

Domintell modules on Ethernet

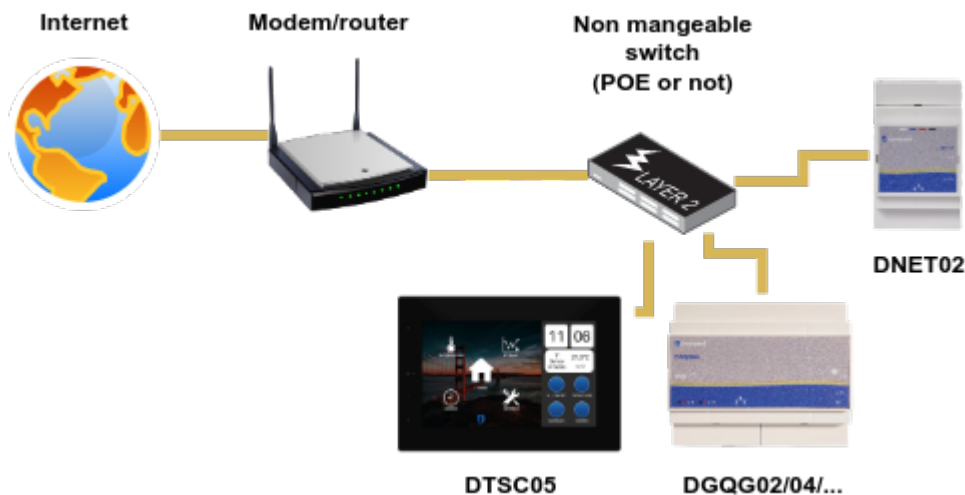
This document will introduce Domintell Ethernet modules : their functionalities, how to configure them (IP settings) and how to reach them from the Internet (configuration of the port forwarding).

The goal of this document is to give the required knowledge to understand and configure Ethernet devices.

IMPORTANT NOTE

Some modems/routers do not properly broadcast frame using a Multicast protocol which uses an IP/group address other than 239.255.255.250:1900 (SSDP) and 224.0.0.51:5353 (mDNS/Bonjour).

NewGen Domintell Ethernet modules use Multicast protocol on the group **239.255.44.49:17490/udp**. It is highly recommended to use a basic switch (not manageable) to interconnect all Domintell Ethernet module and connect this switch to the modem/router.



Ethernet basics

Ethernet networks are divided in several type: LAN (local area network), WLAN (wireless local area network), WAN (wide area network often called the "Internet" or the "Cloud"), DMZ (demilitarized zone, an isolated zone in a company network for self-hosted web or mail servers), ...

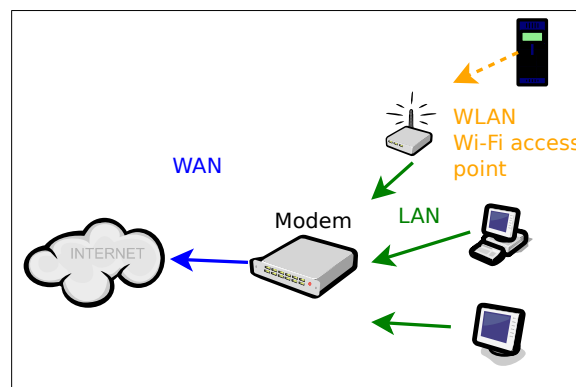


Illustration 1: Types of Ethernet networks : LAN, WLAN and WAN

This document will focus on LAN and WAN.

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A network is composed of several devices (computers, smartphones, routers/modems, servers, ...). Each device is identified by :

- its physical address also called MAC or Ethernet address. It is normally unique all over the world (like a bank account number or the serial number of a mobile phone, car, ... There is nothing more to know about MAC address for the scope of this document).
- Its IP address. On residential LAN, IP addresses like 192.168.0.x or 192.168.1.x are generally used. Each device on a same network must have a different IP address from each other (duplicate IP addresses are forbidden).

A device (associated to an IP address) can host several services, each of them associated to a different port number. A service defines a website server, a mail server, a video server (IP camera), ... The pair IP address/port will identify the service. Most common ports are 80 (HTTP, standard website), 443 (HTTPS, encrypted website), 25 (SMTP, mail server), 17481 (standard port of Domintell modules).

To fully define a service, the protocol must be provided : UDP (needs few resources but can loose data/packets) and TCP (needs more resources but avoid losing data/packets).

