

PRINTRONIX®

AUTO ID

Online Data Validator 2D User's Manual



T8204 and T8304 Printers

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Unauthorized changes or modifications could void the user's authority to operate the equipment.

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- EN 55022 — “Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.”
- EN 55024 — “Electromagnetic Immunity Requirements for Information Technology Equipment”
- EN 60950 — “Safety of Information Technology Equipment.”

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This product has been tested and found to comply with the limits of Class A Information Technology Equipment according to European standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication devices.

WARNING

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

CE Symbol



Taiwan

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Compliance Statements

The Printronix Online Data Validator 2D gathers data per the ISO/ANSI method of verification to perform practically all the industry standard bar code quality parameter calculations. These include all ISO/ANSI method parameters for 1-D and 2-D barcodes along with decoding the symbol.

Reflectance Compliance – 660 nm Wavelength (Red) Light

The reflectance values embedded in the calibration symbol supplied with each ODV2D are measured using a calibrated ISO compliant verifier.

ISO/ANSI Method Compliance

The Printronix ODV2D gathers data and performs all ISO/ANSI method parameter calculations per the ISO/IEC 15416 (1-D) and ISO/IEC 15415 (2-D), and ANSI X3.182-1990 methodologies with a few special considerations and exceptions. The ODV2D also conforms to ISO/IEC 15426-1 and 15426-2 per the requirements specified in Section 2 of both documents, with some exceptions.

The exceptions and considerations are related to the instrument's design and mission. The design incorporates a proprietary image scanner that has been assembled with a fixed focal length to produce a calibrated dot resolution for measuring 10mil or larger minimum X-dimensions. Further, the measurement accuracy of some grading parameters may be lower than identified in the standard.

The mission is to not only analyze bar code quality, but also to detect any printer failures, process failures or media problems. For maximum performance and to conform to quality specifications, a fixed mounting distance and angle are required.

An image scan resolution that can detect errors of the particular print method is highly recommended. The scan resolution used may or may not correspond to the recommendations in various specifications that it be related to the X dimension of a particular symbol, but instead correspond to the printer's resolution or some other parameter(s) critical in the application. A major philosophy of an on-line verification system is; if the printer and/or process is operating correctly and the media has proper reflectance properties, the best print quality for that particular print method and material is achieved by definition.



Special Considerations

1. Final system tests are performed at the proper focus distance and at an angle of 27 degrees. Units with common focus distances are checked to yield analysis results within 10% of the ISO verifier accuracy requirements.
2. All ODV2D's use the same light source with a wavelength of 624 +/- 10 nm. Therefore, any ISO/ANSI overall symbol grade calculated by an ODV includes 624 as the wavelength portion of the grade.

Exceptions to the ISO/ANSI Method

The Defects calculation does not include the quiet zone area. A separate quiet zone check is implemented to more easily isolate print problems vs. setup problems in an on-line environment.

Table of Contents

Communication Notices.....	2
Compliance Statements	4
1 Installation Instructions	9
Overview.....	9
Capability Highlights	9
Supported Barcodes	10
Operational Parameters.....	10
Enable the ODV-2D.....	11
Calibration	12
Purpose of Calibration	12
Procedure.....	12
Validation Demo Page	12
ODV-2D Menu Overview 	13
Grading Parameters	14
Grading A-F.....	14
ISO versus Non-ISO	14
Parameter Applicability	15
Configuring  the ODV-2D.....	16
Enabling and Disabling	16
Note on Energy Star	16
Checking the Firmware Revision Number	16
Validator Reporting	16
Requesting a Validator Report.....	16
Defining the Output Destination (Telemetry Path).....	17
Sending Validation Data (Return Data)	17
Selecting the Type of Report (Telemetry Data)	17
Resetting ODV-2D Data.....	17
Control Submenu	17
Validator Active	18
Auto Report.....	18
Auto Report Time.....	19
Telemetry Path.....	19
Return Data.....	20
Telemetry Data	20
Validator Action.....	21
Quiet Zones.....	22
Skip Labels.....	22
Overstrike Style.....	22
Num Retry.....	23

Max Retry Action.....	23
Label Save	23
Comm Error.....	24
Symbology Submenu.....	24
Orientation.....	24
Graphics Search	24
Code 39.....	25
Code 128.....	25
Interleaved 2/5	25
Code 93.....	25
Codabar	25
UPC/EAN	26
PDF417	26
Data Matrix.....	26
QR Code	26
Grading Submenu.....	27
Grading Mode	27
Overall Grade.....	27
Decodability.....	28
Percent Decode	29
Defects.....	29
Modulation.....	29
EC Min	30
RMin.....	30
Symbol Contrast	30
Fixed Pattern Damage	31
Axial Non-Uniformity	31
Grid Non-Uniformity	31
Unused Error Correction	32
Codeword Yield.....	32
Global Threshold.....	32
Diagnostics Submenu	33
Scan Report	33
Scan Profile.....	34
Profile Horiz Mag	35
Print Settings.....	35
Print Bullseye	36
Print Dots	36
Symbol Card Cal.....	36
Statistics Submenu	37
Clear Data	37
Good Barcodes	37
Good Forms	37

Overstrike Forms	37
Average BWD	37
Last BWD	37
Validator F/W	37
Serial Number	38
IP Address.....	38
MAC Address.....	38
Operation	39
Print Speed Limits	39
Page Size and Barcode Limits.....	39
Minimum Code Height	39
Data Matrix Complexity.....	39
On-Demand Printing	39
PTX_SETUP Control	40
Bar Code Failures.....	42
Process for 1-D Barcode Analysis	42
Bad Bar Code Error Detection	43
Missing Bar Code Error Detection	43
Validator Action (Error Action)	43
Stop.....	44
Overstrike.....	44
Retry Form	44
Stop & Retry.....	44
Grade&Report.....	45
Rescan Form.....	45
Rescan&Retry	45
Rescan&Stop	45
Error Messages.....	47
Troubleshooting.....	51
Maintenance	53
Software License Agreement	54
Open Source Acknowledgements	56
Angstrom Linux	56
Linux Boot Loader	56
Aptina Video Driver Module	57
GNU C Libraries.....	57
OpenCV	57
ZXing Barcode Reader	58
Mongoose Web Server	58
Open Source Licenses	60
GPL 2.0	60
GPL 3.0	63
LGPL 3.0	70

Apache 2.0	72
A Contact Information	75
Printronic Customer Support Center	75
Corporate Offices	76

1 *Installation Instructions*

Overview

The online data validator for one and two-dimensional barcodes (ODV-2D) is an external bar code camera scanning device attached above the paper exit of the printer. When activated, it records the image of the printed output looking for bar codes in any rotation. When it finds a bar code, it determines what type of bar code, the data encoded, and the ISO grading parameters.

As the entire label is passing under the camera, the validator grades the bar code and sends a report to the printer. Printer response is determined by the validator settings, explained in “Configuring the Validator” on page 14.

Capability Highlights

The new ODV-2D system is a camera based system with LEDs that flash at a given frequency to illuminate the output. A sensor is used to record slices of the image as the output moves past the lens and then stitches them together for analysis. Thus, the entire image is recorded by the ODV-2D for analysis which allows verification of barcodes in any orientation and capable of 2-D barcode grading.

The summary of capabilities are as follows:

- The ODV-2D is supported on the T8000 4” models (T8204 and T8304).
- The ODV-2D supports all orientations of barcodes (0, 90, 180, 270 degrees).
- The ODV-2D supports full ISO-based grading for PDF417, DataMatrix, and QR symbologies.
- Barcodes printed as graphics (Win Drivers, WYSIWIG label programs) do not require additional setup. The printer will dynamically inspect and identify all properly scaled graphic barcodes.
- The ODV-2D firmware can be downloaded via the printer or via ODV-2D ethernet webpage.
- The ODV-2D has an Ethernet port (hidden by cover plate) with a webpage that provides:
 - Calibration and Alignment Wizards
 - Trending Analysis
 - The ability to capture and view images from the camera
 - Advanced Diagnostics

Supported Barcodes

Table 1 lists the symbologies supported by the ODV-2D. Some of these will be supported in future maintenance releases

Table 1 Symbologies Supported

Feature	ODV-2D
Code 39	Yes
Interleaved 2/5	Yes
Code 93	Yes
Code 128	Yes
UPC/EAN	Yes
UPC/EAN Supplemental	Yes
PDF417	Yes
PDF417 Limited	Future
Micro PDF417	Future
DataMatrix (Square)	Yes
DataMatrix (Rectangle)	Yes
QR	Yes
Aztec	Future

Operational Parameters

The design parameters of the validator are as follows:

- The ODV-2D can support labels of 24 inches maximum.
- The ODV-2D can track the performance of up to 50 barcodes on a label.
- The ODV-2D can support 2-8 IPS setting for picket fence and 2-6 IPS for ladder.
- The ODV-2D requires a minimum narrow bar width of 10 mils (0.010 inch). This is equivalent to 2 dots at 203 DPI or 3 dots at 300 DPI.
- The ODV-2D can support bar codes up to 0.10 inch in height (linear 1-D codes).
- Depending on the complexity of the form and number of barcodes, the printer may pause between labels if required to complete the calculations on a given label.

Enable the ODV-2D

IMPORTANT If you make any changes to the default configuration menu items, you will be prompted to save the configuration when you attempt to put the printer online. See the *Administrator's Manual* for more information.

Software can automatically detect an installed ODV-1 or ODV-2D validator when the printer is powered up. This section focuses on the specifics of the ODV-2D but follows the same behavior as the ODV-1 except with ODV-2D icons and menus. The state of the ODV-2D can be observed from the ONLINE screen as shown in Figure 1 below.



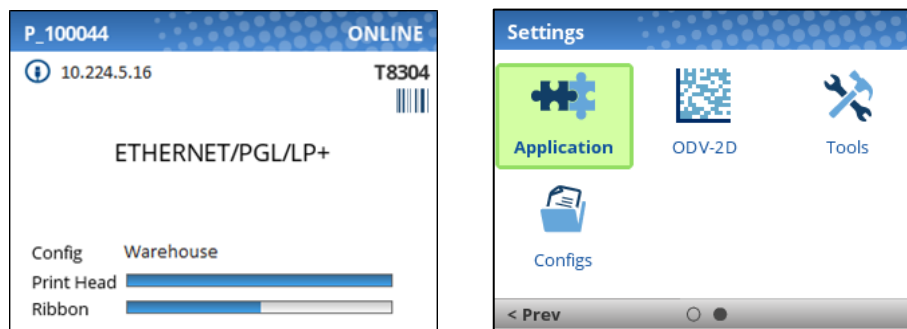
- The ONLINE screen will show the “enabled” validator symbol  under the model number when the ODV-2D is installed AND enabled via the menu *ODV-2D > Control > Validator Active*.
- The ONLINE screen will show the “disabled” validator symbol  under the model number when the ODV-2D is installed and disabled via the menu *ODV-2D > Control > Validator Active*.
- If neither the ODV-1 nor ODV-2D is installed, then no validator symbol will be present on the ONLINE screen.
- The Settings screen will use validator icons as follows:
 - If neither the ODV-1 nor ODV-2D is installed, the greyed-out ODV-2D icon will be present.
 - If the ODV-1 is installed, the color Validator 1-D icon will be present.
 - If the ODV-2D is installed, the color ODV-2D icon will be present.
- Within the menu section, then the ODV-1 will use the heading *Validator* (e.g., *Validator > Control*) and the ODV-2D will use *ODV-2D* (e.g., *ODV-2D > Control*).

Figure 1 Online Screen and ODV-2D Icon



Once the ODV-2D is installed, the *ODV-2D* section under Settings can be selected and the ODV-2D configured. However, it may not be enabled by default:

- If the printer is powered up with the menu *Configs > Control > Power-Up Config* set to Factory, the *ODV-2D > Control > Validator Active* will be set to “Enable” automatically.
- If the printer is powered up with *Configs > Control > Power-Up Config* to something other than Factory, the *ODV-2D > Control > Validator Active* is set to “Disable”.

