



DG TECHNOLOGIES

Vehicle Network Solutions

BEACON[®]

USER MANUAL



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I M P O R T A N T

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.
- Specifications presented herein are for illustration purposes only and are not necessarily representative of the latest revisions of hardware or software. Dearborn Group Inc. assumes no responsibility for any intellectual property claims that may result from the use of this material.
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This manual contains the following sections:

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 / Getting Started – Describes key features of the BEACON® hardware.

Section 3 – Configuring the Host PC Connections – Describes how to set up the USB and Ethernet connections, IP address and how to modify the BEACON® TCP/IP parameters.

Section 4 – On Board Web Pages – Describes the onboard web page interface along with available utilities and their use.

1 Introduction

The Beacon family of hardware interfaces provides remote connectivity for multiplexed automotive and automation communication networks. These products use an Ethernet or USB 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 many existing PCs, workstations, and network hardware systems.

The BEACON® includes the following features:

User interface

- Web-page interface

Hardware

- Processor: ARM Cortex A8, 1 GHz core speed.
- RAM: 512 Mbytes SDRAM
- NAND Flash Memory: 512 Mbytes
- Internal storage: Micro SD card, to 64 GBytes
- One RJ45 Ethernet connector
- Two USB Type A Host connectors on the front of the unit for USB peripherals
- One USB Device Type B connector on the front of the unit for connection to a Host PC
- 6 Channels of High Speed CAN / CAN FD
- 1 Channel Single Wire CAN
- 1 Channel Fault Tolerant CAN
- 2 Channels LIN

Software

- Linux OS
- On-board Web server
- TCP/IP support of standard services into the BEACON® (FTP, SSH, etc.)
- Module drivers and applications

Users can utilize one of DG's existing PC programs, or write their own client based or stand-alone applications for communication with the hardware.

The BEACON® utilizes the Gryphon® Communication Protocol, which is a client/server communication protocol specification that defines the format of messages passed over a TCP connection between the BEACON® and a client.

Typical applications for the BEACON® include:

- PC-to-vehicle network adapter.
- Stand-alone node running custom applications.
- LAN gateway to one or more vehicle networks.
- End Of Line (EOL) test applications

1.1 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

E-mail: techsupp@dgtech.com

Fax: (248) 888-9977

Web site: <http://www.dgtech.com/tech-supp/>

1.2 Related documents

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

Dearborn Group Inc. – Phone: (248) 888-2000

Linux-related Web sites:

Introductory Linux information; a good place to get started. <http://www.linux.com/>

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/>

Linux Foundation <https://www.linuxfoundation.org/>

2 Hardware Overview / Getting Started

Please read this section before using your hardware. It describes the hardware information necessary for successful installation and operation. Each section describes an individual hardware configuration. Once you understand your hardware connection, move to **Section 3** for connecting to your PC via Ethernet or USB.

2.1 Contents of the BEACON® Package

2.1.1 BEACON® Hardware provided

- BEACON® unit
- 12 VDC Universal A/C power adapter
- RJ45 Ethernet cable – The BEACON® is shipped with a standard Cat5e Ethernet cable. **(Note that the hardware can detect and switch to use either type of cable: straight-through or cross-over.)**
- Optional Wi-Fi USB adapter
- Open ended cable with HD15 male connector

2.1.2 BEACON® Software provided

Installation program with:

- 32-bit C, C++ libraries and samples
- J2534 API and samples
- BEACON® User Manual (PDF)
- Various utility programs
- Hercules Analyzer Software
- Data Logger Software

The Installation Programs and Documentation are provided on a Virtual USB drive, which is mounted to your PC when the BEACON unit is connected via a USB cable. The BEACON will power on when it is connected to a Host PC via a USB cable.

After the BEACON has booted, you will see in Windows file explorer that a new USB mass storage drive has appeared. It is named "BEACON_USB". This USB mass storage drive will act like any other USB drive. You can copy files to it or from it.

See the separate document "Software Installation Quick Start Guide" for more information.

2.2.3 Vehicle Network connections

The BEACON® has a total of 8 CAN channels and 2 LIN channels. These network channels are built into the Beacon. The CAN channels are dedicated to certain versions of CAN, as shown below.

