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

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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**

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Overview of IMPLEMENTATION Parameters

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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.
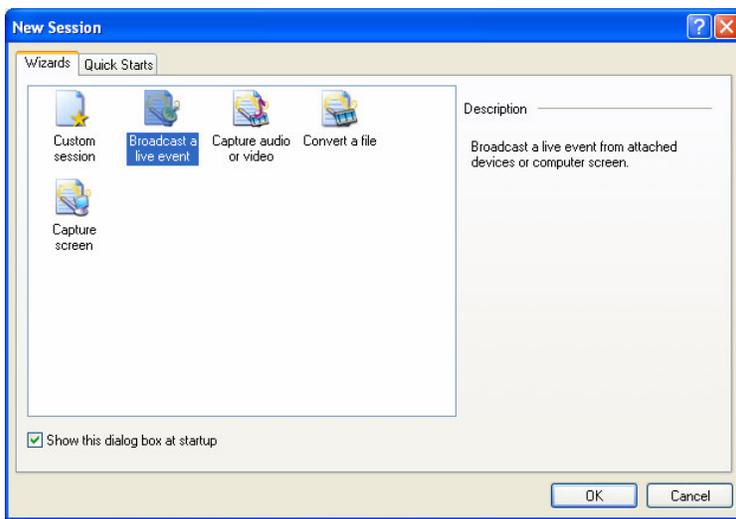

Let's get started!!!

Encoder Stream Set-up
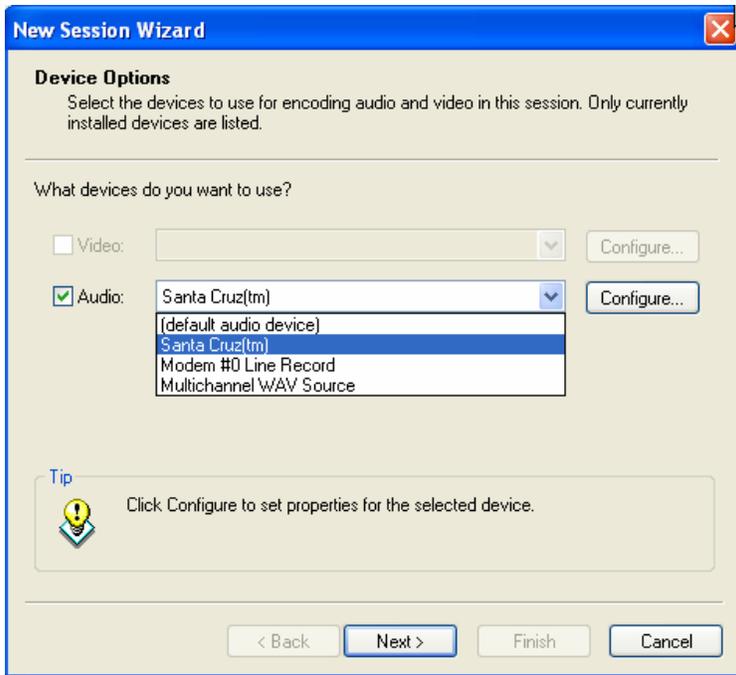## <u>IMPLEMENTATION</u> INSTRUCTION MANUAL

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

The New Session window will appear:

Click on <u>OK</u> to accept the "Broadcast a live event" icon

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

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.

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


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 http://66.58.251.301 (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 http://www.whatismyipaddress.com

