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# Operating Instructions Manual

Configuration & Monitoring  
Software

Version 3.5.0



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# 1 About this Document

This manual provides detailed product related information, installation, configuration and operation instructions for 3DLevelManager software. The manual is designed for trained personnel. Please read it entirely and carefully before proceeding with installation of the product.

## 1.1 Symbols in use

The following symbols indicate different sections of additional information as follows:



**IMPORTANT:** An indication for additional information, tips, hints or an indication of helpful additional knowledge.



**WARNING:** Indication of a potentially dangerous situation, which could result in serious injury to persons and/or damage.

## 1.2 For your safety

### Authorized Personnel

All operations described in this manual should be performed by authorized and trained personnel only. For safety and warranty reasons, any internal work on the devices must be performed by manufacturer authorized personnel only.

### Appropriate Use

The 3DLevelScanner™ is a device designed for continuous level or volume measurement.

### Warning about Misuse

Inappropriate or incorrect use of the device can give rise to application-specific hazards, e.g. vessels overflow or damage to system components through incorrect mounting or adjustment.

### General Safety Instructions

The 3DLevelScanner™ is a high technology device which requires strict observance of standard regulations and guidelines. The user must take note of the safety instructions detailed in this manual, as well as country-specific installation standards, and all common safety regulations and accident prevention rules.

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## 2 3DLevelManager™ Overview

### 2.1 Overview

The 3DLevelManager™ software is a configuration and monitoring tool for managing 3DLevelScanner™ devices.

The software supports various methods for connecting to the scanners, monitoring their measurement readings, configuring their various parameters, log results and generating various types of graphical reports.

This manual is compatible with SW version 3.5.0 and FW version 4.0.137 and above.

### 2.2 Features

Major features of the 3DLevelManager software:

- Supports HART, RS-485/Multi-drop, GSM, GPRS and TCP/IP communication interfaces to the linked scanners
- Supports all 3DLevelScanner models (S, M, MV, ML and MVL) in a single or multiple scanner arrangements
- Easy to use wizard-based parameter configuration tools including graphical presentation and configuration aids
- Various logging options and displaying log information as time-lined graphs
- 3-Dimensional, animated graphical presentation of filling/emptying processes in MV and MVL models
- Built-in advanced analysis tools
- Fully adaptable to user preferences (measurement units, display modes)

### 2.3 System requirements

The following minimum computer system characteristics are required for 3DLevelManager to install and run properly:

#### Computer Hardware:

- Processor: Pentium 1GHz
- RAM: Minimum 1GB
- Graphic resolution: Minimum 800x600
- Hard drive: Minimum 18GB free memory on HD per year (Verbose log enabled), Log file: 50MB/day
- CD-ROM drive
- One serial port (built in RS-232 / USB)

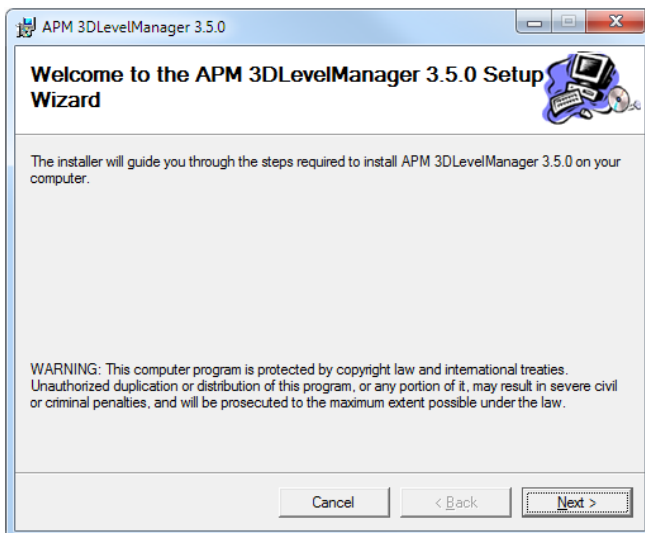
#### Operating System:

- Windows XP SP2 and Windows 7
- Microsoft .NET Framework 3.5 SP1

## 3 Installation

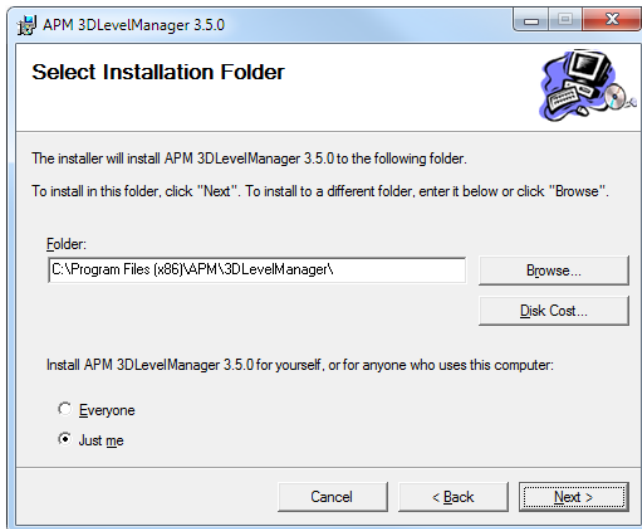
### 3.1 Installing the software

- 1 Insert the APM software CD into the CD drive.
- 2 Auto run should start automatically (if enabled in your computer). Otherwise, browse the CD and execute the file *APM Level Scanner.msi* file. The setup wizard appears as shown:

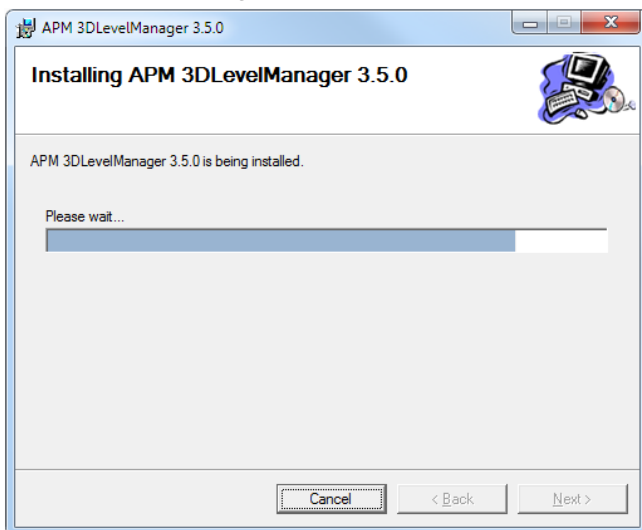


**NOTE:** If a previous version of the software is already installed on your computer, you will be offered with Repair and Remove options, for installing an updated version or completely uninstalling the existing software.

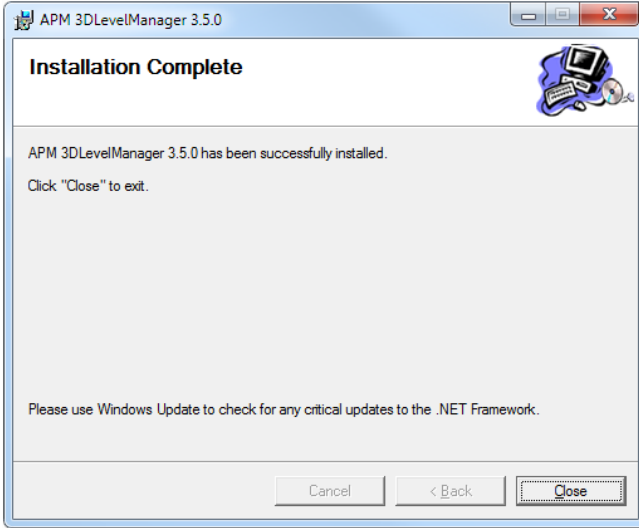
- 3 Click **Next** to proceed with the installation. The following screen appears:



- 4 Click **Browse** to select a different installation folder if needed.
- 5 You may allow other users of this computer accessing the software by selecting **Everyone**, or limit the access for yourself only by selecting **Just me**.
- 6 Click **Next** to proceed.
- 7 In the Confirm Installation window appearing next, click **Next** to begin the installation and wait until the installation progress is complete:



- 8 The software installation is in process, and all the necessary files are being installed in your computer. When complete, the following confirmation screen appears:



- 9 APM 3DLevelManager software installation is complete. Press **Close** to exit the installation wizard.

Note the APM 3DLevelManager shortcut icon which has been added to your desktop.



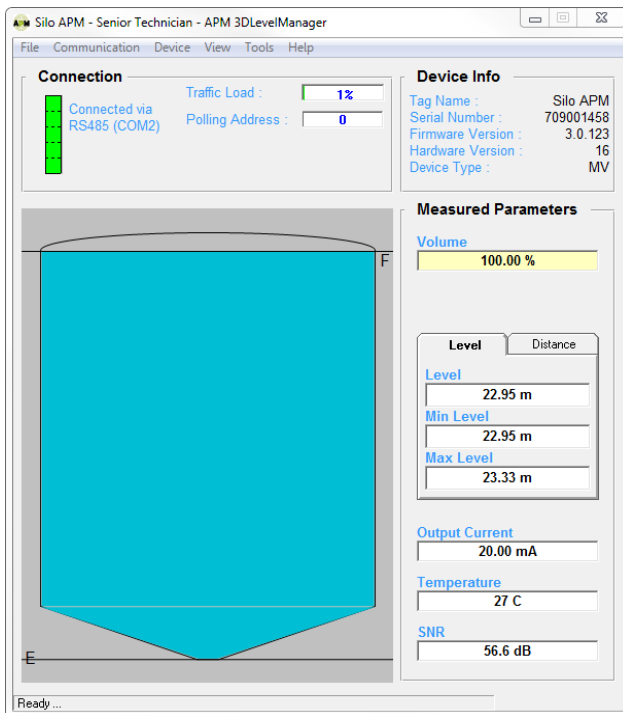
## 3.2 Understanding 3DLevelManager Basics

The 3DLevelManager software is designed for both end users and technical personnel. This chapter includes an overview of the user interface and general details regarding the different modes of operation.

### Connection Status

Once a connection is established, the software downloads all parameters from the scanner. The download process may take few seconds depending on the communication type and quality, during which the software will not respond and cannot be accessed.

Once a 3DLevelScanner is connected to the computer running the 3DLevelManager software, the connection quality level is indicated by a 5-bar green indicator in the Connection field (appears 1 minute after connection) on the upper left side of the window (see figure below). The 5-bar indicates the real-time communication quality. If the indication level drops (from 5 to 4, 3, 2 or 1 bars) for a significant period, we strongly recommend to check the communication physical connection and any other element related, such as drivers, network collisions, etc. 5 green bars indicates very good communication quality, 3 yellow bars indicate a fair connection and 1 red bar indicates a bad connection quality.



The 3DLevelManager in Senior Technician Mode



## Device Info

The following device information is displayed on top of the screen:

- Connection status
- Hardware interface and port number used for communication with the device
- Device polling address
- Tag Name (as defined for this connection)
- Electronic card serial number
- Firmware version of the electronic card
- Hardware version of the electronic card
- Device type (S / M / MV / ML / MVL)

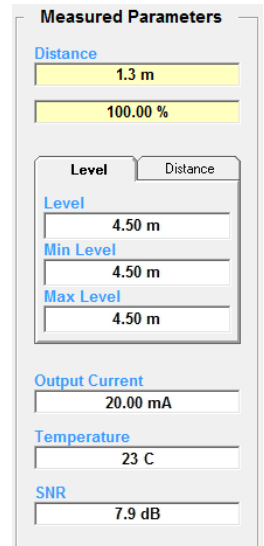


The Device Information area

## Measured Parameters

The following device measured parameters are displayed on the right area of the screen, as shown to the right:

- First and second fields represent the calculated output selected in the Output Settings under the Device menu. The first field shows one of: Volume, Mass, Level or Distance with its selected units. The second field shows the percentage based on the selected output.
- **Distance** (tab): Average distance between the top of the scanner body and the material.
- **Min Distance**: Minimum distance between the top of the scanner body and the material.
- **Max Distance**: Maximum distance between the top of the scanner body and the material.
- **Level** (tab): Average level between all echoes, measured from vessel bottom.
- **Min Level**: The distance between the lowest measured echo to the vessel bottom.
- **Max Level**: The level from vessel bottom to the material's highest point (equals Empty Calibration–Min Distance).
- **Output Current**: 4-20mA analog output current.
- **Temperature**: Temperature level around the antennas inside the vessel.
- **SNR**: Signal-to-Noise Ratio measured inside the vessel, in decibels (dB). The SNR indicates the energy of the transmitted signal compared to the acoustic noise inside the vessel.



