

Description

This invention relates to communication systems and especially to patch panel arrays for optical communication systems.

A patch panel is a housing for the connections between lines of a communication system, such as a connection between a main trunk line and a subscriber line. Currently optical communication patch panels have a vertical panel having a two dimensional array of apertures for receiving the terminations of one set of lines on to which connectors for the lines to be connected can be attached. These panels are housed in cabinets.

There are two problems associated with this current arrangement. Firstly there is a limit to the density of the array that can be fitted on to the vertical panel and to the number of panels that can be located in a given cabinet. In exchanges having many lines, and especially in major cities where floor space is at a premium, it is desirable to minimise the space occupied by patch panels, or in other words it is desirable to increase the packing density of the connectors. The second problem that can arise is that when the connectors are disconnected it is possible to view directly into a potentially active line since, for reasons of access, the lines that are directly supported by the patch panel have their terminations inserted through the panel from the rear and face forwardly ready to receive a connector from the front. In normal operating circumstances it is unlikely that laser light signals emanating from an exposed line end would be harmful to the human eye when simply viewed with the naked eye, but if the light were viewed through or in conjunction with optical apparatus there may be a risk of damage.

Known patch panels are described in EP-A-0293183, US-A-4673246 and GB-A-2166262. EP-A-0293183 constitutes prior art in the meaning of Art. 54(3) EPC.

The aim of the invention is to provide a patch panel which may accommodate a greater density of connectors, and which inhibits direct viewing into disconnected line terminals.

The present invention provides apparatus for housing connections between lines of an optical communications system, the apparatus comprising a patch panel for supporting a plurality of line connectors, the patch panel comprising a series of corrugations defining alternately oriented, plane faces, alternate faces on each side of a central axis of the patch panel, which axis runs parallel to the corrugations, being provided with apertures for receiving line connectors, characterised in that the apertured faces slope away from said central axis of the patch panel in a direction towards opposite edges of the patch panel.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a frontal view of a patch panel according to a preferred embodiment of the invention,

Figure 2 is a view from above a patch panel rack assembly according to a preferred embodiment of the invention, and

Figure 3 is a larger view of the patch panel

Referring firstly to Figure 2, a preferred patch panel assembly is shown which comprises a substantially rectangular section frame having a back wall 1, side walls 2 and front wall portions 3. The central part of the front of the frame between wall portions 3 is open to give access to a patch panel 4. The front of the frame may be open by virtue of a large central aperture leaving upper and lower front wall portions for support in addition to the side portions 3, or the entire central part of the front may be open from top to bottom between the wall portions 3. Adjacent to each side wall 2 there are fibre support trays 5 or fingers for separating and guiding the lines from individual connectors on the patch panel.

It will be seen from Figure 2 that the patch panel 4 is not a planar sheet as in the prior art, but has a zig zag corrugated section. Apertures for individual connectors are provided on alternate faces of the corrugations, as shown in Figure 1. The faces with apertures, referenced 6, are those faces that, viewed from the front, are facing towards the nearest front corner of the frame (or more generally they are angled away from the centre towards the nearest side that runs parallel to the faces of the corrugations) giving rise to a change of direction at the centre. Fibre terminations, such as from a trunk line, are threaded through access ports in the side walls 2 and are supported on the fibre support fingers 5, as shown for fibre 7. This fibre termination is then coiled in a loop 8 and the terminal connector inserted into an aperture in the patch panel from the rear. In a similar manner a subscriber line, for example, is connected as shown for a fibre referenced 10, the line again entering through a port in the side wall, being supported by fibre support fingers, coiling in loop 11 and then being connected to a connector of an appropriate line in the patch panel. The fibre support fingers are generally arranged in layers, each layer serving several horizontal layers of the patch panel. An alternative fibre storage arrangement is for the fibres from each column of connectors to the wound on an individual reel.

The front wall portions 3 are arranged to extend inwardly sufficiently far to prevent direct line of sight into the apertures of the patch panel or into exposed terminal connectors mounted in the panel.

It is preferred for the angle of the faces with the apertures to progressively change, as seen more clearly in Figure 3, at the centre the face being angled at about 45° to the front wall portions 3, and at the sides the final face being parallel or close to parallel with the front wall portions. Thus the angle between a perpendicular plane bisecting the central vertical plane of the patch panel (as viewed in Figure 1) and the faces 6 progressively decreases, the angle between that plane and the connectors (viewed from the front) progressively decreases. This progressive change of angle of the faces enables the connectors at the sides to be more easily accessed.

