

Opal Manual

Introducción

El Opal de Comrex es una puerta de enlace de audio web diseñada para uso en el estudio. La función principal de Opal es permitir audio bidireccional desde el estudio a invitados remotos, como una llamada telefónica. Sin embargo Opal no utiliza líneas telefónicas. Opal recibe llamadas de audio de la internet usando computadoras y teléfonos inteligentes del invitado.

Hay dos ventajas clave para usar Opal:

- 1 Opal utiliza codificadores y decodificadores de audio que ofrecen alta fidelidad, audio con calidad de estudio, mientras se mantiene el retardo típico de un teléfono móvil.
- 2 Opal está diseñado para ser extremadamente simple para el invitado o talento remoto - los llamantes no técnicos pueden utilizar fácilmente Opal.

Opal tiene la capacidad de manejar dos llamadas simultáneamente, proporciona dos entradas y salidas XLR balanceado o AES3. En el firmware actual, la conferencia interna no es posible.

Opal utiliza el internet en el estudio. Tiene requisitos especiales con respecto a las redes. Pero todos estos requisitos permiten que el proceso de llamada sea extremadamente simple para el invitado. Todas las complejidades están en el lado del estudio, el invitado no necesita ningún equipo en especial.

Todas las conexiones de Opal son entrantes - ninguna funcionalidad se proporciona hacer conexiones salientes de Opal.

Una vez que Opal se ha instalado y configurado, se realizan conexiones mediante el envío de una **Invitación** al invitado remoto. Esta **Invitación** puede ser enviada vía mensaje de texto, correo electrónico, correo, whatsapp, etc. La **Invitación** consiste en un enlace de Internet, como una página web. La única responsabilidad del invitado es tener un navegador web o aplicación compatible, un micrófono, auriculares, y ser capaz de hacer clic o copiar la **Invitación**.

Las **Invitaciones** se generan ingresando a Opal desde el lado del estudio a través de un navegador web usando una contraseña en la cuenta de **INVITE "Invitar"**. En el firmware actual, las invitaciones se pueden habilitar y deshabilitarla manualmente. En el futuro las invitaciones pueden ser programadas para expirar después de un tiempo, uso, o nunca expirar. La **Invitación** manda automática la llamada a uno de los dos canales de audio del Opal, designados cuando se crea la **Invitación**.

Compatibilidad

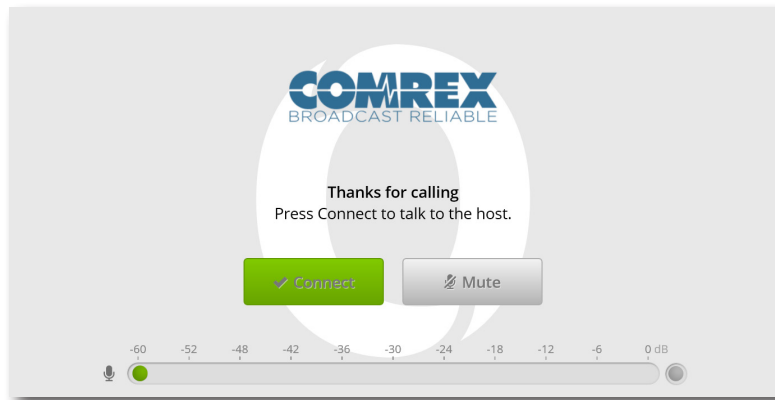
En el extremo remoto el invitado debe tener acceso a una computadora con un navegador compatible, un micrófono y audífonos. Los navegadores actualmente soportados son **Edge, Chrome, Opera** y **Firefox**. El **OS X Safari** estará disponible en un futuro. Opal también es compatible con **Chrome** y **Firefox** en dispositivos Android, así como **Safari** en **iOS 11**, pero hemos visto problemas operativos en los navegadores móviles actuales. Recomendamos el uso de la aplicación Opal en dispositivos móviles, actualmente disponible en las tiendas de **Apple iTunes** y **Google Play** de forma gratuita.

Para obtener la mejor calidad de audio, se recomienda que el invitado utilice unos audífonos y un micrófono con cable, en lugar de un altavoz abierto y micrófono incorporado de una computadora portátil. Esto es importante no sólo con respecto al ruido, pero aislar el micrófono local del audio de “retorno” hará una gran diferencia en calidad. Por razones similares, para los usuarios de teléfonos inteligentes es aconsejable utilizar el teléfono como un teléfono, en lugar de un altavoz. En los teléfonos inteligentes, auriculares con cable proporcionará la mejor calidad de audio.

Cómo funciona OPAL

Opal está instalado en la conexión de Internet en el estudio. Para obtener mejores resultados, Opal necesita una dirección IP pública y estática con un nombre de dominio asignado por un proveedor de nombres de dominio.

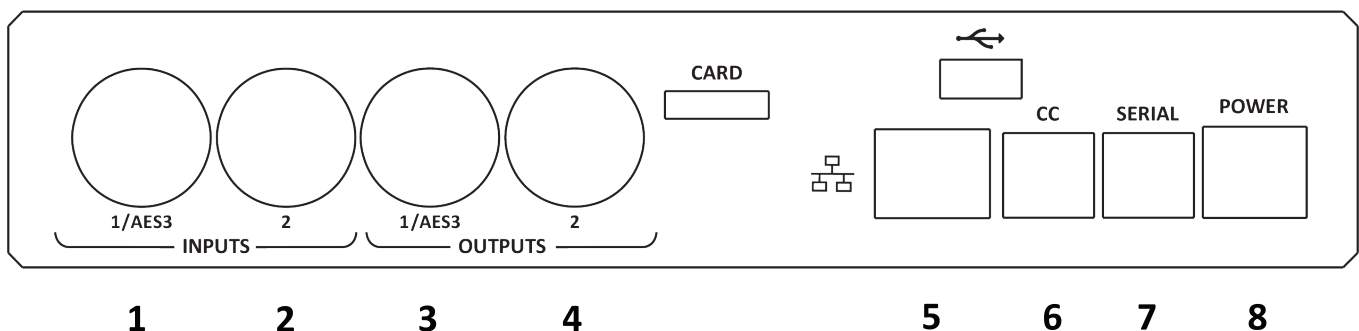
Las invitaciones se obtienen de Opal a través de la interfaz de web de **Invitación** y se transfieren al invitado. El invitado le da clic o copia la **Invitación** en un navegador compatible y verá la página de destino de Opal con los botones “**Connect**” y “**Mute**”.



El invitado al presionar “**Connect**” se creará un enlace de audio de alta calidad a uno de los dos canales del Opal. La conexión finalizará cuando la persona que llama aprieta el botón de “**Disconnect**”.

Accesorios posteriores del Opal

La siguiente figura muestra el panel posterior del Opal.

