EYE-C-GAS ™

Infrared Gas Leak Detection System

User's Manual

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OPGAL
Beyond the visible

Main Sections

NOTICE

Opgal Optronics Industries Ltd. operates under a continual product improvement program and reserves the right to make improvements and or changes without prior notification. This manual supersedes all previous manuals for this instrument.

EYE-C-GAS is an **Opgal Optronics Industries Ltd.** registered trademark.

P/N PS8G9006-Rev 1

1 Congratulations

Congratulations on the purchase of your EYE-C-GAS™ Infrared Camera. The new Opgal EYE-C-GAS combines the latest in infrared technology with an innovative product design to bring you the first handheld infrared camera engineered specifically for use in gas leak detection. The innovative, easy-to-use interface on EYE-C-GAS enables users to begin achieving results immediately.

The benefits of using infrared technology as a tool for gas leak detection are many. Several particularly notable benefits include increased worker safety, reduced environmental emissions, and substantial financial savings as a result of leak detection and remediation. Some of the many uses for your EYE-C-GAS camera include:

- Maintenance
- Plant survey inspection
- On line update of database
- Documentation of the surveyed inspection with the recorded video data

NOTE:
To ensure that we are able to reach you with any product or software updates, please fill out the warranty card enclosed with your EYE-C-GAS Infrared Camera.

2 Warnings & Cautions

2.1 WARNINGS

2.1.1 Li-ion Batteries

You must read these safety instructions and warnings before using or charging your batteries.

- Lithium Polymer and Li-ion batteries are volatile. Failure to read and follow the below instructions may result in fire, personal injury and damage to property if charged or used improperly.

CAUTION
DO NOT EXPOSE THE BATTERY TO TEMPERATURES ABOVE 60°C (140°F). Do not disassemble. To be used only with the EYE-C-GAS camera. Use only the supplied battery charger. FAILURE TO FOLLOW these instructions may present risk of explosion or fire. THIS USER'S MANUAL INCLUDES ADDITIONAL SAFETY INSTRUCTIONS WHICH MUST BE OBSERVED AND FOLLOWED.

WARNING
Read all instructions and warnings before using this product. Your EYE-C-GAS Infrared Camera is like any other tool. It must be used properly and safely. All users should be trained on the proper and safe use of infrared imaging prior to using the EYE-C-GAS Infrared Camera. This is especially important for users who may use the product in potentially hazardous or explosive environments. Failure to follow this information could result in death or serious injury.

2.2 Cautions

Battery handling and charging, heat, laser or energy sources, moisture or rain ingress, shocks and drops, fire, temperature range, cleaning procedures, maintenance, etc.

Table of Contents

Table of Figures

3 Packing List

A complete EYE-C-GAS system consists of the items in the table below. Items 1, 3 through 10 are housed in a rugged Carrying Case and all 10 items are standard with the system. You may have purchased additional accessories with your camera. These are listed in the “Accessories” column below.

No	Deliverables	Standard Item	Part Number	Accessories
1	EYE-C-GAS Camera	✓	8G9A0000A	
2	EYE-C-GAS Carrying Case	✓	815034	
3	EYE-C-GAS CD software	✓		
4	Batteries (x 3)	✓	8G9M5000B	
5	Battery Charger	✓	8G9M6000B	
6	Glare Shield	✓	8G9A0020B	
7	Neck Strap	✓	807016	
8	Cable, USB A to Mini B	✓	802078	
9	EYE-C-GAS User's Manual	✓		
10	Head Set	✓	8G9A0050A	
11	Tripod /Monopod		807015	✓
12	Monopod		TBD	✓
13	BNC Video Adaptor		8G9H0010A	✓
14	Backpack		815032	✓

4 System Overview

The following section highlights the key parts of the EYE-C-GAS System including accessories.

4.1 EYE-C-GAS Camera- P/N ***8G9A0000A***

EYE-C-GAS is a handheld infrared camera capable of autonomous imaging and recording operations for the detection of gas leaks. EYE-C-GAS runs on lithium ion polymer (Li-Ion) batteries.

4.2 EYE-C-GAS Carrying Case - P/N ***815034***

The EYE-C-GAS Carrying Case is a plastic hard case containing custom made protective foam designed to securely house and cushion the EYE-C-GAS camera. The case also conveniently stores the neck strap, charger, battery set, power cord, glare shield, USB cable, software CD and head set.

4.3 ArtSoft CD Software for EYE-C-GAS -

ArtSoft is a virtual “control panel” for EYE-C-GAS. Contained on a CD, ArtSoft facilitates various system operations for EYE-C-GAS including time and date setting, system version verification, software and firmware updating, file download, conversion and playback.

4.4 Batteries X 3 - P/N ***8G9M5000B***

Set of three lithium ion battery packs for powering the EYE-C-GAS. One battery pack runs the EYE-C-GAS camera continuously for over four hours and is custom designed with voltage and protection circuitry exclusively for use with EYE-C-GAS camera.

4.5 Battery Charger - P/N ***8G9M6000B***

The 110/220 volt AC Battery Charger can charge 1-3 EYE-C-GAS battery packs simultaneously.

4.6 Glare Shield - P/N ***8G9A0020B***

The EYE-C-GAS Glare Shield is useful for direct sunlight and other bright light situations where screen glare impedes direct viewing of the liquid crystal display (LCD). The glare shield is easily applied to the back of the camera around the LCD, blocking outside light. An optical magnifier promotes easier viewing.

4.7 Neck Strap - P/N ***807016***

The Neck Strap provides hands-free transport for user and camera safety.

4.8 Cable, USB A to Mini-B - P/N ***802078***

The USB cable connects the EYE-C-GAS to a PC via a USB port. The EYE-C-GAS is equipped with a mini-B connector on the front panel for quick connection.

4.9 Head Set - P/N 815032

The EYE-C-GAS Head Set enables audio overlays onto recorded video. The operator can embed an audio track during video recording, while the headset speakers output the recorded soundtrack during playback for field audio and video monitoring. The head set attaches to the user's hard hat.

4.10 Optional Accessories

These optional accessories, available for EYE-C-GAS, promote optimal ease-of-use and enhanced user experience (not supplied standard with EYE-C-GAS):

4.10.1 Backpack - P/N ***815032***

The custom designed Backpack stores and transports EYE-C-GAS and its accessories. Ideal for field use, the backpack offers a safe, comfortable carrying option.

4.10.2 Tripod / Monopod - P/N ***807015***

The specially equipped Tripod/Monopod connects EYE-C-GAS for stationary, long-term viewing and recording. *Note: Please read tripod / monopod instructions before use.*

4.10.3 Monopod - P/N - TBD

The Monopod enables easy use of the EYE-C-GAS and reduces user fatigue during extended inspections. The Monopod keeps the camera stable and in position for use as the operator searches for a leak. *Note: Please read tripod / monopod instructions before use.*

4.10.4 BNC Video Adapter (not shown) – P/N - 8G9H0010A

The BNC Video Adapter allows the real-time infrared video image to be displayed on an external device such as a projector or monitor.

4.11 Features

These features maximize the functionality and capability of the EYE-C-GAS Infrared Camera:

4.11.1 DVR - Digital Video Recorder -

The Digital Video Recorder (DVR) for EYE-C-GAS records up to four gigabytes of audio and video. The DVR built into the EYE-C-GAS housing requires no additional hardware. Audio and video files are stored in its internal memory and are downloadable via USB to a PC. EYE-C-GAS can record and playback infrared and visible video and audio files. Audio and video files can be deleted from the camera's memory as needed. The Artsoft program can be used to download and convert recorded files.

4.11.2 CCD –Video Camera -

A Video Camera (CCD) adds CCD visible video capability to EYE-C-GAS enhancing operator orientation, component identification and text and number recognition.

Prior to Operation

4.12 Battery Charging

To charge EYE-C-GAS batteries, connect the AC power cord to the battery charger and plug the cord into an AC outlet. Insert a battery into the EYE-C-GAS charger by loading the battery into the charger until it latches (the battery can only be loaded one way). Repeat for the other two batteries. The battery charger LEDs will indicate red while charging and turn to green when the corresponding battery is fully charged. A flashing red LED indicates an error such as incorrect battery placement on the charger or an improperly functioning battery. To fully charge a depleted battery takes about 6 hours.

Caution

Use only EYE-C-GAS battery packs manufactured by Opgal (part number: 8G9M5000B).
Use only the supplied battery charger to charge the battery packs.
Damage to the EYE-C-GAS system caused by batteries manufactured by other companies may void the system warranty.
Do not charge the battery pack(s) while they are hot.
Do not charge the battery pack(s) or operate the battery charger in a hazardous environment.
Recycle the battery pack(s) at an approved disposal location.
Operating the battery pack(s) in high or low temperature environments will reduce operational run time.
Do not expose the battery pack(s) to fire or extremely high temperatures.
Do not cause damage to or attempt to short circuit the battery pack(s).
Fully charge a battery pack if it has not been used in two months.
Refer to Section 8, Troubleshooting and Maintenance for additional battery pack maintenance recommendations.

4.13 EYE-C-GAS Initial Operation

Before operating your EYE-C-GAS camera for the first time, ensure that all standard items and features and those accessories or features that you have purchased are included and/or installed per the Packing List.

1. Take out the EYE-C-GAS camera and remove the installed battery.
2. Take out the two additional battery packs from the carrying case.
3. Remove the adhesive tape from all battery contacts if installed.
4. Place the battery packs in the charger and perform a full charge.
5. Check if the battery packs have a full charge by verifying the green LED is lit on the charger for all three packs. When installed on the EYE-C-GAS, all three green LEDs will be lit to also indicate the battery pack is fully charged. OPGAL recommends that you fully charge any battery pack which is not fully charged prior to using.
6. Install a fully charged battery pack into the EYE-C-GAS camera.

5 EYE-C-GAS Controls and Operation

The following section details operation and use of the EYE-C-GAS Infrared Camera.

5.1 Controls and Display

Using the EYE-C-GAS is simple and intuitive. Large, convenient buttons located on the top of the EYE-C-GAS control most camera operations. The two connectors located on the front panel facilitate connection to external devices.

5.1.1 Front Panel

Figure 1: Front Panel

The front panel of the EYE-C-GAS comprises the following:

5.1.1.1 3.5" Color LCD Display

A VGA format 640 x 480 LCD displays high resolution grayscale infrared and visible color video images. The glare resistant LCD is designed to be viewable in brightly lit areas.

5.1.1.2 Battery Status LEDs

Five LEDs, from left to right, display EYE-C-GAS battery status. The three green, one yellow and one red LEDs provide easy recognition of remaining battery capacity. The LEDs will extinguish in order from left green to right red. A single red LED indicates the battery is very low and should be changed out with a fully charged one.

5.1.1.3 Camera Warning Indicator

A red LED on the right side of the row of LEDs indicates when the EYE-C-GAS or battery is not working properly.

5.1.1.4 USB2 Connector

The USB2 connector is useful at the conclusion of field operations, allowing a user to upload information to EYE-C-GAS as well as download audio and video files directly to a PC. This connector is protected by a cover which must be in place when the connector is not in use.

5.1.1.5 Accessories Connector

The accessories connector allows a user to connect the standard head set and optional analog video adaptor. This connector is protected by a cover which must be in place when the connector is not in use.

5.1.2 EYE-C-GAS Components

Designed to withstand the rigors of everyday handling in refineries and chemical plants, EYE-C-GAS also incorporates safeguards for use in hot air environments.
The key components of EYE-C-GAS are shown in Figure 2

Figure 2: EYE-C-GAS, main parts

5.1.3 Keypad Buttons and connectors

The default setup of the keypad buttons is shown in Figure 3.

5.1.3.1 NUC

Figure 3: Keypad buttons functionality in Normal Mode

The NUC, or Non-uniformity Correction, button refreshes the camera image as needed. Refer to section 5.2.1.2 for details. Also is used as the down arrow when in menu mode

5.1.3.2 Polarity

The Polarity button switches the infrared image between white hot (WH) and black hot (BH) depending on user preference and scene dynamics.

5.1.3.3 Visible / Infrared

The Visible / Infrared button switches between the CCD visible image and the infrared image. EYE-C-GAS can record both types of imagery with the DVR.

5.1.3.4 Menu /Select

The Menu button is the main interface of EYE-C-GAS. Depressing the menu button shows various options and commands while depressing the menu button a second time while a

corresponding item is selected initiates those options and commands. Refer to section 5.1.4 for details.

5.1.3.5 Mode

The Mode button switches between Normal and Enhanced modes.

While in Normal mode the camera is set for handheld monitoring of the components in the search for potential leaks.

The second Mode is called Enhanced (ENH). In this mode the camera performs in a high sensitivity detection mode and the use of a tripod or monopod is recommended to visualize the leaks of a cluster of components and at a distance.

To enter the ENH mode (see Figure 3), press the Mode button while in Normal mode. After the button is pressed the keypad configuration will change to that described below in Figure 4.

Figure 4: Keypad configuration in Enhanced Mode operation

5.1.3.6 Record / Stop

The Record / Stop button facilitates recording of either visible or infrared video and audio to the DVR. Depress the Record button once to begin recording and a second time to stop recording.

5.1.3.7 Zoom

The Zoom button scrolls through the electronic zooms. When the button is repeatedly pressed the zoom increases from x1 to x2 to x4 and back again to x1.

Note: Most of the button functions are also available through the menu.

5.1.4 Menu and Keypad Map

The Keypad map can appear on the screen to guide new users in working the EYE-C-GAS, as shown in Figure 5.

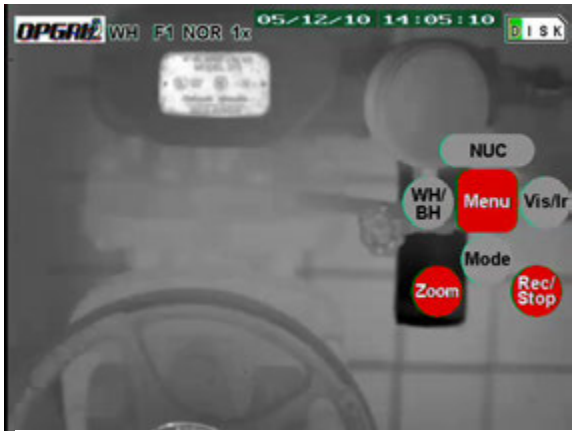


Figure 5: Keypad mapping on LCD

The EYE-C-GAS menu system allows advanced users to set up the menu system, as shown in Figure 6, according to their individualized needs. As shown in Figure 6, keypad mapping control is "ON" and active.

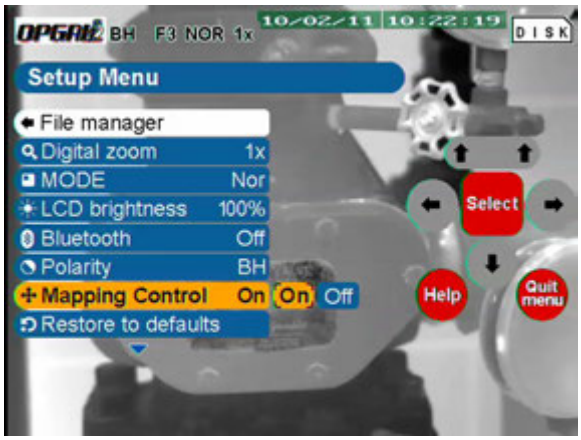


Figure 6: Menu Display on LCD – Mapping Control ON

5.1.5 File Manager

Selecting File Manager allows users to preview and delete files stored in the DVR.

