



U.S. Department
of Transportation

Pipeline and Hazardous
Materials Safety
Administration

1200 New Jersey Avenue, SE
Washington, D.C. 20590

NOV 11 2012

Mr. Kendall Wilcox
Data Domain, BRS Division of EMC Corporation
2421 Mission College Blvd.
Santa Clara, CA 95054

Ref. No.: 12-0137

Dear Mr. Wilcox:

This responds to your June 24, 2012 letter requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to the requirements for lithium batteries. In your letter, you describe a 7.2V battery pack that consists of two United Nations (UN) Manual of Tests and Criteria (UN 38.3) tested lithium ion cells connected in series. The battery pack itself has been tested under section 38.3 of the UN Manual of Tests and Criteria and incorporates protective circuitry. You install these battery packs in your systems, which incorporate a charging circuit. You state that there are between 3 and 6 battery packs on each system, each with its own identical charging circuit. The packs are connected in parallel to provide 7.2V power and are protected via fusing and diodes to prevent reverse currents between packs. In addition, the packs and charging circuits have been evaluated for compliance with UL2054 battery regulations. You ask if the final connected system, as shown in your attached diagram, must be evaluated to the UN 38.3 transportation test. If so, you ask whether every system needs to be tested or can a single system be used to represent all of them, assuming all of the protection circuitry is identical.

It is the opinion of this Office that in your scenario, each battery assembly, with different numbers of battery packs, would not require additional testing under UN 38.3. Based on your scenario, the final connected system you describe does not appear to be a battery assembly as described in UN 38.3(f). Under this section, the battery assembly is not required to undergo tests 3, 4, 5 and, in addition, test 7 in the case of a rechargeable battery assembly.

I hope this satisfies your inquiry. Please contact us if we can be of further assistance.

Sincerely,

T. Glenn Foster
Chief, Regulatory Review and Reinvention Branch
Standards and Rulemaking Division



Data Domain, BRS Division of EMC Corporation
2421 Mission College Blvd.
Santa Clara, Ca 95054 USA

June 24, 2012

Office of Hazardous Materials Safety
Pipeline and Hazardous Materials Safety Administration
U.S. Department of Transportation
1200 New Jersey Avenue, SE
East Building, 2nd Floor
Washington, DC 20590

Dear Sir/Madame,

Data Domain ships lithium ion batteries that are subject to various shipping regulations. We have multiple configurations utilizing the same batteries. I would like to provide you with details regarding our configurations and request feedback on your understanding of the specific tests that are necessary that ensure compliance with UN38.3 testing requirements.

