PoE Power over Ethernet

Teldat Dm776-I

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Teldat Dm772-I Common Configuration Interfaces

Chapter 1 Configuration

1.1 Introduction

With the advent and rapid spread of IP telephony based on Ethernet Interfaces, a mechanism to supply power to network devices over existing infrastructures has become necessary. At the same time, devices that are able to provide backup mechanisms and centrally manage the power supplied to these network devices are also needed.

Thanks to the IEEE. 802.3af Power Over Ethernet (PoE) standard, up to 15.4 watts of DC power can be delivered over the Ethernet copper cable. This allows for new network powered devices to be integrated on existing LAN infrastructures, without having to resort to more cabling or power supplies.

In addition, the IEEE PoE standard allows power sourcing equipment (PSE) and the powered device (PD) to signal one another. This way, the power source can identify the device and determine the amount of power required (thus enabling efficient management of the power provided).

We have developed modules that are capable of providing PSE functionality to certain devices with switch functionality. They all share the configuration and monitoring described in this manual.

1.2 Installation

The external power source of routers with this functionality must be connected to the PSE connector before the device is switched on.

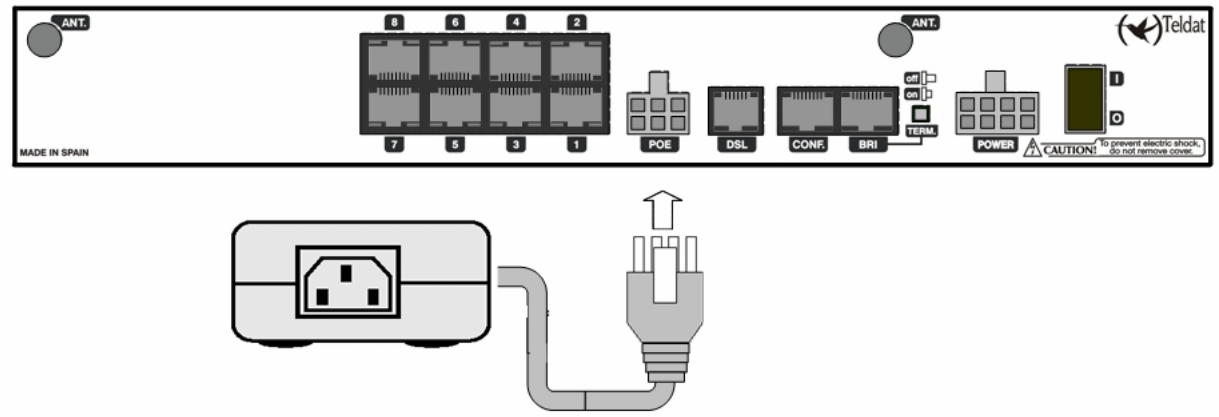

Fig. 1: Rear panel of an 8-Port Switch Device:

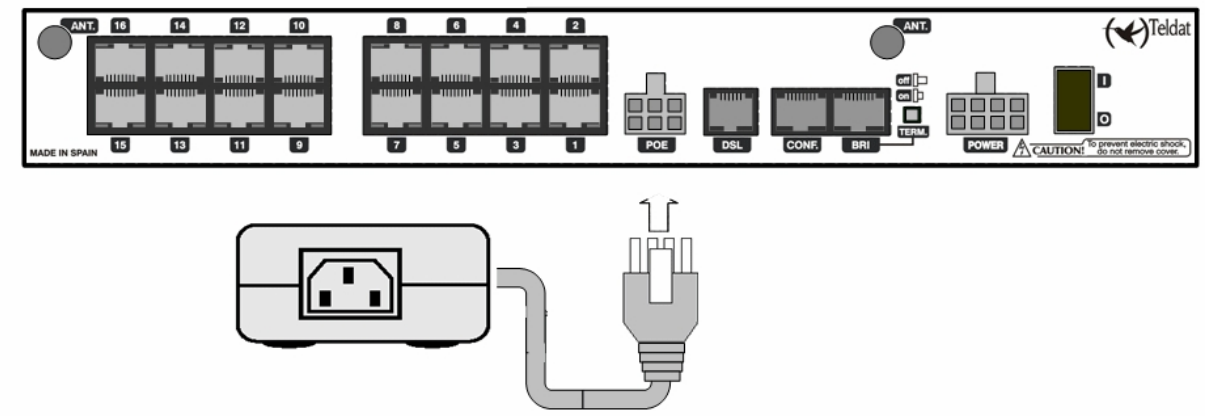

Fig. 2: Rear panel of a 16-Port Switch Device:

Each Switch port has two LEDs. One of them is yellow and indicates the status of the port at the delivered power level:

Frequency	
Off	Open Circuit.
On	Correct class has been detected and power is applied or forced.
Rapid blinking	Short circuit detected.

