Mini Coax modules (press-fit)

Mini Coax tooling see chapter 15

The Mini Coax connector system is a multi line RF interconnection for board-to-backplane applications. The Mini Coax allows transmission of radio frequency signals up to 2.5 GHz per line. Moreover this connector system is compact, ruggedised and provides total mating reliability due to its closed entry. The compact size (a 10 coaxial line connector is as small as a PC's enter key) and excellent crosstalk features propel this connector system for high end equipment within cellular telecom infrastructure.

The modules are available in metric sizes 1.00, 1.25 and 1.50 SU (SU = System Unit = 25 mm) for both cable harnesses and pcb's with 2 to 10 coaxial lines. The angled daughtercard modules and the straight backplane modules are press-fitted with simple tooling. The straight modules are delivered with an inserted plastic cap that protects the coaxial contacts against dust and dirt as well as being used as an upper press-in tool. So an easy and safe flat rock process is guaranteed.

In addition to the coax modules an angled power connector with press-in termination is available. It is assembled in the same board drillings as the coaxial configuration and can be loaded up to 15 A working current at 70 °C.

Customer specific cable assemblies utilising different modules are manufactured on request. An extensive accessory and tooling range compliments the wide product range.

Both connector types (Mini Coax and *har-bus® HM*) are made for simultaneous use on the same board (see Fig. 2).

