



OM1006A

Industrial Ethernet Switch

Four 10/100/1000BASE-T PoE/PoE+ ports
Two 100/1000BASE-X SFP optical ports

USER MANUAL

Rev. 1.1

July 7, 2014

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Part 15 Class A

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Manual Revision History

- Revision 1.0 Initial release September 6, 2013
- Revision 1.1 Document tap aggregator option

Table of Contents

Description.....	1
USB Console Port.....	3
SFP Selection.....	3
PoE Card.....	4
Power Inputs.....	4
Alarm Relay.....	5
Management Interface.....	5
Main Menu.....	6
Options Menu.....	7
Ethernet Setup Menu.....	7
PoE Setup Menu.....	11
Alarm Setup Menu.....	14
Software Upload Menu.....	15
Ethernet Diagnostic Menu.....	16
Register Diagnostics Menu.....	16
Reset Switch.....	16
Set Password.....	17
Ordering Information.....	18
Accessories.....	19
DIN Rail Mounting Clip.....	19
Spare Power Cube.....	19
Rack Mount Panel.....	19
Specifications.....	20
Certification.....	21
Warranty.....	21

Description

The OM1006A Ethernet switch has four 10/100/1000BASE-T electrical ports and two optical SFP ports. The available SFP modules support a variety of distance requirements, wavelengths, optical speeds, and fiber types. Both 100BASE-X and 1000BASE-X SFP modules are supported for compatibility with existing equipment. LED bar graphs show the received optical power for each SFP making it easy to diagnose fiber connection problems.

Power over Ethernet (PoE) support is optional. The four RJ45 Ethernet ports can support either PoE or PoE+ as per IEEE Std 802.3at-2009. This allows convenient connection of surveillance cameras, wireless access points and IP phones in situations where local power is not readily available. The OM1006A can deliver up to 30 Watts of power per port. Total power delivery depends on the supplied power adapter(s). Both Alternative A and Alternative B pinouts are supported.

All connectors are on the front for easy access. The OM1006A has redundant power inputs. Power adapters are available for both non PoE and PoE applications. A relay contact closure is provided for alarms on link, power and PoE power delivery. A USB serial console interface is provided for status, configuration and software updates.

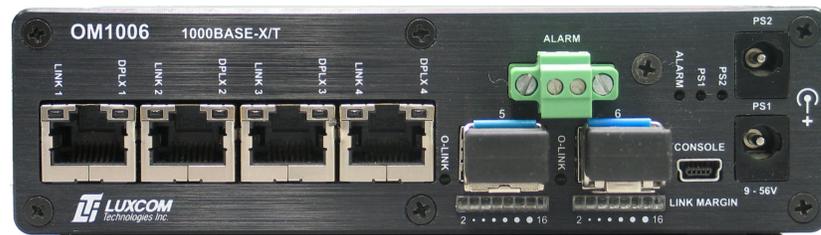
The OM1006A is designed to meet the requirements of IEEE 802.3at-2009 (Environment A) and the electrical safety requirements of UL60950-1.

The compact rugged metal enclosure ensures low radiated and conducted emissions. It can be DIN rail or 19" rack mounted with optional hardware.

The OM1006A can operate in several modes. It can be configured as a standard six port switch. Ports 5 and 6 can be configured as a redundant fiber trunk. It can function as a dual media-converter or port-to-port dual media-converter. Finally, it can be configured in a secure 802.1Q VLAN port fan out mode for segregated traffic.

Features

- Two 100BASE-X/1000BASE-X optical SFP ports
- Single or multimode fiber operation
- Single fiber bidirectional option
- Receive optical power meters
- Distances up to 100 km
- Power over Ethernet
- Four 10/100/1000BASE-T ports
- DIN rail and 19" rack mounting option
- Power/PoE/Link fail alarm relay
- Redundant power supply inputs
- Industrial temperature -40°C to 70°C
- 5 Year warranty



Indicators

ALARM	Red when an enabled alarm condition is present.
PS1	Green when power is applied to power input 1.
PS2	Green when power is applied to power input 2.
LINK (Ports 1-4)	<p>Green when a 1000BASE-T LINK has been established.</p> <p>Orange-Green when a 100BASE-TX LINK has been established.</p> <p>Orange when a 10BASE-T LINK has been established.</p> <p>Flashes when data is transmitted or received.</p>
HDPLX (Ports 1-4)	<p>Yellow when the port is half duplex.</p> <p>Off when the port is not in half duplex.</p>
O-LINK (Ports 5-6)	<p>Green when a bidirectional OPTICAL LINK has been established.</p> <p>Flashes when data is transmitted or received.</p>
LINK MARGIN (Ports 5-6)	<p>This bar graph displays the optical link margin (remaining signal strength before link loss) in 2 dB increments. When less than 1dB of link margin is left, the first indicator flashes. All indicators flash when a receiver overload condition may be present. When all the indicators are off, the optical signal is absent or weak, or an SFP without Digital Diagnostics is installed. See the SFP Selection section. For 1000BASE-X optical modules, the link margin is typically about 12 dB (six indicators on). As the fiber length increases the number of indicators decreases. The <i>Specification</i> section shows the link margins for different optics.</p>

USB Console Port

The OM1006A has an isolated USB mini B console interface using a USB UART. The UART is USB bus powered, so the OM1006A's status can be observed at power on. The port settings are 38400 bps, 8 data bits, no parity, 1 stop bit and no flow control.

Windows systems require installation of a FTDI Chip device driver. The system will prompt to install the driver when the OM1006A is first connected. The driver can be downloaded automatically from the Internet or manually from FTDI.

