THE GAMER'S GUIDE TO 3D

LEARN HOW TO SET UP YOUR 3D PROJECTION SYSTEM FOR GAMES

BEAMAX

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► 1. INTRO

With Call of Duty: Black Ops coming out in 3D, there has never been a better time to look at 3D gaming.

And that is because 3D will make games even more entertaining, you will be put smack in the middle of the action.

At the moment though, there is a lot of confusion about 3D. And that leads to questions such as:

- What's the hardware you need?
- Do you need to wear special glasses?
- How far do you need to be away from the screen?
- Will I be able to use my exisiting equipment?

All those questions and more are answered in this guide. The focus will be on console-based gaming with a projecor and projection screen set up.
But, if you have a PC or play on a TV, you'll get a lot out of this guide as well.
If you have any question that's not answered here, please let me know at **otto@beamax.com**
Thanks and enjoy,

Otto Tromm

Beamax founder
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▶ 2. WHY PROJECTION

Ever looked at your TV screen, wanting just a little bit more? Ever had friends over, straining their eyes to see what's happening?

In gaming, the quality and size of your display is important. The better the quality and the larger the size of the images, the more you will be drawn into the game. As gaming in Full-HD is now possible, for PC, PS3 and Xbox360 alike, you can get a really big image with high quality.

This makes projection ideal for gaming.

If you use a projector and a projection screen, you will get a screen that's many times bigger than a LCD or Plasma, at the same or lower cost. If you ever thought a 50" plasma is big, consider the size of the average projector screen. The smallest projection screen (77" diagonal) has twice the surface of a 50" plasma (one of the biggest). If you compare a 106" projection screen to a 50" display, the difference is even bigger: This projector screen has 4X the surface of a 50" display.

Did they ever tell you size doesn't matter? They're wrong!

Here are 5 reasons to go BIG:

- **With the larger size image of a projection screen, everyone can see what's happening.** Players and audience alike. So now you can have the proper surface to show off your killer moves.

- **The devil is in the details. In gaming, the smallest details make all the difference.** With a big picture in full-HD glory, you won't miss any detail. This gives you a definite advantage over the competition; straining their eyes to figure out what's going on.

- **Big and Bold.** Get really drawn in with big images. A large projection screen turns your room into a all-immersive environment. Turn up the sound to match that big image and see every detail of the track, hear the engines roaring, feel the excitement.

- **Multi Player Madness.** Finally you can get in multiplayer mode without suffering from a lack of vision. As a projection screen is easily 4 times the size of a display, in 4-player mode, you'll have a 50" display area for each player. This brings a whole new level of excitement to off-line multi-player game playing.

- **Time to WOW.** Turn your system on, fire up your projector, roll down your screen - now pause. Take a look at the faces of your friends staring at the screen - yes, that look says it all. It's WOW written all over their faces. This just leaves beating them all to really make your day.

So you know why size matters. Now see how big the differences really are.

50" FLAT PANEL VS. COMMON PROJECTION SCREEN SIZES

Beamax projection screens compared to a 50" flat screen

42" FLAT PANEL VS. COMMON PROJECTION SCREEN SIZES

Beamax projection screens compared to a 42" flat screen

37" FLAT PANEL VS. COMMON PROJECTION SCREEN SIZES

Beamax projection screens compared to a 37" flat screen

Source: www.beamax.com

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▶ 3. DIFFERENT 3D SYSTEMS

3D is an area that is currently rapidly developing. The result is a range of different technologies, which can be confusing.

First off, let's look at glasses and no-glasses 3D.

GLASSES OR NO GLASSES?

At the moment, you're very likely to play 3D games with glasses on - unless it's on a Nintendo 3DS.

Most TV manufacturers are focusing on 3D with glasses and there are some developments, but even the most optimistic vendors do not expect glassless 3D before 2013.

So don't expect it to be available any time soon.

And that's just for TVs. 3D without glasses for projector-based solutions is even further away.

