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# Technicolor DCI401MCS Integrator's Manual



**REVISION RECORD**

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## Introduction

The DCI401MCS is a setback tuner box with the following features:

### Pro:Idiom decryption

- Allow operators to deploy this product as a solution to enable both residential and commercial televisions with HDMI inputs to display Pro:Idiom protected HD content.

### MPEG4 support

- Supports legacy and limited function televisions, which may not decode all DIRECTV video formats.

### Interactive Channel Guide

- Interactive Channel guide allows a user to scroll through a customized channel guide and tune a channel directly from the guide, similar to a DIRECTV set top box.

### PSIP

- Supports in-band channel information and mapping via PSIP data included in off-air and DIRECTV signals originating from a COM2000 headend.
- Programming information is displayed on screen.
- **Note PSIP mapping is disabled in software versions that support IPG.**

### Remote Configuration

- Supports in-band remote management and configuration via the COM2000 HD headend
- Channel mapping
- Menu options
- User experience

### Remote Control

- Zigbee RF4CE Radio frequency remote does not require line of site operations. This allows mounting the DCI401MCS in a hidden location on the back of furniture or the TV.
- Pairing feature mates the remote with an individual unit to facilitate multiple TV locations in close proximity.
- Allows for control of the TV via infrared commands

### RF Remote

- Radio frequency remote does not require line of site operations. This allows mounting the DCI401MCS in a hidden location on the back of furniture or the TV.
- Pairing feature mates the remote with an individual unit to facilitate multiple TV locations in close proximity.

## Simple Operations

- Simple operating system replicates the TV experience without requiring complex menus or remotes.
- Exceptionally simple system for less technical users to operate without problems.

## Small Compact Design

- Dimensions

4.4" X 3.2" X .8"      112mm X 81mm X 20mm

## Technical Specifications

### System key resources

RAM	(for System, Video & OSD): 128 Mbytes
FLASH	16 Mbytes
Security	Supports Zenith Pro:Idiom copy protection

### Broadcast Channel Interface

Cable tuner	54 to 864 MHz (1GHz option)
Input impedance	75 Ohm unbalanced
Max. nondestructive input power	10 dBm
Channel spacing	6 MHz - IRC/ HRC/Standard channel plan
Demodulation	64/256-QAM - ITU J83 Annex B

### Transport Layer

Standard ISO13818-1	(MPEG-2 - SPTS / MPTS)
---------------------	------------------------

### Video

Standard	ISO13818-2 (MPEG-2) – MP @ ML & HL ISO14496-10 (MPEG-4 AVC) – MP @ L3 and HP @ L4, L4.1
Output aspect ratio	4:3 / 16:9
Output resolution	720 x 480i @ 29.97 – 4:3 720 x 480p @ 59.95 – 4:3 720 x 480p @ 59.95 – 16:9 1280 x 720p @ 59.95 – 16:9 1920 x 1080i @ 29.97 – 16:9

### Audio

Compression format	AC-3 per ATSC A/52A, MPEG-1 layer 2, MPEG4 part 3
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### Graphics

Colors	24 bit color with 8 bit alpha blend
Overlay	Partial / full over analog
Audio language	Stereo and SAP audio supported
Loader	Full code SW download w image authentication

### Closed captioning & VBI Data Processing

Insertion of CEA-608D closed captioning data (SCTE-20/SCTE-21) on RF

### Software

Architecture	TECHNICOLOR developed native software.
User experience	Operator configurable, simple channel up/down, volume up/down

### RF Remote Control Protocol

Zigbee RF4CE and infrared (IR) for TV functions

### **Front Panel**

Single-color LED for status indication and RF reception acknowledgement

### **Back Panel**

Power input

5 Volt DC

RF input

F type connector

RF output

F-type connector - Channel 3/4 only

HDMI port (with HDCP)

Channel 3/4 switch

Located on back panel

### **General Data**

Product certification

UL and FCC

MTBF

> 100,000 hours.