In most case, any devices connected on the same network can communicate freely to each others.

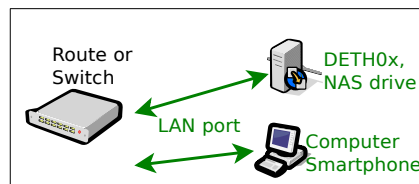


Illustration 2: LAN-to-LAN communications

To interconnect two (or more) networks together, for example to connect a residential/home network (LAN) to the Internet (WAN), a device called router/modem is used. A residential router/modem will allow all devices connected to the LAN to communicate with any devices (servers) on the WAN. This is the usual situation when someone visit a Website (<http://www.domintell.com>, <http://www.google.com>, ...).

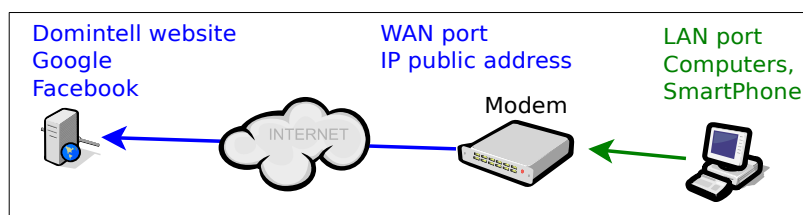


Illustration 3: LAN to WAN connection

By default, if a device on the WAN (or an other LAN separate the other LAN with a WAN - understand a router/modem) try to initiate a communication with a device on a LAN, it will be blocked by the router/modem. This globally means that a user can not connect to the computer, NAS, music server, Domintell Ethernet modules of its neighbour.

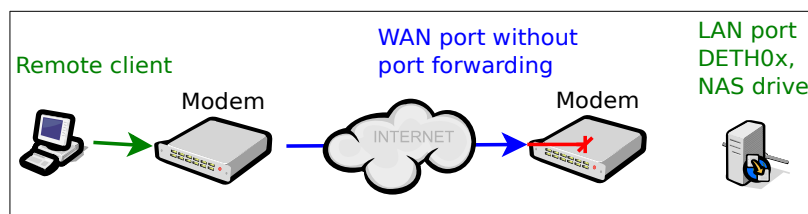


Illustration 4: Remote connection denied without port forwarding

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A mechanism in the router/modem must be program to allow this external connection to reach the device on the LAN. The mechanism is called *port forwarding*.

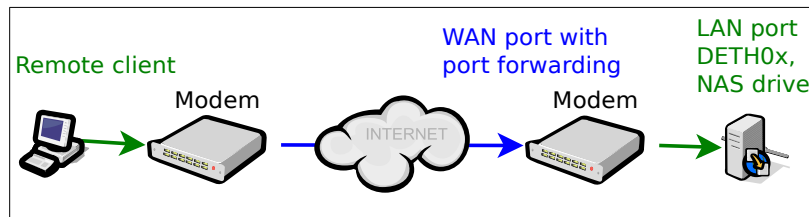


Illustration 5: Remote connection authorized with port forwarding

Terms LAN, WAN, router, device, IP address and port must be fully understood to continue reading this document.

Summary of Domintell Ethernet modules and services

a) Glossary

- server : means that the module is listening for incoming connections (inbound connection)
- client : means that the module will start the connection with a remote server (outbound connection)
- For UDP port : the module is listening on this port for incoming data but will also send data to remote host

b) DELEC01

- Port 67/udp and Port 68/udp : DHCP client.
 - Not used if static IP address is set.
- Multicast group 224.0.0.251:5353/udp : discover service over Bonjour/mDNS protocol.
- Port 17483/udp : discover service.
 - Only to be able to DISCOVER module using broadcast (255.255.255.255). *Do not forward this port in the modem/router !*
- Port 17485/tcp server : data server.
 - DGQG connects to this port to read data from module.

c) DETH02

- Port 67/udp and Port 68/udp : DHCP client.
 - Not used if static IP address is set.
- Port 17481/udp : LightProtocol server.
 - Used to control a Domintell installation with a smartphone (or a tablet) and a dedicated application (Domintell Pilot, domRemote, iRidium or any third-party application).

d) DETH03

- Port 17481/udp : Configuration server.
 - Used to configure a Domintell installation using Domintell2 configuration software or GoldenGate for DGQG01 (replace USB cable on DGQG01).

