DRAFT USER GUIDE
for xpo.1 & xpo.2
03.08.2001

CYVIZ AS
Forus Atrium – 4313 Sandnes – Norway
Tel. +47 51635580 – Fax +47 51635581 – Email mail@cyviz.com
www.cyviz.com

Table of contents

1 Setting up the xpo 5
1.1 Requirements 5
1.1.1 PC and graphics card 5
1.1.2 Projectors 5
1.1.3 Screen 5
1.1.4 Polarizing filters 5
1.1.5 Viewing glasses 5
1.2 Set-up procedure 5
1.2.1 Connecting projectors 5
1.2.2 Connecting the PC 5
1.2.3 Aligning the projectors 6
1.2.3.1 Placement of projectors 6
1.2.3.2 Zoom 6
1.2.3.3 Focus 6
1.2.3.4 Beam alignment 6
1.2.3.5 Lens shift 6
1.2.3.6 Fine-adjust 6
1.2.4 Setting up linear polarizing filters 7
1.2.5 Enabling the stereo-software 7
1.2.6 Connect the stereo sync cable (if possible) 7
1.3 Eye-strain 7
1.3.1 Checking if left and right image is correct 7
1.3.2 Software parameters 7
1.3.3 Bad set-up of polarizing filters 7
1.3.4 Colour- or brightness-differences in projectors 8
1.3.5 Moving objects 8
1.4 Remote controlling the xpo 8
2 Keyboard functions 9
2.1 LED indicators 9
2.2 Standby button 9
2.3 Toggle button 9
2.4 Right black button 9
2.5 Menu button 9
2.6 OSD (On Screen Display) 9
2.7 Cursor buttons 9
3 Serial commands 10
3.1 Summary 10
3.2 The help command 10
3.3 Topics 10
3.4 Commands 10
3.4.1 ?/HELP [%][command/topic/wildcard/allcmds/alltopics] 10
3.4.2 . [new arguments] 11
3.4.3 , 11
3.4.4 QI 11
3.4.5 QS 11
3.4.6 QINFO 12
3.4.7 ISPL (+/-/pixels pr line) 12

3.4.8 IPHA (+/-/phase of sampling) 12
3.4.9 IST (0-3/{AUTO}/SEP/COMP/SOG) 13
3.4.10 ISOGT (0-31){23} 13
3.4.11 IBR (0-127) 13
3.4.12 ICO (0-127) 13
3.4.13 DVIHPOS (0-..) 13
3.4.14 DVIVPOS 13
3.4.15 IAUTO [X] 13
3.4.16 OBL [L/R/B/{N}] 14
3.4.17 OSM (0-3) 14
3.4.18 OSW (0/1(ON/OFF/TOG) 14
3.4.19 RS 14
3.4.20 SST (0-4/AUTO/INT/{DIN}/VGA/CYV) 14
3.4.21 SSP 15
3.4.22 TG 15
3.4.23 CLEANUPSRC 15
3.4.24 NAMESRC (name) 15
3.4.25 STORE [SYSTEM/(location)] 15
3.4.26 DELSRC (location) 15
3.4.27 LISTSRC [loc[,toloc]] 15
3.4.28 FRZ 0/1/ON/OFF/TOG 15
3.4.29 SV 16
4 Advanced commands 16
4.1.1 SEARCH [{ON}/OFF] 16
4.1.2 RESTOREFACTORYSETTINGS 16
4.1.3 FORC (location) 16
4.1.4 COMSET (baudrate)[,{0}-1] 16
4.1.5 POWEROFF 16
4.1.6 POWERON 17
5 Technical information 18
5.1 Different types of picture signal 18
5.2 Different types of stereo syncs 18
5.2.1 Different types of stereo sync connectors 18
5.2.1.1 3pin mini din 18
5.2.1.2 7pin mini din (SUN) 18
5.2.1.3 8pin mini din (SGI) 18
5.2.1.4 9pin DSUB (SGI) 18
5.2.1.5 VGA pin 12 18
5.3 Left/right Sequence in frame sequential stereo 18
5.3.1 Correct stereo sync at half rate 19
5.3.2 Wrong stereo sync polarity at half rate 19
5.3.3 Stereo sync at full rate 19
6 Appendix A - Serial interface 20
6.1 Connection 20
6.2 Setting up HyperTerminal 20
6.3 Setting up other system 22
7 Appendix B - xpo Firmware upgrade 23
7.1 Using windows 23
7.2 Using non-windows terminal 24

8 Appendix C - Connectors 25
8.1 VGA input 25
8.2 Power input 25
8.3 Stereo sync input 26
8.4 Serial plug 1 26
8.5 Serial plug 2 26
8.6 DVI-D left and right output 27
8.7 VGA left and right output 28
8.8 Serial RS232 cable 28
9 Technical specifications 29

1 Setting up the xpo

1.1 Requirements

1.1.1 PC and graphics card

To run stereo using the xpo converters you need a frame-sequential stereo source. Any kind of stereo running as active stereo (shutter glasses) will be accepted by the xpo. Your graphics card must be stereo-compatible (see http://www.stereographics.com/boards/brd-chrt.htm) for a list of stereo-capable cards for PC. As this text is written (July 2001), there exist even more cards that are not listed. If you already have a stereo-capable graphics-card, you need to enable the stereo (some refer to it as quad-buffer). For the PC, this is usually done in the ' startmenu -> settings -> controlpanel->display' somewhere. Exactly where this is done varies a little on different cards.

