



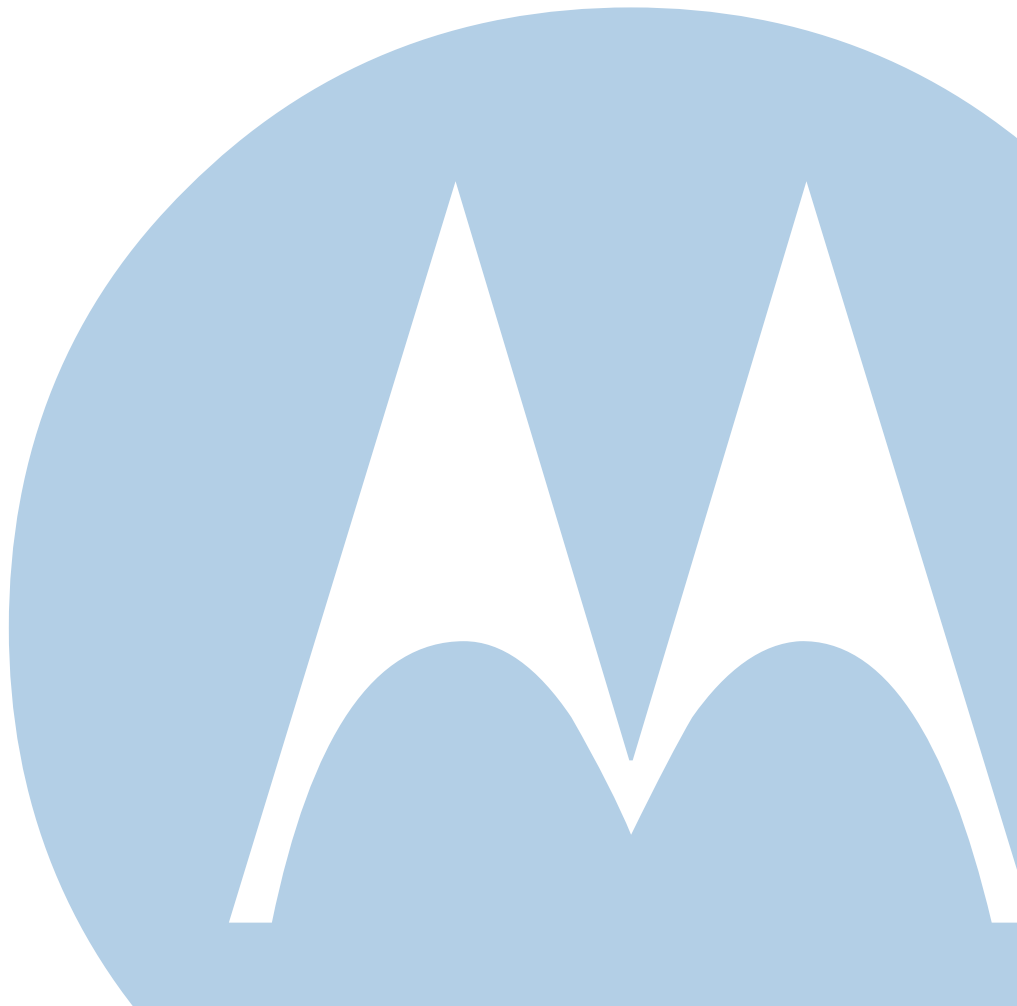
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*Installation Manual*

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## QIP7000 (P2) Series

Hybrid QAM/IP HD Set-top Terminal



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# Safety and Compliance

## 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

WARNING - to reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

The QIP7000 series requires careful handling to avoid potential damage to its internal components such as the hard disk drive which can lead to the loss of recorded data. Be sure to follow these requirements during transportation and installation.

## 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.
- To avoid shock and vibration damage to the internal hard drive, do not move the terminal while it is plugged in.
- To allow the hard drive to spin down and park its heads, wait at least 10 seconds after disconnecting power before moving the terminal.

## FCC Compliance

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.*

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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 QIP7000 series set-tops comply 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.

Please visit [www.motorola.com/recycle](http://www.motorola.com/recycle) for instructions on recycling.



# Contents

<b>Safety and Compliance</b> .....	<b>i</b>
<b>Introduction</b> .....	<b>1</b>
Features.....	3
Getting Help.....	5
Calling for Repairs .....	5
<b>Overview</b> .....	<b>6</b>
Front Panel.....	6
Rear Panel.....	6
M-Card™.....	7
System Overview .....	8
PON Overview .....	8
Whole Home IP Video Customer Premises Network—Embedded MoCA BHR .....	9
MoCA .....	11
Multi-Room DVR .....	12
<b>Installation</b> .....	<b>13</b>
Whole Home IP Video Network Installation .....	13
Before You Begin.....	14
During the installation: .....	14
Checking the Home Coaxial Network Topology .....	15
Video Connection Options .....	16
Audio Connection Options .....	17
Clearing the Hard Drive .....	17
Connecting to the ONT.....	18
Connecting to the ONT with embedded MoCA.....	19
Connecting Homes with Multiple Existing Cable Drops .....	21
Connecting the Home Router.....	21
Connecting the Home Router - embedded MoCA ONT .....	21
Installation Overview .....	22
Cabling to an HDTV for Video .....	23
Cabling to an HDTV for Audio .....	24
Cabling to a High-Definition TV and an A/V Receiver for Video .....	25
Cabling to a High-Definition TV and an A/V Receiver for Audio .....	26
Cabling to a Standard-Definition TV .....	27
Cabling to a Standard-Definition TV, A/V Receiver and VCR.....	28
Data Device Connections.....	29
Verifying the MoCA Network .....	30



Operational Check for the Remote Control .....	30
Optimizing the High-Definition Settings .....	30
Graphics Overlaying the Video .....	33
<b>Diagnostics.....</b>	<b>34</b>
Using the Diagnostics.....	34
d01 General Status .....	35
d02 Purchase Status.....	38
d03 Out-Of-Band (OOB) Status .....	40
d04 In-Band Status .....	43
d05 Unit Address/Security .....	45
Separable Security .....	46
d06 Current Channel Status .....	48
d07 Upstream Status.....	51
d08 Code Modules .....	53
d09 Memory Configuration.....	56
d10 Audio/Video Status .....	57
d11 Interface/Port Status.....	60
d12 User Setting Status .....	63
d13 DVR/Hard Drive Status .....	65
d14 Application Specific Information .....	67
d15 Interactive Status.....	68
d16 Connected Home .....	70
d17 Key Pad / LED Test.....	72
<b>Troubleshooting .....</b>	<b>73</b>
IP Network Issues .....	76
Insufficient RF Network Throughput.....	76
Bypassing an Amplifier.....	77

## Tables

Table 1 – DVR Recording Time Guidelines.....	4
Table 2 – Front panel .....	6
Table 3 – Rear panel connections.....	7
Table 4 – Sample table listing signal levels and MAC Addresses .....	15
Table 5 – QIP7000 series video outputs.....	16
Table 6 – ONT1000M Connections .....	20
Table 7 – TX Data Rate .....	71
Table 8 – Troubleshooting Guidelines.....	73



## Figures

Figure 1 – QIP7232 Front and rear views.....	2
Figure 2 – QIP7100 Front and rear views.....	2
Figure 3 – QIP7232 front panel.....	6
Figure 4 – Rear panel.....	7
Figure 5 – PON overview.....	8
Figure 6 – Whole Home IP Video CPE overview.....	10
Figure 7 – MoCA RF spectrum.....	11
Figure 8 – Multi room DVR network.....	12
Figure 9 – Network with multi room DVR playback and additional set tops.....	12
Figure 10 – MoCA Set-Tops.....	13
Figure 11 – QIP Set-Top MAC Addresses.....	14
Figure 12 – Connecting to the ONT1000.....	18
Figure 13 – Connecting to the ONT1000M.....	19
Figure 14 – Cabling to an HDTV.....	23
Figure 15 – Cabling to an HDTV for Audio.....	24
Figure 16 – Cabling to an HDTV and A/V Receiver for Video.....	25
Figure 17 – Cabling to an HDTV and A/V Receiver.....	26
Figure 18 – Cabling to a Standard Definition stereo TV.....	27
Figure 19 – Cabling to a Standard Definition TV, A/V Receiver and VCR.....	28
Figure 20 – Sample data devices you can connect to the QIP7000 series.....	29
Figure 21 – Example of the front panel display for the main menu.....	34
Figure 22 – Example General Status display (no error).....	36
Figure 23 – Front panel display for Purchase Status diagnostic.....	38
Figure 24 – Front panel display for the OOB diagnostic.....	40
Figure 4-5 Front panel display for in-band diagnostic.....	43
Figure 25 – Front panel display for in band diagnostic.....	43
Figure 26 – Front panel display of a unit address.....	45
Figure 27 – Current channel status front panel displays.....	49
Figure 28 – Ethernet Return front panel display.....	51
Figure 29 – Front panel display for code modules.....	54
Figure 30 – Interactive status front panel display.....	68
Figure 31 – Using a diplexer to bypass a line amplifier.....	77



**1**

# Introduction

This manual provides instructions for cable operator personnel to install the Motorola QIP7000 series High-Definition Set-top. This unit includes a high-end processor, expanded memory, and enhanced graphics to support digital, on-demand, and interactive services. It provides a full complement of interconnection options.

The QIP7000 series provides advanced capabilities, including:

- Authorization and purchase of on-demand programming
- High-Definition television (HDTV) video decoding
- HDTV output through component video (YPbPr), High-Definition Multimedia Interface™ (HDMI™), or IEEE-1394
- Surround-sound audio through a variety of analog and digital interconnection options
- Dual-tuner DVR functionality on the QIP7200 to pause and time shift live video and seamlessly record in conjunction with the Interactive Programming Guide (IPG)
- Built-in MoCA
- Adaptability to various software platforms

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



Figure 1 – QIP7232 Front and rear views



Figure 2 – QIP7100 Front and rear views



## Features

### Tuners

- Two 54 to 864 MHz video tuners with digital video processor (Dual tuners available only with the QIP7200)
- One dedicated tuner for the out-of-band (OOB) control channel

### Standard Audio/Video Features

- ITU standard 64/256 QAM/FEC/enhanced adaptive equalizer
- CSA 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)
- Macrovision® copy protection
- High-Definition video output through:
  - HDMI (also compatible with DVI using an HDMI-to-DVI converter cable)
  - Component Video (YPbPr)
  - IEEE-1394
- Standard-Definition video output through:
  - S-Video
  - Baseband (Composite)
  - RF
- Audio output through:
  - Digital audio (S/PDIF) ATSC standard Dolby® Digital coaxial or optical
  - Baseband L/R

### Standard DVR Functionality (Only available with the QIP7232)

- DVR functionality integrated with the IPG enables subscribers to:
  - Pause, rewind, fast-forward, or record live TV
  - Maintain a personal recorded program library and access it using the IPG
  - Select programs to record across multiple channels and time slots
  - Rewind and replay recorded programs
  - Simultaneously watch two programs, switching easily between them using the swap key (Dependent upon program guide support and provided remote control)
  - Record a program in the background while viewing another live program



- Simultaneously record programs from two channels while watching a different pre-recorded program, with the ability to switch viewing between any of the three programs

Motorola cannot guarantee the exact amount of programming that each subscriber will be able to record. The approximate time depends on the programming type and the drive size:

**Table 1 – DVR Recording Time Guidelines**

Internal Drive Size	Estimated Recording Hours For:	
	Standard Digital Channels	HDTV Channels
160 GB	55 to 100	14 to 21
250 GB	80 to 150	20 to 30
320 GB	110 to 210	30 to 45
500 GB	175 to 222	45 to 73

All times are approximate. The actual hours a subscriber can record are a function of program bit rate, the IPG type, and the reserved buffer space.

### Standard Data Features

- 32 MB flash memory
- 256 MB SDRAM
- One rear and one front Universal Serial Bus (USB) 2.0 port (dual connector interface)
- 10/100 Mbps Ethernet Port (RJ-45)

### Standard Miscellaneous Features

- Switched AC accessory outlet
- Messaging capabilities
- Digital diagnostics
- Full feature access from front panel using a four-digit, seven-segment LED display



## Getting Help

If you need assistance with your Motorola product, contact the Motorola Technical Support Call Center (TSCC):

- Toll-free: 1 888 944 HELP (1 888 944 4357)
- Direct: 1 847 725 4011
- Motorola Online: <http://businessonline.motorola.com>

The TSCC is available 24 hours a day, 7 days a week, in addition, Motorola Online offers a technical documentation, repair status, shipping information and low priority issue creation/tracking. For specific Toll Free numbers when calling from outside of the United States please refer to your product manual or our web page.

## Calling for Repairs

If a Motorola 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

The front panel controls provide functional navigation if the remote control is lost or is temporarily out of service. Certain functions, such as those requiring a numeric entry, require a remote control. Some connectors are not enabled and require the support of application software.



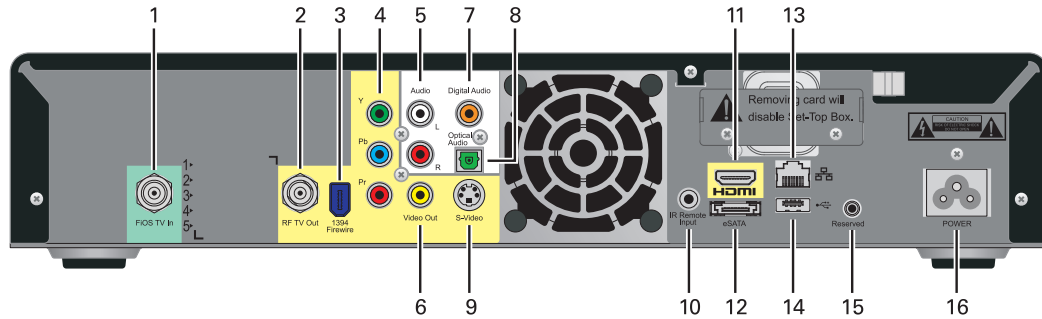
**Figure 3 – QIP7232 front panel**

**Table 2 – Front panel**

Label	Description
1	USB connector
2	Cursor — 4-way menu navigation
3	Display Panel —
4	Power — Turns the set-top on and off (standby)

### Rear Panel

The rear panel contains a switched power outlet; connectors for video, audio, and RF cabling; data output; and data interface connectors. Some connectors are not enabled and require the support of application software.



**Figure 4 – Rear panel**

**Table 3 – Rear panel connections**

Lable	Description
1	FiOS TV In — Connects to FiOS signal from your service provider
2	RF Out — Ch 3/4 modulated audio/video (SDTV) to TV or VCR
3	IEEE-1394 — Audio and video device connection
4	YPbPr — Component video output (HDTV)
5	Audio — Composite Audio L/R outputs
6	Video — Composite Video (SDTV) output
7	Digital Audio (RCA)* — Provides Dolby® Digital 5.1 audio or PCM output
8	Optical Audio (S/PDIF)* — Provides Dolby® Digital 5.1 audio or PCM output
9	S-Video — Connects to S-Video (SDTV) input of TV or VCR
10	IR Remote Input — Connects to a remote control set-top accessory cable
11	HDMI — High-Definition TV (HDTV) connector
12	eSATA* — External Serial ATA disk interface (QIP7200 Only)
13	Ethernet* — Network connection
14	USB* 2.0 — High-Speed peripheral device connection
15	Reserved – Service only
16	Power cord connector — switched accessory 2 prong AC outlet

*\*Feature is dependent upon application setting and availability in content*

## M-Card™

The M-Card is required to view television programs, previously recorded programs on the DVR, or interactive on-demand programs. The M-Card should not be removed.



## System Overview

This section introduces key concepts relevant to installing the Motorola Whole Home IP Video Network CPE. It describes:

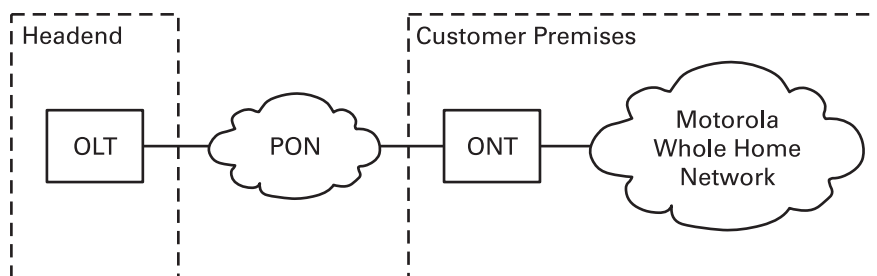
- The passive optical network (PON) connecting the customer premises to the headend
- The Motorola Whole Home IP Video Network that you install at the customer premises
- Multimedia Over Coax Alliance (MoCA) technology
- Multi-room DVR

The Motorola Whole Home IP Video Network connects to the fiber-to-the-premises (FTTP) passive optical network (PON). It uses MoCA technology to provide an integrated Ethernet, IP, and coaxial radio frequency (RF) network. This network enables the delivery of services such as interactive video, high-speed data, and IP telephony to residential and small-business customers using existing RF coaxial cabling.

