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## Connector

## Description

The invention relates to a connector, in particular for cabling systems in telecommunications technology and data systems technology in buildings.

Companies which have commercial space are increasingly making use of large open floor areas which are divided into offices (rooms) and the like. The company occupying the commercial space typically determines the most efficient use of the space in accordance with its own needs, and selects how the space is divided into smaller work areas by means of portable wall panels and similar structures. So-called "systems furniture" is used to divide larger spaces into smaller work areas (rooms). This typically utilizes interior upright space-dividing panels which are connected to one another via two-panel straight or angled connections or suitable three- or four-panel connections in order in this way to define a large multiplicity of individual work areas. Such panels are typically of a height which is less than the height from the floor to the ceiling, and co-operate with other furniture components in such a way as to define a specific work area.

Each work area must be equipped with combined power and communication cabling. Various systems and components have been developed, including modular electrical systems which co-operate with the panels and can readily be mounted thereon, as a result of which the panels can be reconfigured and power can be made available for the work areas. Various systems have been proposed to avoid a large number of conventional four-pair communication cables, specifically individual cables fed through floor conduits or ceiling clearances to the individual work areas. However, the various known systems have not achieved any sort of great commercial significance or utilization. Examples of such known systems and devices are described in US Patent 5,272,277,

5,160,276 and 4,928,303.

In the systems furniture field, numerous power supply systems are known aside from the few systems relating to communication. A large number of these systems deal with special problems of power transmission and distribution in the case of systems furniture.

US Patent 4,781,609 describes a multicircuit electrical system which is used with wall panels. The system contains seven conductors with three live and three neutral conductors, the result being to define three separate electrical circuits each with a neutral conductor. A portable power tap unit (a receptacle unit) can be plugged into the power supply block and optionally make a connection with one of the three circuits. Although, after erection of the wall panels, this system offers great advantages with regard to provision and distribution of power on site through the use of the tap feature, it comprises very many cost-intensive components.

US Patent 5,236,370 describes a further electrical system for use with interior space-dividing walls. The system is prefabricated and includes elongate cable harnesses accommodated in channels which extend inside the space dividing elements. Adjacent cable harnesses are connected via flexible electrical jumpers which form plug-like connections with power supply blocks. This system provides substantial advantages in use. However, this system also includes numerous components, and this gives rise to significant costs. Furthermore, the system includes features which relate to the power distribution and problems with the power distribution.

The technical problem on which the invention is based is to provide a high-density, high-performance connector for telecommunications and data applications, in particular for use with interior space-dividing systems, the connector providing a good physical and electrical connection and permitting simple tapping of signals on the connected wires, in which installation and

reconfiguration is simplified.

The technical problem is solved by means of the features of patent claim 1. The electrical connector can be manufactured and assembled with a small number of different parts owing to the modular design of the connector from at least two assemblies, the latter having in each case a base element with a base portion which has wire connection ends and contact areas in which switchable contacts are arranged and which form the detachable connection of assemblies in such a way that, in the connected state, the latter form an opening into which a tap means can be plugged in order to feed to a user signals present at the contacts of an assembly. For this purpose, the assemblies are mounted detachably but firmly at a suitable site such as, for example, the wall panels previously described. In addition to mounting the assemblies, all that the work of installation further requires is for the available data and/or supply lines to be connected in an electrically conductive fashion to the contacts in the region of the wire connection ends. The configuration or reconfiguration of a workstation is then performed by selecting assemblies by a tap means and appropriately switching the switchable contacts so that the required or desired data lines are available. Further advantageous embodiments of the invention follow from the subclaims.

Configuration or reconfiguration can be carried out with particular ease owing to the construction of the tap means with wire connection means, which are preferably designed as insulation displacement contacts, and contacts which can be connected to the contacts arranged on the base portion, the wire connection means and the contacts of the tap means being connected electrically to one another. For this purpose, the data lines leading to the user are simply connected, together with the insulation, to the wire connection means, accessible from outside, of the tap means. As known in the case of other applications, in the embodiment with insulation displacement contacts the data line is pressed without

prior baring into the insulation displacement contacts, which then sever the insulation and produce an electrical contact with the wire core of the data line.

