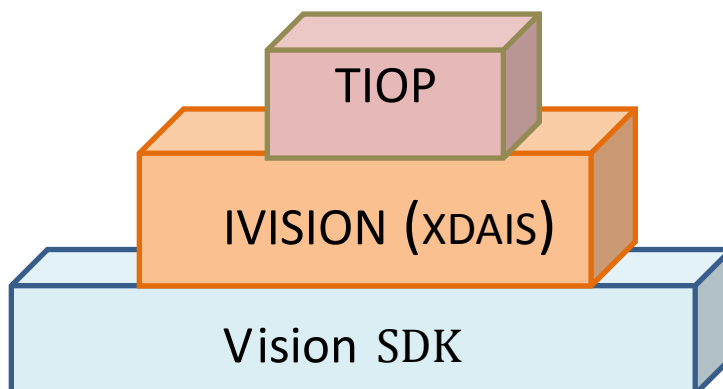


TI Object Propagation Datasheet

- IVISION (XDAIS) interface compliant
- Validated on TDA2x EVM
- Supports up to 5 levels for LK tracker and this parameter is configurable
- Supports user controlled parameters
- Threshold and scale factor for HC
- Supports externally calculated Image Pyramidal data as input



1.1 Description

TI Object propagation (TIOP) module is TI's proprietary Vision and Imaging algorithm implemented on TMS320C66x DSP. TIOP module is validated with Code Composer Studio version 5.4.0.00091 and code generation tools version 7.4.2.

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1.2 Performance and Memory Summary

Table 1. Configuration Table

CONFIGURATION	ID
Number of Input detections = 200 Number of Image Pyramidal levels = 4 Number of Iterations for LK tracker = 10 Number of output detections = 200 Input frame width = 1280 Input frame height = 720 External Image pyramidal input = 0	TIOP_001
Number of Input detections = 200 Number of Image Pyramidal levels = 4 Number of Iterations for LK tracker = 10 Number of output detections = 200 Input frame width = 1280 Input frame height = 720 External Image pyramidal input = 1	TIOP_002

Table 2. Cycle Performance Statistics

CONFIGURATION ID	TEST DESCRIPTION	TI C66X DSP PERFORMANCE STATISTICS	
		MIN (MEGA CYCLE PER CALL)	MAX (MEGA CYCLE PER CALL)
TIOP_001	720p image size with 5-6 objects	2.57	2.57
TIOP_002	720p image size with 5-6 objects	1.01	1.01

¹ Performance is validated by running on TDA2x platform, DDR-532Mhz, DSP-600Mhz. Performance number is heavily dependent on input data.

Table 3. Memory Statistics

CONFIGURATION ID	MAXIMUM INPUT DETECTIONS	MEMORY STATISTICS ¹						
		PROGRAM MEMORY	DATA MEMORY					TOTAL
			INTERNAL	EXTERNAL			STACK	
				PERSISTENT	SCRATCH	CONST		
TIOP_001	200	20	25.3	607	908	0	2	1562.3
TIOP_002	200	20	25.3	16	908	0	2	971.3

All memory requirements are expressed in kilobytes (1 K-byte = 1024 bytes) and there could be a variation of around 1-2% in the numbers.

Table 4. Internal Data Memory Split-up

CONFIGURATION ID	DATA MEMORY – INTERNAL ²		
	SHARED		INSTANCE ³
	CONSTANTS	SCRATCH	
TIOP_001	0	25	0.3
TIOP_002	0	25	0.3

² Internal memory refers to on chip memory. All memory requirements are expressed in kilobytes and there could be a variation of around 1-2% in numbers. ³ I/O buffers are not included. Some of the instance memory buffers could be scratch. For L1D 16KB is configured as cache, whereas for L2D 128 KB is configured as cache.

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1.3 Notes

- I/O buffers:
 - Input Data frame buffer size = 1280×720 , where input is a 720p frame in luma(Y) format.
 - Input Data list buffer size = $200 \times 7 \times 4$, where input frame has 200 detections (and each has 7×4 size) includes moderate and strong detections.
 - Input Image pyramidal data buffer size = $1280 \times 720 \times (1/4 + 1/16 + 1/64)$ for Numlevels = 4.
 - Output data list buffer size = $200 \times 7 \times 4$, where output list will have maximum of 200 detections (and each has 7×4 size)
 - Total data memory for N non pre-emptive instances = Constants + Runtime Tables + Scratch + $N \times (\text{Instance} + \text{I/O buffers} + \text{Stack})$
 - Total data memory for N pre-emptive instances = Constants + Runtime Tables + $N \times (\text{Instance} + \text{I/O buffers} + \text{Stack} + \text{Scratch})$

1.4 References

- TIOBJECTPROGATION_DSP_UserGuide.pdf

1.5 Glossary

Constants	Elements that go into .const memory section
Scratch	Memory space that can be reused across different instances of the algorithm
Shared	Sum of Constants and Scratch
Instance	Persistent-memory that contains persistent information - allocated for each instance of the algorithm

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1.6 Acronyms

TIOP	TI Object Propagation
DSP	Digital signal processor
EVM	Evaluation Module
DDR	Double Data Rate

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