

# FELSTON



# HD940

4-INPUT HDMI DIGITAL AUDIO DELAY

**Owner's Manual**

# IMPORTANT INFORMATION

## PLEASE READ THIS BEFORE OPERATING THE UNIT

1. To ensure the best performance, read this manual carefully. Keep it in a safe place for future reference.
2. Install this unit in a well-ventilated, cool, dry, clean place. There should be a space of at least 4" (10cm) above, behind and to the sides of the unit. Lack of ventilation can cause the unit to malfunction.
3. Do not expose the unit to sudden temperature changes from cold to hot. Do not locate the unit in an environment with high humidity (e.g. a room with a humidifier), as this can cause condensation inside the unit which may cause an electrical shock, fire, damage to the unit and/or personal injury.
4. Do not plug this unit into a wall socket until all the connections are completed.
5. When disconnecting the power adaptor from the wall socket, hold the plug-in adaptor. Do not pull on the power lead.
6. Do not use force on any of the buttons or the cables attached to the unit.
7. Do not clean this unit with chemical solvents, as this can damage the unit's finish. Use only a clean, dry cloth.
8. Only use the power adaptor supplied with this unit. Using another power supply is dangerous and may cause fire and/or damage to the unit, and/or personal injury. The manufacturer of the unit will not be held responsible for any damage or injury caused in this way.
9. Only use in a wall socket providing the AC voltage specified on the power adaptor. Using an AC voltage outside the specified range is dangerous and may cause fire and/or damage to the unit, and/or personal injury. The manufacturer of the unit will not be held responsible for any damage or injury caused in this way.
10. To prevent damage by lightning, disconnect the power adaptor from the wall socket during an electrical storm.
11. Take care not to drop any liquid or foreign objects into the unit.
12. Do not open the unit, the power adaptor, or try to modify them in any way. There are no user-serviceable parts inside the unit or power supply. Opening the unit or power supply, or carrying out any modifications will invalidate your warranty, as well as being potentially dangerous. Always contact your supplier or the manufacturer for service requirements.
13. When you are not using the unit for a long period of time, disconnect the power adaptor from the wall socket.
14. Should a problem occur, please read the *Troubleshooting* section covering common operating errors before deciding the unit is faulty.



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 removing and reapplying power to the equipment, 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 AV receiver
- Connect the equipment to an outlet on a circuit different from that to which the AV receiver is connected
- Consult the dealer or an experienced radio/TV technician for help



This unit is in conformity with the EMC directive and low-voltage directive.



Disposal of Waste Electrical & Electronic Equipment (WEEE). This symbol on the product or on its packaging indicates that this product shall not be treated as household waste. Instead it shall be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. The recycling of materials will help to conserve natural resources. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the dealer from whom you purchased the product. Visit [www.felston.com/weee](http://www.felston.com/weee).



This product is compliant with the European Union Restriction of Hazardous Substances (RoHS) directive 2002/95/EC, which became effective July 2006.

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# Introduction

Digital image processing within broadcasts and modern displays (Plasma, LCD, etc.) causes video delay which lets audio arrive a fraction of a second too soon. This creates the annoying timing difference we see in lip motion and sound called *lip-sync error*.

However, research at Stanford University<sup>1</sup> in the US statistically confirmed that presentations with this unnatural phenomenon - *audio leading video* - caused viewers to perceive the material more negatively - even viewers who did not consciously notice the lip-sync error.

So lip-sync error is not just a minor distraction but it is the most noticeable symptom of the larger problem - *sound before its cause* - which fundamentally undermines the home cinema experience by contradicting reality.

The HD940 builds on the years of experience we have gained in lip-sync correction along with the invaluable input we have received from customers of our previous digital audio delays, the DD340, DD540 and DD740. And now the Felston HD940 gives you complete control over audio/video synchronization of your HDMI AV system. And by delaying audio to match the video delay you will not only correct lip-sync but also *restore reality!*

Users of our other Felston units will be used to the wide range and precision of delay available. Now the HD940 introduces for the first time the ability to automatically correct lip-sync error. Using the audio and video latencies available via HDMI (depending on the equipment), correction for a TV's processing time is possible automatically. The HD940 takes sophistication even further by allowing this correction to vary according to the video format being watched, all settable by the user.

We appreciate your choosing the Felston HD940 to *restore reality* to your home cinema and look forward to hearing from you:

*FelstonListens@Felston.com*

<sup>1</sup>B. Reeves, D.Voelker: "Effects of Audio-Video Asynchrony on Viewer's Memory, Evaluation of Content, and Detection Ability", Research Paper Prepared for Pixel Instruments at Stanford University

## Features of the HD940

Thank you for purchasing the Felston HD940 High Definition Audio Delay unit for correcting lip-sync error in your AV system. Here are some of the main features of your HD940:

- Connects to up to 4 HDMI sources
- HD940 can be used with or without an AV Receiver
- Provides audio delays between 0 and 340 ms (and up to 999 ms for some audio formats), in 1 ms steps
- Fine Delay Adjustment allows delay to be set in  $\frac{1}{3}$  ms steps
- 32 presets (8 presets per input)
- Delay setting may be done using Auto Delay mode, Extended Auto Delay mode, or manually for full control
- User-selectable position of on-screen display, or on-screen display can be turned off completely
- Cascade Mode allows up to 7 HD940's to be connected and controlled as a single device for lip-sync correcting up to 22 HDMI sources<sup>1</sup>
- Support for learning remote controls including additional IR codes for discrete power on/off, etc.
- Programmable remote control identity so multiple HD940's may be located and controlled in the same location without control interference<sup>2</sup>

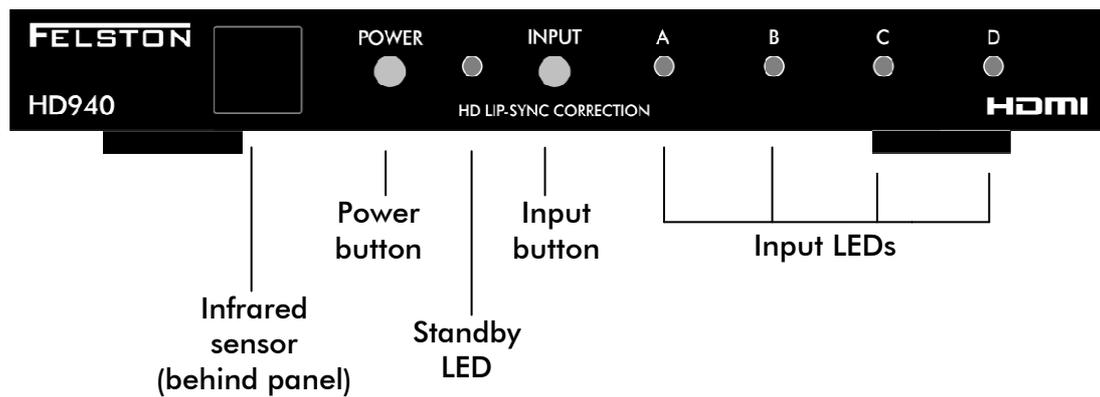
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<sup>1</sup> Using 3 or more HD940's in Cascade Mode requires the use of a third-party learning remote control handset, not supplied.

