Tektronix

Model 2606B 4-Channel System SourceMeter® Source Measure Unit

Regional Presentation

11 APRIL 2018

KEITHLEY
A Tektronix Company

Introduction

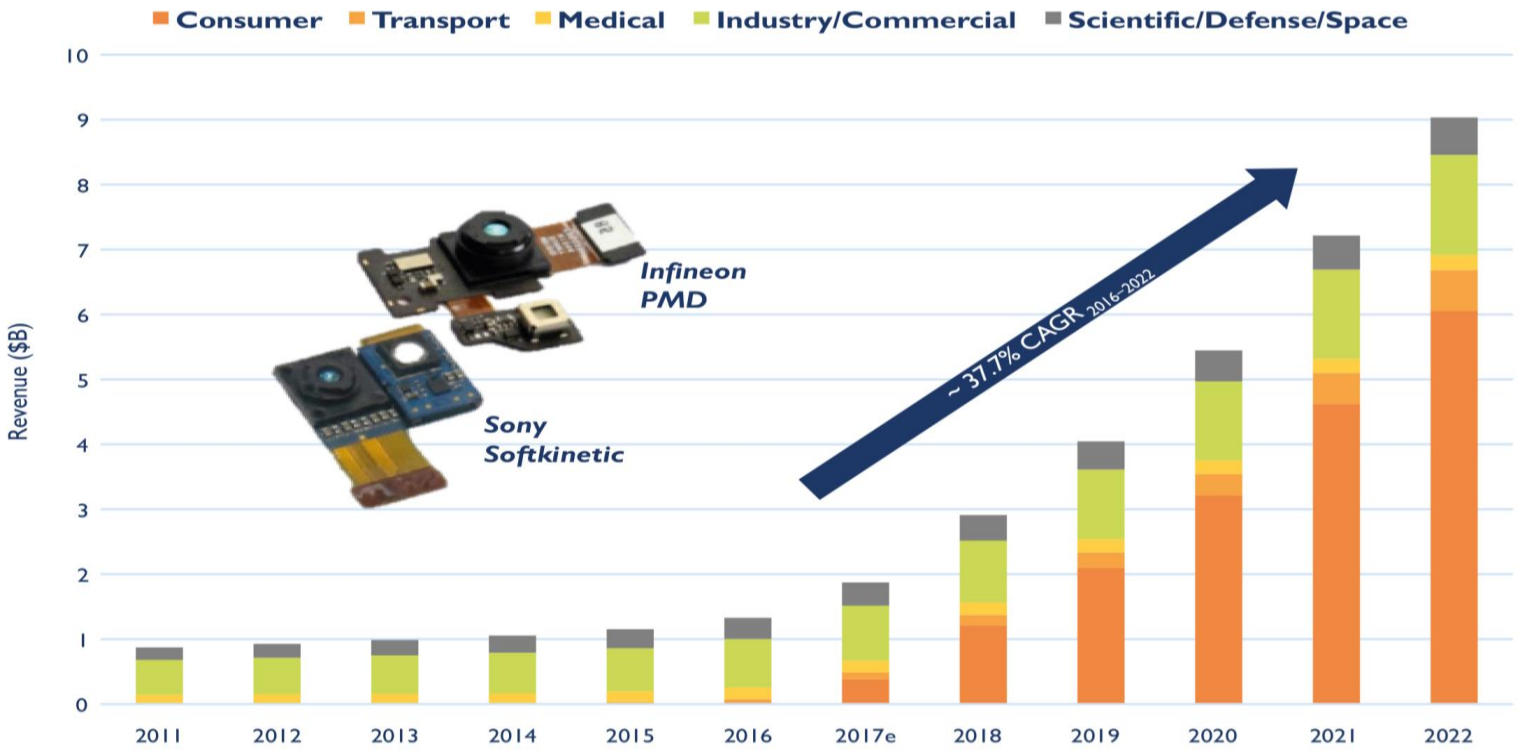
3D Sensing and Imaging Technology

GROWING DEMAND FOR OPTOELECTRONIC DEVICES

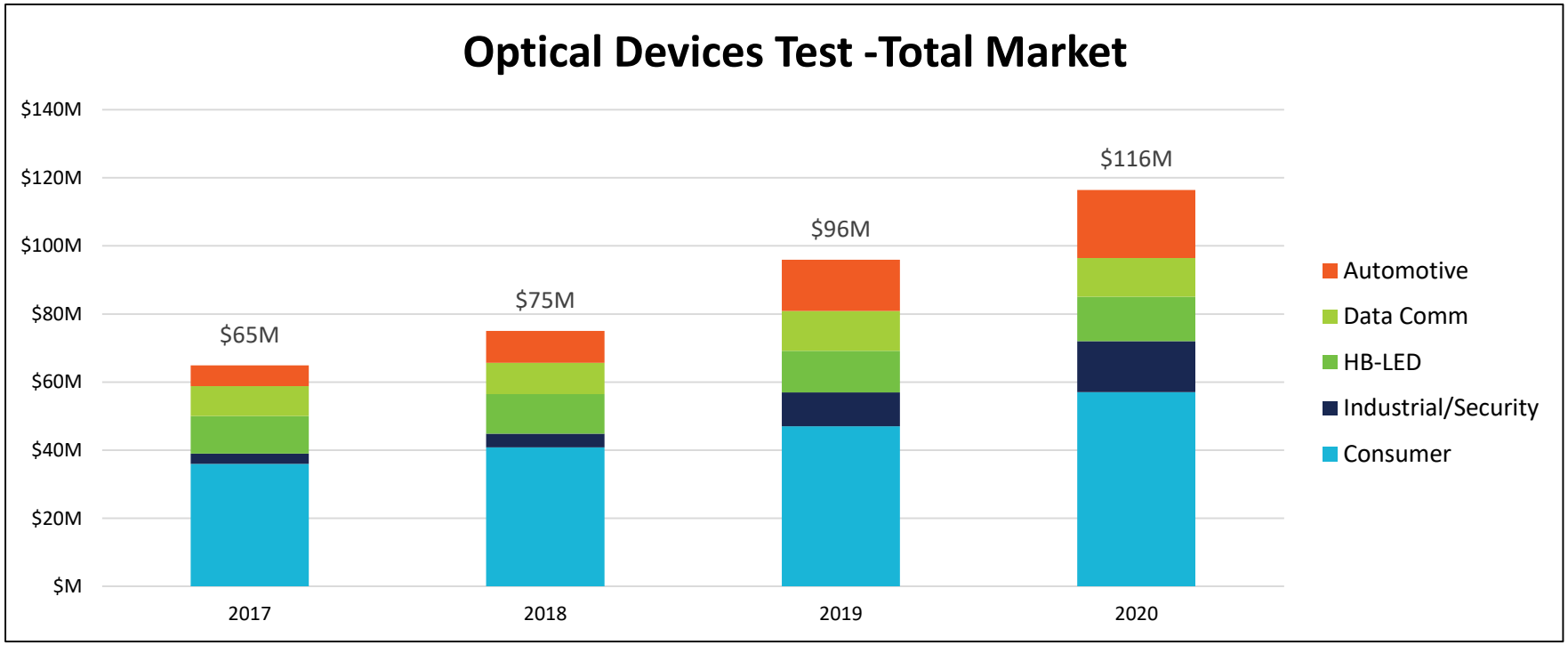
Growth in 3D Imaging & Sensing Devices

2011 - 2022 market forecast for 3D imaging & sensing devices

(Source: 3D Imaging & Sensing 2017 report, April 2017, Yole Développement)



3D Sensing Driving Optical Market



- 21% CAGR for overall LD/LED LIV Test Market
- Consumer market is driven by 3D capabilities such as 3D facial recognition
- Automotive market is driven by IR sensors for safety based driver assistance.
- VCSEL technology is the fastest growing optical technology
- “DC” testing in 3D LD optical imaging fits well into Keithley’s offerings (millisecond pulses)
  - Typically lower power applications (facial recognition)

