

This guide contains information about network port requirements and third-party software packages used for Extron NAV® Pro AV over IP Series of products. The diagram and the tables below show the network ports and protocols service and number requirements for configuration, maintenance, control, and streaming that are required for communication between the NAVigator, NAV encoders, NAV decoders, and Extron tools and controls. Consult your network administrator to confirm the connectivity for the network ports mentioned in this guide.

## Network Port Information

The following tables provide network port information for network planning and troubleshooting.

- “Inbound/Outbound” refers to the flow of traffic to and from the device.
- “Inbound” indicates that traffic is received on the specified port on the device.
- “Outbound” indicates that the traffic is sent out from the specific port.
- “Both” indicates that traffic is received by and also sent out from the specified port.

## NAV Pro AV Configuration, Maintenance, and Control Table

The following table provides network port information for network planning and troubleshooting.

### Ports and Protocols for NAVigator NAV LAN Interface

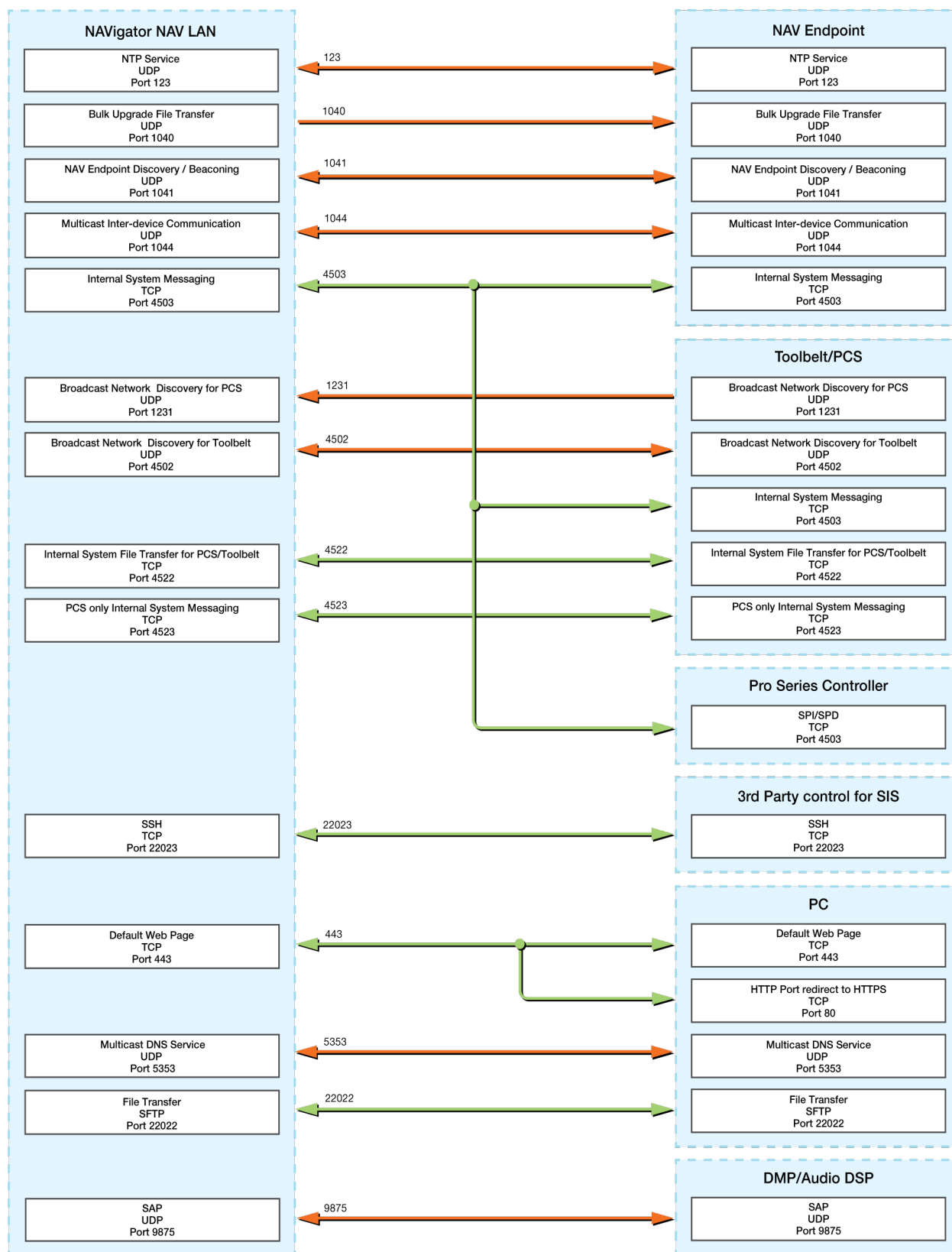
| Port | IP Protocol | Inbound/Outbound | Service     | Description                                         | Default Address |
|------|-------------|------------------|-------------|-----------------------------------------------------|-----------------|
| 53   | UDP         | Both             | DNS         | DNS Service                                         |                 |
| 68   | UDP         | Both             | DHCPv4      | DHCPv4 client                                       |                 |
| 80   | TCP         | Both             | HTTP        | Port redirects to HTTPS                             |                 |
| 123  | UDP         | Both             | NTP         | NTP service                                         |                 |
| 443  | TCP         | Both             | HTTPS / SSL | Default web page                                    |                 |
| 546  | UDP         | Both             | DHCPv6      | DHCPv6 client                                       |                 |
| 1040 | UDP         | Outbound         | BULKXFER    | Multicast bulk upgrade file transfer                | 239.255.255.249 |
| 1041 | UDP         | Both             | IGMP        | NAV endpoint discovery and beaconing                | 239.255.255.254 |
| 1044 | UDP         | Both             | IGMP EP2EP  | Multicast inter-device communication for ID pairing | 239.255.255.254 |
| 1231 | UDP         | Inbound          | BCAST       | Broadcast mode listener for PCS                     |                 |
| 4502 | UDP         | Both             | BCAST       | Broadcast mode listener for Toolbelt                |                 |
| 4503 | TCP         | Both             | SSH         | Internal system messaging                           |                 |

