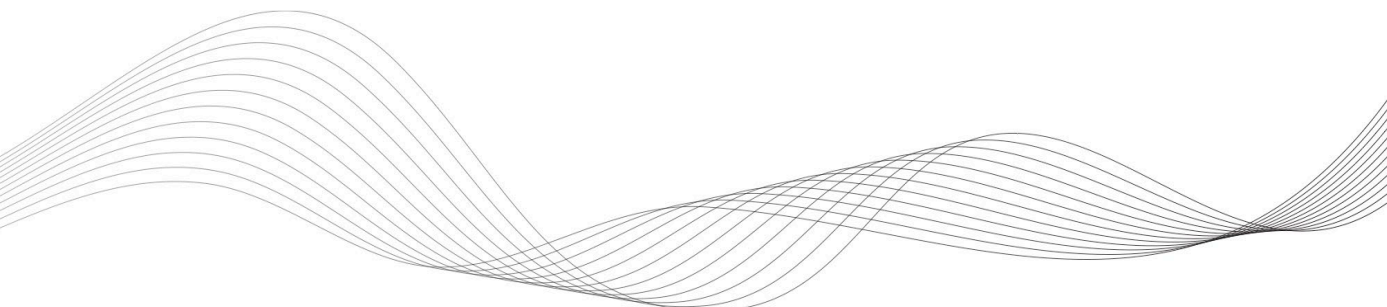


**PDI IPTV & MULTIMEDIA PLAYER APP
USER GUIDE**




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OVERVIEW

The PDI IPTV & Multimedia App, also known as PDI IPTV Player, is found on PDI A-Series TVs and medTAB products. It is a multimedia player that can show live and on demand content. The source of the content can be on-premises live streaming multicast over ethernet/wifi, or it can be on-demand content from a local USB or on premises server such as DLNA or FTP. Traditional sources of content such as RF cable and HDMI are viewed by a separate app on the A-series medTV or medTAB.

This document applies to PDI TV Player v1.0.7 and newer.

IPTV NETWORK REQUIREMENTS

To ensure compatibility with the PDI IPTV app, the IPTV network must be installed correctly based on the following guidelines. Additional information about IPTV, including what to consider when designing the infrastructure for an IPTV distribution system, can be found here:

<https://www.pdiarm.com/iptv>

Be sure to download PDI's white paper, "**Designing IPTV Infrastructure for PDI TV and TAB**".

SIGNAL SOURCE

- The IPTV channel source is typically a rack-mounted transcoder in the facility's headend room or MDF.
 - The transcoder input is usually either a roof mounted satellite dish, a cable company coax or optical fiber.
 - Transcoders compatible with PDI TVs include, but are not limited to
 - ATX UCrypt
 - Blonder Tongue NexGen
 - DirecTV COM3000
 - Dish SMARTBOX 2
 - In some cases, a roof mounted off air antenna is also used as an input.
- PDI TVs are compatible with the following stream formats over ethernet
 - Transport layer: UDP (with or without RTP)
 - Network layer: IP, IGMP
 - Video Encoding: MPEG-2 and AVC / MPEG-4 Part 10
 - DRM Encryption: ProIdiom-M (including the Dish Network variant) and AES-128
 - Encapsulation: MPEG-2 single program (SPTS) and multiprogram transport streams (MPTS)


IGMP SNOOPING AND QUERYING

- IPTV uses IP multicasting so all switches must support IGMP and it must be configured properly.
- IGMP Querying must be enabled on the core switch attached to the headend transcoder. Querying must be enabled globally and on the vlan used for IPTV.
- IGMP Snooping must be enabled on all the switches to ensure that multicast traffic is being properly forwarded only to devices that request it. It must be enabled globally and on the vlan used for IPTV. Check whether your network requires IGMP v2 or v3, then be sure all devices are set to support the same version. Most systems will use v2, but if the headend transcoder uses Source Specific Multicasting (SSM) then IGMP v3 must be set on all switches.
- If the building has an IPTV source outside the headend/MDF such as a chapel video feed, there may be a switch between it and the IGMP querier. The intermediate switch must be set to forward all incoming unknown multicast toward the querier/mrouter.
- If the headend transcoder is on a different vlan from the televisions, multicast routing must be enabled between vlans.

IP ADDRESSING

- Each video channel from the head end must be assigned a unique IP multicast group address and port.
- TV channels may be single program (SPTS) or multiprogram (MPTS) transport streams.
- PDI TV's must have a unicast host address assigned either by DHCP or static. The TV will not listen for multicast packets without a unicast address assigned to the TV.
- For IPTV channel assignment, PDI recommends using administratively scoped multicast address space as defined in RFC 2365.
- If Source Specific Multicast is used, select IP addresses in the 232.0.0.0/8 CIDR range as this is compatible with most systems.