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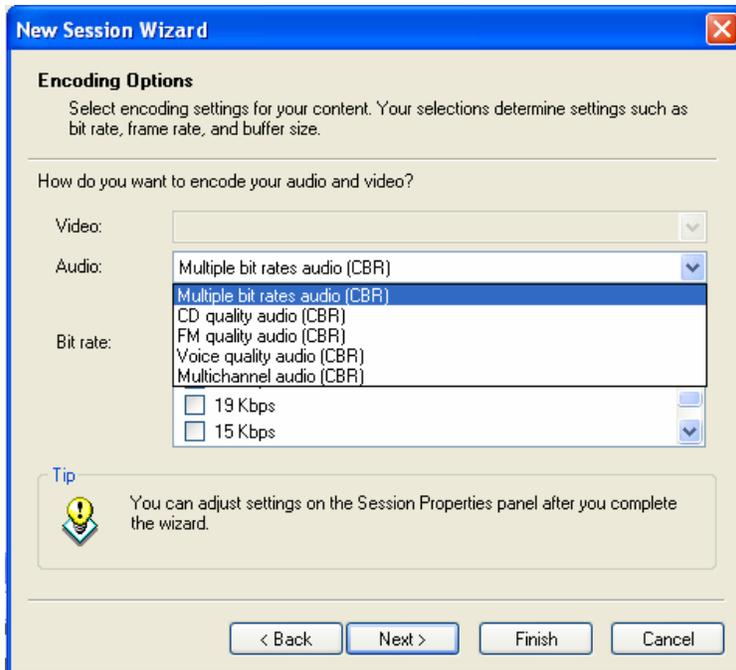
Click on Multiple bit rates audio (CBR)
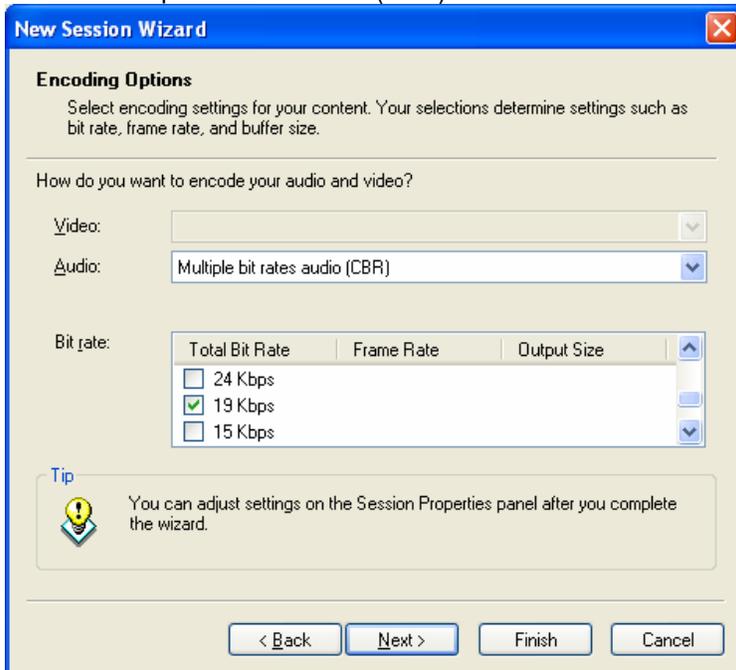
You will next choose your first bit rate setting to test. We suggest you start at the Total Bit Rate setting of 19Kbps which streams at 16Kbps or 24 Kbps for a 20Kbps stream. The difference in rates is accounted for by the head-room required for the TCP encoding.

**CAUTION:** We are using CBR or Constant Bit Rate – 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** *after you make sure only one Bit Rate is checked.*