**Note:** Both temperature and SNR are displayed under technician modes.

## Standard Mode

Standard Mode is the default operating mode of the software. This mode allows connecting and disconnecting the scanner, viewing of log graphs and 3D image and performing basic grades analysis. Scanner configuration and Advanced Parameters are disabled for this mode.

## Technician Mode

Technician Mode allows configuration of advanced parameters which are not available under Viewer mode (the default operating mode). Switching to Technician mode requires a password.

To switch to Technician mode, choose Tools → Operating Mode → Technician Mode. You will be prompted with the Password Request box. Enter the Technician mode password and press the **OK** button. The Technician mode password is **techAPM**, and it cannot be changed.

For Switching back to Standard mode, select Tools → Operating Mode → Standard Mode from the Tools menu (no password required).

In Technician mode, there are 6 more tabs at the left area of the screen. These tabs allow viewing of parameters, modifying part of them. The tabs include other useful tools such as False Echo Mapping. This document describes the work under technician mode.

## Senior Technician Mode

Senior Technician mode allows configuration of more advanced parameters which are not available under technician mode. Switching to Senior Technician mode requires a password.

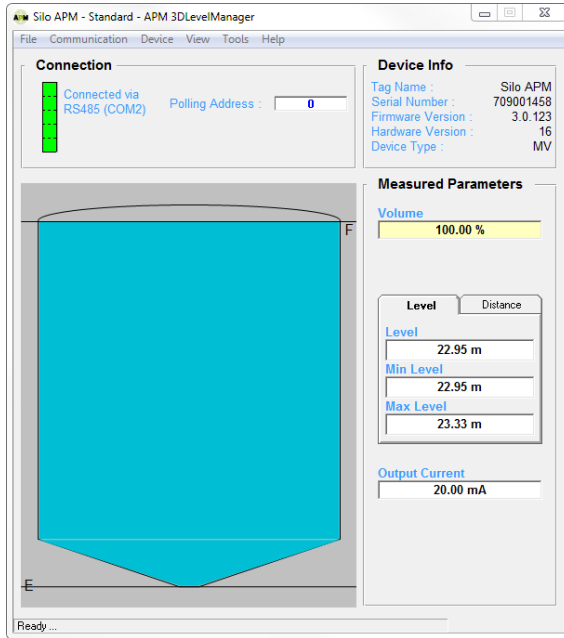
To switch to Senior Technician mode, choose Tools → Operating Mode → Senior Technician Mode. You will be prompted with the Password Request box. Enter Senior Technician mode password and press the **OK** button. The Senior Technician mode password is **admin**, and it cannot be changed.

Further differences between Senior Technician and Technician modes are detailed in this manual where relevant.

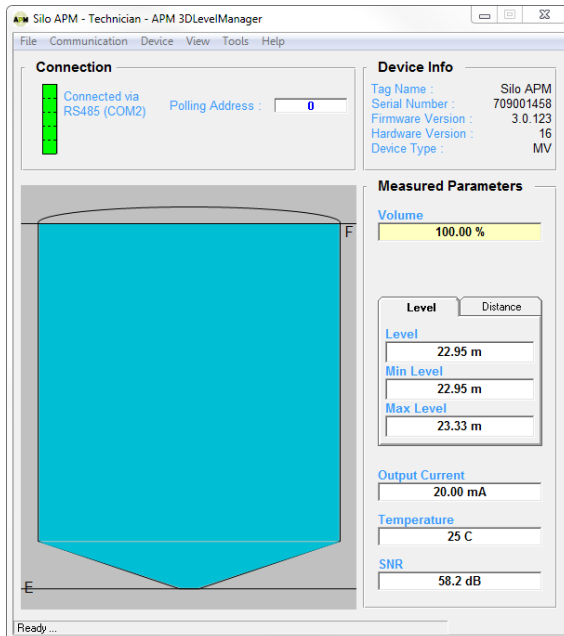
No password is needed for switching back to a lower access mode: Select Tools → Operating Mode → select the required mode from Tools menu (no password required).

## Debug Mode

Debug mode can be accessed from Tools → Operating mode menu or by pressing F12. This mode is strictly limited for APM development team use and password protected.



The 3DLevelManager in Standard Mode



The 3DLevelManager in Technician Modes

## 4 Connecting to 3DLevelScanner™

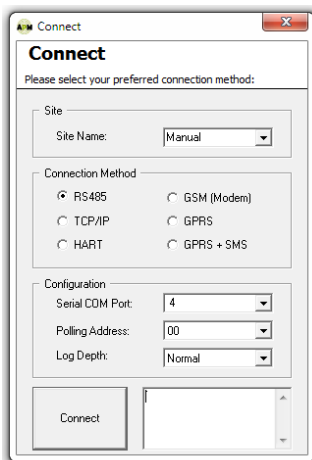
### 4.1 3DLevelScanner Connection Options

The 3DLevelManager Software enables communication with 3DLevelScanner devices using different methods: RS-485, HART, GSM Modem, GPRS Modem and TCP/IP. Communicating using an RS-485 is much faster than GSM, GPRS or via a HART connection, therefore it is recommended to use standard RS-485 as communications infrastructure.

#### Establishing a Connection

Press **Communication** → **Connect...** (or click the large red **Connect** button, or press **Ctrl+M**) to initiate a connection between the 3DLevelManager and the connected scanners. This opens the connection box which allows choosing the required communication properties and establishing data connection between the software and the scanner. The Connect window allows different communication setup for different operators.

In the **Connection Method** field, select the communications interface used for connecting the scanner to the computer and the software. For detailed information regarding the communication options and settings, refer to *page 22: Connect...*

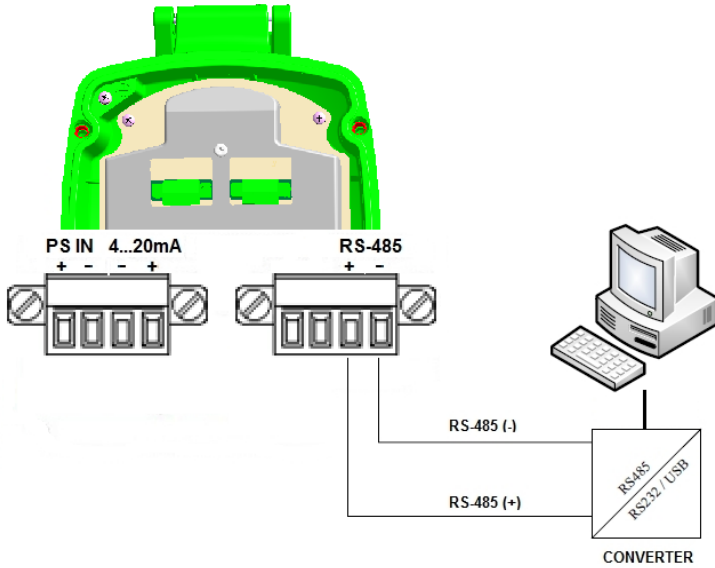


*Connection window in Technician Mode*

#### RS-485 Connection

The figure on the next page shows a schematic connection between a PC running the 3DLevelManager software and a 3DLevelScanner, using an RS-485 connection. For more

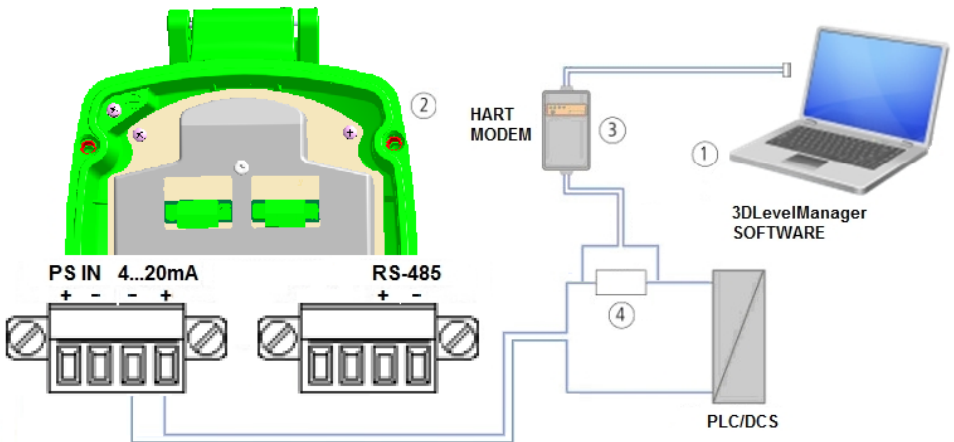
information about physical connections, refer to the *APM 3DLevelScanner Operating Instructions manual*.



RS-485 Connection

### HART Connection

When using an RS-232/USB HART Modem, a 250 Ohm resistor is required. The figure below shows a local connection between a PC running the 3DLevelManager software and a 3DLevelScanner, using a HART modem connection.



HART Modem Connection

In this figure:

- 1 RS-232/USB Connection
- 2 3DLevelScanner
- 3 HART Modem
- 4 HART Resistor - 250 ohm, can be placed on any of the 4-20mA lines

## **GSM**

The GSM option enables a modem-to-modem communication. This type of connection requires a GSM modem connected to the scanner on one side, and a GSM modem connected to the computer on the other side. The telephone number of the modem connected to the scanner is required.

## **GPRS**

The GPRS option allows IP connection to a remote 3DLinkPro with GPRS enabled. When selecting this option, a TCP port must be opened in the local network and to be forwarded to the computer running the 3DLevelManager. On pressing **Connect**, an SMS message should be sent manually to the 3DLinkPro in the following format:

CALLAPM,[external IP address],[TCP Port],[APN],

A comma must end the SMS message.

For example:

CALLAPM,82.123.25.102,7024,internet,

## **TCP/IP**

The TCP/IP option allows converting and transferring the RS-485 data over TCP/IP using compatible converter. When establishing a connection to the TCP/IP converter, the local IP address and the TCP port values must be set as defined in the converter.

## **GPRS + SMS**

This option creates a GPRS connection without manual sending of an SMS message. A 3DLinkPro unit must be connected to the local computer running the 3DLevelManager software in order to send the SMS message to the 3DLinkPro connected to the scanner.

## **GPRS + SMS Server**

This option creates a GPRS connection without manual sending of an SMS. A 3DLinkPro unit must be connected to a computer in the network in order to send the SMS message to the 3DLinkPro connected to the scanner. This option is available for Senior Technician and to be used when several computers in the same network can be connected to different scanners and 3DLinkPros.

## **Multiple Scanner Connection**

When connecting several scanners in a Daisy-Chain, the 3DLevelManager can be connected to all scanners and a specific scanner may be chosen to be viewed at any time. For this type of connection, each scanner must be set with a different polling address. One of the scanners must be set with a polling address of 00.

## Using the Phonebook

The 3DLevelManager stores a file named PhoneBook.ini which contains all connections and their properties. Each connection can be named and stored automatically in the phonebook file for further use. Based on the phonebook entries, a folder is created to store relevant data such as grades analysis.

For viewing and editing the phonebook, select **Browse to local folder** from the **File** menu, and select the file 'PhoneBook.ini'. Each connection entry should start in a new line and with a different name.

Examples for Phonebook entries may look like:

```
[APM Scanner]
Polling=Multiple
Method=GPRS2
COM= 7
LocalIP=192.168.2.130
APN=internet
Number=+972541234567
LocalPort=7040
```

```
[Test 1]
Polling=Multiple
Method=485
COM=6
```

```
[TCPIP Connection]
Polling=00
Method=TCP
HostIP=192.168.2.48
HostPort=7040
```

## 5 First-time Configuration

This chapter describes the recommended steps to be taken for configuration of the scanner and bringing the scanner to full capability mode, in their recommended order.

### 5.1 Configuration Wizard

Use the 5-stage configuration wizard for first-time configuration of the 3DLevelScanner.



