GEARView Basic

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Use of Fictitious Patient Data

Patient demographics appearing in this manual are examples only. No actual patient study data were used in the preparation of this manual. Any similarities to persons living or deceased is purely coincidental.

Indications for Use

GEARView Basic is intended to be used by patients and healthcare personnel to review medical images and related results.

GEARView Basic is not labeled for diagnostic use.
Contents

1 Welcome ...........................................................................................................................1
  1.1 Starting and exiting GEARView Basic ........................................................................... 4

2 Basic operations ..............................................................................................................5
  2.1 Decryption .................................................................................................................. 5
  2.2 Patient List tab ......................................................................................................... 6
  2.3 Patient tabs ............................................................................................................... 7
  2.4 Help Menu ............................................................................................................... 9

3 Viewing and Manipulating Images .................................................................................10
  3.1 Window controls ......................................................................................................10
  3.2 Thumbnail context menu commands .........................................................................13

4 Keyboard shortcuts .......................................................................................................21

5 Support ..........................................................................................................................22
1 Welcome

GEARView Basic

Congratulations on adding GEARView Basic™ to your PACS/EHR system. GEARView Basic gives patients and healthcare personnel a simple way to view medical images and related results. When burned to media—CDs, DVDs, or USB flash drives—GEARView Basic creates a complete and portable medical record.

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Glossary of Terms and Symbols

The following terms and symbols are used in PACSGEAR manuals.

Consult instructions for use. Appears on the product CD.

Conformité Européenne. Indicates that the product complies with the requirements of the 93/42/EEC Medical Device Directive.

Symbol for manufacturer.

Symbol for European authorized representative.

Click to view a video tutorial.

Caution. Messages that alert you to conditions that could result in equipment failure, equipment damage, or data loss.

WARNING. Messages that alert you to conditions that could result in death or serious injury.

Accession number
A tracking or order number for patient studies.

AE
Application entity. A local or remote DICOM service.

AMD
Automatic marker detection. Automatic detection of markers to identify mammography image orientation.

AST
Auto segmentation technology. PACSGEAR’s proprietary technology for converting sectional films into a stack or cine loop.

Burner
A digital recording device such as a CD recorder that stores data on media.

CR
DICOM modality abbreviation for computed radiography.

DICOM
Digital imaging and communications in medicine. A networking standard for the medical industry.

DOB
Date of birth.

DCA
Dynamic contrast algorithm. PACSGEAR’s proprietary technology for displaying mammography film priors with a digital “look and feel.”

DX
DICOM modality abbreviation for digital radiography.

EMR
Electronic medical records.

EHR
Electronic health records.

HIPAA
The Health Insurance Portability and Accountability Act. A law that stipulates transferability of health insurance coverage, standardizes aspects of electronic medical records, and protects patient confidentiality with regard to health information.

LDAP
Lightweight directory access protocol. Used for looking up network services and addresses.

Media
Electronic storage media, such as CD-ROM and DVD.
<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MG</td>
<td>DICOM modality abbreviation for <em>mammography</em>.</td>
</tr>
<tr>
<td>Modality</td>
<td>Sources of data, such as from ultrasonography, MRI, PET, and CT.</td>
</tr>
<tr>
<td>MRN</td>
<td><em>Medical record number.</em> Sometimes referred to as the “patient ID number.”</td>
</tr>
<tr>
<td>PACS</td>
<td><em>Picture archival and communication system.</em></td>
</tr>
<tr>
<td>PacsSCAN</td>
<td>General term for any of the PacsSCAN products (PacsSCAN Film, PacsSCAN Video, etc.)</td>
</tr>
<tr>
<td>PGMS</td>
<td>PACSgear Media Server. Software that enables enhanced workflow, optimized for video/audio distribution.</td>
</tr>
<tr>
<td>PIE</td>
<td><em>PACSgear Image Exchange.</em></td>
</tr>
<tr>
<td>PIES</td>
<td><em>PACSgear Image Exchange Server</em></td>
</tr>
<tr>
<td>QC</td>
<td><em>Quality control.</em> A process of correcting errors and inconsistencies in imaging studies.*</td>
</tr>
<tr>
<td>RIS</td>
<td><em>Radiology information system.</em> A system used to order radiology studies.*</td>
</tr>
<tr>
<td>UID</td>
<td><em>Unique identifier.</em> A manufacturer-specific identification string that is assigned by modalities to images, series, or studies.</td>
</tr>
<tr>
<td>WADO</td>
<td><em>Web Access to DICOM Objects.</em> A service that makes DICOM images and reports available via a Web browser.*</td>
</tr>
</tbody>
</table>

