ODATALOGIC™

Gryphon™ GFE4400
Fixed Area Imaging
Bar Code Scan Engine

Integration Guide

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NOTES

Gryphon™ GFE4400 Integration Guide

This document gives instruction, mechanical details, and design considerations to integrate the Gryphon™ GFE4400 model (designated as "scan engine" or "OEM scan engine" in this manual) specifically into equipment-integrated scanning applications.

Overview

The GFE4400 OEM scan engine is a compact, decoded, omni-directional imaging scan engine for fixed position OEM integration, such as price verifiers, kiosks, vending machines, point-of-sale (POS) terminals, and other equipment-integrated scanning applications. The new proprietary imaging technology excels at capturing hard-to-read bar codes in omni-direction orientation.

A typical system using the scan engine consists of a host system such as a price verifier or kiosk. The host system interfaces with the scan engine and receives decoded bar code data produced by the scan engine. The illumination LEDs in the scan engine emit visible light when a bar code passes through the scan volume area and light is reflected off the bar code. The scan engine collects this reflected light, processes it into a digital signal and decodes it into data that can be used by the host system. The scan engine has different operational modes which can be selected via special programming bar codes.

The OEM scan engine is the same reader as that found in the Gryphon

GFS4400 scan module. This document is meant to give instruction, mechanical details, and design considerations to integrate the OEM scan engine model only.

Details on the Configuration Settings and Programming are found in the GFS4400 Product Reference Guide (PRG). The Datalogic Aladdin Configuration Utility (available free from the Datalogic website) can also be used to modify settings.

Unpacking the Scan Engine

The scan engine is shipped in custom packaging. Carefully open the package, and inspect for the following:

- scan engine
- power supply (if ordered)
- interface cable (if ordered)

If any parts are damaged or you need additional hardware, please contact Technical Support.

Scan Engine Care

The scan engine contains sensitive components which require special handling. Datalogic may not warrant damage due to improper handling.

- Do not disassemble the scan engine. Doing so will void the warranty.
- Use standard ESD precautions & policies when handling the GFE 4400 scan engine.
- Avoid touching the camera lens. Fingerprints will degrade the scan engine's performance.

Technical Support

Datalogic Website Support

The Datalogic website (www.datalogic.com) is the complete source for technical support and information for Datalogic products. The site offers product support, product registration, warranty information, product manuals, product tech notes, software updates, demos, and instructions for returning products for repair.

Telephone Technical Support

If you do not have internet or email access, you may contact Datalogic technical support at (541) 349-8283 or check the back cover of your manual for more contact information.

Mounting the Scanner

This section describes how to design the mounting for optimum scanner performance.

General Considerations

A typical system uses the scanner mounted inside a host enclosure, with an opening for the scanning pattern to exit and read bar codes. The opening should be the size of the scanner field of view at a minimum, but only exposing as much of the scanner as necessary.

Although the scanner has been designed to be rugged, it is important to consider the effect of the environment on the scanner. In particular, mounting should minimize the possibility of foreign objects coming into contact with the electronics. Such contact could damage the device or reduce the scanner's performance.

Mounting

The primary method of mounting to the host enclosure is to attach the scanner using the three mounting holes provided in the main PCBA. "Mechanical Specifications" on page 25 has mechanical drawings of the scanner, including the position of the mounting features.

The scanner can be mounted upside down with no loss in scanning performance.

Mounting the Scanner Standalone

The OEM scanner is not intended for use in a standalone application. This model is intended to be integrated inside a host enclosure. GFS4400 models should be used when a standalone application is required.

Scan Engine Electrical Connections

The GFE4400 scan engine has three application ports for device integration, as indicated below, a Host (J1), User (J2), and Good Read Beep Interface.

