

| Module Set     | Module | Crate | Croc | Chain | Board | PMT Box # | FEB #  | Date installed | Module Type | Weave   | Most Recent Modification                                  |
|----------------|--------|-------|------|-------|-------|-----------|--------|----------------|-------------|---------|-----------------------------------------------------------|
| <b>Crate 0</b> |        |       |      |       |       |           |        |                |             |         |                                                           |
| MS1            | 1W     | 0     | 1    | 0     | 1     | 247       | 572364 |                | tracker     | Tufts   |                                                           |
| MS1            | 2W     | 0     | 1    | 0     | 2     | 49        | 572414 | 27/9/2017      | tracker     | Tufts   | 9/27/17: PMT#1137 was replaced                            |
| MS1            | 3W     | 0     | 1    | 0     | 3     | 1369      | 572980 | 27/9/2017      | tracker     | Rutgers | 9/27/17: FEB#572362 was replaced due to bad low tripchip5 |
| MS1            | 4W     | 0     | 1    | 0     | 4     | 218       | 572330 |                | tracker     | Tufts   |                                                           |
| MS1            | 5W     | 0     | 1    | 0     | 5     | 58        | 573502 |                | tracker     | Tufts   |                                                           |
| MS1            | 6W     | 0     | 1    | 0     | 6     | 1402      | 573663 |                | tracker     | Tufts   |                                                           |
| MS1            | 7W     | 0     | 1    | 0     | 7     | 1400      | 573539 |                | tracker     | Tufts   |                                                           |
| MS1            | 8W     | 0     | 1    | 0     | 8     | 1051      | 573410 |                | tracker     | Rutgers |                                                           |
| MS1            | 9W     | 0     | 1    | 0     | 9     | 271       | 572559 |                | tracker     | Tufts   |                                                           |
| MS1            | 10W    | 0     | 1    | 0     | 10    | 126       | 572571 | 27/9/2017      | tracker     | Tufts   | 9/27/17: FEB#572351 was replaced due to bad low tripchip5 |
| MS2            | 1W     | 0     | 1    | 1     | 1     | 164       | 573418 |                | tracker     | Tufts   |                                                           |
| MS2            | 2W     | 0     | 1    | 1     | 2     | 1039      | 572372 |                | tracker     | Rutgers |                                                           |
| MS2            | 3W     | 0     | 1    | 1     | 3     | 1321      | 572338 |                | tracker     | Rutgers |                                                           |
| MS2            | 4W     | 0     | 1    | 1     | 4     | 1359      | 573360 |                | tracker     | Rutgers |                                                           |
| MS2            | 5W     | 0     | 1    | 1     | 5     | 258       | 573355 |                | tracker     | Tufts   |                                                           |
| MS2            | 6W     | 0     | 1    | 1     | 6     | 96        | 572564 | 27/9/2017      | tracker     | Tufts   | 9/27/17: FEB#572541 was rpelace due to bad low tripchip4  |
| MS2            | 7W     | 0     | 1    | 1     | 7     | 187       | 572398 |                | tracker     | Tufts   |                                                           |
| MS2            | 8W     | 0     | 1    | 1     | 8     | 100       | 573365 |                | tracker     | Tufts   |                                                           |
| MS2            | 9W     | 0     | 1    | 1     | 9     | 1112      | 573103 |                | tracker     | Tufts   |                                                           |

|     |     |   |   |   |    |      |        |           |         |         |                                                                                                                                                                                                        |
|-----|-----|---|---|---|----|------|--------|-----------|---------|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MS2 | 10W | 0 | 1 | 1 | 10 | 1183 | 572962 | 7/3/2012  | tracker | Tufts   | 12/19/2011; Swap PMT on 3/7/12 for unstable HV                                                                                                                                                         |
| MS3 | 1W  | 0 | 1 | 2 | 1  | 250  | 572385 |           | tracker | Tufts   |                                                                                                                                                                                                        |
| MS3 | 2W  | 0 | 1 | 2 | 2  | 214  | 573529 | 21/9/2015 | tracker | Tufts   | Old FEB was 573685. The FEB is good. It was corrupted during v95 download but recovered                                                                                                                |
| MS3 | 3W  | 0 | 1 | 2 | 3  | 1425 | 573161 |           | tracker | Tufts   | 04/21/15: swap FEB (old 573265) to new one (573161) because crosstalk Trip-t chip (pixels 48-63).---12/23/10-- Problems in the log entry. 192 was removed and 1425 was installed, see log entry 15008. |
| MS3 | 4W  | 0 | 1 | 2 | 4  | 158  | 573674 |           | tracker | Tufts   |                                                                                                                                                                                                        |
| MS3 | 5W  | 0 | 1 | 2 | 5  | 22   | 573329 |           | tracker | Tufts   |                                                                                                                                                                                                        |
| MS3 | 6W  | 0 | 1 | 2 | 6  | 59   | 573689 |           | tracker | Tufts   |                                                                                                                                                                                                        |
| MS3 | 7W  | 0 | 1 | 2 | 7  | 1203 | 572388 | 17/1/2016 | tracker | Tufts   | FEB not detected in slowcontrol                                                                                                                                                                        |
| MS3 | 8W  | 0 | 1 | 2 | 8  | 161  | 573682 |           | tracker | Tufts   |                                                                                                                                                                                                        |
| MS3 | 9W  | 0 | 1 | 2 | 9  | 1001 | 572956 | 28/2/2012 | tracker | Rutgers | Replaced FEB 12/4/13 because of high pedestals in glo.                                                                                                                                                 |
| MS3 | 10W | 0 | 1 | 2 | 10 | 248  | 573512 |           | tracker | Tufts   |                                                                                                                                                                                                        |
| MS4 | 1W  | 0 | 1 | 3 | 1  | 159  | 573691 |           | tracker | Tufts   |                                                                                                                                                                                                        |

|     |    |   |   |   |   |      |        |            |                |         |                                                                                                                                  |
|-----|----|---|---|---|---|------|--------|------------|----------------|---------|----------------------------------------------------------------------------------------------------------------------------------|
| MS4 | 2W | 0 | 1 | 3 | 2 | 68   | 573692 |            | tracker        | Rutgers | Old PMT 231 replaced on 10/1/2015, showed gain variation.                                                                        |
| MS4 | 3W | 0 | 1 | 3 | 3 | 23   | 573413 | 27/9/2017  | tracker        | Tufts   | 9/27/17: PMT#1154 was replaced                                                                                                   |
| MS4 | 4W | 0 | 1 | 3 | 4 | 285  | 573400 |            | tracker        | Tufts   |                                                                                                                                  |
| MS4 | 5W | 0 | 1 | 3 | 5 | 270  | 573406 |            | tracker        | Tufts   |                                                                                                                                  |
| MS4 | 6W | 0 | 1 | 3 | 6 | 1140 | 573698 |            | tracker        | Tufts   |                                                                                                                                  |
| MS1 | 1E | 0 | 2 | 0 | 1 | 190  | 572544 |            | tracker        | Tufts   |                                                                                                                                  |
| MS1 | 2E | 0 | 2 | 0 | 2 | 1178 | 572587 | 2/2/2016   | tracker        | Tufts   | Replaced FEB 572931, HV spikes.                                                                                                  |
| MS1 | 3E | 0 | 2 | 0 | 3 | 116  | 573289 | 21/9/2015  | tracker        | Tufts   | Swaped corrupted FEB 573532 (old) during v95 download                                                                            |
| MS1 | 4E | 0 | 2 | 0 | 4 | 1415 | 573487 | 27/9/2017  | tracker        | Rutgers | Swap with faulty FEB, that kept alternating between a good and bad state. 9/27/17: FEB#572445 was replaced due bad low tripchip5 |
| MS1 | 5E | 0 | 2 | 0 | 5 | 1104 | 573168 | 25/10/2016 | tracker        | Tufts   | Communication Problem FEB 573415                                                                                                 |
| MS1 | 6E | 0 | 2 | 0 | 6 | 151  | 573381 |            | tracker        | Tufts   |                                                                                                                                  |
| MS1 | 7E | 0 | 2 | 0 | 7 | 257  | 573407 | 27/9/2017  | tracker        | Tufts   | 9/27/17: FEB#572346 was replaced due to bad low trip chip4                                                                       |
| MS1 | 8E | 0 | 2 | 0 | 8 | 12   | 572361 | 26/2/2011  | nuclear target | Tufts   | Changed FEB (old 573394) due to unstable HV.                                                                                     |

|     |     |   |   |   |    |      |        |            |                |         |                                  |
|-----|-----|---|---|---|----|------|--------|------------|----------------|---------|----------------------------------|
| MS1 | 9E  | 0 | 2 | 0 | 9  | 102  | 573409 |            | tracker        | Tufts   |                                  |
| MS1 | 10E | 0 | 2 | 0 | 10 | 29   | 573422 |            | tracker        | Tufts   |                                  |
| MS2 | 1E  | 0 | 2 | 1 | 1  | 189  | 573100 |            | tracker        | Tufts   |                                  |
| MS2 | 2E  | 0 | 2 | 1 | 2  | 1223 | 573108 |            | tracker        | Tufts   |                                  |
| MS2 | 3E  | 0 | 2 | 1 | 3  | 62   | 573101 |            | tracker        | Tufts   |                                  |
| MS2 | 4E  | 0 | 2 | 1 | 4  | 1031 | 573420 |            | tracker        | Rutgers |                                  |
| MS2 | 5E  | 0 | 2 | 1 | 5  | 263  | 573285 |            | tracker        | Tufts   |                                  |
| MS2 | 6E  | 0 | 2 | 1 | 6  | 256  | 573358 |            | tracker        | Tufts   |                                  |
| MS2 | 7E  | 0 | 2 | 1 | 7  | 1002 | 573477 | 23/8/2010  | tracker        | Rutgers | Faulty Trip 3. Old FEB 572392    |
| MS2 | 8E  | 0 | 2 | 1 | 8  | 165  | 573224 | 25/10/2016 | nuclear target | Tufts   | Communication Problem FEB 573344 |
| MS2 | 9E  | 0 | 2 | 1 | 9  | 1169 | 572942 | 10/1/2017  | tracker        | Tufts   |                                  |
| MS2 | 10E | 0 | 2 | 1 | 10 | 1358 | 572948 | 20/12/2011 | tracker        | Rutgers | Varying HV. Old FEB 573105       |
| MS3 | 1E  | 0 | 2 | 2 | 1  | 1197 | 573401 |            | tracker        | Tufts   |                                  |
| MS3 | 2E  | 0 | 2 | 2 | 2  | 255  | 573112 | 5/10/2011  | tracker        | Tufts   |                                  |
| MS3 | 3E  | 0 | 2 | 2 | 3  | 209  | 573510 |            | tracker        | Tufts   |                                  |
| MS3 | 4E  | 0 | 2 | 2 | 4  | 210  | 572390 |            | tracker        | Tufts   |                                  |
| MS3 | 5E  | 0 | 2 | 2 | 5  | 177  | 573296 |            | tracker        | Tufts   |                                  |
| MS3 | 6E  | 0 | 2 | 2 | 6  | 153  | 573452 |            | tracker        | Tufts   |                                  |
| MS3 | 7E  | 0 | 2 | 2 | 7  | 216  | 572451 |            | tracker        | Tufts   |                                  |
| MS3 | 8E  | 0 | 2 | 2 | 8  | 193  | 573686 |            | tracker        | Tufts   |                                  |
| MS3 | 9E  | 0 | 2 | 2 | 9  | 284  | 573690 |            | tracker        | Tufts   |                                  |
| MS4 | 1E  | 0 | 2 | 3 | 1  | 1158 | 573696 |            | tracker        | Tufts   |                                  |
| MS4 | 2E  | 0 | 2 | 3 | 2  | 1107 | 572911 | 3/11/2016  | tracker        | Tufts   | Nearline Errors FEB 573681       |
| MS4 | 3E  | 0 | 2 | 3 | 3  | 1119 | 573471 |            | tracker        | Tufts   |                                  |
| MS4 | 4E  | 0 | 2 | 3 | 4  | 1118 | 573496 | 28/10/2016 | tracker        | Tufts   | Nearline Errors FEB 572556       |
| MS4 | 5E  | 0 | 2 | 3 | 5  | 1147 | 573396 | 28/10/2016 | tracker        | Tufts   | Nearline Errors FEB 573380       |

