Media Recorder

Reference Manual

Version 2.5

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Chapter 1

Introduction

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1.1 The Media Recorder

Thank you for purchasing the Media Recorder. The Media Recorder is a software package that enables you to make digital video files with many different types of cameras. The video files can subsequently be used in other software programs such as The Observer XT, EthoVision XT and FaceReader. The Media Recorder can be used as a standalone program to create video files. However, with The Observer XT and EthoVision XT it is also possible to send commands to the Media Recorder. This way, the Media Recorder can be started automatically when starting an observation and stopped when ending an observation. Furthermore, the videos obtained this way can automatically be linked to an observation.

This manual describes how to make optimal use of the Media Recorder. Chapter 2 contains general information about the Media Recorder. Chapter 3 describes the setup of the drivers and the software. Chapter 4 describes the settings of the Media Recorder. In Chapter 5 you find how to create video files with the Media Recorder. Subsequently Chapter 6 describes how to make full use of the Media Recorder with other Noldus products. And Chapter 7 contains the minimum technical specifications for your hardware.

If you have any problems, questions, remarks or comments, please let us know. You can contact us via our website (www.noldus.com/helpdesk) and fill out a Support Request Form (preferred), or phone. We offer 24 hours phone support from our worldwide network of helpdesks. Please refer to the **Contact** section on our website for other contact information. You can also contact the Support Department by opening the **Help** menu in the Media Recorder, select **Noldus Online** and subsequently **Contact Help Desk**.

1.2 What's new in Media Recorder 2.5?

If you have been using a previous version of the Media Recorder, you should read this section to get an idea of the improvements in this version.

FOR CUSTOMERS WITH MEDIA RECORDER 1

Picture in Picture

It is now possible to choose the position of the embedded video images in the primary video. Furthermore, you can select the margin of the embedded video images.

Identify

The Media Recorder now has an Identify button which allows you to see which video image comes from which camera. When you press this button the video numbers are superimposed on the camera images.

GigE cameras

The Media Recorder now also supports the use of GigE cameras. It has extensively been tested with the Basler GigE camera (AC1300-30gm). The drivers of this camera are present on the Media Recorder installation CD.

FOR CUSTOMERS WITH MEDIA RECORDER 2.0

Windows 7 and 8 64 bit compatible

The Media Recorder is now compatible with Windows 7 and 8 64 bit. For Windows 7, Service Pack 1 should be installed. Some supported hardware has also been tested with Windows 7 32 bit. For more

information, see “System requirements for Noldus software” on www.noldus.com/downloads.

Support of Epiphan DVI2PCIe screen capture

Besides the Epiphan DVI2USB 2.0 screen capture device, the Media Recorder now also supports screen capturing with the DVI2PCIe. This is a frame grabber board that can be inserted into a PCIe port of the computer with the Media Recorder. The bandwidth is much higher than with the DVI2USB 2.0 device. This means that recording can be done with a higher resolution and frame rate than with the DVI2USB.

Support of 6 analog cameras for use in EthoVision XT

Together with the Media Recorder you can now buy a Picolo U8 encoder board. With this board you can videos from up to 6 analog cameras simultaneously for use in EthoVision XT.

For customers with Windows 7 32 bit

Customers that have a 32 bit version of Windows 7 with Service Pack 1, and upgrade Media Recorder to version 2.5 should realize that most supported devices have been tested with the 64 bit version of Windows 7 with Service Pack 1. We expect that the supported devices also work with Windows 7 32 bit with Service Pack 1, but this has not been thoroughly tested.

Chapter 2

The Media Recorder

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2.1 Video formats

The Media Recorder creates video files in MPEG-4 DivX or H.264 AVC format. The generated media files can be used in The Observer XT 10, Ethovision XT 8, and FaceReader 4, or higher versions of these programs. For use with The Observer XT and FaceReader, you can record up to 4 high-quality video files simultaneously. For use with EthoVision XT you can record up to 6 high-quality videos simultaneously.

MPEG-4 DivX

MPEG-4 can achieve a high rate of compression with good quality, because it separately codes the background (which does not change much from frame to frame) from the moving parts of the video. MPEG-4 is in fact best seen as a collection of definitions rather than one fixed file format, and there are many different implementations of MPEG-4. MPEG-4 has a higher compression rate than for example MPEG-2 and it can have much higher resolution (with the Media Recorder up to 1920 x 1080 pixels). The Media Recorder creates MPEG-4 DivX video files. DivX is an implementation of MPEG-4 which has both high quality and good compression. The audio format is MPEG 1 Layer 2 (MP2). The container with these video and audio streams is AVI-format.

H.264 AVC

H.264 AVC is a type of MPEG-4 and is also known under the names H.264/AVC, AVC/H.264, H.264/MPEG-4 AVC, MPEG-4/H.264 AVC, MPEG-4 Part 10 or x.264. It creates good video quality and uses previously-encoded pictures as references in a much more flexible way than in other standards, allowing the use of up to 16 reference frames. Because H.264 encoding and decoding requires significant computing power, software implementation is typically slow. With an H.264 encoder card you can create H.264 video files without slowing down your computer.

PICOLO H.264 ENCODER CARD

You can buy a Picolo U4 H.264 encoder card together with the Media Recorder. With this card you can create H. 264 AVC video files from analog video input. You can connect four analog cameras to this card and create four H.264 video files simultaneously for use with The Observer XT and FaceReader. This number is limited to three for use with EthoVision XT. This is caused by the fact that the Media Recorder drops some frames when four analog cameras are used with default frame rate and resolution. For The Observer XT this is not a problem, since the time information in the video is corrected with one of the filters (see Appendix A in The Observer XT Service Manual). However, for accurate tracking in EthoVision XT, all video frames are needed. When three analog cameras are used simultaneously, no frames are dropped.

If you want to record more videos simultaneously for use in EthoVision XT you can buy a Picolo U8 H.264 encoder card. This card is supported for use with EthoVision XT only. You can record up to six H.264 videos simultaneously.

The Picolo H.264 encoder cards make video files with the video and audio streams in a container with MPEG-format. The audio has the format MPEG 1 Layer 2 (MP2). H.264 decoding software for playing back the video and audio is present on the installation CD of the Media Recorder.

H.264 compression is often used to create High Definition (HD) files on Blue Ray Disks. However, H.264 High Definition (HD) files are very highly compressed and your computer processor has to do a lot of work in order to play an HD file back. Therefore, you can only use one H.264 HD file at the same time in The Observer XT and you can only play it back at 1x speed. The higher demands that The Observer XT places on video (accurate timing while playing multiple videos forwards and backwards at multiple speeds) are more than computers can currently handle with the H.264 codec. Therefore, the H.264 encoder card that is sold with the Media Recorder only creates H.264 Standard Definition (SD) files.

2.2 Types of applications

You can use the Media Recorder in the following ways:

- **As a stand-alone application** — The digital video files you create this way can be used for 'offline scoring' in The Observer XT, track “from video file” in EthoVision XT, or ‘video analysis’ in FaceReader.
- **As an external application controlled by The Observer XT** — This way you can start and stop the Media Recorder from within The Observer XT and automatically link synchronized digital video files to observations.
- **As an external application controlled by EthoVision XT** — This way you can start and stop the Media Recorder with EthoVision XT.

2.3 Input sources

The Media Recorder can create video files from a wide range of sources:

- Industrial FireWire cameras
- USB cameras
- IP cameras
- GigE cameras
- Analog cameras (in combination with an H.264 encoder board)
- The screen capture devices DVI2USB and DVI2PCIe
- The analog to USB converting device TerraTec Grabby
- Canopus ADVC-55

In the Media Recorder Service manual you find a list of specific devices with which the Media Recorder has extensively been tested. The drivers of these devices are present on the Media Recorder installation CD. The

type of camera you choose depends on the way you are going to use the video material. Each of the camera types has its advantages and restrictions. The Media Recorder Service Manual also contains an overview of the advantages and restrictions for each type of device. Furthermore, the optimal settings for use with the Media Recorder are documented. You can download the Media Recorder Service Manual from www.noldus.com/downloads.

The Media Recorder does not work in combination with the Picolo Diligent Video Capture Card that was used with Noldus MPEG-4 Recorder 1.1. Neither does the Media Recorder work in combination with the IEI IVC-4300 Video Capture Card that was used with Noldus MPEG Recorder 2.

The Media Recorder cannot create video files from cameras with HDMI output.

PLAYING BACK MEDIA RECORDER VIDEO FILES

The Media Recorder videos play back in Microsoft Windows Media Player if you have installed the Mainconcept decoder package from the Media Recorder installation disc. This decoder package is automatically installed when you install the Media Recorder.

On computers with Windows 8, some Windows Media Player codecs need to be disabled to be able to play back the H.264 video files the Media Recorder creates with the Picolo H.264 board. These codecs are disabled by the Media Recorder installation. De-installing the Media Recorder restores the Windows Media Player codecs.

In Windows 8, the MPEG4 DivX files (.avi) created by de Media Recorder from output of digital cameras play back with the Video app in the Start window with tiles. The H.264 files created by the Media Recorder with the Picolo H.264 board from output of analog cameras (.mpg) play back with the Microsoft Windows Media Player in the desktop. You can open the MPEG-4 files manually from within the Windows Media Player.

Chapter 3

Installation

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3.1 Installing the Media Recorder

Do not insert your licence key before the installation is complete. If you do so, drivers are automatically installed, which leads to incorrect functioning of the licence key. Drivers of the licence key should be installed using the installation CD (see below).

Installing the Media Recorder requires the following steps:

1. Turn off automatic updates for device drivers (see below).
2. Change the power saving settings of your computer (see page page 21).
3. Optionally install the H.264 encoder card (see page page 23).
4. Install the setup prerequisites (see page page 27) and optionally the drivers for H.264 decoding (see page page 28).
5. Install the Media Recorder software (see page page 30).
6. Connect the video cameras (see page page 31).

If you have a Picolo Diligent card, we recommend you remove it before you install the H.264 encoder card.

3.2 Turn off automatic updates for device drivers

Although the general recommendation from Microsoft to use automatic updates is good, especially for security updates, automatic updates of hardware device drives can sometimes give problems. The

procedure below describes how to specifically turn off the automatic updates only for device drivers. If you ordered a computer with The Media Recorder from Noldus IT, the automatic updates for device drivers have already been turned off.