Windows allocates a USB serial COM port when the OM1006A is connected but it doesn't inform the user as to which port it allocated. This can be determined by opening the Ports (COM & LPT) tab in the Windows Device Manager.

The OM1006A is shipped with a fixed USB device serial number (12345678). As a result, the same driver instance is selected by Windows for all units. If multiple OM1006A units are connected to a USB hub, it may be desirable to program different serial numbers for each unit. This can be done with the FTDI MProg application.

A serial terminal program such as HyperTerminal, Tera Term Pro or Putty is required to connect to the OM1006A console interface. For software uploads, the program must support the Xmodem protocol. Connect to the OM1006A using the selected COM port and terminal settings shown above.

See the *Management Interface* section for information on configuring the OM1006A.

SFP Selection

Several types of SFP modules are available for different Ethernet optical links. It is important that the SFP's wave length match the link partner's - 850, 1310, or 1550 nm. As well, the SFP must be compliant with the *port's optical mode* (100BASE-X or 1000BASE-X).

The SFP modules supplied by Luxcom have digital diagnostics which enable the bar graphs to display received optical power. Detailed diagnostic information is also available using the console interface. SFPs without digital diagnostics can be used but the power meters will not work.

The Luxcom 1000-LX SFP transmits into both multimode and singlemode fiber, but the transmission distance in multimode fiber is greatly reduced because of bandwidth limitations caused by modal dispersion. Modal dispersion varies greatly from fiber to fiber. The 1000-LX distances in multimode fiber assume that a mode conditioning patch cord is installed. See the *Specifications* section for more information.

The 1000-ZX/ZXE SFP is used for distances up to 100 km. It uses 1550 nm laser optics. These optics are usually used in matched pairs because the

optical transmit and receive specifications are not standardized.

SFP modules should only be inserted when the unit is not powered. This avoids I2C bus faults that sometimes occur when a module is inserted.

Luxcom modules are recommended to ensure compatibility.

See the *Ordering Information* section for the available SFP modules.

PoE Card

When the OM1006A is shipped with a PoE card, it is shipped with the PoE jumpers positioned for “Alternative A” (jumpers toward middle of card). The jumpers can be repositioned for “Alternative B” (power on spare pairs) by moving the jumpers to the edge of the card. There are two jumpers per port and they both have to be positioned identically.

The eight internal PoE jumpers can be removed for non PoE applications. This ensures power supply isolation from the MDI pins.

Power Inputs

Currently, Luxcom provides a 60 Watt 56V supply for PoE+ and a 70 Watt 48V supply for PoE. A 12V supply is provided for non PoE applications.

These supplies have a maximum operating temperature of 40°C except for the 70 Watt supply. It can operate at ambient temperatures up to 60°C but its output must be derated to 56 Watts at this temperature.

There are two power inputs on the OM1006A. Generally only one input is used; however both may be used for redundancy. The higher voltage supply powers the unit. Power sharing can occur when both inputs are at the same voltage.

When the PoE card is not installed, both power inputs can be any voltage between 9.0V and 36.0V.

The following considerations must be taken into account when using non Luxcom power supplies.

The unit accepts 2.1 x 5.5 x 9.5 mm center positive barrel connectors.

For PoE operation, a 48V, 54V or 56V supply must be used. The minimum input voltage is 45.0 V and the maximum 57.0 V. For PoE+ operation, a 54V or 56V supply must be used and the minimum voltage is 51.0 V. The control logic turns on at approximately 31.6 V. It turns off at 29.5 V. On over-voltage, it turns off at approximately 62.7 V and on at 60.3 V.

In order to meet safety regulations and the requirements of IEEE 802.3at, the OM1006A must be powered by one or two fully isolated power supplies (IEC/EN 61140 protection class II, double insulated). Frame ground must not be connected to any power lead. The supply must be capable of withstanding 2250 VDC between its outputs and frame ground if present. The power

conductors must not be accessible.

Class II supplies typically have a C8 or C18 A/C connector, and the double insulated icon on the label.

Power adapters with a C14 A/C connector are typically Class 1 supplies and frame ground is connected to the secondary V- output. Thus, they don't meet the isolation requirement.

A protection class II supply is not the same as a Class 2 supply. A Class 2 Power Supply does not have to be double insulated. Class 2 supplies are limited to a maximum output of less than 100 Watts. They have reduced requirements regarding insulation, wire size, derating factors, and over-current protection compared to Class 1 supplies.

The OM1006A is a limited power source as defined in IEC 60950-1. Each PoE output is independently fused. This limits the maximum output current per port to less than 1.75 A and the maximum output power to less than 100 Watts. In normal operation, this limit should never occur as the PoE port controller limits output current based on port classification and PoE mode.

The maximum power output of the OM1006A is limited by supply capability. Care must be taken to ensure that the output load doesn't drag down the input supply voltage.

The input voltage to the PoE controller (V_{ee}) is monitored to ensure that the port output voltages comply with the requirements of IEEE Std 802.3at-2009. The minimum port voltage is 44.0 V and 50.0 V for PoE and PoE+, respectively. The ports are shutdown on over-voltage and under-voltage conditions. Brief under-voltage transients are permitted as long as they aren't more than 7.6 % below the minimum port voltage. Low priority ports are shutdown first when a small under-voltage is present.

Alarm Relay

The relay contact on the front of the modem closes when a monitored condition fails or the control microprocessor fails to open the relay contact. Alarm conditions are set using the console. The contact closure may be used to trigger an audible or visible alarm. See the *Specification* section for the relay rating.

