

ServSwitch™ Dual 2.7 and iPATH 2.3

New features



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Federal Communications Commission and Industry Canada Radio Frequency Interference Statements

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Instrucciones de Seguridad (Normas Oficiales Mexicanas Electrical Safety Statement)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico debe ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.
12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

Table of Contents

- 1. Magic Eye and Dithering 6
 - 1.1 What Is Dithering? 6
 - 1.2 Why Has It Been an Issue for ServSwitch Agility Extenders? 6
 - 1.3 What Is Magic Eye? 6
 - 1.4 How Can I Tell If My Video Source Is Dithered? 6
- 2. New CODEC-AFZ 7
 - 2.1 Why Are We Offering a New CODEC? 7
 - 2.2 What Is the New CODEC? 7
 - 2.3 What Benefit Does It Bring? 7
 - 2.4 Is It Backward Compatible? 7
 - 2.5 AFZ and Magic Eye Together—the Solution to Working with Apple Computers 7
- 3. Video-Related Features 8
 - 3.1 Cloning of Video Outputs 8
 - 3.2 Video Compatibility Check 8
 - 3.3 Background Refresh 8
 - 3.4 Hot Plug Detect 8
- 4. USB-Related Issues 9
 - 4.1 Fast Switching of USB 9
 - 4.2 Increased Ability to Share 9
 - 4.3 Using Two USB Touchscreens—Enable Multiport Configuration 9
 - 4.4 Enable Isochronous Endpoint Attach 9
- 5. Extended API for Channel Switching 10

1. Magic Eye and Dithering

1.1 What Is Dithering?

Dithering is a technique used to improve perceived image quality by creating the illusion of more shades of color than a display can actually produce. By diminishing harsh transitions between colors, dithering can remove the “banding” that appears in areas of gradually changing color or brightness, such as photographs of the sky.

Dithering was quite useful a few years back when LCD panels were only capable of 6 bits of color per pixel. The DVI specification for the graphics cards used a maximum of 8 bits, and the monitors simply ignored the bottom bits of data. It was very easy to see banding and harsh transitions.

However, technology moves on, and we all now use monitors with 8-bit color so the need for dithering for LCD panels is simply gone.

Dithering technology is still in play today, with it being available on Nvidia and ATI graphics cards. Apple® still uses the technique on all its computer products.

1.2 Why Has It Been an Issue for ServSwitch Agility Extenders?

Unfortunately dithering is an issue for us because, at a digital level, it appears that every pixel is changing color all the time, even when the image is static. This requires up to five times more network data than can be carried by Gigabit Ethernet. The result is a reduction in video frame rate, which the user sees as slow mouse response and jerky video content.

1.3 What is Magic Eye?

The Magic Eye feature reduces network traffic by ignoring small variations in the video from frame to frame. When it is used with Apple® Mac® computers and other host computers that have dithered video output, Magic Eye enables the ServSwitch Agility to transmit high frame rates, providing instant mouse response and smooth video playback. It can also be used to improve performance if the video source is noisy (e.g. from a VGA-to-DVI converter).

Magic Eye is enabled by default as it is not obvious to the user that poor mouse behavior is caused by dithering. In most cases, Magic Eye is invisible, but it can, of course, give slight color inaccuracies on the monitor. For full color accuracy, Magic Eye can be disabled for video sources that are not dithered or noisy.

For applications where color accuracy is vital, we highly recommend disabling video dithering altogether.

1.4 How Can I Tell If My Video Source is Dithered?

The only way to tell is to look at the network traffic generated by the ServSwitch Agility unit.

On average, a single 1920 x 1080 screen with a background refresh rate of 32 frames will use about 5–6% of bandwidth.

A dithered source will generate about 700 Mbps of data, or 70% of available bandwidth.

2. New CODEC-AFZ

2.1 Why Are We Offering a New CODEC?

ServSwitch Agility was originally designed as a pixel-perfect, low-latency desktop extension tool, and as such, the technology works extremely well.

But with customers using the equipment in moving-video-type environments, we saw the need for a more-focused video encoding scheme to match their requirements.

2.2 What is the New CODEC?

The new compression scheme builds on the existing CODECS and is primarily focused on improving the performance for "natural" images (i.e. photographs and movies). It works with the existing CODECs and is automatically selected whenever there is a benefit to do so.

The new CODEC is lossless and is very low latency (a small fraction of a frame delay). It generally achieves 50% improvement (in compression) on current scheme for any areas of the screen that consist of images, gradients, shadows etc.—elements commonly found in modern desktop environments.