### Operating Procedure Conventions

Operating procedures employ the following conventions.

<table>
<thead>
<tr>
<th>Convention</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boldface</strong> type</td>
<td>Names of buttons.</td>
</tr>
<tr>
<td><strong>Italic</strong> type</td>
<td>Names of on-screen objects other than buttons (such as menu commands).</td>
</tr>
<tr>
<td><strong>Courier font</strong></td>
<td>Text that the user types.</td>
</tr>
<tr>
<td>&gt;</td>
<td>Sequence of procedures.</td>
</tr>
</tbody>
</table>
1.1 Starting and exiting GEARView Basic

Starting GEARView Basic

If GEARView Basic was included on the CD or other medium that contains studies, the program will usually start automatically when you insert the medium into a drive or port on the PC. If it does not start automatically, navigate to the folder containing the studies, and run gearview.exe.

A graphic (the “splash screen”) will appear showing the product name. If this graphic does not appear, please contact PACSGEAR Support. After a few seconds, the splash screen disappears and either the Encryption Password dialog box or the Patient List tab of the main program appears (see next chapter).

Exiting GEARView Basic

Click the Windows close button.
2 Basic operations

If the medium you inserted into the PC contains only unencrypted studies, GEARView Basic automatically starts and displays the studies in the Patient List tab (see section 2.2). If the medium contains encrypted studies, you are prompted to decrypt the files according to the procedure below.

2.1 Decryption

When you insert the medium into the PC, GEARView Basic starts and displays the Encryption Password dialog box.

![Encryption Password dialog box](image)

Enter the password (determined at burn time) into the box and click View. GEARView Basic decrypts the studies, copies them from the medium to the folder where GEARView Basic was installed, and opens them in the Patient List tab. Alternately you can click Export to decrypt and copy the studies to a folder of your choice and exit GEARView Basic. After export, the folder will contain DICOM files that can be imported to PACS.

Password

In the Password box, enter the password specified in MediaWriter’s Confirm Studies dialog box when the studies were originally burned.
2.2 Patient List tab

If studies on a burned medium are not encrypted, or if they have been decrypted as described in section 2.1 above, they are ready for viewing. When **GEARView Basic** first opens, the Patient List tab is displayed.

![Patient List tab](image)

*Figure 2.2 Patient List tab*

The Patient List tab displays all of the studies that are available for viewing. Double-click any study in the Patient List tab to view the study in a new patient tab (see next section).
2.3 Patient tabs

Each time you double-click a study for a new patient in the Patient List tab, a new patient tab is opened. To close a patient tab, click the close button on the right side of the tab.

The contents of the patient tabs and other parts of the program screen are described as follows.

A Patient List tab. Click to display the patient list.

B Exam history icons. An icon is displayed for each exam associated with the patient. Each icon shows the modality (VL, MR, CT, etc.) and date/time of the exam. Click an icon to display a new exam strip containing all series in the exam. If an opened exam strip is off screen, you can jump to it by clicking its exam history icon.

C Patient tabs. To switch between opened patient tabs, simply click the desired tab. If a particular exam is not displayed in the tab, click one or more of the exam history icons.

D Tab scroll buttons. Click to move open tabs to the left or right.

E Help menu. Click to view the user’s manual, view or change the license, or to switch display languages.