5 In a further preferred embodiment, each base element of an assembly is assigned a strain relief element which acts on the input wires in the region of the wire connection ends and presses the latter firmly in such a way that intimate contact is produced with the contacts assigned to the base portion. If the contacts  
10 are constructed as insulation displacement contacts in the region of the wire connection ends, means for pressing the input wires into the insulation displacement contacts are arranged on the strain relief element. The strain relief element preferably includes a latching  
15 means which provides a detachable connection through latching with a corresponding latching means of the base portion.

The tap means can be constructed with a contact side and an insulation side. As before, each contact on  
20 the contact side is then uniquely assigned a contact on the base portion and a wire connecting means of the tap means, from where the data lines are led to the users.

Furthermore, each assembly can be assigned at least one contact-opening device for switching the  
25 contacts on the base portion, which device can move the contacts back and forth between a contact position and a non-contact position. The contact-opening device advantageously corresponds to elastic means of the contacts on the base portion, the contact-opening devices holding the  
30 contacts in a defined initial position.

An arbitrary number of assemblies can be connected to form stacks of assemblies with the aid of connecting means on the base element and the strain relief element, with the result that the connector can be  
35 constructed such that it can be set up as desired, all the assemblies and individual parts thereof preferably being constructed identically so that a complex connector can be formed with a minimum number of different components.

The invention is explained in more detail below with the aid of an exemplary embodiment. In the figures:

- Figure 1 shows a perspective view of the front of a base portion of the high-density, high-performance connector,
- 5 Figure 2 shows a perspective view of the front of a strain relief element of the high-density, high-performance connector,
- Figure 3 shows a front view of the strain relief element of the connector,
- 10 Figure 4 shows a cross section through the strain relief element along the line 4-4 in Figure 3,
- Figure 5 shows a perspective view of the rear side of the strain relief element,
- 15 Figure 6 shows a perspective view of the rear side of the base portion of the connector,
- Figure 7 shows a front view of the base portion of the connector,
- 20 Figure 8 shows a cross section through the base portion of the connector along the line 8-8 in Figure 7,
- Figure 9 shows a cross section through the base portion of the connector along the line 9-9 in Figure 7,
- 25 Figure 10 shows a cross section through the base portion of the connector along the line 10-10 in Figure 7,
- Figure 11 shows a side view of a contact of the connector,
- 30 Figure 12 shows a plan view of the contact,
- Figure 13 shows a front view of the contact,
- Figure 14 shows a perspective view of the contact,
- Figure 15a shows a perspective view of an actuation side of an upper contact-opening device,
- 35 Figure 15b shows a perspective view of the contact side of the upper contact-opening device according to Figure 15a,
- Figure 16a shows a perspective view of an actuation

- Figure 16b shows a perspective view of the contact side of the upper contact-opening device according to Figure 16a,
- 5    Figure 17 shows an exploded representation of the arrangement of the contacts and the upper contact-opening device with respect to the front of the base portion,
- 10    Figure 18 shows a plan view of a contact, connected to a contact-opening device of one connector, and a contact, co-operating with a contact-opening device of a further connector in a contact position, the two contacts touching one another,
- 15    Figure 19 shows a perspective view of an upper contact-opening device and two contacts of one connector, and of a contact-opening device and two contacts of a further connector, in order to represent the alignment of the two connectors and to represent the contact position,
- 20    Figure 20 shows a perspective view of the base portion with contacts and upper and lower contact-opening device,
- 25    Figure 21 shows a side view of the connection of the contact-opening device with the base portion,
- 30    Figure 22 shows an exploded representation of the base portion according to Figure 22 with a strain relief element, the connection between the strain relief element and the base portion being represented and the strain relief element being partially cut away,
- 35    Figure 23 shows a perspective view of a tap means,
- Figure 24 shows a plan view of the inserted tap means,
- Figure 25 shows a cross section through the inserted tap means,

Figure 26 shows a perspective view of a stack of assemblies,

Figure 27 shows a perspective view of assembly stacks, assigned to pieces of furniture, in a mated position with a tap being inserted, the lines having been omitted for the sake of clarity, and

Figure 28 shows a perspective view of a portion of an assembly.