Figure 1. Scan Engine Application Ports

J3 Beep Interface

J2 User Interface
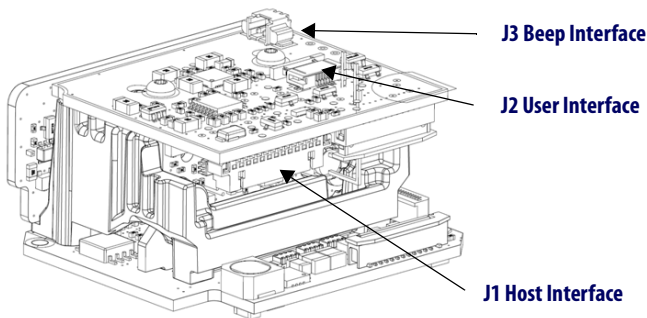
J1 Host Interface

Host Interface

The Host Interface connection (J1) provides all the connection points for either RS-232 or USB host communications. Additionally, this connector is input for power and provides access to the external triggering input and digital signal output functions. The assignment of the connector pins are indicated in Table 1 on page 6.

Table 1. J1 Connector Pins Assignment

Pin Number	Pin Functionality
1	USB D+
2	USB D-
3	USB Shield
4	USB Shield
5	EXT_TRIGGER_IN; (input to the base of a transistor, pull high to activate)
6	RS232 TXD (output from scanner)
7	RS232 RTS (output from scanner)
8	RS232 RXD (input to the scanner)
9	RS232 CTS (input to scanner)
10	DIGITAL_OUT (open collector)
11	+5V (USB Vbus or external power adapter)
12	GND

The J1 connection on the GFE4400 scan engine is a Hirose, DF13C-12P-1.25V,12 circuit connector. For application integration the recommended mating plug is DF13-12S-1.25C housing with DF13-12S-1.25C wire crimp terminals.

Figure 2. Interface Board (bottom view)
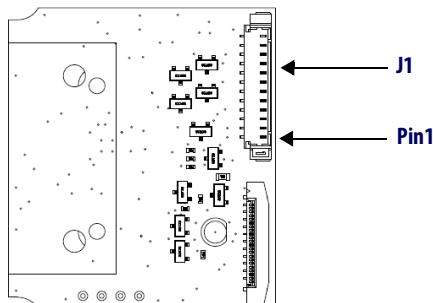
USB

For USB setup, the recommended wiring is the following. A compatible USB cable is available from Datalogic, part number: 770111600.

Figure 3. USB Cabling
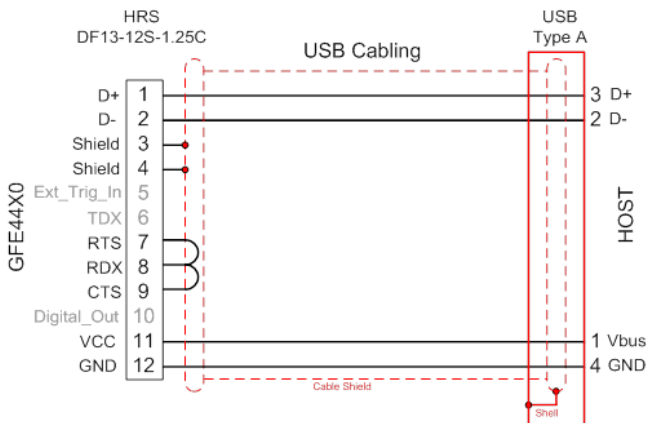
It is important that connections 7/8/9 be wired together for USB Auto Detection.

RS-232

For RS-232 serial setup, the recommended wiring is shown below. A compatible serial cable is available from Datalogic, part number: 770111700.

