ECAL Channel Mapping Conditions

The ECAL channel mapping of DAQ information to geometric crystal IDs is defined in the **ecal_channels** table of the conditions database and has the following conventions.

ECAL Channel Mapping Fields

channel_id is numbered sequentially from 1 to 442.

x is the column number and is numbered from -23 to 23 without any 0 value.

y is the row number and is numbered from 5 to -5 without any 0 value.

crate designates the top or bottom ROC and is either 1 or 2.

slot denotes the FADC VME slot number within the readout crate and is numbered from 3 to 20.

channel denotes the readout channel in the slot and is numbered from 0 to 15.

Channel Identifiers

x and **y** together provide the unique **geometric ID** for a crystal.

crate, **slot** and **channel** together provide a unique **DAQ ID**.

The **channel_id** by itself also uniquely identifies a single crystal.

Channel ID Numbering Convention

The channel ID can be used to uniquely identify a specific crystal and its corresponding DAQ channel.

This document shows the geometric and DAQ values for the detector.

https://wiki.jlab.org/hps-run/images/f/f4/Ecal_manual_annex.pdf

Channel ID 1 starts at x = -23 and y = 5, in the upper right of the diagram.

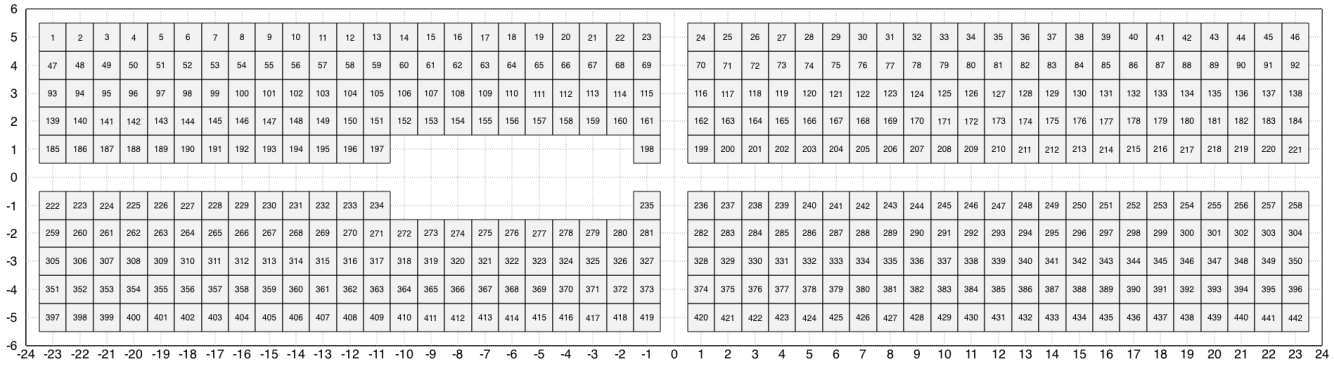
The channel IDs then increase sequentially across the row, increasing in x.

So channel ID 2 has x = -22, 3 has x = -21, -etc.

At the end of the row, the x value resets back to -23 and the y = 4, so channel 47 has x = -23 and y = 4, channel 48 has x = -22 and y = 4, etc.

The same convention is used for the top and bottom halves of the detector.

Across the beam gap, the geometric numbering continues to increment even where there are not physically crystals present.



Accessing ECAL Channel Conditions in Java

Before the conditions can be accessed, the **DatabaseConditionsManager** must be created and initialized correctly, which should happen automatically if you are running a command line job or using the monitoring application.

The ECAL channel conditions can be accessed in user code in the following way.

Accessing ECAL Channel Conditions

```
// Get ECAL conditions.
EcalConditions ecalConditions = ConditionsManager.defaultInstance().getCachedConditions(EcalConditions.class,
TableConstants.ECAL_CONDITIONS).getCachedData();

// Get the list of EcalChannel objects.
EcalChannelCollection channels = ecalConditions.getChannelCollection();
```

The channel mapping is modeled by the EcalChannel class which has the unique channel ID plus the associated geometric and DAQ information.

Once retrieved from the conditions system, a channel object can be used to get the conditions constants associated with a single crystal.

Getting Channel Constants

```
EcalChannelConstants channelConstants = ecalConditions.getChannelConstants(anEcalChannelObject);
```

Channels may be looked up in the collection using several different search methods.

Searching for Channels

```
// Find a channel by its encoded geometric ID e.g. from an LCIO hit object like CalorimeterHit.
CalorimeterHit hit = ...;
EcalChannel channel = channels.findGeomtric(hit.getCellID());

// Find a channel by its unique channel ID.  This finds channel #1.
EcalChannel channel = channels.findChannel(1);

// Find a channel by its DAQ information.  This looks up the crystal connected to crate 1, slot 20 and channel
12 on the DAQ.
EcalChannel channel = channels.findChannel(new DaqId(new int [] { 1, 20, 12 } ));
```

There are several other ways of looking up channels not listed here. Please refer to the source code for EcalChannel for complete details.

