RAZER DEVELOPERS CONFERENCE 2021
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RAZER CHROMA RGB   Q&A

Link to Razer DevCon Resources: https://developer.Razer.com/devcon/

The following is a summary of key questions gathered from Razer DevCon 2021

- **RAZER CHROMA RGB -**

Q: How do we add Razer Chroma RGB to our game?
A: We invite you to please view the live recordings of the Razer Chroma RGB sessions which can be found in the program outline: https://developer.Razer.com/devcon/
Additional great resources for getting started with Razer Chroma RGB are available here:
https://developer.Razer.com/works-with-Chroma/guides/ and https://developer.Razer.com/works-with-Chroma/download/

Q: How would I tie the ambient lighting from a video to Chroma?
A: Try the C++ Sample app which includes an ambient awareness demo that captures a bitmap from the primary screen and displays that on Chroma keyboards and keypads.

Q: Is there a limit to the number of frames per second (FPS) that Chroma devices support?
A: Devices support a max of 30 frames per second. Higher rates might freeze the RGB lighting and require the physical hardware to be reconnected.

Q: If we programmed one of these Chroma effects for our game, how would we make it available for users to grab and use?
A: Games are not required to use Chroma plugins and can implement the Chroma SDK directly. Chroma plugins are also available which add support for animations and other common features. Games that use the Chroma plugins can either bundle or embed the Chroma effects. Users must have Synapse and the Chroma Connect module installed in order to view effects on their Chroma devices. Some engines might require that games ship with engine specific Chroma plugins. Plugins will have engine specific documentation to explain how they are deployed.

Q: How strenuous on the systems is this animation? Energy consumption? I haven't used keyboards with many designs.
A: Maximum energy consumption is expected to be 5V 500mA per cable used for a Razer Chroma device.

Q: What is the overhead cost of Chroma Animations?
A: Chroma animations support six device categories at 30 FPS and the data is relatively small. You can expect less than 1% CPU usage with support for the full device set.

Q: On localized keyboards, Is there a "right" way to get the keys position in the grid? Right now it involves (afaik) calls to the Win32 API to map to the locale.
A: API calls for mappings are available at the SDK level and in plugins for convience. Mapping logic can easily move to the game source to further customization. Chroma effects can be created for either a grid visual layout or for specific keys to support hotkey highlighting. The SDK supports key and grid layouts. These layouts map RZKeys and RZLeds to a row/column or index on the grid. Input detection code is available for testing input detection code on localized keyboards.

Q: Is it possible to subdivide the categories in the C# sample APP? (Ex. CHROMALINK → CHROMALINK-ChromaHDK, CHROMALINK-CHROMA ADDRESSABLE RGB CONTROLLER)
A: We strongly advise developers to create Chroma lighting effects based on devices categories (i.e. Keyboards, mice, mousepad, ChromaLinked etc) rather than specific devices. We want users to experience Chroma from all devices and not just for a particular device.

Q: Which Razer keyboard is recommended to test our Chroma integrations?
A: BlackWidow v2 is a full keyboard with additional macro keys and the numpad. You can design effects for the entire keyboard to see how it would look.

Q: How does Razer Chroma work?
A: Chroma has a C++ API and REST API which allows code to set color data which appears on the physical hardware.

Q: I would like to interact with HUE lights along with Razer devices, ideally through a REST interface. Is that possible? If so, could you brag about it a bit?
A: We do not have a API (Application Programming Interface) for controlling the HUE lights, but you can perform basic lighting configuration from the Synapse Chroma Studio. You can arrange the HUE lights in a virtual space and assign Chroma lighting effects to the whole scene along with other Chroma devices.

Q: I would like to play pong on my keyboard with my friend. The problem is, we both have our own keyboards. Does Chroma support two keyboards on one machine?
A: Yes, Chroma supports multiple keyboards plugged into the same machine. Using device guids you can create alternate RGB lighting patterns for different types of keyboards plugged into the same machine. I.e. if you are competing via a Huntsman versus a Cynosa. You could create a battleship style RGB game using the device GUID effects.

Q: I saw the new Yeelight strips on the DevCon page. Are those single ChromaLink color like the dev kit LED's or multi zone?
A: Yeelight devices sync with the ChromaLink CL1 index only.

Q: As a developer who uses a custom game engine, what would you recommend as the best method for creating A: custom Chroma animations?
The Chroma animation format is a binary universal format supported by the Chroma plugins. Custom engines can use the same authoring tools as other engines and the animations are interchangeable.