To enable the ODV-2D, change the menu *ODV-2D > Control > Validator Active* to “Enable” and save the configuration as described in the *Administrator's Manual*.

IMPORTANT Do not enable or disable the ODV-2D with data in the buffer. See “Resetting ODV-2D Data” on page 17.

Calibration

Purpose of Calibration

Calibration is needed for the following three purposes:

- To make sure the ODV-2D unit is functioning properly. This requires the use of a GS1 calibrated plaque that was supplied with your unit.
- To make sure the ODV-2D unit is aligned properly with the printer. The ODV-2D unit is connected via a bracket and fine tuning may be required if the unit is bumped or transported to another location.
- To make sure the ambient lighting conditions are considered when grading barcodes.

Procedure


The calibration procedures can only be performed by trained and certified personnel. Therefore, the procedures are defined separately. Contact your Printronix Service Representative or provider for more information.

Validation Demo Page

The 2-D bar code validation demo page allows you to test or demonstrate proper validator operation without a host computer. This page contains several bar code symbologies (including 2-D) and is recommended for 4x6 labels.

NOTE: If the menu *Media > Image > Label Width* or *Media > Image > Label Length* or *Media > Image > Label Width* is set to something other than 4" or 6", respectively, then some of the barcodes may not print. This does not invalidate the test, but does not allow the entire scan width to be verified. If Label dimensions are too small, no barcodes will be printed.

To print and validate the bar code validation demo page:

1. Load the factory default configuration. (Refer to the *Administrator's Manual*.)
 2. Set *ODV-2D > Control > Validator Active* to "Enable".
 3. Set *Sensors > Control > Gap/Mark Sensor* to "Gap".
 4. Load media.
 5. Using *Sensors > Calibrate > Auto Calibrate* or by selecting  in the Home screen, run Auto Calibrate for proper gap sensing.
 6. Edit the menu *Tools > Print Tests > Run Tests*. If the panel is locked, press the UP+DOWN ARROW keys simultaneously to unlock.
 7. Find the printer test named "Barcode Demo 2D" and press the ENTER key.
 8. The printer will return ONLINE automatically and print one demo page.
 9. To demonstrate a bad bar code reading, block the scanning beam with an opaque object while the bar code moves under the beam. When you block the beam, the ODV-2D will generate a reading error and will perform a default error action. The default setting for *ODV-2D > Control > Validator Action* is "Retry Form". Using the factory default settings, the printer will pull the label with the bad barcode back, overstrike the entire label, reprint the barcodes on the next label, and then stop.
 10. Press the PAUSE key to take the printer OFFLINE.
 11. Lock the panel again using the UP+DOWN ARROW keys.
 12. Press the PAUSE key to place the printer back ONLINE.
- Operation

ODV-2D Menu Overview

The ODV-2D section is structured into four submenus as follows:

- The **Control** submenu is used to configure how the ODV-2D will operate with respect to the results provided by the validator. Those menus are described starting on page 17.
- The **Symbology** submenu is used to configure which orientations and symbologies will be graded and which will be ignored.
- The **Grading** submenu is used to configure grading criteria of the barcodes found by the validator. Those menus are described starting on page 24.
- The **Diagnostics** submenu is used to run test procedures to help determine the accuracy and troubleshoot the validator. Those menus are described starting on page 32.
- The **Statistics** submenu is general read-only and used to gather and report statistics on how the validator is reporting on print jobs sent to the printer. Those items are described starting on page 37.

The ODV-2D menu structure and its defaults are summarized in Figure 2 and Figure 3.

Figure 2 ODV-2D Section and Submenus

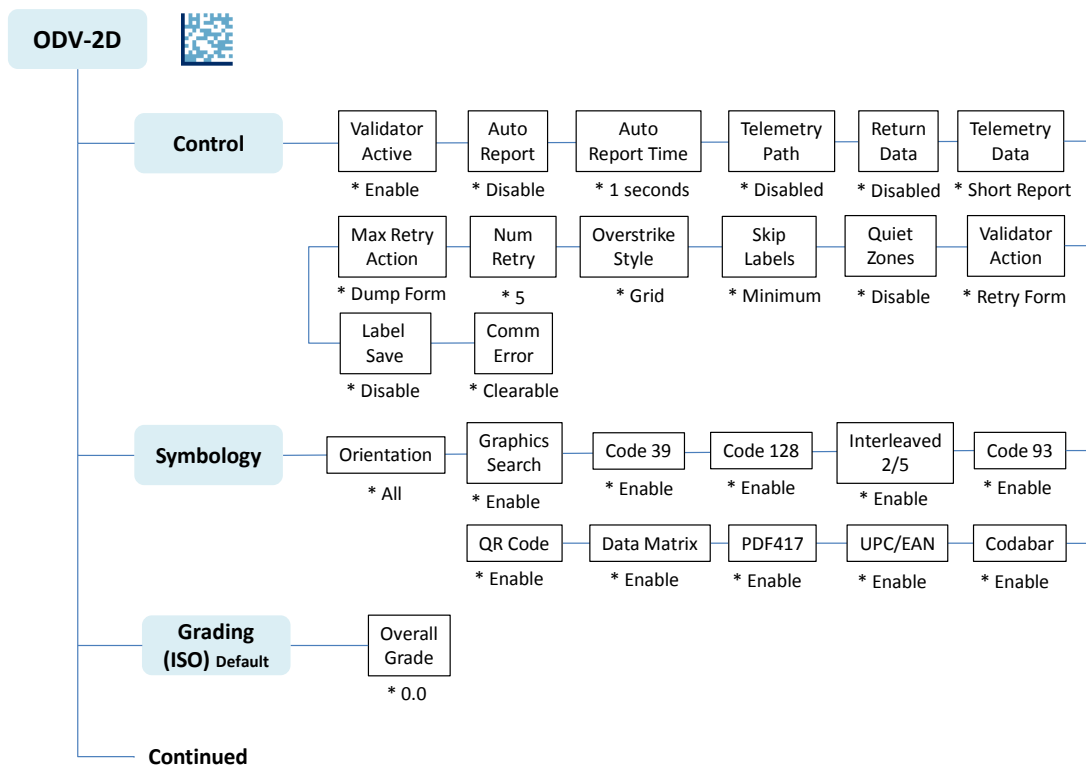
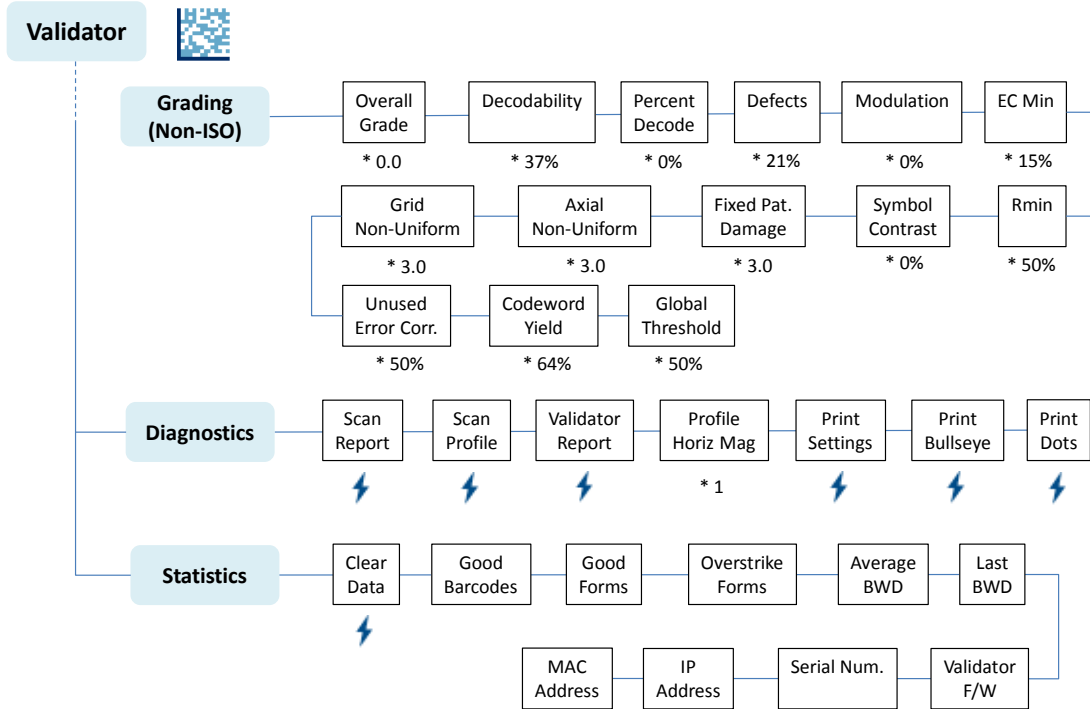


Figure 3 Validator Section and Submenus, Continued



Grading Parameters

Grading A-F

Several ISO and traditional parameters are individually graded per the ISO and ANSI specifications, and these individual grades are combined to make an overall ISO-compliant grade. The ODV-2D will always fail any barcodes which have grades less than or equal to the value specified in the Overall Grade menu. Instead of grade letters (A-F), numbers are used to allow for more resolution. ISO-compliant letter grades correspond to numerical grades as shown in the table below.

Table 2 Grading Numerical Range

Letter Grade	Grade Numerical Range
A	3.5 - 4.0
B	2.5 - 3.4
C	1.5 - 2.4
D	0.5 - 1.4
F	0.0 - 0.4

ISO versus Non-ISO

In terms of grading the form, there are two different modes available based on the menu setting *ODV-2D > Grading > Grading Mode*:

- ISO – In this mode, all grading parameters are based on ISO standards. Only the **Overall Grade** menu is user adjustable to generate a fault. When this mode is selected all other menus in this section are hidden and reset. The grading results are then based on the ISO specifications.
- Non-ISO – This mode allows the user to set custom failure thresholds on individual barcode quality parameters. Changing individual quality parameters may lead to non-ISO standard grading. It is recommended that only users that understand both the ISO standards and the end user barcode quality requirements change any setting that affects the barcode quality parameters. All quality parameter menus are visible and user adjustable in this mode

Parameter Applicability


Barcode verifiers use parameters dictated by industry standards for grading and reporting barcodes. The table below shows a summary of the industry standard parameters used for barcode grading. While the ODV-2D is limited to validation, it will implement the same ISO parameters for grading as shown in Table 3.

Table 3 Configurable Analysis Parameters

Parameter	1D	2D	
		Stacked	Matrix
Modulation	x	x	x
Symbol Contrast	x	x	x
Overall Grade	x	x	x
Rmin	x	x	
ECmin	x	x	
Defects	x	x	
Decodability	x	x	
Fixed Pattern Damage			x
Axial Nonuniformity			x
Grid Nonuniformity			x
Unused Error Correction Code		x	x

NOTE: Stacked Barcodes include PDF417. Matrix barcodes include DataMatrix, QR, and Aztec.

Configuring the ODV-2D

Configuring the validator is done by selecting the ODV-2D icon  within the Settings section. The ODV-2D comes equipped with a default setting for each configuration option, and it works without having to change any of these options. However, in some cases it is necessary to adjust these options, which are described below.

IMPORTANT If you are unable to select the ODV-2D icon or the icon is grey , then the validator is not properly installed. Please contact the Printronix Customer Support Center on page 75.

IMPORTANT If you make any changes to the default configuration menu items, you will be prompted to save the configuration. See “Auto Save Configuration” in the *Administrator’s Manual*.

Enabling and Disabling

Software can automatically detect an installed validator when the printer is powered up. If the printer is powered up with *Configs > Control > Power-Up Config* set to “Factory”, the ODV-2D icon can be selected and *ODV2-2D > Control > Validator Active* is set to “Enable”.

If *Power-Up Config.* is not set to *Factory*, the ODV-2D icon can be selected, but *ODV-2D > Control > Validator Active* is set to “Disable”. Set this menu to “Enable” and save the configuration as described in the *Administrator’s Manual*. In the same manner, the validator can be disabled.

IMPORTANT Do not disable or enable the ODV-2D with data in the buffer. See “Resetting ODV-2D Data” page 17.

