

Using Multiple Comrex Codecs Behind A Single IP Address

In some environments, it's required that several Comrex codecs are installed, but the local network only has one static IP address available. Standard procedure would be to install a router that would create a local LAN, and change the ports used for each codec to deliver its configuration web page and to transfer media.

There may be some complexities involved in this arrangement, and this Tech Note describes them along with work-arounds. It presupposes a basic knowledge of IT concepts like static addressing and port designations.

The decision on how to arrange this depends on certain factors:

1. Do you need to control the codecs remotely?
2. Are CrossLock connections required?
3. Are you installing single-channel codecs or five-instance MultiRack codecs?
4. Is Switchboard being used, or are all connections manual entries?

Each of these scenarios is discussed here with some technical insight as to why these settings are required. CrossLock connections are always recommended, and use of multiple network devices (on either end of the link) requires it.

It is assumed that firmware 4.5 or higher is being used here. Current port configuration is available by clicking "Details" in the status box on the Connections Tab of your codec as shown in **Figure 1**.

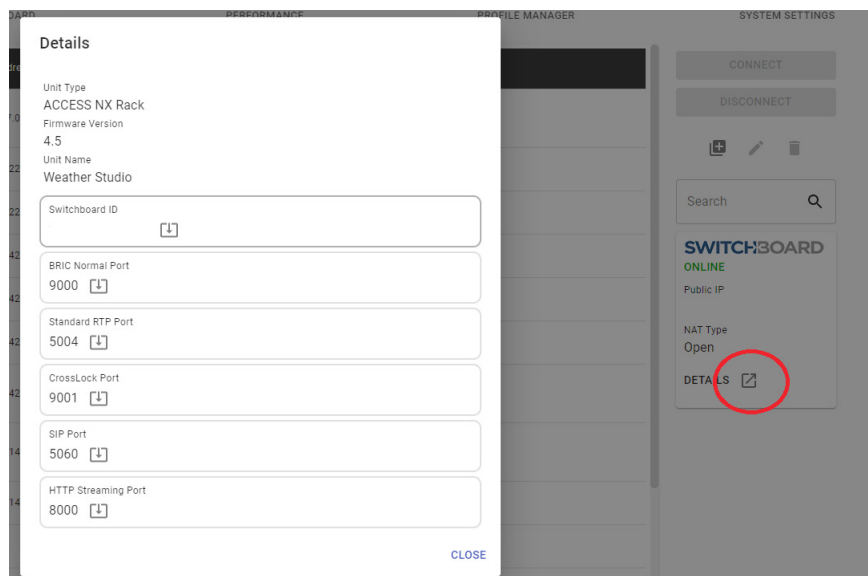


FIGURE 1 PORT CONFIGURATION - DETAILS

Web Interface Ports

Single-channel codecs serve their web interface page at port TCP 80. To address these pages from outside the router, they must be on unique ports. This is set in the System Settings->Advanced->Security->Web Server Port entry. Recommended values for single channel codecs are 80, 82, 83 etc. MultiRacks serve pages on five ports already, defaulted to 80, and 82-85. It's recommended to increment each port on Multi-Rack by ten (e.g 90, 92-95 for the second MultiRack).

To access the web pages as their new ports, you will add a port suffix to the unit's IP address in your browser (e.g. 192.168.25.17:83).

BRIC Normal and CrossLock Connections

Each Comrex codec uses a default port of UDP 9000 when making BRIC Normal connections. This is used either on the literal network, or within CrossLock under the VPN. Either way, each codec must be changed to have a unique BRIC Normal port setting.

You will need to change the BRIC Normal port in the System Settings tab (Instance Settings on MultiRack) under Advanced->Alternate Modes->BRIC Normal->IP Port entry on each codec beyond the first as shown in **Figure 2**.