Operating temp range

+5°C to +45°C

DC pack

100-120V~ @ 60 Hz 5 VDC @ 1.2 A

Power consumption

Max 10W (AC power)

Dimensions

4.4" x 3.2" x 0.8" (112 mm x 81 mm x 20 mm)

## What's in the box?

Included with every DCI401MCS are the following:

- DCI401MCS set back box
- Power supply
- RF remote control and 2 AAA batteries
- 4' coaxial jumper
- 4' HDMI cable
- Instructions for remote control programming

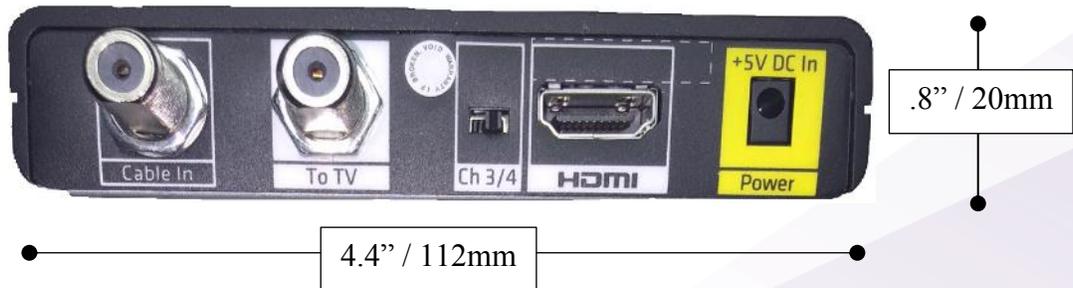


## Dimensions

Front View



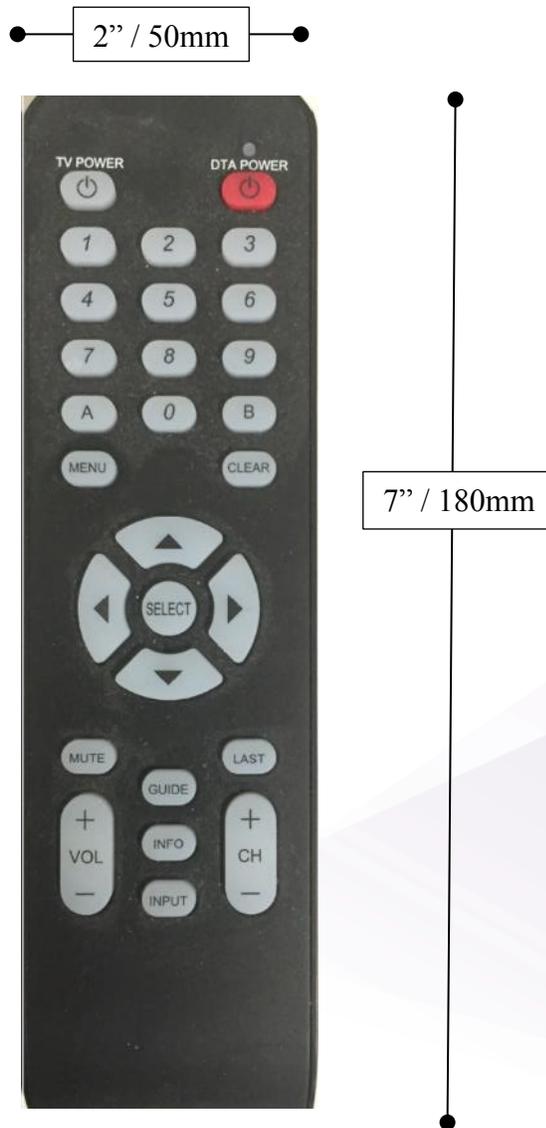
Rear View



Top View



## Remote Control



## Installation

Connect the RF input to the cable plant. Optimum signal levels should be 8dbmV +/- 5dB. However in a testing environment the unit has performed well between -5dBmV and +17dBmV.

Connect the unit to the TV via provided HDMI cable. The DCI401MCS RF coaxial outputs only standard definition. If possible set the TV to default to the HDMI input used.

