

# **SERVICE MANUAL**

## **ADDITIONAL INFORMATION ON MODEL QX-747**

**Subject: SUB-CHANNEL CIRCUIT ASSEMBLY OF MODEL QX-747**

On account of modification due to improvement, conventional Assembly  
AWX-051-A will be replaced by a new type of Assembly AWX-051-B.

**Notice:**

- (1) Old Assembly and New One are mutually interchangeable.
- (2) You are requested to make use of this additional information together with the furnished service manual.

## Parts List of Sub-Channel Circuit Assembly (AWX-051-B)

### CAPACITORS

| Symbol | Description  |        |     | Part No.      |
|--------|--------------|--------|-----|---------------|
| C1     | Ceramic      | 470p   | 50V | CKDYB 471K 50 |
| C2     | Ceramic      | 470p   | 50V | CKDYB 471K 50 |
| C3     | Electrolytic | 1      | 25V | CEA 010P 25   |
| C4     | Mylar        | 0.033  | 50V | CQMA 333K 50  |
| C5     | Electrolytic | 1      | 25V | CEA 010P 25   |
| C6     | Electrolytic | 0.47   | 25V | CSSA R47M 25  |
| C7     | Mylar        | 0.0027 | 50V | CQMA 272K 50  |
| C8     | Mylar        | 0.001  | 50V | CQMA 102K 50  |
| C9     | Mylar        | 0.0033 | 50V | CQMA 332K 50  |
| C10    | Electrolytic | 33     | 16V | CEA 330P 16   |
| C11    | Electrolytic | 47     | 10V | CEA 471P 10   |
| C12    | Electrolytic | 2.2    | 50V | CEA 2R2P 50   |
| C13    | Electrolytic | 33     | 16V | CEA 330P 16   |
| C14    | Mylar        | 0.018  | 50V | CQMA 183K 50  |
| C15    | Electrolytic | 4.7    | 25V | CEA 4R7P 25   |
| C16    | Electrolytic | 4.7    | 25  | CEA 4R7P 25   |
| C17    | Electrolytic | 100    | 35V | CEA 101P 35   |
| C18    | Electrolytic | 220    | 35V | CEA 221P 35   |
| C19    | Electrolytic | 4.7    | 25V | CEA 4R7P 25   |
| C20    | Mylar        | 0.0082 | 50V | CQMA 822K 50  |
| C21    | Mylar        | 0.0082 | 50V | CQMA 822K 50  |
| C22    | Mylar        | 0.022  | 50V | CQMA 223K 50  |
| C23    | Mylar        | 0.01   | 50V | CQMA 103K 50  |
| C24    | Mylar        | 0.022  | 50V | CQMA 223K 50  |
| C25    | Mylar        | 0.022  | 50V | CQMA 223K 50  |
| C26    | Mylar        | 0.015  | 50V | CQMA 153K 50  |
| C27    | Electrolytic | 0.47   | 25V | CSSA R47M 25  |
| C28    | Electrolytic | 0.47   | 25V | CSSA R47M 25  |
| C29    | Electrolytic | 0.68   | 35V | CSZA R68K 35  |
| C30    | Mylar        | 0.033  | 50V | CQMA 333K 50  |
| C31    | Electrolytic | 4.7    | 25V | CEA 4R7P 25   |
| C32    | Electrolytic | 10     | 16V | CEA 100P 16   |
| C33    | Electrolytic | 10     | 16V | CEA 100P 16   |
| C34    | Mylar        | 0.01   | 50V | CQMA 103K 50  |
| C35    | Mylar        | 0.15   | 50V | CQMA 154K 50  |
| C36    | Electrolytic | 0.47   | 25V | CSSA R47M 25  |
| C37    | Electrolytic | 0.68   | 25V | CSSA R68M 25  |
| C38    | Electrolytic | 10     | 16V | CEA 100P 16   |
| C39    | Electrolytic | 10     | 16V | CEA 100P 16   |
| C40    | Electrolytic | 10     | 16V | CEA 100P 16   |
| C41    | Mylar        | 0.01   | 50V | CQMA 103K 50  |
| C42    | Mylar        | 0.15   | 50V | CQMA 154K 50  |
| C43    | Electrolytic | 0.47   | 25V | CSSA R47M 25  |
| C44    | Electrolytic | 0.68   | 25V | CSSA R68M 25  |
| C45    | Electrolytic | 4.7    | 25V | CEA 4R7P 25   |