10 Referring, in particular, to the drawings, the invention comprises a connector formed from connector halves, specifically from joined connector assemblies for forming a connection. The connector halves are preferably identical and associated in each case with a piece of  
15 furniture, for example a wall panel.

Each connector assembly includes a base element designated in general by 2, as shown in Figure 1, and a strain relief element designated in general by 4, as shown in Figure 2. The base element 2 comprises a base  
20 portion 20 and posts 22 which serve to align the base element 2 with the strain relief element 4. Openings 24 are provided to serve for connection to the wall panel or a similar fixture. A multiplicity of grooves 26 is provided for receiving contacts 30. The preferred form of  
25 the base portion 20 includes eight pairs of grooves 26 for receiving eight pairs of individual contacts 30 for connection with eight pairs of communication wires (not represented). The base portion 20 is constructed with wire connection ends 32 for input wires and with contact  
30 areas 34. Each of the contacts 30 extends into the respectively assigned contact area 34. The contacts 30 include a wire-connecting means 70 (Figure 13) at the wire connection end 32, in order to provide an electrical connection between a communication wire and an assigned  
35 contact 30. The wire-connecting means 70 is preferably constructed as an insulation displacement contact.

When communication wires are connected to the base element 2, the strain relief element 4 is arranged above the communication wires. This provides retention

(strain relief) for the wires. The base element 2 connected to the strain relief element 4 (see Figure 22) forms an assembly 80 (Figure 26). The assembly 80 is then mated with or connected to a similar (preferably identical) assembly 80. A plurality of assemblies 80 on each connection side can be connected or stacked to form stacked assemblies 82 (see Figure 26). A tap 16 can be arranged between the mated assemblies 80, and will be explained in more detail below.

10           The strain relief element 4 is represented in perspective in Figure 2. The strain relief element 4 includes a multiplicity of connecting posts 36. These connecting posts 36 permit the stacking of a multiplicity of assemblies 80. The strain relief element 4 further  
15 includes openings 38 which are aligned with the openings 24 of the base element 2 when the strain relief element 4 is connected to the base element 2. Furthermore, the strain relief element 4 includes a latching means with a latching opening 40 for receiving a latching element 42  
20 of the base element 2.

As may be seen from Figures 3 and 5, the strain relief element 4 includes a multiplicity of wire-connecting and wire-clamping elements 41. These elements 41 press the wires down and serve to secure the wires.  
25 The clamping elements 41 form part of the wire-connecting and wire-clamping means of the assembly 80.

As can best be seen from Figure 4, the connecting posts 36 are preferably essentially cylindrical. These male connecting posts 36 have a tapered or conical tip 44  
30 by means of which the connecting posts 36 can slide into the corresponding slotted receiving openings 46 of the base element 2 (see Figure 6).

Figure 6 shows the rear side of the base element 2. The base portion 20 is preferably a single injection-molded plastic part. The base portion 20 is constructed  
35 with slotted openings 46, 48. The slotted openings 46 receive the connecting posts 36 of the strain relief element 4 from a further assembly 80, as a result of which a plurality of assemblies 80 can be stacked in

order to form the stacked assemblies 82. The slotted openings 48 on the other side accept connecting elements 50 of a further assembly 80. The connecting elements 50 are provided with a conical tip 52 and a connecting web portion 54 which connects the connecting element 50 to the remainder of the base portion 20 (see, for example, Figure 10). A slot 56 of the slotted opening 48 (the slotted opening 46 is the same) permits the connecting element 50 to be connected to its assigned base portion 20 via webs. The webs extend through the slot 56 when the connecting element 36, 38, 50 slides into the opening 46, 48.

