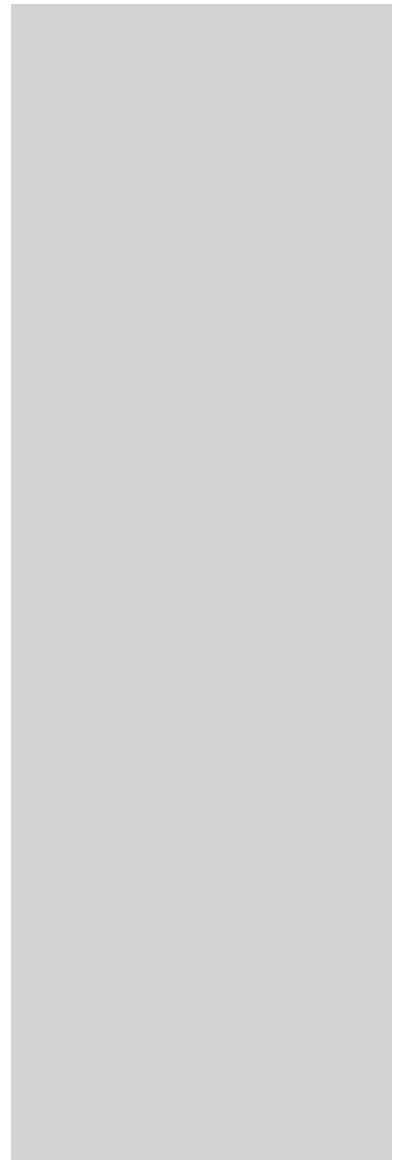
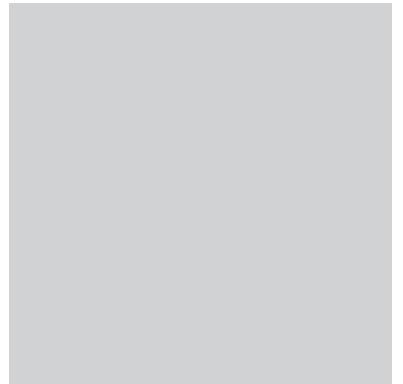
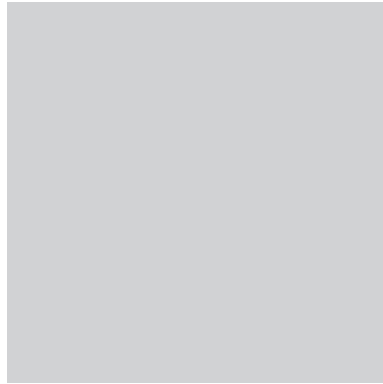


INSTALLATION MANUAL

DCH70

Installation Manual



IMPORTANT SAFETY INSTRUCTIONS

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- The apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturers instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

IMPORTANT SAFETY CONSIDERATIONS

Be sure to follow these requirements during transportation and installation.

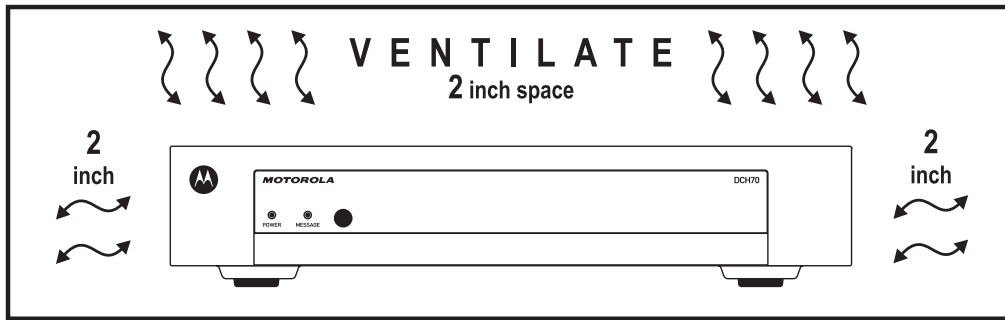
The plug is the main disconnect device. It shall remain readily accessible and operable.

DURING TRANSPORTATION TO THE SUBSCRIBER HOME

Transport the cable terminal in its shipping box or an equally padded container.

Do not expose the terminal to rain or moisture.

DURING INSTALLATION



- Do not place the cable terminal in an enclosed area where the cooling vents are blocked or impede the flow of air through the ventilation openings.
- Install the terminal so that its position does not interfere with its proper ventilation. For example, do not place the terminal on a bed, sofa, rug, or similar surface that could block the ventilation openings.
- Install the terminal away from heat sources such as radiators, heat registers, and stoves. Installation of the terminal near consumer electronics devices, such as stereo receiver/amplifiers and televisions, is permitted as long as the air surrounding the terminal does not exceed 40° C (104° F).
- Place the terminal on a flat surface not prone to vibration or impact.
- Do not install the terminal in an area where condensation occurs.
- To prevent the temporary loss of guide data and cause a temporarily non-responding terminal, do not plug the AC power cord into a switched power outlet.

FCC COMPLIANCE

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Changes or modifications not expressly approved by Motorola for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC DECLARATION OF CONFORMITY

Motorola Inc., Connected Home Solutions, 101 Tournament Drive, Horsham, PA 19044, 1-215-323-1000, declares that the DCH70 receiver complies with 47 CFR Parts 2 and 15 of the FCC rules as a Class B digital device.

Canada Industry Canada (IC)

This Class B digital device complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

CARING FOR THE ENVIRONMENT BY RECYCLING



When you see this symbol on a Motorola product, do not dispose of the product with residential or commercial waste.

Recycling your Motorola Equipment

Please do not dispose of this product with your residential or commercial waste. Some countries or regions, such as the European Union, have set up systems to collect and recycle electrical and electronic waste items. Contact your local authorities for information about practices established for your region. If collection systems are not available, call Motorola Customer Service for assistance.

© 2007 Motorola, Inc. All rights reserved. No part of this publication may be reproduced in any form or by any means or used to make any derivative work (such as translation, transformation, or adaptation) without written permission from Motorola, Inc.

MOTOROLA and the Stylized M logo are registered in the US Patent and Trademark Office. CableCARD™, and M-Card™ are trademarks or registered trademarks of Cable Television Laboratories, Inc. Dolby and the Double D symbol are registered trademarks of Dolby Laboratories. Macrovision is a registered trademark of Macrovision Corporation. All other product or service names are the property of their respective owners. All rights reserved.

Motorola reserves the right to revise this publication and to make changes in content from time to time without obligation on the part of Motorola to provide notification of such revision or change. Motorola provides this guide without warranty of any kind, implied or expressed, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Motorola may make improvements or changes in the product(s) described in this manual at any time.



CONTENTS

1 Introduction	1
Features	2
Tuner	2
Standard Audio/Video Features	2
Standard Data Features	2
Standard Miscellaneous Features	2
If You Need Help	3
Calling for Repairs	3
2 Overview	5
Front Panel	5
Rear Panel	6
M-Card™	6
3 Installation	7
Before You Begin	7
Video Connection Options	7
Audio Connection Options	8
Installation Overview	8
Cabling to a Standard-Definition TV and an A/V Receiver	9
Cabling to a Standard-Definition TV and Audio Receiver	10
Operational Check for the Remote Control	11
Graphics Overlaying the Video	11
4 Diagnostics	13
Using the Diagnostics	13
General Status	14
Out-Of-Band (OOB) Status	16
Agile OOB Tuner Hunting	17
Summary of Operator Selection of the OOB Frequency (OSD Frequency Override in Hunted Mode)	17
In-Band Status	19
Audio/Video Status	21
Unit Address	23
Separable Security	24
Firmware Version	25
Current Channel Status	26
Renewable Security	28
Upstream Modem	29
App Code Modules	30

CONTENTS

Memory Configuration	31
Interactive Status	32
MAC Frequency Table	34
Control Channels	34
Message Types	35
In-band Program Association Table (PAT)	35
In-band Program Map Table (PMT)	36
Task Status	36
In-band Multicast Address Filter	37
Connected Home Status	38
Keyboard / LED	40
5 Troubleshooting	41

Figures

Figure 1-1 Front and rear views	1
Figure 3-1 Cabling to a Standard-Definition stereo TV	9
Figure 3-2 Cabling an audio receiver	10

Tables

Table 3-1 Operational check procedures	11
--	----



1 INTRODUCTION

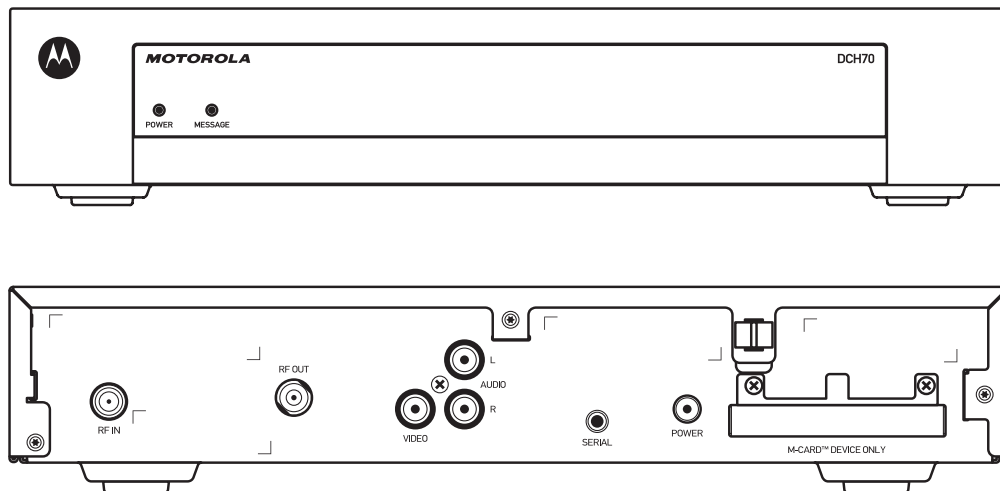
This manual provides instructions for cable operator personnel to install the Motorola DCH70 cable receiver. This unit includes a high-end processor, expanded memory, and enhanced graphics to support digital, on-demand, and interactive services.