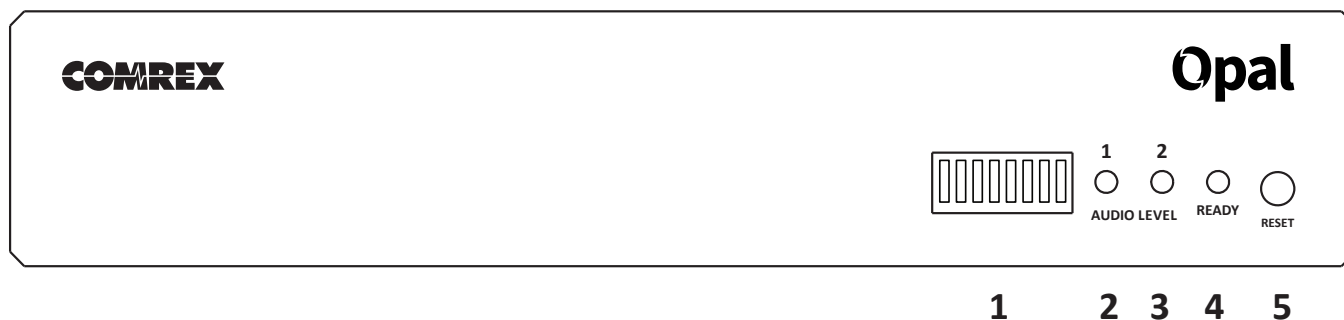


- 1 **CH 1 INPUT** - En el modo analógico, este conector XLR debe enviar una señal equilibrada, nivel profesional que es escuchado por las personas que llaman cuando se conectan a Opal en el canal 1. Esto suele ser un “**mix minus**” creado en su consola de estudio. En modo digital AES3, tanto **CH 1 INPUT** como **CH 2 INPUT** son aplicadas aquí (en el canal izquierdo y derecho, respectivamente). AES3 disponible con una frecuencia de muestreo de 48KHz solamente.

- 2 **CH 2 INPUT** - Esta entrada analógica recibe audio para ser enviada a los llamantes en el Canal 2. Esta entrada es desactivada cuando está en modo AES3.
- 3 **CH 1 OUTPUT** - Esta salida analógica entregará el audio de los invitados que se conectan a Opal Channel 1. En el modo digital AES3, tanto **CH 1 OUTPUT** como **CH 2 OUTPUT** se suministran aquí (canal a la izquierda ya la derecha respectivamente). AES3 disponible con una frecuencia de muestreo de 48KHz solamente.
- 4 **CH 2 OUTPUT** - Esta salida analógica entregará el audio de las personas que llaman al canal 2 del Opal. Esta salida está deshabilitada cuando está en AES3.
- 5 **Puerto Ethernet** - conecte su red a este puerto Ethernet compatible con gigabit.
- 6 **Conector de cierre de contacto** - Contiene 4 señales de entrada y salida de cierre de contacto, para varias funciones de control remoto y de registro como se describe más adelante.
- 7 **Puerto serie** - se trata de un conector RS-232 que presenta un puerto serie para uso futuro.
- 8 **Entrada de fuente de alimentación** - Aplique aquí la salida de adaptador de corriente incluido. El puerto de la fuente de alimentación requiere 24VDC en 0.5A.

La próxima figura explica el panel frontal del Opal.

The following figure shows the Opal front panel.



- 1 **Switch DIP** - Ver configuración más abajo.
- 2 **Indicador de audio de Canal 1** - Muestra el nivel de audio entrante o saliente (seleccionable) en el canal 1
- 3 **Indicador de audio de Canal 2** - Muestra el nivel de audio entrante o saliente (seleccionable) en el canal 2
- 4 **Listo / Indicador de estado** - Muestra el estado de la red y de la llamada
- 5 **Botón de reinicio** - Restablecer los valores predeterminados de fábrica (Consulte la sección Restablecer fábrica para el proceso completo).

Los indicadores de nivel se iluminarán en verde cuando se detecte el nivel de entrada / salida (dependiendo del ajuste de los DIP Switch), rojo cuando está cortando el audio.

Led Ready/Estado -

Rojo - no se ha detectado ninguna red

Amber - Red esta detectada pero sin certificados

Verde intermitente - Cargando el sistema (arranque)

Apagado - Red OK / Inactivo

Verde - Llamada activa

DIP Switch Settings

DIP Switch	Function	Default (down)
1	Entrada Analoga/AES3	Analog
2	Salida Analoga/AES3	Analog
3	Para Futuro	
4	Indicadores de nivel Mandar/Recibir	Mandar
5-6	AES3 – Sample Rate	48 KHz
7-8	Resetear a fabrica	

Selección de Muestreo AES

Opal soporta I/O de muestreo de 48 KHz, 44.1KHz y 32 KHz. La entrada y salida de muestreo siempre debe ser la misma. Opal sincroniza la el reloj de salida AES al reloj de entrada. En muestreos diferentes a 48KHz siempre es necesario tener una entrada AES activa para poder utilizar la salida AES.

Tabla AES usando los Dip Switch 5&6

DIP Switch 5	DIP Switch 6	Muestreo AES
Down	Down	48KHz
Down	Up	44.1KHz
Up	Down	32KHz

Reiniciar Opal luego de cambiar el muestreo AES. En modo análogo los Dip Switch AES son ignorados.

Resetear el equipo a fábrica

Para restablecer Opal a fábrica usando los DIP switch, siga estos pasos:

- 1 Ponga los dip switch 7 y 8 hacia arriba – presionar el botón de reset
- 2 Espere hasta que los indicadores de canal 1, canal 2 y de red / estado parpadeen rojo y verde
- 3 Poner los Dip Switch 7 y 8 hacia abajo
- 4 Retire y vuelva a aplicar la energía a Opal

Acerca de Mix-Minus

El apoyo de Comrex utiliza un montón de tiempo discutiendo mix-minus, ya que no es un concepto obvio. En el estudio de integración telefónica, tenemos una regla de oro:

Las personas que se conectan desde afuera del estudio no deben enviarse su propio audio a sí mismos.

Si no se sigue esta regla, el resultado será un desagradable eco en el oído de la persona que llama. Es responsabilidad del técnico del estudio de conectar una fuente a cada canal de retorno que es una mezcla de todas las fuentes de audio importantes (micrófonos del estudio, automatización, carts, otras fuentes remotas, etc.) menos la persona que llama.

La mayoría de las consolas modernas pueden hacer esto fácilmente. Si no, existen otras opciones y son discutidas en la sección “¿Por qué me escucho a mí mismo?” (Sección XIV de este manual). Finalmente cuando configuramos y conectamos para usar ambas entradas de “envío”, las alimentaciones de mix-minus usualmente contienen el audio del canal de envío opuesto. Opal por ahora no contiene conferencia interna.

