



TECHNOLOGIES

Vehicle Network Solutions

GRYPHON[®] - S4

USER MANUAL

Version 1.0



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IMPORTANT NOTICE

It is essential that you read this document carefully before using the hardware. Damage caused by misuse of the hardware is not covered under the seller's product warranty.

When using this manual, please remember the following:

- This manual may be changed, in whole or in part, without notice.
- Dearborn Group Inc. assumes no responsibility for any damage resulting from any accident, or for any other reason, while the hardware is in use.
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1. Introduction

The Gryphon Vehicle Gateway Products family of hardware interfaces provides remote connectivity for multiplexed automotive and automation communication networks. These products use an Ethernet connection to the user's PC to provide a high-speed user interface for applications such as diagnostics, monitoring, and troubleshooting, as well as for custom applications. An embedded Linux operating system and standard Transmission Control Protocol/Internet Protocol (TCP/IP) services ensure inter-connectivity with a large number of existing PCs, workstations, and network hardware systems.

The Gryphon S4 includes the following features:

User interface

- Ethernet with 1000/BaseT TCP/IP
- Wireless with 802.11bgn support
- RS-232 diagnostic port (for terminal connection only)

Hardware

- Embedded 486-class processor, AMD Elan™
- One expansion module slot
- Two external USB ports with WiFi and Flash Drive memory support
- I/O connector (3 Inputs and 2 Outputs)

Software

- GNU/Linux environment
- Flash-based file system
- On-board Web server
- TCP/IP support, standard services (Telnet, FTP, SSH, etc.)
- Expansion module drivers and applications

The S4 provides an expansion slot for connection of interface modules. Users can utilize one of DG Technology's existing PC programs, such as Hercules, or write their own client or stand-alone applications. The hardware has the Gryphon Protocol, which is a client communication protocol specification that defines the format of messages passed over a TCP connection between the S4 and a client, as well as several APIs. Please check our website for updates on this support.

Typical applications for the S4 include:

- PC-to-vehicle network adapter.
- Stand-alone node running custom applications.
- LAN gateway to one or more vehicle networks.

1.1 Document organization

This manual contains the following sections and appendix:

Section 1 – Introduction – Provides an overview of the manual, summarizing the contents of the remaining sections and appendices. Also, provides a reference to related documentation and technical support resources.

Section 2 – Hardware Overview – Describes key features available for the Gryphon hardware.

Section 3 – Website Overview – Describes the unit's on-board website.

Section 4 – Configuring the Ethernet Connection – Describes how to set up the Ethernet connection, IP address and modify Gryphon TCP/IP parameters.

Section 5 – On Board Utilities – Describes available utilities and their use.

Section 6 – Gryphon Communication Interface – Resource listing of protocol specifications for communication with the Gryphon.

Appendix – TCP/IP Settings – Contains server definitions, network settings and configuration instructions.

1.2 Package contents

The tool package should include the following items:

- S4 hardware unit
- 12 VDC power adapter
- RJ45 Ethernet null cable (cross-over)
- Molex Automotive 18" open ended cable
- Installation CD which includes the S4 User Manual, Easy API, Gryphon Library, Utilities, and the Gryphon Toolkit
- Hercules Software CD (and manual)

If you are missing any part of this package, please contact your sales representative, or the technical support hotline, immediately.

1.3 Technical support

In the U.S., technical support representatives are available to answer your questions between 9 a.m. and 5 p.m. EST. You may also fax or e-mail your questions to us. Include your voice telephone number for prompt assistance.

Phone: (248) 888-2000

Fax: (248) 888-9977

E-mail: techsupp@dgtech.com

Web site: <http://www.dgtech.com>

1.4 Future document updates

Due to the flexibility of the product, the hardware will be updated periodically to support new features and networks. To keep users updated, this manual will also change to reflect these new features and improvements. To keep you informed of updates to the manual, it is essential that we have your current e-mail address.

1.5 Related documents

For further information regarding programming with the hardware, you may wish to consult one or more of the following resources:

DG Technologies – Phone: (248) 888-2000

Document	Version
<i>API for communication with the DG Gryphon hardware family</i>	4.5
<i>Hercules User Manual</i>	5.0

Linux-related Web sites:

Introductory Linux information; a good place to get started.

<http://www.linux.org/>

Linux Documentation Project - Regularly updated HOWTOs and FAQs

<http://www.tldp.org/>

General Linux Q & A discussion board (with searchable archives)

<http://www.linuxquestions.org/>

News and information regarding the Linux kernel.

<http://www.kerneltrap.org/>

2. Hardware Overview

Before using your hardware, please read this section. It describes the hardware information necessary for successful installation and operation. Once you understand your hardware connection, move to Section 3 for connecting to Ethernet or Wireless.

2.1 S4 hardware Specifications

Dimensional	Height = 2 in., width = 5 1/4 in., depth = 4 1/2 in.
Environmental	Storage temperature: -40 to 80 degrees C Operational temperature: -10 to 80 degrees C
Electrical	Operating voltage range: 8 to 32 VDC (with reverse voltage protection) Nominal voltage: 14.5 VDC (if powered via the vehicle) Maximum supply current: 500 mA (power input fused at 1A)

2.2 Power Connection Options

The S4 tool may be powered through the barrel power jack, the CAN 1 / CAN 2 connector, the I/O Molex Automotive connector, OR the expansion module connector if such a module is present in the unit.

WARNING!

Never connect more than one power source at a time to the S4 tool.

The tool must be powered by **only one** source at a time. Connecting to multiple power sources may cause damage to the hardware and void the product warranty.

2.2.1 Power Barrel Connector

If you are not powering the S4 tool via the vehicle connector or a module, you may do so through the standard 2.5 mm x 5.5 mm power jack (center is positive). The S4 tool operates with an input voltage between 8 and 32 VDC. (During normal operation, a voltage of approximately 12 volts should be applied.)

WARNING!

Never connect more than one power source at a time to the S4 tool.

2.2.2 CAN1 / CAN2 Connector

The CAN1 / CAN2 connector links the CAN1 channel, power, and ground through a single connector. An OBD II adapter cable is required to connect the unit to the SAE J1962 vehicle connector. All cables connected to this connector must have ground connected to pin 10 and power connected to pin 15 if the S4 is to be powered through this connector as in the OBD II cable.

WARNING!

Never connect more than one power source at a time to the S4 tool.

2.2.3 I/O Molex Connector

The I/O connector has power (on pin 1) and ground (pins 6 and 12) routed to it as well as the CAN and I/O signals.

WARNING!

Never connect more than one power source at a time to the S4 tool.

2.2.4 MODULE 1 Connector

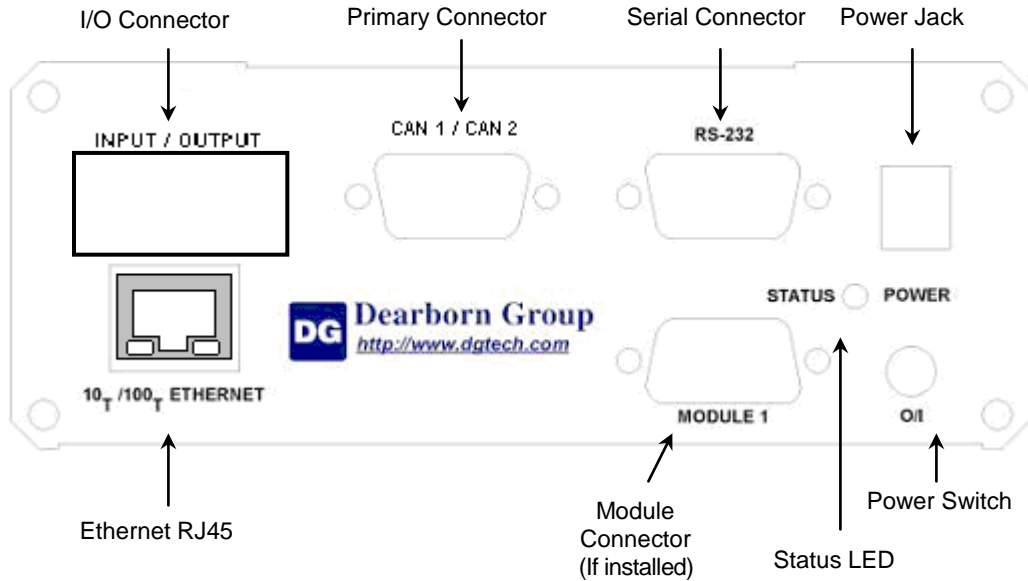
The MODULE 1 connector is the connector on the expansion module if a secondary module is installed. To power the unit through the MODULE 1 connector, refer to the pin assignment chart or diagram for the module installed.

