

Quick Installation & Operating Guide

OS414-MM - 20 PORT (4 1x4 DUPLEX) OPTICAL switch



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Installation

OS414 is a Linux based 20 port (4 1x4 duplex) optical switch used in patch panel automation applications. It provides a serial (RS232) and an Ethernet (10/100) port connectivity for management. Serial port is normally used in special situations such as to debug network connectivity if OS414 is not reachable through Ethernet.

You might require a Laptop or a PC to configure OS414 with an IP address before connecting to your network so that you would be able to access OS414 from remote. You could either use Serial or Ethernet port to configure IP. If you use serial port using supplied null modem cable then you would need to configure serial for **38400 baud rate with 8-N-1** to access OS414. If you use Ethernet then you would need to configure the PC or Laptop's IP to match OS414's default network. The default network configuration is as follows

IP Address: 10.1.1.100
Mask: 255.255.255.0
Gateway: 10.1.1.1
DNS: 10.1.1.1

If you have successfully configured Serial or Ethernet then you would see the os414 login prompt; login as "root" to setup network.

root's password: *osctl*

There is one non-root default user available on OS414 which can be used once the switch is setup (for doing switching of port).

username: *osctl*
password: *osctl*

Configuring Static IP

Use "osctl" command to configure a static IP address after login as "root" user. "osctl -?" shows detailed osctl command options with examples.

```
# osctl -i 192.168.1.10 -m 255.255.255.0 -g 192.168.1.1
```

The above command configures IP address of OS414 as 192.168.1.10 with mask 255.255.255.0 and gateway & DNS as 192.168.1. Once the IP is configured from a PC or a Laptop using Ethernet or serial port, you can then connect OS414 to your network and access it using "telnet" or "ssh".

Configuring Dynamic IP

If you have a DHCP server running on your network and you want to dynamically assign an available IP address to OS414 then use following option.

```
# osctl -D
```

Make sure you know the assigned IP address to login using “telnet” or “ssh”.

Configuring Hostname

You can also change the hostname of OS414 switch using “osctl”.

```
# osctl -h OS414-SW-1
```

The above command changes hostname of OS414 to OS414-SW-1.

Configuring DNS/Nameserver

To configure a DNS or Nameserver, you can use “-n” option of osctl.

```
# osctl -n 192.168.1.11
```

Version Info

The following command shows hardware and software versions and serial number of the switch.