## PON Overview

A passive optical network (PON) is a fiber optic network capable of carrying a high volume of traffic over a single fiber. The same fiber carries data:

- *Downstream* from the optical line terminator (OLT) at the headend to the optical network terminator (ONT) at the customer premises
- *Upstream* from the ONT back to the headend (also referred to as the return path)



**Figure 5 – PON overview**





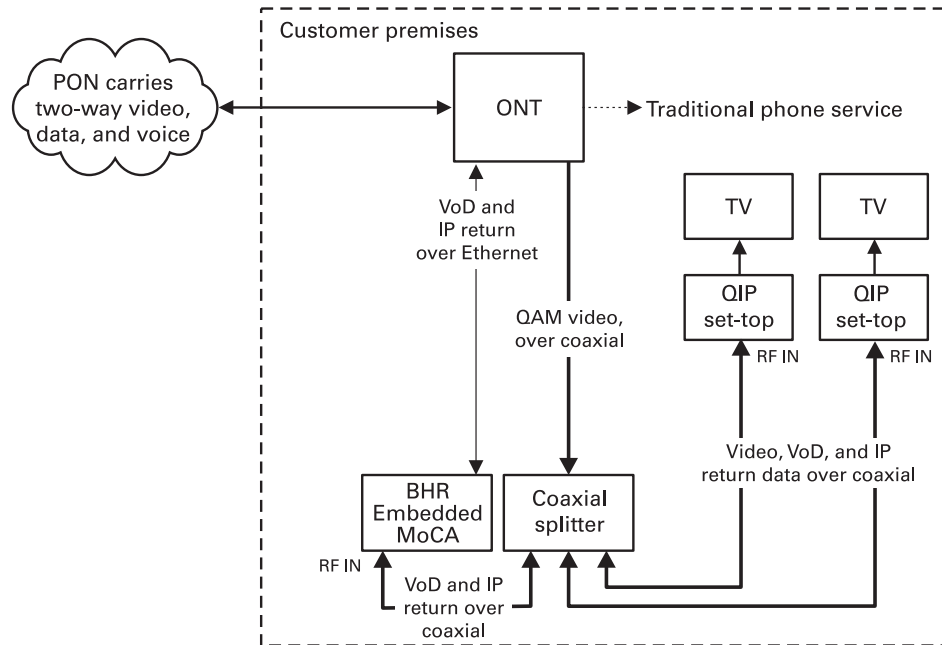
The FTTP PON carries the following services:

Service	Description
Two-way video service	<p>Video services include enhanced interactive services such as video on demand (VoD). Video is carried over the PON to the ONT and then over the in-home coaxial network. Digital and out-of-band (OOB) carriers are supported on the 50 to 862 MHz spectrum. Video traffic on the PON consists of:</p> <ul style="list-style-type: none"> <li>• Downstream digital standard- and high-definition television (HDTV) video services; for example, local broadcast channels, Disney®, ESPN®, and other services.</li> <li>• Downstream IP data; for example, streaming VoD channels.</li> <li>• Upstream IP data; for example, VoD purchase data.</li> <li>• The Motorola MediaCipher® conditional access system: <ul style="list-style-type: none"> <li>• Provides subscription, event, firmware download, and set-top terminal management</li> <li>• Performs real-time encryption for broadcast programs and pre-encryption for VoD content</li> <li>• Uses the OOB RF downstream channel for all control and management functions</li> </ul> </li> <li>• Standard and high-definition VoD services are delivered using constant bit rate MPEG-2 single program transport streams. The MPEG-2 video is transported in User Datagram Protocol (UDP) packets addressed to the set-top that are metered to avoid congestion. All return communication is through IP.</li> </ul>
High-speed data service	The PON provides data service using the same management infrastructure as digital subscriber loop (DSL) service.
Telephony	A separate private virtual circuit carries telephone service over the PON.

## Whole Home IP Video Customer Premises Network—Embedded MoCA BHR

The Motorola Whole Home IP Video Network carries the following over coaxial cable:

- Video QAM MPEG-2 encoded broadcast services over the full 50 to 864 MHz spectrum
- IP over coaxial for interactive traffic and VoD Streaming over the 1125 to 1525 MHz spectrum



**Figure 6 – Whole Home IP Video CPE overview**

The components include:

- Motorola or similar optical network
- Broadband Home Router (BHR) with embedded MoCA
- Motorola QAM/IP set-tops containing embedded MoCA technology:
- QIP7200 advanced digital set-top supporting HDTV and digital video recording (DVR)
- QIP7100 advanced digital set-top supporting HDTV
- QIP2500 core digital set-top supporting standard definition TV

You must connect the BHR to an RF coaxial splitter connecting to the coaxial cable wall outlets in the other rooms in the customer's premises.

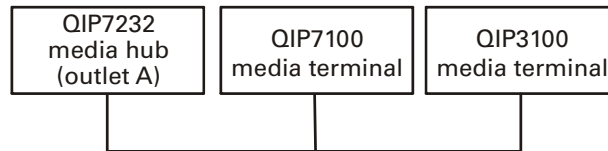




## Multi-Room DVR

Multi-room DVR enables the customer to simultaneously play back programs recorded on a QIP7232 media hub (server) on up to two connected QIP7100 or QIP3100 media terminals (clients). Service providers can enable multi-room DVR for all customers or provide multi-room DVR as an extra-cost option.

One QIP7232 media hub is required.

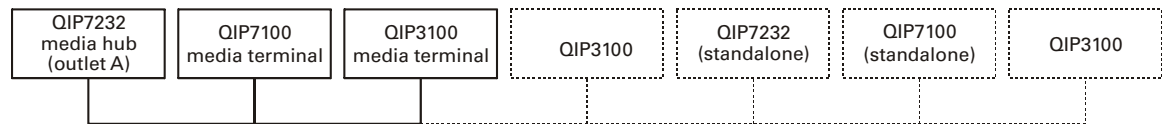


**Figure 8 – Multi room DVR network**

Viewers in the home can simultaneously:

- Record up to two programs
- View one recorded program on the TV connected to the media hub
- View a recorded program on the TVs connected to up to two media terminals

Any connected QIP7100 or QIP3100 can act as a media terminal, but only two can simultaneously play back content.



**Figure 9 – Network with multi room DVR playback and additional set tops**

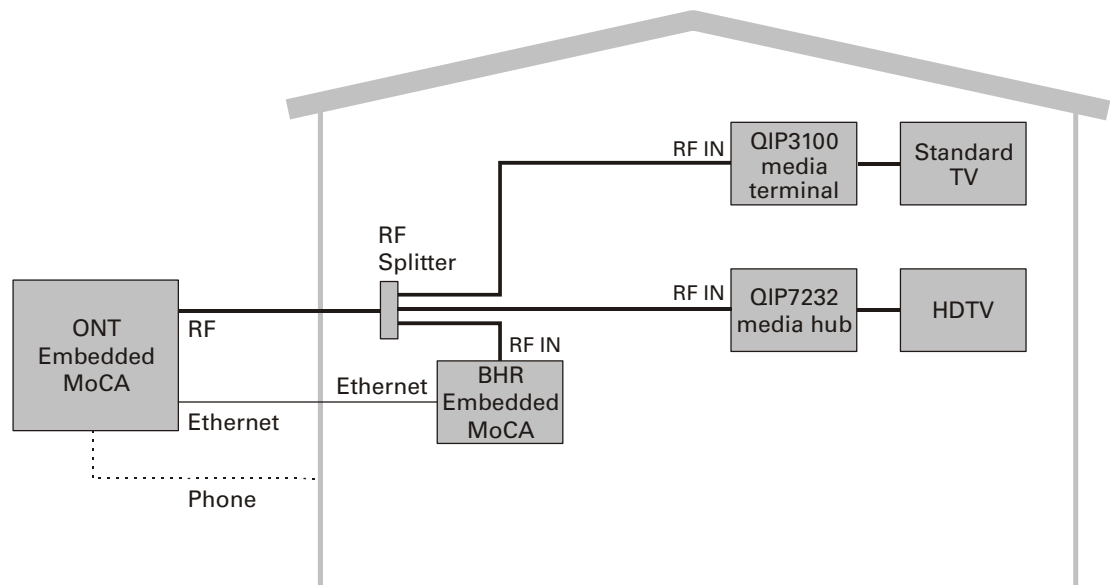


# 3

## Installation

### Whole Home IP Video Network Installation

This section provides instructions to connect the Motorola Whole Home IP Video Network.



**Figure 10 – MoCA Set-Tops**

**Note:** Always be sure to follow all of the [Important Safety Considerations](#).



## Before You Begin

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

- Be sure you have all required tools and equipment.
- Review the installation instructions.
- Check the home coaxial topology. Be sure no cable network or satellite dish is connected. Be sure there are no amplifiers that could interfere with the MoCA network. Determine the numbers and type of splitters used. Verify that the signal at each coaxial outlet you will use is in the range -10 to +10 dBmV. If necessary, replace or move amplifiers or splitters.
- Check the home entertainment system. Determine if you are connecting to a Standard-Definition (analog NTSC supporting RF input, Baseband Composite video, or S-Video) or a High-Definition TV (Component video, HDMI, DVI or IEEE 1394).
- Determine if the subscriber has other equipment to be connected to the terminal (Home Theater or A/V receiver, VCR, etc.). Verify that you have the necessary cables and other required items.
- If the customer ordered multi-room DVR, have the customer specify one QIP7200 as the media hub. Be sure you install the media hub before connecting any other set-tops.
- If the customer ordered a QIP7200 but did not order multi-room DVR, install the QIP7200 at the most likely media hub location before connecting the other set-tops.
- For the QIP7200 only, be sure all previously-recorded programs are [erased from the hard drive](#).
- From the labels on the bottom of each device, record the STB MAC address and serial number of each set-top.



**Figure 11 – QIP Set-Top MAC Addresses**

### During the installation:

1. Connect to the ONT.
2. [Connect the home router](#).
3. Connect the RF coaxial cable to the RF connector in on each set-top.
4. Connect the [A/V connections for each set-top](#) to the home theater equipment.



- After you finish connecting the components:
  1. Perform the [Operational Check for the Remote Control](#). Be sure regular and VoD channels display.
  2. [Optimize the high-definition settings](#).

## Checking the Home Coaxial Network Topology

This section assumes you are networking two or more QIP set-tops. Before you install the Motorola Whole Home IP Video Network hardware:

1. Create a table listing:
  - Every room where you plan to install a set-top
  - The signal levels you measured at the RF cable outlets
  - The HFC MAC Address on the label beneath the set-top used in that room

Optionally, you can include information such as the set-top type, serial numbers, and anything else you or the service provider considers useful.

**Table 4 – Sample table listing signal levels and MAC Addresses**

Room	Cable Outlet Signal Level	Set-Top MAC Address	Set-top Type	Serial Number
Router	-2 dBmV	001225xxxxxx	None	
Living room	-6 dBmV	001225xxxxxx	QIP7200	
Den	-8 dBmV	001225xxxxxx	QIP7100	
Master bedroom	-16 dBmV	001225xxxxxx	QIP2500	

2. Use your TV signal tester at the coaxial outlet where you will connect any MoCA set-top box and router. Verify that the signal level of the highest downstream digital channel frequency is between -10 and 10 dBmV. Record your readings in a table similar to Table 4-1. A signal level of +0 dBmV is ideal.

**Note:** If the signal level is less than -10 dBmV, you must correct the problem before installing the set-top.

3. If possible, determine whether there are one or more in-line coaxial RF amplifiers. If possible, move the existing amplifier to a position near the point of entry. See [Bypassing an Amplifier](#) in Section 5, [Troubleshooting](#).
4. If possible, determine how many splitters, and what kind, are in use. An older splitter, such as an old eight-way splitter, may have unacceptably high throughput loss. Replace any splitter cascades having a loss of 18 dB or more.



5. If the signal level at one or more coaxial outputs remains unacceptably low, the power loss may be caused by long coaxial cable runs using cable of insufficient quality. For example, a 330 ft (100 m) cable can reduce the power by 20 to 27 dB, depending on the cable quality. This results in a very low power level at the outlet of about -5 to -10 dBmV or lower. This loss, combined with loss from a splitter, causes marginal MoCA network performance.
6. If you make any changes to the network, repeat steps 1 and 2.

---

**CAUTION!** *Be sure all connections are properly secured. Poor F-connector fittings or poor grounding can cause ingress.*

---

## 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 QIP7000 series offers the following video outputs:

**Table 5 – QIP7000 series video outputs**

Connection Type	TV Type	Description
Component (YPbPr)	HDTV and SDTV	The YPbPr outputs provide component video, the most widely supported HD video connection.
HDMI or IEEE-1394	HDTV and SDTV	HDMI and IEEE-1394 offer higher quality HD video than component video. If the TV has an HDMI or a DVI input, use the HDMI output instead of the IEEE-1394 output. HDMI and IEEE-1394 are video and audio connections. If you use HDMI or IEEE-1394, no separate audio connection to the TV is required. HDMI is compatible with DVI. If the TV has a DVI input, you can use an HDMI-to-DVI converter cable or adapter to connect to the QIP7000 series HDMI connector. If you use IEEE-1394, on-screen graphics do not display.
S-Video	SDTV only	If the TV has an S-Video input, use S-Video. S-Video is the highest quality standard-definition video output on the QIP7000 series.
Video (composite)	SDTV only	If the TV does not have an S-Video input, use the composite video (video) output.
RF	SDTV only	If the TV only has a coaxial RF input, connect it to the QIP7000 series RF out connector.





## Audio Connection Options

When connecting to a home theater receiver, depending on its inputs, you can use the following QIP7000 series audio outputs:

Connection Type	Description
Digital audio optical (S/PDIF) or digital audio coaxial (RCA)	If the receiver supports it, use the digital audio optical (S/PDIF) or digital audio coaxial (RCA) audio output to deliver Dolby Digital audio to a Dolby Digital home theater receiver. Audio is available via HDMI and IEEE-1394 and no further audio connection is required. For RF output, no further audio connection is required.
Baseband Audio L and R	If the audio receiver does not support Dolby Digital, use the baseband AUDIO L and R outputs to connect to the audio receiver.

Connect the stereo audio cable to the AUDIO L and R connectors on the QIP7000 series and the audio left and right connectors on the TV. If the equipment supports it, use the optical S/PDIF or coaxial digital RCA output instead of the AUDIO L and R outputs. In most cases, these outputs offer better audio quality, including support for 5.1 Surround Sound. The cabling diagrams show sample audio/video (A/V) connections to an audio receiver, where the receiver functions as an A/V router.

When connecting to an audio receiver, reference its installation instructions for directions on connecting to baseband and digital (S/PDIF) audio ports.

**Note:** *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.)*

## Clearing the Hard Drive

On a previously-used cable terminal, delete all recorded programs from the hard drive before installing it at a new subscriber location. This prevents your new subscriber from viewing programming they may not have purchased or may not want to see.

To prevent subscribers from accidentally deleting all of their recorded programs, a specific set of keystrokes is required to clear the hard drive. Having a TV connected is optional.

To clear the hard drive:

1. Start the diagnostics as described in the [Diagnostics](#) section; *d01* is displayed on the front-panel display.
2. Using a remote control, within five seconds, press **REPLAY**, **MY DVR** three times, and **LIVE TV**. On some remote controls, the **MY DVR** key may be labeled **LIST**.
3. If you correctly enter this key sequence in five seconds or less, the hard drive is cleared and the front-panel displays *Clr*.
4. If *Clr* is not displayed, re-enter the key sequence in step 2.



5. If *Clr* is displayed, press any other key to reset the terminal and turn it off to complete the clearing process.

## Connecting to the ONT

If necessary, connect to the ONT to the home coaxial network. This example shows connecting the Motorola ONT1000 model which does not have embedded Multimedia over Coax Alliance (MoCA) technology.

---

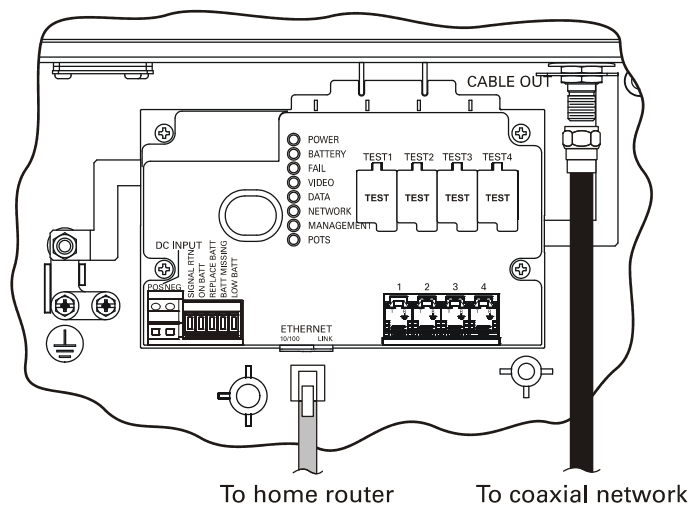
**CAUTION** *Be sure the coaxial cabling on the customer premises is not connected to any digital network or satellite dish.*

---

Determine how to route the coaxial and Ethernet cables from the ONT into the home. You may need to move an existing cable drop from its present location to where the ONT is mounted.

To connect to the Motorola ONT1000:

1. Open its door.
2. Connect the customer's premises coaxial cable wiring to the CABLE OUT port.
3. Connect the customer's premises Ethernet cabling to the ETHERNET port.
4. If necessary, route the coaxial and Ethernet cables into the house.
5. Close the ONT door and secure the ONT.



**Figure 12 – Connecting to the ONT1000**



## Connecting to the ONT with embedded MoCA

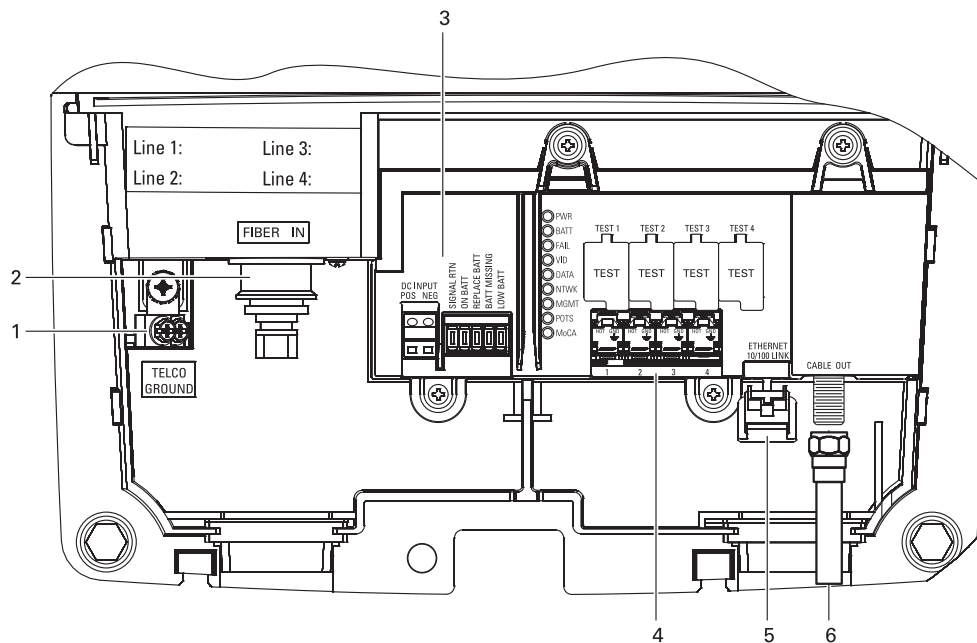
If necessary, connect to the ONT to the home coaxial network. This example shows connecting the Motorola ONT1000M with embedded Multimedia over Coax Alliance (MoCA) technology.

**CAUTION** Be sure the coaxial cabling on the customer premises is not connected to any digital network or satellite dish.

Determine how to route the coaxial and Ethernet cables from the ONT into the home. You may need to move an existing cable drop from its present location to where the ONT is mounted.