Note on Energy Star

The menu *System > Energy Star > Pwr Saver Active* is by default enabled and *System > Energy Star > Pwr Saver Time* is set to 5 minutes. Because Energy Star requires the ODV to be completely shut down, the time to revive the ODV-2D can be more than 30 seconds which can be challenging for on-demand applications. The user is recommended to either increase the *Pwr Saver Time* or disable *Pwr Saver Active* menus if the revival time is not satisfactory.

Checking the Firmware Revision Number

For troubleshooting purposes, you may need to reference the ODV-2D firmware revision number. This can be found in two different places within the Settings section:

- ODV-2D > Statistics > Validator F/W.
- Tools > About > Validator F/W.

Validator Reporting

After any completed print job or Bar Code Demo page, you can request a report from the printer which describes the validation statistics since the printer was turned on, or since the last data reset (for information on resetting data, see page 17.)

Requesting a Validator Report

This procedure prints a summarized validator report

1. Press the PAUSE key to take the printer OFFLINE.
2. If necessary, press the UP+DOWN ARROW keys at the same time to unlock the front panel.
3. Edit the menu *Tools > Print Tests > Run Tests*.
4. Find the printer test named “Valid. Report” and press the ENTER key.

5. Lock the panel again using the UP+DOWN ARROW keys.
6. Press PAUSE again to put the printer ONLINE.

Defining the Output Destination (Telemetry Path)

You may want to send a streaming flow of validation data to the PNE Auto ID Data Manager application during the print job. By default, this function is disabled.

To enable this function, set the menu *ODV-2D > Control > Telemetry Path* to “Network Port”. The printer then outputs the bar code analysis and underlying data from the validator to the PNE connected to the network port so the validator data can be seen and analyzed with the optional remote management software.

Sending Validation Data (Return Data)

You may want to send a streaming flow of validation data to an external device during the print job. By default, this function is disabled.

To enable this function, set the menu *ODV-2D > Control > Return Data* to “Data+Grade” or “Data+Grade+Fail”. The printer then outputs the bar code analysis and underlying data from the validator to a device connected to the port defined in the *System > Printer Mgmt > Ret. Status Port* menu so the ODV-2D data can be seen and analyzed.

Selecting the Type of Report (Telemetry Data)

The validator sends a report to the selected data output destination. There are three different options controlled by the *ODV-2D > Control > Telemetry Data* menu:

- **Short Report.** Default setting. Provides the encoded failure cause or pass indication and the bar width deviation, shown as a percentage.
- **Full Report.** Provides a completed report of all the data captured by the ODV-2D.
- **Validation Mode.** Provides the same data as the Short Report, but adds the actual bar code data read.

Resetting ODV-2D Data

The ODV-2D reports on all bar codes it detects since the last data reset. For example, you print a large batch of labels with bar codes and then print a validator report. Then you print another batch of labels with bar codes and print another report. The report will contain information on both batch jobs. However, if you reset the ODV-2D data between batch jobs, the second report will only contain information on the second batch job.

To reset Validator Data, execute the menu *ODV-2D > Statistics > Clear Data*.

Control Submenu

Several ODV-2D options which define specific parameters for certain print jobs can be set from the printer configuration menu.

Validator Active

ODV-2D > Control > Validator Active	
<p>Software can automatically detect an installed validator when the printer is powered up. If the printer is powered up with <i>Configs > Control > Power-Up Config</i> set to "Factory", the Validator icon can be selected and this option is set to "Enable".</p> <p>If <i>Power-Up Config</i> is not set to Factory, the Validator icon can be selected, but this option is set to "Disable".</p>	
Disable	The ODV-2D is disabled and not active.
Enable	The ODV-2D is enabled and active.
Factory Default	Depends on <i>Configs > Control > Power-Up Config</i> setting. See above.
IMPORTANT	Do not disable or enable the ODV-2D with data in the buffer. See "Resetting ODV-2D Data" on page 17.
IMPORTANT	When exiting Power Saver Mode, about 120 seconds is required to re-initialize ODV-2D. A message will be displayed alerting the user of the delay.

Auto Report

ODV-2D > Control > Auto Report	
<p>This function allows you to disable or enable an automatic validator report printout after a batch job or Bar Code Demo page.</p>	
Disable	No automatic validator report is printed after the job.
Enable	The validator report is printed after the batch job. The end of the batch is determined by either the EXECUTE command or by timeout using <i>ODV-2D > Control > Auto Report Time</i> to the desired value (1 to 10 seconds).
Print&Clear	Same functionality as <i>Enable</i> with the validator statistics are cleared after the report is printed. After the report is printed, the front panel message will display informing the user the statistics are reset.
Scan Report	<p>A diagnostic printout of bar code analysis parameters calculated by the ODV-2D is printed. It allows you to determine which parameter may be the cause of bar code verification failures. The report printed is based on the last Full Report received from the ODV-2D. Allows sending a bar code print job to the printer, having bar code evaluated by the ODV-2D, and view a report of the parameters as seen by the ODV-2D.</p> <p>For forms with multiple bar codes, only information from the last processed bar code will be included in the report. To view validator parameters for all bar codes on a form, use Auto ID Data Manager in PrintNet Enterprise.</p>
Factory Default	Disable

Auto Report Time

ODV-2D > Control > Auto Report Time	
This function allows you to set the timeout for the Auto Report in seconds. If the printer is idle for the set number of seconds, an Auto Report will be generated if Auto Report is set to Enable.	
Minimum	1 seconds
Maximum	10 seconds
Factory Default	1 seconds

Telemetry Path

ODV-2D > Control > Telemetry Path	
You may want to send a streaming flow of validation data to the PNE Auto ID Data Manager application during the print job. By default, this function is disabled. To enable this function, set this menu Path to "Network Port". The printer then outputs the bar code analysis and underlying data from the validator to the PNE connected to the network port so the validator data can be seen and analyzed with the optional remote management software.	
Disabled	The ODV-2D does not send any data to an external device.
Network Port	The printer outputs the bar code analysis and underlying data from the ODV-2D to a device connected to the network port so the validator data can be seen and analyzed with the optional remote management software.
Factory Default	Disabled

Return Data

ODV-2D > Control > Return Data	
<p>This option enables the ODV-2D to send data out the status port as defined by <i>System > Printer Mgmt > Ret. Status Port</i>. If <i>System > Printer Mgmt > Ret. Status Port</i> uses <i>E-NET Stat Port</i>, use <i>System > Printer Mgmt > Status Port Number</i> to set port.</p> <p>This feature is designed to work best with <i>ODV-2D > Control > Validator Action</i> set to <i>Retry Form</i>.</p>	
Disable	No data will be returned through the status port.
Data+Grade	The following data will be sent out the status port for every barcode found: <i>Grade, Barcode Data <Carriage Return><Line Feed></i>
Data+Grade+Fail	In addition to barcode grades and data, a failure indication will be sent out the return status port if the validator fails a label Max Retry times: <i>FAIL<Carriage Return><Line Feed></i>
Factory Default	Disable
IMPORTANT	<p>When the menu is set to something other than <i>Disable</i>, the printer will automatically change <i>ODV-2D > Control > Telemetry Data</i> to <i>Full Report</i> since it is required for the feature.</p> <p>If, however, the user subsequently changes <i>Telemetry Data</i> to something different, barcode grades data will no longer be returned.</p>

Telemetry Data

ODV-2D > Control > Telemetry Data	
<p>The validator sends a report to the selected data output destination. There are three different options based on this menu.</p>	
Short Report	Default setting. Provides the encoded failure cause or pass indication and the bar width deviation, shown as a percentage.
Full Report	Provides a completed report of all the data captured by the validator.
Validation Mode	Provides the same data as the Short Report, but adds the actual bar code data read.
Factory Default	Short Report

Validator Action

ODV-2D > Control > Validator Action	
The printer response is the same whether the error stems from a bad or missing bar code. It is determined by the Validator Action setting. See Validator Action (Error Action) for more details on each one of these options.	
Stop	If the validator detects a bar code failure, the print job stops.
Overstrike	Use Overstrike mode when you want bad labels to be marked, but not reprinted.
Retry Form	This mode is similar to the Overstrike mode. However, instead of resuming printing where the printer had left off, the printer will attempt to reprint the bad form.
Stop & Retry	The printer will stop printing and display the error message. After the error message is cleared and the appropriate labels are skipped from <i>ODV-2D > Control > Skip Labels</i> , it will reprint the bad form and any other forms printed prior to the physical stop.
Grade&Report	The entire print job will print uninterrupted. If one or more errors is detected, the printer status indicator lamp flashes, the alarm sounds, and the error message "Bar code fails / Job has errors" displays.
Rescan Form	Similar to the Retry Form mode, however, instead of backing up and overstriking the form, the printer will back up and rescan the bad form and any other forms that have already printed.
Rescan&Retry	Similar to Rescan Form with one exception: after the printer has rescanned the form and overstruck it if there was still a fault, it will reprint and rescan the same form again.
Rescan&Stop	Similar to the Retry Form mode, however, instead of backing up and overstriking the form, the printer will back up and rescan the bad form and any other forms that have already printed.
Factory Default	Retry Form

Quiet Zones

ODV-2D > Control > Quiet Zones	
<p>Quiet zones are the white spaces surrounding the bar code. Each bar code requires a minimum quiet zone distance in order for the bar code to be scanned properly.</p> <p>The validator requires a minimum distance of 1/2" or 20 times the minimum element width (x-dimension), whichever is greater, between bar codes.</p>	
Disable	The quiet zone is not included in pass/fail criteria.
Enable	The bar code quiet zone is included as part of the pass/fail criteria.
Factory Default	Disable
IMPORTANT	The validator does not recognize x-dimensions greater than 40 mil with Quiet Zones enabled.

Skip Labels

ODV-2D > Control > Skip Labels	
<p>This option is used for skipping blank labels after bad labels have been marked. It is useful when you want to have extra blank labels in between bad and good ones.</p>	
Minimum	Up to one blank label skipped.
Maximum	Up to two blank labels skipped.
Factory Default	Minimum
IMPORTANT	Minimum and Maximum blank labels are only applicable for forms 2 inches (5.08 cm) high or more. For labels less than 2 inches high, the minimum and maximum blank labels may vary.

Overstrike Style

ODV-2D > Control > Overstrike Style	
<p>This option is used for marking bad labels with different overstrike styles: Grid (the default), Grey, Checkerboard, or Error Type Msg.</p>	
Grid	Grid Pattern
Grey	Grey Pattern
Checkerboard	Checkerboard Pattern
Error Type Msg	Error Msg with type of failure will overwrite label
Factory Default	Grid

Num Retry

ODV-2D > Control > Num Retry	
This option allows you to set the number of times a form will be printed before the printer stops. After you clear the error message, the printer will print the same form or the next form, depending on the setting for Max Retry Action (see “Max Retry Action” below).	
Minimum	3
Maximum	5
Factory Default	5
IMPORTANT	This setting is utilized only when Validator Action is set to Retry Form, Stop & Retry, or Rescan&Retry. See “Validator Action (Error Action)” on page 43.

Max Retry Action

ODV-2D > Control > Max Retry Action	
This option determines what the printer will do with the current form once the Num Retry counter has been exhausted (see “Num Retry” above). In the case of any Rescan modes, only one rescan form will be attempted.	
Dump Form	After you clear the fault the form will be dumped and printing will resume with the next form.
Keep Form	After you clear the fault printing will resume with the same form again. It will not attempt to print the next form until the problem form has printed correctly.
Factory Default	Dump Form
IMPORTANT	This setting is utilized only when Validator Action is set to Retry Form, Stop & Retry, Rescan Form, Rescan&Retry, or Rescan&Stop. “Validator Action (Error Action)” on page 43.

Label Save

ODV-2D > Control > Label Save	
The printer will often be printing a label when it determines that the label printed before the immediate label was defective.	
Disable	When set to disable, the printer pulls both labels back, overstrikes them and then reprints them.
Enable	With Label Save enabled, the ODV will accept or reject the label it just printed before it prints the next label. When a label is found defective, it will only overstrike that label.
Factory Default	Disable
IMPORTANT	Label Save enabled causes a slight throughput reduction.

