GRAPHITE

All-in-one Live Production Vehicle

ROSS
Living Live!
ALL-IN-ONE
Live Production Vehicle.

REAL SWITCHER, REAL GRAPHICS, REAL AUDIO

- **Real Production Switcher Hardware:** The video switcher is the heart of any live production, reliability and performance are paramount. Graphite includes the pure production power of Carbonite – the world’s most popular mid-size production switcher – built into dedicated hardware. Enjoy all of Carbonite’s ‘big switcher’ features and never miss a beat.
- **Real Graphics:** Graphics can make or break a show and Graphite comes equipped with the best. The Ross XPression Motion Graphics system is used by top Hollywood productions, sports teams and networks. Graphite also includes XPression Clips – fully featured clip server channels.
- **Real Audio Mixing:** Great video needs great audio. Graphite comes with a professional 48 channel hardware-based audio mixing engine with optional Mic and line breakout panel with great specs and low distortion.

ROCK-SOLID RELIABILITY

- **Crash-Proof Hardware:** Traditional all-in-one systems can suffer from stability problems – a stutter in the middle of an important production or losing an element due to resource limits is unacceptable. Graphite eliminates these issues with its core processing built on dedicated internal hardware that contains the proven Carbonite engine. It even stays up while the computer reboots – ideal for mission critical applications.
- **Proven System:** Graphite is built on a solid foundation of dedicated components made by Ross, quality assured by a team of specialists to ensure a superior experience.
- **Backed by Ross’ Legendary 24/7/365 Support:** When you do need help, it is only a phone call or email away to Ross’ round the clock global technical support team.

SIMPLICITY & SCALABILITY

- **True All-In-One Solution:** No external networking required for inputs and outputs, just plug and play into Graphite’s dedicated I/O.
- **Single or Multi-User Operation:** Graphite scales to meet the demands of various productions – run with a single operator or use separate operators for graphics and audio for larger, more complex productions. Supercharge control with event-specific custom Dashboard user interfaces.
- **Growth Path:** Regular firmware updates are downloadable from the Ross website. Easily expand Graphite’s capabilities with additional graphics channels, newsroom integration and automated production control.

WHY BUY GRAPHITE?

Imagine an all-inclusive system that combines superb big switcher performance with visually stunning 3D graphics, instant access clip servers and pristine audio clarity – with the reliability of separate system components – that’s Graphite.
Switch with confidence on Carbonite – the hallmark Ross Video product. Decades of production switcher experience have gone into this mid-sized power house, resulting in a truly incredible feature-set.

**BIG SWITCHER POWER**
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**POWERFUL GRAPHICS**
Near limitless layering on a single channel with true 3D objects and animation – Xpression Graphite is the motion graphics engine that simply can’t be matched by other all-in-one systems.

**INTEGRATED CLIP SERVER**
Creatively utilize video clips with instant access and frame accurate recall with XPression Clips. Record video or XPression Graphite animations for use in your productions.

**UNMATCHED AUDIO**
Handle demanding live audio without compromise, with the professional RAVE production engine. Do more than you ever imagined was possible in an all-in-one system.

**ULTRA-RELIABLE**
Rely on a system with consistent performance and immunity to traditional all-in-one issues. The unique design only requires power from the host PC for operation, as Graphite’s OS and software are self-contained on a hardware-based PCIe card that is entirely separate from the PC.

**FLEXIBLE WORKFLOW**
Crew your show as you see fit. A single operator can run an entire show through all-encompassing control, or roles can be separated for multiple operators during high-intensity events. This is the advantage of a tightly-integrated system with an intelligent control platform.

**INCREMENTAL GROWTH**
Graphite is the complete foundation for live production. Xpression Graphite can be upgraded via software-license, and it is simple to add additional devices – like Mira Replay, Tria Production Servers, and robotic cameras – for larger events. All of this can be achieved with a single vendor for effortless integration and guaranteed support.

**SPACE CONSCIOUS**
Eliminate the rack space requirement of multiple separate boxes, the entire system fits within a single 4RU frame.

**DURABLE BUILD**
Withstand the rigors of mobile production with carefully engineered physical construction.

**FIRMWARE UPGRADES**
Downloadable firmware upgrades for the life of the product result in an incredible technology lifespan. Based on user feedback, these upgrades expand features and add functionality to keep up with a constantly-progressing industry.