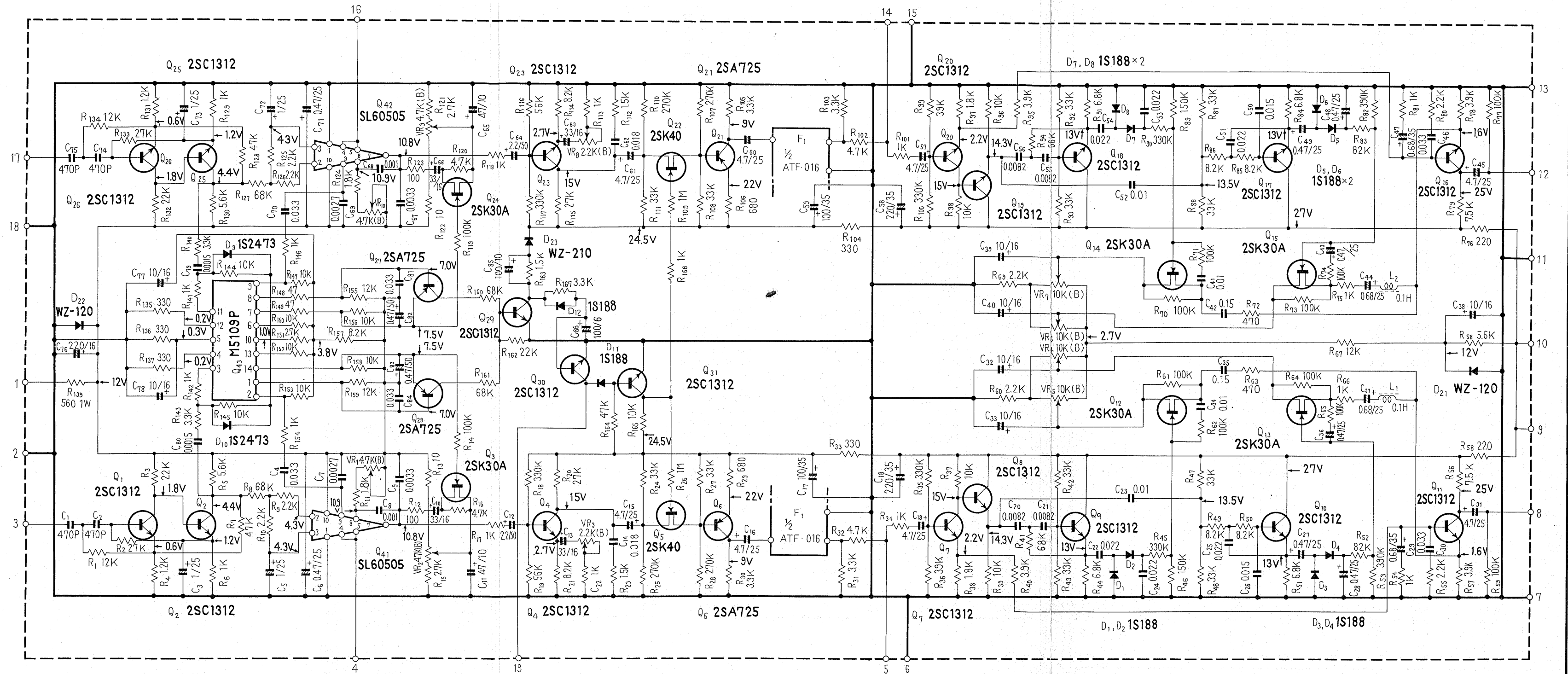
| Symbol | Description  |        |     | Part No.      |
|--------|--------------|--------|-----|---------------|
| C46    | Mylar        | 0.033  | 50V | CQMA 333K 50  |
| C47    | Electrolytic | 0.68   | 35V | CSZA R68K 35  |
| C48    | Electrolytic | 0.47   | 25V | CSSA R47M 25  |
| C49    | Electrolytic | 0.47   | 25V | CSSA R47M 25  |
| C50    | Mylar        | 0.015  | 50V | CQMA 153K 50  |
| C51    | Mylar        | 0.022  | 50V | CQMA 223K 50  |
| C52    | Mylar        | 0.01   | 50V | CQMA 103K 50  |
| C53    | Mylar        | 0.022  | 50V | CQMA 223K 50  |
| C54    | Mylar        | 0.022  | 50V | CQMA 223K 50  |
| C55    | Mylar        | 0.0082 | 50V | CQMA 822K 50  |
| C56    | Mylar        | 0.0082 | 50V | CQMA 822K 50  |
| C57    | Electrolytic | 4.7    | 25V | CEA 4R7P 25   |
| C58    | Electrolytic | 220    | 35V | CEA 221P 35   |
| C59    | Electrolytic | 100    | 35V | CEA 101P 35   |
| C60    | Electrolytic | 4.7    | 25V | CEA 4R7P 25   |
| C61    | Electrolytic | 4.7    | 25V | CEA 4R7P 25   |
| C62    | Mylar        | 0.018  | 50V | CQMA 183K 50  |
| C63    | Electrolytic | 33     | 16V | CEA 330P 16   |
| C64    | Electrolytic | 2.2    | 50V | CEA 2R2P 50   |