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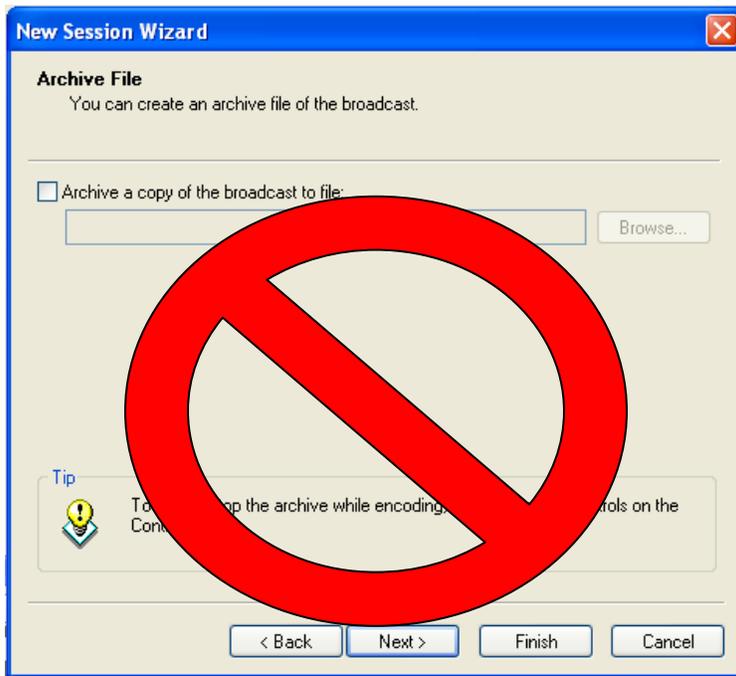
Do not archive a live broadcast. This could potentially cause your machine to use so much memory that it would not leave enough disk space for the operating system to function properly.
Click on Next.
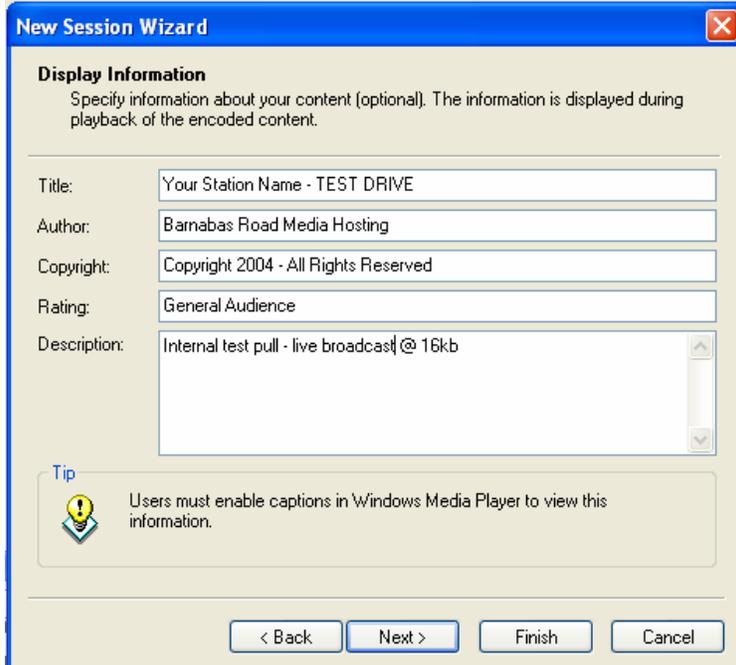
Although this information is optional, the information displayed as your listeners Windows Player is open helps identify who, what, and where of the open web paged player. In other words, take every opportunity to communicate with your listener. Click on **Next** when you are finished.
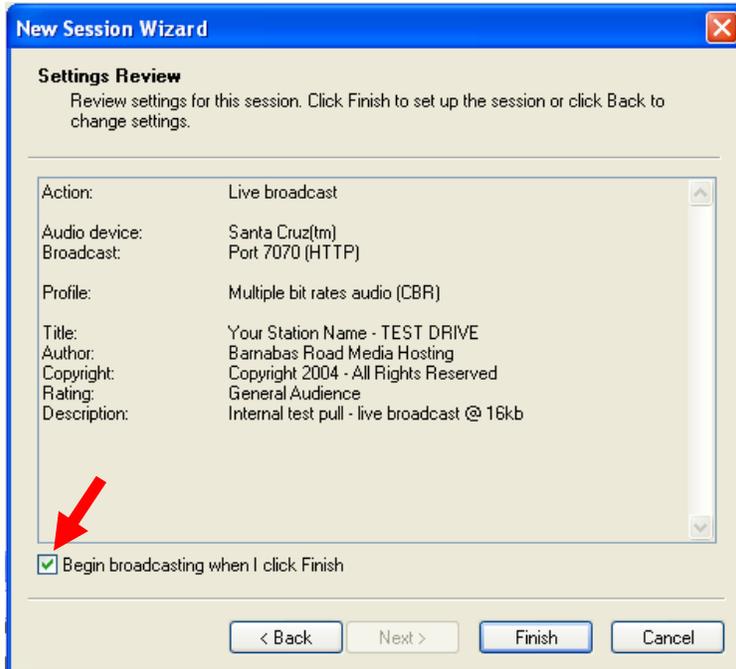
Please review your "New Session Wizard" input, **uncheck** the checkbox… "Begin broadcasting when I click Finish" as you will want to review other items before you start your online broadcast. Then, click Finish.

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 pull 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

