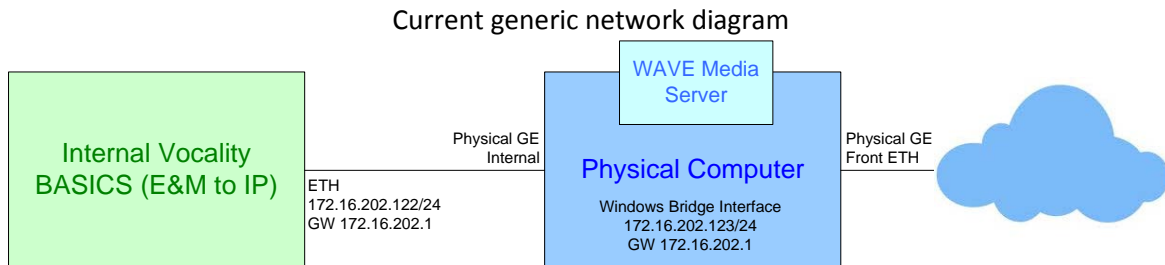


DTECH LMR Multicast Demo Configuration Guide

8/28/2014

This is an **example** of how to configure Vocality Basics with Twisted Pairs WAVE. This document is built for DTECH LABS products to include but, not limited to M3-SE-LMR4, M3-PM-LMR4, M3-SE-LMR8, TXC4 w/ TXC-LMR module which, include the Vocality BASICS 4-WIRE E&M board and a CPU running Twisted Pair's WAVE software.

General information (how it works!)



1000 foot view, WAVE Media Server / WAVE Client and Vocality BASICS will utilize the following multicast addresses and ports to pass audio. They will listen and transmit on the multicast addresses listed below.

MC Group 1 - 239.1.1.1:22202

MC Group 2 - 239.1.1.2:22204

MC Group 3 - 239.1.1.3:22206

MC Group 4 - 239.1.1.4:22208

Intended Power-up Process:

1. Connect source power.
2. **Connect front ETH cable into your local network. (This interface must be UP for WAVE media service to start!)**
3. Power on system.
4. Pre-configured Vocality BASICS board boots up and is waiting for audio. (~15 sec)
5. Pre-configured Windows OS, WAVE Media Service starts. (~2.5 min depending on CPU specs)

Done!

From here you can use WAVE client software to "patch calls" or setup pre-defined conference groups (Management -> Management Console). An administrator can decide whether to setup "remote patches" and "local patches" to cross-band connected radio networks.

Overall Physical/Logical Flow

Radio1 E&M (PHY) <-> (PHY) BASICS E&M (1:0:1) <-> (SG:1) Multicast Group 1 (IP) <-> "Network" <-> (Chan1) WAVE Client
Radio2 E&M (PHY) <-> (PHY) BASICS E&M (1:0:2) <-> (SG:2) Multicast Group 2 (IP) <-> "Network" <-> (Chan2) WAVE Client
Radio3 E&M (PHY) <-> (PHY) BASICS E&M (1:0:3) <-> (SG:3) Multicast Group 3 (IP) <-> "Network" <-> (Chan3) WAVE Client
Radio4 E&M (PHY) <-> (PHY) BASICS E&M (1:0:4) <-> (SG:4) Multicast Group 4 (IP) <-> "Network" <-> (Chan4) WAVE Client

Important configuration settings for WAVE and corresponding Vocality settings

Access

Host OS Server: VGA, USB keyboard, USB mouse -OR- RDP 172.16.202.123 -OR- VMWare vSphere Client

UN: Administrator PW: M3lmr or Sy5adm-n (if configured by DTECH LABS)

WAVE configuration: <http://172.16.202.123/wave>

UN: Administrator PW: <blank>

Host OS Windows Server 2008 or 2003 "Bridge Interface" and IP Address Setup

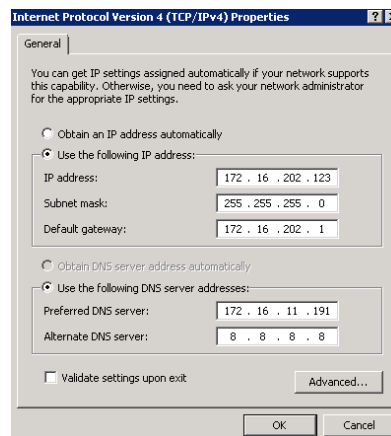
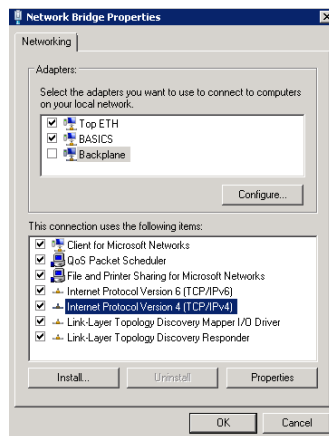
Please navigate to -> Control Panel\Network and Internet\Network Connections

NOTE: The "Bridge Interface" setup is not required on the TXC4.