1.1.2 Projectors

You need 2 projectors to get stereo. To get the maximum out of your xpo, you need to have projectors that supports the resolution of the xpo model you have. The xpo.2 supports up to 1280x768, and the xpo.1 supports up to 1024x768. Also see 1.3.4

1.1.3 Screen

You may NOT use ANY screen to display stereo. You need a screen that has a "non-depolarizing surface". Silverscreens and many rear-projection screens have this quality. Ordinary white screens or white walls does NOT have this quality, and cannot be used.

1.1.4 Polarizing filters

There are two kinds of polarizing filters, the linear (most common) and circular.
You need to setup a polarising filter in front of the lens of both projectors. This is done by a filter-stand delivered with each xpo. The filters need to be placed at the correct rotation angle in a special way. There are 2 polarizing filters delivered with each xpo.

1.1.5 Viewing glasses

The glasses need to match your polarizing filters. There are 10 pairs of glasses delivered with each xpo. These match the polarizing filters included.

1.2 Set-up procedure

1.2.1 Connecting projectors

Use VGA or DVI cables to connect the two projectors to the left and right VGA or DVI output channel of the xpo. We recommend using the DVI wherever possible. Note that the DVI signal has restrictions on cable length.

1.2.2 Connecting the PC

Use a VGA cable to connect the VGA output of the PC to the VGA input of the xpo.
Note: Not all computers have a 15pin VGA connector. The xpo is delivered with a standard cable to be used when there are 15pin VGA connectors in both ends. Some computers have a different connector. Other popular connectors are:
- SUN type 13W3

- SGI type 13W3

These require an adapter or special cable to connect to the xpo.

1.2.3 Aligning the projectors

To get the highest quality stereo picture, you need to align the two projectors to display their picture onto the same area. Although it may be difficult to get close to 100% alignment, you will still be able to see stereo even if the projectors are not completely aligned. Better alignment gives less eyestrain, and distortions. Also, a nicely aligned pair enables you to read 2D details without using viewing glasses or having to black one of the channels.

To start alignment, get a test-picture with a cross-hatch/geometry pattern. You may download the freeware "ntest" monitor-testing utility (for windows) (© NOKIA Monitors) and run the "geometry" test to help you do this. Alternatively you may go to our support page at www.cyviz.com to find a pattern. Now, start these steps:

1.2.3.1 Placement of projectors

The projectors need to be stacked on top of each other. Try to align the projectors such that they are near-perfectly on top of each other, and that they are both at the same angle at all axes. If your projectors have no lens-shift, you need to position the lower projector to point slightly up, and the lower slightly down. Do NOT use digital keystone correction if you can avoid it. Also put the projectors at an acceptable distance for the screen.

Now; power up the projectors. You should be able to see images on both projectors. If they are not already aligned, this will look a little messy.

1.2.3.2 Zoom

Zoom the pictures to cover as much of your screen as possible. Also the size of the pictures needs to be as equal as possible. Normally this is easiest to do by checking the width of the pictures. The outer left and right lines of the test picture from both projectors need to overlap. Also check that the lower projectors lower line is at the bottom of the screen. This can be done with lens shift or physically adjusting the beam direction of the projector.

If the picture is too small for the screen and you are not able to zoom big enough, you may have put the projector too close to the screen. If the picture is too large, you may need to put it closer to the screen.

1.2.3.3 Focus

Adjust Focus to get a clear image on both projectors. If you have problem focusing, the projectors may be too close or too far away from the screen.

1.2.3.4 Beam alignment

Make the horizontal edges overlap by shifting the upper or lower projector physically sideways.

1.2.3.5 Lens shift

Now adjust the lens shift of the upper projector until the picture overlaps the lower projectors nearly perfect.

1.2.3.6 Fine-adjust

If you are not satisfied with the result, go back to 1.2.3.1 and fine-tune the set-up. Practice!

1.2.4 Setting up linear polarizing filters

WARNING: Do NOT look directly into the beam of a projector when doing this! This may cause damage to your eyes!

It is important to get the left image at the left eye. To do this, press the middle button (L|R) and the projector showing the right eye will go black. If you now put on a pair of polarizing glasses, you should hold the polarizing filter before the non-black projector at the angle where the right eye will see as black picture as possible. It is important that you hold your head (or actually glasses) up when doing this.When the polarizer angle is found, set the filter into the filterstand at this angle such as it covers the projector light beam. For the other projector, do the same but now the left eye should see a black picture. When the correct rotation angle is found, put the filter into the filterstand such as it covers the other projector light beam. Press (L|R) again and make sure that the left eye sees one projector, and the other sees the other one.

Note: See also 1.3.3

1.2.5 Enabling the stereo-software

In adition to enable the stereo on the graphics-card, you normally also have to enable the stereo in the software you are using. Also you may need to adjust some stereo settings, like eye-distance and focus point (and maybe others).

1.2.6 Connect the stereo sync cable (if possible)

If your graphics card has got a stereo sync connector, connect it using a stereo cable that fits your stereo sync output. If you do not have sucth cable, you may need to press the (L|R) button on the keyboard to tell the xpo which picture is left and right. It is STRONGLY recommended to use the stereo sync cable. This will save you from a lot of trouble.

1.3 Eye-strain

If you detect any uncomfortableness by looking at the picture through the glasses, you may check these settings:

1.3.1 Checking if left and right image is correct

To check whether the left and right image is swapped, you may easily turn over your glasses either upside down, or looking outside in. If the image looks correct this way, the left and right image are swapped. NOTE: This may be caused by different things, such as setting the polarizing filters wrong, bad software settings or wrong definition of stereo sync polarity.

1.3.2 Software parameters

Bad software parameters such as eye distance, and focus point may cause eyestrain. Unfortunately also bad algorithms for displaying stereo have been discovered on some software.

1.3.3 Bad set-up of polarizing filters

A slight wrong rotation of these filters will make the picture greenish or purplish. This makes the colour of the left and right eye slightly different, and may look uncomfortable.