**NOTE:** Prior to 3DLevelScanner configuration, verify that the 3DLevelScanner has the most up-to-date firmware version installed.

**NOTE:** Make sure the operating mode is set to Technician mode before trying to open the Configuration Wizard. Technician mode password is '*techAPM*'.

**NOTE:** When working with scanners of firmware version later than 3.1.0, the wizard pops up automatically when the scanner is set to factory defaults.

From the main menu, select **Device** → **Configuration Wizard...** (or press **F4**) to activate the wizard.

The configuration wizard appears, starting at its first stage. During wizard navigation, the following options are available at any stage:

- Click **←Previous** to switch to previous stage.
- Click **Cancel** to exit the wizard without completion. No parameter will be modified or saved to the scanner.
- Click **Next→** to continue to the next stage.
- **Upload All** available only for Senior Technician

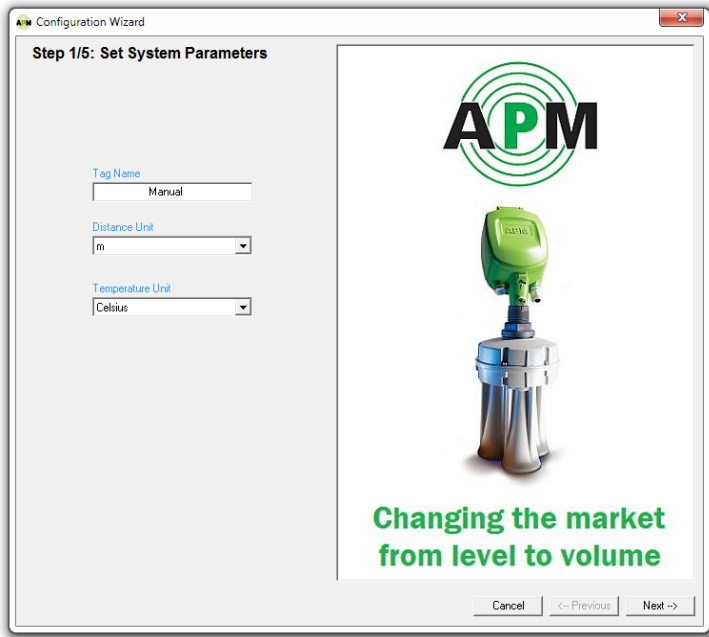
Device	View	Tools	Help
Configuration Wizard...			F4
Advanced Parameters...			F5
Current Output Settings...			F6
Output Settings...			F8
Upload All			F2
Download All			F3
Device Reset			▶

#### Step 1/5: Set System Parameters

Step 1 allows choosing device name and preferred measurement units.

- ① Set the device tag name/identity in the **Tag Name** field. This name is displayed on the scanner screen and in the software window title once the device is connected. The tag name field is limited to 16 characters.
- ② Choose the preferred distance measurement units in the **Distance Unit** field. The available options are: meters (m), centimeters (cm), millimeters (mm), feet (ft) and inches.
- ③ Choose the preferred temperature measurement units in the **Temperature Unit** field. The available options are: Celsius and Fahrenheit.
- ④ Click **Next**.





Set System Parameters stage

## Step 2/5: Set Vessel Parameters

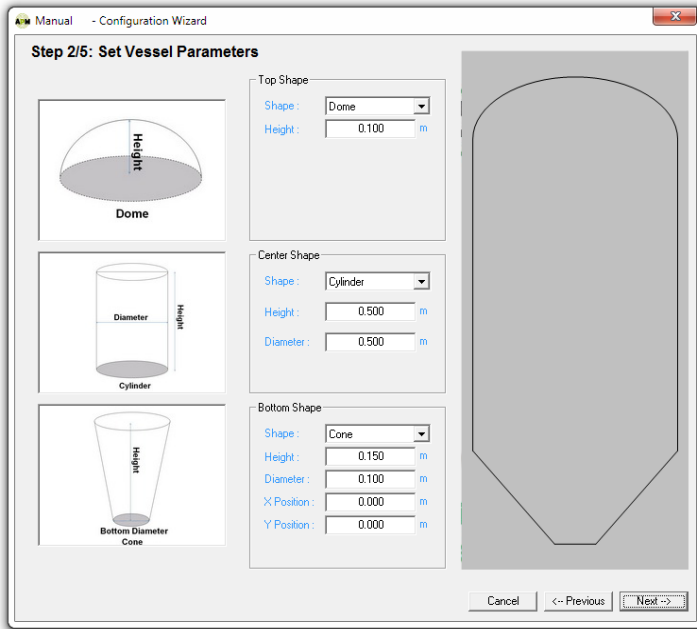
Step 2 allows identifying the vessel geometry including with a specific shape for exact volume analysis.

The vessel major parts (top, center and bottom) schematic geometry can be chosen and dimensions can be defined.

- ① Choose the proper shape for the vessel top from the **Top Shape** field. The options are: Flat, Cylinder, Dome, or Pyramid. Set the dimensions:
  - For a Cone shape, set the height and the top diameter of the cone.
  - For a Dome shape, set the height of the dome.
  - For a Pyramid shape, set the top section height, width and length of the vessel top at the X and Y directions.
- ② Choose the proper shape for the vessel center from the **Center Shape** field. The options are: Cylinder or Cube. Set the dimensions:
  - For a cylinder shape, set the height and the diameter.
  - For a cubic shape, set the height, width and length of the vessel according to the X and Y axis, respectively.
- ③ Choose the proper shape for the vessel bottom section from the **Bottom Shape** field. The options are: Flat, Cone, Dome, or Pyramid. Set the dimensions:
  - For a Cone shape, set the height and the bottom diameter of the vessel bottom section.
  - For a Dome shape, set the dome height.

- For a pyramid shape, set the height, width and length of the vessel bottom section at the X and Y directions.
- If the vessel shape is asymmetrical (for both cone and pyramid shapes), it is possible to set the bottom center as an offset from the entire shape center. The X Position and Y Position are the offset of the bottom section from the center.

4 Click **Next**.



*Set Vessel Parameters stage*

### Step 3/5: Set the Device Position

This stage allows specifying the exact location of the scanner on the vessel's top.

- 1 Set the device location according to the previously defined top vessel shape using one of the following methods.
  - Drag the device on screen, or
  - Enter the X and Y coordinates in **Device Position** fields at the top right corner.
  - Set the Offset from Vessel Top if the scanner is not installed on the vessel ceiling but a standpipe or socket is used, or the scanner is lowered using neck extension or head-body separation kit.
  - The offset referred to the top part of the antenna body and not necessarily to the flange.

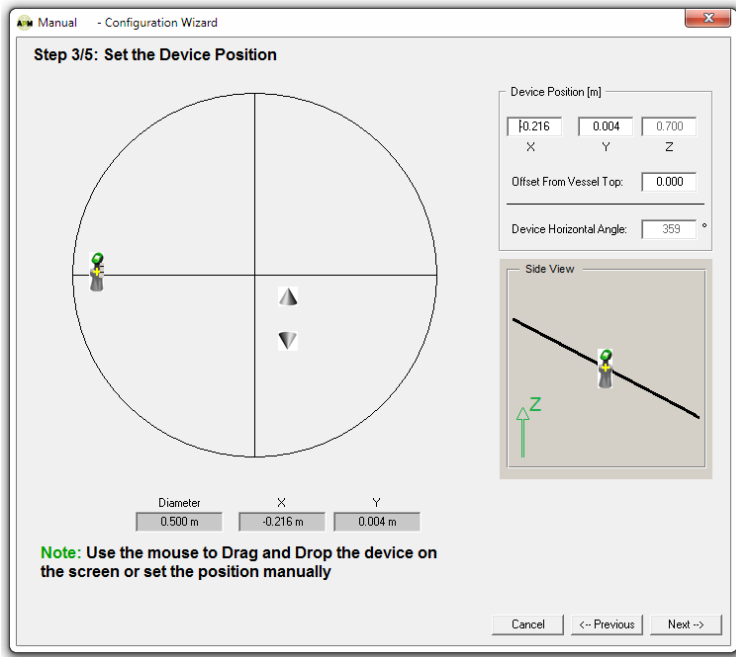


**NOTE:** The device Z position is being calculated automatically.

**NOTE:** The Side View image will display the changes of the scanner (if the offset parameter is used) and will show the scanner when mounted on the ceiling slope or a horizontal rooftop.

**NOTE:** In Senior Technician Mode it is possible to set the angle manually or by double clicking the angle field.

2 Click Next



*Set the Device Position stage*

### Step 4/5: Set Filling Points

This stage allows configuration of the vessel filling points. Up to 9 filling points may be defined. The following figure describes a schematic top view of the vessel and the filling point locations.

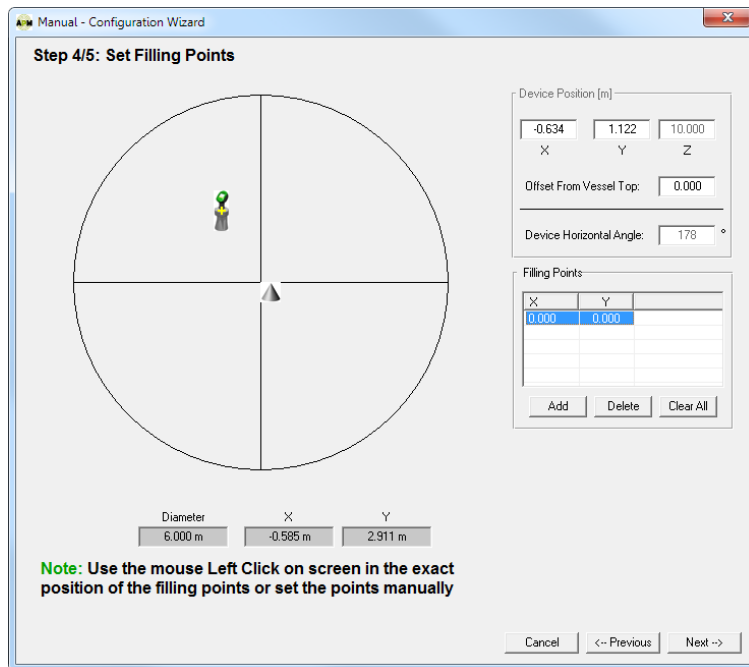
- 1 Set the filling points using one of the following methods:
  - Bring the cursor to the desired location over the vessel top shape and left-click the mouse to add a filling point, or:
  - Press **Add** and enter the X and Y coordinates in the **Filling Points** table and press **Enter** button after every number entered.

To edit a field: double click the field, enter the required value and press enter.

To delete a filling point, mark the corresponding row and click **Delete**.

To delete the full list of filling points, click **Clear All**.

2 Click **Next**.

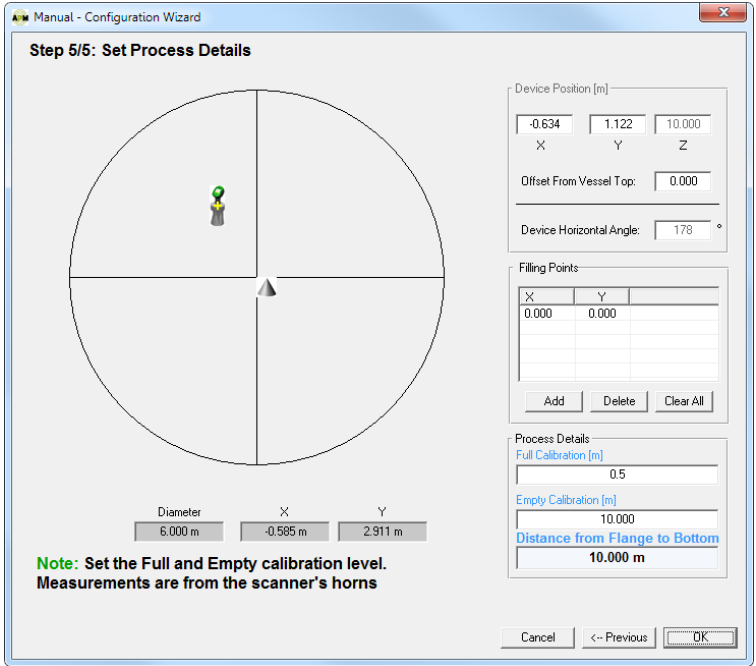


Set the Filling Points

### Step 5/5: Set Full and Empty Calibration Levels

This stage allows configuration of the vessel full and empty calibration levels. The following figure show the full and empty calibration fields to set.

