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1 PURPOSE

The purpose of this procedure is to describe how Waters assigns Ethernet MAC Addresses to products that contain a Waters designed Ethernet MAC. It outlines how a new block of Ethernet MAC Addresses are allocated, documented and transmitted to the contract manufacturer.

An Ethernet MAC address is a 6 byte identifier of the format YY-YY-YY-XX-XX-XX, where YY-YY-YY is the Organizationally Unique Identifier (OUI) and XX-XX-XX is the unique address within the given OUI. OUIs are assigned and maintained by IEEE.

Waters' OUI as assigned by the IEEE is 00-00-C4. The remaining 6 hex digits leave a total of 16,777,216 possible combinations. Waters entire range of addresses starts at 00-00-C4-00-00-00 and ends at 00-00-C4-FF-FF-FF. These are allocated in blocks of 64,536 addresses.

2 SCOPE

The scope of this procedure applies to Waters products that have Ethernet MAC Addresses which require Waters assignment of MAC Addresses. Waters Milford Operations provides Ethernet MAC Address Blocks to contract manufacturers upon request.

3 DEFINITIONS AND ABBREVIATIONS

Term	Definition / Abbreviation
IEEE	Institute of Electrical and Electronics Engineers. This is an international standards body that is responsible for the definition of the Ethernet standard.
MAC	Media Access Control. In networking, this is the portion of the protocol that provides the ability to uniquely address a networking interface.
MAC Address	In Ethernet, the unique identifier for a networking interface. A MAC Address is 12 hex digits, or 6 bytes in length.
OUI	Organizationally Unique Identifier. The first 6 hex digits of a MAC Address, assigned by the IEEE. While many standards reference OUI and it is a commonly used term, IEEE now calls this MA-L
MA-L	MAC Address Block Large. This is the term that IEEE uses for OUI.
Ethernet Address Block	A contiguous set of 65,536 Ethernet MAC Addresses. In hexadecimal, the last four digits of an Ethernet Address Block contain all of the possible values from 0000 to FFFF

4 ROLES AND RESPONSIBILITIES

Roles	Responsibilities
Contract Manufacturer	Assigns individual unique MAC Addresses and programs them into Waters products These MAC Addresses are selected from a block of addresses Requests new block of addresses from Waters Operations when necessary
Waters Operations	Receives requests for new MAC Addresses from Contract Manufacturers Sends block of new MAC Addresses to Contract Manufacturers
Commodity Management: Waters Ethernet Authority	Assigns blocks of MAC address to contract manufacturers when requested Updates the master list of assigned MAC addresses

5 REFERENCES / RELATED DOCUMENTS

Not applicable

6 FORMS

Not applicable

7 HEALTH & SAFETY

No Health & Safety specific considerations

Should anyone following this instruction identify a health and safety hazard which has not been highlighted in this section and/or within the body of the text, they should notify their Manager/ Supervisor immediately.

7.1 Equipment/Materials of Use Required

Not applicable

8 PROCEDURE

8.1 REQUEST ETHERNET MAC ADDRESS

Roles	Tasks/Instructions
<i>Contract Manufacturer</i>	8.1.1 Identify the need for a new Ethernet MAC Address Block. 8.1.2 Send a request to Waters for an Ethernet Address Block as required.
<i>Waters Operations</i>	8.1.3 Forward the request to the Waters Ethernet MAC Address Authority unless the authority was contacted directly.

8.2 ALLOCATE ETHERNET MAC ADDRESS BLOCK

Roles	Tasks/Instructions
<i>Commodity Management: Waters Ethernet MAC Address Authority</i>	8.2.1 Find the next available row in Appendix 1 the Master List where the "Assigned to" column is designated as "Unassigned". 8.2.1.1 A row in the Master List represents a single Ethernet Address Block. 8.2.2 Fill in the current date in the "Date" column in the newly allocated row. 8.2.3 Change "Unassigned" to the name of the requesting contract manufacturer in the "Assigned to" column in the newly allocated row. 8.2.4 Fill in the name of the product in the "Product Name" column in the newly allocated column. 8.2.4.1 If a contract manufacturer manufactures more than one product for Waters then they must maintain a separate pool of Ethernet Address Blocks for each product. An Ethernet Address Block cannot be shared across multiple products. 8.2.5 Fill in the name of the of the Waters Operations personnel who will be passing the block of addresses back to the contract manufacturer in the "Notes" column in the

	newly allocated row. Fill in any additional information in the “Notes” column in the newly allocated row. 8.2.6 Submit the modified version of the Ethernet MAC Address Assignment with updated Master List (appendix 1) into SAP.
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8.3 TRANSMIT ETHERNET MAC ADDRESS BLOCK