Figure 4. RS-232 Cabling
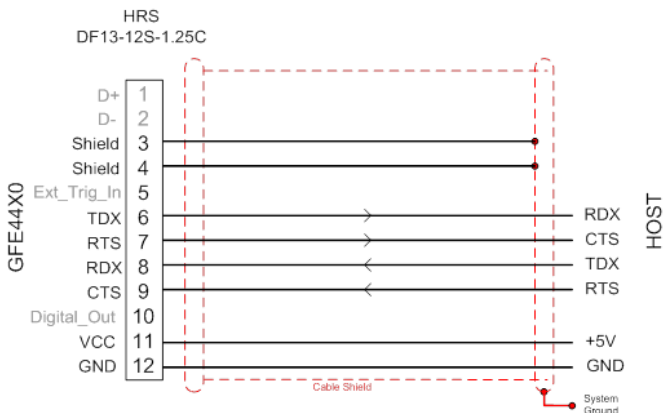
External Trigger and Digital Output

The interface allows the user's adapting interface to trigger the scan engine if not set for Automatic Reading Mode. Also, a programmable digital output signal is available, which indicates a good read/decode. The figures on the following page provide interface suggestions.

Figure 5. Connections

Output Connection
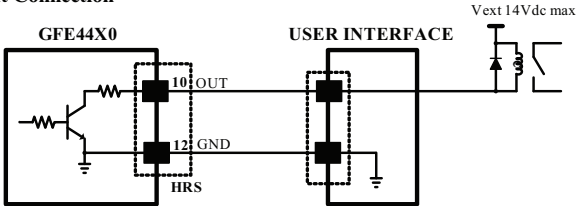
Input Trigger Using GFE44X0 Power
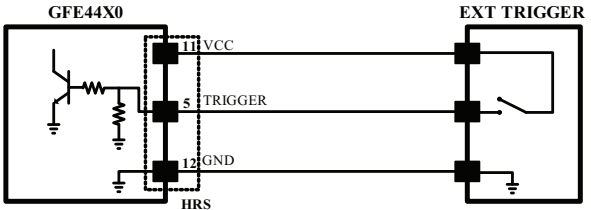
Input Trigger Using External Power
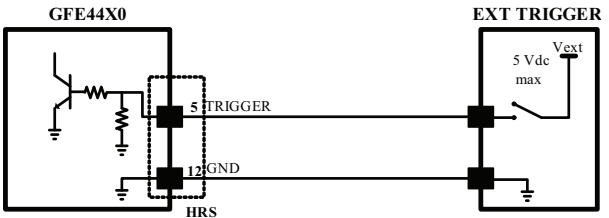
User Interface

The User Interface connection (J2) provides the integrator a means to monitor scan engine status (LEDs), and offers an additional mechanism for manually triggering the device.

The user connection (J2) uses a Molex part number, 0527460671, 0.50mm (.020") Pitch FFC/FPC Connector, Right Angle, SMT, ZIF, Bottom Contact Style, 6 Circuits, Gold Contact Plating. For custom adaptations, the integrator must interface using an FFC (Flat Flexible Cable) that mates properly to scan engine ZIF connector.

Figure 6. Top view
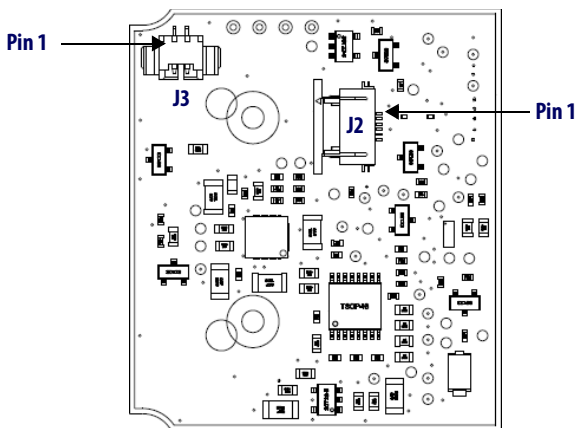
The assignment of the J2 connector pins are indicated in the following table.

Table 2. J2 Connector Pins

Pin Number	Pin Functionality
1	LED1 Ctrl Signal, Trigger (active low)
2	LED2 Ctrl Signal, Status (open collector active low)
3	LED3, Power, (hard wired to VCC internally)
4	VCC_Out (5v for LED supply)
5	Trigger Switch+
6	Trigger Switch- (ground)

The following table outlines scan engine status assigned to each LED (with recommended colors).