The DCH70 provides advanced capabilities, including:

- Authorization and purchase of on-demand programming
- Adaptability to various software platforms

As with all Motorola digital cable receivers, the hardware features are enabled by core operating and third party application software.

Figure 1-1 Front and rear views



1 INTRODUCTION

Features

Tuner

- Digital MPEG-2 main profile main level video processor
- Provides an out-of-band (OOB) control channel

Standard Audio/Video Features

- ITU standard 64/256 QAM/FEC/enhanced adaptive equalizer
- DES based encryption/DCII (via inserted CableCARD™) access control
- Out-of-band data receiver (70-130 MHz) 2.048 Mbps
- Digital video scaling (picture in graphics)
- 32-bit 2D graphics support in hardware
- Macrovision® copy protection
- Standard-Definition video output through:
 - Baseband
 - RF
- Audio output through:
- Baseband L/R

Standard Data Features

- 8 MB flash memory
- 32 MB SDRAM
- On-board real-time RF return

Standard Miscellaneous Features

- Messaging capabilities

1 INTRODUCTION

If You Need Help

If you need assistance while working with the DCH70, contact the Motorola Technical Response Center (TRC):

- Inside the U.S.: 1-888-944-HELP (1-888-944-4357)
- Outside the U.S.: 1 847 725 4011
- Motorola Online: <http://businessonline.motorola.com>

The TRC is on call 24 hours a day, 7 days a week. In addition, Motorola Online offers a searchable solutions database, technical documentation, and low-priority issue creation and tracking. For specific toll-free numbers when calling from outside the United States, please refer to your product manual or our Web page.

Calling for Repairs

If a Motorola DCH70 set-top requires repair service, please call one of the following Motorola Authorized Service Centers:

Company	From USA or Canada	Outside USA or Canada
World Wide Digital	1-800-227-0450	1-956-541-0600
Teleplan	1-800-352-5274	1-302-322-6088

To ensure efficient service, request a Return for Service Authorization (RSA) number. Be sure to display the RSA number prominently on all equipment boxes.

The Service Center will provide the shipping address of the location performing your repairs.

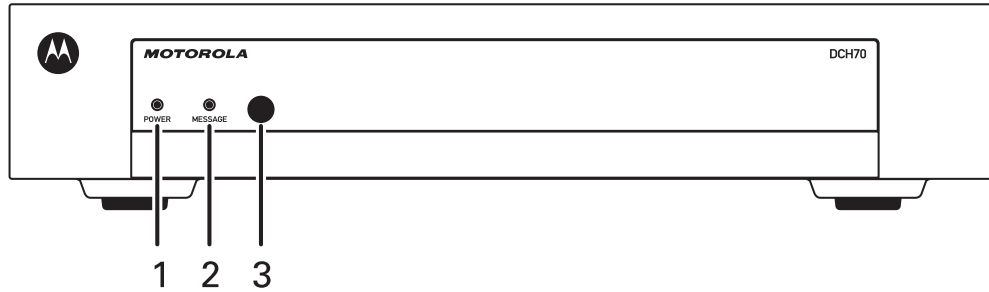
To ship your equipment for repair:

- Pack the unit securely, if possible in its original factory shipping carton.
- Print or display the RSA number so it is easily visible on all equipment boxes.
- Enclose a note describing the exact problem. Complete and enclose the checklist provided with the unit.
- Ship the unit PREPAID to the address provided by the Service Center.



2 OVERVIEW

Front Panel

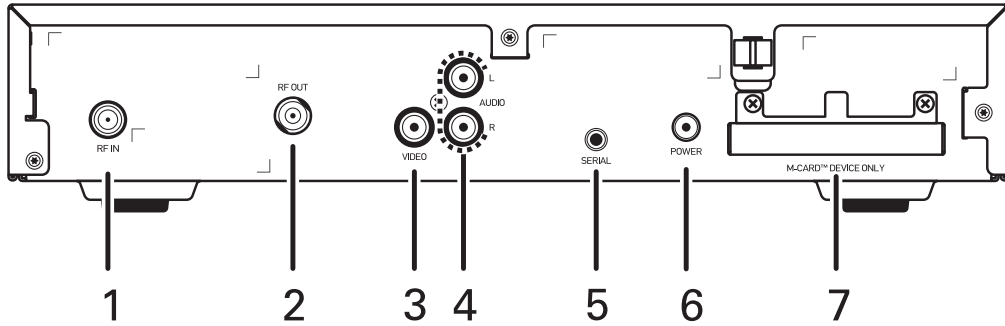


1	Power Indicator — Lit when the unit is powered ON, unlit when unit is OFF
2	Message Indicator* — Lit when a new message is waiting to be read, unlit otherwise
3	IR remote sensor — communicates with the remote control

**Availability of certain features is dependent upon application support.*

2 OVERVIEW

Rear Panel



1	RF In — Connects to cable signal from your service provider
2	RF Out — Ch 3/4 modulated audio/video (SDTV) to TV or VCR
3	Video — Composite video (SDTV) outputs
4	Audio Out — Composite audio outputs
5	Serial — Service only
6	Power supply connector
7	M-Card — Inserted M-Card

**Availability of certain features is dependent upon application support.*

M-Card™

The M-Card is required to view cable television programs or interactive on-demand programs. The M-Card should not be removed.



3 INSTALLATION

Before You Begin

Before you move or change components on the subscriber entertainment system:

- Review the installation instructions.
- Determine if you are connecting to a standard TV or a composite (baseband) monitor.
- Verify that you have the necessary cables and other required items.

Video Connection Options

Use the following guidelines to determine the best video connection for the subscriber's home entertainment system. To determine the available video inputs on the TV, check the manual supplied with the TV or the TV itself.

The DCH70 offers the following video outputs:

Video (composite)	SDTV only	Use the composite video (video) output (L and R).
RF	SDTV only	If your TV only has a coaxial RF input, connect it to the DCH70 RF out connector.

3 INSTALLATION

Audio Connection Options

Connect the stereo audio cable to the AUDIO L and R connectors on the DCH70 and the audio left and right connectors on the TV.

When connecting to a home theater receiver, depending on its inputs, you can use the following DCH70 audio outputs:

Baseband Audio R and L	If the audio receiver does not support Dolby® Digital, use the baseband AUDIO L and R outputs to connect to the audio receiver.
-------------------------------	---

The cabling diagrams show sample audio/video (A/V) connections to an audio receiver, where the receiver functions as an A/V router.

The VCR and TV receive their A/V signals from the currently selected input device on the audio receiver. This is important when the subscriber has another A/V device such as a DVD player, a secondary VCR, a CD player, or other electronic component. We recommend connecting the TV to the monitor output so on-screen menus for the receiver can be displayed. (In many cases, the receivers themselves have interactive on-screen menus).