Now that we have seen that there is no 3D projection without glasses, let's have a look at the different glasses-based solutions:

3.1. ACTIVE SYSTEMS

With an active system, you need a power source for both the projector's lens shutters and the 3D glasses. For the glasses that would simply be a battery. The shutter glasses are synchronised with the projector's lens shutters.

The hardware you need are a d ready projector, the glasses and a 3D source.

You do no not need a special projection screen fabric.

3. 2. ANAGLYPH

With this system, the color spectrum is divided in 6 bands, 2 for each of the colors green, red and blue. You will need the glasses most of us are familiar with: the ones with one blue lens and one red lens.

The glasses work as a filter, so each eye gets one version of the color band and the other eye the other version.

No special projection screen fabric is required.

3.3. POLARISATION SYSTEMS

These are the systems that you will find in commercial cinemas mainly. You need special glasses that have a different lens for each eye. In addition to that, you also need 2 projectors and a processing device. So it is a complex set up that also requires a specific projection screen fabric.

This fabric is silver like and ensures the polarisation is maintained. Matt white and other fabrics are not able to do this.

Unless you are building a high end games room, you will not have a polarisation system. The active and anaglyph systems will be what most vendors will have on offer.

Sources: AVnews - October 2010 issue **www.avnews.co.uk**

▶4. ELEMENTS OF YOUR SYSTEM

4. 1. PLAYER

There are 2 groups of players: consoles and pcs

Let's look at each of them:

PCS AS A SOURCE FOR 3D

Pcs are arguably the best source for 3D. And that's because they are very versatile. Upgrading is a matter of switching components.

The biggest benefit of using a PC is the fact that you can get the best possible 3D image quality. Unlike the PS3, that can only give you 720p 3D, a PC can give you full HD (1080p)3D images.

This means the images are a lot sharper, because they have a higher resolution. And that's important when your screen gets bigger.

As you will see in the projector section, there are some exciting developments for PC 3D gaming. NEC and Nvidia will be working together to make their technologies work together as seamlessly as possible.

The big drawback is the cost of a dedicated games PC compared to a console. The demands games make of the hardware of the PC are big and that makes a dedicated gaming PC a lot more expensive than your standard office PC.

CONSOLES

Both the Xbox and the PS3 are capable of supporting 3D games.

The hardware has stayed the same, but a software upgrade "transformed" the machines into 3D capable sources.

Arguably, Sony is pushing the 3D format harder than Microsoft, which is giving priority to the Kinect motion control system. And this is visible in the quality of the images, as defined by their resolution:

The PS3 supports 3D up to 720p and matches the HDMI 1.4 specs. The resolution of each image would be 720 x 405 pixels

For the Xbox, there's no support so far of the HDMI 1.4 specs. So the question is whether the Xbox will be able to reach that level.

If you already own one (or both) of these machines, you'll just have to live with what the console has to offer.

When you don't have a console yet, 3D performance can be a deciding factor. However, if you are playing on a TV rather than on a projection screen as a display, it's less of an issue.

And that's because the smaller the display's surface, the less the resolution matters.

4. 2. CABLES

Cables are important because they have to carry the signal from your console or computer to your projector (or indirectly via an amplifier).

DON'T USE THE STANDARD CABLE THAT COMES WITH YOUR CONSOLE

When you buy a console you normally get a standard cable, but you shouldn't always use it unless it's an HDMI one.

That goes even for non-3D gaming, because the standard cable that comes with the PS3, you won't be able to play in High Definition.

(You can recognise that cable by the yellow, red and white connectors that you should plug into your TV or projector)

NOT EVERY HDMI IS GOOD ENOUGH

I know this is odd, if you're not familiar with this stuff, but not every HDMI connection is equal.

There are different versions of HDMI and we're now up to HDMI 1.4.

It's a big deal for 3D, because you can only get full-HD 3D with HDMI 1.4

Of the previous versions versions, you can also use HDMI 1.3, but you can get 1080i 3D only.

SO NOW WHAT? UPGRADE THE WHOLE LOT?

Not necessarily. A PS3 for example, is only capable of pushing out 3D at 720p (HD-ready level images).