## NAV Pro AV — Network Ports, Protocols, and Licenses

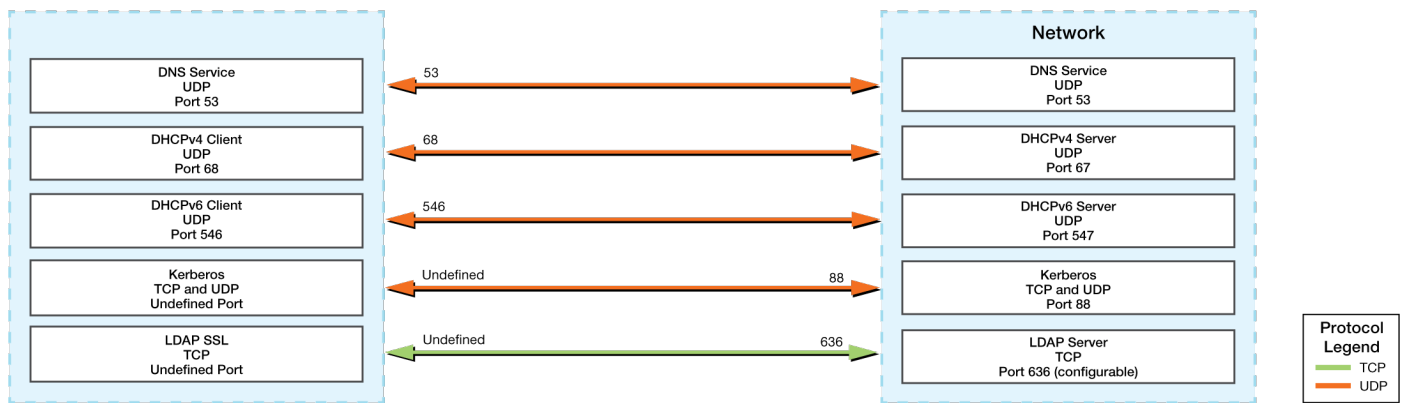
| Port      | IP Protocol | Inbound/Outbound | Service   | Description                                          | Default Address |
|-----------|-------------|------------------|-----------|------------------------------------------------------|-----------------|
| 4522      | TCP         | Both             | SFTP      | Internal system file transfer for PCS and Toolbelt   |                 |
| 4523      | TCP         | Both             | SSH / SIS | Internal system messaging for PCS                    |                 |
| 5353      | UDP         | Both             | mDNS      | Multicast DNS service for Dante controller discovery | 224.0.0.251     |
| 9875      | UDP         | Inbound          | SAP       | Session announcement protocol for AES67              | 239.255.255.255 |
| 22022     | TCP         | Both             | SFTP      | Secure file transfer                                 |                 |
| 22023     | TCP         | Both             | SSH       | 3rd Party Control for SIS (Simple Instruction Set)   |                 |
| 34419     | UDP         | Both             | AVAHI     | Zero-Conf (Link-Local address)                       |                 |
| Undefined | TCP         | Both             | LDAPS     | Active Directory                                     |                 |
| Undefined | TCP and UDP | Both             | Kerberos  | Kerberos authentication                              |                 |