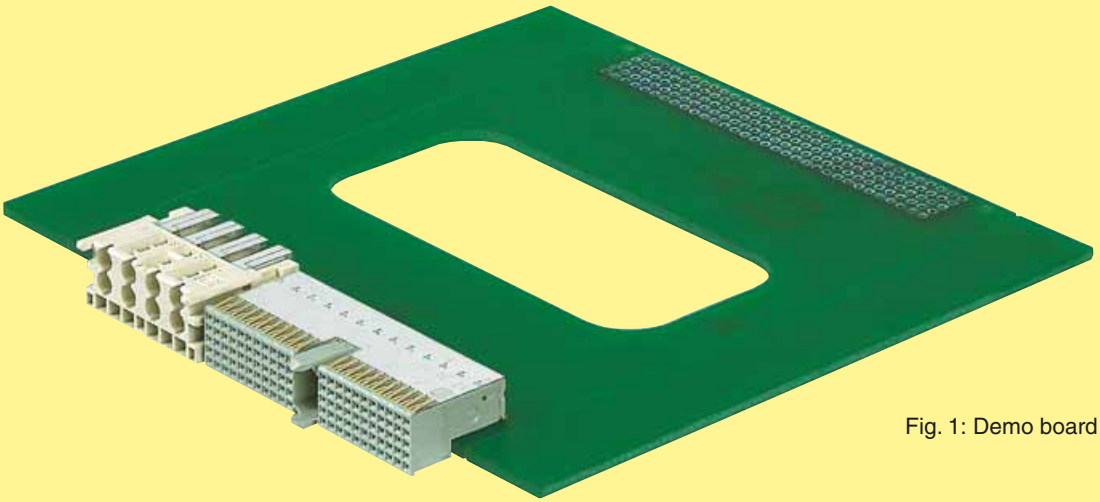


Fig. 1: Demo board

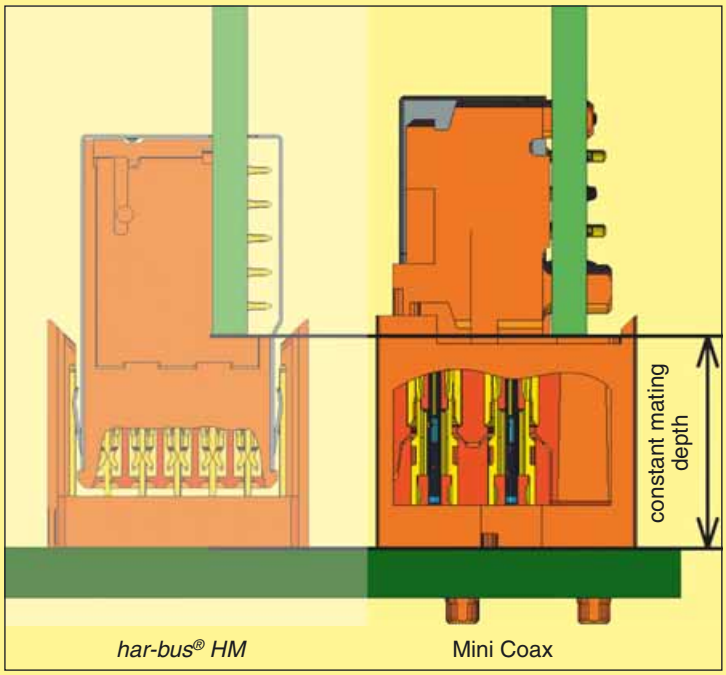


Fig. 2: Cross section of both connector types

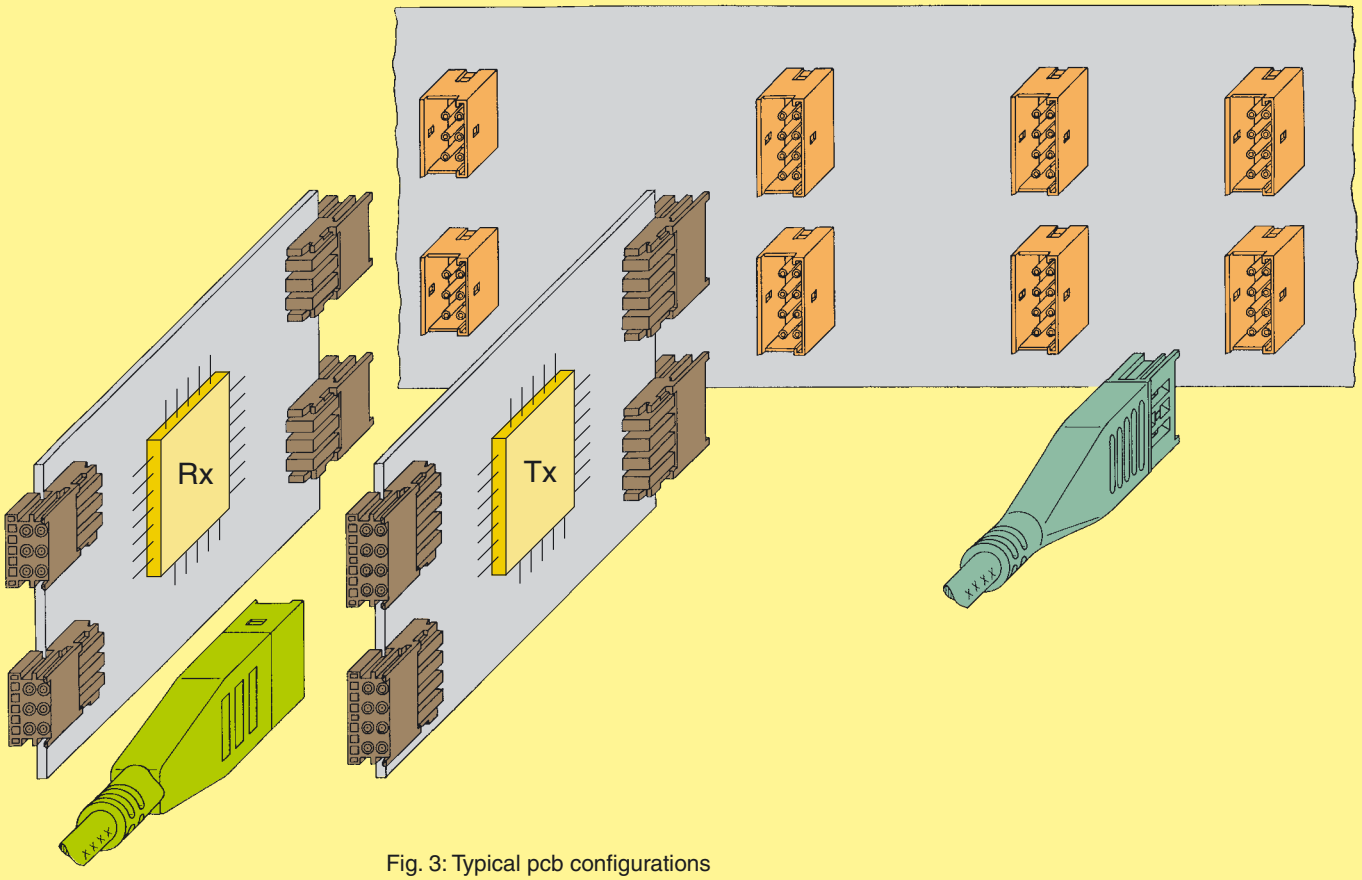


Fig. 3: Typical pcb configurations

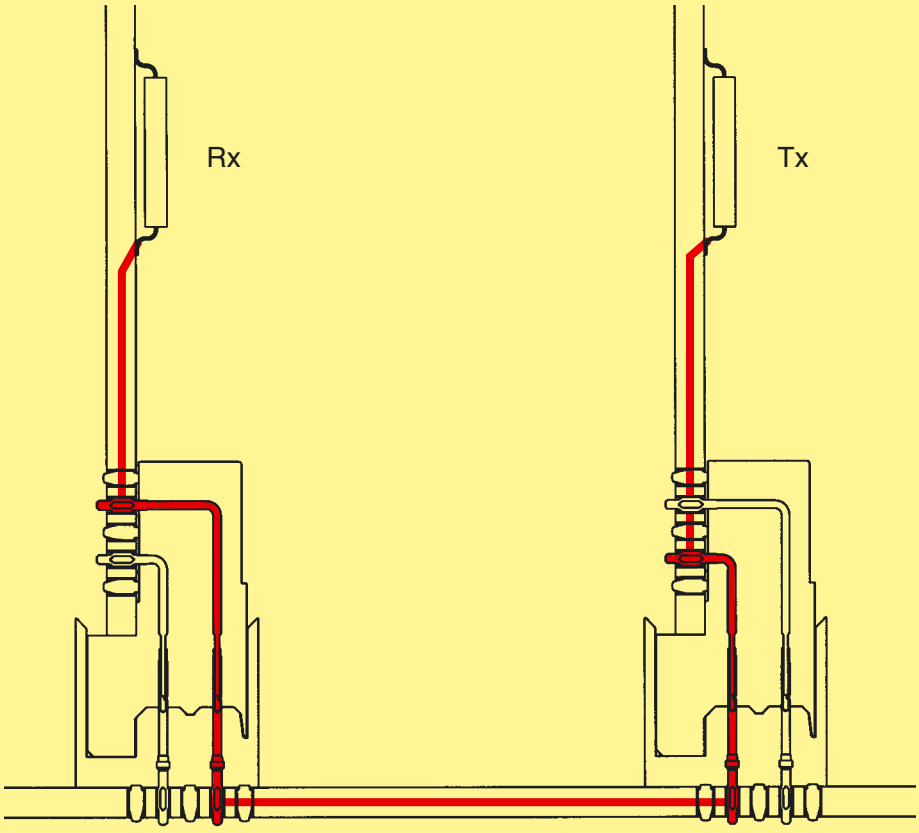


Fig. 4: Signal path of an analog RF signal from Rx to Tx

Rx: Receiver
Tx: Transceiver

Number of contacts	:	2, 4, 6, 8 or 10 coaxial contacts
Dielectric withstanding Voltage $U_{r.m.s.}$	:	≤ 1000 V (for 60s)
Power	:	≤ 40 W (at 2.5 GHz)
DC-contact resistance		
Centre contact	:	≤ 12 mΩ
Ground contact	:	≤ 6 mΩ
Insulation resistance	:	≥ 5000 MΩ
Nominal impedance	:	50 Ω
Frequency range	:	0 – 2.5 GHz
Return loss* (see Fig. 11)	:	≥ 22 dB[1] (0 … 2.5 GHz) equal to VSWR ≤ 1.17
Insertion loss (see Fig. 10)	:	≤ 0.25 dB[1] (0 … 2.5 GHz) ≤ 0.8 dB[2] (0 … 2.5 GHz)
Crosstalk attenuation (see Fig. 12)	:	35 dB / 50 dB / 70 dB[2] (0 … 2.5 GHz) depending on distances between adjacent contacts
Mating cycles	:	max. 500

Recommended configuration of plated through holes :

Tin-lead plated PCB (HAL) acc. DIN EN 60 352-5	Hole	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Sn	max. 15 µm
	Plated hole	0.94-1.09 mm
Chemical tin-plated PCB	Hole	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Sn	min. 0.8 µm
	Plated hole	1.00-1.10 mm
Au / Ni plated PCB	Hole	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Ni	3-7 µm
	Au	0.05-0.12 µm
	Plated hole	1.00-1.10 mm
Silver plated PCB	Hole	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Ag	0.1-0.3 µm
	Plated hole	1.00-1.10 mm
OSP copper plated PCB	Hole	$1.15^{\pm 0.025}$ mm
	Cu	min. 25 µm
	Plated hole	1.00-1.10 mm

PCB board thickness: ≥ 1,6 mm

Mating force	:	≤ 5 N/line
Withdrawal force	:	> 1 N/line
Grid pattern	:	4.40 x 6.25 mm (within a twin x between twins)
Stack height	:	9.5 mm
Mating distance	:	12.5 … 15 mm
Wiping length	:	2.5 mm
Acceptable radial mating offset	:	max. ± 1.5 mm
Temperature range	:	– 55 °C ... + 125 °C
Moulding material	:	Liquid Cristal Polymer (LCP), UL 94-V0
Contact surface		
Contact zone	:	Au
Termination area		
Centre pin	:	Au
Ground pin	:	Ni

* Reference: short contact

[1] Data of a separate Mini Coax mated connector pair including the press-in terminations to pcb

[2] Data of Mini Coax connector pair including the whole test board environment (see Fig. 6)