Comm Error

ODV-2D > Control > Comm Error	
This menu allows the 'Validator not communicating' error to be clearable by the user or not clearable by the user.	
Not Clearable	The user must resolve the error and recycle the printer power to print.
Clearable	The user will be able to clear the fault and print jobs. Barcodes in these jobs will not be validated.
Factory Default	Clearable

Symbology Submenu

Several ODV-2D options which define which barcodes will be graded and which will be ignored. This can be chosen based on symbology or orientation. Note there are also PTX-SETUP commands that can be used to configure these options as described in Section "PTX_SETUP Control" on page 40.

Orientation

ODV-2D > Symbology > Orientation	
This menu selects the barcode orientations that will be processed and graded and which will be ignored.	
All	All orientations will be graded.
Picket	Picket barcodes and 2-D barcodes in 0 and 180 degree rotations.
Ladder	Ladder barcodes and 2-D barcodes in 90 and 270 degree rotations.
Factory Default	All

Graphics Search

ODV-2D > Symbology > Graphics Search	
This menu determines if parts of the label defined with graphics (as opposed to emulation commands) should be searched for barcodes. Graphics are often used in jobs sent via Windows Drivers or from a Postscript or PDF emulation. Searching graphics takes more processing time and this menu should be disabled for jobs with heavy graphics usage in which barcodes don't exist.	
Enable	Search graphics for barcodes.
Disable	Ignore graphics in terms of barcodes.
Factory Default	Enable

Code 39

ODV-2D > Symbology > Code 39	
Determines if Code 39 barcodes should be processed or ignored.	
Enable	Search for Code 39 barcodes.
Disable	Ignore Code 39 barcodes.
Factory Default	Enable

Code 128

ODV-2D > Symbology > Code 128	
Determines if Code 128 barcodes should be processed or ignored.	
Enable	Search for Code 128 barcodes.
Disable	Ignore Code 128 barcodes.
Factory Default	Enable

Interleaved 2/5

ODV-2D > Symbology > Interleaved 2/5	
Determines if Interleaved 2/5 barcodes should be processed or ignored.	
Enable	Search for Interleaved 2/5 barcodes.
Disable	Ignore Interleaved 2/5 barcodes.
Factory Default	Enable

Code 93

ODV-2D > Symbology > Code 93	
Determines if Code 93 barcodes should be processed or ignored.	
Enable	Search for Code 93 barcodes.
Disable	Ignore Code 93 barcodes.
Factory Default	Enable

Codabar

ODV-2D > Symbology > Codabar	
Determines if Codabar barcodes should be processed or ignored.	
Enable	Search for Codabar barcodes.
Disable	Ignore Codabar barcodes.
Factory Default	Enable

UPC/EAN

ODV-2D > Symbology > UPC/EAN	
Determines if UPC/EAN barcodes should be processed or ignored.	
Enable	Search for UPC/EAN barcodes.
Disable	Ignore UPC/EAN barcodes.
Factory Default	Enable

PDF417

ODV-2D > Symbology > PDF417	
Determines if PDF417 barcodes should be processed or ignored.	
Enable	Search for PDF417 barcodes.
Disable	Ignore PDF417 barcodes.
Factory Default	Enable

Data Matrix

ODV-2D > Symbology > Data Matrix	
Determines if Data Matrix barcodes should be processed or ignored.	
Enable	Search for Data Matrix barcodes.
Disable	Ignore Data Matrix barcodes.
Factory Default	Enable

QR Code

ODV-2D > Symbology > Code QR	
Determines if QR Code barcodes should be processed or ignored.	
Enable	Search for QR Code barcodes.
Disable	Ignore QR Code barcodes.
Factory Default	Enable

Grading Submenu

As described in Section “ISO versus Non-ISO” on page 14, the menu **Grading Mode** will determine how this section will be used and configured.

Grading Mode

ODV-2D > Grading > Grading Mode	
This menu selects the type of barcode grading performed. The mode selected will dictate the types of barcode grading faults that will be reported during validation.	
ISO	The Overall Grade per ISO standards will determine if the barcodes pass or not. All quality parameter menus will be hidden and only Overall Grade will be selectable.
Non-ISO	This mode allows the user to set custom failure thresholds on individual barcode quality parameters. Changing individual quality parameters may lead to non-ISO standard grading. All quality parameter menus are visible and user adjustable in this mode.
Factory Default	ISO
WARNING	It is recommended that only users that understand both the ISO standards and the end user barcode quality requirements change any parameters when in the non-ISO mode.

Overall Grade

ODV-2D > Grading > Overall Grade	
<p>This menu item sets the value used by the validator for pass/fail threshold during the analysis of bar codes. Instead of a letter grade, numbers are used to allow for more resolution. Higher values create a stricter pass criterion. The numbers can be translated to letter grades per below:</p> <p style="margin-left: 40px;">Letter Grade A = 3.5 to 4.0 range Letter Grade B = 2.5 to 3.4 range Letter Grade C = 1.5 to 2.4 range Letter Grade D = 0.5 to 1.4 range Letter Grade F = 0.0 to 0.4 range</p> <p>The Overall Grade is determined by taking the lowest grade obtained for any of the applicable bar code quality parameters. See Section “Parameter Applicability” on page 15 for more details.</p>	
Minimum	0.0
Maximum	4.0
Factory Default	0.0
IMPORTANT	Any bar code with a grade below this threshold value will cause the printer to display the Overall Grade Fail error message (see “Error Messages” on page 47) and take the appropriate error action.

Calculations

The ODV-2D follows the specified algorithm defined in the ANSI X3.182 specification for determining the Overall Grade based on an average. Although it is not defined, the validator truncates the result of all analysis parameters averages for a slightly stricter grading.

A side effect of the ANSI specified algorithm is that the Overall Grade may be lower than any of the averaged analysis parameters. This occurs because the Overall Grade is based on the lowest grade on any scan converted to a single digit grade (A to F, 4 to 0) which is then averaged. This usually occurs when a single analysis parameter has a value just above or just below the Overall Grade.

Example

The Decodeability value of 51 displays as B, but the Overall Grade displays as C.

The bar code was scanned five times: three scans had values of 0.49 (grade C) and two scans had values of 0.54 (grade B).

The Decodeability grading calculation is:

$$(3 \times 0.49) + (2 \times 0.54) = 2.55$$

$$2.55 \div 5 = 0.51 \text{ (grade B)}$$

The Overall Grade calculation is:

$$(3 \times 2.0) + (2 \times 3.0) = 12$$

$$12 \div 5 = 2.4 \text{ (grade C)}$$

Also, with certain combinations of multiple analysis parameters and possibly the truncation used on the analysis parameter's average, the Overall Grade may be higher than an individual analysis parameter grade.

Example

The Decodeability value of 48 displays as C, but the Overall Grade displays as B.

The bar code was scanned five times: four scans had values of 0.51 (grade B) and one scan had a value of 0.40 (grade C).

The Decodeability grading calculation is:

$$(4 \times 0.51) + (1 \times 0.40) = 2.44$$

$$2.44 \div 5 = .49 \text{ (grade C)}$$

The Overall Grade calculation is:

$$(4 \times 3.0) + (1 \times 2.0) = 14$$

$$14 \div 5 = 2.8 \text{ (grade B)}$$

Decodability

ODV-2D > Grading > Decodability	
Decodability is a measurement of the variance in the width of the bars and spaces which compose the bar code. It always factors into the Overall Grade. This menu allows the user to specify a stricter requirement for Decodability beyond the ISO compliant overall grade. The ODV-2D will fail any barcode with a Decodability at or below the value set in this menu, regardless of overall grade.	
BARCODES	All 1D, PDF417
Minimum	30%
Maximum	90%
Factory Default	37%
IMPORTANT	Factors into the Overall Grade (page 27).

Percent Decode

ODV-2D > Grading > Percent Decode	
You can set how strict the validator grades each bar code. For example, setting Percent Decode to 60% means that 60% of the scanned bar code must be readable for the ODV-2D to give the bar code a passing grade. The higher the percentage value chosen, the stricter the validator grades.	
BARCODES	All 1D
Minimum	0%
Maximum	99%
Factory Default	0%
IMPORTANT	Factors into the Overall Grade (page 27).

Defects

ODV-2D > Grading > Defects	
You can set how strict the validator grades the irregularities such as voids and spots found within elements and quiet zones for each bar code. For example, the Defects default is 21%. This means that if the bar code and quiet zone defects exceed 21%, the ODV-2D gives the bar code a failing grade. The lower the percentage value chosen, the stricter the ODV-2D grades.	
BARCODES	All 1D, PDF417
Minimum	0%
Maximum	100%
Factory Default	21%
IMPORTANT	Factors into the Overall Grade (page 27).

Modulation

ODV-2D > Grading > Modulation	
Modulation measures how well the ODV-2D sees the wide elements (bars or spaces) relative to the narrow elements. This menu item sets the value used by the ODV-2D for pass/fail threshold during the analysis of bar codes. Higher values create a stricter criterion for passing.	
BARCODES	All
Minimum	0%
Maximum	100%
Factory Default	0%
IMPORTANT	Factors into the Overall Grade (page 27).

EC Min

ODV-2D > Grading > EC Min	
This menu item sets the minimum edge contrast, which is the worst edge transition (bar to space or space to bar) used by the ODV-2D for pass/fail threshold during the analysis of bar codes. Bar codes with an edge contrast below this threshold will fail. The higher the value, the stricter the criterion.	
BARCODES	All 1D, PDF417
Minimum	0%
Maximum	100%
Factory Default	15%
IMPORTANT	Factors into the Overall Grade (page 27).

RMin

ODV-2D > Grading > RMin	
This menu item sets the minimum reflectance value used by the ODV-2D for pass/fail threshold used during the analysis of bar codes. A bar code will fail if all the bar reflectance values are above the percentage of space reflectance set by this threshold. For example, an Rmin setting of 50% requires that at least one bar reflectance value fall under the midpoint of the reflectance value read for the highest space reflectance.	
BARCODES	All 1D, PDF417
Minimum	0%
Maximum	100%
Factory Default	50%
IMPORTANT	Factors into the Overall Grade (page 27).

Symbol Contrast

ODV-2D > Grading > Symbol Contrast	
Symbol Contrast represents the contrast between the bars and spaces in the bar code used by the validator for pass/fail threshold used during the analysis of bar codes. The bar code must have a certain level of contrast to be recognized by the ODV-2D. Bar codes with a symbol contrast below the threshold will fail. The higher the value, the stricter the criterion for passing.	
BARCODES	All
Minimum	0%
Maximum	100%
Factory Default	0%
IMPORTANT	Factors into the Overall Grade (page 27).

Fixed Pattern Damage

ODV-2D > Grading > Fixed Pat. Damage	
<p>Fixed Pattern Damage is a measurement of damage to the finder pattern where modulation scores for the fixed pattern portions of 2D matrix barcodes are degraded. This failure may be caused by physical damage to the code such as a mark or scuff or may be due to printing errors such as a bad print head.</p> <p>The ODV-2D will fail any barcode with a fixed pattern damage at or below the value set in this menu, regardless of overall grade.</p>	
BARCODES	DataMatrix, QR
Minimum	0.0
Maximum	4.0
Factory Default	3.0
IMPORTANT	Factors into the Overall Grade (page 27).

Axial Non-Uniformity

ODV-2D > Grading > Axial Non-Uniform	
<p>Axial Non-Uniformity is a measurement of the uneven scaling of symbol obtained by measuring the module centers in both the X and Y axis. Low axial non-uniformity grades may be caused by software errors in code generation or print speed variation during printing.</p> <p>The ODV-2D will fail any barcode with an axial non-uniformity at or below the value set in this menu, regardless of overall grade.</p>	
BARCODES	DataMatrix, QR
Minimum	0.0
Maximum	4.0
Factory Default	3.0
IMPORTANT	Factors into the Overall Grade (page 27).