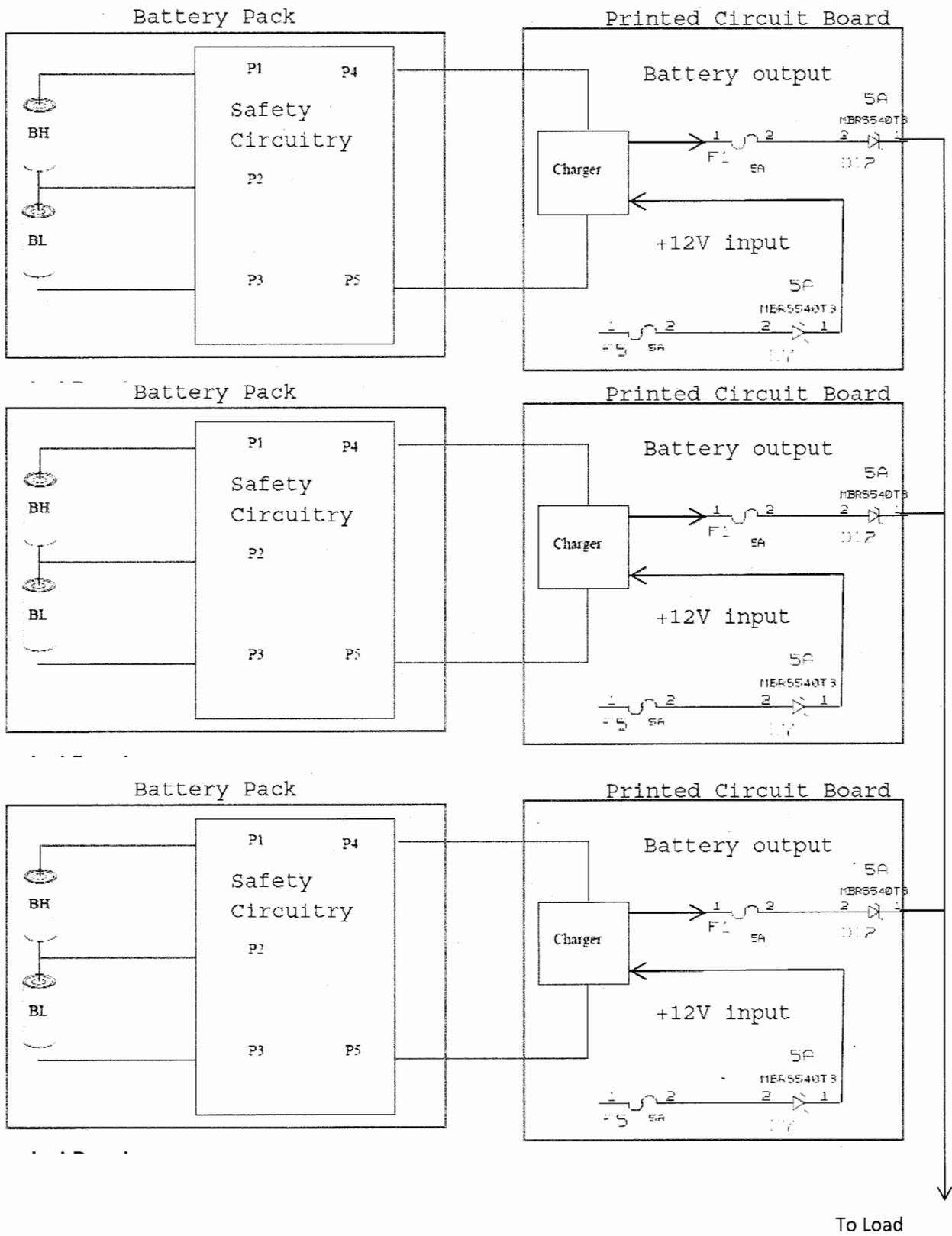
We utilize a 7.2V battery pack that consists of two UN 38.3 tested lithium ion cells connected in series. The battery pack has also been UN38.3 tested and incorporates protection circuitry (thermal protection, short/open circuit protection, reverse charging). We will install these battery packs in our systems. The systems incorporate a charging circuit. We will use between 3 and 6 packs depending on the system we install them into. Each pack has its own identical charging circuit, so if there are 3 packs there are 3 separate charging circuits, 4 packs, 4 charging circuits, etc. The packs are connected in parallel to provide a 7.2V power source and are protected via fusing and diodes to prevent reverse currents between packs. The packs and charging circuits have been evaluated for compliance with UL 2054 battery regulations. See below for a block diagram.

My question is: does the final system need to be evaluated to the UN38.3 transportation tests? If the answer is yes, then does every system need to be tested, or can a single system be used to represent all of them assuming all of the protection circuitry is identical?

Sincerely,

Kendall Wilcox
Consulting Hardware Engineer
Data Domain/EMC

Andrews
3173. 185
Batteries
12-0137



Drakeford, Carolyn (PHMSA)

From: INFOCNTR (PHMSA)
Sent: Thursday, July 05, 2012 6:02 PM
To: Drakeford, Carolyn (PHMSA); Andrews, Steven (PHMSA)
Subject: FW: interpretation request
Attachments: How to UNZIP.html; SecureZIP Attachments.zip

We received the below request to update interp request 12-0137 with the attached letter. -Victoria

From: kendall.wilcox@emc.com [<mailto:kendall.wilcox@emc.com>]
Sent: Thursday, July 05, 2012 5:53 PM
To: INFOCNTR (PHMSA)
Subject: RE: interpretation request

Hello Victoria,

Can you replace my original request letter with the attached document? I was reviewing it with another engineer on our team and he noticed that the block diagram could be modified slightly to more accurately describe our circuit. Nothing else has changed. If there are any questions on this please let me know.

Sincerely,
Kendall Wilcox
Consulting Hardware Engineer
EMC Corp

From: INFOCNTR.INFOCNTR@dot.gov [<mailto:INFOCNTR.INFOCNTR@dot.gov>]
Sent: Monday, June 25, 2012 10:14 AM
To: Wilcox, Kendall
Subject: RE: interpretation request

Dear Kendall Wilcox,

We have received your request for a written letter of interpretation regarding the hazardous materials regulations (49 CFR Parts 171-180). The hazardous materials regulations are available at the following URL:

<http://hazmat.dot.gov/regs/rules.htm>

Typically, written letters of interpretation are responded to at minimum of approximately 6 weeks from when they are received by the Office of Hazardous Materials Standards. However, delivery time of a written interpretation can vary markedly based on topic complexity and the backlog of letters to be completed.