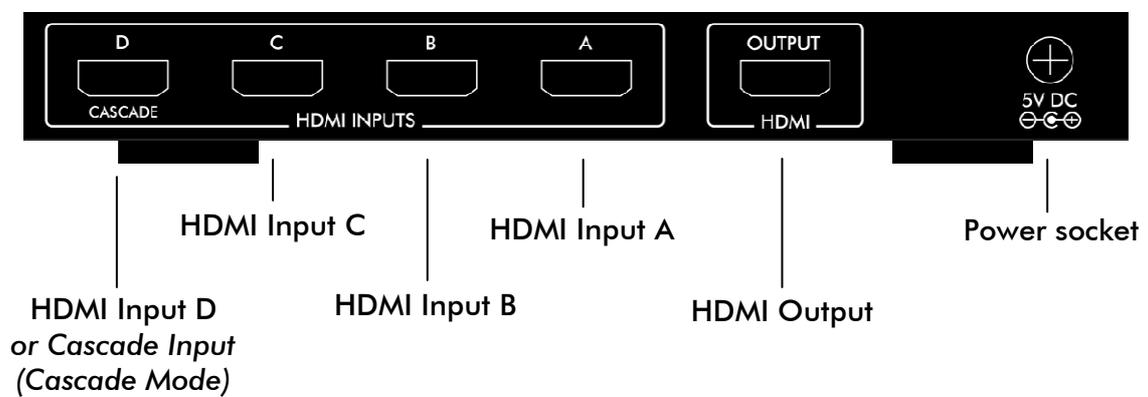
<sup>2</sup> Requires use of a third-party learning remote control, not supplied.

# Controls & Connections

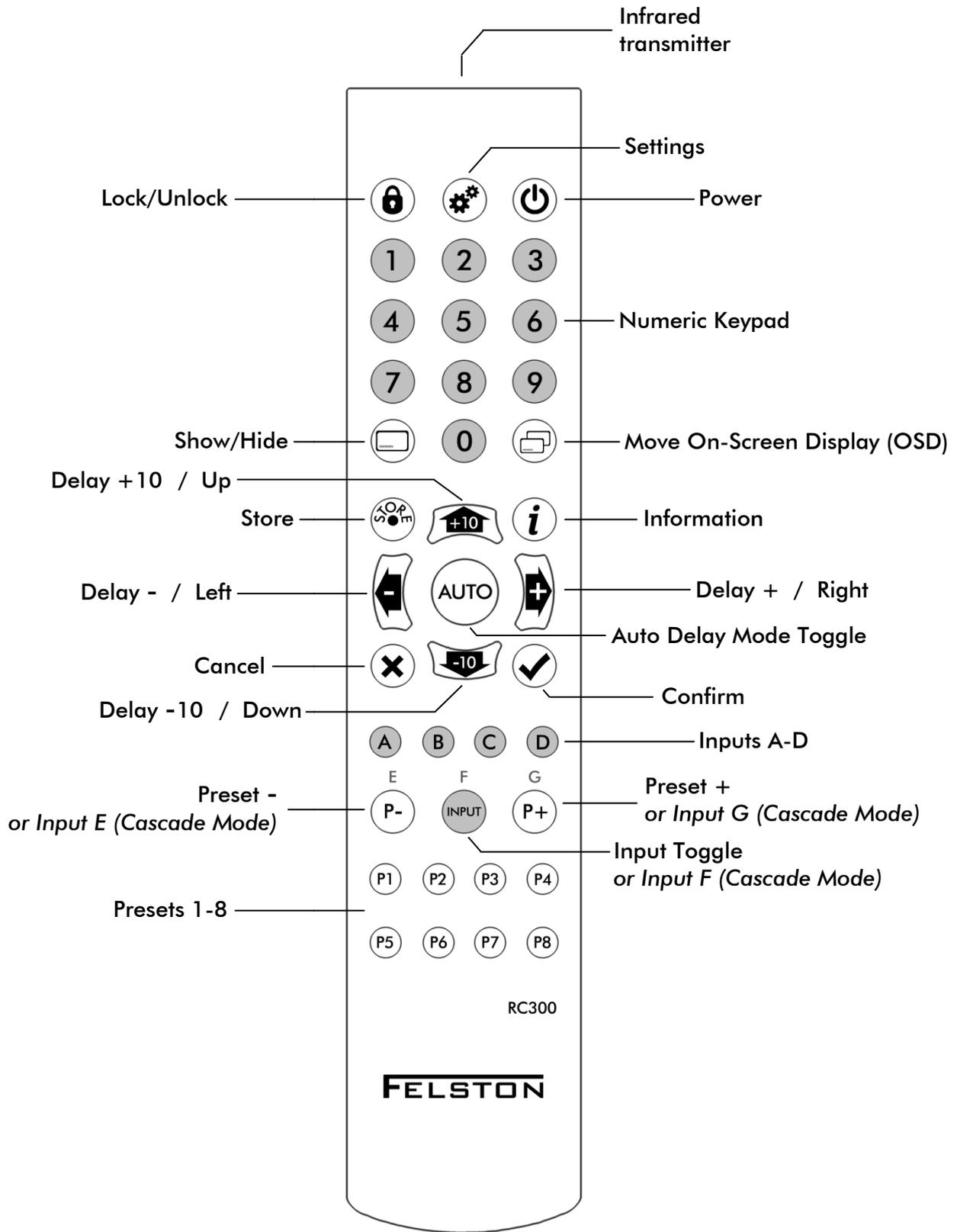
## Front Panel



## Rear Panel



# Remote Control



# Getting Started

## Check Package Contents

- HD940 digital audio delay
- Power adaptor
- Remote control
- 2 x AAA batteries
- Owner's manual – this document

**PLEASE KEEP ALL THE ORIGINAL PACKAGING!**

If the unit requires repair it should be returned in its original packaging to ensure protection.

## Preparing for Use

### Remote Control

Install two AAA (UM-4/MN2400/LR03) alkaline 1.5V batteries into the remote control. Ensure their + and - terminals are as pictured on the diagrams embossed within the battery compartment. Do not use rechargeable batteries as they have lower voltage and may not work.

Note: when using the remote control to operate the HD940, point it towards the front panel.