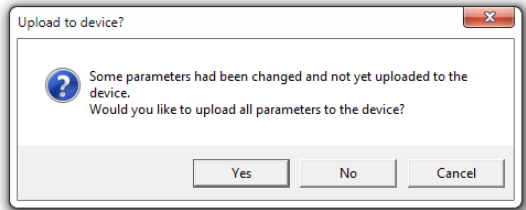
- ① Set the distance from the flange (or top of the horns body) to the material 100% (20mA) level (see figure below) using the **Full Calibration** field. Default value is 0.5m (1.64ft). Dead band is 50cm (1.64ft).
- ② Set the distance from the flange to the material 0% (4mA) level (see following figure), using the **Empty Calibration** field.
- ③ **Distance from flange to bottom** – represent the maximal distance between the flange (or top of the horns body) to the bottom of the vessel, double clicking this field will set the empty calibration level with the same value.
- ④ Press **OK**.



Set Full and Empty Calibration Levels

If parameters were modified during the wizard process, the following box appears (figure to the right) offering an option to upload all parameters to the scanner.

- Click **Yes** to upload parameters to the scanner and to close the wizard.
- Click **No** to close the wizard without uploading parameters to the scanner.
- Click **Cancel** to close the window and stay in the wizard.



Upload configuration to the scanner

## 5.2 Advanced Configuration Parameters

Following the completion of the configuration wizard, open the advanced parameter window (press **Device**→**Advanced Parameters...** or press **F5**) in order to set general parameters such as Material Slope and Damping Time. Other parameters may be configured and fine adjustments can be done at a later stage. Refer to *page 28: Advanced Parameters...* for detailed instructions and descriptions.

## 5.3 Grades Analysis

Once configuration is complete, a Grades Analysis should be performed for viewing the returned echoes from the material surface and using the analysis results to adjust the scanner. Refer to *page 45: Analyze...* menu for detailed instructions.

## 5.4 False Echo Mapping

In vessel installations with high sockets, struts or agitators, corrugations, as well as with material buildup and welded joints on the vessel walls, reflection interference occur which may result in erroneous measurements. The False echo mapping allows marking these false echoes to be ignored during volume measurement. It is advised to map out the false echoes when the vessel is close to empty for detection of all potential interfering reflections.

The false echo mapping feature is located under the **Tools** menu, and allows automatic scanning (enter a range to scan), manual scan (enter the range and threshold) and to reset all false echo mapping (including Auto False Echoes). Refer to *page 46: False Echo Mapping*.

## 5.5 Log Viewer

The 3DLevelManager collects all data received from the scanner and stores it on the local computer's hard drive. Selecting **View→Log File...** or by pressing **CTRL+W** opens the logs viewer application. When a scanner is connected, the log graph starts from the connection time and date. Browsing for old logs can be done by pressing the browse button [...] and selecting the folder/s for viewing the log file/s contents.

The logs are saved in HTML format and are stored in a folder named with the connection time and date. For more information, refer to *page 43: Measurement Logs*.

## 5.6 3D Image Profile

The 3DLevelManager is equipped with a highly useful feature of generating and displaying a 3-dimensional, graphical representation of the visual mapping contour of the stored material as scanned by the 3DLevelScanner MV and MVL models. For more information, refer to *page 39: 3D Image*.

---

## 6 Software Menus

This chapter describes the different functions available under the software menus and sub-menu options, ordered as they appear in the menu.

### 6.1 File menu

#### **Load parameters for Browsing... (Ctrl+B)**

Opens a saved parameters file (.APM file) for browsing only. Uploading to the scanner is not possible.

#### **Load Parameters to Device... (Ctrl+D)**

Opens saved parameters file for directly upload to a connected scanner.

#### **Save Configuration... (Ctrl+S)**

Saves all parameters (Basic settings, Output settings and, Advanced Settings) to an .APM type file. You can choose the location and the file name to be saved.

#### **Browse to Local Folder...**

Open the local 3DLevelManager Application Data folder. This folder includes different log files and grade analysis files.

#### **Generate a New Log File**

Stops storing data on current log file and generates new file with an updated time and date stamp. A new log folder will be created under the data folder, for storing log files with all data from the scanner. At least 2MB/day free hard drive space should be reserved for the logging activity in normal connection (not Verbose).

#### **Exit (Ctrl+X)**

Exits the 3DLevelManager software.

### 6.2 Communications Menu

This menu allows connecting and disconnecting to / from the device as well as polling address selection, communications quality test and log file / history viewing.

#### **Connect... (Ctrl+M)**

Opens the connection box which allows setting of the required link and communication properties and to establish a data connection between the software and the scanner(s).

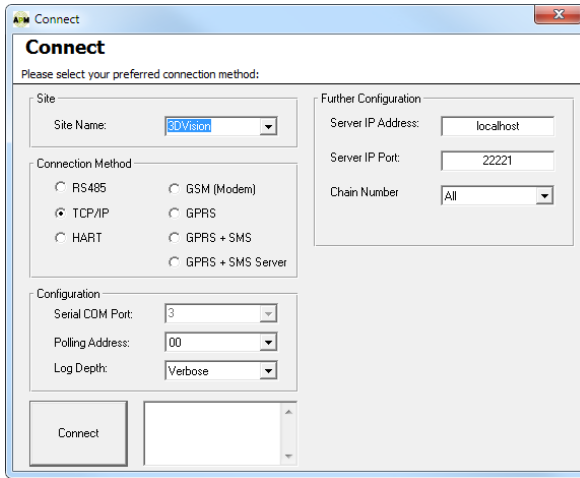
In Standard mode, RS-485, TCP/IP or HART options are available. When switching to a higher operation mode, more options become available. This chapter describes all options. Under the Site, type in the Site Name in order for it to be saved in the 3DLevelManager Phonebook.ini file for future use and tracking. The stored logs and grades analysis are stored under a folder created using the site name entry.

In the Connection Method field, select the communications interface used for connecting the scanner to the computer and the software. The available options are:

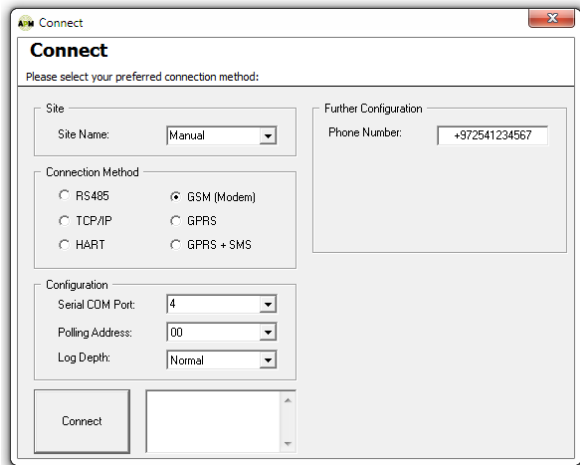
- **RS485:** Connection over RS-485 bus.
  - Select the serial COM Port number the RS-485 Converter is connected to
  - Select the scanner polling address or Multiple to connect to all scanners.
  - Click **Connect**.

- **TCP/IP:** The scanner is connected via a TCP/IP network to an RS-485 connection.
  - Select the site name.
  - Select the scanner polling address.
  - Set the Server IP address and IP port number in the Further Configuration section.
    - Server IP is the device converting RS-485 to TCP/IP.
    - IP Port is the TCP Port assigned to in the TCP/IP converter.
    - Chain Number – When connecting to 3DMultiVision Server it is possible to connect to a specific chain and specific polling address to monitor, this is designed when there are several connection types in the 3DMultiVision Server with possible several scanners having the same polling address.
  - Click **Connect**.





- **HART:** The scanner is connected using a HART modem.
  - Select the serial COM port number the HART modem is connected to, and enter the scanner polling address.
  - Click **Connect**.
- **GSM (Modem):** The scanner is connected using a local GSM modem.
  - Select the serial local COM port number and enter the scanner polling address.
  - Select the site name and enter the phone number of the other side modem.
  - Click **Connect**.

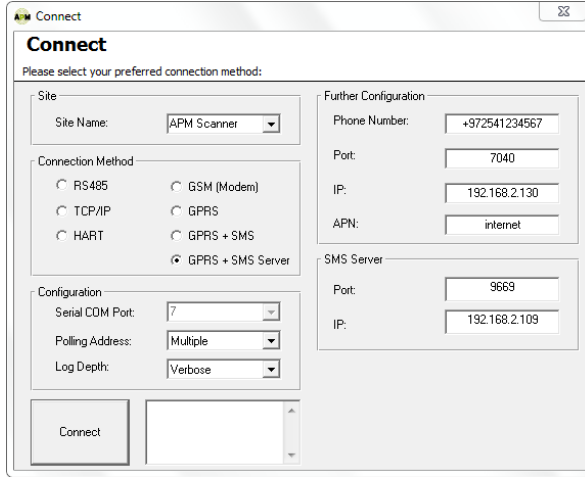


- **GPRS:** The scanner is connected through the internet over GPRS using 3DLinkPro.
  - Enter the local IP port number and the scanner polling address.
  - Click **Connect**.

- Send an SMS message from a mobile phone to the scanner to initiate the connection.
- **GPRS + SMS:** The scanner is connected via the internet using 3DLinkPro. This connection uses SMS messages sent from a GSM modem connected to the computer.
  - Select the site name.
  - Select the serial COM port of the 3DLinkPro connected to the computer.
  - Select the scanner polling address.
  - At the right pane, set phone number of the 3DLinkPro connected to the scanner.
  - Set the computer local IP port.
  - Set the external IP address (usually the router IP address).
  - Set the APN word of the 3DLinkPro connected to the scanner.
  - Click **Connect**.

- **GPRS + SMS Server** (Available only under Senior Technician mode. To be used by APM authorized distributors): The scanner is connected via the internet using 3DLinkPro. The link uses SMS messages using a GSM modem connected to a computer on the local network.
  - Select the site name.
  - Select the scanner polling address.
  - At the right pane, set phone number of the 3DLinkPro connected to the scanner.
  - Set the computer local IP port.
  - Set the external IP address (usually the router IP address). External IP address can be obtained using web services such as [www.whatismyip.com](http://www.whatismyip.com).
  - Set the APN word of the 3DLinkPro connected to the scanner.
  - Set the TCP Port of the computer connected to the modem sending the SMS message. Default port number is 9669 and it should not be changed
  - Set the IP address of the computer connected to the modem

- Click **Connect**.



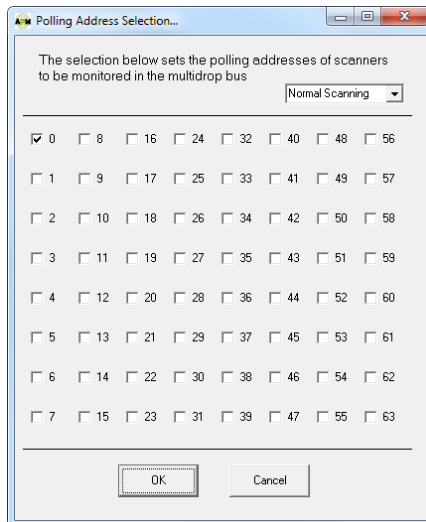
- **Polling Address:** Enter the scanner polling address when connected via daisy-chain connection (RS-485 Multi-drop). Address range: [00 to 63 or Multiple]. When selecting Multiple, each scanner must have its own, unique address.

## Disconnect

Disconnect software communication to the device.

## Polling Address Selection...

Available when the manager is connected in Multidrop. Use the dialog box to select polling addresses of multiple 3DLevelScanner scanners to be monitored using a Multidrop connection.



Check the check-boxes with the polling address per each scanner to be monitored. Log files will accumulate data for all checked scanners.

- **Normal Scanning** scans all the selected scanners. This is the default value and should not be changed.
- **Slow Scanning** adds a delay between polling of each scanner. Useful when communication speed is low
- **Pause Scanning** stops communicating with other scanners except current scanner to retrieve information, until setting back to normal or slow scanning mode.



