

SO-TSFP10GER-AxI

SFP+ 10G Multirate 1.0-11.3Gbps DWDM 100GHz 40km 22dB Auto Tunable D920-960 I-temp

INTRODUCTION

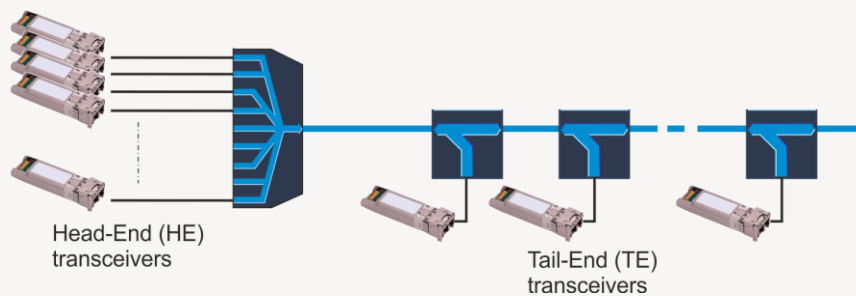
The SO-TSFP10GER-AxI is a set of five SFP+ form-factor, auto-tunable DWDM transceivers for multiple applications in the access area. The transceivers support a bit rate range from 1Gbps to 11.3Gbps enabling a wide span of protocols to be carried. The optical performance supports distances up to 40km over a SingleMode (SM) fiber without dispersion compensation.

There are five transceivers that can be tuned to 9 channels in overlapping bands from 192.00 to 196.00THz in the 100GHz DWDM ITU-T 694.1 grid. This arrangement enables support for the two most common 40ch channel plans 920-959 and 921-960.

When two transceivers covering same band are connected over a link, they can also be set into an auto-tunable mode where an out-of-band protocol ensures that both transceivers are tuned to the correct wavelength to establish a connection. This also works in single-fiber configurations where the up-link and down-link wavelengths cannot be the same.

The Out-Of-Band channel is also used to retrieve diagnostics from the far-end transceiver, such as alarms, warnings and status flags. This enables the operator to perform a first diagnostics of a situation to determine if a service activity is required on site.

An access network is typically built in a hub and spoke configuration having a head-end location and multiple tail-end locations.



To ease installation and commissioning the wavelength tuning can be made without accessing the host equipment. The required functionality resides within the transceivers and is initiated when the transceivers are inserted into the host equipment.

AUTO-TUNING MODES

The transceivers can be configured into two modes. The modes can be set using the Smartoptics SmartBoard and the configuration is non-volatile. A configuration can also be made via the host system if this is supported.

1. "One-time Execution"
When configured in this mode, the transceivers will upon first power up initiate the auto tuning process until the link is established. Upon loss of connection or upon power loss, the transceiver will initiate the same wavelengths it had before the interruption. If auto-tuning must be executed again, it must be manually initiated.
2. "Sustained"
When configured in this mode, the transceivers will always initiate the auto tuning process upon loss of connection or after a power loss.

The "Sustained" mode will provide a more generic function that will work if the transceivers are moved between different ports or locations. The drawback is that the lock-in time will be longer as compared to the "One-time Execution" mode.

The "One-time Execution" will provide a faster re-establishment of a link after a power loss or after a fiber break. The drawback is that the transceiver will not bring up a connection if moved to another location where different wavelengths are to be used.

MODE OF OPERATION



This example configuration uses the 8ch DWDM filter H-MD-09-929-936 from the Smartoptics H-Series filter platform. The filter uses channels 929 to 936. The matching transceiver to this filter is SO-TSFP10GER-A2I covering channels 928 to 936.