1.3.4 Colour- or brightness-differences in projectors

As the lamp gets older on projectors, they change their characteristics in colour and brightness. Therefore you should start with projector of same age, and when replacing lamps, you should replace both lamps at the same time.

1.3.5 Moving objects

If you notice eyestrain when objects are moving, it could be because of the order the left and right images are output. Not all drivers do this properly. See 5.3 to get more technical information about this.

1.4 Remote controlling the xpo

The serial ports enables you to remote control the xpo from a distant location using a standard RS232 serial port on any PC, or a RS485 port. Also the master unit may link to a second xpo, the second to a third and so on, so that you may be able to control all units from a *single* serial port. To do this, see "Serial commands".

2 Keyboard functions

2.1 LED indicators

The xpo has two led indicators, one green and one red. At power on, the red and green will both come on for a short time, and then only the red will go off. When the unit is in standby, no light will show.

2.2 Standby button

The standby button is for turning the unit into low-power mode.

2.3 Toggle button

The toggle button, (L|R), is only used when there is no stereo sync present, or the xpo runs on internal stereo sync. It should be used when the left and right image is swapped.

2.4 Right black button

The right black button, (L|R), is used for turning the right channel black. This may be useful if you need to run 2D without the glasses, where the projectors are not perfectly aligned.

2.5 Menu button

The menu button is used for putting up the OSD menu. OSD is short for On Screen Display. This is not operative yet (August 2001)

2.6 OSD (On Screen Display)

OSD is short for On Screen Display. This is not operative yet (August 2001)

2.7 Cursor buttons

When in menu mode, the cursor buttons are used for navigating inside the menus. This is not operative yet (August 2001)

3 Serial commands

3.1 Summary

To make it simpler to remember commands, the commands have been grouped somewhat.

- All serial commands directly controlling the input start with the letter 'I'.
- Commands controlling the outputs start with an 'O'
- Commands controlling the stereo sync start with 'SS'.
- All query commands start with 'Q'.

More details:

- All commands need to be ended with the ASCII code CR. (which is what happens when you type enter on the keyboard). The LF (Hex 0A) will be ignored.
- Linefeed from the xpo will be of type CR only.
- There is no need for a space between a command and it's arguments.
- Multiple commands may be entered with the character "|" in between

Example:

```
xpo2>sst|ssp
Stereo sync type (SST) = Auto
Stereo sync polarity       (SSP) = Normal
```

- All text after the characters ";" or "#" until CR will be ignored.

3.2 The help command

The help command is useful for getting more help on each command. You may use "help" or "?" to get help. To list all commands, use "? allcmds". To see all commands without explanation, use "? %allcmds". See also 3.4.1.

3.3 Topics

The xpo help commands also have a short explanation of some used topics. Use the command "? alltopics" to list.

3.4 Commands

3.4.1 ?/HELP [%][command/topic/wildcard/allcmds/alltopics]

Shows help on all or specific command.
% shows short format.
[] are optional arguments
() are required arguments
{} is the default argument
No argument will read the current setting.

3.4.2 . [new arguments]

Repeats last command with new arguments.
Note: This is very useful for manual search of correct values for commands like ISPL and IPHA.

Example:

xpo2>ispl
Horizontal rate (ISPL) = 1408 pixel/hsync

xpo2>.+
Horizontal rate (ISPL) = 1410 pixel/hsync

3.4.3 ,

Repeats last command with the same arguments.

3.4.4 QI

Show settings for parameters controlling the picture, ISPL, IPHA, IST, IBR, ICO, DVIHPOS, DVIVPOS, NAMESRC. If location is empty, the current settings will be shown.

A typical output will show:

xpo2>qi
Current settings (location 47)
Horizontal rate (ISPL) = 1408 pixel/hsync
Hsync phase (IPHA) = 0
Image synctype (IST) = AUTO
Brightness (IBR) = 60
Contrast (ICO) = 75
DVI horizontal pos(DVIHPOS) = 276
DVI vertical pos (DVIVPOS) = 52
Name (NAMESRC) = 'VESA 1024x768@120Hz GTF TIMING'

3.4.5 QS

Show settings for global system parameters SST, SSP, SSEP,NAMESRC. If location is empty, the current settings will be shown.

A typical output will show:

xpo2>qs
Stereo sync type (SST) = Auto (not present)
Stereo sync polarity (SSP) = Normal
Eye priority (SSEP)= Left first
Name (NAMESRC) = 'VESA 1024x768@120Hz GTF TIMING'

3.4.6 QINFO

Show system- and basic source-information.

A typical output will show:

```
xpo2>qinfo
Version:0.9 alfa Built at:Jul 12 2001 15:16:56
Serialnumber:00200B-00501E-02

Signal status       = Showing
Active location     = 47
Search mode         = Auto
Active image syn ctype  = SEP (separate)
Stere syncs present     = none

+HSYNC:1006/ 80    , HPER: 10.06 us, HFREQ: 99.40 Khz, WIDTH:8.0 %
+VSYNC: 823/  3    , VPER:  8.28 ms, VFREQ:120.78 Hz,  WIDTH:3 Lines
Pixelrate is roughly 139 MHz

Guessed resolution: 1024x768
```

The +HSYNC tells us that the horizontal sync is positive and the period is 1006 100Mhz cycles, and the with of the sync is 80 100Mhz cycles long. The information after this is calculated from this sync information.
The +VSYNC tells us that the vertical sync is positive and the period is 823 lines long, with 3 lines sync. The information after this is calculated from this and the hsync information.
Also you get an indication of pixel rate that is calculated from the sync information and the ISPL parameter. Based on the number of lines in the signal, a resolution is guessed.

