Teledyne DALSA Industrial Products

Introduction to BOA Spot ID

Introducing the BOA Spot ID

Industrial identification vision sensor

Robust solution for product identification, verification and tracking applications

Combines 1D/2D code reading with OCR and verification tools to ensure all product markings are accurate, readable and traceable

- Quickly and accurately reads printed, stamped or etched 1D/2D codes
- Counts or reads printed, stamped or etched characters on products (such as date and lot codes)
- Verifies printed logos, patterns or general product features for quality error proofing
- Verifies product label location and skew

An Integrated IP67 Solution

Complete with lens, light and processing

LED lights
Red, blue or white

Lens
6,8,12 or 16 mm

Rotating focus window

Status indicators

I/O connection

Ethernet connection

A Code Reader that offers more…

Model options suit a range of application needs

Typical Applications

- Part and product traceability
- Packaging verification – read product codes to avoid labeling mix-ups
- Product marking verification – validate product type, lot and expiration date codes.
- Product quality verification – check markings, label position, feature presence/absence
- Assembly verification – check assembly history at every stage of manufacturing
- Logistics management

Configuration Options

- **Choice of Sensor Resolution**
  - 640x480 @ up to 40 parts per second
  - 1280x960 @ up to 45 parts per second
- **Choice of Lens**
  - Integrated M12 lens – 6, 8, 12 or 16mm
  - External “C” mount – 6 to 50mm
- **Choice of Software**
  - IDS = “Standard Level” toolset
  - IDE = “Expanded Level” toolset
- **Choice of Light source**
  - Integrated Red, White or Blue LED ring (M12 version - strobe only)
  - External (strobe supplied)
  - M12 & C mount Lens filters
- **Choice of Integration**
  - Direct – open-ended cables
  - Indirect – PL-100/101 cabinet modules

Comparison of Model Software Features

IDS model can be field upgraded to IDE

IDS = "Standard level" – robust code reading and character/feature counting

IDE = "Expanded level" – advanced code reading (DPM) and error proofing tools

Model Features	Detail	Spot IDS	Spot IDE
# Solutions	# Saved	32	32
# Locators	Tool alignment	2	4
Preprocessing	In ROI and tool	✓	✓
Graphics	User annotation		✓
Match/Positioning	Match with position		✓
Feature Detection	Edge Count		✓
	Point	✓	✓
	Count	✓	✓
	Verify		✓
Identification	1D, 2D	✓	✓
	OCR		✓
Factory Protocols	EthernetIP, Profinet	✓	✓
Scripting	Control	✓	✓
	Solution switching	✓	✓
	PLC triggering	✓	✓
Network commands	Serial or Ethernet	✓	✓
Image Logging	FTP	✓	✓
User admin	Password access	✓	✓

- One sensor replaces several inspection products
- Multiple use and mixing of tools in a solution
- Tools compensate for part or feature position variation at runtime
- Fast and robust execution

Standard Inspection Capabilities

Common to both IDS and IDE models

Tool	Icon	Description
Barcode		• Use to decode 1D symbologies: Code 11, 32, 39, 93, 128, I25, UPC-A/E, EAN-8/13, Databar, BC412, Pharmacode and more
2D Matrix		• Use to decode 2D symbologies: Data matrix (ECC), QR Code, PDF417, MicroPDF and more
Pre-Processor		• Use to enhance picture quality to accentuate features of interest • Use to improve readability of poorly printed codes
Count		• Use to verify # of characters (simple OCR) or features on a product • Use to count number of products in a package • Can be used to align 1D/2D ROIs to a reliable product feature
Point		• Use to detect a single edge point for basic label/part position measurement • Use to set locator for alignment (from Count tool)

Code Reading Performance

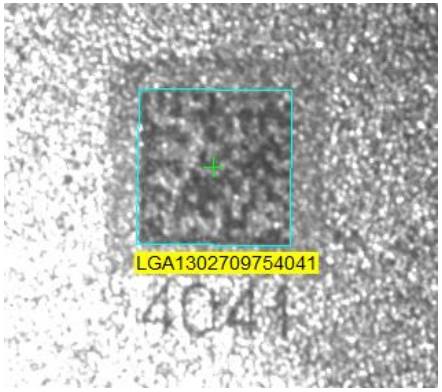
Robust algorithms for challenging applications