# NAV Pro AV — Network Ports, Protocols, and Licenses

## NAVigator NAV LAN Port Description



## NAV Pro AV — Network Ports, Protocols, and Licenses



### Part 2

## NAV Pro AV Configuration, Maintenance, and Control Table

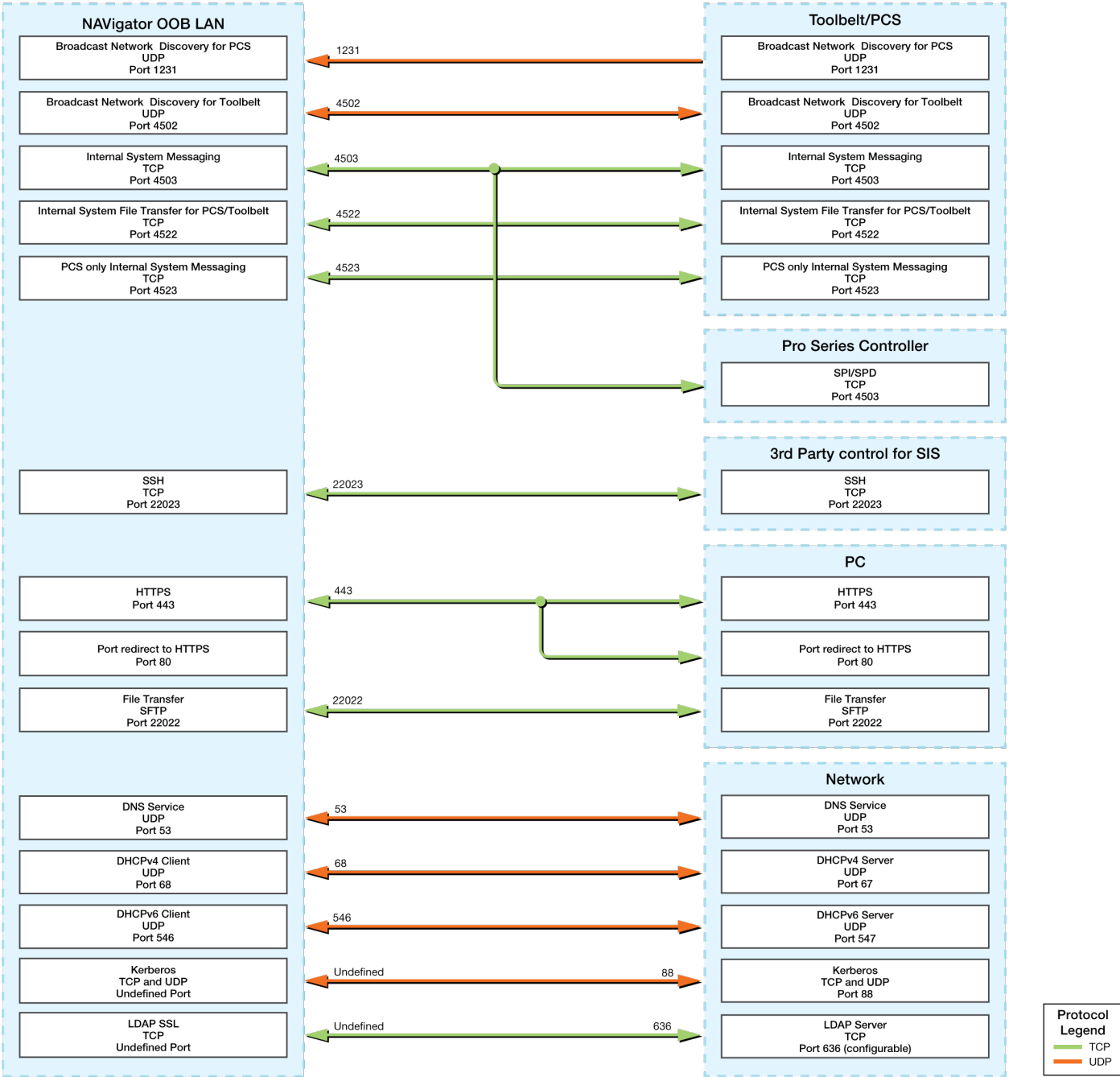
The following table provides network port information for network planning and troubleshooting.