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| MS5 | 1W  | 0 | 3 | 0 | 1  | 1219 | 573384 |  | tracker | Tufts   |                                                                                         |
| MS5 | 2W  | 0 | 3 | 0 | 2  | 229  | 573523 |  | tracker | Tufts   |                                                                                         |
| MS5 | 3W  | 0 | 3 | 0 | 3  | 228  | 573404 |  | tracker | Tufts   |                                                                                         |
| MS5 | 4W  | 0 | 3 | 0 | 4  | 1003 | 573390 |  | tracker | Rutgers |                                                                                         |
| MS5 | 5W  | 0 | 3 | 0 | 5  | 1116 | 573421 |  | tracker | Tufts   |                                                                                         |
| MS5 | 6W  | 0 | 3 | 0 | 6  | 275  | 573412 |  | tracker | Tufts   |                                                                                         |
| MS5 | 7W  | 0 | 3 | 0 | 7  | 16   | 572368 |  | tracker | Tufts   |                                                                                         |
| MS5 | 8W  | 0 | 3 | 0 | 8  | 143  | 573513 |  | tracker | Tufts   |                                                                                         |
| MS5 | 9W  | 0 | 3 | 0 | 9  | 171  | 572403 |  | tracker | Tufts   |                                                                                         |
| MS5 | 10W | 0 | 3 | 0 | 10 | 227  | 573515 |  | tracker | Tufts   |                                                                                         |
| MS6 | 1W  | 0 | 3 | 1 | 1  | 183  | 573521 |  | tracker | Tufts   |                                                                                         |
| MS6 | 2W  | 0 | 3 | 1 | 2  | 286  | 573425 |  | tracker | Tufts   |                                                                                         |
| MS6 | 3W  | 0 | 3 | 1 | 3  | 207  | 573544 |  | tracker | Tufts   |                                                                                         |
| MS6 | 4W  | 0 | 3 | 1 | 4  | 61   | 573551 |  | tracker | Tufts   |                                                                                         |
| MS6 | 5W  | 0 | 3 | 1 | 5  | 178  | 573566 |  | tracker | Tufts   |                                                                                         |
| MS6 | 6W  | 0 | 3 | 1 | 6  | 223  | 573565 |  | tracker | Tufts   |                                                                                         |
| MS6 | 7W  | 0 | 3 | 1 | 7  | 254  | 573430 |  | tracker | Tufts   |                                                                                         |
| MS6 | 8W  | 0 | 3 | 1 | 8  | 264  | 573511 |  | tracker | Tufts   |                                                                                         |
| MS6 | 9W  | 0 | 3 | 1 | 9  | 37   | 573525 |  | tracker | Tufts   |                                                                                         |
| MS6 | 10W | 0 | 3 | 1 | 10 | 97   | 573516 |  | tracker | Tufts   |                                                                                         |
| MS7 | 1W  | 0 | 3 | 2 | 1  | 1322 | 573549 |  | tracker | Rutgers |                                                                                         |
| MS7 | 2W  | 0 | 3 | 2 | 2  | 142  | 573560 |  | tracker | Tufts   |                                                                                         |
| MS7 | 3W  | 0 | 3 | 2 | 3  | 238  | 573554 |  | tracker | Tufts   |                                                                                         |
| MS7 | 4W  | 0 | 3 | 2 | 4  | 154  | 573520 |  | tracker | Tufts   |                                                                                         |
| MS7 | 5W  | 0 | 3 | 2 | 5  | 1364 | 573410 |  | tracker | Rutgers | swap FEB (old 573519) to new one (573410) because crosstalk Trip-t chip (pixels 48-63). |
| MS7 | 6W  | 0 | 3 | 2 | 6  | 85   | 573552 |  | tracker | Tufts   |                                                                                         |
| MS7 | 7W  | 0 | 3 | 2 | 7  | 240  | 573508 |  | tracker | Tufts   |                                                                                         |
| MS7 | 8W  | 0 | 3 | 2 | 8  | 1216 | 573548 |  | tracker | Tufts   |                                                                                         |

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| MS7 | 9W  | 0 | 3 | 2 | 9  | 200  | 573557 |           | tracker | Tufts   |                                                                                              |
| MS7 | 10W | 0 | 3 | 2 | 10 | 1360 | 573231 |           | tracker | Rutgers |                                                                                              |
| MS8 | 1W  | 0 | 3 | 3 | 1  | 181  | 572450 |           | tracker | Tufts   |                                                                                              |
| MS8 | 2W  | 0 | 3 | 3 | 2  | 276  | 572428 |           | tracker | Tufts   |                                                                                              |
| MS8 | 3W  | 0 | 3 | 3 | 3  | 211  | 573547 |           | tracker | Tufts   |                                                                                              |
| MS8 | 4W  | 0 | 3 | 3 | 4  | 239  | 573555 |           | tracker | Tufts   |                                                                                              |
| MS8 | 5W  | 0 | 3 | 3 | 5  | 260  | 573571 |           | tracker | Tufts   |                                                                                              |
| MS8 | 6W  | 0 | 3 | 3 | 6  | 163  | 572591 |           | tracker | Tufts   |                                                                                              |
| MS8 | 7W  | 0 | 3 | 3 | 7  | 146  | 573563 |           | tracker | Tufts   |                                                                                              |
| MS8 | 8W  | 0 | 3 | 3 | 8  | 155  | 572333 |           | tracker | Tufts   |                                                                                              |
| MS8 | 9W  | 0 | 3 | 3 | 9  | 261  | 572915 | 9/10/2015 | tracker | Tufts   | The old FEB is 573545. Dead pixels                                                           |
| MS8 | 10W | 0 | 3 | 3 | 10 | 1225 | 573546 |           | tracker | Tufts   |                                                                                              |
| MS5 | 1E  | 0 | 4 | 0 | 1  | 168  | 572950 | 1/11/2018 | tracker | Tufts   | Chain errors FEB 572553, 11/1/18 replaced 572970 to fix TxRx error, didn't help              |
| MS5 | 2E  | 0 | 4 | 0 | 2  | 1139 | 572568 | 2/11/2018 | tracker | Tufts   | 11/2/18, 573141 or 573579 could cause the TxRx errors on 0-4-0                               |
| MS5 | 3E  | 0 | 4 | 0 | 3  | 48   | 572416 | 2/11/2018 | tracker | Tufts   | 11/2/18, 573141 or 573579 could cause TxRx error on 0-4-0                                    |
| MS5 | 4E  | 0 | 4 | 0 | 4  | 1113 | 572968 | 2/10/2018 | tracker | Tufts   | FEB giving a sequence error, stop DAQ, 10/2/18 replace 572322 to fix TxRx error doesn't help |

|     |    |   |   |   |   |     |        |           |         |       |                                                                                                                                                                                                     |
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| MS5 | 5E | 0 | 4 | 0 | 5 | 199 | 573423 | 2/10/2018 | tracker | Tufts | Chain errors FEB 573393, 10/2/18 Replace 572370 to fix TxRx error, doesn't help                                                                                                                     |
| MS5 | 6E | 0 | 4 | 0 | 6 | 198 | 573658 | 2/10/2018 | tracker | Tufts | Chain errors FEB 572984, 10/2/18 replace 573419 to fix TxRx error, doesn't help                                                                                                                     |
| MS5 | 7E | 0 | 4 | 0 | 7 | 90  | 573389 | 10/1/2018 | tracker | Tufts | TxRx error, does not fix error, 10/2/18 replace 573309, does not fix TxRx error                                                                                                                     |
| MS5 | 8E | 0 | 4 | 0 | 8 | 233 | 572457 | 10/1/2018 | tracker | Tufts | previously (before 09-09-2014) FEB board number was 9 --RDF. This error traces back to v5 of this document, then this module set was first incorporated. 10/1/18 replaceemt does not fix TxRx error |

|     |    |   |   |   |   |      |        |            |         |         |                                                                                                                                                                                                      |
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| MS5 | 9E | 0 | 4 | 0 | 9 | 221  | 573562 | 1/10/2018  | tracker | Tufts   | previously (before 09-09-2014) FEB board number was 10 --RDF. This error traces back to v5 of this document, when this module set was first incorporated. 1/10/18 replacement doesn't fix TxRx error |
| MS6 | 1E | 0 | 4 | 1 | 1 | 33   | 572394 | 18/09/2018 | tracker | Tufts   | old feb 573572 has flaky cat5 connector                                                                                                                                                              |
| MS6 | 2E | 0 | 4 | 1 | 2 | 287  | 573579 | 17/1/2016  | tracker | Tufts   | January Crisis                                                                                                                                                                                       |
| MS6 | 3E | 0 | 4 | 1 | 3 | 272  | 573524 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS6 | 4E | 0 | 4 | 1 | 4 | 280  | 573522 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS6 | 5E | 0 | 4 | 1 | 5 | 175  | 573411 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS6 | 6E | 0 | 4 | 1 | 6 | 215  | 573564 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS6 | 7E | 0 | 4 | 1 | 7 | 197  | 573570 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS6 | 8E | 0 | 4 | 1 | 8 | 36   | 573568 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS6 | 9E | 0 | 4 | 1 | 9 | 148  | 573567 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS7 | 1E | 0 | 4 | 2 | 1 | 243  | 573664 |            | tracker | Tufts   | PMT box practice replacement; replaced 06/27/13 PMT box replacement 03/26/14, FEB swapped 7/24/14                                                                                                    |
| MS7 | 2E | 0 | 4 | 2 | 2 | 234  | 573426 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS7 | 3E | 0 | 4 | 2 | 3 | 182  | 573561 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS7 | 4E | 0 | 4 | 2 | 4 | 1365 | 573556 |            | tracker | Rutgers |                                                                                                                                                                                                      |
| MS7 | 5E | 0 | 4 | 2 | 5 | 1200 | 573662 |            | tracker | Tufts   |                                                                                                                                                                                                      |
| MS7 | 6E | 0 | 4 | 2 | 6 | 1357 | 573427 |            | tracker | Rutgers |                                                                                                                                                                                                      |



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|-----|-----|---|---|---|----|------|--------|------------|---------|---------|-----------------------------------------------------------------------|
| MS7 | 7E  | 0 | 4 | 2 | 7  | 196  | 573429 |            | tracker | Tufts   |                                                                       |
| MS7 | 8E  | 0 | 4 | 2 | 8  | 1356 | 573428 |            | tracker | Rutgers |                                                                       |
| MS7 | 9E  | 0 | 4 | 2 | 9  | 150  | 572578 |            | tracker | Tufts   |                                                                       |
| MS8 | 1E  | 0 | 4 | 3 | 1  | 202  | 572391 |            | tracker | Tufts   |                                                                       |
| MS8 | 2E  | 0 | 4 | 3 | 2  | 230  | 572326 |            | tracker | Tufts   |                                                                       |
| MS8 | 3E  | 0 | 4 | 3 | 3  | 1038 | 572417 |            | tracker | Rutgers |                                                                       |
| MS8 | 4E  | 0 | 4 | 3 | 4  | 262  | 572369 |            | tracker | Tufts   | swap feb because crosstalk in the tript-chip (pixels 0-15)            |
| MS8 | 5E  | 0 | 4 | 3 | 5  | 291  | 573366 |            | tracker | Tufts   |                                                                       |
| MS8 | 6E  | 0 | 4 | 3 | 6  | 99   | 572945 | 18/1/2012  | tracker | Tufts   | HV varying. Old FEB 572360.                                           |
| MS8 | 7E  | 0 | 4 | 3 | 7  | 92   | 572460 | 10/1/2017  | tracker | Tufts   | Typo in the old FEB, the sheet said 572549, the real number is 572459 |
| MS8 | 8E  | 0 | 4 | 3 | 8  | 60   | 572367 |            | tracker | Tufts   |                                                                       |
| MS8 | 9E  | 0 | 4 | 3 | 9  | 176  | 572546 |            | tracker | Tufts   |                                                                       |
| MS9 | 1W  | 0 | 5 | 0 | 1  | 217  | 572334 |            | tracker | Tufts   |                                                                       |
| MS9 | 2W  | 0 | 5 | 0 | 2  | 188  | 573463 | 27/9/2017  | tracker | Tufts   | 9/27/17: FEB#572461 was replaced due to bad low tripchip5             |
| MS9 | 3W  | 0 | 5 | 0 | 3  | 87   | 572590 |            | tracker | Tufts   |                                                                       |
| MS9 | 4W  | 0 | 5 | 0 | 4  | 28   | 573319 |            | tracker | Tufts   |                                                                       |
| MS9 | 5W  | 0 | 5 | 0 | 5  | 249  | 573321 |            | tracker | Tufts   |                                                                       |
| MS9 | 6W  | 0 | 5 | 0 | 6  | 224  | 573363 |            | tracker | Tufts   |                                                                       |
| MS9 | 7W  | 0 | 5 | 0 | 7  | 191  | 573453 |            | tracker | Tufts   |                                                                       |
| MS9 | 8W  | 0 | 5 | 0 | 8  | 203  | 573338 |            | tracker | Tufts   |                                                                       |
| MS9 | 9W  | 0 | 5 | 0 | 9  | 220  | 572593 |            | tracker | Tufts   |                                                                       |
| MS9 | 10W | 0 | 5 | 0 | 10 | 1015 | 573118 | 25/10/2016 | tracker | Tufts   | Communication Problem FEB 573445                                      |