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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.
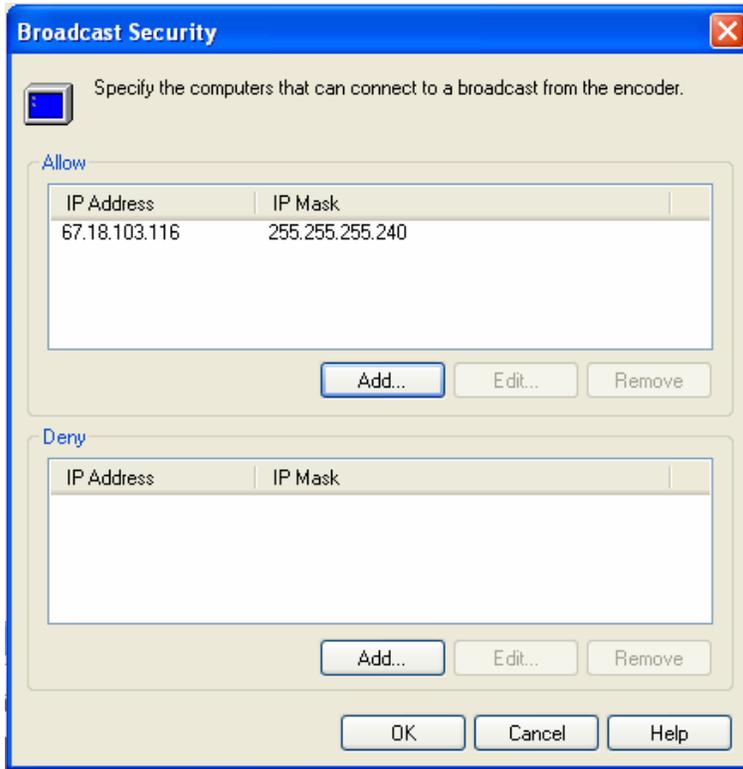
The server IP address is the only portion required, but also uses the IP Mask if it is supplied as well. You access this panel by clicking on tools and security. At the top of the panel... Click on Add to add a new media server IP address and then OK.
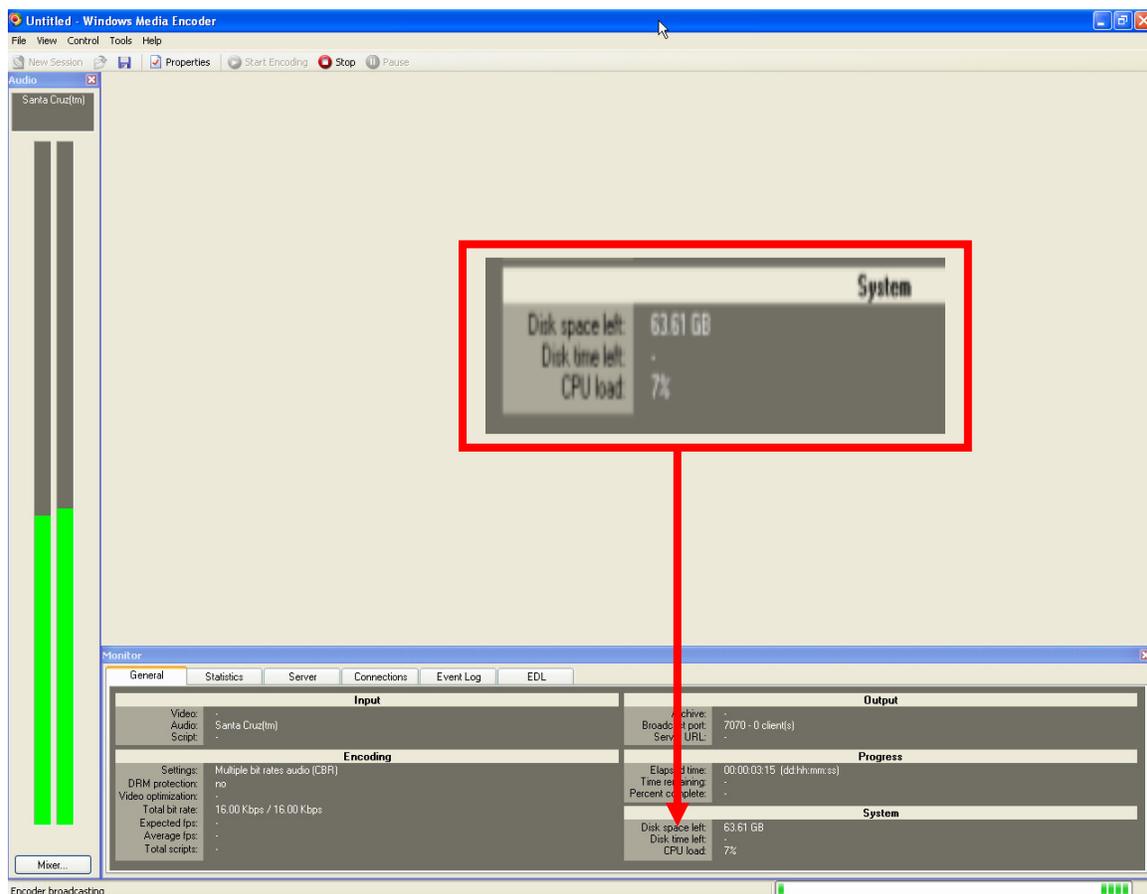
Before we start actually encoding your live radio station broadcast, lets review the various panels of the encoder monitor.

Using the Encoder Broadcast Monitor
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Using all of the cautions mentioned previously… click on Start Encoding

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 mid-streaming broadcast.