Conexiones de Audio

Todas las entradas analógicas de audio XLR tienen un nivel nominal de 0dBu (escala completa + 20dBu). Cuando se cambia el modo de entrada (mediante el DIP switch # 1) al modo AES3, el sistema espera una entrada AES3 de 48KHz. Cuando se cambia el modo de salida (a través del DIP Switch # 2), se emitirá una señal de 48KHz. Para cambiar el muestreo a 44.1KHz o 32 KHz, referirse a la sección anterior, selección de muestreo AES.

Pines de entrada y salida analógicos:

- 1 Ground
- 2 Audio balanceado +
- 3 Audio balanceado -

Pines AES3 de entrada y salida:

- 1 Ground
- 2 Data +
- 3 Data -

Cierre de Contactos

Las señales de cierre de contacto están disponibles a través de un conector mini-DIN de 9 pines.

En el firmware actual, sólo se admiten las salidas de cierre de contacto 1 y 2. El cierre de contacto # 1 está activo cuando una llamada está activa en el canal 1 y el cierre de contacto # 2 está activo cuando una llamada está activa en el canal 2.

Las entradas de cierre de contacto realizan las siguientes funciones:

- #1** - Desconectar la llamada activa en el Canal 1
- #2** - Desconectar la llamada activa en Channel 1 y desactivar la **Invitación**
- #3** - Desconectar la llamada activa en el Canal 2
- #4** - Desconectar la llamada activa en el canal 2 e inhabilitar la **Invitación**

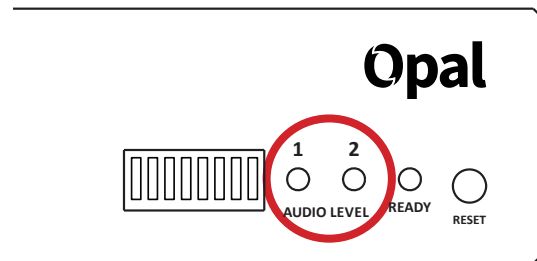
Las entradas se activan haciendo un corto en la entrada respectiva al pin 9. Las salidas consisten en un circuito colector abierto que, cuando está inactivo, ofrecerá un camino de alta impedancia al pin 9 y, cuando está activo, ofrecerá un camino de baja impedancia al pin 9. Estas salidas son capaces de bajar hasta 200mA a una tensión de hasta 12V. **No cambie la alimentación de corriente con estos contactos.**

Contact Closure Pinouts:

Pin 1	Salida #1
Pin 2	Salida #2
Pin 3	Salida #3
Pin 4	Salida #4
Pin 5	Entrada #1
Pin 6	Entrada #2
Pin 7	Entrada #3
Pin 8	Entrada #4
Pin 9	Ground

Detalles de los Niveles de Audio

Como mínimo, Opal necesitará dos conexiones de audio y una conexión de red. Los niveles de todas las entradas y salidas de audio analógico son 0dBu (0.775V) nominal. Este nivel proporcionará un espacio libre de 20dB antes del punto de recorte. El audio de entrada se refleja en los medidores de pico basados en LED del panel frontal como se indica en la siguiente figura. El recorte está indicado por el LED rojo en estos medidores.



Opal necesita una conexión de red para funcionar. En Opal, las conexiones de red se realizan a través de una conexión Ethernet 1000Base-T estándar en un conector RJ-45.

En la mayoría de los casos, Opal se verá como una computadora común a esta red. De hecho, Opal contiene una computadora integrada con un sistema operativo basado en Linux. Opal es perfectamente capaz de trabajar en la mayoría de las redes, pero hay consideraciones especiales que se describen a continuación para que Opal funcione mejor.

Debido a que puede haber problemas de ancho de banda, firewall y seguridad con la instalación de Opal en una red, se recomienda consultar a su administrador de redes. Los detalles que siguen suponen un conocimiento práctico de temas de administración y configuración de redes.

Requisitos de Red

La clave de Opal es la simplicidad para el invitado. Con el fin de proporcionar esto, Opal tiene algunos requisitos especiales en el lado del estudio con respecto a su configuración de red.

Opal requiere la capacidad de aceptar datos no solicitados de la Internet pública. La forma más fácil de permitir esto es que Opal se conecte directamente a Internet, sin ningún enrutador o firewall en su camino. Todas las funciones de Opal están protegidas con contraseña, y es altamente recomendable que el usuario cambie las contraseñas del valor que viene de fábrica.

A menudo no es posible para Opal residir en la Internet pública, y un router o firewall debe ser utilizado. En este caso, se requiere el reenvío de varios puertos dentro del enrutador / firewall. Esto se describe en la sección **“Para administradores de IT”** al final de este manual.

Opal requiere la configuración de una IP estática para ser utilizado correctamente. Esta dirección IP debe ser directamente direccionable desde la Internet pública, y no sólo una dirección local. Los IP estáticos están normalmente disponibles en su proveedor de servicios de Internet o en su departamento de IT en instalaciones más grandes.

Nombre de dominio Opal

Finalmente, Opal necesita un nombre de dominio asociado con su dirección IP estática. Un nombre de dominio puede ser arrendado de cualquier proveedor de dominio. Los nombres de dominio son necesarios para habilitar los certificados de seguridad SSL / TSL que Opal utiliza para las conexiones. Los navegadores requieren estos certificados para poder utilizar la tecnología subyacente que hace que Opal funcione. De lo contrario, el llamador invitado tendrá que hacer clic en varias advertencias de seguridad (si el navegador incluso permite la conexión no segura en absoluto). Algunos usuarios pueden querer usar un nombre de dominio que ya posean. Esto probablemente no funcione, ya que Opal requiere varios puertos que pueden estar en uso en su dominio, incluyendo TCP 80, TCP 443 y TCP 8082. Alternativamente, puede registrar un subdominio como **opalcallers.mystudio.com**.

Si no tiene un nombre de dominio, Comrex le recomienda hacer una búsqueda web en “Nombres de Dominio”. Hay un montón de registradores de bajo costo por ahí. Sólo necesitará su IP estática para darles. Por supuesto, su nombre elegido debe estar disponible, y debe renovarlo antes de que expire. No hay necesidad de obtener un dominio “.com”, cualquier sufijo como .info o .ninja debería funcionar.

A menos que lo necesite para otros servicios, no es necesario comprar certificados SSL ni ninguna otra actualización de seguridad para su nombre de dominio del registrador. Opal maneja todo eso.

Opal trabaja a través de enviar y hacer clic en un link, y el nombre de dominio se pondrá automáticamente en ese link, por lo que no es tan importante que su nombre sea simple o fácil de recordar.

Consejo: Registre **mystudio.com** y **www.mystudio.com** para cubrir todas sus bases (la mayoría de los registradores lo harán por defecto).