Grid Non-Uniformity

ODV-2D > Grading > Grid Non-Uniform	
<p>Grid Non-Uniformity is a measurement of deviation of the scanned grid from the ideal grid (deviation of measured grid intersection positions of a 2D matrix barcode from ideal theoretical positions). Low grid non-uniformity grades may be caused by media slippage during printing.</p> <p>The ODV-2D will fail any barcode with grid non-uniformity at or below the value set in this menu, regardless of overall grade.</p>	
BARCODES	DataMatrix, QR
Minimum	0.0
Maximum	4.0
Factory Default	3.0
IMPORTANT	Factors into the Overall Grade (page 27).

Unused Error Correction

ODV-2D > Grading > Unused Error Corr.	
<p>Unused Error Correction is a measurement of the amount of margin available to recover damage using error correction. Low unused error correction is usually due to regional or spot damage in the code.</p> <p>The ODV-2D will fail any barcode with an unused error correction at or below the value set in this menu, regardless of overall grade.</p>	
BARCODES	PDF417, DataMatrix, QR
Minimum	0%
Maximum	100%
Factory Default	50%
IMPORTANT	Factors into the Overall Grade (page 27).

Codeword Yield

ODV-2D > Grading > Codeword Yield	
<p>Codeword yield is a measurement of the number of validly decoded code words expressed as a percentage of the maximum number of code words that could have been decoded. The amount of margin available to recover damage using error correction. Low codeword yield may indicate a y-axis failure in the barcode such as thermal drag.</p> <p>The ODV-2D will fail any barcode with a codeword yield at or below the value set in this menu, regardless of overall grade.</p>	
BARCODES	PDF417
Minimum	0%
Maximum	100%
Factory Default	64%
IMPORTANT	Factors into the Overall Grade (page 27).

Global Threshold

ODV-2D > Grading > Global Threshold	
<p>This menu sets the threshold used by ODV-2D to interpret a scan reflectance profile into bars and spaces. Reflectance profile values above the Global Threshold are spaces and values below the threshold are bars. The Global Threshold will set the bar/space transition point between the highest (Rmax) and lowest (Rmin) reflectance of a scan profile. The bar/space transition point formula is: $R_{min} + (R_{max} - R_{min}) * (\text{Global Threshold}) / 100$.</p>	
BARCODES	All
Minimum	0%
Maximum	100%
Factory Default	50%
IMPORTANT	Factors into the Overall Grade (page 27).

Diagnostics Submenu

The following items are in the *ODV-2D > Diagnostics* section and used to calibrate the ODV-2D using the following menu options:

- Scan Report
- Scan Profile
- Validator Report
- Profile Horiz Mag
- Print Settings
- Print Bullseye (Calibration Test)
- Print Dots (Calibration Test)
- Symbol Card Cal

Scan Report

IMPORTANT To print a Scan Report, *ODV-2D > Control > Telemetry Data* must be set to the option “Full Report”.

This executable menu item prints a diagnostic printout of bar code analysis parameters calculated by the ODV-2D. It allows you to determine which parameter may be the cause of bar code verification failures. The report printed is based on the last Full Report received from the ODV-2D. This allows you to send a bar code print job to the printer, have the bar code evaluated by the ODV-2D, and view a report of the parameters as seen by the ODV-2D.

For forms with multiple bar codes, only information from the last processed bar code will be included in the report. To view validator parameters for all bar codes on a form, use the Auto ID Data Manager within PrintNet Enterprise.

IMPORTANT If the label is not wide enough, not all the information will print.

The printed report is generated from ODV-2D reports received by the printer during printing. The report does not include information about bar codes that are placed in the ODV-2D scanning beam while the printer is idle or from print jobs that generate an “Unscannable: xx Missing Codes” error message.

The number of Total Scans and Good Scans can help you determine if the print speed is set too high and causing borderline failures. The Scan Report is based on the last Full Report received by the validator. Therefore, if the last bar code printed is positioned close to the last inch of the form, and on-demand printing occurs to force the last bar code to be fed past the ODV-2D beam, the Total Scans and Good Scans reported will not be the same as those reported by the ODV-2D when printing at the set *Media > Speed > Print Speed*. This is because the on-demand printing portion is done at a fixed print speed which may be higher or lower than the set Print Speed. For example, a bar code printed at 7 ips may yield eight Total Scans, but if printed in an on-demand printing mode it may yield 18 Total Scans.

Scan Report Information

1. “ERROR:” followed by highest priority failure message (if an error other than “Unscannable Code” occurred) or “None” if no error occurred
2. Orientation (does not apply to 2-D codes)
3. Printout of characters read from the bar code
4. Symbology Type Read (e.g., Code 39, Code 128)
5. Overall Grade (letter grade and calculated/number value)
6. Aperture (mils)
7. Wavelength (nm)

8. X dimension (mils)
9. Decodability (%)
10. Modulation (%)
11. Symbol Contrast (%)
12. Edge Contrast (%)
13. Defects (%)
14. Rmin
15. Rmax
16. PCS (Print Contrast Signal)
17. Percent Decode (%)
18. Bar Deviation Avg (%)
19. Min. Bar Deviation (%)
20. Max. Bar Deviation (%)
21. Ratio
22. Good Scans
23. Total Scans

The following is a sample scan report of a Code 39, 10 mil bar code containing "**PTX8702**" with a quiet zone violation:

SCAN REPORT

ERROR: Bar code quiet zone too small	
Orientation	Picket
Barcode Data:	[ST]PTX8702[ST]
Symbology	Code 39
Overall Grade	C (2.1)
Aperture (mils)	10
Wavelength (nm)	624
X dimension (mils)	09.9
Decodeability (%)	65
Modulation (%)	34
Symbol Contrast (%)	68
Edge Contrast (%)	30
Defects (%)	14
Rmin	4
Rmax	86
PCS	92
Percent Decode (%)	100
Bar Deviation Avg (%)	-16
Min. Bar Deviation (%)	-31
Max. Bar Deviation (%)	-4
Ratio	2.0
Good Scans	10
Total Scans	10

Scan Profile

This is an executable menu that prints the scan reflectance profile of a picket fence bar code placed in the ODV-2D camera beam. It does not work for ladder or 2-D codes.

IMPORTANT: You will need a minimum installed label width of 2 inches to support the Scan Profile printout.

1. Press the PAUSE key to take the printer OFFLINE.

2. If necessary, press the UP+DOWN ARROW keys at the same time to unlock the front panel.
3. Find *ODV-2D > Diagnostics > Scan Profile*.
4. Place a bar code in the scanning beam path.
5. Press ENTER key to scan the bar code.
6. When prompted on the control panel, remove the scanned bar code.
7. Press ENTER key to print the scan profile.
8. Lock the panel again using the UP+DOWN ARROW keys.
9. Press PAUSE again to put the printer ONLINE.

The length of the scan profile printed depends on the *ODV-2D > Diagnostics > Profile Horiz Mag* setting.

The scan profile will print either a 1.5" wide or a 3" wide graph depending on the *Media > Image > Label Width* setting. (Label widths less than 4" print the smaller 1.5" wide profile.)

IMPORTANT: Printing is done in continuous mode without considering media gap/marks. Use continuous media or else the scan profile may distort at the media gap/marks.

Figure 4 shows two sample scan profile graphs. The left uses a **Profile Horiz Mag** of 1 (default) and the right uses a **Profile Horiz Mag** of 2. These graphs only show the profile of actual bar code data. The dashed lines represent the 90% and 10% marks. You can use these to help set the gain and offset (if necessary).

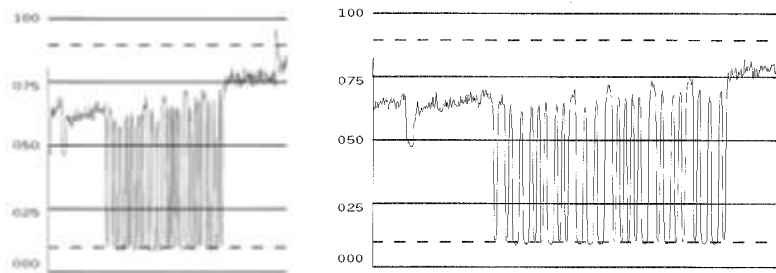


Figure 4 Sample Scan Profile (Profile Horiz Mag 1 & 2)

Profile Horiz Mag

ODV-2D > Diagnostics > Profile Horiz Mag	
This menu item selects the horizontal magnification for printing the scan profile. This allows you to zoom in on the profile. Magnification values are multiples of the scan profile length.	
Minimum	1
Maximum	4
Factory Default	1

Print Settings

This is an executable menu item that reads and prints the settings used by the ODV-2D.

The response received from the ODV-2D after sending the ~DV (retrieves version), ~HT (retrieves hardware settings), and ~PT8 (retrieves parameter settings) commands are printed. Use the printout to view all the active settings the validator is using and to determine if there is any invalid setting which may be causing problems. Table 4 is a sample printout (separated into different columns).

Table 4 Print Settings

~DV Response	~HT Response	~PT8 Response
ODV2D SYSTEM: P300356-V1.16A ODV2D APP: P300398-V1.16D ODV2D DSP: P300358-V1.16A	SerialPort=/dev/ttyS1 TopRow=1018 Aperture=1 DSPDebug=0 EnableCalibrationGain=1 EnableCalibrationGrid=1 CalibrationGridParallax=2.2 CalibrationGridStretch=-1 FinderThreshold=45 PixelGainScale=86 PixelGainoffset=3 LineSyncsPerFrame=3 CalibrationGainCount=10 CameraAnalogGain=6 CenterPosition=2455 PixelSize=2 SerialNumber=30dv21725006	Full Frame RMin=6 RMax=92 Scale=90.956 Offset=7.02174

Print Bullseye

This is used for the field calibration process to align the ODV-2D unit properly with respect to tilt and slope. See Section “Calibration” on page 12 for more details.

Print Dots

This is used for the field calibration process to align the ODV-2D unit properly with respect to tilt and slope. See Section “Calibration” on page 12 for more details.

Symbol Card Cal

This is used for the field calibration process to test the unit itself is properly calibrated and will be necessary to take into account ambient lighting conditions. Currently, this is only available through the ODV2D webpage and should be performed by trained personnel. See Section “Calibration” on page 12 for more details.

Statistics Submenu

Clear Data

ODV-2D > Statistics > Clear Data
The ODV-2D reports on all bar codes it detects since the last data reset. For example, you print a large batch of labels with bar codes and then print a validator report. Then you print another batch of labels with bar codes and print another report. The report will contain information on both batch jobs. However, if you reset the validator data between batch jobs, the second report will only contain information on the second batch job.
This executable menu will clear all the statistics shown in this Statistics submenu.

Good Barcodes

ODV-2D > Statistics > Good Barcodes
The number of bar code reports sent from the ODV-2D since the last Clear Data command.

Good Forms

ODV-2D > Statistics > Good Forms
The number of good (non-overstruck) forms printed since the last Clear Data command.

Overstrike Forms

ODV-2D > Statistics > Overstrike Forms
The number of forms containing a bar code that fell below the minimum acceptable level since the last Clear Data command.

Average BWD

ODV-2D > Statistics > Average BWD
The average of all Bar Width Deviations reported since the last Clear Data command, shown as a percentage.

Last BWD

ODV-2D > Statistics > Last BWD
The Bar Width Deviation included in the most recent report received from the validator, shown as a percentage.

IMPORTANT A bar code's Bar Width Deviation is determined by comparing the bar width the ODV-2D expects to the bar width that is actually printed. For example, if the bar width is printed exactly as the validator expects, the BWD is 0%. However, if the bar width as printed is 25% wider or narrower than the validator expects it to be, it reports a BWD of 25%.

Validator F/W

ODV-2D > Statistics > Validator F/W
Shows the firmware version installed in the ODV-2D.

Serial Number

ODV-2D > Statistics > Serial Num.

Shows the serial number of the ODV-2D installed.

IP Address

ODV-2D > Statistics > IP Address

Shows the IP Address of the Ethernet diagnostic port on the ODV. The Ethernet is accessible from the side of the ODV (needs to remove cover plate to expose).