To connect to the Motorola ONT1000M:

- Open its door.
- Connect the customer's premises coaxial cable wiring to the CABLE OUT port.
- If necessary, route the coaxial cables into the house.
- Replace the lower half enclosure and secure the ONT1000M.



**Figure 13 – Connecting to the ONT1000M**

**Table 6 – ONT1000M Connections**

Key	Name	Description
1	Telco ground terminal	Connects the ONT1000M and the subscriber's telephone, data, and cable TV wiring networks to protective ground at the electrical service ground electrode.
2	Fiber in	OptiFit connector provides input to the ONT1000M from the PON network.
3	UPS input terminal strip	Connects the ONT1000M to an external Uninterruptible Power Supply (UPS), as follows: <ul style="list-style-type: none"> <li>• POS — connects to the +12 VDC output terminal on the external power supply (UPS).</li> <li>• NEG — connects to the –RTN output terminal on the external power supply (UPS).</li> <li>• Signal RTN — connects to the SIG RTN output terminal on the external power supply (UPS).</li> <li>• ON BATT — ONT1000M is operating off of the battery. Connects to the ON BATT terminal on the UPS.</li> <li>• REPLACE BATT — battery present but not operational. Connects to the BATT MISSING terminal on the UPS.</li> <li>• LOW BATT — battery low, needs changing. Connects to the LOW BATT terminal on the UPS.</li> <li>• Using a UPS is optional for a network-powered ONT1000M.</li> </ul>
4	Telephone terminal strip	Termination point for subscriber's telephone lines. These are insulation displacement type connectors (IDCs) and serve as input for four separate lines.
5	Ethernet connection	RJ-45 Ethernet high-speed data connection to the subscriber's computer.
6	Cable out	Cable TV output for distribution of video services to the customer premises.



## Connecting Homes with Multiple Existing Cable Drops

Some customer premises may have multiple coaxial inputs from one or more taps, typically entering different locations in the home. For the PON, it is practical to have one connection *only* per customer premises. You must use a splitter and cabling to connect any additional drops to the ONT. The routing will depend on the layout of the home and customer preference.

## Connecting the Home Router

To connect the home router:

Connect the Ethernet cable you routed from the ONT to one of the Ethernet ports on the home router.

Be sure the router is powered on.

Enable Dynamic Host Configuration Protocol (DHCP) on the router. Follow the instructions provided with the router.

## Connecting the Home Router - embedded MoCA ONT

To connect the home router:

Connect the coaxial cable you routed from the ONT to the coax/MoCA port on the home router.

Be sure the router is powered on.

Enable Dynamic Host Configuration Protocol (DHCP) on the router. Follow the instructions provided with the router.



## Installation Overview

1. Determine if you are connecting to a:

High-Definition TV or monitor	Use the component video (YPbPr), HDMI, or IEEE-1394 outputs. No other video connection supports HDTV. If the TV has no HDMI input but does have a DVI input, connect a DVI-to-HDMI adapter or cable to the HDMI out connector on the QIP set-top instead of the IEEE-1394 connection, and the DVI-HDTV connector on your TV.
Standard-Definition TV	Connect the S-Video connector using an S-video cable, or connect the composite video connector using a composite (RCA phono) cable. If the TV only has a coaxial RF input, connect it to the QIP7000 series RF OUT connector.

2. Determine if you are connecting the audio to a home theater receiver or directly to the TV:
  - For an HDMI or IEEE-1394 video connection, no additional audio connections to the TV are required.
  - For a DVI video connection, additional audio connections to the TV are required.
  - If the receiver or TV has a digital audio (S/PDIF) input, use the digital audio OPTICAL (S/PDIF) or COAXIAL (S/PDIF) outputs.
  - Otherwise, use the baseband left and right audio outputs.
3. Locate the cabling diagram(s) that best match the subscriber's configuration.
4. Connect the audio and video cables in a manner matching that diagram.
5. Determine if you are connecting to a data device (see Data Device Connections in this section). For installation details, refer to the 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.
8. Optimize the high-definition settings. See [Optimizing the High-Definition Settings](#) in this section.

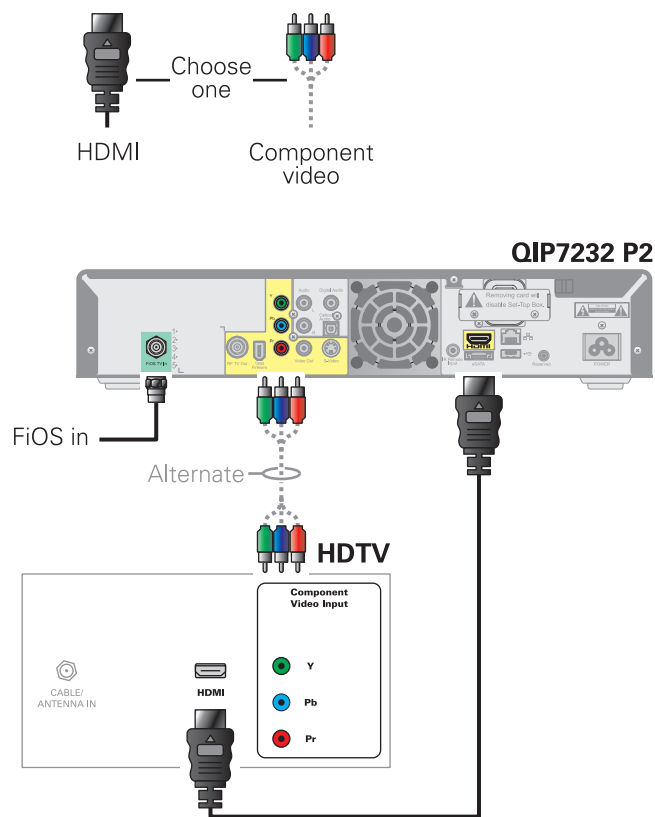


## Cabling to an HDTV for Video

For the best possible HDTV video quality:

1. If the TV has an HDMI input, connect it to the QIP7000 series HDMI output. If the TV has a DVI input, you can connect it to the QIP7000 series HDMI output using an HDMI-to-DVI converter cable or adapter.
  2. If the TV has neither an HDMI nor a DVI input but has an IEEE-1394 input, connect it to the QIP7000 series IEEE-1394 output. If you use IEEE-1394, on-screen graphics do not display.
  3. Otherwise, use the component video (Y, Pb, and Pr) connectors.
- L/R audio connection or digital audio S/PDIF connection is required for sound with component video.

**Note:** Be sure to match up each signal to the same connection on the TV. Otherwise, the colors will not appear correctly on your TV.



**Figure 14 – Cabling to an HDTV**

*Note:* Because HDMI provides both video and audio output, no additional audio connections to the TV are required.



## Cabling to an HDTV for Audio

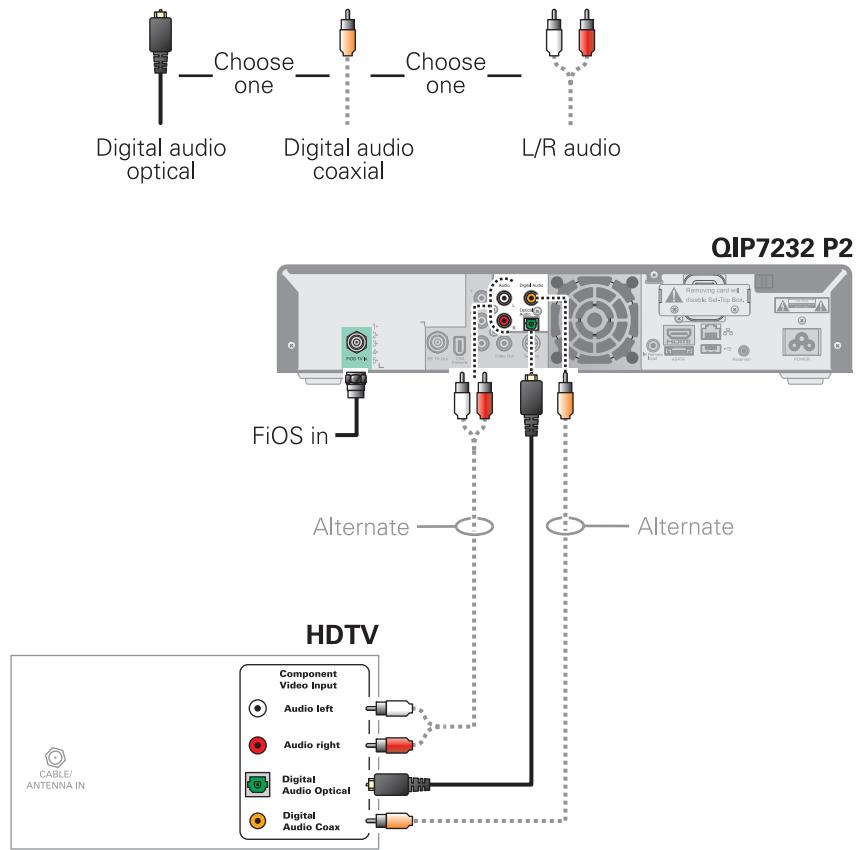
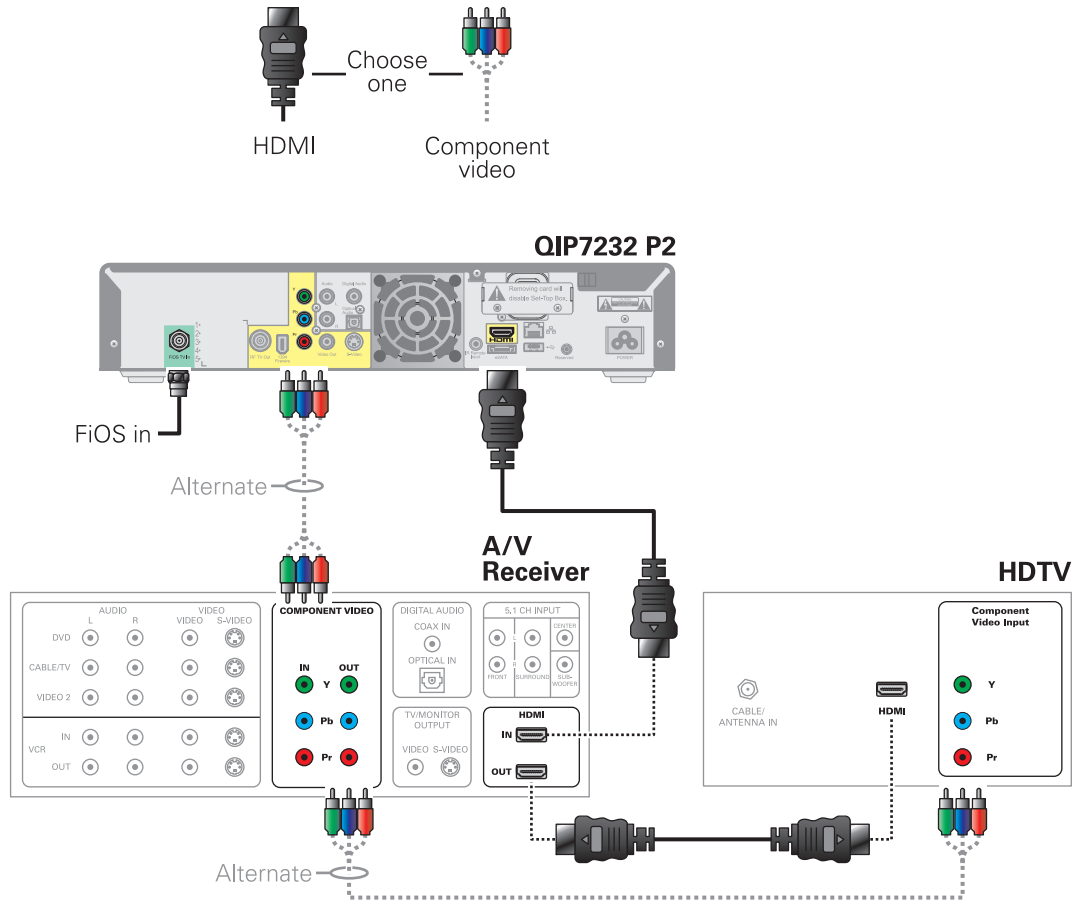


Figure 15 – Cabling to an HDTV for Audio





## Cabling to a High-Definition TV and an A/V Receiver for Video

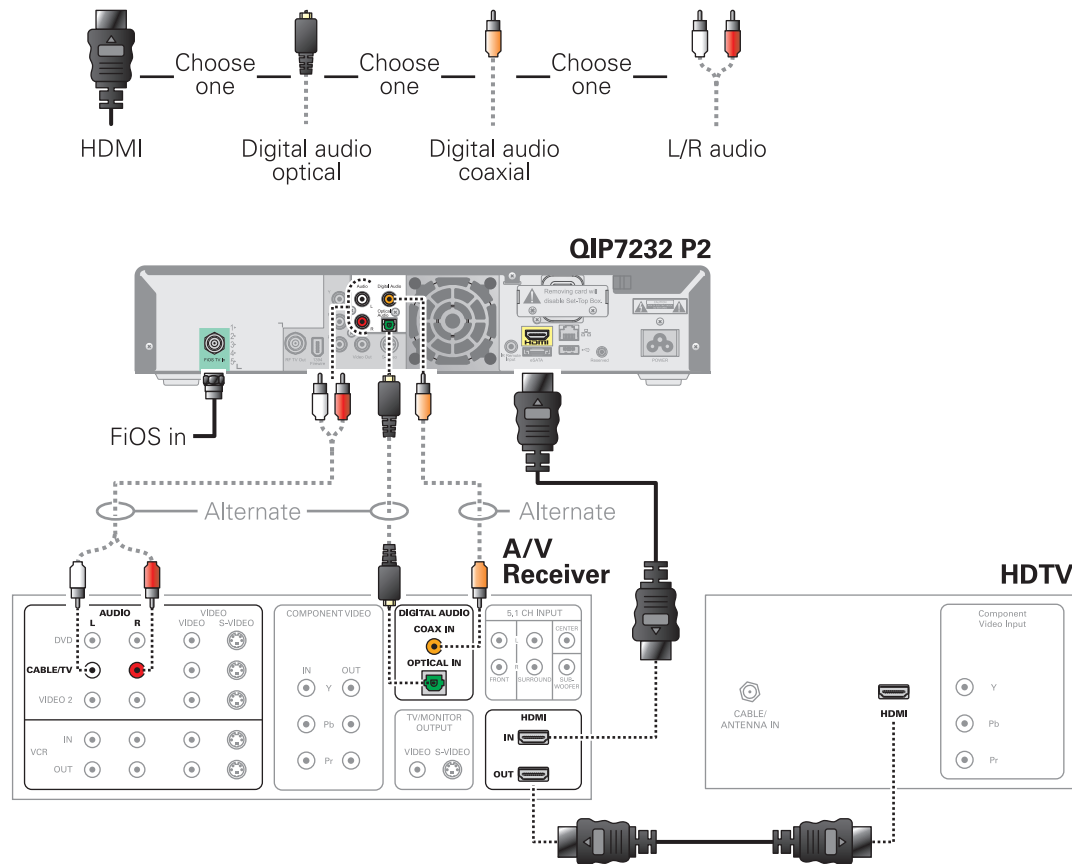


**Figure 16 – Cabling to an HDTV and A/V Receiver for Video**

*Note: If the A/V receiver includes an HDMI input & output, the QIP7000 series HDMI output can be connected directly to the A/V receiver. Because HDMI provides both video and audio output, no additional audio connections to the A/V Receiver and TV are required.*



## Cabling to a High-Definition TV and an A/V Receiver for Audio



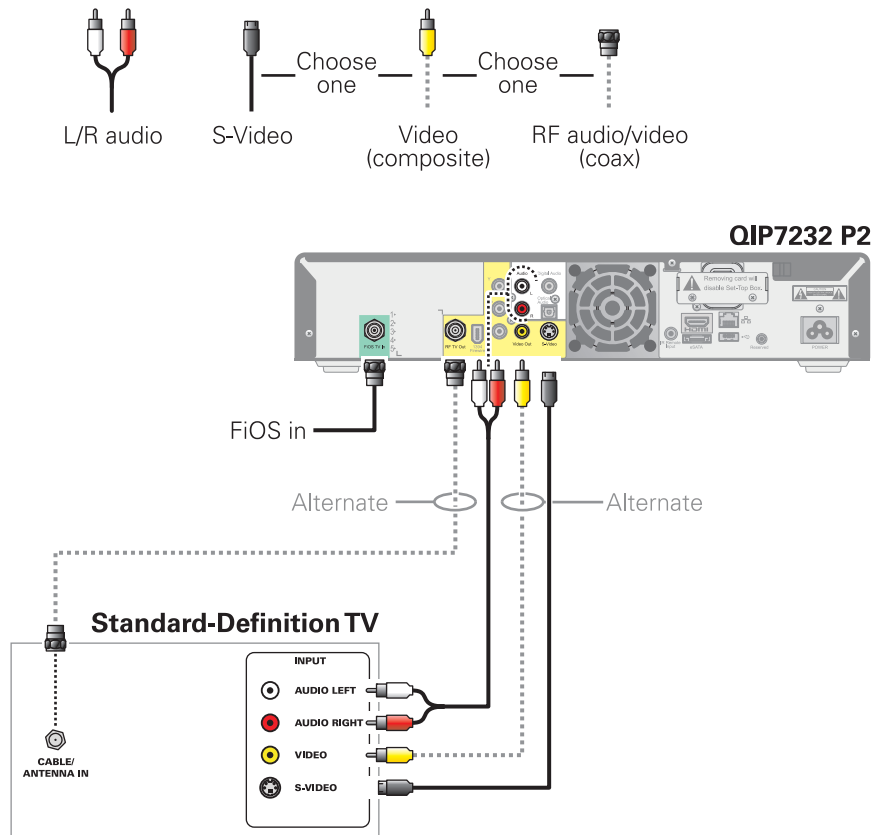
**Figure 17 – Cabling to an HDTV and A/V Receiver**

*Note: If the A/V receiver includes an HDMI input & output, the QIP7000 series HDMI output can be connected directly to the A/V receiver. Because HDMI provides both video and audio output, no additional audio connections to the A/V Receiver and TV are required.*

*Note: If the receiver can check the baseband and digital audio (S/PDIF) ports for appropriate channels, connect both the baseband and digital audio connections. Otherwise, do not connect both the baseband left/right composite connections and the coaxial digital connection. The baseband connections are not necessary because the digital audio port provides a single audio interface for digital and analog channels.*