- **Reliable Barcode reading is essential for many applications and industries**
- BOA Spot ID offers fast, robust decoding of most 1D barcode and 2D matrix code symbologies.
  - Reliably reads Data Matrix and QR codes with damaged or missing finder patterns
  - Reads poorly printed, low contrast, noisy, warped and damaged barcodes
  - Decodes multiple barcodes in the same image ROI
- The “standard” algorithm (both IDS & IDE models) decodes the majority of codes
- The “advanced” algorithm, included only with the IDE model, offers greater robustness for decoding marks etched or dot peened on plastic or metallic surfaces

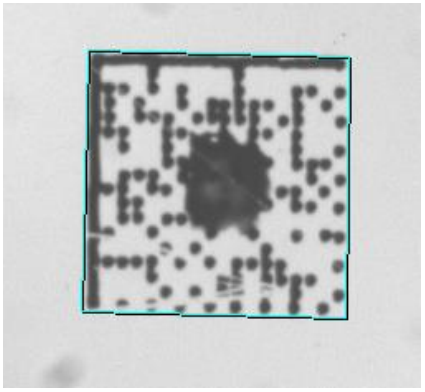
- Code 128
- Code 39
- Code 93
- Interleaved 2 of 5
- Codabar
- UPC/EAN/JAN
- UPC-A
- UPC-E
- EAN-8
- EAN-13
- 2-digit supplemental
- 5-digit supplemental
- GS1 DataBar
- GS1 DataBar Omnidirectional (RSS-14)
- GS1 DataBar Stacked (RSS-14 Stacked)
- GS1 DataBar Limited
- GS1 DataBar Expanded
- GS1 DataBar Expanded Stacked
- Code 11
- Code 32
- Plessey
- MSI Plessey
- Telepen
- Trioptic
- BC412
- Matrix 2 of 5
- Straight 2 of 5 (3-bar Start/Stop)
- IATA 2 of 5
- NEC 2 of 5
- Hong Kong 2 of 5
- Pharmacode
- PDF417
- MicroPDF417
- Composite Codes (CC-A/CC-B/CC-C)
- Codablock F
- Data Matrix
- QR Code
- Micro QR Code
- Aztec Code
- Han Xin Code
- MaxiCode
- USPS Postnet
- USPS Planet
- USPS Intelligent Mail
- Royal Mail

Code Reading Examples

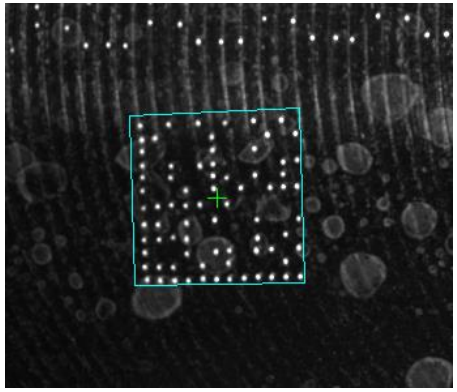
Not all printing methods and surfaces are created equal