MAC Address

ODV-2D > Statistics > MAC Address

Shows the MAC Address of the Ethernet diagnostic port on the ODV. This is the Manufacturer's assigned number and is unique for each ODV-2D. The MAC Address is stored with the SD memory card.

Operation

There are several factors which contribute to successful bar code validation, including printer speed, on-demand print settings, calibration, and ambient light. The following sections describe how to ensure your ODV-2D validator is scanning and reporting properly.

Print Speed Limits

The print speed limits of 2-8 IPS are based on steady paper motion and the ability of the ODV-2D camera system to gather and process the data effectively in real-time. If your application is not acting reliably, there are several possible factors including the reflectivity of the media and/or ambient light. Users should decrease the print speed in these situations to see if this improves performance.

NOTE: The speed is limited to 8 IPS for picket fence and 6 IPS for ladder and 2-D barcodes. The speed will be automatically reduced depending on the label content and remain there.

Page Size and Barcode Limits

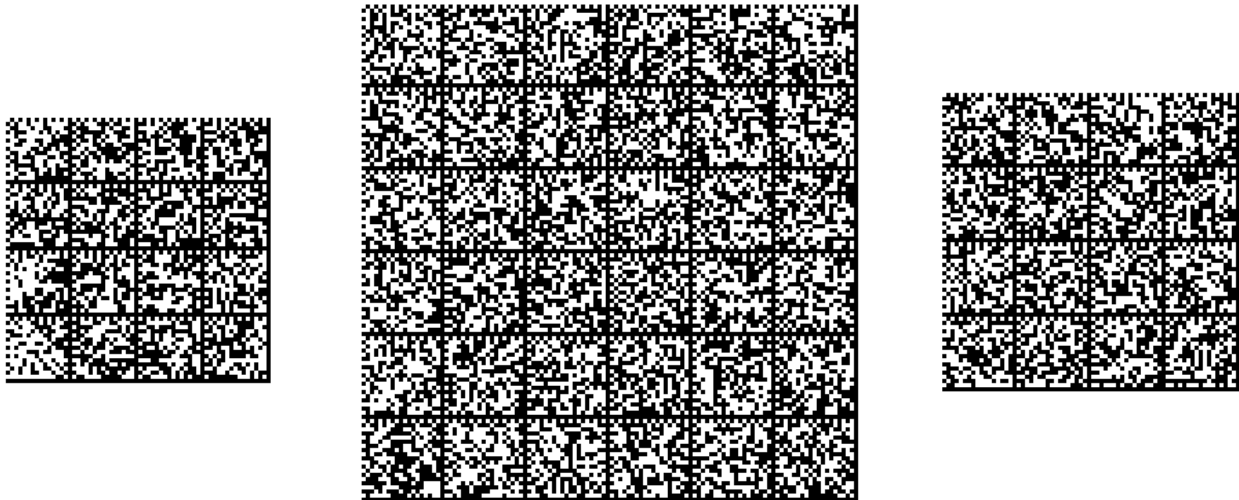
The camera system of the ODV-2D gathers an entire label image during processing and is limited to 24" labels in *Media > Image > Label Length* due to memory and overhead requirements. In addition, no more than 50 codes can be processed in each label.

Minimum Code Height

The barcode height of 1D codes must be at least 0.10 inches. This is required to get the necessary area to do a proper ISO validation. The print speed is not a limiting factor in this requirement.

Data Matrix Complexity

While the ODV-2D is capable of run-time analysis of complex barcodes, there are limitations based on the size of the minimum element combined with the level of data. Barcodes below are examples of 10-mil barcodes that are extremely complex and therefore may not read well for all medias, speeds, and print intensities.



On-Demand Printing

For each bar code to be successfully validated, the entire bar code must pass completely under the beam, even when the printer is set up for on-demand printing. In cases where the bar code is close to the bottom of a label and the printer is in an on-demand printing mode, the printer automatically pushes the label past the scanning beam. Once the bar code is validated, the printer retracts the label back to be cut or torn off.

Because the printer must push out and then retract labels in on-demand printing modes, the extra movements slow the printing process. You can avoid this by adjusting the form so that the bar code appears early enough on the form so that it will pass completely under the scanning beam during normal printing. This may involve rotating the form or moving the bar code to a different position on the form.

PTX_SETUP Control

There are several PTX_SETUP commands that configure the ODV-2D symbologies and orientations that will be processed or ignored, including the ability to skip processing entire labels.

PTX_SETUP commands have the following format:

(SFCC)PTX_SETUP

Command-Sub Command;Value

PTX_END

The SFCC value by default is hex 21 (!) and the entire set of PTX_SETUP commands can be found in the T8000 Administrator's Manual. Table 5 lists those commands.

Table 5 PTX_SETUP Commands for ODV-2D

Command	Sub-Command	Parameter	Description
ODV	GRAPHICS	ON or 1 OFF or 0	When enabled, search graphics within the job for barcodes. Otherwise, ignore the graphics and only process the barcode command from the emulations.
	ORIENT	ALL PICKET LADDER	Choose the orientations of the barcodes to process.
	SKIP	0 = OFF 1-9999 = # > 9999 = ON	Skip a certain number of labels from ODV2D processing. If zero, no labels will be skipped (ignored). If 1-9999, this number of labels will be skipped. Numbers > 9999 will result in indefinite skipping of labels.
	CODE39	ON or 1 OFF or 0	When enabled, Code 39 barcodes will be processed. Otherwise, they will be ignored on the label.
	CODE128	ON or 1 OFF or 0	When enabled, Code 128 barcodes will be processed. Otherwise, they will be ignored on the label.
	INT2/5	ON or 1 OFF or 0	When enabled, Interleaved 2/5 barcodes will be processed. Otherwise, they will be ignored on the

Command	Sub-Command	Parameter	Description
	CODE93	<i>ON or 1</i> <i>OFF or 0</i>	When enabled, Code 93 barcodes will be processed. Otherwise, they will be ignored on the label.
	CODABAR	<i>ON or 1</i> <i>OFF or 0</i>	When enabled, Codabar barcodes will be processed. Otherwise, they will be ignored on the label.
	UPC/EAN	<i>ON or 1</i> <i>OFF or 0</i>	When enabled, UPC and EAN barcodes will be processed. Otherwise, they will be ignored on the label.
	PDF417	<i>ON or 1</i> <i>OFF or 0</i>	When enabled, PDF417 barcodes will be processed. Otherwise, they will be ignored on the label.
	MICRO417 (FUTURE)	<i>ON or 1</i> <i>OFF or 0</i>	When enabled, Micro PDF417 barcodes will be processed. Otherwise, they will be ignored on the label.
	DATAMATRIX	<i>ON or 1</i> <i>OFF or 0</i>	When enabled, Data Matrix barcodes will be processed. Otherwise, they will be ignored on the label.
	QR	<i>ON or 1</i> <i>OFF or 0</i>	When enabled, QR barcodes will be processed. Otherwise, they will be ignored on the label.
	AZTEC (FUTURE)	<i>ON or 1</i> <i>OFF or 0</i>	When enabled, Aztec barcodes will be processed. Otherwise, they will be ignored on the label.

IMPORTANT When PTX_SETUP commands are sent, they will change the front panel menus (if available) in the Section “Symbology Submenu” on page 24.

Bar Code Failures

The ODV-2D tells the printer to announce a fault condition in two situations:

- When the validator detects a bad bar code
- When the validator detects no bar code where it expects to find one.

How the printer reacts to these faults is determined by the printer's configuration settings, as described in this section.

Process for 1-D Barcode Analysis

The following flow chart in Figure 5 is an overview of how the ODV-2D performs the 1-D barcode analysis.

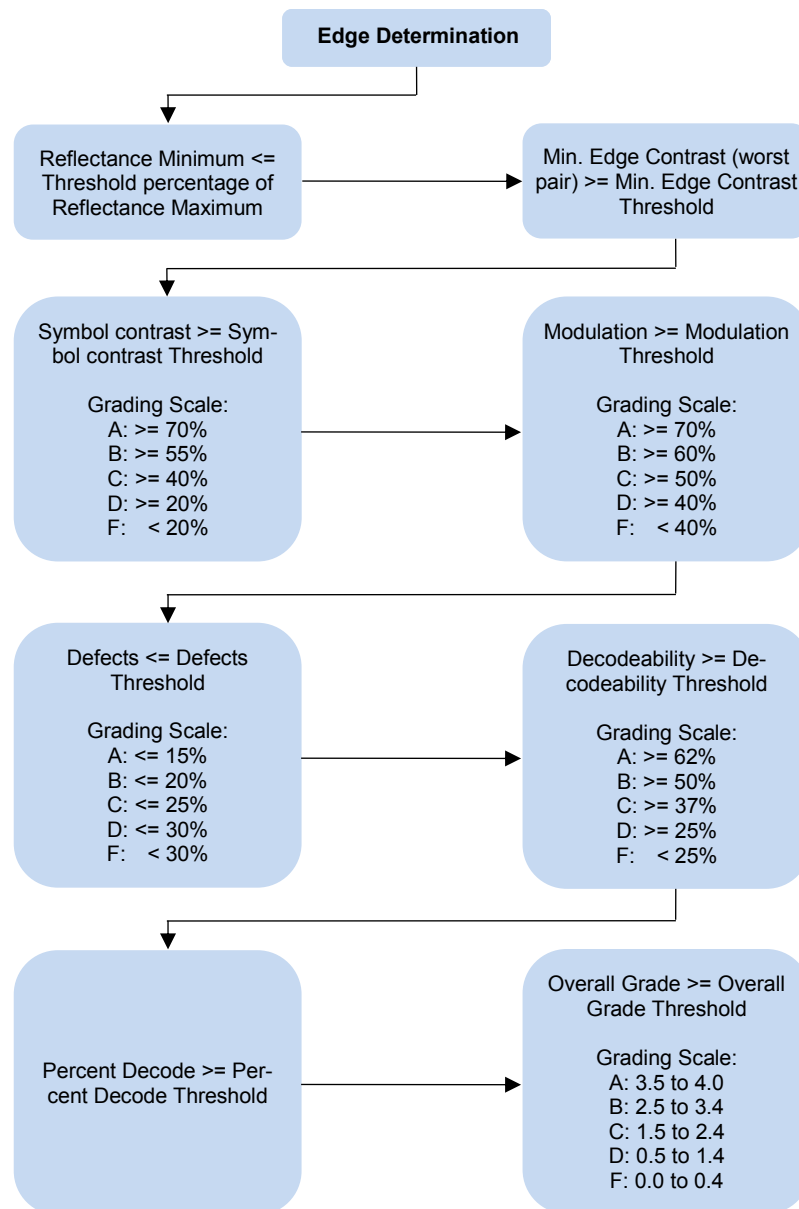


Figure 5 1-D Barcode Analysis

Bad Bar Code Error Detection

The ODV-2D examines every bar code that passes under the beam and sends an analysis report to the printer. If a bar code is reported to have failed to meet any of the acceptance criteria, an error condition is reported. How the printer then reacts is described in “Validator Action (Error Action)” on page 43.

Missing Bar Code Error Detection

A bar code may print so poorly that the ODV-2D cannot detect it, and the printer does not receive an analysis report for the code. To catch this problem, the printer tracks the position of the last label printed and knows when it should have completely passed the beam. It can then compare the number of bar code analysis reports it expected to the number it received. If the printer does not receive enough bar code reports, it enters an error condition. How the printer then reacts is described in “Validator Action (Error Action)” on page 43.

The number of bar codes expected is determined one of two ways:

- If Auto is selected for the *ODV-2D > Control > Number of Codes* parameter, the printer compares the number of bar code commands it receives from the software to the number of analysis reports it receives from the validator.
- You can set the number of bar codes generated by a bitmapped image that the printer should expect per form by selecting a value in the *ODV-2D > Control > Number of Codes* parameter. **This option should not be used (even with graphics) unless the default “Auto” selection is not working.**

Validator Action (Error Action)

The printer response is the same whether the error stems from a bad or missing bar code. It is determined by the *ODV-2D > Control > Validator Action* menu described on page 21. This section will provide details on each particular selection and how it affects printer operation.

