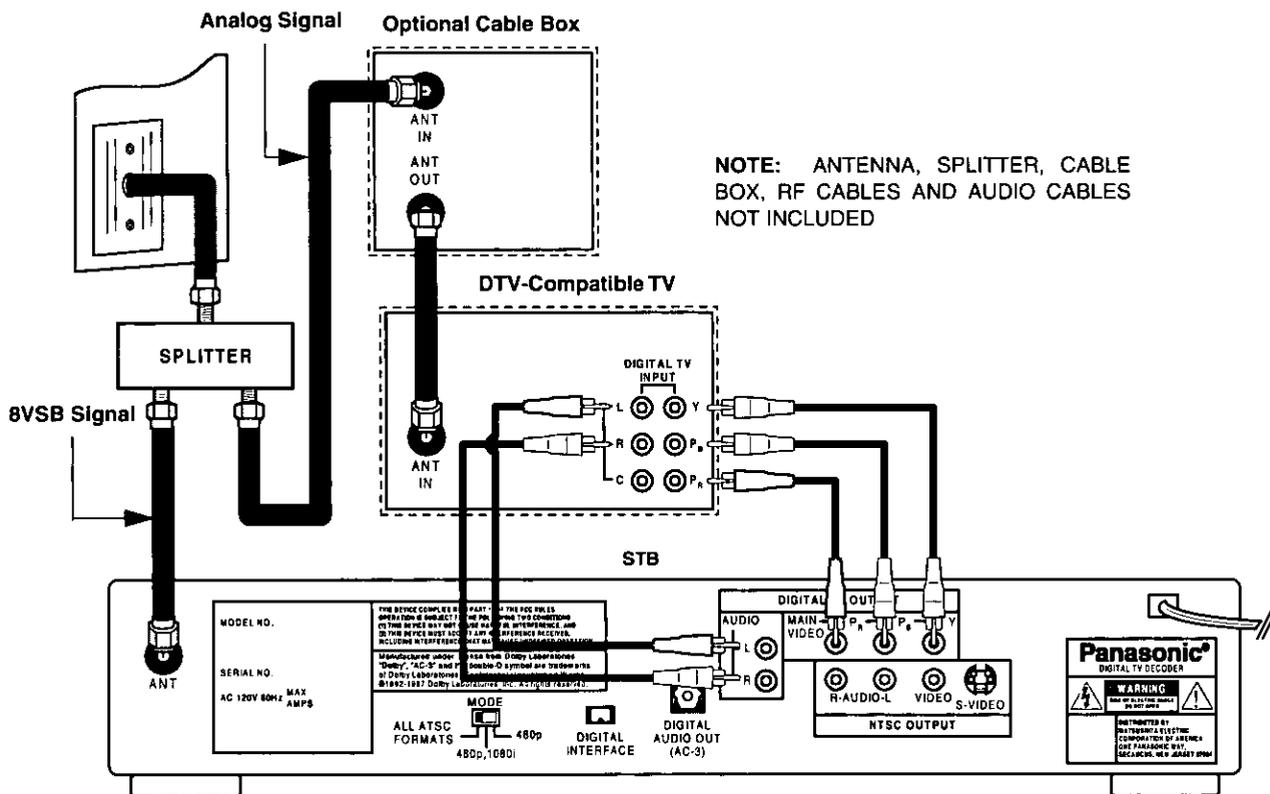
Procedure

- Connect the antenna cable to the STB ANT (antenna) jack.
- If using a cable box, connect the cable wire from the wall jack to the cable box ANT (antenna) IN jack using a standard RF cable with coaxial connector. Connect the cable box ANT (antenna) OUT jack to the TV ANT (antenna) IN jack using a RF cable.
- If not using a cable box, connect the cable wire from the wall jack to the TV ANT (antenna) IN jack using a RF cable (not shown).
- Follow directions in Getting Started section to connect the STB to a conventional TV.

Step 3e. Digital 8VSB Cable/Analog Cable with DTV-Compatible TV

Follow this diagram if you have a DTV-compatible TV, cable service providing 8VSB digital cable and you want to receive digital cable channels through the STB and analog cable channels through the cable box (or through the TV if you have no cable box).

Note: *The STB is able to receive DTV signals from your local cable provider **only** if they are transmitted in the 8VSB modulation format approved by the FCC for DTV transmission. Also, your cable provider may elect to transmit in the 8VSB format for only a limited period of time. **Please contact your cable provider to determine if 8VSB modulation is available.***



DIGITAL 8VSB CABLE/ANALOG CABLE RECEPTION WITH DTV-COMPATIBLE TV SETUP

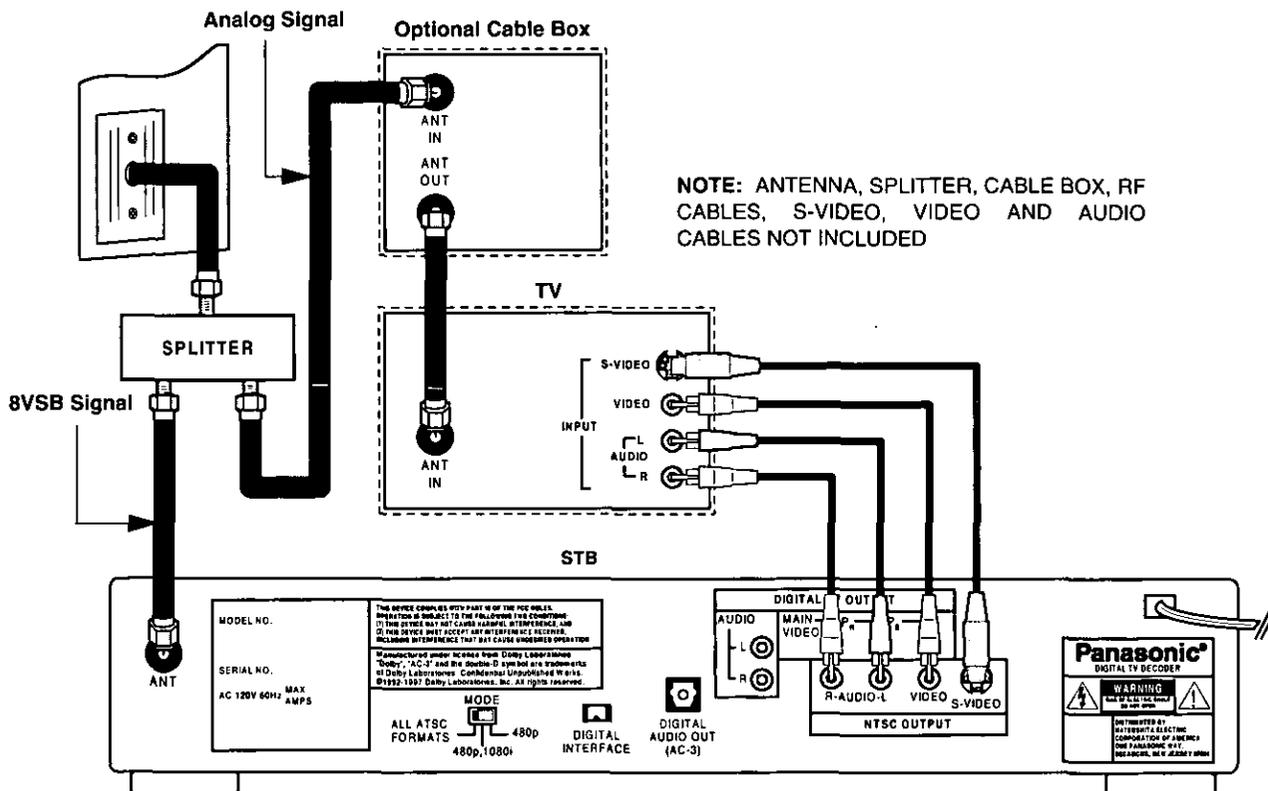
Procedure

- Connect the cable wire from the wall jack to the splitter using a standard RF cable with coaxial connectors.
- Connect one splitter output to the STB ANT (antenna) IN jack using a RF cable.
- If using a cable box, connect the other splitter output to the cable box ANT (antenna) IN jack using a RF cable. Connect the cable box ANT (antenna) OUT jack to the DTV-compatible TV ANT (antenna) IN jack using a RF cable.
- If not using a cable box, connect the other splitter output to the DTV-compatible TV ANT (antenna) IN jack using a RF cable (not shown).
- Follow directions in Getting Started section to connect the STB to a DTV-compatible TV.