- Rename interfaces if you'd like, select the proper interfaces by holding <ctrl> and click. Then "right click" one of the interfaces and select "Bridge Connections."

Name	Status	Device Name ^	Connectivity	Network Category	Owner	Type
Backplane	Disabled	Intel(R) PRO/1000 MT Network Connection			System	LAN or High-Speed Internet
Top ETH	Enabled, Bridged	Intel(R) PRO/1000 MT Network Connection #2			System	Network Bridge
BASICS	Enabled, Bridged	Intel(R) PRO/1000 MT Network Connection #3			System	Network Bridge
Network Bridge	Network	MAC Bridge Miniport	Internet access	Public network	System	Network Bridge

- Once "Network Bridge" is created edit properties, Set IP address, mask and gateway, optionally set DNS server address.



When/if you change the static IP address you'll also need to change the Media Server IP address and restart the media service if used.

(Media Servers -> Media Servers -> <hostname> -> Network Binding Addresses)

Login to host OS. Navigate to Services.msc (Desktop link or Run -> 'services.msc'). Restart WAVE Media Server.

WAVE Setup (Dispatch communicator or Desktop communicator)

Open your favorite web browser and type <http://172.16.202.123/wave> in the url.

Login User ID: Administrator

Login Password: <blank>

1. Setup a profile.

Name	Description	Active Directory	ADSI Group Name	Access Level
<input checked="" type="checkbox"/> Admin Profile	Admin Profile	No		Admin

2. Setup users for client login.

User ID	Digit ID	Name	Department
<input checked="" type="checkbox"/> Administrator		Administrator	(System)
<input type="checkbox"/> user1		user1	
<input type="checkbox"/> user2		user2	

3. Setup channels (ie multicast) settings for client software (Dispatch or Desktop) and BASICS.

Name	Group	App Code	Cross Mute Grp	Description	Type	Receive	Transmit	Transmit Codec
<input type="checkbox"/> Channel1	(Default) (4)			Channel1	Standard	239.1.1.1:22202		G.729/2
<input type="checkbox"/> Channel2	(Default)			Channel2	Standard	239.1.1.2:22204		G.729/2
<input type="checkbox"/> Channel3	(Default)			Channel3	Standard	239.1.1.3:22206		G.729/2
<input type="checkbox"/> Channel4	(Default)			Channel4	Standard	239.1.1.4:22208		G.729/2

4-8. This is an example of one channel. Please repeat for all 4 channels.

Channel Information

Active

Name: * [Profile membership](#)

Description: *

Group: **Simplex Group:**

Audio Receive

IP address: * **Port:** *

Voice Activity Detection (VAD):
 Enable VAD

Instant Replay:
 Enable Instant Replay Keep the last of audio for replay

Audio Filters on this audio stream: **Minimum Mute Level:** WDC

Frequency (BandStop):
Automatic Gain Control:

Audio Transmit

Allow audio transmission on this channel
 Allow the user to 'latch' the microphone
 Mute channel when transmitting
 Mute all other channels when transmitting
 Disable the Talk button when receiving audio (simplex)
 Use the same IP address and port as 'Audio Receive'

IP address: **Port:**

Codec: * **Scale:**

Voice Activity Detection (VAD):
 Enable VAD

Enable Real-Time Media Channel (RTMC) control stream

Enable Real-Time Media Channel (RTMC) control stream

Max Tx Rate:

Cross Mute Group:

Channel Settings

Quality of Service (QoS) enabled:

Minimum jitter buffer length (milliseconds):

Maximum jitter buffer length (milliseconds):

Security

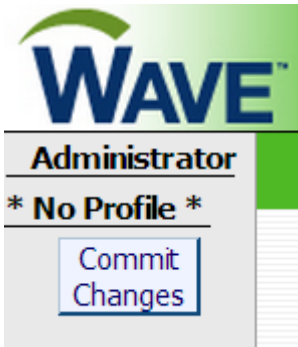
Audio Stream Encryption

Encryption Password:

Enable LMR Features

Enable LMR Features

9. Once all 4 channels are created, commit changes (save changes).



BASICS Multicast configuration settings from factory default

Vocality BASICS (E&M CON): Console 9600, 8N1N

NAVIGATION:

- Press “**up arrow**” or “**<ctrl>+e**” to view something. The **<enter>** key does nothing at the home page.
- Use the **<up>** and **<down>** arrows to scroll through the menu options.
- Press **<enter>** to select an option
- Press **<spacebar>** to cycle/change an option
- Press **<esc>** to move back or exit a menu.
- If a change was made on the menu page, Vocality will ask if you want to save. Press “**y**” to save and exit, press “**n**” to NOT save and exit.
- Each time you exit and save a menu page, the changes are immediate and permanent. (the setting change(s) will take effect and will stay in effect after a power cycle)

SHORTCUTS AND HELPFUL HINTS:

- Press “**<ctrl>+e**” to return to “home screen” at any point.
- Press “**<shift>+D+D+D**” (press and hold **<shift>** then press “**d**” three times) from the “home screen” to go into a diagnostics menu, also where you can reboot the Vocality BASICS.
- Press “**<ctrl>+r+r+r**” from the “home screen” then **<y>** when prompted to factory reset the Vocality BASICS.
- Press “**<ctrl>+t+t**” from the “home screen” to enter a TTY mode. In this area you can “paste” a known good configuration or type “**nodename ?<enter>**” to execute a configuration dump.

HOW TO REBOOT BASICS VIA CONSOLE:

“**<ctrl>+e**” = Resets console screen to default Vocality BASICS splash screen.

“**<shift>+D+D+D**” = Brings up a CLI diagnostics mode

V100 Diagnostic Menu
M = Monitor
F = Flash Loader
R = Connect to Remote

Dbg>Help - Lists User commands

Press “m”

Dbg>boot

HOW TO TROUBLESHOOT BASICS MULTICAST CALLS:

Diagnostics -> Slots Menu -> Slot 0 -> Logs -> SIP Gateway Log

```
000d:00h:00m:21s:17 requesting SIP stack start
000d:00h:00m:21s:26 SetStackStarted
```

```

000d:00h:00m:22s:71 SIPUA001 OpenVoiceChan
000d:00h:00m:22s:71 SIPUA001 Open RTP 22202 <-> 239.1.1.1:22202
000d:00h:00m:22s:71 SIPUA001 Joined mcast group 239.1.1.1:22202
000d:00h:00m:22s:71 SIPUA001 Interface BRG00
000d:00h:00m:27s:90 SIPUA001 start mCallTimer
000d:00h:10m:43s:50 SIPUA002 OpenVoiceChan
000d:00h:10m:43s:50 SIPUA002 Open RTP 22204 <-> 239.1.1.2:22204
000d:00h:10m:43s:50 SIPUA002 Joined mcast group 239.1.1.2:22204
000d:00h:10m:43s:50 SIPUA002 Interface BRG00
000d:00h:10m:43s:60 SIPUA003 OpenVoiceChan
000d:00h:10m:43s:60 SIPUA003 Open RTP 22206 <-> 239.1.1.3:22206
000d:00h:10m:43s:60 SIPUA003 Joined mcast group 239.1.1.3:22206
000d:00h:10m:43s:60 SIPUA003 Interface BRG00
000d:00h:10m:43s:75 SIPUA004 OpenVoiceChan
000d:00h:10m:43s:75 SIPUA004 Open RTP 22208 <-> 239.1.1.4:22208
000d:00h:10m:43s:75 SIPUA004 Joined mcast group 239.1.1.4:22208
000d:00h:10m:43s:75 SIPUA004 Interface BRG00
000d:00h:11m:16s:75 SIPUA002 start mCallTimer

```

...
“<ctrl>+e” to break out of “trace”