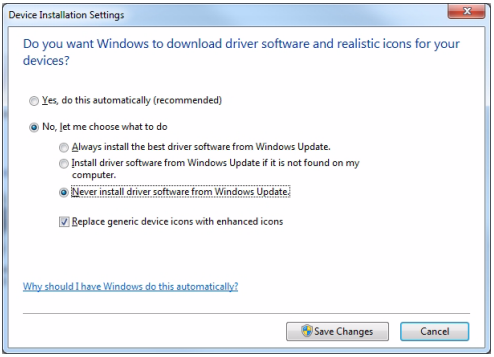
Windows 7

1. From the Windows **Start** menu, go to **Devices and Printers**

If you do not see **Devices and Printers**, open the Windows **Start** menu and type **Devices and Printers**.

2. Right-click on the icon of your computer and select **Device installation settings**.

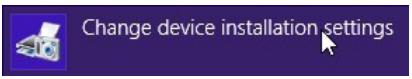
3. To the question "**Do you want Windows to download driver software and realistic icons for your devices**?," select **No, let me choose what to do** and then
4. Select **Never install driver software from Windows Update**.



5. Click **Save Changes**.

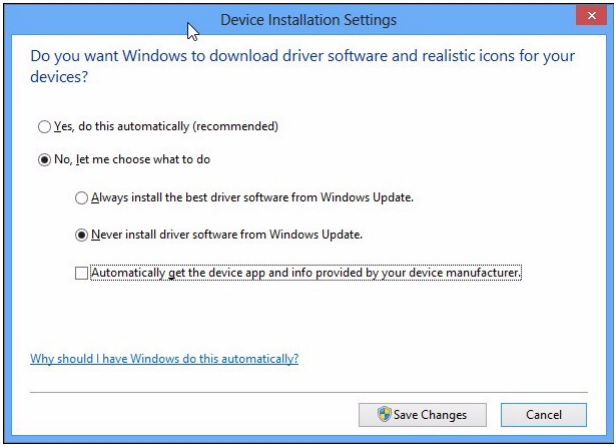
Windows 8

1. Open the Start window with tiles and type **Settings**.
2. Click the **Settings** tile.
3. Click **Change Device Installation Settings**.



4. To the question "**Do you want Windows to download driver software and realistic icons for your devices**?," select **No, let me choose what to do** and then
5. Select **Never install driver software from Windows Update.**

6. Also deselect the checkbox in front of **Automatically get the device app and info provided by your device manufacturer**.



7. Click **Save Changes**.

3.3 Changes to the power saving settings of your computer

Certain power saving options of your computer can interfere with correct functioning of the Media Recorder. When these power saving options are not switched off, synchronization problems can occur in the videos created. It is not possible to solve this problem in the Media Recorder software. Therefore, before you start using your Media Recorder it is important to switch off certain power saving options in the BIOS of your computer. If you ordered a computer with The Media Recorder from Noldus IT, these power saving options have already been turned off.

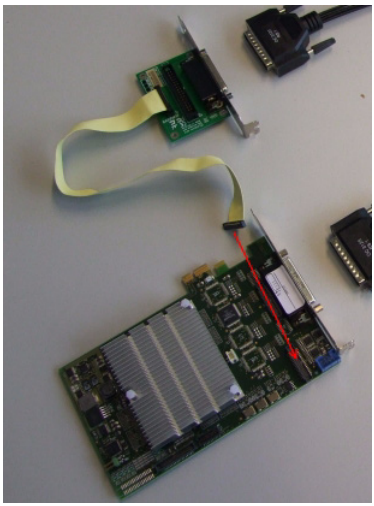
- **Dell Precision™ T3500 quad core workstation** — If you ordered a Dell Precision™ T3500 workstation with your Media Recorder, Noldus has already changed the BIOS settings. If you purchased this computer yourself, go to the BIOS by pressing the **F2** key during startup of your computer. Click **Performance** and subsequently click **C-States Control**. Deselect the checkbox in front of **C-States Control** in the right-upper part of your screen. Also check that the checkbox in front of **SpeedStep** is deselected. Exit the BIOS and click **Yes** when the question **Do you want to save changes?** shows up.
- **Dell Precision™ M4700 quad core Laptop** — If you purchased a Dell Precision™ M4700 Laptop from Noldus, the BIOS settings are already correct. If you purchased a computer yourself, go to the BIOS by pressing the **F2** key during startup of your computer. Click **Performance** and subsequently click **SpeedStep**. Deselect the checkbox in front of **SpeedStep** in the right-upper part of your screen. Also check that the checkbox in front of **C-States Control** is deselected. Exit the BIOS and click **Yes** when the question **Do you want to save changes?** shows up.

If you bought a Dell Precision™ T3600 quad core workstation, it is not necessary to switch off the power saving settings. If you have purchased a computer with another processor than the ones described above, similar power saving options are present in the BIOS. For example **PowerNow!** and **Cool'n'Quiet** (AMD processors), or **PowerSaver** (VIA processors). It may be necessary to disable these power saving options in the BIOS, for correct synchronization by the Media Recorder. We recommend the use of the Dell Precision™ T3500, or T3600, workstation or the Dell Precision™ 4700 Laptop with the Media Recorder. The Media Recorder has been tested with and optimized for these processors.

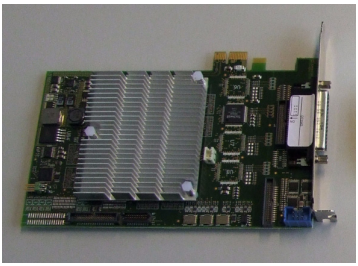
3.4 Installing the Picolo U4, or U8, H.264 encoder card, the drivers and the decoding software

The following steps are required to install the Picolo U4, or U8, H.264 encoder card.

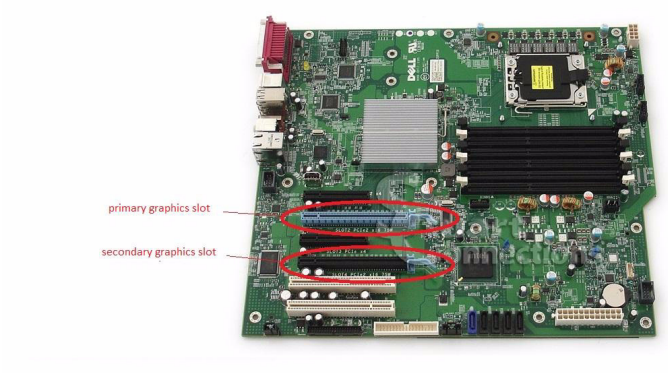
1. Make sure your computer is turned off and the power cable is disconnected. Open the computer.
2. If you are also recording audio, you received an audio bracket with the H.264 card. Connect the FTSH34 connector of the audio bracket to the H.264 card and insert the bracket into a free slot in the computer.



3. Gently but firmly insert the Picolo U4, or U8, H.264 encoder card into a free PCI express slot. Avoid touching the contacts or other metal parts of the card.



Do not insert the card into one of the graphics slots. Use the smaller black slots next to the graphics slots (see picture below).



4. IClose the computer.

5.

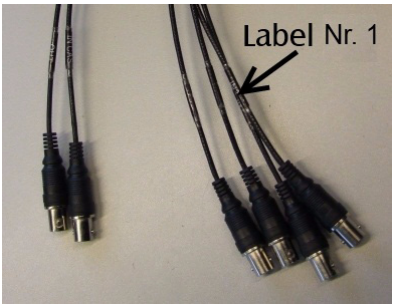
a **Picolo U4 H.264 card** - With the Picolo U4 H.264 card you received an HD44M (=Male) to BNC breakout cable with six BNC connectors. This cable has a HD44M connector with the label *H.264 Video*. You also received an HD44M to RCA breakout cable

with four RCA connectors. This cable has a HD44M connector with a label *H.264 Audio*.

b **Picolo U8 H.264 card** - With the Picolo U8 H.264 card you received an HD44M (=Male) to BNC breakout cable with ten BNC connectors. This cable has a HD44M connector with the label *H.264 Video*. You also received an HD44M to RCA breakout cable with eight RCA connectors. This cable has a HD44M connector with a label *H.264 Audio*.

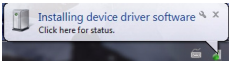
3. Connect the HD44M connector with the label *H.264 Video* to the HD44F (=Female) connector on the Picolo U4 H.264 card. This card has the label *H.264 Video* on the bracket. Connect the HD44M connector with the label *H.264 Audio* to the HD44F connector of the audio bracket. This bracket has the label *H.264 Audio*.

4. Connect at least one video camera to one of the BNC connectors. With the Picolo U4 H.264 card, do not use the cables with number 5 and 6. With the Picolo U8 H.264 card, do not use the cables with numbers 9 and 10. When you select the cable labelled with number **1**, this is shown as **Euresys Picolo U4 (or U8) H.264 No/o - VID 1** in the Media Recorder.

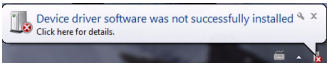


5. Connect the power cable and turn the computer on.

   Two balloons may appear in the right-bottom corner of your screen immediately after the computer is restarted:



   and later



   If so, wait until both these messages have disappeared before you proceed with the next step. If not, proceed with the next step.

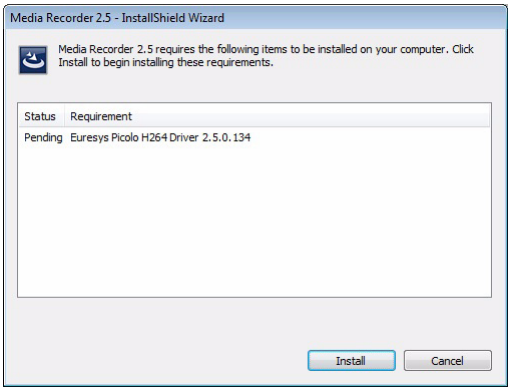
If you use the H.264 encoder card, you need H.264 decoding software to be able to play the videos. This decoding software is present on your installation CD and is installed during installation of the Media Recorder (see page page 28 for details).

You can now go ahead and install the setup prerequisites and the Media Recorder.