Otro consejo: asegúrese de que su dominio está registrado como un **Registro de DNS** real que apunta directamente a su dirección IP y no a un servicio de “reenvío” de dominio. Los certificados de seguridad requeridos no funcionarán si el proveedor de su dominio envía o procesa el tráfico de su dominio.

Último Consejo: **Dot.tk** es un proveedor de dominio gratuito que ofrece **DNS A Records** a nombres dentro de su dominio .tk. Hay algunas limitaciones que pueden afectar el uso a largo plazo, pero para hacer pruebas es recomendado.

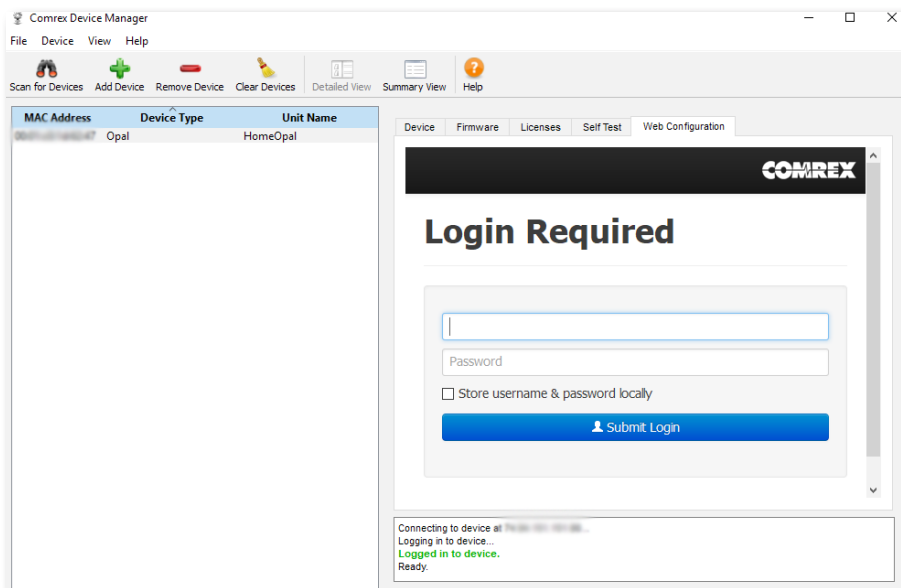
Configuración Opal

Como mínimo, necesitará configurar la dirección IP estática de Opal y su nombre de dominio.

Dirección IP estática

Opal se envía desde la fábrica configurada al modo DHCP, por lo que encontrará una dirección en su red si es posible. La manera más fácil de encontrar qué dirección es, es usando la aplicación de Comrex **Device Manager**, disponible en nuestro sitio web para tanto en plataformas Windows y Mac. También puede utilizar **Device Manager** para actualizar el firmware de su Opal.

Instale **Device Manager** en una computadora en la misma red física que el Opal. Una vez instalado y funcionando, presione el botón **“Scan for Devices”** en la esquina superior izquierda para escanear su red de productos Comrex. Los resultados deben tener este aspecto:



Hay dos maneras de colocar la información de IP estática mediante el **Device Manager**. El modo “rescate” le permite cambiar los parámetros durante los primeros cinco minutos de funcionamiento, y se inicia con el botón **“Network Settings”** en el panel derecho. Este modo es muy útil si ha olvidado la contraseña de la unidad. El modo normal de cambiar cualquier configuración en Opal es haciendo clic en la pestaña **“Configuración Web”** en el panel derecho. Esto abre el toolbox de la unidad **Toolbox** es una interfaz basada en web que le permite establecer todos los parámetros relevantes del producto. Una vez usted sabe la dirección IP de la unidad, **Toolbox** también se puede acceder a través de un navegador, vaya a **http: // [dirección ip del opal] / cfg. Toolbox** requiere que inicie sesión con un nombre de usuario y una contraseña. El nombre de usuario predeterminado es **“admin”** y la contraseña es **“comrex”**. Le recomendamos que cambie la contraseña predeterminada. Una vez conectado, elija la opción **“Network”**. En modo **“Network”**, verá las siguientes opciones:

Cambie el modo a **“STATIC”** e introduzca la dirección IP, la máscara de red, la puerta de enlace y la información de DNS de su red.

Haga clic en **“Apply IP Settings”** después de que toda la información es correcta. Si necesita acceder a **Toolbox** después de esto, necesitará para volver a scan for devices y volver a iniciar sesión (o abrir un navegador con la nueva dirección IP).

Nombre de dominio

Una vez que pueda iniciar sesión en Opal desde su dirección IP estática correcta, puede configurar el **Dominio** en la opción de **“NETWORK”** en el **Toolbox**.

No se requiere **HTTPS** o // aquí, sólo el dominio (por ejemplo, **comrex.com**). Si ha registrado un dominio con un prefijo "**www.**", asegúrese de que esté incluido en el nombre de dominio.

Una vez que la entrada del dominio esté configurada correctamente, presione el botón "**Get / Renew Certificate**". Opal llegará a su servidor de certificados e instalará automáticamente los certificados de seguridad necesarios.

Cuentas

Hasta ahora, hemos tratado con la cuenta de administrador de **Toolbox**, que permite la configuración completa de Opal, así como la generación de invitaciones (explicado en la siguiente sección). Esta cuenta está siempre activa y no se puede quitar. Es posible crear "subcuentas" en **Toolbox** con sus propias contraseñas y capacidades. La razón más común para esto es crear una cuenta secundaria "operador". Los operadores no pueden cambiar la configuración de Opal, pero sólo pueden generar / eliminar y activar / desactivar invitaciones y desconectar las llamadas activas en curso a través de **Toolbox**.

Cree una cuenta adicional en Opal utilizando la opción **SECURITY-> ACCOUNTS**. Establezca un nombre de usuario y una contraseña y si el usuario tiene privilegios de administrador o de operador.

Invites / Invitados

Opal monitorea las llamadas entrantes generando invitaciones. Éstas toman la forma de links de estilo URL que se pueden copiar y pegar y luego entregar a los invitados.

Cuando una llamada entrante intenta conectarse a Opal, la **Invitación** se comprueba contra su base de datos interna. Si la **Invitación** es válida, la conexión continúa. Si no es así, el usuario recibe un mensaje de error.