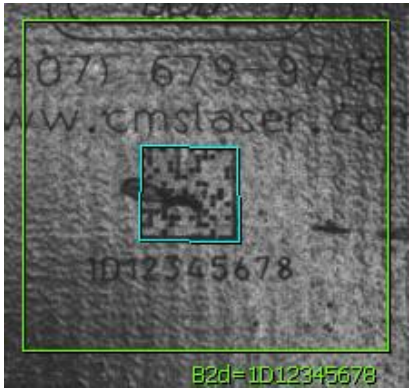
Noisy



Damaged



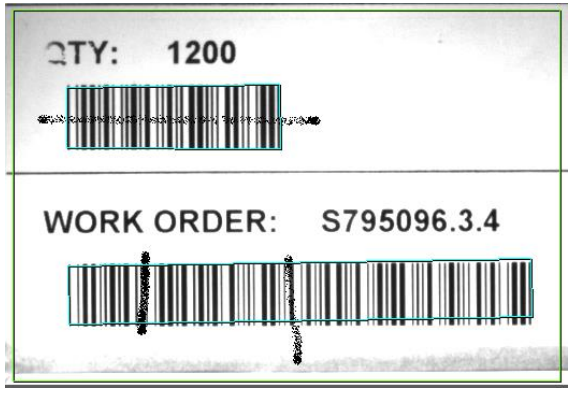
DPM



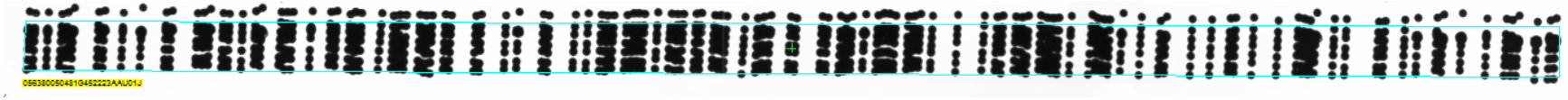
Poor contrast

Warped

Worn



Damaged



Ink Jet

Code Reading Considerations

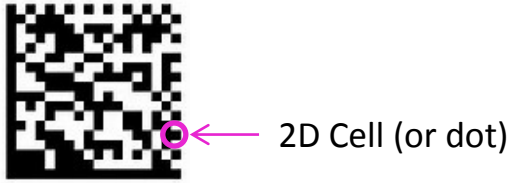
Match the product to your application

1D Codes

- Minimum distance between bars = 1.5 pixels (2.5 pixels for low contrast)
- Minimum bar width = 1.5 pixels (2.5 pixels for low contrast)

2D Codes

- Minimum cell size = 2 x 2 pixels
- Minimum dot diameter = 2 pixels



Field Of View (FOV) and reading distances

BOA Spot ID supports different sensor resolution and lens options to match field of view (FOV) and desired working distance.

- FOV increases with working distance and sensor size
- FOV decreases with focal length
- Smaller focal length (i.e. 6mm) = greater FOV at the same WD
- Smaller focal length lenses have greater wide angle distortion
- M12 lenses have a fixed aperture. Shorter WD = more light to stop motion
- “C mount” option offers variable aperture (light control) and less distortion

Code Reading Considerations

Match the code size to the FOV and reading distance

6 mm Lens

Distance in mm	Approx FOV (mm)		2D min cell (mil)	1D min bar (mil)
	640 Model	1280 Model		
65	25 x 19	50 x 38	3	2.5
82	32 x 24	64 x 48	4	3
103	40 x 30	80 x 60	5	4
205	81 x 61	162 x 122	10	7.5

8 mm Lens

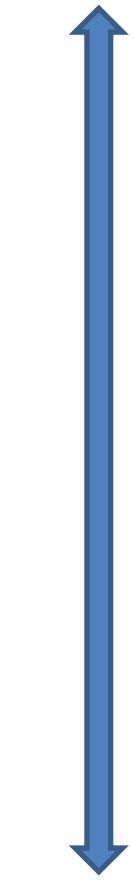
Distance in mm	Approx FOV (mm)		2D min cell (mil)	1D min bar (mil)
	640 Model	1280 Model		
50	16 x 12	32 x 24	2	1.5
103	32 x 24	64 x 48	4	3
130	40 x 30	80 x 60	5	4
265	80 x 60	160 x 120	10	7.5

12 mm Lens

Distance in mm	Approx FOV (mm)		2D min cell (mil)	1D min bar (mil)
	640 Model	1280 Model		
90	16 x 12	32 24	2	1.5
130	24 x 18	48 x 36	3	2.5
170	32 x 24	64 x 48	4	3
210	40 x 30	80 x 60	5	4
410	80 x 60	160 x 120	10	7.5

16 mm Lens

Distance in mm	Approx FOV (mm)		2D min cell (mil)	1D min bar (mil)
	640 Model	1280 Model		
120	16 x 12	32 x 24	2	1.5
225	32 x 24	64 x 48	4	3
280	40 x 30	80 x 60	5	4
550	80 x 60	160 x 120	10	7.5