Step 3f. Digital 8VSB Cable/Analog Cable with Conventional TV

Follow this diagram if you have a conventional TV, cable service providing 8VSB digital cable and you want to receive digital cable channels through the STB and analog cable channels through the cable box (or through the TV if you have no cable box).

Note: The STB is able to receive DTV signals from your local cable provider **only** if they are transmitted in the 8VSB modulation format approved by the FCC for DTV transmission. Also, your cable provider may elect to transmit in the 8VSB format for only a limited period of time. **Please contact your cable provider to determine if 8VSB modulation is available.**



DIGITAL 8VSB CABLE/ANALOG CABLE RECEPTION WITH CONVENTIONAL TV SETUP

Procedure

- Connect the cable wire from the wall jack to the splitter using a standard RF cable with coaxial connectors.
- Connect one splitter output to the STB ANT (antenna) IN jack using a RF cable.
- If using a cable box, connect the other splitter output to the cable box ANT (antenna) IN jack using a RF cable. Connect the cable box ANT (antenna) OUT jack to the TV ANT (antenna) IN jack using a RF cable.
- If not using a cable box, connect the other splitter output to the TV ANT (antenna) IN jack using a RF cable (not shown).
- Follow directions in Getting Started section to connect the STB to a conventional TV.

Step 4. Turning STB On

Procedure

- Press the Remote Control DTV mode button .
- Press the **POWER** button.

Note: TV should also be turned on.

Step 5. Switching to DTV Mode (Panasonic TV models)

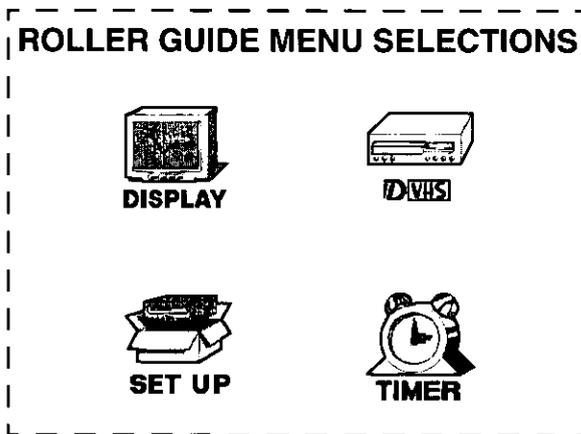
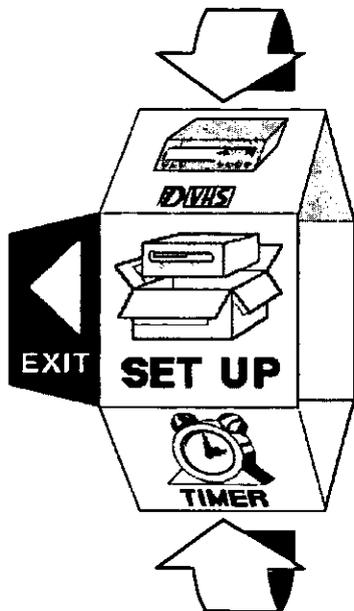
Press the Remote Control **TV/VIDEO** button until DTV (VIDEO input) appears on the TV screen.

Note: Non-Panasonic brand televisions require switching to the component video input.

Step 6. Roller Guide Menu™

Press the **MENU** button to display the **Roller Guide Menu***. Press the Δ or ∇ arrow on the **ACTION** button to rotate the Roller Guide. Press the \triangleleft arrow on the **ACTION** button to exit the Roller Guide Menu.

Panasonic



Δ ∇ for more features
Press ACTION to select.

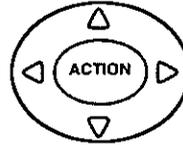
Note: To exit the Roller Guide Menu, press the \triangleleft arrow on the **ACTION** button or press the **MENU** button.

*Roller Guide Menu is a trademark of Panasonic Consumer Electronics Company. U.S. Patent Pending.

Step 6a. ACTION / Navigation Button

Press the **ACTION** button to select main menu items. Press the Δ or ∇ arrows to highlight sub menus. Press the \blacktriangleright arrow to select features. Press the Δ or ∇ arrows to scroll through options within a feature. Press the \blacktriangleleft arrow to return to main menu items.

Remote ACTION / Navigation Button



Note: Be careful to press **ACTION** in the middle of the button. If you do not press in the middle of the button, the arrow buttons may be activated.

Step 7. Antenna/Cable Mode

Select either Antenna or Cable mode, depending on the type of incoming signal you are using. Cable must be 8VSB format.

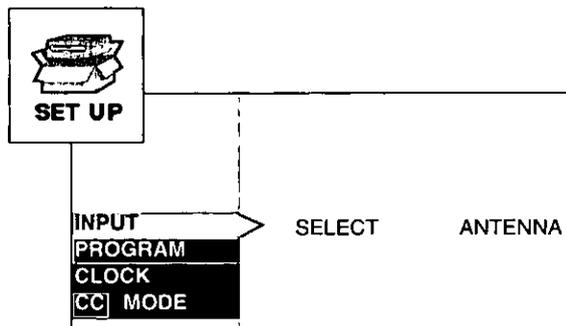
Procedure

- In SET UP Menu, select INPUT to choose either ANTENNA or Cable.
- Press the \blacktriangleright arrow, then the Δ and ∇ arrows to select ANTENNA, Cable STD, Cable HRC or Cable IRC.
 - ANTENNA - VHF/UHF
 - Cable STD - Standard Cable TV Signals
 - Cable HRC - Harmonic Related Carrier
 - Cable IRC - Incremental Related Carrier

Note: Contact your local cable provider if you are not sure which setting to use.

- Press the **ACTION** button to make your selection.
- Press the \blacktriangleleft arrow to exit back to Roller Guide.

Note: Whenever the antenna or cable mode is changed, Timer 1 and Timer 2 will revert back to default settings.



Step 8. Programming Available Channels

YOU MUST PERFORM THE AUTOMATIC CHANNEL PROGRAMMING BEFORE MANUALLY ADDING AND DELETING CHANNELS BECAUSE OF THE DIGITAL TUNING SYSTEM USED BY THE STB. THIS METHOD WILL ENSURE THAT EVERY AVAILABLE CHANNEL IS CAPTURED AND STORED INTO MEMORY.

Automatic Channel Programming

The STB will scan for all available channels and store them in memory. The scan will normally take several minutes to complete.

Procedure

- In SET UP Menu, select PROGRAM to choose AUTO to automatically scan and store all channels with a signal.
 - Press the **ACTION** button to cancel or exit back to SET UP Menu.

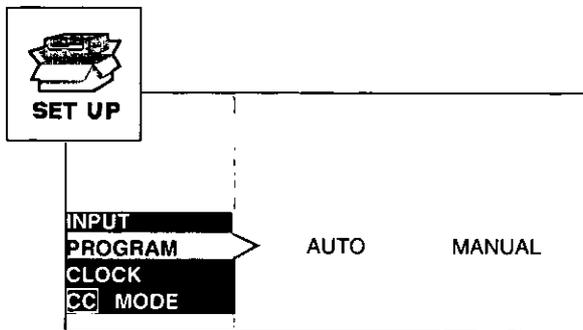
Note: *As more digital channels become available in your area, the AUTO feature must be selected to store the new digital channels into memory.*

Manual Channel Programming

After programming all available channels, you can use the MANUAL feature to selectively add or delete channels.

Procedure

- In SET UP Menu, select PROGRAM to choose MANUAL to manually add or delete channels.
 - Use the Δ , ∇ arrow buttons and numeric keypad to select a channel.
 - Use the \triangleleft and \triangleright arrow buttons to add and delete channels.
 - Press the **ACTION** button to exit back to SET UP Menu.