Figure 7 shows the base element 2 without the contacts 30 in a plan view. Figures 8, 9 and 10 show different cross-sectional views of the base element 2 along the various cross-sectional lines 8-8, 9-9 and 10-10 in Figure 7. Each of the cross-sectional views according to Figures 8, 9 and 10 shows the slotted openings 48. Figures 8 and 9 show the slot 56.

Figure 11 shows a side view of a preferred contact 30. The contact 30 preferably has a terminal (wire-connecting means) 70 which is arranged adjacent to the wire connection end 32 of the base element 2. The contact 30 further has a contact surface 71 which is arranged at the contact area 34 of the base element 2. As can be seen from Figure 13, each terminal 70 has opposed cutting/clamping elements 74. The cutting/clamping elements 74 are preferably supported by a U-shaped support 76. In addition, the U-shaped support 76 also provides the cutting/clamping elements 74 with a certain elasticity, and it applies the necessary pressure for maintaining the contact between the wire core and the cutting/clamping element 74. This structure permits a wire to be capable of being clamped between the cutting/clamping element 74 and the U-shaped support 76 which provides the elasticity. The cutting/clamping elements 74 cut into the insulation of the wire and make contact with the wire core in order in this way to enable electrical connection between the wire and the contact

30. The cutting/clamping element 74 can be formed from the same metal piece as the U-shaped support 76 and can be lagged in order to arrange the cutting/clamping element 74 at an angle to a wire arranged inside the U-shaped support 76.

The contact 30 includes a contact arm 78 which has a contact surface 71 (see Figure 14), as well as an actuation end 72, which will be explained in further detail later. The contact arm 78 is preferably constructed in an elastic fashion, as a result of which the contact surface 71 can be moved relative to the base element 2, specifically can be pressed towards the base portion 20 (into a non-contact position). This movement preferably results in a movement of the contact surface 71 into the or towards the groove 26. The contact surface 71 extends out of the groove 26 (into a contact position).

The invention provides a mechanism for moving the contact surface 71 of each contact 30 between the contact position and the non-contact position. This is achieved by providing one or more contact-opening devices 84, 92 which press the contact 30 into the non-contact position or permit the contact 30 to remain in the contact position.

Figure 15a shows an actuation side 88 of an upper contact-opening device 84. The contact-opening device 84 has a bevelled upper edge 86. Figure 15b shows the upper contact-opening device 84 with a multiplicity of connector posts 90. The connector posts 90 connect the upper contact-opening device 84 to an upper part of the base element 2 with an actuation end 72 of the contact 30, which is arranged between the contact-opening device 84 and the base element 2. As can be seen from Figure 15b, the contact side 87 of the upper contact-opening device 84 has a multiplicity of contact surfaces 89 which press the contact 30 into the non-contact position. The connector posts 90 can be provided such that they extend through a contact 30 and are then fastened to the base portion 20. However, in a preferred

embodiment of the invention each contact 30 is seated in a corresponding groove 26. The connector posts 90 are then arranged next to the contacts 30 and preferably extend beyond the contacts 30 in a region between contact groups (see Figure 17). In particular, each connector post 19 passes into an opening 120 provided in the base portion 20. The connector post 90 can be provided with a latching element which prevents the contact-opening device 84 from being disconnected from the base portion 20. The distance between the latching element and the contact surface 89 of the contact-opening device 84 is set such that the contact-opening device 84 can move relative to the base portion 20, as described further below.