F Close button. Click to close the exam strip. At any time you can reopen the exam by clicking the appropriate exam history icon.
An overlay of the main study information.

Exam strip. The horizontal strip containing a header (I) and all series thumbnails (J) in an exam.

Exam header (the date/time and name of the exam). Double-click to open the Image Details window.

Series thumbnail (hereinafter, thumbnail). Each exam contains one or more series, and each series contains one or more images. Each series is shown as a thumbnail in the exam strip.

An overlay of the size of the currently displayed image (in pixels).

An overlay of the number of the currently displayed image. If a series contains multiple images, you can scroll through them using the mouse wheel.

Overlays

The text that is superimposed over images, such as in G, K, and I above, is called an overlay. To display or hide overlays, right-click a thumbnail and click Text On/Off, or click a thumbnail and press the A keyboard shortcut.
2.4 Help Menu

Click the help button in the upper right corner of the main screen to access the help menu.

![Figure 2.4 Help menu]

**User's Manual (PDF)**
Click to display the user's manual in PDF format.

**Language**
Click to select the language of the user interface. The supported languages are English, French, German, Portuguese, and Spanish.

**About**
Click to display the version and other information about the program.
3 Viewing and Manipulating Images

GEARView Basic provides you with convenient tools to view and manipulate images. These tools differ depending on the type of image.

3.1 Window controls

The following window controls are available.

**Full screen**
To open an image in a full-screen viewport, double-click its thumbnail in the exam strip or click the Full screen button (figure 3.1B).

**Compare**
Click the Compare button (figure 3.1A) to open the image in a half-screen viewport. Click the Compare button of a second image to open the second image in a half-screen viewport in the other half of the screen. This easily enables comparison of two images.

![Figure 3.1 A: Compare button; B: Full screen button; and C: Close button. The Close button is only visible if the image is displayed in Compare or Full Screen view.](image)

![Figure 3.2 Compare view](image)
Close
Any time an image is opened in a full-screen or compare viewport you can return to thumbnail view by double-clicking the image again, or by clicking its Close button (figure 3.1C).

Cine images
This button is only available if the series contains more than one image (see figure 3.3A below). Click to automatically cine through all images in the series. After clicking, the button changes to a Pause button. Click Pause to pause the cine. You can also press C on the keyboard to Cine/Pause images.

Cine slider
This slider is only available if the series contains more than one image (see figure 3.3B). Drag the slider to the right or left to manually cine forwards or backwards through images in the series. You can also rotate the mouse wheel.

MPEG controls
These controls are available when viewing MPEG files (see figure 3.4).

SR paging
When a structured report (modality = SR) or encapsulated PDF is opened in a full-screen viewport, two buttons appear at the bottom of the screen for paging the report forward and backward.

Mammography mode
When a mammography study (modality = MG) is opened in a compare viewport, using the left/right arrow keys will advance to the next two linked mammography series with matching laterality (for example, RMLO/LMLO to RCC/LCC).
Linking series

When two series are opened in compare viewports, their scrolling behavior becomes linked by default if they satisfy two conditions: 1) the series are from the same exam; and 2) the series reside on the same plane (as determined by the relevant DICOM patient orientation tags). When two series are linked, scrolling performed by the user on one of the series is likewise applied, to the extent possible, in the other series. Linked series are identified by the word “Linked” appearing at the lower left of each series. When linking is enabled, a “Link” command appears in each series’ context menu that allows you to turn linking ON and OFF (see figure below).

![Figure 3.6 Two linked series. The command "Link" becomes available in the context menu.](image)

Encapsulated PDFs

DICOM compatible encapsulated PDFs can be opened from any source. When viewing encapsulated PDFs, GEARView QC displays scroll bars and paging buttons for navigating multipage files, as well as a context menu with the following commands.

- **Zoom**: Zooms the image by the selected amount.
- **Image details**: Opens the image details window in figure 3.9.
- **Export**: Lets you export all or portions of the study to PDF or DICOM.