When planning an installation remember that the DCI401MCS needs AC power. If TVs are wall mounted there must be adequate room to plug in the power adaptor. Which measures 3”H X1.5”W X 1.5” D



## Remote Setup

The DCI401MCS remote control communicates with the unit via a Radio Frequency (RF) signal. Unlike typical infrared remotes (IR) the RF signal does not require a line of site between the remote and the box. This allows the unit to be mounted in a discrete location without the need for remote IR receivers. Since the RF signal could possibly send unwanted commands to nearby boxes each remote needs to be assigned or paired to a unit.

At default (out of the box), The DCI401MCS remote has no TV codes programmed. All RC keys will be transmitting RF4CE signals until the remote is set-up for sending TV IR codes.

When the DCI401MCS is initially powered on the first remote key pressed will result in a request to pair the remote and DCI401MCS. Use the remote control number keys to enter the code shown.

If it becomes necessary to re-pair the unit use the following steps:

1. Press and hold the select and DTA Power buttons for approximately three seconds on the remote until the red light comes on. Then release the buttons. This will bring up the Remote Control Pairing screen as shown below.
2. Enter the three digit code shown on the screen.
3. Once complete you will see the confirmation screen.



The remote will now control only the DCI401MCS unit it has been paired to.

The DCI401MCS will also control most televisions. The user can program the remote to control a TV using infrared signal. The remote contains a US universal IR database. The remote control contains IR codes for the following TV functions: Power-toggle, Input, Volume+, Volume-, and Mute.

Below are instructions to program the remote for a TV. Instructions for remote pairing and TV programming are included in the DCI401MCS box.

1. Press and hold both the 1 and 3 buttons until the red light above the DTA Power button turns on.
2. Point the DCI401MCS remote at the TV while it is powered on.
3. Press and hold the TV Power button until the TV turns off. Release the TV power button for two seconds to lock in the code.
4. Point the remote at the TV and press the TV power button. The TV should turn on. The volume, mute and input buttons should now control the TV.
5. Included in the DCI401MCS box is an instruction set for pairing and programming the remote. You should leave several of these aids with your customer for future reference.

There are two additional buttons on the remote that will control functions.

A = Closed Captioning

B = Display settings

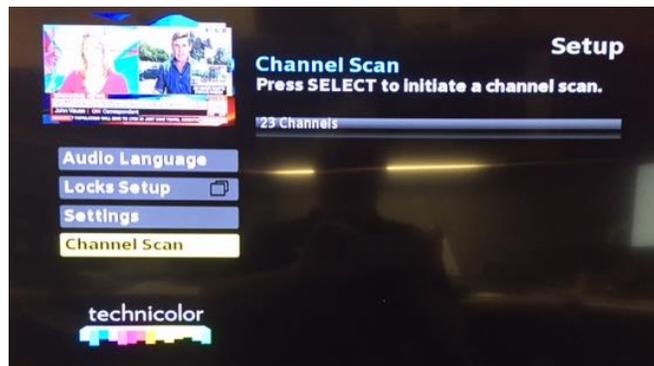
## Performing a Channel Scan

Upon initial power up the DCI401MCS will perform a channel scan. If PSIP mapping is being used the channels mapped in the EPG will load.

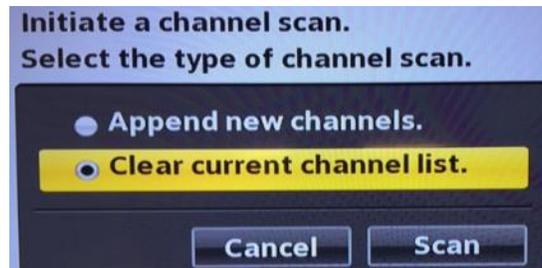
A manual scan may be performed from the DCI401MCS menu.

If IPG is used a manual scan will be required after the guide.xml file is created.

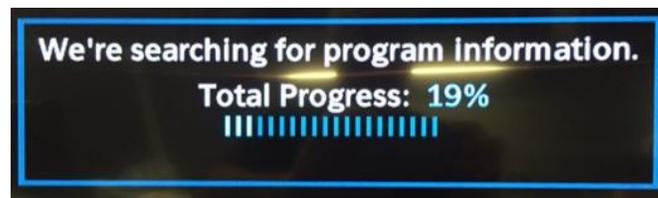
Navigate to the menu and select Channel Scan.



