# Media Server Implementation

We've made it easy to implement your connection to the

### BarnabasRoad.com

Streaming Media Network

Follow the enclosed detailed instructions so you can implement your broadcast over the BarnabasRoad.com Streaming Media Network.

# **IMPLEMENTATION** INSTRUCTION MANUAL

Implement your radio broadcast over the Internet connect to the BarnabasRoad.com Streaming Media Network®

Requires Windows Media Series 9 Encoder and Windows Media Series 9or 10 Player

# IMPLEMENTATION INSTRUCTION MANUAL

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You will receive your Network Access Connection Point Internet address (URL) via a separate email.

# REQUIRED EQUIPMENT & SOFTWARE IMPLEMENTATION INSTRUCTION MANUAL

This **IMPLEMENTATION** INSTRUCTION MANUAL assumes your station is not already streaming your broadcasting radio programming over the Internet.

If you have not yet prepared your station's computer equipment, sound devices, and software for Internet broadcasting, then you are not quite ready to hook up your broadcast personal computer to the internet. Please install your sound-card and Windows Media Encoder before your call to our broadcast media center.

If you are already broadcasting on the Internet, you are using an analog audio capture device, analog to digital encoder and some means of listening to your own Internet signal such as an embedded Windows Media Player on your stations web page, then you are what we call "port ready" and you may call at any time to become connected to the broadcast media center servers.

**IMPLEMENTATION** Instruction Manual was created taking advantage of the new Windows Media 9 Series encoder, player and server system technology advances. Therefore, we highly recommend you download the two free Windows Media Series 9 software packages listed below. Please type in the Microsoft Corporation web address to obtain the free downloads. Or click on this link.



http://www.microsoft.com/windows/windowsmedia/download/default.asp

The Windows Media Series 9 encoder is about 20% more efficient in compressing a signal for transmission. This means you save on bandwidth charges without having to do anything but to download free software. The software set up is super easy as you will soon learn.

#### Download the Free Windows Media 9 Series software:

- **Series 9 Encoder**
- ◊ Series 9 or 10 Player

# Overview of IMPLEMENTATION Parameters IMPLEMENTATION INSTRUCTION MANUAL

One of the most wonderful aspects about anything Internet related is the "virtual" nature of its existence. The Internet is a means of access, a means of data transmission, and sometimes whether it's a hardwired or wireless connection, a means of virtually reaching the world in reality. Such is the case with the Internet Hosting of radio station broadcasts on the Internet. The product in reality is both access to the Internet, but more importantly, the faithful reproduction of your radio programming to hundreds or even thousands of simultaneous listeners.

The Windows Media 9 Series system is our internet media system of choice. It features high utility, reliability, and lower cost of use. Our lower cost of use is expressed in our network access fees and your lower cost of use will be gained in higher quality low bandwidth streams and tighter signal compression.

In any event, here is how we conduct your IMPLEMENTATION using the BarnabasRoad.com Streaming Media Network.

This instruction manual was written for those radio stations already broadcasting or at least capable of broadcasting on the Internet. This means that you have the required equipment, software, and your analog to digital encoder is capable of spitting out a signal onto the Internet.

#### **IMPLEMENTATION...** Detailed Overview

**IMPLEMENTATION** is basically accomplished by turning on a Windows Media Series 9 encoder and creating a custom session that uses your current broadcast.

You will listen to your IMPLEMENTATION output by entering a Barnabas Road Media (BRM) provided Internet Address (URL) to your broadcast from our Media Center or "Publishing Point".

We highly encourage you to experiment with different bit rate levels. The BRM pre-rated packages are based upon these lower bandwidth amounts, but higher bandwidth packages are available. Dual Stream packages have been recently added to the portfolio of packaged products.

The Windows Media 9 Series Encoder is delivered capable of 5 continuous streams. The encoder can even be modified to handle up to 50 continuous streams, but few PCs have the speed and distribution capability to actual handle more than a few streams at one time without serious signal degeneration. Most PCs can handle two concurrent and relatively low-bandwidth streams without abnormal processor stress.