ECAL Channel Mapping Table Dump

Channel ID Mapping

This is a dump from the database of the currently used ECAL channel map for the engineering run, ordered on **channel_id**.

```
mysql> select channel_id, x, y, crate, slot, channel from ecal_channels where collection_id = 2 order by
channel_id;
+------------+-----+----+-------+------+---------
+
| channel_id | x   | y  | crate | slot | channel
|
+------------+-----+----+-------+------+---------
+
|          1 | -23 |  5 |     1 |   20 |      12
|
|          2 | -22 |  5 |     1 |   20 |       7
|
|          3 | -21 |  5 |     1 |   20 |       2
|
|          4 | -20 |  5 |     1 |   19 |      13
|
|          5 | -19 |  5 |     1 |   19 |       8
```

6	-18	5	1	19	3
7	-17	5	1	18	14
8	-16	5	1	18	9
9	-15	5	1	18	4
10	-14	5	1	17	15
11	-13	5	1	17	10
12	-12	5	1	17	5
13	-11	5	1	17	0
14	-10	5	1	16	11
15	-9	5	1	16	7
16	-8	5	1	16	3
17	-7	5	1	15	15
18	-6	5	1	15	11
19	-5	5	1	15	7
20	-4	5	1	15	3
21	-3	5	1	14	15
22	-2	5	1	14	11
23	-1	5	1	14	7
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26	3	5	1	9	8
27	4	5	1	9	3
28	5	5	1	8	14
29	6	5	1	8	9
30	7	5	1	8	4
31	8	5	1	7	15
32	9	5	1	7	10
33	10	5	1	7	5
34	11	5	1	7	0
35	12	5	1	6	11
36	13	5	1	6	6
37	14	5	1	6	1
38	15	5	1	5	12
39	16	5	1	5	7
40	17	5	1	5	2

| 41 | 18 | 5 | 1 | 4 | 13
|
| 42 | 19 | 5 | 1 | 4 | 8
|
| 43 | 20 | 5 | 1 | 4 | 3
|
| 44 | 21 | 5 | 1 | 3 | 14
|
| 45 | 22 | 5 | 1 | 3 | 9
|
| 46 | 23 | 5 | 1 | 3 | 4
|
| 47 | -23 | 4 | 1 | 20 | 11
|
| 48 | -22 | 4 | 1 | 20 | 6
|
| 49 | -21 | 4 | 1 | 20 | 1
|
| 50 | -20 | 4 | 1 | 19 | 12
|
| 51 | -19 | 4 | 1 | 19 | 7
|
| 52 | -18 | 4 | 1 | 19 | 2
|
| 53 | -17 | 4 | 1 | 18 | 13
|
| 54 | -16 | 4 | 1 | 18 | 8
|
| 55 | -15 | 4 | 1 | 18 | 3
|
| 56 | -14 | 4 | 1 | 17 | 14
|
| 57 | -13 | 4 | 1 | 17 | 9
|
| 58 | -12 | 4 | 1 | 17 | 4
|
| 59 | -11 | 4 | 1 | 16 | 15
|
| 60 | -10 | 4 | 1 | 16 | 10
|
| 61 | -9 | 4 | 1 | 16 | 6
|
| 62 | -8 | 4 | 1 | 16 | 2
|
| 63 | -7 | 4 | 1 | 15 | 14
|
| 64 | -6 | 4 | 1 | 15 | 10
|
| 65 | -5 | 4 | 1 | 15 | 6
|
| 66 | -4 | 4 | 1 | 15 | 2
|
| 67 | -3 | 4 | 1 | 14 | 14
|
| 68 | -2 | 4 | 1 | 14 | 10
|
| 69 | -1 | 4 | 1 | 14 | 6
|
| 70 | 1 | 4 | 1 | 14 | 1
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|
| 75 | 6 | 4 | 1 | 8 | 8
|
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|
| 77 | 8 | 4 | 1 | 7 | 14
|
| 78 | 9 | 4 | 1 | 7 | 9
|
| 79 | 10 | 4 | 1 | 7 | 4
|
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|
| 81 | 12 | 4 | 1 | 6 | 10
|
| 82 | 13 | 4 | 1 | 6 | 5
|
| 83 | 14 | 4 | 1 | 6 | 0
|
| 84 | 15 | 4 | 1 | 5 | 11
|
| 85 | 16 | 4 | 1 | 5 | 6
|
| 86 | 17 | 4 | 1 | 5 | 1
|
| 87 | 18 | 4 | 1 | 4 | 12
|
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|
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|
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|
| 91 | 22 | 4 | 1 | 3 | 8
|
| 92 | 23 | 4 | 1 | 3 | 3
|
| 93 | -23 | 3 | 1 | 20 | 10
|
| 94 | -22 | 3 | 1 | 20 | 5
|
| 95 | -21 | 3 | 1 | 20 | 0
|
| 96 | -20 | 3 | 1 | 19 | 11
|
| 97 | -19 | 3 | 1 | 19 | 6
|
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|
| 99 | -17 | 3 | 1 | 18 | 12
|
| 100 | -16 | 3 | 1 | 18 | 7
|
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|
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|
| 103 | -13 | 3 | 1 | 17 | 8
|
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|
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|
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|
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|
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|
| 111 | -5 | 3 | 1 | 15 | 5
|