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- Port 67/udp and Port 68/udp : DHCP client.
 - Not used if static IP address is set.

e) DGQG02/DGQG03/DGQG04/DGQG05

- Port 21/tcp (+ 3000-3100/tcp for passive connections) : FTP server.
 - Accessible via : ftp://<ip_address>:21/
 - FTP server is used to update the O.S., retrieve logs, ...
 - It can not be accessed behind a modem/router (port can not be forwarded). See FTPoverHTTP service (17421/tcp).
- Port 53/udp : DNS resolver client.
- Port 67/udp and Port 68/udp : DHCP client.
 - Not used if static IP address is set.
- SSDP Multicast group 239.255.255.250:1900/udp : discover service.
 - Another protocol to be able to discover Ethernet modules on LAN. *Do not forward this port in the modem/router !*
- Port 1980/tcp server : discover service.
 - HTTP server used to retrieve service description from SSDP protocol. *Do not forward this port in the modem/router !*
- Port 4002/tcp client : Domintell cloud.
 - Only used if the Domintell cloud is explicitly enabled in application.
 - Used to send notifications to Pilot2 through the Domintell cloud infrastructure.
 - Used to send/received LightProtocol data to Pilot2 through the Domintell cloud infrastructure (not used when there is a DNET02 in the application).
- Multicast group 224.0.0.251:5353/udp : discover service over Bonjour/mDNS protocol.
- Port 17481/tcp server : LightProtocol server
 - Disabled when there is a DNET02 in the application.
 - DETH02 emulation over secured WebSocket. Allow control of the Domintell installation via a Smartphone using a NewGen application (Domintell Pilot, DomRemote, ...).
- Port 17483/tcp server : Configuration server for GoldenGate.
 - Replace the old UDP DETH03 module. Now communications run over secured WebSocket. Allow configuration of the Domintell installation using GoldenGate software.
- Port 17483/udp : discover service.
 - Only to be able to DISCOVER module using broadcast (255.255.255.255). *Do not forward this port in the modem/router !*
- Port 17484/tcp client and server : file manager service.
 - Port to exchange files with other Domintell modules or GoldenGate. *Do not forward this port in the modem/router !*

Domintell modules on Ethernet

- **Multicast group 239.255.44.49:17490/udp** : Domintell bus over Ethernet and discover service.
 - Group to communicate with other Domintell modules. It is also used to discover Domintell modules or to send status/progression of an update. *Do not forward this port in the modem/router !*
- Port 17491/udp : status service.
 - Broadcast port used to send current device status (e.g. update's progression) that will be caught by monitoring software (e.g. GoldenGate). *Do not forward this port in the modem/router !*

f) DNET01

- Port 21/tcp (+ 3000-3100/tcp for passive connections) server : FTP server.
 - Accessible via : ftp://<ip_address>:21/
 - FTP server is used to update the O.S. and the application, retrieve logs, ...
- Port 53/udp : DNS resolver client.
- Port 67/udp and Port 68/udp : DHCP client.
 - Not used if static IP address is set.
- SSDP Multicast group 239.255.255.250:1900/udp : discover service.
 - Another protocol to be able to discover Ethernet modules on LAN. *Do not forward this port in the modem/router !*
- Port 1980/tcp server : discover service.
 - HTTP server used to retrieve service description from SSDP protocol. *Do not forward this port in the modem/router !*
- Multicast group 224.0.0.251:5353/udp : discover service over Bonjour/mDNS protocol.
- Port 17481/tcp server : LightProtocol server.
 - Not used if disabled in application.
 - DETH02 emulation over secured WebSocket. Allow control of the Domintell installation via a Smartphone using a NewGen application (Domintell Pilot, DomRemote, ...).
- Port 17481/udp : LightProtocol server.
 - Not used if disabled in application.
 - DETH02 emulation over UDP (Legacy DETH02). Allow control of the Domintell installation via a Smartphone using an old generation application (iDomintell, DomintellRemote, iRidium, ...). This mode should not be used and must be disabled if possible..
- Port 17483/tcp server : Configuration server for GoldenGate.
 - Not used if disabled in application.
 - DETH03 emulation over secured WebSocket. Allow configuration of the Domintell installation using GoldenGate software (Replace USB connection on DGQG01).
- Port 17483/udp : discover service.

