

# **MudView++: QMIPS Sonar File Viewer for Windows**

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by

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# Introduction

MudView++ is a Windows application for viewing QMIPS<sup>2</sup> format digital sonar data files. It was developed at the USGS Marine Facility to allow scientists to use desktop computers to access sonar data file images for interpretation, review and publication. MudView++ is written in Microsoft Visual C++ V1.5 and the source code is available<sup>3</sup> to the public. The QMIPS format has become the de facto standard for sonar data acquisition in both the Atlantic and Pacific Branches of Marine Geology. Between the two branches there are three QMIPS compatible systems collecting sonar imagery. MudView++ provides the link between the field data collection system and the geologist's desktop.

## System Requirements

### Hardware

MudView++ requires a no specialized hardware for a modern IBM compatible PC. The video adapter must be capable of displaying up to 256 simultaneous colors. Horizontal and vertical resolution can be in the range of 640 X 480 pixels up to 1280 X 1024 pixels.

Description	Required	Recommended
Video Adapter	Minimum Resolution 640X480 256 Colors	1024 X 768 256 Colors
Hard Disk Space	3 MB	300 MB
RAM	8 MB	16 MB

### Software

MudView++ requires Microsoft Windows<sup>4</sup> 3.1 or later.

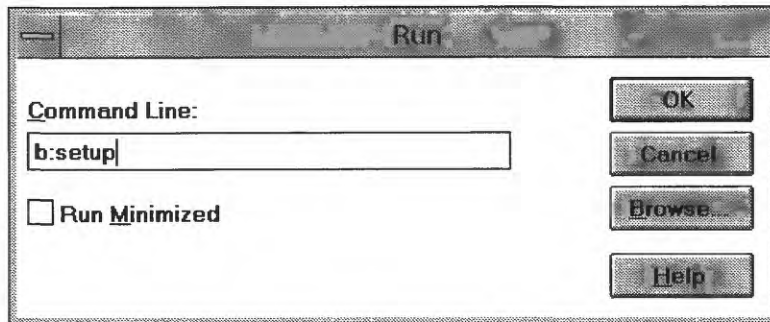
<sup>2</sup> QMIPS is a registered trademark of Triton Technology, Inc., Watsonville, CA

<sup>3</sup> For MudView++ source code, fax or mail written request to John Gann, USGS Marine Facility, 599 Seaport Blvd. Redwood City, CA 94063 FAX: 415 365-9841

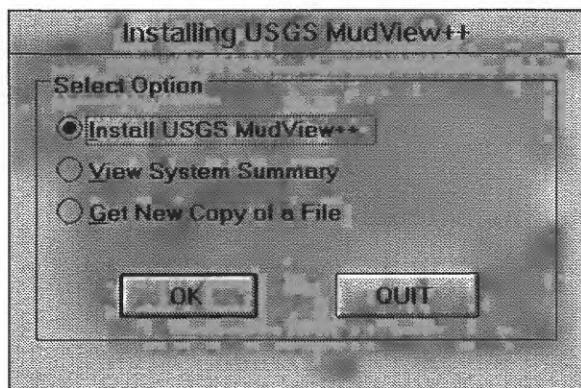
<sup>4</sup> Windows is a registered trademark of Microsoft Corporation, Redmond, WA.

# Software Installation

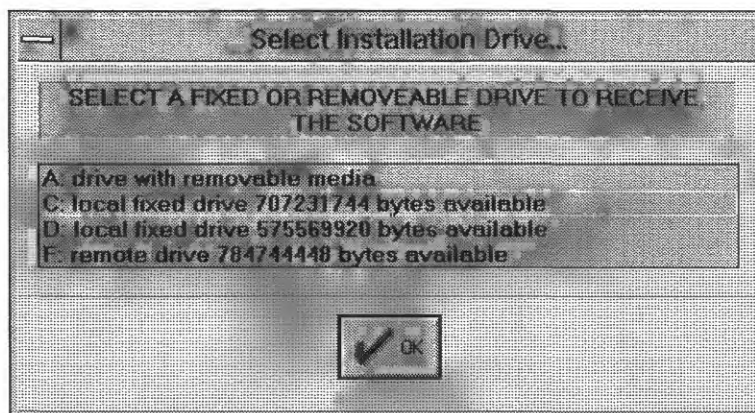
1. Insert the MudView++ install diskette in drive A (or B).
2. From the Program Manager, run SETUP on the MudView++ Install Diskette.