3.4.7 ISPL (+/-/pixels pr line)

Reads/sets, increases or decreases the active samples pr scan line including sync and blank. +/- will increase or decrease by 1 or 2 (depending on full or half rate). Entering a number will set the number entered.

A typical output will show:

```
xpo2>ispl
Horizontal rate   (ISPL) = 1408 pixel/hsync
```

3.4.8 IPHA (+/-/phase of sampling)

Reads/sets the phase of the sampled pixel clock in relation to the hsync edge.

A typical output will show:

```
xpo2>ipha
Hsync phase       (IPHA) = 0
```

3.4.9 IST (0-3/{AUTO}/SEP/COMP/SOG)

Reads/sets the synctype of the source signal.
0=AUTO
1=SEP (Separate)
2=COMP (Composite)
3=SOG (Sync on green)
A typical output will show:

```
xpo2>ist
Image synctype  (IST) = AUTO
```

3.4.10 ISOGT (0-31){23}

Reads/sets the threshold level of SOG slicer.
A typical output will show:

```
xpo2>isogt
SOG threshold   (ISOGT) = 23
```

3.4.11 IBR (0-127)

Reads/sets the offset/brightness.
Notes:
Lower values give in general higher brightness.
The xpo2 clamps at the hsync period, and samples the black area of the incoming signal. The displaying device connected to the outputs of the xpo may clamp elsewhere, and therefore the brightness level may not have the desired effect.
A typical output will show:

```
xpo2>ibr
Brightness          (IBR) = 60
```

3.4.12 ICO (0-127)

Reads/sets the gain/contrast.
A typical output will show:

```
xpo2>ico
Contrast  (ICO) = 75
```

3.4.13 DVIHPOS (0-..)

Reads/sets horizontal placement of DVI area.
A typical output will show:

```
xpo2>dvihpos
DVI horizontal pos        (DVIHPOS) = 276
```

3.4.14 DVIVPOS

Reads/sets vertical placement of DVI area.
A typical output will show:

```
xpo2>dvivpos
DVI vertical pos (DVIVPOS) = 52
```

3.4.15 IAUTO [X]

Tries to find settings automatically. It does NOT save these settings into memory. If argument X is given, the list of stored sources will be checked first, and if found, it will recall the settings from there.

3.4.16 OBL [L/R/B/{N}]

Show black on Left/Right/Both/None of the outputs. Defaults to none.

3.4.17 OSM (0-3)

Set the output scan mode. At full rate the out signal will be the same vertical refresh rate as the output, with every frame output twice. At half rate the output signal will be half the speed as the incoming.
0=stereo fullrate
1=stereo halfrate
Defaults to stereo halfrate where possible, else stereo fullrate if possible.
Notes:
If the xpo is not able to do fullrate you will get an error message like:
Can not do full rate for Pixel clock>120MHz

If the xpo refuses to do halfrate you will get an error message like:
Can not do half rate for Vrate<80Hz

A typical output will show:
xpo2>osm 1
Half rate (OSM) = On

3.4.18 OSW (0/1(ON/OFF/TOG)

Swaps left and right output channels.
A typical output will show:
xpo2>osw tog
Swap is on.

3.4.19 RS

Soft-resets the xpo

3.4.20 SST (0-4/AUTO/INT/{DIN}/VGA/CYV)

Selects stereo sync type in FSS and LSS modes. When a sync is selected, but not present, the internal will be used. You may map these syncs correctly using SSP and SSEP.
A typical output will show:
xpo2>sst
Stereosync type (SST) = Auto
SSEP
Selects eye priority. Used to tell which picture appears first (on the insignal) of a pair of pictures. 0=left+following right belongs together (Normal on FSS).
1=right+following left.
A typical output will show:
xpo2>ssep
Eye priority (SSEP) = Left first

3.4.21 SSP

Toggles or sets the polarity of the internal stereosync signal (also the internal, if no sync).
0 is Left frame on high(FSS)/long(Cyvizync)/first(LSS,PSS)/ top(TBH)/left(LRH)
1 is Right frame on high(FSS)/long(Cyvizync)/first(LSS,PSS)/ top(TBH)/left(LRH)
A typical output will show:
xpo2>ssp
Stereosync polarity (SSP) = 0

3.4.22 TG

Toggles internal stereosync polarity. Use SSP to change the external sync polarity.

3.4.23 CLEANUPSRC

Clean up the storage area.
Note:Because of the way tings are stored, a cleanup is needed if you have done a lot of chances and storing of sources. If you use the STORE function and a cleanup is needed, the xpo will tell you.

3.4.24 NAMESRC (name)

Sets the name of the current source. This name will be stored when the store command is used.
A typical output will show:
xpo2>namesrc
Name (NAMESRC) = 'VESA 1024x768@120Hz GTF TIMING'

3.4.25 STORE [SYSTEM/(location)]

Stores the source settings in one of the locations. If parameter is omitted, the active location (if any) will be overwritten. If no location is active, the next free location is selected and activated. If the parameter is 'SYSTEM' then the current system settings will be stored and used at next power up.

3.4.26 DELSRC (location)

Deletes the source settings at the specified location.

3.4.27 LISTSRC [loc[,toloc]]

Lists the stored sources. If no argument is given, all sources will be listed. If only loc is given, only this is listed. If also the toloc is given, all locations between loc and toloc are listed.

3.4.28 FRZ 0/1/ON/OFF/TOG

Sets/resets freeze of a picturepair. The freeze is synchronized at the end of a picturepair, so you will always see 2 complete pictures as they appear from the source.
A typical output will show:
xpo2>frz tog
Freeze is now on.