Mini Coax connector integrated in test boards

Transmission characteristics of a connector can only be measured within its typical environment. The environment for a board-to-board connector is generally a pcb (printed circuit board). The approach to determine the transmission characteristics of the connector itself is to measure the complete arrangement with special calibration techniques and to remove the parameters of the connector. The performance of the test board is responsible for the accuracy of the parameters on the connector itself.

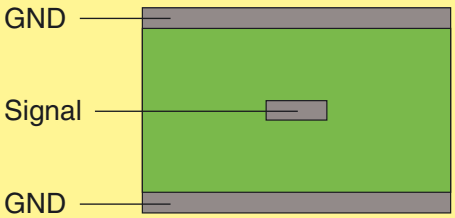


Fig. 5: Cross-section of a trace of the test board

The signal integrity of a test board is mainly influenced by the characteristic impedance, losses of pcb traces and the design of micro vias. It's obvious that the pin in hole of the connector and the vias have to be considered as one. This means that the thickness, material and the amount of layers of the pcb have to be taken into consideration for the characterisation of a board-to-board connector.

Fig. 6 shows the test boards with the integrated Mini Coax connector. The test boards are executed in stripline technology with a characteristic impedance of 50 Ω. To connect the test boards with the cables of the measurement instrument, SMA connectors are used.

For high speed digital applications the main parameters are defined in the time-domain, like reflection loss, rise-time degradation, eye-opening etc. For RF-applications like in radio base stations or broadcasting services the frequency-domain is the preferred point-of view in order to characterise the systems and the components in regards to return loss, insertion loss, crosstalk, linearity etc.

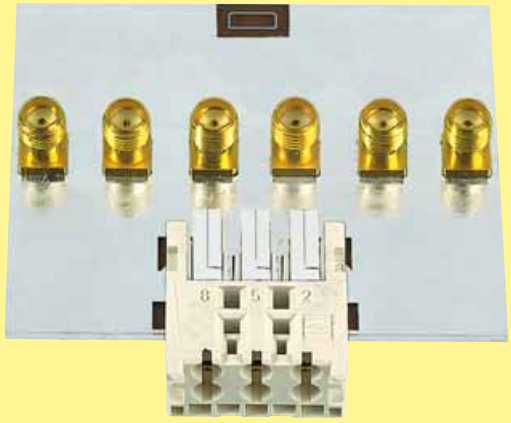


Fig. 6: Test boards with implemented Mini Coax connector

Figure 7 shows the signal path given by the Mini Coax connector and the components on the evaluation board. Significant areas in the signal path are indicated with the characters A...G and T for traces on the board.

The signal path was measured with a Time Domain Reflectometer (TDR) to determine the discontinuities of the arrangement (Fig. 8).

Figure 9 shows the equivalent circuit of the signal path with grouped elements for the Mini Coax connector. The parameters had been extracted from the measured TDR profile.