Management Interface

The OM1006A has a menu driven management interface to display status of subsystems and to configure the unit. The menu system is hierarchical. Menu actions are specified by entering a single alphanumeric character. A <CR> causes the current menu to redisplay. <ESC> goes up one menu level except at the top level. <ESC> can also be used to abort numeric and string entries. This causes the action to be aborted.

Main Menu

The main menu is shown below and some of its status displays:

```

OM1006 Main Menu
1) Show Ethernet status
2) Show PoE status
3) Show SFP status
4) Options menu
5) Software upload menu
6) Ethernet diagnostics menu
7) Register diagnostics menu
8) Reset switch
9) Set password

:> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

Mode: SFP ports (5 and 6) trunked
Monitor Mode: Off

Ethernet Status
Port  VID  Link          Auto          Speed          Duplex          MDI/MDI-X
      VID  Good          Negotiation
P1     0  No          Enabled        NA              NA              NA
P2     0  No          Enabled        NA              NA              NA
P3     0  No          Enabled        NA              NA              NA
P4     0  Yes         Enabled        100BASE-TX     Full-Duplex    MDI-X
P5     0  Yes         Enabled        1000BASE-X    Full-Duplex    NA
P6     0  Yes         Enabled        1000BASE-X    Full-Duplex    NA

:> 2
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

PoE Status and Configuration
Port  PwrGood  PwrEnable  Class  Detect
P1     No      Off        Unknown  Ropen
P2     No      Off        Unknown  Ropen
P3     No      Off        Unknown  Ropen
P4     No      Off        Unknown  Ropen

Port  Priority  PoE+  DisconEn  Mode  Icut (mA)  Current (mA)
P1     High    Yes   Yes       Automatic  374.4      0.0
P2     High    Yes   Yes       Automatic  374.4      0.0
P3     High    Yes   Yes       Automatic  374.4      0.0
P4     High    Yes   Yes       Automatic  374.4      0.0

Vee (Volts)  OverTemp  VeeUVLO  AltB  HRev  FRev
-53.069      No        No       No    b    0.2.79

:> 3
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

Port 5: SFP Diagnostic Values
Parameter  Units  Value  High  Low  High  Low
           Units  Value  Alarm Alarm Warning Warning
T           C    46.6  100.0 -50.0  100.0 -50.0
Vcc         V    3.18  5.00  0.00  5.00  0.00
TX Bias     mA   30.7  100.0  0.0  100.0  0.0
TX Power    dBm  -4.6  7.0  -40.0  7.0  -40.0
RX Power    dBm  -4.5  7.0  -40.0  7.0  -40.0

Port 6: SFP Diagnostic Values
Parameter  Units  Value  High  Low  High  Low
           Units  Value  Alarm Alarm Warning Warning
T           C    43.2  90.0 -45.0  85.0 -40.0
Vcc         V    3.32  3.50  3.10  3.45  3.15
TX Bias     mA   16.8  100.1  6.0  90.0  7.0
TX Power    dBm  -5.8  -3.0  -9.5  -3.5  -9.0

```

RX Power dBm -4.9 -3.0 -21.0 -3.5 -20.5

Options Menu

The options menu is the entry point for configuring the Ethernet and PoE subsystems, and for enabling alarms:

```
> 4
OM1006A Options Menu
1) Name modem
2) Ethernet setup menu
3) PoE setup menu
4) Alarm setup menu
Esc Back

> 1
Enter modem name: merlin
>
```

Ethernet Setup Menu

The Ethernet setup menu is shown below:

```
> 2
OM1006A Ethernet Options Menu
1) Show Ethernet status
2) Set switch operation mode
3) Enable port auto negotiation
4) Force port speed, duplex and crossover
5) Set port 5 transceiver mode
6) Set port 6 transceiver mode
7) Setup monitoring (mode, destination and source)
8) Set port VID for 802.1Q VLAN switch mode
Esc Back
```

```
> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30
```

Mode: SFP ports (5 and 6) trunked
Monitor Mode: Off

Ethernet Status						
Port	VID	Link	Auto Negotiation	Speed	Duplex	MDI/MDI-X
P1	0	No	Enabled	NA	NA	NA
P2	0	No	Enabled	NA	NA	NA
P3	0	No	Enabled	NA	NA	NA
P4	0	Yes	Enabled	100BASE-TX	Full-Duplex	MDI-X
P5	0	Yes	Enabled	1000BASE-X	Full-Duplex	NA
P6	0	Yes	Enabled	1000BASE-X	Full-Duplex	NA

```
> 2
Mode    Description
0      All ports switched
1      SFP ports (5 and 6) trunked
2      Dual media-converter (ports 1, 2, 5 and 3, 4, 6)
3      Port-to-port dual media-converter
4      Secure 802.1Q VLAN port fan out (EndSpan)
5      Secure 802.1Q VLAN port fan out (MidSpan)
6      SPAN port tap aggregator
```

Enter operation mode (0 to 6) [0]: 1

“All ports switched” mode is the default operation mode of the modem. In this mode, packets entering a port can exit any other port. The switch learns destination addresses.

“SFP ports (5 and 6) trunked” mode is similar except ports 5 and 6 are trunked for added performance and link reliability. Two units must be used back-to-back in this mode. A hash algorithm based on the source and destination addresses of a packet is used for load balancing. If link fails on one port, its traffic is switched over to the remaining port.

“Dual media-converter” mode splits the unit into two separate three port switches using port-based VLANs. The two port groups are completely separate and packets cannot cross the VLAN boundary. Within a port group, packets are switched in the default manner. Ports 1, 2 and 5 make up one group and ports 3, 4 and 6 the other group.