3.4.29 SV

Shows software version and serial number.
A typical output will show:
Version:0.9 alfa Built at:Jul 13 2001 14:14:30
Serialnumber:00200B-00501E-02

4 Advanced commands

4.1.1 SEARCH [{ON}/OFF]

Enables or disables automatic search for new sources. When no parameter is given, the search is enabled. When on, the unit will, as soon as it sees a different source, look for it in the table of known sources. If it is found, the settings will be loaded from the list. If not found the IAUTO command will be run. When off, no changes will be made to any parameters when a new source is found. This is for debugging only.
A typical output will show:
xpo2>search off
Manual mode.

4.1.2 RESTOREFACTORYSETTINGS

Restores the factory settings. Will NOT ask for confirmation.
The output will show:
xpo2>restorefactorysettings
Restoring factorysettings.
Erasing old data..ok.
Programming sources.. ok.

4.1.3 FORC (location)

Forces loading of parameters at specified location. This will also put the device in 'search off' mode.
A typical output will show:
xpo2>forc 1
Forced location 1. Manual mode.

4.1.4 COMSET (baudrate)[,{0}-1]

Sets the serialport baudrate for specified channel
0(RS232)
1(RS485/422)
A typical output will show:
xpo2>comset 19200
Actual baudrate is 18750 bits/second.

4.1.5 POWEROFF

In poweroff mode, only the poweron command works. Also you will not see any echo from the xpo as you type.
The output will show:
xpo2>poweroff

Power turned off.

4.1.6 POWERON

The output will show (note there will be no echo when powering up):
Powering up....

xpo2 Stereo 3d converter, (C) 1998-2000 Cyviz AS (www.cyviz.com)
Version:0.9 alfa Built at:Jul 13 2001 14:14:30
Serialnumber:00200B-00501E-02
xpo2>

5 Technical information

5.1 Different types of picture signal

There are 3 main synctypes used in computer video signals, (separate sync, composite sync, and sync on green) which are all supported by the xpo.

5.2 Different types of stereo syncs

The xpo needs to know wich part of the signal belongs to the left and right image. There are 3 main methods of doing this. Seperate stereo sync through a standard VESA 3pin mini DSUB connector. (See "3pin mini din"). Cheaper graphics cards use pin12 of the VGA plug (which originally is used for VESA DDC communication). Also we have defined the Cyvizync which use the length of the vertical sync. All these stereosynctypes can be used by the xpo.

5.2.1 Different types of stereo sync connectors

5.2.1.1 3pin mini din

This plug is defined by StereoGraphics at
http://www.stereographics.com/html/whtpaprs.html

5.2.1.2 7pin mini din (SUN)

To use this you need a 3pin mini-din adapter.

5.2.1.3 8pin mini din (SGI)

To use this you need a 3pin mini-din adapter.

5.2.1.4 9pin DSUB (SGI)

To use this you need a 3pin mini-din adapter.

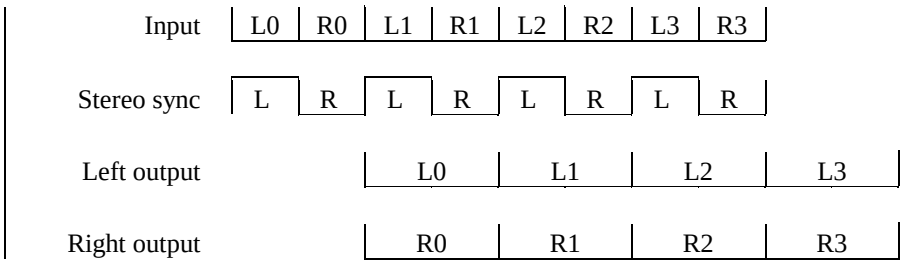
5.2.1.5 VGA pin 12

Some graphics cards use pin 12 of the VGA connector (which originally is used for transferring DDC data during monitor identification) as stereo sync. At the time of writing this, most ELSA cards using the revelator drivers use this type of stereo sync. To use this you need a splitter from VGA to VGA+3pin mini-din.

5.3 Left/right Sequence in frame sequential stereo

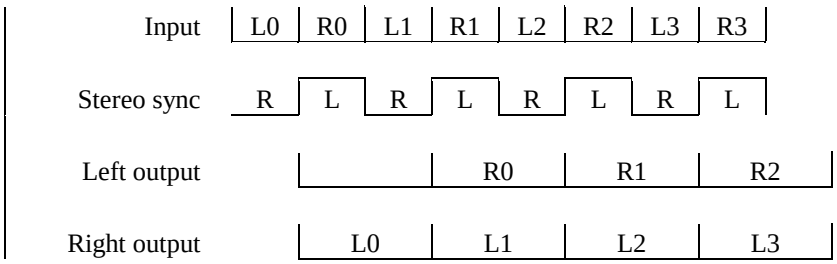
The left and right frame coming from a frame sequential source needs to be output correctly to get an optimal viewing condition. This is very important when you have moving objects on the screen. Usually the frames come out in pairs, where the left and the next right frame were rendered at the same point of time. These need to be output at the same time. To make shure this is happening, you need to know how the computer does this. You may change this sequence by using the SSEP and SSP commands on the serial interface. Also it is recommended that you use one of the stereosync methods described in 5.2.
To illustrate this, here are some drawings. The difference is clearly visible when objects on the screen are moving, even if the frames are changing slowly due to complex objects.