3. From the installation menu, select **Install USGS MudView++** and click OK.



4. Select Installation Drive. Select a hard drive to receive the MudView++ software. Do not install on a network drive.



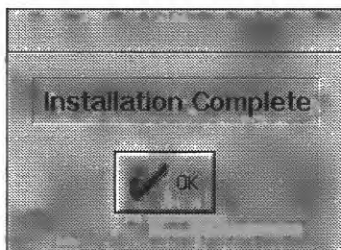
5. Select an installation directory on the installation drive and press OK



6. If necessary, the MudView++ installer will prompt you to insert the second installation diskette.



7. The MudView++ Installer will begin to copy all of the files to the destination directory. When the message box "Installation Complete" appears, MudView++ is ready to go.

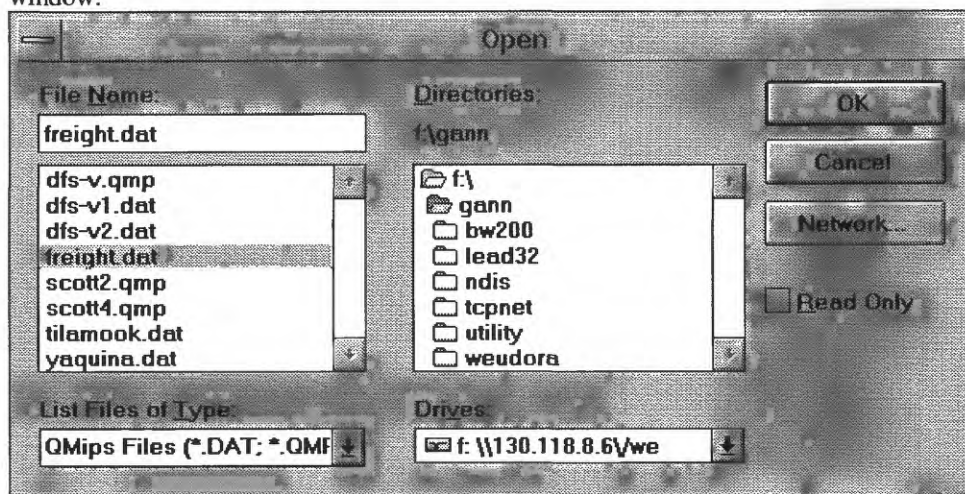


8. The MudView++ Installer will create a program group named USGS Applications. MudView++ will be added to this program group.

# Running MudView++



1. MudView++ is launched by double-clicking the MudView++ sonar icon in the USGS Application program group. MudView++ initially starts up in full screen mode, but can be minimized if desired.
2. To view the sample sonar file included with the installation files, select the File/Open menu. Then select the freight.dat sonar file. An hour-glass cursor will appear to indicate that the file is being loaded. When the loading is complete, the sonar image will appear in the client area of the view window.

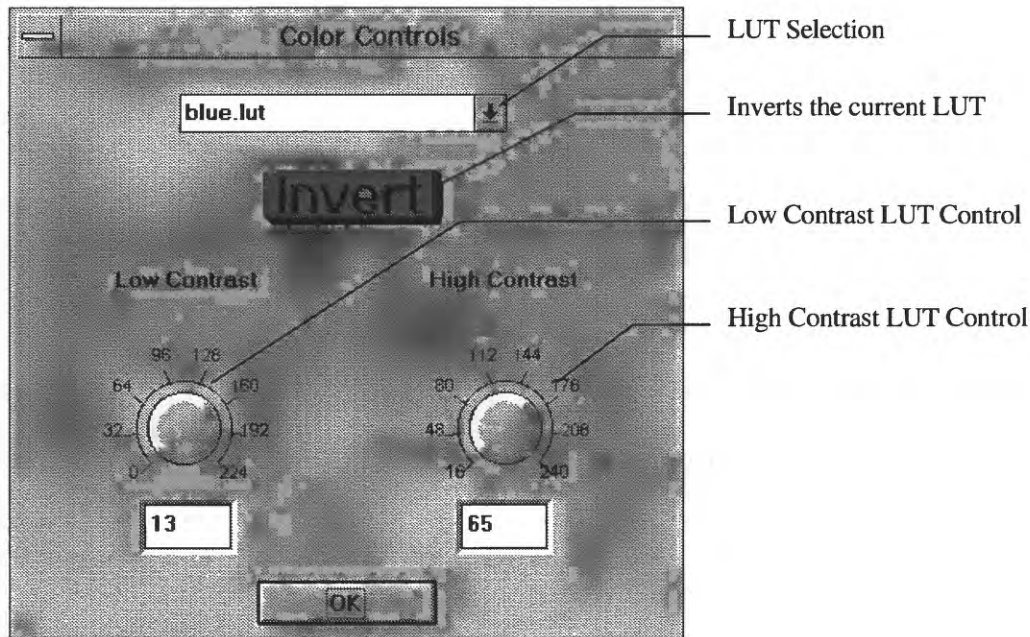


## Now What

MudView++ contains several user options for enhancing a sonar image. The following sections describe these enhancement options.