Introducing
The Model 2606B 4-Channel System SourceMeter

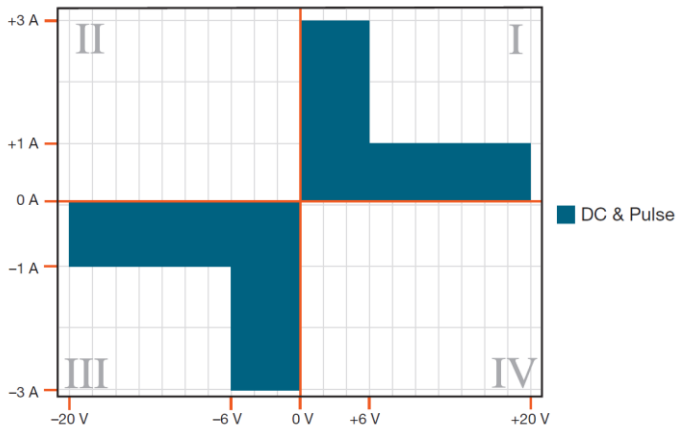
4 Channels in a 1U form factor

Test more devices.

REVOLUTIONEERING

2606B 4- Channel System SourceMeter®

More Channels in a Smaller Space



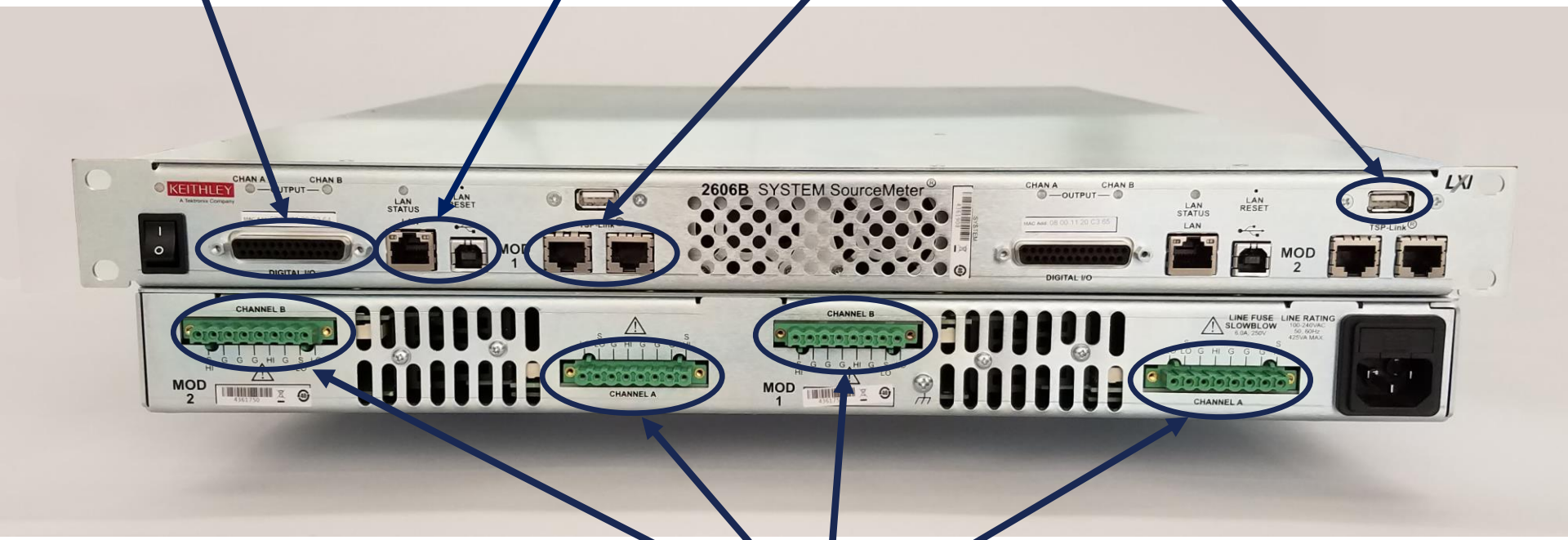
- Four channel SMU in a single 1U full rack chassis; Stackable; No 1U spacing requirements between units; 3x the density of the 2602B
- 20V @ 1A and 6V @ 3A power envelopes, 20 Watts. No extended range pulsing.
- 100 nA range with 2 pA resolution
- 0.015% basic measure accuracy with 6½-digit resolution
- Up to 28 open drain digital I/O bits
- Correlated results to the 2602B System SourceMeter. 100% code compatibility.
- Front panel Digital I/O, LAN, USB-Device, USB-Host, and TSP-Link connectivity
- 2606B Virtual Front Panel

