Name

ViewDat

Version

1.04

Synopsis

Viewdat [Port] [Baud] [-bN] [-x]

Description

VIEWDAT is a simple bench test program for the DIGITISER digitiser. It receives DIGITISER output data over an RS-232 serial port, provides a real-time text display of seismic data, GPS status and instrument state-of-health, and a real-time graphical display of seismic data.

Usage and Options

VIEWDAT may be run under DOS or in a DOS window under OS/2 using the command-line syntax given above. If you wish to use the graphical display mode of VIEWDAT you must run the program as a DOS full-screen session. The data port of the DIGITISER should be connected to one of the serial ports (com1 or com2). To avoid missing any data, the program should be started before the DIGITISER is powered up. However, the program may be started at any time; it will start displaying and recording data after receiving the next data sync (at the start of the next data packet).

VIEWDAT recognizes the following command-line options:

Com Port	Specify com1 or com2 to specify to which serial port the DIGITISER is connected. Default is com2.
Baud Rate	Specify the baud rate for communication with the DIGITISER. Accepted values are 12(00), 24, 48, 96, 192 and 384. The default is 38400. This MUST be set to the same value as that being used for transmission by the DIGITISER.
Data Bundles per Packet (-bN)	Specify the number of data bundles per compressed data packet. This must be an odd number in the range of 1 to 59. This MUST be set to the same value as that being used for transmission by the DIGITISER. The default is 59.
Transmission Mode (-x)	Data transmission may be optimized for wire (default) or radio mode (-x). In radio mode the data is scrambled and the data is augmented by filler in order to maintain the full transmission baud rate. In wire mode the data is unscrambled. This parameter MUST be set to the same value as that being used for transmission by the DIGITISER.
Help (-h)	Type VIEWDAT -h to display a usage summary.

Commands

VIEWDAT recognizes the following keyboard commands:

V	Toggles between the two display modes (text and graphics).
P	Pauses the display (stops displaying incoming data).
R	Resumes updating the display.
ESC	Exit the program.

In graphics mode VIEWDAT also provides the following commands:

D	Toggle the DC removal option. DC removal Off - the raw data is displayed DC removal On - the packet mean is subtracted from the data before plotting.
+/-	Changes the vertical scale factor for the trace plots.

Text Mode Display

The VIEWDAT text display is divided into 4 parts:

1. The top section of the screen shows current signal statistics from each data channel,
2. the next section shows the current GPS status,
3. the third section shows the most recent state-of-health readings and
4. the bottom section logs incoming messages and communication diagnostics.

Data Display

The VIEWDAT display is packet-based. The DIGITISER outputs data in packets which contain a timestamp, followed by 4N to 16N data samples in a compressed format, where N is the number of data bundles per packet (see above). For example, if N = 59, each packet contains 236 to 944 samples, which corresponds to 1.2 to 4.7 seconds of data at 200 sps. VIEWDAT computes signal statistics based on the data contained within a single packet and displays the following information:

Channel Number	The digitiser channel number (0 to 5).
Sequence Number	The sequence number of this packet. Packets are numbered sequentially for each channel. Sequence number is reset to zero when the DIGITISER is restarted. Only the last 4 digits of the sequence number are shown.
Time	The time of the first sample in the packet in the format MM:SS.FRAC.
Number of Samples	The number of samples in the packet. This is also the number of samples over which the displayed values are calculated.
Maximum	The maximum sample value in the packet.
Minimum	The minimum sample value in the packet.
Mean	The arithmetic mean of all sample values in the packet.
RMS	The root mean square (standard deviation) of the sample values in the packet.
Trend	The rate of change of the mean value per second. This is determined through a linear regression of the sample value vs. time.
ZC - zero crossings	The number of zero crossings in the packet.
Frequency	Estimated signal frequency is based on the number of zero crossings. This is meaningful only for sinusoidal input signals.

GPS Display

The GPS status display shows the GPS status and activity as determined from the most recent message received.