Normally, there is very little risk or impairment of your current broadcast signal when you start a second simultaneous stream of your broadcast. We have discovered that not all Windows operating systems will support multiple streams form a single sound-card. Further, we have generally noted that Windows XP (Home Edition) and (Professional Edition) will support the streaming of two independent encoders from a single sound-card and single audio source. Nevertheless you will monitor your CPU utilization and if the two streams exceed 50% of your CPU processing capacity, you should probably stop... go out and upgrade your CPU to something much faster. Windows operating systems such as Windows 98, 2000, ME, and NT will generally require the use of multiple sound cards if you intend to encode multiple streams from the same or different sound sources on the same personal computer.

All kidding aside, if you do reach an abnormal processor utilization with only two streams, you may want to use a different machine or limit your output to only one stream good for both broadband/DSL and Dial-up... such as 20K.

Serious signal degeneration rarely happens unless, as we said, the processor speed is extremely low. In reality your IMPLEMENTATION may help point the way to the improvement of the quality of your output signal without increasing your bandwidth stream by simply upgrading your equipment.

Let's get started!!!

# Encoder Stream Set-up IMPLEMENTATION INSTRUCTION MANUAL

Click on the Microsoft Windows Media 9 Encoder Icon to start the program:



The New Session window will appear:

New Session	? 🛛
New Session Wizards Quick Starts Custom Broadcast a session Rive event Capture audio Convert a file or video Convert a file Capture screen	Description Broadcast a live event from attached devices or computer screen.
✓ Show this dialog box at startup	OK Cancel

Click on OK to accept the "Broadcast a live event" icon

New Session V	Vizard 🛛 🛛 🛛
Device Optic Select the installed de	ons devices to use for encoding audio and video in this session. Only currently evices are listed.
What devices	do you want to use?
Video:	Configure
🗹 Audio:	Santa Cruz(tm) Configure  (default audio device) Santa Cruz(tm) Modem #0 Line Record Multichannel WAV Source
Tip Cli	ck Configure to set properties for the selected device.
	< Back Next > Finish Cancel

Check the Audio checkbox and select the device that you use to encode your broadcast signal Then click Next

New Session Wizard				
Broadcast Method You can broadcast content by pushing it to a Windows Media server or by allowin players or Windows Media servers to pull directly from the encoder.	ıg			
How do you want to broadcast your encoded content?				
Push to a Windows Media server (the connection is initiated by the encod	jer)			
O Pull from the encoder (the server or player initiates the connection)				
Tip For information about setting up a push distribution session, see Help.				
< Back Next > Finish Ca	incel			

Click on the "Pull from the encoder.... Radio button and then click Next

We use this method in order to save bandwidth. When no players are accessing the Media Network the server disconnects from your encoder. Thus, no bandwidth is used during non-active periods.

Our required connection method is to "pull" the broadcast from your encoder.

New Session Wizard 🛛 🔀					
Broadcast Connection Select the port through which players and Windows Media servers can access the stream.					
What port do you want to use?					
HTTP port:	7070 Find Free Port				
URL for Internet connections: http://66.58.251.301:7070					
URL for LAN connections:					
Tip You can copy the URL and provide it to users so they can access the stream.					
- Ba	ick Next > Finish Cancel				

Enter 8080 for your first stream and then open a second instance of the encoder with an 8081 in the HTTP port field as your secondary encoder. Multiple streams only.

The URL for Internet connections field will be the required URL needed by BRM in order to "pull" your broadcast from the encoder. The <a href="http://66.58.251.301">http://66.58.251.301</a> (a URL example only) number should have been the URL reported to RadioCast24x7.com when you signed up for your IMPLEMENTATION. If it is not the URL you previously reported, please let your Account Manager know your actual broadcast computer URL as quickly as possible. We must have the correct URL for the broadcast media server to be able to access your broadcast stream.