“Port-to-port dual media-converter” mode is a special mode to carry up to four separated streams between a pair of media converters connected back-to-back. Port 1 on converter 1 connects to port 1 on converter 2, etc. Packets are restricted by port-based VLANs and interchip tagging from exiting any other port.

“Secure 802.1Q VLAN port fan out (EndSpan)” mode is similar to the **“Port-to-port dual media-converter”** mode in that 802.1Q VLAN tags are used to restrict ports 1 through 5 to a single VLAN. So, if a pair of media converters are connected back-to-back using port 6 and both port 1's are set to VLAN ID 1, then port 1 on converter 1 will only connect to port 1 on converter 2. Packets are restricted by port-based VLANs and 802.1Q tags from exiting any other port.

Because this mode uses 802.1Q tags, the mode is not transparent to tagged packets. When a packet enters port 1, it exits port 6 with a VLAN tag containing port 1's VLAN ID (VID). If a VLAN tagged packet enters port 1, its VID is replaced by port 1's VID. When a packet exits port 1, its VLAN tag is removed. Packets exiting port 6 are always tagged. All untagged packets entering port 6 are dropped. A tagged packet entering port 6 will be dropped if it is not a member of the VLAN VTU database or if the egress port specified in the VTU database is not allowed by the port-based VLAN settings. Further, each VLAN uses a separate forwarding information database to ensure that packets can't tunnel between VLANs. Monitoring is also disabled in this mode. For these reasons, the mode is termed secure.

Port 6 can be connected to a larger managed switch that can switch VLANs. In this way, up to five separate VLANs can be securely distributed to a location using fiber. As the tagging is all done by the OM1006A, the attached equipment doesn't have to be VLAN aware. The managed switch can perform device authentication (802.1X) if desired.

Port 6 can also connect to a OM1006A in **“Secure 802.1Q VLAN port fan out (MidSpan)”** mode. This mode is similar to the **“Secure 802.1Q VLAN port fan out (EndSpan)”** mode except that both ports 5 and 6 are tagged VLAN ports. This allows a string of OM1006A modems to interconnect a set of VLANs. The VID assigned to a port must be unique within a modem and each modem can switch a maximum of 64 VLANs.

“SPAN port tap aggregator” is a special mode to aggregate Ethernet wire

Management Interface

taps. Incoming packets on ports 1 through 5 egress only on fiber port 6. Learning is disabled on ports 1 through 5 to ensure that packets received on these ports are flooded to port 6. Incoming packets on port 6 are dropped and no packets egress ports 1 through 5. Auto-negotiation still occurs on port 6 in 1000BASE-X mode, so the link status for this port correctly reflects the status of the fiber link.

Commands which change the current operating mode or port configuration generally result in a unit reset. This causes the Ethernet switch to be reset, shutting down all ports briefly until they are reconfigured.

The next two commands are used to enable auto-negotiation or forced mode on a port. For example,

```
>> 4
Enter port (1 to 4): 3
Enter speed (0 = 100BASE-TX, 1 = 10BASE-T) [0]:
Enter duplex mode (0 = full duplex, 1 = half duplex) [0]:
Enter crossover mode (0 = MDI-X, 1 = MDI) [0]:

>> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

Mode: SFP ports (5 and 6) trunked
Monitor Mode: Off

Ethernet Status
Port  VID  Link      Auto          Speed      Duplex      MDI/MDI-X
      Good  Negotiation
P1     0  No      Enabled      NA         NA         NA
P2     0  No      Enabled      NA         NA         NA
P3     0  No      Disabled    100BASE-TX Full-Duplex MDI-X
P4     0  Yes     Enabled      100BASE-TX Full-Duplex MDI-X
P5     0  Yes     Enabled      1000BASE-X Full-Duplex  NA
P6     0  Yes     Enabled      1000BASE-X Full-Duplex  NA

>> 3
Enter port (1 to 4): 3
>> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

Mode: SFP ports (5 and 6) trunked
Monitor Mode: Off

Ethernet Status
Port  VID  Link      Auto          Speed      Duplex      MDI/MDI-X
      Good  Negotiation
P1     0  No      Enabled      NA         NA         NA
P2     0  No      Enabled      NA         NA         NA
P3     0  No      Enabled      NA         NA         NA
P4     0  Yes     Enabled      100BASE-TX Full-Duplex MDI-X
P5     0  Yes     Enabled      1000BASE-X Full-Duplex  NA
P6     0  Yes     Enabled      1000BASE-X Full-Duplex  NA
```

The next two commands configure ports 5 and 6 to 1000BASE-X or 100BASE-FX. For example,

```
>> 5
Enter port mode (0 = 1000BASE-X, 1 = 100BASE-FX): 0
```

The final Ethernet setup command is to setup port monitoring. This involves selecting a monitor mode, and destination and source ports. Ports 5 and 6 cannot be used as a monitor source or destination in the "SFP ports (5 and 6)

trunked” and “Port-to-port dual media-converter” modes.