WARNING!

Never connect more than one power source at a time to the S4 tool.

2.3 External Hardware

The following figure shows the external features of the S4.



S4 Front Access Panel

2.3.1 Power Connector

The power connector is a standard 2.5 mm x 5.5 mm x 9 mm power jack (center is positive). The power adapter provided is a 12V switched regulator power adapter.

WARNING!

Never connect more than one power source at a time to the S4 tool.

2.3.2 ON/OFF Switch

The power switch is a snap action, momentary-on, contact switch. Once power is applied to the unit, the switch may be used to turn the S4 unit on, off, or reset the unit's network parameters to the default settings. Refer to section 3 for the default network settings. The S4 also has an Autoboot function, which allows the unit to turn on as long as power is supplied. The Autoboot function is set at the factory with an internal jumper setting shown in section 2.4.2. With Autoboot enabled, the switch functions are the same, but the unit will not turn off unless power is completely disconnected. The functions of the switch are described below.

Switch Function	Action
Power On	Press the power switch in briefly then release. The S4 Status LED will flash red, green, and amber several times. When the LED is solid green (after approximately 45 seconds), the S4 is ready for normal operation.
Power Off	Press the power switch in, holding power switch until green light flashes slowly three times, emits a brief amber flash, and then rapidly flashes green five times. Release the power switch after the amber flash. The Status LED will blink several times and then go out. The unit is now powered off.
Network Parameter Reset	If unit is off, press the power switch in and hold for at least 45 seconds, or until the Status LED flashes green, slowly, off then on, then release power switch. The S4 DHCP settings and IP address are reset to the default state.

2.3.3 LED Status Indicator

The Status LED gives information about the status of the hardware.

LED Color	Meaning
Green	Unit is on / booting
Flashing Red	Disk activity
Flashing Green	Power down sequence occurring or network parameters reset

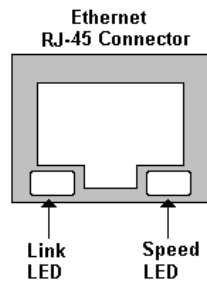
2.3.4 RS-232 Connector

The serial port can be used to communicate with the S4 or for user-defined applications.

2.3.5 Ethernet Connector

A null RJ45 Ethernet cable is provided with the S4 tool package for use in a point-to-point configuration with a PC. This cable connects the tool's Ethernet port to the host PC's Ethernet port. To connect the tool to a LAN, you will need to use a standard Ethernet cable (available for purchase) instead of the supplied null cable.

NOTE: Null Ethernet cables are sometimes referred to as “cross over cables.”



This connector contains two status LEDs to provide additional information. The Link LED is on (green) when a data link is established but no data transmission activity exists. This LED will blink when data is being transmitted. When the Speed LED is on (green) the transmission speed is set at 100-base-T (100_T). When this LED is off the transmission speed is set at 10-base-T (10_T).

2.3.6 CAN1 / CAN2 Connector

The integrated network contains either two high-speed dual-wire CAN channels, or one single-wire CAN channel and one high-speed dual-wire CAN channel. If you did not specify at the time of purchase that the unit needs to have a single-wire channel, then it does not have one and has two dual-wire CAN channels instead.

The high-speed dual-wire CAN channels use a Philips CAN transceiver P/N TJA1050 and an Infineon TLE6250G transceiver. The single-wire CAN channel uses the Melexis single-wire CAN transceiver P/N TH8056 and conforms to GM specification GMW 3089 revision 2.2.

The following table provides pin assignments for the CAN1 / CAN 2 channels and Pass Thru Signals.

Pin # on HD15	Protocol
1	CAN-Low (Channel 2)
2	CAN-Low (Channel 1)
3	PASSTHRU 2
4	Not Connected
5	Ground (V- IN)
6	CAN-High (Channel 2)
7	CAN-High (Channel 1)
8	PASSTHRU 4
9	PASSTHRU 3
10	Ground (V- IN)
11	PASSTHRU 1
12	PASSTHRU 1
13	Not Connected
14	Not Connected
15	V+ IN (Input Voltage: 8 – 32 VDC)

2.3.7 INPUT/OUTPUT Connector

The INPUT/OUTPUT connector is a 16 pin Molex Automotive male connector. The mating female connector is supplied with the S4 with 18-inch leads. The chart below shows the pin-out and color-code for the signals on the supplied connector.

Pin	Function	Wire Color
1	V+ IN (Input Voltage: 8 – 32 VDC)	RED
2	Output 2, High Side output, 1 Amp maximum source capability	BROWN
3	Output 1, High Side output, 1 Amp maximum source capability	YELLOW
4	Not connected	
5	Input 1, hysteresis input	ORANGE
6	Ground	BLACK
7	CAN-High (Channel 1)	WHITE/BLUE
8	CAN-High (Channel 2)	BLUE
9	Not Connected	
10	Output 2, Low Side output, 1 Amp maximum sink capability	WHITE/BROWN
11	Output 1, Low Side output, 1 Amp maximum sink capability	WHITE/YELLOW
12	Ground	BLACK
13	Input 3, hysteresis input	GREY
14	Input 2, hysteresis input	VIOLET
15	CAN-Low (Channel 1)	WHITE/GREEN
16	CAN-Low (Channel 2)	GREEN

WARNING!

Never connect more than one power source at a time to the S4 tool.

Inputs handle 0-32VDC, and include hysteresis / transient protection. Any of the 3 inputs can be configured via internal jumpers to cause a power-up event on either rising or falling logical edge.

Inputs can be treated both as immediate values (the driver returns the current state) or edge detectors (the driver returns a latched edge and can clear such events on demand).

No pull-up to the appropriate passive state is required externally.

Outputs are 1A sinks (MOSFET switch to ground).

2.3.8 USB Connectors (Rear Panel)

There are two standard USB Type A ports on the rear panel and two internal. The S4 currently supports USB Flash Drives, GPS and the supplied Buffalo Wireless Adapter (P/N WLI-UC-GNM).

2.3.9 Module Connector (Optional)

A single module slot is provided with the S4 hardware. Each installed module will have connector information. Any expansion module can provide power to the S4 tool. Please make certain of the pin assignments for the individual module before applying voltage to the pins marked *VBAT* (positive or negative).

WARNING!

Never connect more than one power source at a time to the S4 tool.

2.4 Internal Hardware

There are jumpers and headers on the board referenced in other sections of this manual.

2.4.1 USB

There are two headers for internal USB ports located next to the external USB ports. Refer to the diagram in section 2.4.2 for the location.

2.4.2 Input Jumpers

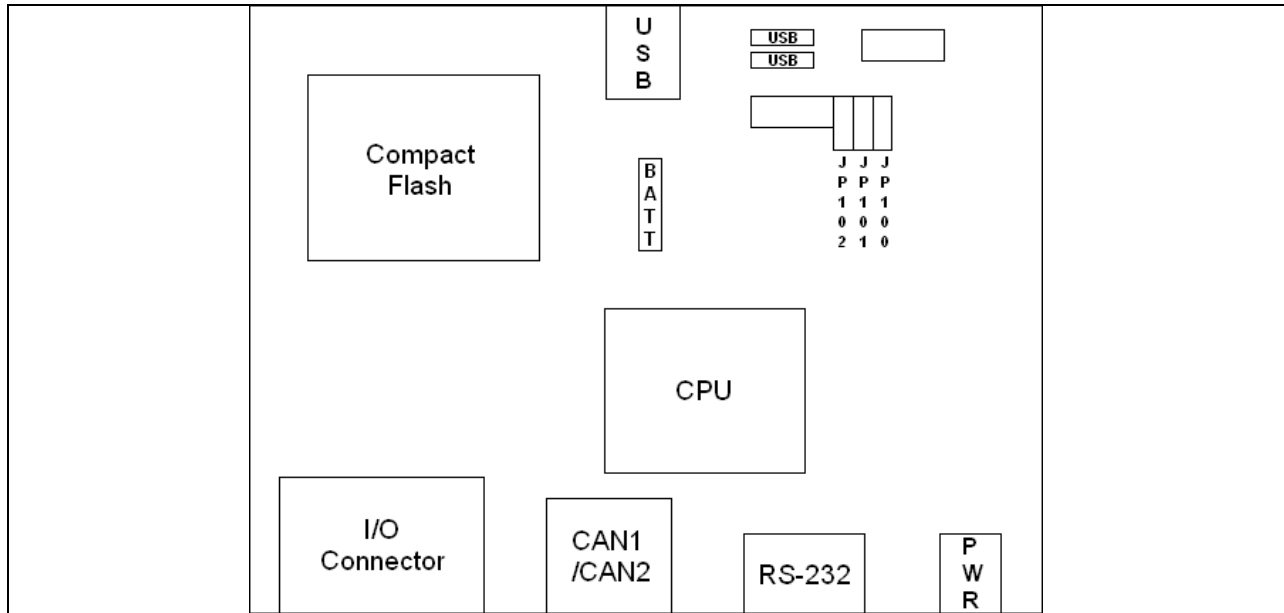
As viewed from the top of the board with the front of the unit down, the jumpers are located in the top right quarter of the board. These jumpers correspond to the three inputs on the INPUT/OUTPUT connector. JP100, JP101, and JP102 correspond with input channels 1, 2, and 3 respectively.