### Ports and Protocols for NAVigator Out of Band (OOB) LAN Interface

| Port      | IP Protocol | Inbound/Outbound | Service     | Description                                        |
|-----------|-------------|------------------|-------------|----------------------------------------------------|
| 53        | UDP         | Both             | DNS         | DNS Service                                        |
| 68        | UDP         | Both             | DHCPv4      | DHCPv4 client                                      |
| 80        | TCP         | Both             | HTTP        | Port redirects to HTTPS                            |
| 123       | UDP         | Both             | NTP         | NTP service                                        |
| 443       | TCP         | Both             | HTTPS / SSL | Default web page                                   |
| 546       | UDP         | Both             | DHCPv6      | DHCPv6 client                                      |
| 1231      | UDP         | Inbound          | BCAST       | Broadcast mode listener for PCS                    |
| 4502      | UDP         | Both             | BCAST       | Broadcast mode listener for Toolbelt               |
| 4503      | TCP         | Both             | SSH         | Internal system messaging                          |
| 4522      | TCP         | Both             | SFTP        | Internal system file transfer for PCS and Toolbelt |
| 4523      | TCP         | Both             | SSH / SIS   | Internal system messaging for PCS                  |
| 22022     | TCP         | Both             | SFTP        | Secure file transfer                               |
| 22023     | TCP         | Both             | SSH         | 3rd Party Control for SIS (Simple Instruction Set) |
| Undefined | TCP         | Both             | LDAPS       | Active Directory                                   |
| Undefined | TCP and UDP | Both             | Kerberos    | Kerberos authentication                            |

NAV Pro AV — Network Ports, Protocols, and Licenses

NAVigator OOB LAN (Out of Band) Port Description



## NAV Pro AV — Network Ports, Protocols, and Licenses

### NAV Pro AV Configuration, Maintenance, Control, and Streaming Table

The following table provides network port information for network planning and troubleshooting.

#### Ports and Protocols for NAV Encoder

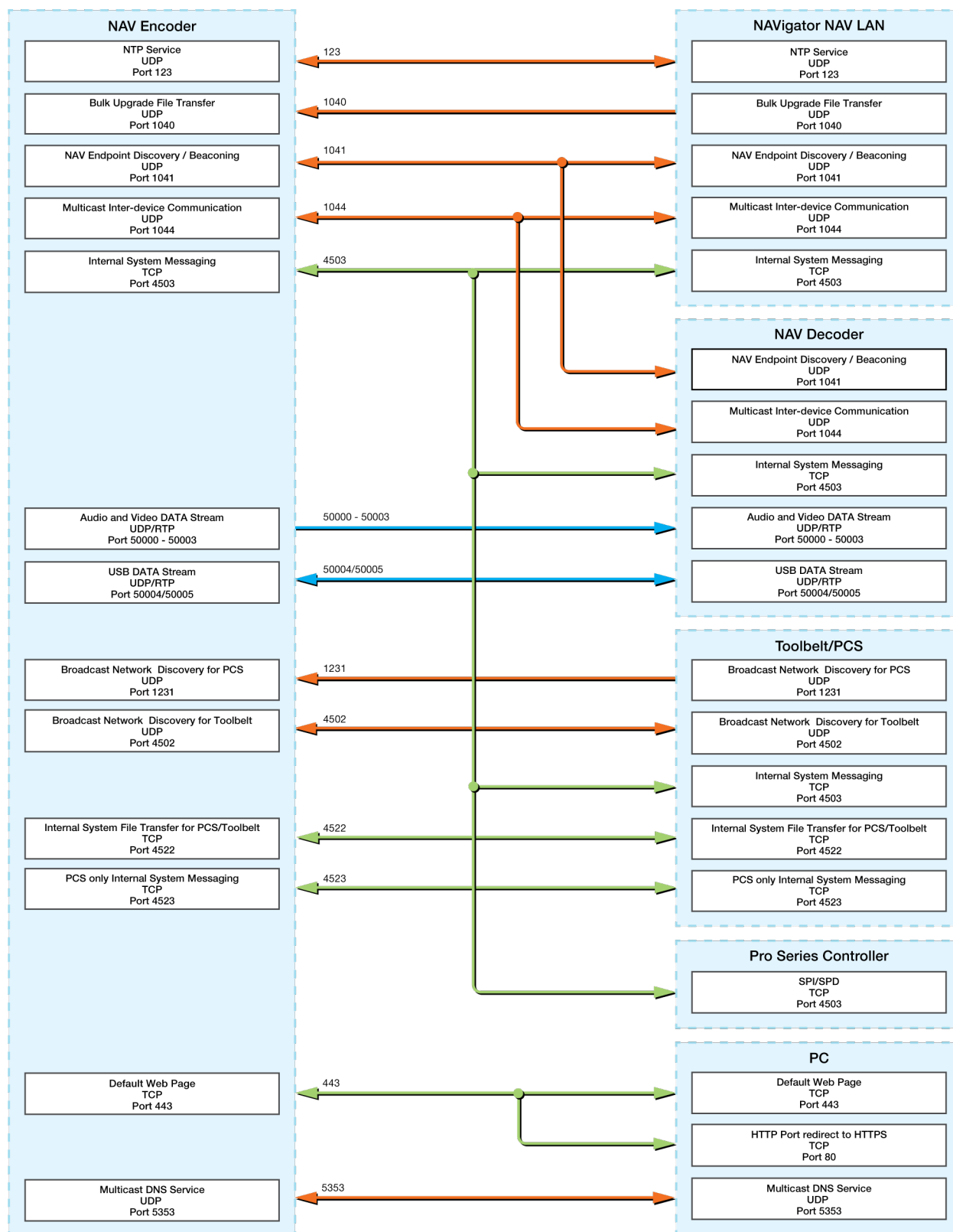
| Port  | IP Protocol | Inbound/Outbound    | Service     | Description                                          | Default Address |
|-------|-------------|---------------------|-------------|------------------------------------------------------|-----------------|
| 68    | UDP         | Both                | DHCPv4      | DHCPv4 client                                        |                 |
| 80    | TCP         | Both                | HTTP        | Port redirects to HTTPS                              |                 |
| 123   | UDP         | Both                | NTP         | NTP service                                          |                 |
| 320   | UDP         | Both                | PTP         | Precision Time Protocol for AES67                    | 224.0.1.129     |
| 443   | TCP         | Both                | HTTPS / SSL | Default web page                                     |                 |
| 546   | UDP         | Both                | DHCPv6      | DHCPv6 client                                        |                 |
| 1040  | UDP         | Inbound             | BULKXFER    | Multicast bulk upgrade file transfer                 | 239.255.255.249 |
| 1041  | UDP         | Both                | IGMP        | NAV endpoint discovery and beaconing                 | 239.255.255.254 |
| 1044  | UDP         | Both                | IGMP EP2EP  | Multicast inter-device communication for ID pairing  | 239.255.255.254 |
| 1231  | UDP         | Inbound             | BCAST       | Broadcast mode listener for Toolbelt and PCS         |                 |
| 4502  | UDP         | Both                | BCAST       | Broadcast mode listener for Toolbelt                 |                 |
| 4503  | TCP         | Both                | SSH         | Internal system messaging                            |                 |
| 4522  | TCP         | Both                | SFTP        | Internal system file transfer for PCS and Toolbelt   |                 |
| 4523  | TCP         | Both                | SSH / SIS   | Internal system messaging for PCS                    |                 |
| 5005  | UDP         | Inbound or Outbound | AES67       | AES67 audio stream                                   | 239.69.xxx.xxx  |
| 5353  | UDP         | Both                | mDNS        | Multicast DNS service for Dante controller discovery | 224.0.0.251     |
| 9875  | UDP         | Outbound            | SAP         | Session announcement protocol for AES67              | 239.255.255.255 |
| 34419 | UDP         | Both                | AVAHI       | Zero-Conf (Link-Local address)                       |                 |