Here is an example showing the mirroring setup:

```
> 7
Mode  Description
  0    Monitoring off
  1    Ingress monitoring
  2    Egress monitoring
  3    Ingress and Egress monitoring

Enter monitor mode (0 to 3) [0]: 1
Enter monitor destination port (1 to 4): 1
Enter monitor source port (1 to 4): 4
Luxcom Technologies Inc.
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

OM1006 Main Menu
1) Show Ethernet status
2) Show PoE status
3) Show SFP status
4) Options menu
5) Software upload menu
6) Ethernet diagnostics menu
7) Register diagnostics menu
8) Reset switch
9) Set password

> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

Mode: SFP ports (5 and 6) trunked
Monitor Mode: Ingress, Destination port 1, Source port 4

Ethernet Status
Port  VID  Link  Auto  Speed  Duplex  MDI/MDI-X
      Good  Negotiation
P1    0  No    Enabled  NA      NA      NA
P2    0  No    Enabled  NA      NA      NA
P3    0  No    Enabled  NA      NA      NA
P4    0  Yes   Enabled  100BASE-TX  Full-Duplex  MDI-X
P5    0  Yes   Enabled  1000BASE-X  Full-Duplex  NA
P6    0  Yes   Enabled  1000BASE-X  Full-Duplex  NA

> 4
OM1006A Options Menu
1) Name modem
2) Ethernet setup menu
3) PoE setup menu
4) Alarm setup menu
Esc Back

> 2
OM1006A Ethernet Options Menu
1) Show Ethernet status
2) Set switch operation mode
3) Enable port auto negotiation
4) Force port speed, duplex and crossover
5) Set port 5 mode
6) Set port 6 mode
7) Setup monitoring (mode, destination and source)
Esc Back

> 7
Mode  Description
  0    Monitoring off
  1    Ingress monitoring
  2    Egress monitoring
  3    Ingress and Egress monitoring
```

Management Interface

Enter monitor mode (0 to 3) [0]:

```
Luxcom Technologies Inc.
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30
```

```
OM1006 Main Menu
1) Show Ethernet status
2) Show PoE status
3) Show SFP status
4) Options menu
5) Software upload menu
6) Ethernet diagnostics menu
7) Register diagnostics menu
8) Reset switch
9) Set password
```

```
:> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30
```

```
Mode: SFP ports (5 and 6) trunked
Monitor Mode: Off
```

Ethernet Status						
Port	VID	Link	Auto	Speed	Duplex	MDI/MDI-X
		Good	Negotiation			
P1	0	No	Enabled	NA	NA	NA
P2	0	No	Enabled	NA	NA	NA
P3	0	No	Enabled	NA	NA	NA
P4	0	Yes	Enabled	100BASE-TX	Full-Duplex	MDI-X
P5	0	Yes	Enabled	1000BASE-X	Full-Duplex	NA
P6	0	Yes	Enabled	1000BASE-X	Full-Duplex	NA

The following example shows how to set the port VID for “**Secure 802.1Q VLAN port fan out**” mode:

```
:> 8
Enter port (1 to 5): 1
Enter unique port VID (1-4094 or 0 to isolate)[1]: 1
:> 1
OM1006A Ethernet Switch
OM1006A BootLoader 1.0 Apr 12 2013 11:48:17
OM1006A Application 1.4 Aug 13 2013 17:03:03
```

```
Mode: Secure 802.1Q VLAN port fan out (EndSpan)
Monitor Mode: Off
```

Ethernet Status						
Port	VID	Link	Auto	Speed	Duplex	MDI/MDI-X
		Good	Negotiation			
P1	1	No	Enabled	NA	NA	NA
P2	2	No	Enabled	NA	NA	NA
P3	0	No	Enabled	NA	NA	NA
P4	0	No	Enabled	NA	NA	NA
P5	0	No	Enabled	1000BASE-X	NA	NA
P6	0	Yes	Enabled	1000BASE-X	Full-Duplex	NA

A port can be set to any unique VID between 1 and 4094. VLAN IDs 0 and 4095 are reserved for special purposes in VLAN tags. We use an entry value of 0 to isolate a port from all other ports. Effectively, this disables a port although it will still link. So, in the example, ports P3, P4 and P5 are isolated and ports P1 and P2 have their default VID values.

PoE Setup Menu

The PoE setup menu and the PoE status are shown below:

```
OM1006A PoE Options Menu
1) Show PoE status
2) Set PoE port config
3) Set port current limit
4) Power on manual/semiauto ports
5) Shutdown low-priority ports
6) Reset PoE chip
7) Reconfigure shutdown ports
Esc Back
```

```
:> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30
```

```
PoE Status and Configuration
Port PwrGood PwrEnable Class Detect
P1 No Off Unknown Ropen
P2 No Off Unknown Ropen
P3 No Off Unknown Ropen
P4 No Off Unknown Ropen
```

```
Port Priority PoE+ DisconEn Mode Icut (mA) Current (mA)
P1 High Yes Yes Automatic 374.4 0.0
P2 High Yes Yes Automatic 374.4 0.0
P3 High Yes Yes Automatic 374.4 0.0
P4 High Yes Yes Automatic 374.4 0.0
```

```
Vee (Volts) OverTemp VeeUVLO AltB HRev FRev
-53.248 No No No b 0.2.79
```

The PoE controller has four modes: shutdown, manual, semi-auto and automatic. The mode shown in the status display is the port's actual mode. This may differ from the configured mode if the port has been shutdown.

While ports can be configured to manual and semi-auto, these are primarily useful for testing purposes. These commands can be used to power legacy and non compliant devices since I_{CUT} is not set based on class.

At this time, the control software doesn't support powering devices automatically in manual and semi-auto modes. In manual and semi-auto modes, ports can be powered by the "Power on manual/semiauto ports" command. I_{CUT} can be changed after a port is powered.

In automatic mode, detection classification and port powering are all automatic with no host intervention required. I_{CUT} and I_{LIM} are automatically set according to the PoE+ mode and classification result. The PoE+ bit specifies the DC current limit (I_{LIM}) at either 425 mA or 850 mA nominal.