Status

Unlocked	The GPS is off or unlocked (not providing accurate time information).
Coarse Lock	The GPS is locked and the instrument time is in fast-lock mode.
Fine Lock	The GPS is locked and the instrument time is in fine-lock mode.

Mode

NAV 3D	The GPS has a full 3D time and position solution.
NAV 2D	The GPS has a 2D time and position solution.
ACQ	The GPS is searching for satellites and does not have accurate time and position.
ACQ COLD:	The GPS is searching for satellites in cold start mode.

Num Satellites

This shows the number of satellites used for the current GPS time and position solution.

Figure of Merit

An indicator of the horizontal position accuracy: 1 = best; 9 = unlocked.

Date, Time and Position

The middle column of the GPS display shows the time and position returned by the GPS clock. Note that the time may not be completely up to date since the GPS information messages may be buffered for some time before being transmitted to VIEWDAT.

Channel Status

The right hand column of the GPS display shows the current activity of the 5 GPS channels. Each channel may be searching for a satellite, tracking a satellite, or idle. The display also shows the PRN number of the satellite being searched for or tracked and the signal to noise ratio of the incoming GPS signal. The signal to noise ratio must usually be over 30 in order to track a satellite; over 40 is better. Poor signal to noise ratios often indicate that the GPS antenna is obstructed.

State of Health Display

SSOH and FSOH	These fields show the most recent readings from the slow and fast state-of-health channels respectively. Readings are shown as counts from a 10-bit A/D and are always between 0 and 1023.
Comm Rx	This shows the number of bytes received from the DIGITISER by VIEWDAT.
Comm Ovr	This shows the number of bytes lost due to com port overruns (should be zero).
Bytes Lost	This shows the number of bytes lost due to sync or CRC errors. This should be zero for a good communication link. Any change in this value indicates that one or more messages has been lost, usually due to noise or fading on the serial data link.

Graphical Display

In graphical display mode VIEWDAT plots the contents of each data packet as it is received. The vertical scale may be adjusted by pressing + or -; the current scale factor is shown in the status line at the top of the screen. The horizontal scale is adjusted automatically to the number of samples in the data packet. To the left of each trace VIEWDAT displays the maximum, minimum, mean and RMS for the current packet. The sequence number and number of samples for the displayed packet is shown in the upper left corner of the trace box; the time of the first sample is shown in the lower left corner. Definitions of all displayed fields are given above.

Note that VIEWDAT plots packets; since packets on different channels may be generated at different times the traces shown are not, in general, aligned with each other along the time axis.

Environment

Viewdat will run under DOS (DOS 6.2 or higher), in DOS full-screen mode under OS/2, Windows95 or WindowsNT.

This document information

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Name

FIRMWARE UPGRADE - upgrading digitiser firmware using the ZOC terminal emulator

Description

ZOC is a simple third party terminal emulator program used by Nanometrics for upgrading the digitiser firmware. Any other terminal emulator program can be used for this purpose if it is configured correctly. The description of ZOC configuration for firmware upload provides enough information for configuring a different terminal emulator program. ZOC is supported on DOS, OS/2, and Win32 platforms.

Usage and Options

Install ZOC on PC

1. Insert the appropriate ZOC installation diskette (**ZOC for OS/2** or **ZOC for Windows**) into the floppy drive of the PC.
2. Open a command prompt window.
3. Change the working directory to the floppy drive by typing **a:** at the command prompt and pressing **Enter**. (assuming A: is the floppy drive)
4. At the command prompt type **install** (if OS/2) or **setup** (if Windows) and press **Enter**.
5. If the "Destination path" box is empty, type **c:\zoc** (or a suitable alternative) in the box.
6. Press the ZOC **Install** button to start the installation.
7. When notified "All files processed - installation complete", press the **OK** button.
8. When asked "Do you want to read ZOC's DOC files now?", press the **No** button.
9. To close the command prompt window, type **exit** and press **Enter**.
10. Remove the ZOC installation diskette from the floppy drive of the PC and save it in a safe place.