|      |     |   |   |   |    |      |        |           |         |         |                                                                    |
|------|-----|---|---|---|----|------|--------|-----------|---------|---------|--------------------------------------------------------------------|
| MS10 | 1W  | 0 | 5 | 1 | 1  | 212  | 573112 | 27/9/2017 | tracker | Tufts   | 9/27/17:<br>FEB#572594 was<br>replace ddue to bad<br>low tripchip4 |
| MS10 | 2W  | 0 | 5 | 1 | 2  | 1037 | 573576 |           | tracker | Rutgers |                                                                    |
| MS10 | 3W  | 0 | 5 | 1 | 3  | 1370 | 573334 |           | tracker | Rutgers |                                                                    |
| MS10 | 4W  | 0 | 5 | 1 | 4  | 1021 | 572588 |           | tracker | Rutgers |                                                                    |
| MS10 | 5W  | 0 | 5 | 1 | 5  | 149  | 572580 |           | tracker | Tufts   |                                                                    |
| MS10 | 6W  | 0 | 5 | 1 | 6  | 88   | 572584 |           | tracker | Tufts   |                                                                    |
| MS10 | 7W  | 0 | 5 | 1 | 7  | 1046 | 573318 |           | tracker | Rutgers |                                                                    |
| MS10 | 8W  | 0 | 5 | 1 | 8  | 1174 | 572576 |           | tracker | Tufts   |                                                                    |
| MS10 | 9W  | 0 | 5 | 1 | 9  | 93   | 573122 |           | tracker | Tufts   |                                                                    |
| MS10 | 10W | 0 | 5 | 1 | 10 | 1034 | 573447 |           | tracker | Rutgers |                                                                    |
| MS11 | 1W  | 0 | 5 | 2 | 1  | 185  | 573336 | 19/1/2010 | tracker | Tufts   |                                                                    |
| MS11 | 2W  | 0 | 5 | 2 | 2  | 241  | 573352 | 19/1/2010 | tracker | Tufts   |                                                                    |
| MS11 | 3W  | 0 | 5 | 2 | 3  | 1026 | 573348 | 19/1/2010 | tracker | Rutgers |                                                                    |
| MS11 | 4W  | 0 | 5 | 2 | 4  | 1033 | 573693 | 19/1/2010 | tracker | Rutgers |                                                                    |
| MS11 | 5W  | 0 | 5 | 2 | 5  | 1045 | 573347 | 19/1/2010 | tracker | Rutgers |                                                                    |
| MS11 | 6W  | 0 | 5 | 2 | 6  | 1354 | 573339 | 19/1/2010 | tracker | Rutgers |                                                                    |
| MS11 | 7W  | 0 | 5 | 2 | 7  | 1373 | 573629 | 19/1/2010 | tracker | Rutgers |                                                                    |
| MS11 | 8W  | 0 | 5 | 2 | 8  | 1367 | 573353 | 19/1/2010 | tracker | Rutgers |                                                                    |
| MS11 | 9W  | 0 | 5 | 2 | 9  | 180  | 573345 | 19/1/2010 | tracker | Tufts   |                                                                    |
| MS11 | 10W | 0 | 5 | 2 | 10 | 1371 | 573454 | 19/1/2010 | tracker | Tufts   |                                                                    |
| MS12 | 1W  | 0 | 5 | 3 | 1  | 1362 | 573610 | 6/11/2009 | tracker | Rutgers |                                                                    |

|      |     |   |   |   |    |      |        |            |         |         |                                                                                                                                                                                                             |
|------|-----|---|---|---|----|------|--------|------------|---------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MS12 | 2W  | 0 | 5 | 3 | 2  | 195  | 572422 | 21/10/2015 | tracker | Tufts   | PMT Unstable HV 5/1/2012. Old FEB 572920, PMT is showing HV variation, May be FEB is ok. Old PMT 1423 replaced on 10/13/15. PMT 17 was replaced again on 10/16/15. Old FEB 572996 was replaced on 10/21/15. |
| MS12 | 3W  | 0 | 5 | 3 | 3  | 259  | 573133 | 6/11/2009  | tracker | Tufts   |                                                                                                                                                                                                             |
| MS12 | 4W  | 0 | 5 | 3 | 4  | 236  | 573121 | 6/11/2009  | tracker | Tufts   |                                                                                                                                                                                                             |
| MS12 | 5W  | 0 | 5 | 3 | 5  | 208  | 572429 | 22/10/2015 | tracker | Tufts   | FEB 573120 replaced on 10/22/15 for one dead channel (32).                                                                                                                                                  |
| MS12 | 6W  | 0 | 5 | 3 | 6  | 1024 | 572453 | 23/10/2015 | tracker | Rutgers | Replaced FEB 573294 on 10/23/15 due to high RMS in channels 32-63.                                                                                                                                          |
| MS12 | 7W  | 0 | 5 | 3 | 7  | 1209 | 573134 | 6/11/2009  | tracker | Tufts   |                                                                                                                                                                                                             |
| MS12 | 8W  | 0 | 5 | 3 | 8  | 1126 | 573137 | 6/11/2009  | tracker | Tufts   |                                                                                                                                                                                                             |
| MS12 | 9W  | 0 | 5 | 3 | 9  | 1036 | 573291 | 6/11/2009  | tracker | Rutgers |                                                                                                                                                                                                             |
| MS12 | 10W | 0 | 5 | 3 | 10 | 1336 | 572952 | 6/11/2009  | tracker | Rutgers | 40990                                                                                                                                                                                                       |
| MS9  | 1E  | 0 | 6 | 0 | 1  | 269  | 573350 |            | tracker | Tufts   |                                                                                                                                                                                                             |
| MS9  | 2E  | 0 | 6 | 0 | 2  | 246  | 572572 | 17/1/2016  | tracker | Tufts   | January Crisis                                                                                                                                                                                              |
| MS9  | 3E  | 0 | 6 | 0 | 3  | 156  | 573234 | 9/10/2015  | tracker | Tufts   | Old FEB 573514, Pixel 35 is dead.                                                                                                                                                                           |
| MS9  | 4E  | 0 | 6 | 0 | 4  | 14   | 572549 |            | tracker | Tufts   |                                                                                                                                                                                                             |
| MS9  | 5E  | 0 | 6 | 0 | 5  | 145  | 572407 |            | tracker | Tufts   |                                                                                                                                                                                                             |
| MS9  | 6E  | 0 | 6 | 0 | 6  | 244  | 572547 |            | tracker | Tufts   |                                                                                                                                                                                                             |

|      |    |   |   |   |   |      |        |           |         |         |                                                                     |
|------|----|---|---|---|---|------|--------|-----------|---------|---------|---------------------------------------------------------------------|
| MS9  | 7E | 0 | 6 | 0 | 7 | 173  | 572387 |           | tracker | Tufts   |                                                                     |
| MS9  | 8E | 0 | 6 | 0 | 8 | 277  | 573392 | 27/9/2017 | tracker | Tufts   | 9/27/17:<br>FEB#572438 was<br>replaced due to bad<br>low tripchip 5 |
| MS9  | 9E | 0 | 6 | 0 | 9 | 162  | 572363 |           | tracker | Tufts   |                                                                     |
| MS10 | 1E | 0 | 6 | 1 | 1 | 222  | 572577 |           | tracker | Tufts   |                                                                     |
| MS10 | 2E | 0 | 6 | 1 | 2 | 251  | 572443 | 17/1/2016 | tracker | Tufts   | January Crisis                                                      |
| MS10 | 3E | 0 | 6 | 1 | 3 | 174  | 573574 |           | tracker | Tufts   |                                                                     |
| MS10 | 4E | 0 | 6 | 1 | 4 | 91   | 573327 |           | tracker | Tufts   |                                                                     |
| MS10 | 5E | 0 | 6 | 1 | 5 | 213  | 572395 |           | tracker | Tufts   |                                                                     |
| MS10 | 6E | 0 | 6 | 1 | 6 | 147  | 572920 | 10/1/2017 | tracker | Tufts   |                                                                     |
| MS10 | 7E | 0 | 6 | 1 | 7 | 65   | 573330 |           | tracker | Tufts   |                                                                     |
| MS10 | 8E | 0 | 6 | 1 | 8 | 1168 | 573575 |           | tracker | Tufts   |                                                                     |
| MS10 | 9E | 0 | 6 | 1 | 9 | 86   | 573331 |           | tracker | Tufts   |                                                                     |
| MS11 | 1E | 0 | 6 | 2 | 1 | 1361 | 573449 | 19/1/2010 | tracker | Rutgers |                                                                     |
| MS11 | 2E | 0 | 6 | 2 | 2 | 1355 | 573435 | 19/1/2010 | tracker | Rutgers |                                                                     |
| MS11 | 3E | 0 | 6 | 2 | 3 | 237  | 573672 | 19/1/2010 | tracker | Tufts   |                                                                     |
| MS11 | 4E | 0 | 6 | 2 | 4 | 289  | 573351 | 19/1/2010 | tracker | Tufts   |                                                                     |
| MS11 | 5E | 0 | 6 | 2 | 5 | 1352 | 573450 | 19/1/2010 | tracker | Rutgers |                                                                     |
| MS11 | 6E | 0 | 6 | 2 | 6 | 1041 | 573343 | 19/1/2010 | tracker | Rutgers |                                                                     |
| MS11 | 7E | 0 | 6 | 2 | 7 | 1050 | 573437 | 19/1/2010 | tracker | Rutgers |                                                                     |
| MS11 | 8E | 0 | 6 | 2 | 8 | 1047 | 573444 | 19/1/2010 | tracker | Rutgers | 40942                                                               |
| MS11 | 9E | 0 | 6 | 2 | 9 | 247  | 573189 | 19/1/2010 | tracker | Tufts   |                                                                     |
| MS12 | 1E | 0 | 6 | 3 | 1 | 1115 | 573132 | 6/11/2009 | tracker | Tufts   |                                                                     |
| MS12 | 2E | 0 | 6 | 3 | 2 | 1363 | 573297 | 6/11/2009 | tracker | Rutgers |                                                                     |
| MS12 | 3E | 0 | 6 | 3 | 3 | 1366 | 573299 | 6/11/2009 | tracker | Rutgers |                                                                     |
| MS12 | 4E | 0 | 6 | 3 | 4 | 1189 | 573131 | 6/11/2009 | tracker | Tufts   |                                                                     |
| MS12 | 5E | 0 | 6 | 3 | 5 | 1143 | 573287 | 6/11/2009 | tracker | Tufts   |                                                                     |
| MS12 | 6E | 0 | 6 | 3 | 6 | 1211 | 573136 | 9/11/2009 | tracker | Tufts   |                                                                     |
| MS12 | 7E | 0 | 6 | 3 | 7 | 1202 | 573135 | 6/11/2009 | tracker | Tufts   |                                                                     |
| MS12 | 8E | 0 | 6 | 3 | 8 | 1179 | 573505 | 6/11/2009 | tracker | Tufts   |                                                                     |

|      |     |   |   |   |    |      |        |            |         |         |  |
|------|-----|---|---|---|----|------|--------|------------|---------|---------|--|
| MS12 | 9E  | 0 | 6 | 3 | 9  | 1022 | 573295 | 6/11/2009  | tracker | Rutgers |  |
| MS13 | 1W  | 0 | 7 | 0 | 1  | 1162 | 573304 | 2/11/2009  | tracker | Tufts   |  |
| MS13 | 2W  | 0 | 7 | 0 | 2  | 1175 | 573305 | 2/11/2009  | tracker | Tufts   |  |
| MS13 | 3W  | 0 | 7 | 0 | 3  | 1206 | 573303 | 2/11/2009  | tracker | Tufts   |  |
| MS13 | 4W  | 0 | 7 | 0 | 4  | 1155 | 573302 | 2/11/2009  | tracker | Tufts   |  |
| MS13 | 5W  | 0 | 7 | 0 | 5  | 1134 | 573301 | 2/11/2009  | tracker | Tufts   |  |
| MS13 | 6W  | 0 | 7 | 0 | 6  | 1145 | 573283 | 2/11/2009  | tracker | Tufts   |  |
| MS13 | 7W  | 0 | 7 | 0 | 7  | 1159 | 573288 | 6/11/2009  | tracker | Tufts   |  |
| MS13 | 8W  | 0 | 7 | 0 | 8  | 1121 | 573284 | 2/11/2009  | tracker | Tufts   |  |
| MS13 | 9W  | 0 | 7 | 0 | 9  | 1207 | 573106 | 2/11/2009  | tracker | Tufts   |  |
| MS13 | 10W | 0 | 7 | 0 | 10 | 1221 | 573281 | 2/11/2009  | tracker | Tufts   |  |
| MS14 | 1W  | 0 | 7 | 1 | 1  | 1180 | 573117 | 29/10/2009 | tracker | Tufts   |  |
| MS14 | 2W  | 0 | 7 | 1 | 2  | 1213 | 573139 | 29/10/2009 | tracker | Tufts   |  |
| MS14 | 3W  | 0 | 7 | 1 | 3  | 245  | 573113 | 29/10/2009 | tracker | Tufts   |  |
| MS14 | 4W  | 0 | 7 | 1 | 4  | 184  | 573119 | 29/10/2009 | tracker | Tufts   |  |
| MS14 | 5W  | 0 | 7 | 1 | 5  | 204  | 573114 | 29/10/2009 | tracker | Tufts   |  |
| MS14 | 6W  | 0 | 7 | 1 | 6  | 232  | 573124 | 29/10/2009 | tracker | Tufts   |  |
| MS14 | 7W  | 0 | 7 | 1 | 7  | 283  | 573126 | 29/10/2009 | tracker | Tufts   |  |
| MS14 | 8W  | 0 | 7 | 1 | 8  | 205  | 573482 | 29/10/2009 | tracker | Tufts   |  |
| MS14 | 9W  | 0 | 7 | 1 | 9  | 1160 | 573129 | 29/10/2009 | tracker | Tufts   |  |
| MS14 | 10W | 0 | 7 | 1 | 10 | 1153 | 573130 | 29/10/2009 | tracker | Tufts   |  |
| MS15 | 1W  | 0 | 7 | 2 | 1  | 1314 | 573459 | 27/10/2009 | tracker | Rutgers |  |
| MS15 | 2W  | 0 | 7 | 2 | 2  | 1342 | 573456 | 27/10/2009 | tracker | Rutgers |  |
| MS15 | 3W  | 0 | 7 | 2 | 3  | 1102 | 573442 | 27/10/2009 | tracker | Tufts   |  |
| MS15 | 4W  | 0 | 7 | 2 | 4  | 242  | 572339 | 27/10/2009 | tracker | Tufts   |  |
| MS15 | 5W  | 0 | 7 | 2 | 5  | 252  | 573473 | 27/10/2009 | tracker | Tufts   |  |
| MS15 | 6W  | 0 | 7 | 2 | 6  | 267  | 573110 | 27/10/2009 | tracker | Tufts   |  |
| MS15 | 7W  | 0 | 7 | 2 | 7  | 235  | 573467 | 27/10/2009 | tracker | Tufts   |  |
| MS15 | 8W  | 0 | 7 | 2 | 8  | 268  | 573465 | 27/10/2009 | tracker | Tufts   |  |
| MS15 | 9W  | 0 | 7 | 2 | 9  | 1334 | 573433 | 27/10/2009 | tracker | Rutgers |  |