### Power Adaptor

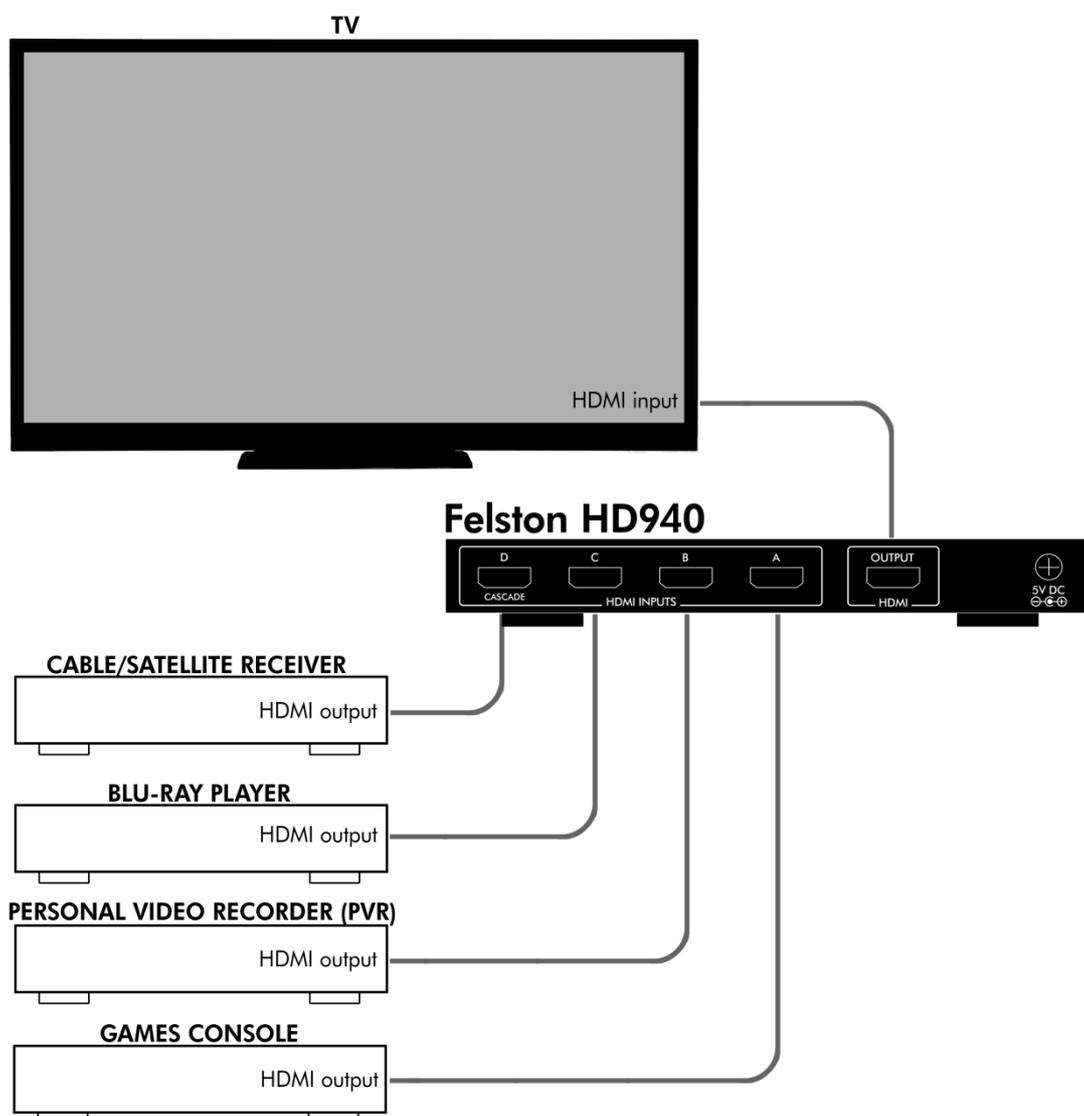
The power adaptor comes complete with a selection faceplates allowing it to be used in most countries. Select the faceplate for your country and clip it into place on the power adaptor.

# Connecting the HD940

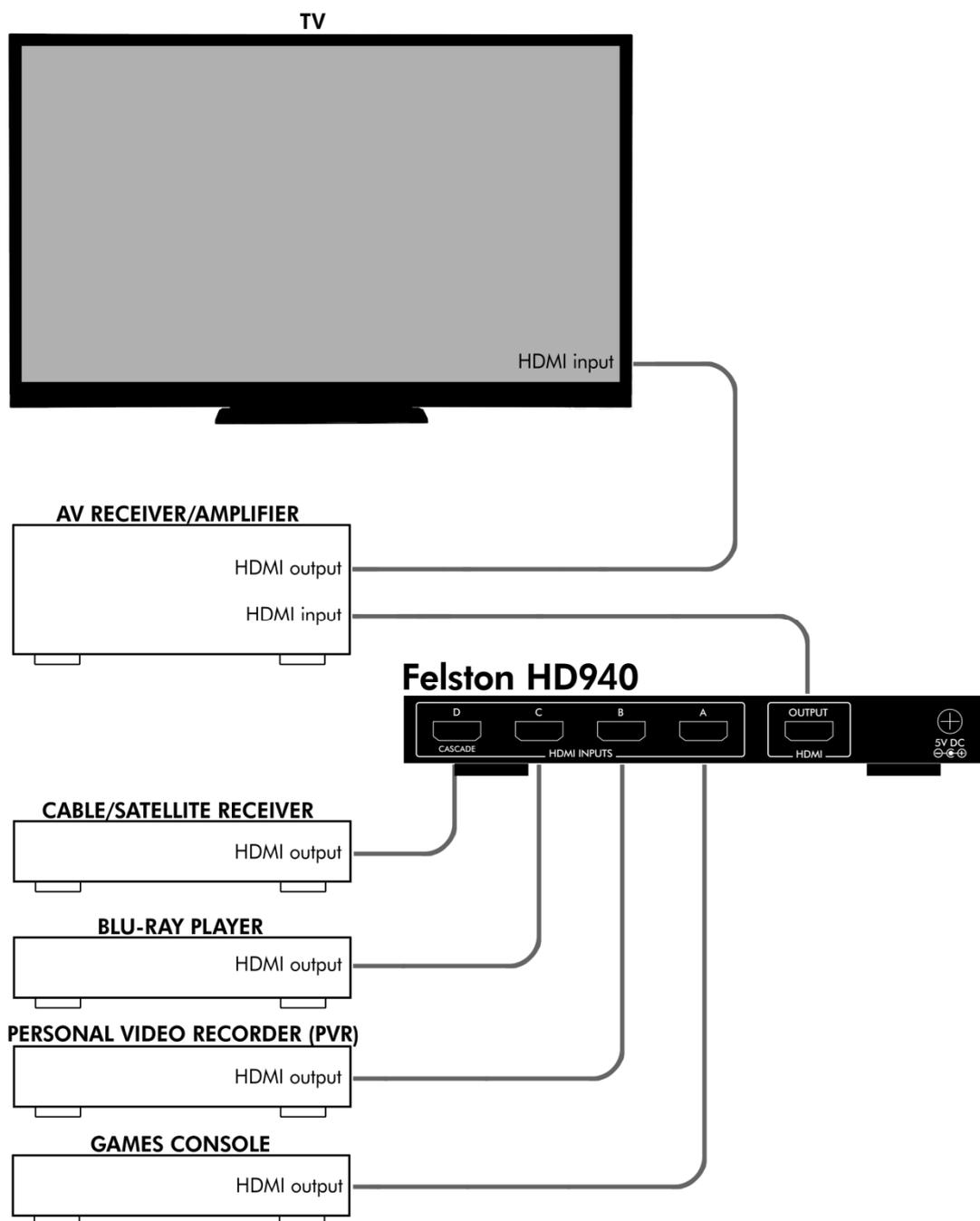
Ensure the power cable to your HD940 is disconnected. Ensure all the equipment you wish to connect to is switched off. This must also be done whenever you connect/disconnect equipment from the HD940.

Connect the HD940 between your source equipment and your TV or your AV Receiver. Example configurations are shown below:

## Example Connections (without an AV Receiver)



## Example Connections (with an AV Receiver)



**NOTE:** In the examples above, none of the equipment or cables shown attached to the HD940 are included. Connections shown are suggestions only.

## **Connecting Power**

When all connections to the HDMI sockets of the HD940 have been completed, plug the power cable into the power socket on the rear of the HD940. Finally plug the power adaptor into a wall socket.

When power is connected, the HD940 will enter standby mode, indicated by the Standby LED glowing red.

Switch on your TV and source equipment. Select the HDMI Input of your TV that is connected to the HD940.

## **AV Receiver Settings**

If you are using an AV Receiver and it has its own audio delay setting, set this to zero milliseconds. If this is not done then it may be impossible to adjust the total audio delay low enough to achieve perfect lip-sync.

# Basic Operation

## Standby Mode

When power is first connected to the HD940, it enters Standby mode. This is indicated by the Standby LED glowing red. None of the Input LEDs are lit in Standby mode.