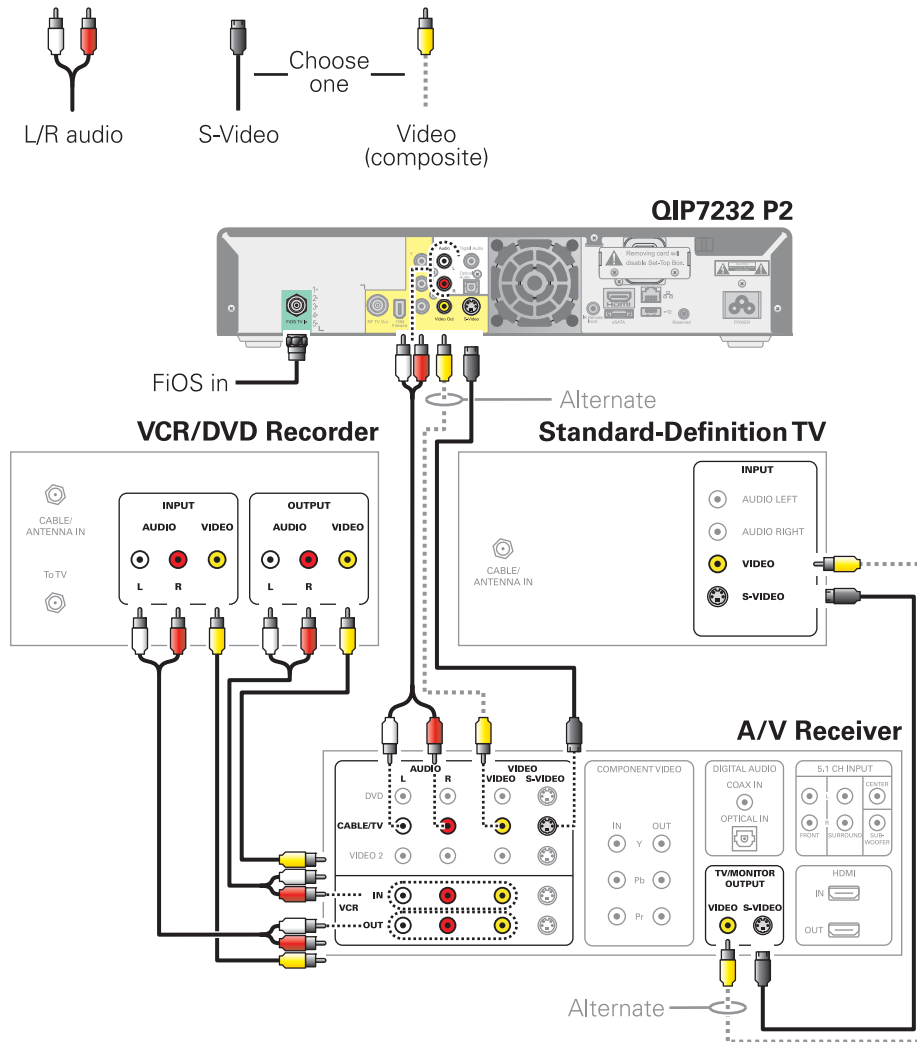
## Cabling to a Standard-Definition TV



**Figure 18 – Cabling to a Standard Definition stereo TV**



## Cabling to a Standard-Definition TV, A/V Receiver and VCR



**Figure 19 – Cabling to a Standard Definition TV, A/V Receiver and VCR**

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

*Note: This connection method does not support HDTV. For information, see Cabling to an HDTV for Video in this section.*



## Data Device Connections

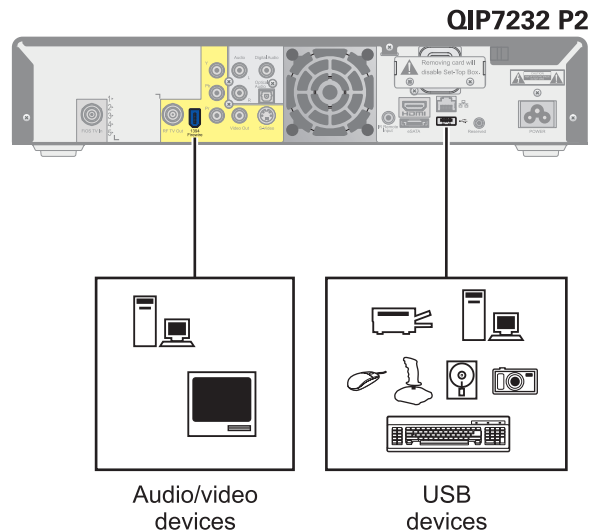
The QIP7000 series provides optional high-speed data services such as Internet access, USB, Ethernet, and more. The functionality of each data device port requires, and depends on, installed application software.

The QIP7000 series rear panel provides the following data ports:

Port type	Description
USB 2.0	Can be used to daisy-chain USB devices such as printers and storage devices, or to interface with keyboards, joysticks, and other USB PC peripherals
Ethernet	10/100 Mbps RJ-45 port
eSATA	Can be used to connect an external hard drive to increase DVR capacity (QIP7200 only)
IEEE-1394	Can be used to connect an MPEG-2 compatible display device

The QIP7000 series front panel provides:

Port type	Description
USB 2.0	Can be used in the same manner as the rear panel USB 2.0 port



**Figure 20 – Sample data devices you can connect to the QIP7000 series**



## Verifying the MoCA Network

To verify that the nodes are connected, check the rates on the Connected Home Status diagnostic (see [Troubleshooting](#)).

## Operational Check for the Remote Control

The operational check tests communication with the remote control:

Feature	Testing Procedure
Power on	Press <b>POWER</b> on the remote control to turn on the QIP7000 series. Tune to the output channel (3 or 4) if using the RF output.
Channel selection	Scan through the channels using the <b>CHANNEL +</b> or <b>-</b> keys. Tune to several channels by entering the channel number using the numeric keys.
Volume control	Press <b>VOLUME +</b> or <b>-</b> on the remote control to increase the volume to its upper limit, lowest level, and to a comfortable level. Press <b>MUTE</b> to turn the sound off. Press <b>MUTE</b> again to restore the sound.

If the QIP7000 series does not operate properly, refer to the [Troubleshooting](#) section.

## Optimizing the High-Definition Settings

This subsection describes how to optimize SD and HD video settings and closed captioning based on subscriber preferences.

Before you optimize the output settings:

1. Connect the QIP7000 series set-top to other home entertainment devices.
2. Plug the QIP7000 series set-top into a power outlet.
3. Initialize the QIP7000 series set-top and authorize services.
4. Turn the TV on.

**Note:** For an HDMI connection, be sure the TV is on and connected to the HDMI connector before adjusting the settings. Motorola recommends using HDMI cables less than 20 meters long.

To optimize the output settings:

1. Power off the QIP7000 series and then immediately press the **MENU** key on the front panel twice. If the TV is on, the on-screen menu lists the settings you can configure:



USER SETTING STATUS	
TV TYPE:	16:9
YPbPr OUTPUT	1080i
4:3 OVERRIDE	480i
CLOSED CAPTION	DISABLED
SERVICE SELECTION	
ANALOG	CC1
DIGITAL	PRIMARY LANG
FONT SIZE	AUTO
FONT STYLE	AUTO
FONT COLOR	AUTO
FONT OPACITY	AUTO
FONT EDGE TYPE	AUTO
FONT EDGE COLOR	AUTO
BACKGROUND COLOR	AUTO
BACKGROUND OPACITY	AUTO
SETTINGS	AUTO

Use the remote control or the cursor keys on the front panel to navigate the on-screen menus:

- Press the ▲ and ▼ keys to highlight the setting you wish to change.
- Press the ► key to select an option.
- To exit the setting and move to another setting, press the ▲ or ▼ key.
- To exit the menu and save your settings, press the power or menu key.

If the User Settings menu does not display on the HDTV screen, the TV may not support the default video output setting. Use the front panel display to adjust the settings as described in “There is no video on the TV screen” in the [Troubleshooting](#) section.

The User Settings menu options are:

Setting	Description
TV Type	<p>Allows you to specify the style of television connected to the QIP set-top. Options include 16:9, 4:3 LETTERBOX, and 4:3 PAN SCAN. By default, the 16:9 option is selected. The options are used as follows:</p> <ul style="list-style-type: none"> <li>• 16:9 designates that a widescreen television is connected to the QIP set-top.</li> <li>• 4:3 LETTERBOX designates that a standard screen television is connected to the QIP set-top and that widescreen programs should be scaled to fit the screen with black bars above and below the picture.</li> <li>• 4:3 PAN SCAN designates that a standard screen television is connected to the QIP set-top and that widescreen programs should be cropped so that the picture fills the entire screen.</li> </ul>
HDMI/YPbPr Output	<p>Allows you to specify the video output format of the QIP set-top for all content (when the 4:3 override setting is Off) or for all 480p, 720p, and 1080i content (when the 4:3 override is used). Options include 1080i, 720p, 480p, and 480i. By default, the 1080i option is selected. The options are used as follows:</p> <ul style="list-style-type: none"> <li>• 1080i — The QIP set-top will present programs in the High-Definition 1080i format (1920 x 1080 pixels).</li> <li>• 720p — The QIP set-top will present programs in the High-Definition 720p format (1280 x 720 pixels).</li> <li>• 480p — The QIP set-top will present programs in the Enhanced-Definition 480p format (720 x 480 pixels).</li> <li>• 480i — The QIP set-top will present programs in the Standard-Definition 480i format (720 x 480 pixels).</li> </ul>



Setting	Description
	<p>Some televisions may only support certain video formats. Please consult your television's user manual for more information on format compatibility.</p> <p>The QIP set-top can detect when the HDMI connection is in use. If you are not using the HDMI connection on the QIP set-top, the HDMI/YPbPr Output setting will display as YPbPr Output in the User Settings Menu.</p>
4:3 Override	<p>The 4:3 Override setting allows you to specify the video output format of the QIP set-top when it is tuned to a standard-definition program or playing back a standard-definition program from the DVR. Options include 480i, 480p, Stretch, and Off. By default, the 480i option is selected. The options are used as follows:</p> <ul style="list-style-type: none"> <li>• 480i — The QIP set-top will present standard-definition programs in the Standard-Definition 480i format (720 x 480 pixels).</li> <li>• 480p — The QIP set-top will present standard-definition programs in the Enhanced-Definition 480p format (720 x 480 pixels).</li> <li>• Stretch — The QIP set-top will automatically stretch all standard-definition programs to a widescreen aspect ratio and present the video in the format designated by the HDMI/YPbPr Output setting. Note that the Stretch option is only available when the TV Type setting is 16:9.</li> <li>• Off — The QIP will create a widescreen version of a standard-definition program by adding black bars to the left and the right of the picture and present the video in the format designated by the HDMI/YPbPr Output setting.</li> </ul> <p>Some televisions may only support certain video formats. Please consult your television's user manual for more information on format compatibility.</p> <p>If the HDMI/YPbPr Output setting is 480i, the 4:3 Override feature is disabled and is no longer selectable in the menu. The 4:3 Override feature is available when the HDMI/YPbPr Output setting is 1080i, 720p, or 480p.</p>
Closed Caption	Turns closed captions off or on. The front panel display indicates the status of the closed captions. Defaults to DISABLED. Options are ENABLED or DISABLED.
Service Selection	Sets the service used for closed captions: Digital: PRIMARY LANGUAGE, SECONDARY LANGUAGE, 3, 4, 5, or 6. The default is PRIMARY LANGUAGE.
Font Size	Sets the font size for closed captions. Defaults to AUTO. Options are AUTO, STANDARD, LARGE, or SMALL.
Font Style	Sets the font style for closed captions. Defaults to AUTO. Options are AUTO, MONO SERIF, PROPORTION SERIF, MONO NO SERIF, PROPORTION NO SERIF, CASUAL, CURSIVE, or SMALL.
Font Color	Sets the font color. Defaults to AUTO. Options are AUTO, WHITE, BLACK, RED, GREEN, BLUE, YELLOW, MAGENTA, or CYAN.
Font Opacity	Sets the opacity. Defaults to AUTO. Options are AUTO, TRANSPARENT, TRANSLUCENT, SOLID, or FLASHING.
Font Edge Type	Sets the edge appearance — AUTO, NONE, RAISED, DEPRESSED, UNIFORM, LEFT SHADOWED, or RIGHT SHADOWED. The default is AUTO.
Font Edge Color	Sets the edge color — AUTO, WHITE, BLACK, RED, GREEN, BLUE, YELLOW, MAGENTA, or CYAN. The default is AUTO.
Background Color	Sets the background color for closed captions. Defaults to AUTO. Options are AUTO, WHITE, BLACK, RED, GREEN, BLUE, YELLOW, MAGENTA, or CYAN.
Background Opacity	Sets the background opacity for closed captions. Defaults to AUTO. Options are AUTO, TRANSPARENT, TRANSLUCENT, SOLID, or FLASHING.
Settings	Sets the default settings for closed captions (AUTO) or the settings you have





Setting	Description
	configured (USER). Defaults to AUTO. Options are AUTO or USER.
Restore All Defaults	To reset all User Settings to their defaults, select this option and press the ► key.

## Graphics Overlaying the Video

The QIP7000 series can generate graphics that overlay the video programming or fill the entire television screen. Common examples include on-screen menus (such as the User Setting menu), closed captions, and IPG. The QIP7000 series overlays these graphics whenever you open a menu, enable closed captions, or scroll through a program grid. On-screen graphics are available for all QIP7000 series video outputs except IEEE-1394.



# 4

## Diagnostics

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

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

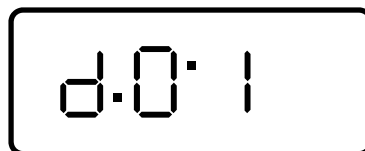
For the diagnostics described in this section:

- All indicators are in decimal notation, unless otherwise noted
- All signal-level and quality indicators use a 1% to 100% scale, unless otherwise noted
- All sample displays are illustrative; actual data may differ from the examples

### Using the Diagnostics

To use the diagnostics:

1. Ensure that the QIP7000 series is installed with the Thin Client software and that it is connected to an AC outlet.
2. Press power and immediately press select to enable diagnostic mode. The Diagnostics main menu is displayed on the OSD and "d01" is displayed on the front-panel display.



**Figure 21 – Example of the front panel display for the main menu**

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

1. Press channel ▲, channel ▼, cursor ▲, or cursor ▼ to select d01 through E.
2. Press cursor ◀, cursor ▶, select or enter to execute the selected diagnostic.
3. Select E from the main menu or press power to exit.



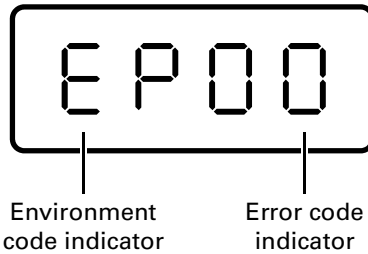
## d01 General Status

This diagnostic displays system status information on the OSD and front panel. The information is updated each time the diagnostic is displayed.

```
DIAGNOSTICS
> d01 GENERAL STATUS
d02 PURCHASE/POLL STATUS
d03 OOB STATUS
d04 INBAND STATUS
d05 UNIT ADDRESS/SECURITY
d06 CURRENT CHANNEL STATUS
d07 UPSTREAM STATUS
d08 CODE MODULES
d09 MEMORY CONFIG
d10 AUDIO/VIDEO STATUS
d11 INTERFACE/PORT STATUS
d12 USER SETTING STATUS
d13 DVR/HDD STATUS
d14 APPLICATION SPECIFIC INFORMATION
d15 INTERACTIVE STATUS
d16 CONNECTED HOME
d17 KEYPAD/LED
E EXIT
```



```
GENERAL STATUS  
ERROR:          EPO0 N/A      CSA  
CONNECTED/DISCONNECTED:  
PLATFORM ID:    0x0200  
MAPPED PLATFORMID: 0x0150  
FAMILY ID:      0x0015  
MODEL ID:       0xA730  
REMOD CHANNEL:  03  
SETTOP TIME:    N/A  
DST ACTIVE:     N/A  
TIME ZONE:      N/A  
DST ENTRY TIME: N/A  
DST EXIT TIME:  N/A  
CURRENT GPS TIME: N/A  
COUNTRY CODE:  N/A
```



**Figure 22 – Example General Status display (no error)**



The General Status fields are:

Field	Description																										
Error	Error codes display on the front panel and OSD when an error occurs. If multiple errors occur, the last recorded error is displayed:																										
	<table border="1"> <thead> <tr> <th>Error Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>EP00</td> <td>No error</td> </tr> <tr> <td>EP01</td> <td>Not connected</td> </tr> <tr> <td>EP03</td> <td>DRAM error</td> </tr> <tr> <td>EP04</td> <td>SRAM error</td> </tr> <tr> <td>EP07</td> <td>ROM verification failure</td> </tr> <tr> <td>EP08</td> <td>RAM test failure</td> </tr> <tr> <td>EP09</td> <td>Battery test failure</td> </tr> <tr> <td>EP11</td> <td>Invalid unit address</td> </tr> <tr> <td>EP12</td> <td>Power on self test failure</td> </tr> <tr> <td>EP14</td> <td>GITV startup failure</td> </tr> <tr> <td>EP15</td> <td>TSI structure corrupt</td> </tr> <tr> <td>EP18</td> <td>Driver initialization failure</td> </tr> </tbody> </table>	Error Code	Description	EP00	No error	EP01	Not connected	EP03	DRAM error	EP04	SRAM error	EP07	ROM verification failure	EP08	RAM test failure	EP09	Battery test failure	EP11	Invalid unit address	EP12	Power on self test failure	EP14	GITV startup failure	EP15	TSI structure corrupt	EP18	Driver initialization failure
Error Code	Description																										
EP00	No error																										
EP01	Not connected																										
EP03	DRAM error																										
EP04	SRAM error																										
EP07	ROM verification failure																										
EP08	RAM test failure																										
EP09	Battery test failure																										
EP11	Invalid unit address																										
EP12	Power on self test failure																										
EP14	GITV startup failure																										
EP15	TSI structure corrupt																										
EP18	Driver initialization failure																										
Connected State	A QIP-operations connect or disconnect message determines whether the QIP7000 series is CONNECTED or DISCONNECTED.																										
Platform ID	A unique, 16-bit hexadecimal number that identifies the platform image (also called the ROM ID).																										
Family ID	The manufacturer and product family, in hexadecimal.																										
Model ID	The model, in hexadecimal.																										
Remod Chan	The interface to the subscriber TV; channel 3 or 4 in the USA.																										
Set-top Time	The current OOB time displayed in global positioning system (GPS) seconds from Jan 6, 1980. It is an integer from 0 to 4294967295.																										
Decryption Mode	Indicates secure processor decrypt scheme: <ul style="list-style-type: none"> <li>• CSA — connect scrambler algorithm</li> <li>• DES — Data Encryption Standard</li> </ul>																										