Figure 7: File manager screen

Upon selecting File Manager, a list of infrared and visible image files will appear. Selecting a file for preview will display it on the LCD. Selecting "*X* " (when its background is yellow) next to the file name and then pressing the "Enter" button will delete the file from the DVR permanently. As shown in Figure 8, play is selected.

Figure 8: File selection screen for preview and deletion

5.1.5.1 Digital Zoom

Digital Zoom allows the user to electronically zoom EYE-C-GAS while viewing infrared imagery. Selectable options are *1x* or no zoom (default), *2x* zoom and *4x* zoom.

Figure 9: Digital Zoom screen selection

5.1.5.2 LCD Brightness

Users can adjust LCD brightness on EYE-C-GAS. Adjustable settings are *25%*, *50%*, *75%* and *100%* brightness levels. Less brightness conserves battery power.

Figure 10: LCD Brightness to 75%

5.1.5.3 Inactive Bluetooth menu option

Users should not try to activate Bluetooth functionality. Keep this setting set to *Off* to conserve power.

Figure 11: Bluetooth set to Off

5.1.5.4 Mode

Users can select between two modes of operation. Normal mode (*Nor*) is the default setting and appropriate for most applications. Enhanced mode (*Enh*) can be used in environments where scene dynamics make gas detection more difficult, allowing high sensitivity when using the EYE-C-GAS on a steady pose with a tripod or monopod.

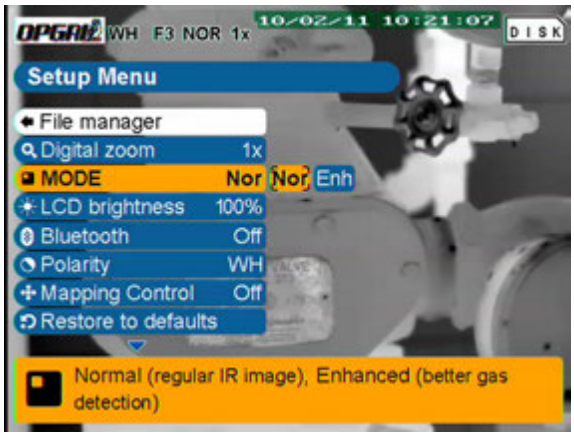


Figure 12: Mode screen with help

5.1.5.5 Image Polarity

Users can select image polarity for infrared imagery. Selectable options are the default **white hot** (*WH*) and **black hot** (*BH*).

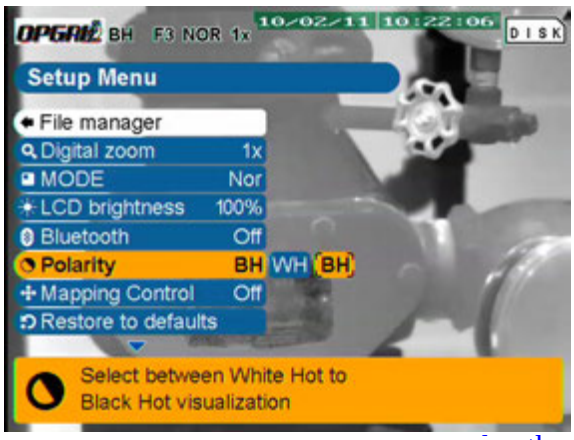


Figure 13: Polarity selection screen

5.1.5.6 Mapping Control

Users can select the keypad Mapping Control *On* or *Off*

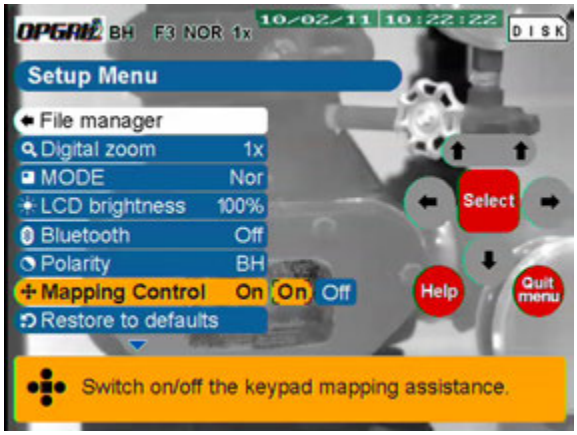


Figure 14: Mapping control On

5.1.5.7 Help and Quit Menu

Help text will appear at the lower part of the screen upon selection of the help command button while navigating menu items (see Figure 14). Selecting help again will remove the help text. To exit the menu system, select *Quit Menu*.

5.1.5.8 Restore to Defaults

Users can restore the EYE-C-GAS menu's default values by selecting *Restore to defaults* and selecting Yes.

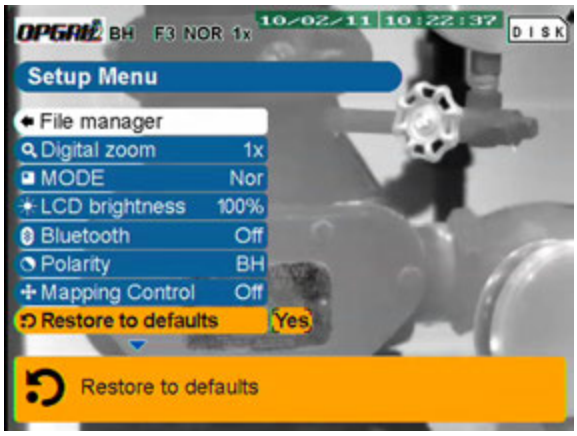


Figure 15: Restore to defaults screen

5.1.5.9 Analog Video (infrared video output using the optional BNC Video Adapter)

Users can turn analog video *On* or *Off* (keeping it set to *Off* conserves power). See Section 7.

Figure 16: Analog video selection screen

5.1.5.10 Status Row

The status row shows all the current operating modes and date and time of EYE-C-GAS. Specific indicators are described below.

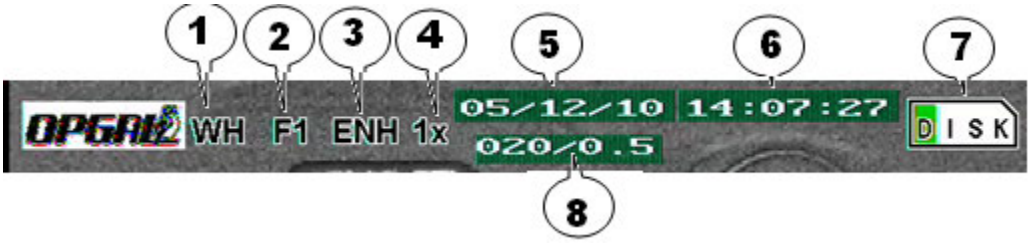


Figure 17: Status Row

1. Image Polarity – designated by either *WH* or *BH* refers to whether the infrared image is set to white hot or black hot. The infrared image is displayed in shades of grey. In *WH* mode, the hottest parts of the image are displayed in white while the coolest parts in black; in *BH* mode the hottest parts of the image are displayed as black while the coolest parts are white.
2. Filter Selection (NOT USED) – F1 is default.
3. Mode – designated as *NOR* or *ENH*, indicates the operating mode of the camera. Refer to Sections 5.1.3.5, 5.1.5.4 and 5.2.4 for details on using the modes.
4. Zoom value – designated as *1x*, *2x*, or *4x* indicates the electronic zoom value.
5. Date – displayed as MM/DD/YY indicates the current date.
6. Time – displayed using the 24-hour timekeeping system (seconds are displayed while recording) indicates the current time. The time is factory set to UTC time. The user can change the camera's time using Artsoft. See 6.3.2 for details.
7. Recording Capacity – designated by the *DISK* symbol indicates the remaining recording capacity of EYE-C-GAS. Initially all white, as the camera records images and video the indicator begins to fill green. A fully green indicator means EYE-C-GAS has no recording space available.
8. When in Enhanced Mode the actual parameter numbers of enhanced adjustment will be displayed. The number on the left corresponds to the depth of enhancement (from 005 to 100, see Table 1) and the number on the right is the amount of background scene adjustment (from 0.20 to 0.80, see Table 1).

Note: Table 1 is shown on page 24.

5.2 EYE-C-GAS Operation

5.2.1 General

5.2.1.1 Power On & Off

Before powering on the camera, ensure that the battery is properly inserted and fully charged.

EYE-C-GAS Power Button: ***(see Figure 18 below)***

To power on the EYE-C-GAS camera, depress the middle Power/Menu Button for one second. A sequence of screens will appear as the camera initiates an internal calibration sequence.

Figure 18: Keypad, multifunction middle button

During the initial 30 second (approximate) power up sequence, EYE-C-GAS will display a white screen followed by a color test screen. After this is completed, the Opgal logo will appear and will fade to black (the battery LEDs will also fade) during the next 30 seconds to conserve battery life while the internal cooler lowers to its required operating temperature. After the LCD dims to black, the leftmost LED battery indicator will blink indicating that the detector cooler is cooling to its required temperature.

Figure 19: Logo and LED blinking during cool down

The cool down sequence will take approximately 8 to 10 minutes. When completed, a video image will appear on the LCD. To power off the EYE-C-GAS, depress the Power/Menu Button for a minimum of 8 seconds.

5.2.1.2 Non-uniformity Correction (NUC) Operation

The NUC calibrates the EYE-C-GAS image making it ready for use. To perform a NUC, cover the lens with the lens cap and press the large NUC button (Figure 3). The image will freeze (indicated by no movement in background noise). Upon completion of the image freeze, a uniform image will be displayed on the LCD, and the EYE-C-GAS will be ready for use.

5.2.2 EYE-C-GAS Set-up for Operation

1. Ensure that the EYE-C-GAS camera is powered on and ready for use.
2. Perform a NUC (see section 5.2.1.2 for details).
3. Select the mode of operation via the Menu.
4. Select other desired parameters and exit the menu by depressing the Quit Menu button.
5. Aim EYE-C-GAS toward a desired component or area for inspection and manually focus the lens via the rubber ring until the image is clear.
6. The image can be adjusted as necessary to correspond to changing scene conditions. When detection proves difficult, adjust the camera's polarity and mode (Normal or Enhanced) to enable better detection capability.

5.2.3 Video / Audio Recording

1. To record video, depress the "Record" button once to begin recording and a second time to stop recording. While recording users can change polarity, switch between infrared and visible CCD video, change modes and other settings. Connect the head set to the accessories connector to also record audio. A red blinking indicator will be active when recording under the DISK icon.
2. To play back records, depress the Menu button and enter the File Manager menu. Browse the files, select the desired file and depress menu again to view the file. A video file can also be deleted when selected. Note: you cannot recover deleted files.

5.2.4 Operational Modes

The EYE-C-GAS camera has two basic operational modes: Normal and Enhanced, which are selectable by depressing the Mode button on the keypad.

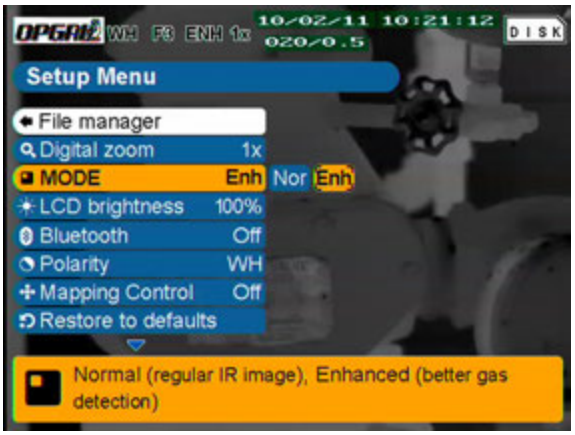


Figure 20: Mode screen

1. Normal Mode (*Nor*). This mode provides standard detection functionality for normal environmental conditions being the common mode for operating the EYE-C-GAS.

2. Enhanced Mode (*Enh*). This mode provides enhanced sensitivity while operating in low-contrast backgrounds and/or where attempting to detect low gas flow leakages; EYE-C-GAS will provide greater sensitivity but the image will appear grainier while operating in enhanced mode.

- From the Normal mode when the Mode button is pressed the keypad configuration will change to provide adjustments in the Enhanced Mode as shown in Figure 22. The adjustment is required for maximum detection while having a clear and steady image. The default values provide full detection capabilities, but in order to bring the camera to a clear and steady image without losing the gas leak detection change to lower values Enh+/Enh- first and then Diff+/Diff- as shown in Table 1 on page 24.

Figure 21: Keypad configuration in Enhanced Mode operation

Figure 22: Enhanced Mode of operation

- Up/Down (Diff+/Diff-) buttons adjust the depth of the enhanced function. The maximum enhanced level is 005 as indicated in the Status row. See Figures 17, 22 and Table 1 for settings and values.

Diff+/ Diff-		Enh+/Enh-	
maximum	005	20% Background	0.2
	007		
	010	40% Background	0.4
	020		
	030	50% Background	0.5
	040		
	050	60% Background	0.6
	060		
	070	80% Background	0.8
	080		
	090		
minimum	100		

Table 1: Enhanced values adjustment

- Right /Left (Enh+/Enh-) buttons adjust the amount of background scene as a ratio used for the final image displayed. The maximum enhanced value is 0.2. See Figures 17, 22 and Table 1 for settings and values.

3. Enhanced Mode (Enh) operational explanation.

   The principle of use of the enhanced mode is related to the values of Diff and Enh commands. The higher the values are the more the image will appear clear and noiseless. For higher contrasting backgrounds, the higher the Enh value is the better the acquired image and detection will be. For the purpose of enhancing poor contrasts the value of Enh should be set to lower ones while keeping in mind that when the gas is visualized on the LCD the image should be as less grainy as possible by when adjusted with the (+) or (-) Enh command.

   The same holds for the Diff value, which in this case the highest value is used for detecting large leaks. For small leaks the Diff value should be adjusted lower until the leak is seen.

   A combination of the two values will allow the user to achieve the best image quality for finding leaks and performing best for video recording when desired.

5.2.5 Head Set mounting, connection and use

Connect the Head Set to EYE-C-GAS through the Accessories connector located to the right of the display below the USB2 connector (see Figure 1). Mount the head set on your hard hat as shown in Figure 23.

Figure 23: Head set mounting to the hard hat

For recording audio, speak into the noise cancelling microphone during recording. Audio recording will automatically be recorded with the video track. The head set performs audio recording and play back. The head set earphones can be used to listen to embedded recorded audio from an EYE-C-GAS file and also provides basic hearing protection.

5.2.6 Side straps, neck strap and lens cover

The side straps and neck strap are adjustable to adapt to each user. To adjust the side straps, lift up the flap, adjust the strap length and push the flap back down again.

It is highly recommended to attach and use the neck strap for hands-free camera transport as well as user and camera safety.