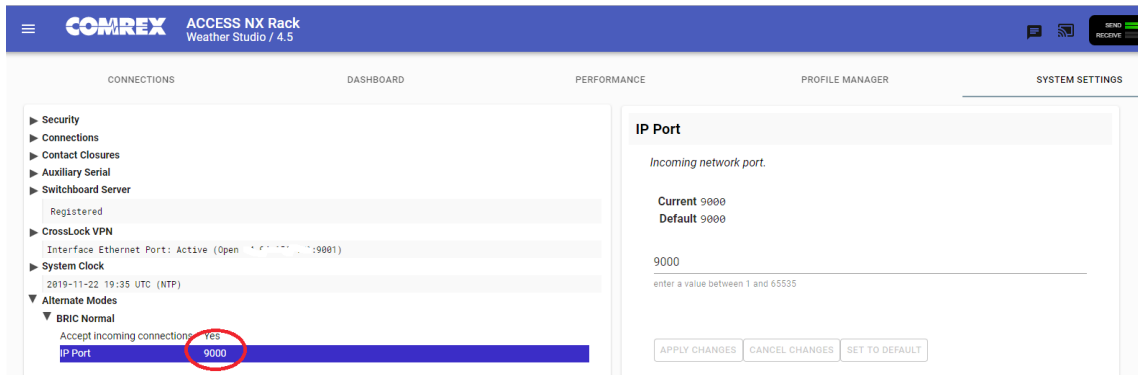


FIGURE 2 BRIC NORMAL PORT

The layout is shown in **Figure 3** on the following page.

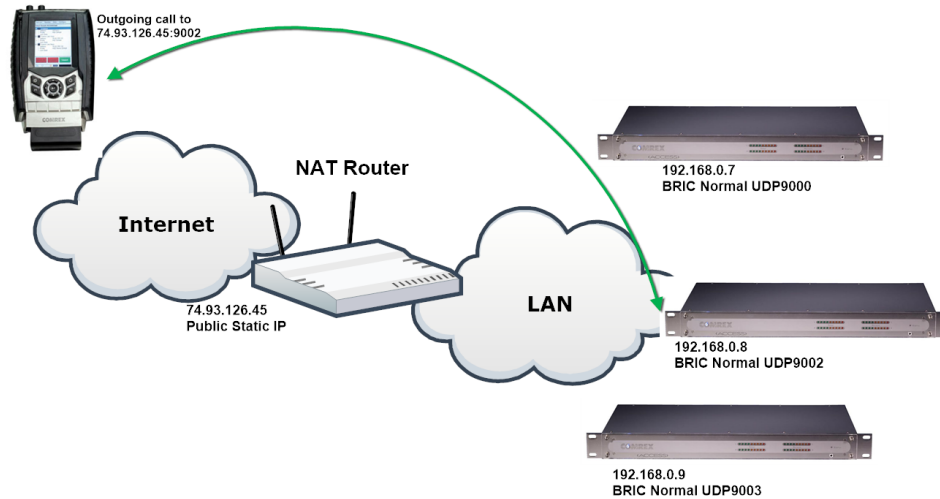


FIGURE 3 CONNECTING TO NON-DEFAULT BRIC NORMAL PORT

To manually call into any codec beyond the first, you must append the new BRIC Normal port number to the outgoing IP address used on the far end (e.g. 72.92.156.156:9003). Switchboard will handle this automatically, so no change is necessary when using it.

On MultiRack, your five instances default to UDP 9000 for instance #1, and 9002-9005 for instances #2-5. These must all be changed on each instance via the Instance Tab as shown in **Figure 4**.

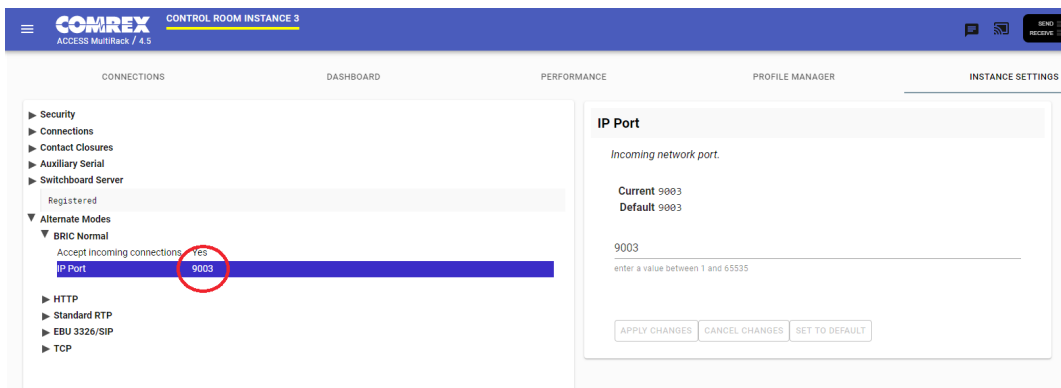


FIGURE 4 MULTIRACK INSTANCE BRIC NORMAL PORT

The layout is shown in **Figure 5** on the following page.

