

Cisco Systems, Inc.
VS.
Capella Photonics, Inc.

IPR2014-01166, 01276
Patent Owner Demonstratives

capella
Intelligent Subsystems

Patents at issue

The '368 patent claims at least two unique features:

- an optical switch that has an input port, an output port and one or more other ports
- beam-deflecting elements that are individually and continuously controllable in two dimensions

(Representative claim 1)

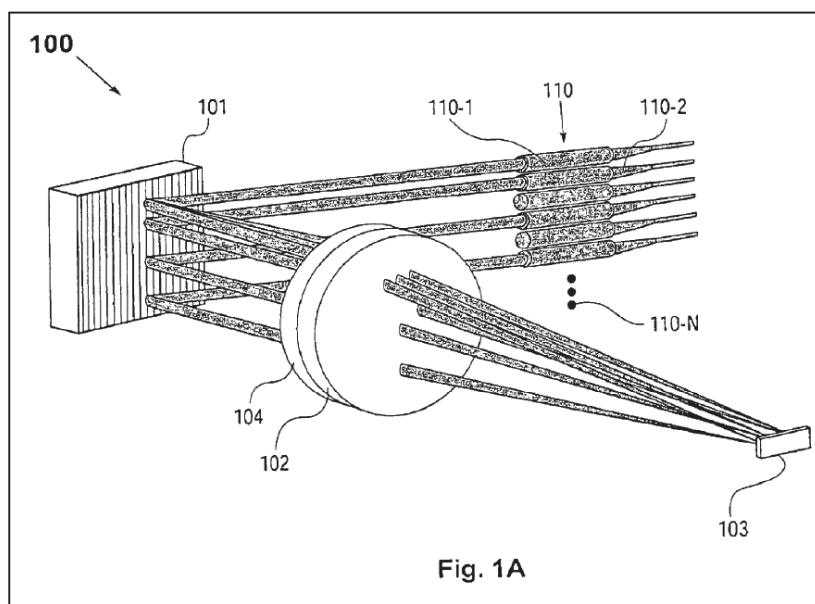
The '678 patent claims at least two unique features:

- multiple fiber collimators, providing an input port and a plurality of output ports
- micromirrors being pivotal about two axes and being continuously controllable

(Representative claim 1)

Patents at issue

These features allow the claimed systems to route individual channels from the input port to a selected output port among multiple ports. As a result, the claimed systems can route a greater number of individual channels than systems in the prior art. ('368 and '678 patents, 5:49-58, Fig. 1A.)

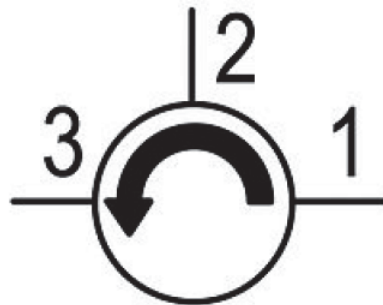


All in all, the OADMs of the present invention provide many advantages over the prior art devices, notably:

- 1) By advantageously employing an array of channel micro-mirrors that are individually and continuously controllable, an OADM of the present invention is capable of routing the spectral channels on a channel-by-channel basis and directing any spectral channel into any one of the output ports. As such, its underlying operation is dynamically reconfigurable, and its underlying architecture is intrinsically scalable to a large number of channel counts.

Prior art

- Prior art optical switches relied on circulators
- A circulator is a device that is used to separate optical signals traveling in opposite directions.
- Light entering circulator port 1 is emitted from circulator port 2, light entering circulator port 2 is emitted from circulator port 3, and light entering circulator port 3 is emitted from circulator port 1.



- Optical systems using circulators were not scalable to a large number of channels because every added circulator contributed cost, bulk, and insertion loss (*i.e.*, crosstalk between channels) to the optical system.

Patents at issue

- To overcome the limitations of circulators, the inventors of the '368 and '678 patents designed an add/drop optical switch using **multiple ports** instead of circulators. This multiple port configuration made Capella's system reconfigurable and scalable to a large number of channels. ('368 and '678 patents, 5:56-58; Fig. 1A.)

Those skilled in the art will recognize that the aforementioned embodiments provide only two of many embodiments

output ports. As such, its underlying operation is dynamically reconfigurable, and its underlying architecture is intrinsically scalable to a large number of channel counts.

basis and directing any spectral channel into any one of the 55
output ports. As such, its underlying operation is dynamically
reconfigurable, and its underlying architecture is
intrinsically scalable to a large number of channel counts.

- 2) The add and drop spectral channels need not be multiplexed and demultiplexed before entering and after leaving 60
the OADM respectively. And there are not fundamental
restrictions on the wavelengths to be added or dropped.
- 3) The coupling of the spectral channels into the output ports
is dynamically controlled by a servo-control assembly, 65
rendering the OADM less susceptible to environmental
effects (such as thermal and mechanical disturbances) and
therefore more robust in performance. By maintaining an

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