| C65    | Electrolytic | 47     | 10V | CEA 471P 10   |
| C66    | Electrolytic | 33     | 16V | CEA 330P 16   |
| C67    | Mylar        | 0.0033 | 50V | CQMA 332K 50  |
| C68    | Mylar        | 0.001  | 50V | CQMA 102K 50  |
| C69    | Mylar        | 0.0027 | 50V | CQMA 272K 50  |
| C70    | Mylar        | 0.033  | 50V | CQMA 333K 50  |
| C71    | Electrolytic | 0.47   | 25V | CSSA R47M 25  |
| C72    | Electrolytic | 1      | 25V | CEA 010P 25   |
| C73    | Electrolytic | 1      | 25V | CEA 010P 25   |
| C74    | Ceramic      | 470p   | 50V | CKDYB 471K 50 |
| C75    | Ceramic      | 470p   | 50V | CKDYB 471K 50 |
| C76    | Electrolytic | 220    | 16V | CEA 221P 16   |
| C77    | Electrolytic | 10     | 16V | CEA 100P 16   |
| C78    | Electrolytic | 10     | 16V | CEA 100P 16   |
| C79    | Mylar        | 0.0015 | 50V | CQMA 152K 50  |
| C80    | Mylar        | 0.0015 | 50V | CQMA 152K 50  |
| C81    | Mylar        | 0.033  | 50V | CQMA 333K 50  |
| C82    | Electrolytic | 0.47   | 50V | CEA R47P 50   |
| C83    | Electrolytic | 0.47   | 50V | CEA R47P 50   |
| C84    | Mylar        | 0.033  | 50V | CQMA 333K 50  |
| C85    | Electrolytic | 100    | 10V | CEA 101P 10   |
| C86    | Electrolytic | 100    | 6V  | CEA 101P 6    |