Slow blinking	Detection error (Resistance: High or Low).

1.3 Configuration Commands

This chapter describes the power sourcing equipment (PSE) configuration commands and is divided into the following sections:

- Viewing the PSE configuration prompt.
- PSE configuration commands.

1.4 Viewing the PSE configuration prompt

Access the configuration environment as follows:

(1) At the GESTCON (*) prompt, enter **Process 4** (or **P 4**) or **Config**.

(2) At the configuration prompt (Config>), enter **network <interface_name>** (**interface_name** is the name of the Ethernet interface on which the PSE functionality can be used).

(3) To set specific POE parameters, use the available commands from the PSE configuration menu described in this chapter. To access the menu corresponding to the specific parameters, run **power-sourcing-equipment** (interface configuration).

```
*config

Config>net ethernet0/0

-- Ethernet Interface User Configuration -
ethernet0/0 config>?
  description                 Enter interface description
  input-buffers               Number of rx buffers
  ip                          Interface Internet Protocol config commands
  ip-encapsulation            IP transport mode in the ethernet frame
  list                        Displays the current configuration
  llc                         Displays the LLC configuration prompt
  mac-address                 Adopt locally administered addresses
  no
  power-sourcing-equipment    Access to the Power Sourcing Equipment configuration
  repeater                    Access to the repeater configuration
  shutdown                    Change state to administratively down
  update                      Update a level indicator
  exit
ethernet0/0 config>power-sourcing-equipment

-- Power Sourcing Equipment configuration --
ethernet0/0 PSE config>
```

Certain commands are common to all device interfaces. These commands are described in Teldat manual *Dm 772-I Common Configuration Interfaces*.

1.5 Configuring PSE

This section describes the PSE configuration commands.

Command	**Function**
? (HELP)	Shows the available commands and their options within a command.
AVAILABLE-POWER	Configures the available power value.
DEFAULT-PORT-CONSUMPTION	Configures the default power consumption value for each connected port.
ENABLE	Enables power sourcing equipment.
LIST	Lists the interface options configuration.
NO	Sets the default of a particular option.
PORT	Configures each port individually.
TRACE	Enables tracing.
EXIT	Returns to the *ethernetx/y config>* configuration prompt.

1.5.1 ? (HELP)

Use the **?** (HELP) command to list all the commands available at the router configuration level. It can also be used after a specific command to list the available options.

Syntax:

```
ethernet0/0 PSE config>?
```

Example:

```
ethernet0/0 PSE config>?
  available-power             Sets the amount of power available in milliWatts
  default-port-consumption    Sets the default power consumption of the POE
                              devices connected to the switch in milliwatts
  enable                      Enables Power Sourcing Equipment
  list                        Display Power Sourcing Equipment configuration
  no                          Negate a command or set its defaults
  port                        Port configuration
  trace                       Enable tracing
  exit
ethernet0/0 PSE config>
```

1.5.2 AVAILABLE-POWER

Configures a deliverable power limit for all devices powered by the switch. Default is 120000.

The indicated value is in milliwatts.

Run **no** to restore the default value.

For the equipment to operate correctly, the value configured in this parameter must always be equal to or lower than the actual value of the source connected to the router.

Syntax:

```
ethernet0/0 PSE config>available-power ?
  <120000..245000>    milliWatts
```

Example:

```
ethernet0/0 PSE config>available-power 140000
```

1.5.3 DEFAULT-PORT-CONSUMPTION

Configures the computed consumption value for each device connected to the switch.

Default is 0, corresponding to the **no** value.

The indicated value is in milliwatts.

The following strategy is used when calculating the power delivered to the devices:

- If a value has been configured for this parameter, it will be used as the consumption value for each connected device.

By programming this parameter, you do not need to be overly restrictive with the devices that show high consumption levels during detection (automatically assigned to the default class when incapable of implementing class detection) but end up not consuming as much.

Note

Programmers are responsible for assigning values that match the actual parameters of the devices to be connected.