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- The following IP addressing scheme is used by default in the IPTV app. It is recommended to follow this when creating your custom lineup so troubleshooting is easier.
 - The channel number range is 1 to 9999.
 - The multicast range is 239.255.0.1 through 239.255.99.99 and the default port is 1234.
 - The last octet of the IP address represents the lower 2 digits of the channel number.
 - The 3rd octet of the IP address represents the hundreds and thousands digits of the channel number.
 - Examples of default channel numbers:
 - TV channel 1 is on udp://239.255.00.01:1234
 - TV channel 105 is on udp://239.255.01.05:1234
 - TV channel 500 is on udp://239.255.05.00:1234
 - TV channel 9999 is on udp://239.255.99.99:1234

TV SETUP: A-SERIES MODELS ENDING IN A OR B

The following instructions include upgrading TV firmware to the latest v2.XX version. You must have a red PDi programmer remote, PD108-520 (or a PD108-420 remote with overlay sticker PD227-298). A USB or wireless keyboard and mouse is recommended but not required. See product user manual, PD196-389 for additional details.

TV FIRMWARE UPDATE

The default TV application on PDi's A-Series TVs (model numbers PDI-AxxA, PDI-AxxB) is RF(coax)-based. To view IP channels, the IPTV player must be enabled. The first step to enabling IPTV is to update the TV firmware to at least v2.60.

To check to see what version of FW is loaded:

- From the RF TV Application, press TV SET UP on programmer remote -> Common ->System Info -> TV Version.
- Verify that the TV firmware is at least 2.60

To upgrade:

- From the TV Main Menu, press TV SETUP on programmer remote -> Common
- Select System Upgrade
- Select "check for system update"
- DON'T POWER OFF. Unit will reboot.
- If the TV is running V1.xx, it is now ready to be upgraded to v2.xx.
- Repeat the steps above to get back to the OTA screen but don't check for an update yet.
- Change OTA Settings so the "1" in the 5th and 6th lines are "2"
 - 1build.prop -> 2build.prop
 - .1ota.zip -> .2ota.zip
- Select "check for system update".
- DON'T POWER OFF. Unit will reboot.

IPTV INITIAL SETUP THROUGH SETUP WIZARD

Once the TV firmware updates and the TV reboots, the TV will enter the Setup Wizard. The final step of the Setup Wizard will be default TV app selection (selecting the RF TV application or the IPTV application). Select IPTV in this final step. Once IPTV is enabled, the TV application on the Main Menu will now be PDi's IPTV player. The TV can be used in IPTV-only mode, which disables the Main Menu with Games, Relaxation (Education, Internet, and News). Instructions to set the TV for IPTV only are below.

ACCESS TO HOSPITAL TV SETTINGS

Some system settings can only be accessed through the RF TV application. To get to these settings, from within the IPTV application, press "TV/AV" button on the red remote and select TV. Press "TV Setup" button on the red remote. You now have access to all of the hospital TV settings.



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IPTV-ONLY POWER ON CONFIGURATION

To configure the TV to start on an IPTV channel, instead of the home screen, follow these instructions. From the main menu or form within the IPTV application:

1. Press the TV/AV button on the program remote. Navigate to TV and press OK.
2. Press "TV Setup" button on the red remote.
3. Navigate to Sources -> Default Source. Set to Last
4. Navigate to Common -> CH +/- Change Source. Toggle to OFF
5. Navigate to Common -> Standby Power -> Set Standby Power to High
6. Exit out of menus by pressing back button on remote.
7. Press the TV/AV button on the remote. Navigate to Home and press OK
8. From the TV home screen, switch the program remote to mouse mode by pressing the mouse button on the remote. You will see a message on the TV indicating the TV is now in mouse mode.
9. With the navigation arrows, move the mouse to the medTV logo (or other logo if the TV has been previously customized through GENiO) in the top left corner of the screen. Press and hold the OK button on the remote until a password entry window appears.
10. Enter the default password 45066. NOTE: The TV will still be in mouse mode. The numbers can be entered with the keypad on the remote but to select OK, you will need to navigate the mouse cursor to the OK button. Alternatively, you can put the TV back in keyboard mode by pressing the mouse button on the remote.
11. The Device Management Menu below will appear. Press 3 on the red remote to move the Enable Top-leftmost Startup switch to on.
12. Press 9 to Save and Exit. The TV should now power on into IPTV.
13. To get out of IPTV, press the TV/AV button on the red remote and select either TV or Home depending on menus you need to access.

Device Management

Basic info's (project identifier: 999999)

BUILD ID	m7332_us-userdebug 11 RP1A.200720.011 eng.buide.20240814.164836 dev-keys			
PRODUCT	m7332_us	HWID	f4201527be5c	
MODEL	A32C	MANUFACTURER	CVT_NULL	
Device name	Notes			
9A1632F06E19D4A0	Setup by configuration page			
Assigned department	Location			

Terminal network info's

Ip Address	Netmask	CIDR	Address Family	MAC
192.168.200.63	255.255.255.0	192.168.200.63/24	IPv4	f4:20:15:27:be:5c

1-SETTINGS
2-SETUP WIZARD
 3-Enable Top-leftmost Startup
0-CANCEL
9-SAVE and EXIT

CONFIGURE IPTV CHANNELS

See the "IPTV App Settings" section below in this document.

TV SETUP: A-SERIES MODELS ENDING IN C

You must have a red PDi programmer remote, PD108-520 (or a PD108-420 remote with overlay sticker PD227-298). A USB or wireless keyboard and mouse is recommended but not required. See product user manual, PD196-457 for additional details.