	L3	POWER (yellow	ON = Power ON
			OFF = Power OFF
	L2	STATUS (green)	ON = Good Read
			Blinks = USB enumeration or interface inactive or waiting for change of configuration
	L1	TRIGGER (blue)	ON = External trigger or button pressed or phase active
			Blinks = During transfer of captured image, or during Flash memory updates
	S1	SWITCH	Press for manual-controlled trigger

The following is an example of a possible connection scheme for the User Interface:

Figure 7. Sample Connection Scheme
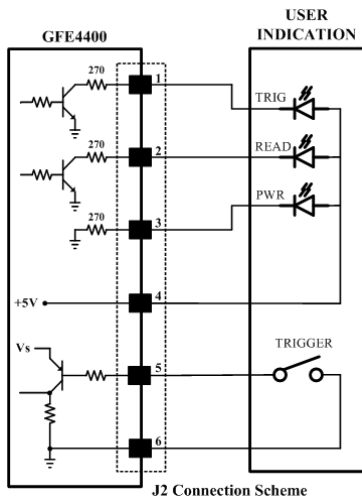
Good Read Beep Interface

The Beep Interface connection (J3) provides the integrator a means to tap the engine's good read beep signaling and interface with an external audio device.

The Beep Connection (J3) is a Molex part number, 53261-0271, 1.25mm Pitch PicoBlade™ 2 Circuit Header. To attach to this SMT Right Angle Header, the integrator should use the Molex mating plug, 51021-0200 and wire crimp terminal, 50079-8000 or equivalent.

Table 3. J3 Connector Pin Assignment

Pin	Pin Functionality
1	Good Read Beep Signal (open collector, active low)
2	Common (gnd)

The Good Read Beep is a 2750Hz signal burst for 100ms provided by an on board Open Collector transistor drive circuit. Below is a simple example of an external audio implementation. See "Technical Specifications" on page 18 for additional information about Good Read Beep output.

Figure 8. Beeper Connection Scheme
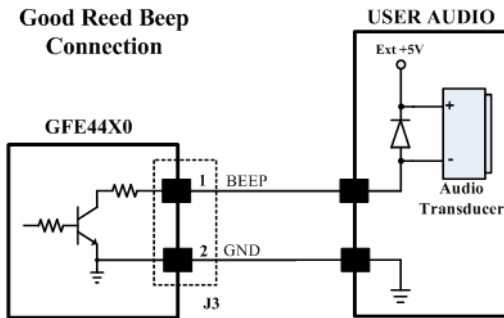
Scanner Ventilation

When mounting the scanner inside an enclosure, it is important to have proper ventilation to ensure that the scanner temperature does not exceed the maximum range as listed in "Technical Specifications" on page 18. The reliability of the scanner may be compromised if the temperature range is not maintained.

Integrating the Scanner to Read at the Proper Distance

When deciding how to mount the OEM scanner, there are many criteria that must be considered. First, there are minimum and maximum distances that the bar code can be from the front of the scanner to be properly read, depending on the size of the bar code. These distances, or depth of field, are specified in "Technical Specifications" on page 17.

The scanner must be positioned so that the scan volume and illumination light will cover the entire bar code. The scan volume is shown in Figure 9. The combination of the Scan Volume and the illumination light is called the Field of View. Designing around the scanner Field of View is explained more in the following section.