Placing a jumper over the two pins located toward the front access panel selects falling-edge power-on for that channel.

Placing a jumper over the two pins located away from the front access panel selects rising-edge power-on for that channel.

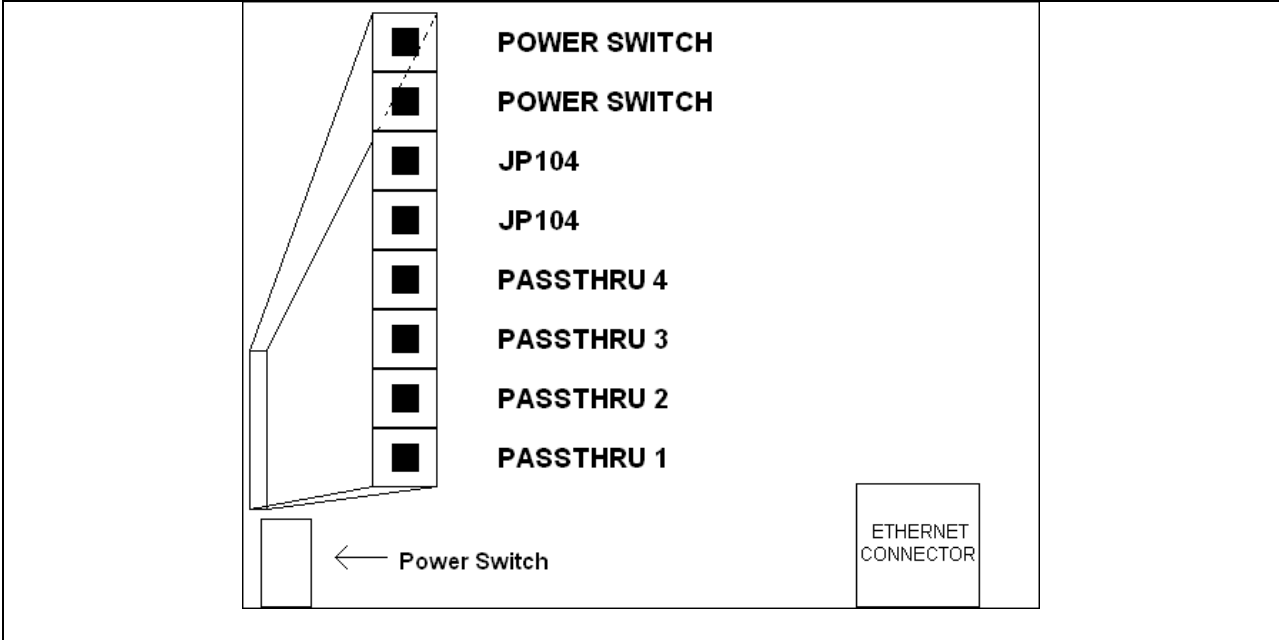
Removing the jumper will prevent a power-up event from occurring for that channel.

If any of the above jumpers are in place, the unit will power up if either the Power button is pressed or a voltage is applied to any of the “jumpered” input lines.



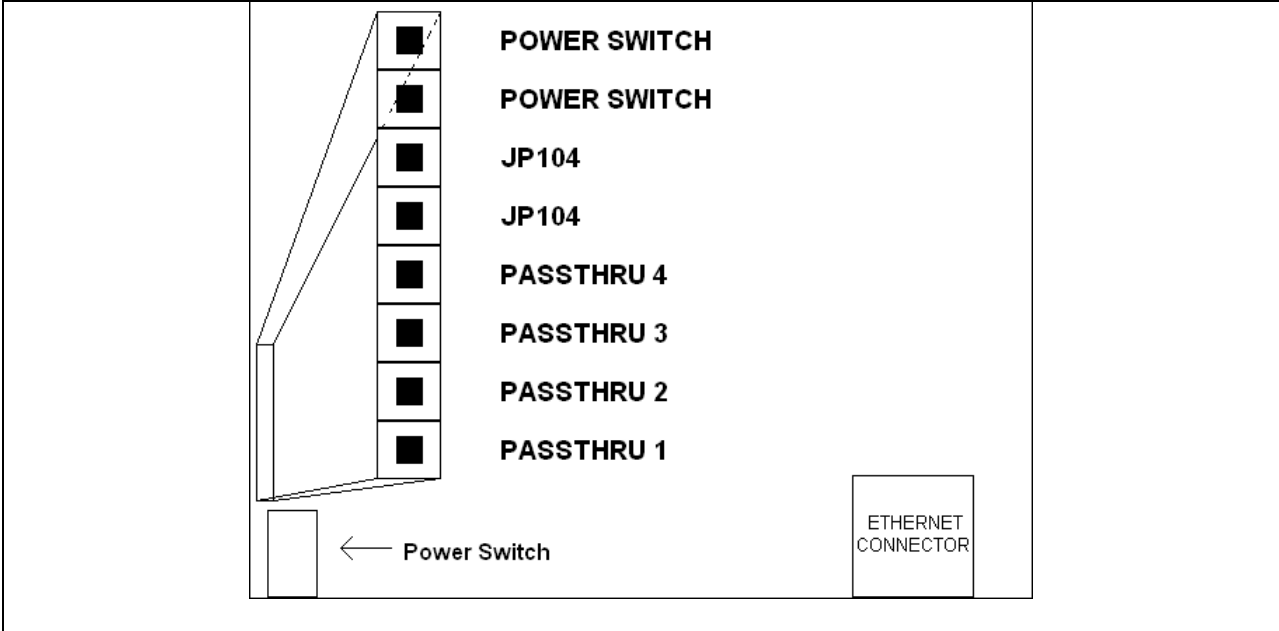
2.4.3 Autoboot

As viewed from the bottom of the board, there is an 8-pin header on the left side of the board. By placing a jumper across JP104, the unit will power-up and boot automatically as soon as power is supplied to the unit. Place the jumper on only one pin to disable the Autoboot function.



2.4.4 Passthru

There are four pins that are directly connected to the CAN1 / CAN2 connector. There are 4-pin headers on most daughter modules that can be connected to these pins providing the cable connected to the CAN1 / CAN2 connector is wired to accommodate the additional signals.



3. Website Overview

The S4 is equipped with an on-board Web server that hosts its own Website accessible to available browsers such as Firefox or Internet Explorer by entering the unit's IP address in the address bar of the browser or by selecting the unit's Device Name in Zeroconf Neighborhood Explorer.

3.1 Main Page

The Main Page has a link to DG Technologies website at the top of the page. Under the link and to the right is the Device Name, IP Address, Release, and Kernel Build. The Device Name is the name of the unit for the Zeroconf utility. The number at the end of the name is the serial number of the unit.

In the left column are links to the Configuration, Modules/Pinouts, Info/Stats, Channels, Documentation, and Utilities pages.

DG Technologies S4

Configuration	Device Name: DG S4 - 536538
Modules/Pinouts	IP Addr (eth0): 192.168.1.138
Info/Stats	Release: Release S4_20120801
Channels	Kernel Build: Linux gryphon 2.6.13.4 #8 Tue Jul 31 15:23:44 EDT 2012 i486 unknown
Documentation	
Utilities	



3.2 Configuration

There are three buttons at the top that will take you back to the Main Page, the Gateway Configuration, or Advanced Configuration. Below the buttons is a tab screen that will allow you to update the system date and time, configure the Zeroconf settings, configure the DNS settings, configure the Default Route settings, configure the Ethernet and Wireless settings, select programs and services to run at Startup, change the unit's Sysadmin password, enable the RS-232 serial port for login, and change the unit's Gryphon Protocol Optimization setting.