Roles	Tasks/Instructions
<i>Commodity Management: Waters Ethernet MAC Address Authority</i>	8.3.1 Communicate the new block of Ethernet MAC Addresses to the contract manufacturer and/or Waters Operations personnel. 8.3.1.1 Waters’ OUI is 00-00-C4. The format of the Ethernet address block that is returned to the contract manufacturer is <i>00-00-C4-xx-00-00 to 00-00-C4-xx-FF-FF</i>, where xx indicates the new block. This block contains 64,536 unique Ethernet Addresses. As an example, if the newly allocated row in the Waters Ethernet MAC Address Assignment document has a start address of <i>B0-00-00</i> and an end address of <i>B0-FF-FF</i> then the response that is returned to the contract manufacturer is “<i>00-00-C4-B0-00-00 to 00-00-C4-B0-FF-FF</i>.”
<i>Waters Operations</i>	8.3.2 Communicate the new block of Ethernet MAC Addresses to the contract manufacturer unless the Ethernet MAC Address Authority was contacted directly

9 APPENDIX 1: Waters Ethernet MAC Address Master List

An Ethernet MAC address is a 6 byte identifier of the format YY-YY-YY-XX-XX-XX, where YY-YY-YY is the Organizationally Unique Identifier (OUI) and XX-XX-XX is the unique address within the given OUI. OUIs are assigned and maintained by IEEE.

Waters' OUI is 00-00-C4 so all Waters Ethernet MAC addresses start with 00-00-C4. The remaining three bytes are distributed in blocks as follows:

Start Address	End Address	Date	Assigned to	Product	Notes
00-00-00	00-FF-FF	Unknown	Engineering	None	For development use
01-00-00	01-FF-FF	Unknown	Operations	LACE	Original Assignment for LACE
02-00-00	02-01-D3	Unknown	Operations	LACE	Assumed use for LACE
02-01-D4	02-01-FB	Unknown	Sparton	LACE	First and last issued by Sparton
02-01-FC	02-FF-FF	Unknown	RDE	None	Assigned to John Heden, Ryszard Feldman. CPU2000 default: 02-0F-FF
03-00-00	03-FF-FF	Unknown	Operations	CPU2000	
04-00-00	04-FF-FF	7/2005	Operations	CPU2000	
05-00-00	05-FF-FF	2/2006	Solectron/Flex	Unknown	Given to Peter Pino
06-00-00	06-FF-FF	Unknown	Spark Holland	Auto Sampler Breeze	Given to Brian Edwardsen
07-00-00	07-FF-FF	2/6/2008	GES	Acquity Handheld	Given to Hal Richardson
08-00-00	08-FF-FF	7/27/2009	CEI	CPU2000	Given to Denise Soter
09-00-00	09-FF-FF	2/13/2013	CEI	CPU2000	Given to Rich Letourneau
0A-00-00	0A-FF-FF	8/10/2015	CEI	CPU2000	Given to Mark Looney
0B-00-00	0B-FF-FF	8/29/2017	CEI	CPU2000	Given to Dave Reed
0C-00-00	0C-FF-FF	5/28/2019	CEI	CPU2000	Given to Paul Brusco
0D-00-00	0D-FF-FF		Unassigned		
0E-00-00	0E-FF-FF		Unassigned		
0F-00-00	0F-FF-FF		Unassigned		
10-00-00	10-FF-FF		Unassigned		
11-00-00	11-FF-FF		Unassigned		
12-00-00	12-FF-FF		Unassigned		
13-00-00	13-FF-FF		Unassigned		
14-00-00	14-FF-FF		Unassigned		
15-00-00	15-FF-FF		Unassigned		
16-00-00	16-FF-FF		Unassigned		
17-00-00	17-FF-FF		Unassigned		
18-00-00	18-FF-FF		Unassigned		
19-00-00	19-FF-FF		Unassigned		
1A-00-00	1A-FF-FF		Unassigned		
1B-00-00	1B-FF-FF		Unassigned		
1C-00-00	1C-FF-FF		Unassigned		
1D-00-00	1D-FF-FF		Unassigned		
1E-00-00	1E-FF-FF		Unassigned		
1F-00-00	1F-FF-FF		Unassigned		
20-00-00	20-FF-FF		Unassigned		