3.5 Installing the setup prerequisites

To start the installation of the Media Recorder:

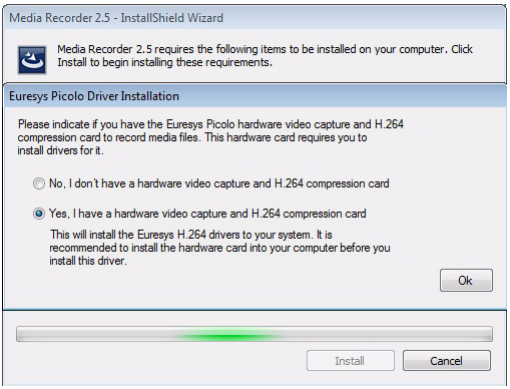
1. Insert the Media Recorder installation CD. The Media Recorder setup browser opens. If this is not the case, browse to the CD and run the program **Setupbrowser.exe**. Under **Install Software**, select **Media Recorder 2.5**.
2. Click **Install** in the window that opens



The following setup prerequisites are installed automatically before Media Recorder 2.5 is installed:

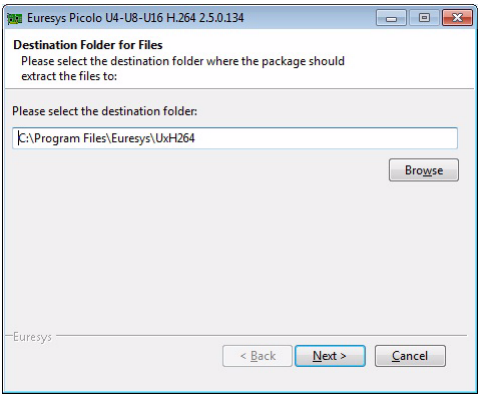
- **Sentinel HASP Run time** — Needed for correct functioning of your licence key.
- **Noldus MediaLooks AV Filters 3** — Needed for several features of the Media Recorder, like Picture-in-picture videos, synchronization of audio and video and volume control.
- **Noldus Mainconcept Encoder Package 7.5** — Needed to create MPEG-4 DivX video files.
- **Noldus MainConcept Codec Package 8.5.26**— Needed for audio encoding, MPEG-4 DivX decoding, and H.264 AVC decoding.

- **Euresys Picolo H.264 Driver** — Needed for correct functioning of the Picolo U4 H.264 card. The following window opens before this driver is installed:

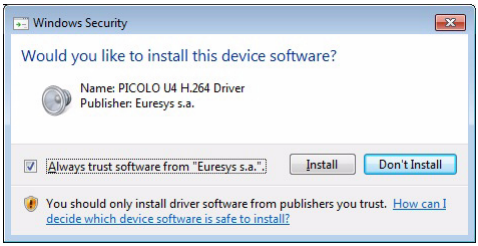


Please note that this window opens directly on top of the Installation Wizard.

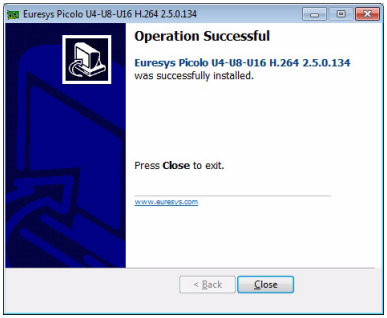
Click **Yes** when you have the Picolo U4 or U8 H.264 encoder card and **No** when you do not have one of these cards. If you have chosen **Yes**, the following window opens:



Accept or change the folder and click **Next**. The following window appears:



Select **Always trust software from "Euresys s.a."**. Continue to follow the instructions on your screen. Accept the terms in the Licence Agreement, and install the software. When finished, the following window opens:



Click **Close**. A question appears whether you want to restart your computer now. Click **Yes** to finish the installation of the Picolo H.264 card drivers. The computer now restarts.

Do not remove the installation CD before the entire installation procedure, including installation of the Media Recorder, is finished.

When the computer is restarted, the installation Wizard of the Media Recorder opens. On computers with Windows 8 it may happen that it restarts with the Start window with tiles and you do not see the installation Wizard. If that happens, go to the desktop. Continue with step 1. below.

3.6 Installing the Media Recorder software

1. After the setup prerequisites are installed, the installation wizard continues with installing the Media Recorder program. Follow the on-screen instructions to install the software.
2. When the License Agreement Window is shown, choose **I accept the terms in the License Agreemen**t.
3. Optionally, choose the location where the program is saved. By default this is: **C:\Program Files\Noldus\Media Recorder 2** (32 bit) or **C:\Program Files (x86)\Noldus\Media Recorder 2** (64 bit)
4. Optionally, choose **Custom Setup** in which you choose which features to be installed. We recommend you choose **Complete Setup**.
5. Click **Install**. The Media Recorder program is now installed.

Notes

- On computers with Windows 7 the installation adds Media Recorder 2 to the **Start** menu under **All Programs|Noldus|Media Recorder 2**. Also a shortcut is added to the Desktop. On computers with Windows 8 a shortcut is added to the Desktop and a Media Recorder 2 tile is added to the Start window.
- If the Media Recorder software is not installed in the default folder **C:\Program Files\Noldus\Media Recorder 2** (32 bits) or **C:\Program Files (x86)\Noldus\Media Recorder 2** (64 bits), the software

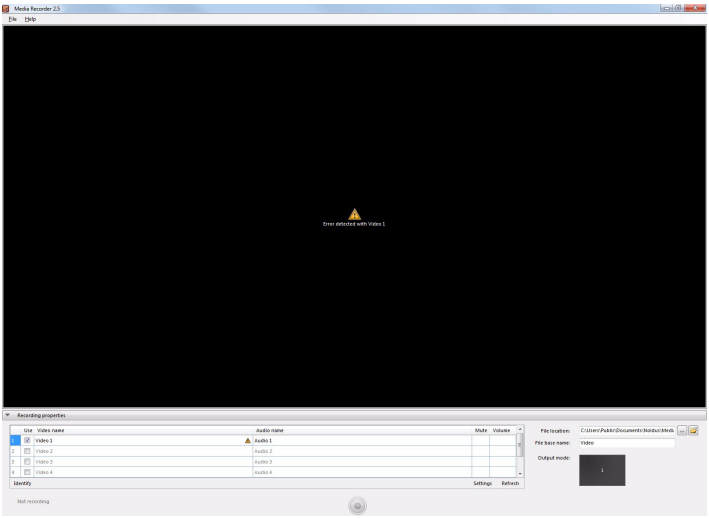
provided on the installation CD for embedding this tool in The Observer XT does not function.

Installation of the Media Recorder is also possible on computers that have Chinese, Japanese, or Cyrillic language packs of Windows 7 and 8.

3.7 Connecting the video cameras

1. Connect your cameras to your computer.
2. Optionally connect your microphones to your computer.
3. Start the Media Recorder.

The main screen of the Media Recorder opens.



Chapter 4

Working with the Media Recorder

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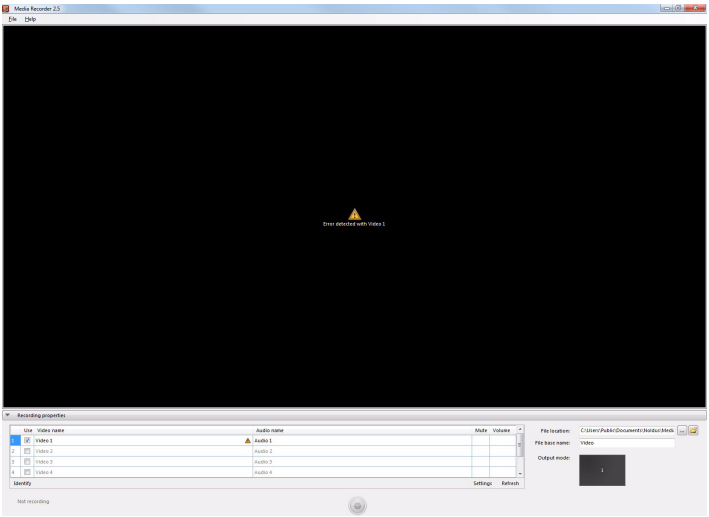
4.4 Video length 46

4.1 Working with the Media Recorder

To start the Media Recorder with Windows 7, open the Windows **Start** menu, select **All Programs**, then **Noldus**, then **Media Recorder 2**, then click the **Media Recorder 2** icon. You can also double-click the Media Recorder 2 icon on the desktop. On computers with Windows 8, double-click the Media Recorder icon on the desktop, or click the Media Recorder 2 tile in the Start window. The main window of the Media Recorder opens. You see a black screen with a warning triangle “Error detected with Video 1”. Furthermore, the table under this black screen is empty and also contains a warning triangle. This is because you did not select your video cameras yet.

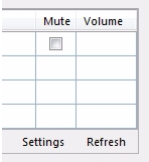


The main window of the Media Recorder contains the following features:

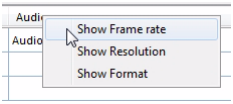
1. **Table with cameras and settings** — The table under the black window contains the available cameras and their settings. This table is filled in once you have created settings for the cameras. See

page 4.2page 38 for more information on how to choose your cameras and create settings.

You can select which videos to use in this table. For each selected video you can mute the audio during preview and recording by selecting the checkbox in the **Mute** column. You may want to do this when you have more than one audio channel. If you select the checkbox in the mute column, you do not hear audio of the selected video during preview and recording, but audio is recorded normally in the video files.



You can add columns with the frame rate, resolution and format to this table. To do so, right-click one of the column headers and select the preferred options.



2. **File location** — By default the video files the Media Recorder creates are stored in the folder **C:\Users\Public\Public Documents\Noldus\Media Recorder\Video Files**. To change this location, browse to the folder where you want to store the video files, by clicking one of these buttons.

You must be able to write in the selected folder and there must be enough file space available (at least 500 Mb per video per hour for MPEG-4 DivX and 600 Mb per video per hour for H.264 AVC files).

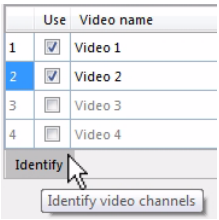
3. **File base name** — The name of the video file consists of the File base name followed by the video input name, the date and the time the videos were recorded, and the number of the video camera. For instance, if your File base name is Video, you have changed the name of "Video 1" to "Webcam" in the Settings Window, the date is 11 May 2013, the time 10:54:43 and you create 2 videos simultaneously, the video from the second input is called: Video Webcam _5_11_2013 10_54_43 AM 2.avi

   You can also use Cyrillic, Chinese, or Japanese characters in the video file name.

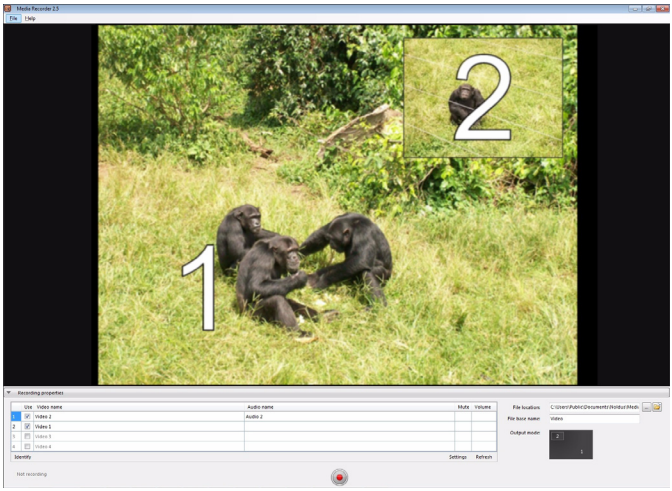
4. **Settings button** — Clicking the Settings button opens the **Media Recorder Settings** window in which you can select your cameras and create their settings. See page page 38 for further details.