Figure 9. Scanning Volume

106mm

169mm

Scan Volume @ 188mm
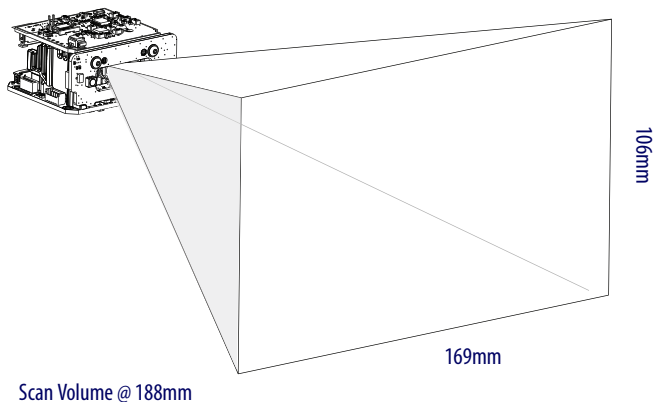
Design of the Scanner Opening

The design and placement of the scanner opening within a host enclosure are critical for optimum system performance. A typical system uses the scanner mounted inside a host enclosure, with an opening to allow the scanner Field of View to exit the scanner window and read bar codes.

Use the following guidelines to design the host enclosure and scanner opening, along with the dimensions shown in "Mechanical Specifications" on page 25.

- The opening must not block any of the outgoing illumination light, described by dimensions of the scanner Field of View.

- Ensure that there are no reflective surfaces around the area of the scanner opening.

- The minimum opening size must increase as the distance between the scanner and the host enclosure window increases. This is necessary to accommodate the width and height of the scan volume.

- The opening or other parts of the host enclosure must not enter the Field of View in order to allow the bar code image to be captured by the scanner.

- If the scanner is flush against the opening, the opening must be the size of the scanner at a minimum, but only exposing as much of the front surface of the scanner as necessary.

Integrating the Scanner Behind a Window

CAUTION

The addition of a host enclosure window could degrade scanner performance. This is due to the optical reflective surfaces that will cause interference with the imaging technology.

It is recommended to conduct scan performance testing with any window to determine if the performance level is acceptable for the application.

•   Window material should be transparent with ≥92% transmission to wavelength 625nm and 850nm.

•   Only a flat window must be used.

•   The window should be as thin as possible (thickness less than 2mm).

•   The window should be as close to the illumination LEDs as possible to avoid LED ghost images or light reflections. Tilting the window and/or anti-reflective coating can help mitigate illumination reflections.

Performance degradation may include:

•   The scan module will not read very low contrast labels.

•   The scan module will not be able to wake up, especially in low ambient light (typically <100Lux). In this case, the scan module may need its wakeup sensitivity setting increased.

ESD Protection

The host enclosure design must provide adequate ESD protection for the scanner. Ideally, static discharge should not be allowed to discharge to the scanner. The preferred method to prevent static discharge is to provide a long discharge path to all circuits. The scanner is intended to be mounted inside a host enclosure. Only the front surface should be exposed in order to read bar codes. This is to protect the rear interface connector area, which can be susceptible to static discharge. Interface cables should also not have power applied when inserted into the scanner. Any metal mounting surfaces for the scanner must be electrically grounded with proper insulation to the scan engine mounting.

Static discharge (ESD) testing is recommended for the entire system integration to ensure proper ESD protection.

ESD

Proper ESD protection should be used at the time of installation and servicing of the scanner or the host equipment.

Technical Specifications

Item	Description
Physical Characteristics	
Dimensions	Height 28.2mm (1.11") Length 42mm (1.65") Width 48 mm (1.89")
Weight (without cabling)	Approximately 51.2 g (1.8 oz)
Electrical Characteristics	
Input Voltage	5 VDC ± 5% Overvoltage tolerant to 14VDC
External Trigger Input : 1V - 5V Current Consumption for 1V = 2mA max	5V = 10mA max Min Pulse Duration = 25ms *

* Although the scan engine can respond to this minimum pulse width for triggering, bar code decoding time is dependent on several factors. External Trigger should be held active until there is a good read decode or a determined timeout period.