V_{EE} must be between 50.0 V and 57.0 V if any port is configured for PoE+.

The "DisconEn" bit must be set to remove power on disconnect. Normally, disconnect enable should be on.

"PwrGood" indicates that the port has been turned on and the port voltage is within two volts of V_{EE} . "PwrEnable" indicates the port has been turned on. Class and detect status are also provided in the status data.

Ports can be configured as shown in the following example:

```
:> 2
```

Management Interface

```
Enter port (1 to 4): 1

PoE Port Configuration
Bits Description
  4 0 = High priority
    1 = Low priority
  3 0 = PoE
    1 = PoE+
  2 0 = DisconEn Off
    1 = DisconEn On
  1:0 0 = Shutdown
       1 = Manual
       2 = Semiauto
       3 = Auto

Enter port config (hex) [0x0F]: 1f
:> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

PoE Status and Configuration
Port PwrGood PwrEnable Class Detect
P1 No Off Unknown Unknown
P2 No Off Unknown Ropen
P3 No Off Unknown Ropen
P4 No Off Unknown Ropen

Port Priority PoE+ DisconEn Mode Icut (mA) Current (mA)
P1 Low Yes Yes Shutdown 374.4 0.0
P2 High Yes Yes Automatic 374.4 0.0
P3 High Yes Yes Automatic 374.4 0.0
P4 High Yes Yes Automatic 374.4 0.0

Vee (Volts) OverTemp VeeUVLO AltB HRev FRev
-53.248 No No No b 0.2.79
:> 3
Enter port (1 to 4): 1
Enter port Icut (3.2 mA * hex) [0x75]: 0x80
:> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

PoE Status and Configuration
Port PwrGood PwrEnable Class Detect
P1 No Off Unknown Unknown
P2 No Off Unknown Ropen
P3 No Off Unknown Ropen
P4 No Off Unknown Ropen

Port Priority PoE+ DisconEn Mode Icut (mA) Current (mA)
P1 Low Yes Yes Shutdown 409.6 0.0
P2 High Yes Yes Automatic 374.4 0.0
P3 High Yes Yes Automatic 374.4 0.0
P4 High Yes Yes Automatic 374.4 0.0

Vee (Volts) OverTemp VeeUVLO AltB HRev FRev
-53.248 No No No b 0.2.79
```

It is not valid to change the PoE+ bit after a port has been powered. Thus, ports are reset (shutdown) prior to reconfiguration. The configuration and I_{CUT} value for a port are restored by doing a microcontroller reset or power on.

The “Power on manual/semiauto ports” command attempts to turn-on ports in manual or semi-auto mode. It doesn't turn-on shutdown or automatic ports.

In the semi-auto mode, port turn-on is delayed until the next detection and classification. The port will not power if the detection or classification is not valid.

In manual mode, detection and classification are disabled. The commands forces a single classification to turn-on the port. Detection is not done and the detect status will always indicate "Unknown".

The "Shutdown low-priority ports" command turns off low priority ports.

The "Reset PoE chip" command resets the PoE controller to its default state. It can be useful testing PoE devices. The following shows the result of doing a "Reset PoE chip" command:

```
> 6
> 1
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 09:26:30

PoE Status and Configuration
Port PwrGood PwrEnable Class Detect
P1 No Off Unknown Unknown
P2 No Off Unknown Unknown
P3 No Off Unknown Unknown
P4 No Off Unknown Unknown

Port Priority PoE+ DisconEn Mode Icut (mA) Current (mA)
P1 High No Yes Shutdown 374.4 0.0
P2 High No Yes Shutdown 374.4 0.0
P3 High No Yes Shutdown 374.4 0.0
P4 High No Yes Shutdown 374.4 0.0

Vee (Volts) OverTemp VeeUVLO AltB HRev FRev
-53.248 No No No b 0.2.79
```

Finally, the "Reconfigure shutdown ports" command attempts to reconfigure shutdown ports. The command may fail if one or more ports have been shutdown due to over-current, under-voltage, etc, and the fault hasn't been corrected.

Alarm Setup Menu

The alarm setup menu is shown below:

```
OM1006 Alarm Options Menu
0) Show alarm status
1) Toggle port 1 link alarm enable
2) Toggle port 2 link alarm enable
3) Toggle port 3 link alarm enable
4) Toggle port 4 link alarm enable
5) Toggle port 5 link alarm enable
6) Toggle port 6 link alarm enable
7) Toggle power 1 input alarm enable
8) Toggle power 2 input alarm enable
Esc Back

> 1
Alarm Description Alarmed Status
Port 1 Link Lost Yes LOST
Port 2 Link Lost No
Port 3 Link Lost No
Port 4 Link Lost No
Port 5 Link Lost No
Port 6 Link Lost No
Power 1 Input Lost No
Power 2 Input Lost No
>
```

Alarm enables are provided for the following conditions: link lost for ports 1 through 6, and power supply inputs 1 and 2. When an alarm is enabled and the alarmed condition is present, the status is shown as “LOST”. When a “LOST” condition is present, the alarm LED is turned on and the contact on the alarm relay is closed. One can determine the source using the “Show alarm status” command.