IPTV INITIAL SETUP THROUGH SETUP WIZARD

The final step of the Setup Wizard on PDi's A-Series TVs (models PDI-AxxC) will be default TV app selection (selecting the RF TV application or the IPTV application). Select IPTV in this final step. Once IPTV is enabled, the TV application on the Main Menu will



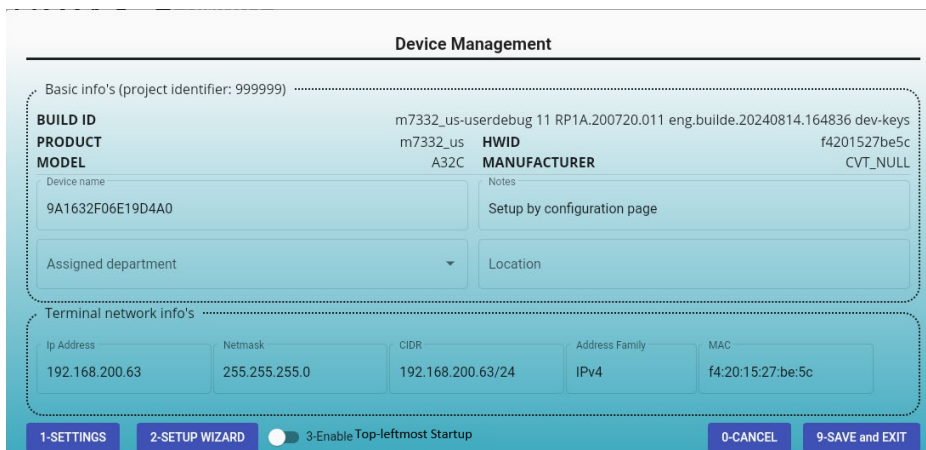
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now be PDi's IPTV player. The TV can be used in IPTV-only mode, which disables the Main Menu with Games, Relaxation (Education, Internet, and News). Instructions to set the TV for IPTV-only are below.

CHANGE TO IPTV - RESET CONFIGURATION

If necessary, reset the TV's configuration to use the IPTV application instead of the RF application:

1. From the TV home screen, switch the program remote to mouse mode by pressing the mouse button on the remote. You will see a message on the TV indicating the TV is now in mouse mode.
2. With the navigation arrows, move the mouse to the medTV logo (or other logo if the TV has been previously customized through GENiO) in the top left corner of the screen. Press and hold the OK button on the remote until a password entry window appears.
3. Enter the default password 45066. NOTE: The TV will still be in mouse mode. The numbers can be entered with the keypad on the remote but to select OK, you will need to navigate the mouse cursor to the OK button. Alternatively, you can put the TV back in keyboard mode by pressing the mouse button on the remote.
4. The Device Management Menu below will appear. With the TV in keyboard mode, press 2 on the remote to reconfigure the device per the set up wizard instructions above.



Device Management

Basic info's (project identifier: 999999)

BUILD ID	m7332_us-userdebug 11 RP1A.200720.011 eng.builde.20240814.164836 dev-keys		
PRODUCT	m7332_us	HWID	f4201527be5c
MODEL	A32C	MANUFACTURER	CVT_NULL

Device name: 9A1632F06E19D4A0

Notes: Setup by configuration page

Assigned department: [dropdown]

Location: [dropdown]

Terminal network info's

Ip Address	Netmask	CIDR	Address Family	MAC
192.168.200.63	255.255.255.0	192.168.200.63/24	IPv4	f4:20:15:27:be:5c

1-SETTINGS 2-SETUP WIZARD 3-Enable Top-leftmost Startup 0-CANCEL 9-SAVE and EXIT

ACCESS TO HOSPITAL TV SETTINGS

From the main menu or from within the IPTV application:

1. Press the TV/AV button on the program remote. Navigate to TV and press OK.
2. Select Cancel on scan for channels pop up menu.
3. Press TV Setup on the red remote. You now have access to all of the hospital TV settings

IPTV-ONLY POWER ON CONFIGURATION

To configure the TV to start on an IPTV channel, instead of the home screen, follow these instructions. From the main menu or from within the IPTV application:

1. Press the TV/AV button on the program remote. Navigate to TV and press OK.
2. Select Cancel on "scan for channels" pop up menu.
3. Press TV Setup on the red remote.
4. Navigate to Sources -> Source Enable. Set the sources as follows:
 - TV - Enable No APO
 - HDMI 1 - Disable
 - HDMI 2 - Disable
 - HDMI 3 - Disable
 - USB MEDIA - Disable
 - HOME - Disable
 - IPTV - Enable



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5. Navigate to Sources -> Default Source. Set to IPTV
6. Navigate to Common -> CH +/- Change Source toggle to OFF
7. Navigate to Common -> Standby Power -> Set Standby Power to High
8. Exit out of menus by pressing back button on program remote.
9. Press the TV/AV butt on the program remote. Navigate to IPTV and press OK

CONFIGURE IPTV CHANNELS

See the "App Settings" section below in this document.