**Key Benefits**
EVERYTHING YOU NEED TO CREATE A MAGNIFICENT PRODUCTION

Experience the exhilaration of a full suite of top-notch production tools at your fingertips. Graphite gives you what you need to create great live content, whether streaming to the web, broadcasting over the air or feeding big screens.
RAVE AUDIO PROCESSING ENGINE
A first for Ross and an essential development for Graphite, RAVE (Ross Audio Video Engine) breaks the mold of uninspired audio capability in all-in-one production systems. RAVE includes internal audio routing and output channel shuffling, together with a hardware-based 46-channel, 24bit, digital audio production mixer. Graphite's audio production capabilities are matched only by independent audio production systems, but adds the benefit of host PC access for additional audio input and monitoring.

Optionally, up to three audio breakout panels provide professional discrete audio I/O connection for balanced analog mic inputs with high quality pre-amps and phantom power as well as separate analog outputs and AES I/O.

ADD SOME DASHBOARD MAGIC
DashBoard allows you to easily build powerful CustomPanels – graphical user interfaces tailored to control virtually anything in your production environment. Build a panel to control graphics for sports like tennis, baseball or hockey, a panel that recalls your robotic camera settings, or a control panel that runs effects on a studio monitor wall. You get the idea – DashBoard CustomPanels take complex production operations and make them simple. DashBoard has a wide range of supported devices, is free and can be downloaded from the Ross Video website.

CARBONITE PRODUCTION SWITCHER
Graphite contains Ross Video’s most successful product of all time, the Carbonite Production Switcher. Enjoy the high-end production power of the world’s most popular broadcast switcher in a compact all-in-one production system.

XPression 3D MOTION GRAPHICS
High-quality compelling graphics are an everyday essential for any production. An incredibly powerful graphics engine, XPression Graphite is integrated within the system. Scenes and templates are designed, built, and saved for later use, or immediately available for keying over video inputs. An independent user interface allows on-the-fly creation and editing - even during production.

XPression CLIPS
Video clips and prerecorded animations are another key production element. Graphite incorporates two channels of XPression Clips, clip servers that add another layer of production sophistication. Users are able to record, manage, and play-out video clips on-the-fly or from within a predetermined sequence or rundown.

Graphite offers the production power of all these components, concentrated into one compact 4RU package.

The Whole is Greater Than the Sum of Its Parts
Graphite is the culmination of time-honored Ross product development, innovative technology, and an unrelenting dedication to enabling first-rate live productions. Graphite is an all-in-one system that contains:
Under The Hood.

PROVEN PERFORMANCE
Graphite contains Ross Video’s most successful product of all time, the Carbonite Production Switcher. Enjoy the high-end production power of the world’s most popular mid-sized switcher in this compact production system. For those not already familiar with Carbonite, key features include:

4 POWERFUL MEs
Carbonite packs major effects and keying power into two MEs. Each ME has four powerful keyers with luma, linear, chroma, and DVE key types as well as an additional fifth transition keyer for animated Media Wipes and DVE transitions. Each ME can access the two advanced Ultrachrome chroma keyers. Two advanced pattern generators per ME are available for stipes, pattern masks and color washes. Each ME also provides a clean feed output.

4 MiniMEs
Powerful effects modules that include an independent in- and 2 Keyers: 1 standard Keyer and 1 specifically for DVE boxes. MiniME modules do not reside in a fixed position in the signal-flow, they ‘float’ and can be used anywhere in the signal path. There are 4 MiniMEs in the system, which can be assigned to multiple locations and used simultaneously.

POWERFUL EFFECTS CONTROL
Create and repeatably control compelling effects with Carbonite Custom Control macros and event memories. Get perfectly timed effects and event recalls from the press of a single button.

MultiViewer
Two configurable MultiViewers (up to 32 windows) are included in the Carbonite feature set. These clean, low latency MultiViewers have access to all external and internal sources. Source naming and tally assignment automatically follow window routing selections. Each MultiViewer has user selectable layouts with the individual choice of border, tally and source label display for each source.