Forms Printed After an Error Detection

Because of physical differences between the location of the printhead and the beam, one or more forms may print after a bad form (a form with a bar code error that the validator detected).

The number of forms printed after a bad form depends on the *Media > Image > Label Length*, *Media > Speed > Print Speed*, and *Media > Speed > Slew Speed* settings. Shorter forms and faster speeds tend to increase the number of forms printed before the ODV-2D has a chance to detect an error. Also, the ODV-2D may not detect an error on forms that have bar codes near the bottom of the form until the next form has already started printing.

Forms that print after a bad form are treated differently, depending upon the error action mode selected (see Table 6). Modes that require a reprint operation may need to reprint more than just the bad form.

Table 6 Actions Done to Forms after a Bad Form

Validator Action	Action to Forms after a Bad Form
Stop	Tagged as failed, even though it was never scanned.
Overstrike	Overstruck.
Retry Form	Overstruck and reprinted (default).
Stop & Retry	Reprinted.
Grade&Report	Not applicable (all forms are scanned once).
Rescan Form	Scanned. If error persists, it will be rescanned and overstruck.
Rescan&Retry	Scanned. If error persists, it will be overstruck and

	reprinted.
Rescan&Stop	Scanned. If error persists, it will be tagged as failed, even though it was never scanned.

Stop

If the ODV-2D detects a bar code failure, the print job stops, the printer status indicator lamp flashes, the alarm sounds, and the appropriate error message displays.

The printer remains in a fault condition until you press the PAUSE key. This clears the error message and takes the printer OFFLINE. You must correct any condition that may have caused the fault. When ready, the printer can be put back ONLINE and it will resume printing with the form immediately following the bad form and any other forms printed prior to the physical stop (see “Forms Printed After an Error Detection” on page 43).

Overstrike

Use Overstrike mode when you want bad labels to be marked, but not reprinted (i.e., when using pre-numbered labels).

If the system detects a bar code failure, the print job stops, the printer status indicator lamp flashes, the alarm sounds, and the appropriate error message displays.

Without pausing, the printer then automatically reverses to the top of the bad form. It then prints an obliterating pattern over the bad form and any other forms printed prior to the physical stop (see “Forms Printed After an Error Detection” on page 43). By default, the obliterating pattern is a grid of fine lines which clearly marks the label as bad but allows you to read what was originally printed.

The *ODV-2D > Control > Overstrike Style* options are: Grid, Grey, Checkerboard, or Error Type Msg. Select “Error Type Message” to see the error message printed on the bad form as the Overstrike Style.

After the overstrike printing, the printer clears the error message and stops the alarm, then resumes normal printing at the point the job was stopped.

If more than one form is overstruck, only the first overstruck form is lost (the one with the missing or bad bar code), and a separate print command is required to resend it from the host, if needed. The rest of the overstruck forms are automatically resent.

Retry Form

This mode is like the Overstrike mode. However, instead of resuming printing where the printer had left off, the printer will attempt to reprint the bad form. The number of times the printer will attempt to print the form is determined by the *ODV-2D > Control > Num Retry* setting

The printer will stop, indicate an error, and overstrike as described on page 44. Then it will skip several blank labels, depending on the setting for *ODV-2D > Control > Skip Labels*. It will then slew to the next top of a blank form and reprint the bad form and any other overstruck forms (see “Forms Printed After an Error Detection” on page 43).

Once the *ODV-2D > Control > Num Retry* counter has been exhausted, the print job stops completely. After you clear the error message, the printer will print the same label or the next label, depending on the setting for *ODV-2D > Control > Max Retry Action*.

Stop & Retry

This mode is like the Stop mode: the printer will stop printing and display the error message. After you clear the error message, it will then skip several blank labels, depending on the setting for *ODV-2D > Control > Skip Labels*. Then it will slew to the next top of a blank form and reprint the bad form and any other forms printed prior to the physical stop (see “Forms Printed After an Error Detection” on page 43).

NOTE: The number of times the printer will attempt to reprint the bad form is determined by the *ODV-2D > Control > Num Retry* setting.

The printer will stop after the specified *ODV-2D > Control > Num Retry* attempts. After you clear the error message, the printer will print the same label or the next label, depending on the setting for *ODV-2D > Control > Max Retry Action*.

Grade&Report

In this mode, the entire print job will print uninterrupted. If one or more errors is detected, the printer status indicator lamp flashes, the alarm sounds, and the error message “Bar code fails / Job has errors” displays.

IMPORTANT The error message lets you know that at least one bad form printed. To determine which form(s) are bad, you must manually scan all of them.

The printer remains in a fault condition until you press the PAUSE key. This clears the error message and takes the printer OFFLINE. Correct any condition that may have caused the fault, then press PAUSE to place the printer back ONLINE.

Rescan Form

This mode is like the Retry Form mode, however, instead of backing up and overstriking the form, the printer will back up and rescan the bad form and any other forms that have already printed (see “Forms Printed After an Error Detection” on page 43).

NOTE: The printer will only attempt this once before declaring an error.

If the printer scans these forms correctly on any of the rescans, it will continue printing with the next form.

If the printer fails to scan these forms correctly, it will overstrike the forms, stop, and indicate an error like Stop mode. After you clear the error message, the printer will skip several blank labels, depending on the setting for *ODV-2D > Control > Skip Labels*.

It will then slew to the next top of a blank form and reprint the same form or go the next form, depending on the setting for *ODV-2D > Control > Max Retry Action*.

NOTE: The only difference between Rescan Form and Rescan&Stop is that when a form still fails after all the rescans, Rescan Form will overstrike the bad form, whereas Rescan&Stop will not.

Rescan&Retry

This mode is similar to Rescan Form with one exception: after the printer has rescanned the form and overstruck it if there was still a fault, it will reprint and rescan the same form again.

NOTE: The printer will only attempt this once before declaring an error.

The number of times the printer will attempt to *reprint* the bad form is determined by the *ODV-2D > Control > Num Retry* setting.

If the printer scans these forms correctly on any of the rescans or reprints, it will continue printing with the next form.

If the printer fails to scan these forms correctly on all the rescans and reprints, it will overstrike the forms, stop, and indicate an error like Stop mode. After you clear the error message, the printer will skip several blank labels, depending on the setting for *ODV-2D > Control > Skip Labels*.

It will then slew to the next top of a blank form and reprint the same form or go the next form, depending on the setting for *ODV-2D > Control > Max Retry Action*.

Rescan&Stop

This mode is like the Retry Form mode, however, instead of backing up and overstriking the form, the printer will back up and rescan the bad form and any other forms that have already printed (see “Forms Printed After an Error Detection” on page 43).

NOTE: The printer will only attempt this once before declaring an error.

If the printer scans these forms correctly on any of the rescans, it will continue printing with the next form.

If the printer fails to scan these forms correctly on all the rescans, it will stop and indicate an error like Stop mode. After you clear the error message, the printer will skip several blank labels, depending on the setting for *ODV-2D > Control > Skip Labels*.

It will then slew to the next top of a blank form and reprint the same form or go to the next form, depending on the setting for *ODV-2D > Control > Max Retry Action*.

NOTE: The only difference between Rescan Form and Rescan&Stop is that when a form still fails after all the rescans, Rescan Form will overstrike the bad form, whereas Rescan&Stop will not.

Error Messages

The ODV-2D can detect several errors. When one of these errors occurs, the validator alerts the printer to perform the currently selected error action (see “Validator Action (Error Action)” on page 43) and show the appropriate error message on the printer display. Validator error messages are explained in Table 6.

Table 6. Message List

Displayed Message	Solution/Explanation
<p>Bar code fails Job has errors</p>	<p>This message appears when at least one label in a batch of labels has a data validation error and Validator Action is set to Grade&Report.</p> <ol style="list-style-type: none"> 1. Press PAUSE to clear the message. 2. Manually scan all the bar codes in the label batch, then reprint the bad labels
<p>Bar Code Improper Data Format</p>	<p>Data validation error: the bar code is not properly encoded. For example, a check sum is incorrect, a required number of characters is not met, or the required terminator characters are not included. This problem is almost always caused by incorrect form or host application design.</p> <ol style="list-style-type: none"> 1. Fix the application so it sends data in the correct bar code format.
<p>Bar code quiet zone too small</p>	<p>Data validation error: the blank zone(s) left or right of the bar code is not big enough to meet the minimum requirement. Typically, this occurs in forms where bar codes are placed too close to other elements, the bar code is too close to an edge of the media, or the media’s position is shifting. The minimum quiet zone on each end of the bar code should be ten times the minimum element width or 1/4 inch, whichever is greater. In addition, between bar codes, the validator requires a minimum distance of 20 times the minimum element width or 1/2 inch, whichever is greater.</p> <ol style="list-style-type: none"> 1. Fix the application. 2. Disable <i>ODV-2D > Control > Quiet Zone</i> menu.
<p>Calibration warning</p>	<p>The validator has detected that it needs calibration. This message is a reminder and does not halt printing.</p> <ol style="list-style-type: none"> 1. Press PAUSE to clear the message. Calibrate the validator. See “Calibration” on page 12.

Table 6. Message List

Displayed Message	Solution/Explanation
Checksum Failure	<p>The bar code data fails the checksum check or is missing the checksum digit.</p> <ol style="list-style-type: none"> 1. Verify that the checksum digit exists in the bar code and that it is the correct value.
Contrast too low Check media	<p>Data validation error: the contrast between bars and spaces is not sufficient. This can be caused by too little heat in the thermal transfer or by use of colored media or ribbons.</p> <ol style="list-style-type: none"> 1. Increase <i>Media > Image > Print Intensity</i> or reduce <i>Media > Speed > Print Speed</i> by menu or host software, change media, or set <i>ODV-2D > Grading > Symbol Contrast</i> to 0% (to disable it).
ODV COMM ERR See Manual	<p>Communication error between printer and online data validator (ODV).</p> <ol style="list-style-type: none"> 1. Cycle power. 2. If the problem persists, contact your authorized customer service representative.
Overall Grade Fail	<p>Overall data validation failure: decodability, percent decode, defects, modulation, EC Min, Rmin, and/or Symbol Contrast.</p> <ol style="list-style-type: none"> 1. Press PAUSE to clear the message. 2. Adjust the parameter that is causing the failure. To see which parameter is failing, run a Scan Report (page 33). 3. Lower the <i>ODV-2D > Grading > Overall Grade</i> to a point where the worst parameter grade will be above the Overall Grade threshold.
Poor scanning Check heat&head	<p>Data validation failure: decodability. The difference between wide and narrow elements is too close for the validator to reliably discern. This usually indicates an improperly set heat/speed/pressure combination or the loss of a printhead element.</p> <ol style="list-style-type: none"> 1. Adjust <i>Media > Image > Print Intensity</i> and <i>Media > Speed > Print Speed</i> menu or via host software. 2. Adjust the printhead pressure. (Refer to the Administrator's Manual.).