BASICS Multicast configuration settings from factory default

Items in **BLUE** are important

```

*****
**** GENERAL SETUP ****
*****
-----[ ADVANCED CONFIG / SYSTEM OPTIONS / SYSTEM ]-----
NODE NAME                : Node1                NODE ID                : 1

CONFIGURATION BY REMOTE  : Enabled

REMOTE MGMT ENCRYPT KEY  :

COUNTRY                  : Us
PROGRESS TONES           : Country
CONNECTION TIMEOUT       : 10 seconds
RECEIVE READY FILTER     : 1 seconds          ACTIVITY TIMEOUT       : 30 seconds
DATA CHANNEL ACTIVATION  : Auto              TRIB RETRY DELAY       : 10 seconds
DATA CHANNEL FLAG        : Always On         BACKUP TIMER           : 40 seconds
TIE-LINE ACTIVATION      : Voice Detect:Auto
ASYNC BUFFER SIZE        : 32 buffers        FALLBACK TIMER         : 40 seconds
JITTER TOLERANCE        : 0 ms
LED BRIGHTNESS           : 128

-----[ ADVANCED CONFIG / CLOCKING ]-----
GC1 SOURCE TYPE          : PRIMARY           BACKUP                 TERTIARY
SOURCE CLOCK             : Internal         Internal               Internal
                        : -                 -                     -

-----[ ADVANCED CONFIG / IP / NETWORK ]-----
ETHERNET MODE            : AUTONEGOTIATE

UPLINK
CHANNEL                  : UPLNK
IP ADDRESS                : 172.016.202.122
IP ADDRESS MASK           : 255.255.255.000
DEFAULT GATEWAY           : 172.016.202.001
MTU                       : 1514

DNS SERVER
PRIMARY                   : 000.000.000.000   SECONDARY              : 000.000.000.000

SNTP
PRIMARY SERVER            : DISABLED
SECONDARY SERVER          : ntp.vocality.com
RETRY TIME                : 60 secs          UPDATE TIME            : 86400 secs

PASSTHROUGH ENABLED     : Yes

```

-----[ADVANCED CONFIG / IP / ACCESS TABLE]-----

Description	Type	Peer	Mask	Port	Service
(New Entry)	Address	000.000.000.000	000.000.000.000	-	Any

**** MULTICAST SETUP ****

-----[ADVANCED CONFIG / SIP / SIP GATEWAY / SYSTEM]-----

MODE : Gateway
FULLY QUALIFIED DOMAIN NAME :
SIP TRANSPORT : UDP
RE-REGISTRATION INTERVAL : 300 seconds
PROTOCOL LOGGING : Disabled
ENABLE RTCP : Disabled
RTCP Interval -multiple of 5: 5 seconds
TIMEOUT CONNECTION ON RTCP : Disabled
SRC ADDRESS OVERRIDE : -
IP TOS : 0
STUN SERVER ADDRESS :
STUN SERVER PORT : 3478
RTP/STUN KEEPALIVE : Disabled

-----[ADVANCED CONFIG / SIP / SIP GATEWAY / CHANNEL DETAILS]-----

CHANNEL TO EDIT : COMMON SIP BYPASS : Enabled
DESTINATION : N/A
IP TOS : b8
ALGORITHM : G.729 8K RESERVED BW : 8000
SILENCE SUPPRESSION : Off
RTP INACTIVITY THRESHOLD : 0
RTP TX REMOTE ADDR : N/A
RTP TX REMOTE PORT : N/A
RTP TX LOCAL PORT : N/A
RTP RX ADDR : N/A
RTP RX LOCAL PORT : N/A

-----[ADVANCED CONFIG / SIP / SIP GATEWAY / CHANNEL DETAILS]-----

CHANNEL TO EDIT : SG:1 SIP BYPASS : Enabled
DESTINATION : 1:0:1
IP TOS : b8
ALGORITHM : G.729 8K RESERVED BW : 8000
SILENCE SUPPRESSION : Off
RTP INACTIVITY THRESHOLD : 0
RTP TX REMOTE ADDR : 239.001.001.001
RTP TX REMOTE PORT : 22202
RTP TX LOCAL PORT : 22202
RTP RX ADDR : 000.000.000.000
RTP RX LOCAL PORT : 0

-----[ADVANCED CONFIG / SIP / SIP GATEWAY / CHANNEL DETAILS]-----

CHANNEL TO EDIT : SG:2 SIP BYPASS : Enabled
DESTINATION : 1:0:2
IP TOS : b8
ALGORITHM : G.729 8K RESERVED BW : 8000
SILENCE SUPPRESSION : Off
RTP INACTIVITY THRESHOLD : 0
RTP TX REMOTE ADDR : 239.001.001.002
RTP TX REMOTE PORT : 22204
RTP TX LOCAL PORT : 22204
RTP RX ADDR : 000.000.000.000
RTP RX LOCAL PORT : 0

-----[ADVANCED CONFIG / SIP / SIP GATEWAY / CHANNEL DETAILS]-----

CHANNEL TO EDIT : SG:3 SIP BYPASS : Enabled
DESTINATION : 1:0:3
IP TOS : b8
ALGORITHM : G.729 8K RESERVED BW : 8000
SILENCE SUPPRESSION : Off
RTP INACTIVITY THRESHOLD : 0
RTP TX REMOTE ADDR : 239.001.001.003
RTP TX REMOTE PORT : 22206

```

RTP TX LOCAL PORT      : 22206
RTP RX ADDR           : 000.000.000.000
RTP RX LOCAL PORT     : 0