![Figure 3.7 PDF file open with context menu](image)
3.2 Thumbnail context menu commands

You can right-click any thumbnail in an exam strip to open the following context menu.

![Context menu for images in studies](image)

**Reset**
Resets rotation to none, window/level to its original values from the DICOM file, and the invert state, and clears all measurements.

**Tools**
See Tools context menu below.

**Flip/rotate**
See Flip/rotate context menu below.

**Layout**
Only displayed when the image is open in a viewport. See Layout context menu below. This command is only available in a viewport.

**Text On/Off**
Displays or hides the text overlay.

**Scout On/Off**
Displays or hides scout lines. When turned ON, scout lines appear in one or more series that are perpendicular to the series you point to with the mouse.

**Window/level presets**
See Window/level presets context menu below.

**Image details**
Opens a window that displays patient, study, and other information associated with the image (see figure 3.9 below). Each piece of information corresponds to standardized DICOM fields, and is accompanied by the relevant field codes.

To search for information, type a keyword in the *Find* box and click *Find next* as many times as is necessary to jump to the desired item.

**Export**
Enables you to save the selected image, or all images in the selected series, to a specified folder as JPEG or DICOM (*.dcm) files.
Print image
Opens a print dialog box for printing the selected image.

Load highest quality
Only available when both compressed and raw/uncompressed images are available on the source medium. Click to load the uncompressed file, displaying the highest possible image quality. The image overlay displays “Decompressed.”

<table>
<thead>
<tr>
<th>Tag</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient details</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0010.0010)</td>
<td>Patient Name</td>
<td>CONAN TRISTAN</td>
</tr>
<tr>
<td>(0010.0020)</td>
<td>Patient ID</td>
<td>CTE3333</td>
</tr>
<tr>
<td>(0010.0030)</td>
<td>Patient Birth Date</td>
<td>19430101</td>
</tr>
<tr>
<td>(0010.0040)</td>
<td>Patient Sex</td>
<td>F</td>
</tr>
<tr>
<td>Study details</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0008.0050)</td>
<td>Accession Number</td>
<td>CT115</td>
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<td>Study Instance UID</td>
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<td>Study ID</td>
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<tr>
<td>(0008.0020)</td>
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<td>20030801</td>
</tr>
<tr>
<td>(0008.0030)</td>
<td>Study Time</td>
<td>061736</td>
</tr>
<tr>
<td>(0008.1030)</td>
<td>Study Description</td>
<td>CT HEAD V/W CONTRAST</td>
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<tr>
<td>Series details</td>
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<td></td>
</tr>
<tr>
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<td>Series Instance UID</td>
<td>1.2.3.20031027174026.88</td>
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<tr>
<td>(0008.103E)</td>
<td>Series Description</td>
<td>SCOUT HEAD</td>
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<tr>
<td>(0020.0011)</td>
<td>Series Number</td>
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</tr>
<tr>
<td>(0008.0021)</td>
<td>Series Date</td>
<td>20030801</td>
</tr>
<tr>
<td>(0008.0031)</td>
<td>Series Time</td>
<td>061736</td>
</tr>
<tr>
<td>(0008.0060)</td>
<td>Modality</td>
<td>CT</td>
</tr>
<tr>
<td>Image details</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0002.0001)</td>
<td>File Meta Information Version</td>
<td>(...)</td>
</tr>
<tr>
<td>(0002.0002)</td>
<td>Media Storage SOP Class UID</td>
<td>1.2.840.10008.5.1.4.1.1.2</td>
</tr>
<tr>
<td>(0002.0003)</td>
<td>Media Storage SOP Instance UID</td>
<td>1.2.840.10008.5.1.4.1.2.3.6</td>
</tr>
<tr>
<td>(0002.0010)</td>
<td>Transfer Syntax UID</td>
<td>1.2.840.10008.1.2.57</td>
</tr>
<tr>
<td>(0002.0012)</td>
<td>Implementation Class UID</td>
<td>1.2.826.0.1.388043.2.125.1066...</td>
</tr>
<tr>
<td>(0002.0013)</td>
<td>Implementation Version Name</td>
<td>1.4.14/NIH32</td>
</tr>
</tbody>
</table>

Figure 3.9 Image Details window
Tools context menu

Window/level
Changes the cursor to the window/level cursor. Drag the cursor horizontally or vertically over an image or thumbnail to adjust the window or level, respectively.