## RESISTORS

| Symbol | Description      | Part No.   |
|--------|------------------|------------|
| R1     | Carbon film 12k  | RD¼PM 123J |
| R2     | Carbon film 27k  | RD¼PM 273J |
| R3     | Carbon film 22k  | RD¼PM 223J |
| R4     | Carbon film 1.2k | RD¼PM 122J |
| R5     | Carbon film 5.6k | RD¼PM 562J |
| R6     | Carbon film 1k   | RD¼PM 102J |
| R7     | Carbon film 47k  | RD¼PM 473J |
| R8     | Carbon film 68k  | RD¼PM 683J |
| R9     | Carbon film 2.2k | RD¼PM 222J |
| R10    | Carbon film 2.2k | RD¼PM 222J |
| R11    | Carbon film 1.8k | RD¼PM 182J |
| R12    | Carbon film 100  | RD¼PM 101J |
| R13    | Carbon film 10   | RD¼PM 100J |
| R14    | Carbon film 100k | RD¼PM 104J |
| R15    | Carbon film 2.7k | RD¼PM 272J |
| R16    | Carbon film 4.7k | RD¼PM 472J |
| R17    | Carbon film 1k   | RD¼PM 102J |
| R18    | Carbon film 330k | RD¼PM 334J |
| R19    | Carbon film 56k  | RD¼PM 563J |
| R20    | Carbon film 27k  | RD¼PM 273J |
| R21    | Carbon film 8.2k | RD¼PM 822J |
| R22    | Carbon film 1k   | RD¼PM 102J |
| R23    | Carbon film 1.5k | RD¼PM 152J |
| R24    | Carbon film 33k  | RD¼PM 333J |
| R25    | Carbon film 270k | RD¼PM 274J |
| R26    | Carbon film 1M   | RD¼PM 105J |
| R27    | Carbon film 33k  | RD¼PM 333J |
| R28    | Carbon film 270k | RD¼PM 274J |
| R29    | Carbon film 680  | RD¼PM 681J |
| R30    | Carbon film 3.3k | RD¼PM 332J |
| R31    | Carbon film 3.3k | RD¼PM 332J |
| R32    | Carbon film 4.7k | RD¼PM 472J |
| R33    | Carbon film 330  | RD¼PM 331J |
| R34    | Carbon film 1k   | RD¼PM 102J |
| R35    | Carbon film 330k | RD¼PM 334J |
| R36    | Carbon film 39k  | RD¼PM 393J |
| R37    | Carbon film 10k  | RD¼PM 103J |
| R38    | Carbon film 1.8k | RD¼PM 182J |
| R39    | Carbon film 10k  | RD¼PM 103J |
| R40    | Carbon film 3.9k | RD¼PM 392J |
| R41    | Carbon film 68k  | RD¼PM 683J |
| R42    | Carbon film 33k  | RD¼PM 333J |
| R43    | Carbon film 33k  | RD¼PM 333J |
| R44    | Carbon film 6.8k | RD¼PM 682J |
| R45    | Carbon film 330k | RD¼PM 334J |
| R46    | Carbon film 150k | RD¼PM 154J |
| R47    | Carbon film 33k  | RD¼PM 333J |
| R48    | Carbon film 33k  | RD¼PM 333J |
| R49    | Carbon film 8.2k | RD¼PM 822J |
| R50    | Carbon film 8.2k | RD¼PM 822J |

SUB CHANNEL CIRCUIT ASS'Y

AWX-051





| Symbol | Description      | Part No.   |
|--------|------------------|------------|
| R51    | Carbon film 6.8k | RD¼PM 682J |
| R52    | Carbon film 82k  | RD¼PM 823J |
| R53    | Carbon film 390k | RD¼PM 394J |
| R54    | Carbon film 1k   | RD¼PM 102J |
| R55    | Carbon film 2.2k | RD¼PM 222J |
| R56    | Carbon film 7.5k | RD¼PM 752J |
| R57    | Carbon film 3.9k | RD¼PM 392J |
| R58    | Carbon film 220  | RD¼PM 221J |
| R59    | Carbon film 100k | RD¼PM 104J |
| R60    | Carbon film 2.2k | RD¼PM 222J |
| R61    | Carbon film 100k | RD¼PM 104J |
| R62    | Carbon film 100k | RD¼PM 104J |
| R63    | Carbon film 470  | RD¼PM 471J |
| R64    | Carbon film 100k | RD¼PM 104J |
| R65    | Carbon film 100k | RD¼PM 104J |
| R66    | Carbon film 1k   | RD¼PM 102J |
| R67    | Carbon film 12k  | RD¼PM 123J |
| R68    | Carbon film 5.6k | RD¼PM 562J |
| R69    | Carbon film 2.2k | RD¼PM 222J |
| R70    | Carbon film 100k | RD¼PM 104J |
| R71    | Carbon film 100k | RD¼PM 104J |
| R72    | Carbon film 470  | RD¼PM 471J |
| R73    | Carbon film 100k | RD¼PM 104J |
| R74    | Carbon film 100k | RD¼PM 104J |
| R75    | Carbon film 1k   | RD¼PM 102J |
| R76    | Carbon film 220  | RD¼PM 221J |
| R77    | Carbon film 100k | RD¼PM 104J |
| R78    | Carbon film 3.9k | RD¼PM 392J |
| R79    | Carbon film 7.5k | RD¼PM 752J |
| R80    | Carbon film 2.2k | RD¼PM 222J |
| R81    | Carbon film 1k   | RD¼PM 102J |
| R82    | Carbon film 390k | RD¼PM 394J |
| R83    | Carbon film 82k  | RD¼PM 823J |
| R84    | Carbon film 6.8k | RD¼PM 682J |
| R85    | Carbon film 8.2k | RD¼PM 822J |
| R86    | Carbon film 8.2k | RD¼PM 822J |
| R87    | Carbon film 33k  | RD¼PM 333J |
| R88    | Carbon film 33k  | RD¼PM 333J |
| R89    | Carbon film 150k | RD¼PM 154J |
| R90    | Carbon film 330k | RD¼PM 334J |
| R91    | Carbon film 6.8k | RD¼PM 682J |
| R92    | Carbon film 33k  | RD¼PM 333J |
| R93    | Carbon film 33k  | RD¼PM 333J |
| R94    | Carbon film 68k  | RD¼PM 683J |
| R95    | Carbon film 3.9k | RD¼PM 392J |
| R96    | Carbon film 10k  | RD¼PM 103J |
| R97    | Carbon film 1.8k | RD¼PM 182J |
| R98    | Carbon film 10k  | RD¼PM 103J |
| R99    | Carbon film 39k  | RD¼PM 393J |
| R100   | Carbon film 330k | RD¼PM 334J |