```

-----[ADVANCED CONFIG / SIP / SIP GATEWAY / CHANNEL DETAILS]-----

```

CHANNEL TO EDIT        : SG:4          SIP BYPASS : Enabled
DESTINATION            : 1:0:4
IP TOS                 : b8
ALGORITHM              : G.729 8K     RESERVED BW : 8000
SILENCE SUPPRESSION   : Off
RTP INACTIVITY THRESHOLD : 0
RTP TX REMOTE ADDR    : 239.001.001.004
RTP TX REMOTE PORT    : 22208
RTP TX LOCAL PORT     : 22208
RTP RX ADDR           : 000.000.000.000
RTP RX LOCAL PORT     : 0

```

```

*****
**** ANALOG SETUP ****
*****

```

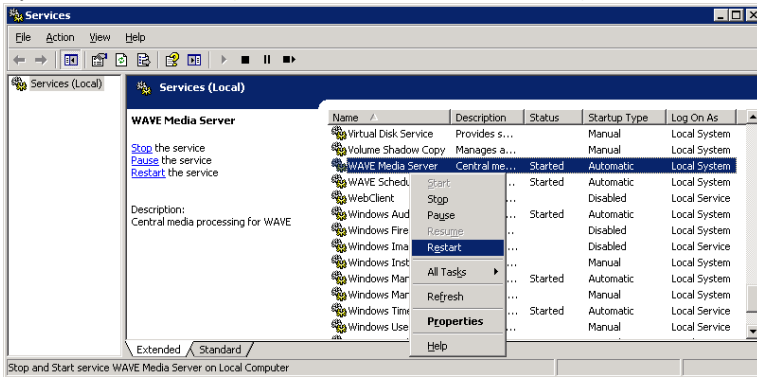
-----[ADVANCED CONFIG / ANALOGUE VOICE / ANALOGUE PORTS]-----

Chan	Ref	Op	IF	Type	Algorithm	Silence Suppress	Resvd BW	In	Out	Gain	Destination
0:1	GCl	DTMF	Tie-Line	G.729A	8K	OFF	8000	0dB	0dB		1:SG:1
0:2	"	DTMF	Tie-Line	G.729A	8K	OFF	8000	0dB	0dB		1:SG:2
0:3	"	DTMF	Tie-Line	G.729A	8K	OFF	8000	0dB	0dB		1:SG:3
0:4	"	DTMF	Tie-Line	G.729A	8K	OFF	8000	0dB	0dB		1:SG:4

Additional troubleshooting notes.

HOW TO RESTART 'WAVE MEDIA SERVER' SERVICE

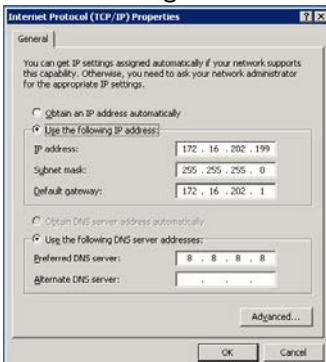
Open Services.msc (Start -> Run -> 'services.msc') or select 'Services' shortcut on desktop.



HOW TO CHANGE IP ADDRESS

1. Login to host OS. Reference first page for login information.

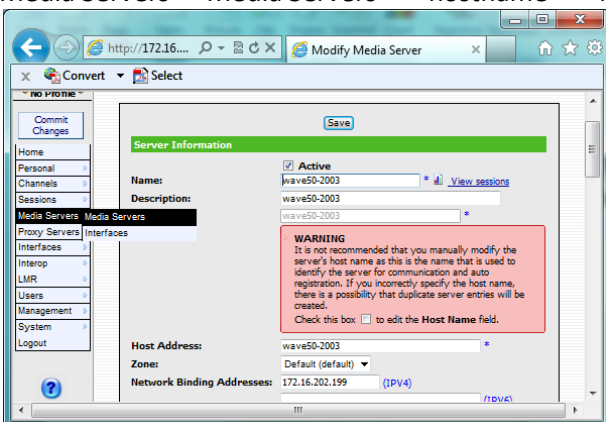
Start -> Settings -> Network Connections -> External -> Properties -> Internet Protocol (TCP/IP)



2. Change WAVE Media Server Network binding address and 'Commit'.

http://<new_ip_address>/wave

Media Servers -> Media Servers -> <hostname> -> Network Binding Addresses



3. Restart 'WAVE Media Server Service' (see above)