NoBL™, The ZBT™-Compatible Family!

NoBL & ZBT: Are they different or are they the same? There has been a lot of confusion on this issue of late. The purpose of this white paper is to examine the facts and determine the differences between the two. NoBL, short for No Bus Latency, is the name of a family of synchronous SRAMs being designed and manufactured by Cypress Semiconductor. "ZBT" (short for Zero Bus Turnaround) is the name given to a family of synchronous SRAM devices designed and manufactured by IDT (Integrated Device Technology). Both NoBL and ZBT target networking applications, which can benefit from the elimination of wait states during Write/Read transitions. The question at hand is whether NoBL and ZBT are compatible with one another. The underlying question is, do they share the same "Form, Fit, and Function?" **Yes!** The details will be examined below.

IDT has cross licensed the "ZBT" name to both Micron and Motorola. The implication of this agreement is that both Micron and Motorola are legally entitled to use the "ZBT" name. In order to use this name, each company will provide devices that are "Form, Fit, and Function" equivalents to that offered by IDT. However each company will design, manufacture and market their own devices independently from one another.

Form - The Package

Packaging is a key place to begin the comparison analysis. All NoBL devices are offered in a 100-pin TQFP package. This is an industry (JEDEC) standard package used for most synchronous SRAMs. The ZBT family is also being offered in the same 100-pin JEDEC standard TQFP package. Therefore, NoBL devices **are 100% compatible to the "Form" used by ZBT devices**.

Fit - The Pinout

The next step in evaluating these two families is comparing the Fit or pinout used by each device. The pinout for IDT's 128Kx36 Pipelined ZBT device (IDT71V546) is shown in *Figure 1*. The pinout used for the CY7C1350, Cypress's 128Kx36 Pipelined NoBL device is shown in *Figure 2*. **A detailed pin-by-pin evaluation reveals that the FUNCTION OF EACH PIN OF THE NoBL CY7C1350 IS 100% COMPATIBLE WITH THE ZBT DEVICE IDT71V546.** The same comparison has been carried out for each and every NoBL device to its ZBT counterpart. In every case, the NoBL device was found to be 100% compatible to the ZBT device. **Therefore, the pinout used by the NoBL family is 100% compatible to the "Fit" used by the ZBT family.**

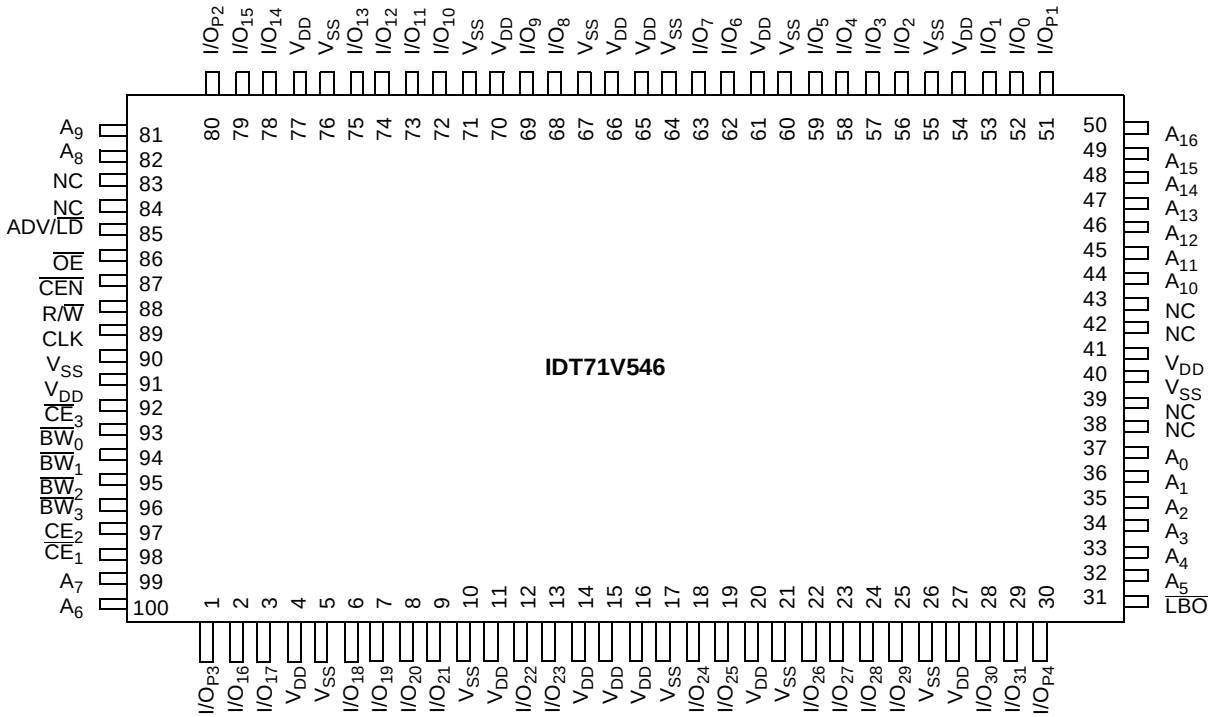


Figure 1. Pinout of IDT's 128Kx36 Pipelined ZBT Device (IDT71V546)

NoBL is a trademark of Cypress Semiconductor Corporation. ZBT is a trademark of Integrated Device Technology.