Select Clear current channel list and click Scan



Progress bar will appear on screen



## Menu Functions

The DCI401MCS has a user menu with convenient function and information screens:

The Audio Language and Locks Setup screens are usually left at default in commercial applications.



The settings option will bring you to the System info page. Important information from this screen is:

➤ The Unit Identifier

Unit Identifier number should be documented along with the location of the unit to facilitate direct access to specific DCI401MCS boxes from the COM2000 interface.

➤ Software Version

Should be the most current available from Technicolor. Take care if using PSIP on TVs not using DCI401MCS. PSIP channel mapping is disabled on software versions V01\_22\_XX and newer will disable PSIP channel mapping functions

➤ Power Level

Displays the RF power in dBmV.

➤ Signal to Noise

Displays Signal to Noise ratio in dBmV.

## Software Updates

As with most Technicolor equipment it is important to keep software versions current. Recent software versions can be acquired through your Distributor or downloaded from the Library section of the Technicolor support website.

<http://www.technicolor.com/en/solutions-services/connected-home/commercial-video-solutions/library>

***Important Note: V01\_22\_09 software (and newer) instruction set is to ignore PSIP mapping data from EPG. Channel mapping is done via the .XML file sent to the DCI401MCS. If you are using PSIP data load software version 02\_21\_06. DO NOT ATTEMPT TO LOAD SOFTWARE OLDER THAN 02.21.06, IT WILL RENDER THE DCI401 INOPERABLE!***

Download and save the software to your desktop or a designated folder on your computer.

Load the software to the COM46 TFTP Software Upgrade section of the Pairing info page. Refer to the COM2000 Integrator's Manual for detailed instructions.

Software Upgrade:  
Usage:  ▾  
Server\_IP\_Address:   
Filename:   
Mode:  ▾

### Browser Upload

TFTP server at 192.168.3.18 current files:  
3461316 DCI401MCS\_v01\_22\_06.bin

Upload a file to the TFTP server at 192.168.3.18  
 No file chosen

When you have uploaded the software highlight and copy the file name. Then navigate to the COM46 401 tab.

### DCI401MCS

MessageType:

Receiver\_ID:

RF\_Channel:

Bank:

Filename:

TFTP\_IP:

Paste the copied file name into the Filename field. Enter the IP address of the COM46 card you are using for TFTP.

It is recommended to enter the RF channel that the DCI401MCS is currently tuned to in the RF channel field.

If you leave the Receiver ID with the default 0xffffffff the update will go to all DCI401MCS boxes connected to the system.

If you prefer to send the update to only one unit then enter the Receiver ID in this field.

Press submit and the message below will appear on screen verifying the TFTP information.

```
Command401(0,4294967295,23,0,DCI401MCS_v01_22_06.bin)
tftp -l /tmp/www/tmpimg -r DCI401MCS_v01_22_06.bin -g 192.168.3.18
```

When the command is received the DCI401MCS will display a message on screen that it is receiving a software update.

You can verify the software version by navigating to the DCI401MCS Setup page.

This page also displays the input power level and SnR.

Use the DCI401MCS remote and navigate to the Menu > System Info page.



## Sending Commands and Setting Features

The COM46 card can send commands and feature sets to the DCI401MCS. From the drop down menu on the 401 tab you can select several options.

### DCI401MCS

MessageType:  ▼

Receiver\_ID:

RF Channel:

Bank:

Filename:

TFTP\_IP:

0 = Download Now      Used for software upgrades

1 & 2      N/A

3 = Feature Enable      Select Feature Enable and Checkboxes Entry Mode. The page below will be displayed. By default all features are enabled. Unchecking a box will disable that feature. It is recommended to disable the Power and menu keys in most environments with multiple guests such as hotels.. Click submit when complete.

MessageType:

Receiver\_ID:

Entry Mode:  Values  Checkboxes

Uncheck a feature to remove it.