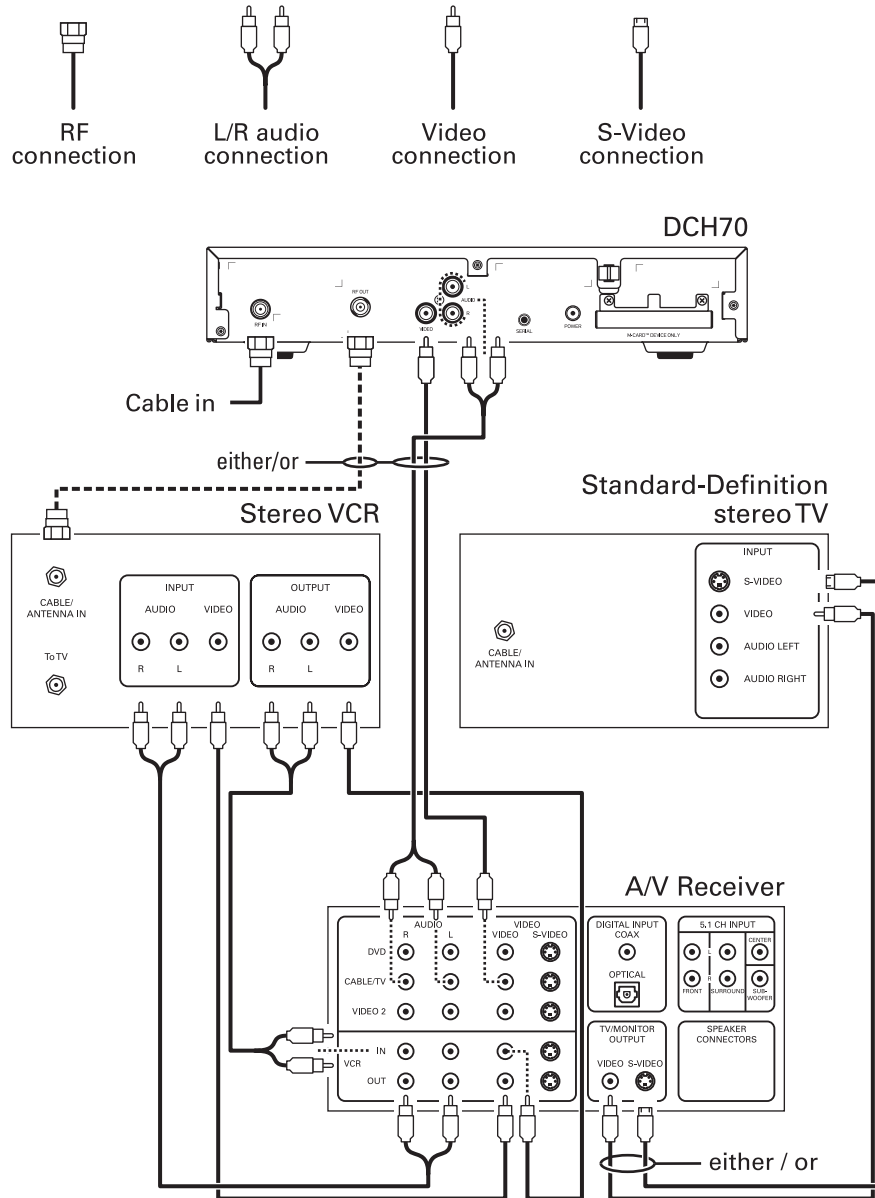
Installation Overview

1. Connect the composite video connector using a composite (RCA phono) cable. If the TV only has a coaxial RF input, connect it to the DCH70 RF OUT connector.
2. Connect the composite video connector using a composite (RCA phono) cable. If the TV only has a coaxial RF input, connect it to the DCH70 RF OUT connector.
 - Determine if you are connecting the audio to a home theater receiver or directly to the TV; use the baseband left and right audio out outputs.
3. Locate the cabling diagram(s) that best match the subscriber configuration.
4. Connect the audio and video cables in a manner matching that diagram.
5. Determine if you are connecting to a data device. For installation details, refer to instructions included with the data device.
6. Connect the cable terminal to the coaxial cable wall outlet.
7. Perform the operational check for the remote control.

3 INSTALLATION

Cabling to a Standard-Definition TV and an A/V Receiver

Figure 3-1 Cabling to a Standard-Definition stereo TV



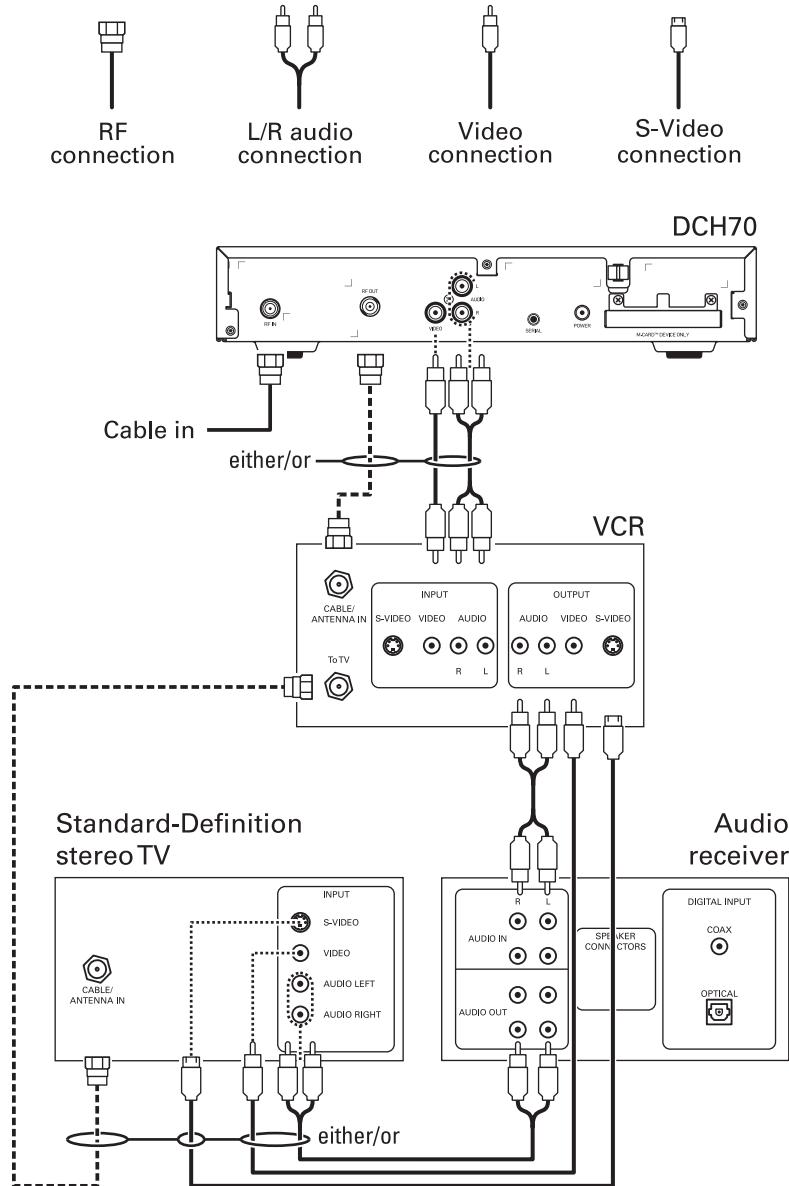
Because some entertainment equipment cannot simultaneously support baseband composite video and S-Video, never simultaneously connect both video inputs.

3 INSTALLATION

Cabling to a Standard-Definition TV and Audio Receiver

To connect to an audio receiver, such as a home mini system, follow a daisy-chain convention. The A/V configuration illustrated enables digital stereo recording, including Dolby® Surround sound. Use only one set of composite input connectors on the stereo:

Figure 3-2 Cabling an audio receiver



3 INSTALLATION

Operational Check for the Remote Control

The operational check tests communication with the remote control:

Table 3-1 Operational check procedures

Feature	Testing Procedure
Power on	Press POWER on the remote control to turn on the DCH70. Tune to the output channel (3 or 4).
Channel selection	Scan through the channels using the CHANNEL + or - keys. Tune to several channels by entering the channel number using the numeric keys.
Volume control	Press VOLUME + or - on the remote control to increase the volume to its upper limit, lowest level, and to a comfortable level. Press MUTE to turn the sound off. Press MUTE again to restore the sound.

If the DCH70 does not operate properly, refer to the [Troubleshooting](#) section.

Graphics Overlaying the Video

The DCH70 can generate graphics that overlay the video programming or fill the entire television screen. Common examples include on-screen menus (such as the On-Screen Diagnostics) and EPG. The DCH70 overlays these graphics whenever you open a menu or scroll through a program grid.

On-screen graphics are available for all DCH70 video outputs.



4 DIAGNOSTICS

Diagnostics are displayed on the on-screen display (OSD). They confirm proper installation, including:

- Checking error states and signal integrity
- Identifying the cable terminal on the network
- Verify communications with the headend

For the diagnostics described in this section:

- All indicators are in decimal notation, unless otherwise noted.
- All signal-level and quality indicators use a 0 to 100% scale, unless otherwise noted.
- All sample displays are illustrative; actual data may differ from the examples.
- All screens self-refresh at a minimum rate of once every five seconds.

You can use the diagnostics when running the Base Platform software.

Using the Diagnostics

To operate the set-top, use the Motorola universal remote control. To access and navigate the diagnostic mode:

1. Ensure that the DCH70 is installed with the Base Platform software and that it is connected to an AC outlet.
2. Press POWER on the remote control to turn on the set-top.
3. Wait five seconds and then press POWER again to turn off the set-top.

To enable diagnostic mode, press SELECT/OK on the remote control within two seconds after powering off. The DIAGNOSTICS main menu is displayed on the OSD:

```
DIAGNOSTICS
>>01 General Status
02 DOB Status
03 In Band Status
04 Audio/Video Status
05 Unit Address
06 Firmware Version
07 Current Channel Status
08 Renewable Security
09 Upstream Modem
10 App Code Modules
11 Memory Config
12 Interactive Info
13 MAC Frequency Table
14 Control Channels
15 Message Types
16 In Band PAT
17 In Band PMT
18 Task Status
19 USB Status
20 IB MCA Status
21 Connected Home Status
22 Keyboard/LED
```

You can use the following keys to navigate the diagnostics menus:

- Press channel ▲, channel ▼, cursor ▲, or cursor ▼ to select d01 through d22.

4 DIAGNOSTICS

- Press cursor ◀, cursor ▶, SELECT, or ENTER to execute the selected diagnostic.
- To exit the diagnostic mode, press POWER on the remote control. The set-top exits the diagnostic mode and powers off.