- If a value has not been configured, the consumption value for each device will correspond to the value configured for the port (when in forced power mode) or to the value of the class detected for this device. In this case, the power is:

Class	Implementation	Minimum Delivered Power	Maximum power consumed in

		(PSE)	the device (PD)
0	By default	15.4 W	0.44 to 12.95 W
1	Optional	4.0 W	0.44 to 3.84 W
2	Optional	7.0 W	3.84 to 6.49 W
3	Optional	15.4 W	6.49 to 12.95 W
4	Reserved for Future Use	Treated as Class 0 15.4 W	Reserved for future use.
5	Reserved for Future Use	Treated as Class 0 15.4 W	Reserved for future use.

Syntax:

```
ethernet0/0 PSE config>default-port-consumption ?
  <4500..15400>    milliWatts
```

Example:

```
ethernet0/0 PSE config> default-port-consumption 7500
```

1.5.4 ENABLE

Operates as power sourcing equipment. Default is disabled, so you will need to specify this command to enable PSE.

Syntax:

```
ethernet0/0 PSE config>enable
```

Example:

```
ethernet0/0 PSE config>enable
```

1.5.5 LIST

Lists the current configuration for the interface's configurable parameters.

Example:

```
ethernet0/0 PSE config>list

Power Sourcing Equipment .......... Enabled
Available Power ................... 140000 mW
Default Power Line Consumption ....   4500 mW

ethernet0/0 PSE config>
```

1.5.6 NO

Establishes the default values for the options.

Example:

```
ethernet0/0 PSE config>no ?
  available-power             Sets the amount of power available in milliWatts
  default-port-consumption    Sets the default power consumption of the POE
                              devices connected to the switch in milliwatts
  enable                      Enables Power Sourcing Equipment
  port                        Port configuration
  trace                       Enable tracing
ethernet0/0 PSE config>
```

1.5.7 PORT

Activates the forced power mode function on each port. This way, and unless a short circuit is detected, ports always receive power supply.

You should also configure the maximum power allocated to the connected device.

This command also allows you to permanently power off a port.

Default is normal power mode.

Syntax:

```
ethernet0/0 PSE config>port <port number> <mode> <power assigned>
<port number>
  <1..16>    Port number
  all        All ports
<mode>
  disable        Power off
  force-power    Force power
<power assigned>
  <4500..15400>    milliWatts
```

To configure port 3 in forced power mode and assign it 7600 mW.

Example 1:

```
ethernet0/0 PSE config>port 3 force-power 7600
```

To configure all ports in forced power mode and assign 7600 mW to each port.

Example 2:

```
ethernet0/0 PSE config>port all force-power 7000
```

To disable the forced power configuration on port 3.

Example 3:

```
ethernet0/0 PSE config>no port 3 force-power
```

To disable the forced power configuration on all ports.

Example 4:

```
ethernet0/0 PSE config>no port all force-power
```

History:

Release	Modification
11.00.06 11.01.01	The disable option was introduced.

1.5.8 TRACE

Selectively enables debugging traces. Traces are generated as ETH.055 events.

Syntax:

```
ethernet0/0 PSE config>trace {all | <subsystem>}
```

Example:

```
ethernet0/0 PSE config>trace all
```

History:

Release	Modification
11.00.04 11.01.00	This command was introduced.

1.5.9 EXIT

Run **exit** to exit the PSE configuration menu and to return to the main Ethernet *ethernet0/0 config>* interface configuration menu.

Syntax:

```
ethernet0/0 PSE config>exit
```

Example:

```
ethernet0/0 PSE config>exit
ethernet0/0 config>
```

Chapter 2 Monitoring

2.1 Monitoring

This chapter describes the power sourcing equipment (PSE) monitoring commands and is divided into the following sections:

- Viewing the PSE monitoring prompt.
- PSE monitoring commands.

2.2 Viewing the PSE monitoring prompt

Follow these steps to access the monitoring environment:

(1) At the GESTCON (*) prompt, enter **Process 3** (or **P 3**) or **Monitor**.

(2) At the monitoring prompt (+), enter **network <interface_name>** (**interface_name** is the name of the Ethernet interface the PSE feature can be used on).

(3) To monitor the POE functionalities, simply use the commands described in this chapter. To access this menu, run **power-sourcing-equipment** (in the interface monitoring environment).

```
*monitor
Console Operator
+net ethernet0/0

--  Ethernet Console  --
ethernet0/0 ETH+?
  bitrate
  collision
  llc
  power-sourcing-equipment
  repeater
  status
  exit
ethernet0/0 ETH+power-sourcing-equipment
-- Power Sourcing Equipment Monitoring Console --
ethernet0/0 PSE+
```

2.3 Monitoring PSE

This section describes the PSE monitoring commands.