|      |     |   |   |   |    |      |        |            |         |         |                                                                  |
|------|-----|---|---|---|----|------|--------|------------|---------|---------|------------------------------------------------------------------|
| MS15 | 10W | 0 | 7 | 2 | 10 | 1350 | 573405 | 27/10/2009 | tracker | Rutgers | 40816, the old number 573462 is wrong, it should be 572462       |
| MS16 | 1W  | 0 | 7 | 3 | 1  | 1372 | 573536 | 22/10/2009 | tracker | Rutgers |                                                                  |
| MS16 | 2W  | 0 | 7 | 3 | 2  | 1309 | 573585 | 22/10/2009 | tracker | Rutgers |                                                                  |
| MS16 | 3W  | 0 | 7 | 3 | 3  | 169  | 573583 | 22/10/2009 | tracker | Tufts   |                                                                  |
| MS16 | 4W  | 0 | 7 | 3 | 4  | 281  | 573581 | 22/10/2009 | tracker | Tufts   |                                                                  |
| MS16 | 5W  | 0 | 7 | 3 | 5  | 288  | 573584 | 22/10/2009 | tracker | Tufts   |                                                                  |
| MS16 | 6W  | 0 | 7 | 3 | 6  | 206  | 573649 | 22/10/2009 | tracker | Tufts   |                                                                  |
| MS16 | 7W  | 0 | 7 | 3 | 7  | 290  | 573661 | 22/10/2009 | tracker | Tufts   |                                                                  |
| MS16 | 8W  | 0 | 7 | 3 | 8  | 1307 | 573676 | 22/10/2009 | tracker | Rutgers |                                                                  |
| MS16 | 9W  | 0 | 7 | 3 | 9  | 1368 | 573580 | 22/10/2009 | tracker | Rutgers |                                                                  |
| MS16 | 10W | 0 | 7 | 3 | 10 | 1301 | 573479 | 27/9/2010  | tracker | Rutgers |                                                                  |
| MS13 | 1E  | 0 | 8 | 0 | 1  | 1215 | 573310 | 2/11/2009  | tracker | Tufts   |                                                                  |
| MS13 | 2E  | 0 | 8 | 0 | 2  | 1141 | 573311 | 2/11/2009  | tracker | Tufts   |                                                                  |
| MS13 | 3E  | 0 | 8 | 0 | 3  | 1108 | 573306 | 2/11/2009  | tracker | Tufts   |                                                                  |
| MS13 | 4E  | 0 | 8 | 0 | 4  | 1170 | 573312 | 2/11/2009  | tracker | Tufts   |                                                                  |
| MS13 | 5E  | 0 | 8 | 0 | 5  | 1124 | 573317 | 2/11/2009  | tracker | Tufts   |                                                                  |
| MS13 | 6E  | 0 | 8 | 0 | 6  | 1217 | 573313 | 2/11/2009  | tracker | Tufts   |                                                                  |
| MS13 | 7E  | 0 | 8 | 0 | 7  | 1127 | 573315 | 2/11/2009  | tracker | Tufts   |                                                                  |
| MS13 | 8E  | 0 | 8 | 0 | 8  | 1152 | 573528 | 2/11/2009  | tracker | Tufts   |                                                                  |
| MS13 | 9E  | 0 | 8 | 0 | 9  | 1142 | 572247 | 2/11/2009  | tracker | Tufts   |                                                                  |
| MS14 | 1E  | 0 | 8 | 1 | 1  | 1212 | 573434 | 29/10/2009 | tracker | Tufts   |                                                                  |
| MS14 | 2E  | 0 | 8 | 1 | 2  | 1190 | 573432 | 29/10/2009 | tracker | Tufts   |                                                                  |
| MS14 | 3E  | 0 | 8 | 1 | 3  | 1422 | 572979 | 7/3/2012   | tracker | Tufts   | 7-March-12;<br>Unstable HV, PMT replaced 5/1/2012<br>Unstable HV |
| MS14 | 4E  | 0 | 8 | 1 | 4  | 1129 | 573300 | 29/10/2009 | tracker | Tufts   |                                                                  |
| MS14 | 5E  | 0 | 8 | 1 | 5  | 1122 | 573111 | 29/10/2009 | tracker | Tufts   |                                                                  |
| MS14 | 6E  | 0 | 8 | 1 | 6  | 1335 | 573286 | 29/10/2009 | tracker | Rutgers |                                                                  |
| MS14 | 7E  | 0 | 8 | 1 | 7  | 1117 | 573123 | 29/10/2009 | tracker | Tufts   |                                                                  |

|      |    |   |   |   |   |      |        |            |         |         |                                                                                                                                                                                                                                                                                                                                                             |
|------|----|---|---|---|---|------|--------|------------|---------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MS14 | 8E | 0 | 8 | 1 | 8 | 1054 | 573474 | 29/10/2009 | tracker | Rutgers |                                                                                                                                                                                                                                                                                                                                                             |
| MS14 | 9E | 0 | 8 | 1 | 9 | 1150 | 573115 | 29/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |
| MS15 | 1E | 0 | 8 | 2 | 1 | 1227 | 573675 | 9/10/2015  | tracker | Tufts   | Old FEB 572552, pixels 0 to 31 are dead                                                                                                                                                                                                                                                                                                                     |
| MS15 | 2E | 0 | 8 | 2 | 2 | 1188 | 573440 | 27/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |
| MS15 | 3E | 0 | 8 | 2 | 3 | 1210 | 573666 | 27/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |
| MS15 | 4E | 0 | 8 | 2 | 4 | 1166 | 572551 | 27/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |
| MS15 | 5E | 0 | 8 | 2 | 5 | 1204 | 573446 | 27/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |
| MS15 | 6E | 0 | 8 | 2 | 6 | 1177 | 573455 | 27/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |
| MS15 | 7E | 0 | 8 | 2 | 7 | 1133 | 573466 | 27/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |
| MS15 | 8E | 0 | 8 | 2 | 8 | 1218 | 573468 | 27/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |
| MS15 | 9E | 0 | 8 | 2 | 9 | 1341 | 573458 | 10/9/2014  | tracker | Rutgers | Previously: Tube #1353 (Rutgers; installed on 10/27/2009). [This box had previously been removed from the detector because of a light leak (3/9/2010). Comments from Lab G spreadsheet: "Long Period ~10000, needs repair but might be ok for the Tesbeam. It does come up on voltage eventually. 09-05-2014 Does not come up in voltage."Cross-talk: 5.9%] |
| MS16 | 1E | 0 | 8 | 3 | 1 | 1105 | 573673 | 22/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |
| MS16 | 2E | 0 | 8 | 3 | 2 | 1182 | 573670 | 22/10/2009 | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                                             |

|                |     |   |   |   |    |      |        |            |         |         |                                                                     |
|----------------|-----|---|---|---|----|------|--------|------------|---------|---------|---------------------------------------------------------------------|
| MS16           | 3E  | 0 | 8 | 3 | 3  | 1138 | 573630 | 22/10/2009 | tracker | Tufts   |                                                                     |
| MS16           | 4E  | 0 | 8 | 3 | 4  | 1184 | 573650 | 22/10/2009 | tracker | Tufts   |                                                                     |
| MS16           | 5E  | 0 | 8 | 3 | 5  | 1312 | 573671 | 14/1/2015  | tracker | Rutgers | Original on 10/22/2009                                              |
| MS16           | 6E  | 0 | 8 | 3 | 6  | 1345 | 573597 | 22/10/2009 | tracker | Rutgers |                                                                     |
| MS16           | 7E  | 0 | 8 | 3 | 7  | 1300 | 573656 | 22/10/2009 | tracker | Rutgers |                                                                     |
| MS16           | 8E  | 0 | 8 | 3 | 8  | 1302 | 572376 | 9/12/2015  | tracker | Rutgers | FEB 573653 replaced on 12/9/15 due to Cross Talk in the trip chips. |
| MS16           | 9E  | 0 | 8 | 3 | 9  | 1311 | 573578 | 22/10/2009 | tracker | Rutgers |                                                                     |
| <b>Crate 1</b> |     |   |   |   |    |      |        |            |         |         |                                                                     |
| MS17           | 1W  | 1 | 1 | 0 | 1  | 1167 | 573608 | 19/10/2009 | tracker | Tufts   |                                                                     |
| MS17           | 2W  | 1 | 1 | 0 | 2  | 1208 | 573602 | 19/10/2009 | tracker | Tufts   |                                                                     |
| MS17           | 3W  | 1 | 1 | 0 | 3  | 172  | 572406 | 19/10/2009 | tracker | Tufts   |                                                                     |
| MS17           | 4W  | 1 | 1 | 0 | 4  | 1408 | 573476 | 19/10/2009 | tracker | Tufts   |                                                                     |
| MS17           | 5W  | 1 | 1 | 0 | 5  | 15   | 573498 | 19/10/2009 | tracker | Tufts   |                                                                     |
| MS17           | 6W  | 1 | 1 | 0 | 6  | 69   | 573604 | 19/10/2009 | tracker | Tufts   |                                                                     |
| MS17           | 7W  | 1 | 1 | 0 | 7  | 19   | 573600 | 19/10/2009 | tracker | Tufts   |                                                                     |
| MS17           | 8W  | 1 | 1 | 0 | 8  | 57   | 573492 | 19/10/2009 | tracker | Tufts   |                                                                     |
| MS17           | 9W  | 1 | 1 | 0 | 9  | 1042 | 573599 | 19/10/2009 | tracker | Rutgers |                                                                     |
| MS17           | 10W | 1 | 1 | 0 | 10 | 1346 | 573609 | 19/10/2009 | tracker | Rutgers |                                                                     |
| MS18           | 1W  | 1 | 1 | 1 | 1  | 1331 | 573374 | 14/10/2009 | tracker | Rutgers |                                                                     |
| MS18           | 2W  | 1 | 1 | 1 | 2  | 1106 | 573601 | 14/10/2009 | tracker | Tufts   |                                                                     |
| MS18           | 3W  | 1 | 1 | 1 | 3  | 1326 | 573614 | 14/10/2009 | tracker | Rutgers |                                                                     |
| MS18           | 4W  | 1 | 1 | 1 | 4  | 1131 | 573648 | 14/10/2009 | tracker | Tufts   |                                                                     |
| MS18           | 5W  | 1 | 1 | 1 | 5  | 1333 | 573621 | 14/10/2009 | tracker | Rutgers |                                                                     |
| MS18           | 6W  | 1 | 1 | 1 | 6  | 1323 | 573660 | 14/10/2009 | tracker | Rutgers |                                                                     |
| MS18           | 7W  | 1 | 1 | 1 | 7  | 1191 | 573260 | 14/10/2009 | tracker | Tufts   |                                                                     |
| MS18           | 8W  | 1 | 1 | 1 | 8  | 1114 | 573598 | 14/10/2009 | tracker | Tufts   |                                                                     |
| MS18           | 9W  | 1 | 1 | 1 | 9  | 1157 | 573611 | 14/10/2009 | tracker | Tufts   |                                                                     |
| MS18           | 10W | 1 | 1 | 1 | 10 | 1136 | 573669 | 14/10/2009 | tracker | Tufts   |                                                                     |



|      |     |   |   |   |    |      |        |           |                  |         |                                    |
|------|-----|---|---|---|----|------|--------|-----------|------------------|---------|------------------------------------|
| MS19 | 1W  | 1 | 1 | 2 | 1  | 1205 | 573357 | 7/10/2009 | tracker          | Tufts   |                                    |
| MS19 | 2W  | 1 | 1 | 2 | 2  | 11   | 572918 | 2/2/2016  | tracker          | Tufts   | Replaced PMT 1228, period problems |
| MS19 | 3W  | 1 | 1 | 2 | 3  | 1173 | 573646 | 7/10/2009 | tracker          | Tufts   |                                    |
| MS19 | 4W  | 1 | 1 | 2 | 4  | 1135 | 573248 | 7/10/2009 | tracker          | Tufts   |                                    |
| MS19 | 5W  | 1 | 1 | 2 | 5  | 1151 | 573261 | 7/10/2009 | tracker          | Tufts   |                                    |
| MS19 | 6W  | 1 | 1 | 2 | 6  | 1320 | 572558 | 7/10/2009 | tracker          | Rutgers |                                    |
| MS19 | 7W  | 1 | 1 | 2 | 7  | 1012 | 573485 | 7/10/2009 | tracker          | Rutgers |                                    |
| MS19 | 8W  | 1 | 1 | 2 | 8  | 1130 | 573622 | 7/10/2009 | tracker          | Tufts   |                                    |
| MS19 | 9W  | 1 | 1 | 2 | 9  | 1004 | 573642 | 7/10/2009 | tracker          | Rutgers |                                    |
| MS19 | 10W | 1 | 1 | 2 | 10 | 1176 | 573251 | 7/10/2009 | tracker          | Tufts   |                                    |
| MS20 | 1W  | 1 | 1 | 3 | 1  | 1226 | 573634 | 2/10/2009 | ECAL/<br>tracker | Tufts   |                                    |
| MS20 | 2W  | 1 | 1 | 3 | 2  | 1224 | 573150 | 2/10/2009 | ECAL/<br>tracker | Tufts   |                                    |
| MS20 | 3W  | 1 | 1 | 3 | 3  | 1303 | 573271 | 2/10/2009 | ECAL/<br>tracker | Rutgers |                                    |
| MS20 | 4W  | 1 | 1 | 3 | 4  | 1214 | 573155 | 2/10/2009 | ECAL/<br>tracker | Tufts   |                                    |
| MS20 | 5W  | 1 | 1 | 3 | 5  | 1164 | 573274 | 2/10/2009 | ECAL/<br>tracker | Tufts   |                                    |
| MS20 | 6W  | 1 | 1 | 3 | 6  | 123  | 573587 | 2/10/2009 | ECAL/<br>tracker | Tufts   |                                    |
| MS20 | 7W  | 1 | 1 | 3 | 7  | 1401 | 573577 | 2/10/2009 | ECAL/<br>tracker | Tufts   |                                    |
| MS20 | 8W  | 1 | 1 | 3 | 8  | 1146 | 573636 | 2/10/2009 | ECAL/<br>tracker | Tufts   |                                    |
| MS20 | 9W  | 1 | 1 | 3 | 9  | 1196 | 573639 | 2/10/2009 | ECAL/<br>tracker | Tufts   |                                    |
| MS20 | 10W | 1 | 1 | 3 | 10 | 1049 | 573152 | 2/10/2009 | ECAL/<br>tracker | Rutgers |                                    |