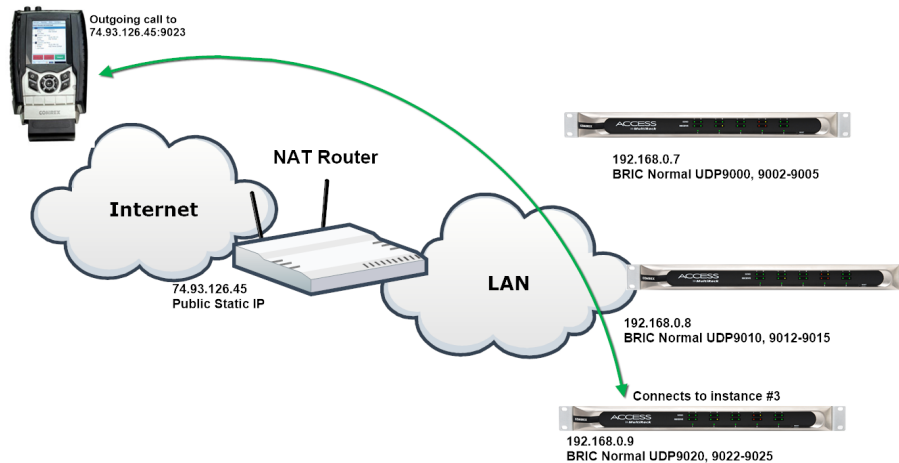


FIGURE 5 CONNECTING TO NON-DEFAULT MULTIRACK PORT

Care must be taken to choose ports that are not used by other codec services. For single-channel codecs, we recommend the sequence of 9000, 9002, 9003 etc. Avoid 9001 as it's the default port used for CrossLock. For MultiRack, you'll need a sequence of five BRIC Normal ports per unit. We recommend each MultiRack increment the defaults by 10 (e.g. MultiRack 2 would use 9010, 9012, 9013 etc, leaving 9011 for CrossLock).

Additional Changes for CrossLock Connections

Each Comrex codec uses a default port of UDP 9001 when making CrossLock connections. CrossLock connections in this scenario are more complex. To achieve multiple CrossLock sessions behind one IP address, the following steps must be taken:

1. Change the BRIC Normal ports for each codec to a unique number as noted above.
2. Change the CrossLock port of each codec beyond the first to a unique number (unused by any BRIC Normal settings on any codecs).
3. As with any CrossLock connections, enter the Switchboard ID/MAC address of the opposite codec into each unit's connection list (not required for Switchboard).
4. **On the far end unit (not using shared IP addressing), add a suffix to the Switchboard ID/MAC address of the opposite codec to reflect the new CrossLock port (explained below, not required for Switchboard operation).**

The CrossLock port is changed in the Advanced CrossLock VPN settings on the System Settings page (single channel codecs) or Global Settings Page (MultiRack) as shown in **Figure 6**.

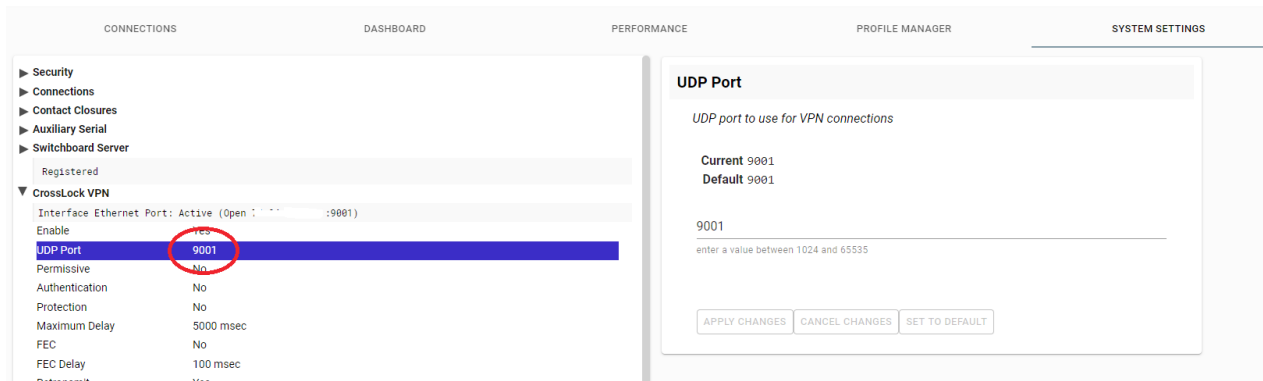


FIGURE 6 CROSSLOCK PORT

The layout is shown in **Figure 7**. Note that the BRIC Normal ports used within the CrossLock VPN are not shown for simplicity. The call is placed using the desired BRIC Normal port designation. The system infers the use of CrossLock on its own.