The preferred embodiment of the electrical connector further includes a lower contact-opening device 92, which has a bevelled lower edge 94. Figure 16a shows the actuation side. Figure 16b shows the contact side 95. As can be seen from Figure 16b, a multiplicity of connector posts 98 are provided for the purpose of connecting the lower contact-opening device 92 to a lower part of the base element 2. The contact side 95 has a multiplicity of contact surface portions 97. These correspond to the number of the contacts 30. The contact surface portions 97 are provided for the purpose of moving a lower set of contacts 30 from the contact position into the non-contact position by pressing on the actuation end 72 of the contact 30. The connector posts 98 are connected in each case to a corresponding connector post opening 120 in the base portion 20, as described above with reference to the connector posts 90. Again, the end of the connector posts 98 keeps the contact-opening device 92 in connection with the base portion 20, but permits some movement towards the base portion 20 and away from it, as described further below.

Each of the upper contact-opening devices 84 and lower contact-opening devices 92 has a multiplicity of nubs 130. These nubs 130 are designed in the form of protruding portions. The nubs 130 extend from the surface

of the actuation side 88 of the upper contact-opening device 84, and the nubs 130 likewise extend from the surface of the actuation side 96 of the contact-opening device 92.

5           Figure 17 is an exploded representation showing the contacts 30, the upper contact-opening device 84 and a base portion 20. The grooves 26 for positioning the contacts 30 are provided for receiving the contacts 30. The connector posts 90 of the upper contact-opening  
10 device 84 are snapped into the openings 120 and are held by the end of the connector post 90. However, the length of the connector post 90 is designed with respect to the width of the base portion 20 such that the contact-opening device 84 can move away from the base portion 20  
15 and towards the latter. This degree of movement permits the contact-opening device 84 to press the actuation end 72 of the contact 30 such that the contact 30 is moved into a non-contact position (the contact surface 71 is moved towards the base portion 20, with the result that  
20 it is not in physical contact with an opposite contact surface 71 of an opposite connector). The elastic construction of the contacts 30, in particular of the contact arm 78, normally presses the contact-opening device 84 away from the base portion 20.

25           Figure 18 shows the position of the contact-opening device 84 and of the contacts 30 for two different connector assemblies. The contacts 30 are shown in the contact position (the contact surface 71 of each contact 30 is in physical contact with a contact surface  
30 71 of an opposite contact 30). As can be seen from this view, a movement of one or both contact-opening devices 84 in the direction of their assigned base portion 20 of the assigned assemblies 80 results in the fact that the contact 30 is moved out of the contact position.

35           Figure 19 provides a perspective view of the relationship between the mated contacts 30 and the respective contact-opening devices 84. Figure 19 also shows the bevelled upper edge 86, which facilitates the passage of a tap 16 into the space between the contacts

30.

Figure 20 shows an assembly 80 with the base element 2, including the base portion 20, the contacts 30, the upper contact-opening device 84 and the lower contact-opening device 92. The upper contact-opening device 84 and the lower contact-opening device 92 are fastened to the base portion 20 via the connector posts 90 and 98 respectively. The strain relief element 4 is connected to the base portion 20 with the wires 12 (inside wire bundles) by means of the contacts 30.

The connection between the contact-opening device 84 and the base portion 20 can best be seen in Figure 21. The base portion 20 is constructed with receiving sockets 99, each receiving socket 99 serving to receive expanding parts of the connector post 90.

A preferred embodiment of the assembly 80 is shown in Figure 22 in an exploded representation. The lower part of the strain relief element 4 is cut away. Nevertheless, it can be seen from this exploded representation that the strain relief element 4 in accordance with the preferred embodiment with the latching element 42 snaps into the latching opening 40. By means in each case of a wire connected to each of the contacts 30, the base element 2 is connected to the strain relief element 4 by pressing the latches 41 into the assigned latching openings. This provides the assembly 80.

