

ELS10-27MDU

User's Guide Addendum

9033276

**CABLETRON**  
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**NOTE:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment uses, generates, and can radiate radio frequency energy and if not installed in accordance with the operator's manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

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This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

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Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

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Application of Council Directive(s): **89/336/EEC**  
**73/23/EEC**

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Conformance to Directive(s)/Product Standards: **EC Directive 89/336/EEC**  
**EC Directive 73/23/EEC**  
**EN 55022**  
**EN 50082-1**  
**EN 60950**

Equipment Type/Environment: **Networking Equipment, for use in a**  
**Commercial or Light Industrial Environment.**

We the undersigned, hereby declare, under our sole responsibility, that the equipment packaged with this notice conforms to the above directives.

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# Introduction

This addendum introduces the ELS10-27MDU. It explains the default configuration and provides the user with the necessary information to manage and configure this switch. This addendum is provided in conjunction with the *ELS10-27TX User Guide*, and does not repeat the information found in that document. The user should refer to the *ELS10-27TX User Guide* for basic switch installation, management and technical information.

## Product Overview

The ELS10-27MDU is a 24 port 10BASE-T switch with three Fast Ethernet ports. It is a specially modified version of the ELS10-27TX, designed to provide Internet access in Multiple Dwelling Units (MDUs), such as hotels, apartment buildings, and dormitories. The ELS10-27MDU has unique firmware, designed for product installation in MDU environments, in which security and restriction of data traffic between user ports are the primary considerations. This is accomplished by using the special VLAN configuration features of the switch.

The default configuration of the ELS10-27MDU is designed to limit traffic between the ports for purposes of security. This configuration may be modified as needed. There are 24 10BASE-T ports (user ports), and 3 Fast Ethernet ports (ports 25, 26 and 27). Port 27 is the *uplink* port, and Ports 25 and 26 are *downlink* ports. The downlink ports pass traffic only to an uplink port, and similarly the uplink port passes traffic only to a downlink port (or to the user ports on that switch) when multiple ELS10-27MDU switches are cascaded. The uplink port at the highest level in a cascaded configuration of switches would typically be connected to a router with a connection to the Internet. Security is provided by restricting traffic as follows:

- Traffic only passes between the 10Mbps ports and the single 100Mbps uplink port
- Traffic only passes between the 100Mbps downlink port(s) and the single 100Mbps uplink port on another ELS10-27MDU switch in a cascaded configuration
- Traffic is inhibited from passing between 10Mbps ports
- Traffic is inhibited from passing between the 10Mbps ports and the 100Mbps downlink ports
- All IP packets not received on the uplink port are ignored

Figure 1 shows a sample configuration with seven ELS10-27MDU cascaded in three layers.