3.2.1 Date and Time

The system's date and time can be updated two ways. Values can be entered in the text boxes by clicking on the Enter Values from PC button or by manually entering values. Clicking on the Enter Values from PC button will retrieve the date and time on the local machine (the computer that is running the browser). Once the values have been set, click on the Submit Date Changes button to update the systems date and time with the vales entered.

DG Gryphon System Administration

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[Date & Time](#)

[Zeroconf](#)

[DNS](#)

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[Programs](#)

[Password](#)

[Serial Port](#)

[Optimization](#)

Set Date and Time

Month: Day: Year:

Gryphon's date and time

Hour: Minute: Seconds:

[Submit Date Changes](#)

[Enter values from PC](#)

[Return to Main Page](#)

3.2.2 Zeroconf

The Name text box displays the current Zeroconf name. To change the unit's Zeroconf name, change the name in the text box, then click the Submit Zeroconf Changes button.

The Device Locator can be used to identify the unit whose web page you are viewing. Click the Identify ON button to activate the locator function. The S4's Status indicator will flash on and off rapidly. Click the button again to deactivate.

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Zeroconf Name & Device Locator

Name: Identify is currently: OFF

Other DG devices found on the network

```
Grumpy's G2 192.168.36.4
Grouchy's S3 192.168.36.3
GRYPHON-01:04:23
Grouchy's G1 192.168.36.1
GRYPHON-01:04:27
GRYPHON-01:04:24
```

[Return to Main Page](#)

3.2.3 DNS

To enable/disable DNS, check/clear the checkbox. To change the Local Domain Name or Name Server Address, enter the values and then click on the Submit DNS Configuration Changes button.

DG Gryphon System Administration

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DNS Configuration

DNS Configuration Parameters

Enable DNS:

Local domain name:

Name server address:

[Submit DNS Configuration Changes](#) [Reset](#)

[Return to Main Page](#)

3.2.4 Default Route

To enable/disable the default route, check/clear the checkbox. To change the Default Route, enter the default route and then click on the Submit Default Route Configuration Changes button.

DG Gryphon System Administration

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Default Route Configuration

Default Route Configuration Parameters

Enable Default Route:

Default Route: . . .

[Submit Default Route Configuration Changes](#) [Reset](#)

[Return to Main Page](#)

3.2.5 Network

The Ethernet and wireless network have separate settings. If the wireless adapter is not plugged in while the unit is booting, then the wireless settings will not be shown.

3.2.5.1 Ethernet

The Ethernet has default settings with the IP address of 192.168.1.1, Net mask of 255.255.0.0, and the Configuration Type set to DHCP Server.

The Configuration Type can be set to Static, which allows the user to manually configure the IP address and Net mask. Setting the Configuration Type to Automatic allows the unit to automatically set the network parameters if the unit is on a network with a server present. Setting the Configuration Type to Server will allow the unit to act as a server on the network and assign IP addresses to other devices on the network unless the unit detects another server on the network, then it will automatically act as a client. Setting the Configuration Type to Disable will completely disable the Ethernet connection for the unit until it is changed by the user.

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Network configuration

S4_Ethernet (eth0)

Current IP address:
192.168.0.138

Configuration Type

Automatic (DHCP Client/Zeroconf)

Manual (Static configuration)

Server (DHCP Server) DHCP server detected; running as DHCP client

Disable

Static Configuration Parameters

IP address: . . .

Net mask: . . .

[Submit S4_Ethernet Changes](#) [Reset](#)

3.2.5.2 Wireless

The wireless network has a default IP address of 10.0.0.1, a Net Mask of 255.0.0.0, SSID of DG-S4- plus the unit's serial number, WLAN Mode set to Auto, Operating mode set to Ad-Hoc, WEP mode Disabled, no WEP KEY, Channel Automatic, and Configuration Type set to Manual as shown.

USB_8192CU_802.11 (eth1)

Current IP address:
10.0.0.1

Wireless Options

SSID: Any Available DG-S4-536538

WLAN Mode: Auto

Operating Mode: Ad-Hoc

WEP Mode: Disabled

WEP KEY:

Channel: Automatic

Configuration Type

Automatic (DHCP Client/Zeroconf)

Manual (Static configuration)

Disable

Static Configuration Parameters

IP address: 10 . 0 . 0 . 1

Net mask: 255 . 0 . 0 . 0

3.2.6 Programs

There are programs that run at Start Up that can be enabled/disabled by checking/clearing the corresponding checkbox then clicking on the Submit Changes button.

DG Gryphon System Administration

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Startup Programs / Services

Warning: file(/tmp/name) [function.file]: failed to open stream: No such file or directory in /www/docs/sysadmin/entry.php on line 899

- PGMLOADER** (Program Loader)
- RESP** (Message Responder)
- USDT** (USDT Layer)
- GATEWAY** (Gateway Program)
- SWCANSPEED** (SWCAN Speed Chg)
- CPULOAD** (Sys Utilization)
- LIN** (LIN LDF server)
- CONVERT** (LIN Signal server)
- J1939** (J1939 Protocol layer)
- LOGGER** (Data Logger)
- GPS** (GPS channels)

[Submit changes](#)

[Return to Main Page](#)

3.2.7 Password

The unit's password can be changed from the default of dggryphon by entering the new password in both text fields and clicking on the Submit Changes button. Changing the password

this way only changes the password for the Web Interface. It does not change the root password for logging into the unit via Telnet or any other application.

DG Gryphon System Administration

Return to Main Page Gateway Configuration Advanced Configuration

Date & Time Zeroconf DNS Default Route Network Programs Password Serial Port Optimization

Change Sysadmin Password

This password controls access to this web page only!
Use the `passwd` command from a login shell to change login passwords.

New password:

Verify new password:

Submit Password Change Reset

Return to Main Page

3.2.8 Serial Port

The serial port can be used to interface with the unit with third party applications or as a login terminal. To use the serial port to log in to the unit, select RS-232 port login enabled from the drop menu then click Change RS-232 Configuration.

DG Gryphon System Administration

Return to Main Page Gateway Configuration Advanced Configuration

Date & Time Zeroconf DNS Default Route Network Programs Password Serial Port Optimization

External RS232 Port

This setting affects the behavior of the external RS232 port.

RS232 port unallocated

Return to Main Page

3.2.9 Optimization

The Gryphon Protocol Optimization feature can be used to select either the default, Optimize for message latency or Optimize for Message throughput.

DG Gryphon System Administration

[Return to Main Page](#) [Gateway Configuration](#) [Advanced Configuration](#)

[Date & Time](#) [Zeroconf](#) [DNS](#) [Default Route](#) [Network](#) [Programs](#) [Password](#) [Serial Port](#) [Optimization](#)

Gryphon Protocol Optimization

- Optimize for message throughput.
(Maximize the number of messages per second delivered to the client.)
- Optimize for message latency.
(Minimize the time to deliver messages to the client.)

[Submit](#)

[Return to Main Page](#)

3.3 Modules/Pinouts

This page lists installed modules, with associated pin outs and channel ID assignments. A channel or interface is only accessible if it is listed here. This page is automatically generated based on boot-time detection of installed hardware.

It shows the modules installed, with their type, version and serial number. Each channel is shown with its pin-outs listed.

DG Gryphon: Installed Modules

[Back to main page](#)

Module 1

DG-CAN-SJA1000-C
Version 2.0.1
Serial Number:536538

Channel 01: DG-CAN-SJA1000-C
(interface 1 on module 1)
Type: 02 Subtype: 11

Pin Number	Pin Assignment
2	CAN-LOW
7	CAN-HIGH
10	V- IN/GND
12	PASSTHRU1
13	PASSTHRU2
15	V+ IN

Channel 02: DG-CAN-SJA1000-C
(interface 2 on module 1)
Type: 02 Subtype: 11

Pin Number	Pin Assignment
1	CAN-LOW
6	CAN-HIGH
10	V- IN/GND
12	PASSTHRU1
13	PASSTHRU2
15	V+ IN

Module 2

DG-HBCC
Version 2.31
Serial Number:111457

Channel 03: DG-HBCC
(interface 1 on module 2)
Type: 03 Subtype: 01

Pin Number	Pin Assignment
1	V- IN
2	BUS-
3	BUS+
5	GND
6	V+ IN
8	V TERM

3.4 Info/Stats

This page is used to display specific Gryphon information. Select each button to display different categories of information on the bottom of the page.