Item	Description
Digital Output : Open Collector	
Vout	14VDC
Vce	20 VDC max
Collector Current	40 mA continuous max
Vce Saturation	0.3 V max at 15 mA
Power Dissipation	80 mW max at 50 °C (ambient temperature)
Good Read Beep Output	
Output Type	Open Collector
Maximum Sink Current	200mA
Maximum Sink Voltage	5V (ESD protection limit)
Current & Power Consumption	
Input current at 5V in Automatic (Object Sense) Reading Mode	
Operating (typical)	175 mA (OnLine & Serial OnLine Modes) 165 mA (Automatic Object Sense Mode)
Operating (max)	180 mA
Idle/standby (typical)	53 mA (OnLine & Serial OnLine Modes) 100 mA (Automatic Object Sense Mode) No idle in Automatic Mode
Performance Characteristics	
Nominal Frame Rate	53 frames/second
Light Source	Dual Red LEDs
Roll (Tilt) Tolerance	Up to ± 180°

Pitch Tolerance	$\pm 40°$				
Skew (Yaw) Tolerance	$\pm 40°$				
Print Contrast Minimum	25% minimum reflectance				
Field of View	40° H x 26° V				
Depth of Field (Typical)		cm		inches	
		NF	FF	NF	FF
	Code 39 5mil	3.8	16.8	1.5	6.6
	Code 39 10mil	0.8	32.3	0.3	12.7
	Code 39 20mil	0.2	48.3	0.1	19.0
	EAN 7.5mil	1.9	26.4	0.7	10.4
	EAN 13mil	1.6	41.0	0.6	16.1
	PDF-417 6.6mil	2.4	14.5	1.0	6.0
	PDF-417 10mil	1.3	23.0	0.5	9.4
	PDF-417 15mil	1.6	34.7	0.6	13.6
	DataMatrix 10mil	1.8	16.2	0.7	6.4
	DataMatrix 15mil	0.3	23.7	0.1	9.3
	QR Code 10mil	2.6	15.1	1.0	5.9
	QR Code 15mil	0.0	23.4	0.0	9.2
Minimum Element Width	1D Min Resolution = 4 mil PDF-417 Min Resolution = 5 mil Datamatrix Min Resolution= 7 mil				

Decode Capability

1D Bar Codes

UPC/EAN/JAN (A, E, 13, 8); UPC/EAN/JAN (including P2 /P5); UPC/EAN/JAN (including; ISBN / Bookland & ISSN); UPC/EAN Coupons; Code 39 (including full ASCII); Code 39 Trioptic; Code39 CIP (French Pharmaceutical); LOGMARS (Code 39 w/ standard check digit enabled); Danish PPT; Code 32 (Italian Pharmacode 39); Code 128; Code 128 ISBT; Interleaved 2 of 5 ; Standard 2 of 5; Interleaved 2 of 5 CIP (HR); Industrial 2 of 5; Discrete 2 of 5; Datalogic 2 of 5 (China Post Code/Chinese 2 of 5); IATA 2of5 Air cargo code; Code 11; Codabar; Codabar (NW7); ABC Codabar; EAN 128; Code 93 ; MSI; PZN; Plessey; Anker Plessey; GS1 DataBar Omnidirectional; GS1 DataBar Limited; GS1 DataBar Expanded; GS1 DataBar Truncated; DATABAR Expanded Coupon.

* 13 mils DOF based on EAN. All others are Code 39. All labels grade A, minimum illumination 100 lux, 20°C, label inclination 10°, static reading. Measured from illumination LEDs.

2D / Stacked Codes

The Gryphon I GFS4400 scanner is capable of decoding the following symbologies using multiple frames (i.e. Multi-Frame Decoding).

Datamatrix; Inverse Datamatrix; Datamatrix is configurable for the following parameters:; Normal or Inverted; Square or Rectangular Style; Data length (1 - 3600 characters); Maxicode; QR Codes (QR, Micro QR and Multiple QR Codes); Aztec; Postal Codes - (Australian Post; Japanese Post; KIX Post; Planet Code; Postnet; Royal Mail Code (RM45CC); Intelligent Mail Barcode (IMB); Sweden Post; Portugal Post); LaPoste A/R 39; 4-State Canada; PDF-417; MacroPDF; Micro PDF417; GS1 Composites (1 - 12); Codablock F; French CIP13[a]; GS1 DataBar Stacked; GS1 DataBar Stacked Omnidirectional; GS1 DataBar Expanded Stacked; GSI Databar Composites; Chinese Sensible Code; Inverted 2D codes[b].