The lens cover may be attached to one of the side straps when the camera is in use to prevent the lens cable from being snagged. When the camera is not in use the lens cover must be attached over the lens to protect the lens.

6 EYE-C-GAS Software "ARTSOFT"

ArtSoft is a virtual “control panel” for the EYE-C-GAS infrared camera. Contained on a CD, ArtSoft facilitates various system operations for the EYE-C-GAS including time and date setting, system version verification, software and firmware updating and file management, conversion and playback. ArtSoft is a Windows XP, Vista and 7 compatible program.

6.1 Installation of the software

Insert the CD into the PC.
Run the Artsoft application file (Artsoft_v1.0.2.5 setup.exe).
Follow the installation instructions located in Appendix A.

Note: If the software Dot Net Framework is already installed in your computer there is no need to install it again.

6.2 Connecting the EYE-C-GAS to the PC

Run the Artsoft software on the PC.
Connect the camera to the PC through the mini USB to USB cable (supplied) to the USB connection connector in the front panel of the EYE-C-GAS (Figure 1) and the PC USB connector. Wait (about 2 minutes XP and 10 seconds in Windows 7) until the connection is recognized and proceed to download movies or perform other functions.

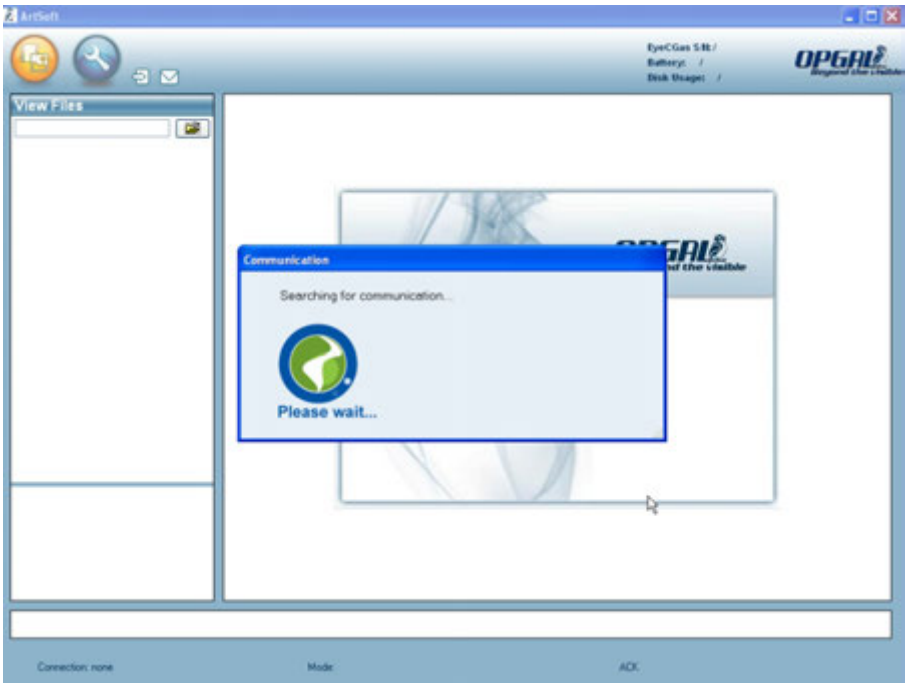


Figure 24: Welcome screen and communication search

6.3 ArtSoft Screens

There are two major windows in ArtSoft and the four icons for those windows are shown in Figure 25 below.

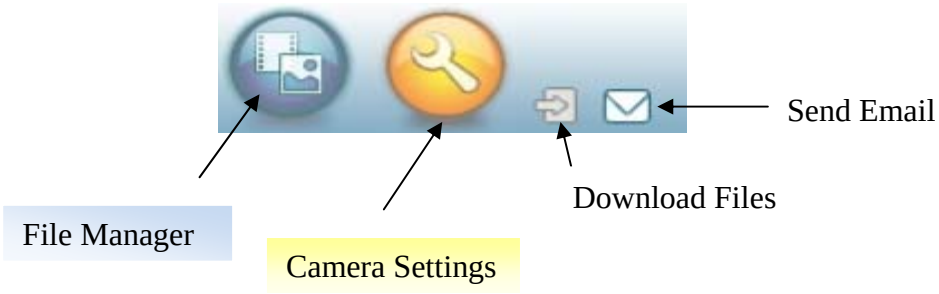


Figure 25: Artsoft Icons

Clicking the File Manager icon will allow opening the proper window to manage movie files. The Download Files icon is for manual operations and not typically used. The Camera Settings window will allow the user to adjust the date and time in the camera as well as update new software and firmware versions upon availability. The Send Email icon will allow an email to be sent to Opgal's service center or representative for any questions or failure report. An internet connection is needed.

6.3.1 Video Download screen

The EYE-C-GAS camera contains a SD memory card which stores all the recorded movies. After a communication is achieved with the camera, a popup screen appears and asks whether to move the stored files from the camera to the PC. Answering "Yes" allows the files to be moved from the camera and copied to the PC.

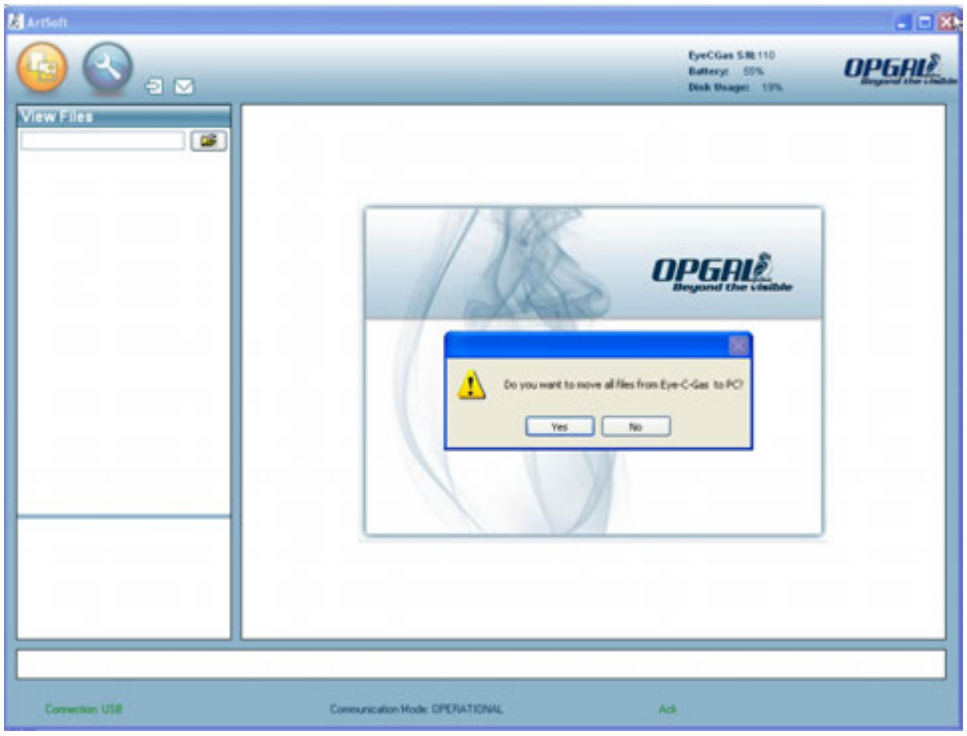


Figure 26: Artsoft video download request

Answering Yes will start the download process and will display the following screen until the download is complete, showing the progress made. Before the download will be performed an additional question will be asked, "Do you want to delete the files from the camera at the end?" If answered “Yes”, all the files will be removed from the camera. It is recommended to answer “No” until downloaded. The movies will be located at the default XP folder C:\Program Files\Artsoft\EyeCGas_Movies unless changed to a different location as when installing under Windows 7.

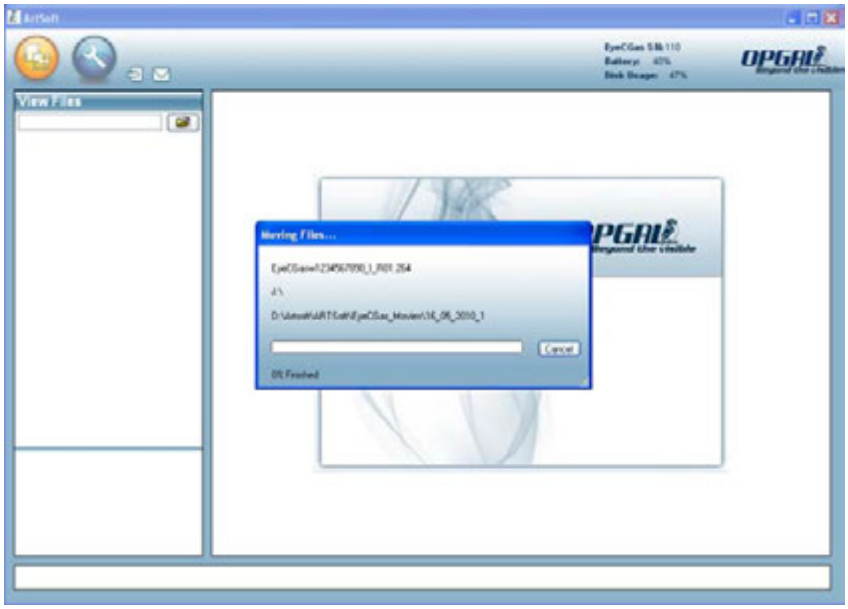


Figure 27: Movies download screen

While in the download process a small window will show the progress as shown in Figure 28.

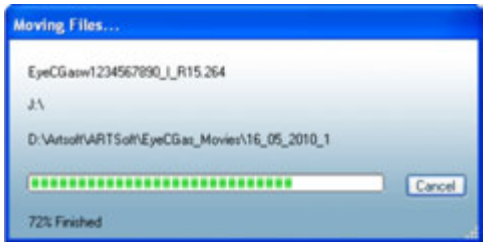


Figure 28: Download progress window

When the download is completed, the left window will show the downloaded movie names and it will be possible to select which movie to be played or deleted from the PC as shown in Figure 29. The movies will be in the MP4 file format.

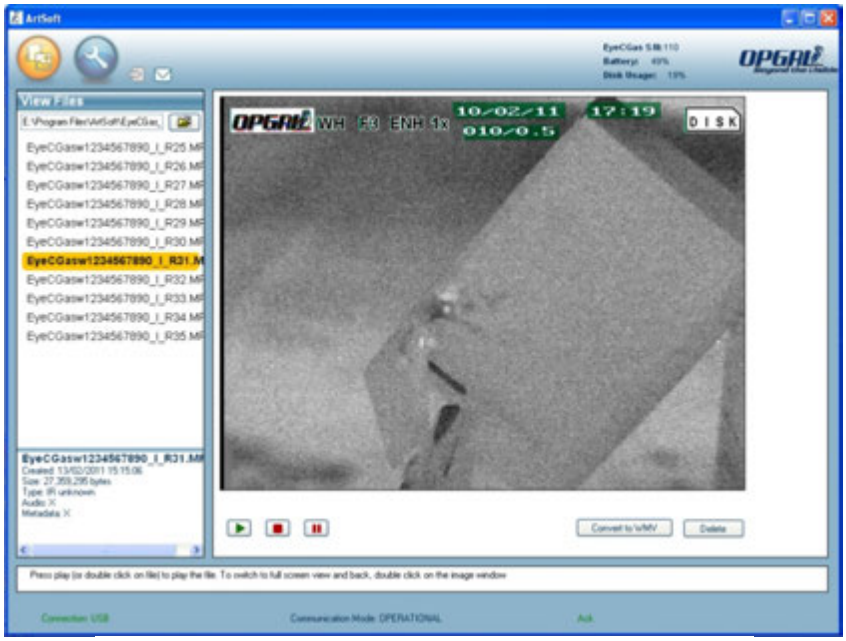


Figure 29: File Manager Screen with preview

Once the download is completed, it can be viewed in the right side of the screen when selected. The Movie can be played by selecting play, stop or pause respectively. The movie can be also deleted from the folder by clicking the "Delete" command. An additional button provides the command to convert the movie to a WMV format if desired.

Figure 30: Movie commands

Clicking the "Convert to WMV" button will display the following message:

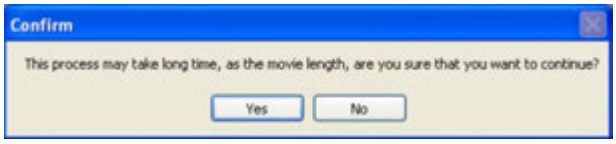


Figure 31 : Convert to WMV confirmation

And when Yes is clicked the process will start and show the conversion progress as displayed in the figure below:

Figure 32: File conversion progress

Once the process is finished the following message will be displayed:

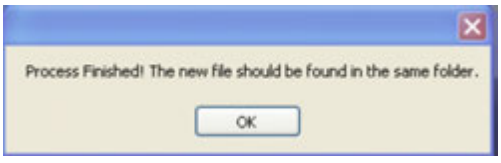


Figure 33: Conversion finished message

6.3.2 Setting date and time

Through this screen the date and time setting to the camera may be done as well as the date format. Setting the time takes about 1 minute to complete.

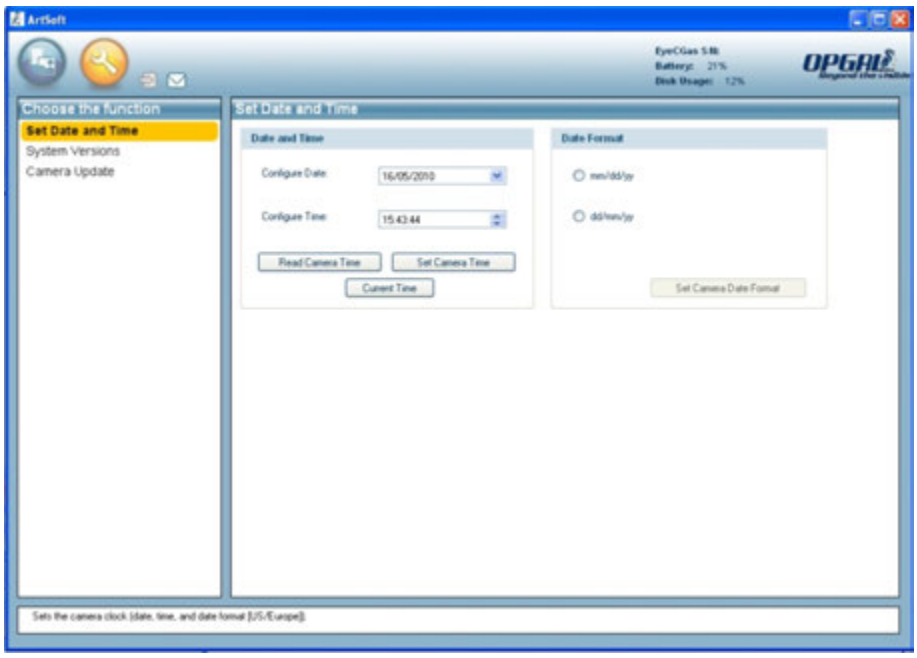


Figure 34: Date and Time setting screen

6.3.3 Verifying System Version

This screen allows the user to view the system version of the camera and Artsoft.