When in Standby mode, there is no output from the HDMI Output socket of the HD940. The HD940 must be put into Active mode in order to view any sources connected. All other functions of the HD940 (e.g. selecting the input) also require the HD940 to be in Active mode.

## Switching to Active Mode

From Standby mode, press  on the remote control or the **POWER** button on the front panel of the HD940. The HD940 will switch to Active mode, indicated by the Standby LED going out and one of the Input LEDs glowing green. To return to Standby mode press  again.

**BEFORE DISCONNECTING POWER:** Always switch the HD940 into Standby mode before removing power from the unit. If power is removed while the HD940 is in Active mode, this can result in recent user settings being lost.

## Selecting Input Source

By default, the HD940 automatically switches input to the most recent input that has become active. We call this "IntelliInput". But you can also change input manually:

- Press  on the remote control, or **INPUT** on the front panel, to toggle through inputs A to D<sup>3</sup>
- Or use the discrete input buttons , ,  and  to select the input directly

The Input LED on the front panel indicates which source is selected. When an active source is selected, after a few seconds you should see the source image on your TV.

Note: For fully manual input selection, turn IntelliInput off. See page 36 for more information.

## On-Screen Display

When you change input or another setting of the HD940, it will show the relevant information in the bottom-left corner of the screen.

To see the current input selection and delay, press  any time, e.g.

Input C    107 ms

Press  again to clear the on-screen display.

## Position of On-Screen Display

You can move the on-screen display between 2 positions, one close to the bottom-left corner, and one position further in towards the center (this position is useful if you watch your TV in "zoom" mode). In addition you can turn off the on-screen display altogether. You will still be able to set delays and perform all other functions of the HD940, but there will be no display on your TV. To toggle between **Inner Position**, **Outer Position**,

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<sup>3</sup> The  button has a different function in Cascade Mode and does not toggle through inputs. See *Cascade Mode* on page 27 for more details.

and **Display Off**, press and release  until you reach your desired option.

The  button is also useful if you are changing a setting on the HD940 and decide you wish to cancel the change. Whenever the HD940's on-screen display is showing, press  to blank the on-screen display and cancel the change being made.

## Displaying Video Format Information

The HD940 can show you information on the current video format.

Press and release . The display will show the current video format, e.g.

1280x720p60

The first number is the horizontal resolution (e.g. 1280 pixels). The second number is the vertical resolution (e.g. 720 pixels). This is followed by either a "p" meaning the display is in "progressive" mode, or an "i" meaning it is in interlaced mode. The final number is the frame rate (e.g. 60 frames per second).

Press and release  a second time and the on-screen display shows further information.

VIC#4 e=not set

The first number is the HDMI Video Identification Code of the video format. This can be a number between 1 and 64. When using Extended Auto Delay mode, the VIC is used to decide which audio delay to use.

To the right of the VIC information is shown the Extended Audio Delay setting for the current video format. In the case above it has not yet been set. Further information on Extended Auto Delay mode is on page ?.

Press and release  a third time and the on-screen display will blank.

## Setting the Audio Delay

So you can achieve perfect lip-sync correction, the HD940 allows you to set the audio delay in steps of just 1 millisecond (1 ms), i.e. 1/1000th of a second. In addition, Fine Delay Adjustment mode allows steps of an even smaller  $\frac{1}{3}$  ms.

The minimum delay you can select is 0 ms, i.e. no delay. The maximum audio delay you can select is between 340 ms and 999 ms depending on the type of HDMI audio signal.

To increase the audio delay in steps of 1 ms, press . By holding down this button, the delay will increase quickly until you release it. The amount of delay will be shown on-screen. The delay will only activate once you have stopped changing the delay.

Whenever the audio delay is changed, the audio will mute for a short period. This is normal operation.

To decrease the delay in steps of 1 ms, use  in the same way.

To increase the delay by 10 ms, press . The new delay will be shown on-screen. To increase by another 10 ms, release the button and press it again (there is no auto-repeat on this button). Decrease the delay by 10 ms by pressing  in the same way.

The delay is set independently for each input. If the input changes the delay will revert to the setting that was last used for the new input.

## Numeric Delay Entry

The numeric keypad can also be used to set the delay. Simply enter the desired delay by pressing the number buttons in

sequence. The delay will be shown on-screen as you enter each digit, e.g. pressing **8** then **5** will show this:

8\_\_ ms

85\_ ms

The delay will be set after a brief pause following the last digit entered.

Input B      85 ms

**ADVANCED USE:** Numeric delay entry allows up to 3 digits to be entered. If you want to set a 1-digit or 2-digit delay (e.g. 56 ms) you can enter e.g. **0** **5** **6** as your delay. This will reduce slightly the time taken for the HD940 to activate the delay after it is entered.

## Maximum Delay Available

If you select a delay greater than the maximum delay possible for the current HDMI signal, then it will appear on-screen in red as you enter it. The display will change soon after to indicate the actual delay (in white) enacted by the HD940.

If your audio signal subsequently changes format, meaning the maximum delay possible is increased, then the unit will automatically reselect the original delay that you entered.

Note though, in practice a delay of more than 200 ms is rarely needed. And the 340 ms delay provided by the HD940 for every audio format is sufficient in all but the most extreme circumstances.

## Fine Delay Adjustment

To enter Fine Adjustment mode, press  then  in quick succession.

Following this key sequence, any adjustments made using  and  will change the delay by  $\frac{1}{3}$  ms with each press. Fine

mode is indicated when you are changing delay by the word "FINE" and also that a decimal digit is shown after the delay, e.g.

FINE 105.7 ms

Note, the decimal digit is only shown during adjustment of the delay. Pressing the SHOW/HIDE button will show the digits before the decimal place only.

Input B 105 ms

You can leave Fine Delay Adjustment by pressing  when no on-screen display is showing. Fine Delay Adjustment is also exited automatically after 10 minutes of no button presses or if the power to the HD940 is interrupted.

## Presets

The HD940 allows storage of up to 32 delay settings for easy recall, 8 for each input. Presets are stored and recalled using buttons on the remote control. Presets are retained even if power to the HD940 is lost.

### Storing a Delay in a Preset

1. Press 
2. The current delay will be shown in yellow

120 ms

3. Select the preset to store the delay using either the  and  buttons, or the discrete preset buttons  through 

Preset 5 120 ms

4. Press . The display will change to white indicating that the preset is stored. After a couple seconds the on-screen display will disappear

Before pressing  in the steps above, if you decide not to store the delay then press  or . The on-screen display will disappear and the delay will not be stored.

## Recalling a Delay from a Preset

### Method 1:

Press  $\text{P+}$  or  $\text{P-}$  repeatedly until the preset you require is shown on screen.

Preset 3 82 ms

Wait a couple seconds and the on-screen display will change to show the current input and the newly selected delay. The new delay will be set.

### Method 2:

Press one of the discrete preset buttons  $\text{P1}$  through  $\text{P8}$  to select the preset you require.

# Auto Delay Modes

As part of the current HDMI standard, TVs and source equipment are able to inform each other of their internal video and audio delays, or "latencies". They do this by exchanging this information in packets of "EDID" data. In theory this allows a system to calculate the audio delay required for synchronization without the viewer having to set the delay manually.

In practise, much HDMI equipment does not provide these video and audio latencies so automatic audio delay is not possible in those cases. In addition, even using equipment that does provide these latencies, the delays are fixed and do not take into account such factors as delays in the source material itself, e.g. the particular blu-ray disc or the television broadcast. So manual audio delay selection still provides best results for lip-sync.