### Color Look-up Tables (LUTs)

LUTs are an effective way to put the video hardware to work for you in image processing applications. MudView++ includes a feature that allows the user to map various LUTs to a sonar image. Under the View/Color Control... menu the user can select a color control dialog.



### Contrast Controls

Most of the sonar data collected does not employ the full dynamic range of an 8-bit display device. To improve the contrast of low dynamic range data, 2 contrast dials are provided. The low contrast dial maps all of the pixel values less than or equal to the dialed-in low contrast value to the current LUT's lowest color. The high contrast dial maps all of the pixel values greater than or equal to the dialed-in high contrast value to the current LUT's highest color value. The remaining sonar pixels (between the lower and upper contrast settings) are remapped to a LUT that stretches from the low contrast setting to the high contrast setting. The effect of increasing the low contrast value is to remove low level noise like that typically found in the water column. The effect of lowering the high contrast value is to make weaker sonar pixels appear as stronger returns. An effect of either raising the lower contrast value or lowering the high contrast value is that the total image contrast will increase since the sonar image is being stretched across fewer available colors.

### Inverting the LUT

MudView++ allows you invert the color look up table through the use of the *Invert* button on the color control dialog. Inverting the LUT creates an image that is the negative of the currently displayed image. The LUT can also be inverted at any time by pressing the F3 key.



## Rotating the LUT

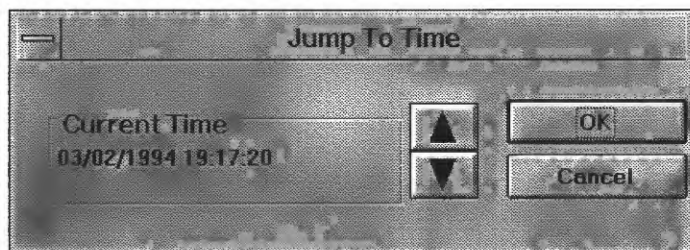
Some features in sonar images can be enhanced by rotating the color look up table through the sonar pixels. Press the F4 key to rotate the LUT left. Press the F5 key to rotate the LUT right.

## Scrolling through the Sonar Data

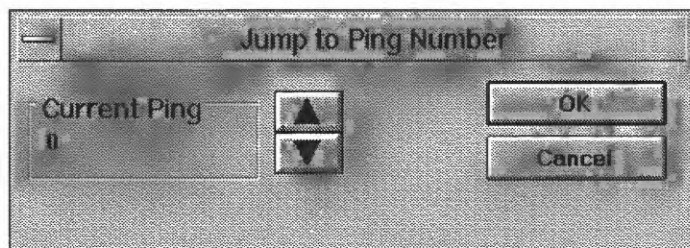
To scroll through the sonar data use the PgUp/PgDn keys.

## Jumping to a Specific Location in the Sonar Data

To display a certain page of data from the sonar data file use the *View/Jump To..* menu selection. To jump to a specific time in the file use the spin control on the *Jump To Time* dialog. MudView++ will limit the start and end times in the file based on information in the QMIPS header.



To jump to a specific ping location in the file, use the *Jump To Ping* dialog. MudView++ will limit the values in the dialog to the number of pings it computes based on file size and samples per ping.





## QMIPS Header Information

Additional QMIPS header information is available by selecting the *View/Header...* menu option.

