

New i3070 Series 6 is 1.5x Faster than the Series 5

Introduction

Since the 1980s, manufacturing operations have relied upon i3070 in-circuit testers (ICT) to run electrical tests on assembled printed circuit boards (PCBs). Manufacturers are always looking to optimize their processes to reduce the cost of manufacturing their products. Time to market is a critical success factor as every second saved in test time is multiplied by the high volume, frequently thousands of units of products produced, deeply impacting manufacturing.

Especially at these high volumes, machines used in manufacturing need to operate stably and reliably at high throughput. The new Keysight i3070 Series 6 ICT is the latest test solution that meets manufacturing demands, improving test efficiency built upon the latest Control XTPB card, software supporting PathWave Manufacturing Analytics, Industry 4.0 Connected Factory Exchange IPC-CFX 2591, and machine-to-machine connectivity IPC-Hermes 9852. The i3070 Series 6 family includes configurations for the appropriate production needs using the two main test head sizes in Figure 1: Four modules (E9903G), two modules (E9902G), and a small footprint of two modules (E9905G).



Figure 1. The i3070 Series 6 family

This application note compares the test throughput of the i3070 Series 3 and Series 5 ICT versus the new i3070 Series 6 ICT on select computer notebook motherboards and automotive boards.

Study #1: The i3070 Series 6 showed a 1.5x improvement over Series 3 ICT

For Study #1, testers evaluated 500 computer laptop PCB assembly panels on the i3070 Series 6 and Series 3 ICT. Both systems used the same test fixture and program for the same test coverage. The following are the system configurations of the respective testers and the average test times:

Configuration 1: The **i3070 Series 6** with i-system card, ASRU N, Control XTPB, RP5810, Windows 10, and i3070 10.00p software revision.

Configuration 2: The **i3070 Series 3** with system card, ASRU C, Control XT, RP5700, Windows 7, and i3070 8.40p software revision.

Table 1. Test time comparison of Series 6 versus Series 3

| Test type | i3070 Series 6 Configuration 1 (secs) | i3070 Series 3 Configuration 2 (secs) | Improvement |
|----------------|---------------------------------------|---------------------------------------|-------------|
| Pins | 0.8 | 2.0 | 59% |
| Preshorts | 1.4 | 1.4 | 2% |
| Shorts | 0.7 | 1.7 | 61% |
| Analog_ICT | 6.8 | 8.3 | 18% |
| VTEP | 0.3 | 0.6 | 44% |
| Analog_cluster | 0.5 | 0.7 | 25% |
| Setup_PS | 12.9 | 17.2 | 25% |
| Digital | 0.4 | 3.0 | 85% |
| Boundary scan | 4.2 | 12.4 | 66% |
| Mixed | 1.0 | 1.3 | 23% |
| Disconnect_PS | 19.4 | 22.1 | 12% |
| Shorts1 | 0.7 | 1.7 | 59% |
| Total | 51.1 | 76.1 | 33% |

Table 2. First pass yield, stability, and volume comparison

| | Series 6 | Series 3 |
|--|--|---|
| First pass yield (FPY) | 98.1% | 97.6% |
| No trouble found (NTF) | 0.95% | 0.94% |
| True failures | 0.95% | 1.41% |
| Possible production volume (assume 20-hour days) | $(20 \times 60 \times 60) / 51.1 = 1409$ | $(20 \times 60 \times 60) / 76.1 = 910$ |
| Increase in volume / day | 499 | |
| Increase in volume / year | 182,135 | |

Study #1: Conclusion

There are three key findings:

- The study revealed that Series 6 completed the same test plan 25 seconds faster than Series 3, which translates to about a 1.5x improvement in test time. This finding suggests i3070 Series 6 is more productive by 499 boards per day and 182,135 boards per year.
- The study demonstrated that the first pass yield remains the same — i3070 Series 6 is as stable and repeatable as Series 3.
- The digital boundary scan test saw the greatest reduction in test time for a nearly 3x increase in efficiency.

Study #2: The i3070 Series 6 Series showed a 1.5x improvement over the 5 ICT

For this study, a panel comprised of four boards in an autonomous dedicated short-range communication application was tested on i3070 Series 6 and Series 5 ICT. Both systems used the same test fixture and test program and have the same test coverage. The following are the system configurations for the respective testers and the average test results:

| Panel of 4 boards | |
|-----------------------------|--------|
| Device test results | |
| Nodes (nets) on the board | : 1352 |
| Total nodes tested | : 588 |
| Total devices in board data | : 716 |
| Shorts test details | |
| Total nodes in shorts-test | : 1352 |
| Total inaccessible nodes | : 764 |

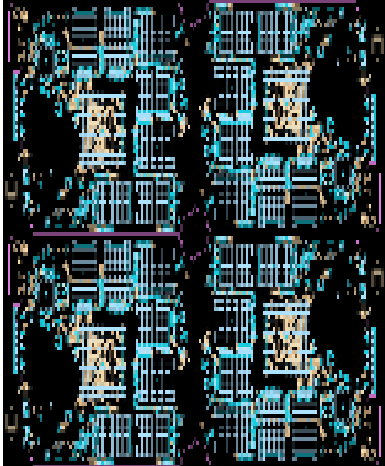


Figure 2. Board information and skeleton of the four-board panel

Configuration 3: The **i3070 Series 6** with i-system card, ASRU N, Control XTPB, RP5810, Windows 10, and i3070 software revision 10.00p.