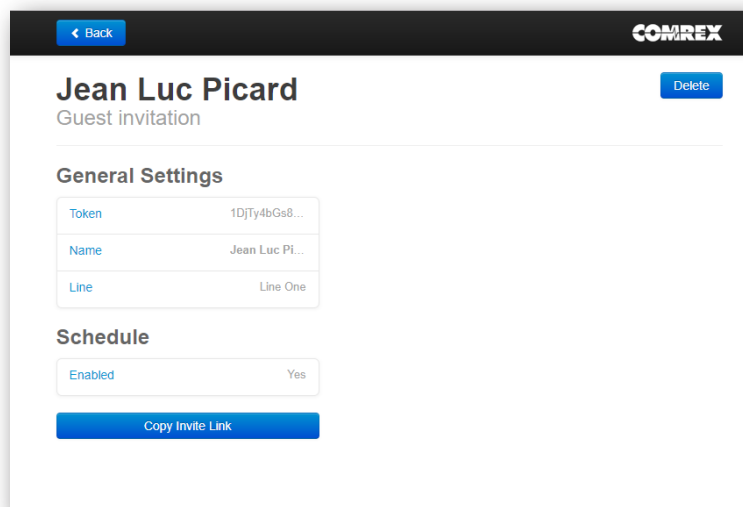
Algunos usuarios van a querer evitar el proceso de proyección (screening) de llamadas. En este caso, simplemente cree una **Invitación** universal para todos los usuarios. Esto puede incluso ser publicado al público, y seguirá siendo válido hasta que lo cambie en **Toolbox**.

En el firmware actual, Invites se puede generar, eliminar, habilitar y deshabilitar. En el firmware futuro, Invites se puede configurar para que expire después de un límite de tiempo, una fecha o el número de conexiones.

Para generar una **Invitación**, inicie sesión en Opal **Toolbox** con **Device Manager** o apunte un navegador a

http://[opal_ip_address]/cfg/

Utilice su nombre de usuario y contraseña de administrador u operador para acceder al **Toolbox** y, a continuación, seleccione "**Invite**". Elija "**Add Invite**" para crear una **Invitación** nueva. Se le ofrecerán las siguientes opciones:



The screenshot shows the Opal Toolbox interface for configuring a guest invitation. At the top, there is a "Back" button and the "COMREX" logo. The main heading is "Jean Luc Picard" with a "Delete" button to its right. Below the heading, it says "Guest invitation". The configuration is divided into two sections: "General Settings" and "Schedule".

General Settings	
Token	1DJty4bGs8...
Name	Jean Luc Pi...
Line	Line One

Schedule	
Enabled	Yes

At the bottom of the form, there is a blue button labeled "Copy Invite Link".

Link - esta es la **Invitación** que va a copiar y enviar a los invitados. También puede copiarlo en tu clipboard de la computadora.

Name – Nombre de su invitado algo familiar como **“Crazy Larry”** para que pueda referirse quién está llamando.

Channel / Line - Elija si este invitado aparecerá en el canal 1 o 2 del Opal 1 o 2, o cualquiera que esté disponible.

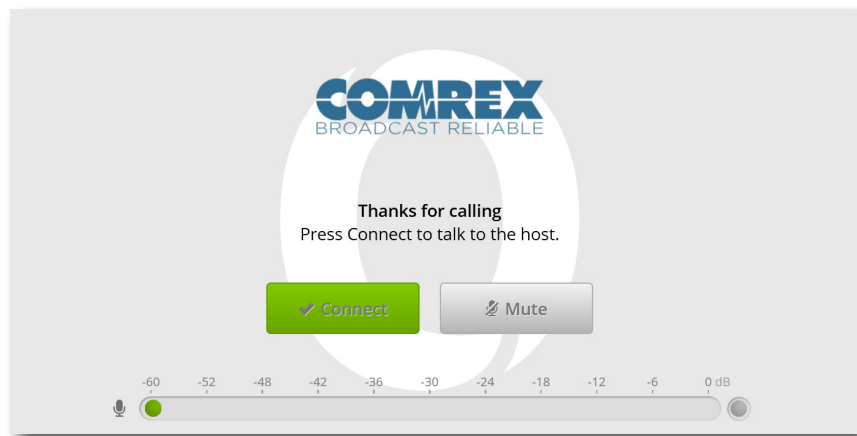
Enabled (Activado) - Esta opción le permite desactivar esta **Invitación** sin borrarla.

Una vez establecida tu **Invitación**, puedes hacer clic en **“Copy Invite Link”** y el toolbox copiará la **Invitación** (link) para que puedas pegar en un navegador, correo electrónico, mensaje de texto, etc.

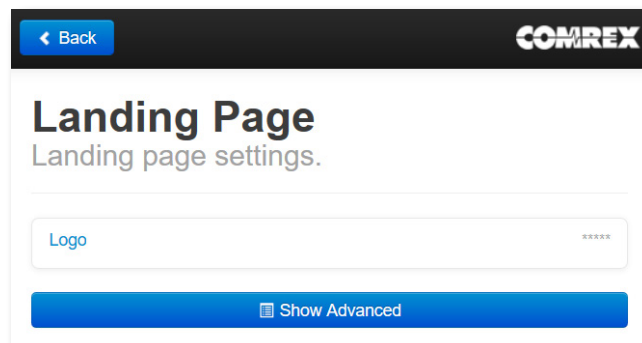
Puedes volver a la página de **Invitación** de **Toolbox** en cualquier momento para deshabilitar o eliminar invitaciones que ha creado en el pasado.

Cómo subir tu logotipo del Estudio a Opal

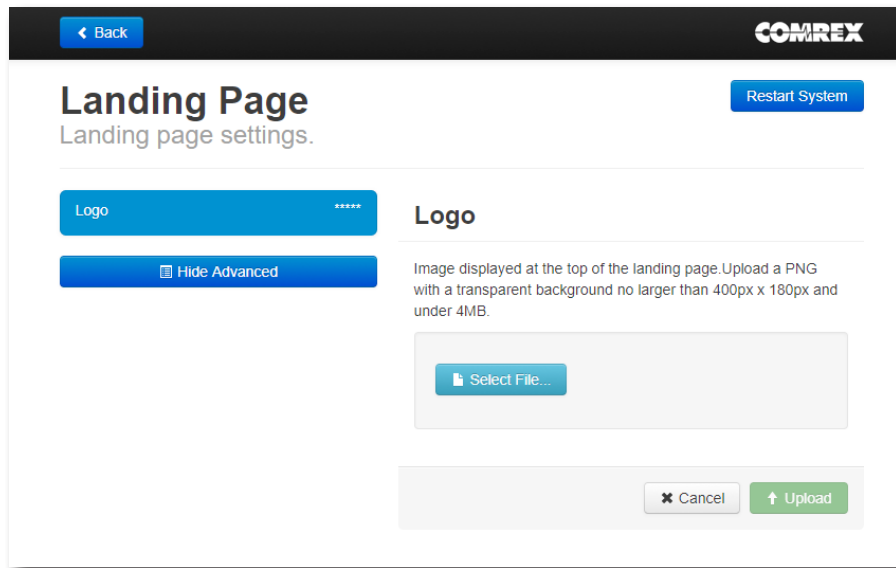
Cuando los clientes usan Opal con un navegador web o una aplicación, van a ver la página Opal como se muestra abajo:



Es posible reemplazar el logo superior de Comrex por uno propio, para que los clientes vean exactamente a quién están llamando. Para esta operación necesitas un navegador ya que no se puede hacer via **Device Manager**. Entra a la interface del Opal via el navegador con la IP del Opal. Ejemplo IP/cfg. **192.168.1.100/cfg**. Para ello, necesitará un gráfico de empresa en formato .png con una resolución de hasta 800 píxeles (ancho) x 300 píxeles (alto). Se recomienda un fondo transparente para su logotipo. Su archivo debe tener 4 MB o menos de tamaño. Ningún otro formato o resoluciones son compatibles con Opal, y la aplicación de otros gráficos de estilo o resolución puede causar distorsión de la página o imposibilidad de carga. Puede cargar su gráfico en el **Toolbox** con la opción **“Landing Page”** – **“LOGO”**.