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|
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|
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|
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|
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|
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|
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|
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|
| 164 | 3 | 2 | 1 | 9 | 5
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|
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|
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|
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| 177 | 16 | 2 | 1 | 5 | 4
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| 178 | 17 | 2 | 1 | 4 | 15
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|
| 220 | 22 | 1 | 1 | 3 | 5
|
| 221 | 23 | 1 | 1 | 3 | 0
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|
| 223 | -22 | -1 | 2 | 20 | 3
|
| 224 | -21 | -1 | 2 | 19 | 14
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| 225 | -20 | -1 | 2 | 19 | 9
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| 227 | -18 | -1 | 2 | 18 | 15
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|
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|
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|
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|
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|
| 237 | 2 | -1 | 2 | 9 | 9
|
| 238 | 3 | -1 | 2 | 9 | 4
|
| 239 | 4 | -1 | 2 | 8 | 15
|
| 240 | 5 | -1 | 2 | 8 | 10
|
| 241 | 6 | -1 | 2 | 8 | 5
|
| 242 | 7 | -1 | 2 | 8 | 0
|
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|
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|
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|
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|
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|
| 248 | 13 | -1 | 2 | 6 | 2
|
| 249 | 14 | -1 | 2 | 5 | 13
|
| 250 | 15 | -1 | 2 | 5 | 8
|
| 251 | 16 | -1 | 2 | 5 | 3
|
| 252 | 17 | -1 | 2 | 4 | 14
|
| 253 | 18 | -1 | 2 | 4 | 9
|

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272	-10	-2	2	16	8
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285	4	-2	2	9	0
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322	-6	-3	2	15	9
323	-5	-3	2	15	5
324	-4	-3	2	15	1

325	-3	-3	2	14	13
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343	16	-3	2	5	5
344	17	-3	2	5	0
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|
| 361 | -13 | -4 | 2 | 17 | 9
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|
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|
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|
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|
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|
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|
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|
| 383 | 10 | -4 | 2 | 7 | 4
|
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|
| 385 | 12 | -4 | 2 | 6 | 10
|
| 386 | 13 | -4 | 2 | 6 | 5
|
| 387 | 14 | -4 | 2 | 6 | 0
|
| 388 | 15 | -4 | 2 | 5 | 11
|
| 389 | 16 | -4 | 2 | 5 | 6
|
| 390 | 17 | -4 | 2 | 5 | 1
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| 391 | 18 | -4 | 2 | 4 | 12
|
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|        408 | -12 | -5 |     2 |   17 |       5 |
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|        411 |  -9 | -5 |     2 |   16 |       7 |
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|        413 |  -7 | -5 |     2 |   15 |      15 |
|        414 |  -6 | -5 |     2 |   15 |      11 |
|        415 |  -5 | -5 |     2 |   15 |       7 |
|        416 |  -4 | -5 |     2 |   15 |       3 |
|        417 |  -3 | -5 |     2 |   14 |      15 |
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|        419 |  -1 | -5 |     2 |   14 |       7 |
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|        421 |   2 | -5 |     2 |    9 |      13 |
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|        427 |   8 | -5 |     2 |    7 |      15 |
|        428 |   9 | -5 |     2 |    7 |      10 |
|        429 |  10 | -5 |     2 |    7 |       5 |
|        430 |  11 | -5 |     2 |    7 |       0 |
|        431 |  12 | -5 |     2 |    6 |      11 |
|        432 |  13 | -5 |     2 |    6 |       6 |
|        433 |  14 | -5 |     2 |    6 |       1 |
|        434 |  15 | -5 |     2 |    5 |      12 |
|        435 |  16 | -5 |     2 |    5 |       7 |
|        436 |  17 | -5 |     2 |    5 |       2 |
|        437 |  18 | -5 |     2 |    4 |      13 |
|        438 |  19 | -5 |     2 |    4 |       8 |
|        439 |  20 | -5 |     2 |    4 |       3 |
|        440 |  21 | -5 |     2 |    3 |      14 |
|        441 |  22 | -5 |     2 |    3 |       9 |
|        442 |  23 | -5 |     2 |    3 |       4 |
+------------+-----+----+-------+------+---------+
442 rows in set (0.00 sec)
```

DAQ Mapping

This is the same information ordered by the DAQ values (crate, slot, channel).