Zoom
Changes the cursor to the zoom cursor. Drag the cursor vertically over an image or thumbnail to zoom in or out.

Pan
Changes the cursor to the pan cursor. Drag the pan cursor over an image or thumbnail to pan (drag) the image in any direction. Note that you can only pan left and right in the full-screen viewport. Note that the edges of images cannot be panned beyond the edges of the viewport.

Cine
Select this command to cine through images in a series. This command only works if the series contains more than one image.

Measure
After selecting this command, click two points on the image in succession: a start point and an end point. A line appears between the two points with the distance between them measured in units of millimeters. After the first line is displayed, you can move either of the two points to new locations in order to measure new distances. To delete a line, place the pointer over an endpoint so that the line turns yellow, then press the Delete key.

Figure 3.10 Tools context menu

Figure 3.11 Use the Measure tool to measure portions of an image
**Measure pixel**
After selecting this command, click and hold down the mouse button over any point on the image to display the pixel value at that point. One value is shown for grayscale images, and three points are shown (R, G, and B) for color images.

**Measure angle**
After selecting this command, click three points on the image in succession: a start point, a vertex, and an end point. Lines appear between the vertex and start and end points, and the resultant angle is displayed in units of degrees. After the first angle is displayed, you can move any of the three points to new locations in order to measure new angles.

*Figure 3.12 Use the Measure angle tool to measure angles in images*

**Measure Cobb angle**
After selecting this command, click four points on the image in succession: a start and end point for line 1, and a start and end point for line 2. The two lines appear along with a third line between the first two lines, and the Cobb angle is displayed (the angle swept by the lines where the vertex is assumed).

*Figure 3.13 Use the Measure Cobb angle tool to measure angles in images*
**Measure ROI**
After selecting this command, click and drag on the image to create, size, and shape an ellipse around the region of interest. The ellipse’s area is displayed along with that area’s average pixel value and standard deviation of pixel values.

![Figure 3.14 Measuring with the ROI tool](image)

**Invert**
Inverts black and white values on grayscale images. Has no effect on color images.

**Flip/rotate context menu**

<table>
<thead>
<tr>
<th></th>
<th>Reset</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Flip/rotate</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Layout</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Text On/Off</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Scout On/Off</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Window/level presets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Image details</td>
<td>Ctrl+D</td>
</tr>
<tr>
<td></td>
<td>Export</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Print image</td>
<td></td>
</tr>
</tbody>
</table>

|            | Rotate right 90        |
|            | Rotate left 90         |
|            | Rotate 180             |
|            | Flip horizontal        |
|            | Flip vertical          |

![Figure 3.15 Flip/rotate context menu](image)

**Rotate right 90**
Rotates the image or thumbnail ninety degrees clockwise

**Rotate left 90**
Rotates the image or thumbnail ninety degrees counterclockwise

**Rotate 180**
Rotates the image or thumbnail one hundred and eighty degrees
Flip horizontal
Flips the image horizontally (on its vertical axis)

Flip vertical
Flips the image vertically (on its horizontal axis)

Layout context menu
The Layout context menu is only visible when the study is displayed in a viewport, and is useful only if there is more than one slice in the series. Select 1 x 1, 2 x 2, or 3 x 3 from the submenu to display a “tiled” layout of slices. Use the Up/Down arrow keys to scroll slices one-by-one through the tiles, or use the Page Up/Page Down keys to scroll them screen-by-screen.

![Layout command with submenu](image)

If there are not enough slices to fill the layout, portions of the layout are left blank.