Sincerely,

Victoria, Hazardous Materials Specialist

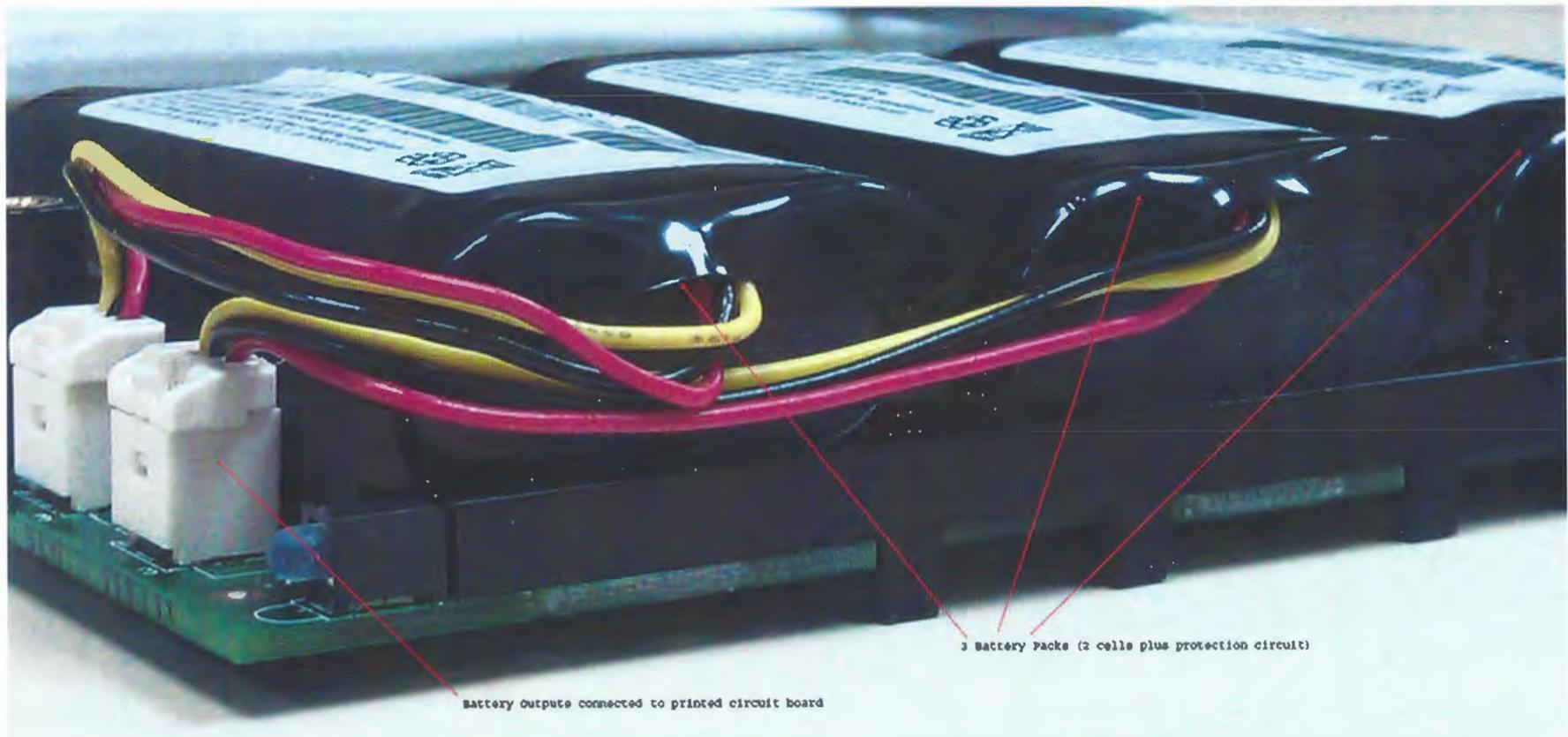
An e-mail response from this office is considered informal guidance. Formal guidance may be requested in accordance with 49 CFR 105.20. <http://hazmat.dot.gov/infocent.htm>

From: kendall.wilcox@emc.com [<mailto:kendall.wilcox@emc.com>]
Sent: Monday, June 25, 2012 8:08 AM
To: PHMSA HM InfoCenter
Subject: interpretation request