## d02 Purchase Status

This diagnostic displays the status of subscriber event purchases on the OSD and front panel. The displays are updated each time this diagnostic is viewed:

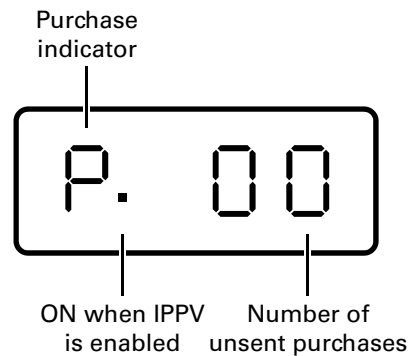
```

                                PURCHASE/POLL STATUS
PURCHASES:
UNSENT:           00
UNACK:            00
LAST SEQ NUM:    0000
LAST RB TIME:    Jan 01 1970 00:00:00

IPPV STATUS:     DISABLED
LAST POLL STATUS
PREP CMD:        0      N/A
PREP ACK:        0      N/A
POLL REQ:        0      Jan 01 1970 00:00:00
POLL ACK:        0      Jan 01 1970 00:00:00

STACK LIMIT:    00000010
SHOW COUNT:    00000000
CREDIT TOTAL:   0000010000
DEBIT TOTAL:    0000000000

```



**Figure 23 – Front panel display for Purchase Status diagnostic**



The Purchase Status fields are:

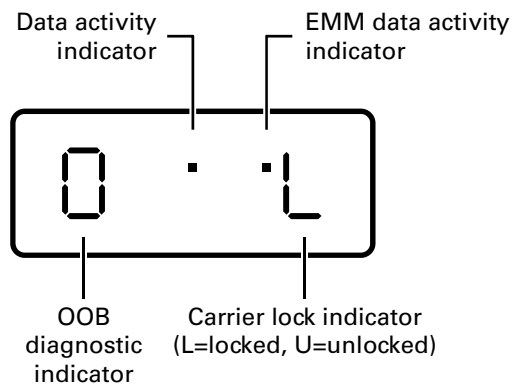
Field	Description
Unsent	The number of purchases in the QIP remaining to be polled. It can be an integer from 0 to 63.
Unack	The number of reports that have not been acknowledged by the controller. It is an integer.
Last Seq Num	The last acknowledged sequence number of a purchase sent by the controller. It is a 16-bit, unsigned hexadecimal number.
Last RB Time	The last time the QIP7000 series attempted to report back purchases to the controller, in GPS seconds.
IPPV Status	If IPPV is enabled, the IPPV status indicator is on. If IPPV is disabled, the IPPV status indicator is off.
Prep CMD	"Last Prepare for Poll Command" sequence number and time of the last prepare for poll request command that was sent by the controller. Note that each requesting process maintains an independent sequence of poll requests to uniquely identify the poll responses.
Prep ACK	"Last Prepare for Poll Acknowledge" sequence number and time of the last Report Purchase request sent by the controller.
Poll Request	Sequence number and time of the last send poll buffer command that was sent by the controller.
Poll Acknowledge	Sequence number and time of the last Poll Acknowledge message sent by the controller.
Stack Unit	Unit used in purchase processing.
Show Count	Count used in purchase processing.
Credit Total	Credit used for purchase processing.
Debit Total	Debit used for purchase processing.



## d03 Out-Of-Band (OOB) Status

This diagnostic indicates the out-of-band control channel status. The information is updated every five seconds.

OOB STATUS		
OOB FREQUENCY:	075.25 MHz	
CARRIER LOCK:	NO	
DATA:	NO	
EMM DATA:	NO	
SNR:	00.0 dB	INVALID
AGC:	0 %	INVALID
EMM PROVIDER ID:	0x0003	
EMM PID:	0x1FFF	
NETWORK PID:	0x1FFF	
HUNT MODE:	Hunted	
LKC:	075.25 MHz	
MAN FREQ:		



**Figure 24 – Front panel display for the OOB diagnostic**





The Out-Of-Band Status fields are:

Field	Description									
OOB Frequency	Indicates the OOB tuner center frequency, from 70 to 130 MHz.									
Carrier Lock	Indicates whether the OOB receiver is locked to the carrier:									
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Front Panel</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>YES</td> <td>L</td> <td>Carrier locked</td> </tr> <tr> <td>NO</td> <td>U</td> <td>Carrier unlocked</td> </tr> </tbody> </table>	OSD	Front Panel	Description	YES	L	Carrier locked	NO	U	Carrier unlocked
OSD	Front Panel	Description								
YES	L	Carrier locked								
NO	U	Carrier unlocked								
Data	Indicates whether data is being carried by the OOB and EMM traffic, which is tracked separately:									
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Front Panel</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>YES</td> <td>On</td> <td>OOB data detected within last 5 seconds</td> </tr> <tr> <td>NO</td> <td>Off</td> <td>OOB data not detected within last 5 seconds</td> </tr> </tbody> </table>	OSD	Front Panel	Description	YES	On	OOB data detected within last 5 seconds	NO	Off	OOB data not detected within last 5 seconds
OSD	Front Panel	Description								
YES	On	OOB data detected within last 5 seconds								
NO	Off	OOB data not detected within last 5 seconds								
EMM Data	Indicates whether EMM data is being carried on the OOB stream:									
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Front Panel</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>YES</td> <td>On</td> <td>EMM data detected within last 5 seconds</td> </tr> <tr> <td>NO</td> <td>Off</td> <td>EMM data not detected within last 5 seconds</td> </tr> </tbody> </table>	OSD	Front Panel	Description	YES	On	EMM data detected within last 5 seconds	NO	Off	EMM data not detected within last 5 seconds
OSD	Front Panel	Description								
YES	On	EMM data detected within last 5 seconds								
NO	Off	EMM data not detected within last 5 seconds								
SNR	<p>When carrier lock has been established, displays an estimate of the carrier signal-to-noise ratio in dB, with an explanation:</p> <ul style="list-style-type: none"> <li>• GOOD — Good value</li> <li>• FAIR — Marginal signal level, check the signal</li> <li>• POOR — Unusable signal</li> <li>• INVALID — Invalid SNR value</li> </ul>									
AGC	<p>When carrier lock has been established, displays an estimate of the AGC as a percentage, with an explanation:</p> <ul style="list-style-type: none"> <li>• GOOD — Good value</li> <li>• FAIR — Marginal signal level, check the signal</li> <li>• POOR — Unusable signal</li> <li>• INVALID — Invalid AGC value</li> </ul>									
EMM Provider ID	Displays the conditional access stream for the QIP7000 series, in hexadecimal.									
EMM PID	Displays the packet identifier (PID) stream the QIP7000 series tunes to for EMM data, in hexadecimal.									
Network PID	Displays the network PID to which the QIP7000 series is tuned to receive network messages, in hexadecimal.									
Hunt Mode	The hunt mode includes Hunted, None, Round Robin (RR), Search (SRCH), Fixed Frequency (FIX), or EMM Provider ID (EMM).									
LKC	<p>The last known carrier is the last valid OOB frequency displayed in MHz and ranges from 70 to 130 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.</p> <p>LKC will remain blank during hunting if a valid carrier has not been found, and will be populated once a valid OOB is found.</p>									
Man Pag	Only displayed when QIP7000 series is not hunting and the operator presses "menu" button. The operator can then scroll up or down to one of the specific OOB frequencies.									



## Agile OOB Tuner Hunting

An OOB frequency can be selected manually by pressing the **MENU** button while in the OOB Status diagnostics screen. 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. when the set-top is hunting, the ability to press the Menu button on the OOB status screen to display MAN FREQ is not available.

## Summary of Manual 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 MAN 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 MAN 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.

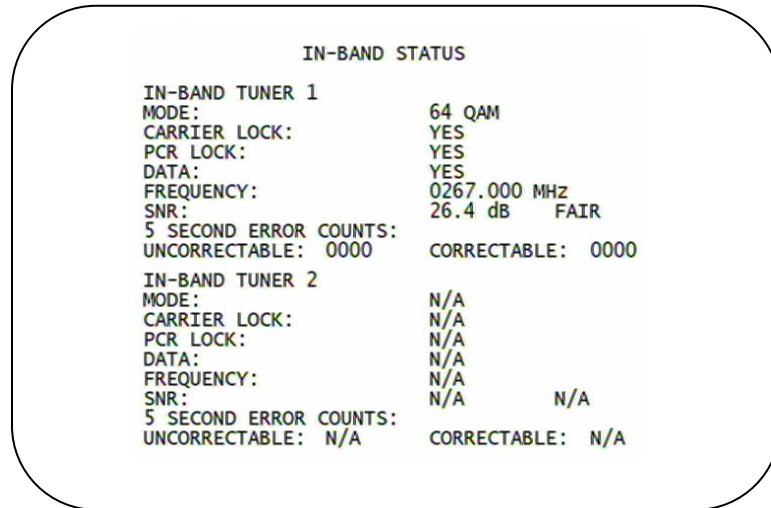
1. When in the OOB Receiver Status Diagnostic, press the **MENU** button to enter the frequency selection mode. The frequency of the last known carrier is displayed on the Front Panel. The OSD displays a new "MAN FREQ" line at the bottom of the screen, which indicates the last known carrier frequency. At this point, if desired, the frequency change mode can be exited by pressing the **MENU** key a second time.
2. 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 Front Panel and on the "MAN FREQ" line of the OSD. When the last known frequency is selected, a DOT will appear in the middle-upper part of the Front Panel.
3. When the desired new frequency has been selected, press the **SELECT** key to start the search. The manual frequency search will last up to 40 seconds. As the set-top searches, the frequency being searched for will flash on the front panel. On the OSD, the "MAN FREQ" line of text will be cleared, the "HUNT MODE" will display "FIX" to indicate a search on a fixed frequency, and the "OOB FREQ" field will change to the frequency being searched for.
4. If the frequency is found with the proper EMM Provider ID, then the front panel will display the normal OOB receiver status. 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.
6. TO ABORT A Search without waiting the 40 seconds, the **POWER** key can be pressed to cause an immediate warm reset.

**Note:** The front panel will display "hunt" after a cold reset from the front panel. This indicates that the product is in a Round Robin Hunt Mode. The message "hunt" will continue to be displayed until the proper stream is detected.

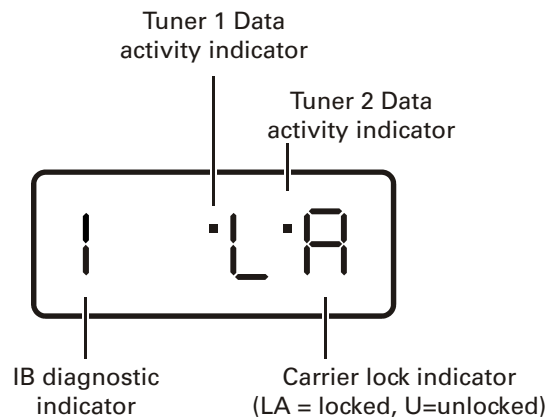


## d04 In-Band Status

This diagnostic displays the in-band status for the last attempted tuned channel. The information is updated every 5 seconds.



**Figure 4-5 Front panel display for in-band diagnostic**



**Figure 25 – Front panel display for in band diagnostic**



The In-Band Status fields are:

Field	Description									
Mode	The values displayed on the OSD are: <ul style="list-style-type: none"> <li>• 64 QAM — 64 QAM digital channel</li> <li>• 256 QAM — 256 QAM digital channel</li> </ul>									
Carrier Lock	Indicates whether the in-band receiver is locked to the carrier. If a digital carrier is not present, it indicates the carrier is not locked: <table border="1"> <thead> <tr> <th>OSD</th> <th>Front Panel</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>YES</td> <td>L</td> <td>Carrier locked</td> </tr> <tr> <td>NO</td> <td>U</td> <td>Carrier not locked</td> </tr> </tbody> </table>	OSD	Front Panel	Description	YES	L	Carrier locked	NO	U	Carrier not locked
OSD	Front Panel	Description								
YES	L	Carrier locked								
NO	U	Carrier not locked								
PCR Lock	Indicates whether the in-band receiver is locked to the current program clock reference for a digital video service on the specified tuner. If a digital carrier is not present, it indicates the PCR is not locked.									
Data	Indicates whether data is being carried 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>Front Panel</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>YES</td> <td>On</td> <td>In-band data detected within last 5 seconds</td> </tr> <tr> <td>NO</td> <td>Off</td> <td>In-band data not detected within last 5 seconds</td> </tr> </tbody> </table>	OSD	Front Panel	Description	YES	On	In-band data detected within last 5 seconds	NO	Off	In-band data not detected within last 5 seconds
OSD	Front Panel	Description								
YES	On	In-band data detected within last 5 seconds								
NO	Off	In-band data not detected within last 5 seconds								
Frequency	The in-band frequency is center RF carrier frequency tuned for the digital service on the specified tuner. The frequency is displayed in MHz in xxxx.xxx format and ranges from 54 to 860 MHz.									
SNR	When carrier lock has been established, displays an estimate of the carrier signal-to-noise ratio in dB, with an explanation: <ul style="list-style-type: none"> <li>• GOOD — Good value</li> <li>• FAIR — Marginal signal level, check the signal</li> <li>• POOR — Unusable signal</li> <li>• INVALID — Invalid SNR value</li> </ul>									
5 Second Error Counts	Indicates the number of correctable and uncorrectable digital multiplex errors, up to 9999. It is updated every 5 seconds and reset each time the QIP7000 series is power cycled or another digital multiplex is tuned. The maximum value displayed is 9999, even if there were more than 9999 errors.									



## d05 Unit Address/Security

This diagnostic displays the unit address of the CableCARD, if inserted:

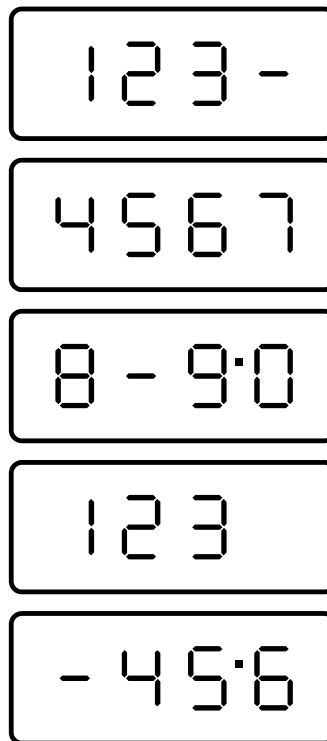
```

UNIT ADDRESS

TVPC INSTALLED:          NO
CableCARD INSERTED:     YES
UNIT ADDRESS:  000-02989-96882-195

OOB ADDRESSES:
NETWORK:      085-14316-55765-159
MULTICAST 16 FOR:      POLL
                0x4444      0x3333
                0x2222      0x1111
HOST-SERIAL NUMBER: 298996882195
HOST-MAC ADDRESSES:
MAC-Address1: 00 17 EE ED 27 68
MAC-Address2: 00 18 C0 06 BF 08
MAC-Address3: 00 18 C0 FF FE 06 BF 0D
MAC-Address4: 00 18 C0 06 BF 0C
MAC-Address5: 00 17 EE ED 27 69
MAC-Address6: 00 17 EE 06 BF 0C
Page 1 of 2                vvv Scroll Down vvv

```



**Figure 26 – Front panel display of a unit address**



The Unit Address fields are:

Field	Description
TvPC Installed	Indicates whether the TvPC renewable security system is installed: NO — TvPC is not installed ( <i>Note: the QIP7000 series does not include a TvPC slot</i> )
CableCARD Inserted	YES — CableCARD is inserted NO — CableCARD is not inserted
Unit Address	A unique decimal number that indicates the unit address or physical address.
OOB Addresses	
Network	The QIP7000 series network address displayed in decimal format.
Multicast 16 Address	Specifies the stream to which the OOB multicast 16 addresses are assigned. The stream type and multicast 16 addresses cycle on the OSD every 5 seconds. The valid stream types are: <ul style="list-style-type: none"> <li>• Net — Network</li> <li>• EMM — EMM</li> <li>• SCC — SCC_ECM</li> <li>• Dnld — Download</li> <li>• Data — Data</li> <li>• Poll — Polling packet identifier (PID)</li> </ul> <p>The 16-bit multicast address is displayed in 4-byte hexadecimal format. The Multicast 16 addressed messages filter on a 16-bit multicast address. The user processor can define up to four multicast addresses in hardware, and any message matching one of the four is processed. Messages not matching the multicast address are discarded.</p>
Serial Number	The Host Serial Number is displayed on the Unit Address diagnostic screen.
MAC Addresses	The MoCA, Ethernet, 1394, USB, and MAC addresses are stored in protected flash and displayed in hexadecimal.

## Separable Security

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



```

AAA Scroll Up AAA

Separable Security

CARD Interface: GOOD
CableCARD ID: 000-299-006-404-6
Host ID: 044-000-025-204-7
Data ID: 298-740-142-43
Validation: UNKNOWN

Pairing Rpt Method:MMI
MSO Phone Number: 1-215-323-2000

CableCARD
Object Name: MCB1Card
Object Ver: 02.65
Manufacturer: 0x0000
HW Version: 0x0201

Page 2 of 2

```

The Separable Security fields are:

Field	Description
CARD Interface	CableCARD Interface is a status indication of the interface between the QIP and CableCARD. It will indicate 'Good' if no errors were detected, 'Error' if there is a problem detected with establishing the CableCARD interface, or 'Unsupported CARD' if the inserted CableCARD is not an M-Card.
CableCARD ID	The unique identifier provided by the CableCARD.
Host ID	The unique identifier in the QIP Device Certificate.
Data ID	A value generated by the CableCARD for the Pairing report.
Validation	<ul style="list-style-type: none"> <li>• UNKNOWN if a Validation message was not received by the product</li> <li>• VALID or INVALID as set by the Host Validation Message received from the headend</li> <li>• BINDING if the CableCARD is busy with the binding authentication process</li> <li>• NOT BOUND if Card validation status is not bound for CableCARD reasons</li> <li>• HOST CERTIFICATE INVALID if the status is not bound because the Host Certificate was invalid</li> <li>• HOST SIGN FAILED if status is not bound because of failure to verify Host's SIGN</li> <li>• AUTH KEY FAILED if status is not bound because of failure to match AuthKey from the Host Device</li> <li>• FAILED if binding failed for other reasons</li> </ul>
Pairing Rpt Method	Set to 'MMI' or 'Reportback' as received by a message from the headend, or 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.