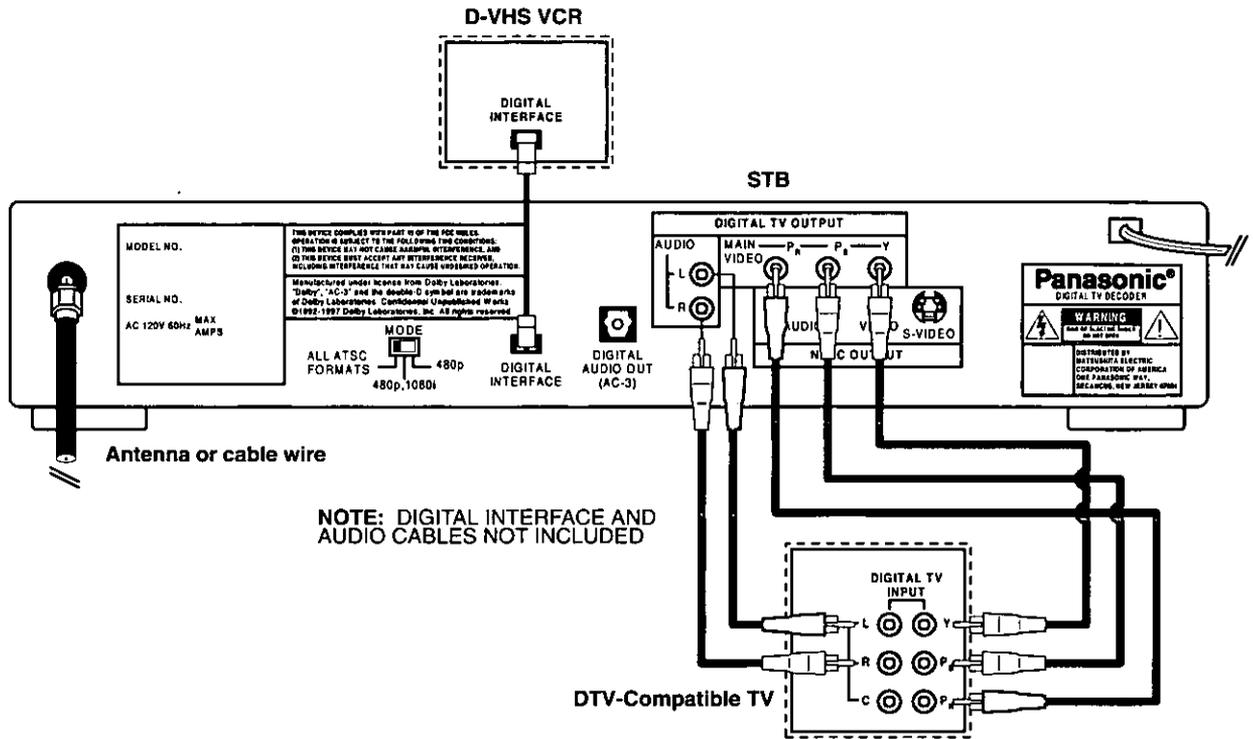
 **Automatic Channel Programming**

The AUTO feature must be selected first to ensure that all available channels are captured and stored into memory.

Installation

Set-Top Box Connection to Panasonic D-VHS VCR

Follow this diagram when connecting the STB to a D-VHS VCR.



PANASONIC D-VHS VCR SETUP

Procedure

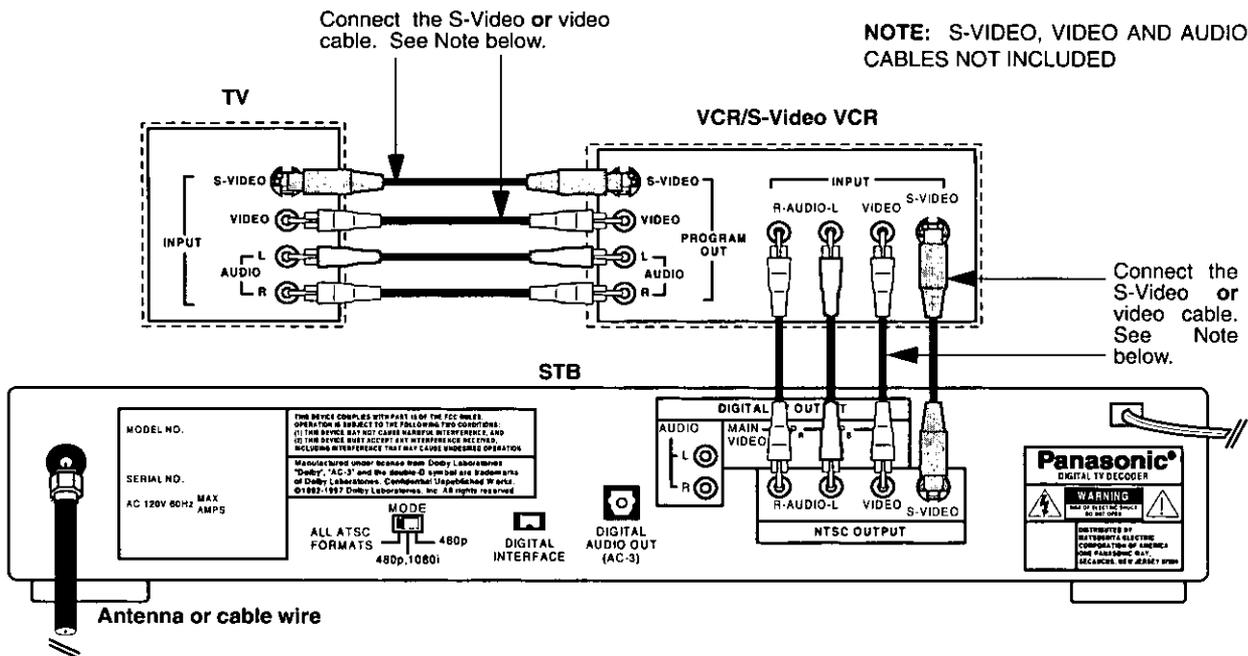
- Connect digital interface cable from the digital interface output connection on the STB to the digital interface input connection on the D-VHS VCR.

Note: The STB works with a Panasonic D-VHS VCR only.

- Follow directions in Getting Started section to connect the STB to a DTV-compatible TV.

Set-Top Box Connection to VCR/S-Video VCR

Follow this diagram when connecting the STB to a VCR or S-Video VCR.



VCR/S-VIDEO VCR SETUP

Procedure

- Connect video cable from the NTSC video output jack on the STB to the video input jack on the VCR/S-Video VCR.
- OR
- Connect S-Video cable from the NTSC S-Video output jack on the STB to the S-Video input jack on the VCR/S-Video VCR.
- Connect audio cables from the left and right NTSC audio output jacks on the STB to the left and right input jacks on the VCR/S-Video VCR.
- Connect video cable from video output jack on the VCR/S-Video VCR to video input jack on TV.
- OR
- Connect S-Video cable from S-Video output jack on the VCR/S-Video VCR to S-Video input jack on TV.
- Connect audio cables from the left and right audio output jacks on the VCR/S-Video VCR to the left and right audio input jacks on the TV.

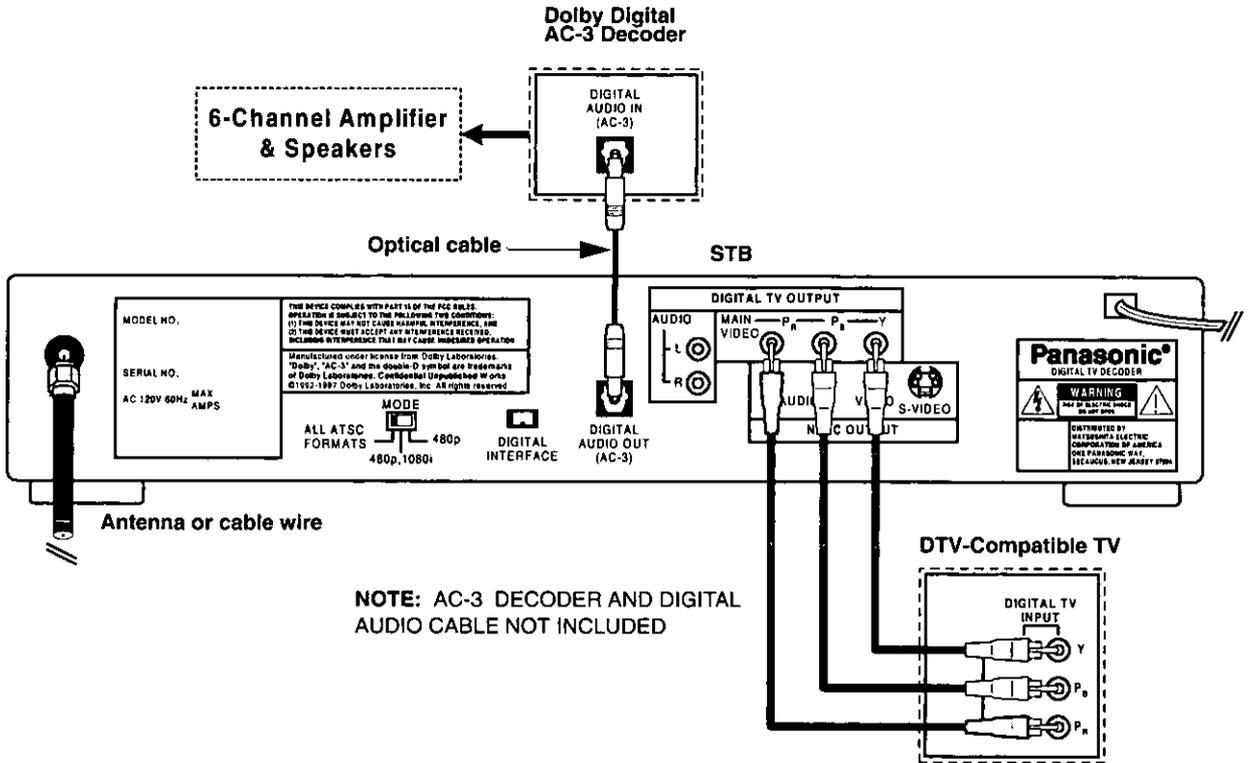
Note: Connect either your S-Video or video input/output.