In accordance with a preferred embodiment, the base portion 20 can be connected to eight pairs of wires 12. The contacts 30 are arranged in pairs of two in pairs of grooves 26. The terminal 70 of each contact 30 is connected to a wire. The lower half of the base element 2 likewise includes eight contacts, specifically four contact pairs. In this arrangement, eight pairs of wires can be connected to the base portion 20, which then forms an assembly 80 with the strain relief element 4. A tap 16 is provided for connecting the communication wires 12 to the end user at the workstation via the base element 2. The tap 16 has a user interface part 60. The user interface part 60 includes a multiplicity of insulation

displacement contacts 62. These can be constructed in the form of a cutting/clamping arrangement with a cutting/clamping metal element 64 which co-operates with a strain relief portion (not shown). Wires to the user at the workstation can be connected to a terminal block or to the user interface part 60, each wire connected to an insulation displacement contact 62 being connected to a corresponding communication wire 12 connected to the base element 2.

10           The tap 16 has a multiplicity of contacts 66 on a contact tap side 67 of the tap 16. The connection between the contacts 62 and the contacts 66 can be made by a printed circuitboard (tracks etc.) provided on or in the contact tap side 67. Similarly, a tap has an insulation side 68, which is free of contacts. Accordingly, the tap 16 taps a signal from a series of contacts 30 of one assembly 80 of two mated assemblies 80. By contrast, the tap 16 interrupts the signal to the other assembly 80, because of the insulation side 68. The tap 16 has a bevelled edge 69, which facilitates plugging the tap 16 into the space between two mated connector assemblies 80. The preferred form of the tap 16 provides eight contacts 66, which are connected to eight of the sixteen contacts 30 of an assembly 80, either to an upper set of contacts 30 or a lower set, depending on whether the tap 16 is plugged in from the top or from the bottom (from the top, the tap 16 is connected to the upper contact-opening device 84 and from below it is connected to the lower contact-opening device 92).

30           Figure 26 provides a view of the space into which the tap 16 is plugged. The upper opening 100, formed by two mated assemblies 80, provides access to the upper contact-opening device 84 of a first assembly 80 and to the upper contact-opening device 84 of a second assembly 80. A similar (essentially identical) arrangement is provided with respect to the bottom of the mated assemblies 80. The bevelled edge 69 of the tap 16 is plugged into the plug-in opening 100.

As described above, each contact-opening device

84, 92 has nubs 130. The tap 16 is provided with a multiplicity of receiving spaces for the nubs 130, preferably in the form of holes 132 (see Figure 23). When the tap 16 is plugged into the opening 100 of the mated assemblies 80, the bevelled edge 69 presses each contact-opening device 84, 92 towards its respective base portion 20. The tap surfaces 67 and 68 then come into contact with the nubs 130, which ensure a movement of the various contacts 30 out of the contact position (into the non-contact position), in which the contact surfaces 71 are separated. If the tap 16 is plugged fully into the unit, there is an alignment between the nubs 130 and the corresponding holes or openings 132. This permits the contact-opening device 84 to move towards the tap 16, and permits the contacts 30 to move back towards the contact position. All the contacts 30 assigned to the contact-opening device 84 facing the contact side 67 or the tap 16 come into contact with one of the contact areas 66 of the tap 16 (the contact surface 71 of each of these contacts 30 moves towards the corresponding contact 66 on the contact side 67 of the tap 16 and forms a physical contact). The contacts 30 facing the insulation side 68 are likewise moved in the contact direction. However, the signals no longer pass through these contacts to the connected wires 12.

As can best be seen from Figure 25, the bevelled edge 69 of the tap 16 comes into contact with the upper bevelled surface 86 of each of the two contact-opening devices 84. When the tap 16 is pressed downwards, the contacts 30 move from the contact position into the non-contact position. This separates the connection between, for example, a left-hand assembly L80 and a right-hand assembly R80. When the tap 16 is fully plugged in, only the contacts 30, which are located on the contact side 67 of the tap 16, make an electrical connection with the contacts 66 of the tap 16. For example, in the case of the tap 16 shown the contact side 67 is located on the right-hand side, with the result that the contacts 30 of the assembly R80 are in electrical contact with various

contacts 66 of the tap 16 when the latter is fully plugged in. The signal is tapped thereby, and the contacts 30 of the assembly L80 are separated from the signal.