## Auto Delay Mode

As well as manual delay mode as described in previous sections, the HD940 also provide an Auto Delay Mode that uses the latencies from your TV and source equipment. So you can choose automatic or manual delay mode as you wish.

## Selecting Auto Delay Mode

Press . If your HDMI equipment provides audio and video latencies, then Auto Delay mode will be selected. The on-screen display will show the automatic delay in blue.

AUTO 93 ms

If your HDMI equipment does not provide audio and video latencies then Auto Delay mode has no way to know what delay to set. In this case the HD940 will show an error in red:

No Latency Info

Note though that an advanced feature of the HD940 means, even if your HDMI equipment does not provide latencies, you can still use Auto Delay mode. See *Replacement Auto Latencies* on page 33 for information.

To exit Auto Delay mode, press  again. The delay will return to the previously selected manual delay.

## Extended Auto Delay Mode

One factor that can affect the amount of audio delay required for perfect synchronization is the TV's current video setting. For instance, high resolution screen modes can take longer to process meaning that more audio delay required. A different screen refresh rate (or "frequency") can also affect it. The HD940 includes an Extended Auto Delay mode that adds to the Auto Delay feature, allowing different automatic delays to be set for different video formats.

As explained in "*Displaying Video Format Information*" on page 16, it is possible to see what your current video format is and also the video format's code number (its "VIC"). The Extended Auto Delay feature of the HD940 allows each VIC code (1 to 64) to have a different audio delay.

## Storing an Extended Auto Delay

The steps below will store the current audio delay as the Extended Auto Delay for the current video format of your TV.

1. Press 
2. The current delay will be shown in yellow

**72 ms**

3. Press . Display will change to

**E-AUTO 72 ms**

4. Press . The display will change to green indicating that the delay is stored as the Extended Auto Delay for the current video format. After a couple seconds the on-screen display will disappear.

Before pressing  in the steps above, if you decide not to store the delay then press  or . The on-screen display will disappear and the delay will not be stored.

To change the Extended Auto Delay, simply repeat the steps above.

## Selecting Extended Auto Delay Mode

You can only select Extended Auto Delay mode if the current video format on your TV has an Extended Auto Delay stored.

Press . The display will cycle between these options:

Input A	64 ms	Manual Delay (white)
AUTO	80 ms	Auto Delay (blue)
E-AUTO	72 ms	Extended Auto Delay (green)

Note that Auto Delay mode will not be shown if there are no latency values available (see page 21). Note also that Extended Auto Delay mode will only be shown if there is an Extended Auto Delay stored for the current video format.

The HD940 will remain in the auto or manual delay mode you have selected. This mode is selected independently for each input. So for example inputs A and C may be in manual delay mode, while input B is in Auto Delay mode, and input D is in Extended Auto Delay mode.

If you are in Extended Auto Delay mode and the video format changes to a format that has no extended auto delay stored, then the mode will switch automatically to Auto Delay mode (if latencies are available) or else Manual Delay mode.

If you want to view, set or change the Extended Auto Delays for a video format other than the TV's current format then you can. All of the 64 Extended Auto Delays can be accessed together via the Settings menu. See page 37 for information.

## Lock/Unlock

To prevent preset values and Extended Auto Delay values being changed, the remote control handset has a Lock feature.

To Lock the handset, press and hold . While you are holding it down a message will appear on-screen in yellow:

Locking...

After 6 seconds the message will change to white and will read:

Locked

Now release .

The handset is now locked which means that the  button will not function. In this way, presets and Extended Auto Delay values cannot be accidentally changed.

To unlock the handset, press and hold . While you are holding it down a message will appear on-screen:

Locked

After 6 seconds the message will change to this:

Unlocked

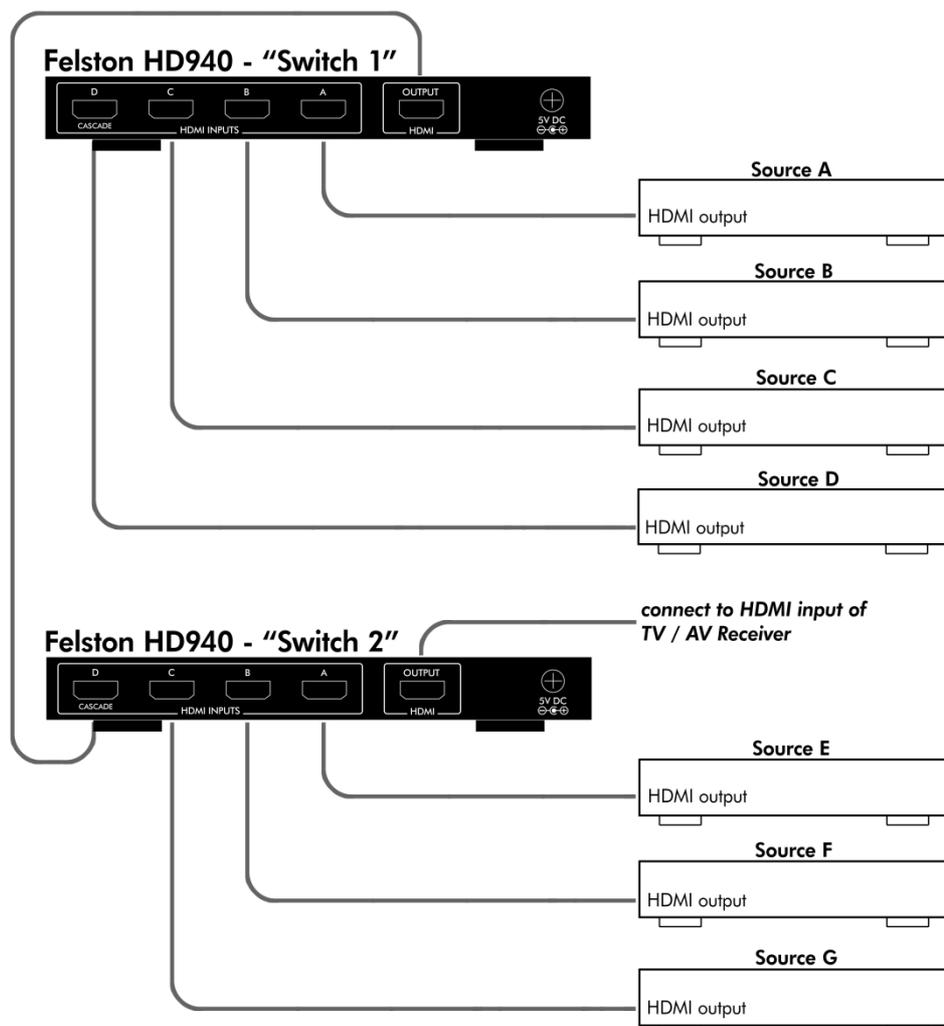
Now release .

The handset is now unlocked and the  button will work normally again.

# Cascade Mode

If you have more than 4 input sources that you wish to correct lip-sync for, then you can do so by connecting multiple HD940's together in "Cascade Mode". Two HD940's can be connected in this way to allow up to 7 input sources to be controlled from the HD940's remote control. In addition, up to 7 HD940's can be connected in Cascade Mode allowing up to 22 input sources. Note that when more than 2 HD940's are used in Cascade Mode, a suitable programmable remote control is required for their operation (supplied by the user).