|      |    |   |   |   |   |      |        |            |         |         |                                                                                                                                                                                                    |
|------|----|---|---|---|---|------|--------|------------|---------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MS17 | 1E | 1 | 2 | 0 | 1 | 1101 | 573591 | 19/10/2009 | tracker | Tufts   | PMT box practice replacement; replaced 06/27/13                                                                                                                                                    |
| MS17 | 2E | 1 | 2 | 0 | 2 | 1186 | 573596 | 19/10/2009 | tracker | Tufts   |                                                                                                                                                                                                    |
| MS17 | 3E | 1 | 2 | 0 | 3 | 1329 | 573595 | 19/10/2009 | tracker | Rutgers |                                                                                                                                                                                                    |
| MS17 | 4E | 1 | 2 | 0 | 4 | 1030 | 573493 | 19/10/2009 | tracker | Rutgers |                                                                                                                                                                                                    |
| MS17 | 5E | 1 | 2 | 0 | 5 | 1125 | 573592 | 19/10/2009 | tracker | Tufts   |                                                                                                                                                                                                    |
| MS17 | 6E | 1 | 2 | 0 | 6 | 1103 | 573593 | 19/10/2009 | tracker | Tufts   |                                                                                                                                                                                                    |
| MS17 | 7E | 1 | 2 | 0 | 7 | 1156 | 573588 | 19/10/2009 | tracker | Tufts   |                                                                                                                                                                                                    |
| MS17 | 8E | 1 | 2 | 0 | 8 | 1198 | 573589 | 19/10/2009 | tracker | Tufts   |                                                                                                                                                                                                    |
| MS17 | 9E | 1 | 2 | 0 | 9 | 1011 | 573530 | 19/10/2009 | tracker | Rutgers |                                                                                                                                                                                                    |
| MS18 | 1E | 1 | 2 | 1 | 1 | 1427 | 572908 | 14/10/2009 | tracker | Tufts   | PMT box practice replaced; replaced 07/19/13, old 1181, FEB replaced 12/2/13 to check if that repairs the HV varying issue. PMT Replaced 12/4/13 bc HV varying was not solved via FEB replacement. |
| MS18 | 2E | 1 | 2 | 1 | 2 | 1340 | 573644 | 14/10/2009 | tracker | Rutgers |                                                                                                                                                                                                    |
| MS18 | 3E | 1 | 2 | 1 | 3 | 1032 | 573643 | 14/10/2009 | tracker | Rutgers |                                                                                                                                                                                                    |
| MS18 | 4E | 1 | 2 | 1 | 4 | 1194 | 573620 | 14/10/2009 | tracker | Tufts   |                                                                                                                                                                                                    |
| MS18 | 5E | 1 | 2 | 1 | 5 | 1172 | 573647 | 14/10/2009 | tracker | Tufts   |                                                                                                                                                                                                    |
| MS18 | 6E | 1 | 2 | 1 | 6 | 1144 | 573619 | 14/10/2009 | tracker | Tufts   |                                                                                                                                                                                                    |
| MS18 | 7E | 1 | 2 | 1 | 7 | 1222 | 573255 | 14/10/2009 | tracker | Tufts   |                                                                                                                                                                                                    |
| MS18 | 8E | 1 | 2 | 1 | 8 | 1319 | 572997 | 14/10/2009 | tracker | Rutgers | FEB Replacement, jumping gain 03/26/14. Old PMT 1149 replaced 10/1/2015, showed gain variation.                                                                                                    |

|      |    |   |   |   |   |      |        |            |                  |         |                                                   |
|------|----|---|---|---|---|------|--------|------------|------------------|---------|---------------------------------------------------|
| MS18 | 9E | 1 | 2 | 1 | 9 | 1138 | 573615 | 14/10/2009 | tracker          | Rutgers |                                                   |
| MS19 | 1E | 1 | 2 | 2 | 1 | 134  | 573624 | 7/10/2009  | tracker          | Tufts   |                                                   |
| MS19 | 2E | 1 | 2 | 2 | 2 | 140  | 573335 | 17/1/2016  | tracker          | Tufts   | January Crisis                                    |
| MS19 | 3E | 1 | 2 | 2 | 3 | 1185 | 572444 | 7/10/2009  | tracker          | Tufts   | 573632 has red light                              |
| MS19 | 4E | 1 | 2 | 2 | 4 | 1110 | 573369 | 21/12/2018 | tracker          | Tufts   |                                                   |
| MS19 | 5E | 1 | 2 | 2 | 5 | 1305 | 573677 | 7/10/2009  | tracker          | Rutgers |                                                   |
| MS19 | 6E | 1 | 2 | 2 | 6 | 1048 | 573537 | 7/10/2009  | tracker          | Rutgers |                                                   |
| MS19 | 7E | 1 | 2 | 2 | 7 | 1316 | 572388 | 17/1/2016  | tracker          | Rutgers | January Crisis                                    |
| MS19 | 8E | 1 | 2 | 2 | 8 | 1201 | 573627 | 7/10/2009  | tracker          | Tufts   |                                                   |
| MS19 | 9E | 1 | 2 | 2 | 9 | 1053 | 573341 | 7/10/2009  | tracker          | Rutgers |                                                   |
| MS20 | 1E | 1 | 6 | 3 | 1 | 1220 | 573270 | 2/10/2009  | ECAL/<br>tracker | Tufts   |                                                   |
| MS20 | 2E | 1 | 6 | 3 | 2 | 1043 | 573637 | 2/10/2009  | ECAL/<br>tracker | Rutgers |                                                   |
| MS20 | 3E | 1 | 6 | 3 | 3 | 1195 | 573149 | 2/10/2009  | ECAL/<br>tracker | Tufts   |                                                   |
| MS20 | 4E | 1 | 6 | 3 | 4 | 1347 | 573645 | 2/10/2009  | ECAL/<br>tracker | Rutgers |                                                   |
| MS20 | 5E | 1 | 6 | 3 | 5 | 1315 | 573259 | 2/10/2009  | ECAL/<br>tracker | Rutgers |                                                   |
| MS20 | 6E | 1 | 6 | 3 | 6 | 1328 | 573154 | 2/10/2009  | ECAL/<br>tracker | Rutgers |                                                   |
| MS20 | 7E | 1 | 6 | 3 | 7 | 1306 | 573146 | 25/3/2016  | ECAL/<br>tracker | Rutgers | PMT was showing<br>HV residuals, broke<br>the FEB |
| MS20 | 8E | 1 | 6 | 3 | 8 | 1109 | 573640 | 2/10/2009  | ECAL/<br>tracker | Tufts   |                                                   |
| MS20 | 9E | 1 | 6 | 3 | 9 | 1313 | 573342 | 2/10/2009  | ECAL/<br>tracker | Rutgers |                                                   |
| MS21 | 1W | 1 | 3 | 0 | 1 | 1327 | 573497 | 29/9/2009  | ECAL             | Rutgers |                                                   |
| MS21 | 2W | 1 | 3 | 0 | 2 | 1332 | 573181 | 29/9/2009  | ECAL             | Rutgers |                                                   |
| MS21 | 3W | 1 | 3 | 0 | 3 | 1111 | 573187 | 29/9/2009  | ECAL             | Tufts   |                                                   |

|      |     |   |   |   |    |      |        |           |      |         |                                                                                                                                                                           |
|------|-----|---|---|---|----|------|--------|-----------|------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MS21 | 4W  | 1 | 3 | 0 | 4  | 1337 | 572995 | 29/9/2009 | ECAL | Rutgers | Replaced 1/9/14:<br>Would not come up<br>on full voltage.                                                                                                                 |
| MS21 | 5W  | 1 | 3 | 0 | 5  | 1052 | 573185 | 29/9/2009 | ECAL | Rutgers |                                                                                                                                                                           |
| MS21 | 6W  | 1 | 3 | 0 | 6  | 1317 | 572909 | 27/9/2017 | ECAL | Rutgers | 9-27-17:<br>FEB#572432 was<br>replaced due to a<br>bad low tripchip 5                                                                                                     |
| MS21 | 7W  | 1 | 3 | 0 | 7  | 1330 | 573679 | 29/9/2009 | ECAL | Rutgers |                                                                                                                                                                           |
| MS21 | 8W  | 1 | 3 | 0 | 8  | 1123 | 573186 | 29/9/2009 | ECAL | Tufts   |                                                                                                                                                                           |
| MS21 | 9W  | 1 | 3 | 0 | 9  | 1325 | 573188 | 29/9/2009 | ECAL | Rutgers |                                                                                                                                                                           |
| MS21 | 10W | 1 | 3 | 0 | 10 | 1165 | 572955 | 29/9/2009 | ECAL | Tufts   | Replaced 1/9/14,<br>might not be bad,<br>but was in a bad<br>state after a power<br>cycle of the chain.                                                                   |
| MS22 | 1W  | 1 | 3 | 1 | 1  | 35   | 573494 | 25/9/2009 | ECAL | Tufts   |                                                                                                                                                                           |
| MS22 | 2W  | 1 | 3 | 1 | 2  | 1007 | 573170 | 25/9/2009 | ECAL | Rutgers |                                                                                                                                                                           |
| MS22 | 3W  | 1 | 3 | 1 | 3  | 1013 | 572903 | 25/9/2009 | ECAL | Rutgers | Replaced 2/6/14<br>because there was<br>one green light on,<br>and the board could<br>not be found by slow<br>control anymore.<br>Resetting did not<br>solve the problem. |
| MS22 | 4W  | 1 | 3 | 1 | 4  | 1019 | 572365 | 25/9/2009 | ECAL | Rutgers |                                                                                                                                                                           |
| MS22 | 5W  | 1 | 3 | 1 | 5  | 1014 | 573165 | 25/9/2009 | ECAL | Rutgers |                                                                                                                                                                           |
| MS22 | 6W  | 1 | 3 | 1 | 6  | 1035 | 572384 | 27/9/2017 | ECAL | Rutgers | FEB573164<br>replaced on<br>09/27/17 because of<br>Missed Start Gate                                                                                                      |
| MS22 | 7W  | 1 | 3 | 1 | 7  | 1027 | 573163 | 25/9/2009 | ECAL | Rutgers |                                                                                                                                                                           |