Table 6. Message List

Displayed Message	Solution/Explanation
<p>Poor scanning Check media</p>	<p>Data validation failure: percent decode. The validator detected gross inconsistencies within the height of the bar code. These types of failures are likely attributed to large blemishes within the bar code, caused by ribbon wrinkle or debris on media.</p> <ol style="list-style-type: none"> 1. Check for a wrinkled ribbon or debris on media. Roll wrinkled area onto take-up spindle. 2. Adjust the printhead pressure blocks. (Refer to the Administrator's Manual.).
<p>Poor scanning Inspect head</p>	<p>Data validation failure: hardware defect. The validator detected unexpected dark spots in spaces or light spots in bars. This usually indicates a poor ribbon/media combination, a dirty printhead, or a burned pixel.</p> <ol style="list-style-type: none"> 1. Check that paper and ribbon are clean, unwrinkled, and installed correctly. 2. Clean the printhead. 3. If message reappears, replace the printhead.
<p>Speed Exceeds Validator Limit</p>	<p>Print Speed is set above the maximum allowed for bar code printing by the validator as the Power-Up configuration with the validator option installed. An attempt was made to set <i>Media > Speed > Print Speed</i> above the maximum allowed via menu or host software.</p> <p>Speed is limited to 2-8 IPS. In the case ladder barcodes are present, the speed will be reduced automatically to 6 IPS and remain there.</p>

Table 6. Message List

Displayed Message	Solution/Explanation
<p>Unscannable: xx Missing Codes</p>	<p>Data validation error: missing bar code. An expected bar code is missing or was printed so poorly that the validator cannot detect it.</p> <p>xx = number of bar codes missing on the form that caused the error.</p> <ol style="list-style-type: none"> 1. Check that paper and ribbon are clean, unwrinkled, and installed correctly. 2. Run a print job and check that the validator beam is not obstructed; remove obstructions as necessary. 3. Run a print job and check that the READ LED flashes as bar codes exit the printer. If the READ LED does not flash, cycle power and run the job again. If the READ LED does not flash, inspect the cables and the cable connections. If the cables are undamaged and the connections are good, replace the validator. 4. If using bitmapped bar codes, set <i>ODV-2D > Control > Number of Codes</i> to the number of codes per form (not Auto). 5. Adjust <i>Media > Image > Print Intensity</i> and <i>Media > Speed > Print Speed</i> in the menu or via host software. 6. Make sure that all expected bar codes are printing. If the physical label is too small, the image may be clipped. 7. Press PAUSE to clear the message. 8. Execute the <i>ODV-2D > Statistics > Clear Data</i> function.
<p>Validator not communicating</p>	<p>The <i>ODV-2D > Control > Validator Active</i> is enabled in the menu, but when the printer was first powered up it could not communicate with it. Another possibility is the validator was connected to the printer and then later removed.</p> <ol style="list-style-type: none"> 1. Check that the validator signal cable is securely connected to the validator unit. 2. Disable <i>ODV-2D > Control > Validator Active</i>. Save this setting in the <i>Configs > Control > Power-Up</i> configuration and reboot the printer.

Troubleshooting

If you are having problems with the validator, consult Table 7 for a list of symptoms and possible solutions.

Table 7. Troubleshooting the Validator

Symptom	Solution
The ODV-2D beam does not come on.	<ol style="list-style-type: none"> 1. Make sure the power/data cable is plugged into the ODV-2D and the controller board on the printer. 2. Make sure the validator has not been disabled in the <i>ODV-2D > Control > Validator Active</i> menu. See “Enabling and Disabling the Validator” on page 16. 3. Print a bar code validation demo page (page 12). 4. Call your service representative if the problem persists.
The ODV-2D beam does not cover the entire width of the labels being printed.	There is something wrong with the LED array. Call your service representative if the problem persists.
The printer pauses after scanning each label.	For complex labels with 2-D or several 1-D bar codes, the printer might be waiting for the ODV-2D to complete analysis. Try reducing the print speed to minimize pausing.
Printing less than 10 mil (0.010 inch) x-dimension width bar codes constantly causes error messages.	The validator does not recognize x-dimensions as smaller than 10 mil. If you must print bar codes this size, disable the validator to prevent error reports. See “Enabling and Disabling the Validator” on page 16.
The printed labels look clean, but the validator is still reporting an error message.	The validator glass may be dirty, distorting the report results. Power down the printer and clean the glass using a household glass cleaner and a dry, lint-free cloth.

Table 7. Troubleshooting the Validator

Symptom	Solution
The printed bar codes are causing error conditions.	<p>There are several factors which could be causing validation errors:</p> <ul style="list-style-type: none">• The ODV-2D is not properly aligned with the printer. See “Calibration” on page 12.• Make sure the entire bar code passes completely under the scanning beam.• The media is not falling straight down when exiting the print path thereby distorting the images taken by the camera.• The validator and printer are not properly communicating. Test the validator operation without using a host. See “Bar Code Validation Demo Page” on page 12.• Bar code width. The validator can recognize x-dimensions as narrow as 10 mils.• Bar code size. A minimum height of 0.10 inch is required for validation. If problems persist, increase the bar code height.

Table 7. Troubleshooting the Validator

Symptom	Solution
<p>The printed bar codes are causing error conditions. (continued)</p>	<ul style="list-style-type: none"> • Bar code type. The validator only recognizes the following linear, picket fence bar codes: Codabar, Code 39, Code 93, Code 128, Interleaved 2 of 5, and UPC/EAN, PDF417, Data Matrix, and QR. • Bar code spacing. The validator requires a minimum distance of 1/2 inch or 20 times the minimum element width, whichever is greater, between bar codes. • Printer speed. See “Print Speed Limits” on page 39. If problems persist, decrease the <i>Media > Speed > Print Speed</i>. • Be sure the bar code is not printing on the extreme edges of the label. • Clean the printhead. See “Cleaning” in the <i>Administrator’s Manual</i>. • Check that paper and ribbon are clean, unwrinkled, and installed correctly. • Check the number of bar codes being validated concurrently. The validator can track the performance of up to 50 barcodes at one time.

Maintenance

The ODV-2D is a self-contained unit that requires only periodic cleaning. Every so often, power down the printer and use a household glass cleaner and a dry, lint-free cloth to clean the glass.

If the problem with the printer is not fixed by one of these troubleshooting methods, call your authorized service representative or the Printronix Customer Support Center. See “Printronix Customer Support Center” on page 75.

Software License Agreement

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Open Source Acknowledgements

The ODV-2D runs several components on a Linux based system that include proprietary code for the ODV-2D application along with open source components. This section will specify which open source components are used along with license information. Table 7 lists the various open source components.

Table 7 Open Source Components

Package	Version	Description	Mods	License
Angstrom Linux	2.6.32	The Linux operating system.	Y	GPL 2.0
Linux Boot Loader (U-Boot)	2011.06	Loads the operating system during boot.	Y	GPL 3.0
Aptina Video Driver	Unknown	Controls the ODV-2D camera.	Y	GPL 2.0
GNU C Libraries	2.25	Dynamically linked C/C++ Libraries	N	LGPL 3.0
OpenCV	2.4.13	Optimized Image Processing Library	Y	BSD
ZXing Barcode Reader	3.3	Barcode Decoding Library	Y	Apache
Mongoose Web Server	3.1	Enables a webpage for Diagnostics	Y	MIT

For packages that are GPL or LGPL and required modifications (see Column “Mods” in Table 7), Printronix Auto ID provides all changes on the www.PrintronixAutoID.com website to allow the public an easy way to download:

1. At the bottom of the www.PrintronixAutoID.com website, there is a link *Legal & Compliance* that takes you to www.PrintronixAutoID.com/legal-compliance/. Under the ODV-2D section, the modified GPL and LGPL open source components will be listed.
2. Once a particular component is chosen, the appropriate license will be displayed along with a download link to the source code modifications.
3. The information in the download link may be updated from time to time based on software maintenance releases or significant updates to the code.

The various licenses are disclosed as required in Section “Open Source Licenses” on page 60.

Angstrom Linux

The Angstrom Linux operating system (Version 2.6.32) is compiled and linked independently of the ODV-2D application and tailored for embedded devices and shipped with the BeagleBoard-xM and BeagleBone. Information about Angstrom Linux can be found at <http://www.angstrom-distribution.org/>.

Changes have been made to Angstrom Linux modules and thus based on the [GPL 2.0 License](#) (Section “GPL 2.0” on page 60) these changes must be made available to the public.

Go to <http://gitorious.org/beagleboard-validation/linux/trees/beagleboardXM-camwork> to download version 2.6.32.

Linux Boot Loader

The **Linux Boot Loader (U-Boot)** (Version 2011.06) is compiled and linked as a separate program within the ODV-2D system and not directly linked to the application. Its purpose is to load and start the Linux operating system and setting any necessary environment variables. Information about U-Boot can be found at <http://beagleboard.org/project/angstrom>.

Changes have been made to U-Boot and thus based on the [GPL 3.0 License](#) (Section “GPL 3.0” on page 63) these changes must be made available to the public.

Version 2011.06 can be downloaded at <ftp://ftp.denx.de/pub/u-boot/u-boot-2011.06.tar.bz2>.

Aptina Video Driver Module

The Aptina Video Driver Module (Version unknown) is used to capture images for the ODV-2D system. The driver module is compiled separately and bundled with the Angstrom Linux operating system. It does not have any direct linkage with the proprietary ODV-2D application. This module is described at https://github.com/Aptina/BeagleBoard-xM/blob/master/MT9V034/Angstrom/README_Beagleboard-xM_mt9v034.txt.

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This can be downloaded at <https://github.com/Aptina/BeagleBoard-xM/tree/master/MT9P031/Angstrom>.

GNU C Libraries

The GNU C Libraries (Version 2.25) are a standard for Unix and Linux operating systems. Applications written in C need these libraries and thus they must be included with the Angstrom Linux package.

The GNU C Libraries are under [LGPL 3.0 License](#) (Section “LGPL 3.0” on page 70) and compiled separately and dynamically linked with the Angstrom Linux operating system. The GNU C Libraries have not been modified and they do not have any direct linkage with the proprietary ODV-2D application. Since no changes have been made, there is nothing that must be made available to the public.

The GNU C Libraries can be downloaded at Included in Angstrom root file system <http://www.angstrom-distribution.org/builder/>.

OpenCV

From <http://opencv.org/about.html>: OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-licensed product, OpenCV makes it easy for businesses to utilize and modify the code. OpenCV Developers Team: www.itseez.com.

The OpenCV Library is under the [BSD License](#) and compiled and statically linked with the ODV-2D application. Changes have been made to improve decoding and grading metrics but are not required for disclosure.

The OpenCV Library (Version 2.4.13) can be downloaded at Included in Angstrom root file system <http://www.angstrom-distribution.org/builder/>. The license information in the source code is as follows:

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ZXing Barcode Reader

From <https://code.google.com/p/zxing/>: ZXing (pronounced "zebra crossing") is an open-source, multi-format 1D/2D barcode image processing library implemented in Java, with ports to other languages. Our focus is on using the built-in camera on mobile phones to scan and decode barcodes on the device, without communicating with a server. However, the project can be used to encode and decode barcodes on desktops and servers as well.

The ZXing Barcode Reader (Version 3.3) is under the [Apache 2.0 License](#) (Section "Apache 2.0" on page 72) is compiled and statically linked with the ODV-2D application. Changes have been made but are not required for disclosure.

The ZXing Barcode Reader can be downloaded at <http://zxing.googlecode.com/files/ZXing-2.0.zip>. The licensor is Sean Owen and headers in the source code contain the following information:

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Mongoose Web Server

From <http://code.google.com/p/mongoose>: Project mission is to provide simple, functional, embeddable web server to make it easy for application and device developers to implement web interface for their application and devices, and to offer a simple development environment.

The Mongoose Embedded Web Server (Version 3.1) is under the [MIT License](#) is compiled and statically linked with the ODV-2D application. It is used for diagnostics. Changes have been made but are not required for disclosure.

The Mongoose Web Server can be downloaded at <http://code.google.com/p/mongoose/downloads/list>. The licensor is Sergey Lyubka. Below is the information in the source code header.

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END OF TERMS AND CONDITIONS

A **Contact Information**

Printronix Customer Support Center

IMPORTANT

Please have the following information available prior to calling the Printronix Customer Support Center:

- Model number
- Serial number (located on the back of the printer)
- Installed options (i.e., interface and host type if applicable to the problem)
- Configuration printout: Refer to the *Administrator's Manual*.
- Is the problem with a new install or an existing printer?
- Description of the problem (be specific)
- Good and bad samples that clearly show the problem (faxing or emailing of these samples may be required)

Americas	(844) 307-7120 Service@PrintronixAutoID.com
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Asia Pacific	+886 3 990 6155 APAC_support@PrintronixAutoID.com
China	+86 755 2398 0479 CHINA_support@PrintronixAutoID.com

Printronix Auto ID Support: <http://PrintronixAutoID.com/support/>
Printronix Auto ID Consumables: <http://PrintronixAutoID.com/products/consumables/>

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