## Using 2 HD940's in Cascade Mode



The diagram above shows the rear panels of two HD940's, and how they may be connected to each other and to up to 7 input sources. Note that we call the HD940 connected to the first 4 inputs "Switch 1", and the HD940 connected to the next 3 inputs "Switch 2". These names are relevant when configuring the units in the procedure below.

## Configuring Cascade Mode

With all equipment switched off (TV, AV receiver, input sources) and power disconnected from both HD940's, connect as shown in the diagram above. Now follow these steps to put the HD940's into Cascade Mode:

1. Connect power to only the HD940 that will be Switch 1
2. Press and keep held down 
3. After 30 seconds approximately, notice two input LEDs on the HD940 flash briefly. This indicates it is in cascade mode.
4. Release the button
5. Disconnect power from HD940 Switch 1
6. Connect power to the HD940 that will be Switch 2
7. Press and keep held down the button labeled "E", i.e. 
8. After 30 seconds approximately, notice that two input LEDs on the HD940 flash briefly. This indicates it is also in cascade mode
9. Release the button
10. Connect power to HD940 Switch 1

## Operating in Cascade Mode

Your two HD940's are now in Cascade Mode and can be controlled together by a single Felston remote control. The units work as a single entity, routing your AV signals from source to your TV/AV receiver as required when you select one of the inputs A through G.

There is very little difference in using a single HD940 compared to using two HD940's in Cascade Mode. Note that the ,  and  buttons do not work in their usual way when in Cascade Mode. Instead they are used to select inputs E, F and G respectively, as indicated on the remote control handset above those buttons. In addition, when changing settings, display options etc. you only change the settings for the HD940 connected to the active source. Other HD940's are unaffected.

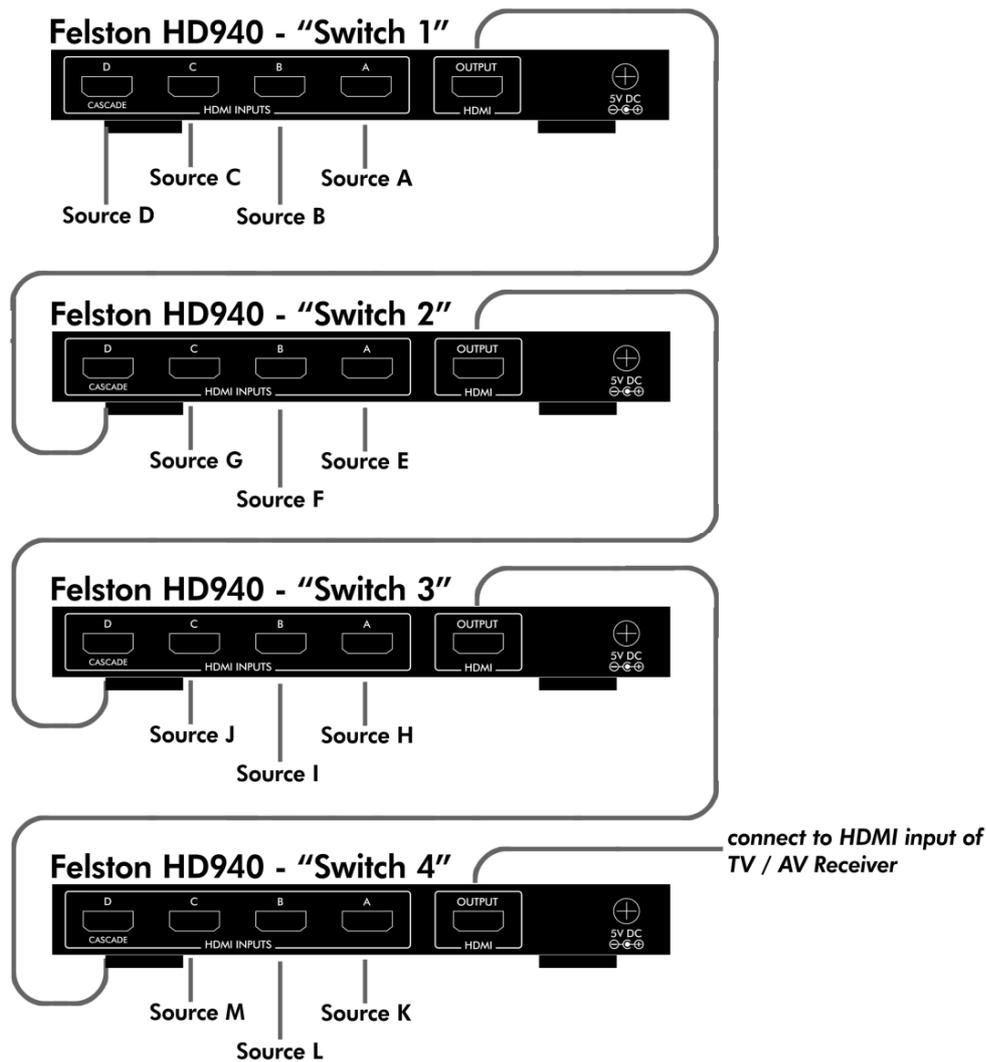
Note: In Cascade Mode when power is first applied to a HD940 the input LEDs will flash to indicate which switch it is configured as. See "*REMOTE CONTROL RECEPTION IN **CASCADE MODE:***"

So that the HD940's operate reliably and synchronized with each other, they should all be located close together and facing the same direction, so that their remote control IR receivers all get signals from the remote control whenever you press a button. If for some reason you need to locate the HD940's apart from each other then you can use a third-party IR repeater to route the infrared signals from your remote control to the HD940's.

Cascade Mode Configuration Table" on page 30 for more information.

## Using More Than 2 HD940's in Cascade Mode

Up to 7 HD940's can be connected in Cascade Mode, allowing for up to 22 sources. As an example, this diagram below shows how 4 HD940's are connected in Cascade Mode:



When connecting HD940's in Cascade Mode, follow these steps:

1. Connect HD940 Switch 1's inputs A through D to your first 4 sources.
2. Connect Switch 1's Output to the Cascade Input (i.e. Input D) of HD940 Switch 2.
3. Connect HD940 Switch 2's inputs A through C to your next 4 sources.
4. Connect Switch 2's Output to the Cascade port of HD940 Switch 3.
5. Repeat the above steps for any further HD940's.
6. With the final HD940, connect it's Output to your TV or AV receiver.

With your equipment and HD940's connected, now proceed to configure each HD940 as Switch 1, Switch 2 etc. as described in the section below.

## **Remote Control Handset for Cascade Mode**

The remote control handset supplied with the Felston HD940 is only suitable for controlling up to 2 HD940's in Cascade Mode. If you want to use 3 or more HD940's then you will need to use a learning remote. See *Programmable Learning Remotes* on page 39 for more information. Once you have your learning remote configured for HD940 Cascade Mode, follow the instructions below.

## **Configuring Cascade Mode**

With all equipment switched off (TV, AV receiver, input sources) and power disconnected from all HD940's follow these steps to put the HD940's into Cascade Mode:

1. Connect power to only the HD940 that will be Switch 1
2. Press and keep held down the **A** input button on your remote control
3. After 30 seconds approximately, notice two input LEDs on the HD940 flash briefly. This indicates it is in Cascade Mode
4. Release the button
5. Disconnect power from HD940 Switch 1
6. Connect power to the HD940 that will be Switch 2
7. Press and keep held down the **E** input button on your remote control
8. After 30 seconds approximately, notice that two input LEDs on the HD940 flash briefly. This indicates it is also in Cascade Mode
9. Release the button
10. Disconnect power from HD940 Switch 2
11. Repeat steps 5 through 9 for any other HD940's you are using. Refer to the table below for the input button to press

and the flashes of the LED you will see when a HD940 is put into Cascade Mode

#### **REMOTE CONTROL RECEPTION IN CASCADE MODE:**

So that the HD940's operate reliably and synchronized with each other, they should all be located close together and facing the same direction, so that their remote control IR receivers all get signals from the remote control whenever you press a button. If for some reason you need to locate the HD940's apart from each other then you can use a third-party IR repeater to route the infrared signals from your remote control to the HD940's.