GRAPHICS INTEGRATION
XPression Graphite has a direct connection to Carbonite’s Media-Stores. Individual still graphics can be transferred and stored for inclusion in the production in addition to the live multi-layered graphics. It is also possible to use switcher media stores as a preview channel for the XPression Graphite application.

MULTISCREEN AND UHD OUTPUT
Built in MultiScreen processing provides image scaling and keying across multiple displays. This is perfect for multi-projector and large video wall production and is independent of the main MEs. In MultiScreen quad mode, output UHD with automatically upscaled HD content.

ROBOTIC CAMERA CONTROL
Take complete control of your production with integrated PTZ / Robotic camera control built right in to Graphite. Control Ross PIVOTCam PTZ and CamBot robotic camera systems as well as any PTZ camera product that uses VISCA protocols.

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Creating a Great Look

<table>
<thead>
<tr>
<th>Graphic Templates</th>
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| Create a Great Look with XPression, a premium news & sports graphics system. These templates are customizable, so matching specific color schemes and branding requirements is a snap.

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<th>Straightforward Playout</th>
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| Add scenes as take items by dragging them directly into XPression's Sequencer. XPression's template-based workflow replaces text, stills, clips, and modifies data hooks, while playing out to air.

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<tr>
<th>XPression CLIPS</th>
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| The included XPression Clips dual-channel server provides a full database to browse, catalog, and play clips. XPression Clips offers instant recall times and back-to-back clip transitions.

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<th>Get into the Game Easily</th>
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| Quickly get started building lower third titles with more advanced users able to leverage a deep graphics tool set.

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<tr>
<th>Go Deep for Enhanced Performance</th>
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| Achieve even more complex 3D animations by animating Virtual Cameras along with objects in XPression. Both perspective and orthogonal cameras are available. Easy manipulation in the Viewport is possible with mouse camera control that allows you to zoom and orbit objects on a grid that toggles on and off.

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<tr>
<th>3D Primitives</th>
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| Build graphics from XPression's 3D primitives. Animate, resize, and re-skin elements for final output. This is a huge improvement over the titling systems that are commonly found in traditional all-in-one systems.

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<th>Visual Logic</th>
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| Automate and add intelligence to XPression scenes with Visual Logic. It is no longer necessary to use complex scripting to create "smart templates". With visual logic, simply drag parameters to the workspace and connect them with functions and other parameters by drawing lines from output to input. Live data can be applied to change the outcome of the logic.
Graphite features the powerful RAVE audio production mixing and channel management engine that is only matched by dedicated audio mixing devices. Simply put, Graphite's audio capability cannot be matched by other all-in-one production systems.

### A Higher Pitch

Graphite offers crisp 24-bit audio at a sample rate of 48 kHz.

### Audio Sources

RAVE provides access to audio from SDI inputs, internal sources like XPression and XPression Clips, and even PC audio sources such as Skype. Within each SDI input, RAVE can access all 16 embedded channels (8 pairs) and assign them to available faders within the mixer. SDI-output channels are configurable with passthrough, all mixes, Main Mix, Monitor mix and custom aux mixes.

### Audio Mixer

RAVE is a 48-channel audio mixer that offers input management, level monitoring, volume & gain adjustment, pre-fade listen, input sample rate conversion, mix-minus AUX outputs and more.

### Flexible Control

Manage the RAVE audio mixer with built-in DashBoard control software or USB-connected MIDI audio mixer panels.

### Audio EQ

A must have for microphone-heavy productions. EQ is both a powerful technical and creative tool, drawing out the best parts of your sound and removing those undesirable elements. The RAVE audio mixer’s 4-band EQ gets the best out of every channel in the mix.
Graphite Options

**GRAPHITE + OVERDRIVE**
Combine Graphite with the industry’s most widely-used Automated Production Control (APC) system - OverDrive. Enjoy an accessible automated production solution that fits easily into your existing workflow.

**HARDWARE AUDIO CONTROL**
Graphite’s RAVE audio mixer can be controlled via inexpensive USB-connected MEX audio mixer panels.

**RAVE - 1RU AUDIO BREAKOUT PANEL**
For users that have more rigorous audio needs, Graphite can connect to up to three 1RU audio breakout panels that add discrete Analog and Digital audio I/O, together with microphone pre-amps and phantom power.