Configure ZOC

1. Start **ZOC** by double clicking on the icon created on the OS/2 desktop or from the entry in the Windows Start button menu.
2. If notified "No CTS signal from COM1", press the **Abort** button.
3. If a "License Agreement" window is displayed, press the **Agree** button.
4. If notified "New month -- do you want a phone cost report?", press the **No** button.
5. If a "Getting Started" help window is displayed, double click on the button at the top left of the help window to close it.
6. Select the **Options** item from the menu bar.
7. Select the **Settings...** item from the Options drop down menu.
8. Check that the I/O Device is set to **Serial/Modem**.
9. Check that the **Com-Port** is set to the PC com port to which the Digitiser configuration port is connected.
10. Check that the Com-Port baud is set to **9600**. (The Orion's are shipped with the configuration port set to 9600 baud. However, it may have been changed since then.)
11. Check that the Com-Port is set to **8N1**. (8 bits data, no parity, 1 stop bit is the only option for the configuration port.)

12. Deselect the Com-Port **Valid CD signal** handshaking option. The other handshaking options should already be deselected. (The Digitiser configuration port does not have any of the modem control signals used for handshaking.)
13. Press the **Transfer** tab at the right (if OS/2) or at the top (if Windows) of the "Options Settings".
14. Select the **Compuserve-B+** Protocol.
15. Select both the **Disable ENQ** and the **Disable ENQ message** Compuserve-B+ options. This will prevent ZOC from hanging on binary data.
16. Select the **Zmodem** Protocol.
17. If OS/2, press the right arrow button at the bottom right to go to **[Page 2 of 2]** of the transfer options, otherwise if Windows, press the **Transfer-2** tab.
18. Change the ASCII-/Clipboard Sending option **Char delay** to **0**. This will make ASCII uploads MUCH faster.
19. Press the **Safety** tab.
20. Deselect the **... ending program** Confirm ... option.
21. Deselect the **Warning for high speed without RTS/CTS** Miscellaneous option.
22. If a "Getting Started" help window was displayed on startup press the Window tab and deselect the **Initial help window** Screen Elements option.
23. Press the **Save** button at the top of the "Options Settings" window.
24. Close **ZOC** by double clicking on the button at the top left of the ZOC window.

Copy DIGITISER firmware to PC's hard drive

Note: the new Digitiser firmware must be copied to the PC's hard drive since uploading firmware from a floppy drive is not reliable. (A network drive is possible but a local drive is preferable.)

1. Insert the Digitiser Release diskette into the floppy drive of the PC.
2. The Digitiser Release diskette contains 7 files.
3. The file DSPDIAGS.HEX contains a diagnostics program which the DSP runs on startup to do basic hardware checks.
4. The file DSPLOAD.HEX contains a utility program used to transfer the main DSP program into the DSP memory.
5. The file FIRS.HEX contains the FIR filter coefficients used by the DSP.
6. The file DSPxx.HEX contains the main DSP firmware (xx indicates the version number) for the digitiser.
7. The file TCPyyy.HEX contains the main TCP firmware (yyy indicates the version number) for the digitiser.
8. The file HRDzz.HEX contains the previous 5 files released in one file (zz indicates the release number) for uploading into HRDs.
9. The file HRDzz.BIN contains the binary image of the file HRDzz.HEX used for burning into flashes.
10. Open a command prompt window.
11. Change the working directory to **c:\zoc\upload** (assuming ZOC was installed in c:\zoc), at the command prompt type **cd \zoc\upload** and press

Enter. This directory is chosen to make the ASCII uploads easier, however any directory may be chosen.

12. Copy the new Digitiser firmware release from the floppy, at the command prompt type **copy a:\digitiser*.hex** and press **Enter**.
13. Close the command prompt window.
14. Remove the Digitiser Release diskette from the floppy drive of the PC and save it in a safe place.