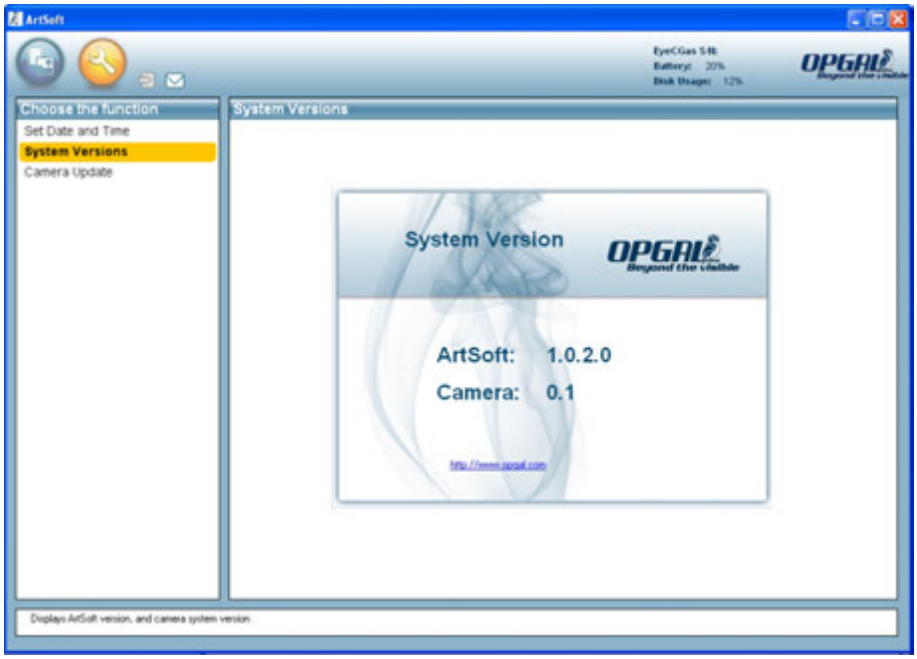


Figure 35: System version screen

6.3.4 Updating software and firmware

Through this screen Artsoft allows the user to update the software and firmware of the EYE-C-GAS camera. When an update is available, the upload process is performed automatically after selecting the folder where the file is located and clicking “Load”.
When the load process is finished the EYE-C-GAS must turn off and on again to allow the update process in the camera to be completed.

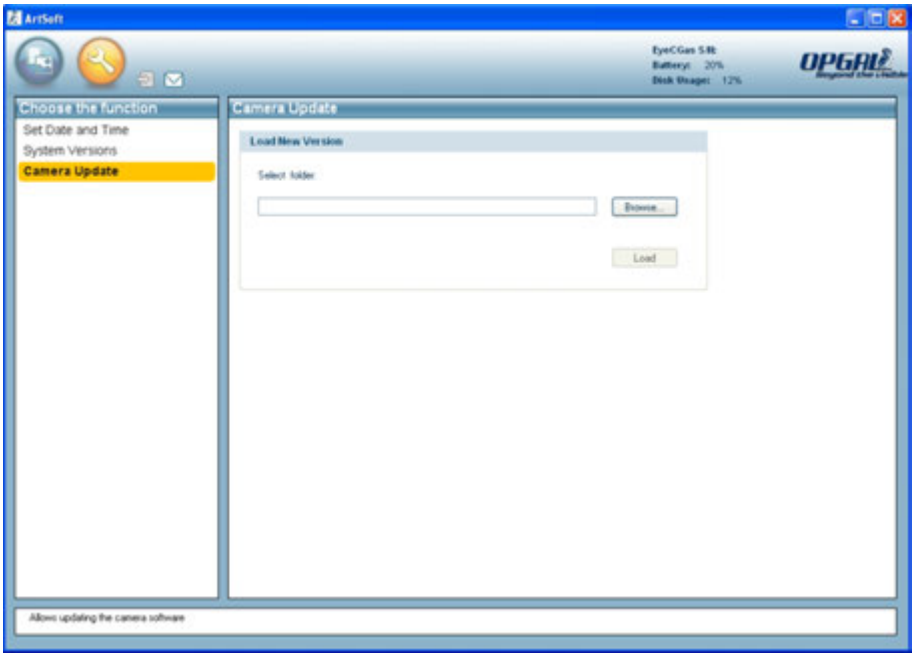


Figure 36: Camera Software and Firmware update screen

7 Connectivity to other Devices

The EYE-C-GAS camera, when connected to a PC using USB2, will appear to the PC as a flash drive. Experienced PC users will be able to explore the contents of the SD memory card which will contain the original compressed H264 video files, the WAV audio files and camera files. In the event Artsoft is not available and free space must be made available on the SD memory card, the H264, WAV and camera files can be downloaded to a PC and then deleted from the camera. A third party conversion program will then be required to merge and convert the original files to MP4 and / or WMV. The original files can also be uploaded back into the SD memory card at a later date and Artsoft then used.

The accessories connector (see Figure 1) can also be used with the optional BNC Video Adapter for real-time viewing of the infrared image on an external device such as a projector or monitor. Playback is not supported in the analog video output. The analog infrared video output is in composite form. A BNC to RCA adapter can be used along with a cable with the video adapter for easy connection to the "yellow" RCA input on the external device. The analog video output must be enabled (set to ON) in the Menu. See Section 5.1.5.9 for details. When not needed, the analog video output should be disabled (set to OFF) to conserve power.

8 Troubleshooting / Maintenance

To prevent the lens from becoming scratched, always attach the lens cover when the camera is not being used. If the lens becomes dirty or smudged, do not try to wipe or rub the lens clean with any cloth other than one intended for optics use. If necessary, dampen the optical cloth or tissue with water and lightly wipe the lens. Allow to air dry before use or attaching the lens cover. The LCD protective screen may also be cleaned with a dampened optical cloth or tissue.

The camera body may be cleaned with a soft cotton cloth dampened with water. Do not use any solvents.

It is normal for the batteries to wear out with use and they will need to be replaced after several hundred charge cycles. The Li-ion battery packs require special care when not used for extended periods of time. It is recommended to not leave a battery pack in the charger during storage. When charged, the battery pack(s) should be removed from the charger and stored at ambient conditions between 50 – 80 ^{o}F and less than 70 % relative humidity as in a home or office. They should not be stored in a warehouse that is not climate controlled. It is also recommended that at least once every other month during storage the battery pack(s) be placed in the charger and topped off. The batteries should not be allowed to fully discharge and then be stored for extended periods of time. This will significantly shorten the charge cycle lifetime and capacity of the batteries. During normal use the battery pack(s) should also be charged at ambient conditions between 50 – 80 ^{o}F. Significantly higher or lower temperatures will not allow the battery pack(s) to be charged to full capacity and will also shorten their charge cycle lifetime.

Do not attempt to disassemble the camera. This will void the warranty.

In necessary, contact your local Heath Consultant Inc. sales office or the factory at 800 HEATHUS (800 432-8487) for service and support. Support information and documents are also available on the Heath website at www.heathus.com.

9 OPGAL

OPGAL Optronics Industries is a leading global manufacturer of innovative thermal imaging safety systems and infrared cameras. Its safety applications are used for detection of gas and hazardous material leaks and for aerial remote fire detection. OPGAL offers the widest selection of infrared cooled and un-cooled OEM cameras and engines for military, paramilitary, security and aviation applications. Its products have been field tested worldwide for the past 25 years. The company's creative R&D, cutting edge technology, speed and flexibility make us your best partner for IR applications.

OPGAL's diverse product line includes fully integrated thermal imaging systems customized to specific applications, as well as off the-shelf thermal imaging cameras and engines for private labeling, OEM partners and other systems integrators.

Key applications:

• Safety - fire detection, gas and hazardous material leak detection systems
• Cutting-edge infrared camera for the avionic industry
• Infrared defense OEM partnership
• Strategic site protection & security
• Law enforcement, rescue and fire fighting thermal

Your Partner for IR Applications

10 Technical Support / Service

NOTE:
Before contacting Opgal on a technical support or service matter, please consult the Troubleshooting section of this manual. Many common issues are listed in this section and you may find a quick answer or solution by checking this section before contacting Opgal.

Technical Support
For technical support inquiries, please follow the inquiry submission instructions on our technical support page at www.gasleaksolutions.com/support. Our team will assess your question or issue and respond back to you within 24 business hours.

Service
If your EYE-C-GAS Infrared Camera is not performing properly, please contact Opgal at +972 49953961. Describe the problem to the Opgal representative as completely as possible. For your convenience, your representative may try to help you diagnose or correct the problem over the phone. Before returning your EYE-C-GAS Infrared Camera, you should verify with your representative that the product should be returned to Opgal. Opgal Customer Service will provide you with written permission and a return authorization number.

If the return is a non-warranty repair, an Opgal Customer Service Representative will provide you with a repair invoice estimate. To authorize repair, you must provide Opgal a purchase order for the amount of the estimate. Once Opgal receives your authorization, we will issue you a return authorization number so that you can return the unit for service. If the cost of repairs exceeds the stated quote by more than 15%, an Opgal representative will re-estimate your repair and will contact you for authorization to complete repairs. After repairs are completed and the goods have been returned to you, Opgal will invoice you for the actual repair amount.

NOTE
Do not attempt to disassemble the sealed case of your Opgal EYE-C-GAS Thermal Imager. If the unit is not functioning properly, return it to Opgal (as described in the Service section) for evaluation. Disassembling the unit voids all warranties.

Prior to returning your product, decontaminate and clean it to remove any hazardous or contaminated materials that may have settled on the product during use. Laws and/or shipping regulations prohibit the shipment of hazardous or contaminated materials. Products suspected of contamination will be professionally decontaminated at the customer's expense.

11 Warranty

Opgal warrants to the original purchaser that the EYE-C-GAS and all features/accessories installed in the unit are free of defects in materials and workmanship under intended use and service for a period of one (1) year from date of manufacture. Opgal's obligation under this warranty is limited to repairing or replacing, at its option, articles that are returned within the warranty period and that, after examination, are shown to Gas Leak Solution's satisfaction to be defective, subject to the following limitations:

a) Article must be returned to Opgal with shipping charges prepaid.
b) Article must not be altered from its original configuration.
c) Article must not have been misused, abused, or damaged in transport.
d) Maintenance and field replaceable items, if defective, are covered under warranty for a ninety (90) day period. These items include:
   - Batteries
   - Straps
   - Display covers
   - AC/DC adapters
   - All other parts and accessories except those installed in the EYE-C-GAS

Opgal provides a limited lifetime warranty on the EYE-C-GAS outer shell. This warrants that the outer shell is free of defects in materials and workmanship under intended use and service for the original purchaser. Opgal's obligation under this warranty is limited to repairing or replacing, at Opgal's option, articles that after examination are shown to Opgal' s satisfaction to be defective, subject to the following limitations:

1. Article must not be altered from its original configuration.
2. Article must not have been misused, abused, or damaged in transport.
3. When the outer shell is obsolete and Opgal no longer stocks the part, the limited lifetime warranty will be terminated.

In no event shall Opgal be responsible for damages, loss of use, or other indirect, incidental, consequential or special costs, expenses or damages incurred by the purchaser, notwithstanding that Opgal has been advised of the possibility of such damages.

Any implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to one (1) year from the date of manufacture.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

Extended Warranty
The extended warranty has all the same terms and conditions as the one-year warranty, except it is for a period totaling two years (standard one-year warranty plus one additional year).

Appendix A - ArtSoft Installation

The installation process will install 4 main components on your computer:

1. DirectX_9.0.

2. K-Lite Codec Pack 6.9.0

3. Microsoft Dot.Net Framework 3.5.

4. The ArtSoft Application 1.0.2.5

Instructions:

During the installation you may see different screens from those shown in the manual, in the event that some of the components have already been installed in your computer.

During the "K-Lite" installation you may be asked to uninstall some components that you already have on your computer. K-Lite will replace them. It is recommended that you allow these components to be removed.

During the installation, the installer may try to access the Internet to search for updates. Ignore this action, and let the installation continue. (If an Internet browser is open, you should close it.)

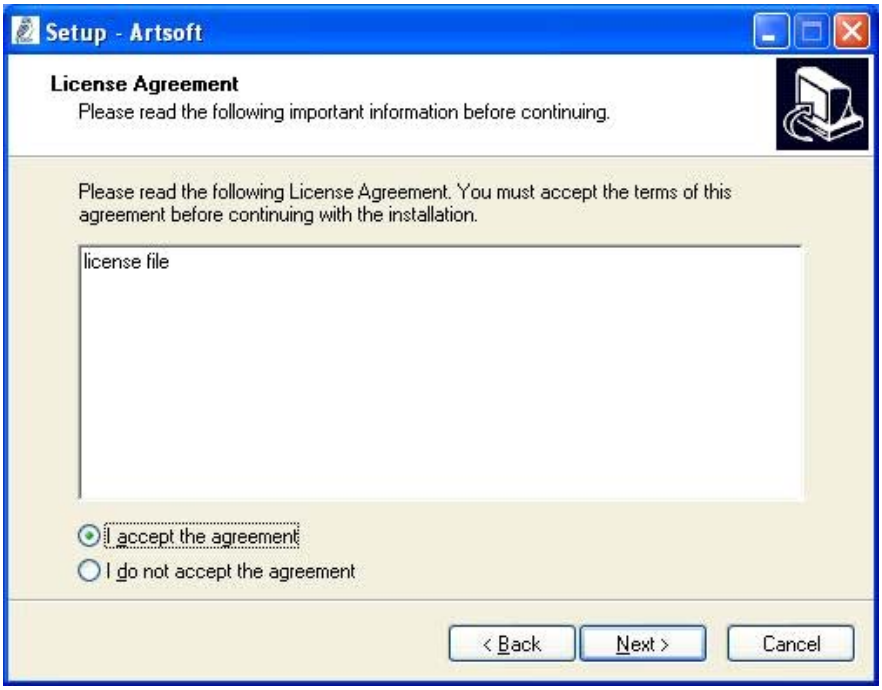
If you already have Dot.Net Framework installed on your computer, then select the "Repair" option when starting the Dot.Net Framework install. An error message may appear after installing the Dot.Net Framework. Ignore this message, as the installation should still be OK.

To start the installation process, please run the installation file "Artsoft_v1.0.2.5_setup.Exe".

Step #1 ...