This is within the range of HDMI 1.3, so if that's the standard you are working on, you're fine.

If you have a cable below the 1.3 version, you will need to upgrade.

Here's a short summary:

YOUR CABLE TYPE	STATUS
HDMI 1.4	You're fine
HDMI 1.3	You won't be able to display full HD images, but for a PS3 or XBOX, you're fine
HDMI 1.2 OR LOWER	You need to upgrade. Go for HDMI 1.4

Because this is all very confusing, in the near future, there will be a new naming system for HDMI 3D cables. You can see the explanation and the official logos below

Source: HDMI.org

• STANDARD HDMI CABLE

The Standard HDMI cable is designed to handle most home applications, and is tested to reliably transmit 1080i or 720p video – the HD resolutions that are commonly associated with cable and satellite television, digital broadcast HD, and upscaling DVD players.

• STANDARD HDMI CABLE WITH ETHERNET

This cable type offers the same baseline performance as the Standard HDMI Cable shown above (720p or 1080i video resolution), plus an additional, dedicated data channel, known as the HDMI Ethernet Channel, for device networking. HDMI Ethernet Channel functionality is only available if both linked devices are HDMI Ethernet Channel-enabled.

• AUTOMOTIVE HDMI CABLE

Designed for internal cabling of vehicles equipped with onboard HD video systems. Tested to a more robust performance standard, and capable of withstanding the unique stresses of the motoring environment such as vibration and temperature extremes.

- **HIGH SPEED HDMI CABLE**

The High Speed HDMI cable is designed and tested to handle video resolutions of 1080p and beyond, including advanced display technologies such as 4K, 3D, and Deep Color. If you are using any of these technologies, or if you are connecting your 1080p display to a 1080p content source, such as a Blu-ray Disc player, this is the recommended cable.

- **HIGH SPEED HDMI CABLE WITH ETHERNET**

This cable type offers the same baseline performance as the High Speed HDMI Cable shown above (1080p video resolution and beyond), plus an additional, dedicated data channel, known as the HDMI Ethernet Channel, for device networking. HDMI Ethernet Channel functionality is only available if both linked devices are HDMI Ethernet Channel-enabled.

Sources:

http://www.hdguru3d.com/index.php?option=com_content&view=article&id=180:what-you-need-to-know-about-3d-and-hdmi&catid=35:hdguru3d-news&Itemid=59

http://www.hdmi.org

4. 3. GLASSES

As we have seen, both passive and active 3D systems need glasses.

These are often given away with a Tv set or a projector, but they are going to cost you if you want more of them. For friends who watch you play for example. Or when you have just lost a multiplayer game and thrown them against the wall…

You won't be able to take your own brand of glasses and go to friends to play on their system (from another brand).

Very annoying, but a reality.

A company called XpanD makes active 3D glasses that are claimed to be compatible with any 3D display. This could be a good option if you have to pay for your glasses anyway, but want to watch 3D on systems other than your own.

4. 4. PROJECTOR

The projector is an important part of your system.

Let's look at a few specifications:

A. IMAGE RESOLUTION: HD OR NO HD?

B. CONNECTIONS

IMAGE RESOLUTION

The bigger the image on your screen will be, the more important the resolution of the image becomes.

Resolution basically means the amount of dots on your screen that together create the image. Because the dots (called pixels) are lined up in a grid, resolution is expressed in the number of pixels horizontally and vertically.

So, for HD, the resolution you are looking for is 1920 x 1080. This creates a screen in 16:9 format.

CONNECTIONS

There is always a number of connections on your projector.

This allows you to:

1. Connect more than one source (PC, console or DVD player)
2. More importantly, to ensure you have the best possible connection. And that's the one that allows the highest resolution.

SO WHICH ARE THE MUST-HAVE CONNECTIONS ON YOUR PROJECTOR?

The HDMI connector is the must-have one for 3D.

All the others (from component to composite) can not be used for 3D

As we have seen before, make sure it's compatible with the HDMI 1.4 specification. This ensures you can get 3D images.