2.3 What Benefit Does it Bring?

The CODEC now enables smooth playing of videos filmed at 24/25 or 30 fps at maximum screen resolution.

When AFZ is turned on, the bandwidth reduces and frame rate picks up.

Average bandwidth for this clip (1080p video—Dual head but on single screen) is about 700 Mbps with RLE at @36 fps and the AFZ shows 400 Mbps but a higher frame rate of @50 fps.

A still screen uses about 80 Mbps (8%) with a background refresh every 32 frames.

2.4 Is It Backward-Compatible?

The encoding part is only fitted to the ACR1002A-T, and the decoder is in ACR1002A-R. When an Agility (single) receiver unit connects, the transmitter automatically reverts to the standard RLE-based CODEC.

2.5 AFZ and Magic Eye Together—the Solution to Working with Apple Computers

With the combination of the two technologies, it is now possible to get the performance a user would expect while using Apple computers even when using large dual-link cinema screens.

Chapter 3: Video-Related Features

3. Video-Related Features

3.1 Cloning of Video Outputs

It is now possible to send a single video stream to both video outputs on an a ServSwitch Agility Dual receiver.

This is useful if you are using screens back to back, attaching another extender or transmission device like the Black Box® Digital Wizard IP DXS. By “splitting” the video at the receiver, you will only need to transmit the video to one transmitter, therefore limiting the data required to transmit the video to two screens (or other devices).

3.2 Video Compatibility Check

This feature is designed to stop the sending of video resolutions to monitors that cannot support them.

Many monitors simply stop working if they receive a signal they can't support. It is then impossible to bring up an OSD to change the selected channel.

The compatibility check reads the supported resolution list from the monitor and will only allow connection to those specific resolutions.

If the resolution sent is not supported, an OSD message from ServSwitch Agility is generated saying “out of range” and you will be able to switch to another appropriate channel.

The drawback here is that many monitors do not hold the full information of the video resolutions they can support. (i.e. Dell xxx, Native 2048 x 1152—works fine at 1920 x 1080 but doesn't list it in EDID, so with compatibility set to “ON,” it will not display a fixed resolution of 1920 x 1080).

3.3 Background Refresh

This feature has not changed in this release. The default setting is currently set at 32 frames. This means that after 32 frames, an entire frame is sent whether it has any changes or not.

For two static 1920 x 1080 screens this uses about 10% bandwidth.

The refresh is designed to minimize any impacts of lost data (IP packets) but, in reality, packets do not go missing in a wired system.

We suggest that you set the refresh rate to 256 frames—this reduces the bandwidth to about 1% and assists frame rate performance when video is played.

3.4 Hot Plug Detect

Not a new feature, but we have extended the selection of HPD times to include a 1-second period.

4. USB-Related Issues

4.1 Fast Switching of USB

In Version 2.6 of Agility dual firmware, we implemented fast switching USB. This is the implementation of the final piece of our USB True Emulation technology, which we have developed on products like the ServSwitch Freedom and ServSwitch Wizard DVI DL.

The TX units now store information about the USB devices they have connected and continue to report them to the host computer even when the receiver has disconnected. This means that the host computer doesn't tear down its USB link if an RX unit switches to another computer. So, the time to establish a USB link is reduced by $\frac{2}{3}$ of the time to just two seconds.

4.2 Increased Ability to Share

This change also improved the potential number of devices that can connect to any single TX unit.

The number was previously limited to 12 devices but is now limited to 12 different VID/PID identities.

This means you could have six keyboards and six mice all of the same make and model connected at one time and yet the TX unit only sees one keyboard and one mouse.

4.3 Using Two USB Touchscreens—Enable Multiport Configuration

In some applications, you do not want USB devices to be merged but rather you want them to retain their individual identity, such as when connecting two touchscreens to a single receiver unit.

The bottom two USB ports on the back of the receiver can be set not to merge. This feature is turned off by default (i.e., they merge as standard) but can be turned on in the Web pages.

The feature is labeled in the USB settings tab as "Enable multiport configuration."

It is currently not in the iPATH pages (Version 2.3) but will be in the next release.

4.4 Enable Isochronous Endpoint Attach

Some devices (for instance an iPhone®) have multiple USB devices reported and, in this case, one of the endpoints is isochronous.

Until Version 2.7, these combined devices would be rejected out of hand. Now the ServSwitch Agility still rejects the isochronous part but allows the other USB features to proceed.

Isochronous devices are still not supported.

5. Extended API for Channel Switching

Until now, the API has been limited to just activating presets. This has now been expanded so you can make individual channel changes via a third-party control system.

As normal, full documentation is available in the iPATH page.

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ACR1000A-CTL New Features

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