```
mysql> select channel_id, x, y, crate, slot, channel from ecal_channels where collection_id = 2 order by crate,
slot, channel;
+------------+-----+----+-------+------+---------
+
| channel_id | x   | y  | crate | slot | channel
|
+------------+-----+----+-------+------+---------
+
|        221 |  23 |  1 |     1 |    3 |       0
|
|        184 |  23 |  2 |     1 |    3 |       1
|
|        138 |  23 |  3 |     1 |    3 |       2
|
|         92 |  23 |  4 |     1 |    3 |       3
|
|         46 |  23 |  5 |     1 |    3 |       4
|
|        220 |  22 |  1 |     1 |    3 |       5
```

|
| 183 | 22 | 2 | 1 | 3 | 6
|
| 137 | 22 | 3 | 1 | 3 | 7
|
| 91 | 22 | 4 | 1 | 3 | 8
|
| 45 | 22 | 5 | 1 | 3 | 9
|
| 219 | 21 | 1 | 1 | 3 | 10
|
| 182 | 21 | 2 | 1 | 3 | 11
|
| 136 | 21 | 3 | 1 | 3 | 12
|
| 90 | 21 | 4 | 1 | 3 | 13
|
| 44 | 21 | 5 | 1 | 3 | 14
|
| 218 | 20 | 1 | 1 | 3 | 15
|
| 181 | 20 | 2 | 1 | 4 | 0
|
| 135 | 20 | 3 | 1 | 4 | 1
|
| 89 | 20 | 4 | 1 | 4 | 2
|
| 43 | 20 | 5 | 1 | 4 | 3
|
| 217 | 19 | 1 | 1 | 4 | 4
|
| 180 | 19 | 2 | 1 | 4 | 5
|
| 134 | 19 | 3 | 1 | 4 | 6
|
| 88 | 19 | 4 | 1 | 4 | 7
|
| 42 | 19 | 5 | 1 | 4 | 8
|
| 216 | 18 | 1 | 1 | 4 | 9
|
| 179 | 18 | 2 | 1 | 4 | 10
|
| 133 | 18 | 3 | 1 | 4 | 11
|
| 87 | 18 | 4 | 1 | 4 | 12
|
| 41 | 18 | 5 | 1 | 4 | 13
|
| 215 | 17 | 1 | 1 | 4 | 14
|
| 178 | 17 | 2 | 1 | 4 | 15
|
| 132 | 17 | 3 | 1 | 5 | 0
|
| 86 | 17 | 4 | 1 | 5 | 1
|
| 40 | 17 | 5 | 1 | 5 | 2
|
| 214 | 16 | 1 | 1 | 5 | 3
|
| 177 | 16 | 2 | 1 | 5 | 4
|
| 131 | 16 | 3 | 1 | 5 | 5
|
| 85 | 16 | 4 | 1 | 5 | 6
|
| 39 | 16 | 5 | 1 | 5 | 7
|
| 213 | 15 | 1 | 1 | 5 | 8
|

176	15	2	1	5	9
130	15	3	1	5	10
84	15	4	1	5	11
38	15	5	1	5	12
212	14	1	1	5	13
175	14	2	1	5	14
129	14	3	1	5	15
83	14	4	1	6	0
37	14	5	1	6	1
211	13	1	1	6	2
174	13	2	1	6	3
128	13	3	1	6	4
82	13	4	1	6	5
36	13	5	1	6	6
210	12	1	1	6	7
173	12	2	1	6	8
127	12	3	1	6	9
81	12	4	1	6	10
35	12	5	1	6	11
209	11	1	1	6	12
172	11	2	1	6	13
126	11	3	1	6	14
80	11	4	1	6	15
34	11	5	1	7	0
208	10	1	1	7	1
171	10	2	1	7	2
125	10	3	1	7	3
79	10	4	1	7	4
33	10	5	1	7	5
207	9	1	1	7	6
170	9	2	1	7	7
124	9	3	1	7	8
78	9	4	1	7	9
32	9	5	1	7	10
206	8	1	1	7	11
169	8	2	1	7	12

123	8	3	1	7	13
77	8	4	1	7	14
31	8	5	1	7	15
205	7	1	1	8	0
168	7	2	1	8	1
122	7	3	1	8	2
76	7	4	1	8	3
30	7	5	1	8	4
204	6	1	1	8	5
167	6	2	1	8	6
121	6	3	1	8	7
75	6	4	1	8	8
29	6	5	1	8	9
203	5	1	1	8	10
166	5	2	1	8	11
120	5	3	1	8	12
74	5	4	1	8	13
28	5	5	1	8	14
202	4	1	1	8	15
165	4	2	1	9	0
119	4	3	1	9	1
73	4	4	1	9	2
