



**ZIPPY TECHNOLOGY CORP.**

**Mean Time Between Failures  
PREDICTION REPORT**

**MIL-HDBK-217F, Notice 2**

**Product : Redundant Switching Power Supply**

**Model/Type : R1U2-5400K2H(RoHS)(PMBus WP1.2)**

|                    |                                                                                     |            |                                                                                      |
|--------------------|-------------------------------------------------------------------------------------|------------|--------------------------------------------------------------------------------------|
| <b>Approval By</b> |  | 正式資料<br>用章 |  |
| <b>Prepared By</b> |  |            |                                                                                      |

ZIPPY TECHNOLOGY CORP.  
10F.,No.50,MINQUAN RD.,  
XINDIAN DIST.,NEW TAIPEI CITY,TAIWAN,R.O.C.  
RELIABILITY PREDICTION STANDARD REPORT  
(Sorted by Part Number)  
MIL-HDBK-217F, Notice 2

PRED-FIRST (c) Reliability Prediction Program, BJM Engineering Services

Date: AUG-29-2018  
End Item Title : R1U2 SERIES MTBF  
End Item Part Number : R1U2-5400K2H(RoHS)(PMBus WP1.2)  
R1U2-5400K2H(RoHS)(PMBus WP1.2) MTBF : 239,796  
Module Title: ZIPPY TECHNOLOGY CORP  
Module Part Number : R1U / MTBF  
Power Unit Module : R1U-2400K2(RoHS)(PMBus WP1.2)  
Environmental Condition: GB  
Ambient Temperature: 25°C

#### RELIABILITY MODELING OF REDUNDANT UNITS

##### Two Redundant Units:

Two identical units may be connected in parallel, each capable of supplying the total required output. If one unit fails and can be removed from the system ( does not interfere with the operation of the other unit ) , then the other unit supplies the required output. Using a constant failure rate, the following relations apply.

$$\text{Total Failure Rate}(F) = M \lambda / (3/2) + B \lambda = 5.214183 / (3/2) + 0.694086 = 4.170208$$

$M \lambda$  = Main power failure rate ,  $B \lambda$  = Back plane failure rate

$$R1U2-5400K2H(RoHS)(PMBus WP1.2)(MTBF) = F / 10^6 \text{ (Hrs)} = 1 / (4.170208 / 10^6) = 239,796$$

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RELIABILITY PREDICTION STANDARD REPORT  
(Sorted by Part Number)  
MIL-HDBK-217F, Notice 2

Date : AUG-29-2018      Time : 16:02:36  
End Item Title : R1U SERIES MTBF  
End Item Part Number : R1U-2400K2(RoHS)(PMBus WP1.2)  
R1U-2400K2(RoHS)(PMBus WP1.2) MTBF : 191,785  
Module Title : ZIPPY TECHNOLOGY CORP  
Module Part Number : R1U / MTBF  
Module Reference Designation : R1U  
Environmental Condition : GB  
Ambient Temperature: 25°C

R1U-2400K2(RoHS)(PMBus WP1.2)