Gryphon Information

[Back to main page](#)

Load Averages

1 minute	5 minutes	15 minutes
0.00	0.00	0.00

User Memory

Total = 29,962,240 bytes
Used = 10,518,528 bytes (35.1%)
Free = 19,443,712 bytes (64.9%)

```
pwrmonitor[714]: Power was turned on via input 1
pwrmonitor[724]: idpipe: 04

startgate.pl[877]: Unable to open /gryphon/gate/default for input: No such file
```

Message Responder trace is OFF

3.5 Channels

This page is a listing, by channel, of the modules (with their associated pin outs) installed on the hardware, (i.e., a different view of the module/pin out information).

DG Gryphon: Installed Channels

[Back to main page](#)

Channel 01	
DG-CAN-SJA1000-C Version 2.0.1 Serial Number:536538 (interface 1 on module 1) driver information <input type="button" value="Setup"/>	Error reporting level: 0
	Speed: Preset 7 (0x80 0x2B) 500,000 bps
	Bus Load
	Mode 0 Period Bus load monitoring OFF.

Channel 02	
DG-CAN-SJA1000-C Version 2.0.1 Serial Number:536538 (interface 2 on module 1) driver information <input type="button" value="Setup"/>	Error reporting level: 0
	Speed: Preset 7 (0x80 0x2B) 500,000 bps
	Bus Load
	Mode 0 Period Bus load monitoring OFF.

Channel 03	
DG-HBCC Version 2.31 Serial Number:111457 (interface 1 on module 2) driver information <input type="button" value="Setup"/>	Error reporting level: Not Supported
	Speed: Preset 3 (0x02) 41,600 bps
	Bus Load
	Mode 0 Period Bus load monitoring OFF.

Delay Driver	
driver information	Error reporting level: Not Supported
	Speed: n.a.
	Bus Load n.a.

On this page, you may configure the following channel settings (by clicking the **Setup** button for the particular channel you wish to modify):

- Bus load monitor mode (*Off, Time Average, or Msg Count Average*)
- Bus load monitor period (needed for the busload monitor mode)
- Error reporting level
- Bus speed (customized or one of several presets). For Speed changes to become valid, check the Initialization box.

Gryphon Channel 1 Setup

Bus Load Monitor Mode

Bus Load Monitor Period seconds/messages

Error Level
Active after next INIT

Speed Custom speed:
Active after next INIT

Initialize

If you turn on the bus load monitor, the *Installed Channel* screen will now display as follows. The data displayed is static and can only be updated by pressing “Reload” on the browser.

DG Gryphon: Installed Channels

[Back to main page](#)

<p>Channel 01</p> <p>DG-CAN-SJA1000-C Version 2.0.1 Serial Number:536538 (interface 1 on module 1)</p> <p>driver information</p> <p style="text-align: center;"><input type="button" value="Setup"/></p>	<p>Error reporting level: 0</p> <p>Speed: Preset 7 (0x80 0x2B) 500,000 bps</p> <p>Mode 1 (avg. over time)</p> <p>Period 100 seconds</p> <p>Bus Load</p> <table style="width: 100%;"> <tr><td>Average</td><td style="text-align: right;">0.00%</td></tr> <tr><td>Current</td><td style="text-align: right;">0.00%</td></tr> <tr><td>Peak</td><td style="text-align: right;">0.00%</td></tr> <tr><td>Hist.Peak</td><td style="text-align: right;">0.00%</td></tr> </table> <p>Counters</p> <table style="width: 100%;"> <tr><td>Rx Count</td><td style="text-align: right;">0</td></tr> <tr><td>Rx Dropped</td><td style="text-align: right;">0</td></tr> <tr><td>Rx Err</td><td style="text-align: right;">0</td></tr> <tr><td>Tx Count</td><td style="text-align: right;">0</td></tr> <tr><td>Tx Dropped</td><td style="text-align: right;">0</td></tr> <tr><td>Tx Err</td><td style="text-align: right;">0</td></tr> </table>	Average	0.00%	Current	0.00%	Peak	0.00%	Hist.Peak	0.00%	Rx Count	0	Rx Dropped	0	Rx Err	0	Tx Count	0	Tx Dropped	0	Tx Err	0
Average	0.00%																				
Current	0.00%																				
Peak	0.00%																				
Hist.Peak	0.00%																				
Rx Count	0																				
Rx Dropped	0																				
Rx Err	0																				
Tx Count	0																				
Tx Dropped	0																				
Tx Err	0																				

3.6 Documentation

This page is the manual for the Gryphon Protocol, the generic TCP/IP socket commands used to program directly to the hardware. It is described in Chapter 5.

Gryphon: Technical Information

- Gryphon Communication [Protocol](#)
- Gryphon [Hardware](#) Information
- Gryphon [Utils](#) Documentation
- Gryphon [Linux Kernel](#) information

Examples, Source Code, and FAQs

- Unix client [example source code](#) (.tgz archive)
- C [header files](#) (.tgz archive)
- [Gryphon Product Technical Support](#) on DG's web site

3.7 Utilities

There are several utilities included on this page. The BTR Calculator can be used to calculate BTR values when the preset values (section 3.5) do not include desired BTR values. Contact DG Technologies for information on other utilities.

DG Gryphon Utilities

[Return to Main Page](#)

BTR Calculator	Manage LDFs	Manage Playback Files	Manage Logger Config Files	Manage DBC Files	Programming Multiplexor
		Data Playback	Manage Logger Data Files		
			Display Logger Information		

4. Configuring the Network Connection

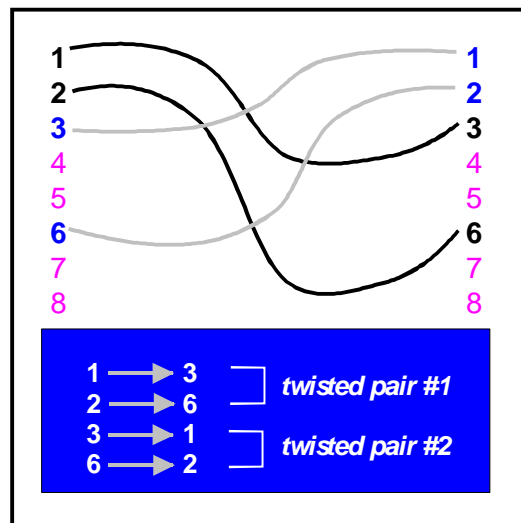
For users wanting to access information externally from the hardware, a communication connection to the S4 must be established via an Ethernet or Wireless link. This connection will allow you to send and retrieve data, execute an onboard application, or run DG's Hercules application, as examples.

4.1 Connection to the PC

You must have access to an Ethernet connection. Your office, workshop, or factory floor may already be equipped with such a link. If it is not, or if you are establishing a point-to-point connection with a dedicated PC not already equipped with Ethernet, then an appropriate network card must be installed on your PC.

A null RJ45 Ethernet cable is provided for use in a point-to-point configuration with a PC. This cable connects the S4's Ethernet port to a host PC's Ethernet port. (To connect the S4 to an Ethernet *hub*, you will need to use a *standard* RJ45 Ethernet cable instead of the supplied null cable.)

NOTE: Null Ethernet cables are sometimes referred to as “cross over cables.”



Ethernet Cross Over Cable

4.2 Default IP address

Ethernet communicates by having each individual device on a network using a unique Internet Protocol (IP) Address. Along with these addresses, there are the Netmask, Broadcast and Default Route Addresses to configure.

The hardware has predefined default parameter values. If you are using the tool one-to-one with your PC, these parameters typically do not need to be changed. You **will** need to change these default parameters, however, **if your PC is not configured as a DHCP Client, or if you want to connect the hardware to a network.**

The following table lists the S4's default address:

Parameter name	Hardware default value
IP (Internet Protocol) Address	192.168.1.1
Netmask	255.255.0.0
Broadcast	192.168.255.255
Default Route	192.168.2.1
TCP/IP Settings	

Note: To enable communication with an S4 unit at the above listed address, your PC's IP address must be configured to: **192.168.1.2**.

Prior to establishing a connection with your building's existing LAN, you should contact your company's network administrator and coordinate new values for your hardware.