27	4	5	1	9	3
201	3	1	1	9	4
164	3	2	1	9	5
118	3	3	1	9	6
72	3	4	1	9	7
26	3	5	1	9	8
200	2	1	1	9	9
163	2	2	1	9	10
117	2	3	1	9	11
71	2	4	1	9	12
25	2	5	1	9	13
199	1	1	1	9	14
162	1	2	1	9	15

| 116 | 1 | 3 | 1 | 14 | 0
|
| 70 | 1 | 4 | 1 | 14 | 1
|
| 24 | 1 | 5 | 1 | 14 | 2
|
| 198 | -1 | 1 | 1 | 14 | 3
|
| 161 | -1 | 2 | 1 | 14 | 4
|
| 115 | -1 | 3 | 1 | 14 | 5
|
| 69 | -1 | 4 | 1 | 14 | 6
|
| 23 | -1 | 5 | 1 | 14 | 7
|
| 160 | -2 | 2 | 1 | 14 | 8
|
| 114 | -2 | 3 | 1 | 14 | 9
|
| 68 | -2 | 4 | 1 | 14 | 10
|
| 22 | -2 | 5 | 1 | 14 | 11
|
| 159 | -3 | 2 | 1 | 14 | 12
|
| 113 | -3 | 3 | 1 | 14 | 13
|
| 67 | -3 | 4 | 1 | 14 | 14
|
| 21 | -3 | 5 | 1 | 14 | 15
|
| 158 | -4 | 2 | 1 | 15 | 0
|
| 112 | -4 | 3 | 1 | 15 | 1
|
| 66 | -4 | 4 | 1 | 15 | 2
|
| 20 | -4 | 5 | 1 | 15 | 3
|
| 157 | -5 | 2 | 1 | 15 | 4
|
| 111 | -5 | 3 | 1 | 15 | 5
|
| 65 | -5 | 4 | 1 | 15 | 6
|
| 19 | -5 | 5 | 1 | 15 | 7
|
| 156 | -6 | 2 | 1 | 15 | 8
|
| 110 | -6 | 3 | 1 | 15 | 9
|
| 64 | -6 | 4 | 1 | 15 | 10
|
| 18 | -6 | 5 | 1 | 15 | 11
|
| 155 | -7 | 2 | 1 | 15 | 12
|
| 109 | -7 | 3 | 1 | 15 | 13
|
| 63 | -7 | 4 | 1 | 15 | 14
|
| 17 | -7 | 5 | 1 | 15 | 15
|
| 154 | -8 | 2 | 1 | 16 | 0
|
| 108 | -8 | 3 | 1 | 16 | 1
|
| 62 | -8 | 4 | 1 | 16 | 2
|
| 16 | -8 | 5 | 1 | 16 | 3

|
| 153 | -9 | 2 | 1 | 16 | 4
|
| 107 | -9 | 3 | 1 | 16 | 5
|
| 61 | -9 | 4 | 1 | 16 | 6
|
| 15 | -9 | 5 | 1 | 16 | 7
|
| 152 | -10 | 2 | 1 | 16 | 8
|
| 106 | -10 | 3 | 1 | 16 | 9
|
| 60 | -10 | 4 | 1 | 16 | 10
|
| 14 | -10 | 5 | 1 | 16 | 11
|
| 197 | -11 | 1 | 1 | 16 | 12
|
| 151 | -11 | 2 | 1 | 16 | 13
|
| 105 | -11 | 3 | 1 | 16 | 14
|
| 59 | -11 | 4 | 1 | 16 | 15
|
| 13 | -11 | 5 | 1 | 17 | 0
|
| 196 | -12 | 1 | 1 | 17 | 1
|
| 150 | -12 | 2 | 1 | 17 | 2
|
| 104 | -12 | 3 | 1 | 17 | 3
|
| 58 | -12 | 4 | 1 | 17 | 4
|
| 12 | -12 | 5 | 1 | 17 | 5
|
| 195 | -13 | 1 | 1 | 17 | 6
|
| 149 | -13 | 2 | 1 | 17 | 7
|
| 103 | -13 | 3 | 1 | 17 | 8
|
| 57 | -13 | 4 | 1 | 17 | 9
|
| 11 | -13 | 5 | 1 | 17 | 10
|
| 194 | -14 | 1 | 1 | 17 | 11
|
| 148 | -14 | 2 | 1 | 17 | 12
|
| 102 | -14 | 3 | 1 | 17 | 13
|
| 56 | -14 | 4 | 1 | 17 | 14
|
| 10 | -14 | 5 | 1 | 17 | 15
|
| 193 | -15 | 1 | 1 | 18 | 0
|
| 147 | -15 | 2 | 1 | 18 | 1
|
| 101 | -15 | 3 | 1 | 18 | 2
|
| 55 | -15 | 4 | 1 | 18 | 3
|
| 9 | -15 | 5 | 1 | 18 | 4
|
| 192 | -16 | 1 | 1 | 18 | 5
|
| 146 | -16 | 2 | 1 | 18 | 6
|

100	-16	3	1	18	7
54	-16	4	1	18	8
8	-16	5	1	18	9
191	-17	1	1	18	10
145	-17	2	1	18	11
99	-17	3	1	18	12
53	-17	4	1	18	13
7	-17	5	1	18	14