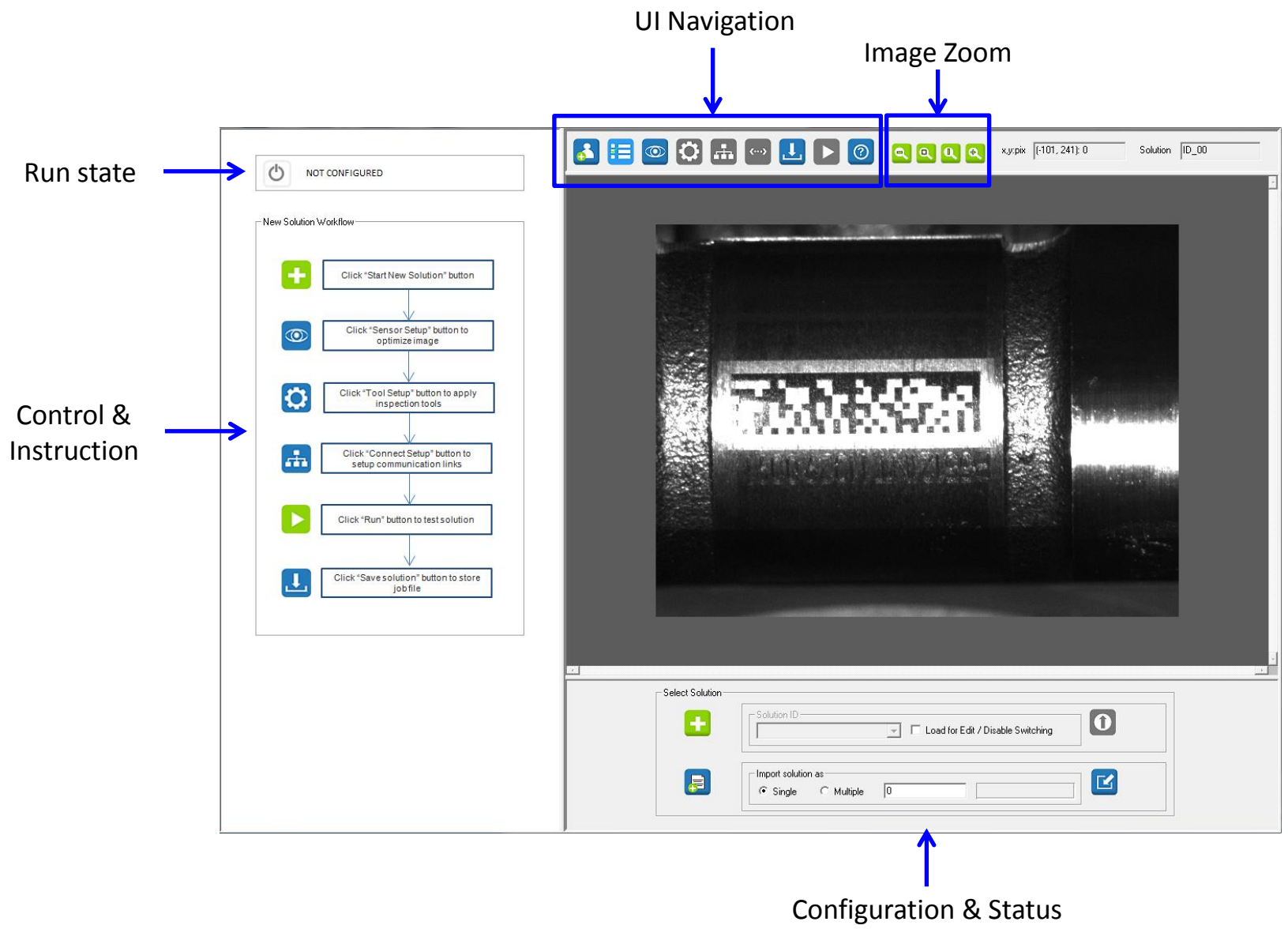
IDE Advanced Inspection Capabilities

For when code reading isn't enough

Tool	Icon	Description
OCR		• Use to read printed, stamped or etched characters on labels or parts.
Match		• Use to verify patterns, such as logos, on products • Use to locate features on a product or package • Use to align tool ROIs at runtime if necessary
Edge		• Use to find edge transitions for determining label position and or alignment • Use to count edges to determine # of products in a package
Verify		• Use to verify product features, such as labels or logos. Trains on a series of good samples to learn acceptable variation. • Use to detect defects on labels caused by poor printing, ink stains, scuffs or tears
Graphics		• Use to annotate text on a runtime image • Use to inform operators what to do in case of error