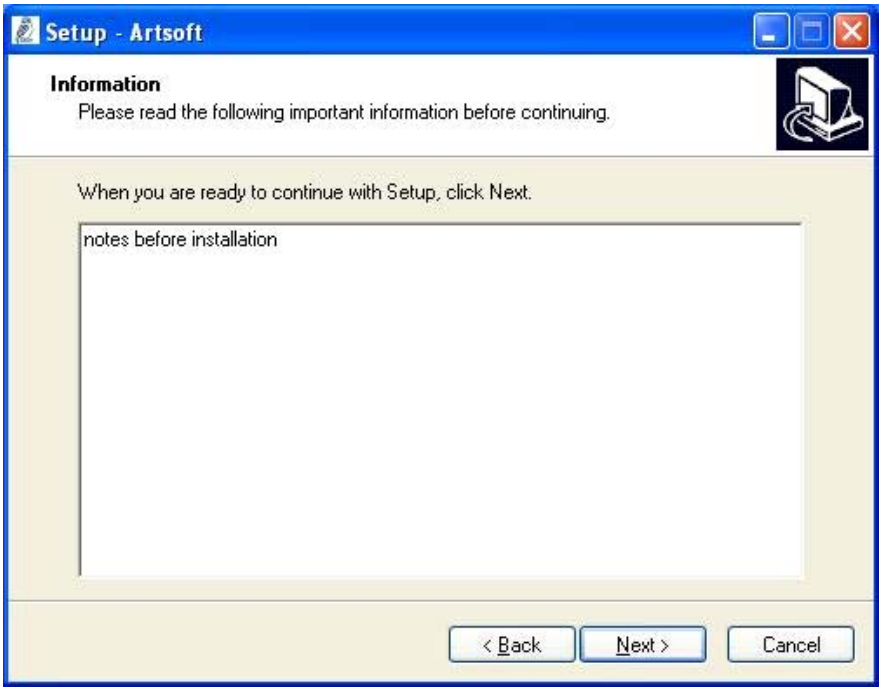
Click 'Next'.

Step #2 ...



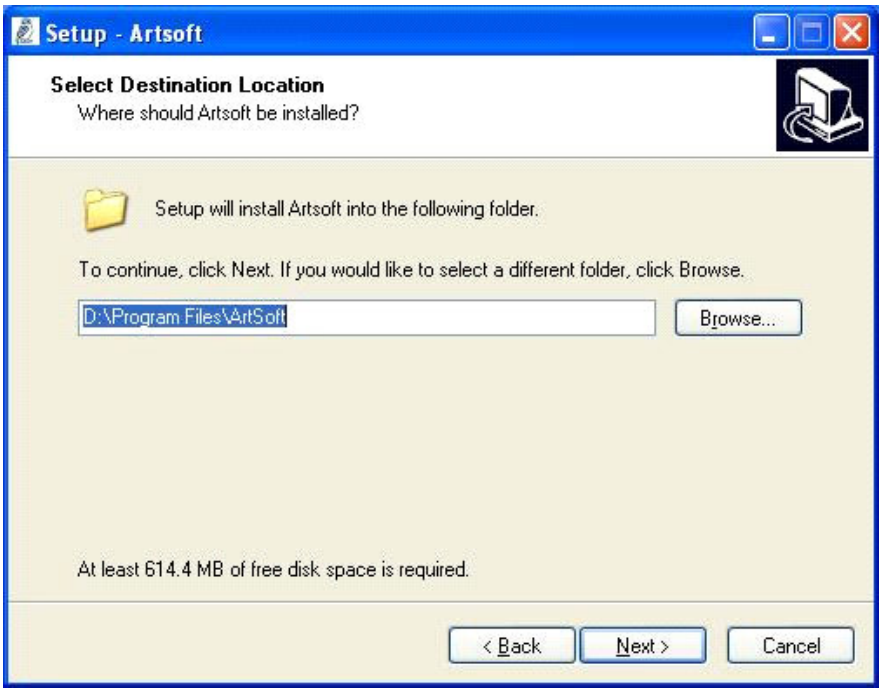
Select "I accept the agreement", then click 'Next'.

Step #3 ...



Click 'Next'.

Step #4 ...

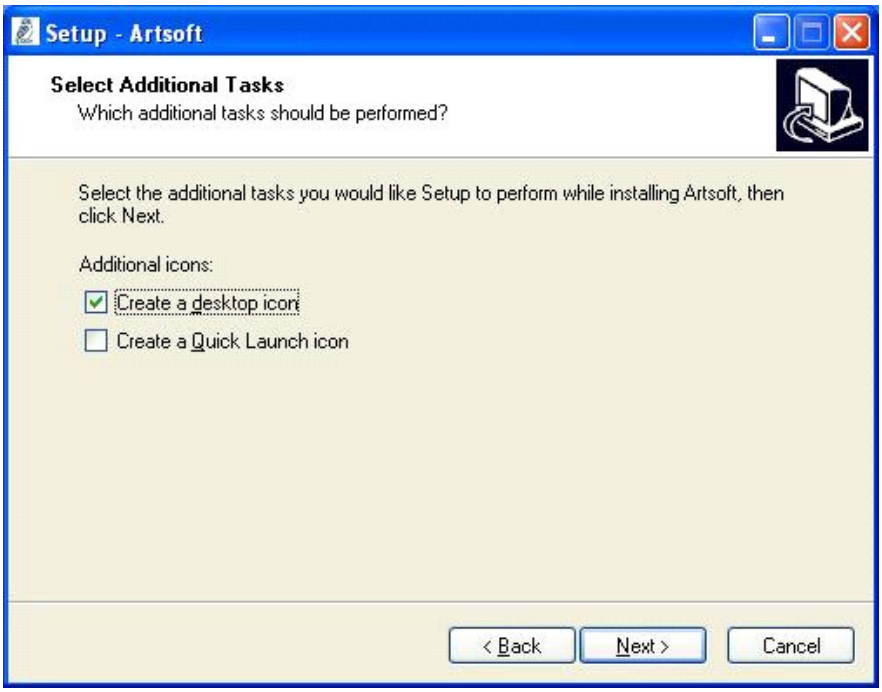


Select the location in which you wish to install the ArtSoft software, then click 'Next'.
Note: For Windows 7 the installation MUST NOT be in or under the Program Files folder. In this case select a different folder or edit out "Program Files" from the default location (Ex: D:\Artsoft).

Step #5 ...

Select your Start Menu folder, then click 'Next'.

Step #6 ...

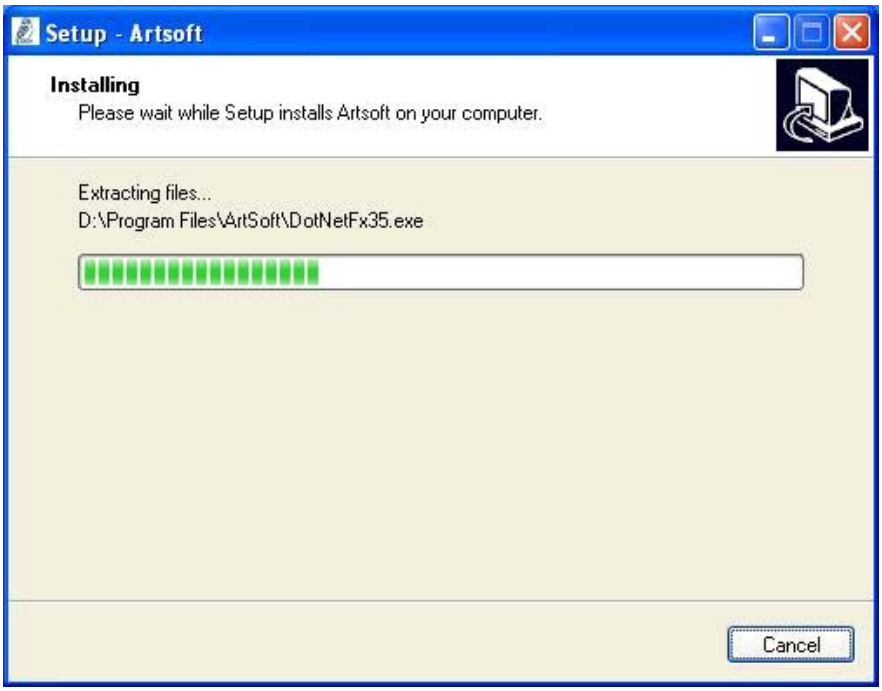


Select the shortcuts you wish the installation to create, then click 'Next'.

Step #7 ...

1. Read the review before installation.
2. Click "Back" if you want to change an input or a selection you made in a previous window, or click 'Install' to start the installation.

Step #8 ...

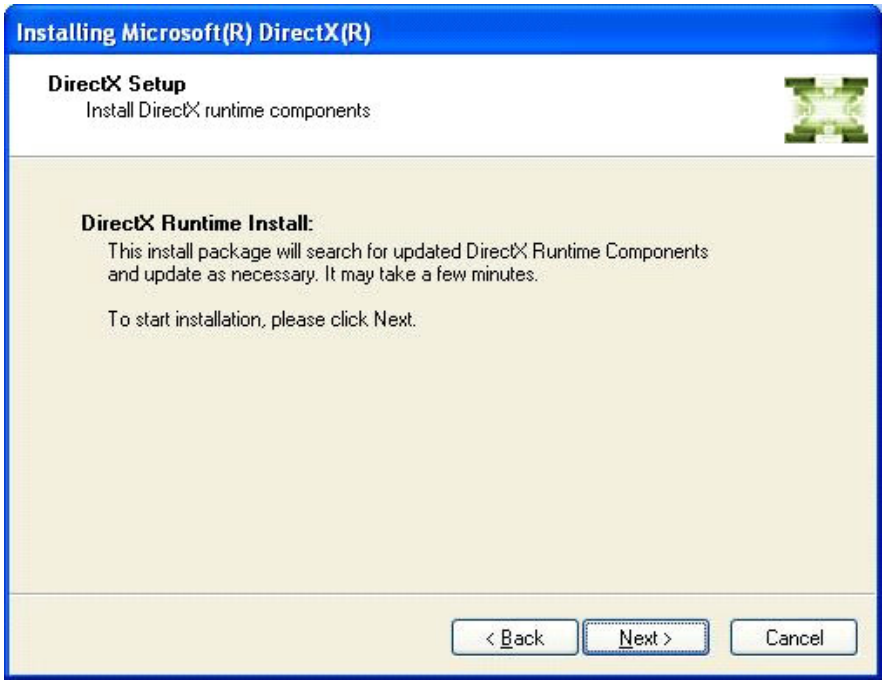


Wait while the installation is in progress.

Step #9 ...

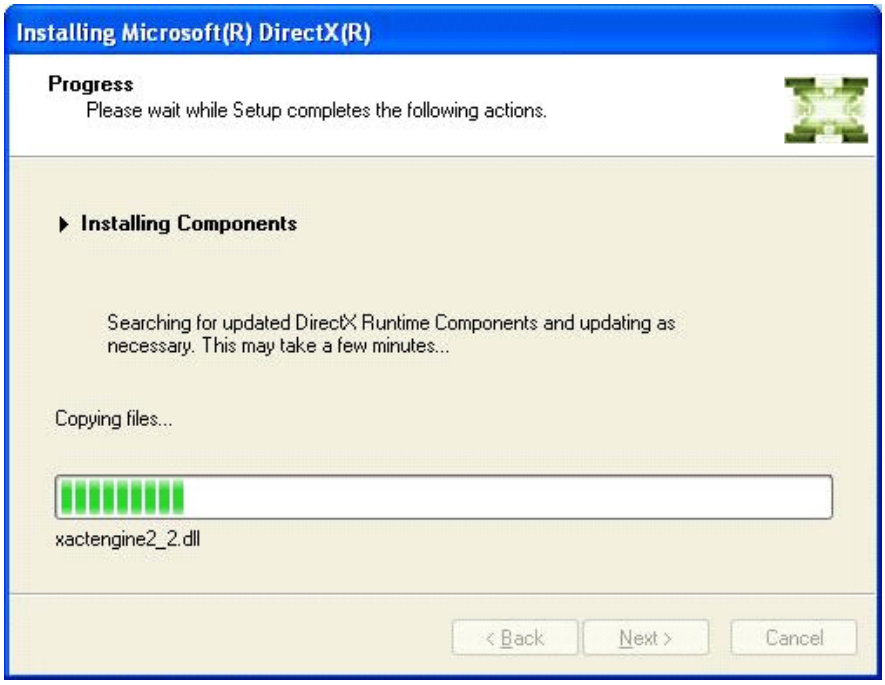
Select "I accept the agreement", then click 'Next' to start installing DirectX-9.0.

Step #10 ...



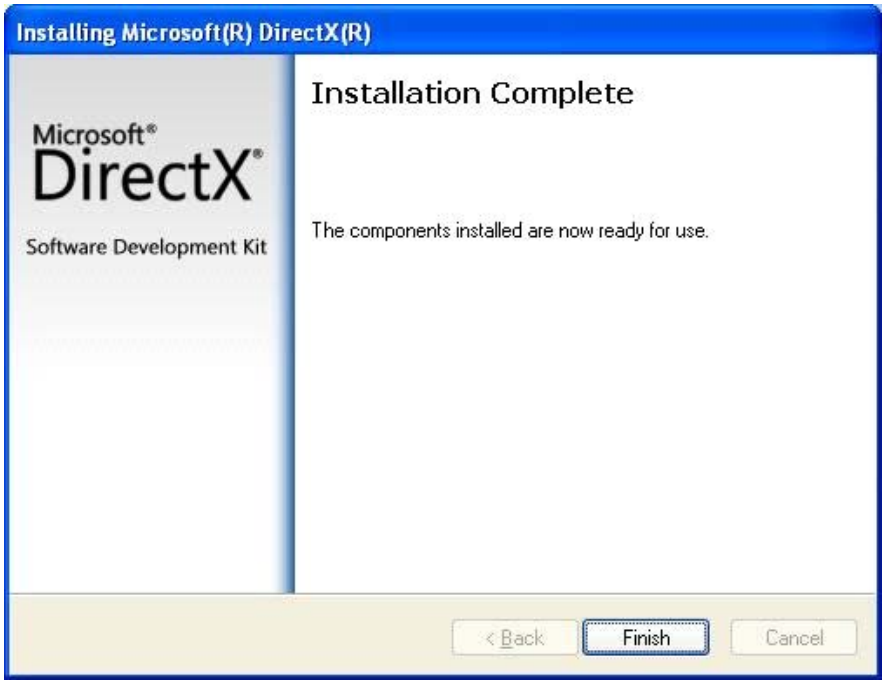
Click "Next" to start the installation.

Step #11 ...



Wait while the installation is in progress.

Step #12 ...

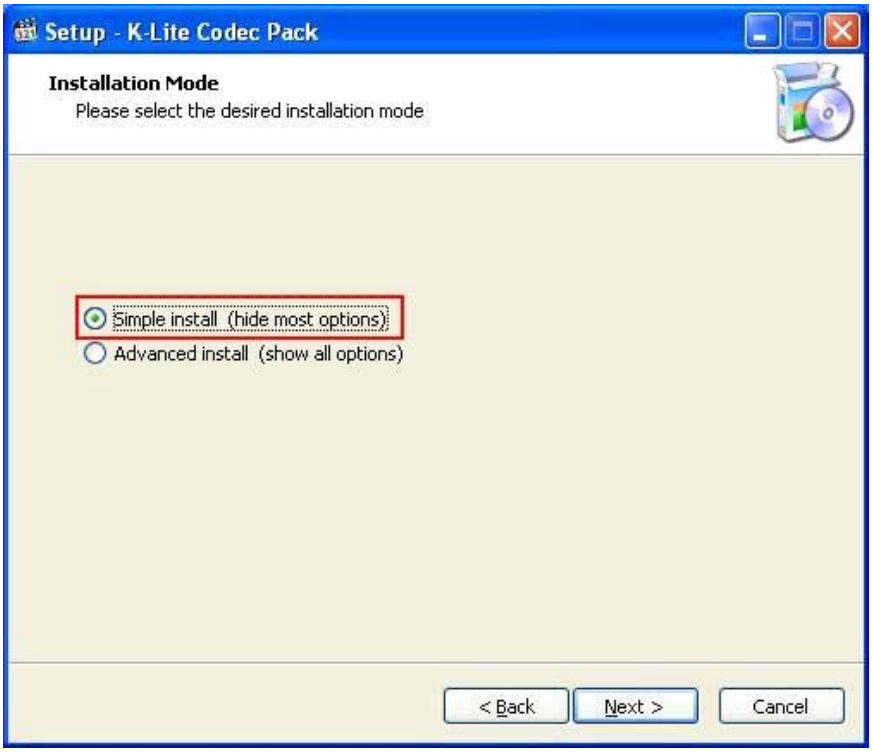


DirectX-9.0 installation is done, click 'Finish' to continue.

