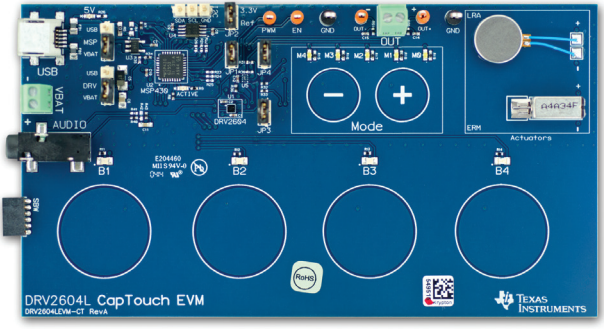
DRV2604LEVM-CT

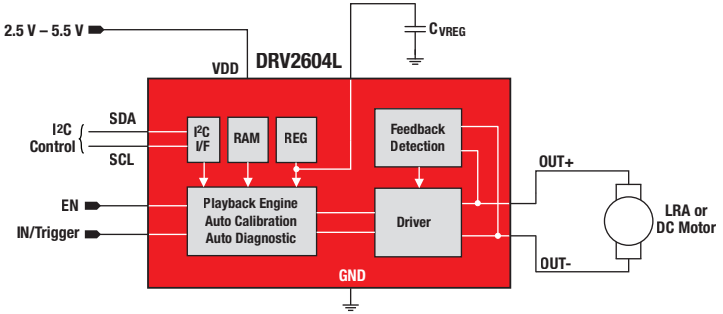
Quick-Start Guide

Start Here



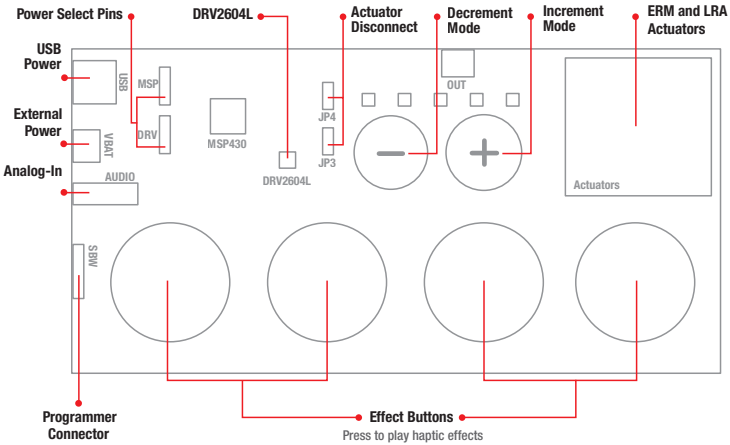
Evaluation Kit Contents

- DRV2604L LRA / ERM haptics driver with automatic overdrive and braking for ERM and LRAs
- Eccentric rotating mass motor (ERM)
- Linear resonant actuator (LRA)
- Programmable MSP430™ with haptic effects
- Capacitive touch buttons
- Mini-USB cable



Getting Started

1. Verify jumpers MSP and DRV, next to the USB connector, are connected to the USB pin.
2. Plug the board into an available USB power source (computer or wall charger) using the included USB cable.
3. Board will enter a power up sequence and the 5 V indicator will light up.
4. Use the large buttons to play effects and the “+” and “-” buttons to switch between modes. Each mode has a different set of effects.



Mode and Effects

Mode	Button	Description	Actuator	Waveform Location	Interface
Mode Off LEDs Off	B1	Click + Bounce	ERM	RAM	Internal Trigger (I^2C)
	B2	Ramp Up + Click	LRA		
	B3	Gallop Alert	ERM		
	B4	Pulsing Alert	LRA		
Mode 4 LED M4 On	B1	StrongClick	ERM	RAM	Ext. Level Trig.
	B2	Bump + Release			Internal Trigger
	B3	Double Strong Click			Ext. Edge Trig.
	B4	Click (Open Loop)		µController	PWM
Mode 3 LED M3 On	B1	StrongClick	LRA	RAM	Ext. Level Trig.
	B2	Single-Cycle Click			Internal Trigger
	B3	Single-Cycle Click with braking			Ext. Edge Trig.
	B4	Click (Open Loop)		µController	PWM
Mode 2 LED M2 On	B1	Buzz Auto-Resonance ON	LRA	µController	RTP (I^2C)
	B2	Buzz Auto-Resonance OFF	LRA		PWM
	B3	Buzz Alert	ERM		PWM
	B4	Scroll Wheel	LRA		RTP (I2C)
Mode 1 LED M1 On	B1	Click with braking	ERM & LRA	RAM	Internal Trigger (I^2C)
	B2	Click without braking			
	B3	Click with braking (open loop)			
	B4	Selects ERM or LRA			
Mode 0 LED M0 On	B1	Auto-Calibration	ERM	Internal Routine	Internal Trigger (I^2C)
	B2	Auto-Calibration	LRA		
	B3	Click	ERM/LRA	RAM	Internal Trigger (I^2C)
	B4	Buzz			