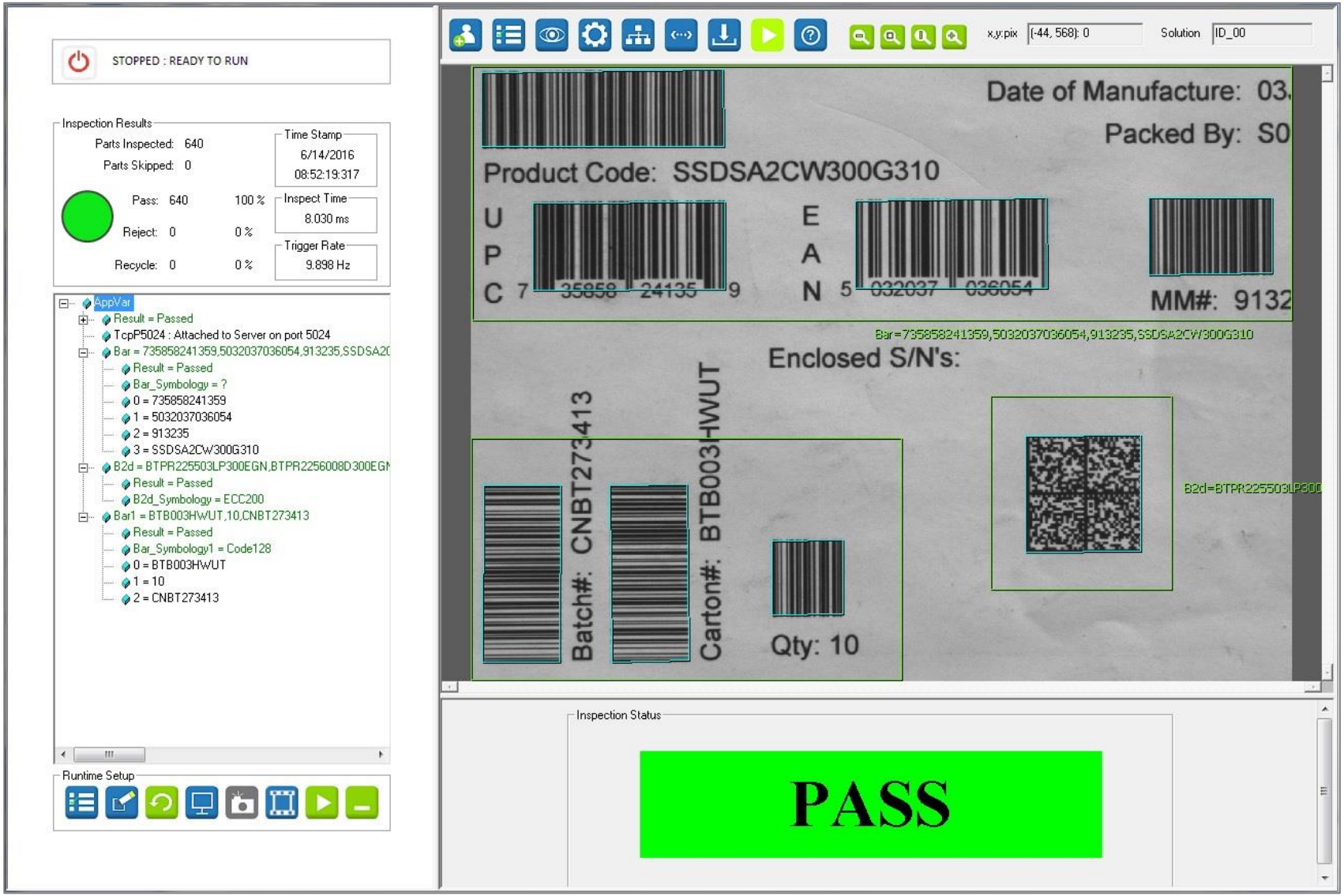
Easy to setup User Interface

Accessed through IE Browser or emulator on PC client



Ready to Deploy Runtime Interface

Provides results and essential operator controls



Versatile I/O for Control and Interfacing

- **INPUTS**
  - Trigger + 2 general purpose inputs
  - 2 Inputs can be used for hardware solution switching
- **OUTPUTS**
  - 3 general purpose outputs or 2 outputs + external light strobe (required for C mount version)
- **SERIAL**
  - RS-232

M12	Name	Wire
1	PWR	Brown
2	GND	Blue
3	OUT2	White
4	OUT CMN	Green
5	IN0 / TRIG	Pink
6	IN2	Yellow
7	IN CMN	Black
8	RS232 TX	Gray
9	RS 232 RX	Red
10	OUT 1	Purple
11	OUT 0	Gray/Pink
12	IN 1	Red/Blue