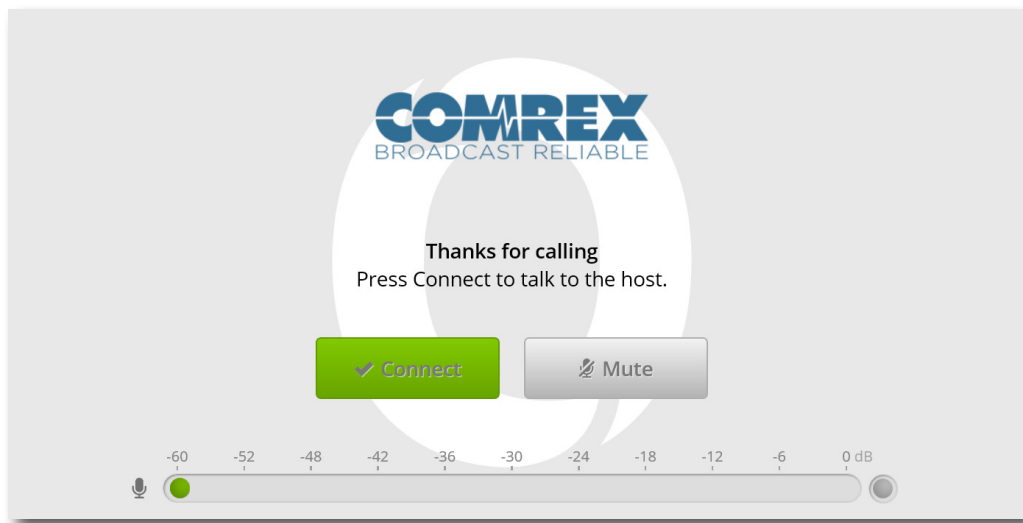
Seleccione **“Select File”**, y un cuadro de exploración se abrirá en su computadora.



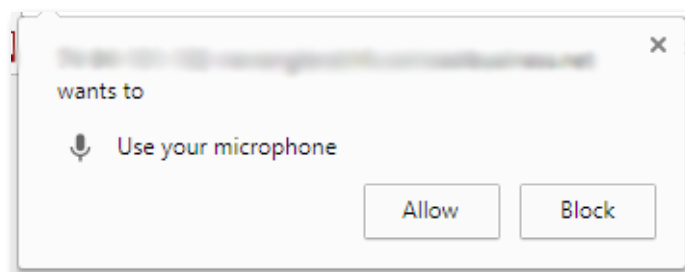
Elija el archivo para cargar y seleccione **“UPLOAD”** para enviar el archivo gráfico a Opal.

Llamando a Opal

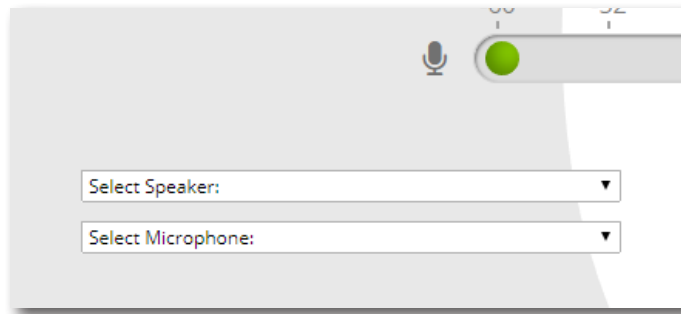
Su invitado tendrá que abrir el link **“INVITE”** que le mandaron en un navegador compatible (**Chrome, Edge, Opera, Firefox**). Ellos deben ver la página de destino Opal:



La primera vez que el invitado se conecta, se le pedirá que autorice la página Opal para usar su micrófono. El invitado debe elegir **“ALLOW - PERMITIR”** para que la conexión funcione.



En dispositivos que tengan múltiples micrófonos y audífonos (por ejemplo, un portátil con micrófono/audífonos incorporados pero también conectas unos externos), la página Opal ofrecerá un menú desplegable para que el invitado elija qué dispositivo va a utilizar.

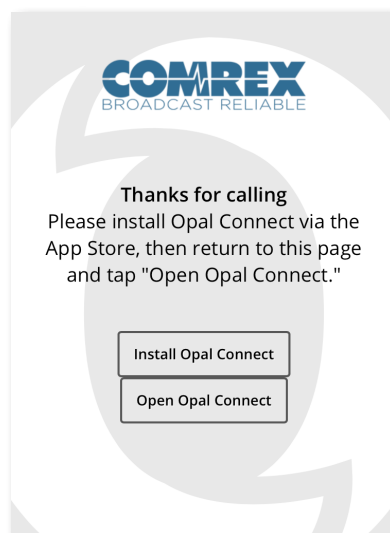


Una vez que el dispositivo es elegido (si es necesario), el invitado debe ver el medidor de audio se mueve cuando el habla si esto no sucede, el navegador no puede conectarse a Opal.

Las conexiones se hacen presionando el botón "**Connect**", y esperando que se vuelva verde. Desconectar con el mismo botón (ahora denominado "**Desconectar**"). Si en cualquier momento el invitado desea silenciar el micrófono local, presione el botón "**Mute**". El audio para el invitado no se verá afectado.

Realizar una llamada a Opal desde un navegador móvil (celular o tableta)

Cuando Opal detecta que el invitado está utilizando un navegador móvil, se comporta de manera diferente. Opal mostrará las opciones al usuario, alentándolos a instalar o (si ya está instalado) a lanzar la aplicación gratuita Opal para Android o iOS.



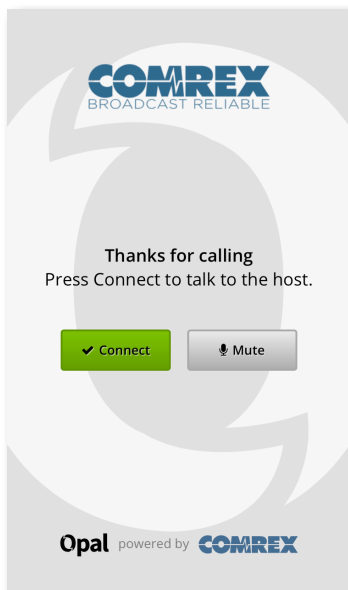
En este momento, aunque los navegadores móviles soportan los protocolos Opal, todavía existen problemas que pueden surgir. Nosotros recomendamos el uso de las aplicaciones de Opal en todo momento en Android o iOS. Opal mostrará dos opciones a los usuarios móviles:

- 1 **Instalar Opal Connect** - El usuario será llevado a la tienda de aplicaciones y se le ofrecerá la oportunidad de descargar e instalar la aplicación gratuita de Opal.