- S-Video will provide better picture quality.
- If both S-Video and video are connected, S-Video will override video.

Optional Connections

Set-Top Box Connection to Dolby Digital AC-3 Decoder

Follow this diagram to connect the STB to a Dolby Digital AC-3 decoder.



DOLBY DIGITAL AC-3 DECODER SETUP

Procedure

- Connect Digital Audio cable from the Digital Audio Out connection on the STB to the Digital Audio In connection on the Dolby Digital AC-3 decoder.
- Follow directions in Getting Started section to connect the STB to a DTV-compatible TV.

Remote Control

ASPECT (Ratio)

Select picture shape to match signal and monitor format

POWER

Press to turn ON and OFF.

MENU

Press to access Roller Guide Menu.

ACTION

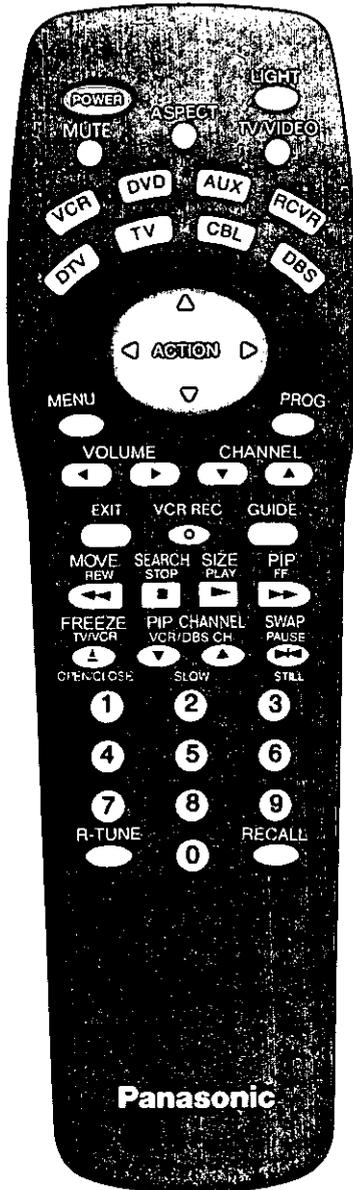
Press to access main menu items.

"0" ~ "9"

Press numeric keypad to select any channel.

R-TUNE*

Press to switch to previously viewed channel or program.



LIGHT*

Press to light remote control for five (5) seconds.

TV/VIDEO

Press to select DTV, TV or Video mode.

VCR DVD AUX RCVR DTV TV CBL DBS

Press to select remote operation.

PROG (Program)

Press to select next program within a channel.

CHANNEL

Press to select next channel or program.

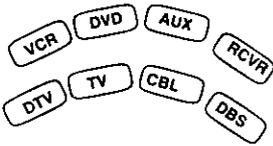
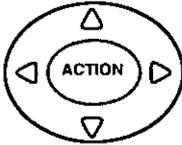
RECALL*

Press to display time, channel banner, and other options.

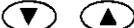
EUR511154

*Turn the light OFF and ON by pressing R-TUNE and RECALL, together.

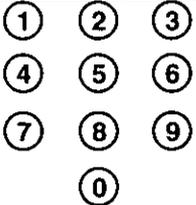
Remote Control Functional Key Chart

Key	Component	Function
	ALL COMPONENTS	Turn components On and Off
LIGHT 	REMOTE CONTROL	Illuminate buttons
MUTE 	TV RCVR CBL	Mute audio
TV/VIDEO 	ALL COMPONENTS	Switch between component and TV
ASPECT 	TV DTV	Change picture shape to fit format: Full - Normal picture shape (16:9 or 4:3) Zoom - Expand picture uniformly Letterbox (Letterbox) - Black bars above and below picture Shrink - Picture will shrink to full view Sidebar/4:3 - 4:3 picture on wide aspect screen with vertical bars on both sides Expand/Just - 4:3 picture digitally "stretched" to fill wide aspect screen
	ALL COMPONENTS	Component mode selection for Remote Control
	TV DTV	Up navigation Down navigation Left and right navigation Exit Roller Guide Menu Select and adjust features
ACTION 	TV DTV VCR DBS CBL	Roller Guide Menu Main menu selections Menu ENTER
MENU 	DTV DVD	Roller Guide Menu Menu
PROG 	DTV	Select program within a channel

Remote Control Functional Key Chart

Key	Component	Function
<p>VOLUME</p> 	<p>TV VCR DVD/LD AUX CBL RCVR CD AUX(TAPE)</p>	<p>TV volume down and up Cable volume down and up Receiver volume down and up</p>
<p>CHANNEL</p> 	<p>ALL COMPONENTS</p>	<p>Channel down Channel up</p>
<p>EXIT/GUIDE</p> 	<p>DBS</p>	<p>Exit / Guide Menus</p>
<p>VCR REC</p> 	<p>VCR DBS AUX (Cassette Deck)</p>	<p>Record</p>
<p>MOVE REW</p> 	<p>TV DVD/LD CD RCVR</p> <p>VCR AUX (Cassette Deck)</p>	<p>Move PIP Skip / Search Rewind Search Rewind Decrease surround</p> <p>Rewind</p>
<p>SEARCH STOP</p> 	<p>TV</p> <p>VCR DVD/LD/CD AUX (Cassette Deck)</p>	<p>PIP channel search</p> <p>Stop</p>
<p>SIZE PLAY</p> 	<p>TV</p> <p>VCR DVD/LD/CD AUX</p>	<p>Change PIP size</p> <p>Play</p>
<p>PIP FF</p> 	<p>TV DVD/LD CD RCVR</p> <p>VCR AUX (Cassette Deck)</p>	<p>PIP Skip/Search Fast Forward Search Fast Forward Increase Sound</p> <p>Fast Forward</p>
<p>FREEZE TV/VCR</p>  <p>OPEN/CLOSE</p>	<p>TV VCR DVD/LD/CD</p>	<p>Freeze PIP Switch between TV and VCR Open / Close</p>
<p>SWAP PAUSE</p>  <p>STILL</p>	<p>TV DVD/CD/LD</p> <p>VCR AUX (Cassette Deck and Tape)</p>	<p>Switch <i>Main Picture</i> and <i>PIP</i> Still / Pause</p> <p>Pause</p>
<p>PIP CHANNEL VCR/DBS CH</p>  <p>SLOW</p>	<p>TV VCR CBL DBS RCVR DVD LD CD</p>	<p>PIP channel up / down Channel up / down Center channel sound up / down (+/-) Slow +/- Side A / B Repeat / Random</p>

Remote Control Functional Key Chart

Key	Component	Function
R-TUNE 	TV CBL DBS DTV DVD LD CD (AUX) AUX (Cassette Deck)	Previous channel Previous channel or program Title AB repeat Next disc Deck A/B
RECALL 	TV VCR DVD/LD DBS DTV CD (AUX)	On screen display Set-top box on screen display Time format
	TV DTV VCR CABLE DBS LD CD (AUX) RCVR	Selects channel Selects code Selects chapter Selects track Keys 1, 2, 3, and 4 selects A/V Inputs, 5 = CD, 6 = Tuner, 7 = Phono, 8 = Cassette Deck, 9 = Aux

Battery Installation

Incorrect installation can cause battery leakage and corrosion that will damage the Remote Control.

Use two AA batteries:

Remove the battery cover by pushing in near the arrow and sliding the cover back.

Install batteries matching (+) and (-) polarity signs.

Replace the battery cover.