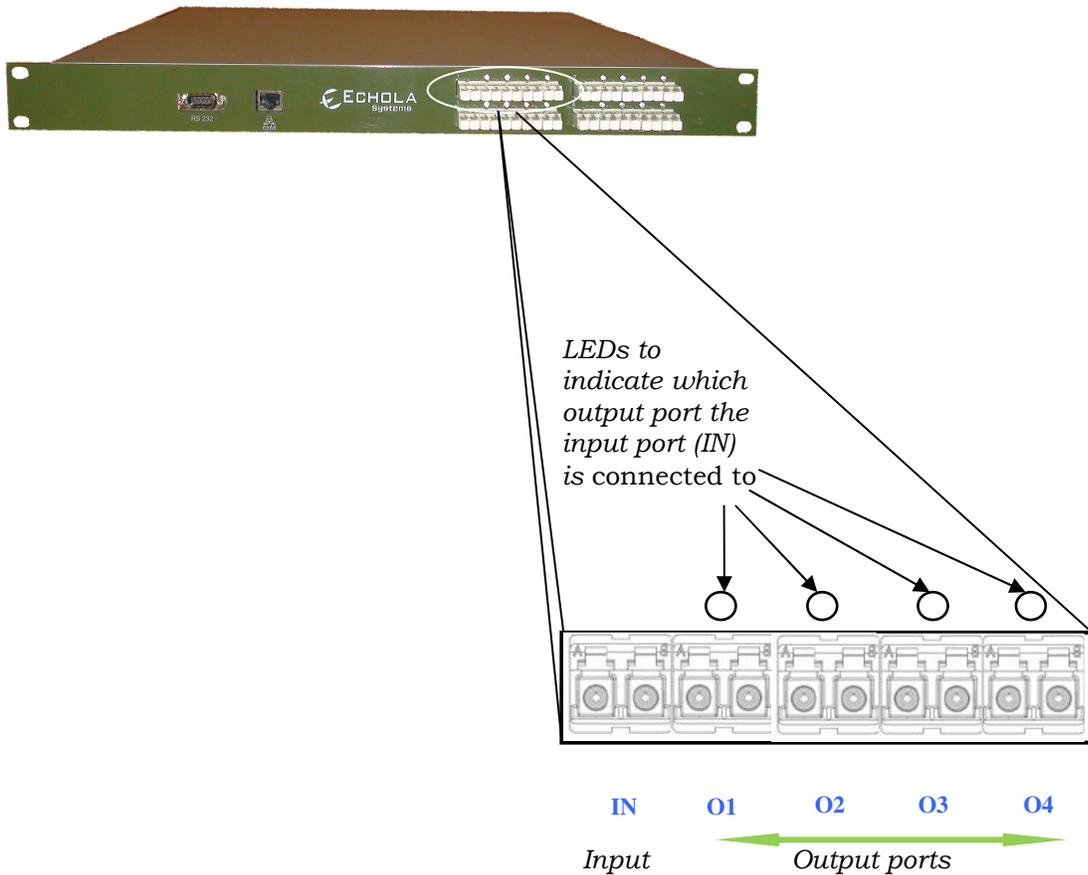
```
# osctl -v
```

Other Administrative commands

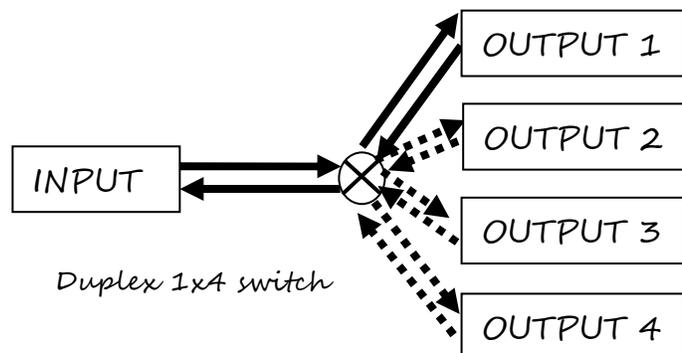
Most of other administrative functions can be done using standard Linux commands. For example, to change the password use “*passwd*” command from the Linux prompt and to add new user use “*useradd*” command. You have to be “root” user in order to add a new user.

Operation

OS414's front panel has 4 port blocks each with 5 LC duplex connectors numbered left to right and top to bottom from 1 to 4. Each port block is an individual duplex 1x4 optical switch, consists of 1 input port labeled as "IN" and 4 output ports labeled as "O1", "O2", "O3" and "O4". *Even though we refer ports as input and output ports they are bi-directional (duplex) so you can use them as either input or output. This means switch can act as 1x4 or 4x1 switch.*



Each input ports' Tx and Rx are internally connected to corresponding output ports' Tx and Rx. OS414 uses 8 such 1x4 switches, as one shown on right, to provide 20 ports connectivity.



The switching of light from input port to any of the four output ports can be achieved using a command line interface. To simplify the operation, all functions are provided in a single command called “osctl”. Osctl provides 3 major functions

1. *Network & Host configuration* (allowed only in “root”)
2. *Switch Control & Status*
3. *Port group Management*

Osctl will show correct syntax usage if you make mistakes in typing command options. It will also provide some examples on how to use the command when you make mistakes. Also you may use “osctl -?” which shows all syntaxes with all examples.

Network & Host configuration

Network setup has 4 different syntaxes.

1. To configure static IP
osctl -i <ip> -m <mask> -g <gw> -n <dns> -h <hostname>
2. To use DHCP
osctl -D
3. To configure hostname alone
osctl -h <hostname>
4. To configure DNS/NameServer
osctl -n <dns ip addr>

For details refer to installation section as these are explained in that section.

Switch Control

In order to switch input to output port 1 to 4 of a particular port block is achieved by using following command.

```
$ osctl -p {<port#/s> | <port_range> | <port_group>} <1|2|3|4> [-t <secs>]
```

Note that the “{}” (braces) groups options and “|” is equivalent to “or”. If the options are in square brackets “[]” then it is optional. *Note: wherever you see in_port# or port# they represent 1 of 4 port block of OS414.*

For example:

```
$ osctl -p 4 1
```

➔ switch input port 4 (port block 4) to output port 1 of same port block. LED on output port 1 lids when this command is issued which confirms that the input port is switched to out port 1.

```
$ osctl -p "1 2 3" 2
```

➔ switch input ports 1, 2 and 3 to their corresponding output port 2. Note that the double quote is required, without double quote the command will fail.

```
$ osctl -p "1-4" 1
```

➔ switch ports 1, 2, 3 and 4 to corresponding output port 1 (range 1 to 4). This comes in handy when you want to switch bunch of ports in order.

```
$ osctl -p gp1 1
```

➔ switch all ports in group "gp1" to corresponding output port 1. You will have to create the group with “-c” option before using above command as explained in “Port group Management” section.

```
$ osctl -p 2 2 -t 120
```

➔ switch port 2 to output port 2 after 120 secs (delayed switching)

Switch Status

Following command shows the status of a port whether it is on/off or status of ports in a pre-defined group.

```
$ osctl -s [<port_group> | <in_port#>]
```