5.3.1 Correct stereo sync at half rate



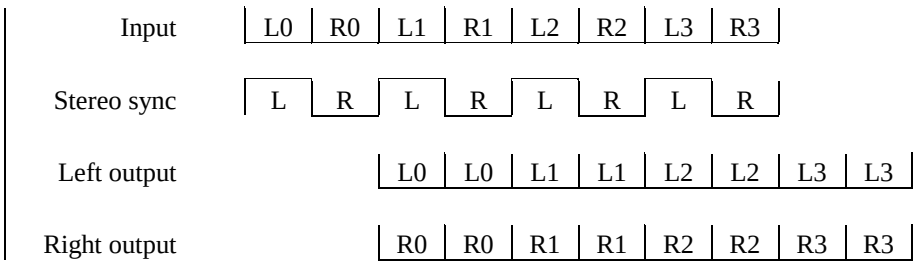
5.3.2 Wrong stereo sync polarity at half rate

Note: If the output channels are swapped here, the stereo looks correct if there is no or little movement in the picture. Therefore, do the set up-procedure *exactly* as described in 1.2.



5.3.3 Stereo sync at full rate

Similar effects as for halfrate will occur in fullrate. At fullrate every frame coming in, is output twice at the output.



6 Appendix A - Serial interface

The xpo is prepared for serial (RS-232) controlling and firmware upgrading. To use this serial interface you need a terminal-software like the "HyperTerminal" found in most windows installations (“Programs/accessories/communications” in the start-menu) and a serial cable connection.

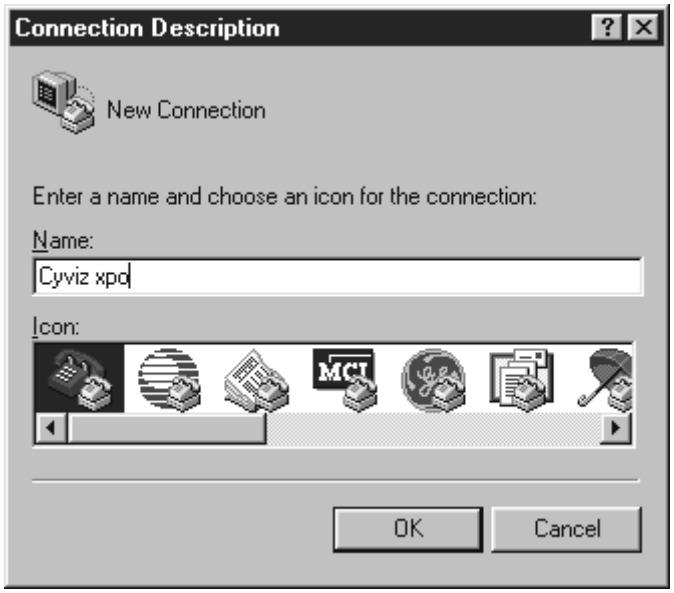
6.1 Connection

Connect the xpo serial cable between one of the RS-232 ports (COM1, 2...) on the computer and the serial port “IOIO[1]” on the xpo. If you have a 25pin serial port you need an adapter from 25pin male to 9pin female.
(See 8.8 for pin configuration on xpo serial cable)

6.2 Setting up HyperTerminal

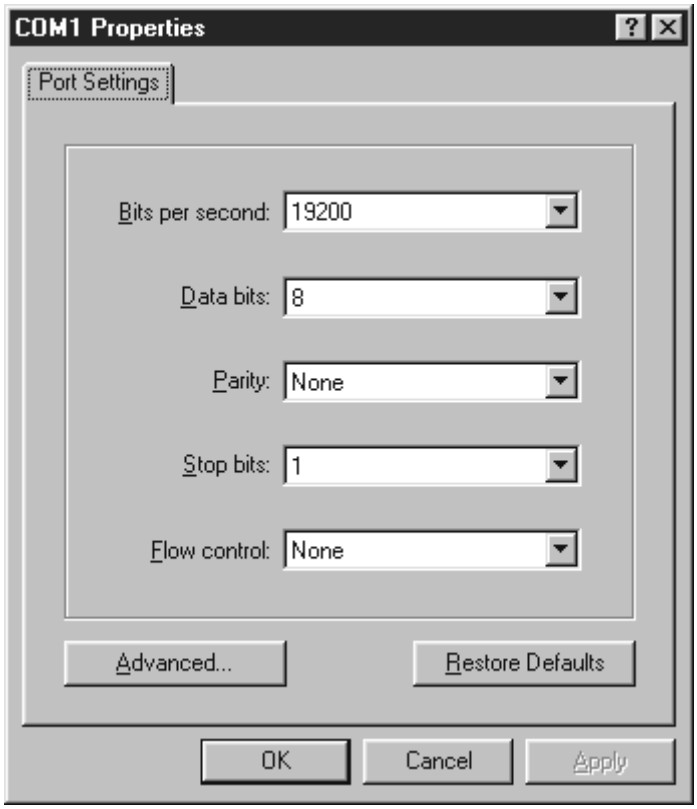
To set-up serial control with HyperTerminal, do the following:

- Start the HyperTerminal program.
- A window will appear asking for a name on your new connection.



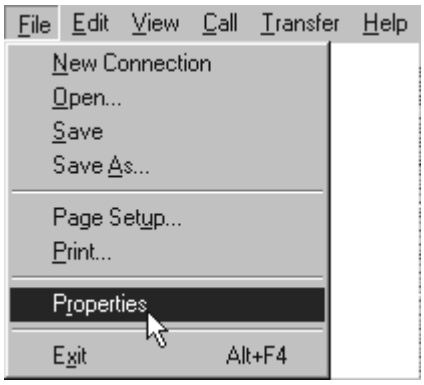
- Enter "Cyviz xpo" and click [OK]

- Select "Direct to ComX" where X is the COM port you have plugged the xpo into. (Normally this is COM1 or COM2)
- Click [OK]