Step #13 ...

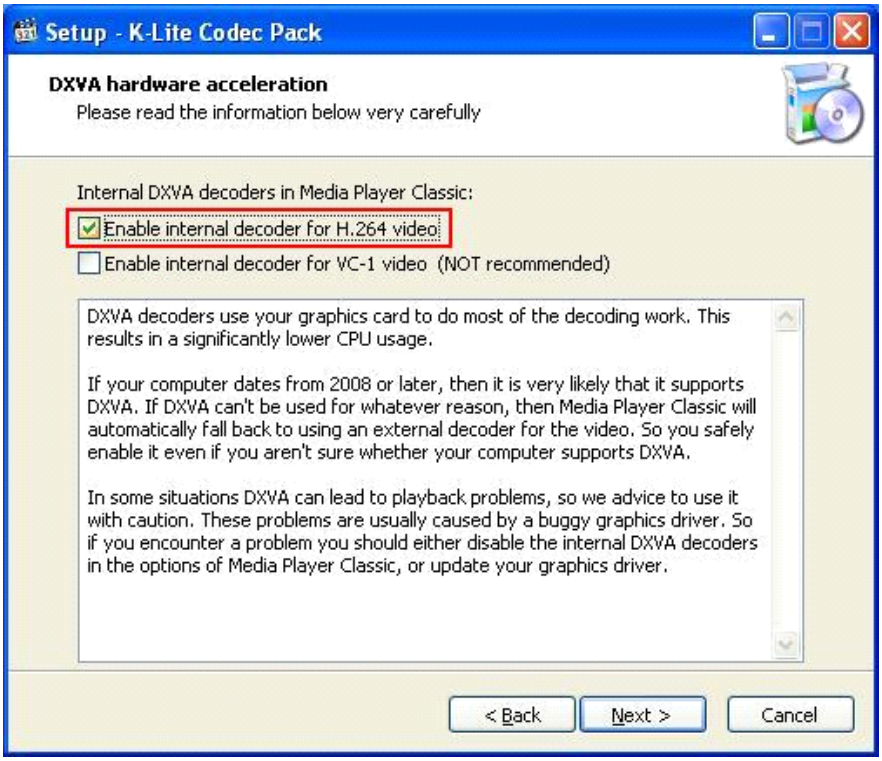
Click 'Next' to start the K-Lite Codec Pack configuration before installation.

Step #14 ...



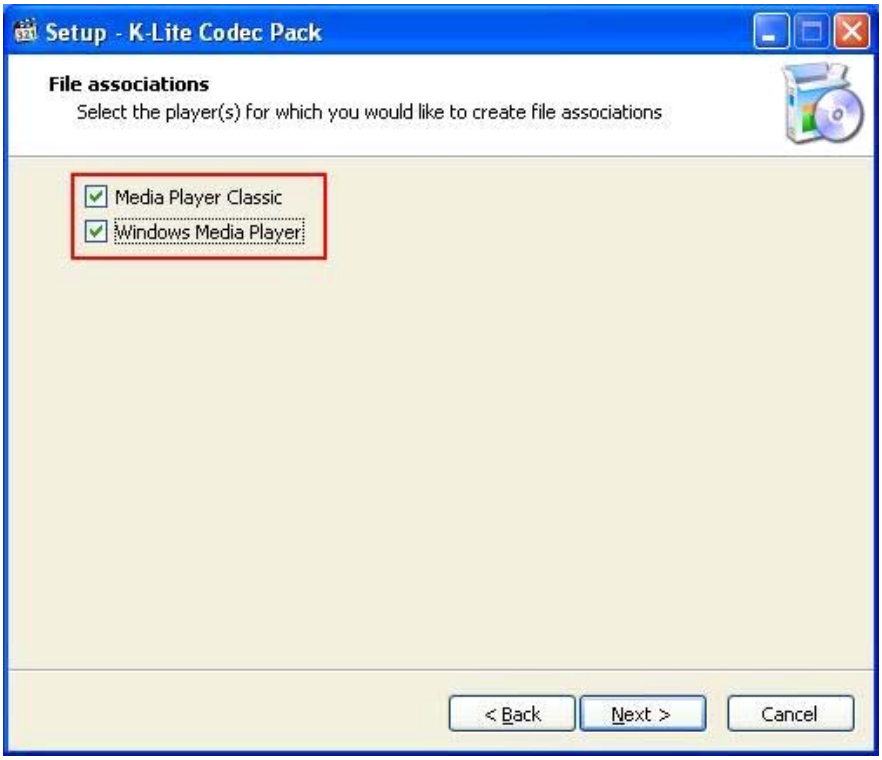
Select the "Simple Install" option, then click 'Next'.

Step #15 ...



Make sure that the option "Enable internal decoder for H.264 video" is selected, then click 'Next' to continue.

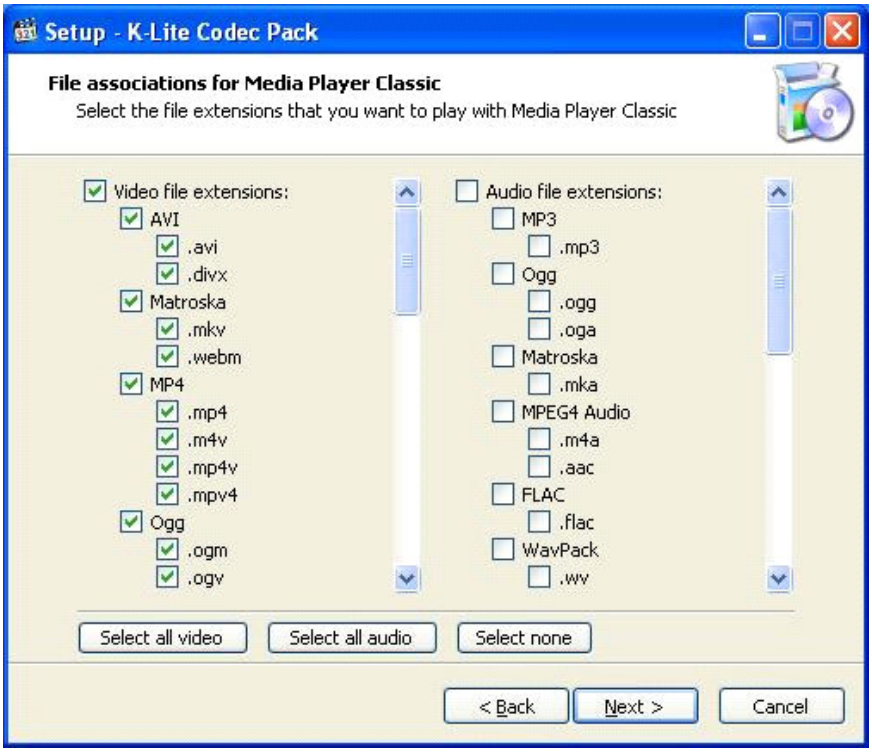
Step #16 ...



Make sure that the two options ("Media Player Classic" and the "Windows Media Player") are selected, then

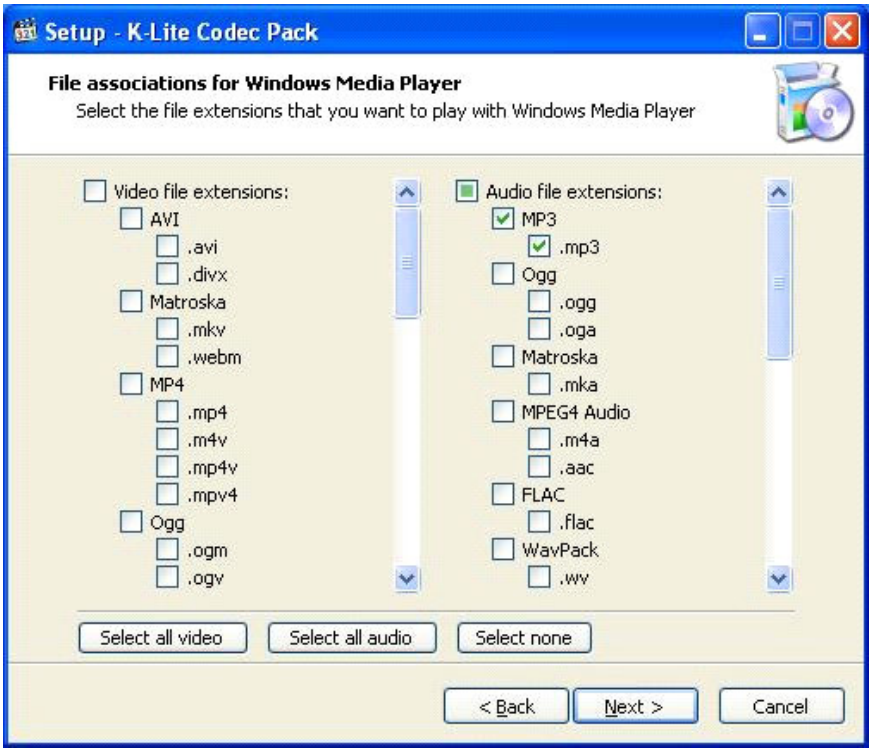
click 'Next' to continue.

Step #17 ...



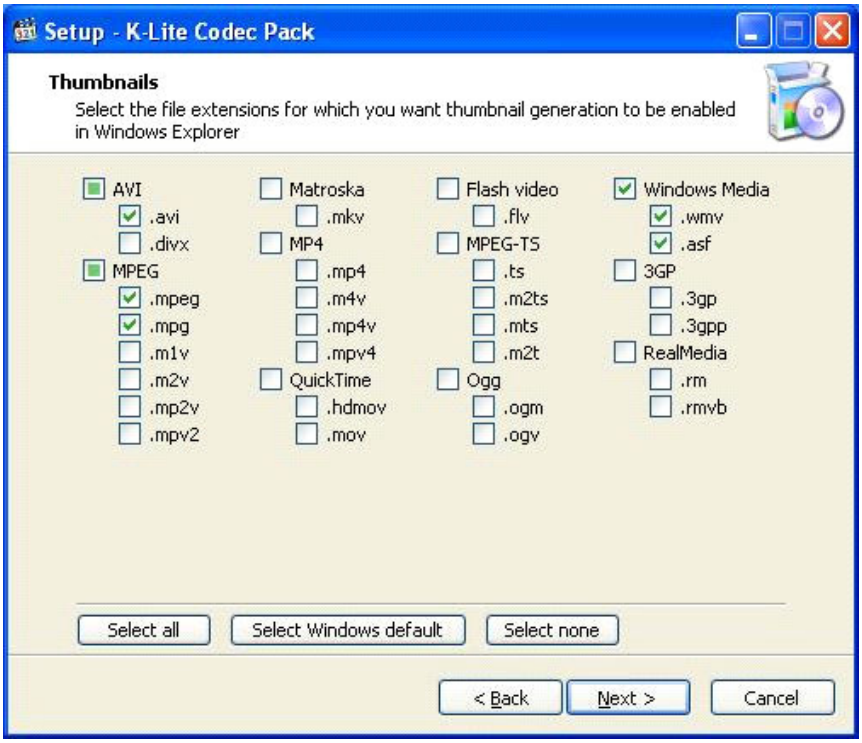
Click 'Next'.

Step #18 ...



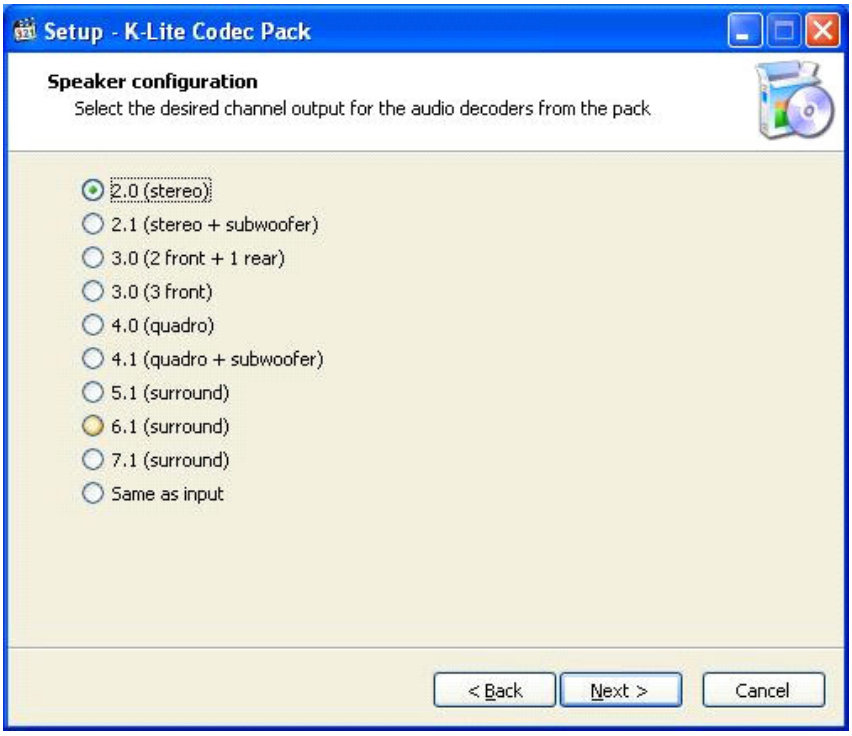
Click 'Next'.

Step #19 ...