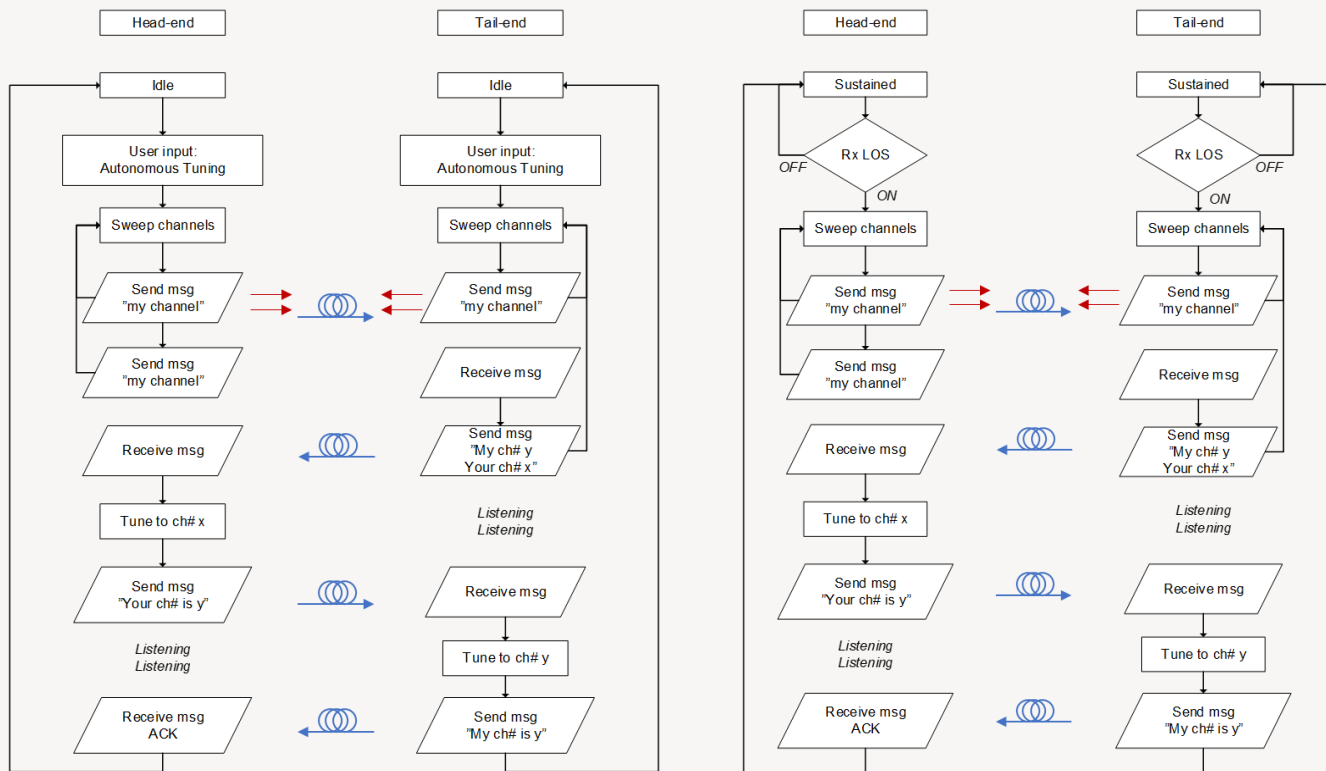
In this example the transceivers are connected to port 933. The filter will only let a channel at this frequency to pass through. The transceivers have no knowledge of what channel it should send to get it through the filters.

As the transceivers start to walk through their channels, the far-end transceiver will only receive a signal only when the near-end transceiver transmits at channel 933. This is also valid in the opposite direction.

Both transceivers will signal the used channel number via the Out-Of-Band (OOB) signaling channel. They will also signal if they have received an optical signal and the channel number that it has received via the OOB-channel.

So both transceivers will eventually receive information from its opponent what channel number it should use. They will then stop the scan and select the correct channel. This process can take up to ~180 seconds.

This procedure works independently if the up-stream and down-stream is using same or different channels. So the automatic tuning will also work in a single-fiber configurations.



Flow charts for "One-time Execution" and "Sustained".