**ANALOG TO DIGITAL CONVERSION**
The RAVE audio breakout panel includes precision analog to digital conversion to allow the inclusion of external analog sources in the production. Output digital to analog conversion provides analog program and aux sends.

**ANALOG BALANCED MICROPHONE / LINE INPUTS**
The audio breakout panel features 8 analog inputs individually selectable between microphone and line levels.

**MICROPHONE PRE-AMPS**
RAVE’s audio breakout panel provides pristine quality microphone pre-amp gain (0-60dB) and digital pad (-20dB).

**PHANTOM POWER**
Higher quality microphones often require phantom power. RAVE’s Audio Breakout Panel provides individually selectable phantom power to all microphone inputs, in industry-standard 48V format.

**AUX OUTPUTS**
Any of the breakout panel’s five analog outputs can be used as customized AUX outputs. This is an excellent feature for productions that require specific audio feeds, such as multi-lingual productions, shows with multiple hosts or mix-minus feeds.

**AES I/O**
To integrate your professional audio gear, RAVE provides a direct 2-channel AES input and output.

**CARBONITE BLACK PANELS**
While Graphite can be entirely operated via its graphical user interface, it can also be connected to any of the ergonomically beautiful Carbonite Black panels - the widest range of panels available for any application.

**MIRA REPLAY**
Sporting events happen fast, which is why your audience needs a second look at those pivotal moments throughout the game. Replay capability is a must-have during sports productions and thanks to the complete production system that Graphite provides, the only addition you need to make is Mira Replay Systems easily connect with Graphite to form a total sports production solution. Boosting multiple channels for record and play operation. Mira is built with a straightforward user interface and control surface that any operator can master with ease. Enjoy a complete two-piece solution and make sure your audience doesn’t miss a second.

**MIRA EXPRESS**
Mira Express is the newest iteration of Mira Replay, it is the perfect solution for adding rapid instant replay to fast-paced sport productions, at a remarkable price point. Mira Express is built on a solid platform that won’t let you down and is a truly reliable alternative to traditional budget replay systems.

**aja HELO STREAMING OUTPUT**
For web applications, the optional AJA HELO offers a simple streaming solution for Graphite. Facebook Live, YouTube, Twitter and other services and Content Delivery Networks (CDN) as well as direct streaming are supported.

**PIVOTCam PTZ Cameras**
An excellent choice for quality robotic image capture. PIVOTCam has a high-performance camera with quiet and accurate PTZ functionality, at a fantastic value. Graphite’s camera control provides preset-based recall, manual and intuitive joystick control from a Carbonite panel joystick and is tightly integrated with DashBoard for total production control.
Graphite Frame Specifications

13 External Inputs
- 2 SD/HD/3G SDI / 1 HDMI

7 Internal Inputs
- Single Channel XPression with Multiple Key Layers
- 2 Channels of XPression Clip Playback
- 4 Channels of Media Storage (Stills & Animations w/ Audio)

8 Outputs
- 6 SDI / 2 HDMI

Carbonite Engine Specifications

Number of MEs
2

Number of MiniMEs
4

Number of MultiViewers with Tally and Source Names
2 (up to 8 windows)

Internal Format Converters / Frame Synchronizers
6

Number of Floating DVEs
4

Performance Features
- Number of Keys Per ME
- 9 (5 x 1 Transition Key)
- Number of Keys Per MiniME
- 2 per MiniME

Operational Features
- Ultrachrome Keyers (Floating)
- Number of Floating DVEs (Spatial Capacity)
- 4

Supported Media File Types - Stills and Animations
- .BMP (no Alpha)
- .GIF or .APNG (no Alpha)
- .PNG (with or without Alpha)

Operational Features
- Performance Specifications
- Browser-Based Graphics Management
- Pattern Generators
- 2 per ME
- Animated MediaWipes
- √

Control Interfaces
- Robotic Camera Control
- √
- Signal Processing Standards
- Standard Definition
- 480i/59.94, 576i/50
- High Definition
- 720p & 1080i 50/59.94
- 1080P
- 25 / 29.97 (1.5Gb) & 50 / 59.94 (3Gb)
- UHD Up Conversion for Output
- 4x Quad Link (MultiScreen Mode)
**XPression Graphite Specifications**