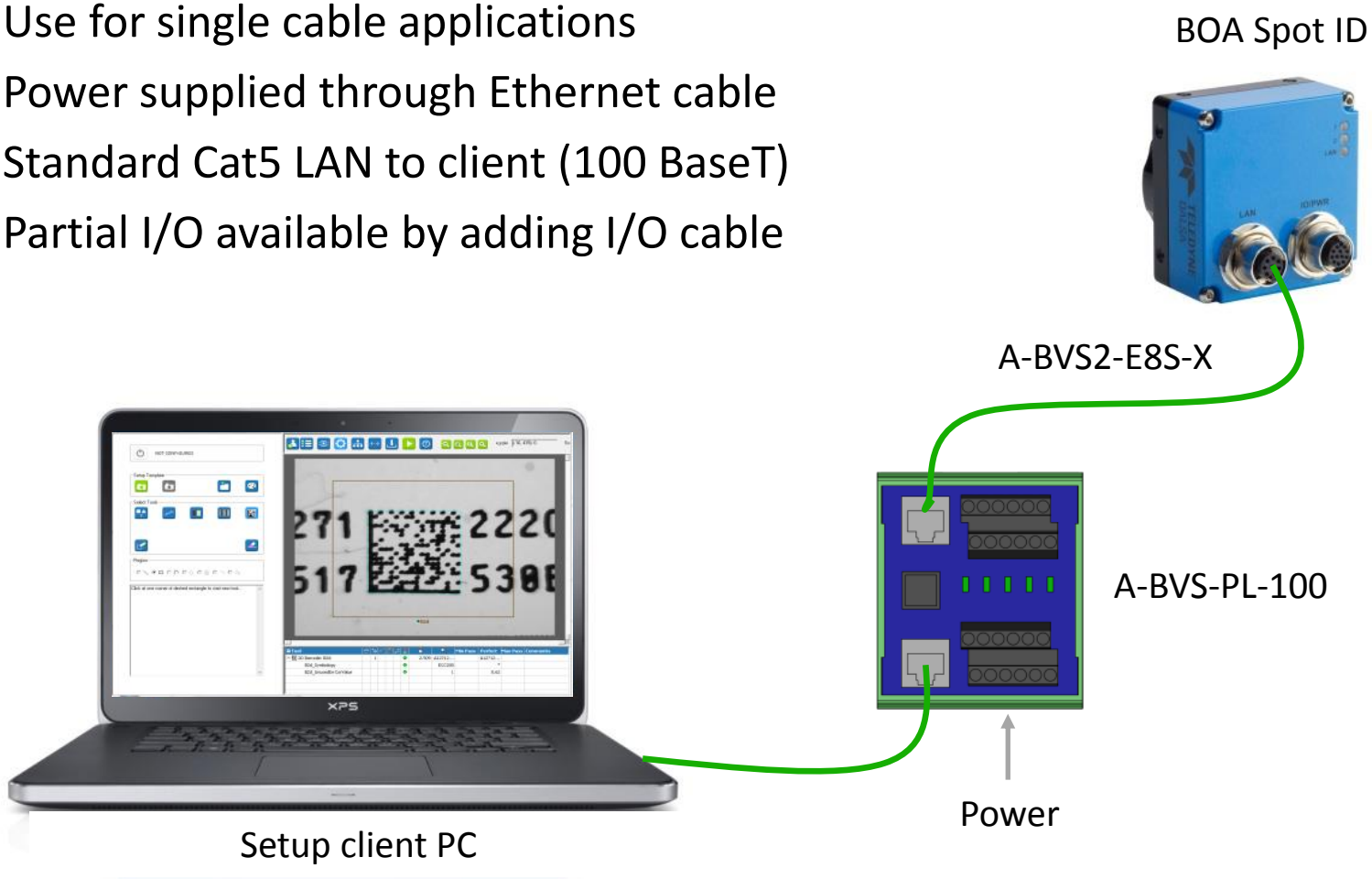
Cables & Breakout Modules

- Open-ended I/O use A-BVS2-IO12S-X
- PL-101 I/O use A-BVS-PL101S-X
- Ethernet use A-BVS-E8S-X
- Use PL-100 for single cable Ethernet (PPoE)
- Use PL-101 for I/O and RS-232 breakout