[a]It is acceptable to handle this with ULE

[b]The SW can apply the Normal/Reverse Decoding Control to the following symbologies: Datamatrix, QR, Micro QR, Aztec and Chinese Sensible Code.

NOTE: The Scanner can also decode mirrored images of 2D matrix codes Datamatrix, QR Code and Maxicode.

Host Interface supported	RS-232 USB (full speed)

User Environment	
Operating Temperature	-4° to 122° F (-20° to 50° C)
Storage Temperature	-4° to 158° F (-20° to 70° C)
Humidity	Operating: 5% to 90% relative humidity, non condensing
Ambient Light immunity	Up to 100,000 Lux
Regulatory	
LED Emission Class	(IEC-62471:2006-07) Exempt (No Risk) IEC60825-1: 2007

RS-232 Electrical Connections

9-pin connector

1	Trigger	Trigger signal input
2	TX	Transmit Data (output from scanner)
3	RX	Receive Data (input to scanner)
4	NC	Not connected
5	GND	Ground
6	VCC	+5Vdc
7	CTS	Clear To Send (input to scanner)
8	RTS	Request To Send (output from scanner)
9	DIGITAL OUTPUT	Output signal

Default configuration is RS-232: 9600, 8, N, 1, no handshaking, ACK/NAK disabled.

Indicators

The reader's LED L2 of J2 illuminates to indicate various functions or errors. An optional "Green Spot" also performs useful functions. The following tables list these indications. One exception to the behaviors listed in the tables is that the reader's functions are programmable, and so may or may not be turned on.

Indicator	Description	LED L2 of J2
Good Read	A label has been successfully scanned by the reader.	LED2 and Green Spot LED behavior for this indication is configurable via the feature "Good Read: When to Indicate" (see the GFS4400 PRG for information.)
ROM Failure	There is an error in the reader's software/programming	Flashes
Configuration Programming Mode	The scan engine is ready to read a configuration label or a command from the Aladdin Configuration Utility.	The LED blinks continuously.
Reader Disabled	The reader has been disabled by the host.	The LED blinks continuously.
Green Spot[a] flashes momentarily	Upon successful read of a label, the software shall turn the green spot on for the time specified by the configured value.	N/A
Image Capture	On when ready to capture image	Blue LED on
Flash Memory Update	Occurs while update is in progress	Blue LED blinks

[a]Except when in sleep mode or when a Good Read LED Duration other than 00 is selected

Error Codes

Upon startup, if the reader's LED2 and Green Spot are blinking alternately, this means the reader has not passed its automatic Selftest and has entered FRU (Field Replaceable Unit) isolation mode. If the reader is reset, the sequence will be repeated. Press and release the trigger to see the FRU indication code from LED2 flashes.

The following table describes the LED flashes associated with an error found.

Number of LED2 Flashes	Error	Corrective Action
1	Configuration	Contact Helpdesk for assistance
2	Interface PCB	
6	Digital PCB	
11	Imager	

Mechanical Specifications

Physical Properties

Parameter	Specification
Dimensions	42.0mm x 48.0mm x 28.2mm (1.65" x 1.89" x 1.11")
Weight	~51.2 g (1.8 oz)