- 2 **Open Opal Connect** - El usuario debe elegir esta opción si la aplicación Opal ya está instalada. La **Invitación** se rellenará automáticamente en la aplicación cuando se abra.



Cuando **Opal Connect** se inicia desde un navegador, se mostrará la **Invitación** en la barra de direcciones URL de **Opal Connect**. Si **Opal Connect** se lanzará independientemente del navegador, ofrecerá la última **Invitación** utilizada (si corresponde) o una barra de entrada de URL en blanco. Es posible pegar o ingresar manualmente una **Invitación** en la barra de URL. Cuando el botón "**GO**" es presionado, la aplicación mostrará la página de Opal.



Opal Connect ofrece una experiencia casi idéntica a los usuarios de los navegadores en una computadora. La principal diferencia es que **Opal Connect** no ofrece un medidor de nivel de audio de micrófono. **Opal Connect** no funciona en "modo de fondo" en dispositivos móviles teléfonos o tabletas. Si la aplicación se está ejecutando y enviada al fondo (a través del botón "inicio" u otros medios), la llamada se desconectará. Pero ya que **Opal Connect** mantiene y ofrece la última **Invitación** cuando se abre de nuevo, es muy sencillo y rápido volverse a conectar.

Para las llamadas posteriores, los clientes pueden simplemente lanzar la aplicación Opal directamente en sus teléfonos, sin usar el navegador en absoluto. La última **Invitación** utilizada se ofrecerá como la opción de conexión.

Desconexión de las llamadas de Opal

Las llamadas no se pueden hacer desde la página de Opal **Toolbox**, pero pueden finalizarse. Bajo la opción **"Control"**, (disponible en los modos de administración y de operador), se puede desconectar una llamada activa en cualquiera de los canales usando la opción **"Drop Call"** para ese canal. Además, la llamada se puede cancelar y la **Invitación** se deshabilita simultáneamente mediante el botón **"Drop call and Disable Invite"**.

Para los administradores de TI

Los siguientes puertos son requeridos por Opal para estar abiertos para conexiones entrantes

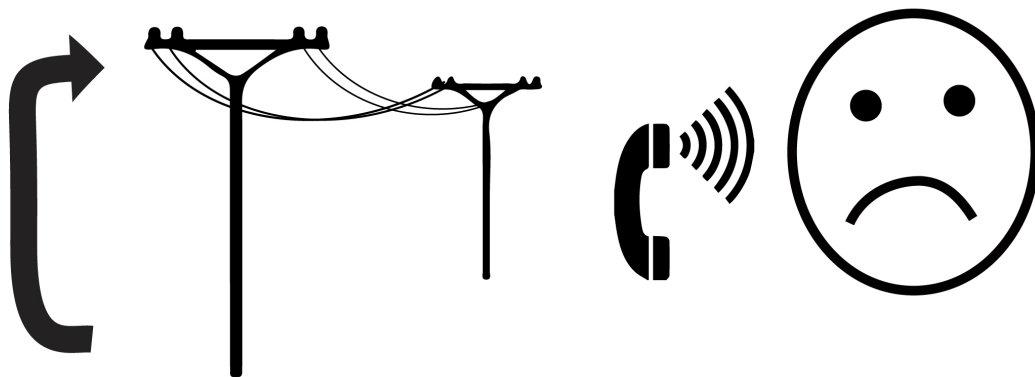
TCP 80*	** Opcional, los usuarios de HTTP serán redirigidos a TCP 443 para HTTPS
TCP 443	Servidor HTTPS
TCP 8082	Señalización
UDP 16390-16393	audio RTP

Además, Opal realizará conexiones salientes a los siguientes puertos:

UDP 123	NTP
TCP 80, 443	Conseguir los certificados SSL

Mix-Minus y La Eliminación del Eco (¿PORQUE ME ESCUCHO A MI MISMO?)

La integración de los audios afuera del estudio como Opal, teléfonos, codec es un proceso bidireccional. La persona que llama debe enviar su audio al estudio pero también recibe una alimentación de retorno que le permite interactuar con otras fuentes, como un presentador. Un elemento importante del audio remoto involucra permitir que una persona que llame no escuche su propia voz y escuche el audio compartido desde la emisora en su propio auricular. El Mix-Minus provee a la persona que habla el confort de saber que su voz está llegando y hace que la comunicación bidireccional fluya más fácilmente.



Pero por varias razones, el retorno del audio siempre es generado localmente dentro del equipo de la persona que habla, en vez de en el otro extremo de la llamada. Esto se debe a que los seres humanos tienen un tiempo muy difícil para/al manejar incluso el retraso más pequeño de este retorno. En las pruebas, nos encontramos con que cualquier demora más de unos 10mS comienza a tener un efecto llamado "slapback" donde la persona que habla es incapaz de mantener una conversación y comienza a detenerse y tartamudear.

Inclusive en los circuitos analógicos "a la antigua", es posible crear un round-trip con 10mS de delay en una llamada de larga distancia. Ahora suma en el requerimiento que los sistemas modernos basados en VoIP tienen una ventana de buffer delay y es fácil de apilar más de 100 ms de ida y vuelta en una llamada. Un retraso de esta longitud normalmente no impedirá conversación interactiva, pero sin duda crea un ambiente "slapback" intolerable si la persona que llama escucha su propia voz retrasada.