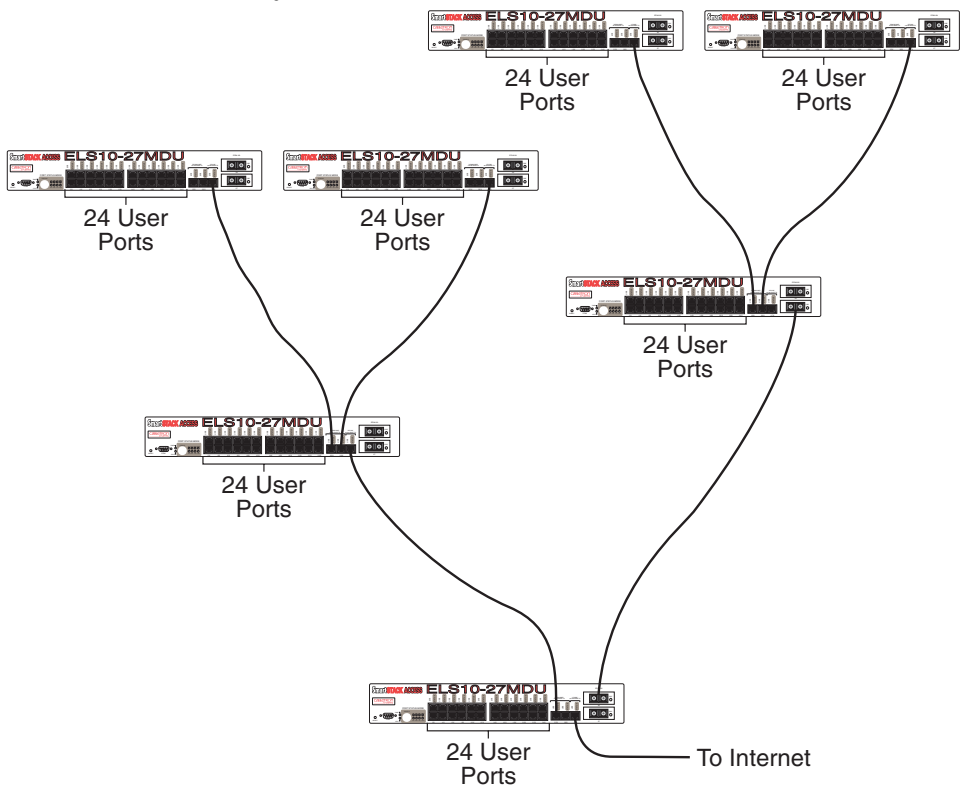


Figure 1. Sample ELS10-27MDU Configuration

## Configuring the ELS10-27MDU

The ELS10-27MDU may be managed by the Local Console or over the uplink port (port 27). If using the uplink port, an IP address is required. In the default configuration, port 27 is in the 0x01C VLAN. To Assign an IP address to this port, type:

```
ipaddr [IP-ADDRESS [NETWORK-MASK]] 0x01C
```

### Additional Commands

The *ELS10-27TX User Guide* details the various commands that are available through the Local Console or management port. The following additional commands have been added to the ELS10-27MDU:

#### Address Limiting

Address Limiting is the ability to configure a limit, on a per port basis, on the number of end user devices that have connectivity from a single port. The command for Address Limiting is part of the enable command set. To activate Address Limiting, type:

```
enable [PORT-RANGE [RIP] [TransmitPacing] [ADDRESS_LIMIT]]
```

The default is no limit. The user can set the limit on a "per port" basis. Setting the limit to zero allows unlimited access. Enabling a port without setting a limit will remove any limit that was previously set.

#### Trapcontrol

Trap Control is setting the IP address for traps. To activate, type:

```
trapcontrol [on | off] [IPADDR]
```

The IP address can be changed whenever traps are turned on or off. Setting the IP address to 0.0.0.0 removes the address.

## **VLANs on the ELS10-27MDU**

IEEE 802.1Q is a standard for virtual bridged local area networks (VLANs). It provides an alternate method for forwarding packets through a switch. In an 802.1D (Spanning Tree) bridge, packets are forwarded in accordance with the spanning tree as dynamically created by the 802.1D protocol Bridge Protocol Data Units (BPDUs), and the spanning tree state of each port. In 802.1Q, in addition to spanning tree, packets are forwarded in accordance with a VLAN tag that is embedded in the packet, and the set of ports registered for that VLAN. A set of rules is used for ingress (receipt), forwarding, and egress (transmit).

The ELS10-27MDU provides support for port based VLANs.

The ingress rules deal with the reception of tagged and untagged packets and the decision to either drop them, or forward them to the forwarding process.

The forwarding rules deal with forwarding packets utilizing topology restrictions, the filtering database, queue frames (not supported), map priorities (not supported), and recalculation of the FCS. The forward/filtering database can contain three types of entries:

- Permanent entries
- Static entries
- Dynamic entries

Dynamic entries are created by the protocols supported by the switch (GVRP). There will be no learning of VLANs outside of this protocol.

The egress rules deal with whether the destination port(s) are members of the VLAN, and whether the VLAN tag is to be stripped.

802.1Q does NOT replace 802.1D, but limits the relaying of packets on the spanning tree to a subset. The subset being the members of a particular VLAN. This is determined by comparing the VLAN ID, which is held within the tag, to the ports which are members of that VLAN. The maximum number of VLANs supported in 802.1Q is 32.

The ELS10-27MDU supports some 802.1Q VLAN capabilities. Static capabilities are provided. GVRP is not supported at this time.

The ELS10-27MDU operates in 802.1Q mode only. All ports are configured as access ports. When a packet is received, an 802.1Q tag is inserted into the packet. This tag and the MAC address are used to forward the packet. Only ports that are members of this VLAN may receive the packet.