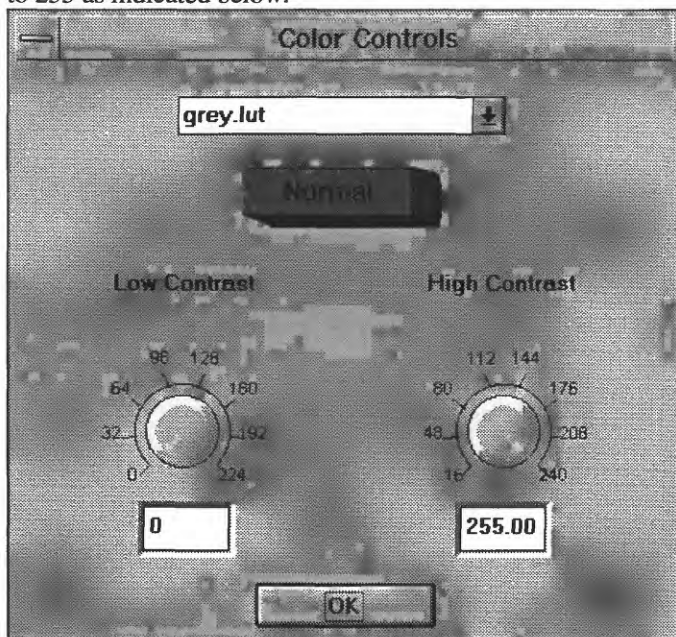
Qmips Header Info			
Filename	F:\GANN\SCOTT4.QM	Projection Type	UTM
Number of Pings	1799	Spheroid	WGS-84
Sonar Used	MudSeis DSP V1.13	Range Scale (m)	0
Nav Used	YoNav	Nav Units	0
Pixels Per Channel	1000	Nav Zone	10
Number of Imagery Channels	2	Bits Per Sample	8
Number of Sonar Channels	2	Sonar Frequency (kHz)	100
File Start Time	03/02/1994 19:17:17	File End Time	03/02/1994 19:21:17
Average Pings Per Second	7.50		