Software Upload Menu

The software upload menu provides a means to upload new software and to view the status of current uploads. It uses the xmodem protocol available in HyperTerminal® and other terminal programs. The example below shows a sample upload:

```
> 5
Software Upload Menu
1) Show stored files
2) Upload new BACKUP
3) Swap BACKUP and PRIMARY
4) Reprogram card with PRIMARY
Esc Back

> 1
PRIMARY MCU software file
Model: OM1006A Ethernet Switch
Card: OM1006A Application 1.0 Sep 14 2012 09:26:30

BACKUP MCU software file
Model: OM1006A Ethernet Switch
Card: OM1006A Application 1.0 Sep 14 2012 09:26:30
> 2
Delete BACKUP file (y/n): y
Start Xmodem transfer (Send File)
CCC
File upload successful
65536 bytes uploaded
> 3
BACKUP file is now PRIMARY file
> 4
Flash command issued successfully.

Luxcom Technologies Inc.
OM1006A Ethernet Switch (merlin)
OM1006A BootLoader 1.0 May 07 2012 11:50:01
OM1006A Application 1.0 Sep 14 2012 13:55:29

OM1006 Main Menu
1) Show Ethernet status
2) Show PoE status
3) Show SFP status
4) Options menu
5) Software upload menu
6) Ethernet diagnostics menu
7) Register diagnostics menu
8) Reset switch
9) Set password

> 5
Software Upload Menu
1) Show stored files
2) Upload new BACKUP
3) Swap BACKUP and PRIMARY
4) Reprogram card with PRIMARY
Esc Back

> 1
PRIMARY MCU software file
Model: OM1006A Ethernet Switch
```

Card: OM1006A Application 1.0 Sep 14 2012 13:55:29

BACKUP MCU software file

Model: OM1006A Ethernet Switch

Card: OM1006A Application 1.0 Sep 14 2012 09:26:30

Ethernet Diagnostic Menu

This menu provides information about the register state of the Ethernet controller, port MIB statistics, and cable tests. The menu and sample outputs are shown below:

```

:> 6
OM1006 Ethernet Diagnostic Menu
1) Show port 1 registers      a) Show port 1 statistics    g) Do port 1 cable
test                          test                               test
2) Show port 2 registers      b) Show port 2 statistics    h) Do port 2 cable
test                          test                               test
3) Show port 3 registers      c) Show port 3 statistics    i) Do port 3 cable
test                          test                               test
4) Show port 4 registers      d) Show port 4 statistics    j) Do port 4 cable
test                          test                               test
5) Show port 5 registers      e) Show port 5 statistics    k) Dump ATU database
6) Show port 6 registers      f) Show port 6 statistics    l) Dump VTU database
7) Show global registers
Esc Back

:> d
Packet Statistics for Port 4
  InGoodOctetsLo:          9807,      InGoodOctetsHI:          0
  InBadOctets:             0,         OutFCSErr:               0
  InUnicast:               40,         Deferred:                 0
  InBroadcasts:           12,         InMulticasts:            20
  64Octets:                478,        65 to 127Octets:        714
  128 to 256Octets:        201,        256 to 511Octets:       275
  512 to 1023Octets:       74,         1024 to MaxOctets:      13
  OutOctetsLo:             292384,     OutOctetsHi:             0
  OutUnicast:              568,         Excessive:                0
  OutMultcasts:            466,        OutBroadcasts:           649
  Single:                  0,         OutPause:                 0
  InPause:                 0,         Multiple:                 0
  InUndersize:             0,         InFragments:              0
  InOversize:              0,         InJabber:                 0
  InRXErr:                 0,         InFCSErr:                 0
  Collisions:              0,         Late:                     0

:> j
Port 4 Virtual Cable Test
Pair Polarity Amplitude Distance
0      1      0x00      0x00
1      1      0x00      0x00
2      0      0x55      0x09
3      0      0x58      0x09

```

Register Diagnostics Menu

The register diagnostics menu provides raw register dumps from various devices in the OM1006A for factory diagnostic purposes.

Reset Switch

This command resets the control microprocessor and Ethernet switch. This restores the saved configuration.

Set Password

This command changes the unit's password. It is used to control access to configurable data in the "Options menu". Password processing can be disabled by entering an empty password. The password prompt has a 120 second keyboard timeout delay. Here is an example:

```
:> 9  
Enter old password: *****  
Enter new password: *****  
Reenter new password: *****  
Password successfully changed
```

The default password as shipped is "**luxcom**".

Ordering Information

OM1006A-T5-T6-P-A-C

T5, T6 SFP TRANSCEIVER OPTION (Ports 5 and 6)

Code	Abbreviation	Function
A	1000-SX	= 1000BASE-SX 850 nm multimode optics
B	1000-LX	= 1000BASE-LX 1310 nm single/multimode optics
C	1000-LXE	= 1000BASE-LX 1310 nm single optics extended distance.
D	1000-ZX	= 1000BASE 1550 nm single-mode optics 80 km
E	1000-ZXE	= 1000BASE 1550 nm single-mode optics 100km
F	1000-BU	= 1000BASE-BX 1310 nm TX single-fiber bidirectional optics†
G	1000-BD	= 1000BASE-BX 1550 nm TX single-fiber bidirectional optics†
H	100-FX	= 100BASE-FX 1310 nm multimode optics
I	100-LX10	= 100BASE-LX10 1310 nm singlemode optics
J	100-LX10E	= 100BASE-LX10 1310 nm singlemode optics extended distance.
K	100-BU	= 100BASE-BX 1310 nm TX single-fiber bidirectional optics†
L	100-BD	= 100BASE-BX 1550 nm TX single-fiber bidirectional optics†
0		= Without transceiver

† The single-fiber transceivers must be used in complimentary pairs (one BU and one BD).

Replacement optics can be ordered by specifying the **T5/T6** Abbreviation; for example 1000-SX.