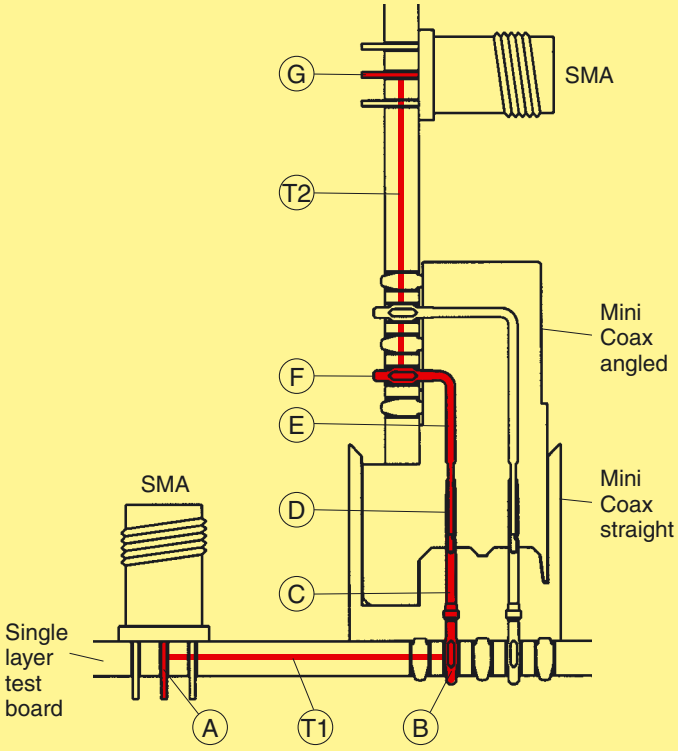


Fig. 7: Signal path of a board to board Mini Coax connector
(SMA connectors used for measurement device connection)