Domintell modules on Ethernet

- Only to be able to DISCOVER DETH03 emulation. *Do not forward this port in the modem/router !*
- Multicast group 239.255.44.49:17490/udp : Domintell bus over Ethernet and discover service.
 - group to communicate with other Domintell modules. *Do not forward this port in the modem/router !*
- Port 17491/udp : status service.
 - Broadcast port used to send current device status (e.g. update's progression) that will be caught by monitoring software (e.g. GoldenGate). *Do not forward this port in the modem/router !*

g) DNET02

- Port 21/tcp (+ 3000-3100/tcp for passive connections) server : FTP server.
 - Accessible via : ftp://<ip_address>:21/
 - FTP server is used to update the O.S., retrieve logs, ...
- Port 53/udp : DNS resolver client.
- Port 67/udp and Port 68/udp : DHCP client.
 - Not used if static IP address is set.
- SSDP Multicast group 239.255.255.250:1900/udp : discover service.
 - Another protocol to be able to discover Ethernet modules on LAN. *Do not forward this port in the modem/router !*
- Port 1980/tcp server : discover service.
 - HTTP server used to retrieve service description from SSDP protocol. *Do not forward this port in the modem/router !*
- Port 4002/tcp client : Domintell cloud.
 - Only used if the Domintell cloud is explicitly enabled in application.
 - Used to send/received LightProtocol data to Pilot2 through the Domintell cloud infrastructure.
 - Used to send/received commands/statuses to voice assistant (Alexa®, ...) through the Domintell cloud infrastructure. Only used if there are items enabled to be controlled by a voice assistant.
- Multicast group 224.0.0.251:5353/udp : discover service over Bonjour/mDNS protocol.
- Port 17481/tcp server : LightProtocol server.
 - Not used if disabled in application.
 - DETH02 emulation over secured WebSocket. Allow control of the Domintell installation via a Smartphone using a NewGen application (Domintell Pilot, DomRemote, ...).
- Port 17481/udp : LightProtocol server
 - Not used if disabled in application.

Domintell modules on Ethernet

- DETH02 emulation over UDP (Legacy DETH02). Allow control of the Domintell installation via a Smartphone using an old generation application (iDomintell, DomintellRemote, iRidium, ...). This mode should not be used and must be disabled if possible..
- Port 17483/udp : discover service.
 - Allow discovering of this module using UDP broadcast. *Do not forward this port in the modem/router !*
- Port 17484/tcp server : file manager service.
 - Port to exchange files with other Domintell modules or GoldenGate. *Do not forward this port in the modem/router !*
- Multicast group 239.255.44.49:17490/udp : Domintell bus over Ethernet and discover service.
 - group to communicate with other Domintell modules. *Do not forward this port in the modem/router !*
- Port 17491/udp : status service.
 - Broadcast port used to send current device status (e.g. update's progression) that will be caught by monitoring software (e.g. GoldenGate). *Do not forward this port in the modem/router !*
- Third-party modules : ports are only used/opened when these modules are enabled/configured in the application.
 - DoorBird® (doorstation)
 - Multicast group 224.0.0.251:5353/udp : discover service over Bonjour/mDNS protocol.
 - Search for DoorBird devices on the local network.
 - Port 6524/udp : event service.
 - Listening on this port to receive encrypted events from DoorBird device (like push on call button or motion detections).
 - Port 80/tcp (client) : control service.
 - Outbound connection to the DoorBird device to control the integrated relays or the IR LED (using DoorBird API).
 - ModBus® TCP
 - Port 502/tcp (client) : data service.
 - Outbound connection to the ModBus device to read/write its registers. The port 502 is the default port but it can be changed in GoldenGate if ModBus device uses a non standard port number !
 - Voice Assistant
 - See the Domintell cloud section (port 4002/tcp)

h) DTSC02/DTSC04

- Port 21/tcp (+ 3000-3100/tcp for passive connections) server : FTP server.
 - Accessible via : ftp://<ip_address>:21/
 - FTP server is used to update the O.S. and the application, retrieve logs, screenshots, ...