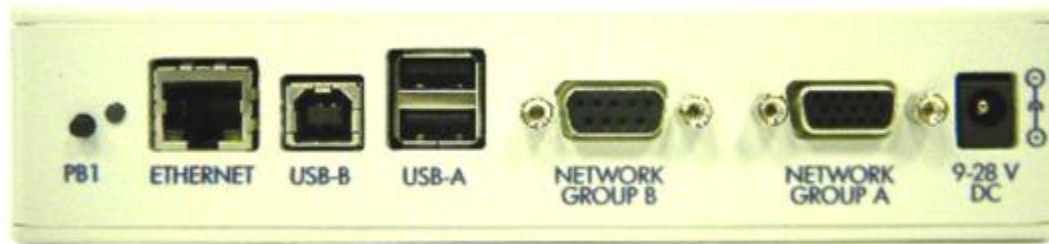
- CAN channels #1 to 6 support High Speed CAN, including CAN FD
- CAN channel #7 supports Single Wire CAN^{Note 2}
- CAN channel #8 supports Fault Tolerant CAN^{Note 2}

Note 2: A factory option is available to convert CAN channels 7 and 8 into High Speed CAN/CAN FD Channels. Please contact our sales department for more details about this option.

The pinout information for the vehicle connectors in your Beacon is shown in Table 1 below, and it also may be found in the internal web pages of the Beacon.

2.3 Hardware overview

Figure 1 BEACON® Connector Panel:



2.3.1 Powering up the hardware

Apply a power source to the power jack connector (see Section 2.3.3 for details) or to one of the vehicle connectors (see Section Protocol Connections for details). The BEACON® will automatically power on and begin the boot up process.

2.3.2 Status indicator

There is a multi-color (RGB) LED indicator on the connector panel. This LED indicator will provide information about the state of the BEACON®.

LED colors:

- Solid Green: Normal boot up
- RGB cycling: Normal operating condition
- Alternating red/blue at 2Hz: Unit identify function has been triggered (from web page-configuration -> device name -> Turn Identify ON)
- Solid Yellow: Default settings are being restored
- Solid Purple: Reflashing in process
- Solid Blue: Reflashing failed / other error

2.3.3 Power jack connector

One way of powering the BEACON® is through the standard 2.5 mm x 5.5 mm power jack (with positive center pin). The BEACON® operates with an input voltage between 6 and 32 VDC. Typical operating voltage supplied by the included power adapter is 12 VDC.

Another means of powering the BEACON® is through the specified pins on one of the network modules. (Please see section 2.3.7 for details.)

2.3.4 USB Type A connectors

The two USB type A connectors on the front panel allow the user to connect USB devices such as Memory sticks or Wi-Fi adapters to the BEACON®.

2.3.5 USB Type B connector

Your Beacon product is equipped with a USB type B connector. The single USB type B connector on the front panel allows the user to connect the BEACON® to a Host PC.

2.3.6 Ethernet RJ45 connection

A CAT5e RJ45 Ethernet cable is provided with the BEACON® tool package. This cable may be used to connect the Ethernet port on the front panel of the BEACON® to the Ethernet port on the host PC or hub.

Either a straight through or crossover cable may be used with the Beacon. The BEACON® can detect which cable is being used and will accommodate the use of either cable.

The BEACON® supports 10/100 Ethernet.

2.3.7 Protocol Connections

The vehicle bus signals are provided on 2 different connectors.

There is a high-density 15 pin D connector, labeled 'Network Group A', and a 9 pin D connector labeled 'Network Group B'. The pin numbers of the two connectors are shown in the table below.

You may also access pin out information on the "Pinouts" internal web page of the BEACON®.

Either the of the two connectors may be used to provide power to the BEACON® hardware.

Before applying voltage to pins marked **V + IN** and **V – IN/GND** (positive and negative), make certain that you have the correct pin out information for the module being used to power the unit.