| ITEM<br># | Part<br>Number | Ref<br>Desig | Qual<br>Level | Quant | Individual<br>Failure Rate<br>(F/10 <sup>6</sup> Hrs) | Total<br>Failure Rate<br>(F/10 <sup>6</sup> Hrs) |
|-----------|----------------|--------------|---------------|-------|-------------------------------------------------------|--------------------------------------------------|
| 1         | B105900010     | BOM          | SPECIAL       | 1     | 0.226012                                              | 0.226012                                         |
| 2         | B106080002     | BOM          | SPECIAL       | 1     | 0.101232                                              | 0.101232                                         |
| 3         | B106080003     | BOM          | SPECIAL       | 1     | 0.104791                                              | 0.104791                                         |
| 4         | B106080004     | BOM          | SPECIAL       | 1     | 0.606885                                              | 0.606885                                         |
| 5         | B106080005     | BOM          | SPECIAL       | 1     | 0.374260                                              | 0.374260                                         |
| 6         | B200000296     | BOM          | NMIL          | 1     | 0.005248                                              | 0.005248                                         |
| 7         | B200000308     | BOM          | NMIL          | 2     | 0.013289                                              | 0.026578                                         |
| 8         | B200000559     | BOM          | NMIL          | 1     | 0.005483                                              | 0.005483                                         |
| 9         | B200000603     | BOM          | NMIL          | 1     | 0.005248                                              | 0.005248                                         |
| 10        | B200000612     | BOM          | NMIL          | 1     | 0.004716                                              | 0.004716                                         |
| 11        | B200010052     | BOM          | NMIL          | 4     | 0.000337                                              | 0.001348                                         |
| 12        | B200010056     | BOM          | NMIL          | 3     | 0.000323                                              | 0.000969                                         |
| 13        | B200010068     | BOM          | NMIL          | 1     | 0.064181                                              | 0.064181                                         |
| 14        | B200010242     | BOM          | NMIL          | 2     | 0.060285                                              | 0.120570                                         |
| 15        | B200010252     | BOM          | NMIL          | 6     | 0.072168                                              | 0.433008                                         |
| 16        | B200010266     | BOM          | NMIL          | 1     | 0.069822                                              | 0.069822                                         |
| 17        | B200020024     | BOM          | NMIL          | 1     | 0.002332                                              | 0.002332                                         |
| 18        | B200020034     | BOM          | NMIL          | 1     | 0.016175                                              | 0.016175                                         |
| 19        | B200030069     | BOM          | NMIL          | 1     | 0.002308                                              | 0.002308                                         |
| 20        | B200030083     | BOM          | NMIL          | 1     | 0.002308                                              | 0.002308                                         |
| 21        | B200040073     | BOM          | NMIL          | 12    | 0.011646                                              | 0.139752                                         |
| 22        | B200040120     | BOM          | NMIL          | 1     | 0.011646                                              | 0.011646                                         |
| 23        | B200040133     | BOM          | NMIL          | 2     | 0.011646                                              | 0.023292                                         |
| 24        | B200040147     | BOM          | NMIL          | 1     | 0.002268                                              | 0.002268                                         |

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| ITEM<br># | Part<br>Number | Ref<br>Desig | Qual<br>Level | Quant | Individual<br>Failure Rate<br>(F/10 <sup>6</sup> Hrs) | Total<br>Failure Rate<br>(F/10 <sup>6</sup> Hrs) |
|-----------|----------------|--------------|---------------|-------|-------------------------------------------------------|--------------------------------------------------|
| 25        | B200040150     | BOM          | NMIL          | 1     | 0.011646                                              | 0.011646                                         |
| 26        | B200050081     | BOM          | NMIL          | 5     | 0.003013                                              | 0.015065                                         |
| 27        | B200050084     | BOM          | NMIL          | 1     | 0.003013                                              | 0.003013                                         |
| 28        | B200050088     | BOM          | NMIL          | 1     | 0.003013                                              | 0.003013                                         |
| 29        | B200060029     | BOM          | NMIL          | 1     | 0.012584                                              | 0.012584                                         |
| 30        | B200090005     | BOM          | NMIL          | 1     | 0.001476                                              | 0.001476                                         |
| 31        | B200110001     | BOM          | NMIL          | 1     | 0.002896                                              | 0.002896                                         |
| 32        | B200110035     | BOM          | NMIL          | 1     | 0.002896                                              | 0.002896                                         |
| 33        | B200110046     | BOM          | NMIL          | 1     | 0.002896                                              | 0.002896                                         |
| 34        | B200110128     | BOM          | NMIL          | 1     | 0.001551                                              | 0.001551                                         |
| 35        | B200110162     | BOM          | NMIL          | 1     | 0.002896                                              | 0.002896                                         |
| 36        | B200110177     | BOM          | NMIL          | 1     | 0.002896                                              | 0.002896                                         |
| 37        | B200110185     | BOM          | NMIL          | 1     | 0.002896                                              | 0.002896                                         |
| 38        | B200110192     | BOM          | NMIL          | 1     | 0.002210                                              | 0.002210                                         |
| 39        | B200110279     | BOM          | NMIL          | 1     | 0.002210                                              | 0.002210                                         |
| 40        | B200110282     | BOM          | NMIL          | 1     | 0.002896                                              | 0.002896                                         |
| 41        | B200110337     | BOM          | NMIL          | 2     | 0.003039                                              | 0.006078                                         |
| 42        | B200110473     | BOM          | NMIL          | 3     | 0.002896                                              | 0.008688                                         |
| 43        | B200110498     | BOM          | NMIL          | 2     | 0.002210                                              | 0.004420                                         |
| 44        | B200110523     | BOM          | NMIL          | 1     | 0.002210                                              | 0.002210                                         |
| 45        | B200110530     | BOM          | NMIL          | 1     | 0.002210                                              | 0.002210                                         |
| 46        | B200110544     | BOM          | NMIL          | 1     | 0.002210                                              | 0.002210                                         |
| 47        | B200110608     | BOM          | NMIL          | 3     | 0.002835                                              | 0.008505                                         |
| 48        | B200110709     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 49        | B200110715     | BOM          | NMIL          | 2     | 0.002896                                              | 0.005792                                         |
| 50        | B200110733     | BOM          | NMIL          | 9     | 0.002026                                              | 0.018234                                         |
| 51        | B200110734     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 52        | B200110738     | BOM          | NMIL          | 5     | 0.002026                                              | 0.010130                                         |
| 53        | B200110739     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 54        | B200110775     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 55        | B200110777     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 56        | B200110808     | BOM          | NMIL          | 7     | 0.002026                                              | 0.014182                                         |
| 57        | B200110811     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 58        | B200110814     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 59        | B200110819     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 60        | B200110821     | BOM          | NMIL          | 1     | 0.002126                                              | 0.002126                                         |
| 61        | B200110851     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 62        | B200110870     | BOM          | NMIL          | 1     | 0.002126                                              | 0.002126                                         |
| 63        | B200110872     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 64        | B200110891     | BOM          | NMIL          | 1     | 0.002126                                              | 0.002126                                         |