5. **Refresh button** — Click this button when you have connected a camera after you have started the Media Recorder. If you have already created settings for this camera (see page page 38), the video signal now becomes visible.

6. **Identify button** - Click this button to view which video number in the table corresponds with which camera source.



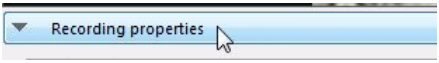
Result — the video numbers are superimposed on the camera images.



7. **Recording button** — After you have created settings for the cameras (see page page 38), use this button to start recording.

The button now changes into the stop recording button and the status **Not recording** in the lower-left corner of your screen changes into a timer.

8. **File menu** — The file menu contains the options **Open configuration...** and **Save configuration as...** You can also open the **Media Recorder Settings** window (see page page 38) from the **File** menu. The settings you create for the different cameras are automatically saved to the file **Current settings.mrs**. When you restart the Media Recorder these settings are used. To save your settings under a different name, open the File menu and select **Save Configuration As.....** This way you can create different settings for, for example, The Observer XT, EthoVision XT, and FaceReader. You can also use Cyrillic, Chinese, or Japanese characters for the configuration name. To go back to the default configuration, open the **File** menu and select **Open Configuration**. Browse to the file **Default Settings.mrs.** This file is read-only. You can find this file in the folder **C:\Users\Public\Public Documents\Noldus\Media Recorder.**
9. **Recording Properties bar** — Click this bar to hide or show all the features visible under the preview window.



See below to select your cameras and create their settings.

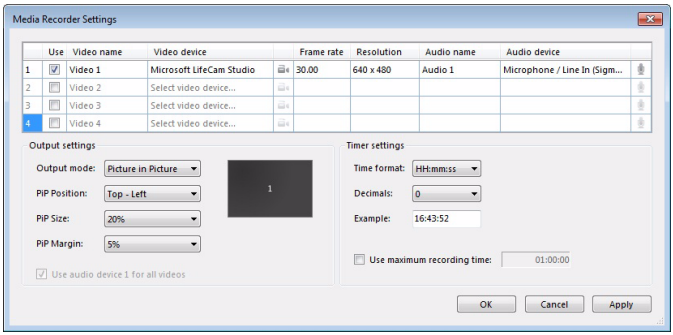
4.2 Settings

To select your cameras and create their settings, open the **Media Recorder Settings** window by clicking the **Settings** button, or choose **Settings** from the **File** menu.

If the **Settings** button is not visible, the recording properties may be hidden. If this is the case, first click the bar **Recording Properties**. By default the recording properties are visible.

1. In the **Media Recorder Settings** window, select your cameras from the drop down list under **Video device**.

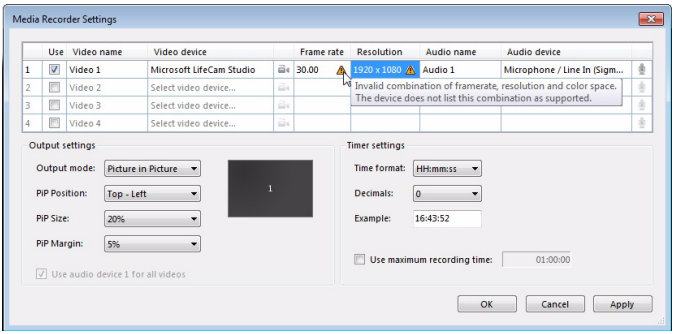
   Select the preferred frame rate and resolution. The options shown in these fields are dependent on your type of camera.



You can show and hide the columns Frame rate and Resolution by right-clicking one of the column headers and selecting or deselecting one of the options. This way you can also show the column **Format**. This column is hidden by default, because the default options are the most optimal ones. The formats column shows the color format of the created video file. See http://www.noldus.com/knowledge-base/search for extensive background information on color formats.

By default the optimal combination of frame rate and resolution and color space of your camera is selected. If you increase the frame rate, the maximum resolution available goes down and vice versa. If you select an impossible combination of frame rate and

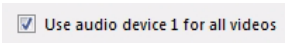
resolution and format, the Media Recorder gives a warning (see below).



2. For more advanced settings click on the video symbol next to the name of your video device.

The **Advanced Settings** window of your video device opens. The options available depend on your video device, for some cameras you can zoom and adjust settings for brightness and contrast in this window. It may be that the settings chosen in the **Advanced Settings** window are not shown in the **Media Recorder Settings** window. However, when you click **OK** in the **Media Recorder Settings** window, the correct settings are shown in the Media Recorder main window.

3. Under **Audio device**, either select the microphone of your computer, a separate microphone, or choose the audio channels from your cameras. You can also choose to record audio from only one camera. To do so, select this checkbox:



By selecting this checkbox the input of the selected audio device is used in all videos.

You can also choose not to record audio at all. To do so, keep the default No audio selected.

Audio of H.264 files
When you have the encoder H.264 card, you need microphones for the audio signal. It is not possible to use the audio of the computer. You should not directly connect microphones to the audio inputs connected to the card. You need pre-amplifiers to amplify the microphone signals to Line Level (+0 dBu, 0.775 V). The option to use one audio signal for all videos is not available in the Media Recorder when you use the H. 264 encoder card. If you want to use the same audio source for all videos, you need an audio splitting cable. Subsequently, you can connect the outputs of the audio splitting cable to the audio inputs that are connected to the H.264 encoder card. Audio recorded by the H.264 card is always mono.

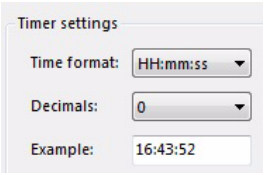
You can only select the same channel number for the video input as for the audio input in the Settings window of the Media Recorder. So if you connected a camera to the video cable No. 2, you should connect the microphone to the audio cable No. 2.

4. Click the microphone button for Audio settings.

The **Advanced Settings** window of your audio device now opens. The options that are shown depend on your audio device. In this window you can adjust the volume of your recording.

5. You can optionally change the names of “Video 1”, “Video 2” etc, and “Audio 1” to for example “Webcam”, “Sony Camcorder”, and “Microphone”. You can also enter Cyrillic, Chinese, or Japanese characters in these fields.

6. Specify the format of the recording timer under **Timer settings**.



The recording timer is shown when recording on the left-lower part of the main Media Recorder window.

7. If wanted, you can specify the maximum recording time.

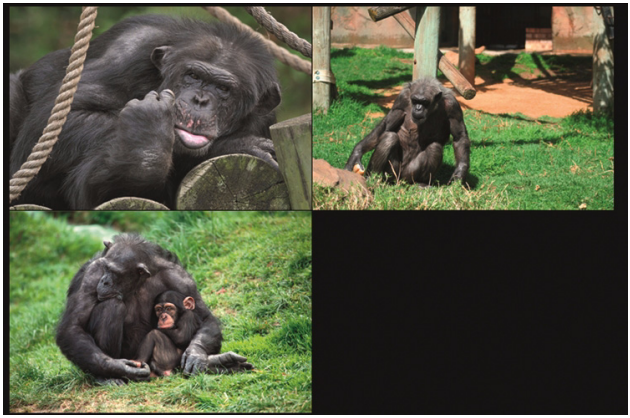
The maximum is 99:99:59 (hr: min: sec). However, for use in The Observer XT we recommend that you create separate videos for each period of 3 hours. The maximum supported recording time is 24 hours for standalone use, or for use in EthoVision XT. If you record longer videos, the time information becomes less accurate. However, please realize that video files of 24 hours are very large, at least 12 Gb. Therefore we recommend to create multiple shorter videos.

8. If you have selected more than one video source, several options are available under **Output Settings**.

Output mode - From the list next to Output mode, you can select one of the options below:

- **Separate videos** — The Media Recorder creates separate video files for each camera.
- **Picture by Picture** — The Media Recorder creates one video file with the images from each camera next or above each other. If possible, choose the same frame rate for all the videos. If you choose different frame rates the videos with the lowest frame rates may flicker and may not be suitable for use in The Observer

XT, EthoVision XT, or FaceReader. If you use different frame rates, the Media Recorder gives a warning message.



If you choose **Picture by Picture** while you are using the Picolo H.264 card, the format of the output file is not H.264, but MPEG-4 DivX.

- **Picture in Picture** — The Media Recorder creates one video file with the images from the second (and third and fourth) camera embedded in the image from the first camera. If possible, choose the same frame rate for all the videos. If you choose different frame rates the videos with the lowest frame rates may flicker and may not be suitable for use in The Observer XT, EthoVision XT, or FaceReader. If you use different frame rates, the Media Recorder gives a warning message.

  If you select the option **Picture in Picture** the following options become available:

  - **PIP Position** — Choose the position of the second (and third and fourth) camera image in the image from the first camera.
  - **Pip Size** — Choose the size of the second (and third and fourth) camera image. The percentage is based on the width

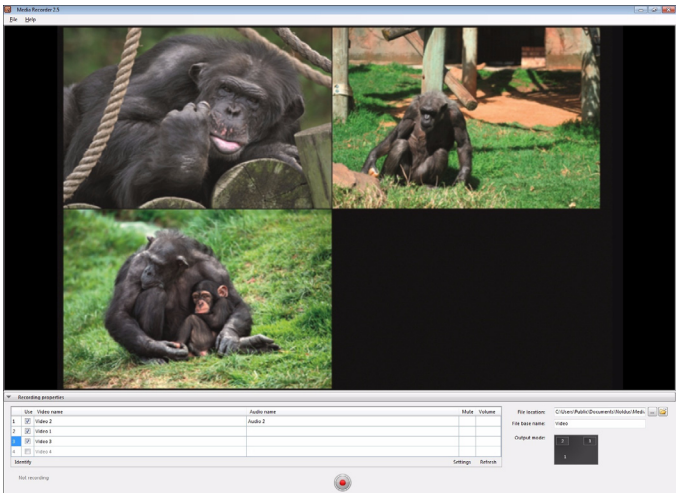
of the first camera image. The aspect ratios of the embedded camera images are maintained.

Please note that if you have multiple videos in portrait format, they may overlap when you use Picture in Picture.

- **Pip Margin** — Choose the position of the embedded images in the main image. When the percentage is zero, the image is positioned directly on the edge of the main image. The percentage is based on the width of the first camera image.

If you choose **Picture in Picture** while you are using the Picolo H.264 card, the format of the output file is not H.264, but MPEG-4 DivX.

9. Click **OK**. The **Media Recorder** window now shows the selected cameras and settings and a preview of the videos.



10. You can change the order of the video cameras by dragging and dropping rows. Click the **Refresh** button after you have done this.