190	-18	1	1	18	15
144	-18	2	1	19	0
98	-18	3	1	19	1
52	-18	4	1	19	2
6	-18	5	1	19	3
189	-19	1	1	19	4
143	-19	2	1	19	5
97	-19	3	1	19	6
51	-19	4	1	19	7
5	-19	5	1	19	8
188	-20	1	1	19	9
142	-20	2	1	19	10
96	-20	3	1	19	11
50	-20	4	1	19	12
4	-20	5	1	19	13
187	-21	1	1	19	14
141	-21	2	1	19	15
95	-21	3	1	20	0
49	-21	4	1	20	1
3	-21	5	1	20	2
186	-22	1	1	20	3
140	-22	2	1	20	4
94	-22	3	1	20	5
48	-22	4	1	20	6
2	-22	5	1	20	7
185	-23	1	1	20	8
139	-23	2	1	20	9
93	-23	3	1	20	10

47	-23	4	1	20	11
1	-23	5	1	20	12
258	23	-1	2	3	0
304	23	-2	2	3	1
350	23	-3	2	3	2
396	23	-4	2	3	3
442	23	-5	2	3	4
257	22	-1	2	3	5
303	22	-2	2	3	6
349	22	-3	2	3	7
395	22	-4	2	3	8
441	22	-5	2	3	9
256	21	-1	2	3	10
302	21	-2	2	3	11
348	21	-3	2	3	12
394	21	-4	2	3	13
440	21	-5	2	3	14
255	20	-1	2	3	15
301	20	-2	2	4	0
347	20	-3	2	4	1
393	20	-4	2	4	2
439	20	-5	2	4	3
254	19	-1	2	4	4
300	19	-2	2	4	5
346	19	-3	2	4	6
392	19	-4	2	4	7
438	19	-5	2	4	8
253	18	-1	2	4	9
299	18	-2	2	4	10
345	18	-3	2	4	11
391	18	-4	2	4	12
437	18	-5	2	4	13
252	17	-1	2	4	14
298	17	-2	2	4	15
344	17	-3	2	5	0

390	17	-4	2	5	1
436	17	-5	2	5	2
251	16	-1	2	5	3
297	16	-2	2	5	4
343	16	-3	2	5	5
389	16	-4	2	5	6
435	16	-5	2	5	7
250	15	-1	2	5	8
296	15	-2	2	5	9
342	15	-3	2	5	10
388	15	-4	2	5	11
434	15	-5	2	5	12
249	14	-1	2	5	13
295	14	-2	2	5	14
341	14	-3	2	5	15
387	14	-4	2	6	0
433	14	-5	2	6	1
248	13	-1	2	6	2
294	13	-2	2	6	3
340	13	-3	2	6	4
386	13	-4	2	6	5
432	13	-5	2	6	6
247	12	-1	2	6	7
293	12	-2	2	6	8
339	12	-3	2	6	9
385	12	-4	2	6	10
431	12	-5	2	6	11
246	11	-1	2	6	12
292	11	-2	2	6	13
338	11	-3	2	6	14
384	11	-4	2	6	15
430	11	-5	2	7	0
245	10	-1	2	7	1
291	10	-2	2	7	2
337	10	-3	2	7	3
383	10	-4	2	7	4

|
| 429 | 10 | -5 | 2 | 7 | 5
|
| 244 | 9 | -1 | 2 | 7 | 6
|
| 290 | 9 | -2 | 2 | 7 | 7
|
| 336 | 9 | -3 | 2 | 7 | 8
|
| 382 | 9 | -4 | 2 | 7 | 9
|
| 428 | 9 | -5 | 2 | 7 | 10
|
| 243 | 8 | -1 | 2 | 7 | 11
|
| 289 | 8 | -2 | 2 | 7 | 12
|
| 335 | 8 | -3 | 2 | 7 | 13
|
| 381 | 8 | -4 | 2 | 7 | 14
|
| 427 | 8 | -5 | 2 | 7 | 15
|
| 242 | 7 | -1 | 2 | 8 | 0
|
| 288 | 7 | -2 | 2 | 8 | 1
|
| 334 | 7 | -3 | 2 | 8 | 2
|
| 380 | 7 | -4 | 2 | 8 | 3
|
| 426 | 7 | -5 | 2 | 8 | 4
|
| 241 | 6 | -1 | 2 | 8 | 5
|
| 287 | 6 | -2 | 2 | 8 | 6
|
| 333 | 6 | -3 | 2 | 8 | 7
|
| 379 | 6 | -4 | 2 | 8 | 8
|
| 425 | 6 | -5 | 2 | 8 | 9
|
| 240 | 5 | -1 | 2 | 8 | 10
|
| 286 | 5 | -2 | 2 | 8 | 11
|
| 332 | 5 | -3 | 2 | 8 | 12
|
| 378 | 5 | -4 | 2 | 8 | 13
|
| 424 | 5 | -5 | 2 | 8 | 14
|
| 239 | 4 | -1 | 2 | 8 | 15
|
| 285 | 4 | -2 | 2 | 9 | 0
|