Supported Panel Link Configurations

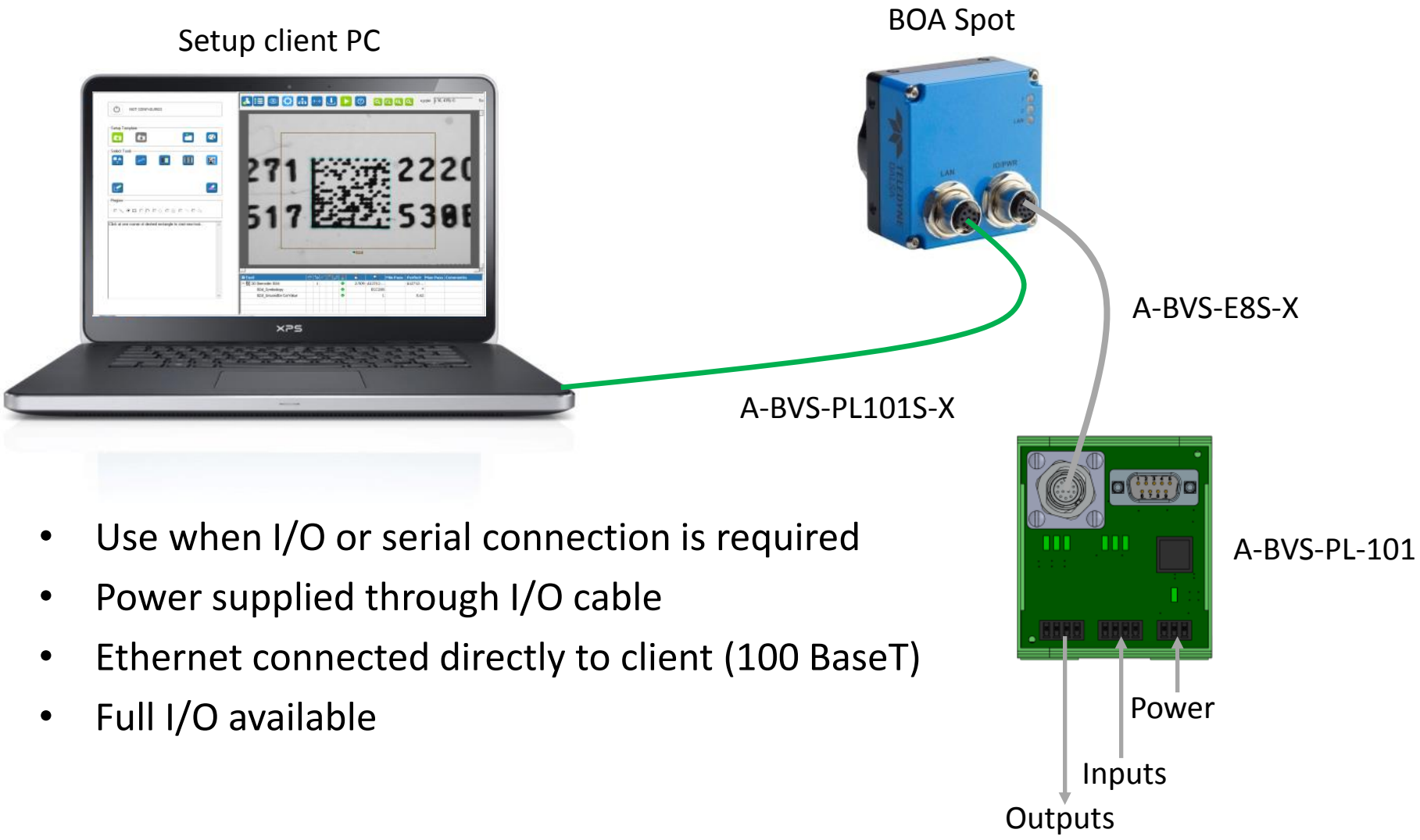
Passive PoE using PL-100 (single cable setup)

- Use for single cable applications
- Power supplied through Ethernet cable
- Standard Cat5 LAN to client (100 BaseT)
- Partial I/O available by adding I/O cable



Supported Panel Link Configurations

I/O breakout using PL-101 (preferred setup)