5           Figure 26 shows a multiplicity of stacked assemblies 80. The connecting element 36 of each strain relief element 4 (apart from the first strain relief element 4) is connected to the slotted openings 46 of the assemblies 80 directly in front thereof. This provides a  
10           stack of assemblies 82.

          In operation, a stack of assemblies 82 is mated with an essentially identical stack of assemblies 82. The assemblies 80 comprise identical parts. Each strain relief element 4 and each base element 2 or base portion  
15           20 is preferably produced with the same geometry. This permits the use of only two injection molds for these parts. The assemblies 80 are also hermaphroditic assemblies. A third injection mold is used to produce the  
20           third and fourth parts, specifically the upper contact-opening device 84 and the lower contact-opening device 92. The so-called hermaphroditic nature of the connector is obvious when it is considered that the connecting elements 50 form a male portion and the slotted openings 48 form a female portion. Each assembly 80 has both male  
25           and female parts which form part of the connecting means.

          The tap 16 can be provided at any desired site where a user is to be provided with a connection at a workstation. For example, in erecting wall panels 200 as shown in Figure 27, many wall panels 200 will be erected  
30           in which the data/voice lines need merely to be led through from the wires of one wall panel 200 to the wires of another wall panel 200. However, at certain sites a tap 16 is required in order to make the data connection or voice connection available to a user at a workstation.

35           When a tap is positioned between two connected assemblies 80, the contacts 66 make electrical contact with corresponding contacts 30 of an assembly 80, as a result of which a user is provided with access to the data lines and voice lines. However, downstream of the

tapped contacts 30 of the mated assemblies 80 the lines are dead, since the insulation side 68 of the tap 16 makes no contact with the contacts 30 of the opposite or mated assembly 80.

5               Figure 28 shows a base element 2 with contacts 30 and contact-opening devices 84. In addition, this element is provided with a strain relief element 4. The strain relief element 4 is connected to an end of the base  
10 element 2, as shown. In this arrangement, a single base element 2 with connected strain relief element 4 can be mated with a further base element 2 with strain relief element 4. In this case, the latching opening 40 of the strain relief element 4 is connected to the latching  
15 element 42 of a further base element 2, as a result of which one base element 2 can be mated with another. This is useful when a stack 82 of assemblies 80 is not required and eight lines or fewer need to be connected through. This arrangement still provides the same opening  
20 tion the tap 16 is plugged in in the same way as in the case of the mated stacks 82 of assemblies 80.

While specific embodiments of the invention have been shown and described in detail in order to explain the application of the principles of the invention, it  
25 will be understood that the invention can also be embodied otherwise without departing from such principles.

List of reference symbols

|    |    |                                           |
|----|----|-------------------------------------------|
|    | 2  | Base element                              |
|    | 4  | Stress relief element                     |
|    | 12 | Wire                                      |
| 5  | 16 | Tap means                                 |
|    | 20 | Base portion                              |
|    | 22 | Post                                      |
|    | 24 | Opening                                   |
|    | 26 | Groove                                    |
| 10 | 30 | Contact                                   |
|    | 32 | Wire connection end                       |
|    | 34 | Contact area                              |
|    | 36 | Connecting post                           |
|    | 38 | Opening                                   |
| 15 | 40 | Latching opening                          |
|    | 41 | Wire-connecting and wire-clamping element |
|    | 42 | Latching element                          |
|    | 44 | Conical tip                               |
|    | 46 | Slotted opening                           |
| 20 | 48 | Slotted opening                           |
|    | 50 | Slotted opening                           |
|    | 52 | Conical tip                               |
|    | 54 | Connecting web portion                    |
|    | 56 | Slot                                      |
| 25 | 60 | User interface part                       |
|    | 62 | Insulation displacement contact           |
|    | 64 | Cutting/clamping metal element            |
|    | 66 | Contact                                   |
|    | 67 | Contact side                              |
| 30 | 68 | Insulation side                           |
|    | 69 | Edge                                      |
|    | 70 | Wire connecting means                     |
|    | 71 | Contact surface                           |
|    | 72 | Actuation end                             |
| 35 | 74 | Insulation displacement contact           |
|    | 76 | U-shaped support                          |
|    | 78 | Contact arm                               |
|    | 80 | Assembly                                  |

