MPD
MEMORY PROTECTION DEVICES, INC.

Battery Holder Design and Testing, ANSI, EIA, UL

For testing new designs of battery holders, MPD fabricated min-max sized battery slugs. The slugs proved to be a great aid to our engineering staff in several ways.

- First off is saving time and money by not having to shop for several brands of batteries to confirm that your design works with common batteries.
- They weigh more than a battery, generating more force during drop testing.
- They are more durable than batteries when drop testing.
- They have no power and will not short circuit, leak or require storage-handling precautions.

The minimum – maximum, length and width for common batteries is fairly wide.

	Length		Height	
Alkaline	**Min**	**Max**	**Min**	**Max**
D cell	59.5	61.5	32.3	34.2
C cell	48.5	50.0	24.9	26.2
AA cell	49.2	50.5	13.5	14.5
AAA cell	43.3	44.5	9.5	10.5
6 volt	23.9	25.2	12.0	13.0
9 Volt	46.5	48.5	34.5	26.5
Lithium				
CR1/2AA	24.9	25.1	14.5	14.8
CR2/3A	33.5	34.5	16.0	17.0
CR123A	33.5	34.5	16.0	17.0
CR1632	15.8	16.0	3.0	3.2
CR2032	19.7	20.0	2.9	3.2
CR2325	22.6	23.0	2.2	2.5
CR2430	24.2	24.5	2.7	3.0
CR2450	24.2	24.5	4.6	5.0
CR2477	24.2	24.5	7.3	7.7

Dimensions shown are mm
IEC-ANSI standards

UL2069: Issue number 2, October 2001

The UL standard determines if batteries stay in a holder.

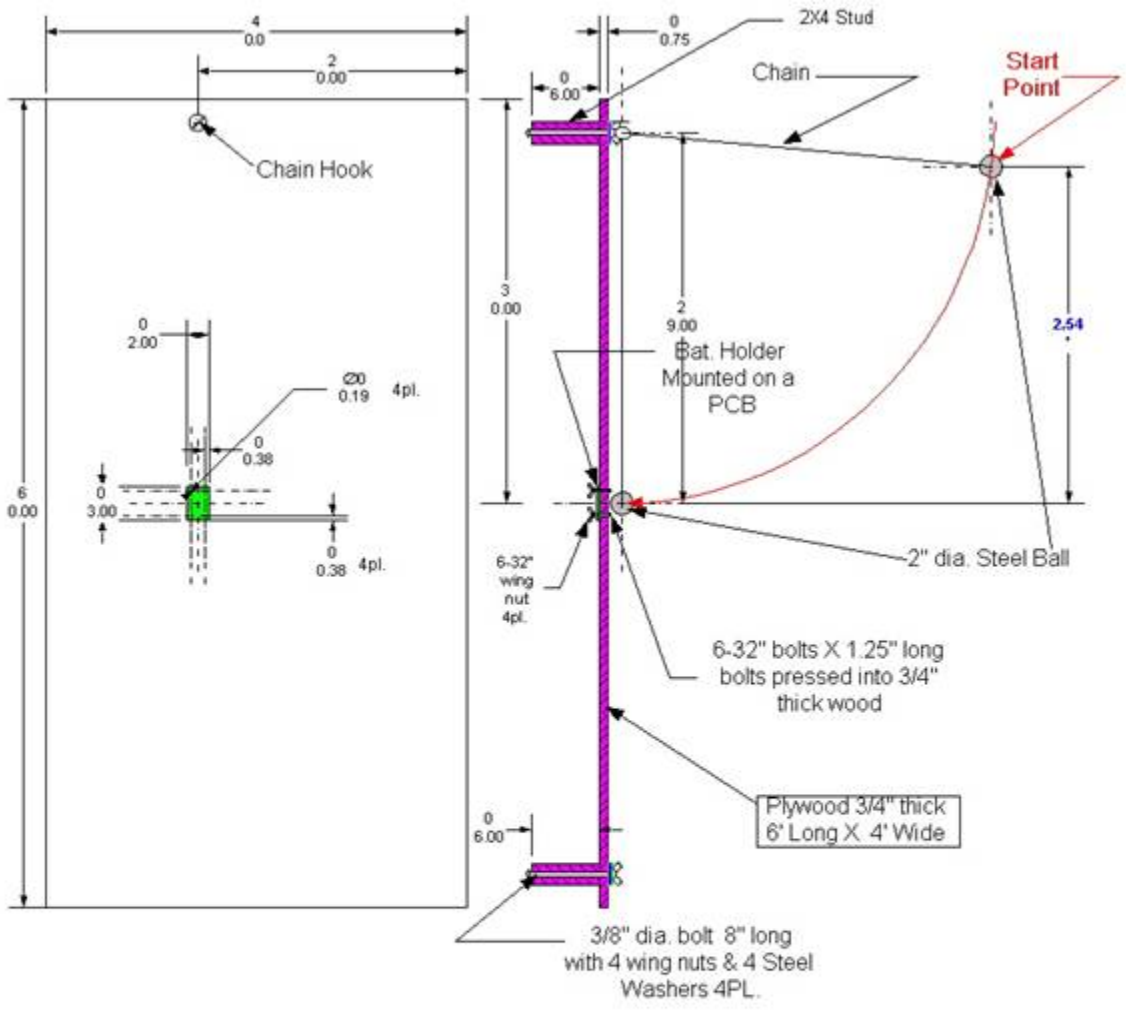
50 insertion-extractions of the battery are followed by contact retention, conditioning, vibration and jarring tests. Notable in the test procedure is temperature conditioning with unplated copper slugs.