Q: Is it easy for teams with lesser resources to integrate Chroma into games/apps/devices, or create custom animations?
A: Yes. Please refer to the extensive list of guides and resources on Razer Developer Portal. Do reach out to us if you have any questions!

Q: Is Synapse supported on MacOS? Is it supported on older versions of Windows?
A: Synapse 3 is only available on Windows. Synapse 2.0 can support specific versions of Mac OS. Please refer to this article for more information.

Q: How can I add Chroma effects during my game, noticed it with a few others and was just wondering how to integrate it.
A: The process showed by the session is to first create a Chroma design for how effects might look in game. The design is converted to code that the game can use by the design converter which handles most of the port process. Test the ported effects using one of the sample projects. The sample project code and plugins can be added to the game. Next, go through the game code to find events where Chroma effects can be played. The last step is to follow the game loop sample to add Chroma code that supports hotkeys and multiple animations playing at the same time.

Q: Is it feasible to animate Chroma devices in real-time, i.e. without pre-generating animation files?
A: Animation files are not required. The game loop samples use animations as source color data and can be mixed together in realtime. The game loop sample shows how to directly access the effect arrays in real-time. Color data can be set programatically.

Q: Will new products such as Case Fans be included in Chroma Connect Program soon?
A: We add new partners under the Chroma Connect Program all the time! Keep a look out here.
Do ensure that your game is set up using ChromaLink data, so all future products will be supported as well.

Q: Will Razer have more Chroma compatible browsers such as Vivaldi and OperaGX?
A: Browsers can use the Chroma SDK or the Chroma REST API to do an integration. In the session, the design pages, trailers, and website demos are using the Chroma REST API and that will work in any browser.

Q: Is it possible to have Chroma-enabled devices react in real-time to audio?
A: Yes! Simply enable the Chroma Visualizer module in Synapse 3. This allows all your Chroma-enabled devices to react to the audio input. Check out the Developer Portal for more information such as the core C++ sample app and codes.

Q: What are some examples of tying Chroma to game mechanics?
A: The keyboard can highlight hotkeys to show action keys, player states, and ability cooldowns. The FKeys can be used to show health and ammo bars. The base color can be linked to environment color. You can do environment effects for things like fire, rain, and snow. Animations can be created for game events like melee attacks, taking damage, killing an enemy, or player death. Animations can use patterns using sprites, trails, and particle effects.

Q: Are external, non-Razer products compatible with Razer Chroma™ RGB?
A: As the world's largest lighting ecosystem for gaming devices, Razer Chroma™ RGB is supported by over 50 partners across thousands of devices and hundreds of apps/games, under our Razer Chroma Connect Program.

Q: Will there ever be an Unreal Engine Chroma FX Maker plugin?
A: Creating a runtime/editor plugin to capture Unreal effects might be unnecessary by using a workflow that does the same thing. You can use the Chroma editor with the OBS Virtual Camera to capture from a screen capture of Unreal. That way you can capture directly from the existing Unreal editor, tools, and gameplay that you already use.

Q: My engine isn't listed, how do I add Chroma support?
A: In most cases the existing plugins will work for most engines. If you need support added for your particular engine use the developer portal contact form to request support.

Q: I have Chroma in my game, can I use the same animations on our website?
A: Yes. The animation files are universal. The same animation files from the game will also play on the website. You can also use the authoring tools to embed the animations into the website to avoid needing the animation files.

Q: Can I do a webpage with lots of game characters that play Chroma animations when specific characters are selected?
A: Yes, you aren't limited to the number of characters on a webpage that can play Chroma effects. In the web part of the session, the web template had a single hover control as an example. A webpage could use a ton of hover sections for all the characters on the page. The page could even reuse a set of common animations and dynamically colorify the animations based on character color and do that on the fly.

Q: How long does it take to integrate Chroma into games/apps/devices?
A: This is dependent on a number of variables, such as the amount of resources on hand or the extensiveness of the Chroma effects. Typically, it should take less than a week to create the effects, but it may take longer to review and test the games/app/devices.

Q: Which programming languages are planned to be initially supported?
A: The plugins currently support C++, C#, Lua, UE4 Blueprints, ClickTeam Fusion, Godot, Gideros, Java, and more.

Q: Is it possible to have key bindings for when a certain color or subset of colors is pressed for a Chroma integrated keyboard?
A: Yes. You can bind Chroma effects to input events. Chroma effects can set a static color for the entire device or individual colors per LED. You can even mark out sets of keys into zones to set to static colors.

Q: I'm facing an issue while trying to integrate Chroma into my game. What should I do?
A: Please refer to the extensive list of guides and resources on Razer Developer Portal. Do reach out to us if you have any questions!