For example:

```
$ osctl -s
```

➔ shows all ports' & groups' status as follows. It shows first all the ports' statuses and tells you which ports are part of a group. The following snippet shows the actual output.

```

                All Ports Status
=====
Port      | Port Status
=====
1         | 1
2         | 3
3         | 4
4         | 4
-----
```

If you have a group configured (see next section) then you might see following as well. **Note that the port groups may not be that useful for OS414.**

```

                Group Status
=====
Group Name | Port Status
=====
gp1       | 1
-----
                Group's Port Details
=====
GroupName: <gp1>
Port Status: 1
Ports in the group: 1 2 3 4
-----
```

```
$ osctl -s gp1
```

➔ shows group "gp1" status only. You will have to create group before using it with "-c" option as explained in "Port group Management" section.

```
$ osctl -s 2
```

➔ shows port 2 status only

Port group Management

Port group management commands provide convenience of switching bunch of ports together identified by a name. Group name can be any alpha-numeric name. Group name can not be just a number or start with a number. For example group name can not be "10" or 10gp1. The following are the group commands. Whenever you see reference to port_group it is same as group name.

Osctl provides 5 different syntaxes to manage port group functions.

1. To create a new group
\$ osctl -c <port_group> {<in_port#/s> | <inport_range>}
2. To update existing group
\$ osctl -u <port_group> {-a | -r <in_port#/s>}
3. To delete a group
\$ osctl -d <port_group>
4. To delete all groups
\$ osctl -R
5. To list ports in a group
\$ osctl -l [<port_group> | <in_port#>]

For example:

```
$ osctl -c gp1 "1 3 4"
```

→ creates group named "gp1" with ports 1,3 and 4. The double quotes around space separated port numbers are required, without that command will fail. Note that when you create a group, all the ports in the gp1 group are *switched to output port 1 by default*.

```
$ osctl -c gp2 "1-3"
```

→ creates group named "gp2" with ports 1,2 and 3 (1 to 3 range)

```
$ osctl -u gp1 -a "2 4"
```

→ adds ports 2 & 4 to existing group gp1

```
$ osctl -u gp1 -a 3
```

→ adds port 3 to existing group gp1

```
$ osctl -u gp1 -r "2 4"
```

→ removes ports 2 & 4 from group gp1

```
$ osctl -d gp1
```

→ deletes group gp1 and release all ports which were part of the group.

\$ osctl -l

→ lists ports in group, like

GroupName: <gp1>

Ports in the group: 1 2 3 4

\$ osctl -R

→ delete all groups in the database.

Troubleshooting

- If you use telnet and is very slow, it could be due to name server / DNS issue. Make sure you have name server configured correctly (-n option). Try “ping <name_server_ip>” to see if name server configured can be reached from OS414. If you don't have dns on your network then you can just remove file “/etc/resolv.conf” and see if it works normal.
- All the group information is stored in a hidden XML database file. If for some reason this file is corrupted, the system will recover from this error by trying to copy the backup database file. If this happens it will throw a warning message but it is not guaranteed that all the group information will be restored correctly. In that case you may need to recreate missing groups.

Hardware Specifications

Electrical

Input Power	100-240 AC
Total Power Consumption	< 7 Watts
Serial Port	1x RS232
Networking	1x 10/100 Ethernet

Optical

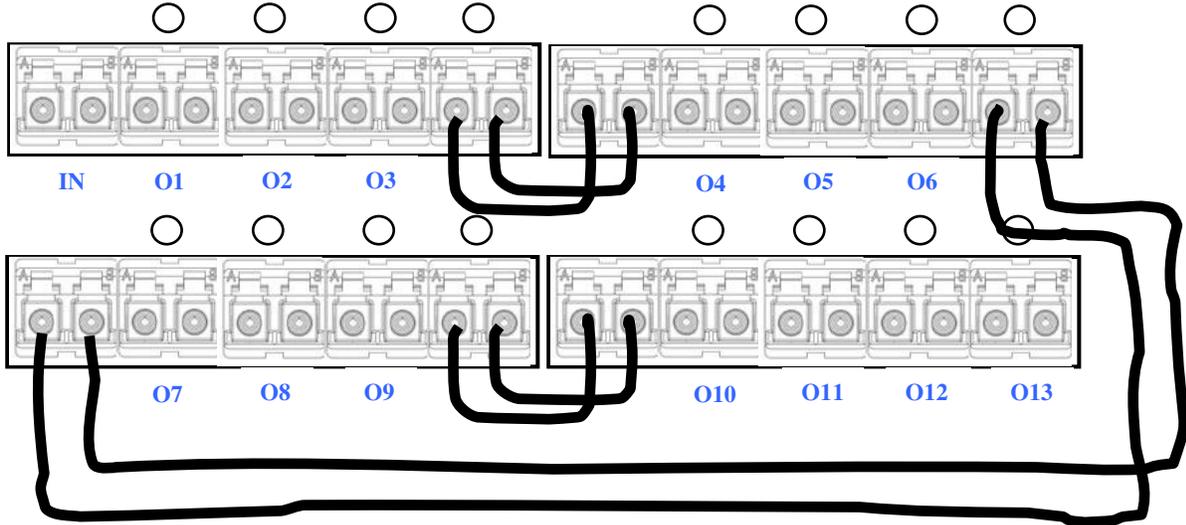
Connectivity	20 Duplex Multimode LC ports
Data rate	No limitation - Physical Layer Switch
Wavelength (nm)	850/1300
Optical Technology	1x4 Electro-mechanical-optical switch
Insertion Loss (dB)	0.5 Typical, 0.8 Max.
Switching Time (ms)	≤ 10
Crosstalk (dB)	≤ -80
Repeatability (dB)	≤ 0.1