2606B 4-Channel SourceMeter® vs. 2602B SourceMeter® Front/Rear Panel Views

Model 2606B

Model 2602B

Front / Rear Panel Details



2606B 4-Channel SourceMeter® vs. 2602B SourceMeter® Feature Comparisons

Feature	Model 2606B	Model 2602B
Power Output	20.2W / channel	40.4W / channel
Current Capability	Min: 100fA Max: 3A, 3A Pulse	Min: 100fA Max: 3A 10A Pulse
Voltage Capability	Min: 100nV Max: 20V	Min: 100nV Max: 40V
Basic Accuracy: I, V	I: 0.020%; V: 0.015%	I: 0.020%; V: 0.015%
Rack Height	1U (44mm; 1.7 inches) (No additional 1U rack spacing required for cooling)	2U (89mm; 3.5 inches) (Additional 1U spacing needed for stacking instruments for cooling)
Connections	*Front Panel*: Digital I/O (up to 28 lines), USB-Host, TSP-Link, Comm. Ports *Rear Panel*: Mass Term Screw Connector	*Front:* USB-Host *Rear*: Digital I/O (up to 14 lines), TSP-Link, Comm. Ports, Mass Term Connector
Contact Check	Yes	Yes
Comm. Ports	LAN, USB-Device	GPIB, LAN, USB-Device, RS-232
Embedded Scripting	TSP Programming (Code compatible with 2602B)	TSP + 2400 Emulation Programming

2606B 4- Channel System SourceMeter® SMU Instrument

- 4 SMU Channels in a 1U Form Factor
  - Easy to stack and rack. 3x the density of 2602B's.
  - No additional 1U thermal spacer required
- Measurement Integrity
  - 0.015% basic voltage accuracy
  - Faster test times at lower noise levels. Tight synchronization between channels.
  - 100% correlated measurements with the existing Model 2602B System SourceMeter.
- Lower Cost of Test
  - Reuse existing connectors that were used on the 2602B's; Reuse TSP Scripts
  - Test more devices

Ordering Information

Ordering Information

- New Instrument

Model	Description
2606B	4-Channel SourceMeter SMU Instrument

  - Supplied Accessories:
    - Power cord, (2) LAN crossover cables, TSP-Link Cable, (4) 8-Pin Phoenix Connectors, 25-PIN Digital I/O Connector, 1U Fixed Rack Mount Kit
    - Note: manuals and software are all on www.tek.com website

Schedule

KEY DATES & MARKETING RESOURCES

Date	Activity
April 21st	VIP Open Order Queue
April 25th	Stocking orders begin shipping
May 8th	Public Announcement; Sales Enablement Ready;
July 16th	Marketing Campaign Launch

- **Resources Available to Promote new SMU:**
  - ✓ Data Sheet
  - ✓ Fact Sheets
  - ✓ Customer Presentation
  - ✓ Banner Advertisements
  - ✓ High Resolution Images

