Series MBX – miniature board connectors

Description

HUBER+SUHNER MBX and MBX 2nd generation connectors are especially developed for board-to-board and board-tomodule RF interconnections. The mechanical design is outstanding, allowing the MBX to cope with mechanical misalignment in radial and axial directions and still hold an excellent electrical performance.

MBX fulfils higher requirements with best in class axial misalignment of \pm 1.2 mm. MBX is the answer to higher integration and miniaturisation. It is the perfect solution for multiple connections from board-to-board/board-to-module and complex stack-ups in radio module applications.

Content

| Description | 55 |
|-------------------------------|----|
| Design guideline | 56 |
| Technical data | 57 |
| PCB connectors | 59 |
| Adaptors within series | 61 |
| Cable connectors | 61 |
| Receptacles with solder end | 62 |
| Assembly and disassembly tool | 63 |
| | |

| Characteristics | MBX and MBX ^{2nd} |
|--|--|
| Frequency | DC to 6 GHz |
| Axial float (misalignment) | ± 1.2 mm |
| Radial float (misalignment) | ±0.6 mm (at 13 mm board-to-board distance) ± 1.0 mm (≥ 18 mm board-to-board distance) |
| Min. board-to-board distance | 13 mm |
| Min. panel-to-board distance | < 13 mm depending on connector |
| Min. panel-to-panel distance | < 13 mm depending on connector |
| Power at room temperature, at 2.4 GHz | typical 260 W (MBX) typical 240 W (MBX ^{2nd}) |



Series MBX - design guideline

Working range (axial and radial)

In mated condition, the two PCB connector have to be aligned within the dimension given for the axial and radial working range.

The axial working range is \pm 1.2 mm, the radial working range is \pm 1.0 mm.

In contradiction to the MMBX interface, the tilt of the adaptor is limited with MBX. The great advantage of this feature is that there is a constant connecting range/radial working range for all adaptor lengths and thus the same funnel (pull-in range) can be used.

Connecting range

The two PCB connector have to be aligned within the dimension given for connecting range. The connecting range is \pm 1.0 mm and is equivalent to the max. allowed misalignment between two PCB boards when mating.

In order to guarantee a blind mateable connection, the tilted adaptor will be guided by the funnel of the opposite connector.

Recommendation

HUBER+SUHNER recommends using guiding pins to align the boards within the connecting range and working range. Distance holders to maintain the axial misalignment within working range are also of benefit.

HUBER+SUHNER provides outline drawings for every application with the relevant mechanical dimensions that need to be considered when designing-in MBX. 3D STEP files are available on www.hubersuhner.com.

MBX 2nd generation

An alternative, cost effective and reliable solution are the 2nd generation MBX connectors. By keeping best in class mechanical characteristics like working and connecting range these connectors are designed to meet today's requirements within the communication industry. Standard MBX and 2nd generation MBX are intermateable.

Connecting range



Working range



Series MBX – technical data

MBX PCB connectors – board-to-board/adaptors within series

| Electrical data | MBX | | MBX 2 nd | |
|---|--|--|--|--|
| Impedance | 50 Ω | | | |
| Frequency range | DC to 6 GHz | | | |
| Dielectric withstanding voltage (at sea level) | 1 kV rms, 50 Hz | | | |
| Working voltage (at sea level) | ≤ 330 V rms, 50 Hz | | | |
| Insulation resistance | ≥lGΩ | | | |
| Contact resistance • Centre contact • Outer contact | ≤ 5 mΩ ≤ 2.5 mΩ | | ≤5 mΩ ≤5 mΩ | |
| Return loss/VSWR | typical values for a board-to-board connection (measured on a board) | | | |
| | axial misalignment | DC to 2.5 GHz | 2.5 to 4 GHz | 4 to 6 GHz |
| | ± 1.2 mm ± 0.8 mm ± 0.4 mm | 22 dB/1.17 23 dB/1.15 26 dB/1.11 | 19 dB/1.25 20 dB/1.22 21 dB/1.20 | 15 dB/1.43 16 dB/1.38 18 dB/1.29 |
| RF-leakage (interface only) | ≥ 70 dB (DC to 6 GHz) | | | |
| Power (room temperature) | typical 260 W at 2.4 (| GHz | typical 240 W at 2.4 | GHz |