Command	Function
? (HELP)	Displays the available commands or the options available within a command.
DISABLE-PORT	Disconnects a connected port.
ENABLE-PORT	Reconnects a disabled port.
LIST-STATUS	Displays the status of the ports.
MODE-PORT	Sets port operating mode.
REGISTERS	Displays device registers.
RESTART-PSE	Restarts the PSE control.
EXIT	Returns to the *ethernetx/y ETH+* monitoring prompt.

2.3.1 ? (HELP)

Use the **?** (HELP) command to list all the commands that are available at the router configuration level. It can also be used after a specific command to list the available options.

Syntax:

```
ethernet0/0 PSE+?
```

Example:

```
ethernet0/0 PSE+?
  disable-port    Disconnect a connected port
  enable-port     Reconnect a disabled port
  list-status     Display ports status
  mode-port       Set port operating mode
  restart-pse     Restart PSE control
  exit
ethernet0/0 PSE+
```

2.3.2 DISABLE-PORT

Disconnects (i.e., stops providing power to a previously connected port).

Syntax:

```
ethernet0/0 PSE+disable-port <port number>
```

Example:

```
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 7000 mW
POE output power per port  = As requested
Ports Status
        Port 5: Detect Open Circuit
        Port 6: Detect Good, Class2, requested 7000 mW, applied 7000 mW
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+disable-port 6
Port 6 disabled
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 0 mW
POE output power per port  = As requested
Ports Status
        Port 5: Detect Open Circuit
        Port 6: [Adm. disabled] Disabled
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+
```

2.3.3 ENABLE-PORT

Reconnects (i.e., supplies power to a previously disconnected port).

Syntax:

```
ethernet0/0 PSE+enable-port <port number>
```

Example:

```
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 0 mW
POE output power per port  = As requested
Ports Status
        Port 5: Detect Open Circuit
        Port 6: [Adm. disabled] Disabled
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+enable-port 6
Port 6 enabled
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
```

```
Available PSE output power = 120000 mW
Minimum PSE output power   = 7000 mW
POE output power per port  = As requested
Ports Status
        Port 5: Detect Open Circuit
        Port 6: Detect Good, Class2, requested 7000 mW, applied 7000 mW
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+
```

2.3.4 LIST-STATUS

Displays the status of the PSE.

Syntax:

```
ethernet0/0 PSE+list-status
```

Example 1:

```
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 7000 mW
POE output power per port  = As requested
Ports Status
        Port 5: Detect Open Circuit
        Port 6: Detect Good, Class2, requested 7000 mW, applied 7000 mW
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+
```

Example 2:

```
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
PSE device disabled
Available PSE output power = 120000 mW
Minimum PSE output power   = 0 mW
POE output power per port  = As requested
Ports Status
        Port 5: Disabled
        Port 6: Disabled
        Port 7: Disabled
        Port 8: Disabled
ethernet0/0 PSE+
```

The fields have the following meanings:

POE cards:

Displays the POE cards detected and their ports.

Note

The POE cards field is only available for those devices that can detect the card without power.

Available PSE output power

Corresponds to the value configured through the available-power command.

Minimum PSE output power

Minimum delivered power, calculated in accordance with the devices detected and their requirements.

POE output power per port

Power calculated per port. This corresponds to the value programmed through the **default-power-consumption** command. If the value is different to 0, then each connected port is calculated with the programmed value. However if it is 0, the calculated power will be that assigned to the detected class.

Ports Status

Status of each port. The list of available states is as follows:

Port Status	
Adm. auto	The port mode has been set as *auto* with the *mode-port auto* monitoring command.
Adm. disabled	The port has been disabled with the *disable-port* monitoring command. This command overrides the current configuration.
Adm. force <n> mW	The port mode has been forced to deliver the specified power. This has been enabled with the *mode-port force-power* monitoring command.
Detect Unknown	The port is in *auto* mode. Detection has not completed.
Detect Short Circuit	The port is in *auto* mode. A short circuit was detected during the detection process.
Detect Signature Resistance Low	The port is in *auto* mode. The detection process has revealed that the resistance presented by the device is below that specified in the IEEE.802.3af norm (below 15K).
Detect Signature Resistance High	The port is in *auto* mode. The detection process has revealed that the resistance presented by the device is above that specified in the IEEE.802.3af norm (above 33K).
Detect Good	The port is in *auto* mode. The device class has been correctly detected as shown.
Detect Open Circuit	The port is in *auto* mode. No device has been detected.
Disabled	The port is disabled and will not deliver power.
Power forced, applied <n> mW	Power is unconditionally applied to the port as shown, except when a short circuit is detected.
Unavailable	The port cannot be managed because the device is unavailable. This can happen when there is no power.