**NOTE:** The scanning option parameter selection should not be modified.

**NOTE:** This option works only if there is a scanner with polling address 00. This scanner saves the polling address selection table.

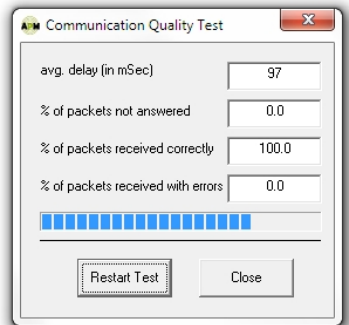
## Communication Quality Test

This tool tests the connection quality between the computer and the scanner. If packets not answered, or received with errors, the cable must be checked for existence of proper resistors on both sides and verified to be of shielded and twisted-pair type.

An example for a good test result: an averaged delay of 97msec (very low), no lost packets and no errors received.

- Click **Restart Test** to restart testing. The test will cycle through until terminated.
- Click **Close** to terminate and close the window.

It is important to test the quality of the communication between the computer running the Manager and the scanners after initial setup and connection.



## Communication Log File...

The Communications Log File contains logged data corresponding to the communications between the software and the scanner connected to it. Selecting this option opens the file in an Internet browser window. The file format is HTML and it might be required for technical support use.

## Communication History...

The Communications History contains logged data corresponding to the communication events between the software and the scanner connected to it. Selecting this option opens the file in an Internet browser window. The file format is HTML and it might be required for tech support use.

## Generate 3DV Files

By pressing this option, the manager will generate a .3DV file. This file is generated to be used with the SCADA integration files, please contact APM Customer Support for additional information.

## 6.3 Device Menu

This menu allows accessing to advanced configuration options. Some of the menu options are disabled on Viewer mode, and become available under Technician mode.

### Configuration Wizard... (F4)

The configuration wizard provides a wizard-based, graphical-aided tool for configuring a connected 3DLevelScanner. At the first run after software installation or following a new scanner connection, all wizard steps must be followed and all parameters should be configured according to the Installation Preparation Form (IPF) filled prior to the installation and approved by the APM Customer Support or by your local distributor.

Refer to *page 15*: Configuration Wizard for a detailed description regarding the configuration wizard.

### Advanced Parameters... (F5)

Opens the 'Advanced Parameters' box, where the algorithm parameters can be adjusted. This window is available under Technician and Senior Technician modes only.

The various fields can be downloaded or uploaded from/to the scanner. Any changed parameter, if not uploaded to the scanner, can be discarded using the **Cancel** button at the bottom. We recommend consulting an APM official distributor or APM Technical Support before changing any of the parameters.

When connecting to a 3DLevelScanner with earlier firmware version (2.x.x), the Advanced Parameters window will look different and may include other visible parameters.

In Technician Mode, the user has limited access to the parameters.

- **Output Damping Time**: Sets the history dump window time of the scanner. This parameter increases stability and improves the SNR. Default value: 300 seconds, minimum value: 60 seconds.
- **Steepest Material Slope**: Set the maximum material slope. The scanner verifies all echoes for not exceeding the slope. Default: 35°. Recommended setting: between 30° to 45°.
- **Max Capacity [tons]**: The total capacity of material within the vessel.
- **Max Emptying Rate [tons/hour]**: The maximum emptying rate.
- **Max Filling Rate [tons/hour]**: The maximum filling rate.

It is recommended to set the maximum capacity and Filling/Emptying rates according to the actual process in the vessel.

- **Top Dead Band [Discard/Don't Discard]**: To be used only when echo cancelation using mapping range for short distances is not possible. The unit discards all echoes up to the full calibration. Default: Don't Discard. **Discard**: The sensor scans material only at a distance larger than full calibration distance. **Don't Discard**: Distances smaller than full calibration distance are scanned as well. If measured distance to the content is smaller than full calibration, the full calibration distance is presented.
- **Historic Log Sampling Period**: Sets the interval between measurements that are saved into the local memory. By default, the scanner does not store the log. The settings are ranged between 1 to 60 minutes. If the scanner has been reset due to powering off or via the software, this parameter resets to its default value and the log will not proceed with data accumulation.

- **Auto False Echo:** Enable/Disable, Sets the algorithm to automatically calculate false echo levels, enabled by default. Setting this parameter to Disable stops the scanner from continuously calculating the false echo levels and keeps the last image of false echoes. If the false echoes are manually reset, the level is set to 0.
- **User False Echo:** Enable/Disable, Sets the algorithm to consider the false echo mapping created manually by the user (enabled by default). Setting this parameter to Disable causes the scanner to ignore the manual false echoes.

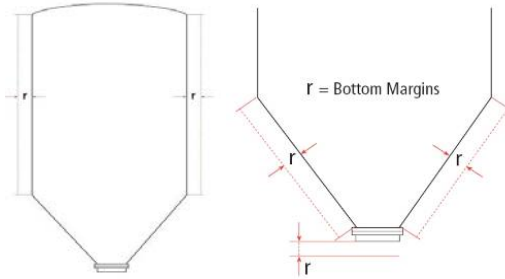
*Advanced Parameters in Technician Mode*

- **Mechanics Type [I/II]:** Sets the type of configured scanner. The options are I or II. It is extremely important to set the mechanics type to avoid wrong calculations.
- **CFAR Sensitivity:** Constant False Alarm Rate detection – an automatic threshold algorithm. Setting the sensitivity adds gain to the CFAR threshold (default: 9dB). Adding 6dB doubles the gain [dB]. This is an adaptive and robust algorithm for detection of targets in a noisy environment.
- **Minimal SNR [dB]:** The lowest SNR threshold. Below this level, the sensor does not measure and the reading remains unchanged. Default: 13dB. Setting the minimal SNR to a value lower than 10dB is not recommended.
- **Restrain coefficient [%]:** Sets the level of preference of echoes from shorter distances over echoes from farther distances. 100% = no preference of closer echoes. 0% = total preference of the first echo. Default: 10%.
- **Side Margins [m/ft]:** Allows tolerance in echo recognition to vessel walls (see figure). Used for creating a tolerance in case of unknown vessel width/diameter, and when a tolerance is required for detecting points on the vessel walls.

Echo within the tolerance/margin range is transformed to the vessel wall on the X-Y plane and will not be eliminated in calculation. Default: 1m (3.28 ft.).

- **Bottom Margins [m/ft]:** Allows adding a tolerance in echo recognition from the bottom shape (but not flat) (see figure).

This feature is used for creating a tolerance in the case of unknown vessel dimensions, and when a tolerance is required for detecting points from the bottom of the vessel. Default: 1m (3.28 ft.).



Side and Bottom margins

- **User False Echo Sensitivity:** Refers to the Manual False Echo mapping created by the user. The minimum extra gain required to distinguish between real echoes and mapped false echoes. Decrease sensitivity if false echoes prevent the device from tracking the true level. Increase the sensitivity if false echoes are not ignored. Default value: 1.2.
- **Auto False Echo Sensitivity:** Refers to the auto false echo calculation done by the algorithm. The minimum extra gain required to distinguish between real echoes and mapped false echoes. Decrease sensitivity if false echoes prevent the device from tracking the true level. Increase the sensitivity if false echoes are not ignored. Default value: 1.2.
- **Exceeding Filling Rate After Echo Loss:** Enables quick recovery after echo loss, for example, when the SNR is below Minimal SNR, the algorithm assumes that there is a filling process and upon SNR recovery, the algorithm will exceed the filling process to the level of material. By default, this feature is set to Yes.
- **Angle Adaptor:** In case the horns are installed in an angle with an APM Angle Adaptor or with other mechanical solution it is required to adjust the angle in the configuration. By default, the angle is set to 0°, maximal value is 30°.



**NOTE:** Make sure the horn's direction is in the same direction as the angle adaptor and is directed towards the center of the vessel.

**Advanced Parameters** Beams Activation

Output Damping Time	300	sec
Steepest Material Slope	35.000	°
Max. Capacity	100.000	ton
Max. Emptying Rate	10.000	ton/h
Max. Filling Rate	10.000	ton/h
-----		
Mechanics Type	II	
CFAR Sensitivity	9	dB
Minimal SNR	13	dB
Restrain Coefficient	10	%
Side Margins	1.000	m
Bottom Margins	1.000	m
Top Dead Band	Don't Discard	
Historic Log Sampling Period	Do not generate log	
User False Echoes	Enable	
Auto False Echoes	Enable	
User False Echoes Sensitivity	1.200	
Auto False Echoes Sensitivity	1.200	
Exceeding Filling Rate After Echo Loss	Yes	
Angle Adaptor	0	°

Download All    Upload All    Cancel

*Advanced Parameters for Senior Technician*

- Beams Activation tab allows choosing manual or automatic (by the algorithm) beams selection. By default, the beams are selected automatically. Part of the beams will be removed depending on silo dimensions.

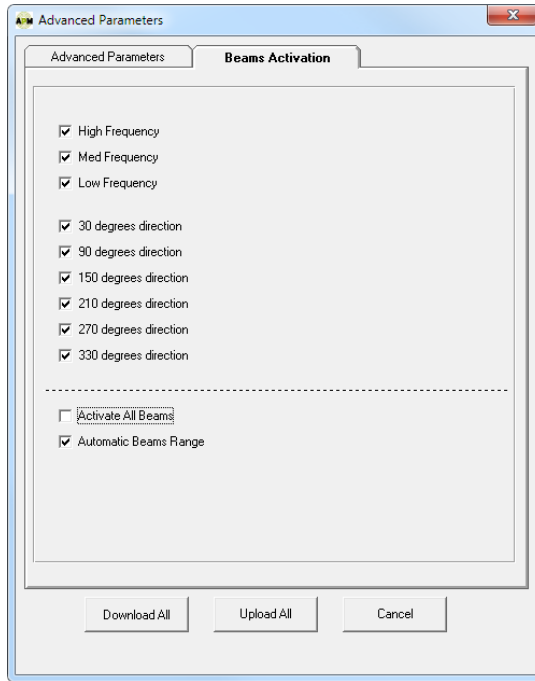
**High, Med and Low** Frequency beams represent three separate transmissions which emit signals from all three antennas simultaneously.

**30, 90, 150, 210, 270 and 330 degrees directions** represent 6 separate directional transmissions which improve the algorithm's analysis of the returned echoes. All 6 transmissions are transmitted in the same frequency as the **Med** frequency (4.5KHz).

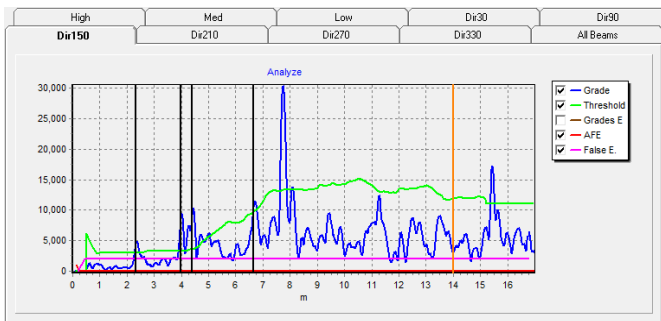
Beams can be enabled or disabled by removing the check box from the **Activate All Beams** box. A selection of less than three directional beams is not allowed. Only a selection of at least three consecutive beams is possible, for example: Direction 30, Direction 330 and Direction 270.

- Automatic Beams Range:** enabled by default. The beams range is limited according to the range at which the beam hit the vessel wall. Low frequency beam has wider angle and thus is more limited. High frequency beam is very narrow and has no limitations. At every possible beam selection the algorithm makes sure that at least one beam has enough range to 'see' the bottom of the vessel. This limitation is visualized in the Grades analysis window as the orange vertical line.





*Beams Activation under Senior Technician Mode*



*Example of range limitation represented as the vertical Orange line*

- **Download All:** Downloads all parameters from the scanner to the software.



**NOTE:** Three options are available for downloading all parameters from the device: using the Main Screen, using the Device menu and using this Advanced Parameters window.

- **Upload All:** Uploads all parameters from the software to the scanner.



**NOTE:** Four options are available for uploading all parameters to the device: using the Main Screen, using the Device menu, using this Advanced Parameters window and using the last step of the wizard.