4.3 Video format

The Media Recorder can create video files in the following formats:

- **MPEG-4, DivX** — Official name: DivX 4 (OpenDivX). Audio encoding: MPEG Audio, MPEG 1 Layer 2 (MP2). Container: AVI. The frequency is 44.1 kHz and the bit depth is 16 bit. Approximate file size: at least 0.5 GB/hr. These files can be used in The Observer XT 10, EthoVision XT 8, and FaceReader 4.
- **H.264, AVC1** — Only available in combination with the H.264 encoding board and decoding software. Official name: H.264/

MPEG-4 AVC. Audio encoding: MPEG Audio, MPEG 1 Layer 2 (MP2). Container: MPEG. The frequency is 44.1 kHz and the bit depth is 16 bit. Approximate file size: at least 0.6 GB/hr. These files can be used in The Observer XT 10 and higher, EthoVision XT 8 and higher and FaceReader 4 and higher.

If you choose **Picture in Picture**, or **Picture by Picture** while you are using the Picolo H.264 card, the format of the output file is not H.264, but MPEG-4 DivX.

4.4 Video length

The maximum video length that is supported if you want to use the videos in The Observer XT, or FaceReader is 3 hours. If you want to use the videos stand-alone, or in EthoVision XT, we recommend to create multiple short videos rather than one very long video, since the file size of the videos is at least 0.5 Gb/Hour. The maximum supported recording time is 24 hours. You find the supported recording time per device in the Service Manual of the Media Recorder that you can download from www.noldus.com/downloads.

Chapter 5

Using the Media Recorder stand-alone

5.1 Stand-alone 48

5.2 Using the Media Recorder in normal mode 48

5.3 Using the Media Recorder in command-line mode .. 50

5.4 Delay 51

5.5 Loading a configuration file 52

5.6 Control Media Recorder at a predefined time 53

5.1 Stand-alone

You can use the Media Recorder as a stand-alone MPEG-4 encoder to create digital video files. These video files can be used for 'offline scoring' in The Observer XT, tracking ‘from video’ in EthoVision XT, and ‘video analysis’ in FaceReader. You can use the Media Recorder either with a normal Windows interface or from a command line.

5.2 Using the Media Recorder in normal mode

1. First connect your cameras and make sure they are turned on (and not in standby mode). If the camera was off when you started the Media Recorder, it may not be possible to preview the images or record from that camera. Similar problems may occur when disconnecting a camera and connecting another one while the Media Recorder program is open. Therefore we recommend to restart the Media Recorder after you have connected and switched on all the cameras.
2. Start the Media Recorder:
   a **Windows 7** - Select **All Programs** from the Windows **Start** menu, then **Noldus**, then **Media Recorder**, then click the **Media Recorder** icon, or double-click the icon on the desktop.
   b **Windows 8** - Double-click the **Media Recorder** icon on the desktop, or click the **Media Recorder** tile in the Start screen.
3. The main window of the Media Recorder opens. Browse to the folder where you want to store the video files that the Media Recorder creates, by clicking one of these buttons.

You must be able to write in the selected folder and there must be enough file space available (at least 500 Mb per video per hour for MPEG-4 DivX and 600 Mb per video per hour for H.264 AVC files).

4. Enter a name in the **File base name** field. The name of the video file consists of the **File base name** followed by the video input name, the date and the time the videos were recorded, and the number of the video camera. For instance, if your **File base name** is *Video*, you have changed the name of *Video 1* to *Webcam* in the **Settings** Window, the date is 11 October 2011, the time 10:54:43 and you create 2 videos simultaneously, the video from the second input is called: Video Webcam 10_11_2011 10_54_43 AM 2.avi
5. Open the **Settings** menu and specify the cameras and other settings. For more details see page 38.
6. Click **OK**.
7. If necessary make adjustments in the main window of the Media Recorder.
8. Click the button at the bottom of the window to start recording.

There may be a small delay after you click the start button and the actual start of the recording. This is dependent on the performance of your computer and the type of camera.

9. If you did not enter a maximum recording time, click the button at the bottom of the window to stop recording.

We strongly recommend to run a test recording of about 2 minutes and play it back in EthoVision XT, The Observer XT or FaceReader, before you start the actual recording. With this test recording you can also determine the delay between the moment you click the start button of the Media Recorder and the actual start of recording.

5.3 Using the Media Recorder in command-line mode

Besides using the Media Recorder stand-alone, you can also use the command line to run it from another program. You can use these commands to run the Media Recorder directly from The Observer XT (see page 58) or EthoVision XT (see page 65).

1.

   a **Windows 7** - From the **Start** menu enter **CMD** in the **Start Search** field and click **Enter**.

   b **Windows 8** - Type **Run** in the Start screen with tiles and click the tile **Run**. Enter **CMD** in the window that opens.

3. Type **CD C:\Program Files\Noldus\Media Recorder 2** (32 bit) or **C:\Program Files (x86)\Noldus\Media Recorder 2** (64 bit).

4. Type the command.

   The following commands are available:

   - **MRCmd.exe** (no parameter after the executable) or **MRCmd.exe /E** — Starts the Media Recorder program.
   - **MRCmd.exe /R** — Starts recording.
   - **MRCmd.exe /S** — Stops recording.
   - **MRCmd.exe /X** — Closes the Media Recorder program.
   - **MRCmd.exe /C** — Loads a configuration file.

There is a space between the file name and the slash. The commands are the same as for the Noldus MPEG Recorder.

5.4 Delay

Opening the Media Recorder program requires time. When a command "Start recording" is sent before the Media Recorder program is open, the recording does not start. So make sure the Media Recorder program is open when you want to start recording. If you send commands with The Observer XT or EthoVision XT to the Media Recorder, make sure to allow enough time between sending the command "Start Media Recorder" and "Start Recording".

There may also be a delay between the command "Start Recording" and the moment the recording actually starts. This delay varies between 0.1 and 10 seconds and is dependent on the number of cameras, camera settings, the processor speed and programs running in the background. This is important when you control the Media Recorder with EthoVision XT. When you control the Media Recorder with commands from The Observer XT 11.5, the videos are automatically synchronized with the events.

When you start an observation in The Observer XT and start the Media Recorder manually, you need to synchronize the observation and videos using an event that is recognizable in the videos. To assess the delay, make a video recording where the camera points at your keyboard. When you press a key for an event, the event is recorded in The Observer XT event log and also in the video footage. You can then visualize video and event data to estimate the time difference between the event logged and the corresponding video footage when the key was pressed. You can also use the SyncBox to assess the delay (see the chapter The SyncBox in The Observer XT Service Manual).

When you use the video in EthoVision XT the delay results in missing frames at the beginning of a video file. To assess this delay, make for example a video of a digital clock and compare the time the command "Start Recording" is given with the time at the first frame of the video.

5.5 Loading a configuration file

In the Media Recorder you can make a configuration file with the settings like frame rate, resolution and color space for your cameras. This way you can for example make separate configuration files for a webcam that films the face of a test participant for FaceReader and two cameras that film the set-up from two different angles for The Observer XT. To save your configuration, open the **File** menu and select **Save Configuration As.....** You can also use Cyrillic, Chinese, or Japanese characters for the configuration name.

You can load a configuration file with **MRCmd.exe** and the command **/C**. By default MRCmd.exe loads a file from the folder **C:\Users\Public\Public Documents\Noldus\Media Recorder**. If the file is located in another folder, you must type the full path. If the file name or the path contains spaces you must type it in between quotation marks.

Example 1 - Command for opening the Media Recorder and loading the configuration file *Configuration_webcam.mrs* that is located in the folder **C:\Users\Public\Public Documents\Noldus\Media Recorder**.

MRCmd.exe /E /C=Configuration_webcam.mrs

Example 2 - Command for opening the Media Recorder and loading the configuration file *Configuration USB cameras* that is located in the folder **C:\Configuration files**

MRCmd.exe /E /C="C:\Configuration files\Configuration USB cameras.mrs"

If you want to load another configuration, make sure the Media Recorder is not recording.

To go back to the default configuration (no cameras selected), open the **File** menu and select **Open Configuration**. Browse to the file **Default Settings.mrs**. This file is read-only. You can find this file in the folder **C:\Users\Public\ Documents\Noldus\Media Recorder**.

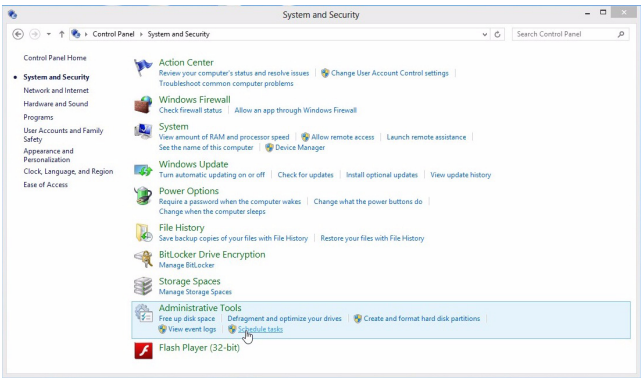
5.6 Control Media Recorder at a predefined time

Windows 7 and 8 come with the program **Task Scheduler**. With this program you can control other programs at a predefined time. With the external commands you can control the Media Recorder at a predefined time. This is especially useful when you want to start recording in the middle of the night, or you do not want to disturb the test subjects by handling the video software.

1.

   a **Windows 7** - Type **Task Scheduler** in the **Search** field of the Windows **Start** menu. Open the program **Task Scheduler**.

   b **Windows 8** - Open the **Control Panel** and click **System and Security**. Then click **Schedule tasks** under **Administrative Tools**.



3. Open the **Action** menu and select **Create Task**.

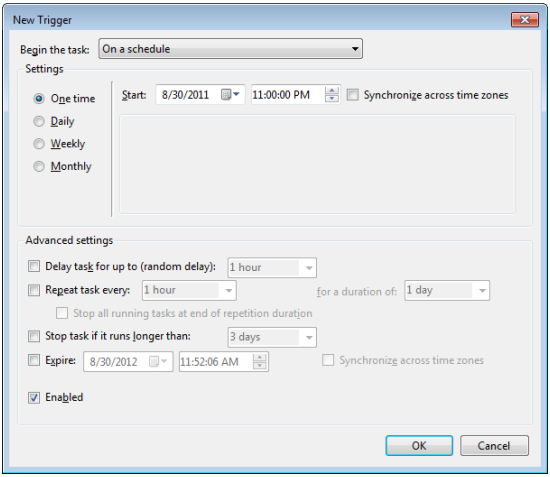
4. In the **General** tab of the **Create Task** window, type a name in the **Name** field, for example Media Recorder with Webcam.

