

The invention relates to a mounting rack for electronic and/or electromechanical assemblies which have contact elements on their edges pointing in the insertion direction for insertion into plugs which are mounted on an interconnection board, the assemblies being capable of insertion into the mounting rack on two sides of the latter pointing in opposite directions, and the interconnection board, which carries plugs on both its sides, being arranged between the insertion openings of the mounting rack.

A mounting rack of the type mentioned above is disclosed in EP-A-0,220,677 which was not published earlier. In the case of the known arrangement, two stacks of circuit boards which form the assemblies are provided on both sides of the interconnection board, the circuit boards of the one stack being directed at right angles to the circuit boards of the other stack. The aim of this arrangement is to avoid any wiring cost.

DE-B-1,302,591 discloses a mounting rack for electronic and/or electromechanical rack assemblies which have contact elements on their edges pointing in the insertion direction for insertion into plugs which are mounted on an interconnection board, it being possible to insert the assemblies therein on two sides of the mounting rack pointing in opposite directions. Provided in the centre between the insertion openings of the mounting rack are two interconnection boards which are separated from one another by spacer elements so that one interconnection board is thus allocated to each group of circuit boards, which can be inserted from one side of the mounting rack.

The invention is based on the object of specifying a mounting rack of the type mentioned initially, which allows a very compact arrangement of the assemblies, that is to say has small external dimensions for a given number of assemblies, and in the case of which very short cable runs result between the individual assemblies, with a low wiring cost.

This object is achieved in that the sliding

guides, which are intended for holding the assemblies, and the plugs on the one side of the interconnection board are arranged offset transversely to the insertion direction with respect to identical sliding guides and
5 plugs on the other side of the interconnection board.

In the case of the solution according to the invention, very short cable runs result between the individual assemblies. Cable connections between the assemblies can be obviated since all the connections are
10 passed via the interconnection board. If the mounting rack is intended for holding system modules of a data-processing system, this means that a large number of system modules can be placed on a very short busbar or bus length. As a result of the short bus length, the
15 system modules can be connected via simple interface modules since, with the short bus length, the delay times of the signals on the bus are less than the time separation between two successively following signals. As a result of the offset arrangement of the plugs and sliding
20 guides on both side of the interconnection board, specific assemblies can optionally be inserted into the mounting rack from the one side or the other. This furthermore allows a particularly compact arrangement of the assemblies and dense packaging of the associated
25 plugs, as well as further shortening of the interconnecting leads on the interconnection board. The obviation of the wiring cost not only means a reduction in the production costs but also increased noise immunity of the apparatuses.

30 The mounting rack preferably has a sliding guide which is directed transversely with respect to the insertion direction of the assemblies, for insertion of the interconnection board. This allows simple fitment of the mounting rack. The interconnection board is initially
35 inserted into the mounting rack and is attached thereto by means of screws, latching elements or the like. Subsequently, the assemblies can be inserted into the mounting rack and can be electrically connected to the interconnection board by means of plug connections.

One preferred embodiment of the mounting rack has at least two tiers, located one above the other, for the insertion of the assemblies. This is particularly advantageous for data-processing apparatuses which are
5 installed close to the workplace and are thus intended to require only a small footprint area. In this case, a common interconnection board is preferably allocated to all the tiers of the mounting rack, so that wiring between the tiers can be obviated.

10 In order to achieve adequate cooling of the assemblies when they are arranged in a compact manner, it is advantageous if a tier for holding a fan unit which can likewise be plugged onto the interconnection board is provided at least between two tiers having electronic
15 and/or electromechanical assemblies. As a result of the arrangement of the fan unit between the tiers of assemblies, there is no need for air-supply ducts. At the same time, the noise caused by ventilation is reduced. The electronic control circuit which is intended to control
20 the fan unit is preferably arranged on the interconnection board, it being possible for at least parts of the electrical control circuit to be common to all the fan units.

In the case of one preferred embodiment of the
25 invention, the mounting rack has an air inlet opening at its upper end and an air outlet opening close to its lower end so that the ventilation flow is passed upwards through the assemblies from the bottom [sic]. This has the advantage that dust close to the base is not sucked
30 into the apparatus and that stress on personnel resulting from an air flow emerging from the apparatus at the top is avoided.

Further features and advantages of the invention result from the following description which explains the
35 invention, with reference to an exemplary embodiment, in conjunction with the attached drawing. The single figure shows a partially schematic, perspective exploded view of a mounting rack according to the invention.