|    |     |                        |
|----|-----|------------------------|
|    | L80 | Left-hand assembly     |
|    | R80 | Right-hand assembly    |
|    | 82  | Stacked assembly       |
|    | 84  | Contact-opening device |
| 5  | 86  | Bevelled upper edge    |
|    | 87  | Contact side           |
|    | 88  | Actuation side         |
|    | 89  | Contact surface        |
|    | 90  | Connector post         |
| 10 | 92  | Contact-opening device |
|    | 94  | Bevelled lower edge    |
|    | 95  | Contact side           |
|    | 96  | Actuation side         |
|    | 97  | Contact surfaces       |
| 15 | 98  | Connector post         |
|    | 99  | Receiving socket       |
|    | 100 | Opening                |
|    | 120 | Openings               |
|    | 130 | Nubs                   |
| 20 | 132 | Holes                  |
|    | 200 | Wall panels            |



## Connector

### Patent claims

1. A connector, in particular for telecommunications technology and data systems technology, comprising at least two assemblies (80), comprising in each case a base element (2) with a base portion (20) which has wire connection ends (32) and contact areas (34) in which switchable contacts (30) are arranged, fastening means (36, 50, 46, 48) for detachably connecting the assemblies (80) being arranged on the assemblies (80), and the assemblies (80) forming in the connected state an opening (100) into which a tap means (16) can be plugged so that signals present at the contacts (30) of an assembly (80) can be fed to a user connected to the tap means (16).

2. The connector as claimed in claim 1, wherein the contacts (30) are constructed in the region of the wire connection ends (32) as insulation displacement contacts (74).

3. The connector as claimed in one of the preceding claims, wherein each base element (2) of an assembly (80) is assigned a strain relief element (4) and can be detachably connected thereto.

4. The connector as claimed in claim 3, wherein the base element (2) and the strain relief element (4) are respectively assigned latching means (40, 42) for the detachable connection.

5. The connector as claimed in one of the preceding claims, wherein the base element (2) is constructed with openings (46, 48) for receiving connecting means (36, 50) of neighboring assemblies.

6. The connector as claimed in one of claims 3 to 5, wherein the strain relief element (4) is constructed with connecting means which are constructed as predominantly cylindrical pins with a conical tip (44, 52) and correspond to the openings (46, 48) of neighboring assemblies (80).



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7. The connector as claimed in one of the preceding claims, wherein each assembly (80) is assigned at least one contact-opening device (84, 92).

5       8. The connector as claimed in claim 7, wherein  
the contact-opening device (84, 92) has an actuation side (88, 96) and a contact side (87, 95), nubs (130) which correspond to holes (132) in the tap means (16) being arranged on the actuation side (88, 96), and connector posts (90) which can be plugged into openings (120) in  
10   the base portion (20) being arranged on the contact side (87, 95).

9. A tap means for a connector as claimed in one of the preceding claims, wherein on a contact side (67) the tap means (16) has user interface parts (60) and  
15   contacts (66) which are electrically connected to one another, it being possible for the contacts (66) to be connected in the plugged-in state to the contacts (30).

10. The tap means as claimed in claim 9, wherein the user interface part (60) is constructed as an  
20   insulation displacement contact (62).