TV SETUP: MEDTAB-E MODEL

The following instructions are for medTABs with MEDTAB-E model numbers. To use IPTV on older MEDTAB-C and MEDTAB-D models, contact PDi at 937-743-6010 ext 2 for instructions.

A red PDi programmer remote, PD108-520 (or a PD108-420 remote with overlay sticker PD227-298) may be useful but is not required. See product user manual, PD196-448 for additional details.

UPDATE TV FIRMWARE

The first step to enabling IPTV is to update the TV firmware.

To upgrade:

- Ensure your device is connected to the internet
- From the medTAB Main Menu, press and hold the medTAB logo in the top left corner until a password screen appears
- Password is 45066
- Select Device Preferences -> About -> System update
- An update will start automatically if an update is available.
- Update can take as long as 8-9 minutes. DON'T POWER OFF. Select Reboot button
- To finalize the update, do a factory reset by going to Settings -> Device Preferences -> About -> Factory Reset. Confirm Factory Reset - > Erase everything

IPTV INITIAL SETUP THROUGH SETUP WIZARD

Once the medTAB firmware updates and the unit reboots, the TV will enter the Setup Wizard. The final step of the Setup Wizard is the default TV app selection (selecting the RF TV application or the IPTV application). Select IPTV in this final step. Once IPTV is enabled, the TV application on the Main Menu will now be PDi's IPTV player. The TV can be used in IPTV-only mode, which disables the Main Menu with Games, Relaxation (Education, Internet, and News). Instructions to set the TV for IPTV only are below.

ACCESS TO HOSPITAL SETTINGS

A remote can be used for IPTV setup on a medTAB if desired. The instructions contained herein use the touchscreen.

1. Open the TV application
2. Press the screen to bring up the onscreen menu and press the Features settings wheel -> App settings
3. Admin password is 45066
4. See IPTV App Settings section below in this document for instructions on how to configure IPTV Channels



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IPTV APP SETTINGS

SETTINGS MAIN MENU

The following is an overview of the IPTV setting menu. To access the settings, from within the IPTV application:

1. Press TV Setup on program remote, or select “App settings” from the touch screen control bar.
2. Default password is 45066

Section	Menu item	Description
Channels	Channel configurator	See Channel Configurator section below for detailed instructions
	Video debug mode	Information about channels to help debug issues
	Closed captions type	Select CEA-608 or CTA-708 caption encoding format. If one setting doesn't show captions, try the other.
	Encryption mode	Defaults to ProIdiom-M. If channels are not encrypted, there is no harm in having an encryption mode enabled. None – No decryption will be applied. ProIdiom-M – This requires a decryption key that was entered into the headend when setting up ProIdiom-M encryption. AES-128 – This requires a decryption key that was entered into the headend when setting up AES-128 encryption. ProIdiom-M DISH Smartbox – Version of ProIdiom only used by DISH Smartbox. Key is defaulted into the hardware, no configuration required.
	Allow sorting	When enabled, the sorting option is shown to the user in the channel list. This can be hidden when the channel list does not have useful names and group ids.
User controls	Remote control mode / Pillow speaker mode	Normal – select if pillow speaker/remote has navigational arrows Option – select if pillow speaker/remote has 0-9 number keys and an OPTION button but no navigation buttons Timer – select if pillow speaker/remote has 0-9 number keys and a button that allows user to cycle through menus, but no OK/ENTER. When the desired option is chosen, it will be selected when menu times out
	Close when reaching first or last channel	If enabled, channel up past the highest channel or channel down past the lowest channel will take the user to the TV Main Menu
Defaults	Default Channel	First time IPTV is opened and after a data wipe, the IPTV player will tune to this channel. Otherwise, the IPTV player will stay on the last channel watched by user
	Default captions on	First time IPTV is opened and after a data wipe, the IPTV player will set captions to this setting. Otherwise, the IPTV player will use the last captions mode set by user
	Default aspect ratio	First time IPTV is opened and after a data wipe, the IPTV player will set aspect ratio to this setting. Otherwise, the IPTV player will use the last aspect ratio set by user. Full – default setting Zoom – 4:3 channels that are broadcast in 16:9 often get framed in black by the TV so the image only takes up the center part of the screen. With the Zoom setting, these images will fill the entire screen 16:9 4:3
Media sources	Enable USB play	When using IPTV on PDi TVs, there are two USB media players available. PDi recommends using this app's USB media player and disabling the other media player. To give users access to this media player, enable it here. Users access the USB media player by inserting USB drive and opening the channel list. From the channel list, they select the USB icon at the top of the menu. A file browser will display all media available on the USB.