Accessing Your Broadcast with Windows Media Player
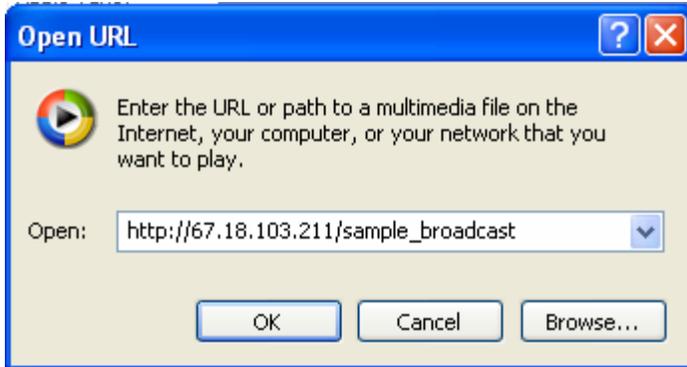## <u>IMPLEMENTATION</u> INSTRUCTION MANUAL

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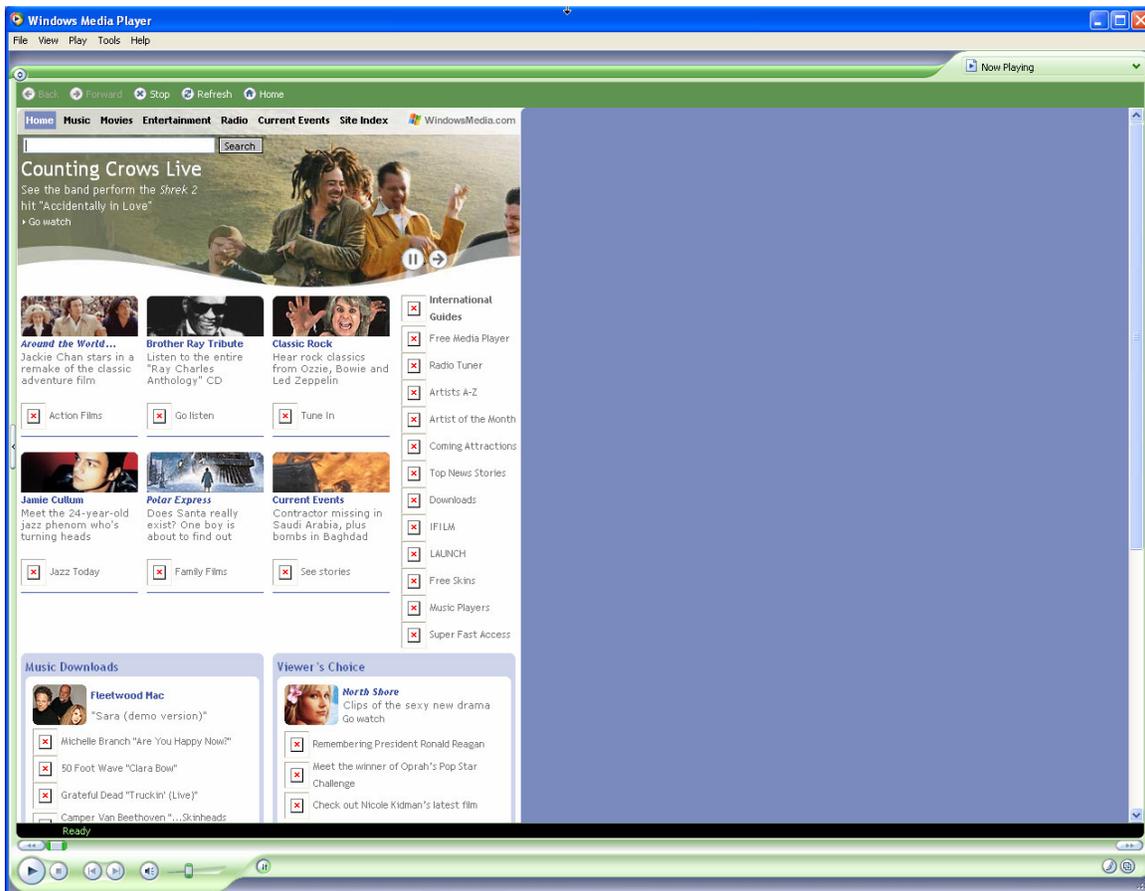
Click on File

 and then Click on… Open URL

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 (http://67.18.103.211:8080) 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
<u>IMPLEMENTATION</u> INSTRUCTION MANUAL

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.

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

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

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.