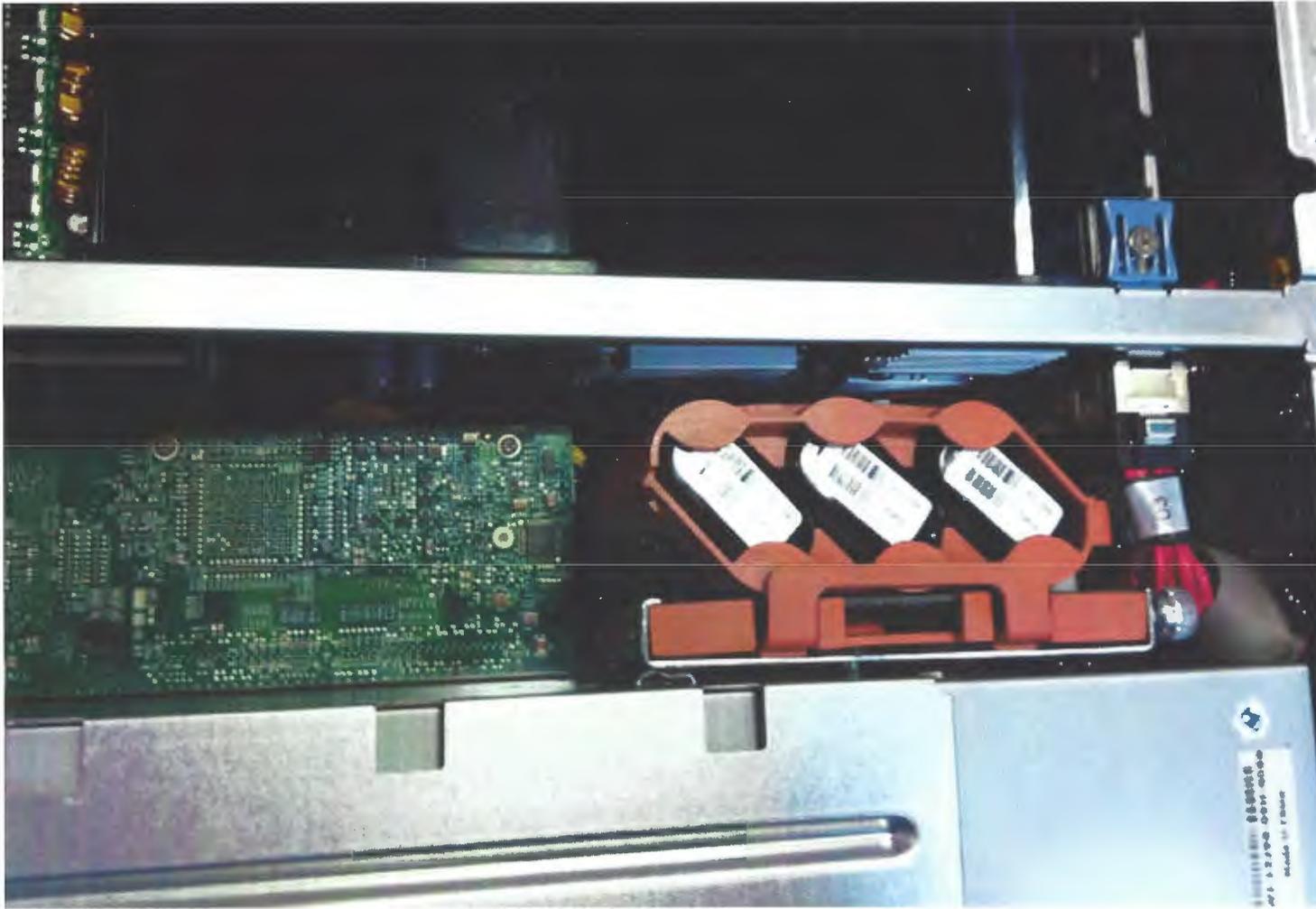
Hello,
Please find that attached question regarding lithium battery testing requirements. If you need more information please let me know.
Sincerely,
Kendall Wilcox
EMC Corporation

Hi Steven,

As discussed, here are some photos to assist in your determination. Below is a photo of one of our battery pack-up power modules removed from the system. You can see the 3 battery packs, each one has its own cable/connector that plugs into the printed circuit board. We have several different end-use systems that we install the battery packs into, and because each system has different physical characteristics, we design different mechanical structures to house the packs depending on the space available. Below are some photos of different implementations. The basic concept is identical for all of these battery packs – they consist of two cells each, include integrated safety circuitry, and connect to the printed circuit board via cable/connector as shown below. The battery packs undergo UN38.3 transportation tests. Each pack has their own input charging circuit and output supply circuit, and the output of each battery connects to its own fuse/diode circuit. After the fuse/diode, the different battery pack outputs are joined together on a single trace on the printed circuit board. Let me know if reviewing the schematics would assist in making your determination and I will send over.



Here is another photo of one of our systems, the top cover is removed and this is looking directly down into the system to see the battery packs installed. This particular battery pack configuration is different than the one above due to the physical configuration of the system it is installed into. These packs also have the same wiring and connectors as above, but it is hidden because the cable exits each battery pack on the side not visible in this view.



Here is another configuration, same idea as above but because of space limitations the battery packs are mounted onto a printed circuit board that has a mechanical structure to allow it to fit into an exterior slot in one of our systems:



The above module gets installed into a slot in the chassis below, which is an external view. The handle below the "A34" in the picture below is the same handle on the right side shown in the picture above.

