

This document outlines the basic DSL (Digital Subscriber Line) service requirements for DVMRe and DSR Digital Video Recorders (referred to as DVRs in this document) networked to a remote PC, and provides background information about those requirements.

BASIC SERVICE REQUIREMENTS

For optimal DVR network functionality, your DSL service must meet the following basic requirements.

- DSL service type: SDSL
- Data transmission type: PPP, TCP/IP, single socket
- IP address: static, public
- MTU for transmission and modem/router: 1500 bytes is optimal; 1400 or 1200 are acceptable but might not produce desired performance

Note: There must be a DSL connection at the DVR site and at the remote PC site (the remote PC site does not require a static IP address).

DSL SERVICE TYPES

The type of DSL service can affect the network performance of your DVR. There are several types of DSL service available; the main differences among them are upload and download speeds, and cost. The two most common types of DSL service are ADSL and SDSL.

- ADSL (Asymmetric Digital Subscriber Line) is the typical service type for home DSL subscriptions. ADSL provides higher data transfer rates for downloading (typically 1.5 Mbps to 9 Mbps) than uploading (typically 16 kbps to 800 kbps). Since DVRs require a high uploading rate, ADSL is not an acceptable service type for use with DVRs.
- SDSL (Symmetrical Digital Subscriber Line) provides the same high data transfer rate for both uploading and downloading (up to 3 Mbps). SDSL is an acceptable service type for use with DVRs.

Other types of high-speed DSL services acceptable for use with DVRs might be available in your area. Two types are HDSL and VDSL.

- HDSL (High data-rate Digital Subscriber Line) provides the same data transfer rate for both uploading and downloading (1.544 Mbps).
- VDSL (Very high data-rate Digital Subscriber Line) provides the same data transfer rate for both uploading and downloading (13 Mbps - 55 Mbps) over short distances, usually between 1000 and 4500 feet (300 - 1500 meters).

DATA TRANSMISSION

Two common data transmission types are:

- PPP (Point-to-Point Protocol) is a protocol for communication using a serial interface between two devices. PPP handles both synchronous and asynchronous communication, can share a line with other users, and provides error detection—all traits that Serial Line Internet Protocol (SLIP) lacks. The DVRs require use of the PPP protocol.
- PPPoE (Point-to-Point Protocol over Ethernet) connects multiple computers on an Ethernet LAN to a remote site through a modem or similar device. PPPoE combines PPP with the Ethernet protocol. PPPoE limits MTU to 1492.

“TCP/IP,” “Packets,” “MTUs,” “Sockets,” “LANs,” and “WANs” are terms related to data transmission and networking.

- TCP/IP (Transmission Control Protocol/Internet Protocol): TCP and IP are sets of rules used to send data packets between devices over a network or the Internet. TCP tracks the packets while IP handles the delivery of the packets. The DVRs require use of the TCP/IP protocol.
- Packets are "chunks" of data. TCP divides data sent over the Internet into packets to route it more efficiently. When the packets all arrive at their destination, TCP reassembles them into the original data set or file.

- MTU (Maximum Transmission Unit) settings on network devices determine the maximum allowable size of each packet sent, passed, or received in any transmission. The optimal MTU size for use with DVRs is 1500 bytes, but 1400 and 1200 are also acceptable. However, you might not find the system performance to be desirable at the lower rates.
- Sockets are communications end-points (clients or servers, for example) on a network. Single-socket communication sends one data stream down one logical connection, while multsocket communication sends multiple data streams down multiple logical connections. The DVRs require single-socket communication.
- LANs (Local Area Networks) are groups of computers and related devices grouped in a geographically limited area to allow easy interconnection (by way of cables or wireless) and speedy data transmission. LANs typically share a common server and data storage. Ethernet is the most common type of PC LAN.
- WANs (Wide Area Networks) are computer networks that span large geographical areas. Most commonly, WANs consist of two or more LANs. WANs often use public networks, such as the telephone system, to transmit data among the remote parts of the WAN.

IP ADDRESSES

IP (Internet Protocol) addresses are identifiers for computers or devices on networks that use TCP/IP. TCP/IP networks use the IP address of the destination to route data. IP addresses can be dynamic or static, public or private.

- Dynamic IP addresses for devices can change each time the devices connect to a network or the Internet. DHCP (Dynamic Host Configuration Protocol) assigns the dynamic IP address. Since static public IP addresses are in short supply, ISPs (Internet Service Providers) most commonly offer dynamic IP addresses. Dynamic IP addresses are not acceptable for DVRs networked to PCs.
- Static IP addresses for devices do not change. The ISP (for public addresses) or the network administrator (for private addresses) assigns static IP addresses. Since remote systems connect to DVRs over the Internet, and network routers forward information to DVRs within a LAN, DVRs require static IP addresses.
- Public IP addresses apply to devices directly routable from the Internet. Public IP addresses can be static or dynamic.
- Private IP addresses apply to devices on LANs buffered from the public Internet. Network Address Translation (NAT, also known as Network masquerading or IP-masquerading) facilitates communication between those LANs and the Internet by rewriting the IP addresses of network packets passing through the router or firewall. Private IP addresses can be static or dynamic.

Additional terms related to IP addressing on networks are “Subnet” and “Gateway.”

- Subnets (Subnetworks) are identifiable, separate parts of a network. On TCP/IP networks, subnets are groups of devices whose IP addresses have the same prefix. Routers forwarding packets through gateways use subnet masks to identify which bits in an IP address relate to the network address and subnet portions of the address.
- Gateways are network points that act as entrances to other connected networks. A gateway is commonly associated with both a router and a switch.

MODEM/ROUTER MTU SETTINGS

Modems, like transmission types, can limit the allowable packet size or MTU. Some modems have user-configurable settings that enable the installer to disable the MTU limit. Linksys and Netopia brand modems are common.

- Linksys modems are recommended for use with the DVRs. To set the modem to allow packets of 1500 MTU or greater, on the Advanced/Filters setup dialog select MTU Disable.
- Netopia modems are acceptable, but are limited to 1492 MTU.

ROUTER POINT FORWARDING

If you network the DVR by way of a LAN to the Internet, your router must have point-forwarding capability. Forward the following ports depending on the software you use on the remote PC.

- WaveReader: port 1024
- WaveBrowser: ports 80 and 1024

The above is general information only. When installing your video and/or access control system, you should consult with your network administrators and/or consultants, who have the required knowledge to fully integrate your network(s) with other systems. GE Security disclaims any express or implied warranty in connection with the above general information, including without limitation, any warranty of merchantability or fitness for a particular purpose.