

## **TalkMaster FOCUS Server Network Considerations**

### **Operator Console Connection Overview**

Operator Consoles initiate a connection to the TalkMaster FOCUS Server which listens on the default TCP port 3010. By default, commands are sent across this connection and the associated audio traffic uses TalkMaster FOCUS Server's default RTP Port 3010. Optionally, audio can be sent across the TCP connection, but when using IP7 hardware that supports Full Duplex audio operations, the audio must be sent via RTP. If the TCP/IP connection is broken for any reason, the Operator Console will attempt to reconnect to the Primary Server, then to any Fail Forward Servers. If still unable to connect, it waits 10 seconds, then retries.

### **IP7 Intercom Communication Overview**

Each IP7 Intercom/Paging Endpoint is configured with an IP Address, Subnet and Gateway as well as the IP Address of the TalkMaster FOCUS Server that it will connect to. A configured endpoint initiates a TCP connection to the TalkMaster FOCUS Server which listens on port 3000. If the TCP connection is broken for any reason, the endpoint will automatically re-establish the connection. The TCP connection remains active regardless of whether audio is being transmitted. Keep-alive packets are sent between the IP7 and TalkMaster FOCUS Server every five seconds to ensure the TCP connection is kept active.

Three types of communication are possible between the TalkMaster FOCUS Server and IP7 Intercom/Paging Endpoints:

- **Endpoint Configuration** -TalkMaster FOCUS Server uses a combination of UDP Unicast, UDP Broadcast and UDP Multicast during initial endpoint configuration:
  - The TalkMaster FOCUS Server sends out UDP endpoint discovery requests and UDP configuration update requests.
  - The endpoints send UDP discovery responses and UDP configuration confirmations
  - The TalkMaster FOCUS Server sends/listens on UDP Port 5001 and the Intercoms listen/send on UDP Port 1459. The TalkMaster FOCUS Server also sends via Multicast Address 224.0.23.59
  - Once the IP7's are connected to the TalkMaster FOCUS Server via TCP, endpoint configuration information and changes are sent via the TCP connection
- **Intercom Audio** - (2-way audio) Audio can be sent via TCP or RTP. TCP is used unless the TalkMaster FOCUS Server and the Endpoint are configured to use RTP<sup>1</sup>. Commands sent to the IP7 are always sent via TCP
- **Paging Audio** - (1-way audio) is sent from TalkMaster FOCUS Server to Intercoms/Paging Endpoints via UDP. TalkMaster FOCUS Server generates a UDP packet to each endpoint at the start and end of an audio page:
  - UDP paging audio can be sent using Unicast, Broadcast or Multicast
  - UDP Broadcast audio is transmitted to the endpoints from a source port between 5002-7001 and is transmitted to the endpoints on port 1459.
  - UDP Unicast audio is transmitted to the endpoints in one of two ways.

- If RTP is not configured, audio is transmitted to the endpoints from a source port between 5002-7001 and is transmitted to the endpoints on port 1459
- If RTP is configured, audio is transmitted from a dynamically assigned port (20000 – 23000) to the same port number on the endpoint. If a fixed RTP Port has been configured on the IP Endpoint, it overrides the dynamically assigned port
- If an IP Endpoint has been configured to use RTP, the audio will be sent via RTP to the Shared RTP port used by the Server or fixed RTP Port of the IP Endpoint.
- UDP Multicast audio is transmitted to the endpoints on a rotating user-specified Multicast address and source port between 5002-7001

### **Communicating with IP7s over a LAN / WAN / VPN**

Following are some network strategies for supporting **Intercom Audio, Paging Audio** and **Endpoint Configuration** over a LAN, WAN, or VPN

- **Strategy 1**
  - Dedicated VLAN with IGMPV2 Multicast support for the TalkMaster FOCUS Server and IP7 Intercoms/Paging Endpoints
  - Operator Consoles can reside outside of this VLAN
- **Strategy 2**
  - Single subnet for TalkMaster FOCUS Server and IP7 Intercoms/Paging Endpoints
  - Operator Consoles can reside outside of this subnet
- **Strategy 3**
  - Multi-subnets with IGMP Multicast support for IP7 Endpoints, TalkMaster FOCUS Server and Operator Consoles
- **Strategy 4**
  - Existing network. TalkMaster FOCUS Server, Operator Consoles and IP7 Endpoints can all be installed in an existing network with no special considerations

### **Communicating with IP7s over the Internet**

Once the IP7 endpoints are connected to the TalkMaster FOCUS Server, **Endpoint Configuration** requests are sent / received via the TCP connection. Typically, the only firewall rule needed is for TalkMaster FOCUS Server TCP port 3000.