General Status

This diagnostic displays the error code and description, purchase count, and other information:

```

GENERAL STATUS
Error:          E 00
NO ERROR

Purchases:      0

Platform ID:    0x02F6
Mapped Plat ID: 0x006A
Family ID:      0x0017
Model ID:       0x0011

Tuner:          AIT1010(V860DLSS)

Remod Channel:  3

Time Zone:
(FFFF8F80) 480 min
DS Entry Time:
03/11/2007 10:00 GMT
DS Exit Time:
11/04/2007 09:00 GMT
Current GPS Time:
Not Available
  
```

The General Status fields are:

Field	Description		
Error	Error codes display on the OSD when an error occurs. If multiple errors occur, the last recorded error is displayed:		
Error Code	Description	Cause	Remedy
E 00	NO ERROR	Indicates normal condition after initialization	None
E 01	NOT CONNECTED	The set-top did not receive a connect message	Restore out-of-band signal Send a connect message
E 02	PWR CYCLE	Init Error	The set-top needs a power cycle to recover
E 03	DRAM	DRAM error	Not used
E 04	DPSRAM	DP-SRAM error	Not used
E 07	ROM	ROM verification failure	Power cycle the set-top; if repetitive, return for repair
E 08	RAM	Faulty RAM, ROM, EEPROM, or POST failure (this is a hardware failure)	Return the set-top for repair
E 09	BATTERY	Dead battery or memory has not been initialized; occurs if battery fails to keep the RAM alive during power-down;	Return the set-top for repair; requires factory initialization message

4 DIAGNOSTICS

Field	Description		
		disconnects the set-top	
E 10	SERIALNO	Invalid serial number	Not used
E 11	INVALID UNIT ADDRESS	Invalid unit address	Return the set-top for repair; requires a unit creation message
E 12	POST ERROR	POST failed	Not used
E 13	BOOT	Sys_boot initialization failure	Power cycle the set-top; if repetitive, return for repair
E 14	STARTUP	System startup failure	Power cycle the set-top; if repetitive, return for repair
E 15	TSI INVALID	TSI Structure is corrupted	Power cycle the set-top; if repetitive, return for repair
E 16	FLASH BAD NUMBER	Bad flash number specified for Initiate Flash Platform	Error logged, ignore
E 17	BAD PLATVAL	Bad platform validation step number	Error logged, ignore
Purchases	Indicates the number of unreported subscriber event purchases stored on the product.		
Platform ID	A unique 16-bit hexadecimal number that identifies the platform image (also called the ROM ID).		
Mapped Platform ID	A unique 16-bit hexadecimal number that identifies the platform image (also called the ROM ID), used in place of the Platform ID for certain third party applications.		
Family ID	The manufacturer and product family, in hexadecimal		
Model ID	The model, in hexadecimal		
Remod Channel	The interface to the subscriber TV; channel 3 or 4 in the USA		
Time Zone	The time zone offset (in minutes) relative to GMT		
DST Entry Time	The daylight savings entry time		
DST Exit Time	The daylight savings exit time		
Current GPS Time	The current time		

4 DIAGNOSTICS

Out-Of-Band (OOB) Status

This diagnostic indicates the status of the out-of-band control channel.

```

OOB DIAGNOSTIC
DATA          *   SNR 20 dB   GOOD
EMM DATA     *
CARRIER LOCK YES  COUNT      8
HUNT MODE     NONE
CUR FREQ      75.25MHz
LKC           75.25MHz
EMM PRVDR ID 0x0001
    
```

The Out-Of-Band Status fields are:

Field	Description	
Data	Indicates whether data is being carried by the OOB (the indicators cover all packet processors, regardless of which stream they are monitoring, and are cleared when you enter the diagnostic).	
	OSD	Description
	"*"	OOB data detected within last 5 seconds
	blank	OOB data not detected within last 5 seconds
SNR	When carrier lock has been established, displays an estimate of the carrier signal-to-noise ratio in dB, with an explanation: GOOD — Good value FAIR — Marginal signal level, check the signal POOR — Unusable signal INVALID — Invalid SNR value	
EMM Data	Indicates whether the set-top is receiving a message on the EMM Stream	
	OSD	Description
	"*"	EMM data detected within last 5 seconds
	blank	EMM data not detected within last 5 seconds
Carrier Lock	The CARRIER LOCK is reset to "1" after an initialization from the headend or a power cycle. Each time the set-top detects a drop in OOB connectivity, the counter increments.	
	OSD	Description
	YES	Carrier locked
	NO	Carrier unlocked

4 DIAGNOSTICS

Field	Description	
Hunt Mode	The state of OOB stream acquisition	
	OSD	Description
	None	The set-top is locked to an OOB carrier
	RR (Round Robin)	The set-top is searching OOB frequencies trying to find an EMM Provider of 0 or 1.
	EMM	The set-top received a Provider ID change and is searching OOB frequencies for a new ID.
	FIX	The set-top has been commanded to attempt to lock onto a frequency.
	SRCH	The set-top at some point had a valid Provider ID on the OOB frequency and is attempting to re-acquire it.
Cur Freq	The current out-of-band frequency	
LKC	The last known carrier (OOB frequency that had correct Provider ID)	
EMM Provider ID	The ID of the provider of the Entitlement Management Message (EMM)	

Agile OOB Tuner Hunting

Manual control for selecting an OOB frequency can be made while in the OOB Status diagnostics screen by pressing the MENU button. To exit this mode, press the Menu button a second time, or press the POWER button.

If the set-top is in the process of hunting for an OOB frequency, control of frequency selection is suspended, i.e. pressing Menu button on OOB status screen to display MANUAL FREQ is not available when the set-top is hunting.

Summary of Operator Selection of the OOB Frequency (OSD Frequency Override in Hunted Mode)

The manual override frequency capability is only displayed if the box is not currently hunting and the operator presses the MENU key while OOB OSD diagnostics are displayed. The MANUAL FREQ displays the LKC and allows the operator to select (via scroll up/down) a specific frequency to check if a valid OOB is on that specific frequency. The MANUAL FREQ parameter is the OOB frequency selected in the frequency selection mode and displayed in MHz, with the specific values of 75.25, 104.20, 72.75, 92.25, 98.25, 107.25, 107.40, 110.25, 116.25, and 103.75.

1. When in the OOB Receiver Status Diagnostic, press the MENU button to enter the frequency selection mode. The OSD displays a new "MANUAL FREQ" line at the bottom of the screen, which indicates the last known carrier frequency. At this point, if desired, the operator can exit the frequency change mode by pressing the MENU key a second time.
2. The operator can use the UP/DOWN channel or cursor keys to scroll through all 10 frequencies until the desired new OOB frequency is found. The new frequency selections will appear on the "MANUAL FREQ" line of the OSD.

4 DIAGNOSTICS

3. After selecting the desired new frequency, the operator will press the SELECT key to start the search. The manual frequency search will last up to 40 seconds. On the OSD, the "MANUAL FREQ" line of text will be cleared, the "HUNT MODE" will display "FIX" to indicate a search on a fixed frequency, and the "CUR FREQ" field will change to the frequency being searched for.
4. If the frequency is found with the proper EMM Provider ID, then the OSD "LKC" field will change to display the new frequency.
5. If after 40 seconds the frequency search is not successful, the product will perform a warm reset and return to the last known carrier frequency.
6. If the operator would like to abort a search without waiting the 40 seconds, the POWER key can be pressed to cause an immediate warm reset.

4 DIAGNOSTICS

In-Band Status

This diagnostic displays the in-band status for the last attempted channel tune.

```
IN BAND DIAGNOSTIC

DATA                *
EMM DATA
CARRIER LOCK      YES
PCR LOCK           YES
SNR                35 dB      GOOD
MODULATION MODE    QAM 64
SHORT TERM ERROR COUNT 00000
LONG TERM ERROR COUNT 09850
TUNED FREQ         219.000
```

```
IN BAND DIAGNOSTIC

DATA                *
EMM DATA
CARRIER LOCK      YES
PCR LOCK           YES
SNR                39 dB      GOOD
MODULATION MODE    QAM 256
SHORT TERM ERROR COUNT 00000
LONG TERM ERROR COUNT 10945
TUNED FREQ         525.000
```

The In-Band Status fields are:

Field	Description						
Data	Indicates whether data is being received on the in-band stream. The indicators cover all packet processors regardless of the stream they are monitoring:						
	<table border="1"><thead><tr><th>OSD</th><th>Description</th></tr></thead><tbody><tr><td>"*"</td><td>In-band data received</td></tr><tr><td>blank</td><td>No In-band data received</td></tr></tbody></table>	OSD	Description	"*"	In-band data received	blank	No In-band data received
OSD	Description						
"*"	In-band data received						
blank	No In-band data received						
EMM Data	Indicates whether data is being received on the EMM stream. The indicator is clear when the diagnostic is started.						

4 DIAGNOSTICS

Field	Description	
	OSD	Description
	" * "	Data received
	blank	No data received
Carrier Lock	Indicates whether the digital in-band receiver is locked to the carrier	
	OSD	Description
	YES	Carrier locked
	NO	Carrier unlocked
PCR Lock	Indicates whether the in-band receiver is locked to the current program clock reference for a digital service	
	OSD	Description
	YES	Carrier locked
	NO	Carrier unlocked
SNR	<p>When carrier lock has been established, displays an estimate of the carrier signal-to-noise ratio in dB, with an explanation. This estimate is based on the QAM cluster variance, which is proportional to the SNR.</p> <p>GOOD — Good value FAIR — Marginal signal level, check the signal POOR — Unusable signal</p>	
Modulation Mode	<p>The values displayed on the OSD are:</p> <p>64 QAM — 64 QAM digital channel 256 QAM — 256 QAM digital channel</p>	
Short Term Error Count	The FEC errors (maximum count of 65535) at 5-second intervals. The Short Term Error Count is cleared after polling.	
Long Term Error Count	The accumulation of the Short Term Error Count (maximum count of 65535). The Long Term Error Count is cleared every 24 hours.	
Tuned Freq	The actual frequency to which the tuner is programmed (Carrier Definition Frequency + 1.75 MHz).	