Coin cell battery holder in 60” drop test fixture per UL2069

We used wing nuts for quick mounting of the same PCB to either the jarring or drop test fixtures.

UL2069 Jarring test fixture

PCB is mounted on rear side of ¾” thick plywood board and struck by 2” steel sphere



Date: 05/01/2006	SCALE 1"=1'		UL2069

UL2069 Jarring test fixture mounted vertically.

For vertical test the 2” steel sphere is dropped down a tube.

Battery holder is mounted on rear of same board mounted horizontally.

EIA Specification number, EIA-540J000

The purpose of the specification is to provide standard test methods, gages and performance requirements for battery holders.

Vibration, shock, contact resistance, solderability, temperature/humidity

The major difference between the UL & EIA tests is that continuity is continually monitored during vibration and mechanical shock in the EIA specification.

Minor differences are contact resistance and solderability requirements.

The EIA also has separate requirements for coin cell holders and cylindrical battery holders, under EIA-540J0AA & EIA540JAB.

ASTM F963, Toy Safety

Coin cell batteries are specifically exempted from the requirements.

Limited requirements for a battery holder as the standards focus is on markings, circuit protection, harness wiring and limiting access to batteries without tools. Minor requirements for the battery holders connectors and wires flammability rating, V-0 and insulation heat resistance.

UL913

Intrinsically safe apparatus, ANSI/UL

If you need to meet this requirement, contact our engineering department
or a professional industrial designer or engineering company.

Electronic Industries Alliance	*Description*	*Contact*
ANSI/EIA-540J0000	Generic spec of battery sockets.	www.eia.org
ANSI/EIA-540J0AA	1/2A, 2/3A, A, AA battery holders	www.eia.org
ANSI/EIA-540J0AB	Coin cell battery holders	www.eia.org
ASTM International		
ASTM F963	Toy safety standard	www.astm.org
BatteryHolders.org		
Battery Holders	Battery and holder standards, newsgroups	BatteryHolders.org
Memory Protection Devices		
Technical Area	Designs and application tips	Application notes
Index	Contact, cross reference, FAQ, forms	FAQ & Index
Underwriters laboratories, Inc.		
UL2069	Coin, AAA to D cell battery holders	www.ul.com
UL913 (CSA157)	Intrinsically safe apparatus, ANSI/UL	www.ul.com
United States Patent Office		
USPTO	Hundreds of US patents	www.uspto.gov

Product Safety Compliance

Batteries are considered safety critical components by compliance laboratories. A properly designed circuit with reverse current charging protection of lithium batteries is required. Typically two blocking diodes is series or a voltage blocking component plus a current blocking component (diode-resistor combination) are commonly used. Plastic components like battery holders have safety Requirements when part of a circuit containing any kind of battery or battery charging circuits. MPD’s drawings contain the necessary information to make your collecting of documentation for product safety easier.