| Mechanical data | MBX | MBX 2 nd |
|----------------------------------|--|---------------------|
| Engagement force (slide-side) | ≤ 15 N/3.4 lbs | |
| Disengagement force (slide-side) | ≤ 15 N/3.4 lbs | |
| Durability (matings) | 100 | 50 |
| Axial float (misalignment) | ± 1.2 mm | |
| Radial float (misalignment) | depending on the adaptor ±0.6 mm (at 13 mm board-to-board distance) ±1.0 mm (≥18 mm board-to-board distance) | |

| Environmental data | MBX | MBX 2 nd |
|--|--|---------------------|
| Temperature range | -55 to +155 °C/-67 to +311 °F | |
| Climatic category | 55/155/10 | |
| Thermal shock | MIL-STD-202, method 107 G, condition B1 | |
| Moisture resistance | MIL-STD-202, method 106 F | |
| Vibration | MIL-STD-202, method 204 D, condition A | |
| Mechanical shock | MIL-STD-202, method 213 B, condition B | |
| Corrosion | MIL-STD-202, method 101, condition B | - |
| Vibration Mechanical shock Corrosion | MIL-STD-202, method 204 D, condition A MIL-STD-202, method 213 B, condition B MIL-STD-202, method 101, condition B | - |

| Processing data | MBX | MBX 2 nd |
|--|--------------------------------------|---------------------|
| Adherent to the print • Shearing • Pulling (vertical to PCB) | ≥ 150 N/33.7 lbs ≥ 150 N/33.7 lbs | |

| Material data | | |
|-----------------|-------------------------------------|--|
| Connector parts | Material | Plating |
| Centre contact | brass/bronze/copper-beryllium alloy | SUCOPRO® gold plating |
| Outer contact | brass/bronze | SUCOPRO [®] gold plating/SUCOPLATE [®] |
| Body | brass | SUCOPRO [®] gold plating/SUCOPLATE [®] |
| Insulators | LCP/PTFE/PFA | |
| Funnel | brass/PA | SUCOPLATE®/- |

Series MBX – technical data

MBX cable connectors

| Electrical data | Requirements |
|---|--|
| Impedance | 50 Ω |
| Frequency range | DC to 6 GHz |
| Dielectric withstanding voltage (at sea level) | 750 V rms, 50 Hz |
| Working voltage (at sea level) | 250 V rms, 50 Hz |
| Insulation resistance | ≥lGΩ |
| Contact resistance • Centre contact • Outer contact | ≤ 5 mΩ ≤ 2.5 mΩ |
| Return loss/VSWR (typical values) | ≥ 30 dB/1.07 (DC to 2.5 GHz) ≥ 25 dB/1.12 (2.5 - 6 GHz) |

| Mechanical data | Requirements |
|----------------------|--------------------------|
| Engagement force | max. 30 N/max. 6.7 lbs |
| Disengagement force | 8 to 30 N/1.8 to 6.7 lbs |
| Durability (matings) | 100 |

| Environmental data | Test conditions |
|---------------------|---|
| Temperature range | -55 to +155°C/-67 to +311°F |
| Climatic category | 55/155/10 |
| Thermal shock | MIL-STD-202, method 107 G, condition A1 |
| Moisture resistance | MIL-STD-202, method 106 F |
| Corrosion | MIL-STD-202, method 101, condition B |
| Vibration | MIL-STD-202, method 204 D, condition A |
| Mechanical shock | MIL-STD-202, method 213 B, condition B |

| Material data | | |
|-----------------|-------------------------------------|--|
| Connector parts | Material | Plating |
| Centre contact | brass/bronze/copper-beryllium alloy | SUCOPRO [®] gold plating |
| Outer contact | bronze/copper-beryllium alloy | SUCOPRO [®] gold plating |
| Body | brass | SUCOPRO [®] gold plating/SUCOPLATE [®] |
| Crimp ferrules | copper | gold /SUCOPLATE® |
| Insulators | LCP/PTFE/PFA | |

Series MBX - PCB connectors

Straight PCB jacks (female)

Surface mount type SMT • MBX









Fig. 1

| HUBER+SUHNER type | ltem no. | Packaging | Soldering pad | Fig. |
|---|----------------------------------|--|---------------|------|
| 82_MBX-S50-0-1/111_NE 82_MBX-S50-0-1/111_NH 82_MBX-S50-0-1/111_NM | 84104680 84094199 84094200 | single bulk 100 pcs. tape and reel | ML 173 | 1 |
| 82_MBX-S50-0-2/113_NE 82_MBX-S50-0-2/113_NH 82_MBX-S50-0-2/113_NM | 84104681 84094287 84094288 | single bulk 100 pcs. tape and reel | | 2 |