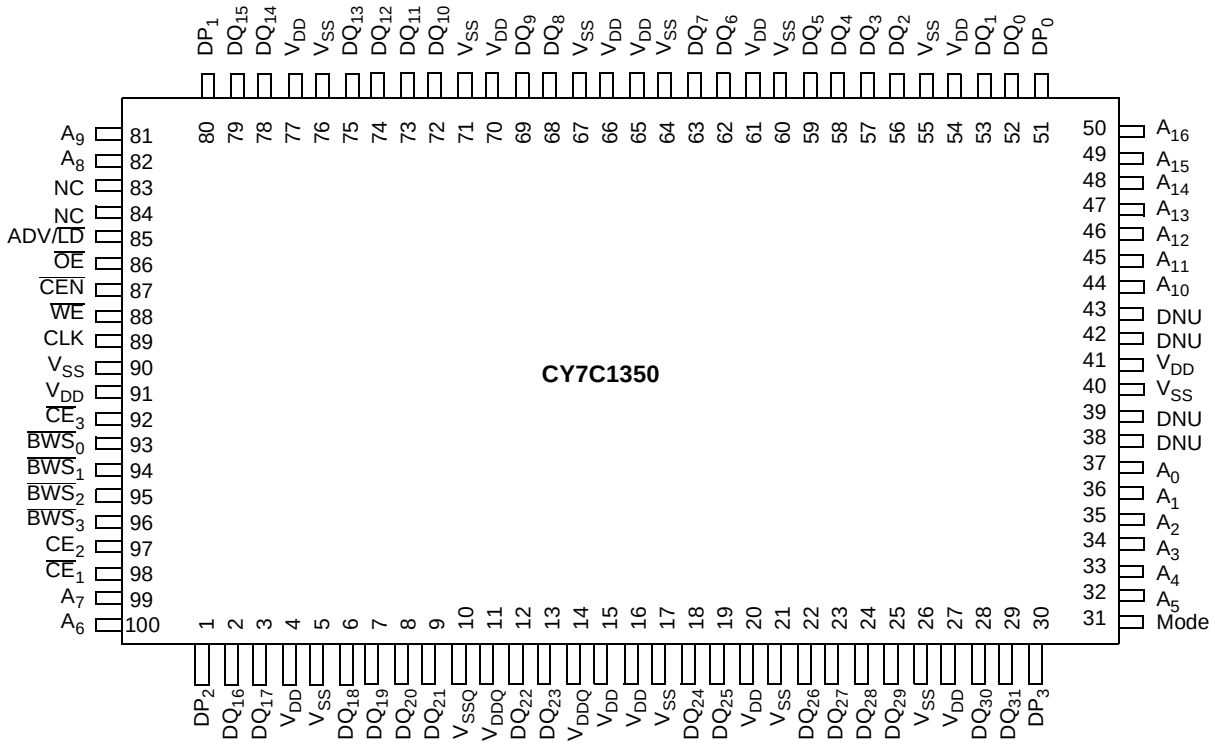


Figure 2. Pinout of Cypress's 128Kx36 Pipelined NoBL Device (CY7C1350)

Function - The Device Functionality

The question then is whether the two families share the same functionality. In order to answer this question a thorough evaluation of each family was conducted. This includes the functional specifications described in the datasheet for each of the two families. Both Pipelined and Flow-Through versions were evaluated independently. The results of this comparison are shown in *Table 1* below.

Table 1. Functional Evaluation of NoBL vs ZBT

Operation Evaluated	NoBL Flowthrough	NoBL Pipelined
	ZBT Compatible	ZBT Compatible
Single Read Operations	Yes	Yes
Burst Read Operations	Yes	Yes
Single Write Operations	Yes	Yes
Burst Write Operations	Yes	Yes
All Read/Write Single Combinations	Yes	Yes
All Read/Write Burst Combinations	Yes	Yes
All Read/Write Burst/Single Sequences	Yes	Yes
All Select and Deselect Logic	Yes	Yes
All High-Z Logic	Yes	Yes
All Low-Z Logic	Yes	Yes
All A/C Timing Specifications	Yes	Yes
All D/C Specifications	Yes	Yes
All A/C Timing Waveforms	Yes	Yes

[+] Feedback

In each and every case the NoBL device was found to be 100% compatible to it's ZBT counterpart (same organization and Pipeline vs. Flow-Through functionality). Therefore, **NoBL IS 100% FUNCTIONALLY EQUIVALENT TO ZBT!**

Conclusion

The comprehensive evaluation described above has determined that the NoBL family of devices offered by Cypress and the ZBT family of devices (offered by IDT, Micron and Motorola) are equivalent in "Form, Fit and Function." Any socket designed to use ZBT can now use the 100% equivalent part as well.

All four vendors discussed in this paper Cypress, IDT, Micron, and Motorola design and manufacture their devices separately from the other three. No two share the same design files or fabrication facilities. Therefore the NoBL family can be thought of as **The ZBT Compatible Family!** The two are interchangeable.

Table 2. NoBL Part Numbers Cross Reference

Density	Pipelined or Flow-Through	Cypress	IDT	Motorola	Micron
64K x 32	Pipelined	CY7C1334	Not Available	Not Available	MT55L64L32P
64K x 32	Flow-Through	CY7C1333	Not Available	Not Available	MT55L64L32F
128K x 36	Pipelined	CY7C1350	IDT71V546	MCM63Z736	MT55L128L36P
128K x 36	Flow-Through	CY7C1351	IDT71V547	MCM63Z737	MT55L128L36F
256K x 18	Pipelined	CY7C1352	Not Available	MCM63Z818	MT55L256L18P
256K x 18	Flow-Through	CY7C1353	Not Available	MCM63Z819	MT55L256L18F

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