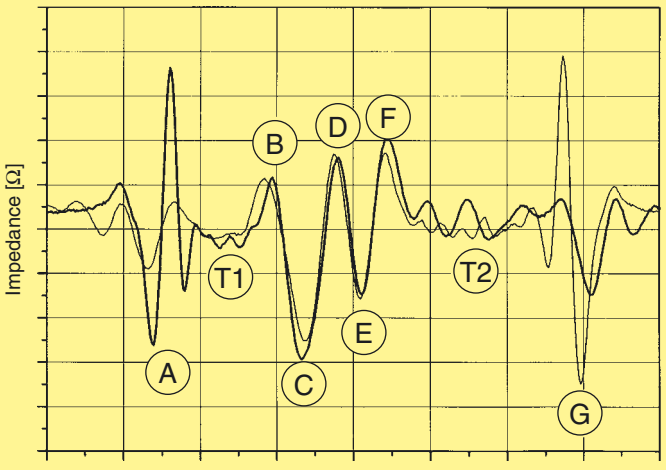


Fig. 8: TDR profile

Legend for Fig. 7 and Fig. 8

(A) : SMA connector

(T1) : 50 Ω trace of the backplane

(B) : Pin in hole
of the straight Mini Coax module

(C) : Section of straight contact behaves capacitive

(D) : Transition of the straight module to the angled module behaves inductive

(E) : Section of angled contact behaves capacitive

(F) : Pin in hole
of the angled Mini Coax module

(T2) : 50 Ω trace of the daughtercard

(G) : SMA connector

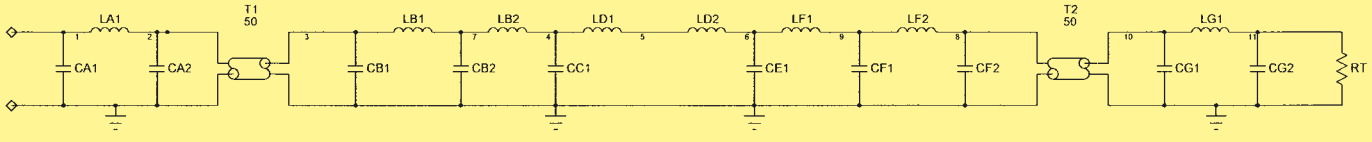


Fig. 9: Equivalent circuit with grouped elements

Insertion and return loss

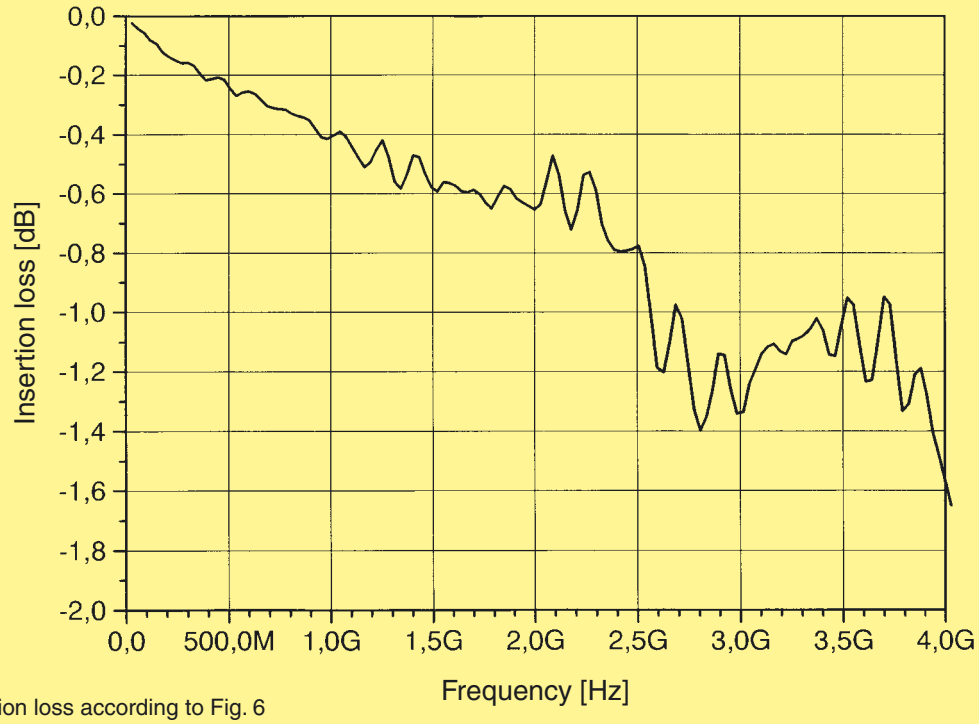


Fig. 10: Insertion loss according to Fig. 6

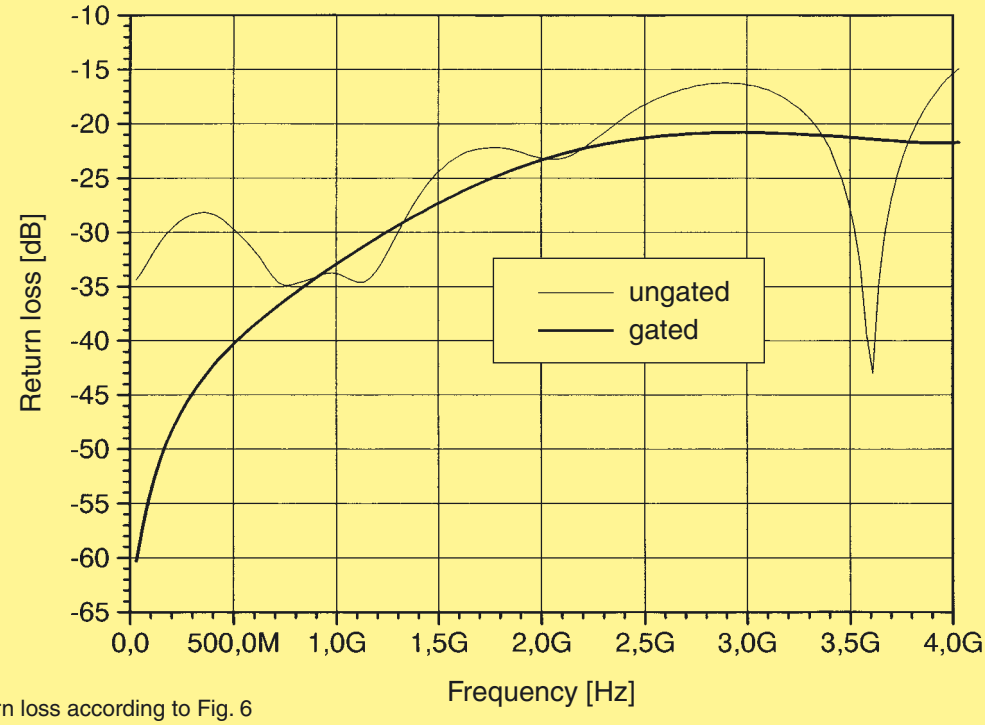


Fig. 11: Return loss according to Fig. 6

To extract the parameters of the connector itself the method of gating was selected. This eliminates the effects of SMA launchers. The test launchers reduce the performance of transmission characteristics due to their discontinuities.

Near-end crosstalk of the Mini Coax modules

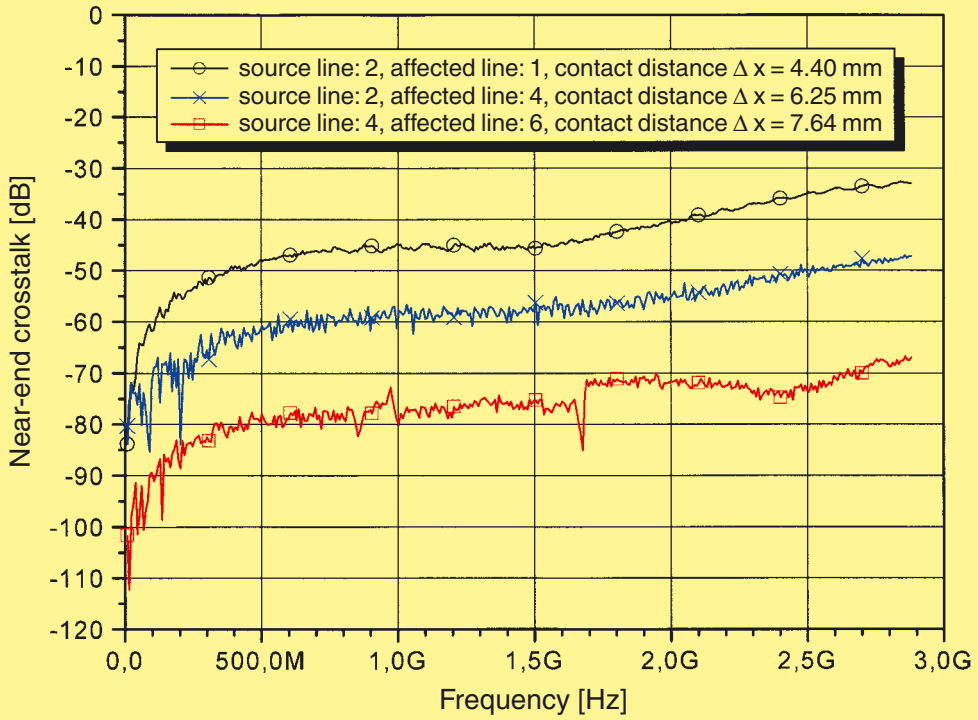


Fig. 12: Near-end crosstalk of several contact configurations

Even for the shortest distance of 4.40 mm crosstalk-values better than 30 dB can be achieved for frequencies of 2.5 GHz and above.