Precautions

- Replace batteries in pairs.
- Do not mix battery types (zinc carbon with alkaline).
- Do not recharge, short-circuit, heat, burn, or disassemble batteries.

SPECIAL REMOTE BUTTONS

Special Remote Buttons

Aspect Ratio Selections

The **ASPECT** button changes the aspect ratio (picture display shape) in response to the source signal and monitor format. You can also change the aspect ratio for your personal viewing preference. Each time the **ASPECT** button is pressed, the STB will cycle to the next available aspect ratio choice.

Full Aspect

16:9 or 4:3 picture will be displayed in the center of the viewing screen at full screen width and height.

Zoom Aspect

The picture will be expanded uniformly (width and height) to fill the viewing screen. The picture will be cropped, either horizontally or vertically to fit the viewing screen. The cropped portion of the original picture will be lost from view.

***Note:** To properly view Closed Captioning, the STB may, in some cases, change the aspect ratio from Zoom to Full.*

Letbox (Letterbox) Aspect

Video formats with aspect ratios greater than 16:9 will be displayed at the proper width, so no video information is lost. Black bars will appear above and below the picture

Shrink Aspect

The source aspect ratio will be maintained and the picture will shrink into full view on the screen.

Sidebar Aspect

4:3 pictures will be viewed on a wide aspect TV screen with vertical bars on both sides of the picture.

Expand Aspect

4:3 pictures will be viewed on a wide aspect TV screen with the picture digitally "stretched" to fill the screen.

***Note:** See following page for illustrations of the various aspect ratios.*

ASPECT RATIO FORMATS

Source Signal	16:9 MONITOR FORMAT				4:3 MONITOR FORMAT			
	FULL	ZOOM	SIDEBAR	EXPAND	FULL	ZOOM	LETTERBOX	SHRINK
16 9		---	---	---				
4 3						---	---	---

The 16:9 and 4:3 pictures represent the incoming source signals received by the STB.

These pictures show the different aspect ratios available with a 16:9 monitor format.

- The top picture shows the 16:9 monitor format available when the STB receives a 16:9 source signal.
- The bottom pictures show the 16:9 monitor formats available when the STB receives a 4:3 source signal.

These pictures show the different aspect ratios available with a 4:3 monitor format.

- The top pictures show the 4:3 monitor formats available when the STB receives a 16:9 source signal.
- The bottom picture shows the 4:3 monitor format available when the STB receives a 4:3 source signal.

SPECIAL REMOTE BUTTONS

TV/Video ^{TV/VIDEO}

The **TV/VIDEO** button allows you to select the mode of your TV. Each time the **TV/VIDEO** button is pressed, the TV will cycle through Channel, Video 1, Video 2, Video 3 and DTV modes.

Note: *Not all television models will display all the modes.*

Menu ^{MENU}

The **MENU** button allows you to access and exit the Roller Guide Menu. Each time the **MENU** button is pressed, the Roller Guide will appear on and disappear from the viewing screen.

Next Program ^{PROG}

The **PROG** button allows you to select programs within a single 6 MHz channel. Each time the **PROG** button is pressed, the STB will move to the next available program within the channel.

Note: *Only programs within the current 6 MHz channel can be selected using the PROG button. If only one (1) program appears, it indicates only one (1) program is available.*

Rapid Tuning ^{R-TUNE}

The **R-TUNE** button quickly switches between two channels or programs. The STB will attempt to immediately tune to the last channel or program in its memory. If programs are no longer transmitting on the channel, the *Unavailable Channel Screen* will display and the STB will automatically select the first program available on the channel.

Recall ^{RECALL}

The **RECALL** button displays the *Recall Screen* for 6 seconds or until you press any button (which automatically exits the Recall mode).

Component Codes

The Universal Remote Control is capable of operating many component brands after entering a code. Some components may not operate because memory is limited. The Universal Remote Control does not control all features in all models.

Codes for TV

Brand	Code
Akai	110
Centurion	112
Daewoo	120
Emerson	141, 143, 144
Fisher	150
GE/Panasonic/ Quasar	101
GE/RCA	162
Hitachi	180
JVC	190
Magnavox	210, 212
Marantz	220

Brand	Code
Panasonic	100, 101, 102
Pioneer	222
Proscan	230
Quasar	101, 103
Radioshack	240
RCA	250, 255
Samsung	260
Sears/Toshiba	130
Sharp	265
Sony	270
Zenith/Inteq	290, 291

Codes for Cable Box

Brand	Code
ABC	530
Archer	531, 544
Cableview	005, 544
Citizen	005, 522
Curtis	130, 131
Diamond	530, 531, 544
Eagle	541
Eastern	560
GC Brand	005, 544
Gemini	522
General Instru- ment/Jerrold	122, 360, 520, 521, 522, 530, 531, 532, 533
Hamlin	130, 350, 720, 730, 731, 900
Hitachi	003, 530
Macom	003, 004, 005
Memorex	542
Movietime	005, 544
Oak	002, 702, 710
Panasonic	120, 121, 132
Philips	006, 541, 542
Pioneer	001, 260
Pulsar	005, 544

Brand	Code
Puser	544
Realistic	544
Regal	130, 350, 720, 730, 731, 900
Regency	560
Rembrandt	005, 544, 702
Samsung	005
Scientific Atlanta	122, 130, 131
Simark	001, 005
Sprucer	005, 121
Stargate	005, 544
Televiow	001, 005
Texscan	810
Tocom	700, 701
Toshiba	004
Unika	531, 544
Universal	522, 544
Videoway	006
Viewstar	541, 542
Zenith	000, 280
Zenith/Drake Satellite	000

Codes for VCR

Brand	Code
Admiral	200
Aiwa	137, 160
Akai	014, 015, 016, 142
Audio Dynamic	011, 240
Bell & Howell	005, 013
Broksonic	081, 136
Canon	125, 135
Citizen	006
Craig	005, 006, 141
Curtis Mathes	130, 137, 300
Daewoo	001, 130, 250
DBX	010, 011, 240
Dimensia	300
Emerson	003, 080, 081, 135, 136, 243, 250
Fisher	005, 007, 008, 009
Funai	081, 136, 137
GE	130, 170, 300
Go Video	220, 512
Goldstar	006
Hitachi	000, 125, 300
Instant Replay	125, 130
J.C. Penney	000, 005, 010, 011, 130, 240, 300
Jensen	240
JVC	010, 011, 190, 240
Kenwood	006, 010, 011, 240
LXI	000, 005, 006, 007, 008, 009, 137
Magnavox	125, 130, 150
Marantz	010, 011, 240
Marta	006
Memorex	009, 130
MGA/Mitsubishi	230, 241, 242, 243, 330, 340
Minolta	000, 300
Mont. Wards	006, 009, 200, 210, 290
Multitech	004, 137, 330
NEC	010, 011, 190, 240
Olympic	125, 130

Brand	Code
Optimus	006, 100, 140, 200
Orion	081, 136
Panasonic	100, 101, 125, 130
Pentax	000, 011, 300
Philco	081, 125, 130, 136, 137, 150
Philips	125, 130, 150
Pioneer	125
Proscan	000, 001, 002, 125, 130, 150, 300, 310
Quasar	100, 101, 125, 130
Radio Shack	005, 009, 130, 137, 170, 210, 241
RCA	000, 001, 002, 125, 130, 150, 170, 300, 310
Realistic	005, 009, 130, 137, 210, 241
Samsung	002, 004, 220
Sansui	081, 136, 240, 520
Sanyo	005, 009
Scott	001, 002, 004, 009, 081, 136, 230, 241, 330, 340
Sears	000, 005, 006, 007, 008
Shaintom	050
Sharp	200, 210
Signature 2000	137, 200
Singer	050
Sony	140, 141, 142
SV2000	137
Sylvania	125, 130, 137, 150
Symphonic	137
Tashiro	006
Tatung	010, 011, 240
Teac	010, 011, 137, 240
Technics	100, 101, 125, 130
Teknika	130, 137
Toshiba	001, 310
Vector Research	011
Yamaha	005, 010, 011, 240
Zenith	290

Codes for CD

Brand	Code
Carver	550
Denon	600
Fisher	405
Harman/Kardon	459, 460, 462
JVC	590, 591, 670
Magnavox	550
Marantz	550
McIntosh	460
Optimus	430, 459
Panasonic	500, 501, 530
Philips	550

Brand	Code
Pioneer	430
Quasar	500, 501, 530
Sansui	432
Sanyo	405
Sharp	600
Sherwood	459
Sony	540
Technics	500, 501, 530
Victor	590, 591, 670
Yamaha	402, 403, 404