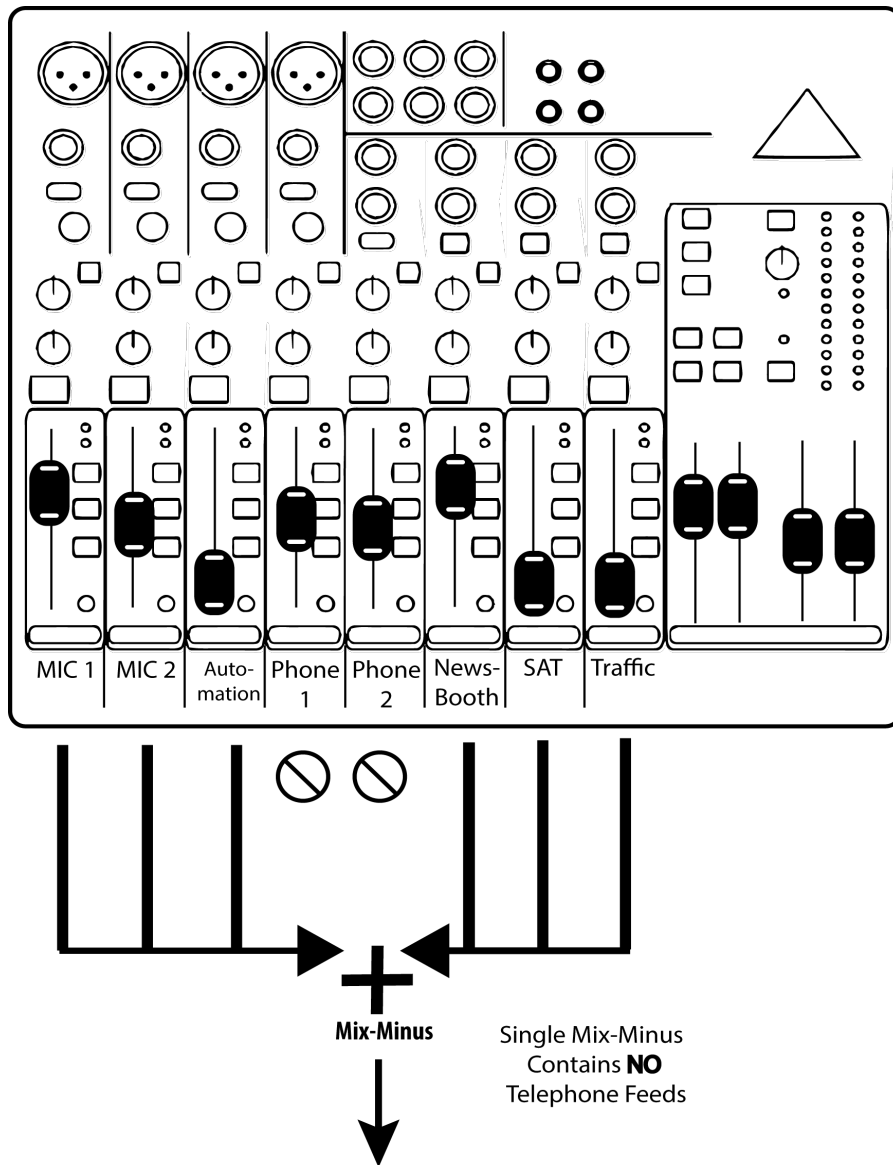
Muchos usuarios que instalan un sistema de audio remoto basado en un estudio, por primera vez cometen el error de la aplicación de audio a la salida de puerto "enviar" que contiene la alimentación principal del programa - el mismo audio que se utiliza para alimentar el transmisor o el webstream. Desde que esta mezcla contiene el audio propio de la persona que llama y un retraso inherente en los sistemas digitales modernos, el efecto "slapback" intolerable es inmediato.

La solución aquí es Mix-Minus, un término usado para una mezcla especial de audio que excluye explícitamente una fuente, el audio proveniente del lugar en que mix-minus está siendo enviado. Para decirlo de otra manera, mix-minus es toda la mezcla de estudio menos una fuente de audio (el que llama).

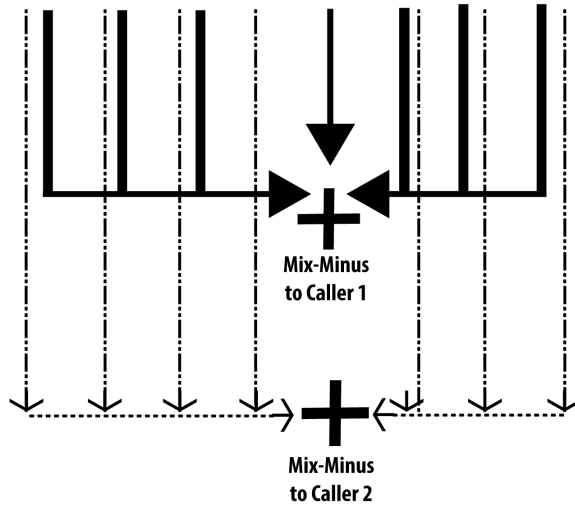
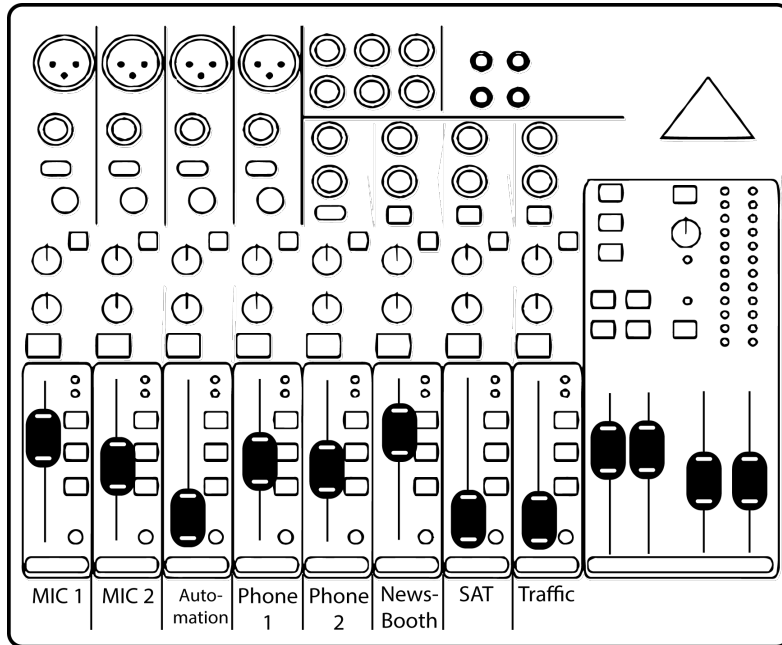
Entonces, ¿cómo podemos crear esta mezcla especial de audio? En los sistemas modernos de estudio, esto

es por lo general bien definido y fácil de hacer. Muchas consolas cuentan con canales dedicados a la interfaz telefónica, y parte del canal es una salida mix-minus creada automáticamente.

En las consolas con menos funciones, un mix-minus a menudo puede ser creado con un auxiliar o con bus de función "audition". Mediante la selección de todas las fuentes entrantes relevantes en el BUS excepto para los faders telefónicos, usted puede hacer esto fácilmente. La figura 10 muestra el diagrama de bloques de una sola alimentación mix-minus siendo generada en una consola de mezcla.



El uso de Opal complica un poco las cosas porque requiere un par de alimentaciones Mix-minus si ambos canales se van a utilizar en el mismo estudio. Esto se debe a que Opal no conecta a los dos llamantes que recibe, y cada llamador necesita un mix-minus personalizado para escuchar al otro, junto con el audio generado por el estudio. Esto se muestra en el siguiente diagrama.



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