- **Cancel:** Closes the Advanced Parameters windows without up/downloading from/to the scanner. If the **Upload All** button is not pressed, the changes will not be saved.

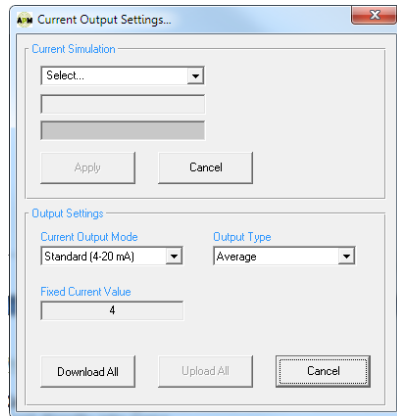
### Current Output Settings... (F6)

The Current settings window is designed to control the 4-20mA output signal. The window includes two major functions:

- **Current Simulation:** The output current can be simulated by setting Volume (%), or Current (mA). This feature is useful for synchronizing with the PLC and verifying of identical read values for both the scanner and the PLC. When the simulation is active, a red blinking signal appears, indicating: **Simulation is Active**.
- **Current Output Mode:** Allows setting the output to send the standard 4-20mA signal, or optionally to send a reverse signal: 20-4mA. The last option sets the scanner to output a fixed value.
- **Output Type:** Switches between Average, Min Level and Max Level options to output in the 4-20mA interface.



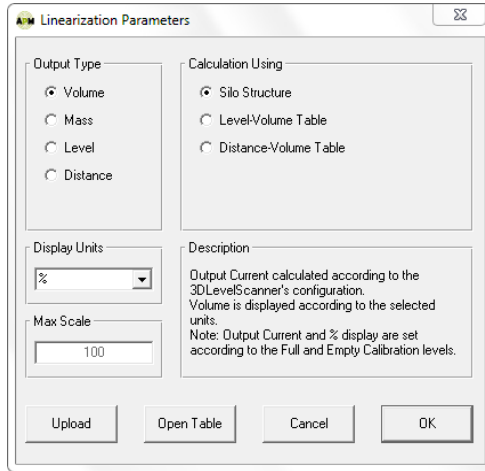
**NOTE:** Notice the simulation indicator, shown when the simulation is active.



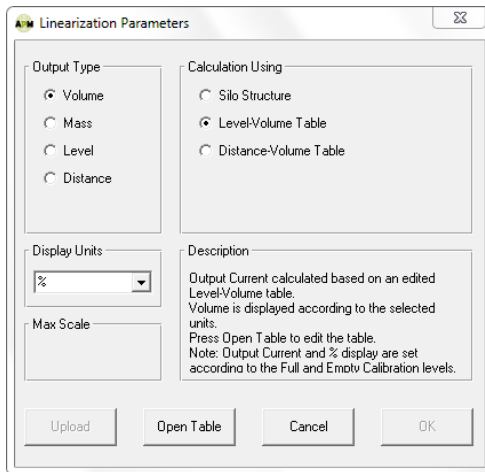
### Output Settings... (F7)

The Output Settings defines the displayed calculation and how the 4-20mA output behaves. The output type of Volume (default), Mass, Level or Distance can be selected.

- **Volume:**
  - **Calculation Using Silo Structure** –calculates the volume based on the silo structure defined using the configuration wizard. The displayed units can be selected to be available to the user.



- **Calculation Using Level-Volume Table** – allows setting a linearization table based on level to volume conversion



#	Level [m]	Distance [m]	Volume [%]	Volume [m <sup>3</sup> ]
1	0.00	15.65	0.00	0.00
2	0.25	15.40	0.07	0.25
3	0.50	15.15	0.18	0.62
4	0.75	14.90	0.33	1.14
5	1.00	14.65	0.53	1.83
6	1.25	14.40	0.78	2.72
7	1.50	14.15	1.10	3.83
8	1.75	13.90	1.49	5.18
9	2.00	13.65	1.95	6.81
10	2.25	13.40	2.50	8.73
11	2.50	13.15	3.15	10.96
12	2.75	12.90	3.89	13.54
13	3.00	12.65	4.73	16.49
14	3.25	12.40	5.69	19.84
15	3.50	12.15	6.77	23.59
16	3.75	11.90	7.98	27.80
17	4.00	11.65	9.31	32.46
18	4.25	11.40	10.79	37.62
19	4.50	11.15	12.42	43.30
20	4.75	10.90	14.21	49.51
21	5.00	10.65	16.15	56.29
22	15.00	0.65	97.28	339.03
23	15.10	0.55	98.02	341.61
24	15.20	0.45	98.62	343.71
25	15.30	0.35	99.10	345.39
26	15.40	0.24	99.46	346.70
27	15.50	0.14	99.76	347.68
28	15.60	0.04	99.96	348.37
29	15.70	-0.06	100.00	348.52
30	15.80	-0.16	100.00	348.52
31	15.90	-0.26	100.00	348.52
32	16.00	-0.36	100.00	348.52

OK Cancel Apply Show Vessel

Level-Volume Linearization Table

- **Calculation Using Distance-Volume Table** – allows setting a linearization table based on distance to volume conversion (to be done the same as above).
- **Mass:**
  - **Calculation Using Fixed Bulk density** – Calculation of mass based on the silo structure and volume calculation at a certain level. The bulk density value can be entered as Tons/M<sup>3</sup> or lbs./ft<sup>3</sup> units.

<b>Output Type</b> <input type="radio"/> Volume <input checked="" type="radio"/> Mass <input type="radio"/> Level <input type="radio"/> Distance	<b>Calculation Using</b> <input checked="" type="radio"/> Fixed Bulk Density <input type="radio"/> Level-Mass Table <input type="radio"/> Distance-Mass Table <input type="radio"/> Level-Variable Bulk Density <input type="radio"/> Distance-Variable Bulk Density
<b>Display Units</b> Tons (Metric)	<b>Description</b> Mass Calculation and output current will be calculated based on the 3DLevelScanner's configuration and by multiplying the volume by a fixed bulk density value entered at this stage. Note: Output Current and % display are set according to the Full and Empty Calibration levels.
<b>Density [Tons / m<sup>3</sup>]</b> 5,0000	
Upload	Open Table
Cancel	OK

- **Calculation Using Level-Mass Table** – conversion of the calculated average level directly into mass

**Linearization Parameters**

**Output Type**

Volume

Mass

Level

Distance

**Calculation Using**

Fixed Bulk Density

Level-Mass Table

Distance-Mass Table

Level-Variable Bulk Density

Distance-Variable Bulk Density

**Display Units**

Tons (Metric)

**Description**

Mass Calculation ignores the 3DLevelScanner's configuration and display/output the mass based on the configured table. Press Open Table to edit the table.  
Note: Output Current and % display are set according to the Full and Empty Calibration levels.

Upload
Open Table
Cancel
OK

**Linearization Table**

#	Level [m]	Distance [m]	Mass [%]	Mass [Tons]
1	0.00	39.80	0.00	0.00
2	21.50	18.30	72.17	82,741.70
3	22.13	17.67	74.22	85,094.16
4	22.75	17.05	76.17	87,330.16
5	23.38	16.42	78.02	89,452.63
6	24.01	15.79	79.77	91,464.54
7	24.63	15.17	81.43	93,368.84
8	25.26	14.54	83.00	95,168.49
9	25.89	13.91	84.49	96,866.45
10	26.51	13.29	85.88	98,465.68
11	27.14	12.66	87.19	99,969.13
12	27.77	12.03	88.42	101,379.80
13	28.39	11.41	89.57	102,700.50
14	29.02	10.78	90.65	103,934.40
15	29.65	10.15	91.65	105,084.30
16	30.27	9.53	92.59	106,153.20
17	30.90	8.90	93.45	107,144.10
18	31.53	8.27	94.25	108,060.00
19	32.15	7.65	94.98	108,903.70
20	32.78	7.02	95.66	109,678.20
21	33.41	6.39	96.28	110,386.50
22	34.03	5.77	96.84	111,031.60
23	34.66	5.14	97.35	111,616.50
24	35.29	4.51	97.81	112,143.90
25	35.91	3.89	98.22	112,617.00
26	36.54	3.26	98.59	113,038.70
27	37.17	2.63	98.92	113,412.00
28	37.79	2.01	99.20	113,739.70
29	38.42	1.38	99.45	114,024.90
30	39.05	0.75	99.66	114,270.50
31	39.67	0.13	99.85	114,479.50
32	40.30	-0.50	100.00	114,654.80

OK
Cancel
Apply
Show Vessel

Level-Mass Linearization table

- **Calculation Using Distance-Mass Table** – conversion of the calculated average distance directly into mass (to be done same as above)

- **Calculation Using Level-Variable Bulk Density Table** – conversion of the calculated average level into volume, based on silo structure and multiplying by the bulk density value at that level to convert into mass

**Linearization Parameters**

Output Type

Volume

Mass

Level

Distance

Calculation Using

Fixed Bulk Density

Level-Mass Table

Distance-Mass Table

Level-Variable Bulk Density

Distance-Variable Bulk Density

Display Units

Tons (Metric)

Max Scale

Description

Mass Calculation is based on known silo shape and average bulk density at a certain level.  
Note: Output Current and % display are set according to the Full and Empty Calibration levels.

Upload    Open Table    Cancel    OK

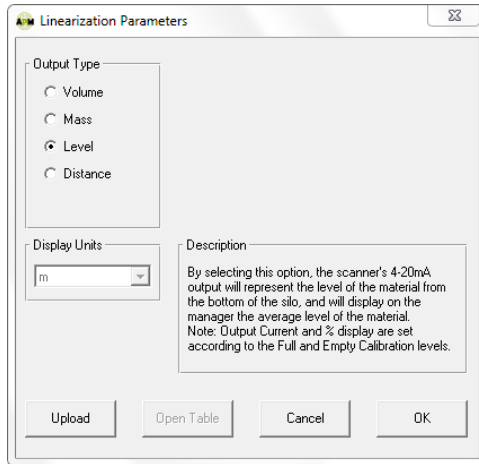
**Linearization Table**

#	Level [m]	Distance [m]	Mass [%]	Mass [Tons]	Density [Tons /
1	0.00	39.80	0.00	0.00	0.00
2	21.50	18.30	72.17	82,741.70	1.02
3	22.13	17.67	74.22	85,094.16	1.02
4	22.75	17.05	76.17	87,330.16	1.02
5	23.38	16.42	78.02	89,452.63	1.02
6	24.01	15.79	79.77	91,464.54	1.02
7	24.63	15.17	81.43	93,368.84	1.02
8	25.26	14.54	83.00	95,168.49	1.02
9	25.89	13.91	84.49	96,866.45	1.01
10	26.51	13.29	85.88	98,465.68	1.01
11	27.14	12.66	87.19	99,969.13	1.01
12	27.77	12.03	88.42	101,379.80	1.01
13	28.39	11.41	89.57	102,700.50	1.01
14	29.02	10.78	90.65	103,934.40	1.01
15	29.65	10.15	91.65	105,084.30	1.01
16	30.27	9.53	92.59	106,153.20	1.01
17	30.90	8.90	93.45	107,144.10	1.01
18	31.53	8.27	94.25	108,060.00	1.01
19	32.15	7.65	94.98	108,903.70	1.01
20	32.78	7.02	95.66	109,678.20	1.01
21	33.41	6.39	96.28	110,386.50	1.01
22	34.03	5.77	96.84	111,031.60	1.00
23	34.66	5.14	97.35	111,616.50	1.00
24	35.29	4.51	97.81	112,143.90	1.00
25	35.91	3.89	98.22	112,617.00	1.00
26	36.54	3.26	98.59	113,038.70	1.00
27	37.17	2.63	98.92	113,412.00	1.00
28	37.79	2.01	99.20	113,739.70	1.00
29	38.42	1.38	99.45	114,024.90	1.00
30	39.05	0.75	99.66	114,270.50	1.00
31	39.67	0.13	99.85	114,479.50	1.00
32	40.30	-0.50	100.00	114,654.80	1.00