Sales Enablement and Marketing

SALES & MARKETING TOOLS AVAILABLE ON THE KEY DATES

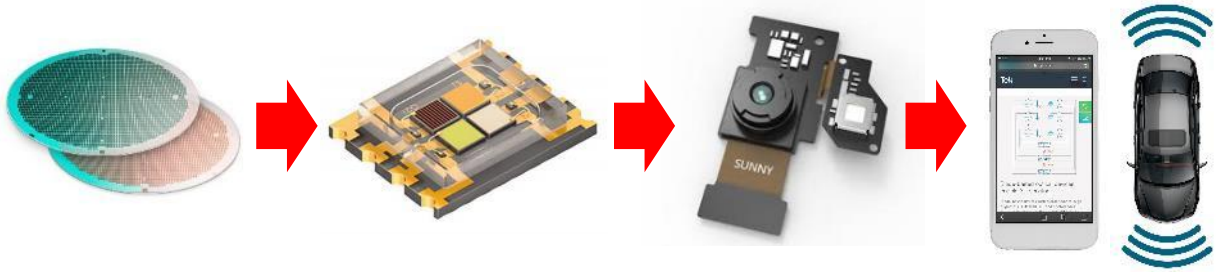
PA / Sales Enablement – May 8th	Marketing Campaign Launch – July 16th
Data Sheet, Specification Sheet, User's Manual	Tek.com Web Banners driving to product page • Center Stage • Product Carousel
Hi Resolution Photos	Tek targeted emails driving customers to product page
2606B Product Fact Sheet	Digital Marketing ads for display
2606B vs. 2602B Comparison Fact Sheet	Content Marketing • White Papers • Webinars • Blogs • Videos
Customer Presentation	Account Based Marketing Programs
Rack Mounting Document	
Web Page (English only)	
Press Release	
LIV / 3D Sensing Webinar (May 15th)	

Tektronix®

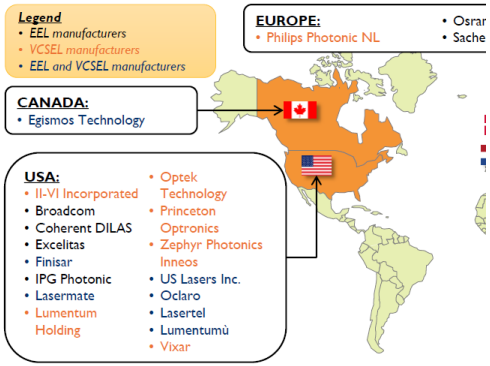
Growth in 3D Imaging & Sensing Devices

SUPPLY CHAIN: GROWTH WITH LASER DIODES

	Wafer & Die Array	Packaged Devices	Modules	End Products
Test Spend by Volume	10%	35%	50%	5%
Influence on Test Req	30%	10%	15%	45%



IR LASERS



Yole Report 2017

- VCSEL - Largest growing optical segment (25%+ CAGR)
- LIV testing occurs at various point of the supply chain
- Need to foster relationship and technically support small orders in order to drive the large design wins
- Watch small orders for key customers, including startups
  - First orders will be for single ‘Eval’ units.
  - Potential for large orders during production ramp-up

2606B Features / Benefits

Feature	Benefit
• 1U High Chassis Form Factor  vs. 	• 4-Channels in a smaller amount of space compared to 2602B • Can stack units on top of each other without the need of an additional 1U thermal spacing (required for 2602B) • Test more devices
• TSP Script code compatible with Model 2602B	• Port TSP scripts from 2602B to 2606B with minimal changes • Minimized cost of test and programming costs.
• Similar I and V source/measure ranges* and signal connectivity	• Minimizes the need to revise TSP script code for different ranging • No extra costs to purchase different connectors.

* Except 20V range on 2606B vs. 40V range on 2602B.

Electrical Test of Laser Diode, LIV

- Key Measurement Parameters
  - Forward voltage (<10V)
  - Forward current sweep (mA)
  - Light power (mW)
    - $L = I_p/R$
    - I_p = photo current from the photo detector (~100nA)
    - R = responsivity of detector at wavelength of choice
  - Back facet detector current
  - Temperature (20-55ºC)
- LIV test data is analyzed to determine laser characteristics,
  - lasing threshold current
  - quantum efficiency
  - presence of "kinks" (non-linearity) in the output