### **Cascade Mode Configuration Table**

<b>HD940</b>	<b>Input Button To Press</b>	<b>Input LED Flashes</b>
Switch 1	<b>A</b>	A and D flash 3 times
Switch 2	<b>E</b>	B and D flash 4 times
Switch 3	<b>H*</b>	C and D flash 5 times
Switch 4	<b>K*</b>	A and D flash 6 times
Switch 5	<b>N*</b>	B and D flash 7 times
Switch 6	<b>Q*</b>	C and D flash 8 times
Switch 7	<b>T*</b>	A and D flash 9 times

*\*This button is only available when using a suitably programmed third-party learning remote control (not supplied).*

### **Operating in Cascade Mode**

Your HD940's are now in Cascade Mode and can be controlled together by your suitably-programmed learning remote control. The units work as a single entity, routing your AV signals from source to your TV/AV receiver as required when you select one of the inputs.

## Exiting Cascade Mode

To take a HD940 out of Cascade Mode, follow these steps:

1. Disconnect power from all HD940's
2. Connect power to the HD940 you wish to leave Cascade Mode (you can do this to more than one HD940 at the same time)
3. Press and keep held down the  (zero) button
4. After 30 seconds approximately, notice input LEDs C and D on the HD940 will flash 11 times. This indicates the HD940 is out of Cascade Mode
5. Release the button

# Settings

The unit includes some settings that advanced users may wish to change. They are accessed via the Settings menu. To enter the Settings menu, press and hold .

While you are holding down the button, a message will appear on-screen:

Settings

After 5 seconds the message will change to display the first setting and its value, e.g.:

AUTO (i) TV EDID

Release .

## Navigating the Settings Menu

To select which setting you want to view or change, use the  and  arrow buttons. Each setting and its current value is shown in white. White indicates the value is stored.

To change a setting, press . The setting's value displayed will change and it will appear in yellow. Yellow indicates the value displayed has not yet been stored. Press  or  to cycle through the possible values of the setting.

To store the new setting value, press . The setting value will go white to indicate it is stored. Alternatively, to leave the setting value unchanged, press . The setting will revert to the stored value.

To exit the Settings menu, either press  or .

## Replacement Auto Latencies

The HDMI specification provides for equipment to specify video latencies, the time taken to process the video signal, in order to allow a basic form of automatic lip-sync correction. However, as mentioned on page 21, much equipment does not provide these numbers. In these case, or if you want to change the latencies being used to determine automatic audio delay, the Replacement Auto Latencies allow you to specify your own values. Once set you will be able to use Automatic Delay Mode, even with a TV that does not provide its own audio latencies over HDMI.

To store a Replacement Auto Latency, follow these steps:

1. Before entering the Settings menu, set the delay to the latency you want to store
2. Enter the Settings menu
3. There are 2 Replacement Auto Latencies, one for interlaced video signals and one for progressive video signals. Select the type you wish to store, i.e.:

AUTO (i) TV EDID      *for interlaced*

AUTO (p) TV EDID      *for progressive*

4. "TV EDID" indicates that currently the audio latency for Auto Delay mode is taken from the TV's HDMI EDID packet. This is the default. To change this to your own value press  or . The value will change to yellow and show the delay you set before entering the Settings menu, e.g.:

AUTO (i) 120 ms

5. Press  to store. The text will change to white to indicate it is now stored.
6. To return to the TV's own latency value (if it has one), press  or  and the text will show e.g.

AUTO (i) TV EDID

Then press  to store.

7. Having set the Replacement Auto Latency for either interlaced or progressive video formats, you may wish to repeat steps 1 through 5 for the other format.

While the Auto Replacement Latency feature of the HD940 does allow some form of automatic lip-sync even for TV's that do not supply their own latency values, you may prefer to use the Extended Auto Delay mode (see page 22) of the HD940 since it provides the ability to control the automatic delay for each video format individually.

In practise, there are so many factors that can affect the synchronization of audio and video that no automatic mode, however sophisticated, will cure it in all circumstances. And so you may find it easiest and also most effective to set the HD940's audio delay manually, changing the value as and when required.

## Input Labels

By default, the 4 input sources of the HD940 are displayed on-screen as **Input A**, **Input B**, **Input C** and **Input D**. Using the Input Labels options in the Settings menu, it is possible to change these to more meaningful names.

To change an input label, cycle through the settings in the Settings menu until you reach the label for the input, e.g. for Input C, cycle to:

C: Input C

Press .

The display will change to yellow, indicating it is being changed, and a "cursor" will appear after the text:

C: Input C\_

Say we want to change the input label to "Cable TV". First we will delete all the existing characters in the input label. Press  twice. The C will disappear and the cursor will move to the left:

```
C: Input_
```

Press  five more times. All that is left will be this:

```
C: I
```

Press  and  to change the I and cycle through the characters available. There are upper and lowercase letters, digits and some symbols. Holding down the button for a couple seconds will make the cycling auto-repeat.

In our example we change the I to an uppercase C:

```
C: C
```

Press .

The display shows the cursor has moved one place to the right of the "C":

```
C: C_
```

Using  and , change the second character to a lowercase A and press  once more:

```
C: Ca_
```

Repeat this process until your display shows:

```
C: Cable_
```

To insert a space after "Cable", simply press .

```
C: Cable _
```

Now complete the label in the same way as the other characters:

## C: Cable TV

Store the input label by pressing . The input label will change to white to indicate it is now stored. Or of course you can undo the changes to the label you have made in the normal way by pressing .

The maximum number of characters allowed in an Input Label (including spaces) is 9.

## IntelliInput

The IntelliInput feature of the HD940 means that it automatically switches to the most recent input that has become active. Usually this is just what you want for easy operation. However, in some circumstances you may want fully manual control of input selection. You can do that by turning IntelliInput off.

To change the IntelliInput setting, cycle through the settings in the Settings menu until you reach it:

IntelliInput ON

Change the setting in the usual way (to either ON or OFF) using  or , then press  to store, or  to cancel the change.

If the HD940 is in Cascade Mode then the IntelliInput setting is ignored; IntelliInput is always off for HD940's in Cascade Mode.

## Audio Latencies

**NOTE: The Audio Latencies setting is an advanced feature. It should normally be left in the default setting of ON.**

The time it takes a TV to process its audio signal is known as its Audio Latency. In HDMI it is possible for equipment to make known their audio latency via the HDMI's "EDID" information. Where a TV does this, the HD940 takes the audio latency into account when calculating the amount of delay required when in

Auto and Extended Auto Delay modes: The amount of audio delay applied by the HD940 is the video latency minus the audio latency.

As an option, the HD940 allows you to turn off this feature, effectively treating the audio latency as always zero. To do this, cycle through the settings in the Settings menu until you reach Audio Latencies:

Audio Lats. ON

Change the setting in the usual way (to either ON or OFF) using  or  then press  to store, or  to cancel the change.