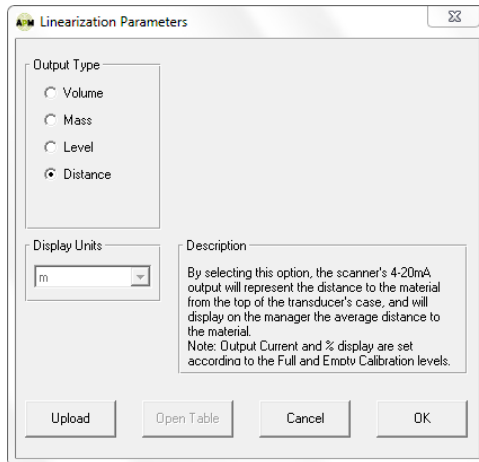
OK    Cancel    Apply    Show Vessel

Level-Mass table using Variable Bulk Density

- **Calculation Using Distance-Variable Bulk Density Table** – conversion of the calculated average distance into volume, based on silo structure and multiplying by the bulk density value at that distance to convert into mass (same as above)
- **Level** – Output the Level of material



- **Distance** – Output distance to material



- Output Settings windows buttons functionality:
  - **Upload** – sends all information to the scanner. If not all parameters are properly configured, an alert pops up with the problem indicated.
  - **Open Table** – when available, the table can be edited according to the requirements
  - **Cancel** – discards all changes and close the window
  - **OK** – keeps settings and advise upload the changes to the scanner
- Table buttons and functionality:

- **OK** – saves the configuration. Uploading from the output settings window will be required
- **Cancel** – discards all changes and closes the table window
- **Apply** – upload all updated settings to the scanner
- **Show Vessel** – enlarges the table window and shows the silo structure and level indication when selecting a table row
- Operations on the table:
  - Right clicking the row number allows: Add Row Above, Delete Row, Clear Rows Above, Clear Row, Clear Rows Below
  - Right clicking the # on the top left of the table allows clearing the entire table
  - Right clicking the editable column allows clearing the column

## Upload All (F2)

Upload all parameters from the software to the scanner.

## Download All (F3)

Downloads all parameters from the scanner to the software.

## Device reset

Allows the following resets options:

- **Restart Scanner:** Sends a restart command to the scanner. The internal DSP boots and starts building the auto false echoes and damping values. The initialization process takes about 30 seconds. The scanner will perform a new search for the correct measurement.
- **Reset to Factory Defaults:** Resets most of the system parameters to their factory default settings. All parameters must be re-defined following this operation. The following parameters remain unchanged: 'Output Damping Time' and 'Steepest Material Slope'.
- **Reset Advanced Parameters:** (available only with firmware versions 3.x.x) Resets all advanced parameters. This function will not reset the 'Output Damping Time', 'Steepest Material Slope', 'Max. Capacity', 'Max. Emptying Rate' and 'Max. Filling Rate'. Scanner's configurations set in the Configuration Wizard will not restore to factory defaults.

## 6.4 View Menu

### 3D Image...

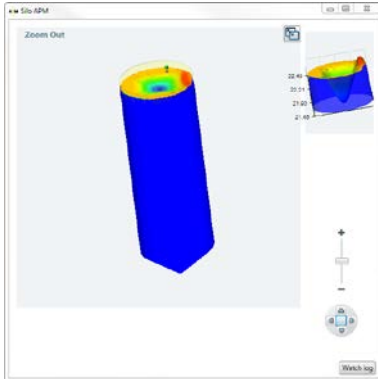
Generates and displays a 3-dimensional graphical representation of the visual mapping contour as scanned by the 3DLevelScanner MV or MVL.

The legend scale to the right side displays the measured level.

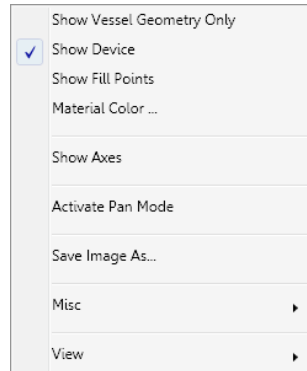
- To rotate the 3D image, press and hold the mouse left key and drag over the image at the desired rotation direction.



- The Manager application generates 3D mapping frames depending on the connection rate. To watch the animation, click **Watch Log**. A new 3D image and a browse window opens. Select the desired log folder (located under the **Logs** folder). Use the video controls to play, stop, move backward or forward or scroll along the time line. The interval in milliseconds (msec) sets the frame time interval. The minimum value is 1msec.
- For switching between a zoomed-out view of the silo and a zoomed-in view of the material surface, click the top right button or double-clicking the 3D image itself.



Visual mapping window

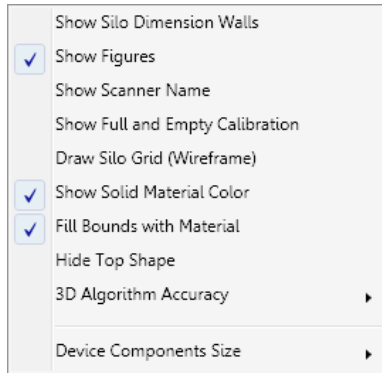


Visual Mapping Options

Right-click the mouse to open the additional features menu:

- **Show Vessel Geometry Only:** Displays the vessel geometry without material.
- **Show Device:** Displays the device relative to the vessel geometry.
- **Show Fill Points:** Display filling points relative to the vessel geometry.
- **Material Color...:** Choose a desired material color from a pop up color chart.
- **Show Axes:** Displays the x-y-z axes.
- **Activate Pan Mode:** Switches from image rotation to panning.
- **Save Image As...:** Performs a screen capture of the entire window for saving as an image file.
- **Misc:** Opens a sub-menu with the following options:
  - **Show Silo Dimensions Wall:** Displays a grid with dimensions, similar to the zoomed-in image.
  - **Show Full and Empty Calibration:** Add the full and empty calibration levels as configured in the scanner.
  - **Draw Silo Grid (Wireframe):** Displays a wireframe over the material surface.
  - **Show Solid Material Color:** Displays the material in a solid gray color.
  - **Fill Bounds with Material:** Shows the complete material around the surface, or the surface only.
  - **Hide Top Shape:** Hides the top part of the vessel (if not flat).
  - **3D Algorithm Accuracy:** Controls the number of points in the image. Available options are: Normal, Good and Best. Default option: Normal. Changing the option is not recommended since a high value consumes most graphic card resources.

- **Device Components Size:** Change the scanner image size, options: Real, Relative Large, Relative Normal and Relative Small.



*Visual Mapping Misc options*

- **View:** Opens a sub-menu with selectable viewing angle.

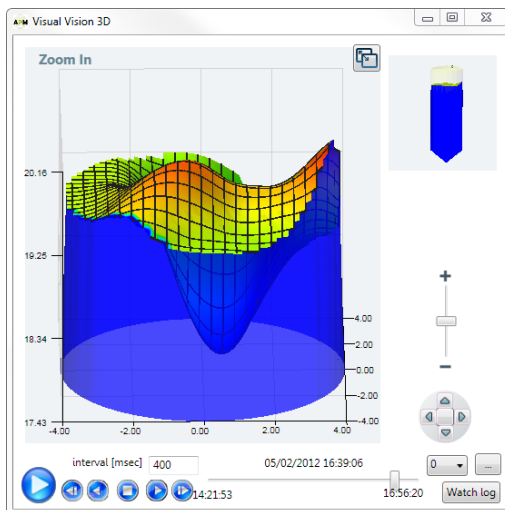
### 3D Movie...

The Visual Mapping feature allows building and viewing a movie based on the generated 3D representations as frames. When activated, a browser window automatically opens for selecting the desired logs folder for generating the movie.

The 3D movie feature works only with MV or MVL scanner model logs.

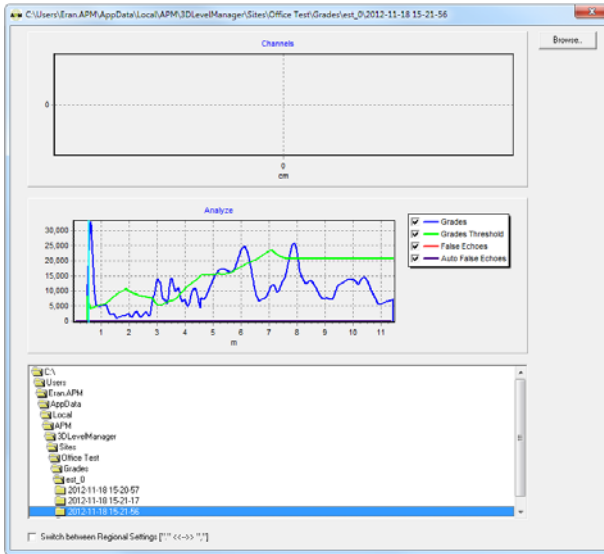
After selecting the log folder, it is possible to play the movie, pause, skip to next scene or return to previous one, jump to start or to the end.

It is also possible to select the polling address of the desired scanner to view and to set an interval time in milliseconds, the interval time define the pause between two 3D image shots.



## Grades FW 2.x.x Logs...

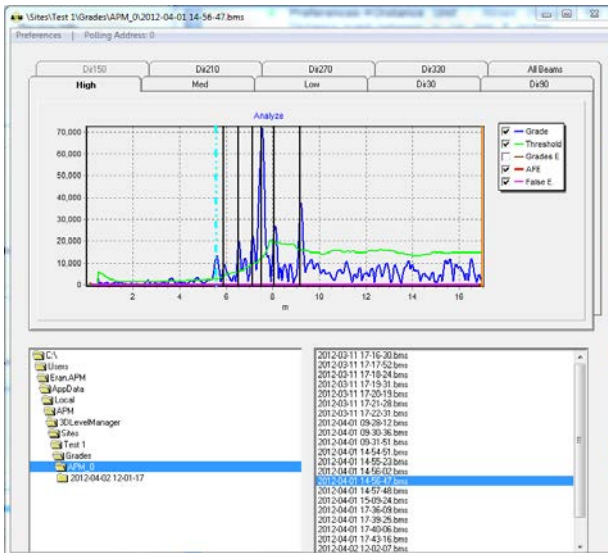
Allow viewing grades analysis results conducted on scanners with FW version 2.x.x.



Example of Grades Analysis log with FW 2.x.x

## Grades FW 3/4.x.x Logs...

Allow viewing previous grades analysis window conducted on scanners with FW version 3.x.x or 4.x.x.



Example of Grades Analysis log with FW 3/4.x.x

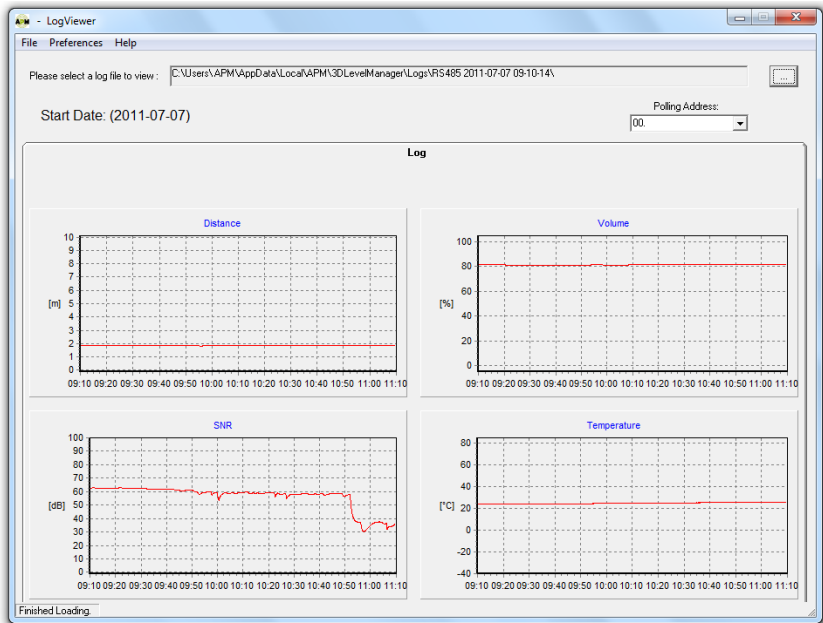
## Measurement Logs... (Ctrl+W)

Loads a log file and displays a chart presentation.