Fig. 2

Surface mount type SMT

• MBX 2nd generation





Fig. 2







Fig. 1

| HUBER+SUHNER type | Item no. | Packaging | Soldering pad | Fig. |
|--|----------------------------------|--|---------------|------|
| 82_MBX-S50-0-23/111_NE 82_MBX-S50-0-23/111_NH 82_MBX-S50-0-23/111_NM | 85018772 85018773 85015265 | single bulk 100 pcs. tape and reel | ML 173 | 1 |
| 82_MBX-S50-0-24/111_NE 82_MBX-S50-0-24/111_NH 82_MBX-S50-0-24/111_NM | 85018775 85018776 85018774 | single bulk 100 pcs. tape and reel | | 2 |

Series MBX - PCB connectors

Straight PCB jacks (female)

Through hole type THT • MBX



Fig. 1

| 82_MBX-50-0-3/111_NE 82_MBX-50-0-3/111_NH 82_MBX-50-0-3/111_NM | 84104683 84094366 84094369 | single bulk 100 pcs. tape and reel | ML 174 |] |
|--|----------------------------------|--|--------|---|
| | 84104684 84094405 84094406 | single bulk 100 pcs. tape and reel | | 2 |

Fig. 2

Through hole type THT

• MBX 2nd generation



Fig. 1

| | | | |
|----------------------------------|--|--------|---|
| | | | |
| 85018976 85018972 85018970 | single bulk 100 pcs. tape and reel | ML 174 | 1 |
| 85019255 85019254 85019252 | single bulk 100 pcs. tape and reel | | 2 |

Cable groups see page 32

Series MBX – adaptors within series

Straight adaptors

Plug to plug (male) • MBX





Black insulator: slide-side White insulator: snap-side

| HUBER+SUHNER type | ltem no. | Packaging | Board-to-board distance | Adaptor length X |
|--|----------------------|-------------------------|-------------------------|-------------------|
| 32_MBX-50-0-1/111_NE 32_MBX-50-0-1/111_NH | 84104690 84142599 | single bulk 100 pcs. | 13 mm/0.512 in. | 9.7 mm/0.382 in. |
| 32_MBX-50-0-2/111_NE 32_MBX-50-0-2/111_NH | 84104691 84094285 | single bulk 100 pcs. | 18 mm/0.709 in. | 14.7 mm/0.579 in. |
| 32_MBX-50-0-3/111_NE 32_MBX-50-0-3/111_NH | 84104692 84094387 | single bulk 100 pcs. | 28 mm/1.012 in. | 24.7 mm/0.972 in. |

Adaptors with other lengths available upon request.

Plug to plug (male) • MBX 2nd generation





Black insulator: slide-side White insulator: snap-side

| HUBER+SUHNER type | ltem no. | Packaging | Board-to-board distance | Adaptor length X |
|--|----------------------|-------------------------|-------------------------|-------------------|
| 32_MBX-50-0-1/133_NE 32_MBX-50-0-1/133_NH | 85001197 85001201 | single bulk 100 pcs. | 13 mm/0.512 in. | 9.7 mm/0.382 in |
| 32_MBX-50-0-2/133_NE 32_MBX-50-0-2/133_NH | 85001211 85001227 | single bulk 100 pcs. | 18 mm/0.709 in. | 14.7 mm/0.579 in. |

Adaptors with other lengths available upon request.

Series MBX – cable connectors

Straight cable plugs (male)





| HUBER+SUHNER type | ltem no. | Cable group (example) | Packaging | Assembly instruction |
|--|----------------------|-----------------------|-------------------------|----------------------|
| 11_MBX-50-2-1 / 113_NE 11_MBX-50-2-1 / 113_NH | 84104694 84093696 | U4 (EF_316_D) | single bulk 100 pcs. | 0000333519 |

MBX

Series MBX - cable connectors

Right angle cable plugs (male)





| 84104696 84093680 | U4 (EF_316_D) | single bulk 100 pcs. | 0000326568 |
|----------------------|---------------|-------------------------|------------|

Series MBX – receptacles with solder end

Receptacles, jack (female)

• MBX



Fig. 1

| 84097667 | industrial 100 pcs. | pressed-in | 1 |
|----------|---------------------|------------|---|
| 84095796 | | screwed-in | 2 |

Series MBX – receptacles with solder end

Receptacles, jack (female)

• MBX 2nd generation



Series MBX – assembly and disassembly tool

| | To assemble use this side | To disassemble use this side |
|-----------|------------------------------|---------------------------------|
| | | |
| | | |
| 0 4101007 | | |