If you have a projector with HDMI 1.3 and that operates at 120 Hz, you can also use a converter, such as the Optoma 3D-XL. This converter downscales the HDMI 1.4 1080p signal to a 720p signal.

This allows you to use your current projector for 3D.

If you're new to projection, it's best to go for one that's capable of HD (1080p) 3D and thus has a HDMI 1.4 connection.

WHY 3D-READY DOESN'T ACTUALLY MEAN 3D-READY

Have you ever wondered why most of the action in 3D-ready projection is concentrated around projectors that use Teas Instruments' DLP technology? It's not that 3D-ready can't be produced using rival technologies, like 3LCD and LCOS - it's just that DLP technology allows projector manufacturers the capability to offer 3D from a single projector (some other current solutions achieve 3D using two projectors in tandem) at a price that is affordable to the average consumer.

In fact, building 3D capabilities into a DLP projector, at the time it is made, adds remarkably little to the overall cost of manufacturing. Soon, every DLP projector will be 3D-ready, but for the present many buyers of 3D-ready projectors will not use the 3D capabilities and will be reluctant to buy if they think they are paying a 3D premium.

In the competitive projector market, even a small extra cost puts the manufacturer at a disadvantage. As a result, 3D-ready doesn't mean 3D-ready – it means 3D-capable but only if you buy the additional components necessary to the 3D functionality.

As you will see elsewhere in this Guide, to use a DLP 3D -ready projector for gaming in 3D, you will need a high definition 3D source, appropriate cables and active 3D glasses.

Texas Instruments' 3D technology for its DLP 3D-ready projector is called DLP-Link. DLP-Link is comparatively cheap to implement for both the projector manufacturer and the user because it doesn't requires special screens or filters. There is also no need for an 'emitter' for synchronising the 3D glasses to the screen.

The DLP imaging chip refreshes at around 120 Hz, and the speed image refresh enables the projector to project left-eye and right-eye almost instantaneously. The images are synchronised by the active glasses to create a 3D image using additional data sent to the glasses in-between each frame of video.

This communication between the 3D-ready projector and the DLP-Link enabled active glasses makes it possible to do away with data emitters and eliminates the need to install and position emitters. This saves time and money and makes set-up relatively easy for the projector user.

At the time of writing no comparable system is available for other projection technologies used in single projector 3D. An announcement is anticipated from Epson - the leading developer of the rival 3LCD technology.

DO YOU HAVE TO BUY A SPECIAL 'GAMING PROJECTOR'?

Over the next five years, the number of 3D-enabled projectors sold each year will increase from 1 million today to more than five million a year. Aware of the potential growth in 3D gaming, some manufacturers have introduced special 'gaming models'.

SHOULD YOU BUY ONE OF THESE, OR WILL ANY 3D-READY

PROJECTOR DO THE JOB?

For some manufacturers, adding the 'gaming' tag is simply a marketing tactic. These manufacturers choose a model with a specification that, they think, corresponds with gamers' requirements and brand it their 'gaming model'.

The problem is that the chosen specification is often designed to achieve a specific price, rather than a performance or quality benchmark. As a result, a manufacturer's 'gaming model' might not correspondent with your requirements, so always buy on the basis of the specification rather than the manufacturer's product labelling.

A good example here is the range of all-in-one, home entertainment projectors that have appeared on the market in the last couple of years. These incorporate a projector, DVD or Blu-ray player, an audio system and even a karaoke function. For the average family, these products can represent exceptional value, but they are probably not the first choice for the serious gamer.

At the opposite end of the spectrum, there are dedicated gaming projectors where the manufacturer has incorporated technologies into the projector which can make a significant contribution to the gaming experience.

For example, NEC has worked with NVIDIA to ensure complete compatibility with the graphics card specialist's 3D Vision technology, Combined with active shutter LCD glasses, a PC with a compatible GeForce graphics processing unit (GPU) gamers can use hundreds of existing PC games in HD stereoscopic 3D.