Table 1 Network Group A

HD 15 pin D connector Network Group A						
pin #	Function					
1				CAN 2 Lo		
2			CAN 1 Lo			
3					CAN 3 Hi	
4	SW CAN Lo (GND)	CAN FD 7 Lo (note 2)				
5	Signal GND					
6				CAN 2 Hi		
7			CAN 1 Hi			
8						CAN 4 HI
9						CAN 4 Lo
10	Power GND					
11					CAN 3 Lo	
12	SWCAN (Channel #7)	CAN FD 7 Hi (note 2)				
13		FTCAN Lo (Channel #8)	CAN FD 8 Lo			
14		FTCAN Hi (Channel #8)	CAN FD 8 Hi			
15	Vin#1 (Vbatt) (fused)	Note 1:				

Note 1: The Beacon may be powered by either of the Vin#1 or Vin#2 inputs. Only one of these are required if the 12 VDC Wall Adapter is not used. Vin#1 and Vin#2 are isolated internally by blocking diodes. See the User Manual.

Note 2: The Beacon may be ordered with a factory option to convert CAN channels 7 and 8 to high-speed CAN/CAN FD. Please contact DG Technologies Sales Department for more details.

Table 2 Network Group B

9 pin D connector Network Group B				
pin #	Function			
1		CAN 6 Lo		
2	CAN 5 Lo			
3			LIN CH 1	
4	Power GND			
5	Power GND			
6		CAN 6 HI		
7	CAN 5 HI			
8				Lin CH 2
9	Vin#2 (Vbatt) (fused)	Note 3:	Vbatt for LIN	

Note 3: When using the LIN channels, Vbatt (+12VDC) must be supplied on pin 9, even if the Beacon is powered from another source.

This 12VDC input would usually be the same 12VDC source used to power the target LIN device.

Pin 9 will power the entire Beacon if 12VDC is applied. See the User Manual.

3 Configuring the Host PC Connections

To access information externally from the hardware, a communication connection to the BEACON® must be established via a USB, wired Ethernet, or Wi-Fi link. This connection will allow you to send and retrieve data, execute an onboard application, or run one of the DG applications.

3.1 USB Connection to the PC

You must have access to a PC with a USB connection. The LODESTAR supports a USB 2.0 high speed connection and has a full-sized USB type B connector for this connection.

A standard USB cable is provided with the BEACON® package. This cable connects the USB port on the front panel of the BEACON® to the USB port on the host PC.

The BEACON uses RNDIS on the PC to provide a TCP/IP communication path between the BEACON and the PC. The Beacon will act as a DHCP server and assign an address to your PC.

Every Beacon USB connection has a unique, static IP address based on an internal serial number, which is used with the RNDIS connection. This unique IP address is printed on the serial number label on the bottom of the Beacon package. In addition, you can see it listed on the opening page of the internal Beacon web page. It is a fixed address and cannot be changed.

The Beacon will act as a DHCP server for the RNDIS connection. Your PC will have an IP address automatically assigned to it during the initial connection. The address will be of the form 10.X.X.X and the address assigned is unique to each Beacon.

For more information about the RNDIS and Windows, see the separate document titled “Beacon RNDIS Driver Installation QuickStart”

3.2 Wired Ethernet 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 Beacon hardware has predefined default parameter values. If you are using the tool in a point-to-point connection with your PC, these parameters typically do not need to be changed. You *may* need to change these default parameters, however, ***if your PC is not configured as a DHCP Client, or if you want to connect the BEACON® to a network.***

The default network configuration of the Beacon is as a DHCP Server.

The following table lists the BEACON®’s default addresses:

<i>Parameter name</i>	<i>BEACON® default value</i>
IP (Internet Protocol) Address	192.168.001.001

Netmask	255.255.000.000
Broadcast	192.168.255.255
Default Route	192.168.002.001
Table 3.2: TCP/IP Settings	

Note: To enable communication with a BEACON® unit at this address, the IP address of your PC must be configured to: **192.168.001.XXX**, where XXX is any value other than 001.

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

3.3 Configuring the wired Ethernet IP Address

To configure the hardware's TCP/IP Ethernet parameters for your wired connection, access the on-board Web server on the BEACON®, and utilize the Beacon's Web page, which includes a configuration tool used to set IP parameters and passwords. The page may be accessed through any Web browser on a computer connected to the BEACON® unit.

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 can be reset to the factory default settings (Server, with DHCP) by using the reset pushbutton.

3.4 Reset Pushbutton

The reset pushbutton is located on the front panel of the Beacon, just to the left of the LED.

To reset the Beacon settings to factory defaults:

- Power up the unit.
- When the LED on the front panel lights (Green), press and hold the button until LED turns Yellow. Yellow color indicates that defaults are being restored.