5. Change or fill in any of the other settings in this tab and click the tab **Triggers**.

6. Click the button **New**.

7. In the **New Trigger** window select **On a schedule** from the list next to **Begin the task:**.

8. Select the time you want to start the command in the **Start** field and choose whether you want to send the command once, daily, weekly or monthly. The window will look like this:



9. Select or change any of the Advanced Settings and click **OK**.

10. Click the **Actions** tab and click **New**.

11. In the **New Action** window, select **Start a program** next to **Action:**.

12. Click **Browse** next to **Program/script:** and browse to **MRCmd.exe**.

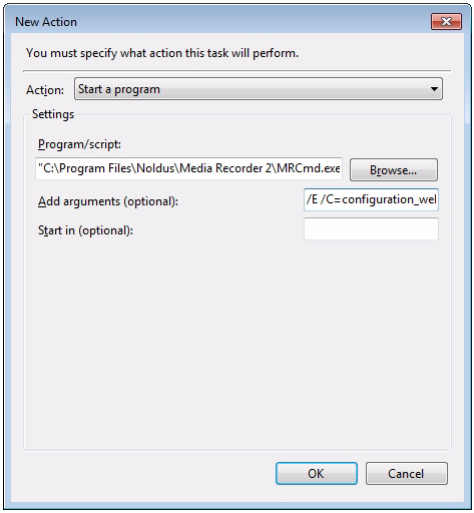
    In the field **Add arguments (optional):** type the command you want. For example, to start the Media Recorder and load the configuration file for your webcam, type

    /E /C=Configuration_webcam.mrs

    If the configuration file is not located in the folder **C:\users\public\public documents\noldus\Media Recorder**, you

must type the full path. If the file name or path contains spaces you must type it in between quotation marks (See also page page 52).

Your window will look like this:



13. Click **OK**. Optionally select or change any settings on the tabs **Conditions and Settings**.

14. Click **OK**. Your command is now scheduled.

15. Similarly, you can create tasks to start and stop recording at a predefined time with the commands **/R** and **/S** and to close the Media Recorder with the command **/X**.

Opening the Media Recorder program requires time, which may be several seconds. When a command “Start recording” is sent before the Media Recorder program is open, the recording does not start. So make sure you allow enough time for the Media Recorder program to open.

---

16. By default, the tasks are stored in the folder **Task Scheduler Library**. To edit or delete a task, click this folder in the tree on the left side and select the task in the window Task Scheduler Library. In the **Actions** pane, click **Properties**, or **Delete**.

WHAT NEXT?

- You can open one or more video files created with the Media Recorder in The Observer XT for **offline scoring** (see chapter 4 in The Observer XT Reference Manual).
- You can open a video created with the Media Recorder in EthoVision XT for tracking **from video file** (see chapter 9 in the EthoVision XT Reference Manual).
- You can open a video file created with the Media Recorder in FaceReader for **video analysis** (see Chapter 3 in the FaceReader Reference Manual).

Chapter 6

Using the Media Recorder with Noldus software

6.1 The Observer XT 58

6.2 EthoVision XT 65

6.3 FaceReader 73

6.1 The Observer XT

We strongly recommend to run a test recording of about 2 minutes and play it back in The Observer before you start the actual recording. (see page 28 how to run the Media Recorder in normal mode).

Offline scoring

The MPEG-4 and H.264 files created by the Media Recorder can be used for offline scoring in The Observer XT 10.0 or higher. No special settings are needed to use files from the Media Recorder in The Observer XT.

External commands

You can use the program **MRCmd.exe** to control the Media Recorder from within The Observer XT. To do so, you select **MRCmd.exe** as external program and specify which command you want to use. On computers with 32 bit version of Windows 7 or 8, this file is present in the folder **C:\Program Files\Noldus\Media Recorder 2**. On computer with a 64 version of Windows 7 or 8, the file is present in the folder **C:\Program Files (x86)\Noldus\Media Recorder 2**.The exact procedure is explained below.

The following commands are available:

- **No parameter or /E** — Starts the Media Recorder program.
- **/R** — Starts recording.
- **/S** — Stops recording.
- **/X** — Closes the Media Recorder program.

Opening the Media Recorder program requires time. When a command “Start recording” is sent before the Media Recorder program is open, the recording does not start. So make sure the Media Recorder program is open when you want to start recording.

On the installation disc of the Media Recorder you find The Observer XT template projects **StartStopMediaRecorder_2_32bit.otx** and **StartStopMediaRecorder_2_64bit.otx**. When you open the appropriate template project, the settings in The Observer XT to use the Media Recorder as an external application are automatically loaded. See paragraph Creating a new project from a Template in Chapter 12 of The Observer XT Reference Manual for information on how to create a project from a template.

Commands to control the Media Recorder with The Observer XT

1. In The Observer XT, from the **Setup** menu, select **Observation Sources**.
2. Select **Live**. The **Devices** window opens. If not, click the **Devices** button.
3. Click the **Add External Program** button. In the **Add External Program** window that opens, under **Name**, type in a name for the commands (only for viewing purposes). For example, *Control Media Recorder*.
4. Select the checkbox next to **New Observation**.
5. In the same row, click the ellipsis button and browse to the file **C:\Program Files\Noldus\Media Recorder 2\MRCmd.exe** (32 bit) or **C:\Program Files (x86)\Noldus\Media Recorder 2\MRCmd.exe** (64 bit).

6. In the same row, leave the space under **Command line options** empty. You can also type the command **/E** in this field. This results in The Observer XT starting the Media Recorder when creating a new observation.
7. Select the checkbox next to **Start observation**.

8. In the same row, click the ellipsis button and browse to the file **C:\Program Files\Noldus\Media Recorder 2\MRCmd.exe** (32 bit) or **C:\Program Files (x86)\Noldus\Media Recorder 2\MRCmd.exe** (64 bit).

9. In the same row, under **Command line options**, type the command **/R**. This way recording starts when you start an observation in The Observer XT.

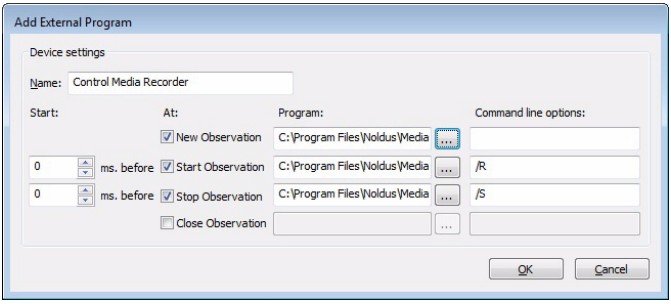
10. Select the checkbox next to **Stop observation**.

11. In the same row, click the ellipsis button and browse to the file **C:\Program Files\Noldus\Media Recorder 2\MRCmd.exe** (32 bit) or **C:\Program Files (x86)\Noldus\Media Recorder 2\MRCmd.exe** (64 bit).

12. In the same row, under **Command line options**, type the command **/S**. This way recording stops when you stop an observation in The Observer XT.

Leave the fields in front of **ms before** at the default value **0**. The videos are automatically synchronized with the events in The Observer XT.

The **Add External Program** window will look like this:



13. Click **OK**. A new row Control Media Recorder appears in the **Devices** window.

Command for linking video files automatically to the observation

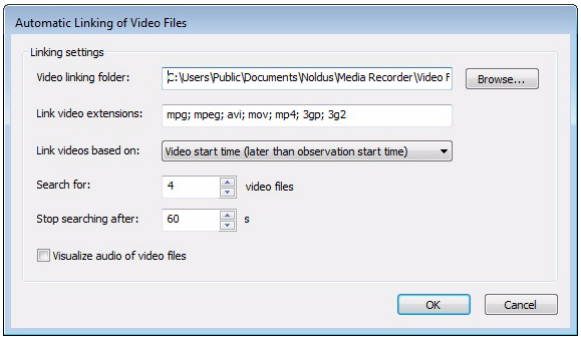
1. Select the option next to **Automatic linking of video files** under **Device**, then double-click this row or click the **Edit Settings** button at the bottom of the table.
2. In the **Automatic Linking of Video Files** window, select the following options:
3. Under **Linking settings**:
   - **Video linking folder** — Browse to the folder where The Observer XT should search for the video files created by the Media Recorder. Make sure that the **Video linking folder** is the folder to which the Media Recorder saves its media files.

By default, the media folder of The Observer XT is selected. However this is not the default folder to which the Media Recorder saves its media files. The Media Recorder saves its files by default in the folder

C:\Users\Public\Publick Documents\Noldus\Media Recorder\Video Files

   - **Link video extensions** — Make sure that ***.avi** and ***.mpg** are included.
   - **Link videos based on** — Select **Video start time (later than observation start time**.
   - **Search for** — Specify here the number of videos you record simultaneously with the Media Recorder. If this is more than two, you need the multiple video add-on of The Observer XT.
   - **Stop looking after** — Specify here the time The Observer XT should look for media files. The maximum time is 600 seconds.
   - **Visualize audio of video files** — select this checkbox if you want to include the audio stream of the videos in the visualization.

The **Automatic Linking of Video Files** window will look like this:



4. Click **OK**. Your **Devices** window now includes the commands to control the Media Recorder and to automatically link video files. See chapter 5 of The Observer XT Reference manual for more information on automatic linking of video files.

LOADING THE CONFIGURATION FILE WITH THE OBSERVER XT

In The Observer XT you can load the configuration file with the external program functionality. To do so, you select **MRCmd.exe** as external program. For example, you want to start the Media Recorder and load a configuration for a webcam when you create a new observation.

1. Create a configuration file for your cameras in the folder **C:\Users\Public\Public Documents\Noldus\Media Recorder.**
2. Click the **Add External Program** button. In the **Add External Program** window that opens, under **Name**, type in a name for the command (only for viewing purposes). For example, *Media Recorder with webcam*.
3. Select the checkbox next to **New Observation**.
4. Click the button next to the **Program** column, and browse to the file **C:\Program Files\Noldus\Media Recorder 2\MRCmd.exe** (32 bit) or

C:\Program Files (x86)\Noldus\Media Recorder 2\MRCmd.exe (64 bit).

5. Under **Command line options**, type the command **/E /C=Configuration_webcam.mrs**

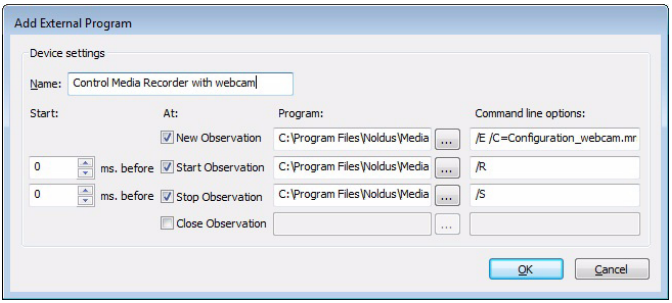
   If the configuration file is not located in the folder **C:\users\public\public documents\noldus\Media Recorder**, you must type the full path. If the file name or the path contains spaces you must type it in between quotation marks (See also page 52).