The frames of the assemblies are arranged to be stackable, for example up to four units high, without the need for a cabinet. The units may stand on a plinth which both houses spare cable and makes the stacked assembly at a workable height. A convenient way to form the patch panel is to fabricate two similar corrugated panels and join them in the centre, as shown in Figure 3, with one panel inverted to provide the mirror image configuration. Fanout arrangements other than an angular corrugation may be used, for example the angles may be rounded.

Claims

1. Apparatus for housing connections between lines of an optical communications system, the apparatus comprising a patch panel (4) for supporting a plurality of line connectors, the patch panel comprising a series of corrugations defining alternately oriented, plane faces, alternate faces (6) on each side of a central axis of the patch panel, which axis runs parallel to the corrugations, being provided with apertures for receiving line connectors, characterised in that the apertured faces (6) slope away from said central axis of the patch panel in a direction towards opposite edges of the patch panel.
2. Apparatus according to claim 1, in which the individual corrugations are asymmetric.
3. Apparatus according to claim 1 or claim 2, in which the plane faces have progressively shallower angles from said central axis towards the sides of the patch panel.
4. Apparatus according to any one of claims 1 to 3, further comprising a frame (1, 2, 3) for supporting the patch panel (4), the frame being provided with flange means extending from the sides of the frame for inhibiting direct line of sight into the connector openings.

5. Apparatus according to any one of claims 1 to 4, further comprising means for supporting fibres leading to the connectors.

Patentansprüche

1. Vorrichtung zum Einbauen von Verbindungen zwischen Leitungen eines optischen Kommunikationssystems, wobei die Vorrichtung eine Steckfrontplatte (4) zum Aufnehmen einer Vielzahl von Leitungsverbindungsanordnungen aufweist, wobei die Steckfrontplatte eine Reihe von Riffelungen aufweist, die alternativ orientierte Stirnflächenebenen definieren, wobei abwechselnde Stirnflächen (6) an jeder Seite einer Mittelachse der Steckfrontplatte, deren Achse parallel zu den Riffelungen verläuft, mit Öffnungen zum Aufnehmen von Leitungsverbindungsanordnungen versehen sind, dadurch gekennzeichnet, daß die mit Öffnungen versehenen Stirnflächen (6) sich von der Mittelachse der Steckfrontplatte in eine Richtung auf gegenüberliegende Kanten der Steckfrontplatte weg neigen.
2. Vorrichtung nach Anspruch 1, bei der die individuellen Riffelungen asymmetrisch sind.
3. Vorrichtung nach Anspruch 1 oder 2, in der die Stirnflächenebenen progressiv engere Winkel von der Mittelachse in Richtung auf die Seiten der Steckfrontplatte haben.
4. Vorrichtung nach einem der Ansprüche 1 bis 3, die weiterhin einen Rahmen (1, 2, 3) zum Aufnehmen der Steckfrontplatte (4) aufweist, wobei der Rahmen mit einer Flanscheinrichtung versehen ist, die sich von den Seiten des Rahmens zum Sperren einer direkten Sichtleitung in die Verbindungsanordnungsöffnungen erstreckt.
5. Vorrichtung nach einem der Ansprüche 1 bis 4, die weiterhin eine Einrichtung zum Aufnehmen von Fasern aufweist, die zu den Verbindungsanordnungen führen.

Revendications

1. Appareil destiné à loger des connexions entre des lignes d'un système de communications optiques, l'appareil comprenant un tableau de commutation (4) pour supporter une série de connecteurs de lignes, le panneau de commutation comprenant une série d'ondulations définissant des faces planes orientées en alternance, des faces alternées (6) situées sur chaque côté d'un axe central du tableau de commuta-

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tion, axe qui est parallèle aux ondulations, comportant des ouvertures pour recevoir des connecteurs de ligne, caractérisé en ce que les faces (6) où sont ménagées des ouvertures s'inclinent en partant dudit axe central du tableau de commutation dans une direction allant vers des bords opposés du tableau de commutation.

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2. Appareil selon la revendication 1, dans lequel les ondulations individuelles sont asymétriques.

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3. Appareil selon la revendication 1 ou la revendication 2, dans lequel les angles des faces planes sont progressivement plus petits en allant dudit axe central vers les côtés du tableau de commutation.

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4. Appareil selon l'une quelconque des revendications 1 à 3, comprenant en outre un cadre (1, 2, 3) de support du tableau de commutation (4), le cadre étant pourvu de moyens de brides s'étendant depuis les côtés du cadre pour empêcher une ligne de vue directe dans les ouvertures des connecteurs.

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5. Appareil selon l'une quelconque des revendications 1 à 4, comprenant en outre un moyen de support de fibres allant vers les connecteurs.

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