Each of the 10Mbps ports is a separate VLAN with only the CPU and the 100Mbps uplink port as members of this VLAN. When packets are received on the 10Mbps ports, they can only be forwarded to the CPU and/or the 100Mbps uplink. The 100Mbps downlinks are configured the in the same manner. This restricts traffic between the uplink and downlinks.

The 100Mbps uplink is a member of all the 10Mbps ports VLANs, and also has its own VLAN, with all the 10Mbps ports as members. The default VLAN id for a port is its port number plus one as shown in Table 1. The VLAN id of *one* is reserved.

**Table 1. VLAN ID for the ELS10-27MDU Ports**

Port #	Default VLAN ID	Description
1	0x2	10Mbps port - user
2	0x3	10Mbps port - user
3	0x4	10Mbps port - user
4	0x5	10Mbps port - user
5	0x6	10Mbps port - user
6	0x7	10Mbps port - user
7	0x8	10Mbps port - user
8	0x9	10Mbps port - user
9	0xA	10Mbps port - user

**Table 1. VLAN ID for the ELS10-27MDU Ports (Continued)**

<b>Port #</b>	<b>Default VLAN ID</b>	<b>Description</b>
10	0xB	10Mbps port - user
11	0xC	10Mbps port - user
12	0xD	10Mbps port - user
13	0xE	10Mbps port - user
14	0xF	10Mbps port - user
15	0X10	10Mbps port - user
16	0x11	10Mbps port - user
17	0x12	10Mbps port - user
18	0x13	10Mbps port - user
19	0x14	10Mbps port - user
20	0x15	10Mbps port - user
21	0x16	10Mbps port - user
22	0x17	10Mbps port - user
23	0x18	10Mbps port - user
24	0x19	10Mbps port - user
25	0x1A	100Mbps port - downlink
26	0x1B	100Mbps port - downlink
27	0x1C	100Mbps port - uplink

## Configuring VLAN

The ELS10-27MDU is pre-configured when shipped. Each of the 10Mbps ports is a separate VLAN with only the CPU and the 100Mbps uplink port as members of this VLAN. This provides for maximum security in a Multiple Dwelling Unit environment. The VLAN configuration may be changed, however, to suit different needs.

### Adding a VLAN

To create a new VLAN, type:

```
vlan [add PORT-RANGE NAME VLAN-ID [IPADDR] [IPMASK]]
```

The port range is a number from 1 to 27.

The Name can be up to 32 ascii characters (optional).

The VLAN-ID is the hexadecimal id number. Pre-configured VLANs are 0x001 through 0x01c.

The IPADDR is the IP address of the unit to be added.

The IPMASK is the IP mask for the IP addresses.

### Deleting a VLAN

To delete a VLAN, type:

```
vlan [del[ete] PORT-RANGE {NAME | VLAN-ID}]
```

The port range is a number from 1 to 27.

The NAME | VLAN-ID identifies the VLAN to be deleted either by ascii character name or by hexadecimal id number.

## Database Requirements

The ELS10-27MDU supports a maximum of 2,048 possible database entries. Under the default configuration, 559 of these entries are used by the system, leaving 1,489 entries available for learning. With the first conversation requiring 29 database entries, and each additional conversation requiring 2 entries, a maximum of 730 conversations can take place simultaneously without flooding. This becomes important as multiple ELS10-27MDU switches are cascaded. (See Figure 1 for an example of cascaded switches.) For example, if there is one client connected to each of the 10Mbps ports, a hierarchy consisting of three ELS10-27MDU switches could involve 72 simultaneous conversations. Based on a balanced topology of cascaded switches, Table 2 shows that a maximum of 5 levels could be achieved without flooding taking place, and the percentage of supported simultaneous conversations at different levels of cascaded switches, assuming all user ports are active.

**Table 2. Database Entries**

<b>Number of Levels</b>	<b>Number of Switches</b>	<b>Number of Active Users</b>	<b>Percent Supported</b>
1	1	24	100
2	3	72	100
3	7	168	100
4	15	360	100
5	31	744	100
6	63	1512	49.3
7	127	3048	23.9



## **Non-Supported Features**

The specialized firmware of the ELS10-27MDU has been designed for use in a secure multi-dwelling unit environment, for which certain features of the ELS10-27TX are not desired. The latest ELS10-27MDU release notes should be reviewed to determine if any functionality support has changed or is not supported.