You can then enter the commands to start recording when you start an observation and stop recording when you stop an observation.

6. Select the checkbox next to **Start Observation**.
7. Click the button next to the Program column, and browse to the file **C:\Program Files\Noldus\Media Recorder 2\MRCmd.exe** (32 bit) or **C:\Program Files (x86)\Noldus\Media Recorder 2\MRCmd.exe** (64 bit).
8. Under **Command line options**, type the command **/R**.
9. Select the checkbox next to **Stop Observation**.
10. Click the button next to the **Program** column, and browse to the file **C:\Program Files\Noldus\Media Recorder 2\MRCmd.exe** (32 bit) or **C:\Program Files (x86)\Noldus\Media Recorder 2\MRCmd.exe** (64 bit).
11. Under **Command line options**, type the command **/S**.

Leave the fields in front of **ms before** at the default value **0**. The videos are automatically synchronized with the events in The Observer XT.

The **Add External Program** window will look like this:

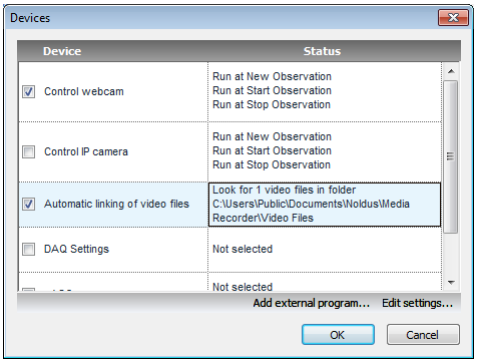


12. Click **OK**. A new row appears in the **Devices** window.

In the same way, you can make settings to load a configuration file and start and stop recording with two cameras for The Observer XT.

Opening the Media Recorder program requires time. When a command “Start recording” is sent before the Media Recorder program is open, the recording does not start. So make sure you allow enough time for the Media Recorder program to open.

If you want to switch configurations between observation in The Media Recorder, make sure the Media Recorder is not recording when you load a new configuration. Make separate device settings for each configuration, for example to switch between an IP camera and a webcam. Select the new configuration in the **Devices** window in The Observer XT **Project Setup** window.



Delay

It is recommended to start and stop recording with the Media Recorder with commands from The Observer XT. If you start recording with the Media Recorder manually and import the videos in the observation, you need to synchronize the observation and videos using an event that is recognizable in the videos. To assess the delay, make a video recording where the camera points at your keyboard. When you press a key for an event, the event is recorded in The Observer XT event log and also in the video footage. You can then visualize video and event data to estimate the time difference between the event logged and the corresponding video footage when the key was pressed. You can also use the SyncBox to assess the delay (see the chapter The SyncBox in The Observer XT Service Manual).

6.2 EthoVision XT

The MPEG-4 DivX and H.264 files created by the Media Recorder can be used in EthoVision XT. However, if you use other hardware or cameras than the ones supplied by Noldus, you need to check whether the time information in the video files is correct and you may need to set a

custom aspect ratio. Contact Noldus Technical Support for more information on how to do this.

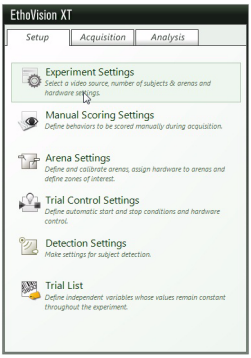
We strongly recommend to run a test recording of about 2 minutes and play it back in EthoVision XT before you start the actual recording. (see page 28 how to run the Media Recorder in normal mode). With this test recording you can also determine the delay between the moment you click the start button of the Media Recorder and the actual start of recording. To assess this delay, make for example a video of a digital clock and compare the time the command "Start Recording" is given with the time at the first frame of the video.

TRACK FROM VIDEO FILES

The MPEG-4 and H.264 files can be used to track from video files in EthoVision XT 8 or higher.

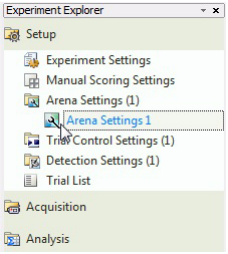
SETTINGS

- In the **EthoVision XT** overview window, open the **Experiment Settings**.



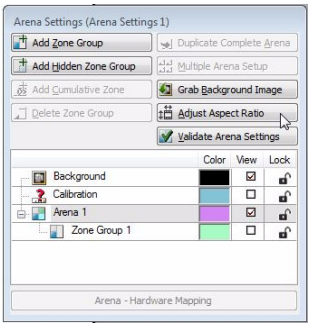
- In the **Experiment Settings** window, choose **From Video File** as your **Video Source**. You find more information on how to make **Experiment Settings** in chapter 5 of the EthoVision XT Reference Manual.

- It is important that you define the correct aspect ratio for your video files in EthoVision XT. To do so, open the **Arena Settings**. To open the **Arena settings**, open the **Setup** menu and select **Arena Settings**, or click the desired **Arena Settings** in the Experiment Explorer.



- Browse to your video file and grab a background image for your arena. See chapter 6 of the EthoVision XT Reference Manual for information on how to do this, and for more information on how to make **Arena Settings**.

- Click **Adjust Aspect Ratio**.



- Depending on whether you use an analog, or a digital camera, the procedure differs.

  Digital cameras

  For most digital cameras you can leave the default option **Diligent controlled by EthoVision or video file with aspect ratio** selected. To be sure the correct aspect ratio is used, place a sheet with a circle under the camera and grab this image as background image. Draw a three point circle. If the aspect ratio of the image is correct, this three point circle fits over the circle from the camera image.

  If the aspect ratio is not correct, select the option **Custom** and enter the adjusted aspect ratio.

  Example 1 – You have a perfectly circular water maze with a diameter of 100 cm. When you open the Background Image of this water maze in an image editing program and draw an ellipse around the maze, the ratio of width/height does not equal '1' but is 1.019. This means that you need to adjust the aspect ratio of the Background Image using this ratio: in the **Adjust Aspect Ratio** window, in the **Custom** field, divide the width (box on the left) of the image by 1.019. Do not change the height.

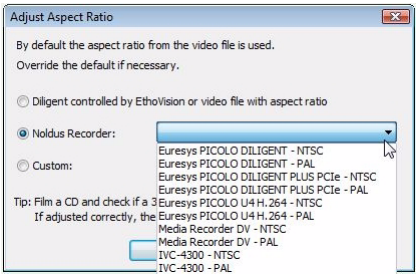
  Example 2 – You have a square open field measuring 40 x 40 cm. When you open the Background Image of the open field in an

image editing program and draw a rectangle around the open field, the ratio of width/height does not equal '1', but is 0.8. This means that you need to adjust the aspect ratio of the Background Image using this ratio: in the **Adjust Aspect Ratio** window, in the **Custom** field, divide the width of the image (box on the right) by 0.8. Do not change the height.

In principle you can create an MPEG-4 file from many different digital cameras. However, for accurate tracking the quality of the digital camera is essential. EthoVision XT has extensively been tested with the FireWire cameras Med Associates Basler (Type A602F),The Imaging Source DMK21AF04 (monochrome), and DFK31AF03 (color) and the GigE camera Basler AC1300-30gm.

Analog cameras

In the **Adjust Aspect Ratio** window choose **Noldus Recorder** and click the dropdown list.



- **Euresys PICOLO U4 H.264 – NTSC** — Select this option when you have the Picolo U4, or U8 H.264 encoder card to create H. 264 files with the Media Recorder. Furthermore you have an NTSC camera with a frame rate of 29.97 frames per second. These cameras are found in North and Central America, together with parts of Asia.

- **Euresys PICOLO U4 H.264 – PAL** — Select this option when you have the Picolo U4, or U8 H.264 encoder card to create H. 264 files with the Media Recorder. Furthermore you have a PAL camera with a frame rate of 25 frames per second. These cameras are found in Europe and the rest of the world, except for North and Central America, together with parts of Asia.

The other options do not apply for video files created with the Media Recorder 2.5.

EXTERNAL COMMANDS

You can use the program **MRCmd.exe** to control the Media Recorder from within EthoVision XT. To do so, you select **MRCmd.exe** as external program and specify which command you want to use. By default this file is present in the folder **C:\Program Files\Noldus\Media Recorder 2\MRCmd.exe** (32 bit) or **C:\Program Files (x86)\Noldus\Media Recorder 2\MRCmd.exe** (64 bit). The exact procedure of creating video files with external commands is explained below.

The following commands are available:

- **No parameter or /E** — Starts the Media Recorder program.
- **/R** — Starts recording.
- **/S** — Stops recording.
- **/X**—Closes the Media Recorder program.

Opening the Media Recorder program takes time. When a command “Start recording” is sent before the Media Recorder program is open, the recording does not start. So make sure the Media Recorder program is open when you want to start recording. There also may be a delay between the command Start Recording and the moment the Media Recorder actually starts recording. Run a test recording to test how long this delay is. To assess this delay, make for example a video of a digital clock and compare the time the command “Start Recording” is given with the time at the first frame of the video.

Settings

To create settings to control the Media Recorder from within EthoVision XT, open the Trial Control screen. For an extensive description of how to use Trial Control, see chapter 7 of the EthoVision XT Reference Manual or the Trial and Hardware Control user Guide.

1. In the **Components** pane, under **Actions** click the button next to External command.

2. Next to **Action Name**, enter the name of the action (for example, *start recording*) or accept the default name.

   Click the **Help** button to get additional information about defining an External command.

3. Under **Actions to perform**, select which file you want to run by clicking the ellipsis button.

4. Next, select file types **Executables (*.exe)** from the list.
5. Locate the file **MRCmd.exe** and click **Open**.
6. Enter one of the commands that are available for the Media Recorder (**/E**, **/R**, **/S**, **/X** or no command) as a **Command line option**.

   Example - You carry out live tracking during a 24-hour period and you want to make a recording in the Media Recorder but only when the animal leaves the shelter (defined as a Hidden Zone, where it spends most of its time). First, start up the Media Recorder using an **External command** box: select **MRCmd.exe** as the Executable to run and enter **/E** as a Command line option to start the Media Recorder.

Next, insert a Condition *Out of shelter* and combine this with a **Time** condition to make sure that the Media Recorder is started before recording starts (see Figure 6.1 for an example). Then, insert an **External command** box: select **MRCmd.exe** as the Executable to run and enter **/R** as a **Command line option** to start recording with the Media Recorder. Similarly, you can stop recording (**Command line option**: **/S**) when the animal enters the shelter again.