4. 5. RECEIVER

Surround Sound Receivers

WHY USE A RECEIVER IN A GAMING SYSTEM IN THE FIRST PLACE

Your surround sound receiver can be the heart of your set up, because all signales - both audio and video - can pass through it. This allows you to easily switch between devices and make the most of what you've got.

That means for example that you can pump the sound of your games through your regular speakers - not just the ones on your TV. This makes gaming all the more realistic.

Especially when you have a surround sound set up (5.1 or 7.1 for example), because the sound from the game will come from where it's supposed to come. Take a bullit coming at you from behind, you'll hear it whistle by, as if someone really fired it from behind you.

CAN YOU USE YOUR CURRENT RECEIVER FOR 3D?

For 3D content, your current HDMI receiver will not be suitable. And that's because your receiver will not recognise the signal from your TV and the screen will turn blank.

So if you want to route all your signals - including 3D - through your receiver, you'll have to upgrade.

More info can be found here: **http://www.hdguru3d.com/index. php?option=com_content&view=article&id=180:what- you-need-to-know-about-3d-and-hdmi&catid=35:hdguru3d-news&Itemid=59**

4.6. PROJECTION SCREEN

The basics of a good projection screen fabric still count though, no matter whether you are looking for a solution for you HD or 3D system:

- The fabric should be smooth
- The fabric should be perfectly wrinkle free once ready for use

▶ 5. WHY VIEWING ANGLE IS SO IMPORTANT

5.1. SEATING DISTANCE "RULES"

Here's an overview of the different seating distances according to THX:

Let's look at a few common projection screen sizes and the ideal seating distance for each of them:

PROJECTION SCREEN DIAGONAL	IDEAL SEATING DISTANCE
77" / 196 cm	92" / 233 cm
92" / 234 cm	110" / 279 cm
106" / 269 cm	126" / 320 cm
120" / 305 cm	143" / 363 cm

Now, let's flip things around and look at viewing distance to determine screen size. This is really helpful when you already know where you want to sit, but are unsure of which projector screen size to go for.

SEATING DISTANCE	IDEAL PROJECTION SCREEN SIZE (DIAGONAL)
6 ft / 183 cm	60" / 154218 cm
7 ft / 213 cm	70" / 179 cm
8 ft / 244 cm	81" / 205 cm
9 ft / 274 cm	91" / 230 cm
10 ft / 305 cm	101" / 256 cm
11 ft / 335 cm	111" / 281 cm
12 ft / 366 cm	121" / 307 cm
13 ft / 396 cm	131" / 332 cm

The seating distance might come as a surprise for you, since you're able to sit quite close to the screen. That's because THX is really all about immersive home theater.

That's why you should really use these numbers as a guideline. From the Beamax projection   screen sales figures, the most popular sizes are (in descending order): 92", 106", 77", 120". That's a lot smaller than the THX guidelines would suggest as the most popular sizes, since most people would be about 3 meters (10 ft) away from the screen. This distance would give you a projector screen diagonal of 140".

Source: http://www.projectionscreen.net/3-essentials-for-home-cinema

▶ 6. THE FUTURE

The future for gaming systems at home is bright.

Not only is 3D coming up, involvement through motion is also on the rise. Nintendo started with WII, but both Sony and Microsoft have their own solutions for the PS3 and Xbox respectively.

If you combine these two elements: movement and 3D, we'll get a whole new level of realism.

And that's incredibly exciting.

Imagine that looking around corners really would involve you turning your head and the seeing what's in front of you as if it was real.

I can imagine that some sort of force feedback could add even more realism to shooting as well. Both in the gun itself, but also with pads on your body.

DBox already has racing systems out that give you a feeling of really being in a car and driving on a track.

More equipment will mean you will have to continue to upgrade your system and invest in more hardware. But it you'll be playing games unlike you've ever played them before.

I can't wait..

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▶ 7. SOURCES

These are the sources I have used in alphabetical order:

- Avnews October 2010 issue - www.avnews.co.uk
- Beamax - www.beamax.com
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- www.hdmi.org
- www.projectionscreen.net

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