4.3 Configuring the IP Address

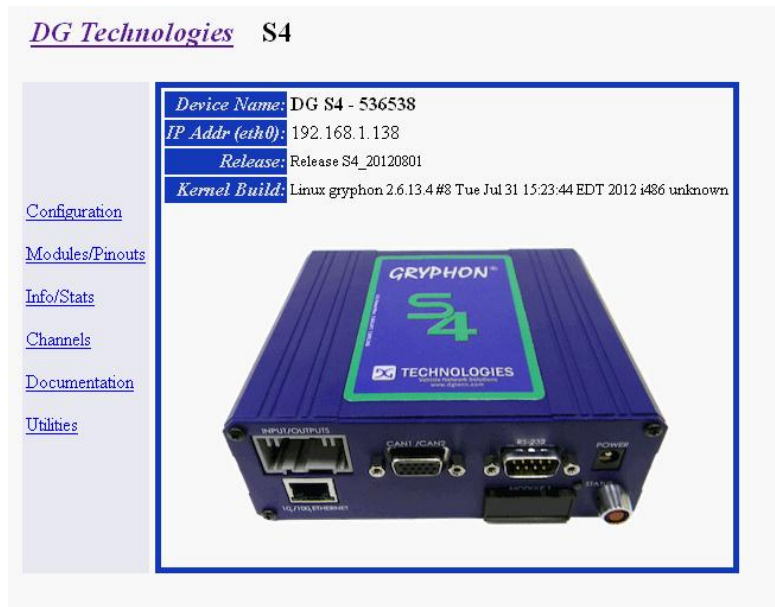
To configure the hardware's TCP/IP Ethernet parameters:

Access the on-board Web server, and utilize the S4's Web page, which includes a configuration tool used to set IP parameters and passwords. The page may be accessed through any Web browser with network access to the S4 unit.

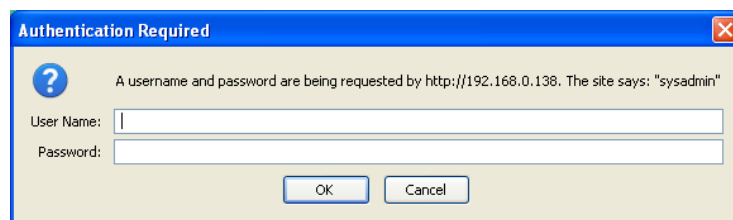
4.3.1 Using a Web browser to modify the Gryphon's TCP/IP parameters

You may access the hardware configuration pages via a forms-capable browser (like Firefox or IE) on a network-connected computer. **Please note:** this option requires that the *current* TCP/IP parameters allow communication over the network. If communication over the network is *not* possible (as is often the case when reconfiguration is required), then the TCP/IP parameters must be changed, either through the method described in *section 3.3.1* or that described in *section 4.1*.

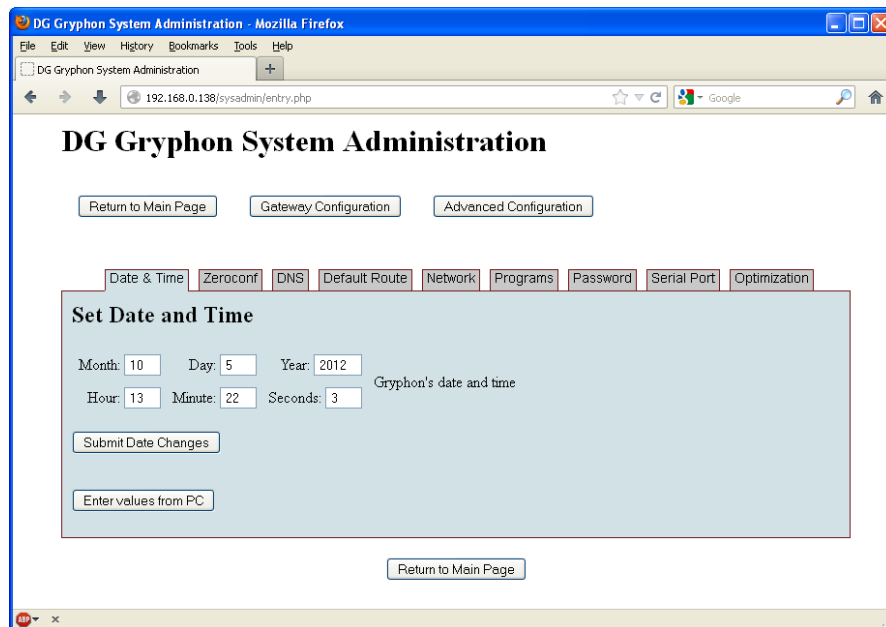
1. Verify that the TCP/IP settings of your PC do not match those set for the S4 unit. (The S4 default parameters are: IP Address = 192.168.1.1; Netmask = 255.255.0.0.)
2. Start your Web browser. Type the following URL: **http://192.168.1.1** The following web page, with its six areas for viewing (*Configuration*, *Modules/Pinouts*, *Info/Stats*, *Channels*, *Documentation* and *Utilities*), appears as shown below.



3. Next, click on *Configuration*. Once you enter this section, a box will prompt you for a user name and password. The default user name is *sysadmin*; the default password is *dggyrphon*. (**Note:** this password is the same as the default root password.)



Once logged in, the *DG Gryphon System Administration* page will appear: On this page, you can configure the connection parameters and change the time and date.



You may set the following parameters:

- **Time/Date** - Enter the new values, and click **Submit Date Changes**. A screen verifying the change should appear.
- **TCP/IP Configuration** – Enter your configuration type and any Static Configuration Parameters, if necessary.
- **Configuration Type** By default the hardware is configured as a DHCP server. See Appendix A for more information about what selection you should choose. All selections are valid for Gryphon hardware, while S4 hardware owners should NEVER choose DHCP client.
- To make your changes, provide new values where necessary, and click **Submit TCP/IP Changes**. Then turn the S4 off and on, (i.e., reboot), to invoke the changes.
- **Startup Programs / Services** - A checkmark indicates that a program is currently active on the S4.
- **Change Sysadmin Password** - Provide a new sysadmin password, and click **Submit Password Change**. A screen verifying the change will appear. (Please note that only the sysadmin password, not the root password, will change.)
- **Update Filesystem** – Used to re-flash the hardware with new embedded software. Only select this after you fully understand the application.

5. On-board Utilities

With an on-board Linux operating system, Gryphon users have a host of utilities they can access.

NOTE

The term “Gryphon” is intended to reference the Gryphon family functionality and is not limited to the S4 tool.

5.1 Using a Web browser to modify the S4’s TCP/IP parameters

You may access the webpage utilities via a forms-capable browser (like Firefox or IE) on a network-connected computer. **Please note:** this option requires that the *current* TCP/IP parameters allow communication over the network. If communication over the network is *not* possible (as is often the case when reconfiguration is required), then the TCP/IP parameters must be changed either through the method described in *section 3.3.1*, or that described in *section 4.1*.

1. Verify that your **PC’s** TCP/IP settings do NOT match those set for the S4 unit. (The Gryphon’s default parameters are IP Address = 192.168.1.1 , Netmask = 255.255.0.0.)
2. Start your Web browser. Type the following URL: **http://192.168.1.1**. The following Web page, with its six areas for viewing (*System Administration*, *Modules/Pinouts*, *Gryphon Stats*, *Channels/Stats*, *Documentation* and *Dearborn Group*), appears as shown below.



The **Systems Administration** view is described in *section 3.3.1* of this manual; the description of the other five views follows.

5.1.1 Dearborn Group link

A link to the DG Technologies Web page, (functional if the hardware is connected to the “outside” world).

5.2 Serial Connection Utilities

The following sections describe the procedure for establishing a serial connection to the hardware and some of the on-board utilities. Other utilities, not listed here, can be located in the Gryphon Protocol Manual.

NOTE: If your current TCP / IP settings allow network communication, you also have the option of using TELNET (rather than a serial cable connection and terminal emulator) to establish a terminal session with the Gryphon and its Lynx browser. (Use **telnet 192.168.1.1**.)

5.2.1 Establishing a serial cable connection

With the hardware turned off, connect a null serial cable to the unit’s serial port and to your PC. Then continue as follows:

1. Start a VT100 terminal emulation program on your computer. Be sure to specify the serial port to which you have the Gryphon connected. Set the terminal emulator’s communication settings to the following values:

BPS	38400	BITS PER CHARACTER	8
PARITY	NONE	STOP BIT	1

2. Turn the hardware unit on. Following several boot-up and status messages, the following prompt will appear:



3. At the login prompt, type your user name and password. The default settings are *user = root, password = dggyphon*.

You have now logged in to the Linux operating system.

6. Communication Interface

Clients communicate with the hardware by means of a TCP connection to port 7000. During a session, the client application and the hardware unit communicate using commands, responses, and event notifications sent over the TCP/IP link.