| 331 | 4 | -3 | 2 | 9 | 1
|
| 377 | 4 | -4 | 2 | 9 | 2
|
| 423 | 4 | -5 | 2 | 9 | 3
|
| 238 | 3 | -1 | 2 | 9 | 4
|
| 284 | 3 | -2 | 2 | 9 | 5
|
| 330 | 3 | -3 | 2 | 9 | 6
|
| 376 | 3 | -4 | 2 | 9 | 7
|

| 422 | 3 | -5 | 2 | 9 | 8
|
| 237 | 2 | -1 | 2 | 9 | 9
|
| 283 | 2 | -2 | 2 | 9 | 10
|
| 329 | 2 | -3 | 2 | 9 | 11
|
| 375 | 2 | -4 | 2 | 9 | 12
|
| 421 | 2 | -5 | 2 | 9 | 13
|
| 236 | 1 | -1 | 2 | 9 | 14
|
| 282 | 1 | -2 | 2 | 9 | 15
|
| 328 | 1 | -3 | 2 | 14 | 0
|
| 374 | 1 | -4 | 2 | 14 | 1
|
| 420 | 1 | -5 | 2 | 14 | 2
|
| 235 | -1 | -1 | 2 | 14 | 3
|
| 281 | -1 | -2 | 2 | 14 | 4
|
| 327 | -1 | -3 | 2 | 14 | 5
|
| 373 | -1 | -4 | 2 | 14 | 6
|
| 419 | -1 | -5 | 2 | 14 | 7
|
| 280 | -2 | -2 | 2 | 14 | 8
|
| 326 | -2 | -3 | 2 | 14 | 9
|
| 372 | -2 | -4 | 2 | 14 | 10
|
| 418 | -2 | -5 | 2 | 14 | 11
|
| 279 | -3 | -2 | 2 | 14 | 12
|
| 325 | -3 | -3 | 2 | 14 | 13
|
| 371 | -3 | -4 | 2 | 14 | 14
|
| 417 | -3 | -5 | 2 | 14 | 15
|
| 278 | -4 | -2 | 2 | 15 | 0
|
| 324 | -4 | -3 | 2 | 15 | 1
|
| 370 | -4 | -4 | 2 | 15 | 2
|
| 416 | -4 | -5 | 2 | 15 | 3
|
| 277 | -5 | -2 | 2 | 15 | 4
|
| 323 | -5 | -3 | 2 | 15 | 5
|
| 369 | -5 | -4 | 2 | 15 | 6
|
| 415 | -5 | -5 | 2 | 15 | 7
|
| 276 | -6 | -2 | 2 | 15 | 8
|
| 322 | -6 | -3 | 2 | 15 | 9
|
| 368 | -6 | -4 | 2 | 15 | 10
|
| 414 | -6 | -5 | 2 | 15 | 11

|
| 275 | -7 | -2 | 2 | 15 | 12
|
| 321 | -7 | -3 | 2 | 15 | 13
|
| 367 | -7 | -4 | 2 | 15 | 14
|
| 413 | -7 | -5 | 2 | 15 | 15
|
| 274 | -8 | -2 | 2 | 16 | 0
|
| 320 | -8 | -3 | 2 | 16 | 1
|
| 366 | -8 | -4 | 2 | 16 | 2
|
| 412 | -8 | -5 | 2 | 16 | 3
|
| 273 | -9 | -2 | 2 | 16 | 4
|
| 319 | -9 | -3 | 2 | 16 | 5
|
| 365 | -9 | -4 | 2 | 16 | 6
|
| 411 | -9 | -5 | 2 | 16 | 7
|
| 272 | -10 | -2 | 2 | 16 | 8
|
| 318 | -10 | -3 | 2 | 16 | 9
|
| 364 | -10 | -4 | 2 | 16 | 10
|
| 410 | -10 | -5 | 2 | 16 | 11
|
| 234 | -11 | -1 | 2 | 16 | 12
|
| 271 | -11 | -2 | 2 | 16 | 13
|
| 317 | -11 | -3 | 2 | 16 | 14
|
| 363 | -11 | -4 | 2 | 16 | 15
|
| 409 | -11 | -5 | 2 | 17 | 0
|
| 233 | -12 | -1 | 2 | 17 | 1
|
| 270 | -12 | -2 | 2 | 17 | 2
|
| 316 | -12 | -3 | 2 | 17 | 3
|
| 362 | -12 | -4 | 2 | 17 | 4
|
| 408 | -12 | -5 | 2 | 17 | 5
|
| 232 | -13 | -1 | 2 | 17 | 6
|
| 269 | -13 | -2 | 2 | 17 | 7
|
| 315 | -13 | -3 | 2 | 17 | 8
|
| 361 | -13 | -4 | 2 | 17 | 9
|
407	-13	-5	2	17	10
231	-14	-1	2	17	11
268	-14	-2	2	17	12
314	-14	-3	2	17	13
360	-14	-4	2	17	14
406	-14	-5	2	17	15
230	-15	-1	2	18	0
267	-15	-2	2	18	1
313	-15	-3	2	18	2
359	-15	-4	2	18	3