| Symbol | Description        | Part No.   |
|--------|--------------------|------------|
| R101   | Carbon film 1k     | RD¼PM 102J |
| R102   | Carbon film 4.7k   | RD¼PM 472J |
| R103   | Carbon film 3.3k   | RD¼PM 332J |
| R104   | Carbon film 330    | RD¼PM 331J |
| R105   | Carbon film 3.3k   | RD¼PM 332J |
| R106   | Carbon film 680    | RD¼PM 681J |
| R107   | Carbon film 270k   | RD¼PM 274J |
| R108   | Carbon film 33k    | RD¼PM 333J |
| R109   | Carbon film 1M     | RD¼PM 105J |
| R110   | Carbon film 270k   | RD¼PM 274J |
| R111   | Carbon film 33k    | RD¼PM 333J |
| R112   | Carbon film 1.5k   | RD¼PM 152J |
| R113   | Carbon film 1k     | RD¼PM 102J |
| R114   | Carbon film 8.2k   | RD¼PM 822J |
| R115   | Carbon film 27k    | RD¼PM 273J |
| R116   | Carbon film 56k    | RD¼PM 563J |
| R117   | Carbon film 330k   | RD¼PM 334J |
| R118   | Carbon film 1k     | RD¼PM 102J |
| R119   | Carbon film 100k   | RD¼PM 104J |
| R120   | Carbon film 4.7k   | RD¼PM 472J |
| R121   | Carbon film 2.7k   | RD¼PM 272J |
| R122   | Carbon film 10     | RD¼PM 100J |
| R123   | Carbon film 100    | RD¼PM 101J |
| R124   | Carbon film 1.8k   | RD¼PM 182J |
| R125   | Carbon film 2.2k   | RD¼PM 222J |
| R126   | Carbon film 2.2k   | RD¼PM 222J |
| R127   | Carbon film 68k    | RD¼PM 683J |
| R128   | Carbon film 47k    | RD¼PM 473J |
| R129   | Carbon film 1k     | RD¼PM 102J |
| R130   | Carbon film 5.6k   | RD¼PM 562J |
| R131   | Carbon film 1.2k   | RD¼PM 122J |
| R132   | Carbon film 22k    | RD¼PM 223J |
| R133   | Carbon film 27k    | RD¼PM 273J |
| R134   | Carbon film 12k    | RD¼PM 123J |
| R135   | Carbon film 330    | RD¼PM 331J |
| R136   | Carbon film 330    | RD¼PM 331J |
| R137   | Carbon film 330    | RD¼PM 331J |
| R138   |                    |            |
| R139   | Metal oxide 560 1W | RS1P 561J  |
| R140   | Carbon film 3.3k   | RD¼PM 332J |
| R141   | Carbon film 1k     | RD¼PM 102J |
| R142   | Carbon film 1k     | RD¼PM 102J |
| R143   | Carbon film 3.3k   | RD¼PM 332J |
| R144   | Carbon film 10k    | RD¼PM 103J |
| R145   | Carbon film 10k    | RD¼PM 103J |
| R146   | Carbon film 1k     | RD¼PM 102J |
| R147   | Carbon film 10k    | RD¼PM 103J |
| R148   | Carbon film 47     | RD¼PM 470J |
| R149   | Carbon film 47     | RD¼PM 470J |
| R150   | Carbon film 10k    | RD¼PM 103J |