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> (1) Power Key                                | <input checked="" type="checkbox"/> (2) Menu Key                              |
| <input checked="" type="checkbox"/> (3) Guide Key                                | <input checked="" type="checkbox"/> (4) CC Key                                |
| <input checked="" type="checkbox"/> (5) Format Key                               | <input checked="" type="checkbox"/> (6) Allow Channel Change                  |
| <input checked="" type="checkbox"/> (7) Allow User Password Override             | <input checked="" type="checkbox"/> (8) Main Menu: Audio Selection            |
| <input checked="" type="checkbox"/> (9) Main Menu: Locks                         | <input checked="" type="checkbox"/> (10) Main Menu: Settings                  |
| <input checked="" type="checkbox"/> (11) Main Menu: Channel Scan                 | <input checked="" type="checkbox"/> (12) Locks: Master Locks                  |
| <input checked="" type="checkbox"/> (13) Locks: Master Locks: Remove All         | <input checked="" type="checkbox"/> (14) Locks: Master Locks: Lock All        |
| <input checked="" type="checkbox"/> (15) Locks: Rating Limits                    | <input checked="" type="checkbox"/> (16) Locks: Rating: Lock Ratings          |
| <input checked="" type="checkbox"/> (17) Locks: Rating: Movie Limits             | <input checked="" type="checkbox"/> (18) Locks: Rating: TV Limits             |
| <input checked="" type="checkbox"/> (19) Locks: Rating: Unrated Limit            | <input checked="" type="checkbox"/> (20) Locks: Channel Locks                 |
| <input checked="" type="checkbox"/> (21) Settings: System Info                   | <input checked="" type="checkbox"/> (22) Settings: System Info: Model         |
| <input checked="" type="checkbox"/> (23) Settings: System Info: UID              | <input checked="" type="checkbox"/> (24) Settings: System Info: Serial Number |
| <input checked="" type="checkbox"/> (25) Settings: System Info: SW Version       | <input checked="" type="checkbox"/> (26) Settings: System Info: Power Level   |
| <input checked="" type="checkbox"/> (27) Settings: System Info: SNR              | <input checked="" type="checkbox"/> (28) Settings: Closed Captioning          |
| <input checked="" type="checkbox"/> (29) Settings: CC: Enable                    | <input checked="" type="checkbox"/> (30) Settings: CC: Analog                 |
| <input checked="" type="checkbox"/> (31) Settings: CC: Digital                   | <input checked="" type="checkbox"/> (32) Settings: CC: Font                   |
| <input checked="" type="checkbox"/> (33) Settings: CC: Font Size                 | <input checked="" type="checkbox"/> (34) Settings: CC: Font Style             |
| <input checked="" type="checkbox"/> (35) Settings: CC: Font Color                | <input checked="" type="checkbox"/> (36) Settings: CC: Font Opacity           |
| <input checked="" type="checkbox"/> (37) Settings: CC: Font Edge Type            | <input checked="" type="checkbox"/> (38) Settings: CC: Font Edge Color        |
| <input checked="" type="checkbox"/> (39) Settings: CC: Font BG Color             | <input checked="" type="checkbox"/> (40) Settings: CC: Font BG Opacity        |
| <input checked="" type="checkbox"/> (41) Settings: HDMI Setup                    | <input checked="" type="checkbox"/> (42) Settings: HDMI: Aspect Ratio         |
| <input checked="" type="checkbox"/> (43) Settings: HDMI: Resolution              | <input checked="" type="checkbox"/> (44) Settings: Remote Control             |
| <input checked="" type="checkbox"/> (45) Settings: Remote: Pair                  | <input checked="" type="checkbox"/> (46) Settings: Remote: Clear Pairing      |
| <input checked="" type="checkbox"/> (47) Settings: Remote: Disable Pairing       | <input checked="" type="checkbox"/> (48) Settings: Remote: IR Setup           |
| <input checked="" type="checkbox"/> (49) Settings: Look & Feel                   | <input checked="" type="checkbox"/> (50) Settings: Look & Feel: Banner Color  |
| <input checked="" type="checkbox"/> (51) Hidden Menu                             | <input checked="" type="checkbox"/> (52) Settings: HDMI: Audio Format         |
| <input checked="" type="checkbox"/> (53) Settings: Look & Feel: Guide Key        | <input checked="" type="checkbox"/> (54) Settings: Look & Feel: Timezone      |
| <input checked="" type="checkbox"/> (55) Settings: Look & Feel: Daylight Savings | <input checked="" type="checkbox"/> Bit56                                     |
| <input checked="" type="checkbox"/> Bit57  | <input checked="" type="checkbox"/> Bit58                                     |
| <input checked="" type="checkbox"/> Bit59  | <input checked="" type="checkbox"/> Bit60                                     |
| <input checked="" type="checkbox"/> Bit61  | <input checked="" type="checkbox"/> Bit62                                     |