## d06 Current Channel Status

This diagnostic displays a status of the last attempted tuned channel on the in-band stream. The channel type determines the status display.

```
          CURRENT CHANNEL STATUS
PRIMARY A/V SOURCE:  TUNER 1
IB TUNER 1
TYPE: DIGITAL                UNE
STATUS:  Acquired and Locked
PREVIEW:                    NO
PURCHASABLE:                 NO
PURCHASED:                   NO
EPOCH Num:                   000
Auth Reason:                 0x00
Service: 0      Status: 1      ID:0x020000
CH: 110      Tuned Frequency: 267.0000 MHz
VCT ID: 7
CCI: 0x00 APS: 0x00 RC Flag: 0x00
CIT: 0x00 DRM: 0x00 RS:  FOREVER
Server IP/Port:
Local IP/Port:
Page 1 of 2                vvv Scroll Down vvv
```

This diagnostic displays a status of the last attempted tuned channel on the in-band stream. The channel type determines the status display.



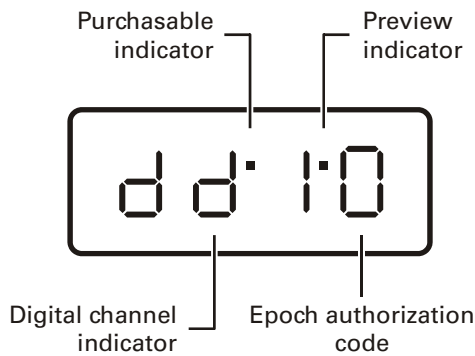


```

                ^^^ Scroll Up ^^^
CURRENT CHANNEL STATUS
IB TUNER 2
TYPE:
STATUS:      N/A
PREVIEW:     N/A
PURCHASABLE: N/A
PURCHASED:   N/A
EPOCH Num:   N/A
Auth Reason: N/A
Service: N/A Status: N/A ID: N/A
CH: N/A Tuned Frequency: N/A
VCT ID:      N/A
CCI: N/A APS: N/A RC Flag: N/A
CIT: N/A DRM: N/A RS: N/A

Server IP/Port:
Local IP/Port:

Page 2 of 2
    
```



**Figure 27 – Current channel status front panel displays**

The Current Channel status fields are:

Field	Description						
Type	Indicates the channel type:						
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Front Panel</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>DIGITAL</td> <td>d</td> <td>Digital</td> </tr> </tbody> </table>	OSD	Front Panel	Description	DIGITAL	d	Digital
OSD	Front Panel	Description					
DIGITAL	d	Digital					
bb	(Digital channels only) The current epoch authorization reason is displayed in the hexadecimal format 0xbb on the OSD and front panel.						
In-Band Frequency	(Digital channels only) The center RF carrier frequency for the digital service. It can be from 54 to 860 MHz.						
Authorized	Indicates whether the QIP7000 series is authorized for the currently tuned service: YES — authorized NO — not authorized						
Purchasable	Indicates whether the current program can be purchased for viewing:						
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Front Panel</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>YES</td> <td>On</td> <td>Can be purchased</td> </tr> </tbody> </table>	OSD	Front Panel	Description	YES	On	Can be purchased
OSD	Front Panel	Description					
YES	On	Can be purchased					

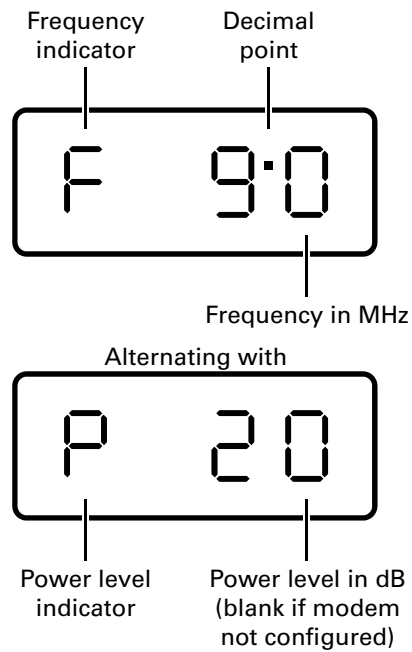
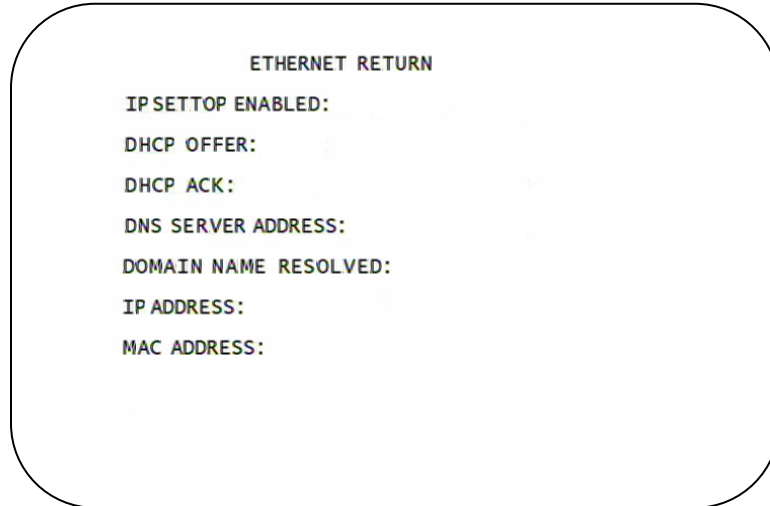


Field	Description									
	NO Off Cannot be purchased									
Preview	Indicates whether the current program is in preview mode:									
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Front Panel</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>YES</td> <td>On</td> <td>In preview mode</td> </tr> <tr> <td>NO</td> <td>Off</td> <td>Not in preview mode</td> </tr> </tbody> </table>	OSD	Front Panel	Description	YES	On	In preview mode	NO	Off	Not in preview mode
OSD	Front Panel	Description								
YES	On	In preview mode								
NO	Off	Not in preview mode								
MPEG Video Lock	Indicates whether the video processor is locked to the video stream: YES — locked NO — not locked									
MPEG Audio Lock	Indicates whether the audio processor is locked to the audio stream: YES — locked NO — not locked									
PCR Lock	Indicates whether the in-band receiver is locked to the program clock reference (PCR): YES — locked NO — not locked									
CCI	The copy control information: 00 — copy free 01 — no more copies 10 — copy once 11 — never copy N/A — the value is invalid or cannot be retrieved									
APS	The Analog Protection System; for example, Macrovision: 00 — No Macrovision 11 — Type 3 Macrovision N/A — the value is invalid or cannot be retrieved									
RC Flag	Displays whether the broadcast flag is present: 0 — no flag/not defined 1 — the flag is present/enabled N/A — the value is invalid or cannot be retrieved									
CIT	The constrained image trigger as delivered in the PRK or the Set DRM API: 1 — set 0 — not set N/A — the value is invalid or cannot be retrieved									
DRM	The digital rights management valid flag bit: 1 — set 0 — not set N/A — the value is invalid or cannot be retrieved									
RS	The retention state: Forever, 1 week, 2 days, 1 day, 12 hours, 6 hours, 3 hours, 90 minutes, or Not Defined N/A — the value is invalid or cannot be retrieved									



## d07 Upstream Status

This diagnostic displays the Ethernet Return status. The information is updated each time this diagnostic is displayed.



**Figure 28 – Ethernet Return front panel display**



The Ethernet Return fields are:

Field	Description
IP Set-top Enabled	Displays YES if the set-top uses Ethernet return; otherwise NO. N/A if the value is invalid or cannot be retrieved.
DHCP Offer	Displays YES if the set-top has received the DHCP offer; otherwise NO. N/A if the value is invalid or cannot be retrieved.
DHCP Ack	Displays YES if the set-top has received the DHCP acknowledge; otherwise NO. N/A if the value is invalid or cannot be retrieved.
DNS Server Address	Displays YES if the set-top has received the DNS Server IP address; otherwise NO. N/A if the value is invalid or cannot be retrieved.
Domain Name Resolved	Displays YES if the set-top has received a domain name; otherwise NO. N/A if the value is invalid or cannot be retrieved.
IP Address	<ul style="list-style-type: none"> <li>• Displays the IP address assigned to Ethernet return MAC Address1:</li> <li>• For IPv4, a 32-bit IP address in dotted-decimal format xxx.xxx.xxx.xxx with each xxx from 0 to 255. Each 1-byte value is padded with zeros. For example. 10.0.1.10 is displayed as 010.000.001.010.</li> <li>• For IPv6, a 128-bit address in the format x:x:x:x:d.d.d.d that is convenient for a mixed environment of IPv4 and IPv6 nodes. An x is a hexadecimal value of six high-order 16-bit piece of the address. A d is a decimal value of a four low-order 8-bit piece (standard IPv4 representation). Examples: 0000:0000:0000:0000:0000::0000.013.001.068.003 and 0000:0000:0000:0000:0000:FFFF:129.144.052.038</li> </ul>
MAC Address	<ul style="list-style-type: none"> <li>• Displays the Ethernet return MAC Address1, saved in hardware and displayed in hexadecimal.</li> </ul>



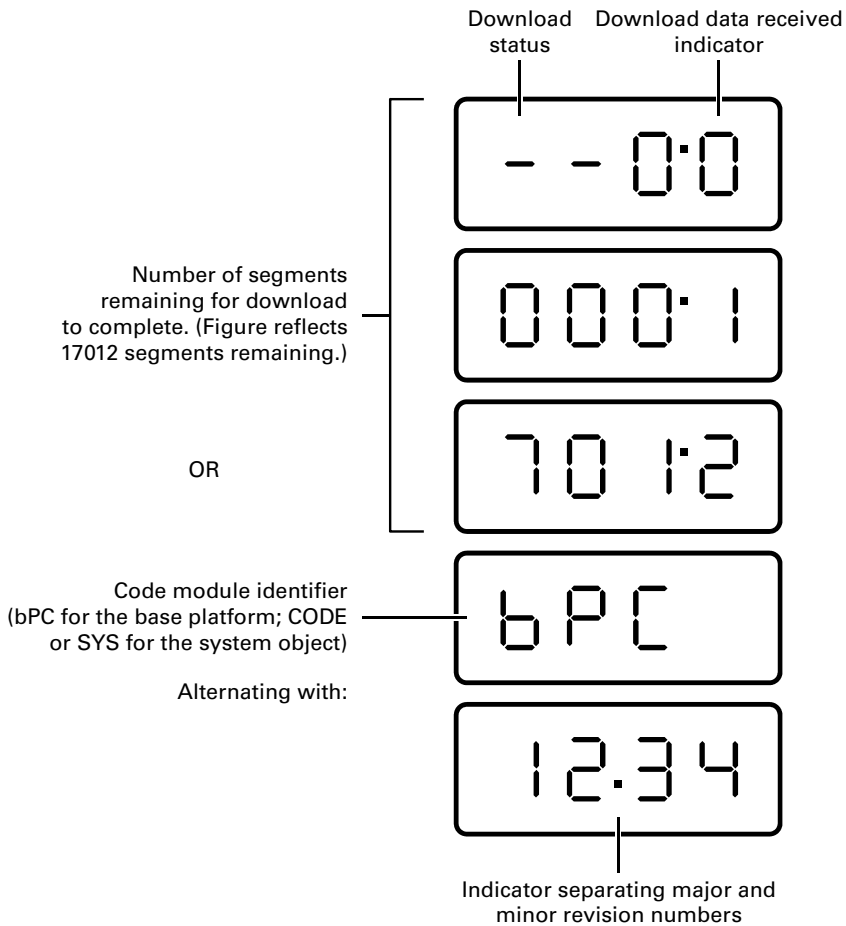
## d08 Code Modules

This diagnostic includes information about the firmware loaded in flash memory and all non-volatile code versions are installed on the QIP7000 series. When the native suite is running, the diagnostics of the application operating system and all associated objects should be accessible.



```

ASTB VALD      Lst:  32 Ver:   3
Boot Code:    06.10 DL PID: 26
Platform Built: Version: 18.16
                Dec 15 2006 11:05:56
Digital Secure Processor: M01
Analog Secure Processor: N/A
DL chan 3510
Object  Ver  Status  ID  LO
TC_CS_CD 18.16 ENABLED 0897 0
s_Tv_Gui 74.53 ENABLED 07DA 1
Mcb1Card 02.01
    
```



**Figure 29 – Front panel display for code modules**



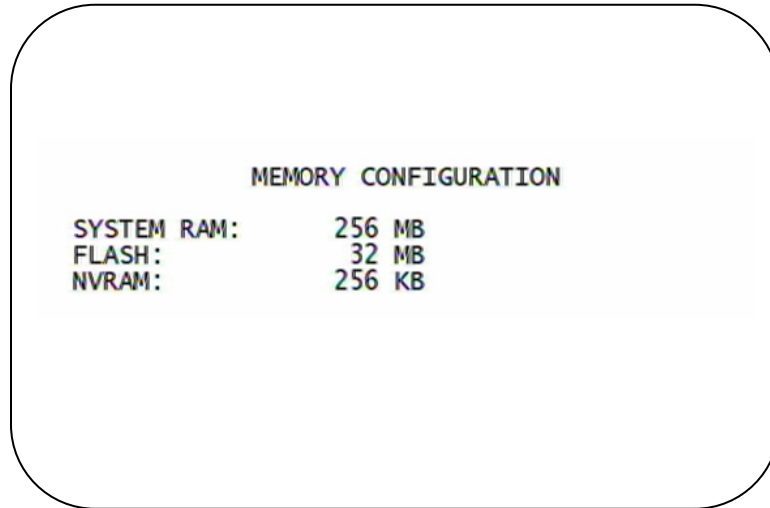
The Code Modules fields are:

Field	Description																																							
Boot Code	The boot code version in ASCII format.																																							
Version	The firmware version and build date in ASCII format.																																							
Digital Secure Processor	The digital secure processor version in ASCII format (N/A is indicated if the platform does not detect a digital secure processor).																																							
Downloadable Object Information Table	Lists all objects loaded, or being loaded, onto the QIP7000 series in ASCII format. The information displayed for each object depends on the running environment. If a download is not in progress, the front panel displays the currently running environment and version number, as shown in Figure 4-9. On the front panel, "bPC" represents Thin Client code.																																							
Object	The object name.																																							
Ver	The object version.																																							
Status	The object status, updated on the OSD and front panel display every 5 seconds while you display the diagnostic:																																							
	<table border="1"> <thead> <tr> <th>OSD</th> <th>Status</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>MEM ALLOC</td> <td>Allocated</td> <td>Memory for object is allocated</td> </tr> <tr> <td>LOADING</td> <td>Loading</td> <td>Object is being loaded</td> </tr> <tr> <td>STARTING</td> <td>Enabling</td> <td>Object is being started (the constructor is running)</td> </tr> <tr> <td>ENABLED</td> <td>Enabled</td> <td>Object is running</td> </tr> <tr> <td>ENA-NOT RUN</td> <td>Enabled_Not_ Runnable</td> <td>Object is enabled, but cannot run</td> </tr> <tr> <td>STOPPING</td> <td>Disabling</td> <td>Object is being stopped (the destructor is running)</td> </tr> <tr> <td>DISABLED</td> <td>Disabled</td> <td>Object has been disabled</td> </tr> <tr> <td>DIS-NOT RUN</td> <td>Disabled_Not_ Runnable</td> <td>Object is disabled and cannot run</td> </tr> <tr> <td>DELETING</td> <td>Deleting</td> <td>Object is being deleted</td> </tr> <tr> <td>POSTPONED</td> <td>Postponed</td> <td>Object cannot run on the current system; it will be enabled during the next boot</td> </tr> <tr> <td>CONNECTED</td> <td>Connect</td> <td>Connected to download PID — awaiting data</td> </tr> <tr> <td>PEND CONNECT</td> <td>TryingToConnect</td> <td>Trying to connect</td> </tr> </tbody> </table>	OSD	Status	Description	MEM ALLOC	Allocated	Memory for object is allocated	LOADING	Loading	Object is being loaded	STARTING	Enabling	Object is being started (the constructor is running)	ENABLED	Enabled	Object is running	ENA-NOT RUN	Enabled_Not_ Runnable	Object is enabled, but cannot run	STOPPING	Disabling	Object is being stopped (the destructor is running)	DISABLED	Disabled	Object has been disabled	DIS-NOT RUN	Disabled_Not_ Runnable	Object is disabled and cannot run	DELETING	Deleting	Object is being deleted	POSTPONED	Postponed	Object cannot run on the current system; it will be enabled during the next boot	CONNECTED	Connect	Connected to download PID — awaiting data	PEND CONNECT	TryingToConnect	Trying to connect
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CONNECTED	Connect	Connected to download PID — awaiting data																																						
PEND CONNECT	TryingToConnect	Trying to connect																																						
ID	The object identifier.																																							



## d09 Memory Configuration

This diagnostic displays the QIP7000 series memory configuration. The information is updated when you display the diagnostic.