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Section	Menu item	Description
	Enable DLNA play	To give users access to the DLNA media player, enable it here. Users access the DLNA media player by inserting USB drive and opening the channel list. From the channel list, they select the movie icon at the top of the menu. A file browser will display all media available on the DLNA server.
	Select DLNA server	Menu will automatically display possible DLNA servers it finds on the network. Choose the correct server and OK.
Debugging	Enable tracing	For developer debugging only
System	Open system settings	Opens the android settings
	Change app settings passcode	Default passcode is 45066
	About version	Access information about the IPTV player version and publish date



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CHANNEL CONFIGURATOR

To Configure the Channel list:



- Enter the app settings as described above.
- Select Channel Configurator

Configurator Page Layout

Across the top of the Channel configurator page are settings that will apply to the entire channel list

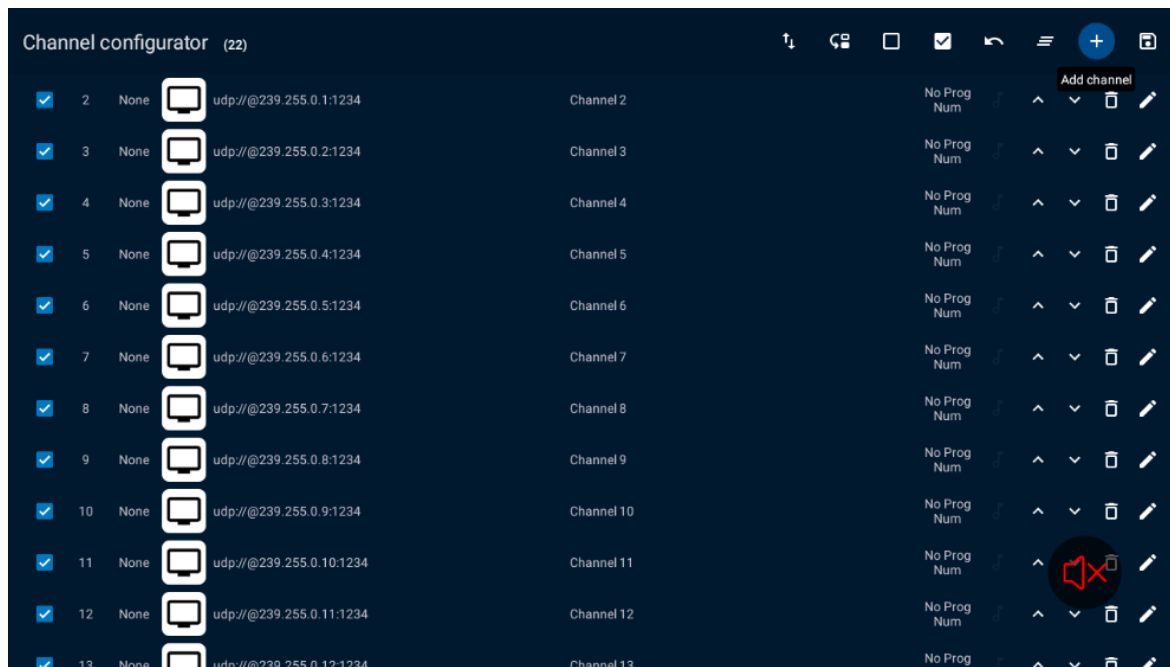
-  Import/export files to/from USB
-  Jump to the specific channel you want to edit
-  Disable all channels
- Enable all channels
-  Undo
-  Remove all channels
-  Add channels
-  Save

When at least one channel has been added to the list, each channel is a line item in the channel configurator. On each line the following actions can be selected.

- Enable/disable channel
- ^ v Reorder channel
-  Delete channel
-  Edit individual channel

The channel information is shown with the following columns

ENABLED	CHANNEL#	GROUP	LOGO	URL	NAME	MPEG-PROG#	ACTIONS
---------	----------	-------	------	-----	------	------------	---------



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Default Channels

A default channel mapping exists when the channel configurator is empty. When at least one channel is entered into the list, all the defaults are removed. See the section “IP Addressing” earlier in this guide for a description of the default channels.

Import / Export Files

“Export configuration” saves the channel list in m3u format to USB. “Import configuration” reads in the channel list plus the other config files including the ProIdiom key, AES key, and DLNA server. See section “Configuration Files” later in the document for more details on these files.

The IPTV app stores settings in several different files to make it easy to import only the settings you want to change. When the app is configured as desired, all settings will be included in the TV’s system “clone” duplication process, so the settings will not need to be separately imported after completing the clone process.

Add Channel Range

Select the + button and then select Add channel or Add channel range.



Menu item	Description
Starting ID	This will be the lowest channel number. Many facilities elect to have the first channel start at Channel 2
Channel count	this should be set to the number of IPTV channels available on your system
IP rollover at 99	If this box is checked, the channel lineup will be user readable. For example, channel 99 will be 239.255.0.99, channel 100 will be 239.255.1.00. If unchecked, channel 255 will be 239.255.0.255 and channel 256 will be 239.255.1.0
Group	Assigning a group for each channel allows you to group or organize channels by channel type. Available groups: None, Sports, Kids, News, Broadcast, Lifestyle, Music, Movies, Shopping, Other
Protocol	select UDP or RTP
Source IP	Enter the Source Specific Multicast address. This can be left blank if not used.
Starting IP	default is 239.255.0.1 This can be any valid multicast group address (224.0.0.0 - 239.255.255.255)
Port	default is 1234
Music channel	check this box only if the channel is a music or other audio only channel. Checking this box will enable the IPTV player to display album covers or images embedded in the stream.
SAVE	The channel edits must be saved or they will be lost.

A channel number higher than 9999 is not allowed. If the range starts below 9999 but exceeds that number, then the range will end at 9999.