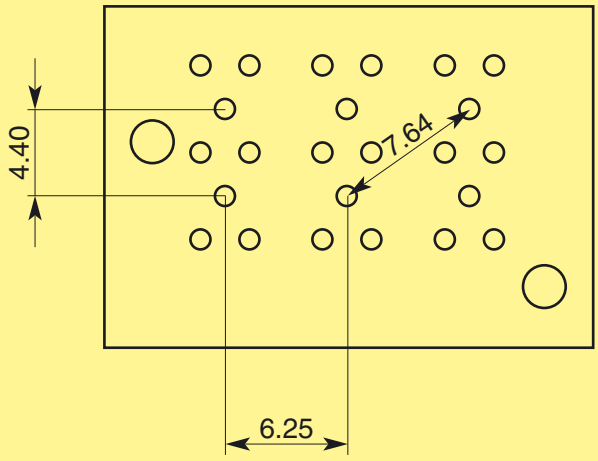
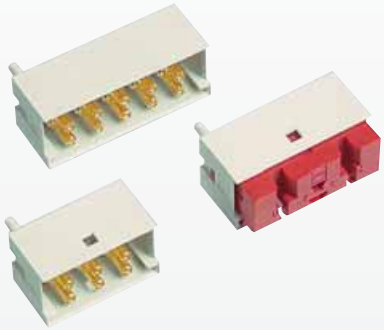


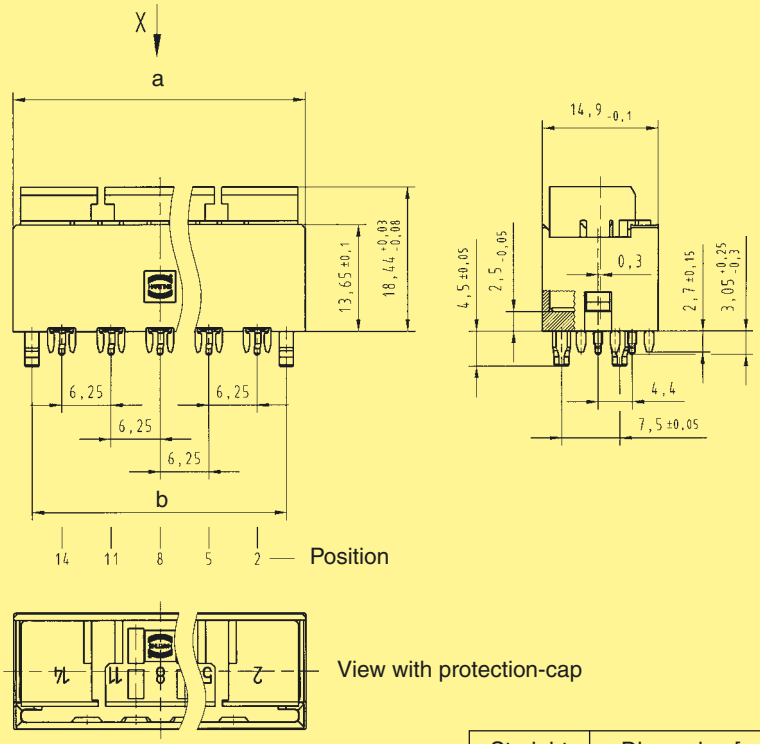
Fig. 13: Measured configurations [mm]



Straight modules

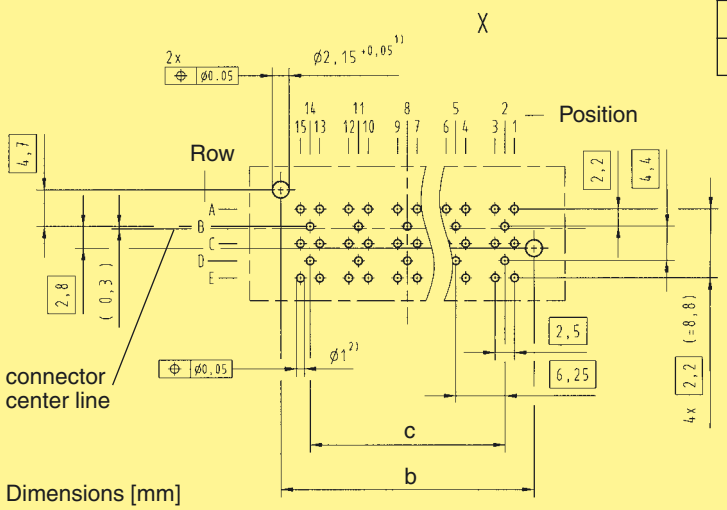
Identification	Number of contacts	SU	loaded positions	Part number
Mini Coax modules, press-in termination	10	1.50	2, 5, 8, 11, 14	07 11 100 0026
	8	1.25	2, 5, 8, 11	07 11 100 0024
	6	1	2, 5, 8	07 11 100 0023
	4	1	2, 8	07 11 900 0024
	2	1	2	07 11 900 0023

Dimensions



Straight module	Dimension [mm] a	b	c
1.50 SU	37.3	32.5	25
1.25 SU	31.05	26.25	18.75
1.00 SU	24.8	20	12.5

Board drillings



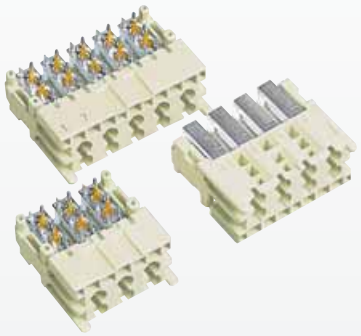
Row B, D: position 2, 5, 8, 11, 14 for signal line