OK

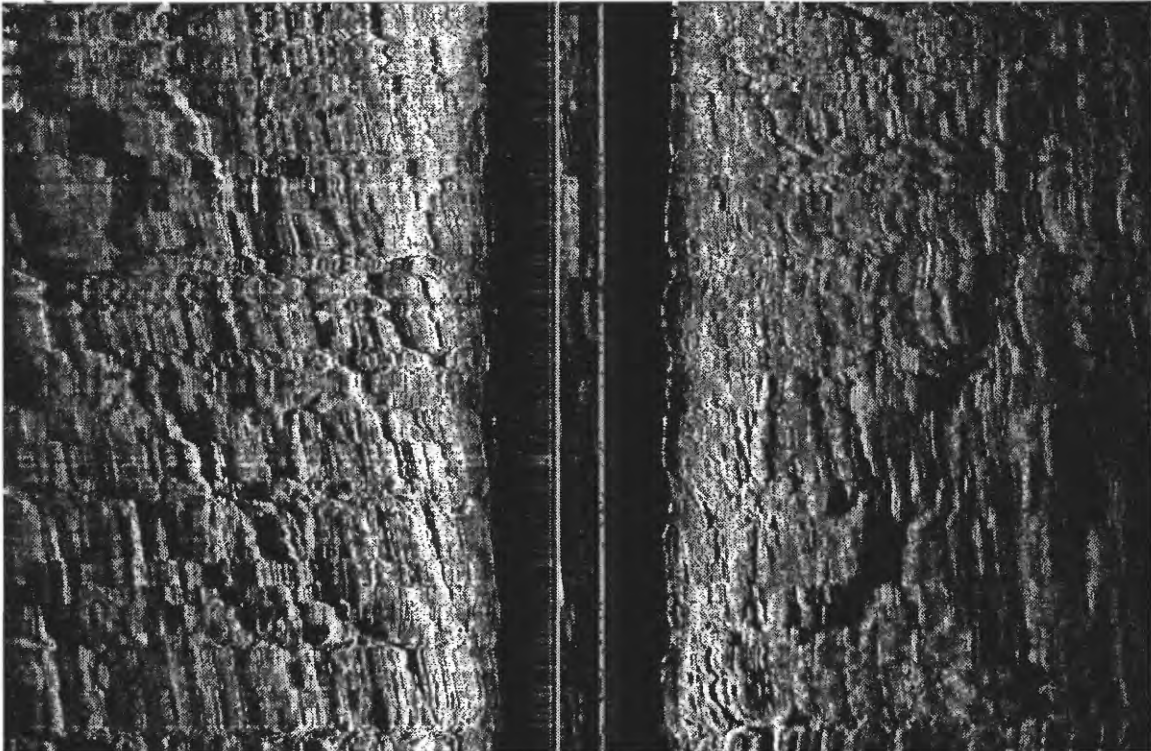
## Examples



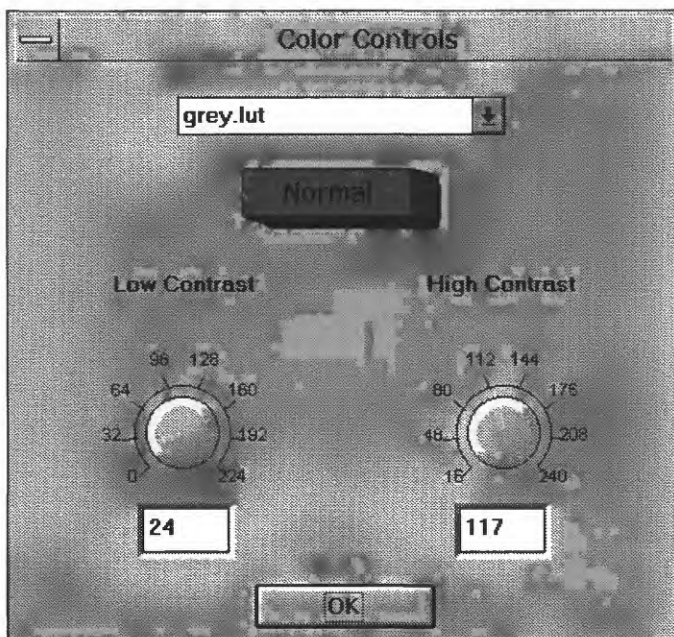
The above example was created using the full LUT with the low contrast set to 0 and the high contrast set to 255 as indicated below.



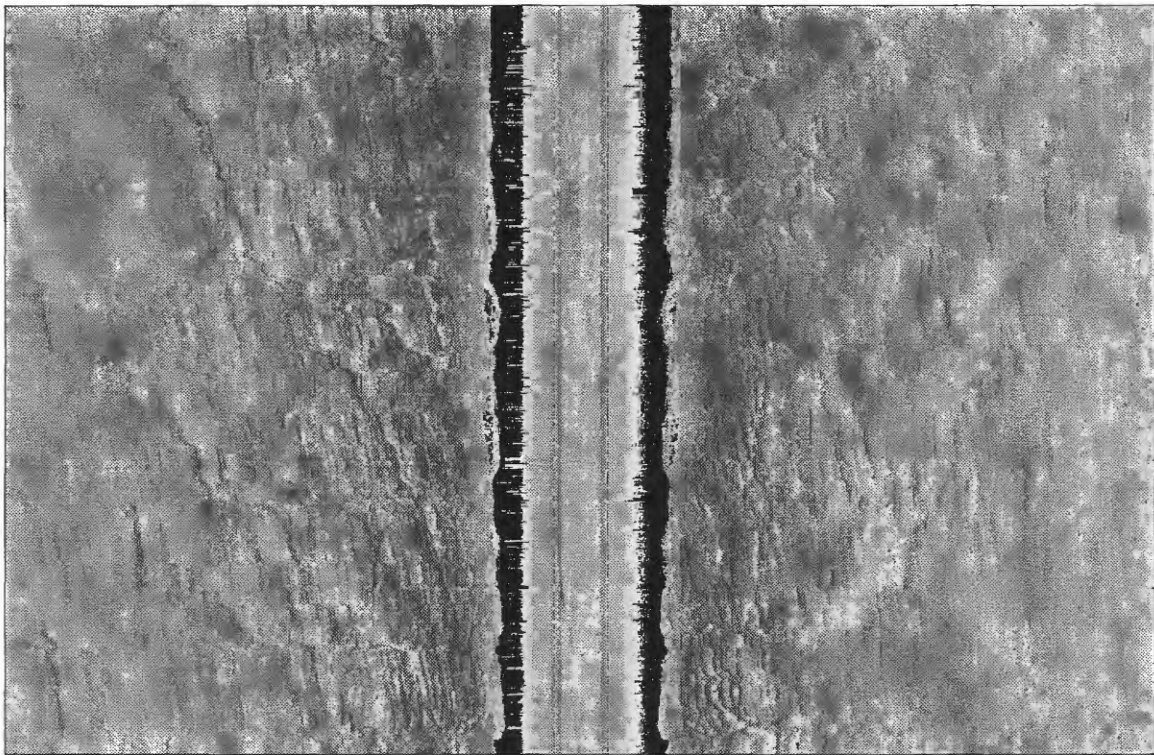
The following sonar image is the same image as above but with the contrast controls used to enhance the image.



The above image was create using the contrast controls depicted in the following dialog.



The following image is once again the same image using the *Invert* LUT button.



This image was produced using the settings below.