To find your exact encoder PC IP address, open your web browser and type in <u>http://www.whatismyipaddress.com</u>

This will tell you your encoder broadcast Personal Computer IP address... this is the address BRM Media Servers will need to "pull" your digital broadcast.

Incounty of	ptions
Select end bit rate, fra	coding settings for your content. Your selections determine settings such as ime rate, and buffer size.
How do you w	ant to encode your audio and video?
Video:	
Audio:	Multiple bit rates audio (CBR)
Bit rate:	CD quality audio (CBR) FM quality audio (CBR) Voice quality audio (CBR) Multichannel audio (CBR)
	□ 19 Kbps □ 15 Kbps ▼
Tin	
W th	e wizard.
	<back next=""> Finish Cancel</back>
ck on Mu	ltiple bit rates audio (CBR)
ck on Mu w Session V	Itiple bit rates audio (CBR)
ck on Mul w Session N Encoding Op Select enc	Itiple bit rates audio (CBR) Vizard
<b>X ON Mul</b> <b>W Session V</b> <b>Incoding Of</b> Select enc bit rate, fra	Itiple bit rates audio (CBR) Vizard Stions eoding settings for your content. Your selections determine settings such as me rate, and buffer size.
ck on Mu w Session N Encoding Of Select enc bit rate, fra łow do you w	Itiple bit rates audio (CBR) Wizard ptions coding settings for your content. Your selections determine settings such as me rate, and buffer size. ant to encode your audio and video?
ck on Mu w Session V Encoding Og Select enc bit rate, fra tow do you w <u>V</u> ideo:	Itiple bit rates audio (CBR) Wizard Potions reading settings for your content. Your selections determine settings such as me rate, and buffer size. ant to encode your audio and video?
Ck on Mu w Session N Encoding Of Select enc bit rate, fra łow do you w ⊻ideo: ∆udio:	Itiple bit rates audio (CBR)  Wizard  Stions  Reading settings for your content. Your selections determine settings such as me rate, and buffer size.  ant to encode your audio and video?  Multiple bit rates audio (CBR)
K on Mu Session V Encoding Of Select enc bit rate, fra tow do you w Video: Audio:	Itiple bit rates audio (CBR) Wizard Detions reading settings for your content. Your selections determine settings such as me rate, and buffer size. ant to encode your audio and video? Multiple bit rates audio (CBR)
Ck on Mu w Session N ancoding Of Select enc bit rate, fra How do you w Video: ∆udio: Bit rate:	Itiple bit rates audio (CBR)  Vizard  Defines  Reading settings for your content. Your selections determine settings such as me rate, and buffer size.  ant to encode your audio and video?  Multiple bit rates audio (CBR)  Total Bit Rate Frame Rate Output Size
K on Mu w Session N Select enc bit rate, fra łow do you w ⊻ideo: ∆udio: Bit rate:	Itiple bit rates audio (CBR)  Wizard  Stions  Roding settings for your content. Your selections determine settings such as me rate, and buffer size.  ant to encode your audio and video?  Multiple bit rates audio (CBR)  Total Bit Rate Frame Rate Output Size  A Kbps  J 9 Kbps
K on Mu x Session N ancoding Og Select enc bit rate, fra low do you w Video: Audio: Bit rate:	Itiple bit rates audio (CBR)  Vizard  Defines  And buffer size.  Ant to encode your audio and video?  Multiple bit rates audio (CBR)  Total Bit Rate Frame Rate Output Size 24 Kbps 19 Kbps 15 Kbps V
k on Mu x Session N Select end bit rate, fra tow do you w ⊻ideo: Audio: Bit rate: Tip ♀ Yo th	Itiple bit rates audio (CBR)         Wizard         botions         coding settings for your content. Your selections determine settings such as me rate, and buffer size.         ant to encode your audio and video?         Multiple bit rates audio (CBR)         Total Bit Rate       Frame Rate         Qutput Size         Q4 Kbps         19 Kbps         15 Kbps         wu can adjust settings on the Session Properties panel after you complete e wizard.