```
|        405 | -15 | -5 |     2 |   18 |       4 |
|        229 | -16 | -1 |     2 |   18 |       5 |
|        266 | -16 | -2 |     2 |   18 |       6 |
|        312 | -16 | -3 |     2 |   18 |       7 |
|        358 | -16 | -4 |     2 |   18 |       8 |
|        404 | -16 | -5 |     2 |   18 |       9 |
|        228 | -17 | -1 |     2 |   18 |      10 |
|        265 | -17 | -2 |     2 |   18 |      11 |
|        311 | -17 | -3 |     2 |   18 |      12 |
|        357 | -17 | -4 |     2 |   18 |      13 |
|        403 | -17 | -5 |     2 |   18 |      14 |
|        227 | -18 | -1 |     2 |   18 |      15 |
|        264 | -18 | -2 |     2 |   19 |       0 |
|        310 | -18 | -3 |     2 |   19 |       1 |
|        356 | -18 | -4 |     2 |   19 |       2 |
|        402 | -18 | -5 |     2 |   19 |       3 |
|        226 | -19 | -1 |     2 |   19 |       4 |
|        263 | -19 | -2 |     2 |   19 |       5 |
|        309 | -19 | -3 |     2 |   19 |       6 |
|        355 | -19 | -4 |     2 |   19 |       7 |
|        401 | -19 | -5 |     2 |   19 |       8 |
|        225 | -20 | -1 |     2 |   19 |       9 |
|        262 | -20 | -2 |     2 |   19 |      10 |
|        308 | -20 | -3 |     2 |   19 |      11 |
|        354 | -20 | -4 |     2 |   19 |      12 |
|        400 | -20 | -5 |     2 |   19 |      13 |
|        224 | -21 | -1 |     2 |   19 |      14 |
|        261 | -21 | -2 |     2 |   19 |      15 |
|        307 | -21 | -3 |     2 |   20 |       0 |
|        353 | -21 | -4 |     2 |   20 |       1 |
|        399 | -21 | -5 |     2 |   20 |       2 |
|        223 | -22 | -1 |     2 |   20 |       3 |
|        260 | -22 | -2 |     2 |   20 |       4 |
|        306 | -22 | -3 |     2 |   20 |       5 |
|        352 | -22 | -4 |     2 |   20 |       6 |
|        398 | -22 | -5 |     2 |   20 |       7 |
|        222 | -23 | -1 |     2 |   20 |       8 |
|        259 | -23 | -2 |     2 |   20 |       9 |
|        305 | -23 | -3 |     2 |   20 |      10 |
|        351 | -23 | -4 |     2 |   20 |      11 |
|        397 | -23 | -5 |     2 |   20 |      12 |
+------------+-----+----+-------+------+---------+
442 rows in set (0.00 sec)
```

Geometric Mapping

Finally, this is the mapping ordered on the geometric information (x and y).

```
ysql> select channel_id, x, y, crate, slot, channel from ecal_channels where collection_id = 2 order by y desc,
x;
+------------+-----+----+-------+------+---------
+
| channel_id | x   | y  | crate | slot | channel
|
+------------+-----+----+-------+------+---------
+
|          1 | -23 |  5 |     1 |   20 |      12
|
|          2 | -22 |  5 |     1 |   20 |       7
|
|          3 | -21 |  5 |     1 |   20 |       2
|
|          4 | -20 |  5 |     1 |   19 |      13
|
|          5 | -19 |  5 |     1 |   19 |       8
|
|          6 | -18 |  5 |     1 |   19 |       3
|
|          7 | -17 |  5 |     1 |   18 |      14
```

8	-16	5	1	18	9
9	-15	5	1	18	4
10	-14	5	1	17	15
11	-13	5	1	17	10
12	-12	5	1	17	5
13	-11	5	1	17	0
14	-10	5	1	16	11
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