Mechanical & Environmental

Each Switch's Durability (Cycles)	> 10 ⁷
Chassis (RU)	1 RU
Dimension (inch)	19 (W) x 16 (D) x 1.75 (H)
Operating Temperature range (°C)	-20 ~ 75
Storage Temperature range (°C)	-40 ~ 70
Humidity	5 – 85 % RH

Appendix A- Cascading OS414

OS414 ports can be cascaded to use as a 1x13 switch. This might be useful if you want to share 13 optical devices with one other optical device. Note that cascading increases the insertion loss but that shouldn't be an issue for most of the applications. To get a 1x13 configuration you will have to make following connections:



The above setup needs some sequence of osctl commands to work. For ports 1 to 3 just use osctl command as in normal case. For ports 4-13 you to follow the following sequence,

```

For port 4
  # osctl -p 1 4 ----- (1)
  # osctl -p 2 1 ----- (2)
For port 5
  # osctl -p 1 4 ----- (1)
  # osctl -p 2 2 ----- (2)
For port 6
  # osctl -p 1 4 ----- (1)
  # osctl -p 2 3 ----- (2)
For port 7
  # osctl -p 1 4 ----- (1)
  # osctl -p 2 4 ----- (2)
  # osctl -p 3 1 ----- (3)
For port 8
  # osctl -p 1 4 ----- (1)
  # osctl -p 2 4 ----- (2)
  # osctl -p 3 2 ----- (3)
  
```

```

For port9
    # osctl -p 1 4          ----- (1)
    # osctl -p 2 4          -----(2)
    # osctl -p 3 3          -----(3)
For port10
    # osctl -p 1 4          ----- (1)
    # osctl -p 2 4          -----(2)
    # osctl -p 3 4          -----(3)
    # osctl -p 4 1          -----(4)
For port11
    # osctl -p 1 4          ----- (1)
    # osctl -p 2 4          -----(2)
    # osctl -p 3 4          -----(3)
    # osctl -p 4 2          -----(4)
For port12
    # osctl -p 1 4          ----- (1)
    # osctl -p 2 4          -----(2)
    # osctl -p 3 4          -----(3)
    # osctl -p 4 3          -----(4)
For port13
    # osctl -p 1 4          ----- (1)
    # osctl -p 2 4          -----(2)
    # osctl -p 3 4          -----(3)
    # osctl -p 4 4          -----(4)

```

It is handy to have a shell script instead of issuing above commands manually.

Appendix B – Chassis installation

It is recommended that you install OS414 1RU chassis on a 19 inch rack that meet ANSI/EIA 310-D and ETS 300-119 standards. We also recommend that you have a 2nd person to assist in the physical installation of the chassis as its heavy.

Make sure you install the chassis with all 4 screws tightened to the rack. If installation is not proper you might see that the chassis is not flat (leveled) to the ground, in that case it is recommended that you install OS414 on a rack tray with rear brackets that comes with the tray. Trays are sold separately by many vendors. One of them is RUI from California -> <http://www.rui.cc/RACK%20TRAYS.htm>. Also make sure there are no heavy equipments sitting (unmounted equipments) on top of OS414.

After installing the chassis, connect the power cable to the power socket at the back of the chassis and connect the Ethernet port of OS414 at the front panel with a cross-over/straight cable to a PC/Switch/Laptop to configure network. Also connect optical devices using multimode cables to the input and output ports of OS414. Make sure Tx and Rx of MM cable are connected to B and A of LC connector respectively on both OS414 input and output ports. The order of optical connection is important; if you connect Tx to B then follow same order on output side as well. Similarly if chose to connect Tx to A then follow same order on ouput. This is because switch implements straight through connection as opposed to cross-over.

Contact Info

If you have any technical questions and need help you can send email to support@echola.com or call 408-321-9663. You can also download latest documents and software from our website www.echola.com.