## NAV Pro AV — Network Ports, Protocols, and Licenses

| Port  | IP Protocol | Inbound/Outbound | Service     | Description                                | Default Address |
|-------|-------------|------------------|-------------|--------------------------------------------|-----------------|
| 50000 | UDP         | Outbound         | Data stream | NAV video                                  | 239.1.xxx.xxx   |
| 50002 | UDP         | Outbound         | Data stream | NAV audio                                  | 239.0.xxx.xxx   |
| 50004 | UDP         | Both             | Data stream | NAV USB 2.0,<br>HID+CAC, KVM,<br>Smart KVM | 239.2.xxx.xxx   |

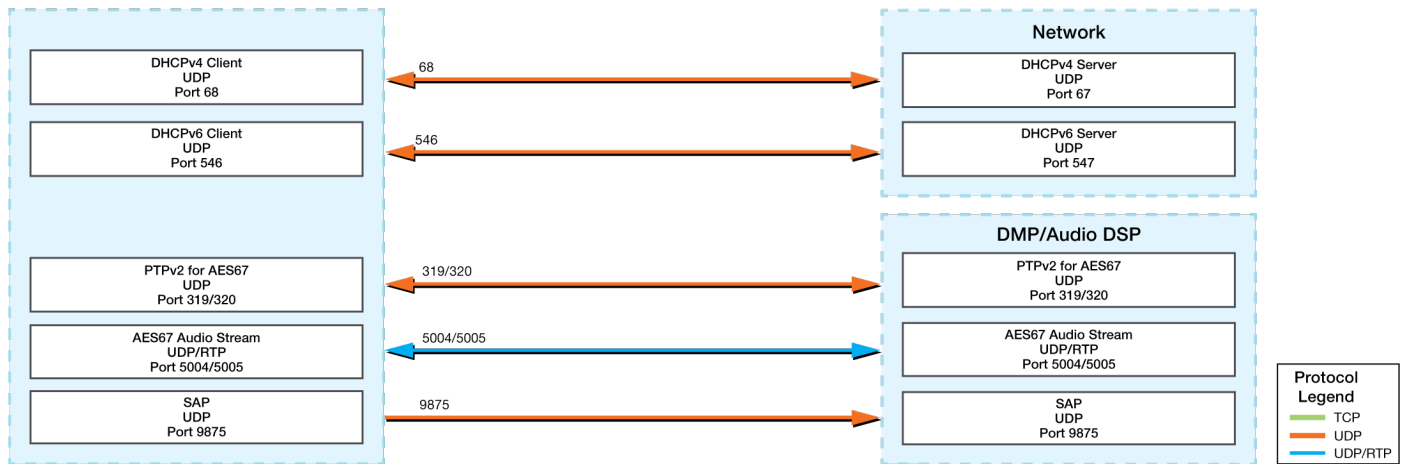
# NAV Pro AV — Network Ports, Protocols, and Licenses