NOTE: The unit will also go through the restore-defaults process during the first boot, so you'll see a Yellow LED / longer boot time during the first boot after reflashing with a new firmware image.

Those parameters that can be reset, such as the Zeroconf name and the network settings, will be set back to factory defaults.

3.5 Firmware Updating

Firmware for the Beacon may be updated using a USB memory stick.

The reflash file will be supplied as a compressed ZIP file. The ZIP file should be extracted to a convenient place on your PC. When the ZIP file is extracted it will produce a folder called “USBDrive”. The contents of this “USBDrive” folder should be loaded onto the root directory of an empty USB memory stick, formatted as a FAT 32 drive.

To initiate a USB reflash:

- With power off, insert the USB stick in one of the 2 USB ports on the front panel.
- Press and hold the pushbutton on the front panel, and keep it held while plugging power in.
- Keep holding button for ~10 sec; USB reflash will attempt to start. The LED will indicate the progress of the reflash operation.
- Solid Purple: Reflashing in process
- Solid Green: Reflashing complete
- Solid Blue: Reflashing failed / other error

After the reflash process has completed successfully, power cycle the Beacon before using it again.

If the reflash was not successful, you can try the process again. The boot code within the unit is not modified or deleted during the reflash process.

! Note that the reflash process does erase the contents of the internal uSD memory card, including any data or user programs stored there. Please be sure to back up any data or programs that need to be saved, before initiating the reflash process.

4 The Beacon Internal Web Pages

The Beacon hosts an internal web page that allows you to control many aspects of the Beacon and to get information about the Beacon. The following sections will walk you through the internal web pages and explain the various items. Please note that due to feature enhancements and software updates you may see slightly different versions of the web pages described below.

To access the internal web pages, use any web browser on your PC, such as Firefox, to access the Beacon. Simply type the Beacon's IP address into the address bar of the browser.

The Home page of the Beacon web page will appear:

4.1 Home Page



Device Name:	"Marketing Beacon-000000D78B14"
IP Address (Ethernet 1):	192.168.1.3
IP Address (USB):	10.94.44.81
Firmware Version:	BEACON_20170115
Kernel Version:	Linux 3.13.4xeno-r2+ armv7l
Mainboard Version:	04.01
Mainboard Serial Number:	000000D78B14
FPGA Firmware Version:	2016-12-08.05

Next, click on *Configuration*. Once you enter this section, a box will prompt you for a user name and password.

Please note: All inputs are case sensitive, and this password is the same as the default root password.

4.1.1 Login Screen

The default user name is sysadmin; the default password is dgBeacon



Once logged in, the **DG Beacon System Administration** page will appear. On this page, you may: access the **DG Beacon Configuration** page, configure the connection parameters, change the time and date, or change the sysadmin password.

The first entry is **Time and Date**. The other entries are: **Zeroconfig Name & Device Locator**, **DNS Configuration**, **Default Route Configuration**, **Network Configuration**, **Startup Programs / Services**, **Change Sysadmin Password**, and **Optimization**.

4.2 Configuration Tab

The configuration tab is the section for setting system parameters for the Beacon.

4.2.1 Date & Time

The screenshot shows the Beacon configuration interface. At the top left is the DG TECHNOLOGIES logo with the tagline 'Vehicle Network Solutions'. At the top right is the 'beacon' logo. Below the logos is a navigation menu with tabs: HOME, CHANNELS, CONFIGURATION (selected), PINOUTS, SYSTEM, UTILITIES, and DOCUMENTATION. Under the CONFIGURATION tab, there is a sub-menu with tabs: Date & Time (selected), Device Name, Network, DNS, Default Route, Programs, Password, and Update. The main content area is titled 'Date and Time Settings' and contains a section for 'PC's date and time' with input fields for Month (1), Day (20), Year (2017), Hour (10), Minute (34), and Seconds (20). Below these fields are two buttons: 'Submit Date Changes' and 'Retrieve date/time from PC'.

- **Set Date and Time** – You can either have the Beacon take the Date and Time from the host PC, or you can enter the new values manually. When you are done updating the Date and Time click **Submit Date Changes**. The new values and confirmation will then appear on the display.