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Add Single Channel

Select the + button and then select Add channel or Add channel range.


Menu item	Description
ID	Enter the desired channel number for the IP stream. The default will be the lowest available channel number.
Enabled	Check the box to put the channel in your channel map
Group	Assigning a group for each channel allows you to group or organize channels by channel type. Available groups: None, Sports, Kids, News, Broadcast, Lifestyle, Music, Movies, Shopping, Other
Protocol	select UDP or RTP
Source IP	Enter the Source Specific Multicast address. This can be left blank if not used.
IP	Enter the IP address for the channel. This can be any valid multicast group address (224.0.0.0 - 239.255.255.255)
Port	default is 1234
Program number	<p>If the head end transcoder takes off air channels (from an antenna) that have subchannels (ie. 16-1, 16-2, 16-3, etc.) and puts them straight to IP as MPTS, by default the system will randomly pick only one of the subchannels. To specify each subchannel, add the MPEG program number from the Program Association Table as assigned by the broadcaster.</p> <p>The MPEG program number can be learned through your PC running an app such as VLC, or through a handheld device such as the Televes H30 Evolution with IPTV monitoring capability. Plug the Televes into your IPTV network. Enter the IP address of the applicable channel. Navigate through the menus to find the SID number.</p>
Tvg-id	Requires a Tivo subscription. Provides access to a full program guide with TVG-IDs provided by Tivo.
Channel name	Name field must be populated with at least on character.
Channel image	Add url to an icon
Music Channel	check this box only if the channel is a music or other audio only channel. Checking this box will enable the IPTV player to display album covers or images embedded in the stream.
SAVE	The channel edits must be saved or they will be lost.

After adding channels and pressing save, the channel list will be displayed. If a duplicate channel number exists, then a popup will ask if you want to overwrite the channel or renumber. If renumbering, then 1 is added to the existing channel number to make room the the newly created one. If that creates a new duplicate, the process of adding 1 to each channel number repeats until there are no duplicates.



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Edit Individual Channels

To edit an individual channel, from within the channel map, select the pencil icon  for that channel.

Channel 2

ID Will be used to determine channel order

Enabled

Group

Protocol

Source IP SSM source IP address of the channel (may be blank)

IP IP address of the channel

Port Stream port

Program number The PAT program number to play

tv-g-id Should be an id compatible with Tivo

Channel name Name displayed to the user

Minimizing the soft keyboard

If the soft keyboard pops up when using a physical keyboard, press the back button on the programmer remote, or touchscreen, to minimize the soft keyboard.



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VIDEO DEBUG MODE

Check the box to enable debug mode, then press the back button on the remote to view.

There are two sections of information, TRACKS and STATS

By default, you will see Tracks. It shows the codecs, resolution, framerate and available closed captions. To switch to STATS, right to highlight stats and press ok. You may need to arrow up before arrowing right. Stats show the IP address, Media source, decryption mode, and data counters as shown below.

Category	Menu item	Description
IO	Host IP address(es)	TV's host IP address
	Media Source	Multicast stream url that is playing
	Elapsed Time	Time viewing the current channel in days:hours:min:sec
	Program ID	MPEG program number that is playing
	Program name	MPEG program name found in the stream
	Demux bitrate	Bandwidth of the program that is playing
	Input bitrate	Bandwidth of the full stream. If the channel has multiple subchannels this will be much larger than the demux rate.
	Demux corrupted	Corrupted packet counter
	Demux discontinuity	Discontinuity occurrence counter
	Demux read bytes	Total bytes read from the stream that is playing
Audio	Decoded	Block counter
	Played	Block counter
	Lost	Block counter
Video	Decoded	Block counter
	Displayed	Block counter
	Lost	Block counter
Encryption	Selected Mode	Encryption mode selected in the admin settings.
	Details	Diagnostic details of the decryption engine. This data varies.

IPTV APP VERSION

To check the version of the IPTV player app, from the IPTV player

1. press TV SETUP on red remote
2. Enter the passcode (45066 is the default)
3. Press OK
4. Scroll down to About Version.

The top number is the version. The second is the release date.



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CONFIGURATION FILES

The IPTV app stores settings in several different files to make it easy to import only the settings you want to change. Importing and exporting these files using the GUI is described in the Channel Configurator section. The app GUI is the easiest way to import settings, but you may also copy the files to the following location on the TV file system.

/sdcard/Download/

Files in that location will be automatically imported the next time the app starts. When the app is configured as desired, all settings will be included in the TV's system "clone" duplication process, so the settings will not need to be separately imported after completing the clone process.

CHANNEL MAP FILE

Filename: m3uchannels.m3u

Channel information is stored in the industry standard m3u text file format. Example file contents with channel numbers 2, 3, and 4 is shown below.