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| ITEM<br># | Part<br>Number | Ref<br>Desig | Qual<br>Level | Quant | Individual<br>Failure Rate<br>(F/10 <sup>6</sup> Hrs) | Total<br>Failure Rate<br>(F/10 <sup>6</sup> Hrs) |
|-----------|----------------|--------------|---------------|-------|-------------------------------------------------------|--------------------------------------------------|
| 65        | B200110928     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 66        | B200111016     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 67        | B200111021     | BOM          | NMIL          | 1     | 0.002126                                              | 0.002126                                         |
| 68        | B200111022     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 69        | B200111024     | BOM          | NMIL          | 1     | 0.002026                                              | 0.002026                                         |
| 70        | B200120170     | BOM          | NMIL          | 1     | 0.004786                                              | 0.004786                                         |
| 71        | B200160009     | BOM          | NMIL          | 1     | 0.007893                                              | 0.007893                                         |
| 72        | B200170055     | BOM          | NMIL          | 1     | 0.003721                                              | 0.003721                                         |
| 73        | B200170071     | BOM          | NMIL          | 3     | 0.003177                                              | 0.009531                                         |
| 74        | B200180075     | BOM          | NMIL          | 3     | 0.001907                                              | 0.005721                                         |
| 75        | B200190037     | BOM          | NMIL          | 1     | 0.012538                                              | 0.012538                                         |
| 76        | B200190072     | BOM          | NMIL          | 1     | 0.010940                                              | 0.010940                                         |
| 77        | B200200075     | BOM          | NMIL          | 1     | 0.009676                                              | 0.009676                                         |
| 78        | B200200092     | BOM          | NMIL          | 8     | 0.009620                                              | 0.076960                                         |
| 79        | B200200116     | BOM          | NMIL          | 4     | 0.004199                                              | 0.016796                                         |
| 80        | B200200140     | BOM          | NMIL          | 1     | 0.003664                                              | 0.003664                                         |
| 81        | B200200142     | BOM          | NMIL          | 1     | 0.007306                                              | 0.007306                                         |
| 82        | B200200158     | BOM          | NMIL          | 1     | 0.004508                                              | 0.004508                                         |
| 83        | B200200193     | BOM          | NMIL          | 1     | 0.004827                                              | 0.004827                                         |
| 84        | B200200197     | BOM          | NMIL          | 1     | 0.005939                                              | 0.005939                                         |
| 85        | B200200207     | BOM          | NMIL          | 2     | 0.005166                                              | 0.010332                                         |
| 86        | B200200208     | BOM          | NMIL          | 5     | 0.006356                                              | 0.031780                                         |
| 87        | B200200213     | BOM          | NMIL          | 1     | 0.004224                                              | 0.004224                                         |
| 88        | B200220020     | BOM          | NMIL          | 1     | 0.003440                                              | 0.003440                                         |
| 89        | B200220082     | BOM          | NMIL          | 3     | 0.001208                                              | 0.003624                                         |
| 90        | B200220087     | BOM          | NMIL          | 2     | 0.001125                                              | 0.002250                                         |
| 91        | B200230210     | BOM          | NMIL          | 1     | 0.008090                                              | 0.008090                                         |
| 92        | B200230276     | BOM          | NMIL          | 3     | 0.001283                                              | 0.003849                                         |
| 93        | B200230281     | BOM          | NMIL          | 1     | 0.007791                                              | 0.007791                                         |
| 94        | B200230288     | BOM          | NMIL          | 1     | 0.001148                                              | 0.001148                                         |
| 95        | B200230381     | BOM          | NMIL          | 1     | 0.006220                                              | 0.006220                                         |
| 96        | B200230417     | BOM          | NMIL          | 1     | 0.001637                                              | 0.001637                                         |
| 97        | B200230436     | BOM          | NMIL          | 2     | 0.001832                                              | 0.003664                                         |
| 98        | B200230442     | BOM          | NMIL          | 1     | 0.022304                                              | 0.022304                                         |
| 99        | B200230537     | BOM          | NMIL          | 1     | 0.011988                                              | 0.011988                                         |
| 100       | B200230538     | BOM          | NMIL          | 2     | 0.013482                                              | 0.026964                                         |
| 101       | B200240012     | BOM          | NMIL          | 1     | 0.005171                                              | 0.005171                                         |
| 102       | B200250009     | BOM          | NMIL          | 1     | 0.011259                                              | 0.011259                                         |
| 103       | B200260266     | BOM          | NMIL          | 1     | 0.009364                                              | 0.009364                                         |
| 104       | B200260382     | BOM          | NMIL          | 1     | 0.019929                                              | 0.019929                                         |