|      |     |   |   |   |    |      |        |            |      |         |                                                                                                |
|------|-----|---|---|---|----|------|--------|------------|------|---------|------------------------------------------------------------------------------------------------|
| MS22 | 8W  | 1 | 3 | 1 | 8  | 1028 | 572448 | 17/1/2016  | ECAL | Rutgers | January Crisis                                                                                 |
| MS22 | 9W  | 1 | 3 | 1 | 9  | 1029 | 573176 | 25/9/2009  | ECAL | Rutgers |                                                                                                |
| MS22 | 10W | 1 | 3 | 1 | 10 | 1016 | 573158 | 25/9/2009  | ECAL | Rutgers |                                                                                                |
| MS23 | 1W  | 1 | 3 | 2 | 1  | 167  | 573212 | 22/9/2009  | HCAL | Tufts   |                                                                                                |
| MS23 | 2W  | 1 | 3 | 2 | 2  | 70   | 573196 | 22/9/2009  | HCAL | Tufts   |                                                                                                |
| MS23 | 3W  | 1 | 3 | 2 | 3  | 141  | 573192 | 22/9/2009  | HCAL | Tufts   |                                                                                                |
| MS23 | 4W  | 1 | 3 | 2 | 4  | 1025 | 573195 | 22/9/2009  | HCAL | Rutgers |                                                                                                |
| MS23 | 5W  | 1 | 3 | 2 | 5  | 1017 | 572985 | 22/9/2009  | HCAL | Rutgers | Feb #573166 replaced in 07/31/2014 because it was causing slowcontrol not to find chain's febs |
| MS23 | 6W  | 1 | 3 | 2 | 6  | 1023 | 573162 | 22/9/2009  | HCAL | Rutgers |                                                                                                |
| MS24 | 1W  | 1 | 3 | 3 | 1  | 45   | 573200 | 18/9/2009  | HCAL | Tufts   |                                                                                                |
| MS24 | 2W  | 1 | 3 | 3 | 2  | 71   | 573204 | 18/9/2009  | HCAL | Tufts   |                                                                                                |
| MS24 | 3W  | 1 | 3 | 3 | 3  | 34   | 573206 | 18/9/2009  | HCAL | Tufts   |                                                                                                |
| MS24 | 4W  | 1 | 3 | 3 | 4  | 279  | 573205 | 18/9/2009  | HCAL | Tufts   |                                                                                                |
| MS24 | 5W  | 1 | 3 | 3 | 5  | 72   | 573201 | 18/9/2009  | HCAL | Tufts   |                                                                                                |
| MS24 | 6W  | 1 | 3 | 3 | 6  | 50   | 573207 | 18/9/2009  | HCAL | Tufts   |                                                                                                |
| MS21 | 1E  | 1 | 4 | 0 | 1  | 13   | 573279 | 5/10/2018  | ECAL | Tufts   | 10/5/18, 573264 stops DAQ                                                                      |
| MS21 | 2E  | 1 | 4 | 0 | 2  | 1187 | 573258 | 29/9/2009  | ECAL | Tufts   |                                                                                                |
| MS21 | 3E  | 1 | 4 | 0 | 3  | 79   | 573269 | 29/9/2009  | ECAL | Tufts   |                                                                                                |
| MS21 | 4E  | 1 | 4 | 0 | 4  | 1010 | 572410 | 5/10/2018  | ECAL | Rutgers | 10/5/18 573273 stops DAQ                                                                       |
| MS21 | 5E  | 1 | 4 | 0 | 5  | 1040 | 572373 | 29/9/2009  | ECAL | Rutgers |                                                                                                |
| MS21 | 6E  | 1 | 4 | 0 | 6  | 1344 | 573489 | 17/12/2018 | ECAL | Rutgers | 573182 "find hardware" fails                                                                   |
| MS21 | 7E  | 1 | 4 | 0 | 7  | 1318 | 573183 | 29/9/2009  | ECAL | Rutgers |                                                                                                |
| MS21 | 8E  | 1 | 4 | 0 | 8  | 1343 | 573180 | 29/9/2009  | ECAL | Rutgers |                                                                                                |
| MS21 | 9E  | 1 | 4 | 0 | 9  | 1148 | 573184 | 29/9/2009  | ECAL | Tufts   |                                                                                                |
| MS22 | 1E  | 1 | 4 | 1 | 1  | 103  | 573156 | 25/9/2009  | ECAL | Tufts   |                                                                                                |

|      |    |   |   |   |   |      |        |           |      |       |                                                    |
|------|----|---|---|---|---|------|--------|-----------|------|-------|----------------------------------------------------|
| MS22 | 2E | 1 | 4 | 1 | 2 | 111  | 573160 | 25/9/2009 | ECAL | Tufts |                                                    |
| MS22 | 3E | 1 | 4 | 1 | 3 | 81   | 573159 | 25/9/2009 | ECAL | Tufts |                                                    |
| MS22 | 4E | 1 | 4 | 1 | 4 | 67   | 573177 | 25/9/2009 | ECAL | Tufts |                                                    |
| MS22 | 5E | 1 | 4 | 1 | 5 | 44   | 573175 | 25/9/2009 | ECAL | Tufts |                                                    |
| MS22 | 6E | 1 | 4 | 1 | 6 | 73   | 573172 | 25/9/2009 | ECAL | Tufts |                                                    |
| MS22 | 7E | 1 | 4 | 1 | 7 | 78   | 573171 | 25/9/2009 | ECAL | Tufts |                                                    |
| MS22 | 8E | 1 | 4 | 1 | 8 | 76   | 573173 | 25/9/2009 | ECAL | Tufts |                                                    |
| MS22 | 9E | 1 | 4 | 1 | 9 | 40   | 572441 | 25/9/2009 | ECAL | Tufts |                                                    |
| MS23 | 1E | 1 | 4 | 2 | 1 | 129  | 572377 | 22/9/2009 | HCAL | Tufts | 40753                                              |
| MS23 | 2E | 1 | 4 | 2 | 2 | 130  | 572983 | 22/9/2009 | HCAL | Tufts | 4/24/2011 ; FEB Replacement, dead channel 03/26/14 |
| MS23 | 3E | 1 | 4 | 2 | 3 | 137  | 573193 | 22/9/2009 | HCAL | Tufts |                                                    |
| MS23 | 4E | 1 | 4 | 2 | 4 | 132  | 572426 | 22/9/2009 | HCAL | Tufts | 40657                                              |
| MS23 | 5E | 1 | 4 | 2 | 5 | 131  | 573387 | 22/9/2009 | HCAL | Tufts | 40657                                              |
| MS24 | 1E | 1 | 4 | 3 | 1 | 120  | 573509 | 18/9/2009 | HCAL | Tufts | Replaced FEB on 11/14/13 see ECL #29224            |
| MS24 | 2E | 1 | 4 | 3 | 2 | 105  | 573214 | 18/9/2009 | HCAL | Tufts | 4/24/2011; 1/16/2011 Water Event                   |
| MS24 | 3E | 1 | 4 | 3 | 3 | 133  | 573197 | 18/9/2009 | HCAL | Tufts |                                                    |
| MS24 | 4E | 1 | 4 | 3 | 4 | 125  | 572963 | 18/9/2009 | HCAL | Tufts | 40896                                              |
| MS24 | 5E | 1 | 4 | 3 | 5 | 135  | 573198 | 18/9/2009 | HCAL | Tufts |                                                    |
| MS25 | 1W | 1 | 5 | 0 | 1 | 95   | 573148 | 9/9/2009  | HCAL | Tufts |                                                    |
| MS25 | 2W | 1 | 5 | 0 | 2 | 1163 | 573322 | 9/9/2009  | HCAL | Tufts |                                                    |
| MS25 | 3W | 1 | 5 | 0 | 3 | 83   | 573145 | 9/9/2009  | HCAL | Tufts |                                                    |
| MS25 | 4W | 1 | 5 | 0 | 4 | 82   | 573213 | 9/9/2009  | HCAL | Tufts |                                                    |
| MS25 | 5W | 1 | 5 | 0 | 5 | 77   | 573208 | 9/9/2009  | HCAL | Tufts |                                                    |

|      |    |   |   |   |   |      |        |           |      |         |                                                                                                                                                                                                                                  |
|------|----|---|---|---|---|------|--------|-----------|------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MS25 | 6W | 1 | 5 | 0 | 6 | 20   | 572566 | 27/9/2017 | HCAL | Tufts   | Replaced the FEB 573218 for the 572905. Spikes outside the main peak in HV residuals (process in log 45633), 5/28/15. PMT 74 was replaced on 10/13/15 for HV spikes. , 09/27/17 FEB 572905 replaced because of Missed Start Gate |
| MS26 | 1W | 1 | 5 | 1 | 1 | 160  | 573225 | 4/9/2009  | HCAL | Tufts   |                                                                                                                                                                                                                                  |
| MS26 | 2W | 1 | 5 | 1 | 2 | 84   | 573242 | 4/9/2009  | HCAL | Tufts   |                                                                                                                                                                                                                                  |
| MS26 | 3W | 1 | 5 | 1 | 3 | 170  | 573223 | 4/9/2009  | HCAL | Tufts   |                                                                                                                                                                                                                                  |
| MS26 | 4W | 1 | 5 | 1 | 4 | 152  | 573222 | 4/9/2009  | HCAL | Tufts   |                                                                                                                                                                                                                                  |
| MS26 | 5W | 1 | 5 | 1 | 5 | 89   | 573243 | 4/9/2009  | HCAL | Tufts   |                                                                                                                                                                                                                                  |
| MS26 | 6W | 1 | 5 | 1 | 6 | 64   | 573221 | 4/9/2009  | HCAL | Tufts   |                                                                                                                                                                                                                                  |
| MS27 | 1W | 1 | 5 | 2 | 1 | 39   | 573244 | 20/8/2009 | HCAL | Tufts   |                                                                                                                                                                                                                                  |
| MS27 | 2W | 1 | 5 | 2 | 2 | 1009 | 573237 | 20/8/2009 | HCAL | Rutgers |                                                                                                                                                                                                                                  |
| MS27 | 3W | 1 | 5 | 2 | 3 | 98   | 573238 | 20/8/2009 | HCAL | Tufts   |                                                                                                                                                                                                                                  |
| MS27 | 4W | 1 | 5 | 2 | 4 | 1006 | 573239 | 20/8/2009 | HCAL | Rutgers |                                                                                                                                                                                                                                  |
| MS27 | 5W | 1 | 5 | 2 | 5 | 43   | 573240 | 20/8/2009 | HCAL | Tufts   |                                                                                                                                                                                                                                  |
| MS27 | 6W | 1 | 5 | 2 | 6 | 75   | 573241 | 20/8/2009 | HCAL | Tufts   |                                                                                                                                                                                                                                  |
|      |    |   |   |   |   |      |        |           |      |         |                                                                                                                                                                                                                                  |
|      |    |   |   |   |   |      |        |           |      |         |                                                                                                                                                                                                                                  |
| MS25 | 1E | 1 | 6 | 0 | 1 | 110  | 573538 | 3/2/2016  | HCAL | Tufts   | Removed to test, problems with the CROCE                                                                                                                                                                                         |
| MS25 | 2E | 1 | 6 | 0 | 2 | 104  | 572335 | 19/2/2016 | HCAL | Tufts   | Trip chip 1 had Xtalk                                                                                                                                                                                                            |

|      |     |   |   |   |    |      |        |            |         |         |                                                           |
|------|-----|---|---|---|----|------|--------|------------|---------|---------|-----------------------------------------------------------|
| MS25 | 3E  | 1 | 6 | 0 | 3  | 113  | 573210 | 9/9/2009   | HCAL    | Tufts   |                                                           |
| MS25 | 4E  | 1 | 6 | 0 | 4  | 109  | 572592 | 3/2/2016   | HCAL    | Tufts   | 40896, FEB OK, test the chain                             |
| MS25 | 5E  | 1 | 6 | 0 | 5  | 127  | 572455 | 3/2/2016   | HCAL    | Tufts   | FEB OK, test the chain                                    |
| MS26 | 1E  | 1 | 6 | 1 | 1  | 106  | 573219 | 4/9/2009   | HCAL    | Tufts   |                                                           |
| MS26 | 2E  | 1 | 6 | 1 | 2  | 101  | 573229 | 4/9/2009   | HCAL    | Tufts   |                                                           |
| MS26 | 3E  | 1 | 6 | 1 | 3  | 121  | 572419 | 3/2/2016   | HCAL    | Tufts   | FEB OK, test the chain                                    |
| MS26 | 4E  | 1 | 6 | 1 | 4  | 112  | 572960 | 4/9/2009   | HCAL    | Tufts   | 40896                                                     |
| MS26 | 5E  | 1 | 6 | 1 | 5  | 114  | 573220 | 4/9/2009   | HCAL    | Tufts   |                                                           |
| MS27 | 1E  | 1 | 6 | 2 | 1  | 117  | 572545 | 19/12/2018 | HCAL    | Tufts   | 572927 prob OK, chain giving errors                       |
| MS27 | 2E  | 1 | 6 | 2 | 2  | 118  | 572437 | 19/12/2018 | HCAL    | Tufts   | 572976 killed by HV?                                      |
| MS27 | 3E  | 1 | 6 | 2 | 3  | 119  | 572424 | 17/12/2018 | HCAL    | Tufts   | 572916 "find hardware" fails                              |
| MS27 | 4E  | 1 | 6 | 2 | 4  | 128  | 573612 | 17/12/2018 | HCAL    | Tufts   | 572935 in file, not 572555 which fails on "find hardware" |
| MS27 | 5E  | 1 | 6 | 2 | 5  | 138  | 572987 | 19/12/2081 | HCAL    | Tufts   | 572430 prob OK chain giving errors                        |
| MS0  | 1W  | 1 | 7 | 0 | 1  | 226  | 573362 |            | tracker | Tufts   |                                                           |
| MS0  | 2W  | 1 | 7 | 0 | 2  | 41   | 573109 |            | tracker | Tufts   |                                                           |
| MS0  | 3W  | 1 | 7 | 0 | 3  | 1412 | 573402 |            | tracker | Rutgers |                                                           |
| MS0  | 4W  | 1 | 7 | 0 | 4  | 157  | 572352 | 27/9/2017  | tracker | Tufts   | old feb (572573) had problems: bad low trip chip          |
| MS0  | 5W  | 1 | 7 | 0 | 5  | 219  | 573272 |            | tracker | Tufts   |                                                           |
| MS0  | 6W  | 1 | 7 | 0 | 6  | 1304 | 573399 |            | tracker | Rutgers |                                                           |
| MS0  | 7W  | 1 | 7 | 0 | 7  | 63   | 573397 |            | tracker | Tufts   |                                                           |
| MS0  | 8W  | 1 | 7 | 0 | 8  | 1416 | 573439 |            | tracker | Rutgers |                                                           |
| MS0  | 9W  | 1 | 7 | 0 | 9  | 32   | 572904 |            | tracker | Tufts   |                                                           |
| MS0  | 10W | 1 | 7 | 0 | 10 | 124  | 572585 |            | tracker | Tufts   |                                                           |