Line	Contents
1	#EXTM3U
2	#EXTINF:-1 tvg-idx="2" tvg-prog-num="0" tvg-id="CH-24741" tvg-name="ABC" tvg-language="English" tvg-logo="https://" tvg-country="US" tvg-url="https://" group-title="Broadcast" is-audio="false",ABC
3	rtp://@239.255.0.2:1234
4	#EXTINF:-1 tvg-idx="3" tvg-prog-num="0" tvg-id="CH-23341" tvg-name="Fox News" tvg-language="English" tvg-logo="https://" tvg-country="US" tvg-url="https://" group-title="News" is-audio="false",Fox News
5	udp://@239.255.0.3:1234
6	#EXTINF:-1 tvg-idx="4" tvg-prog-num="0" tvg-id="CH-23341" tvg-name="ESPN Sports" tvg-language="English" tvg-logo="https://" tvg-country="US" tvg-url="https://" group-title="Sports" is-audio="false",ESPN Sports
7	https://nice.channels.tv:9889

The first line must contain **#EXTM3U**.

The **tvg-idx** tag is the virtual channel number shown to the user. It associates a channel number to the source URL and is used to sort the channels numerically.

The **tvg-prog-num** tag is the MPEG program number found in the PAT of the transport stream. This is used for selecting the sub-channel from a MPTS. When this value is zero, the IPTV player will select the lowest (or only) program number that is present in the stream. Zero is the default when this value is not present.

The **tvg-id** tag is an internal unique id used by the older PDI IPTV app. It can be left blank.

The **group-title** tag options are None, Sports, Kids, News, Broadcast, Lifestyle, Music, Movies, Shopping, Other. This allows the user to sort channels by genre.

The **is-audio** tag is true/false to indicate if software decoding shall be used. Software decoding sometimes works better for audio channels that have slowly changing still images. When set to false, hardware audio/video decoders are used. False is the default when this value is not present.

The remaining tags are standard m3u tags. See <https://en.wikipedia.org/wiki/M3U>



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DLNA URL FILE

Filename: dlna.txt

The IPTV app can play media files hosted on a DLNA server. To manually specify the full DLNA url, it may be copied to a file named dlna.txt and imported. Alternatively, the app can automatically search for DLNA servers from the settings menu without the need for importing the url.

PROIDIOM-M SITEKEY FILE

Filename: sitekey.txt

ProIdiom-M encryption requires a unique, site specific 32-byte key code. It must be shared with the headend transcoder and each TV. After creating the 32-byte (64 hexadecimal digit) key code, it must be copied into a file called sitekey.txt and imported.

AES-128 SITEKEY FILE

Filename: aeskey.txt

AES-128 encryption requires a custom 16-byte cipher key and 16-byte initialization vector. They must be shared with the headend transcoder and each TV. After creating both 16-byte (32 hexadecimal digit) codes, they must be copied to a file called aeskey.txt and imported. The cipher key should be copied to the file first followed by the initialization vector on the next line.



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ANDROID INTENTS FOR LAUNCHING THE APP

The following Android activities/extras allow the app to be launched into custom modes via Android intents. These can be used by custom software applications or home page icons defined in the PDI Genio configuration management system. Genio allows the creation of custom launch icons that can be configured for any of the following scenarios.

1. Launch IPTV player with or without specifying a starting channel. The player will use the default starting channel when none is specified.

Activity Component: com.pdiarm.tvplayer/.ui.PlayerActivity

Extras

Key	Feature	Type	Values	Default
channel	starting channel	integer	any valid channel number	-1

Example Usage From ADB

- Open the player starting with a channel:
adb shell am start -n com.pdiarm.tvplayer/.ui.PlayerActivity --ei "channel" 8

2. Launch into media file browser

Activity Component: com.pdiarm.tvplayer/.ui.BrowserActivity

Extras

Key	Feature	Type	Values	Default
entry_point	starting folder	string	any valid URL	""
browser_type	browser type	string	"usb", "dlna"	"dlna"

Example Usage From ADB

- Open the browser in a dlna folder:
adb shell am start -n com.pdiarm.tvplayer/.ui.BrowserActivity --es "entry_point" "upnp://http://192.168.1.1:32469/ContentDirectory/1a6189a5-9b46-9172-23d2-c5d8011b21c6/control.xml?ObjectID=97f43e69576ade494ca8"
- Open the browser at the root for usb:
adb shell am start -n com.pdiarm.tvplayer/.ui.BrowserActivity --es "browser_type" "usb"
- Open the browser in a local folder:
adb shell am start -n com.pdiarm.tvplayer/.ui.BrowserActivity --es "browser_type" "usb" --es "entry_point" file:///sdcard/Download

3. Play a specified file from a valid URL (usually DLNA or from internal path). Then either exit or loop forever.

Activity Component: com.pdiarm.tvplayer/.ui.FilePlayerActivity

Extras

Key	Feature	Type	Values	Default
url	the media url	string	any valid URL	""
loop	should the playback repeat	boolean	true/false	false



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Example Usage From ADB

- Play a local file named sample.ts, looping forever

```
adb shell am start -n com.pdiarm.tvplayer/.ui.FilePlayerActivity --es "url"
"file:///storage/emulated/0/Download/sample.ts" --ez "loop" true
```
- Play a file from web server without loop

```
adb shell am start -n com.pdiarm.tvplayer/.ui.FilePlayerActivity --es "url"
"http://192.168.1.1:32469/object/d20c53e1233a60523b1f/file.mp3"
```



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TROUBLESHOOTING

If network problems may be causing poor or no TV channel playback, the following topics may help correct the problem. These are listed in order starting with the easiest to check and correct.