![A 3 x 3 layout. Each of eight slices are shown in a different tile of the layout.](image)
Window/level presets context menu

The Window/level presets context menu contains a submenu with a selection of preset window/level values appropriate for different body parts or viewing objectives. The presets available differ depending on the image. You can choose the preset most appropriate for your image, and then fine-tune the window/level setting as desired by using the Window/level tool described above. Notice that the menu includes lookup table (LUT) settings if the image is in color.

![Figure 3.18 Example of a possible Window/level preset submenu](image-url)

Figure 3.18 Example of a possible Window/level preset submenu
Export Submenu

Enables you to save the selected image, or all images in the selected series, to a specified folder as JPEG or DICOM (*.dcm) files.

Print image

Opens a print dialog box for printing the selected image.
4 Keyboard shortcuts

GEARView Basic provides many convenient keyboard shortcuts for efficient operation.

Window/level preset shortcuts
The following are the default keyboard shortcuts for window/level presets. If desired, these can be edited directly in the presets.xml file located in the GEARView Basic folder.

<table>
<thead>
<tr>
<th>Key</th>
<th>Default Preset</th>
</tr>
</thead>
<tbody>
<tr>
<td>F4</td>
<td>Abdomen</td>
</tr>
<tr>
<td>F5</td>
<td>Bone</td>
</tr>
<tr>
<td>F6</td>
<td>Brain</td>
</tr>
<tr>
<td>F7</td>
<td>Liver</td>
</tr>
<tr>
<td>F8</td>
<td>Lung</td>
</tr>
<tr>
<td>F9</td>
<td>Mediastinum</td>
</tr>
<tr>
<td>F10</td>
<td>Myelogram</td>
</tr>
</tbody>
</table>

Other shortcuts

<table>
<thead>
<tr>
<th>Shortcut</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Page Up/Down</td>
<td>Scrolls up/down one screen in layout view</td>
</tr>
<tr>
<td>Up/Down</td>
<td>Scrolls up/down one image in layout view</td>
</tr>
<tr>
<td>Right/Left</td>
<td>Jumps to the next/previous series in layout view</td>
</tr>
<tr>
<td>Home</td>
<td>Jumps to first image of the selected series</td>
</tr>
<tr>
<td>End</td>
<td>Jumps to last image of the selected series</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the highlighted measurement overlay</td>
</tr>
<tr>
<td>A</td>
<td>Shows/hides overlays</td>
</tr>
<tr>
<td>B</td>
<td>Switches to the measure Cobb angle tool</td>
</tr>
<tr>
<td>C</td>
<td>Starts/pauses the selected cine loop</td>
</tr>
<tr>
<td>I</td>
<td>Inverts the current image (grayscale only)</td>
</tr>
<tr>
<td>M</td>
<td>Switches to the measure line tool</td>
</tr>
<tr>
<td>N</td>
<td>Switches to the measure point tool</td>
</tr>
<tr>
<td>O</td>
<td>Switches to the measure ROI tool</td>
</tr>
<tr>
<td>P</td>
<td>Switches to the pan tool</td>
</tr>
<tr>
<td>R</td>
<td>Resets the current image</td>
</tr>
<tr>
<td>S</td>
<td>Shows/hides scout lines</td>
</tr>
<tr>
<td>V</td>
<td>Switches to the measure angle tool</td>
</tr>
<tr>
<td>W</td>
<td>Switches to the window/level tool</td>
</tr>
<tr>
<td>Z</td>
<td>Switches to the zoom tool</td>
</tr>
</tbody>
</table>
5 Support

At PACSGEAR, your success is our success. If you have any questions or problems, please do not hesitate to contact us.

**Customer Support (Americas, Asia-Pacific):**

+1 925 225 6100 (8:00 am to 5:00 pm Pacific Time).

support@pacsgear.com

**Customer Support (Europe, Middle East, Africa):**

+49 (0)89 450 807 600 (08:00 to 17:00 Central European Time).

support@pacsgear.com