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| ITEM<br># | Part<br>Number | Ref<br>Desig | Qual<br>Level | Quant | Individual<br>Failure Rate<br>(F/10 <sup>6</sup> Hrs) | Total<br>Failure Rate<br>(F/10 <sup>6</sup> Hrs) |
|-----------|----------------|--------------|---------------|-------|-------------------------------------------------------|--------------------------------------------------|
| 105       | B200260413     | BOM          | NMIL          | 1     | 0.010127                                              | 0.010127                                         |
| 106       | B200280012     | BOM          | NMIL          | 1     | 0.000623                                              | 0.000623                                         |
| 107       | B200300475     | BOM          | NMIL          | 1     | 0.028071                                              | 0.028071                                         |
| 108       | B200300476     | BOM          | NMIL          | 1     | 0.003336                                              | 0.003336                                         |
| 109       | B200310019     | BOM          | NMIL          | 1     | 0.004813                                              | 0.004813                                         |
| 110       | B200370069     | BOM          | NMIL          | 1     | 0.001373                                              | 0.001373                                         |
| 111       | B200370081     | BOM          | NMIL          | 1     | 0.000962                                              | 0.000962                                         |
| 112       | B200370085     | BOM          | NMIL          | 1     | 0.001196                                              | 0.001196                                         |
| 113       | B210060136     | BOM          | NMIL          | 1     | 0.024396                                              | 0.024396                                         |
| 114       | B210090232     | BOM          | SPECIAL       | 1     | 2.182912                                              | 2.182912                                         |
| 115       | B210160060     | BOM          | NMIL          | 1     | 0.010000                                              | 0.010000                                         |
| 116       | B210192657     | BOM          | NMIL          | 1     | 0.023541                                              | 0.023541                                         |

|                                                |                |
|------------------------------------------------|----------------|
| Total Failure Rate (F/10 <sup>6</sup> Hrs) :   | 5.214183       |
| Mean Time (in hours) Between Failures (MTBF) : | <b>191,785</b> |