21-00-00	21-FF-FF		Unassigned		
22-00-00	22-FF-FF		Unassigned		
23-00-00	23-FF-FF		Unassigned		
24-00-00	24-FF-FF		Unassigned		
25-00-00	25-FF-FF		Unassigned		
26-00-00	26-FF-FF		Unassigned		
27-00-00	27-FF-FF		Unassigned		
28-00-00	28-FF-FF		Unassigned		
29-00-00	29-FF-FF		Unassigned		
2A-00-00	2A-FF-FF		Unassigned		
2B-00-00	2B-FF-FF		Unassigned		
2C-00-00	2C-FF-FF		Unassigned		
2D-00-00	2D-FF-FF		Unassigned		
2E-00-00	2E-FF-FF		Unassigned		
2F-00-00	2F-FF-FF		Unassigned		
30-00-00	30-FF-FF		Unassigned		
31-00-00	31-FF-FF		Unassigned		
32-00-00	32-FF-FF		Unassigned		
33-00-00	33-FF-FF		Unassigned		
34-00-00	34-FF-FF		Unassigned		
35-00-00	35-FF-FF		Unassigned		
36-00-00	36-FF-FF		Unassigned		
37-00-00	37-FF-FF		Unassigned		
38-00-00	38-FF-FF		Unassigned		
39-00-00	39-FF-FF		Unassigned		
3A-00-00	3A-FF-FF		Unassigned		
3B-00-00	3B-FF-FF		Unassigned		
3C-00-00	3C-FF-FF		Unassigned		
3D-00-00	3D-FF-FF		Unassigned		
3E-00-00	3E-FF-FF		Unassigned		
3F-00-00	3F-FF-FF		Unassigned		
40-00-00	40-FF-FF		Unassigned		
41-00-00	41-FF-FF		Unassigned		
42-00-00	42-FF-FF		Unassigned		
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47-00-00	47-FF-FF		Unassigned		

48-00-00	48-FF-FF		Unassigned		
49-00-00	49-FF-FF		Unassigned		
4A-00-00	4A-FF-FF		Unassigned		
4B-00-00	4B-FF-FF		Unassigned		
4C-00-00	4C-FF-FF		Unassigned		
4D-00-00	4D-FF-FF		Unassigned		
4E-00-00	4E-FF-FF		Unassigned		
4F-00-00	4F-FF-FF		Unassigned		
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59-00-00	59-FF-FF		Unassigned		
5A-00-00	5A-FF-FF		Unassigned		
5B-00-00	5B-FF-FF		Unassigned		
5C-00-00	5C-FF-FF		Unassigned		
5D-00-00	5D-FF-FF		Unassigned		
5E-00-00	5E-FF-FF		Unassigned		
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AB-00-00	AB-FF-FF		Unassigned		
AC-00-00	AC-FF-FF		Unassigned		
AD-00-00	AD-FF-FF		Unassigned		
AE-00-00	AE-FF-FF		Unassigned		
AF-00-00	AF-FF-FF		Unassigned		
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B3-00-00	B3-FF-FF		Unassigned		
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B5-00-00	B5-FF-FF		Unassigned		
B6-00-00	B6-FF-FF		Unassigned		
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BB-00-00	BB-FF-FF		Unassigned		
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DB-00-00	DB-FF-FF		Unassigned		
DC-00-00	DC-FF-FF		Unassigned		
DD-00-00	DD-FF-FF		Unassigned		
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E4-00-00	E4-FF-FF		Unassigned		
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EB-00-00	EB-FF-FF		Unassigned		
EC-00-00	EC-FF-FF		Unassigned		
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F1-00-00	F1-FF-FF		Unassigned		
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F3-00-00	F3-FF-FF		Unassigned		
F4-00-00	F4-FF-FF		Unassigned		
F5-00-00	F5-FF-FF		Unassigned		
F6-00-00	F6-FF-FF		Unassigned		
F7-00-00	F7-FF-FF		Unassigned		
F8-00-00	F8-FF-FF		Unassigned		
F9-00-00	F9-FF-FF		Unassigned		
FA-00-00	FA-FF-FF		Unassigned		
FB-00-00	FB-FF-FF		Unassigned		
FC-00-00	FC-FF-FF		Unassigned		
FD-00-00	FD-FF-FF		Unassigned		
FE-00-00	FE-FF-FF		Unassigned		
FF-00-00	FF-FF-FF	Unknown	Data Translation	ESatin Product.	

DOCUMENT HISTORY

(Note: Complete Document History may be obtained via the Document Management System.)

VERSION:	00	ORIGINATOR:	Mike Kahn	Change ID:	N/A
DESCRIPTION OF CHANGE: Initial Release					