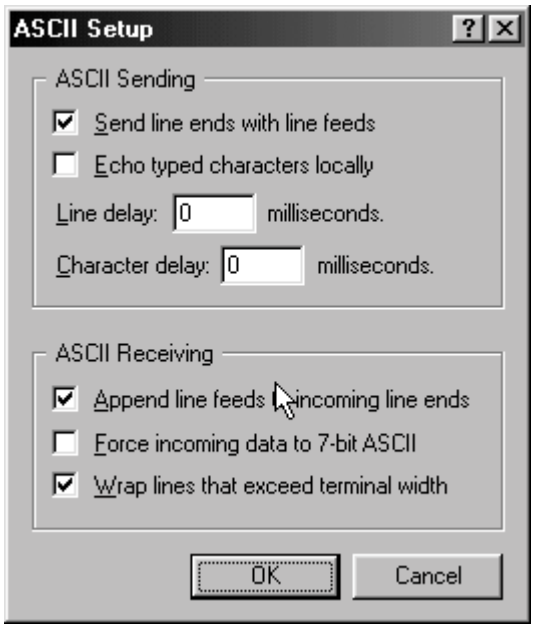


- Set the "Bits per second" to 19200, "Data bits" to 8, "Parity" to None, "Stop bits" to 1 and "Flow control" to None.
- Click [OK]

- Select "Properties" in the “File” menu



- Select “ASCII Set up...” under “Settings”



- Check all boxes, EXCEPT the “Echo typed charters locally” and "Force incoming data to 7-bit ASCII".
- Set the "Line delay" to 0ms and the "Character delay" to 0ms.
- Click [OK]
- Ensure that both serial and power cable is properly connected to the xpo.
- Press enter in the terminal window. The xpo should respond with “xpo1>” or “xpo2>”.
- Use the command “? ALLCMDS” and press enter to get a complete list of all the available commands.

6.3 Setting up other system

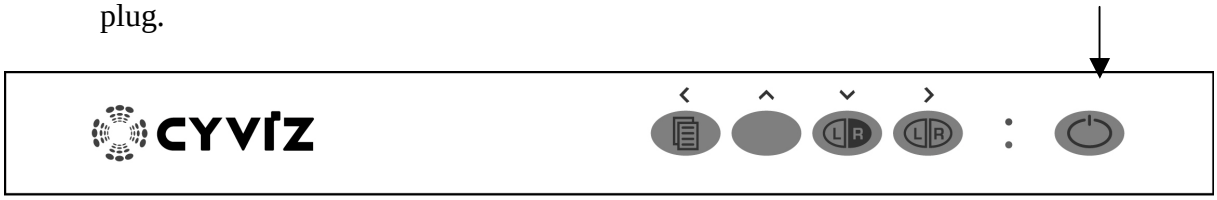
The xpo communicates through a normal RS232 using the following parameters: Baudrate19200, parity: none, 8 bits, 1 startbit, no handshake, no echo, Tx linefeed: CR only, Rx linefeed: CR only. Your serialport must be set up according to this.

7 Appendix B - xpo Firmware upgrade

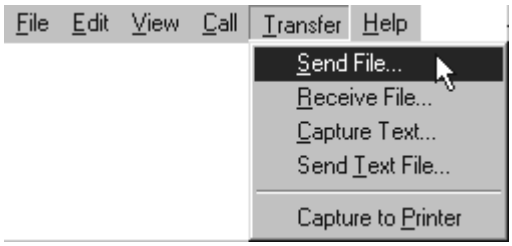
7.1 Using windows

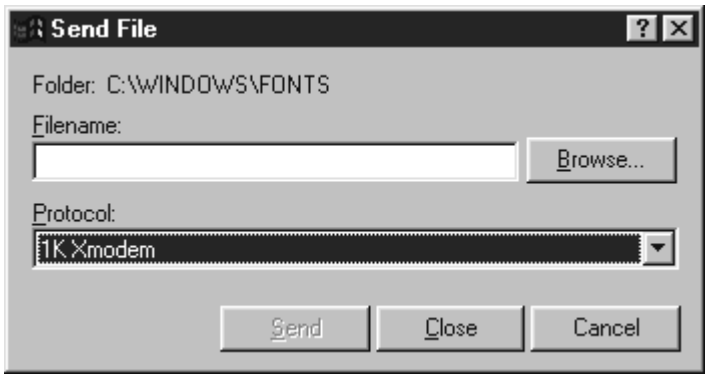
The internal control software (firmware) in the xpo can be upgraded thru the serial communication. If your xpo needs a firmware upgrade you will receive a firmware file (*.xpo1 or *.xpo2). If you have received an xpo firmware file for upgrade please do the following:

- Start the “Cyviz xpo” session in HyperTerminal
- Press enter in the terminal window to confirm the connection. The xpo should respond with “xpo1>” or “xpo2>”.
- Unplug power to xpo.
- Press and hold the “standby” button on the side of the xpo, then reconnect the power plug.



- Release the “standby” button when HyperTerminal prompt with “BOOT>”
- Write the command “ERASEFIRM” and press enter, confirm with “ERASEFIRM YES” and press enter again.
- Wait until the firmware is erased and then write the command “LOADFIRM” and press enter
- Select “Send file...” in the “Transfer” menu in HyperTerminal





- Use the “Browse...” button to locate the xpo firmware file.
- Select “1K Xmodem” as protocol and click [Send] to start the transfer.
- If the transfer complete without error, write the command “HR” and press enter to restart the xpo using the new firmware.

- If the transfer fails, erase the firmware and try to load the firm again.