Features and Benefits

Embedded RAM
Integrated RAM can store over 100 customized waveforms that can be triggerred via I^2C or a GPIO

Immersion-Compatible
Works seamlessly with Immersion TouchSense® 3000

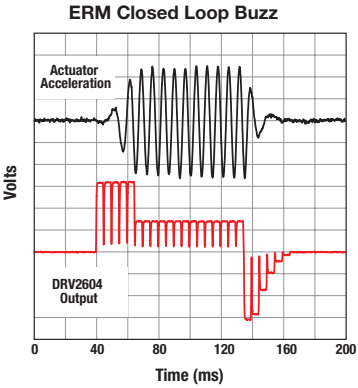
Smart Loop Architecture

Auto-Resonance Detection
Automatically track the resonant frequency of an LRA; maximize vibration strength and improve consistency across devices

Automatic Diagnostics
Automatically detect the status of the actuator

Automatic Calibration
Automatically detect and configure the closed-loop feedback coefficients for every actuator

Closed Loop Feedback
Improve the response time of ERM and LRA actuators with automatic overdrive and braking



Design Resources and References

E2E Haptic Forum
ti.com/hapticforum

Available on **ti.com/drv2604L**

- DRV2604L datasheet
- Complete DRV2604LEVM-CT User's Guide
- Schematics and layout
- EVM source code and binaries

Get more information on TI's solutions for touch feedback-enabled applications at **ti.com/haptics**

- Watch videos
- Compare products
- Find companion products
- Download software
- Order samples and EVMs

SZZB132

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, enhancements, improvements and other changes to its semiconductor products and services per JESD46, latest issue, and to discontinue any product or service per JESD48, latest issue. Buyers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All semiconductor products (also referred to herein as “components”) are sold subject to TI’s terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its components to the specifications applicable at the time of sale, in accordance with the warranty in TI’s terms and conditions of sale of semiconductor products. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by applicable law, testing of all parameters of each component is not necessarily performed.

TI assumes no liability for applications assistance or the design of Buyers’ products. Buyers are responsible for their products and applications using TI components. To minimize the risks associated with Buyers’ products and applications, Buyers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right relating to any combination, machine, or process in which TI components or services are used. Information published by TI regarding third-party products or services does not constitute a license to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of significant portions of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI components or services with statements different from or beyond the parameters stated by TI for that component or service voids all express and any implied warranties for the associated TI component or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

Buyer acknowledges and agrees that it is solely responsible for compliance with all legal, regulatory and safety-related requirements concerning its products, and any use of TI components in its applications, notwithstanding any applications-related information or support that may be provided by TI. Buyer represents and agrees that it has all the necessary expertise to create and implement safeguards which anticipate dangerous consequences of failures, monitor failures and their consequences, lessen the likelihood of failures that might cause harm and take appropriate remedial actions. Buyer will fully indemnify TI and its representatives against any damages arising out of the use of any TI components in safety-critical applications.

In some cases, TI components may be promoted specifically to facilitate safety-related applications. With such components, TI’s goal is to help enable customers to design and create their own end-product solutions that meet applicable functional safety standards and requirements. Nonetheless, such components are subject to these terms.

No TI components are authorized for use in FDA Class III (or similar life-critical medical equipment) unless authorized officers of the parties have executed a special agreement specifically governing such use.

Only those TI components which TI has specifically designated as military grade or “enhanced plastic” are designed and intended for use in military/aerospace applications or environments. Buyer acknowledges and agrees that any military or aerospace use of TI components which have ***not*** been so designated is solely at the Buyer's risk, and that Buyer is solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI has specifically designated certain components as meeting ISO/TS16949 requirements, mainly for automotive use. In any case of use of non-designated products, TI will not be responsible for any failure to meet ISO/TS16949.

Products		**Applications**	
Audio	www.ti.com/audio	Automotive and Transportation	www.ti.com/automotive
Amplifiers	amplifier.ti.com	Communications and Telecom	www.ti.com/communications
Data Converters	dataconverter.ti.com	Computers and Peripherals	www.ti.com/computers
DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
Clocks and Timers	www.ti.com/clocks	Industrial	www.ti.com/industrial
Interface	interface.ti.com	Medical	www.ti.com/medical
Logic	logic.ti.com	Security	www.ti.com/security
Power Mgmt	power.ti.com	Space, Avionics and Defense	www.ti.com/space-avionics-defense
Microcontrollers	microcontroller.ti.com	Video and Imaging	www.ti.com/video
RFID	www.ti-rfid.com		
OMAP Applications Processors	www.ti.com/omap	**TI E2E Community**	e2e.ti.com
Wireless Connectivity	www.ti.com/wirelessconnectivity		

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265