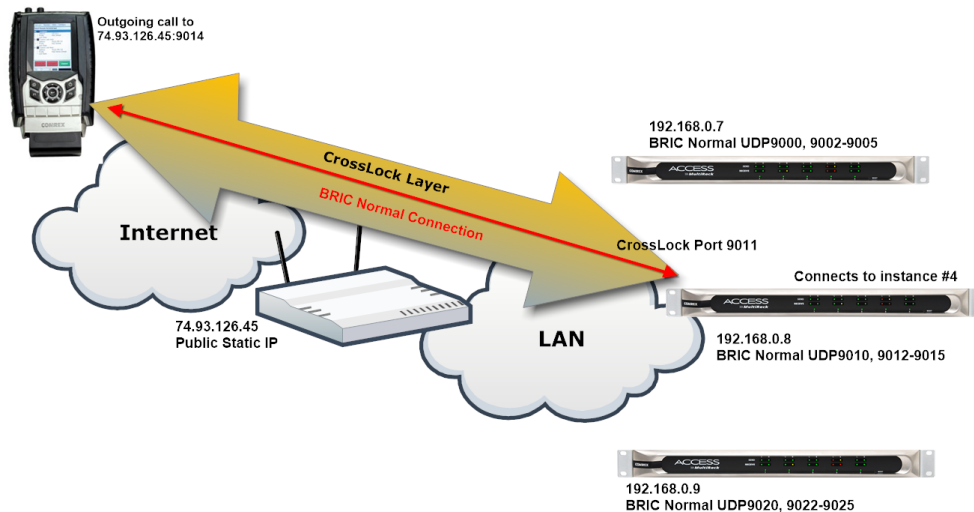


FIGURE 7 CONNECTING TO NON-DEFAULT CROSSLOCK PORT

Details of Special CrossLock Settings

These settings can be skipped when using Switchboard.

As shown in fig 8, you'll need to add the MAC Address/Switchboard ID for the opposite codec when creating a new remote. As detailed in the manual, this must also be done on the receiving codec, even if no outgoing connection from that codec is ever used. This can be considered a "dummy" entry to provide CrossLock compatibility.

On the codec opposite the codec with a non-default CrossLock port (anything other than UDP 9001), the remote entry must be created with a Switchboard ID/MAC address entry that adds the non-default CrossLock port on the far end. As shown in **Figure 8**, use a #character on the end of the existing ID with the new port number. Note in the example, the far-end codec is a MultiRack instance #2 (as indicated by the “-2” suffix). The CrossLock port number comes after this suffix, if present.

Edit Remote Settings

Remote Name	test #2	<i>Optional switchboard ID of the remote unit, only used for CrossLock connections. For MultiRack remotes, include the instance suffix. To use an alternate CrossLock port, add a port suffix separated by '#' (i.e. 00:01:02:03:04:05#9011)</i> Current 01:02:03:04:05-2#9022 Default 01:02:03:04:05-2#9022 input text for setting above
IP Address or Phone Number	1.2.3.4:9002	
Use Crosslock	Yes	
Switchboard ID	01:02:03:04:05-2#9022	
Connection Password		
Profile	(Default Profile)	
Backup Remote	(None)	
Fall Forward	No	

FIGURE 8 SWITCHBOARD ID

Due to system architecture, it’s not possible to edit a Switchboard ID/MAC address once it’s applied. To edit an existing entry, create a new remote with the same settings and delete the old one.

Port Forwarding

In your router, you must make special settings to forward each of these ports to the codec they are assigned to. Remember the BRIC Normal and CrossLock connections use UDP ports, while the configuration web page uses TCP. If only CrossLock connections are to be used, it’s not necessary to forward each BRIC Normal port. Those ports are virtual within the CrossLock VPN, which all run over the CrossLock port only.

Making a Connection to Non-Default Ports

Whether or not you’re using CrossLock, the outgoing address will be appended with the BRIC Normal port number. As an example, if your codec has a CrossLock port of 9011 and a BRIC Normal port of 9002, the IP address dialed on the far end will be <ip_address>:9002.

Alternate Modes

Similar rules apply for using modes like HTTP server, SIP/EBU3326, Standard RTP, and TCP. Each codec or MultiRack instance must use a unique port, and be forwarded correctly. Note that for RTP ports under SIP/EBU3326 and Standard RTP modes, only even numbered ports should be used, as the next highest port is used for RTCP.