| Symbol | Description      | Part No.   |
|--------|------------------|------------|
| R151   | Carbon film 2.7k | RD¼PM 272J |
| R152   | Carbon film 10k  | RD¼PM 103J |
| R153   | Carbon film 10k  | RD¼PM 103J |
| R154   | Carbon film 1k   | RD¼PM 102J |
| R155   | Carbon film 12k  | RD¼PM 123J |
| R156   | Carbon film 10k  | RD¼PM 103J |
| R157   | Carbon film 8.2k | RD¼PM 822J |
| R158   | Carbon film 10k  | RD¼PM 103J |
| R159   | Carbon film 12k  | RD¼PM 123J |
| R160   | Carbon film 68k  | RD¼PM 683J |
| R161   | Carbon film 68k  | RD¼PM 683J |
| R162   | Carbon film 22k  | RD¼PM 223J |
| R163   | Carbon film 1.5k | RD¼PM 152J |
| R164   | Carbon film 47k  | RD¼PM 473J |
| R165   | Carbon film 10k  | RD¼PM 103J |
| R166   | Carbon film 1k   | RD¼PM 102J |
| R167   | Carbon film 3.3k | RD¼PM 332J |

#### POTENTIOMETERS

| Symbol | Description       | Part No.  |
|--------|-------------------|-----------|
| VR1    | Semi-fixed 4.7k-B | C92-051-0 |
| VR2    | Semi-fixed 4.7k-B | C92-051-0 |
| VR3    | Semi-fixed 2.2k-B | ACP-001-0 |
| VR4    | Semi-fixed 10k-B  | C92-049-0 |
| VR5    | Semi-fixed 10k-B  | C92-049-0 |
| VR6    | Semi-fixed 10k-B  | C92-049-0 |
| VR7    | Semi-fixed 10k-B  | C92-049-0 |
| VR8    | Semi-fixed 2.2k-B | ACP-001-0 |
| VR9    | Semi-fixed 4.7k-B | C92-051-0 |
| VR10   | Semi-fixed 4.7k-B | C92-051-0 |

#### SEMICONDUCTORS

| Symbol | Description  | Part No. |
|--------|--|----------|
| Q1     | 2SC1327-T, S or U<br>(2SC1312-F, G or H)<br>(2SC1344-D, E or F) Transistor |          |
| Q2     | 2SC1327-T, S or U<br>(2SC1312-F, G or H)<br>(2SC1344-D, E or F) Transistor |          |
| Q3     | 2SK30A-Y or GR<br>(2SK30AD) FET  |          |
| Q4     | 2SC1327-T, S or U<br>(2SC1312-F, G or H)<br>(2SC1344-D, E or F) Transistor |          |
| Q5.    | 2SK40-D or C<br>(2SK30A-Y or GR) FET                                       |          |