Codes for DVD

Brand	Code
Denon	100
Ferguson	110
Nordmende	110
Mitsubishi	150
Panasonic	100
Pioneer	120
RCA/	110

Brand	Code
Saba	110
Sony	140
Thomson	110
Toshiba	130
Yamaha	100
Sony	270
Zenith/Inteq	290, 291

Codes for Cassette Deck

Brand	Code
Panasonic	700, 730
Technics	700, 730

Codes for DBS

Brand	Code
Echo Star	110
GE	170
Hitachi	050
Panasonic	100
Philips	001, 002

Brand	Code
Primestar	391
RCA	170
Sony	390
Toshiba	000
Uniden	001, 002

Codes for Laser Disc

Brand	Code
Panasonic	200, 201, 235, 380
Pioneer	370
Sony	240, 241, 242, 243

Codes for Receiver/Amplifier

Brand	Code
Admiral	110
Aiwa	160, 161
Denon	200, 201, 202
Fisher	004
Garrard	055
Harman	057, 150
Jensen	164
JVC	190, 191
Kenwood	000, 050
Magnavox	162
Marantz	151
McIntosh	058
Nakamichi	031
Onkyo	051, 056

Brand	Code
Optimus	003, 162, 170, 171
Panasonic	100, 101, 130
Philips	150
Pioneer	030, 032
Quasar	100, 101, 130
RCA	003, 030, 162, 170, 171
Sansui	003, 053, 320
Sharp	200, 203
Sony	140
Soundesign	220
Teac	053, 054, 055
Technics	100, 101, 130
Victor	190, 191
Yamaha	001, 002

Write the code numbers for your components in the space provided below. This will serve as a reference when you need to reprogram your remote control.

CABLE <input type="text"/> <input type="text"/> <input type="text"/> Cable Box	VCR <input type="text"/> <input type="text"/> <input type="text"/> Video Cassette Recorder	RCVR <input type="text"/> <input type="text"/> <input type="text"/> Receiver or Amplifier	LD <input type="text"/> <input type="text"/> <input type="text"/> Laser Disc Player
DBS <input type="text"/> <input type="text"/> <input type="text"/> Direct Broadcast Satellite	TV <input type="text"/> <input type="text"/> <input type="text"/> Television	CD <input type="text"/> <input type="text"/> <input type="text"/> Compact Disc Player	DVD <input type="text"/> <input type="text"/> <input type="text"/> Digital Videodisc
<input type="text"/> <input type="text"/> <input type="text"/> Other Components	<input type="text"/> <input type="text"/> <input type="text"/> Other Components	<input type="text"/> <input type="text"/> <input type="text"/> Other Components	<input type="text"/> <input type="text"/> <input type="text"/> Other Components

Programming the Remote Control

The Universal Remote Control can be programmed to operate many manufacturers' components using the component function buttons for VCR, DVD, AUX, RCVR, DTV, TV, CBL, or DBS. Follow the procedures for programming your Remote Control with and without codes for the component. Determine the manufacturer of the component and look in the table for the code.

Note: *Be careful to press **ACTION** in the middle of the button. If you do not press in the middle of the button, the arrow buttons may be activated. This will interrupt your programming.*

Programming With Code

- Confirm that the external component is plugged in and is turned on.
- Turn the component off.
- Press the **ACTION** and **POWER** button, together, for **at least 5 seconds**. All mode buttons will flash, then let go of the buttons.
- Press appropriate component button (VCR, CBL, etc.) on the Remote Control. The pressed button will illuminate steadily. All other buttons will go out.
- Enter the 3-digit component code using the Remote Control numeric keypad (0 ~ 9 buttons). If a proper code was entered, the mode button will blink twice and go out.
- Press the Remote Control **POWER** button to test the component. If the procedure was successful, the component will turn on.

	Unsuccessful Code
<p>If the component does not operate with the Remote Control, repeat the procedure using another code. (Some brands have multiple codes.)</p> <p>If an incorrect code is entered, or if the procedure takes longer than 30 seconds, the programming will fail.</p>	

Programming Without Code

This procedure searches all codes and is called the "sequence method".

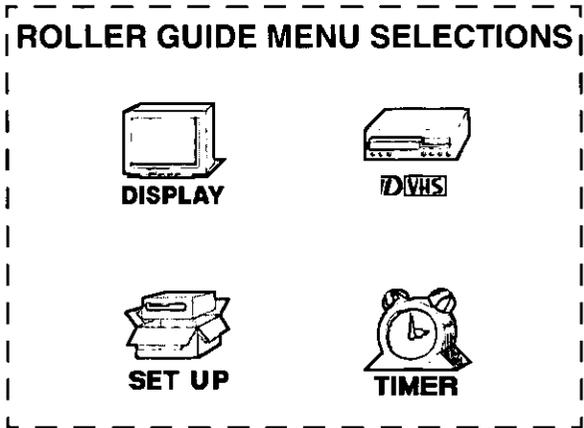
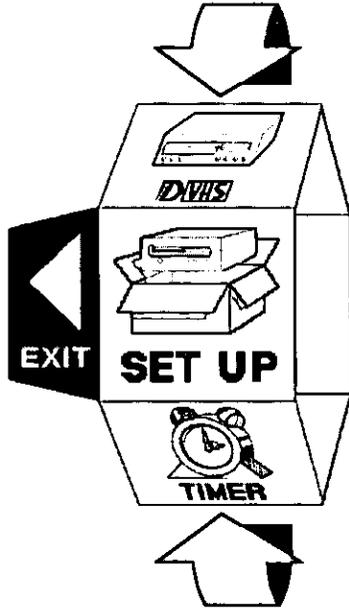
- Confirm that the external component is plugged in and is turned on.
- Turn the component off.
- Press the **ACTION** and **POWER** button, together, for **at least 5 seconds**. All mode buttons will flash, then let go of the button.
- Press appropriate component button on the Remote Control. The pressed button will illuminate. All other buttons will go out.
- Press the **▶** button to move forward to the next code. Press the **◀** button to move backward.
- Press the Remote Control **POWER** button to test the component. If the procedure was successful, the component will turn on.

Note: *Repeat the preceding two steps until the component code is found. It may take many attempts before the correct code is found.*

- After the code is found, press the **ACTION** button to store the code.

Press the **MENU** button on the Remote Control to display the **Roller Guide Menu**. Press the Δ or ∇ arrow to rotate the Roller Guide. Press the \blacktriangleleft arrow to exit the Roller Guide Menu.

Panasonic



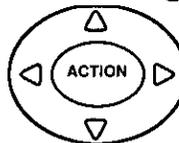
\blacktriangleup \blacktriangledown for more features
Press **ACTION** to select.

Note: To exit the Roller Guide Menu, press the \blacktriangleleft arrow on the **ACTION** button or press the **MENU** button.

ACTION / Navigation Button

Press the **ACTION** button to select main menu items. Press the Δ or ∇ arrows to highlight sub menus. Press the \blacktriangleright arrow to select features. Press the Δ or ∇ arrows to scroll through options within a feature. Press the \blacktriangleleft arrow to return to main menu items.

Remote ACTION / Navigation Button



Note: Be careful to press **ACTION** in the middle of the button. If you do not press in the middle of the button, the arrow buttons may be activated.

Roller Guide Feature Chart

Roller Guide Feature Chart

MENU	DESCRIPTION
 <p>SET UP</p>	<p>SET UP</p>
<p>INPUT</p>	<p><input type="checkbox"/> MODE - Select one of the following:</p> <ul style="list-style-type: none"> • ANTENNA (default setting) - VHF/UHF • Cable STD - Standard Cable TV Signals • Cable HRC - Harmonic Related Carrier • Cable IRC - Incremental Related Carrier <p><i>Note: Contact your local cable provider if you are not sure which setting to use.</i></p>
<p>PROGRAM</p>	<p><input type="checkbox"/> AUTO - Automatically program channels having a signal into memory.</p> <p><input type="checkbox"/> MANUAL - Manually add or delete channels from memory.</p>
<p>CLOCK</p>	<p><input type="checkbox"/> CLOCK - Set time for the DTV system clock. TIME will display on screen after pressing POWER button, RECALL button, or changing channels. (Clock must be set to use Timer features).</p>
<p><input type="checkbox"/> MODE (Closed Captioned)</p>	<p><input type="checkbox"/> CC (If available)</p> <ul style="list-style-type: none"> • CC1-CC4 for closed captioning services. • T1-T4 for text services.
 <p>DISPLAY</p>	<p>DISPLAY</p>
<p>MONITOR</p>	<p><input type="checkbox"/> TYPE</p> <ul style="list-style-type: none"> • 16:9 (default setting) for HDTV wide screen. • 4:3 for SDTV.
<p>BACKDROP</p>	<p><input type="checkbox"/> BACKDROP</p> <ul style="list-style-type: none"> • Black (not recommended) • Gray (default setting)
<p>INFO</p>	<p><input type="checkbox"/> INFO - Select ON or OFF for the Format Info Banner.</p>

Roller Guide Feature Chart (Cont.)