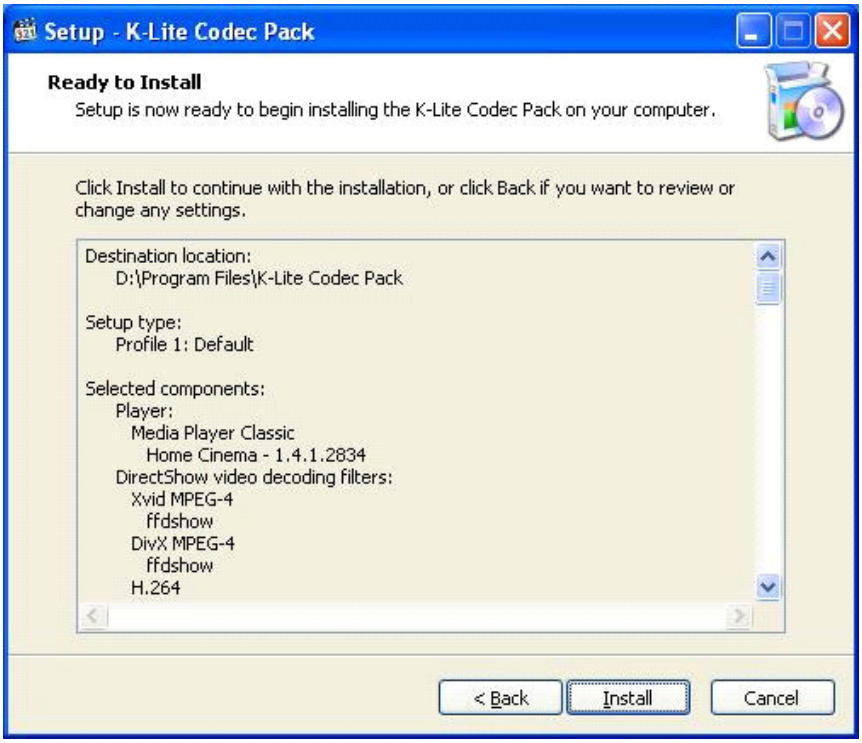
Click 'Next'.

Step #20 ...



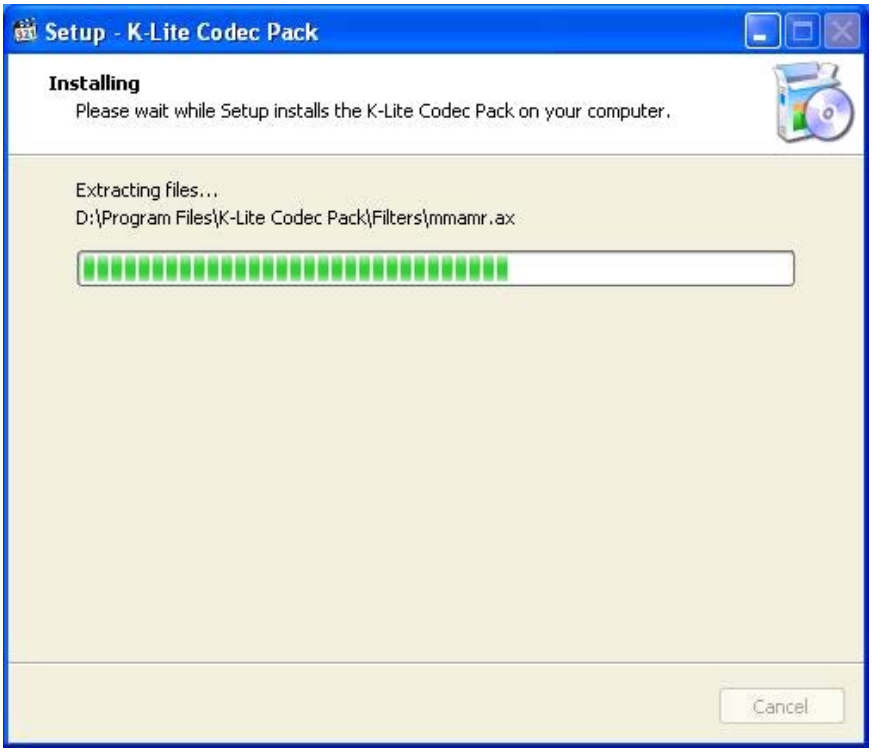
Click 'Next'.

Step #21 ...



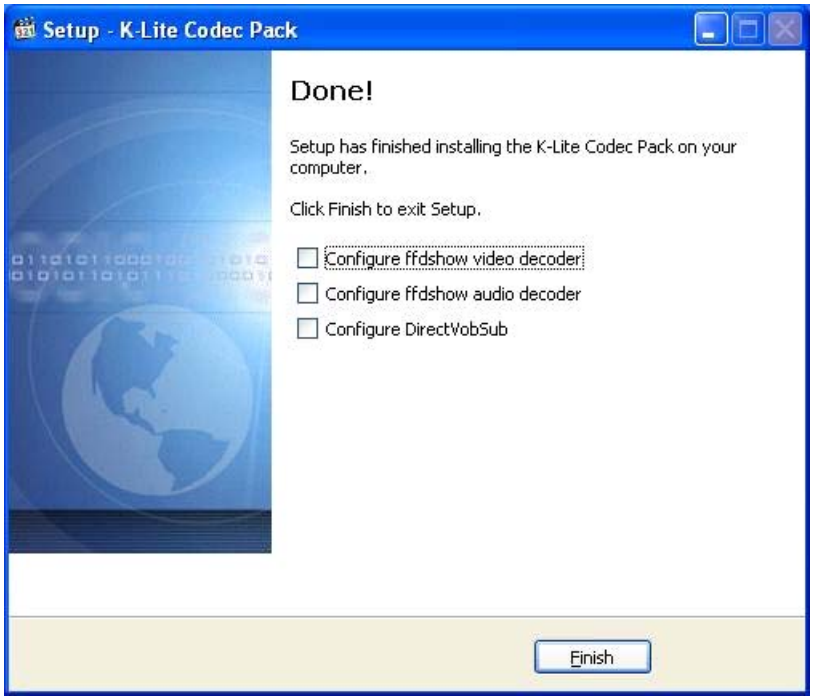
Click 'Install' to start the K-Lite Codec Pack installation.

Step #22 ...



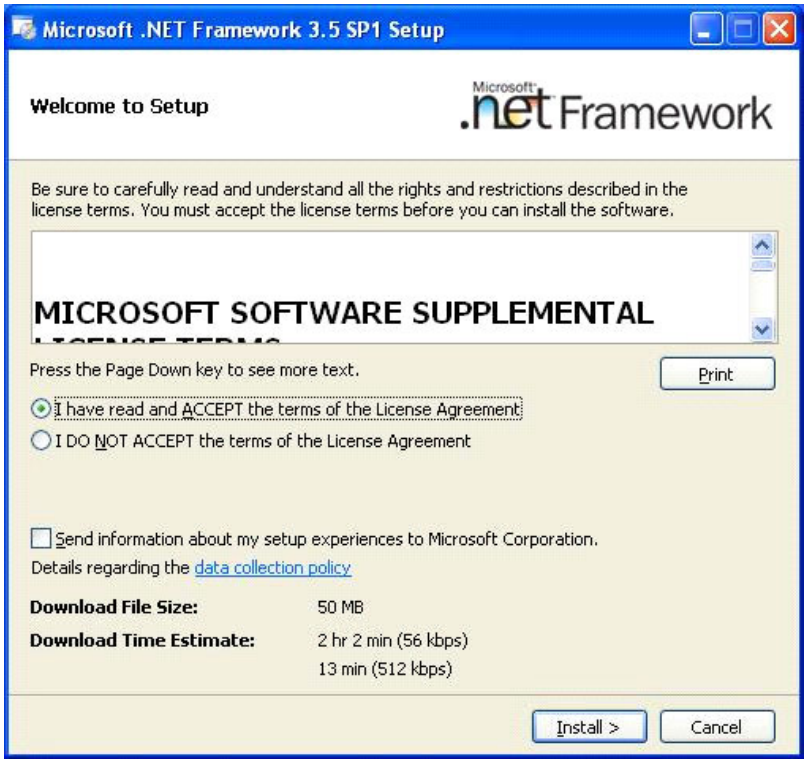
Wait while the installation is in progress.

Step #23 ...



Click 'Finish' to finish the K-Lite installation.

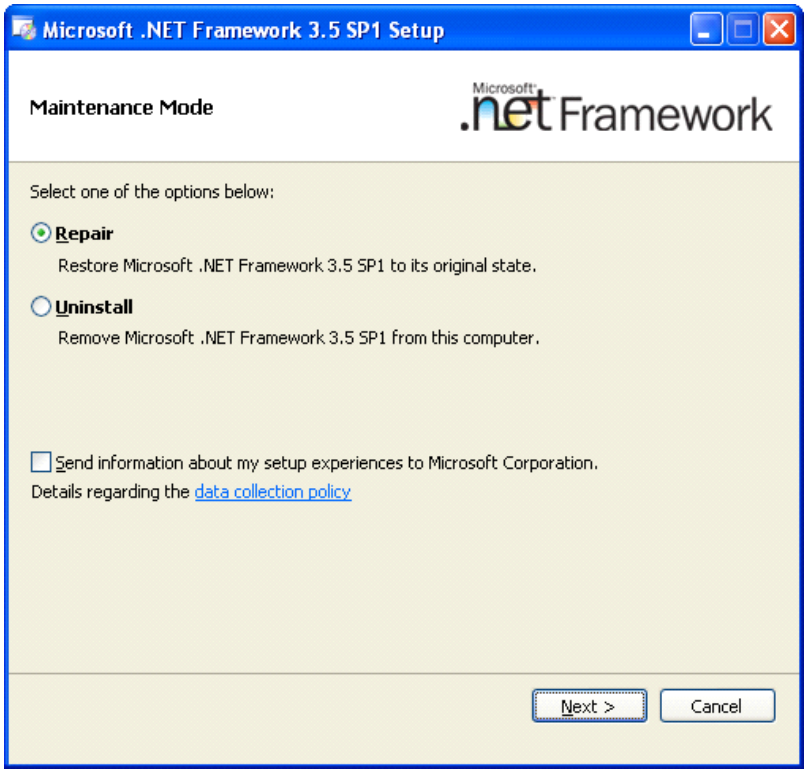
Step #24 ...



Choose the option "I have read and ACCEPT the terms …" then click 'Install' to start installing the Dot.Net Framework.
If Dot.Net Framework is already installed on your computer continue to Step # 25, otherwise please

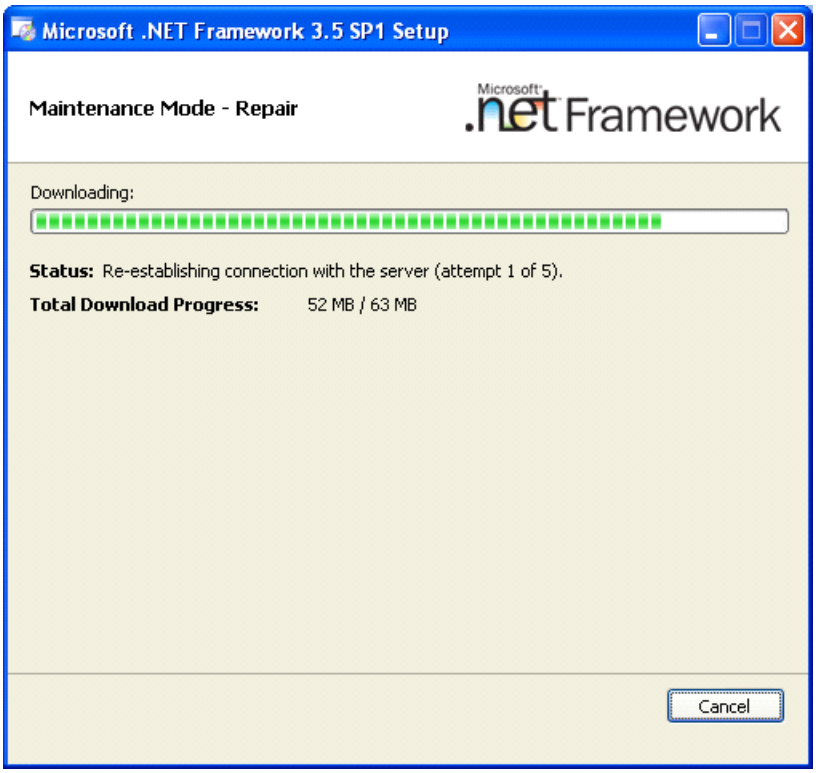
go to Step # 30.

Step #25 ...



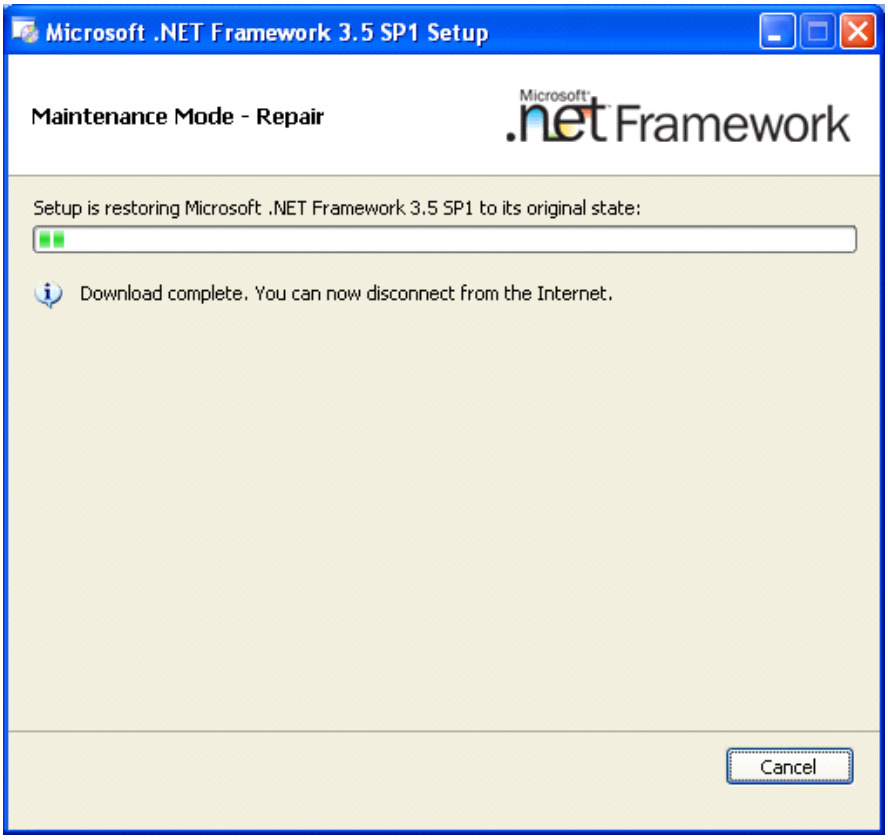
Select the "Repair" option, then click 'Next'.

Step #26 ...



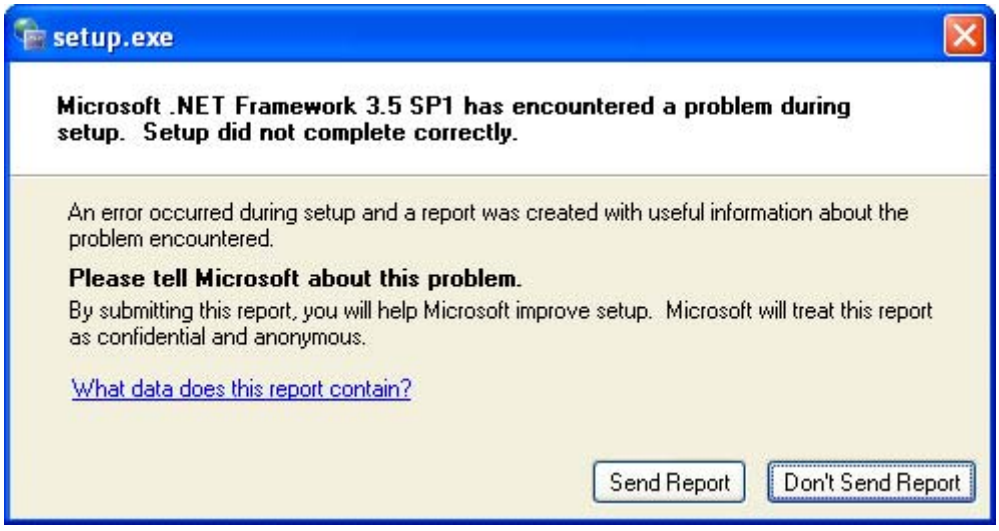
The installer may try to connect to the internet. It will continue the installation after 5 attempts.