Note, if you change the Audio Latencies setting then the your Extended Auto Delays may change values. This is normal as the Extended Auto Delay values include adjustment for audio latency. If you change the Audio Latencies setting back again, then the Extended Auto Delay values will change back too.

## Extended Auto Delays

The setting of the Extended Auto Delay for the current video format has already been described on page 22. But, via the Settings menu, it is also possible to view and set Extended Auto Delays for any of the 64 possible video formats.

The Extended Auto Delays section of the Settings menu is accessed by cycling through the settings until you reach:

E-AUTO Delays...

Press . You will see the extended auto delay of the current video format, e.g.:

VIC#5 e=125 ms

The video format code (VIC#) is shown on the left along with the extended auto delay on the right. Any video format that does not have an extended auto delay set is shown like this:

VIC#12 e=not set

Use  and  to scroll through the video format codes 1 through 64. When you reach the extended auto delay you want to change, press . The display will change to yellow to indicate it is being changed.

Press  to delete the last digit, and repeat as required. Enter the new extended auto delay using the digits on the numeric keypad - and number from 0 to 999 is acceptable.

If you want to unset an extended auto delay then press  repeatedly until the display shows it as not set:

VIC#5 e=not set

To store the new extended auto delay press , or press  to cancel the change.

To exit the Extended Auto Delay section of the Settings menu, press . You will be returned to the Extended Auto Delay option in the Settings menu:

E-AUTO Delays...

## Programmable Learning Remotes

The HD940 is capable of being controlled by various third-party learning remotes. In addition to the IR codes of the buttons present on the standard Felston remote control, the HD940 is also able to handle additional IR codes such as discrete power on/off, additional input selections (for use in Cascade Mode) and more. For the latest information and downloads on using learning remotes with the HD940, visit:

<http://www.felston.com/HD940/remotes>

### Controlling Multiple HD940's Independently

If you have more than one HD940 located near to each other in the same room, and you want different HD940's to respond individually to commands from your remote control handsets, then you can if you have a learning remote control.

Using the procedure below it is possible to change the unique manufacturer's code that a HD940 responds to. Before you follow the steps below your learning remote must be programmed with the commands of the HD940. Each of those commands must also have its manufacturer's code changed from the default value of **B6BA** hexadecimal (the code used by the Felston remote control handset) to another code of your choosing. That process is dependent on the type of learning remote control you are using and is beyond the scope of this manual. For more information about using learning remote controls with the HD940, visit:

<http://www.felston.com/HD940/remotes>

Once your learning remote control is configured with the Felston HD940 commands but a different manufacturer code, follow these steps below to make it respond only to your learning remote control:

1. Connect power to only the HD940 for which you want to change its remote control identity.

2. With the HD940 active (not in Standby), press and hold **7** on the ORIGINAL Felston remote control.
3. After approximately 10 seconds, Input LEDs A and B will flash alternately. Release the **7** button.
4. While the A and B LEDs are flashing, press the **8** button on your LEARNING remote control.
5. The HD940 will go into standby, indicating your learning remote control's manufacturer's code has been learned.

From now on you will be able to control the HD940 from your learning remote control. Pressing buttons on the original Felston remote control will no longer have any effect on this HD940.

If you want to change the remote control code of the HD940 back to the Felston original handset, or if you want to change it to a different learning remote control, follow these steps:

1. Connect power to only the HD940 for which you want to change its remote control identity.
2. With the HD940 active (not in Standby), press and hold **7** on the remote control that currently controls the HD940 (you can also use the original Felston remote control.)
3. After approximately 10 seconds, Input LEDs A and B will flash alternately. Release the **7** button.
4. While the A and B LEDs are flashing, press the **8** button on the remote control you want to use instead.
5. The HD940 will go into standby, indicating the manufacturer's code of the new remote control has been learned.

**NOTE:** Performing a Factory Reset (see page 41) will return the HD940 to control of the original Felston remote control handset.

## Factory Reset

To return all of the HD940's settings to their default values, follow this procedure:

1. Remove power from the HD940
2. Connect power to the HD940
3. Within 1 minute of connecting power, press and hold .
4. After about 60 seconds the 4 input LEDs on the front panel will flash in sequence 4 times. This indicates the factory reset has been completed.

**Factory Reset causes ALL settings of the HD940 to revert to their default values (input labels etc.), and all presets, delays, extended auto delays to be deleted, so USE WITH EXTREME CAUTION!**

## Returns and Repairs

If, after checking the *Troubleshooting* section on page 41, you believe there is a fault with the unit contact your dealer. If a return is required, be sure to include the unit along with all requested accessories, preferably in its original packaging to ensure safe transit.

# Troubleshooting

*When connecting power to the HD940, two green input LEDs flash in a repeating sequence for a few seconds.*

This is normal behavior when the HD940 is in Cascade Mode. See *Lock/Unlock*

To prevent preset values and Extended Auto Delay values being changed, the remote control handset has a Lock feature.

To Lock the handset, press and hold . While you are holding it down a message will appear on-screen in yellow:

Locking...

After 6 seconds the message will change to white and will read:

Locked

Now release .

The handset is now locked which means that the  button will not function. In this way, presets and Extended Auto Delay values cannot be accidentally changed.

To unlock the handset, press and hold . While you are holding it down a message will appear on-screen:

Locked

After 6 seconds the message will change to this:

Unlocked

Now release .

The handset is now unlocked and the  button will work normally again.

Cascade Mode on page 24 for more information.

***When I enter a delay, it appears in red on-screen and a lower delay is actually selected.***

This is normal behavior and indicates that the delay you entered exceeded the maximum possible for the current audio signal. See page 18 for details.

***No standby LED or input LEDs are lit on the front panel.***

Check the power cable is securely plugged into the back of the HD940. Check the power adaptor is plugged into a working, powered wall socket.

***The HD940 is on. It responds to the buttons on its front panel, but there is no response from the remote control.***

Ensure you are pointing the remote control's infrared transmitter squarely at the front of the HD940. Check there is nothing obscuring the display of the HD940. Check the batteries in the remote control are installed correctly; replace them with new ones if required.

***The HD940 is operational, i.e. the input changes when an input button is pressed, but no text messages from the HD940 appear on the TV screen.***

This is normal behavior if you have turned the HD940 on-screen display off. Press  to restore the display. See page 15 for more information on positioning the on-screen display.

***For any other problems with the HD940 perform a Factory Reset (see page 41) before contacting your dealer.***

# Specifications

## Audio Delay Capabilities

- 0 to between 340 ms and 999 ms, in 1 ms or 0.33 ms steps. Maximum delay is dependent on the audio format of the HDMI signal, but is always at least 340 ms.
- 32 user-programmable presets (8 per input)

## Digital Audio Signal Compatibility

The HD940 preserves digital audio integrity *bit-for-bit*, ensuring compatibility with all current HDMI audio formats.

List formats we have tested with along with notes on maximum delay?

## Connections

- 4 x HDMI Inputs
- 1 x HDMI Output
- DC power supply socket

## Power Requirements

5V DC (+ve center), 2A

Refer to the specifications printed on the power adaptor supplied with HD940 for AC power requirements.

## Power Consumption

Less than ?? Watts for the HD940 from 5V DC

AC power consumption will depend upon the country specific power adaptor supplied with the unit but will not exceed 5 watts in any case.

## Dimensions of Main Unit (WxDxH)

Size: 7.9" (200mm) x 4.1" (104mm) x 1.2" (30mm)

Weight: 1lb 5oz (600g) approx.