## Encoder Port Description



Part 1

## NAV Pro AV — Network Ports, Protocols, and Licenses



### Part 2

## NAV Pro AV Configuration, Maintenance, Control, and Streaming Table

The following table provides network port information for network planning and troubleshooting.

### Ports and Protocols for NAV Decoder

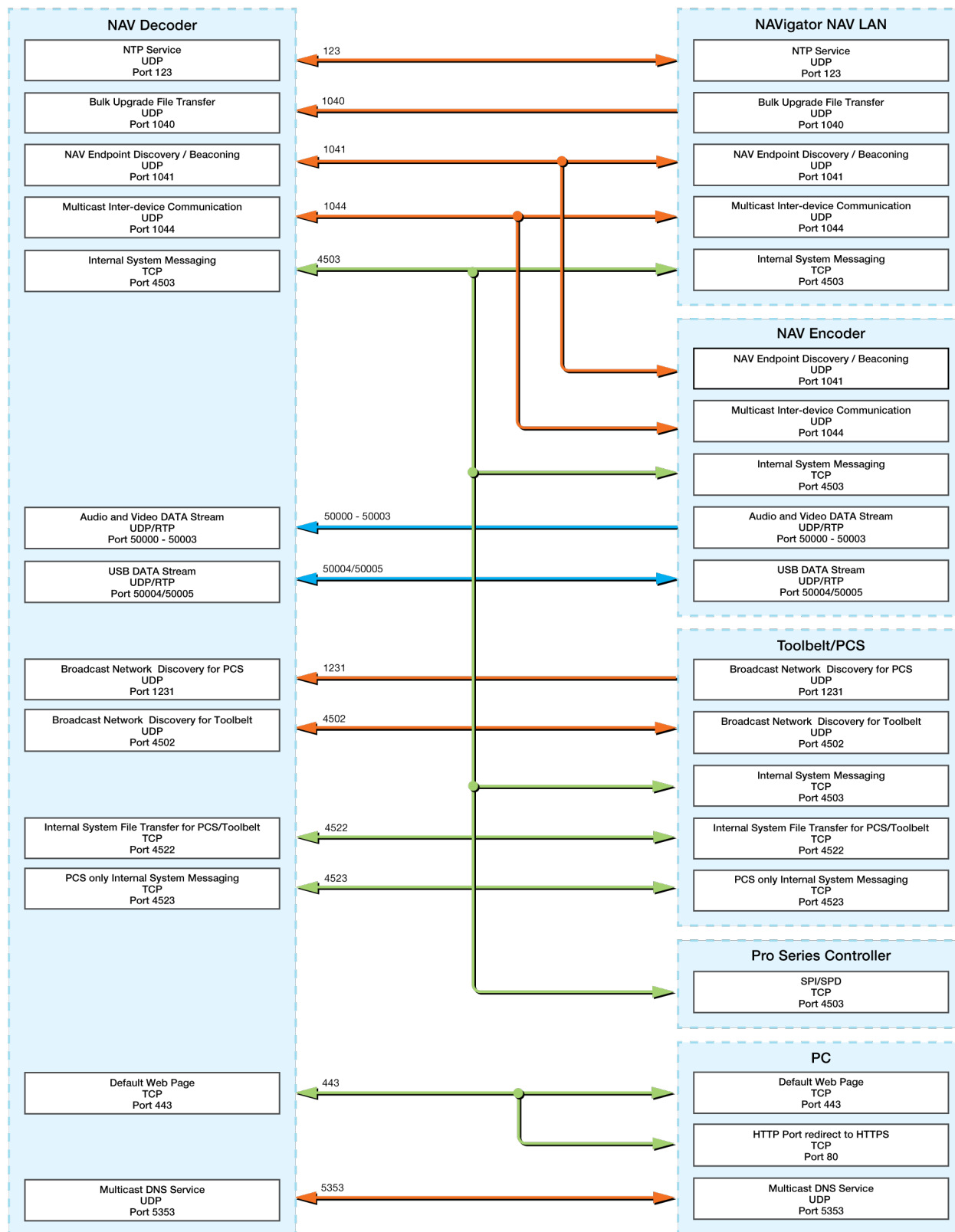
| Port | IP Protocol | Inbound/Outbound | Service     | Description                                         | Default Address |
|------|-------------|------------------|-------------|-----------------------------------------------------|-----------------|
| 68   | UDP         | Both             | DHCPv4      | DHCPv4 client                                       |                 |
| 80   | TCP         | Both             | HTTP        | Port redirects to HTTPS                             |                 |
| 123  | UDP         | Both             | NTP         | NTP service                                         |                 |
| 320  | UDP         | Both             | PTP         | Precision Time Protocol for AES67                   | 224.0.1.129     |
| 443  | TCP         | Both             | HTTPS / SSL | Default web page                                    |                 |
| 546  | UDP         | Both             | DHCPv6      | DHCPv6 client                                       |                 |
| 1040 | UDP         | Inbound          | BULKXFER    | Multicast bulk upgrade file transfer                | 239.255.255.249 |
| 1041 | UDP         | Both             | IGMP        | NAV endpoint discovery and beaconing                | 239.255.255.254 |
| 1044 | UDP         | Both             | IGMP EP2EP  | Multicast inter-device communication for ID pairing | 239.255.255.254 |
| 1231 | UDP         | Inbound          | BCAST       | Broadcast mode listener for PCS                     |                 |
| 4502 | UDP         | Both             | BCAST       | Broadcast mode listener for Toolbelt                |                 |
| 4503 | TCP         | Both             | SSH         | Internal system messaging                           |                 |