The hardware has several ways of programming that interface: Gryphon Protocol, Gryphon C++ Class Library, and the Gryphon C/Visual Basic Library. The libraries and information can be found on the supplied CD or on DG's website (www.dgtech.com).

NOTE

The term “Gryphon” is intended to reference the Gryphon family functionality and is not limited to the S4 tool.

6.1 General overview of Gryphon Communication Protocol

Each communication frame that is sent between the hardware and the client over the TCP/IP link should conform to the format specified in the online documentation pages resident on the Gryphon's embedded Web server – the Gryphon Communication Protocol. It is the set of rules by which Gryphon hardware communicates.

Gryphon Communication Protocol messages are sent through the Gryphon Network in packets of data known as **Gryphon Communication frames**, or **GC frames**. A GC frame is sent from a specific source to a specific destination. These destinations and sources can be internal or external to the hardware.

The **Gryphon server** process is responsible for routing GC frames from their source to their destination. The Gryphon server runs on the Gryphon CPU.

Other common processes are:

SD_CARD a device, or **channel**, for physically accessing an automotive / industrial automation network. These devices are resident on the Gryphon.

SD_CLIENT a user application, e.g., a network monitor program. Client processes can be running either on the Gryphon, or more typically, on a PC connected to the Gryphon over TCP/IP.

SD_SCHED a message scheduler process, running on the Gryphon.

SD_RESP a message responder process, running on the Gryphon.

Here are some scenarios for routing of GC frames in a Gryphon Network:

- CAN frames detected on a CAN bus, sent from an SD_CARD (CAN channel) to an SD_CLIENT (user program)
- CAN frames to be transmitted over a CAN bus, sent from an SD_CLIENT to an SD_CARD
- A channel speed change request sent from an SD_CLIENT to an SD_CARD
- A request for scheduler services, sent from an SD_CLIENT to an SD_SCHED

6.2 GC frames

As stated previously, each GC frame is assigned a unique source and destination address before it is sent over the Gryphon Network; with some exception, such as broadcast.

Some of the most commonly used types of GC Frame are:

- FT_DATA these frames encapsulate the frames of the in-vehicle network protocols. Typically, they are routed by the Gryphon server between processes of type SD_CARD and SD_CLIENT.
- FT_EVENT these frames are used to notify clients of the occurrence of various events and error conditions detected by the Gryphon, e.g., when a service requested by the client has been completed, or when an error condition has been detected on one of the channels.

6.3 Gryphon time and timestamps

The Gryphon time is a 64-bit unsigned integer. The user can set and retrieve this value via the GC Protocol. The user can also change this value when setting the Linux system time via the Gryphon front panel, or the "Time and Date" fields in the "System Administration" web page of the Gryphon, or the "date" command in a telnet session.

A Gryphon timestamp is embedded in every FT_DATA frame routed to a client. The timestamp value indicates the relative time when the encapsulated payload frame (e.g., CAN bus frame) was received and processed by the channel's device driver. It is a 32-bit unsigned integer, representing a time interval in units of 0.00001 seconds (10 micro-seconds).

The Gryphon timestamp is derived directly from the Gryphon time -- it is the lower 32-bits of the latter.

6.4 Channel speed

The bit transmission rate and other physical layer timing characteristics of a channel may be controlled by the user in two ways: through the use of "preset speeds", and through the use of IOCTL commands and data values specific to the channel hardware type.

6.4.1 Preset speeds

Some bus protocols are specified as having a fixed number of standard bit rates. For example, GM's "Class 2" implementation of SAE J1850 is defined as having two: "normal mode" at 10.4 kbps and "4X mode" at 41.6 kbps. To facilitate the user control of channel bit rates, the Gryphon is built with a set of "Preset Speeds" for the different channel types. Thus, for the "GM J1850 / DLC module" channel type, there are two preset speeds: the first corresponds to "normal mode", and the second corresponds to "4X mode".

6.4.2 Arbitrary speeds

Some bus protocols are defined to operate over a wide range of bit rates, and other bit timing characteristics. For the channel types supporting these protocols, the user may need to use the IOCTL method to get complete control over bus timing characteristics.

As a convenience, however, these channel types may also have "preset speeds" defined, especially for the more commonly used bit timing settings.

6.5 Message filtering

Clients use message filtering to control the routing of FT_DATA frames from a channel to a client.

When a client begins a session with the Gryphon server the **filter mode** for all channels, with respect to that client, is "FILTER_OFF_BLOCK_ALL". In this mode, no bus traffic will be routed to the client.

The client sets the filter mode of a channel to "FILTER_OFF_PASS_ALL", then all bus traffic received by that channel will be routed to the client.

Finally, if the client sets the filter mode of a channel to "FILTER_ON", then only those received bus frames that are passed by an active filter, or by the default filter action (described below), will be routed to the client.

Note that the filter mode is applied only to a given client-channel pair; i.e., it has no effect on frame traffic between any other client-channel pair.

6.5.1 Filters

Associated with each client-channel pair is a list of zero or more filters. Clients can add (and delete) filters to this list, and can set each one active or inactive. When the filter mode of the client-channel pair is `FILTER_ON`, incoming frames are checked against each filter in the order that they were added to the filter list. The **filter action** (pass or block specified in the first conforming filter will cause the frame to either be passed to the client, or blocked (discarded). If the frame does not conform to any of the filters, the **default filter action** will take effect.

A frame conforms to a filter if, and only if, the frame conforms to all of the filter's **filter blocks**.

6.5.2 Filter blocks

A filter consists of one or more filter blocks. Each filter block defines a conformance condition by specifying which bytes (within the incoming frame) are to be examined, and the comparison operator to be used. Operators include pattern matching with mask, and signed and unsigned relational comparisons.

6.6 Message scheduling

Clients can create schedules of messages to be transmitted. A message schedule consists of a list of `FT_DATA` frames, together with specifications for:

- The number of transmit iterations for each frame
- The time interval between iterated transmits of the frame
- The time delay before the first transmit of the frame
- The channel over which to transmit the frame
- The number of iterations of the entire schedule
- Whether or not the schedule is to be treated as "time critical"

The client is notified, via an `FT_EVENT` frame (`EVENT_SCHED_DONE`), when the schedule has been completed.

6.7 Message responders

A Message Responder is a process, running on the Gryphon CPU, which transmits GC frames in response to trigger events. A trigger event is the reception of an FT_DATA or FT_EVENT frame having specific data content.

Clients create Message Responder processes by specifying the received message trigger conditions using Filters and Filter Blocks, described earlier. The client also specifies the set of GC frames that are to be used in the response.

Appendix A – TCP/IP Settings: DHCP or Static

WARNING!

The S4 tool is intended for use ONLY in a point-to-point configuration with your PC. The S4 is NOT intended to be connected to a Local Area Network (LAN) and should not be used in the Client Mode.

Dearborn Group assumes no responsibility for malfunction or damages resulting from use of the following functions.

A.1 Definitions

DCHP Server

Every TCP/IP device on a given Ethernet network needs a unique IP address assigned to it to participate on that network. DHCP (Dynamic Host Configuration Protocol) is a protocol that allows a designated server to assign unique IP address to clients that request them. The S4 can operate in three different DHCP modes: DHCP Server Mode, DHCP Client Mode or DHCP Off – Static IP Mode.

Server Mode

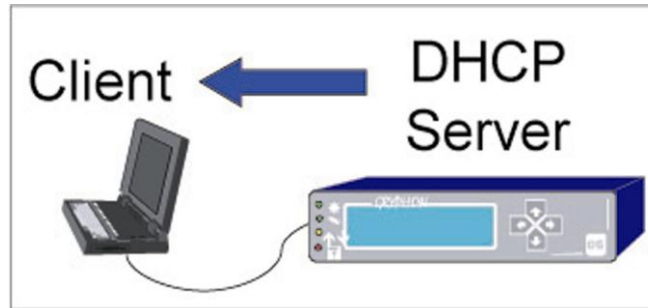
This is the default shipping configuration mode for the hardware. This means that a PC attached point-to-point with the hardware can automatically obtain correct TCP/IP settings for use with the hardware. In this configuration, the hardware uses static TCIP/IP settings for itself, but will act as a DHCP server for other nodes on the network. Using this setting eliminates the need to configure TCP/IP settings on the client PC. (Many company network administrators do not allow PC re-configuration by their users.) This mode can be used to connect the S4 point-to-point to a PC directly if the PC is configured to acquire its TCP/IP settings automatically.