MENU	DESCRIPTION
	<p>D-VHS</p>
<p>CONTROLS</p>	<p><input type="checkbox"/> CONTROLS - Select to display D-VHS Control Panel buttons and status box.</p>
<p>MINIMIZE</p>	<p><input type="checkbox"/> MINIMIZE - Select to minimize D-VHS Control Panel buttons to a title bar.</p>
	<p>TIMER</p>
<p>TIMER 1 TIMER 2</p>	<p><input type="checkbox"/> DAY - Select the day of the week to activate timer.</p> <ul style="list-style-type: none"> • START - Select time for timer to start. • STOP - Select time for timer to stop. <p><input type="checkbox"/> CHANNEL - Select the channel for STB to tune to at appropriate time.</p> <p><input type="checkbox"/> MODE - Select one of the following:</p> <ul style="list-style-type: none"> • OFF (default setting) to disable timer. • VIEW to turn on STB only. (Must turn TV on to view the event). • RECORD to turn on STB and start D-VHS recording mode. <p>Note: Whenever the antenna or cable mode is changed, Timer 1 and Timer 2 will revert back to default settings.</p>

Special Features

SET UP

Antenna/Cable Mode

Select either Antenna or Cable mode, depending on the type of incoming signal you are using. Cable must be 8VSB format.

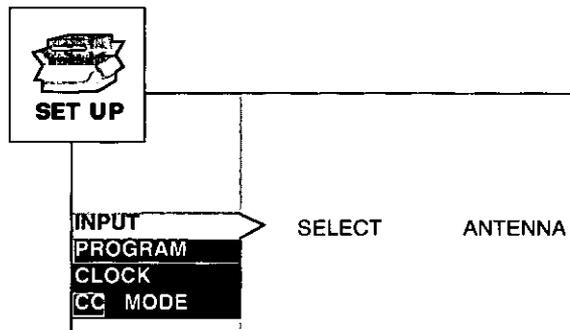
Procedure

- In SET UP Menu, select INPUT to choose either ANTENNA or Cable.
- Press the **▶** arrow, then the **▲** and **▼** arrows to select ANTENNA, Cable STD, Cable HRC or Cable IRC.
 - ANTENNA - VHF/UHF
 - Cable STD - Standard Cable TV Signals
 - Cable HRC - Harmonic Related Carrier
 - Cable IRC - Incremental Related Carrier

Note: Contact your local cable provider if you are not sure which setting to use.

- Press the **ACTION** button to make your selection.
- Press the **◀** arrow to exit back to Roller Guide.

Note: Whenever the antenna or cable mode is changed, Timer 1 and Timer 2 will revert back to default settings.



Programming Available Channels

You must perform the automatic channel programming before manually adding and deleting channels because of the digital tuning system used by the STB. This method will ensure that every available channel will be captured and stored into memory.

Automatic Channel Programming

The STB will scan for all available channels and store them in memory. The scan will normally take several minutes to complete.

Procedure

- In SET UP Menu, select PROGRAM to choose AUTO to automatically scan and store all channels with a signal.
 - Press the **ACTION** button to cancel or exit back to SET UP Menu.

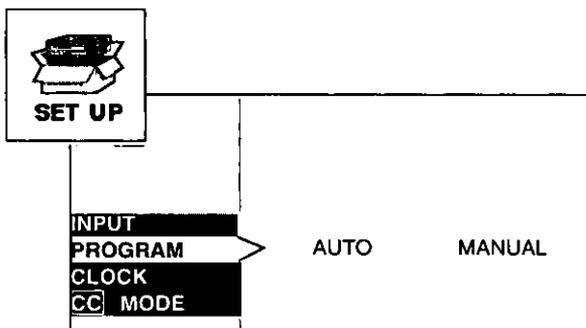
Note: As more digital channels become available in your area, the AUTO feature must be selected to store the new digital channels into memory.

Manual Channel Programming

After programming all available channels, you can use the MANUAL feature to selectively add or delete channels.

Procedure

- In SET UP Menu, select PROGRAM to choose MANUAL to manually add or delete channels.
 - Use the Δ , ∇ arrow buttons and numeric keypad to select a channel.
 - Use the \triangleleft and \triangleright arrow buttons to add and delete channels.
 - Press the **ACTION** button to exit back to SET UP Menu.



Automatic Channel Programming

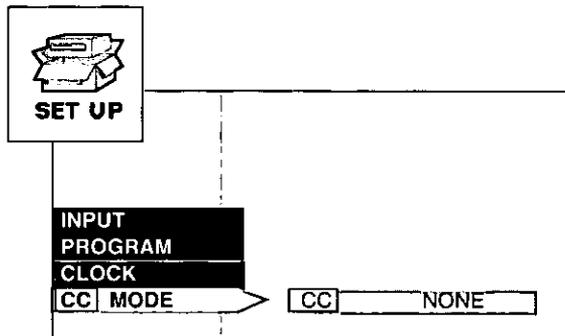
The **AUTO** feature must be selected first to ensure that all available channels are captured and stored into memory.

CC (Closed Captioned)

The STB contains a built-in decoder that is capable of providing a visual display of the audio portion. The program viewed must provide Closed Captioning (CC) for the television to display it. CC is displayed in the form of text across the screen (white or colored letters on black background). It allows the viewer to read the dialogue of a television program or other information.

CC Mode

- In SET UP Menu, select CC (Closed Caption) MODE
- Press the **▼** arrow to select **CC** MODE
- Press the **▶** arrow, then the **▲** or **▼** arrow to select NONE, CC1, CC2, CC3, CC4, T1, T2, T3 or T4.
 - CAPTION OFF - Use when Closed Caption is not desired.
 - CAPTION CC1 - For video related information that can be displayed (up to 4 lines of script on the screen, where it does not obstruct relevant parts of the picture). Script can be in any language.
 - CAPTION CC2 - Another mode used for video related information.
 - CAPTION CC3 and CC4 - Other modes used for video related information.
 - TEXT T1 - Blanks out a large portion of the picture on the television screen, and displays program guide or any other information currently being transmitted.
 - TEXT T2, T3 & T4 - Other Modes that display information and blank out a large portion of the picture on the television screen.
- Press **ACTION** once, then the **◀** arrow to return to Roller Guide.



Note: To properly view Closed Captioning, the STB may, in some cases, change the aspect ratio from Zoom to Full.

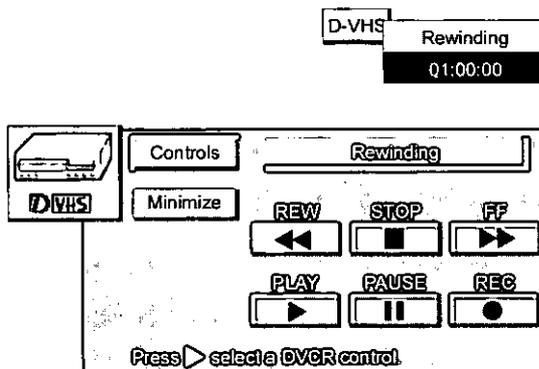
D-VHS Control Panel

The STB allows you to control a Panasonic D-VHS VCR through the digital interface. The on-screen panel of D-VHS control buttons in the D-VHS menu lets you record and playback digital programs.

Note: The STB must be on when D-VHS VCR is recording.

Control Panel

- In D-VHS Menu, select Controls.
- Use ◀, ▶, ▲ and ▼ arrow buttons to select a command.
- Press the **ACTION** button to execute the command.
- Press ◀ arrow twice to exit to Roller Guide.



Note: A status box will appear in the upper right corner describing the command being executed.

Minimizing Control Panel

The STB also allows you to minimize the D-VHS control panel into a title bar, to reduce the portion of the picture blocked by the control panel.

Title Bar

- In D-VHS Menu, select Minimize.
- Press the **ACTION** button to minimize the control panel into a title bar.
- Use ◀ and ▶ arrow buttons to select a command.
- Press the **ACTION** button to execute the command.
- Select ▲, then press the **ACTION** button to maximize the control panel.
- Press ◀ arrow once to exit to Roller Guide.