*Note: There is no front panel display for this diagnostic.*

The Memory Configuration fields are:

Field	Description
System RAM	The allocated system RAM in MB
Flash	The allocated flash memory in MB
NVRAM	The allocated NVRAM in KB





## d10 Audio/Video Status

Audio/Video Status diagnostics display information regarding audio and video content and settings configured for the set-top.

```

                                AUDIO / VIDEO STATUS
SPDIF: DOLBY DIGITAL 2/0      LFE: 0
Audio Mute: OFF
Video Mute: UNMUTED
Captions Detected: N/A
N/A                          Primary Lang
Digital Subtitles Status
Enabled: NO                  ISO Lang: eng
Enhanced: NO                Rendered: NO
PiP Focus: N/A

INPUT SOURCE                IB TUNER 1
ADP LOCK:                   YES
AUDIO MODE:                 STEREO
VP LOCK:                    YES
INPUT FORMAT:              4:3 720x480i 30

```

The Audio/Video Status fields are:

Field	Description
AUDIO SPDIF	Indicates S/PDIF Mode as set by application software.
<b>OSD Display</b>	
N/A	Audio S/PDIF mode is not applicable.
IEC958PCM	PCM audio selected.
Dolby Digital	For Dolby Digital selection, the following speaker selection is set:
1/0	right front or left front.
2/0	right front and left front.
3/0	right front and left front and center.
2/1	right front and left front and (right rear or left rear).
3/1	right front and left front and center and (right rear or left rear).
2/2	right front and left front and right rear and left rear.
3/2	right front and left front and center and right rear and left rear.
LFE: Low Frequency Effect	The LFE indicates if the nomenclature low frequency effects are available in the Dolby Digital audio stream as indicated if the '0.1' is present in the Dolby Digital 5.1 nomenclature (for example, 'Dolby 5.1 Digital surround'). Valid values include:
<b>OSD Display</b>	



Field	Description
	0 LFE is not available.
	1 LFE is available (for example, 'Dolby Digital 5.1 surround').
Muting State and Method	The Audio and Video Mute Status indicates if the audio and/or video has been muted by the software. The audio mute is either 'On' or 'Off'. The Video Mute describes the MPEG muting method selected by the software and indicates if the output video is in the mute state by displaying 'On' or 'Off,' followed by the mute method. Methods include:
	<b>OSD Display</b>
	UNMUTED Displayed if mute method is not selected.
	MUTE to STILL Displayed if the mute method includes stopping video and presenting a still frame, similar to a pause function.
	MUTE to BLACK Displayed if mute method presents a black screen.
Captions	The captions mode displays captions present on the service. <i>Note: The caption options are set via the User Setting Menu, where the subscriber can enable closed captions and select options.</i>
1 <sup>st</sup> Caption Row: Caption Detected:	
	<b>OSD Display</b>
	708 EIA-708 captions detected.
	608 EIA-608 captions detected.
	608 and 708 Both EIA-608 and EIA-708 captions detected.
	None No Captions detected.
2 <sup>nd</sup> Caption Row: Caption Options Set, followed by Service Selected:	
	<b>OSD Display</b>
	708 Set EIA-708 captions enabled, with options set by user. xxxxxxxxxxxx
	708 Default EIA-708 captions enabled, with no options set by user. xxxxxxxxxxxx
	608 Set EIA-608 captions enabled, with options set by user. xxxxxxxxxxxx
	608 Default EIA-608 captions enabled, with no options set by user. xxxxxxxxxxxx
	None Set Captions detected but not enabled.
	CC 1 Closed Caption service CC 1 (default).
	CC 2 Closed Caption service CC 2.
	CC 3 Closed Caption service CC 3.
	CC 4 Closed Caption service CC 4.
	T 1 Closed Caption service T 1.
	T 2 Closed Caption service T 2.
	T 3 Closed Caption service T 3.



Field	Description
T 4	Closed Caption service T 4.
Primary Lang	Primary language established by the provider (default, Service 1).
Second Lang	Secondary language established by the provider (Service 2).
Service 3	Set by the provider Service 3.
Service 4	Set by the provider Service 4.
Service 5	Set by the provider Service 5.
Service 6	Set by the provider Service 6.
Digital 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"> <li>• Enabled is indicated with Yes or No.</li> <li>• The language is displayed as the 3-character ISO639.2 language code.</li> <li>• Enhanced mode is indicated with Yes or No.</li> <li>• Rendered status is indicated with Yes or No.</li> </ul>
Input Sources	<p>The input source list information on ADP Lock, Audio Mode, VP lock, and Input Format.</p> <p>The ADP Lock indicates whether the audio stream is locked. Valid values are</p> <ul style="list-style-type: none"> <li>• YES: Audio Processor is locked to the audio stream.</li> <li>• NO: Audio Processor is not locked to the audio stream.</li> </ul> <p>Audio Mode indicates the audio Mode of in incoming digital service. Valid values include:</p> <ul style="list-style-type: none"> <li>• N/A: the audio mode is not applicable to the currently tuned stream.</li> <li>• Mono: the audio mode is monophonic.</li> <li>• Stereo: the audio mode is stereo.</li> <li>• Surround: the audio mode is surround sound.</li> <li>• 5.1: the audio mode is Dolby Digital 5.1 surround sound.</li> </ul> <p>VP Lock indicates whether the video stream is locked. Valid values are:</p> <ul style="list-style-type: none"> <li>• YES: Video Processor is locked to the video stream.</li> <li>• NO: Video Processor is not locked to the video stream.</li> </ul> <p>The input format includes the aspect ratio (4:3 or 16:9), the screen pixel size (nnnXnnn), pixel display ('i' for interlaced, 'p' for progressive), and frames per second (24, 25, 30, 60).</p>



## d11 Interface/Port Status

The Interface Status diagnostic displays when running in Thin Client. There is no front panel display. The information on the OSD is updated when you display the diagnostic.

```

INTERFACE / PORT STATUS

          ENABLED   ACTIVE
DOCSIS   YES       NO
1394     YES       NO
DVI/HDMI NO       NO
ETHERNET YES       NO
IR XMIT  YES       YES
SMART CARD NO      NO
SPDIF    YES       YES
RF BYPASS NO      NO
USB      YES       NO
HMA AUTHORIZED NO    NO
MOCA AUTHORIZED NO    NO
  Internal YES     NO
  External YES     YES

Page 1 of 4          vvv Scro]] Down vvv

```

```

          ^^^ Scro]] Up ^^^
INTERFACE / PORT STATUS
DVI/HDMI
MODE:      N/A   COLOR SPACE:   RGB
DEVICE CONNECTED: NO
REPEATER:  N/A
VIDEO XMISSION: N/A
HDCP ENABLED: N/A
OUTPUT FORMAT: N/A
ASPECT RATIO: N/A
EDID DATA   N/A
NO DATA AVAILABLE

AUDIO: PCM          RATE:    32KHz
Page 2 of 4          vvv Scro]] Down vvv

```



```

                                     ^^^ Scroll Up ^^^
                                INTERFACE / PORT STATUS
1394
ACTIVE PORTS:                0
DATA XMISSION:              NOT ACTIVE
5C IMPLEMENTATION:          NO
COPY CONTROL:               Copy Free
CYCLE MASTER NODE:         YES
IRM NODE:                   YES
ROOT NODE:                  YES
LOOP DETECTED :            NO

EUI-64:                      0x0018C0FFFE06BF0D

CONNECTED DEVICES: 01
  DEVICE ID
  0x0018C0FFFE06BF0D
  N/A
  N/A
Page 3 of 4                    vvv Scroll Down vvv

```

```

                                     ^^^ Scroll Up ^^^
                                INTERFACE / PORT STATUS

USB DEVICES
NO DEVICES

Page 4 of 4

```



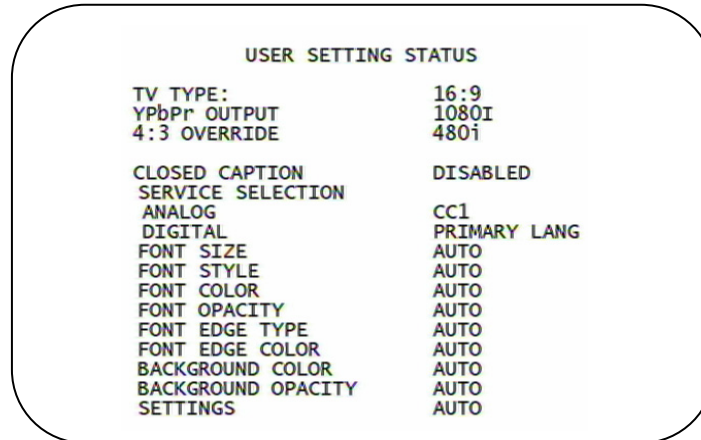
The Interface Status fields are:

Field	Description
1394 I/O Device	Indicates if enabled; indicates if active.
USB I/O Device	Indicates if enabled; indicates if active.
Ethernet Device	Indicates if enabled; indicates if active.
Parallel Port	Indicates if enabled; indicates if active.
IR Xmit	Indicates if enabled; indicates if active.
Hard Drive Status	Indicates if enabled; indicates if active.
Smart Card	Indicates if enabled; indicates if active.
HDMI Port	<p>If a device is connected to the HDMI port only, the following diagnostics display to help troubleshoot the HDMI interface. They all display "N/A" if no device is connected to the HDMI port or the value is invalid or cannot be retrieved.</p> <ul style="list-style-type: none"> <li>• Device Connected — indicates whether a device is connected to the HDMI port — Yes or No.</li> <li>• Repeater — indicates whether the connected device is a repeater — Yes or No.</li> <li>• Video Xmission (transmission) — Indicates whether the QIP7000 series is transmitting video over the HDMI port — Not Active or Active.</li> <li>• HDCP Enabled — Indicates whether the QIP7000 series is using HDCP to encrypt video transmitted over the HDMI link — Yes or No. If the Video Xmission status is Not Active, the HDCP Enabled status is No</li> <li>• Output Format — Indicates the timing format of the video sent through HDMI: <ul style="list-style-type: none"> <li>• 1920 x 1080i — 1920 pixels wide by 1080 pixels high, interlaced</li> <li>• 1280 x 720p — 1280 pixels wide by 720 pixels high, progressive</li> <li>• 720 x 480p — 720 pixels wide by 480 pixels high, progressive</li> <li>• 720 x 480i — 720 pixels wide by 480 pixels high, interlaced</li> <li>• 640 x 480p — 640 pixels wide by 480 pixels high, progressive</li> </ul> </li> <li>• Aspect Ratio — indicates the aspect ratio of the video sent through HDMI — 4:3 or 16:9.</li> </ul>
EDID Data	<p>Indicates the video timing formats that were read from the Extended Display Identification Data (EDID) register for the connected device, in particular the detailed timing description blocks. The list displays all of the formats that the QIP7000 series could read, up to a maximum of 12 formats. If the QIP7000 series cannot read any formats, EDID Data is blank. An asterisk (*) after the aspect ratio means the QIP7000 series supports the format. If more than twelve video timing formats are discovered, the supported formats only are listed first, followed by up to twelve remaining formats.</p>



## d12 User Setting Status

This diagnostic displays the user settings. The format may vary. The information on the OSD and front panel is updated when you display the diagnostic.



The User Setting Status fields are:

Setting	Description
TV Type	<p>Allows you to specify the style of television connected to the QIP set-top. Options include 16:9, 4:3 LETTERBOX, and 4:3 PAN SCAN. The 16:9 option is the default selection. The options are used as follows:</p> <ul style="list-style-type: none"> <li>• 16:9 designates that a widescreen television is connected to the QIP set-top.</li> <li>• 4:3 LETTERBOX designates that a standard screen television is connected to the QIP set-top and that widescreen programs should be scaled to fit the screen with black bars above and below the picture.</li> <li>• 4:3 PAN SCAN designates that a standard screen television is connected to the QIP set-top and that widescreen programs should be cropped so that the picture fills the entire screen.</li> </ul>
HDMI/YPbPr Output	<p>Allows you to specify the video output format of the QIP set-top for all content (when the 4:3 override setting is Off) or for all 480p, 720p, and 1080i content (when the 4:3 override is used). Options include 1080i, 720p, 480p, and 480i. By default, the 1080i option is selected. The options are used as follows:</p> <ul style="list-style-type: none"> <li>• 1080i — The QIP set-top will present programs in the High-Definition 1080i format (1920 x 1080 pixels).</li> <li>• 720p — The QIP set-top will present programs in the High-Definition 720p format (1280 x 720 pixels).</li> <li>• 480p — The QIP set-top will present programs in the Enhanced-Definition 480p format (720 x 480 pixels).</li> <li>• 480i — The QIP set-top will present programs in the Standard-Definition 480i format (720 x 480 pixels).</li> </ul> <p>Some televisions only support certain video formats. Please consult your television's user manual for more information on format compatibility.</p> <p>The QIP set-top can detect when the HDMI connection is in use. If you are not using the HDMI connection on the QIP set-top, the HDMI/YPbPr Output setting will display as YPbPr Output in the User Settings Menu.</p>



Setting	Description
4:3 Override	<p>The 4:3 Override setting allows you to specify the video output format of the QIP set-top when it is tuned to a Standard-Definition program or playing back a Standard-Definition program from the DVR. Options include 480i, 480p, Stretch, and Off. By default, the 480i option is selected. The options are used as follows:</p> <ul style="list-style-type: none"> <li>• 480i — The QIP set-top will present standard-definition programs in the Standard-Definition 480i format (720 x 480 pixels).</li> <li>• 480p — The QIP set-top will present standard-definition programs in the Enhanced-Definition 480p format (720 x 480 pixels).</li> <li>• Stretch — The QIP set-top will automatically stretch all Standard-Definition programs to a widescreen aspect ratio and present the video in the format designated by the HDMI/YPbPr Output setting. Note that the Stretch option is only available when the TV Type setting is 16:9.</li> <li>• Off—The QIP will create a widescreen version of a Standard-Definition program by adding black bars to the left and the right of the picture and present the video in the format designated by the HDMI/YPbPr Output setting.</li> </ul> <p>Some televisions may only support certain video formats. Please consult your television's user manual for more information on format compatibility. If the HDMI/YPbPr Output setting is 480i, the 4:3 Override feature is disabled and is no longer selectable in the menu. The 4:3 Override feature is available when the HDMI/YPbPr Output setting is 1080i, 720p, or 480p.</p>
Closed Caption	Turns closed captions off or on. The front panel display indicates the status of the closed captions. Defaults to DISABLED. Options are ENABLED or DISABLED.
Service Selection	<p>Sets the service used for closed captions:</p> <ul style="list-style-type: none"> <li>• Analog: CC1, CC2, CC3, CC4, T1, T2, T3, or T4. The default is CC1.</li> <li>• Digital: PRIMARY LANGUAGE, SECONDARY LANGUAGE, 3, 4, 5, or 6. The default is PRIMARY LANGUAGE.</li> </ul>
Font Size	Sets the font size for closed captions. Defaults to AUTO. Options are AUTO, STANDARD, LARGE, or SMALL.
Font Style	Sets the font style for closed captions. Defaults to AUTO. Options are AUTO, MONO SERIF, PROPORTION SERIF, MONO NO SERIF, PROPORTION NO SERIF, CASUAL, CURSIVE, or SMALL.
Font Color	Sets the font color. Defaults to AUTO. Options are AUTO, WHITE, BLACK, RED, GREEN, BLUE, YELLOW, MAGENTA, or CYAN.
Font Opacity	Sets the opacity. Defaults to AUTO. Options are AUTO, TRANSPARENT, TRANSLUCENT, SOLID, or FLASHING.
Font Edge Type	Sets the edge appearance — AUTO, NONE, RAISED, DEPRESSED, UNIFORM, LEFT SHADOWED, or RIGHT SHADOWED. The default is AUTO.
Font Edge Color	Sets the edge color — AUTO, WHITE, BLACK, RED, GREEN, BLUE, YELLOW, MAGENTA, or CYAN. The default is AUTO.
Background Color	Sets the background color for closed captions. Defaults to AUTO. Options are AUTO, WHITE, BLACK, RED, GREEN, BLUE, YELLOW, MAGENTA, or CYAN.
Background Opacity	Sets the background opacity for closed captions. Defaults to AUTO. Options are AUTO, TRANSPARENT, TRANSLUCENT, SOLID, or FLASHING.
Settings	Sets the default settings for closed captions (AUTO) or the settings you have configured (USER). Defaults to AUTO. Options are AUTO or USER.
Restore All Defaults	To reset all User Settings to their defaults, select this option and press the ► key.





## d13 DVR/Hard Drive Status

This two-page diagnostic displays the DVR and hard-drive status.

```

DVR / Hard Drive Status

DVR Status:
  Enabled:           True
  Stream Indexer Ver: 132
  Content Record Ver: 5

Encoder
Number      Type      Quality
  1         MPEG2   HIGH2
  2         MPEG2   HIGH2

Drive      Record Capacity Remaining
IDE0              151741530112 B

vvv Scroll Down vvv

```

```

Hard Drive Status
Number of Installed Drives: 1

Drive: 1 INTERNAL
Model Number: ST3160212SCE
Device ID: N/A
Type: IDE
Total size: 160 GB
Used
System      242688 B
GPFS        1037312 B
DVR Content 3008470016 B
DVR Index   15243264 B

State: Active
Temp: 127F 53C      Max Temp: 133F 56.1C
Over Temp: No      Count: 0

```



The DVR/Hard Drive Status fields are:

Field	Description
Enabled	Indicates whether the DVR is enabled, based on the QIP7000 series Connected State (CONNECTED or DISCONNECTED) and resource availability (resource authorized; hard disk installed and functional):
	OSD                      Front Panel    Description
	True                      En                DVR enabled
	False                    Un                DVR disabled
Stream Indexer Ver.	The stream indexer version number, without leading zeros; for example, version 0000000065 is displayed as "65".
Content Record Ver.	The content record version number, displayed without leading zeros.
Drive	The drive type — IDE (internal), 1394, USB (external), or NOT AVAILABLE (neither enabled nor configured).
Record Capacity Remaining	The remaining recording capacity, in bytes.
Number of Installed Drives	The number of internal and external hard drives, up to a maximum of 9.
Drive	The identification number sequentially assigned to each installed drive and whether the drive is Internal or External.
Model Number	The drive model number assigned at the factory.
Device ID	A text string of up to 20 characters that identifies the disk drive; "N/A" is displayed if the value is invalid or cannot be retrieved.
Type	The drive type — IDE, 1394, USB, or Unknown).
Total Size	The drive size in decimal GB. (1 decimal GB = 1x10 <sup>9</sup> bytes. For example, 120 decimal GB = 120x10 <sup>9</sup> bytes).
System, GPFS, DVR Content, and DVR Index	The space used and allocated in MB for each of the internal hard drive's partitions —System, GPFS, DVR Content, and DVR Index (1 binary MB = 220 bytes). "N/A" displays if the value is invalid or cannot be retrieved.
State	The hard drive state: Standby — The hard drive is working normally, but is at rest (the State returns to Active any time disc access is necessary). Active — The hard drive is accessing data. Failed — The hard drive hardware has failed.
Temp (F)	For an internal hard drive only, its temperature in degrees F.
Max Temp	For an internal hard drive only, its maximum temperature in degrees F.
Over Temp	Indicates whether the drive is excessively hot: Yes — The internal drive temperature exceeds 140° F (60° C). The front panel Over-Temp Indicator is on and remains lit until the next over-temp sample is taken (at least once an hour). No — There is no over-temp problem.
Count	The cumulative number of times that the hard drive temperature has been measured over 60° C, with the temperature checked at least once an hour.



## d14 Application Specific Information

This diagnostic displays information about application servers:

```

APPLICATION SPECIFIC INFORMATION
NO ADDITIONAL INFORMATION
SERVER 1 NAME:
SRV 1 IP ADDR:

SERVER 2 NAME:
SRV 2 IP ADDR:

SERVER 3 NAME:
SRV 3 IP ADDR:

SERVER 4 NAME:
SRV 4 IP ADDR:

SERVER 5 NAME:
SRV 5 IP ADDR:

```

The Application Specific Information fields are:

Field	Description
Server# Name	The application server name of up to 14 alphanumeric characters. It is blank if the value is invalid or no value can be retrieved.
Srvr # IP Addr	The application server's IP address in dotted-decimal format xxx.xxx.xxx.xxx; each xxx is from 0 to 255. It is blank if the value is invalid or no value can be retrieved.