TV HOST ADDRESS

- Be sure the PDi TV has a unicast host address assigned either by DHCP or static. The TV will not listen for multicast packets without a unicast address assigned to the TV.

SPANNING TREE PROTOCOL (STP)

- STP can create a long blocking period each time the TV is turned on and its link becomes UP. In some cases the TV may never obtain an IP address due to DHCP request throttling. PDI recommends disabling STP on switch access ports.
- For storm control, instead of STP, use broadcast rate limiting and/or loopback detection.
- If you must use STP, you may set the TV to high power standby so it never disconnects from the switch. You may also use static IP host addresses.

MULTICAST ADDRESSING

- Verify the channel map in the IPTV app matches the IP addresses and port numbers in the headend transcoder.
- If the headend transcoder is using Source Specific Multicast (SSM), be sure each channel is also configured with the correct source IP address in the IPTV app.
- If SSM is used, be sure the IP addresses are in the 232.0.0.0/8 CIDR range as this is compatible with most systems.

IGMP SWITCH SETTINGS

- IPTV uses IP multicasting. Misconfigured multicast settings on the vlan can lead to poor video playback due to the link flooded with many video streams or none at all.
- Check if **IGMP Querying** is enabled on the core switch attached to the headend transcoder. Querying must be enabled globally on the switch and on the vlan used for IPTV.
- Verify that **IGMP Snooping** is enabled on all the switches to ensure that multicast traffic is being properly forwarded only to devices that request it. It must be enabled globally on the switch and on the vlan used for IPTV.
- Check whether your network requires IGMP v2 or v3, then be sure all devices are set to support the same version. Most systems will use v2, but if the headend transcoder uses Source Specific Multicasting (SSM) then IGMP v3 must be set on all switches.
- If the building has any IPTV source outside the headend/MDF such as a chapel video feed, there may be a switch between it and the IGMP querier. Be sure the intermediate switch is set to forward all incoming unknown multicast toward the querier/mrouter.
- If the headend transcoder is on a different vlan from the televisions, be sure multicast routing is enabled between vlans.

COMPARATIVE ANALYSIS BETWEEN ANDROID AND WINDOWS DEVICES

- You may run a **comparative test** between a Windows PC running VLC and the Android device, both connected to the same vlan, playing the same IPTV stream. If VLC cannot play the stream, the TV most likely cannot either.
- **Wireshark** or a similar tool to capture traffic could help identify if there are any differences in how UDP traffic is handled between these two devices.

SIMPLIFY THE ENVIRONMENT

- To isolate whether network settings between the transcoder and the IPTV app are the root cause, test the PDi device directly connected to the same switch as the transcoder. This will eliminate other switches in the building. If the stream plays correctly, this indicates a configuration issue within those other switches.



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NOTE: Connecting the PDi device directly to the headend transcoder is NOT a good test because it probably does not have an IGMP querier built in. While the transcoder floods out all IP channels at well over 100mbps onto its own backplane, it must drop most of those packets to push them into the 100mbps port of the TV.

- If that does not work, check the IGMP querier and snooping is turned on in the core switch.
- If that still does not work, try reducing the number of streams coming from the transcoder, all the way down to one stream. This will reduce total bandwidth on the system and reduce the chances of dropped packets due to network congestion and/or port rate mismatch.

NETWORK STABILITY

- Switch port congestion must be considered for quality of IPTV delivery.
 - Headend transcoders typically use UDP or RTP (over UDP) transmission protocols. UDP has no packet retransmission capability, so any network congestion can result in dropped packets and missing/corrupted video frames.
 - Care must be taken in the network design to avoid port congestion, especially microbursts (100% utilization for a fraction of one second), which can cause intermittent missing/corrupted video.
 - Non-video traffic, going to PC's and other devices, that passes through switch trunks (connections between switches) can result in microburst congestion.
 - Another source of congestion is having too many video streams on one ethernet trunk (from the transcoder to the core switch and/or between switches). Most video streams are variable bit rate, so the combined bit rate of all streams can have large peaks. A good rule of thumb is to assume each IPTV channel uses 20 Mbps.
 - Tips to minimize congestion:
 - Apply QoS on switch ports to prioritize video traffic.
 - Use link aggregation or 10Gbit ports for trunk lines between switches to free up bandwidth.
 - Enable ethernet flow control on all switch ports facing a PDI TV. This allows the TV to send pause frames if its buffer becomes temporarily saturated.
- Test **network stability** and look for **UDP packet loss**. Run network diagnostics using tools such as **iPerf** or **Wireshark** to monitor UDP traffic between the Android device and the IPTV stream source. Comparing this with a Windows device might help identify whether the vlan or network is affecting the Android device differently.

LIMITED WARRANTY

PDi Communication Systems Inc., ("PDi") standard warranty information is found at pdiam.com. For information regarding authorized servicing and all other information pertaining to this warranty, please contact PDI COMMUNICATION SYSTEMS, INC. at 40 Greenwood Ln, Springboro, Ohio 45066 or phone 800-628-9870 and ask for the PDi ProServices team.