Note: The title bar will appear at the bottom of the screen.

D-VHS Status Messages

The STB will report status information about the D-VHS in the status box. The following table is a list of possible status messages.

Command or Event	Status Message
REW	Rewinding
STOP	Stop
FF	Fast Forwarding
PLAY	Playing
PAUSE	Pause
REC	Recording
D-VHS empty	No Cassette
Play: Fast Forward	Forward Searching
Play: Rewind	Reverse Searching
Play: Fast Rewind	Reverse Searching
Tape is not recordable	Not Recordable
Analog tape loaded	Analog Tape
D-VHS not connected to DTV	Not present
D-VHS reported error	Error
D-VHS is powered OFF	Powered Off

Timer 1 and Timer 2

The STB contains two timers that are capable of turning the STB on and off at selected times, on selected channels and on selected days. You can also set your STB to simultaneously turn your D-VHS on to recording mode.

Timer Set up

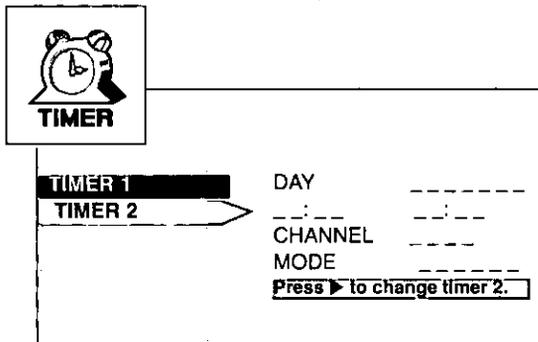
- In **TIMER** Menu, press the Δ or ∇ arrow to select either **TIMER 1** or **TIMER 2**

Note: *TIME must be entered in **CLOCK** to operate **TIMER** features.*

- Press the \blacktriangleright arrow twice, then the Δ or ∇ arrow to select the day.
- Press the **ACTION** button to move to the first time field.
- Press the Δ or ∇ arrow to select the hour, then the \blacktriangleright arrow to move to the minutes.
- Press the Δ or ∇ arrow to select the minutes, then press the **ACTION** button to move to the next time field.
- Press the Δ or ∇ arrow to select the hour, then the \blacktriangleright arrow to move to the minutes.
- Press the Δ or ∇ arrow to select the minutes, then press the **ACTION** button.
- Press the \blacktriangleright arrow, then the Δ or ∇ arrow to select the channel.
- Press the **ACTION** button.
- Press the ∇ arrow once, then the \blacktriangleright arrow once.
- Press the Δ or ∇ arrow to select the mode.
 - OFF - Disables the timer.
 - VIEW - Turns on STB only. (Must turn TV on to view the event).
 - RECORD - Turns on STB and starts D-VHS recording mode.

Note: *All data fields must be entered prior to selecting a mode.*

- Press **ACTION** once, then the \blacktriangleleft arrow twice, to return to Roller Guide



Note: *Times cannot overlap between the timers. The first entered timer (either Timer 1 or Timer 2) will override the second entered timer.*

TIMER Activation

The **TIMER** is active when the STB is **OFF** or **ON**. The STB will switch to the selected channel at the selected time set in the **TIMER**.

Timer Error Messages

The STB will scan the timer data fields and notify you of any problems before letting you set the Mode. The following is a table of possible error messages.

Error Condition	Error Message
The system time was not set	NOTICE: Clock must be set
No data is entered in any of the timer data fields	NOTICE: Timer 1 (or 2) data must be entered
The day of the week was not entered	NOTICE: Day must be entered
The start time was not entered	NOTICE: Start time must be entered
The stop time was not entered	NOTICE: Stop time must be entered
The channel number was not entered	NOTICE: Ch number must be entered.
The day conflicts with the other timer	NOTICE: Day conflicts with Timer 2 (or 1)
The start time conflicts with the other timer	NOTICE: Start conflicts with Timer 2 (or 1)
The stop time conflicts with the other timer	NOTICE: Stop conflicts with Timer 2 (or 1)
The stop time conflicts with start time	NOTICE: Stop conflicts with start time

Troubleshooting

Before requesting service for this unit, check the table below for a possible cause of the problem you are experiencing. Some simple checks or a minor adjustment on your part may eliminate the problem and restore proper operation.

If you are in doubt about some of the check points, or if the remedies indicated in the table do not solve the problem, consult your dealer or call **1-888-VIEW-PTV (843-9788)** for assistance.

Symptom	Remedy
No power	Check that the AC power plug is securely plugged into the power outlet.
No reception	<ul style="list-style-type: none"> •Check that equipment is connected properly. •Check that antenna is properly installed and oriented. •Check that the antenna or cable wire is connected properly. •Make sure the proper mode (antenna or cable) is selected.
No digital cable	<ul style="list-style-type: none"> •Make sure your local cable provider is transmitting in 8VSB modulation format. •Make sure the proper cable mode is selected.
No picture	<ul style="list-style-type: none"> •Check that equipment is connected properly. •Check if the channel is available. •Rerun the Automatic Channel Programming to make sure all available channels are captured and stored into memory.
Available channels are missing	•Rerun the Automatic Channel Programming to make sure all available channels are captured and stored into memory.
Picture is distorted	<ul style="list-style-type: none"> •Make sure the proper display format is selected. •Make sure the proper aspect ratio is selected.
Zoom aspect cannot be selected	<ul style="list-style-type: none"> •Make sure the Closed Caption feature is turned off. •Make sure the remote control is in DTV mode.
No sound	Check that equipment is connected properly.
The remote control is not responding	<ul style="list-style-type: none"> •Check that the batteries are installed with the correct polarities (+ and -). •The batteries are depleted: Replace them with new ones. •Point the remote control unit at the remote control sensor and operate. •Operate the remote control unit at a distance of not more than 23 feet (7 meters) from the remote control sensor. •Remove any obstacles between the remote control unit and remote control sensor.
The remote control is operational, but the STB is not responding	<ul style="list-style-type: none"> •Check that the AC power plug is securely plugged into the power outlet. •Make sure the STB is on. •Make sure the remote control is in DTV mode.
The remote control is operational, but other component(s) are not responding	<ul style="list-style-type: none"> •Check that the AC power plug is securely plugged into the power outlet. •Make sure the component(s) are on. •Reprogram the remote control to make sure it is programmed properly to operate the component(s). •Make sure the remote control is in the proper component mode (i.e. TV, CBL, RCVR, etc.).
The ACTION button is not responding	<ul style="list-style-type: none"> •Make sure to press ACTION in the middle of the button. •Make sure the remote control is in DTV mode.

Symptom	Remedy
No key operation (by the unit and/or the remote control) is effective.	Set the POWER button to OFF and then back to ON. Alternatively, turn off the power, disconnect the power plug and then reconnect it. (The STB may not be operating properly due to lightning, static electricity or some other external factor).
D-VHS VCR is not responding	<ul style="list-style-type: none"> •Check that the AC power plug is securely plugged into the power outlet. •Check that equipment is connected properly. •Make sure it is a Panasonic D-VHS VCR.
D-VHS VCR does not record	Make sure STB is on
VCR/S-Video VCR is not responding	<ul style="list-style-type: none"> •Check that the AC power plug is securely plugged into the power outlet. •Check that equipment is connected properly. •Make sure remote control is in VCR mode.
AC-3 decoder is not responding	<ul style="list-style-type: none"> •Check that the AC power plug is securely plugged into the power outlet. •Check that equipment is connected properly.
Timer does not work	<ul style="list-style-type: none"> •Make sure the clock is set. •Check to see whether the timers have overlapping times programmed. •Check if the timer did not reset to default settings (antenna/cable mode was changed).

Product Service

Do not attempt to remove the cover or repair the unit yourself. Refer servicing to qualified personnel only.

Product Information

For product service, product information or assistance with product operation, consult your dealer or call **1-888-VIEW-PTV (843-9788)**. Please have your Set-Top Box Identification Number (ID#) available when you call. The ID# is displayed on your TV screen when the STB is tuned to any unavailable channel.

If you ship the product

Carefully pack and send it prepaid, adequately insured and preferably in the original carton. Attach a postage-affixed letter, detailing the complaint, to the outside of the carton. **DO NOT** send the product to the Executive or Regional Sales offices. They are **NOT** equipped to make repairs.

For service assistance, please call:

1-888-VIEW-PTV (843-9788).