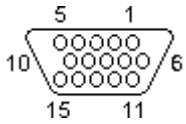
7.2 Using non-windows terminal

For UNIX variants, you may use the command "sx" for transmitting the imagefile. Before you do this, you must run the erasefirm and loadfirm command as described in 7.1

8 Appendix C - Connectors

8.1 VGA input

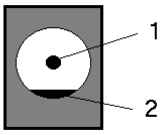
15 pin high density D-SUB female



Pin	Name	Function
1	RED	Red Video in (75 ohm, 0.7 V p-p)
2	GREEN	Green Video in (75 ohm, 0.7 V p-p) (SOG)
3	BLUE	Blue Video in (75 ohm, 0.7 V p-p)
4	RESERVED	Not connected
5	GND	Ground
6	RGND	Red Ground
7	GGND	Green Ground
8	BGND	Blue Ground
9	+5V DC	Not connected
10	SGND	Sync Ground
11	ID0	Grounded
12	SDA	DDC Serial Data Line
13	HSYNC or COMPSYNC	Horizontal Sync (or Composite Sync)
14	VSYNC	Vertical Sync
15	SCL	DDC Data Clock Line

8.2 Power input

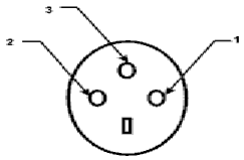
5.5/2.5mm diameter power jack



Pin	Name	Function
1	+V	12-24V DC 30W (max) input
2	GND	Ground

8.3 Stereo sync input

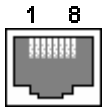
3pin MINI-DIN female



Pin	Name	Function
1	+5V	Not connected
2	GND	Ground
3	Sync	Stereo sync in

8.4 Serial plug 1

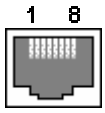
RJ45 female



Pin	Name	Function
1	TxA+	Transmit ch A +
2	TxA-	Transmit ch A -
3	RxB/TxB+	Transmit or Receice ch B +
4	GND	Ground
5	GND	Ground
6	RxB/TxB-	Transmit or Receice ch B +
7	Tx	RS232 Transmit
8	Rx	RS232 Receive

8.5 Serial plug 2

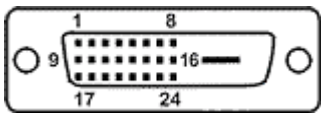
RJ45 female



Pin	**Name**	**Function**
1	TxA+	Transmit ch A +
2	TxA-	Transmit ch A -
3	RxB/TxB+	Transmit or Receice ch B +
4	GND	Ground
5	GND	Ground
6	RxB/TxB-	Transmit or Receice ch B +
7	NC	Not connected
8	NC	Not connected

8.6 DVI-D left and right output

DVI-D female

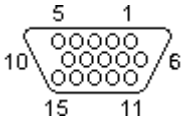


Pin	Name
1	TMDS Data2-
2	TMDS Data2+
3	TMDS Data2 Shield
4	No Connection
5	No Connection
6	DDC Clock
7	DDC Data
8	No Connection
9	TMDS Data1-
10	TMDS Data2+
11	TMDS Data1 Shield
12	No Connection
13	No Connection
14	+5 V Power *
15	Ground (for +5 V)
16	Hot Plug Detect
17	TMDS Data0-
18	TMDSData0+
19	TMDS Data0Shield
20	No Connection
21	No Connection
22	TMDS Clock Shield
23	TMDS Clock +
24	TMDS Clock <

* +5VDC has a 300mA auto reset table fuse.

8.7 VGA left and right output

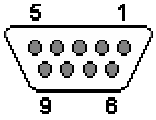
15 pin high density D-SUB female



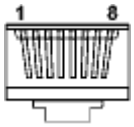
Pin	Name	Function
1	RED	Red Video out (75 ohm, 0.7 V p-p)
2	GREEN	Green Video out (75 ohm, 0.7 V p-p)
3	BLUE	Blue Video out (75 ohm, 0.7 V p-p)
4	RESERVED	Not connected
5	GND	Ground
6	RGND	Red Ground
7	GGND	Green Ground
8	BGND	Blue Ground
9	+5V DC	Not connected
10	SGND	Sync Ground
11	ID0	Grounded
12	SDA	Not connected
13	HSYNC	Horizontal Sync out
14	VSYNC	Vertical Sync out
15	SCL	Not connected

8.8 Serial RS232 cable

9pin DSUB female



RJ45 male



xpo RJ45 male	Computer DB9 female
1	N/C
2	N/C
3	N/C
4	Shield
5	5
6	N/C
7	2
8	3

9 Technical specifications

Functions
• RS-232 control
• Support control of up to 9 converters from the same RS-232 port
• Single mode (sets one of the output channels in black)
• Manual control of stereo sync
• Programmable custom modes
• OSD – menu

Dimensions
• Size: 7 x 19 x 25 cm (HxWxD)
• Weight: approx. 1,5 kg.

Compatibility

xpo.1
• Resolution: 640 x 480 to 1024 x 768

xpo.2
• Resolution: 640 x 480 to 1280 x 1024

xpo.1 & xpo.2
• HV (separate sync), CS (composite sync), SOG (sync on green)
• PC compatibles, workstations
• Frame sequential stereo3D
• Vertical Scan: 60 - 120 Hz

Inputs
• 15 - 25 VDC, 2OW
• VGA 15-pin DSUB female
• 3-pin mini DIN stereo sync connector
• RJ45 port with RS232 and RS485 control
• RJ45 chain RS485 control

Outputs
• 2 x VGA 15-pin DSUB female, left and right channel
• 2 x digital DVI, left and right channel

Supplied Material
• Power adapter 100/240 VAC -19 VDC 2,36A
• RGB computer cable (15 pin DSUB male/male)
• Serial RS-232 cable, RJ45 to 9-pin DSUB female
• 10 pair of polarized glasses
• 1 pair of polarized filters (75 x 75 mm)
• Filter stand
• User’s guide