| Symbol | Description   | Part No.   |  |
|--------|---|------------|--|
| Q6     | 2SA763P-5 or 6<br>(2SA725-F or G)                               | Transistor |  |
| Q7     | 2SC1327-S or T<br>(2SC1312-F or G)<br>(2SC1344-D or E)          | Transistor |  |
| Q8     | 2SC1327-S or T<br>(2SC1312-F or G)<br>(2SC1344-D or E)          | Transistor |  |
| Q9     | 2SC1327-S or T<br>(2SC1312-F or G)<br>(2SC1344-D or E)          | Transistor |  |
| Q10    | 2SC1327-S or T<br>(2SC1312-F or G)<br>(2SC1344-D or E)          | Transistor |  |
| Q11    | 2SC1327-S or T<br>(2SC1312-F or G)<br>(2SC1344-D or E)          | Transistor |  |
| Q12    | 2SK30A-Y or GR<br>(2SK30AD)                                     | FET        |  |
| Q13    | 2SK30A-GR   | FET        |  |
| Q14    | 2SK30A-Y or GR<br>(2SK30AD)                                     | FET        |  |
| Q15    | 2SK30A-Y or GR<br>(2SK30AD)                                     | FET        |  |
| Q16    | 2SC1327-S or T<br>(2SC1312-F or G)<br>(2SC1344-D or E)          | Transistor |  |
| Q17    | 2SC1327-S or T<br>(2SC1312-F or G)<br>(2SC1344-D or E)          | Transistor |  |
| Q18    | 2SC1327-S or T<br>(2SC1312-F or G)<br>(2SC1344-D or E)          | Transistor |  |
| Q19    | 2SC1327-T<br>(2SC1312-F or G)<br>(2SC1344-D or E)               | Transistor |  |
| Q20    | 2SC1327-T<br>(2SC1312-F or G)<br>(2SC1344-D or E)               | Transistor |  |
| Q21    | 2SA763P-5 or 6<br>(2SA725-F or G)                               | Transistor |  |
| Q22    | 2SK40-D or C<br>(2SK30A-Y or GR)                                | FET        |  |
| Q23    | 2SC1327-T, S or U<br>(2SC1312-F, G or H)<br>(2SC1344-D, E or F) | Transistor |  |
| Q24    | 2SK30A-GR   | FET        |  |
| Q25    | 2SC1327-T, S or U<br>(2SC1312-F, G or H)<br>(2SC1344-D, E or F) | Transistor |  |

| Symbol | Description   | Part No.    |  |
|--------|---|-------------|--|
| Q26    | 2SC1327-T, S or U<br>(2SC1312-F, G or H)<br>(2SC1344-D, E or F) | Transistor  |  |
| Q27    | 2SA763P-5 or 6<br>(2SA725-F or G)                               | Transistor  |  |
| Q28    | 2SA763P-5 or 6<br>(2SA725-F or G)                               | Transistor  |  |
| Q29    | 2SC1327-T, S or U<br>(2SC1312-F, G or H)<br>(2SC1344-D, E or F) |             |  |
| Q30    | 2SC1327-U<br>(2SC1312-H)<br>(2SC1344-F)                         | Transistor  |  |
| Q31    | 2SC1327-T, S or U<br>(2SC1312-F, G or H)<br>(2SC1344-D, E or F) | Transistor  |  |
| Q41    | SL60505 (M51361P)   | IC          |  |
| Q42    | SL60505 (M51361P)   | IC          |  |
| Q43    | M5109P  | IC          |  |
| D1     | 1S188 FM-1  | Diode       |  |
| D2     | 1S188 FM-1  | Diode       |  |
| D3     | 1S188 FM-1  | Diode       |  |
| D4     | 1S188 FM-1  | Diode       |  |
| D5     | 1S188 FM-1  | Diode       |  |
| D6     | 1S188 FM-1  | Diode       |  |
| D7     | 1S188 FM-1  | Diode       |  |
| D8     | 1S188 FM-1  | Diode       |  |
| D9     | 1S2473  | Diode       |  |
| D10    | 1S2473  | Diode       |  |
| D11    | 1S188 FM-1  | Diode       |  |
| D12    | 1S188 FM-1  | Diode       |  |
| D21    | WZ-120  | Zener diode |  |
| D22    | WZ-120  | Zener diode |  |
| D23    | WZ-210  | Zener diode |  |

#### COILS AND FILTER

| Symbol | Description     | Part No.  |           |
|--------|-----------------|-----------|-----------|
| F1     | Low pass filter | ATF-016-0 | ATF-019-0 |
| L1     | Choke coil 104k | ATM-008-0 |           |
| L2     | Choke coil 104k | ATM-008-0 |           |

**PIONEER ELECTRONIC CORPORATION**

15-5, 4-Chome, Ohmori-nishi, Ohta-ku, Tokyo, Japan

**U.S. PIONEER ELECTRONICS CORPORATION**

178 Commerce Road, Carlstadt New Jersey 07072 U.S.A.

**PIONEER ELECTRONIC (EUROPE) N.V.**

Meir-center, Meir 21, 2000 Antwerp, Belgium