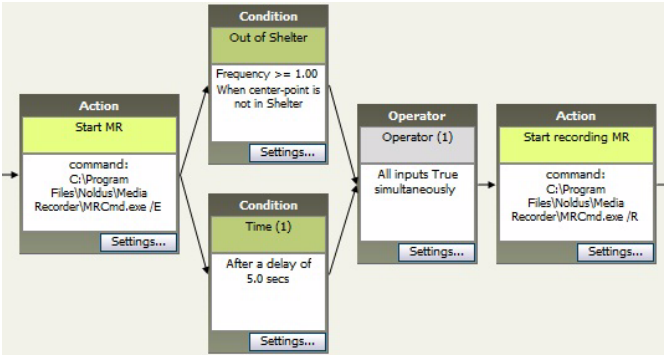


Figure 6.1 *Example of the External command action to start a recording with the Media Recorder when the animal leaves a shelter. The left Start MR action box starts up the Media Recorder. The Start recording MR action box on the right starts the recording when both the 'Out of Shelter' and 'Time(1)' conditions are true, that is, the center-point of the animal has left the shelter at least 5 seconds after the Media Recorder was started.*

USING THE CREATED VIDEO FILES

If you want to use the files created with the Media Recorder with the method described above, you have to make a new experiment and choose the option **track from video file** in the Experiment Settings.

6.3 FaceReader

The MPEG-4 and H.264 files created by the Media Recorder can be used in FaceReader 4 or higher. They can be used for video analysis (offline). FaceReader does not support or wide screen video. No special settings are needed to use files from the Media Recorder in FaceReader. You cannot simultaneously analyze live video signals in FaceReader and create video files in the Media Recorder. If you want to analyze and record videos simultaneously, record the videos in FaceReader.

Chapter 7

Specifications

7.1 **Specifications** **76**

7.1 Specifications

- The Media Recorder supports Microsoft Windows 7 64-bit Professional edition with Service Pack 1 and Windows 8 64-bit Professional edition. The following devices are also supported with Windows 7 32 bit Professional edition with Service Pack 1:
  - Four Axis P5534 IP cameras.
  - Four analog cameras.
  - Three analog cameras in combination with a DVI2USB 2.0 screen capture device.

Customers that have a 32 bit version of Windows 7 and upgrade Media Recorder to version 2.5 should realize that most supported devices have been tested with the 64 bit version of Windows 7. We expect that the supported devices also work with Windows 7 32 bit, but this has only been tested with the above mentioned devices.

The Media Recorder has been thoroughly tested with Windows 7 and 8 Professional, U.S. English 64-bit edition. It has also been tested with and Cyrillic, Japanese and Chinese language packs. It is possible that certain local language versions of Windows may affect how well the program runs.

If you encounter a problem related to the operating system, please contact Noldus Technical Support (see page 85).

Installation of the Media Recorder is also possible on computers that have Chinese, Japanese, or Cyrillic language packs of or Windows 7 and 8.

- The Media Recorder is not designed for use with the Windows Touch features of Windows 7 and 8.
- For working with The Media Recorder and video (files or cameras), we recommend that you use a professional workstation. It is possible to buy consumer-range computers with a high processor

speed and plenty of memory, but in order to remain competitive regarding price, the manufacturers often economize on the underlying system architecture. That means those computers are suitable for home use, but not for running professional scientific software. You should select a computer which is intended for professional use or labeled by the manufacturer as a workstation.

- If you use an older desktop computer, it should have at least a 2.7 GHz Quad Core processor and at least 4 GB of memory. A laptop shoud have at least a 2.2 GHz Quad Core processor and at least 4 GB of memory.
- We strongly recommend to run a test recording of about 2 minutes and play it back in EthoVision, The Observer or FaceReader, before you start the actual recording. (see page 34 how to run the Media Recorder in normal mode). With this test recording you can also determine the delay between the moment you click the start button of the Media Recorder and the actual start of recording.
- For The Observer XT you need the Video module to be able to record and play back up to 2 video files simultaneous. You need the additional Multiple videos module to play back up to 4 video files simultaneous.
- If you want to install the H.264 encoder card, your computer recording the video must have a free PCI express slot. If you want to record audio, your computer also must have a free slot that can contain the audio bracket. Furthermore, the computer must have sufficient hard disk space to store the video files you create. With the default settings, the files have a minimal size of 0.6 GB per hour. It must also meet the minimum specifications for the version of The Observer XT, EthoVision XT, FaceReader, and Windows that you are using.

Recommended computer

If you order a complete solution from Noldus Information Technology, you will obtain a Dell Precision™ T3600 quad core workstation (or its successor) or a Dell Precision™ M4700 quad core laptop (or its successor) for a portable solution. These PCs are the standard test

platforms for The Media Recorder, and we recommend that you use that computer. The Media Recorder 2.5 has also been tested on a Dell Precision™ T3500 quad core workstation.

If you are planning to purchase a different computer than the T3600, or the M4700 please contact us for detailed advice.

We recommend that you do not use the following computers, as these have caused our customers problems in recent years:

- All HP (Hewlett Packard) computers
- Dell Optiplex
- Dell Vostro
- Low-end consumer models
- Dell dual core computers

DISK SPACE TO STORE MEDIA FILES

If you are scoring from video files on the hard disk, you need sufficient free space to store them (MPEG-4 at least 0.5 GB/hr, and H.264 at least 0.6 GB/hr).

VIDEO CARD

For working with digital video, a good quality high-end video card designed for workstations is recommended. Onboard video is not recommended.

USB INPUT

To be able to use cameras with USB output, you need USB version 2.0. The M4700 laptop has a USB 2 and a USB 3 controller. The devices that are supported with the Media Recorder do not need USB 3. However, if you use two USB devices simultaneously, it is recommended to connect one to a USB 2 port and the other one to a USB 3 port. This way, each

device is connected to a separate USB controller, which results in more accurate recordings.

Appendix A

Troubleshooting

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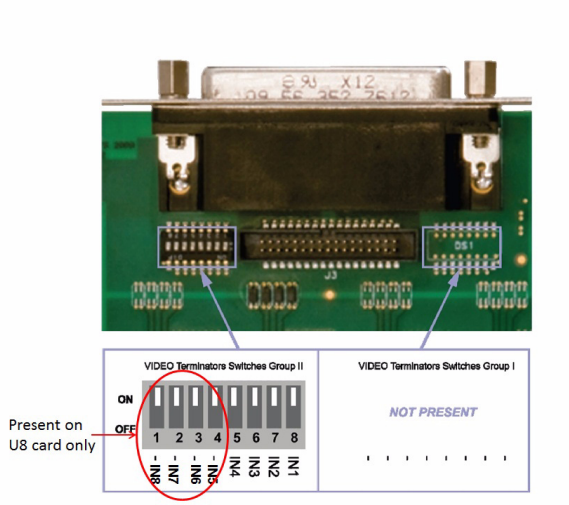
A.2 **Help Menu** **84**

A.3 **Technical Support** **85**

A.1 Troubleshooting

- If you are having problems, please first read Chapter 7 Specifications above, to check that your system is suitable for using the Media Recorder.
- If you get an error message during installation of the Picolo U4, or U8 H.264 card, it is most likely that the card is not correctly inserted into your computer. Turn the computer off and disconnect the power cable. Press the card gently but firmly into place.
- If you split the input of one analog camera and connect them to two video channels on the Picolo U4 H.264 encoder board, it may happen that one or more of the camera images is very bad quality. If this is the case, the dip switches on the encoder board are in the wrong position. Open the computer and make sure that for the video channels you use, one dip switch is set to ON and the other to OFF. The picture below shows which switch belongs to which video channel.



- If your output folder is on the C: drive it is possible that you will have insufficient file space. Most computers are configured with more file space on the D: drive, so select your output folder on the D: drive.
- If you are playing back multiple videos in The Observer XT and you hear an echo on the sound track, turn the sound off on all but one of the video monitors.
- If one of your video inputs is black with a warning triangle and the message like **Error detected with Video 1** is shown, the video source was not turned on when the Media Recorder program was started. Press the **Refresh** button in the Media Recorder to show the image from that camera. Note that with some DV camcorders, they go into standby after a certain amount of time unless you remove the tape. You also get the message **Error detected with Video 1** when you have not yet selected this camera in the Media Recorder **Settings** window (see page 33 for details).
- If one of your video inputs is black and you do not see a warning triangle, this is most likely because the aperture of your camera is closed or the lens cap is not removed. This screen is very similar to the screen when the Media Recorder cannot find the video source.
- If you hear no sound on your recording this could be because:
  - The speakers of your computer are not plugged in, turned off or their volume is low.
  - Your microphone is plugged into an audio channel that does not correspond to the video input channel.
  - The Windows volume control is muted or turned low.
  - You have selected **Line -in** for your audio device instead of **Microphone**.
  - You do not have an audio source connected.
- If you have multiple videos that do not seem to be synchronized, use the offset function in The Observer XT to synchronize. If you send commands with The Observer XT to start and stop recording, the videos are automatically synchronized.

- If you miss frames at the beginning of your video when you sent commands to the Media Recorder with EthoVision, this is because of a delay in starting the actual recording with The Media Recorder. To assess this delay, make for example a video of a digital clock and compare the time the command “Start Recording” is given with the time at the first frame of the video.

A.2 Help Menu

The Media Recorder’s **Help** menu contains the following options:

- **Help topics** – Opens the Reference Manual of The Media Recorder. You can search and find help topics.
- **Noldus Online** – If your computer is connected to the Internet, you can choose this option to go to the Media Recorder home page, check for updates, contact the help desk or consult the Media Recorder knowledge base. If you encounter a problem with the Media Recorder, you can inform Noldus IT with the **Report an Issue** option.

  On the Noldus web site you can also:
  - Download technical notes. Visit www.noldus.com and browse to the **Support - Downloads** section.
  - Get information about known problems and their solution. This information is also available on the **Support - Downloads** section.
- **Upgrade** – If you have purchased an upgrade of The Media Recorder, choose this option to type the new **Upgrade Key** number that you have received from Noldus.
- **About Media Recorder**– Choose this option to see details of exactly which version of The Media Recorder you are using. You can click **User Info** to see the registered user and license number of your software.

A.3 Technical Support

For questions about this or any other Noldus product, please check the Technical Support knowledgebase or contact the Support department (www.noldus.com/support). You can also contact the Support Department by opening the **Help** menu in the Media Recorder, select **Noldus Online** and subsequently **Contact Help Desk**. The help desk may ask for the file **MediaRecorder.log**. You can find this file in the folder **C:\Users\Public\Public Documents\Noldus\Media Recorder**.

Appendix B

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