The mounting rack which is in general designated

by 10 in the figure comprises a box-shaped rack 12 which is composed of profiles, stands vertically on a base 14 and is closed by a wall 16 on each of its vertical broadsides. In contrast, the rack 12 is open on the vertical narrow sides for the insertion of assemblies 18, 20 and 22, which are arranged in three tiers one above the other. The rack 12 is in each case provided with sliding guides, which are known per se and are thus indicated only at 23, for the insertion of the assemblies 18 to 22. In the case of the exemplary embodiment which is shown, the assemblies 18 are formed in the lowest tier of the mounting rack 10 by circuit boards of an electronic data-processing device. The assemblies 22 of peripherals such as disk drives of the data-processing system are formed in the top tier of the mounting rack 10. Inserted in the central tier, between the assemblies 18 and 22, is a fan unit 20 having an axial fan 24 which sucks air in through the upper, open end of the rack 12, said air flowing through the assemblies 22 and cooling them, and the air which is sucked in subsequently blowing through the assemblies 18 until it emerges through ventilation slots 26 in the base 14.

An interconnection board 28 is used for the electrical connection of the individual assemblies 18, 22 to one another and to a power-supply apparatus or the like, which interconnection board 28 can be inserted into the mounting rack 10 in the centre, between the two vertical narrow sides of the rack 12 and parallel to said side. For this purpose, one side wall 16 has a vertical insertion slot 30. Furthermore, sliding guides 32 are provided on the bottom and the top of the rack 12 for the insertion of the interconnection board 28, of which sliding guides only upper ones are shown in the figure for clarity. In order to prevent bending of the interconnection board 28, said board is provided on its two sides with a row of guide profiles 34 which slide along flanges 36 when the interconnection board 28 is being inserted into the insertion slot 30, which flanges 36 are constructed on the edges of the insertion slot 30.

The interconnection board 28 carries plug strips 38, 40, 42 on both sides, into which corresponding contact elements 44 and a mating plug 46 on the assemblies can be inserted, in a manner known per se. The
5 sliding guides as well as the plug strips 38 on both sides of the interconnection board 28 for the circuit boards which can be inserted into the bottom tier of the mounting rack 10 are offset with respect to one another by half the separation of two adjacent circuit boards, as
10 is indicated in the case of the plug strips 38 on the interconnection board 28. In consequence, a very compact arrangement of the plug strips on the interconnection board 28 is obtained, with short cables runs and dense packaging of the assemblies 18.

15 Since the electrical connection between the circuit boards 18 and the peripherals 22 can be carried out via conductor tracks on the interconnection board 28, costly cable connections are obviated. The electronic control circuit for the fan units 20 can likewise be
20 accommodated on the interconnection board 28 so that wiring cost which is otherwise necessary is also obviated here.

It is self-evident that the mounting rack shown, with the racks, is normally enclosed by housing walls, of
25 which at least the upper top surface has air-inlet slots.



Patent Claims

1. Mounting rack for electronic and/or electro-mechanical rack assemblies (18, 20, 22) which have contact elements on their edges pointing in the insertion
5 direction for insertion into plugs which are mounted on an interconnection board, the assemblies (18, 20, 22) being capable of insertion into the mounting rack (10) on two sides of the latter pointing in opposite directions, and the interconnection board (28), which carries plugs
10 (38, 40, 42) on both its sides, being arranged between the insertion openings of the mounting rack (10), characterised in that the sliding guides (23), which are intended for holding the assemblies (18, 20, 22), and the
15 plugs (38) on the one side of the interconnection board (28) are arranged offset transversely to the insertion direction with respect to identical sliding guides (23) and plugs (38) on the other side of the interconnection board (28).

2. Mounting rack according to Claim 1, characterised
20 in that it has a sliding guide (32), which is directed transversely to the insertion direction of the assemblies (18, 20, 22), for insertion of the interconnection board (28).

3. Mounting rack according to Claim 1 or 2, characterised
25 in that it has at least two tiers, located one above the other, for the insertion of assemblies (18, 20, 22).

4. Mounting rack according to Claim 3, characterised
in that a common interconnection board (28) is allocated
30 to all the tiers.

5. Mounting rack according to Claim 3 or 4, characterised in that a tier for holding a fan unit (20) which can be connected to the interconnection board (28) is provided at least between two tiers having electronic
35 and/or electromechanical assemblies (18, 22).

6. Mounting rack according to Claim 5, characterised in that an electronic control circuit which is intended for controlling the fan unit (20) is arranged on the



interconnection board (28).

7. Mounting rack according to Claim 6, characterised in that at least parts of the electronic control circuit are common to all the fan units (20).

5 8. Mounting rack according to one of Claims 5 to 7, characterised in that it has an air inlet opening at its upper end and an air outlet opening close to its lower end.