- **Template Designer**
- **Playout Sequencer**
- **Built-in Motion Graphics Templates**
- **2D / 3D Fonts**
- **Arabic, Asian & Scripted Language Support**
- **3D Primitives**
- **Imported 3D Models**
- **Video Clip Support (within a template)**
- **Video Clip Management**
- **Native 3D Models**
- **AES Output**
- **Relative Transformations**
- **Clip Browser with Selecting**
- **Frame/Field Monitors**
- **Virtual Cameras**
- **Seamless Continuous Tickers**
- **TrueD! Anaglyphic Stereoscopic Preview**
- **Virtual Preview Channels (up next & look-ahead)**
- **Variable Resolution Video Formats**
- **HD Formats (DVI Out only)**
- **Render to Disk**
- **Virtual Preview Channels (up next & look-ahead)**

**Optional XPression Workflow Tools and Applications**

- **Studio Single Channel Edition (SCE)**
- **Studio Multi-Channel**
- **Project Server**
- **openMAM Connectivity**
- **Ross Streamline Asset / Order Management**
- **DataLinq Server**
- **XPression Gateway**
- **MOS Plug-in**
- **NLE Plug-in**
- **Template Builder**
- **CII Gateway**
- **Desktop Preview Server**

**XPression Clips Features**

- **1 Channel of Baseband Video Ingest**
- **2 Channels of Playout**
- **No Pre-roll**
- **Back-to-back Transitions**
- **Clip Browser with Searching**
- **Clip Trimming and Looping**
- **VDCP, AMP, P-bus, and RossTalk Automation Protocols**
- **P-bus Manager for Intelligent Clip Assignment**
- **Clip Manager Application with User Rights or Database Management and Synchronization Setup**

**RAVE Audio Mixer**

- **48-channels**
- **1 PC Audio**
- **2 MediaStores**
- **45 Configurable Channels**
  - Up to 4 XPression Channels
  - Up to 3 Stereo AES
  - Up to 24 Mono Analog

**Output Controls**

- **Fader Volume**
- **Post-Fade Audio Meter**
- **Post-Fade Peak Indicator**
- **Solo Clear**
- **PFL Clear**
- **Audio Aux Channels**
  - 6 – assignable pre or post
- **Configurable Audio Outputs**
  - 48-in/48-out embedded audio channels
  - 48-in/48-out digital audio outputs

**Input Controls**

- **Selectable embedded SDI-channel pairs**
- **Assignable to any available fader**
- **Sample Rate Converters**
  - AES Input ports (2-channels)
  - Input BNCs 1-6 (16-channels)
- **Fader Volume**
- **Pre-Fade Audio Meter**
- **Pre-Fade Peak Indicator**
- **Balance Control on Stereo Inputs**
- **Pan Control on Mono Inputs**
- **Mono Mode**
- **Mute**
- **Solo**
- **Pre-Fade Listen**
- **Audio Follow Video (Assignable)**
- **Audio EQ**
  - 4-band EQ control on any fader
  - (high shelf, dual mid-shelf, low-shelf)

**XPression Breakout Panel**

- **Analog / Microphone Inputs**
- **Analog Outputs**
- **AES Digital Audio Inputs**
- **AES Digital Audio Outputs**
- **GPI/O**
- **Tallies**

**Performance Specifications**
Ross Video has a complete range of technical services available to ensure that your Graphite installation is a success.

**Operational Training** can be provided at Ross Video, on-site or on the web. Experienced Ross operators will teach your staff to get the most out of your new system, and enhance your productions.

**Commissioning** is a service to help get your production system properly configured, connected and installed. This service is performed by factory trained Ross technical staff.

**Technical Training** can be provided at Ross Video, on-site or over the web. Technical training will teach your engineering staff the technical details of the system you have purchased. System configuration, interfaces, databases, and routine maintenance procedures are some of the topics covered.

Graphite comes standard with a 1 year comprehensive warranty. **Extended Warranties** on hardware and software maintenance are available for an annual fee.

Technical advice is available on-line, by telephone, or email to Ross Video – **Included for the life of your system.**