4 DIAGNOSTICS

Audio/Video Status

This diagnostic displays the audio and video status for the tuned channel.

```

AUDIO / VIDEO STATUS

ADP Lock      NO
Audio Mode    MONO
Audio SPDIF   IEC958PCM

VP Lock       NO
MPEG Method   N/A

Subtitle Status
Enabled : NO   ISO LANG: ---
Enhanced: NO   Rendered: ---
    
```

```

AUDIO / VIDEO STATUS

ADP Lock      YES
Audio Mode    MONO
Audio SPDIF   IEC958PCM

VP Lock       YES
MPEG Method   MUTE BLACK

Subtitle Status
Enabled : NO   ISO LANG: ---
Enhanced: NO   Rendered: ---
    
```

Field	Description	
ADP Lock	The ADP Lock indicates the audio processor locked status	
	OSD	Description
	YES	Audio Processor is locked to the audio stream
	NO	Audio Processor is not locked to the audio stream
Audio Mode	Audio Mode indicates the audio Mode of in incoming digital service.	

4 DIAGNOSTICS

	OSD	Description
	N/A	The audio mode is not applicable to the currently tuned stream.
	Mono	The audio mode is monophonic.
	Stereo	The audio mode is stereo.
	Surround	The audio mode is surround sound.
AUDIO SPDIF	Indicates SPDIF Mode as set by application software	
	OSD	Description
	N/A	Audio SPDIF mode is not applicable
	Dolby	For digital channels, the possible Dolby® Digital modes are:
	1+1	Left is channel 1, right is channel 2
	1/0	Center
	2/0	Left, right
	2/1	Left, center, right
	3/1	Left, right, surround
	2/2	Left, right, left surround, right surround
	3/2	Left, center, right, left surround, right surround
	LFE 0	Low frequency effects (subwoofer) channel not available
	LFE 1	Low frequency effects (subwoofer) channel available
VP Lock	VP Lock indicates the Video Processor locked status	
	OSD Display	Description
	YES	Video Processor is locked to the video stream
	NO	Video Processor is locked to the video stream
MPEG Method	The MPEG Method selected	
	OSD Display	Description
	UNMUTED	Is displayed if mute method is not selected
	MUTE STILL	Is displayed if the mute method includes stopping video and presenting a still frame, similar to a pause function
	MUTE BLACK	Is displayed if mute method presents a black screen.
Subtitle Status	<p>The subtitle parameter indicates if subtitles are enabled and, if enabled, what language is selected and if the subtitle is being rendered. The language is displayed as the 3-character ISO639.2/B language code.</p> <ul style="list-style-type: none"> • Enabled is indicated with Yes or No. • The language is displayed as the 3-character ISO639.2 language code. • Enhanced mode is indicated with Yes or No. • Rendered status is indicated with Yes or No. 	

4 DIAGNOSTICS

Unit Address

This diagnostic displays the 16-digit (40-bit) unit address of the set-top.

```
Unit Address:
000-02989-92654-217

Network Address:
000-00000-00001-026

TVPC:
000-00000-00000-000

CableCARD Inserted: Yes

Multicast 16 Address:
000.000 000.000
000.000 000.000
VCN 3500
000.008 032.011
064.182 138.144
Seed Health 0xFF

Serial#: 000000000000000000000000

MAC ADDRESS
MAC-Address1: 00 19 A6 5B 41 C6
MAC-Address2: 00 19 A6 5B 41 C7

vvv Scroll Down vvv
```

The Unit Address fields are:

Field	Description
Unit Address	A unique decimal number that indicates the unit address or physical address (13 address digits and three check digits)
Network Address	The network address in decimal format (13 address digits and three check digits)
TVPC	The TV Passcard Address in decimal format (13 address digits and three check digits)
CableCARD Inserted	YES — CableCARD is inserted NO — CableCARD is not inserted
Multicast 16 Address For	The Multicast 16 address numbers change to display the values for each data stream in TCP/IP decimal byte form. The valid stream types are: Net — Network EMM — EMM SCC — SCC_ECM DWLD — Download DATA — Data POLL — Polling packet identifier (PID)
Seed Health	This value represents the health of the set-top and should be 0xFF. If it is not 0xFF, see the “Troubleshooting” section for more information.
Serial Number	The Host Serial Number is displayed on the Unit Address diagnostic screen.
MAC Addresses	The USB and DCH70 MAC addresses are stored in protected flash and displayed in hexadecimal.

4 DIAGNOSTICS

Separable Security

This diagnostic displays information on the inserted M-CARD and CableCARD Interface with the DCH.

```
          ^^^ Scroll Up ^^^
Separable Security
CARD Interface: Good
CableCARD ID: 000-334-292-601-5
Host ID:      044-000-201-068-2
Data ID:      246-641-049-16
Validation: Valid

Pairing Rpt Method: MMI
MSO Phone Number: 858-404-2259

CableCARD
Object Name:   MCB1Card
Object Ver:    02.65
Manufacturer:  0x0000
HW Version:    0x0265
Boot Version:  03.25
2nd Version:   02.01
```

Field	Description
CARD Interface	CableCARD Interface is a status indication of the interface between the Host and CableCARD. It will indicate 'Good' if a Native/Legacy resource is established between the host and card, 'Error' if an error has occurred when establishing the Native/Legacy resource, or 'Unsupported CARD' if the inserted CableCARD is not a Motorola M-CARD in M-Mode.
CableCARD ID	The unique identifier provided by the CableCARD.
Host ID	The unique identifier in the Host Device Certificate.
Data ID	A value generated by the CableCARD for the Pairing report.
Validation	<ul style="list-style-type: none">• UNKNOWN if a Validation message was not received by the product• VALID or INVALID, as set by the Host Validation Message received from the headend• BINDING if the CableCARD is busy with the binding authentication process• NOT BOUND if Card validation status is not bound for CableCARD reasons• HOST CERTIFICATE INVALID if the status is not bound because the Host Certificate was invalid• HOST SIGN FAILED if status is not bound because of failure to verify Host's SIGN• AUTH KEY FAILED if status is not bound because of failure to match AuthKey from the Host Device• FAILED if binding failed for other reasons.
Pairing Rpt Method	Set to 'MMI' or 'Reportback' as received by a message from the headend, or

4 DIAGNOSTICS

Field	Description
	set to 'Unknown' if the headend message was not received
MSO Phone Number	MSO Phone Number, as configured at the headend
CableCARD	
Object Name	Code object name executing on the CableCARD
Object Ver.	Code object version executing on the CableCARD
Manufacturer	CableCARD manufacturer
HW Version	Version number provided by the CableCARD.
Boot Version	The version number provided by the CableCARD.
2 nd Version	The version number of the second stored object provided by the CableCARD.

Firmware Version

```

FIRMWARE VERSION
04.11      BOOT 04.11
Jul 16 2007 CRC  BOCA41E4
14:20:41

TSODA  t01

CMLBK  0000

FPGA
CableCARD  0.84      SP
MoCA      0.84      Code  0.77
Security   0.84      Patch  0.00

CPLD      2B-70 0507 2007
  
```

This diagnostic displays the following:

Field	Description
Dena firmware version or revision number	Firmware version number currently executing on the set-top
Build date and time	Build data and time of the Dena firmware version
BOOT	Lowest firmware code level that can be used on this set-top
TSODA firmware version number	Firmware version number of the TSODA
CAMEL (CMLBK) firmware version number	Always 0000
FPGA	Controls the CableCARD, the MoCA chip, and the Security Processor chip

4 DIAGNOSTICS

Field	Description
SP	Lists the firmware version, as well as the patch release version number
CableCARD	The firmware version number of the FPGA image that controls the CableCARD
Code	The firmware version number of the Security Processor
MOCA	The firmware version number of the FPGA image that controls the MOCA chip
Patch	The firmware version number of the patch release of the Security Processor
Security	The firmware version number of the FPGA image that controls the Security Processor
CPLD	The firmware version of the CPLD. Will be set to the string value defined by the factory or set to "N/A."

Current Channel Status

This diagnostic displays the status of the last attempted tune on the in-band tuner. It shows channel type (analog/digital), acquisition state, purchasable indicator, preview indicator, parental control status, and mute status. The DCH70 is an all-digital cable receiver, so the Current Channel Status diagnostic will always be related to digital services (channel type will always be digital).

```
Current Channel Status
State: Connected

Primary A/V Source:
IB Tuner1
Type: DIGITAL          ENC  12

Status: AUTH
Preview: NO

Purchasable:          Current      Next
Purchased:            YES          -
EPOCH Num:           169           0
EPOCH Type:          0x80          0x08
Auth Reason:         0x12          0x00
Service - Status - ID -
CH 103   Tuned Freq 165.000
```

4 DIAGNOSTICS

The Current Channel status fields are:

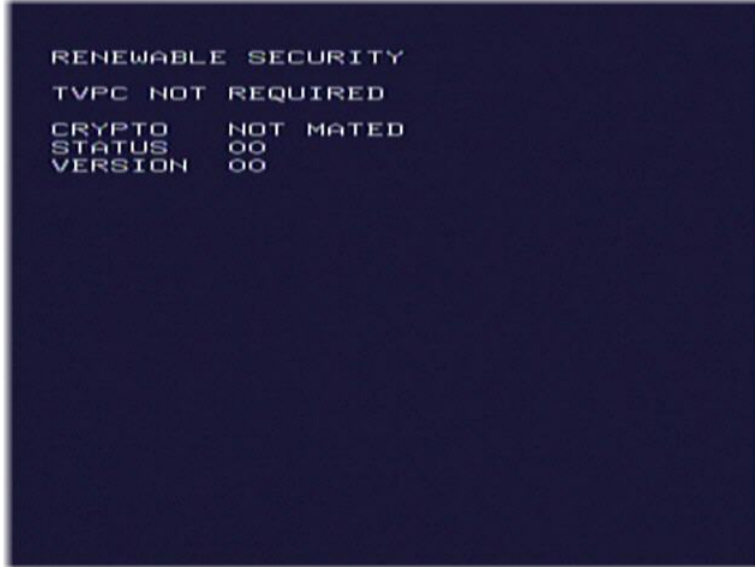
Field	Description	
Connected State	A connect or disconnect message determines whether the set-top is CONNECTED or DISCONNECTED.	
Type	Indicates whether the channel is analog or digital:	
	OSD	Description
	ANALOG	Analog
	DIGITAL	Digital
aaa	Displays the encryption mode for the channel on the OSD. For a digital channel, it can be: ENC — encrypted UNE — unencrypted	
bb	(Digital channels only) The current epoch authorization reason is displayed in the hexadecimal format 0xbb on the OSD.	
Status	Indicates the status of the currently tuned channel:	
	OSD	Description
	INIT	Initialized State
	CONFI	Configured
	ACQUI	Acquiring the program
	AUTH	Authorized for the program
	Not A	Not authorized for the program
Preview	Indicates whether the program is in the free preview state:	
	OSD	Description
	YES	The program is in the free preview state
	NO	The program is not in the free preview state
Purchasable	Indicates whether the current program can be purchased for viewing:	
	OSD	Description
	YES	Can be purchased
	NO	Cannot be purchased
Purchased	Indicates whether the current or next program has been purchased:	
	OSD	Description
	YES	Purchased
	NO	Not purchased
CH	Indicates the channel currently tuned when the OSD appeared	
Tuned Frequency	The actual programmed tuner frequency (Carrier Definition Frequency + 1.75 MHz)	

The EPOCH Number and Type, Authorization, Service Status, and ID are for Motorola use *only*.

4 DIAGNOSTICS

Renewable Security

The renewable security system includes a TVPC card that returns the security status to current.



The Renewable Security fields are:

Field	Description																						
TVPC Required / Not Required	Indicates whether further operation of the set-top requires the TVPC																						
Crypto	Lists the current mode as displayed on the CRYPTO OSD (Stand Alone, Support, or Not Mated)																						
Status	Indicates the TVPC status with the following variables:																						
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>00</td> <td>OK</td> </tr> <tr> <td>01</td> <td>TVPC communication problem</td> </tr> <tr> <td>02</td> <td>TVPC required</td> </tr> <tr> <td>03</td> <td>Validator does not match between GK and TVPC</td> </tr> <tr> <td>04</td> <td>Invalid unit key number</td> </tr> <tr> <td>05</td> <td>Old TVPC unit address</td> </tr> <tr> <td>0a</td> <td>TVPC not mated</td> </tr> <tr> <td>0b</td> <td>TVPC/base module unit address mismatch</td> </tr> <tr> <td>0c</td> <td>New TVPC, but wrong version number</td> </tr> <tr> <td>0d</td> <td>TVPC unit address mismatch</td> </tr> </tbody> </table>	OSD	Description	00	OK	01	TVPC communication problem	02	TVPC required	03	Validator does not match between GK and TVPC	04	Invalid unit key number	05	Old TVPC unit address	0a	TVPC not mated	0b	TVPC/base module unit address mismatch	0c	New TVPC, but wrong version number	0d	TVPC unit address mismatch
OSD	Description																						
00	OK																						
01	TVPC communication problem																						
02	TVPC required																						
03	Validator does not match between GK and TVPC																						
04	Invalid unit key number																						
05	Old TVPC unit address																						
0a	TVPC not mated																						
0b	TVPC/base module unit address mismatch																						
0c	New TVPC, but wrong version number																						
0d	TVPC unit address mismatch																						
Version	Indicates the version of renewable security being used																						

4 DIAGNOSTICS

Upstream Modem

This diagnostic displays the upstream status and operating parameters.

```

STARVUE II DIAGNOSTICS

STATUS:      -
FREQUENCY:   8.864 Mhz
LEVEL:       40
IPPV:        ENABLED

125 02-06-07 09:51:35
125 02-06-07 09:51:36
N/A
N/A
  
```

The RF Modem fields are:

Field	Description								
Status	Indicates the transmitter status with the following variables:								
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>Idle</td> </tr> <tr> <td>t</td> <td>Transmitting</td> </tr> </tbody> </table>	OSD	Description	-	Idle	t	Transmitting		
OSD	Description								
-	Idle								
t	Transmitting								
Frequency	The transmitting frequency								
Level	The approximate power value of the STARVUE II transmitter in dBmV. The difference between the power value on the diagnostic screen and the actual power of the STARVUE II module may be +/- 5 dBmV.								
IPPV	Indicates the Interactive Pay-Per-View status with the following variables:								
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Enabled</td> <td>IPPV Enabled</td> </tr> <tr> <td>Unsent - ##</td> <td>The set-top contains unsent IPPV transactions. <i>The variable ## is the number of unsent transactions.</i></td> </tr> <tr> <td>Disabled</td> <td>IPPV disabled</td> </tr> </tbody> </table>	OSD	Description	Enabled	IPPV Enabled	Unsent - ##	The set-top contains unsent IPPV transactions. <i>The variable ## is the number of unsent transactions.</i>	Disabled	IPPV disabled
OSD	Description								
Enabled	IPPV Enabled								
Unsent - ##	The set-top contains unsent IPPV transactions. <i>The variable ## is the number of unsent transactions.</i>								
Disabled	IPPV disabled								
Last Poll Req.	<p>Indicates the sequence number of the last poll request received by the set-top. The time stamp of the last poll request is also displayed.</p> <ul style="list-style-type: none"> If the set-top has received no poll request, the sequence number and time stamp fields display N/A. If the set-top has received a poll request but its system time has not yet been initialized, the time stamp field displays NOT AVAILABLE. 								

4 DIAGNOSTICS

Last Poll Ack.	<p>Indicates the sequence number of the last poll acknowledge received by the set-top. The time stamp of the last poll acknowledge is also displayed.</p> <ul style="list-style-type: none"> If the set-top has received no poll acknowledge, the sequence number and time stamp fields display N/A. If the set-top has received a poll acknowledge but its system time has not yet been initialized, the time stamp field displays NOT AVAILABLE.
Last Purchase Report Req.	<p>Indicates the sequence number of the last purchase report request received by the set-top. The time stamp of the last purchase report request is also displayed.</p> <ul style="list-style-type: none"> If the set-top has received no purchase report request, the sequence number and time stamp fields display N/A. If the set-top has received a purchase report request but its system time has not yet been initialized, the time stamp field displays NOT AVAILABLE.
Last Purchase Report Ack.	<p>Indicates the sequence number of the last purchase report acknowledge received by the set-top. The time stamp of the last purchase report acknowledge is also displayed.</p> <ul style="list-style-type: none"> If the set-top has received no purchase report acknowledge, the sequence number and time stamp fields display N/A. If the set-top has received a purchase report acknowledge but its system time has not yet been initialized, the time stamp field displays NOT AVAILABLE.

App Code Modules

This diagnostic displays the downloaded code modules. This can be a multi-page display. Press SELECT to display additional pages.

```

ASTB INVD

MODULE   VER   STATUS   ID   LO
017-2500 04.05  ENABLED 0001
s_MS_BAS 17.76  ENABLED 2090
    
```

The Code Modules fields are:

Field	Description
Module	The object name
Version	The object version

4 DIAGNOSTICS

Field	Description
Status	The object status modes available are: <ul style="list-style-type: none">• LOADING• DELETED• ENABLING• ENABLED• DSABLNG• DISABLD• DELETNG• POSTPND• ENNORUN• DISNORUN
ID	The object AppID

Memory Configuration

This diagnostic displays the memory status. The format depends on the installed memory types.

```
MEMORY STATUS

EEPROM Ver.No.          00.00

NVMEM                   PLAT      APP
236K                    20K
DRAM Code/Data         16384K   16384K
FLASH                  2816K   3072K
```

The Memory Configuration fields are:

Field	Description
EEPROM Ver No.	The EEPROM version (never used, should always be 00.00)
NVMEM	The allocated system NVMEM in KB
DRAM Code/Data	The allocated DRAM memory in KB
FLASH	The allocated Flash memory in KB

4 DIAGNOSTICS

Interactive Status

This diagnostic tool gathers data about your system.

```

INTERACTIVE INFO
IP           : 192.168.105.116
UPM         : 0x000345
UPSTREAM ID : 0x0003
DOWNSTREAM ID : 0x0001
STATE       : RUNNING
MAC ABORT CNTR: 0000

GOOD PACKETS :
ERROR PACKETS :

SOCKET PORT STATE
0           UNUSED
1           UNUSED
2           UNUSED
3           UNUSED
4           UNUSED
5           UNUSED
6           UNUSED
7           UNUSED
8           UNUSED
9           UNUSED
10          UNUSED
11          UNUSED
    
```

The Interactive Status fields are:

Field	Description										
IP	The set-top IP address assigned by the NC 1500, in dotted-decimal format; for example xxx.xxx.xxx.xxx where each xxx ranges from 000 to 255. 0.0.0.0 is displayed if the IP address is not configured or unknown.										
UPM	The upstream modem address. This UPM value is the same as the terminal ID assigned by the DAC 6000. It is a unique, system-generated, eight-digit integer between 1 and 16777215. 00000000 is displayed when the UPM is not configured or unknown.										
Upstream ID	The set-top transmission parameter assigned by the DAC 6000. It is a four-digit decimal value from 0000 to 9999. 0000 is displayed if the Upstream ID is not configured or unknown.										
Downstream ID	The set-top transmission parameter assigned by the DAC 6000. It is a four-digit decimal value from 0000 to 9999. 0000 is displayed if the Downstream ID is not configured or unknown.										
State	The interactive status of the set-top:										
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>UNCONFIG</td> <td>The set-top is not configured for the interactive system, and the platform should run as pre-interactive.</td> </tr> <tr> <td>MAC_CONNECT</td> <td>The set-top is waiting to establish a connection to the MAC PID Stream.</td> </tr> <tr> <td>INIT_WAIT_DC_OR_C</td> <td>The set-top is in the interactive initialization state and waiting for the default configuration or the contention channel list messages.</td> </tr> <tr> <td>WAIT_LM_ACK</td> <td>The set-top is in the interactive initialization state and waiting for Link Management Response ACK for Local Address Message.</td> </tr> </tbody> </table>	OSD	Description	UNCONFIG	The set-top is not configured for the interactive system, and the platform should run as pre-interactive.	MAC_CONNECT	The set-top is waiting to establish a connection to the MAC PID Stream.	INIT_WAIT_DC_OR_C	The set-top is in the interactive initialization state and waiting for the default configuration or the contention channel list messages.	WAIT_LM_ACK	The set-top is in the interactive initialization state and waiting for Link Management Response ACK for Local Address Message.
OSD	Description										
UNCONFIG	The set-top is not configured for the interactive system, and the platform should run as pre-interactive.										
MAC_CONNECT	The set-top is waiting to establish a connection to the MAC PID Stream.										
INIT_WAIT_DC_OR_C	The set-top is in the interactive initialization state and waiting for the default configuration or the contention channel list messages.										
WAIT_LM_ACK	The set-top is in the interactive initialization state and waiting for Link Management Response ACK for Local Address Message.										

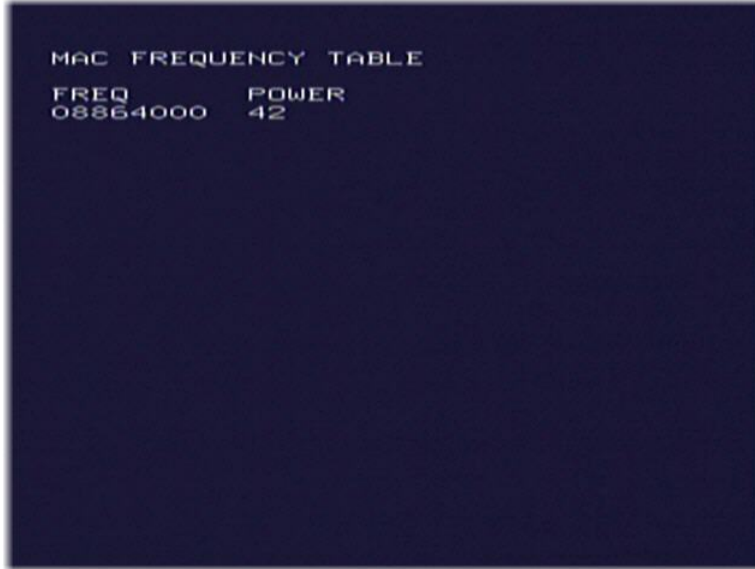
4 DIAGNOSTICS

Field	Description														
	<table border="1"> <tr> <td>WAIT_SO_ACK</td> <td>The set-top is in the interactive initialization state and waiting for a Sign On acknowledgement.</td> </tr> <tr> <td>WAIT_LA_OR_SO</td> <td>The set-top is in the interactive initialization state and waiting for Logical Address or Sign On with verification Frequency message.</td> </tr> <tr> <td>INIT_STOPPED</td> <td>The set-top is in the interactive initialization state and the TransMode has stopped.</td> </tr> <tr> <td>RUN_WAIT_DC_OR_C</td> <td>The set-top is in the interactive state and waiting for the default configuration or the contention channel list messages.</td> </tr> <tr> <td>RUNNING</td> <td>Interactive state is running, sending idle messages, and waiting for any prepare for poll or MAC messages.</td> </tr> <tr> <td>RUN_STOPPED</td> <td>The interactive run state has stopped and the set-top is waiting for status or transmission control message.</td> </tr> <tr> <td>INVALID</td> <td>The interactive state is unknown or invalid.</td> </tr> </table>	WAIT_SO_ACK	The set-top is in the interactive initialization state and waiting for a Sign On acknowledgement.	WAIT_LA_OR_SO	The set-top is in the interactive initialization state and waiting for Logical Address or Sign On with verification Frequency message.	INIT_STOPPED	The set-top is in the interactive initialization state and the TransMode has stopped.	RUN_WAIT_DC_OR_C	The set-top is in the interactive state and waiting for the default configuration or the contention channel list messages.	RUNNING	Interactive state is running, sending idle messages, and waiting for any prepare for poll or MAC messages.	RUN_STOPPED	The interactive run state has stopped and the set-top is waiting for status or transmission control message.	INVALID	The interactive state is unknown or invalid.
WAIT_SO_ACK	The set-top is in the interactive initialization state and waiting for a Sign On acknowledgement.														
WAIT_LA_OR_SO	The set-top is in the interactive initialization state and waiting for Logical Address or Sign On with verification Frequency message.														
INIT_STOPPED	The set-top is in the interactive initialization state and the TransMode has stopped.														
RUN_WAIT_DC_OR_C	The set-top is in the interactive state and waiting for the default configuration or the contention channel list messages.														
RUNNING	Interactive state is running, sending idle messages, and waiting for any prepare for poll or MAC messages.														
RUN_STOPPED	The interactive run state has stopped and the set-top is waiting for status or transmission control message.														
INVALID	The interactive state is unknown or invalid.														
MAC Abort Cntr	This counter increments every time the MAC layer reaches the cell abort count limit. It is reset by the successful upstream transmission of a cell — for example, when an ACK is received by the set-top. If the counter reaches the MAC abort count limit, the DCH70 assumes the MAC layer is unavailable due to noise, congestion, or some other problem. The DCH70 stops transmitting data upstream, reports an error to the calling function, and attempts to re-enter the network using the initialization process. 0000 is displayed as default or if the MAC Abort CNTR is not configured or unknown.														
Socket Port State	<p>The socket mode and activity:</p> <ul style="list-style-type: none"> • UNUSED — The socket is not being used. • OPENED — The socket is open. • READY — The socket is ready to send or receive. • RECVING — The socket is receiving data from the application server. • SENDING — The socket is sending data to the application server. 														

4 DIAGNOSTICS

MAC Frequency Table

The set-top uses a range of frequencies set by the host for upstream communications. The MAC Frequency Table displays your frequency and signal power.



```
MAC FREQUENCY TABLE
FREQ      POWER
08864000  42
```

Field	Description
Frequency	The frequency, in Hz, for an upstream channel
Power	The power level, in dBmV, used on a particular upstream channel to send data to the RPD

Control Channels

This diagnostic lists channels, band types, PIDs, and counts.



```
CONTROL CHANNEL INFO
  CHN  BAND  PID      Cnt  Ovfl  Error
*  0    INB    0000    897    0     0
*  1    INB    00A9   4430    0     0
  2    INB    0000     0     0     0
  3    INB    0000     0     0     0
  4    INB    0000     0     0     0
  5    INB    0000     0     0     0
  6    OOB    0001     1     0     0
*  7    OOB    1503  19784    0     0
*  8    OOB    0777  55378    0     0
*  9    OOB    1503  19785    0     0
* 10    OOB    1C09    627    0     0
* 11    OOB    1C0B  39847    0     0
 12    OOB    0000     0     0     0
 13    OOB    0000     0     0     0
 14    OOB    0000     0     0     0
 15    OOB    0000     0     0     0
 16    OOB    0000     0     0     0
 17    OOB    0000     0     0     0
```

4 DIAGNOSTICS

Message Types

This diagnostic lists message types, IDs, and counts.

```
MESSAGE TYPES (hex data)
Msg  Id  Cnt  Msg  Id  Cnt
 1  00  169  C0  1A  71
 1  01  60  C4  1A  241
 80 00  51  C5  9  40
 80 10  250  D8  11  0
 81  1B  0
 82  12  4
 83  1C  2
 85  1E  147
 86  1D  0
 8C  18  0
 8D  18  0
 8E  18  0
 8F  19  177
 90  17  6
 91  1D  0
 92  1C  0
 95  14  8
 9D  15  0
 A0  15  0
 A4  16  0
 B0  1  63
 C0  13  62
 C1  7  87
 C2  1B  253
```

Field	Description
Msg	The message type
Id	The low order byte of the Connection ID
Cnt	The number of messages received

In-band Program Association Table (PAT)

This diagnostic displays the Program Association Table Information (For Motorola use only).

```
INBAND PAT (hex data)
PAT  SN  PID
001 0001 0029
002 0002 0069
003 0003 00A9
004 0004 00E9
005 0005 0129
006 0006 0169
007 0007 01A9
008 0009 0269
009 000B 02E9
00A 000C 0329
00B 000D 0369
00C 000E 03A9
00D FFFC 0FEF
00E 0000 0FFE
```