- 4= Clear                      Clears all setting in the DCI401MCS
- 5 = Tune Channel            N/A
- 6 = Channel Scan            Commands the DCI401MCS to perform a channel scan
- 7 = Display Message        Places an on screen message on all channels. Enter a timeout in seconds and the message you would like to display on screen. Message will remain on screen until the timeout is reached, the user clicks OK, or the channel is changed.

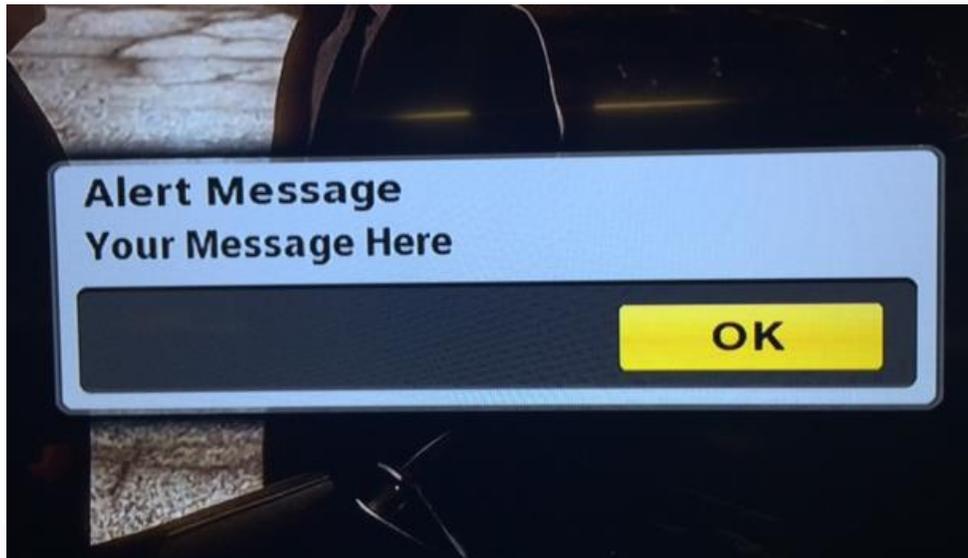
  

MessageType:

Receiver\_ID:

Timeout:

Text:



- 8 = HDCP SRM                N/A
- 9 = Guide Channel            N/A

10 = Text Override

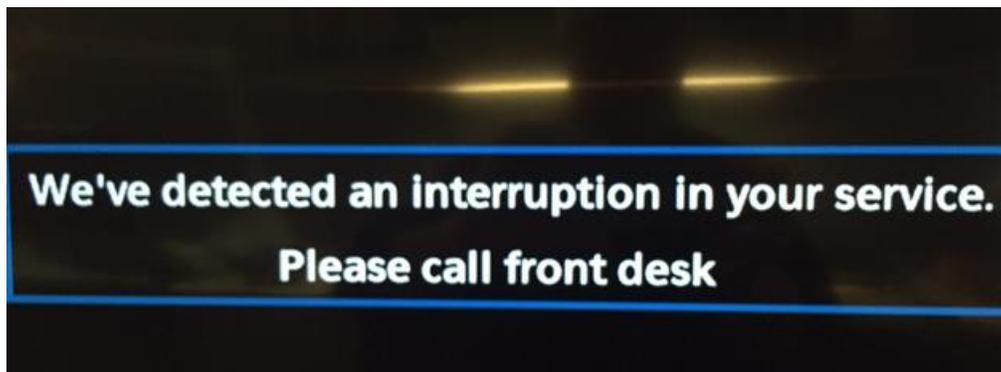
Provides a custom message to be displayed on the DCI401MCS when a signal interruption is detected.