## NAV Pro AV — Network Ports, Protocols, and Licenses

| Port  | IP Protocol | Inbound/Outbound    | Service     | Description                                          | Default Address |
|-------|-------------|---------------------|-------------|------------------------------------------------------|-----------------|
| 4522  | TCP         | Both                | SFTP        | Internal system file transfer for PCS and Toolbelt   |                 |
| 4523  | TCP         | Both                | SSH / SIS   | Internal system messaging for PCS                    |                 |
| 5004  | UDP         | Inbound or outbound | AES67       | AES67 audio stream                                   | 239.69.xxx.xxx  |
| 5353  | UDP         | Both                | mDNS        | Multicast DNS service for Dante controller discovery | 224.0.0.251     |
| 9875  | UDP         | Outbound            | SAP         | Session announcement protocol for AES67              | 239.255.255.255 |
| 34419 | UDP         | Both                | AVAHI       | Zero-Conf (Link-Local address)                       |                 |
| 50000 | UDP         | Inbound             | Data stream | NAV video                                            | 239.1.xxx.xxx   |
| 50002 | UDP         | Inbound             | Data stream | NAV audio                                            | 239.0.xxx.xxx   |
| 50004 | UDP         | Inbound or Outbound | Data stream | NAV USB 2.0, HID+CAC, KVM, Smart KVM                 | 239.2.xxx.xxx   |

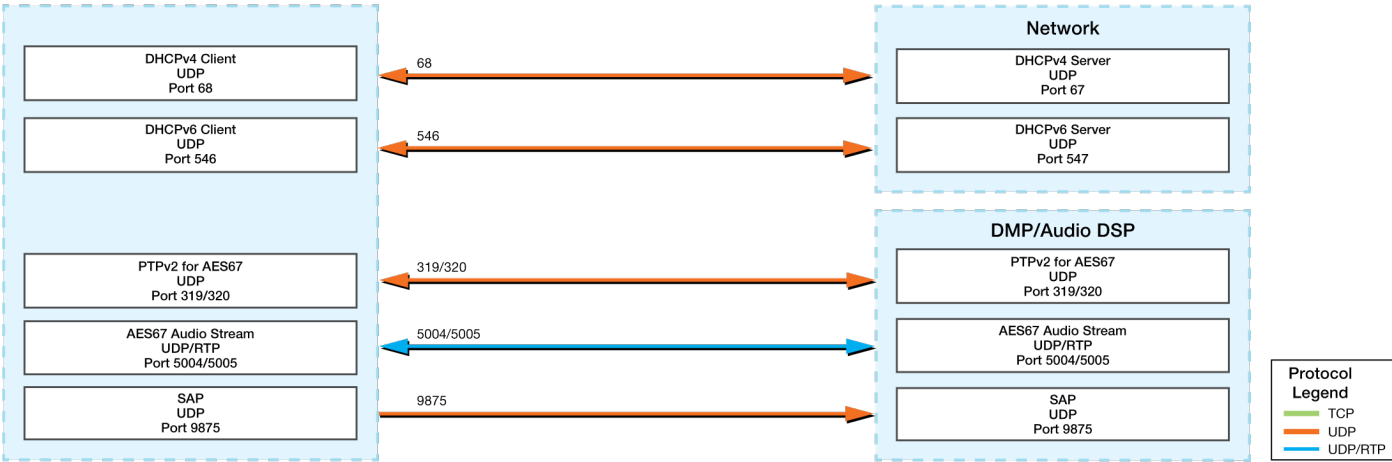
# NAV Pro AV — Network Ports, Protocols, and Licenses

## Decoder Port Description



Part 1

NAV Pro AV — Network Ports, Protocols, and Licenses



Part 2

License Information

The following table lists the licensed third-party software packages used by all NAV Pro AV Series products.

