

# TRITON-TX53 miniature modular computer based on Freescale i.MX53

TRITON-TX53 is a self-contained production-quality module, based on Freescale's low-power high performance multimedia-optimized i.MX535 or i.MX537 microcontrollers with ARM-Cortex-A8 core, NEON VFP, enhanced OpenGL ES 2.0 graphics core and hardware video codec. With BSPs for Windows Embedded Compact 7 and Linux, TRITON-TX53 is a complete solution, ready to be designed into an embedded system.

TRITON-TX53 is a member of a series of pin-compatible, SODIMM format modules based on Freescale's i.MX series of microcontrollers. Each family member has an anticipated production lifetime of 10-15 years, and a guaranteed longevity of 7 years.

For development the TRITON-TX53 is plugged into the StarterKit-5 development baseboard, and then in production the StarterKit is replaced by a project-specific baseboard, based on the supplied StarterKit design. Direct Insight can provide rapid development and manufacture of baseboards as a service.



**TRITON Starter Kit and optional touch-screen**

Because the TRITON system includes a production quality Board Support Package (BSP) and production ready module, project times are cut dramatically.

TRITON-TX53 includes an 800MHz Freescale i.MX537, or

1000MHz / 1200MHz Freescale i.MX535 processor, 512MB or 1GB of high performance, DDR3 RAM and 128MB NAND Flash.

The iMX53's integrated display controller permits direct connection of an LCD screen of up to 1920x1080 resolution. The



**TRITON-TX53 i.MX535 Module Shown Actual Size**

TRITON-TX53 is optionally available with dual LVDS outputs. A directly connected 640 x 480 touch screen is optionally supplied as part of the development kit. The i.MX53 also provides an integral Ethernet 10/100 MAC, with the PHY implemented on the TRITON module.. The processor's I/O is accessible via a standard DIMM200 socket based on the standard TX-module pinout, which in turn is all available via connectors and headers on the StarterKit-5. The overall size of TRITON-TX53 is 67.6mm x 31mm x 4.2mm.

The module operates from either a single 3.1 - 5.5V supply, and may also be powered via USB, or a Li-Ion/Polymer cell.

## Why i.MX53?

The Freescale i.MX53 features low power operation with a broad set of interfaces including Ethernet, USB 2.0 Host x 2 and OTG

System Control		Core/Internal Memory		Standard Connectivity	
Clock Reset	Temp Monitor	ARM® Cortex™-A8		Fast IrDA	UART x 5
Smart DMA	System Buses	Cache	ETM	CSPi	Keypad
Timers		Neon	VFP	I²C x 3	GPIO
GPT	Watchdog x 2	ROM	RAM	Advanced Connectivity	
PWM x 2	EPIT x 2	Multimedia		HS USB OTG + PHY	Ethernet + IEEE* 1588
Power Mgmt. and Analog		GPU		HS Host + PHY	CAN x2/MLB 50
LDO Supply x 2	32 kHz Osc	OpenGL ES 2.0	OpenVG 1.1	HS ULPI Host x 2	Camera Interface
PLL x 4	VPU		External Memory I/F		
Security		Video Encode/Decode	TV Out	2 GB DDR2/DDR3/LV-DDR2/LP-DDR2	
eFuses	RTIC	IPU		External Storage I/F	
Sahara v4	SCC v2	Resizing and Blending	Image Enhancement	SLC/MLC NAND	SATA
TrustZone	SRTC	Inversion and Rotation	Camera Interface	NOR	eMMC/SD
System Debug		De-interlacing/Combining	Display I/F		
Secure JTAG	Audio		Parallel (from IPU)		
		ESAI	SPDIF Tx/Rx	Analog VGA Out	LVDS
		SSI/I²S x 3	ASRC		

(see table overleaf), as well as on-chip video subsystem capable of 720p encode and 1080p decode at 30fps, dual camera input, display controller, including composite video out, as well as an enhanced graphics engine with OpenGL ES 2.0. Based on an ARM Cortex-A8 with NEON vector Floating Point Unit (FPU), the

i.MX53 is a versatile device particularly well suited to high end multimedia and rich GUI applications.

### StarterKit-5 Baseboard

For development purposes, the TRITON-TX53 plugs into the StarterKit-5 baseboard via its DIMM200 connector. This combination, with optional touch-screen display is supplied as a complete development kit running Linux, or Windows Embedded Compact 7. Linux source code and toolchain are supplied, along with a configured virtual machine for development. Windows CE source code is available for a modest fee.

The StarterKit-5 includes connectors for the I/O provided by the

iMX53 processor and TRITON-TX53, including 2x SD/MMC card sockets, 2x RS232, USB-OTG and USB-Host connectors, a D-SUB15 VGA connector for an external video DAC and an Ethernet connector. In addition, there is an audio codec and touchscreen controller with 3.5mm headphone jack connector.

The board is powered via USB, an external supply source, or from a 3.0 to 4.2v Li-Ion/Polymer cell.

To facilitate creation of a production baseboard, full schematics are provided for the StarterKit-5. We offer a custom baseboard design and production service for customers with tight time-to-market constraints who wish to focus their efforts on application development.

## TRITON-TX53 Feature / Option Summary

<i>TRITON-TX53 Feature:</i>	Support	Details
Microcontroller	i.MX53	Freescale i.MX537, optional i.MX535
CPU	ARM Cortex-A8	
Processor clock max (MHz)	800/1000/1200	800MHz i.MX537, 1GHz/1.2GHz i.MX535
RAM(MB)	512/1024/2048	DDR3
NAND Flash (MB)	128	
Coprocessor	Graphics, Video	OpenGL ES 2.0, hard codec 1080p
Floating Point	y	NEON Vector Floating Point
UART (RS-232)	3(2**)	up to 5 UARTs via pin-sharing
Ethernet 10/100 BaseT	1	PHY on module. IEEE1588 on i.MX537
I2C Interface	2	
LCD controller	1920x1080	24-bit parallel OR dual LVDS*
Supplied touch screen	640x480**	other sizes, cap. touch, on request
LVDS	2*	optional LVDS/SATA module build
SATA	1*	optional LVDS/SATA module build
SSP (I2S, AC'97)	2	
CAN	2	TX/RX - i.MX537 only
SD card / SDIO (4-bit)	2	
1-wire interface	1	
USB 2.0 Host	2	
USB 2.0 OTG	1	
SPI	1	
PWM controller	1	
Keypad	8x8	
JTAG	1	
Audio	1**	controller on baseboard
Touch screen interface	1**	4-wire on baseboard, capacitive via I2C
RTC	1	DS1339 on module
PAL / NTSC out	1	
Temp Range	-20/70C -45/80C	i.MX535:-20/+70C, i.MX537:-45/+85C
Dimensions	31mm x 68mm	SODIMM200

\*optional \*\*on baseboard



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