Configuration 4: The **i3070 Series 5** with i-system card, ASRU N, Control XTP, RP5800, Windows 7, and i3070 software revision 9.20p.

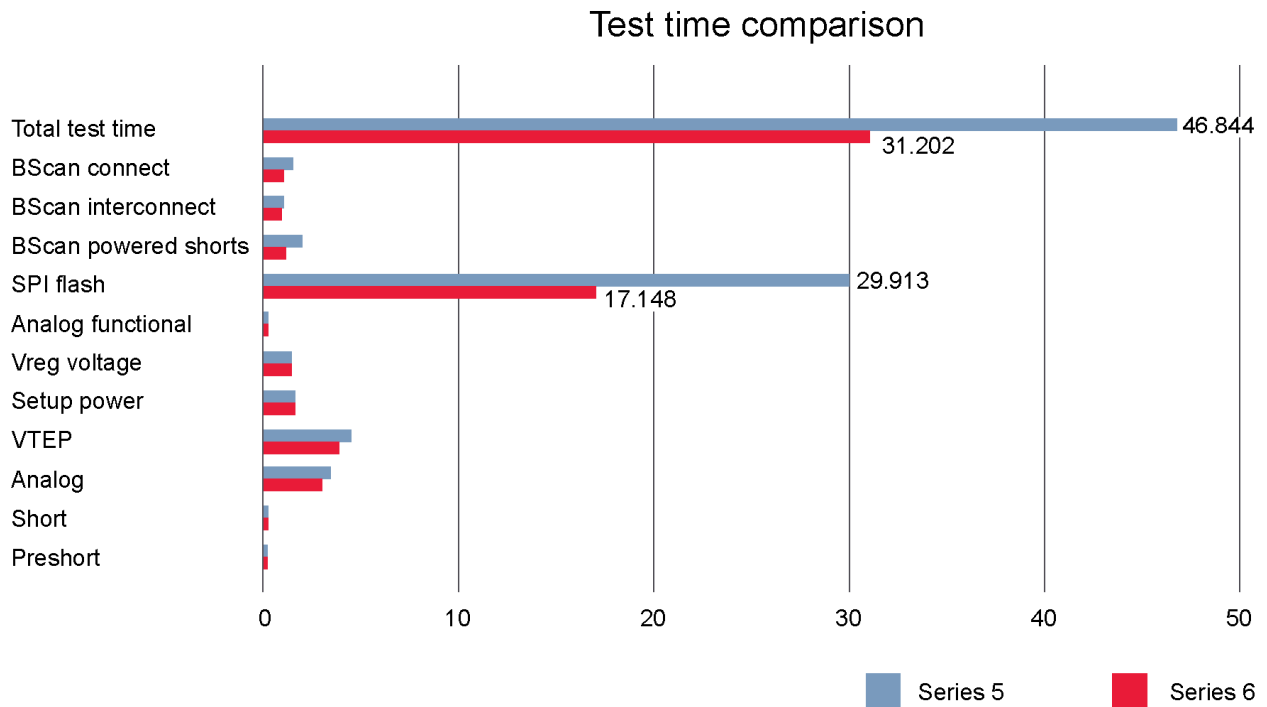


Figure 3. Test time comparison of Series 6 versus Series 5

Study #2 Conclusion

In this case, the Series 6 has improved the serial peripheral interface (SPI) flash test time from 30 seconds to about 17 seconds, improving the overall test time by 1.5x. The main differences in the i3070 Series 6 tester configuration are the latest Control XTPB card and the i3070 10.00p software.

Overall Conclusion

The i3070 Series 6 ICT is fully backward compatible. The full code compatibility on the i3070 Series 6 with the Series 5 guarantees minimal downtime for installation. The i3070 Series 6 demonstrated equally repeatable measurements for the Series 3 and Series 5 configurations, yet users can expect to see test time improvements. There is the potential for up to 3x the test time improvements in boundary scan, silicon nails, and dynamic flash programming due to improvements in Control XTPB card design.

Web Resources

For more information on the i3070 in-circuit test system, visit: <http://www.keysight.com/find/ict>



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

This information is subject to change without notice. © Keysight Technologies, 2020 – 2024, Published in USA, January 30, 2024, 3120-1412.EN