**Intercom Audio** can be sent via RTP<sup>2</sup>, but will require a Port Forwarding rule for each IP7. To send **Paging Audio** to IP7 Endpoints located behind a NAT'd firewall, one of the following methods can be used:

- Use RTP Unicast and Port Forwarding
  - Verify that sufficient bandwidth is available (~80kbps \* Qty of IP7s to be paged) and refer to the note **Using RTP over the Internet** at the end of this document
- Use the UBAM<sup>3</sup> Utility
  - Install the **UBAM Listener** software on the TalkMaster FOCUS Server PC
  - Configure the TalkMaster FOCUS Server's Paging Options for UBAM and UDP Broadcast
  - Install the **UBAM Repeater** software on a PC in each network segment where IP Endpoints are located

**TalkMaster FOCUS Server Firewall Considerations**

<b>Ports</b>	<b>Description</b>	<b>Notes</b>
TCP Port 3000	Used for incoming IP7 Endpoint connections	Required. Port may be changed
TCP Port 3010	Used for incoming TalkMaster Console connections	Required. Port may be changed
RTP Port 3010	Used for incoming/outgoing RTP audio between Operator Console and TalkMaster FOCUS Server if the <b>Use Console UDP/RTP if Possible</b> option is checked	Optional. Port may be changed
UDP Port 3011	Used for outgoing data to the Support Console (normally run on the same machine as the TalkMaster FOCUS Server)	Optional. Port may not be changed
UDP Port 5001	Used for incoming/outgoing endpoint configuration requests	Required. Port may not be changed
UDP Port 5002 – 7001	Used for outgoing audio pages	Dynamically assigned
UDP Port 32111	Communication with the System Tray ICON	Optional
UDP Port 21000-24000	Used for incoming/outgoing RTP audio if <b>Shared RTP Port</b> is not specified	Optional
Shared RTP Port	Used instead of UDP ports 21000-24000 if the user-specified <b>Shared RTP Port</b> is configured as a listener for RTP audio	Optional

**Operator Console**

<b>Ports</b>	<b>Description</b>	<b>Notes</b>
TCP Port 3010	Used for outgoing TCP audio and commands to the TalkMaster FOCUS Server	Required. Port may be changed
RTP Port 23010	Used for incoming/outgoing RTP Audio if the <b>Use Console UDP/RTP</b> option is selected in <b>Operator Console → Logon → Options</b>	Optional. Port may be changed

**UBAM Listener**

<b>Ports</b>	<b>Description</b>	<b>Notes</b>
TCP Port 3003	Used for incoming connections from UBAM "Repeaters"	Optional. Port may be changed

**IP7 Endpoint**

<b>Ports</b>	<b>Description</b>	<b>Notes</b>
TCP Port 3000	Used to initiate connection to TalkMaster FOCUS Server for commands and optionally for audio	Required. Port may be changed (must be the same as the Server's Listening port)
UDP Port 1459	Used for incoming/outgoing Configuration requests and 1-way audio paging	Optional. Not supported behind NAT Firewalls
RTP Port	User specified UDP/RTP port for an endpoint's incoming/outgoing audio. Each IP7 will require its own Port Forwarding rule if it is behind a NAT'd Firewall. Only open during audio operations	Optional. Can be dynamically assigned or specified as a Fixed Port
Dynamic Multicast Address / Port	Used to receive 1-way paging audio if Multicast is specified. Address / Port are only open during audio operations	Optional. Address and Port are dynamically changed

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**<sup>1</sup> Using RTP on a LAN, WAN or VPN:**

- Open the Admin Console:
- On the **Setup → Settings** tab, check the **Use RTP for IP7 Intercom Audio** check box
- Go to the **IP Endpoints → Options 1** tab
- For each Endpoint, check the **Use RTP** check box and click **Save**

**<sup>2</sup> Using RTP over the Internet:**

- Open the Admin Console
- On the **Setup → Settings** tab, check the **Use RTP for IP7 Intercom Audio** check box
- Check the **Shared RTP Port** check box and specify the port the TalkMaster FOCUS Server should use for incoming and outgoing RTP audio
- On the **IP Endpoints** tab, specify a fixed local IP address for the IP7 Endpoint
- On the **IP Endpoints → Options 1** tab, check the **Use RTP** check box and specify a **Fixed RTP Port**. *The combination of the fixed RTP Port and its External IP Address must be unique*
- Create firewall rules for the TalkMaster FOCUS Server TCP and Shared RTP Ports
- Create firewall port forwarding rules for each IP7 fixed IP Address and Port

**<sup>3</sup> UBAM Software Utility**

UBAM Software is an application that bridges certain commands and audio between the **TalkMaster FOCUS Server** and the ii3/IP7 Intercoms/Paging Endpoints on different **network segments** or behind **NAT**'d firewalls. Consider using UBAM if **Paging Audio** must be sent across the Internet.

- UBAM 'Repeaters" in the remote network segments establish a TCP connection with the UBAM "Listener" residing in the network segment with TalkMaster FOCUS Server
- The UBAM "Listener" forwards any UDP Broadcast generated by the TalkMaster FOCUS Server to the UBAM Repeaters
- The UBAM Repeaters re-broadcast these packets in their local network segment
- For detailed instructions, refer to the UBAM sub-directory on the Installation CD