The list of detected classes is as follows:

Class	
0	Power delivered by default: 15400 mW. Default class for devices that do not implement detection.
1	“Low Power PD” devices. Power delivered by default: 4000 mW.
2	“Medium Power PD” devices. Power delivered by default: 7000 mW.
3	“High or Full Power PD” devices. Power delivered by default: 15400 mW.
4	Reserved. Power is delivered as for class 0.
5	Reserved. Power is delivered as for class 0.

2.3.5 MODE-PORT

Changes the operating mode of the ports.

Syntax:

```
ethernet0/0 PSE+mode-port <port number> <mode> <assigned power>
<port number>
  <5..8>    Value in the specified range
  all       All ports
<mode>
  auto           auto mode
  default        set default mode
  force-power    force power
<power assigned>
  <4500..15400>    milliWatts
```

Example 1:

To change the operating mode of port 5 to power forced mode and assign it 7600 mW:

```
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 7600 mW
POE output power per port  = As requested
Ports Status
        Port 5: Detect Signature Resistance Low
        Port 6: Power forced, applied 7600 mW
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+mode-port 5 force-power 7600
Port 5 new mode: force power, with 7600 milliwatts assigned
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 15200 mW
POE output power per port  = As requested
Ports Status
        Port 5: [Adm. force 7600 mW] Power forced, applied 7600 mW
        Port 6: Power forced, applied 7600 mW
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+
```

Example 2:

To change the operating mode of port 6 to automatic mode:

```
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 15200 mW
POE output power per port  = As requested
Ports Status
        Port 5: [Adm. force 7600 mW] Power forced, applied 7600 mW
        Port 6: Power forced, applied 7600 mW
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+mode-port 6 auto
Port 6 new mode: auto
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 14600 mW
POE output power per port  = As requested
Ports Status
        Port 5: [Adm. force 7600 mW] Power forced, applied 7600 mW
        Port 6: [Adm. auto] Detect Good, Class2, requested 7000 mW, applied 7000 mW
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+
```

History:

Release	Modification
11.00.06 11.01.01	The default option was introduced.

2.3.6 REGISTERS

Displays the internal registers of the device.

Syntax:

```
ethernet0/0 PSE+registers
```

Example:

```
ethernet0/0 PSE+registers
Registers for device 0 (ports 5-8)

 0 ... 00 f1 00 -- 00 -- 00 --
 8 ... 00 -- 00 -- 00 00 00 00
10 ... 00 34 00 00 00 00 00 a0
Interrupt: not pending

Registers for device 1 (no ports)

 0 ... 00 f1 00 -- 00 -- 00 --
 8 ... 00 -- 00 -- 00 00 00 00
10 ... 00 30 00 00 00 00 00 a0
Interrupt: not pending

ethernet0/0 PSE+
```

2.3.7 RESTART-PSE

Restarts the PSE control. All ports are powered off and all devices are restarted.

Syntax:

```
ethernet0/0 PSE+restart-pse
```

Example:

```
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 7000 mW
POE output power per port  = As requested
Ports Status
        Port 5: Detect Signature Resistance Low
        Port 6: Detect Good, Class2, requested 7000 mW, applied 7000 mW
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+restart-pse
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 0 mW
POE output power per port  = As requested
Ports Status
        Port 5: Disabled
        Port 6: Disabled
        Port 7: Disabled
        Port 8: Disabled
ethernet0/0 PSE+list-status
POE cards: - POE card 1 (Ports 5-8)
Available PSE output power = 120000 mW
Minimum PSE output power   = 7000 mW
POE output power per port  = As requested
Ports Status
        Port 5: Detect Signature Resistance Low
        Port 6: Detect Good, Class2, requested 7000 mW, applied 7000 mW
        Port 7: Detect Open Circuit
        Port 8: Detect Open Circuit
ethernet0/0 PSE+
```

2.3.8 EXIT

Run **exit** to exit the power sourcing equipment monitoring menu and return to the main Ethernet *ethernet0/0 ETH+* interface monitoring menu.

Syntax:

```
ethernet0/0 PSE+exit
```

Example:

```
ethernet0/0 PSE+exit
ethernet0/0 ETH+
```