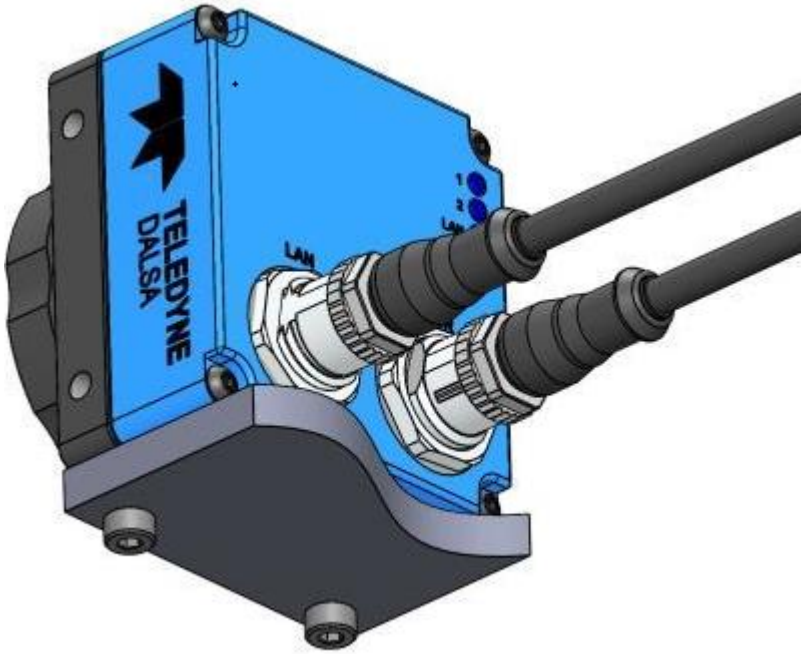


- Use when I/O or serial connection is required
- Power supplied through I/O cable
- Ethernet connected directly to client (100 BaseT)
- Full I/O available

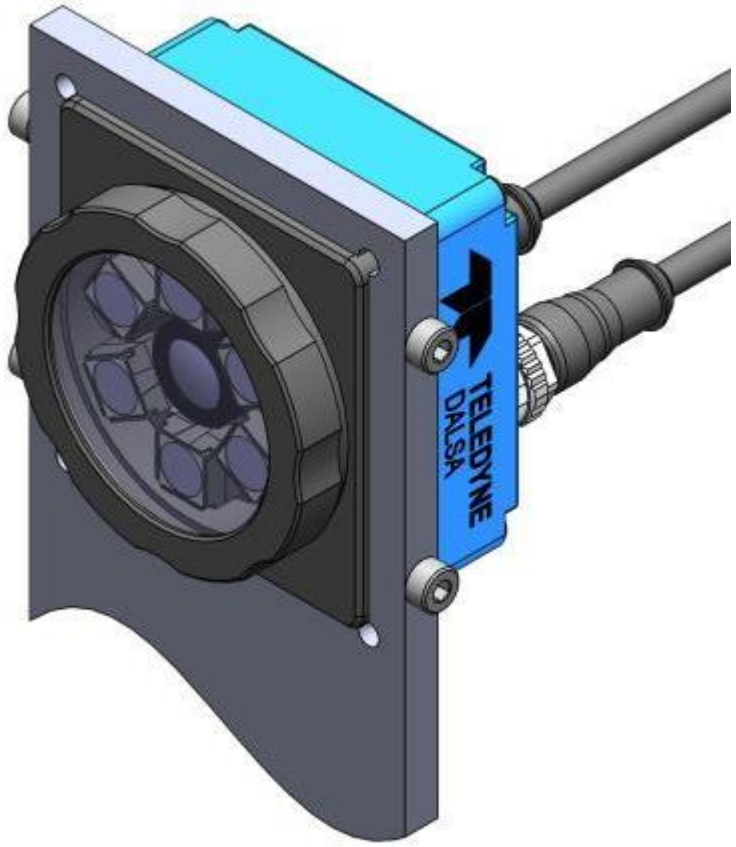
Flexible Mounting Options

Fits in tight “spots”

Surface Mount



Thru Fit Mount



The BOA Product Family Matrix

BOA		• Original model, smallest form factor • 640x480 to 1600x1200 CCD sensors • C-mount lens • Two performance models BOA 50, BOA 200
BOA XA		• High resolution model, periscope form factor • 2M, 3M & 5M CMOS Global Shutter • C-mount lens • Integrated light option (2M version only)
BOA Spot		• Low cost model, slim line form factor • 640x480 & 1280x960 CMOS Global shutter • M12 OR C-mount lens • Integrated light (standard on M12 version)

BOA Spot ID Benefits

Empowering the factory floor with vision

- Low starting price point – under the capital expense threshold for most companies
- Integrated light and lens (saves additional $$)
- Standard low-cost factory M12 cables
- Low and high resolution sensor options
- Easy-to–use application interface (low training investment)
- More capable than competitive ID sensors
- Built-in factory communication protocols
- Low overall cost of ownership