|     |     |   |   |   |    |      |        |                |                |         |                                                                                                                                                                                             |
|-----|-----|---|---|---|----|------|--------|----------------|----------------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MS0 | 1E  | 1 | 7 | 1 | 1  | 25   | 572563 |                | tracker        | Tufts   |                                                                                                                                                                                             |
| MS0 | 2E  | 1 | 7 | 1 | 2  | 31   | 572345 | 9/12/2015      | tracker        | Tufts   | FEB 572379 replaced on 10/23/15 for Bad hit_pixel for >32 channels. FEB 572447 replaced agin on 10/28/15 for same reason. PMT 1100 replaced on 12/9/15 as pixel 2 was giving multiple hits. |
| MS0 | 3E  | 1 | 7 | 1 | 3  | 10   | 572397 |                | tracker        | Tufts   |                                                                                                                                                                                             |
| MS0 | 4E  | 1 | 7 | 1 | 4  | 1414 | 572371 |                | tracker        | Rutgers |                                                                                                                                                                                             |
| MS0 | 5E  | 1 | 7 | 1 | 5  | 47   | 573389 |                | tracker        | Tufts   |                                                                                                                                                                                             |
| MS0 | 6E  | 1 | 7 | 1 | 6  | 186  | 573247 |                | tracker        | Tufts   |                                                                                                                                                                                             |
| MS0 | 7E  | 1 | 7 | 1 | 7  | 1418 | 573403 |                | tracker        | Rutgers |                                                                                                                                                                                             |
| MS0 | 8E  | 1 | 7 | 1 | 8  | 1419 | 572977 | FEB 04/13/2012 | nuclear target | Rutgers | Changed FEB 04/13/2012, PMT 5/1/2012                                                                                                                                                        |
| MS0 | 9E  | 1 | 7 | 1 | 9  | 122  | 573362 |                | tracker        | Tufts   |                                                                                                                                                                                             |
| MS0 | 10E | 1 | 7 | 1 | 10 | 1020 | 573586 |                | tracker        | Rutgers |                                                                                                                                                                                             |

|      |    |   |   |   |   |      |        |            |         |         |                                                                                                                                                                                                                                                                                                                                     |
|------|----|---|---|---|---|------|--------|------------|---------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MS-1 | 1W | 1 | 7 | 2 | 1 | 166  | 572421 | 19/10/2015 | tracker | Tufts   | FEB reset itself for power on configuration, replaced on 9/21/2015. Old FEB 573699. The FEB 573680 was changed again on 10/05/2015, chain failed to download HV config file. FEB 573685 replaced again on 10/19/15. Old PMT 144 was replaced on 10/16/15. The PMT most likely was sending HV arc to FEB which was damaging the FEB. |
| MS-1 | 2W | 1 | 7 | 2 | 2 | 1349 | 573469 |            | tracker | Rutgers |                                                                                                                                                                                                                                                                                                                                     |
| MS-1 | 3W | 1 | 7 | 2 | 3 | 1406 | 573500 |            | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                     |
| MS-1 | 4W | 1 | 7 | 2 | 4 | 1407 | 573253 |            | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                     |
| MS-1 | 5W | 1 | 7 | 2 | 5 | 1410 | 573364 |            | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                     |
| MS-1 | 6W | 1 | 7 | 2 | 6 | 1404 | 573228 | 19/10/2015 | tracker | Tufts   | Old FEB 572460 replaced on 10/19/15. FEB was replaced twice. Other FEB was 572365.                                                                                                                                                                                                                                                  |
| MS-1 | 7W | 1 | 7 | 2 | 7 | 1018 | 573280 |            | tracker | Tufts   |                                                                                                                                                                                                                                                                                                                                     |

|      |     |   |   |   |    |      |        |           |                |         |                                                                                                                                   |
|------|-----|---|---|---|----|------|--------|-----------|----------------|---------|-----------------------------------------------------------------------------------------------------------------------------------|
| MS-1 | 8W  | 1 | 7 | 2 | 8  | 1310 | 573107 | 4/3/2019  | tracker        | Rutgers | 110930, Unstable HV. Old FEB 573495; 190304, its replacement 572458 unstable too                                                  |
| MS-1 | 9W  | 1 | 7 | 2 | 9  | 256  | 573354 |           | tracker        | Tufts   |                                                                                                                                   |
| MS-1 | 10W | 1 | 7 | 2 | 10 | 30   | 573625 | 4/11/2018 | tracker        | Tufts   | FEB replaced 10/22/2014, sending junk data frame? Changed 572911 on 10/01/2015, can't download hv config file. 4/11/18 HV varying |
| MS-1 | 1E  | 1 | 7 | 3 | 1  | 1420 | 573325 |           | tracker        | Rutgers |                                                                                                                                   |
| MS-1 | 2E  | 1 | 7 | 3 | 2  | 1132 | 573326 |           | tracker        | Tufts   |                                                                                                                                   |
| MS-1 | 3E  | 1 | 7 | 3 | 3  | 179  | 573478 |           | tracker        | Tufts   |                                                                                                                                   |
| MS-1 | 4E  | 1 | 7 | 3 | 4  | 42   | 572343 |           | tracker        | Tufts   |                                                                                                                                   |
| MS-1 | 5E  | 1 | 7 | 3 | 5  | 1171 | 573359 |           | tracker        | Tufts   |                                                                                                                                   |
| MS-1 | 6E  | 1 | 7 | 3 | 6  | 1402 | 573153 |           | tracker        | Tufts   |                                                                                                                                   |
| MS-1 | 7E  | 1 | 7 | 3 | 7  | 1405 | 572562 |           | tracker        | Tufts   |                                                                                                                                   |
| MS-1 | 8E  | 1 | 7 | 3 | 8  | 1413 | 572575 | 27/9/2017 | nuclear target | Tufts   | old feb had bad trip chip 5 (FEB#572375)                                                                                          |
| MS-1 | 9E  | 1 | 7 | 3 | 9  | 1409 | 572355 |           | tracker        | Tufts   |                                                                                                                                   |
| MS-1 | 10E | 1 | 7 | 3 | 10 | 1348 | 573697 |           | tracker        | Tufts   |                                                                                                                                   |

| PMT | Weave | Cross Talk from Debbie's File, if present | Location   | Comments on tube                                               | Reason removed from detector | Date Removed | Cross Talk 4nn% 10/13 | Cross Talk 4nn% Most Recent | Missing Pixels (n/a = not able to test) |
|-----|-------|-------------------------------------------|------------|----------------------------------------------------------------|------------------------------|--------------|-----------------------|-----------------------------|-----------------------------------------|
| 31  | Tufts | -99                                       | Cabinet #1 | Reseated HV board 4/26/10, 43% cross-talk? New HV base 1/29/10 |                              |              | 37                    | 5.3                         | 0                                       |

|     |       |     |                |                                            |    |  |    |     |     |
|-----|-------|-----|----------------|--------------------------------------------|----|--|----|-----|-----|
| 195 | Tufts | 9.9 | Cabinet #1     | Reseated cookie, new HV base board 3/19/10 |    |  | 12 | 3.4 | 0   |
| 3   | Tufts | -99 | Dark Box (Bad) | complete tube, unknown status              | 18 |  |    |     | n/a |

|      |         |     |                |                                                  |                    |     |     |     |   |
|------|---------|-----|----------------|--------------------------------------------------|--------------------|-----|-----|-----|---|
| 1353 | Rutgers |     | Dark Box (Bad) |                                                  | HV varying problem | ### |     |     |   |
| 192  | Tufts   | 7.9 | Dark Box (Bad) | Ribbon cables replaced, new HV base board 1/4/11 |                    |     | 7.1 | 7.1 | 0 |

|      |       |     |                     |                                                    |  |  |    |    |     |
|------|-------|-----|---------------------|----------------------------------------------------|--|--|----|----|-----|
| 1005 | Tufts | 6.1 | Dark Box<br>(Empty) | New<br>fiberweave,<br>reseated<br>cookie<br>3/4/10 |  |  | 18 |    |     |
| 1339 | R     | 29  | Dark Box<br>(Empty) |                                                    |  |  | 15 | 15 | n/a |

|     |   |      |                    |                                                               |                                               |          |    |    |   |
|-----|---|------|--------------------|---------------------------------------------------------------|-----------------------------------------------|----------|----|----|---|
| 66  | T | t    | Dark Box<br>(Good) | New HV<br>base<br>board<br>10/26/10                           | Qhi &<br>Qlow<br>low for<br>channels<br>32-64 | ###      | 14 | 14 | 0 |
| 107 | T | 14.2 | Dark Box<br>(Good) | Reseated<br>cookie,<br>inspected<br>weave<br>3/5/10           | HV<br>varying<br>problem                      | 7/3/2012 | 14 | 14 | 0 |
| 194 | T | 19.9 | Dark Box<br>(Good) | Reseated<br>cookie<br>4/30/10,<br>Realigned<br>PMT<br>5/24/10 |                                               |          | 12 | 12 | 0 |



|      |   |      |                 |                                                                    |                             |          |     |     |   |
|------|---|------|-----------------|--------------------------------------------------------------------|-----------------------------|----------|-----|-----|---|
| 253  | T | 253  | Dark Box (Good) | 12% cross talk, New fiber weave 3/19/10, New HV base board 9/10/10 | Channels 17-19 & 48-63dead. | 9/9/2010 | 12  | 12  | 0 |
| 1193 | T | t    | FTBF            | Good PMT                                                           |                             |          | 5.3 | 5.3 | 2 |
| 94   | T | 27.7 | FTBF            | Good PMT                                                           |                             |          | 6.1 | 5.2 | 2 |

|       |   |     |                         |                                                    |                          |          |     |     |  |
|-------|---|-----|-------------------------|----------------------------------------------------|--------------------------|----------|-----|-----|--|
| 1101  | T | t   | MINERv<br>A<br>Detector | 9% cross<br>talk                                   | HV<br>varying<br>problem | 1/5/2012 | 5   | 5   |  |
| 1342  | R | -99 | MINERv<br>A<br>Detector | New<br>PMT,<br>new HV<br>base<br>board<br>10/27/10 |                          |          |     |     |  |
| 1427  | R | -99 | MINERv<br>A<br>Detector | Good<br>PMT                                        |                          |          | 4.5 | 4.5 |  |
| 1     | T | -99 | pmt<br>repair<br>shelf  | needs<br>back<br>plate                             |                          |          |     |     |  |
| 46    | T | t   | pmt<br>repair<br>shelf  | unknown<br>status,<br>not fully<br>assemble<br>d   | Really<br>bad guy.       | 9/8/2010 |     |     |  |
| MAP 3 |   |     | pmt<br>repair<br>shelf  | unknown<br>status,<br>not fully<br>assemble<br>d   |                          |          |     |     |  |
| MAP 4 |   |     | pmt<br>repair<br>shelf  | unknown<br>status,<br>not fully<br>assemble<br>d   |                          |          |     |     |  |
| MAP 5 |   |     | pmt<br>repair<br>shelf  | complete<br>tube,<br>unknown<br>status             |                          |          |     |     |  |

|       |   |      |                  |                                         |                                   |     |     |     |   |
|-------|---|------|------------------|-----------------------------------------|-----------------------------------|-----|-----|-----|---|
| MAP 6 |   |      | pmt repair shelf | complete tube, unknown status           |                                   |     |     |     |   |
| MAP 8 |   |      | pmt repair shelf | complete tube, unknown status           |                                   |     |     |     |   |
| 11    | T | 19   | TB2 Detector     | Reseated cookie, collar damaged 4/22/10 |                                   |     | 16  | 5.3 | 1 |
| 80    | T | 24.6 | TB2 Detector     | New PMT, HV base board 10/28/10         |                                   |     | 4.8 | 4.8 | 0 |
| 4     | R | -99  | TB2 Detector     | Good PMT                                |                                   |     | 5.8 | 5.8 | 0 |
| 9     | T | -99  | TB2 Detector     | New HV base board 10/26/10              | Qhi & Qlo dead for channels 57-60 | ### | 6.7 | 6.7 | 0 |

|    |   |      |                 |                                                    |                  |          |     |     |   |
|----|---|------|-----------------|----------------------------------------------------|------------------|----------|-----|-----|---|
| 17 | T | 6.5  | TB2<br>Detector | Good<br>PMT                                        |                  |          | 5.7 | 5.7 | 0 |
| 18 | T | -99  | TB2<br>Detector | Reseated<br>cookie<br>6/11/10                      |                  |          | 47  | 6   | 0 |
| 20 | T | -99  | TB2<br>Detector | New HV<br>base<br>board<br>11/14/09                |                  |          | 5.5 | 5.5 | 0 |
| 21 | T | 43.8 | TB2<br>Detector | New<br>PMT,<br>new HV<br>base<br>board<br>10/27/10 |                  |          | 5.3 | 5.3 | 0 |
| 23 | T | t    | TB2<br>Detector | New<br>PMT<br>10/27/10                             | High x-<br>talk. | 9/8/2010 | 4.9 | 4.9 | 0 |
| 24 | T | 21.4 | TB2<br>Detector | Reseated<br>3/9/10                                 |                  |          | 21  | 5.9 | 1 |

|    |   |       |                 |                                                    |                                   |          |     |     |   |
|----|---|-------|-----------------|----------------------------------------------------|-----------------------------------|----------|-----|-----|---|
| 26 | T | 10.77 | TB2<br>Detector | New HV<br>base<br>board<br>9/9/10                  | Channels<br>46-21 &<br>48-63bad   | 9/9/2010 | 9   | 8.3 | 0 |
| 27 | R | t     | TB2<br>Detector | New fiber<br>weave<br>3/9/10                       | A cable<br>fell out of<br>PMT box | 6/4/2011 | 9.6 | 9.6 | 0 |
| 38 | R | -99   | TB2<br>Detector | Good<br>PMT                                        |                                   |          | 8.7 | 8.7 | 0 |
| 49 | T | t     | TB2<br>Detector | New<br>PMT,<br>new HV<br>base<br>board<br>10/27/10 |                                   |          | 5   | 5   | 0 |