You will next choose your first bit rate setting to test. We suggest you start at the Total Bit Rate setting of 19Kbps which streams at 16Kbps or 24 Kbps for a 20Kbps stream. The difference in rates is accounted for by the head-room required for the TCP encoding.

**CAUTION:** We are using CBR or <u>C</u>onstant <u>Bit</u> <u>Rate</u> – if more than one Bit Rate amount is checked at the same time, the system will start – stop – sputter – re-buffer... generally, not work at a Constant Bit Rate – and produce a really bad listening experience. Scan the pick-list setting please. Click on **Next** <u>after you make sure only one Bit Rate is checked</u>.



Do not archive a live broadcast. This could potentially cause your machine to use so much memory that it would not leave enough disk space for the operating system to function properly. Click on Next.

New Session W	izard 🛛 🗙				
<b>Display Inform</b> Specify info playback of	nation Irmation about your content (optional). The information is displayed during i the encoded content.				
Title:	Your Station Name - TEST DRIVE				
Author:	Barnabas Road Media Hosting				
Copyright:	Copyright 2004 - All Rights Reserved				
Rating:	General Audience				
Description:	Internal test pull - live broadcast @ 16kb				
Tip Use info	ers must enable captions in Windows Media Player to view this rmation.				
	< Back Next Finish Cancel				

Although this information is optional, the information displayed as your listeners Windows Player is open helps identify who, what, and where of the open web paged player. In other words, take every opportunity to communicate with your listener. Click on **Next** when you are finished.

Action:	Live broadcast	~	
Audio device:	Santa Cruz(tm)		
Broadcast:	Port 7070 (HTTP)		
Profile:	Multiple bit rates audio (CBR)		
Title:	Your Station Name - TEST DRIVE		
Author:	Barnabas Road Media Hosting Casuriate 2004 - All Biatete Reserved		
Rating:	General Audience		
Description:	Internal test pull - live broadcast @ 16kb		

Please review your "New Session Wizard" input, **uncheck** the checkbox... "Begin broadcasting when I click Finish" as you will want to review other items before you start your online broadcast. Then, click Finish.

Windo	ws Media Encoder 🛛 🗙			
By default, there is no restriction on which clients can connect to this broadcast. To prote the stream, you can restrict access by IP address.				
	OK Help			
🔲 Don'	't show me this again			

After you clicked on Finish, this message will appear... that is, unless you have already restricted access to your streaming broadcast as a default. If you click on Help you will see the following text...



#### Restricting access to a broadcast

When you are enabling clients to <u>pull</u> a stream from the encoder, you can allow or deny access to the broadcast based on a static IP address or groups of IP addresses. By default, no clients are restricted from connecting to the broadcast. If you want to specify the clients that can connect, you can add the IP addresses to the allow list. Doing so prevents any unlisted clients from connecting. Or, if you want to prevent a specific client from accessing the broadcast, you can add that client's IP address to the deny list.

If you make changes to the IP address list while encoding, your changes take effect only for clients that connect after you apply your changes. For example, if you add an IP address to the deny list while that client is connected, the client is not disconnected. However, if the client disconnects and then attempts to reconnect to the same broadcast, it is denied. If it is critical to disconnect a client immediately, you can stop encoding.

The following table provides an example of the order in which IP addresses are allowed or denied, depending on the restrictions that you set up.

Allow list	Deny list	Result
Empty	Empty	Allow all IP addresses
Empty	IP address 1	Deny IP address 1, allow all others
IP address 1	Empty	Allow IP address 1, deny all others
IP address 1	IP address 2	Allow IP address 1, deny all others
IP address 1	IP address 1	Deny all IP addresses
IP address 1, IP address 2	IP address 1	Allow IP address 2, deny all others

If you are not already using this feature, it is a good idea to restrict access to your broadcast computer to only the IP address of the media server network. If you are already restricting your accessing IP addresses you must include the BRM media server address assigned for your IMPLEMENTATION. This information will be supplied in your IMPLEMENTATION email announcement.