Row A, C, E: position 1, 3, 4, 6, 7, 9, 10, 12, 13, 15 for ground-line

1) Non-metallised drillings

2) Details see page 10.04

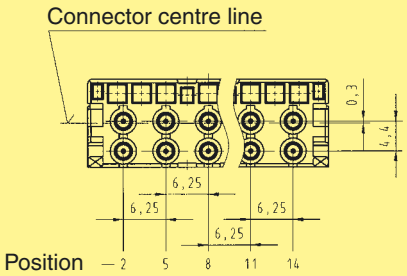
Mini Coax

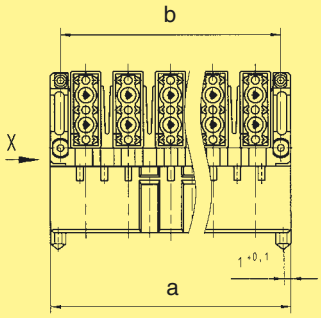


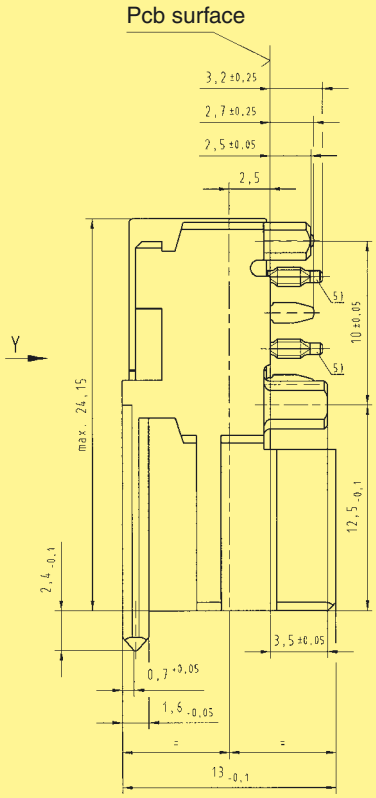
Angled modules

Identification	Number of contacts	SU	loaded positions	Part number
Mini Coax modules, press-in termination	10	1.50	2, 5, 8, 11, 14	07 31 100 0021
	8	1.25	2, 5, 8, 11	07 31 100 0020
	6	1	2, 5, 8	07 31 100 0019
	4	1	2, 8	07 31 900 0022
	2	1	2	07 31 900 0021

Dimensions

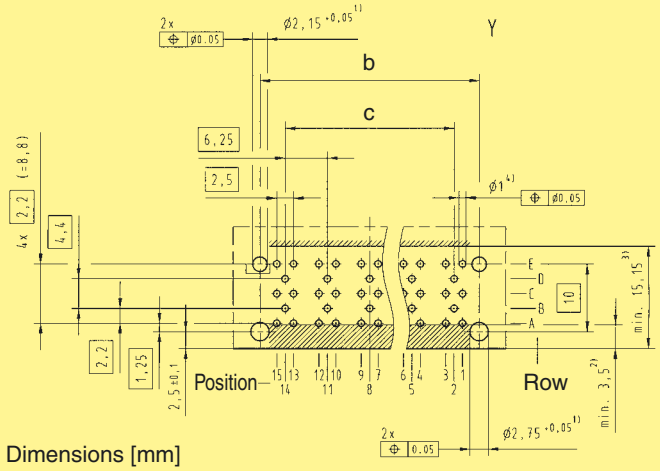






(View magnified)

Board drillings



Dimensions [mm]

Angled module	Dimension [mm] a	b	c
1.50 SU	35.45	32.5	25
1.25 SU	29.15	26.25	18.75
1.00 SU	22.9	20	12.5

Row B, D: position 2, 5, 8, 11, 14 for signal line

Row A, C, E: position 1, 3, 4, 6, 7, 9, 10, 12, 13, 15 for ground-line

1) Non-metallised drillings

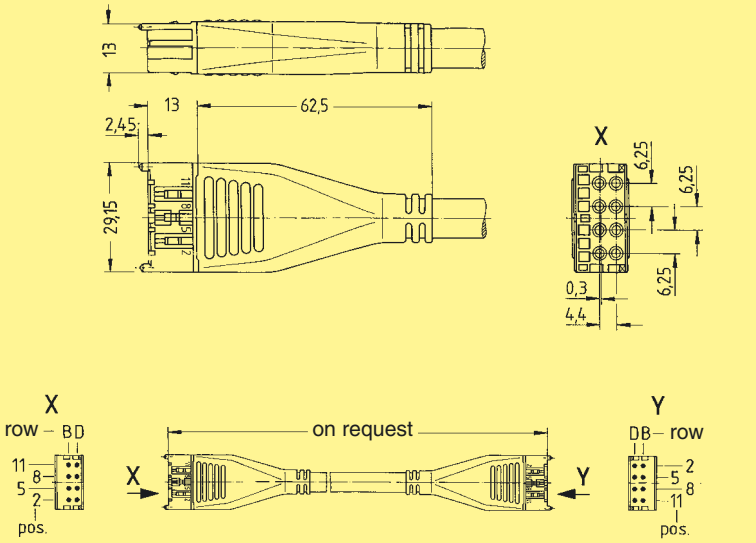
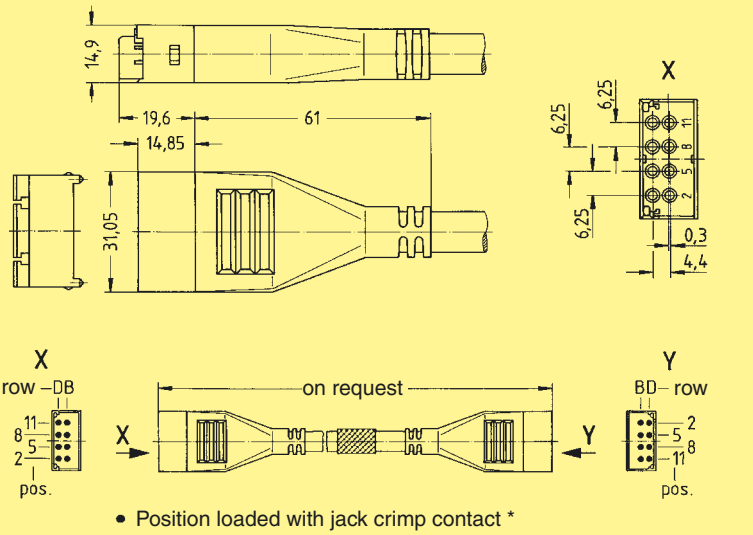
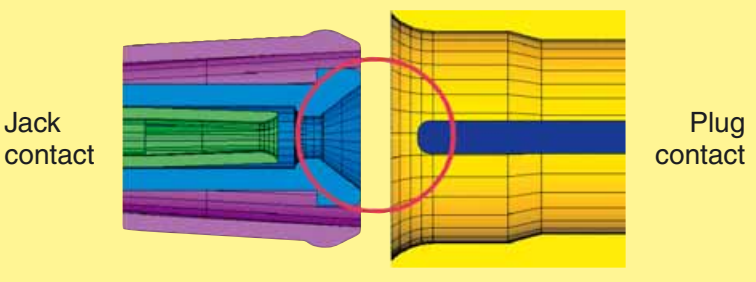
2) No tracks, except solder eyes

