



Top Ten Things You Need to Know

Jim Handy

OBJECTIVE ANALYSIS – Semiconductor Market Research

Last Year's Top Ten

- 1) Price collapse does NOT drive higher GB consumption
- 2) NAND price crash will hit hard in mid-2018
- 3) 4-bit 3D NAND will account for 20% of 2018 bits
- 4) 3D XPoint DIMM shipments surpass XPoint SSDs
- 5) New PC SSD shipments reach 50%
- 6) m.2 PCIe shipments will approach those of SATA
- 7) NAND flash is zero margin business in 2019
- 8) Persistent memory applications remain specialized
- 9) Planar NAND capacity used to make DRAM
- 10) Host-managed SSDs will become mainstream

This Year's Top Ten

- 1) Kioxia (Toshiba Memory) becomes publicly-traded firm
- 2) NAND prices decrease slowly into 2020
- 3) 4-bit enterprise SSDs become mainstream
- 4) 3D XPoint DIMM shipments surpass XPoint SSDs
- 5) New PC SSD adoption slows
- 6) m.2 PCIe shipments surpass those of SATA
- 7) NAND manufacturers nearly cease capital spending
- 8) Several new MRAM & ReRAM SoCs announced
- 9) YMTC ships first revenue products
- 10) Zoned Namespace SSDs will become mainstream

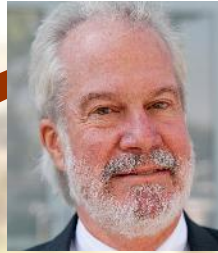


Thank You!

Jim Handy

OBJECTIVE ANALYSIS – Semiconductor Market Research

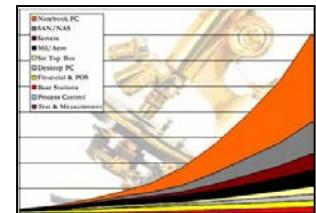
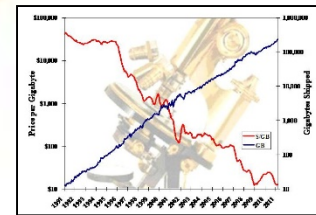
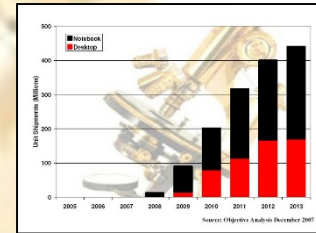
OBJECTIVE ANALYSIS



**Profound
Analysts**

**Reports &
Services**

**Custom
Consulting**



OBJECTIVE ANALYSIS

Semiconductor Forecast Accuracy

| Year | Forecast | Actual |
|-------------|-----------------------------------|--------|
| <u>2008</u> | Zero growth at best | -3% |
| <u>2009</u> | Growth in the mid teens | -9% |
| <u>2010</u> | Should approach 30% | 32% |
| <u>2011</u> | Muted revenue growth: 5% | 0% |
| <u>2012</u> | Revenues drop as much as -5% | -2.7% |
| <u>2013</u> | Revenues increase nearly 10% | 4.9% |
| <u>2014</u> | Revenues up 20%+ | 9.9% |
| <u>2015</u> | Revenues up ~10% | -0.2% |
| <u>2016</u> | Revenues up ~10% | 1.1% |
| <u>2017</u> | Revenues up ~20% | 22% |
| <u>2018</u> | Strong start supports 10+% growth | 14% |
| <u>2019</u> | Semiconductors down -5% | TBD |