|     |   |     |                 |                                                                                             |  |  |    |     |   |
|-----|---|-----|-----------------|---------------------------------------------------------------------------------------------|--|--|----|-----|---|
| 68  | R | -99 | TB2<br>Detector | New HV<br>base<br>3/5/10,<br>4/29/10,<br>Reseated<br>cookie<br>3/5/10,<br>reach full<br>HV? |  |  | 20 | 5.7 | 0 |
| 115 | T | 9.6 | TB2<br>Detector | Reseated<br>cookie<br>3/11/10,<br>PMT<br>swap,<br>new HV<br>base<br>board<br>5/25/10        |  |  | 19 |     |   |
| 136 | T | t   | TB2<br>Detector | Reseated<br>cookie<br>10/3/10                                                               |  |  | 15 | 6.5 | 0 |

|     |   |      |                 |                                                                                          |                                       |          |     |     |   |
|-----|---|------|-----------------|------------------------------------------------------------------------------------------|---------------------------------------|----------|-----|-----|---|
| 139 | T | t    | TB2<br>Detector | New<br>PMT, HV<br>base<br>board<br>10/28/10                                              |                                       |          | 5.1 | 5.1 | 2 |
| 166 | T | 20.8 | TB2<br>Detector | PMT<br>alignmen<br>t,<br>reseated<br>cookie<br>3/11/10                                   |                                       |          | 15  | 5.4 | 0 |
| 201 | T | -99  | TB2<br>Detector | Good<br>PMT                                                                              |                                       |          | 7.9 | 7.9 | 0 |
| 225 | T | 19.6 | TB2<br>Detector | Reseated<br>cookie<br>2/24/10,<br>3/10/10                                                |                                       |          | 17  | 4.9 | 0 |
| 266 | T | 24.2 | TB2<br>Detector | New<br>PMT, HV<br>base<br>board<br>10/28/10                                              |                                       |          | 4.8 | 4.8 | 0 |
| 273 | R | t    | TB2<br>Detector | 9% cross<br>talk,<br>reseated<br>cookie<br>4/22/10,<br>New HV<br>base<br>board<br>9/9/10 | Channels<br>27-31 &<br>48-<br>63dead. | 9/9/2010 | 9.5 | 9.5 | 0 |

|      |   |      |                 |                                                        |                                                                                                                                                                |          |    |     |   |
|------|---|------|-----------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----|-----|---|
| 278  | T | 18.6 | TB2<br>Detector | Reseated<br>cookie,<br>new HV<br>base<br>board<br>5/20 |                                                                                                                                                                |          | 15 | 6   | 0 |
| 1008 | R | t    | TB2<br>Detector | New<br>PMT,<br>new HV<br>base<br>board<br>5/20/10      | HV<br>varying<br>problem                                                                                                                                       | 2/4/2010 | 13 | 6.3 | 0 |
| 1044 | R | t    | TB2<br>Detector | 10%<br>cross talk                                      | HV<br>varying<br>problem                                                                                                                                       | 1/5/2012 | 5  | 5   | 0 |
| 1128 |   |      | TB2<br>Detector |                                                        | Removed<br>from<br>detector<br>to test<br>PMT<br>boxes<br>that had<br>HV<br>varying<br>problems<br>and were<br>"fixed."<br>This PMT<br>has no<br>problems<br>. |          | 6  | 6   | 0 |



|      |  |  |                 |  |                                                                                                                                                                |  |     |     |   |
|------|--|--|-----------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-----|-----|---|
| 1161 |  |  | TB2<br>Detector |  | Removed<br>from<br>detector<br>to test<br>PMT<br>boxes<br>that had<br>HV<br>varying<br>problems<br>and were<br>"fixed."<br>This PMT<br>has no<br>problems<br>. |  | 4.8 | 4.8 | 0 |
| 1181 |  |  | TB2<br>Detector |  | Removed<br>from<br>detector<br>to test<br>PMT<br>boxes<br>that had<br>HV<br>varying<br>problems<br>and were<br>"fixed."<br>This PMT<br>has no<br>problems<br>. |  | 5.8 | 5.8 | 0 |

|      |   |    |                 |                                                    |                          |          |     |     |   |
|------|---|----|-----------------|----------------------------------------------------|--------------------------|----------|-----|-----|---|
| 1192 | T | 26 | TB2<br>Detector | New fiber<br>weave,<br>PMT<br>realigned<br>2/25/10 | HV<br>varying<br>problem | 1/5/2012 | 7.8 | 7.8 | 1 |
| 1199 | T | t  | TB2<br>Detector | Good<br>PMT                                        | 20 dead<br>pixels        | ###      | 5.4 | 7.5 | 1 |

|      |   |       |                 |                                                                                  |                          |     |     |     |   |
|------|---|-------|-----------------|----------------------------------------------------------------------------------|--------------------------|-----|-----|-----|---|
| 1319 | R | 18.6  | TB2<br>Detector | Reseated<br>cookie,<br>realigned<br>PMT<br>4/30/10,<br>PMT<br>swapped<br>5/20/10 |                          |     | 23  | 6   | 0 |
| 1324 | R | 13.75 | TB2<br>Detector |                                                                                  |                          |     | 6.2 | 6.2 | 0 |
| 1351 | R | 7.1   | TB2<br>Detector | Ribbon<br>cables<br>replaced<br>1/4/11                                           | HV<br>varying<br>problem | ### | 3.9 | 3.9 | 0 |
| 1417 | R | -99   | TB2<br>Detector | Good<br>PMT                                                                      |                          |     | 5.3 | 5.3 | 0 |
| 1421 | R | -99   | TB2<br>Detector | Good<br>PMT                                                                      |                          |     | 5.1 | 5.1 | 0 |

|      |   |     |                 |                        |  |  |     |     |   |
|------|---|-----|-----------------|------------------------|--|--|-----|-----|---|
| 1424 | R | -99 | TB2<br>Detector | 4.6%<br>cross talk     |  |  | 4.8 | 4.8 | 1 |
| 1426 | R | -99 | TB2<br>Detector | Good<br>PMT            |  |  | 5.2 | 5.2 | 0 |
| 1429 | R | -99 | TB2<br>Detector | Good<br>PMT            |  |  | 4.7 | 4.7 | 0 |
| 1430 | T | -99 | TB2<br>Detector | Good<br>PMT            |  |  | 5.2 | 5.2 | 0 |
| 1431 | T | -99 | TB2<br>Detector | New<br>PMT<br>10/27/10 |  |  | 5.2 | 5.2 | 0 |

|      |   |      |         |                                                         |  |  |     |     |  |
|------|---|------|---------|---------------------------------------------------------|--|--|-----|-----|--|
| 1428 | R | -99  | Unknown | 4.4%<br>cross talk                                      |  |  | 4.6 | 4.6 |  |
| 1411 | R | -99  | Unknown | 41%<br>cross talk                                       |  |  | 37  | 37  |  |
| 243  | T | 11.4 | Unknown | 10%<br>cross<br>talk,<br>reseated<br>cookie,<br>8/31/10 |  |  | 8.6 | 8.6 |  |

Less than 2 low pixels and Xtalk < 10%

2 or more low pixels and Xtalk < 10%

Light Leak

MINERvA Detector Spares (Do not take it from Lab G)

Removed for Main Detector

**Additio  
nal  
Notes**

12-05-  
2014  
New  
PmT.  
Remove  
from MD  
on  
12/9/201  
5

I would  
like to  
check  
this one  
again  
with new  
optical  
cables...  
08-22-  
2014 No  
problems  
found  
Placed  
on the  
testbeam  
2  
detector  
on 03-03-  
2015

DECONS  
TRUCTE  
D AT  
LAB G.  
12/1/201  
4 strange  
screws  
don't let  
us test it!

11-07-  
2014  
Inconclusive  
tests.  
See entry  
38031 for  
plots.

11-19-  
2014  
Light  
Leak  
discovered  
when  
at the  
TBII  
Detector.  
See entry  
38462 for  
plots. 11-  
21-2014  
New  
base.  
Problem  
persist



10-31-  
2014  
Light  
Leak,  
see entry  
37815 for  
plots 11-  
07-2014  
Light  
Leaking  
fix fail,  
see entry  
38031 for  
plots. 11-  
17-2014  
PMT  
Removed

08-21-  
2014  
FEB  
does not  
find PMT.  
Empty  
Box

Qhi and  
Qlo low  
for  
channels  
32-64,  
also  
qmed is  
low for  
same  
channels.  
See log  
entry  
29590 for  
plots. 08-  
21-2014  
Problem  
Persist.  
See entry  
36870 for  
plots.

No dead  
Channels  
, see log  
29674 for  
plots

09-05-  
2014  
Pixel #19  
and 51  
are low.  
See entry  
37232 for  
plots.

08-21-  
2014  
Slow to  
come up  
on  
voltage.  
Pixels 2  
and 18  
did not  
came up  
during LI.  
See entry  
36870 for  
plots.

On the  
Detector

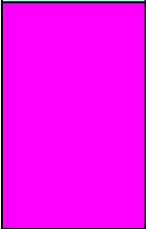
DECONS  
TRUCTE  
D AT  
LAB G

DECONS  
TRUCTE  
D AT  
LAB G

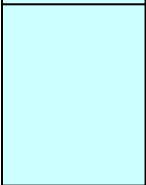
|                                                                                                |
|------------------------------------------------------------------------------------------------|
|                                                                                                |
|                                                                                                |
| check again with a new optical cable?<br>08-21-2014 No problems<br>10-30-2014 Pixel #43 is low |
|                                                                                                |
| No Dead Pixels, see Log entry 30073 for plots.                                                 |



24-11-  
2014  
New  
PMT.



08-25-  
2014  
Slow to  
come up  
on  
voltage



08-21-  
2014  
FEB  
does not  
find PMT  
11-17-  
2014  
New  
PMT.  
Pixel #56  
low. See  
entry  
38406 for  
plots.

No Low Channels  
. See Log entry  
29671 for Plots.

large black extension  
with white plastic pieces  
that help guide the FEB into  
place.

Slow to  
come up  
on  
voltage.  
08-21-  
2014 The  
PMT  
came up  
on  
voltage  
normally

08-21-  
2014  
FEB  
does not  
find PMT  
11-17-  
2014  
New  
PMT.  
Light  
Leak.  
See entry  
38404 for  
plots.

08-21-  
2014  
New  
PMT



08-25-2014  
Pixel #2  
and #58  
are low.  
See entry  
36957 for  
plots.

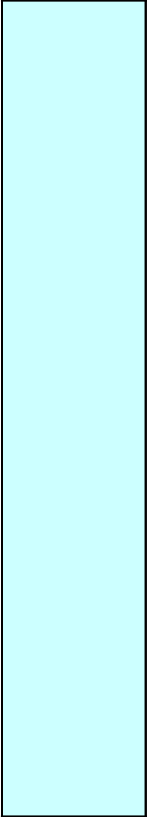
08-21-2014  
New  
PMT

08-21-2014  
New  
PMT

No dead  
Channels  
, see log  
29677 for  
plots

08-21-  
2014  
New  
PMT

08-21-  
2014  
Slow to  
come up  
on  
voltage



09-05-  
2014  
Slow to  
come up  
on  
voltage

08-25-  
2014

Pixel #60  
low. See  
entry  
36957 for  
plots.

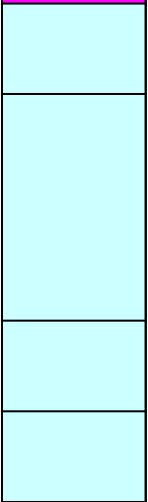
03-03-  
2015

Removed  
from the  
test  
beam 2  
detector,  
HV  
varying  
issue.

ECL  
#41570  
#41577

Pixel #58  
is Low.  
See Log  
entry  
29670 for  
plots. 08-  
21-2014  
Problem  
Persist.

Very low period, possible HV varying issue.  
08-21-2014 No problem with low period spotted. Light leak at the last pixels.  
10-30-2014 No problem to be reported



08-25-2014  
Pixel #51  
is low.  
See entry  
36957 for  
plots.

Control  
PMT, has  
one low  
pixel,  
pixel 37.  
See log  
entry  
29588 for  
plots. 08-  
25-2014  
No dead  
pixel to  
be  
spotted.

09-05-  
2014  
Slow to  
come up  
on  
voltage

11-21-  
2014 Not  
found  
@Lab G

09-05-  
2014 Not  
found  
@Lab G

09-05-  
2014 Not  
found  
@Lab G

| PMT  | Weave | Cross Talk from Debbie's File, if present | Location | Comments on tube                                              | Reason removed from detector                                     | Date Removed | Cross Talk 4nn% 10/13 | Cross Talk 4nn% Most Recent | Missing Pixels (n/a = not able to test) |
|------|-------|-------------------------------------------|----------|---------------------------------------------------------------|------------------------------------------------------------------|--------------|-----------------------|-----------------------------|-----------------------------------------|
| 1149 | Tufts |                                           | LabF     | Showed gain variation in MD                                   |                                                                  | ###          |                       |                             |                                         |
| 231  | Tufts |                                           | LabF     | Pulled out from MD on 10/1/2015 with PMT 68                   | HV varying problem                                               | ###          |                       |                             |                                         |
| 74   | Tufts |                                           | LabF     | Pulled out from MD on 10/13/2015 replaced with PMT 20 from TB | Spikes outside the main peak in HV residuals                     | ###          |                       |                             |                                         |
| 1423 | Tufts |                                           | LabF     | Pulled out from MD on 10/13/2015 replaced with PMT 17 from TB | High voltage variation. FEB change (log entry 47362) didn't work | ###          |                       |                             |                                         |





**Additio  
nal  
Notes**

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