3) Limit area of components (valid for both pcb-sides)

4) Details see page 10.04

5) Press-in zone in any angular position related to it's longitudinal axis possible

Cable assemblies

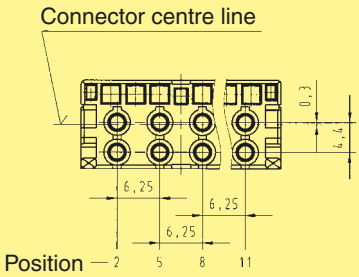
Identification	Number of contacts	Part No.	Drawing	Dimensions [mm]
Cable assembly for mating with the straight module*	1–10	on request	 • Position loaded with plug crimp contact *	
Cable assembly for mating with the angled module*	1–10	on request	 • Position loaded with jack crimp contact *	
* Plug and jack crimp contacts				

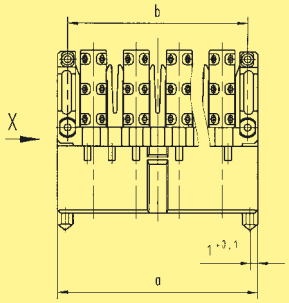
Mini Coax

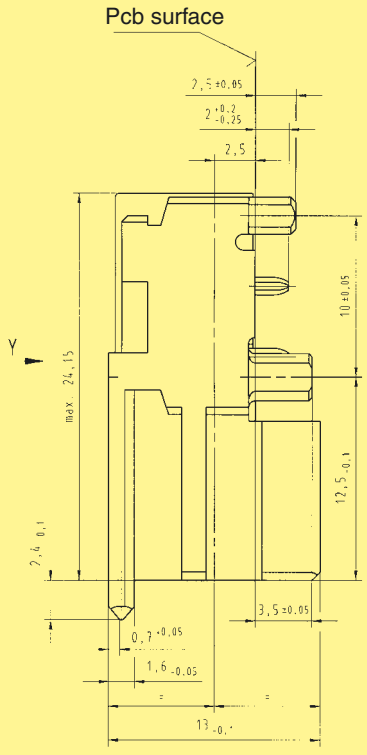
Power modules up to 15 A

Identification	Number of contacts	SU	loaded positions	Part number
Mini Coax power modules, press-in termination	4 3	1.25 1	2, 5, 8, 11 2, 5, 8	07 31 100 0026 07 31 100 0025
Cable assemblies for mating with the power module	4 3	1.25 1	2, 5, 8, 11 2, 5, 8	on request on request

Dimensions

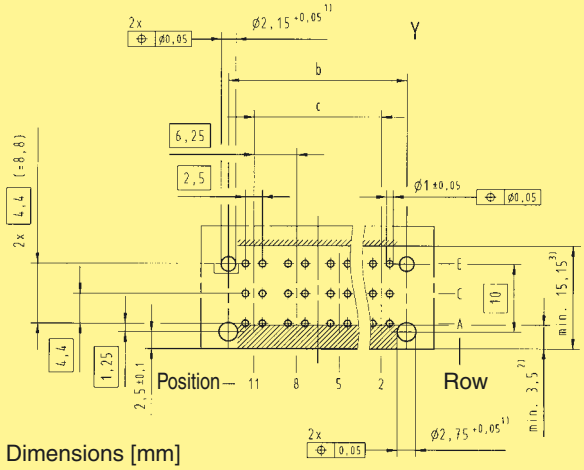






(View magnified)

Board drillings



Dimensions [mm]

Angled module	Dimension [mm] a	b	c
1.25 SU	29.15	26.25	18.75
1.00 SU	22.9	20	12.5

1) Non-metallised drillings

2) No tracks, except solder eyes

3) Limit area of components (valid for both pcb-sides)

X-ON Electronics

Largest Supplier of Electrical and Electronic Components

Click to view similar products for RF Connectors / Coaxial Connectors ***category:***

Click to view products by HARTING ***manufacturer:***

Other Similar products are found below :

R125315120 8915-1511-000 89674-0827 5916-1103-603 6-0001-3 6001-7071-019 6002-7051-003 6002-7551-202 6059674-1 619550-1 630059-000 M39012/25-0021 M39012/79-3008 M39030/3-01N M39030/3-03N M3933/25-36N 6500-7071-046 M83723/72W24576 M83723/72W2457N 6769 CX050L2AQ 7002-1541-010 7002-1572-002 7003-1572-002 7004-1512-000 7010-1511-000 7029-1511-060 7101-1541-010 7101-1571-002 7105-1521-002 7145-1521-002 7209-1511-011 7210-1511-015 7210-1511-019 7225-1512-050 7242-1511-000 73137-5015 73251-0111 73251-0672 7325-1512-000 73276-1501 73366-0013 73404-2300 73413-6080 73415-5721 7405-1521-005 7405-1521-802 7406-1521-005 804S01D04M040 8145-1521-002