## d15 Interactive Status

```

INTERACTIVE STATUS

IP ADDRESS:      000.000.000.000
UPM:            0000000
UPSTREAM ID:    0000
DOWNSTREAM ID:  0000
STATE:         UNCONFIG
MAC ABORT CNTR: 0000

GOOD PACKETS:
ERROR PACKETS:

SOCKET PORT STATE:
0      UNUSED
1      UNUSED
2      UNUSED
3      UNUSED
4      UNUSED
    
```

This diagnostic describes the interactive information that is displayed only when Thin Client platform is running. The information on the OSD and front panel is updated at least once every 5 seconds while the diagnostic is displayed. This is an example of a code module display with status descriptions:



**Figure 30 – Interactive status front panel display**

The Interactive Status fields are:

Field	Description									
IP Address	The IP address in dotted-decimal format xxx.xxx.xxx.xxx assigned by the NC 1500 to the QIP7000 series. 0.0.0.0 is displayed if the IP address is not configured or unknown.									
Downstream ID	A four-digit decimal value from 0000 to 9999 assigned by the DAC 6000 to the QIP7000 series. 0000 is displayed if the Downstream ID is not configured or if it is unknown.									
State	The interactive status of the QIP7000 series:									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Front panel</th> <th style="text-align: left;">OSD</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td>U</td> <td>UNCONFIG</td> <td>The QIP7000 series is not configured for the interactive system, and the platform should run as pre-interactive.</td> </tr> <tr> <td>C</td> <td>MAC_CONNECT</td> <td>The QIP7000 series is waiting to establish</td> </tr> </tbody> </table>	Front panel	OSD	Description	U	UNCONFIG	The QIP7000 series is not configured for the interactive system, and the platform should run as pre-interactive.	C	MAC_CONNECT	The QIP7000 series is waiting to establish
Front panel	OSD	Description								
U	UNCONFIG	The QIP7000 series is not configured for the interactive system, and the platform should run as pre-interactive.								
C	MAC_CONNECT	The QIP7000 series is waiting to establish								



Field	Description
	connection to MAC PID Stream.
I dc	INIT_WAIT_DC_OR_C The QIP7000 series is in the interactive initialization state and waiting for the default configuration or the contention channel list messages.
I L	WAIT_LM_ACK The QIP7000 series is in the interactive initialization state and waiting for Link Management Response ACK for Local Address Message.
I SO	WAIT_SO_ACK The QIP7000 series is in the interactive initialization state and waiting for a Sign On acknowledgement.
I LA	WAIT_LA_OR_SO The QIP7000 series is in the interactive initialization state and waiting for Logical Address or Sign On with verification Frequency message.
S I	INIT_STOPPED The QIP7000 series is in the interactive initialization state and the TransMode has stopped.
r dc	RUN_WAIT_DC_OR_C The QIP7000 series is in the interactive state and waiting for the default configuration or the contention channel list messages.
r	RUNNING Interactive state is running, sending idle messages, and waiting for any prepare for poll or MAC messages.
S	RUN_STOPPED The interactive run state has stopped and the QIP7000 series is waiting for status or a transmission control message.
00	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 when the QIP7000 series receives an ACK. If the counter reaches the MAC abort count limit, the QIP7000 series assumes the MAC layer is unavailable due to noise, congestion, or some other problem. The QIP7000 series stops transmitting data, reports an error to the calling function, and attempts to re-enter the network using the initialization process. 0000 is displayed as the default or if the MAC Abort CNTR is not configured or unknown.
Socket Port State	The socket mode and activity: <ul style="list-style-type: none"> <li>• UNUSED — The socket is not being used.</li> <li>• OPENED — The socket is open.</li> <li>• READY — The socket is ready to send or receive.</li> <li>• RECEIVING — The socket is receiving data from the application server.</li> <li>• SENDING — The socket is sending data to the application server.</li> <li>• UNKNOWN — The socket state is invalid or unknown.</li> </ul>



## d16 Connected Home

This diagnostic displays the MoCA network status:

<b>CONNECTED HOME STATUS</b>			
RF Freq: 1150 MHz			
	<b>MoCA Node/ Set-top Node</b>	<b>Dev (#Ses)/ Ver</b>	<b>MAC/IP</b>
	-/1 M	ETerm (0) 02.51	xx:xx:xx:xx:xx:xx 169.254.001.xxx
	-/2	EHub (2) 02.51	xx:xx:xx:xx:xx:xx 169.254.001.xxx
	-/3	ETerm (1) 02.51	xx:xx:xx:xx:xx:xx 169.254.001.xxx
	-/4	ETerm (0) 02.51	xx:xx:xx:xx:xx:xx 169.254.001.xxx
	3/5	ETerm (0) 02.51	xx:xx:xx:xx:xx:xx 169.254.001.xxx
	0/-	ETerm (0) 02.51	xx:xx:xx:xx:xx:xx 169.254.001.002

The Connected Home Status fields are:

Field	Description
RF Freq	Displays the frequency of the MoCA RF channel in use by the set-top, in MHz, from 1150 to 1500 MHz. The default is 1150 MHz.
Table	<p>Displays data from each detected MoCA set-top:</p> <ul style="list-style-type: none"> <li>• <b>*</b> — Indicates the set-top on which you are viewing the diagnostic</li> <li>• <b>N</b> — Indicates the MoCA network coordinator.</li> <li>• <b>M</b> — Indicates the master set-top.</li> </ul> <p>The columns are:</p> <ul style="list-style-type: none"> <li>• <b>MoCA Node/Set-top Node</b> — Displays the MoCA node ID, which can be 0 to 8.</li> <li>• <b>Dev</b> — ETerm indicates a media terminal. EHub indicates a media hub.</li> <li>• <b>(#Ses)</b> — The Number actually shown on the screen is actually the number of sessions on the Hub's hard drive.             <ol style="list-style-type: none"> <li>There is always one session on a working hard drive. This session supports the pause function.</li> <li>There are 0 or 1 additional sessions, depending if the Hub is recording something or not.</li> <li>There is 1 more session if the Hub user is playing back a recorded session on the hub itself.</li> <li>There are 1 or two sessions if terminal(s) are playing MRDRV sessions.</li> </ol> </li> <li>• <b>Ver</b> — Displays the MoCA software version in xx.yy format (for example, 02.51).</li> <li>• <b>MAC/IP</b> — Displays the MAC address and the link-local IP address 169.254.001.xxx; xxx ranges from 0 to 255.</li> </ul>



Scrolling down displays a table showing the Transmission (TX) Data Rate between Nodes for up to 8 nodes, in Mbps. The MoCA Node IDs displayed on this table are the same as on the Connected Home Status screen.

**Table 7 – TX Data Rate**

Connected Home Link Status					
TX Data Rate Between Nodes (Mbps)					
Collecting Data: Complete					
To Node	0	1	2	3	4
From Node					
0	***	253	233	253	253
1	234	***	N/A	N/A	N/A
2	253	N/A	***	N/A	N/A
3	233	N/A	N/A	***	N/A
4	253	N/A	N/A	N/A	***
5	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A	N/A

*Note: In the example above, the speed between any STB and the router is important for troubleshooting and VOD problems.*

*Note: Additionally, the speed between any terminal and the HUB is important for troubleshooting MRDVR problems.*

The Connected Home Link Status fields are:

Field	Description
Collecting Data	Displays the data collection status: In Progress or Complete.
To Node (column heading)	The column shows the data rate to the device.
From Node (row heading)	The row shows the data rate from the device.

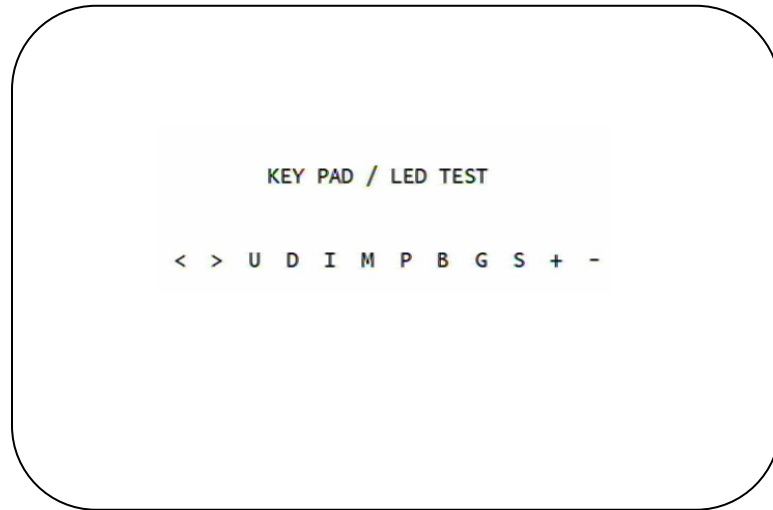
If any of the following warning indicators is displayed next to a MoCA Node ID, perform remediation as described in [IP Network Issues](#) in Section 5, [Troubleshooting](#):

- Bw — The node has a link supporting less than 100 Mbps (the associated BHR RF LED will also be blinking).
- Fr — The node received significant packet errors caused by thermal noise or interfering signals.
- Pw — There is insufficient power at the node.



## d17 Key Pad / LED Test

This diagnostic verifies the functionality of the front panel indicators 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.

**Table 8 – Troubleshooting Guidelines**

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



Problem	Possible Solution
<p>There is no audio from the center and/or surround speakers of a home theater receiver connected to the QIP set-top</p>	<p>Not all Dolby® Digital programs feature full 5.1 surround sound. In some cases, the programs may only contain left and right stereo audio.</p> <ul style="list-style-type: none"> <li>• Verify that the S/PDIF cable (coaxial or optical) is firmly connected to the QIP set-top and the home theater receiver.</li> <li>• Verify that the home theater receiver is set to a surround sound audio mode (Dolby Digital, Dolby Pro Logic II®, Dolby Pro Logic®).</li> <li>• Verify that the receiver is properly configured to work with all connected speakers.</li> </ul>
<p>There is no video on the TV screen</p>	<ul style="list-style-type: none"> <li>• Verify that the TV is powered on and set to the appropriate input source for the QIP set-top.</li> <li>• Verify that the QIP set-top is powered on and tuned to an authorized cable channel.</li> <li>• Verify that all video cables between the QIP set-top and the TV are firmly connected.</li> <li>• Verify that the coaxial cable feed is firmly connected to the QIP set-top and the wall jack.</li> <li>• If the QIP set-top 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.</li> <li>• If the QIP set-top video output is connected to a TV through an HDMI connection, power off the TV and then power off the QIP set-top. Wait one second and then power on the devices.</li> </ul> <p>Not all HDTVs can display every output format (1080i, 720p, 480p, or 480i) available on the QIP set-top. To select a different format:</p> <ol style="list-style-type: none"> <li>1. Ensure that your QIP set-top is plugged into a power outlet and is turned off.</li> <li>2. Ensure the TV is turned on and tuned to the appropriate channel for the set-top</li> <li>3. Press the MENU key on the front panel. Your settings are displayed on the QIP set-top front panel display.</li> <li>4. Use the ▲ and ▼ keys on the front panel to display the HDMI/YPbPr OUTPUT setting.</li> <li>5. Press the ► key to cycle through the available output formats until a picture displays on the TV.</li> </ol>
<p>No graphics or program guides appear on the TV screen</p>	<p>If you use the IEEE-1394 connection, on-screen graphics, including closed captions and program guides, are not displayed by the QIP set-top. On-screen graphics and captions may still be overlaid by your TV, if enabled. Alternatively, use HDMI or component video instead.</p>
<p>No closed captions display</p>	<ul style="list-style-type: none"> <li>• Verify on the User Settings menu that closed captions are enabled on the QIP set-top.</li> <li>• Verify that closed captions are enabled on the TV.</li> </ul> <p><i>Note: Closed captioning may not be available on the current program.</i></p>
<p>There are black bars to the right and left of the picture</p>	<p>Widescreen TVs display 4:3 programs in this format unless set to Stretch. Turn on the 4:3 OVERRIDE feature in the User Settings menu. This enables most widescreen TVs to stretch the video to fill the screen (see your TV manual for information about stretching 4:3 video).</p> <ul style="list-style-type: none"> <li>• If the QIP7000 series is connected to a widescreen TV, verify that the TV TYPE is set to 16:9 in the User Settings menu.</li> </ul> <p>Many HD programs are broadcast in pillar-box format with black bars to the left and right of the picture. These programs are broadcast in 16:9 HD formats, even though the video is not 16:9.</p>



Problem	Possible Solution
There are black bars above and below the picture	<p>All 4:3 HDTVs display HD programs in letterbox format (black bars above and below the picture) because of the shape of the display screen.</p> <ul style="list-style-type: none"> <li>• Turn on the 4:3 OVERRIDE feature in the User Settings menu. This enables most standard screen TVs to display a full screen picture when the QIP7000 series is tuned to a 4:3 program.</li> <li>• Set the TV TYPE to 4:3 Pan-Scan. This enables the QIP7000 series to remove the black bars above and below the picture when possible.</li> </ul> <p>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).</p>
There are black bars on all four sides of the picture	<p>This may occur on a 4:3 TV if the 4:3 OVERRIDE setting is OFF. To set 4:3 SD programming to fill the screen, depending on the capabilities of the TV, set 4:3 OVERRIDE to 480i or 480p.</p> <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 widescreen 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 QIP7000 series cannot correct the video. You may be able to minimize the border using the zoom feature on the TV.</p>
Colors do not appear correctly	<p>Be sure to match up each signal to the same YPbPr connection on the TV. Otherwise, colors will not appear correctly on your TV.</p>
The QIP set-top is making a humming noise	<p>The QIP7200 includes an integrated hard drive and a fan for cooling. During normal operation, the QIP7200 emits a low humming noise, similar to a personal computer. The noise varies in volume occasionally when the speed of the internal fan adjusts to changes in the temperature around the QIP set-top. Please note the hard drive will stay on even when the QIP7200 is turned off (standby).</p>



## IP Network Issues

### Insufficient RF Network Throughput

If the RF light on the BHR is flashing after you connect it to a set-top, use the Connected Home Status diagnostic to display the data rate for each MoCA network link (see [Troubleshooting](#))

The Transmit data rate between each MoCA node is shown on the Link Status page. The MoCA node can be correlated to the MAC address of each device on the Connected Home diagnostic.

The Link Status table also shows which MoCA nodes have insufficient throughput between links (evident by the 'Bw' indicator that precedes the MoCA node ID). Make note of the MoCA node ID on the Link Status page and the associated MAC address on the preceding Connected Home page for each device to track insufficient RF Network Throughput.

The Link Status page displays a table with entries for each MoCA network device:

1. Rows and columns representing each MoCA device on the network are labeled with the MoCA Node ID.
2. In the Link Status table, asterisks (\*\*\*) are displayed when there is no link, i.e., the 'To Node' = 'From Node'.

If all displayed Data Rates in the Link Status table are above the required threshold and the 'Bw' indicator does not appear, the network links to the BHR are normal.

If any displayed Data Rate is below the required threshold, the network may not meet the throughput requirements. Replace the splitter nearest the ONT with a 2 GHz splitter.

After replacing the splitter, reenter the OSD diagnostics for Link Status. If all Data Rates are above the required threshold, the network links to the connected BHR are normal. If any Data Rate remains below the required threshold, continue replacing splitters until all Data Rates are above the required threshold.

If you have replaced every splitter and any Data Rate remains below the required threshold, there may be a faulty coaxial cable in one or more branches.

A difference of 10 to 20 Mbps in the To and From rates for the same connection may indicate an active device, such as an in-line amplifier, in the coaxial cable between the two devices. See "Bypassing" an Amplifier below.

As long as the RF light on the BHR continues to flash, repeat this procedure.

If you make any changes, repeat all tests.

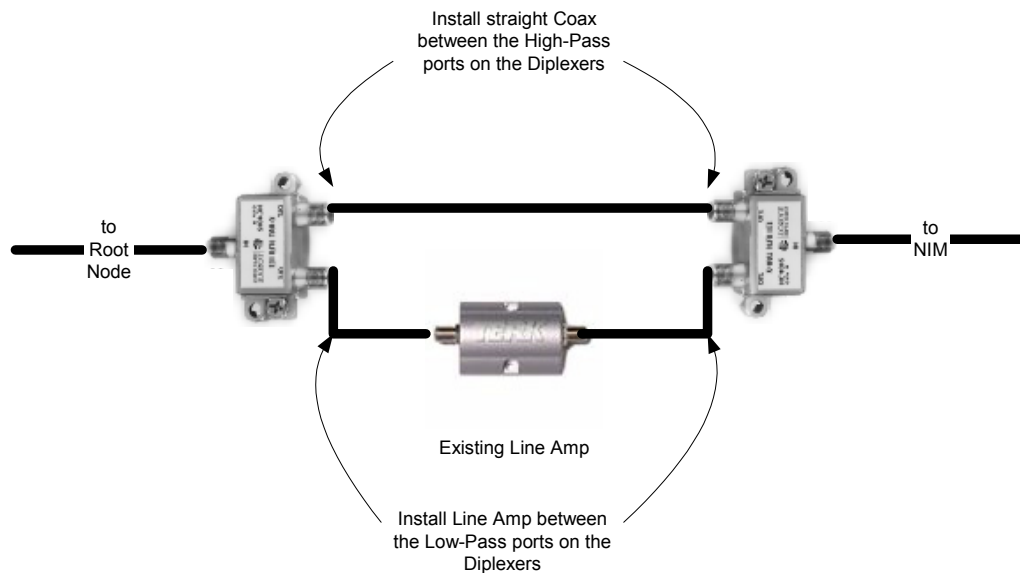


## Bypassing an Amplifier

To bypass the MoCA signal around an in-line amplifier that cannot handle two-way traffic nor has insufficient bandwidth for MoCA:

1. Locate the line amplifier by tracing the coaxial cable back towards the ONT.
2. Disconnect the existing RF cable from the amplifier.
3. Move the existing amplifier to a position near the point of entry.

As shown in the figure below, connect each existing coaxial cable to the diplexer. Connect a new coaxial cable between the high pass ports on the diplexers. Connect the existing amplifier between the low pass ports on the diplexers.



**Figure 31 – Using a diplexer to bypass a line amplifier**



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