Step #27 ...



Wait while the installation is in progress.

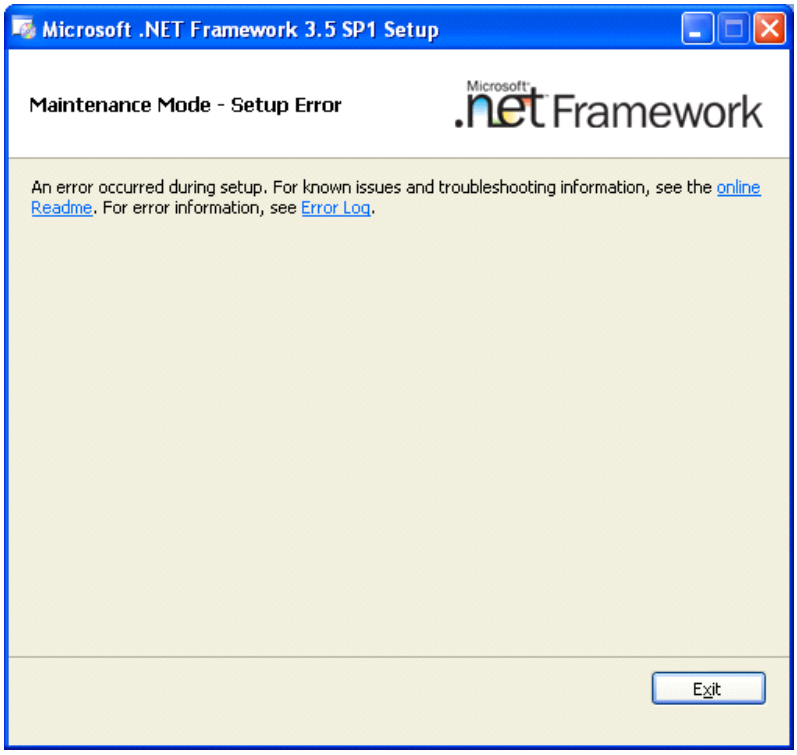
Step #28 ...



You may get the above error message, but the install should still be OK.

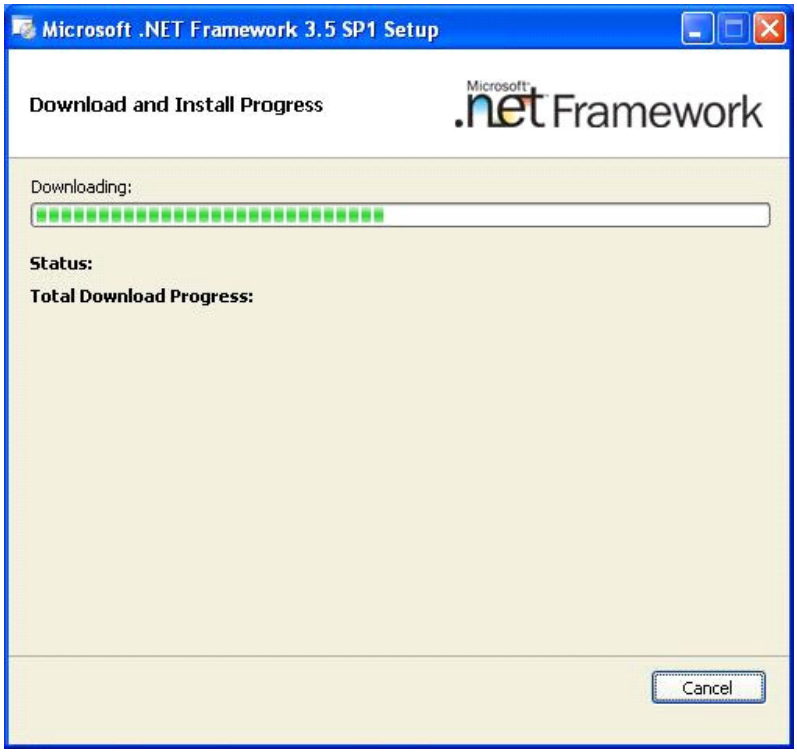
Select the option which you prefer in order to continue.

Step #29 ...



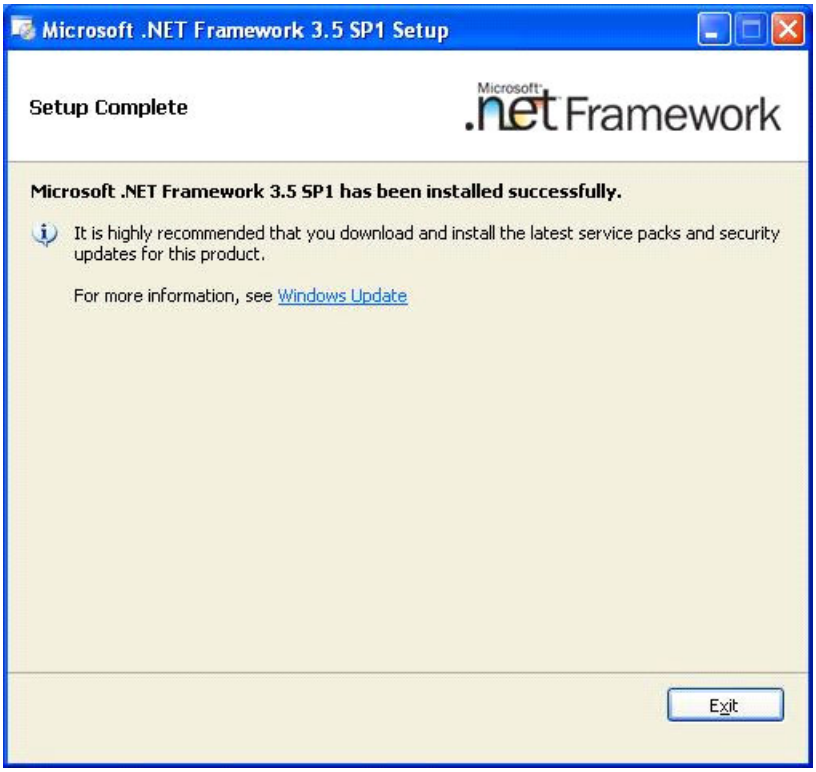
Click the 'Exit' button to continue the installation. Go to Step # 32.

Step #30 ...



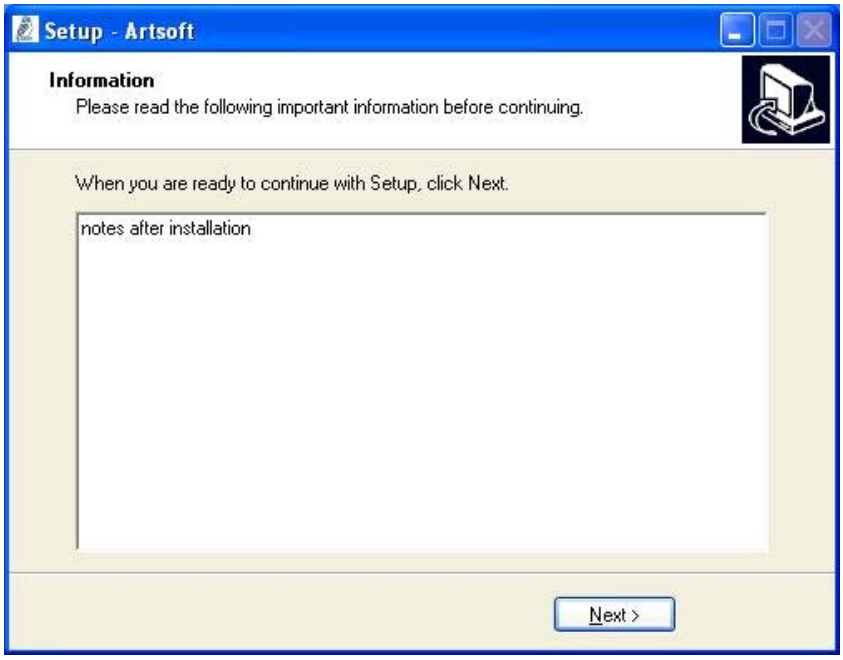
Wait while the installation is in progress.

Step #31 ...



Click 'Exit' to finish the Dot.Net Framework Installation.

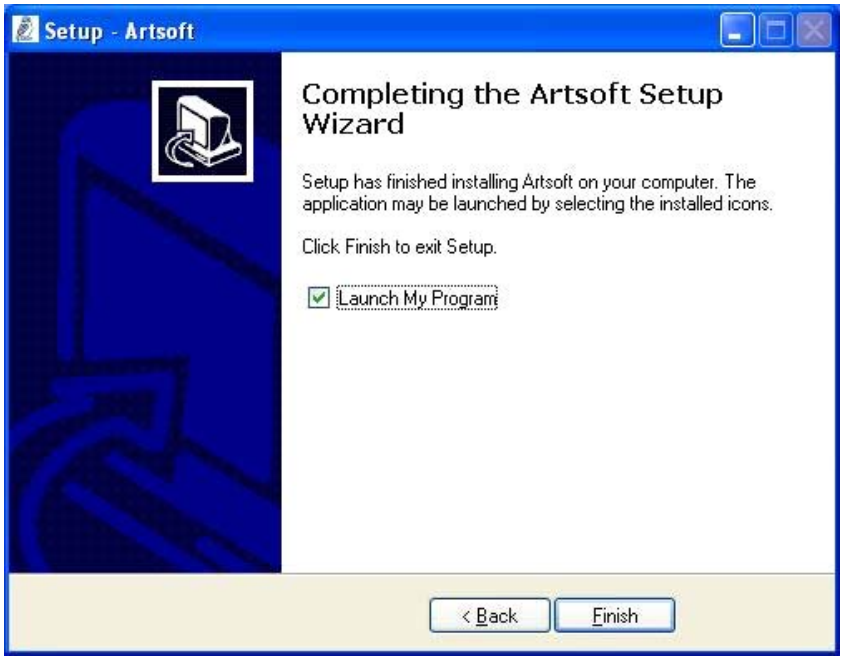
Step #32 ...



Click 'Next'.

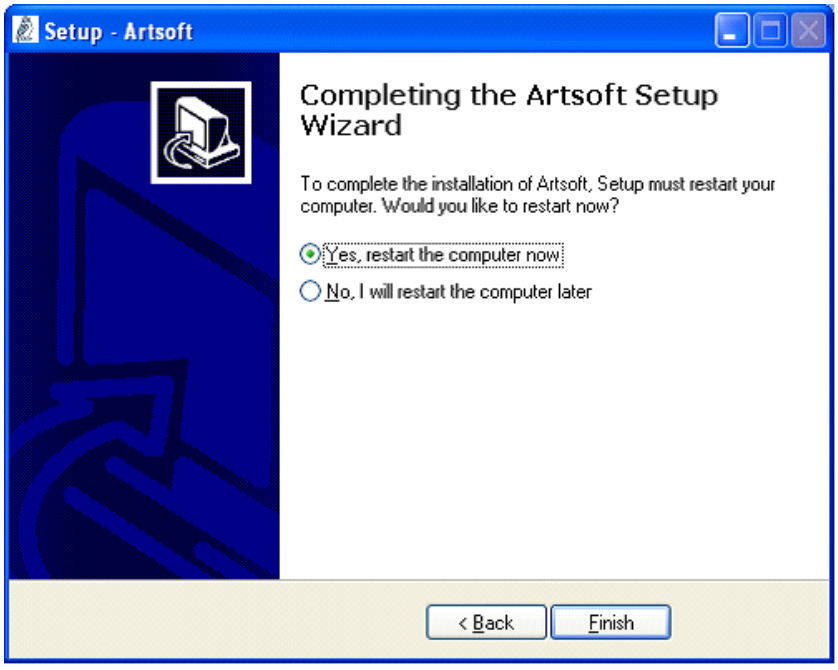
Step #33 ...

You may now get now one of the following screens:



Check 'Launch My Program' if you want to launch the ArtSoft application now. Click 'Finish' to launch and / or finish the ArtSoft installation process.

OR -



Select the "Yes, restart the computer now" option to finish the installation.

The 'ArtSoft' installation process is finished!

Appendix B - Specifications

Imaging Performance	
Thermal Imager	
Thermal Sensitivity	20mK@ 25˚C
F #	1.1
Field of View	18° with 30 mm lens
Focus near	<0.5m
Focusing	Manual
Digital Zoom	x2, x4
Digital Video Camera	
Embedded Digital Camera	VGA, fixed focus, for situational awareness
Detector	
Type	Cooled High Sensitivity , 320x240 pixels
Spectral range	3-5µm
Power Input	
Voltage	12 VDC
Power consumption	14.4 W
Battery Life	4 hours continuous
Physical Characteristics	
Weight (with battery and lens)	2.5 kg (5.5 lbs.)
Color	Grey and Black
Size in (LxHxW)	9" x 4.3" x 5.1" (230 x 110 x 130)mm
Interface	Tripod mounting UNC 1/4", rotation safe
Display	
Display Unit	3.5" Color LCD 640X480
Environmental Conditions	
Operating temperature range	-20°C to +50°C
Storage temperature range	-40° to + 70°C
Water and dust	IP65
Humidity	95%
Intrinsic Safe	Class 1 Div. 2 and ATEX Zone 2 (undergoing certification)
Gas Leak Detection Performance	
Operation features	Auto Mode and Enhanced Mode
Designed for detection of	Ethylene, 1-Hexane, Propanal, 1,3-Butadiene, 1-Butene, Methane, Propylene 1-pentene, StyreneVinyl Benzene, Toluene, Vinyl acetate Acetic acid, ethenyl eater, Xylene 1,2-dimethyl-Benzene, Isobutylene 2methyl-1propene, Isoprene, 2methyl-1,3-butadiene, Benzene, Ethyl benzene, Ethylene oxide, Hexane, Methanol, Propylene oxide, Propylene, Ethane, Octane, Heptane, Isopropyl alchohol, MEK Methyl Ethyl Ketone 2-butanone, Propane, Butane, Pentane
Digital Video and Audio Recording	
Video and Audio recording	Digital recorder build-in with connection to PC via USB 2
Storage Capacity	Up to 6 hours of MPEG4/H.264 video and audio recording in a 4 Gbyte SD card (Built In)
Others Features	
Connectivity	USB2

Supplied Accessories	
	Battery Set (3), Tri Battery Charger, USB cable, Headset, Neck strap, Glare Shield, Carrying Case