**NOTE:** Third-party software is subject to change without notice. This guide was prepared for NAV firmware 1.01.0002-b209.

| Third-party Software and Licenses |                    |              |               |
|-----------------------------------|--------------------|--------------|---------------|
| Package                           | License            | Package      | License       |
| aufs2-util                        | GNU LGPL v2        | Libnss       | MPL v2.0      |
| avahi                             | GNU LGPL v2.1      | Libpcap      | BSD-3c        |
| bstrlib                           | BSD                | Libpng       | libpng        |
| busybox                           | GNU LGPL v2        | Libsocketcan | GNU LGPL v2.1 |
| bzip2                             | BSD                | libssh2      | BSD           |
| can-utils                         | GNU LGPL v2        | libsub       | GNU LGPL v2.1 |
| cjson                             | MIT                | libxml2      | MIT           |
| cracklib                          | LGPL v2.1+         | libxslt      | MIT           |
| devmem2                           | GNU LGPL v2        | linux        | GNU LGPL v2   |
| ecryptfs-utils                    | GNU LGPL v2        | linux-pam    | BSD-3c        |
| ethtool                           | GNU LGPL v2        | linuxptp     | GNU GPL v2+   |
| eudev                             | GPLv2+/ LGPL v2.1+ | minicom      | GNU LGPL v2   |
| expat                             | MIT                | mrouted      | BSD-3c        |
| fbdump                            | GNU LGPL v2        | mtid         | GNU LGPL v2   |
| flex                              | FLEX               | ncurses      | MIT           |
| freetype                          | FreeType license   | netcat       | GNU LGPL v2   |

## NAV Pro AV — Network Ports, Protocols, and Licenses

| Third-party Software and Licenses |                     |               |               |
|-----------------------------------|---------------------|---------------|---------------|
| Package                           | License             | Package       | License       |
| gnupg                             | GNU LGPL v2         | netsnmp       | BSD           |
| gptfdisk                          | GNU LGPL v2         | nginx         | BSD-2c        |
| heirloom-mailx                    | GNU LGPL v2         | ntp           | MIT           |
| hwdata                            | GNU LGPL v2         | openssh       | BSD           |
| i2c-tools                         | GNU LGPL v2         | openssl       | OpenSSL       |
| ifplugd                           | GNU LGPL v2         | pcre          | BSD           |
| iftop                             | GNU LGPL v2         | popt          | MIT           |
| iperf                             | iperf               | psmisc        | GNU LGPL v2   |
| iproute2                          | GNU LGPL v2         | ptpd2         | BSD-2         |
| iptables                          | GNU LGPL v2         | python3       | PSF           |
| jq                                | MIT                 | python-lxml   | BSD           |
| keyutils                          | GPL v2+/ LGPL v2.1+ | python-serial | PSF           |
| kmod                              | GNU LGPL v2         | qjson         | GNU LGPL v2.1 |
| libassuan                         | GNU LGPL v2         | qy            | GNU LGPL v2   |
| libcgicc                          | GNU LGPL v2         | rapidjson     | MIT           |
| libcurl                           | ICS                 | socat         | GNU LGPL v2   |
| libdaemon                         | GNU LGPL v2.1       | spawn-fcgi    | BSD           |
| libdnet                           | BSD                 | sqlite        | public domain |
| libevent                          | BSD-3c/ OpenBSD     | strace        | BSD-3         |
| libfcgi                           | OML                 | tcpdump       | BSD           |
| libffi                            | MIT                 | tzdata        | public domain |
| libgpg-error                      | GNU LGPL v2.1       | uboot         | GNU LGPL v2   |
| libgpgme                          | GNU LGPL v2.1       | util-linux    | GNU LGPL v2   |
| libnl                             | GNU LGPL v2.1       | xinetd        | custom        |
| libnspr                           | MPLv2.0             |               |               |

**NOTE:** Go to [www.extron.com](http://www.extron.com) for the complete user guide, installation instructions, and specifications

For information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the [Extron Safety and Regulatory Compliance Guide](#) on the Extron website.