Q: Is there a way (or a plan) for streamed games to recognize the local peripherals and render Chroma effects, or does it only work if the game is run locally?
A: Currently only local devices are supported. There is a Chroma Twitch extension available that will broadcast local Chroma events to remote viewers.

Is there a way to retrieve the mapping of keypad keys (e.g. Razer Tartarus) to actual keypresses?
A: Most engines have a key input event. Several of the Chroma samples have key input detection. Input detection code is going to depend on the application. Input from a console app code might be different in

a windowed app or in your application. In most cases input events have a unique keycode or scancode that you can use for mapping keys.

Q: Will there be more Chroma-integrated mini games?
A: Please check out Chroma Workshop to discover the latest Chroma-integrated mini games! If you'd like to create one, do check out the guides on C++ SDK and REST A PI as these can be used to create new mini games that are available to play in browsers. You will need to have a mini game that has an input handler and display visuals with Chroma.

Q: Do we need Razer's approval/verification to start making Chroma Integrations for our game?
A: No approval is needed. You can download the SDK and sample projects to immediately start developing Chroma. However, we'd love to work with you to co-market your game! Do reach out to us using the contact form.

Q: Why do all your examples show pre-sequenced animations? It gives the wrong impression. Chroma easily supports fully dynamic animations created on the fly.
A: The tools give a way for designers a way to give feedback during the design process. Precanned animations are just easy to use for demonstration purposes. The SDK supports real-time dynamic effects. Animations are not required to do effects.

Q: Can this be used in something else than Unity?
A: Chroma plugins are available for several languages and engines.

Q: How expensive is the Unity plugin to run?
A: The Unity plugin is free and has very little overhead. If you are concerned about performance animations can be preloaded. Each frame is less than 1k of data that plays at a max of 30 FPS. Chroma should add less than 1% CPU of overhead.

Q: How can we enable our community and fans to create Razer Chroma effects for our games?
A: The developer portal has a modding example which uses relative paths and a naming convention to support Chroma modding. With embedding Chroma animation, games can implement using animation files or use other mechanisms to deliver and play Chroma effects for the community.

Q: Can you integrate Chroma to provide real-time effects?
A: Yes. The SDK supports real-time effects.

Q: What is the best way to announce Chroma integrations?

A: Reach out to us using the contact form to discuss how we can work together!

Q: Can the keyboard be an additional HUD space? Just have health show as lit up keys or colour change perhaps free up screen space?
A: Check out the animation guide where you can find examples for ammo bars and health bars.

Q: Is it possible for directional damage animation? Where the animation indicates where I was shot/hit from?
A: Check out the animation guide to see how a line can be drawn between two random keys. This could be adapted to indicate hit direction. You could swap out a line for other damage shapes and animations.

Q: Where can I raise technical questions regarding Chroma SDK?
A: Yes. Do reach out to us using the Contact Form. You can also refer to the extensive list of guides and resources.

Q: Where can we find the Razer Chroma example project files for the engine of our choice?
A: Sample projects can be found in the developer portal and in the animation guide.

Q: What web browsers support Chroma integration?
A: Vivaldi and OperaGX browsers have native Chroma integration. All web browsers support Chroma through the Chroma REST API.

Q: Do the Chroma animations work with all types of images?
A: You can use the tools to capture from images, GIF animations, video, webcams, and desktop recording via the OBS Virtual Camera.

Q: Is there a way (or a plan) for streamed games to recognize the local peripherals and render Chroma effects, or does it only work if the game is run locally?
A: Current support is local only. The Twitch extension does allow streamers to remotely control their viewers' Chroma via streaming.

Q: Any plans for Chroma integration with Xbox?
A: We have a DX12 C++ sample, UE4, and Unity samples that all work on XBOX. XBOX has XDL (Xbox Dynamic Lighting) and the Chroma plugins automatically translate Chroma effects to XDL. The same code base with Chroma code will work for PC and XBOX. Check out the Turret for XBOX which is an RGB keyboard and mouse that works on the XBOX.

Q: Is the range of AAA games with inbuilt Chroma integrations still growing?
A: Yes. Check out the Chroma workshop to see the ever-expanding list of the latest titles to have Chroma integrated

Q: Am I able to set colors directly in JavaScript instead of using a tool to process a video?
A: Yes. You can see samples of this in the Animation guide. Starting with example 41, the ripple effect is set programatically. Example 42 can draw a line between two random keys. Also check out the health bar and ammo bar examples. These are all examples of setting colors directly.