Broadcast Security	X
Specify the comput	ters that can connect to a broadcast from the encoder.
Allow	
IP Address	IP Mask
67.18.103.116	255.255.255.240
Deny	Add Edit Remove
IP Address	IP Mask
	Add Edit Remove
	OK Cancel Help

The server IP address is the only portion required, but also uses the IP Mask if it is supplied as well. You access this panel by clicking on tools and security. At the top of the panel... Click on Add to add a new media server IP address and then OK.

Before we start actually encoding your live radio station broadcast, lets review the various panels of the encoder monitor.

# Using the Encoder Broadcast Monitor IMPLEMENTATION INSTRUCTION MANUAL

🧿 Untitled - Windows Media Encoder					
File View Control Tools	Help				
🔮 New Session 🏾 🤌 🔒	🛃 Properties	🜔 Start Encoding	O Stop	Pause	

Using all of the cautions mentioned previously... click on Start Encoding

🥺 Untitled - Windows Media Encoder	
File View Control Tools Help	1
File View Control Tools Help View Session  Properties  Start Encoding  Stop  Pause Series Encoding	System
	Disk time left - CPU load 7%
Monitor	
General Statistics Server Connections Event	KLog EDL
Video:	Output
Audio: Santa Cruz(tm) Script:	Broadc t port 7070 - 0 client(s) Serv URL: -
Encoding	Progress
Settings: Multiple bit rates audio (CBR) DRM protection: no	Elaps d time: 00.00.03.15 (dd hh:mm:ss) Time ret sining:
Video optimization: • Total bit rate: 16.00 K brs / 16.00 K brs	Percent conjulete:
Expected fp:	Disk space left 63.61 GB
Average fps: Total scripts:	Disk time left - CPU load: 7%
Mixer	

The mixer level indicator on the far left side should show some level of signal output and the Encoder broadcasting streaming indicator (bottom of screen) should be moving from left to right.

If you are broadcasting two streams from this broadcast computer, be sure and continue to monitor the CPU load field under the System section. We recommend that if the combined CPU load exceeds 50% that you defer your testing until a non-peak listener period of your broadcast day.

The existence of two simultaneous streams should not impair the quality of your broadcast output. Under rare circumstances usually involving the stations use of an extremely slow CPU processing chip, two encoded streams have taxed the processor attempting to broadcast at higher bandwidths.

In order to hear what your listeners are hearing, use your stand alone Media Player and type in your encoder address with the :8080 port suffix. You will be hearing the direct out-put from your encoder.

In any event, we do not want your listeners to experience a poor quality live broadcast. A conservative guide is to consider stopping the IMPLEMENTATION if your combined CPU load exceeds 50% unless after actually listing to your actual live broadcast you determine the output quality is not materially affected.

This IMPLEMENTATION Instruction Manual will not review all of the Monitor panels, but you may want to review the various tabs as you conduct your testing under various bit rate settings.

Create a New Session to change the bit rate setting. You cannot change the bit rate setting midstreaming broadcast.

### Accessing Your Broadcast with Windows Media Player IMPLEMENTATION INSTRUCTION MANUAL

In order to access your IMPLEMENTATION broadcast you will open your downloaded generic Windows Media Series 9 or 10 Player:



Open URL						
☯	Enter the URL or path to a multimedia file on the Internet, your computer, or your network that you want to play.					
Open:	http://67.18.103.211/sample_broadcast					
	OK Cancel Browse					

When this window opens... type in the Publishing Point communicated to you in your IMPLEMENTATION announcement email.

Click on OK...

Have fun and figure out what bandwidth setting makes the most sense for your broadcast. Be sure and read the next section regarding our observations and test indications.

You may listen to the signal coming directly out of your encoder and compare that signal to the Streaming Media Network signal. If your encoder signal is weak or wobbly, the Media Server will not improve your broadcast signal... it simply rebroadcasts your signal to a world-wide audience.

Type your encoder URL into the player including your :8080 port number (<u>http://67.18.103.211:8080</u>) example.

If you have a dynamic IP address you will need to register your broadcast PC IP address with a free IP forwarding service such as No-Ip.com.