4 DIAGNOSTICS

In-band Multicast Address Filter

This diagnostic displays in-band multicast filter information.

```
In Band Multicast Address Filter
Filter Table:
DMCA MCA PQ RQ App CID
CA 0000 0000 -01 -01 0000 00000000
CA 0000 0000 -01 -01 0000 00000000
CA 0000 0000 -01 -01 0000 00000000
CA 0000 0000 -01 -01 0000 00000000
Register Values:
MCA PID
0000 0000 0000 0000
```

Field	Description
Filter Table:	
DMCA	The default multicast 16 address
MCA	The current multicast 16 address
PQ	The preemption notification queue ID
RQ	The response queue ID
APP	The application ID
CID	The connection ID
Register Values:	
MCA	Multicast 16 filter register contents
PID	PID filter register contents

4 DIAGNOSTICS

Connected Home Status

This diagnostic displays information related to the Home Network of which the set-top is a part. *This diagnostic is not applicable to the DCH70.*

```

          ^^^ Scroll Up ^^^
Connected Home Link Status
Tx Data Rate Between Nodes(Mbps)
Collecting Data: In Progress

To Node:   5   6   7
From
Node:
V6U54WN1-O   N/A  N/A  N/A
              N/A  N/A  N/A
              N/A  N/A  N/A
              N/A  N/A  N/A
              N/A  N/A  N/A
              ***  N/A  N/A
              N/A  ***  N/A
              N/A  N/A  ***
  
```

```

          ^^^ Scroll Up ^^^
Connected Home Link Status
Tx Data Rate Between Nodes(Mbps)
Collecting Data: In Progress

To Node:   0   1   2   3   4
From
Node:
V6U54WN1-O   ***  N/A  N/A  N/A  N/A
              N/A  ***  N/A  N/A  N/A
              N/A  N/A  ***  N/A  N/A
              N/A  N/A  N/A  ***  N/A
              N/A  N/A  N/A  N/A  ***
              N/A  N/A  N/A  N/A  N/A
              N/A  N/A  N/A  N/A  N/A
              N/A  N/A  N/A  N/A  N/A
              N/A  N/A  N/A  N/A  N/A
          vvv Scroll Down vvv
  
```

Field	Description
RF Freq	RF frequency of the MoCA network as a numerical value in the range of 0 to 1500 inclusive, representing MHz. Displays "N/A" if the MoCA network is NOT established.
MoCA	The Network and Local MoCA version IDs in the format NN/LL, where NN is the 2 digit Network MoCA version and LL is the 2 digit Local MoCA node version. Displays "N/A" if the MoCA network is NOT established.
RF Password	The MoCA RF Password for the MoCA network is a 12 to 17 decimal digit value, if privacy is enabled in the MoCA network. Displays "N/A" if the MoCA network is NOT established.

4 DIAGNOSTICS

Field	Description	
Connected Home Table	The Connected Home Table contains information related to each device connected to the set-top through the Home Network. The fields included in the Connected Home Table are:	
	Nodes	<ul style="list-style-type: none"> The MoCA Node ID and Set-top MR-DVR Node ID values of each device in the Home Network in format MM/SS, where MM equals the decimal digit MoCA Node ID within the range of 0-15 and SS equals the decimal digit Set-top MR-DVR Node ID within the range 1-8. Displays a single dash "-" for the device if this information is not available. Displays an asterisk "*" in the row of the device that is the Local Device displaying diagnostics Displays an "N" in the row for the device that is the Network Coordinator for the Home Network. Displays an "M" in the row of the device that is the MR-DVR Set-top Master device. Displays "da" in the row of any device that is in the Home Network but is de-authorized for MR-DVR services Displays "inact" in the row of any device that is inactive in the MR-DVR network
	Dev	Displays the device type of the device:listed: <ul style="list-style-type: none"> NIM EHub ETerm Hub Term N/A
	#Ses	The total number of MR-DVR playback and record sessions currently being supported by the device listed
	Ver	Displays the software version of the Entropic chipset in xx.yy format of the device listed
	Mac	The MAC address of the device listed in 8-byte colon-hex format (xx:xx:xx:xx:xx:xx:xx:xx)
	IP	The IP address of the device listed in 4-byte dotted decimal format (xxx.xxx.xxx.xxx). Displays "0.0.0.0" if the IP address of the device is not configured or unknown.
Connected Home Link Status Table	The Connected Home Link Status Table contains information related to the transmit phy rate between each device in the Home Network and may display warning indications under fault conditions. The warning status fields are in format "aabbcc" preceding the "From Node" row heading. These fields are blank if no fault condition exists, or display the following under the defined conditions:	
	aa	Displays "Bw" in the "aa" portion to indicate a minimum bandwidth available warning
	bb	Displays "Fr" in the "bb" portion to indicate a packet error warning
	cc	Displays "Pw" in the "cc" portion to indicate a power level warning
Collecting Data	<ul style="list-style-type: none"> Displays "In Progress" when the set-top is in the process of collecting the required data and populating the Connected Home Link Status Table Displays "Complete" when the set-top has completed collecting the required data and has populated the Connected Home Link Status Table Displays "N/A" when the data it has collected is invalid or unable to retrieve the data 	

4 DIAGNOSTICS

Keyboard / LED

This diagnostic verifies the functionality of the front panel and the front-panel keypad. Each highlighted character corresponds with a front-panel key press.





5 TROUBLESHOOTING

Troubleshooting guidelines follow. If problems still occur after performing the diagnostics, call the TRC for assistance, as described in the Introduction.

Problem	Possible Solution
The DCH receiver will not power on	<ul style="list-style-type: none">• The DCH receiver may have received a software update and may not power on while the new software is being installed. Try again in a few minutes.• Verify that the AC power cord is connected to the DCH receiver and an AC outlet. Unplug the DCH receiver from the AC outlet, plug it back in, and then press the POWER button.• If the DCH receiver is connected to a switched outlet on another unit, verify that that unit is powered on. Unplug the power cord from the DCH receiver's AC outlet, plug it back in, and then press the POWER button. It is recommended you use an unswitched outlet, if possible.• Check the batteries in the remote control. The batteries in the remote control may be depleted. Install new batteries, if needed.
The remote control does not work	<ul style="list-style-type: none">• Verify that the remote control is in "Cable" mode.• Verify that there are no obstructions between the remote control and the DCH receiver. Aim the remote control directly at the DCH receiver front panel, not the TV or VCR.• If using an external IR sensor connected to the EXT IR input on the rear panel, ensure the cable is properly connected to the rear panel input and that there is a clear line-of-sight from the remote to the sensor. <p>The angle between the remote control and the DCH receiver may be too large. Stand in front of the DCH receiver and not too far to either side.</p> <ul style="list-style-type: none">• Press and release operation keys one at a time, firmly and deliberately.• Check the batteries in the remote control. The batteries in the remote control may be depleted. Install new batteries if needed.
There is no audio when viewing cable channels	<ul style="list-style-type: none">• Verify that the mute button on the DCH receiver or the remote control has not been pressed. Press MUTE on the remote control to restore sound.• If the DCH receiver audio output is connected to the TV, verify that the mute button on the TV has not been pressed.• If the DCH receiver audio output is connected to a home theater receiver, verify that the receiver is set to the appropriate input source and the mute button on the receiver has not been pressed.• Verify that you have the correct cables for the audio connections.• Verify that the audio cables are firmly connected between the DCH receiver and the audio playback device (TV, receiver, DVD player, etc.).

5 TROUBLESHOOTING

Problem	Possible Solution
There is no video on the TV screen	<ul style="list-style-type: none"> • Verify that the TV is powered on and set to the appropriate input source for the DCH receiver. • Verify that the DCH receiver is powered on and tuned to an authorized cable channel. • Verify that all video cables between the DCH receiver and the TV are firmly connected. • Verify that the coaxial cable feed is firmly connected to the DCH receiver and the wall jack. • If the DCH receiver video output is connected to a home theater unit, verify that the home theater unit is powered on and set to the appropriate input source.
No closed captions display	<ul style="list-style-type: none"> • Verify that closed captions are enabled on the TV. <p>Note: Closed captioning may not be available on the current program.</p>
There are black bars to the right and left of the picture	Widescreen TVs display 4:3 programs in this format unless set to Stretch (see your TV manual for information about stretching 4:3 video).
There are black bars above and below the picture	Some SD programs are broadcast in the letterbox format, with black bars above and below the picture. Some widescreen TVs offer a zoom feature that may be able to remove the black bars (see your TV manual for information about zooming 4:3 video).
There are black bars on all four sides of the picture	<p>This may occur on a 16:9 TV if the active video for an SD broadcast is in letterbox format. To confirm, wait for a commercial or look for a graphic, such as a network logo. If the commercial fills the screen from top to bottom, or the graphic appears below the active video, the program is being letterboxed by the broadcaster. You can minimize this by activating the zoom feature on the TV.</p> <p>A broadcaster may include black bars on either side of a wide screen broadcast. This is called a "hybrid" aspect ratio and results in a black border surrounding the video on a 4:3 TV. Because this is part of the broadcast, the DCH70 cannot correct the video. You may be able to minimize the border using the zoom feature on the TV.</p>



MOTOROLA

Motorola, Inc.
101 Tournament Drive
Horsham, PA 19044 U.S.A.

<http://www.motorola.com/>

537569-001-a
08/07