MessageType:

Receiver\_ID:

String ID:

Text:



11 = Graphic Download N/A

12 = Channel Map

Downloads a channel map to the DCI401MCS. Not used when PSIP or Guide.xml is functioning.

If you wish to load a custom channel guide to a DCI401MCS follow the instructions on the Channel Map page:

freqIndex-programNum MajorNum-MinorNum ChannelName

Create you map in a Notepad file then copy and paste into the field in the Channel map option

13 = System Mode      System mode will send feature sets for the following:

- Closed Captioning ON OR OFF

#### DCI401MCS

MessageType:

Receiver\_ID:

Mode:

Value:

- 0 = Off
- 1 = On

- DTA power button ON, Off, (Cycle not used)

#### DCI401MCS

MessageType:

Receiver\_ID:

Mode:

Value:

- 0 = Off
- 1 = On
- 2 = Cycle

- Volume Level
  - 1=Volume off
  - 100=full volume from the DCI401MCS.
  - Actual maximum volume will be controlled by the current setting of the TV.

### DCI401MCS

Submit Channel\_Close

MessageType: 13 = System Mode ▾

Receiver\_ID: 0xffffffff

Mode: 2 = Volume Level ▾

Value: 1

- Display Mode Sets display mode to:
  - Auto (recommended)
  - Stretch
  - Pillarbox
  - Zoom

### DCI401MCS

Submit Channel\_Close

MessageType: 13 = System Mode ▾

Receiver\_ID: 0xffffffff

Mode: 3 = Display Mode ▾

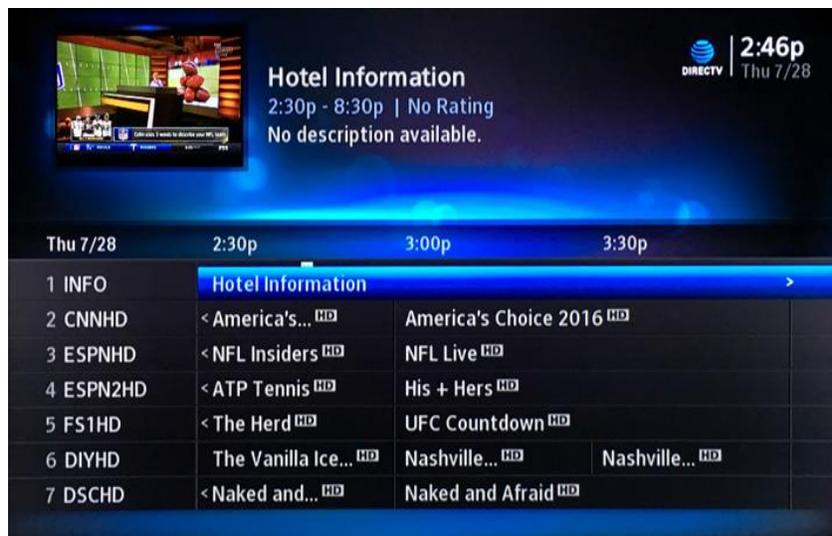
Value:
 

- 0 = Auto ▾
- 0 = Auto
- 1 = Stretch
- 2 = Pillarbox
- 3 = Zoom

- Time Zone
  - Use EPG settings for time zone controls

## Interactive Channel Guide

When used with a Technicolor COM2000 head end system the DCI401MCS provides your customers the convenience of an interactive channel guide similar in operations to a DIRECTV set top box. The guide is accessed by pressing the guide button on the DCI401MCS remote. Using the arrows on the remote control a viewer can scroll through the guide and tune to the highlighted channel using the select button.



The IPG requires the following software versions (or newer)

COM46      STO3.03.41

DCI401MCS v01\_22\_09

***Note: V01\_22\_9 software (and newer) instruction set is to ignore PSIP mapping data. Channel mapping is done via the .XML file sent to the DCI401MCS. If you are using PSIP data retain or load software version 01\_17\_00 or earlier. IPG will not function.***

***The IPG is not compatible with COM24 cards.***

## IPG Channel Guide Setup

Before you start creating a guide click on the **Discover** tab to load recent changes into the guide files.