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- It can not be accessed behind a modem/router (port can not be forwarded). See FTPoverHTTP service (17421/tcp).
- Port 53/udp : DNS resolver client.
- Port 67/udp and Port 68/udp : DHCP client.
 - Not used if static IP address is set.
- Multicast group 224.0.0.251:5353/udp : discover service over Bonjour/mDNS protocol.
- Port 17421/tcp server : FTPoverHTTP service.
 - Accessible via : `http://<ip_address>:17421/`
 - Can be used to manually update the application of all DTSC02/DTSC04/DVIP01/DVIP02 that are on the same LAN through the Internet.
- Port 17480/tcp server and port 17480/udp : Screenshot service.
 - Accessible via : `http://<ip_address>:17480/`
 - This service allows to take screenshot of the current frame displayed.
 - The generated screenshot is available on FTP server.

i) DTSC05

- SSDP Multicast group 239.255.255.250:1900/udp : discover service.
 - Another protocol to be able to discover Ethernet modules on LAN. *Do not forward this port in the modem/router !*
- Port 1980/tcp server : discover service.
 - HTTP server used to retrieve service description from SSDP protocol. *Do not forward this port in the modem/router !*
- Port 17483/udp : discover service.
 - Only to be able to DISCOVER module using broadcast (255.255.255.255). *Do not forward this port in the modem/router !*
- Port 17484/tcp server : file manager service.
 - Port to exchange files with other Domintell modules or GoldenGate. *Do not forward this port in the modem/router !*
- Multicast group 239.255.44.49:17490/udp : Domintell bus over Ethernet and discover service.
 - Group to communicate with other Domintell modules. It is also used to discover Domintell modules or to send status/progression of an update. *Do not forward this port in the modem/router !*
- Port 17491/udp : status service.
 - Broadcast port used to send current device status (e.g. update's progression) that will be caught by monitoring software (e.g. GoldenGate). *Do not forward this port in the modem/router !*

j) DVIP01/DVIP02

- Port 21/tcp (+ 3000-3100/tcp for passive connections) server : FTP server.

Domintell modules on Ethernet

- Accessible via : ftp://<ip_address>:21/
- FTP server is used to update the O.S. and the application, retrieve logs, screenshots, ...
- It can not be accessed behind a modem/router (port can not be forwarded). See FTPoverHTTP service (17421/tcp).
- Port 53/udp : DNS resolver client.
- Port 67/udp and Port 68/udp : DHCP client.
 - Not used if static IP address is set.
- Multicast group 224.0.0.251:5353/udp : discover service over Bonjour/mDNS protocol.
- Port 17421/tcp server : FTPoverHTTP service.
 - Accessible via : http://<ip_address>:17421/
 - Can be used to manually update the application of all DTSC02/DTSC04/DVIP01/DVIP02 that are on the same LAN through the Internet.

k) GoldenGate

GoldenGate uses several technologies to find DGQG on local network:

- Multicast group 224.0.0.251:5353/udp : discover service over Bonjour/mDNS protocol.
- Port 17483/tcp client : Configuration server for GoldenGate.
 - DETH03 emulation over secured WebSocket. Allow configuration of the Domintell installation using GoldenGate software (Replace USB connection on DGQG01).
- Port 17483/udp : discover service.
 - Only to be able to DISCOVER module using broadcast (255.255.255.255). *Do not forward this port in the modem/router !*
- Port 17484/tcp client : file manager service.
 - Port to send and read application to/from DGQG modules. *Do not forward this port in the modem/router !*
- Multicast group 239.255.44.49:17490/udp : Domintell bus over Ethernet and discover service.
 - Group to communicate with other Domintell modules. It is also used to discover Domintell modules or to send status/progression of an update. *Do not forward this port in the modem/router !*
- Port 17491/udp : status service.
 - Broadcast port used to receive statuses of Domintell modules (e.g. update's progression). *Do not forward this port in the modem/router !*

l) GoldenGate for DGQG01

GoldenGate opens ports on your computer to receive data from Domintell2 modules. On some operating systems (mainly Windows), the firewall will pop-up a dialog to warn you that GoldenGate tries to open ports on your computer. You have to allow/authorize access the be able to use the following features:

- Port 17481/udp : discover service.

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- Used to discover Ethernet modules and received data from these modules. GoldenGate only listen (open) this port when port list is refreshed (at startup or when refresh button is clicked). *Do not forward this port in the modem/router !*
- Port 17483/udp : discover service.
 - Only to be able to DISCOVER module using broadcast (255.255.255.255). *Do not forward this port in the modem/router !*
- Port 17491/udp : status service.
 - Used to receive status messages broadcasted by other Domintell2 modules (e.g. update's progression). *Do not forward this port in the modem/router !*