Accessing the Digitiser setup menu

1. Start **ZOC**.
2. Power on the Digitiser.
3. The Digitiser will start up with lines similar to the following:
   TCP Version 5.12, released Mar 17 1997 16:36:40
   Press 'M' key within 5 seconds or during memory test
4. Immediately press the **M** key to access the Digitiser menu. (There will be at least a 5 second window to press the M key, longer if there is a lot of memory to test.)
5. After a power on the memory test will end with the following lines. (the number of memory banks depends on the Digitiser)
   Writing 5555 to 8 banks.....
   Checking for 5555, writing aaaa to 8 banks.....
   Checking for aaaa, writing 0000 to 8 banks.....
6. If the Digitiser has proceeded past the memory test, the menu will still be displayed and the configuration may be changed however it is **UNSAFE** to do a firmware upload. The Digitiser firmware may be severely corrupted (possibly unrecoverable).
7. If intending to upload new firmware, and the Digitiser has proceeded past the memory test or unsure if it has, power it off and start again.

Upload new firmware

1. Access the Digitiser setup menu as outlined above.
2. Double check that the Digitiser did not proceed past the memory test.
3. Press the **U** key to select the "Upload new firmware" option. (On older firmware, press the **D** key to select the "Download New Firmware" option.)
4. The Digitiser will respond with "Ready to Upload..."
5. Select the **Transfer** item from the menu bar.
6. Select the **ASCII-Send...** item from the Transfer drop down menu.
7. Use the **Select ASCII Upload File** dialog box to select the file containing the new Digitiser firmware release. Change the Drive and Directory as necessary if the firmware was not copied to the c:\zoc\upload directory.
8. Press the **OK** button to start the upload.
9. Do not touch the Digitiser or the PC while the upload is in progress, this will take almost 8 minutes.
10. When it has finished the Digitiser will automatically program the new firmware and reboot.
11. The Digitiser will start up with a line indicating the new version number and release date.

Uploading at faster than 9600 baud

Note: 9600 baud is the fastest baud rate that is reliable on all machines. However PCs with buffered com ports (have a 16550 compatible UART) or fast 486's and pentiums should upload reliably at 38400.

Uploading at 19200 reduces the upload time from 8 to 4 minutes, while uploading at 38400 reduces it to 2 minutes.

1. Access the Digitiser setup menu as outlined above.
2. Press the **C** key to select the "Configuration menu" option.
3. Press the **H** key to select the "Edit hardware setup parameters" option. (On older firmware press the **G** key to select the "Edit data communications parameters" option.)
4. Press the B key to change the "Configuration baud rate" setting.
5. Type the desired new baud rate and press **Enter**.
6. Check that the baud rate has been changed.
7. Press the **Esc** key twice to return to the main Digitiser setup menu.
8. Press the **P** key to select the "Program user settings" option.
9. Power off the Digitiser.
10. Press the button labeled 9600-8N1 at the bottom left corner of ZOC.
11. Change the Com-Port baud to the new baud rate set in the Digitiser.
12. Press the **Save** button.

Creating a button for uploading firmware

Note: this feature is only available on ZOC for OS/2.

This feature is of most use when the file to upload is not in the c:\zoc\upload directory and requires a lot of drive and directory changing to find it using the **Select ASCII Upload File** dialog box.

1. Start **ZOC**.
2. Open the **Options Settings** window.
3. Press the **Buttons** tab.
4. Find the first line with nothing under the "Value" heading.
5. Under the "Value" heading type **^XFER=type c:\zoc\upload\hrdzz.hex 1>&%ZOCHFC% -r**. The file indicated should contain the new Digitiser firmware release.
6. Under the "Button Text" heading type **HRDzz** (replace zz with the appropriate release number).
7. Press the **Save** button.
8. A button should have been created with the label HRDzz at the top of the ZOC window.
9. Pressing this button is equivalent to selecting the same file using the **Select ASCII Upload File** dialog box (except no **Bytes sent** status).
10. With the Digitiser **off**, test the button created by pressing it.
11. A window labeled "ZOC Shell Window" should pop up with the name of the file being uploaded.
12. Double click on the button at the top left of this window to close it. Otherwise it will automatically close several minutes later when the entire file has been uploaded.
13. Close **ZOC**.

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