We will need your "Host Name" such as "KVIV.no-ip.info".

After this painless process has produced a "host name" even if your IP address changes at your service provider, BRM will always stay connected as we will have your non-changing "host name" in the media server.

# Previous IMPLEMENTATION Observations

#### Low Bandwidth Observations

The minimum recommended live radio broadcast bit-rate is 16Kbps. It is true that a station could choose to broadcast at a lower bit-rate than 16Kbps, but no one has reported a good listener experience at bit-rates below 16Kbps.

In fact, many have observed that even 16Kbps is inadequate to deliver a non-wobbly musical signal. It appears the biggest variables at the lowest recommended bit-rate of 16Kbps are broadcast signal source equipment. The faster the CPU and quality of a high-end sound capture device make 16Kbps live radio broadcasting plausible.

16Kbps is the least expensive bandwidth proposition for live radio broadcasting, but also leaves the quality of the stream subject to network latency issues. On the other hand, more simultaneous listeners can be connected to the network without creating stress on the media center servers.

One media server can easily handle over 20,000 simultaneous listeners at 16Kbps without creating a stressful CPU crisis. The higher the bandwidth the lower the number of simultaneous streams should be served from one machine. As new stations are added to the BRM Streaming Media Network our goal is to have no one server operating at more than 50% of normal processing capability. Therefore, multiple servers and load balancing is employed to spread the workload over all of the media center servers.

#### The Apparent Current Standard

The most popular Bit Rate setting has been 20Kbps. Most if not all of the flutter disappears and stream stability is enhanced. The quality of equipment does not disappear as an issue, because we have had some extremely low CPU speed PC's (under 300MHz) still under-perform at 20Kbps.

<u>Total</u>	11Kbps 13Kbps 15Kbps	<u>19Kbps</u>	24Kbps	<u>37Kbps</u>	45Kbps
Net	Not Recommended	16Kbps	20Kbps	32Kbps	39Kbps
		<u>54Kbps</u> 48Kbps	<u>70Kbps</u> 64Kbps	<u>135Kbps</u> 128Kbps	

Your Windows Media 9 Series Encoder features preset Bit Rate levels of:

One last point to consider in making a bandwidth selection... as a group, how capable are your listeners to use bandwidth in access of certain limits?

A dial-up listener with a 56K modem rarely actually streams at 56K. More often than not, these listeners will receive a 26K stream and only rarely will the modem negotiate a 36K stream. In short, to broadcast any stream higher than 28K will only be able to be taken advantage of by only a small but growing number of listeners and the higher stream may cause continuous rebufferring.

Least you think we have ignored Broadband and DSL that may be streaming at higher than even 128K, think for a moment about the audio equipment most of these users have to dip into that abundant broadband or DSL audio stream. Most listeners at the office and on their home computers have "guppy nets" versus "commercial fishing nets" when it comes to being able to listen to high fidelity and high definition digital audio.

In short, don't damage your station's reputation by broadcasting a noticeably inadequate signal, but also at the same time don't waste your station's valuable production budget by broadcasting a signal so solid with fidelity and definition that most couldn't hear that additional quality even if it were a bomb that went off in their own back yard. "Waste not... want not!" In most cases 32k is adequate for broadband as long as you also present a 16k or 20k stream for dial-up listeners.

#### **IMPLEMENTATION Summary**

We are constantly testing the network, adding servers, routers and switches in order to be able to keep up with our growing network demand, but just as important as network adequacy is to your broadcast, we at Barnabas Road Media count it part of our ministry to make sure the Word is heard clearly and God's servants in Christian Broadcasting are treated as brothers and sisters in the work of our Lord and Savior Jesus Christ.

Let us know your issues, concerns, and comments. We are learning and growing everyday and we strive to deliver an improving product each and every day. We need your feedback in order to accomplish continuous improvement.

Thank you for IMPLEMENTING the BRM Streaming Media Network.

Paul R. Gathard, President & CEO Barnabas Road Media, Inc.