Recommendation: When using this mode, apply power to the S4 hardware first so that it is ready to serve the IP Address. When the PC is powered after the S4, it will obtain an IP address immediately on power up.

Caution: Use this method **only** with a point-to-point connection. If the S4 is in the server mode and is connected to a building network, it could cause network malfunctions!

WARNING!

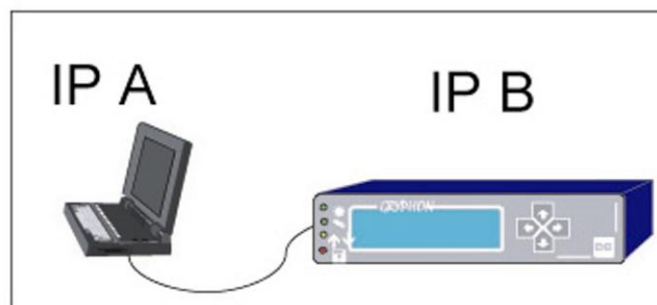
DO NOT CONNECT THE S4 UNIT TO A LAN WHILE THE HARDWARE IS POWERED!



Static IP Mode

This mode allows the S4 to be connected point-to-point or to a building network. A Static (non-changing) IP Address is configured into the S4. For point-to-point connection, it assumes the PC is configured with a Static IP Address. For building a connection, it must be assigned a non-conflicting address.

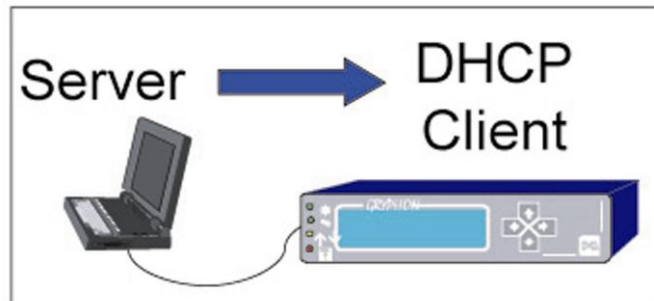
Recommendation: You may need to consult with your system administrator for assistance. If connecting to a LAN, your system administrator may need to assign you a Static IP Address.



Client Mode

This mode is used when a DHCP server will be assigning IP addresses to the S4 hardware. It assumes that the S4 and PC are connected to an Ethernet jack (or hub) which is then connected to a network containing the DHCP server. If the S4 detects a server after the hardware is powered up, the S4 will enter the Client Mode.

Recommendation: You may need to consult with your system administrator for assistance.



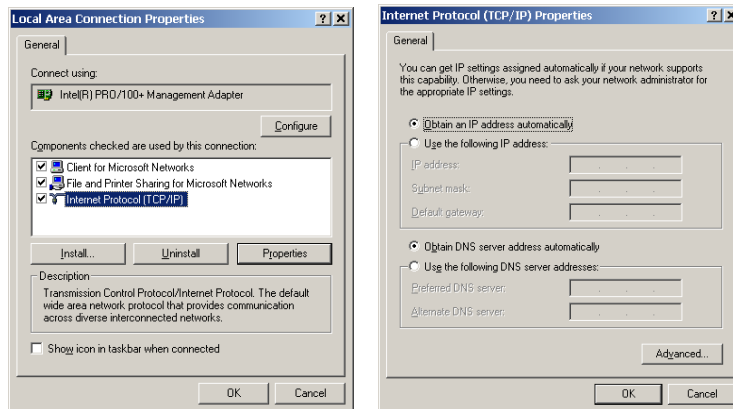
A.2 Configure the PC Network Settings

You need to know what settings your PC is using before deciding what Configuration mode to use. To do this in Windows Operating Systems, follow these instructions:

Setting the DHCP Mode of the PC using Window 2000 or XP

1. Click the Windows Start button, followed by Settings and then **Control Panel**.
2. Double-click the **Network and Dial-up Connections** icon. This displays the “Network and Dial-up Connections” dialog.
3. Click to select/highlight the “network device” in your PC to which the S4 will be connected.
4. Right-click this “network device” item and select **Properties**. This displays a “...Properties” dialog (background).
5. Select/highlight the Internet Protocol (TCP/IP) item and click the **Properties** button. This displays a “...TCP/IP Properties” dialog (foreground).

6. You must next select the applicable DHCP Mode (either DHCP Client or Static IP) by using either of the following methods:
 - a. For DHCP Client mode – Select **Obtain IP Address Automatically** and **Obtain DNS address automatically** (DHCP Server Mode)
 - b. For STATIC IP mode – Consult with your system administrator for assistance.
7. Keep clicking **OK** until all network setup windows are closed.
8. Confirm that all cables are securely connected to the S4 and the PC.
9. Cycle power (off/on) to the S4 to implement any configuration changes.
10. Restart your computer. This must be the last task performed to ensure that the computer will get an IP address from S4.



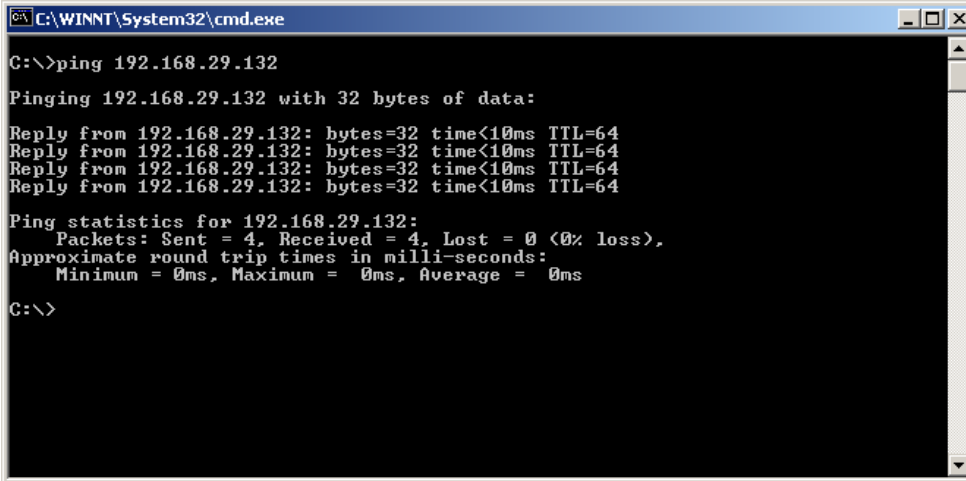
If **Obtain an IP address automatically** is selected, your PC is set up as a DHCP client. This means to connect point-to-point, the hardware must use the DHCP Server configuration. Alternatively, you could connect both the hardware (configured as a DHCP client) and your PC to a LAN with an existing server.

If **Use the following IP address** is selected, your PC is set up as STATIC. This means to connect point-to-point with the hardware, you need to configure the hardware with a STATIC configuration.

A.3 Configure the PC Network Settings

To verify that your settings/configuration are correct you need to PING The S4. Please perform the following to do this:

1. Click the windows **Start** button.
2. Click **Run**.
3. For Windows 2000/XP, type "cmd"
4. A DOS console window will open. At the command prompt, type: "ping 192.168.1.1". Substitute "192.168.1.1" with the chosen IP address or with one that your network administrator assigned to you. You should see something similar to the following text listed for a successful connection.



```
C:\WINNT\System32\cmd.exe
C:\>ping 192.168.29.132
Pinging 192.168.29.132 with 32 bytes of data:
Reply from 192.168.29.132: bytes=32 time<10ms TTL=64
Reply from 192.168.29.132: bytes=32 time<10ms TTL=64
Reply from 192.168.29.132: bytes=32 time<10ms TTL=64
Reply from 192.168.29.132: bytes=32 time<10ms TTL=64
Ping statistics for 192.168.29.132:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
```

5. If you were able to successfully ping the S4, then your setup is complete.
6. If the replies do not come back successfully then something is not configured correctly. Please verify the previous steps or call DG's Technical Support for further help.

A.4 *What Ethernet cable should I use?*

A null RJ45 Ethernet cable is provided with the hardware package, for use in a point-to-point configuration with the PC. This cable connects the hardware's 10/100/1000_T Ethernet port to the host PC's Ethernet port.

To connect the hardware to an Ethernet hub or LAN, you will need to use a standard RJ45 Ethernet cable instead of the supplied null cable.

A.5 *Other Utilities*

If the client PC is started up before the hardware and fails to obtain TCP/IP settings by means of DHCP, you must perform one of the following steps to force re-negotiation of the PC's settings:

- reboot the PC, *or*
- restart Windows