P POE OPTION

0	= Without PoE card
1	= With PoE card

A A/C ADAPTER OPTION

0	= Without A/C adapter
1	= LTIPS-12-1-U (+12V, 12W)
2*	= LTIPS-12-1.5-MP (+12V, 10W)
3	= +48V, 70W, 0 ~ 60°C, PoE
4	= +56V, 60W, 0 ~ 40°C, PoE/PoE+

*This power cube comes with four different styles of plug for non-North American mains. Replacement power adapters can be ordered by specifying *OM1006A power supply option A*. All A/C Adapters accept 100-240Vac, 50-60 Hz input.

C A/C CORD OPTION

0	= Without A/C cord
1	= 6' North American C8 A/C cord (for A/C ADAPTER OPTION 3 and 4) Other cords can be provided on request.

Example **OM1006A-A-B-1-4-1**

Port T5 is a 1000-SX SFP optic.
Port T6 is a 1000-LX SFP optic.
PoE/PoE+ card is installed.
PoE+ power supply included (also works with PoE).
Power supply cord included.

Accessories

DIN Rail Mounting Clip

The OM1006A may be ordered with a mounting clip which allows it to be snapped to 35mm or G-type DIN rails.
Part number: DIN-CLIP-05

Spare Power Cube

The modem comes with a A/C adapter. For non PoE modems, a +12V North American power adapter may be ordered using the following number.
Part number: LTIPS-12-1-U

Inquire for non North American power adapters.

Rack Mount Panel

The MP1 holds two modems, and takes 1U space in a 19" rack.
Part Number: MP1

The MP11 holds one modem, and takes 1U space in a 19" rack.
Part Number: MP11

Specifications

Optical¹

SFP Module	802.3 Specification	Laser Light Source	Fiber Size	Optical Output	Optical ² Sensitivity Minimum	Optical ³ Range
Maximum						
1000-SX	1000BASE-SX	850 nm	50/125 μm	-9 dBm	-18 dBm	550 m
			62.5/125 μm	-9 dBm	-18 dBm	275 m
1000-LX	1000BASE-LX 1000BASE-LX10	1310 nm	50/125 μm	-9 dBm	-20 dBm	1 km
			62.5/125 μm	-9 dBm	-20 dBm	1 km
			9/125 μm	-9 dBm	-20 dBm	10 km
1000-LXE ⁴	PROPRIETARY	1310 nm	9/125 μm	-3 dBm	-23 dBm	40 km
1000-ZX ^{4,5}	PROPRIETARY	1550 nm	9/125 μm	0 dBm	-23 dBm	80 km
1000-ZXE ^{4,5}	PROPRIETARY	1550 nm	9/125 μm	0 dBm	-32 dBm	100 km
1000-BU ⁶	1000BASE-BX10	1310 nm	9/125 μm	-9 dBm	-20 dBm	20 km
1000-BD ⁶	1000BASE-BX10	1550 nm	9/125 μm	-9 dBm	-20 dBm	20 km
100-FX	100BASE-FX	1310 nm	50/125 μm	-23 dBm	-32.5 dBm	2 km
			62.5/125 μm	-19 dBm	-32.5 dBm	2 km
100-LX10	100BASE-LX10	1310 nm	9/125 μm	-15 dBm	-25 dBm	15 km
100-LX10E ⁴	PROPRIETARY	1310 nm	9/125 μm	-5 dBm	-35 dBm	60 km
100-BU ⁶	100BASE-BX10	1310 nm	9/125 μm	-14 dBm	-32.5 dBm	20 km
100-BD ⁶	100BASE-BX10	1550 nm	9/125 μm	-14 dBm	-32.5 dBm	20 km

Electrical¹

Data I/O levels	IEEE 802.3 compatible
Data I/O connectors	RJ45
Power inputs	9.0 to 36.0V DC (no PoE)
Power inputs	45.0 to 57.0V DC (PoE)
Power inputs	51.0 to 57.0V DC (PoE+)
Power consumption	< 5 Watts (no PoE)
Alarm relay Current continuous/peak	2/2 A
Max. Switching Voltage AC/DC.....	250/220V peak

General¹

Operating temperature	-40°C to 70°C
Humidity (RH)	10% to 95%
MTBF	> 50,000 hours
Dimensions	14 x 4 x 12 (front to back) cm

Notes:

- ¹ Specifications are subject to change without notice.
- ² Optical sensitivity measured at 10⁻¹² BER.
- ³ The optical ranges are for typical fibers.
- ⁴ Proprietary optics have high TX power or non-standard wavelength; therefore they must interface with a similar SFP.
- ⁵ Operating temperature range is 0°C to 70°C.
- ⁶ The single-fiber models must be used as complimentary pairs (one BU and one BD).

Certification

Luxcom Technologies Inc. certifies that this equipment met its published specification at the time of shipment from the factory.

Warranty

This Luxcom product is warranted against defects in materials and workmanship for a period of five years from the date of shipment. Luxcom will, at its option, repair or replace products that prove to be defective during the warranty period provided they are returned to Luxcom . Repairs necessitated by misuse of the product are not covered by this warranty.

NO OTHER WARRANTIES ARE EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO , THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. LUXCOM TECHNOLOGIES INC. IS NOT LIABLE FOR CONSEQUENTIAL DAMAGES.

Repackaging For Shipment

Before returning the item, paperwork indicating the name, department, company and telephone number of the sender, model and serial number of the product and a brief description of the problem should be enclosed. As well, the sender must also request a Return Authorization number from Luxcom Technologies Inc. See front cover for shipping address.