- The Log option displays charts for Distance (m/ft), Volume (%), SNR (dB) and Temperature ( $^{\circ}\text{C}/^{\circ}\text{F}$ ) over a time line as shown. Log files are saved as the connection is established. The files are saved in a local folder.

For viewing older log files, press the [...] browse button. A browsing window opens, showing the **Logs** folder for choosing a different log file. The file names include the date and time of the connection. It is possible to select multiple folders or files to be merged together into one log.

- The **LogViewer** application includes three menus with the following options:
  - **File**→**Browse to Local Folder** – Opens the Windows Explorer application in its files location
  - **File**→**Exit** – Exits the LogViewer application
  - **Preferences**→**Distance Unit** – Allows changing the displayed units in the Distance chart between: m, cm, mm, ft, inches
  - **Preferences**→**Temperature Unit** – Allows changing the temperature units between Celsius and Fahrenheit
  - **Preferences**→**Time Offset** – allows adding time offset (between +12 to -12 hours) from the local computer's clock
  - **Help**→**About** – Opens the About window



Log File graph representation

In Multiple Mode, the software monitors all the scanners selected in the Polling Address Selection (see page 26). For viewing a different scanner log file, select the scanner **Polling Address** in the drop-down list at the top-right corner.

Use the preference menu for displaying logs in different distance units (m, cm, mm, ft., inch), different temperature units (Celsius, Fahrenheit), different time zone (hours difference) and different regional settings (using dots or commas as digit separators).

## Working with the Graphs

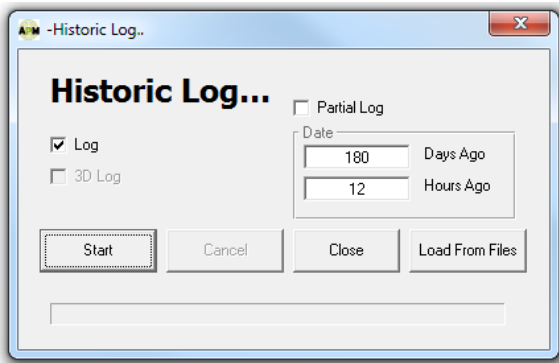
Zoom-in, zoom-out and pan options are available for all charts created by the 3DLevelManager: Grades Analysis, Log and Historic log.

- **Zoom-In:** Choose a rectangular area you wish to zoom in and place the mouse cursor on the top left corner of it. Left click the mouse and drag it to the bottom right corner of the required area, making sure not to release the mouse button until the entire required area is selected.
- **Zoom-Out:** Place the cursor of the mouse inside the graph, left click the mouse and move it from bottom right to top left and release the mouse button.
- **Pan:** Right click the mouse button and hold it inside the graph area. While moving the mouse, the graph will pan to the sides.
- **Back to default view:** In the Grades Analysis window, double clicking on the graph pops up a box for data reloading confirmation.

## Historic Log...

The scanner allows storing logs in its local memory. Use the Historic log settings in the **Advanced Parameters** feature to enable this option. To view the log from the scanner memory, select the **Historic Log...** option.

When selecting the Historic log, a box appears asking for selection of the required log time to be retrieved from the scanner. Once download is complete, a log viewer window opens displaying the logs. The log data is then saved under the Historic log folder.



*Historic Log window*



**Note:** This option allows choosing a 3D Log option which creates a 3-Dimensional representation of the log. The option is not available under Technician Mode.

## 6.5 Tools Menu

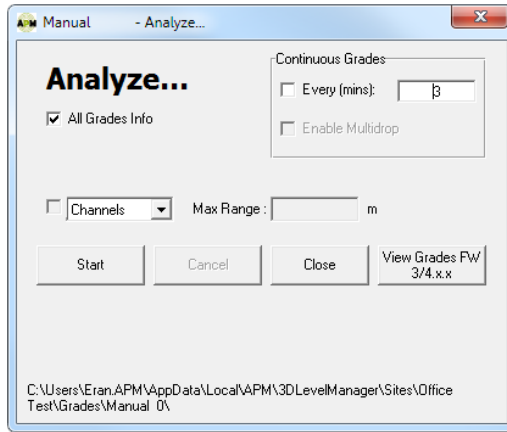
### Analyze... (Ctrl+Z)

The Grades Analysis tool allows a selection of different signal types downloaded from the scanner at a preferred time resolution and generates a chart-type report for each scan. On choosing this menu option, the following box appears:

- Select **All Grades Info** to analyze the scanner behavior in the vessel.
- The application automatically starts the analysis once the Analyze window is opened. The tool will start downloading the signals from the scanner. This stage takes a few seconds or minutes to complete, depending on the communication quality and speed. Once completed, the analysis results window appears.
- Click **Cancel** to stop the download.
- Click **Close** to close the **Analyze...** window.
- Click **View Grades FW 3/4.x.x** and select the file from the appropriate folder for uploading a certain signal (channels, grades, or false echoes).
- **All Grades Info:** Checking this option causes the analyze tool to download the Grades, Grades Threshold (controlled by an automatic algorithm), False Echoes and Auto False Echoes. The files are saved under a separate folder named with the tag name, date, and time. Note that when checking this option, the rest of the options cannot be selected.
- **Continuous Grades:** This feature allows running the grades analysis continuously for later viewing of the changes in material and scanner behavior over time for an in-depth analysis. The Continuous Grades feature is also possible with all scanners connected in multi-drop connection. Use the **Every** field for setting the pause interval between two scans, the minimal value is 3 minutes between scan stop to new scan that starts.
- **Channels:** Checking this option causes the analyze tool to download the nine signals returned to the transducers. Enter the maximum scanning range in the **Max Range** field.
- **Noise:** The Analyze tool will start a noise test.



**NOTE:** All files are saved under a separate folder, named with the tag name, date and time.

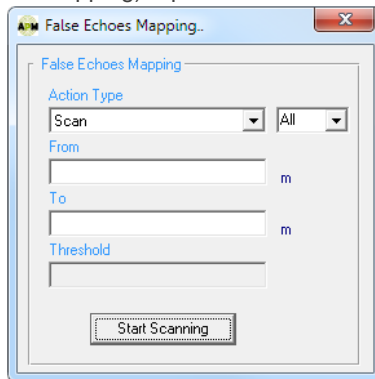


Grades Analysis dialog

### False Echo Mapping...

Allows the user to map out false echoes according to the grades analysis (and based on them).

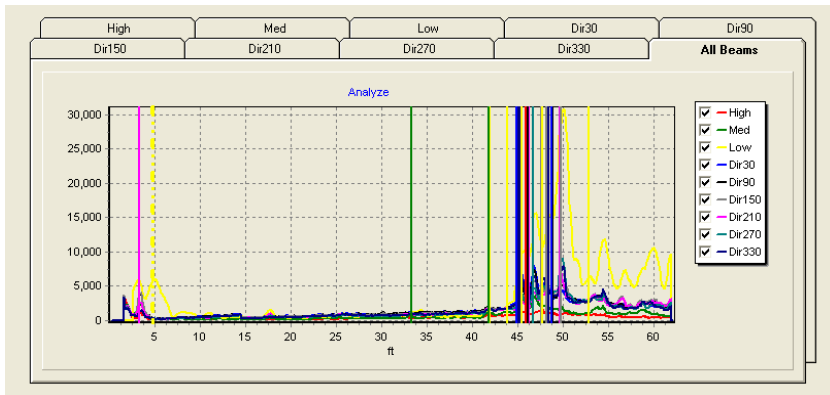
- **Scan** – Automatic false echo mapping between the set ranges From/To
- **Manual Scan** – set a constant level at the defined threshold between the From and To distances
- **Reset All False Echoes** – delete all false echoes done by the Auto False Echo algorithm and in the False Echoes Mapping created by the user.
- In Senior Technician mode, it is possible to do the false echo mapping operation on all beams or just on a specific beam based on the user's requirements.
- **Start Scanning** (or Reset Mapping) – press to start the calculation.



False Echo mapping in Senior Technician mode

## Suggested steps for Grades Analysis and False Echo Mapping

- 1 It is advised to take a manual measurement of the distance from the scanner to the material below it. This can be done with a tape measure equipped with a weight on the end, or a laser. Record the distance measurement for further reference.
- 2 Perform Grades Analysis, can be found under Tools menu. Once completed, the grades log window will pop up same as the *Example of Grades Analysis log with FW 3/4.x.x* in page 42 . The horizontal axis refers to the distance (m or feet) of the echo from the scanner and the vertical axis refers to the power of the echo (there is no unit for power).
- 3 You will then need to determine if the location of the echoes (vertical lines) are close to the manual measurement that was taken earlier. Note that the scanner is taking measurements of multiple points and may not match up with the manual measurement exactly.
- 4 Let's use this next image as an example. We took a manual measure and the tape read 45ft. We are now comparing the Grades Analysis and we notice that there are echoes at the first 5ft. These are clearly false echoes and we will need to map them out.



*False Echo example in Grades Analysis window*

- 5 Zoom into the area of false echoes at the first 10ft by left clicking and dragging down and to the right marking a square around the required area. This is done to view the exact numbers that later needed to be mapped out under the False Echo Mapping function.
- 6 False Echo mapping can be found under the Tools menu. We want to manually scan from 0 to beyond the distance of the false echoes. In this case we found it to be 6-7ft. Select Manual Scan, set the range of scan and the level of the threshold, in this case it can be 7000. Click the Start Scanning button and the word *Calculating...* will appear in the Threshold box. Once the fields are cleared the False Echo Mapping is completed. Wait couple of minutes and perform Grades Analysis again to verify the position of the False E. line (pink) in each of the beams the operation was done. Wait at least one damping time before the algorithm takes effect of the changes and completely ignores the false echoes.



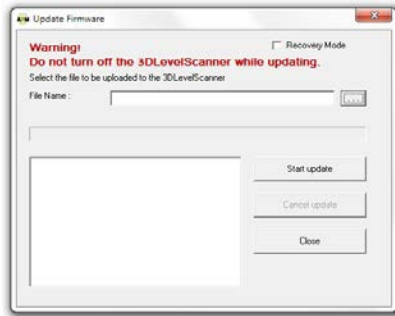


**Note:** This is a brief run through of the False Echo Mapping process. There are many other situations that may call for different techniques. An improper mapping of a vessel can lead to poor function of the 3DLevelScanner.

## Update Firmware...

Uploads a new firmware to the device electronic card.

- Click the [...] browse button to select the APM file (\*.ldr) to upload to the device.
- Click **Start Update** to upload the file to the device.
- Click **Cancel Update** to stop the update process.
- Click **Close** to close the window.



Update Firmware window



**IMPORTANT:** Once the firmware update process is complete, reset the device to factory settings by clicking **Reset to Factory Settings** in *Advanced Parameters...* (F5), page 28. When using firmware version 3.x.x and above, it is not necessary to reset the device to factory defaults since all settings are done automatically.

Downgrading a scanner firmware from version 4.x.x to older versions such as 2.9.843 is not recommended and might reset the scanner's polling address back to 00 and restore model type to S. On such operation, the scanner will return to its factory defaults and an upgrade to the original type will be necessary. Please contact APM Technical Support when facing such requirement.

## Upgrade Model...

Upgrades or downgrades between S, M, MV, ML and MVL versions.

- Select the relevant model to be upgraded to.
- Click **OK**.
- A password is required for upgrading to a higher model (M / MV / ML / MVL). The password can be supplied by your local distributor as a text file, or acquired from APM headquarters. Copy the password from the provided text file (license number) into the empty field in the dialog box.



**Note:** With correct license, the device will automatically reset and initialize itself.



*Upgrade model window*

## Operating Mode

- **Standard Mode:** In this mode, parameter modifications are disabled. Switching from Standard mode to other modes requires a password.
- **Technician Mode:** In this mode, basic parameter modifications are enabled. A password is required. The password is 'techAPM'.
- **Senior Technician Mode:** In this mode, advanced parameter modifications are enabled. The password: 'admin' is required.
- **Debug Mode:** A password protected development mode. Access is allowed only to APM development team.
- Password is required only when moving to a higher level of operator.

## 6.6 Help Menu

The Help menu consist of two functions:

### Operation Manual

Opens this document.

### About (F1)

Opens the about window with version details.

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# Appendix A: End-User License Agreement

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