Navigate to the EPG tab of the COM46 user interface. To activate the IPG you must enter a 3 in the Mode field. Do not enter an IP address or port assignment.

Set the Timezone offset and Timezone Psip fields to reflect your location.

### Electronic Program Guide Display

DestIP:	<input type="text" value="1.2.3.4"/>	
DestPort:	<input type="text" value="0"/>	
TimezoneOffset:	<input type="text" value="8"/>	Pacific=8;Mountain=7;Central=6;Eastern=5
TimezonePsip:	<input type="text" value="8"/>	
Mode:	<input type="text" value="3"/>	0=normal; 1=ignoreDST; 2=Welcome screens (welcome#.bmp); 3=guide.xml
LogoTftpServerIP:	<input type="text"/>	
LogoFilename:	<input type="text"/>	170x60 24bbp bmp bitmap file

Click on Guide.xml and the currently playing channels will load.

The format is displayNumber[-minor] majorNumber-[minorNumber]-[hd|sd] qamChassis port  
OR displayNumber-minor NMyChan\_Event\_info qamChassis port  
The chassis and port are used for PSIP guide generation. Set to -1 to disable.

```
6-0 6-65535-hd 7 81
8-0 8-65535-hd 7 82
13-0 13-65535-hd 7 83
202-0 202-65535-hd 7 97
206-0 206-65535-hd 7 129
209-0 209-65535-hd 7 130
216-0 216-65535-sd 7 115
218-0 218-65535-hd 7 131
229-0 229-65535-hd 7 145
231-0 231-65535-hd 7 146
239-0 239-65535-hd 7 147
242-0 242-65535-hd 7 161
244-0 244-65535-hd 7 162
245-0 245-65535-hd 7 163
246-0 246-65535-hd 7 177
247-0 247-65535-hd 7 178
248-0 248-65535-hd 7 177
249-0 249-65535-hd 7 193
265-0 265-65535-hd 7 194
269-0 269-65535-hd 7 195
501-0 501-65535-hd 7 98
502-0 502-65535-hd 7 99
506-0 506-65535-hd 7 113
545-0 545-65535-hd 7 114
```

<- Load currently playing channels.

The channel information loads with the DIRECTV channel numbers as default, if left as is the DCI401MCS will be mapped to the DIRECTV channel lineup. You can edit the channel mapping as you would in an EPG system by changing the default number to the property requested lineup as shown below. See the COM2000 Integrators Manual for details.

```

2-0 NInfo_Hotel Information 7 84
3-0 6-65535-hd 7 81
4-0 8-65535-hd 7 82
5-0 13-65535-hd 7 83
6-0 202-65535-hd 7 97
7-0 206-65535-hd 7 129
8-0 209-65535-hd 7 130
9-0 216-65535-sd 7 115
10-0 218-65535-hd 7 131
11-0 229-65535-hd 7 145
12-0 231-65535-hd 7 146
13-0 239-65535-hd 7 147
14-0 242-65535-hd 7 161
15-0 244-65535-hd 7 162
16-0 245-65535-hd 7 163
17-0 246-65535-hd 7 177
18-0 247-65535-hd 7 178
19-0 248-65535-hd 7 177
20-0 249-65535-hd 7 193
21-0 265-65535-hd 7 194
22-0 269-65535-hd 7 195
23-0 501-65535-hd 7 98
24-0 502-65535-hd 7 99
25-0 506-65535-hd 7 113

```

Submit EpgLoad Guide.xml <- Load currently playing channels.

When you have completed edits click Submit.

Once you have created an IPG guide you will need to complete a channel scan on the DCI401MCS.

It may take several minutes for the guide data and channel mapping to take effect.



The DCI401MCS and accessories are available through our Network of Distributors listed in the “Contact Us” section of [www.technicolor.com/mcs](http://www.technicolor.com/mcs) . For added convenience, individual and small volume purchases of the DCI401MCS as well as spare Remotes and Power Supplies are also available via credit card purchase at: [www.technicolorstore.com](http://www.technicolorstore.com)