Scanner Dimensions

3X Ø 4 CLEARANCE

40.97

3.16

36.75

TOP VIEW
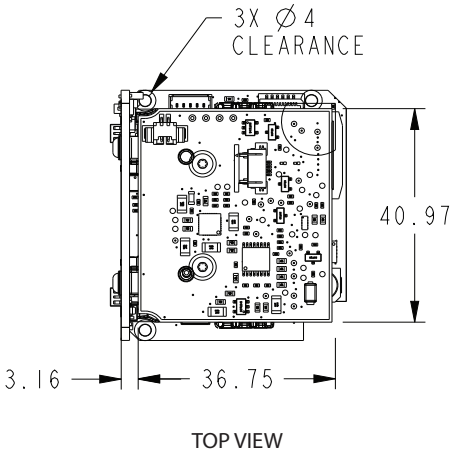
Scanner Dimensions (continued)
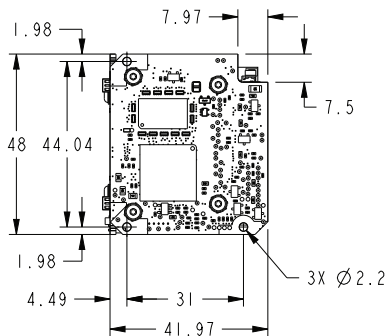
BOTTOM VIEW
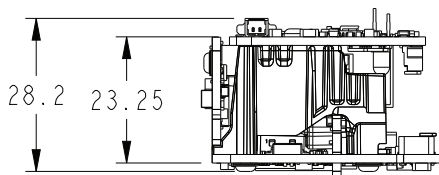
SIDE VIEW

Clearance Required for Integration

187.97

11.28

4.48

168.96

TOP VIEW

7.3

105.64

SIDE VIEW

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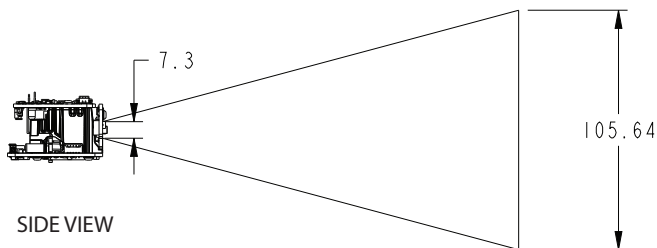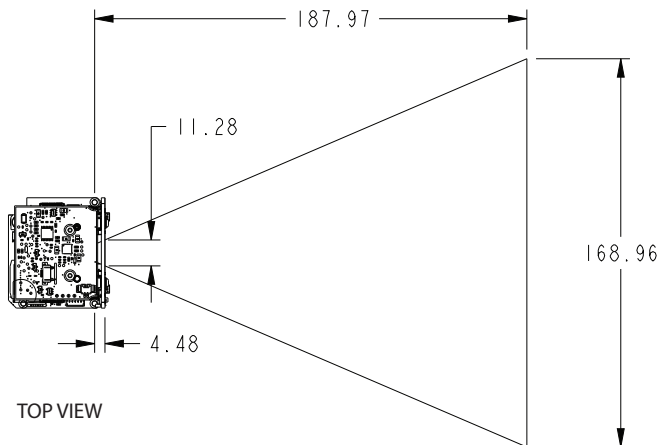
China RoHS

PART	部件名称	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexavalent Chromium (Cr(VI)) 六价铬	Polybrominated biphenyls (PBB) 多溴联苯	Polybrominated diphenyl ethers (PBDE) 多溴二苯醚
				有毒有害物质或元素			
Printed Circuit Board Assembly	电路板组件	X	O	O	O	O	O
Assy, Optics Block	光学组件	X	O	O	O	O	O
Assy, Module	光学组件	X	O	O	O	O	O

O: 代表此种部件的所有均质材料中所含的该种有毒有害物质均低于中华人民共和国信息产业部所颁布的《电子信息产品中有毒有害物质的限量要求》(SJ/T 11363-2006) 规定的限量。

X: 代表此种部件所用的均质材料中，至少有一类材料其所含的有毒有害物质高于中华人民共和国信息产业部所颁布的《电子信息产品中有毒有害物质的限量要求》(SJ/T 11363-2006) 规定的限量

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