4.2.2 Device Name Tab

The screenshot displays the Beacon web interface. At the top left is the DG TECHNOLOGIES logo with the tagline 'Vehicle Network Solutions'. At the top right is the 'beacon' logo. Below these are navigation tabs: HOME, CHANNELS, CONFIGURATION, PINOUTS, SYSTEM, UTILITIES, and DOCUMENTATION. Under the CONFIGURATION tab, there are sub-tabs: Date & Time, Device Name, Network, DNS, Default Route, Programs, Password, and Update. The 'Device Name' sub-tab is active. It contains two main sections: 'Zeroconf Device Name' and 'Device Locator'. The 'Zeroconf Device Name' section has a text input field with the value 'Beacon-000000D78B14' and a 'Submit Zeroconf Changes' button. The 'Device Locator' section shows 'Identify is currently: OFF' and a 'Turn Identify ON' button.

- * **Zeroconf Name & Device Locator** – Provides Zeroconf (Zero Configuration) Name change and Device Locator functionality.

The name created is linked to the IP address for the unit.

The **Identify ON / OFF** key is useful when more than one BEACON® units are being used in the same proximity. With this function turned **ON** the LED on the front panel will flicker rapidly to indicate which unit is being identified.

4.2.3 Network Tab

On this page you can set the network parameters for the wired Ethernet and the Wi-Fi connection (if present)

The screenshot shows the 'Network Configuration' page for 'Ethernet (eth0)'. At the top, there are navigation tabs: HOME, CHANNELS, CONFIGURATION (selected), PINOUTS, SYSTEM, UTILITIES, and DOCUMENTATION. Below these are sub-tabs: Date & Time, Device Name, Network (selected), DNS, Default Route, Programs, Password, and Update. The main content area is titled 'Network Configuration' and contains a section for 'Ethernet (eth0)'. It shows the 'Current IP address: 192.168.1.3'. Under 'Configuration Type', there are four radio buttons: 'Disable', 'Manual' (which is selected), 'Manual + DHCP Server', and 'Automatic (DHCP/Zeroconf)'. Below this, 'Manual Configuration Parameters' are shown with input fields for IP address (192, 168, 1, 3) and Netmask (255, 255, 0, 0). At the bottom of the configuration area are two buttons: 'Save Ethernet Changes' and 'Reset'.

- **Network configuration** – Enter your configuration type (DHCP Client, Static or DHCP Server) and any Static Configuration Parameters, as necessary. To make changes, provide new values where necessary, and click **Submit BEACON® Ethernet Changes**. Then turn the BEACON® unit off and back on, (i.e., reboot), to invoke the changes. Clicking on **Reset** will display the previous settings.

Note: If equipped with an 802.11 b, g, or n adapter, a Wireless Configuration section will appear as indicated in the view shown below.

WIFI (wlan0)

Current IP address:
10.0.0.1

Wireless Options

SSID:

WPA2 Password:

Operating Mode:

Configuration Type

Disable

Manual

Manual + DHCP Server

Automatic (DHCP/Zeroconf)

Manual Configuration Parameters

IP address: . . .

Netmask: . . .

The screenshot displays the Beacon web interface for DNS configuration. The header features the DG Technologies logo and the Beacon logo. The navigation menu includes 'HOME', 'CHANNELS', 'CONFIGURATION', 'PINOUTS', 'SYSTEM', 'UTILITIES', and 'DOCUMENTATION'. The 'DNS' tab is selected, showing the 'DNS Settings' section. The 'Enable DNS' checkbox is checked. The 'Local domain name' field is empty, and the 'Name server address' field contains '8.8.8.8'. At the bottom of the settings area are 'Save DNS Configuration Changes' and 'Reset' buttons.

- **DNS Configuration** – The initial setting for DNS is Not Enabled.

If you wish to use DNS on the Beacon, check the Enable DNS box (Domain Name Service), fill in the required information and then click **Submit DNS Configuration Changes**. Confirmation of the changes will appear on the display.

The Domain Name Service allows the user to resolve Domain names into IP addresses.

The **Reset** button returns the **DNS Configuration Parameters** to the initial settings.

The screenshot shows the Beacon web interface. At the top left is the DG TECHNOLOGIES logo with the text "Vehicle Network Solutions". At the top right is the "beacon" logo. Below the logos is a navigation menu with tabs: HOME, CHANNELS, CONFIGURATION, PINOUTS, SYSTEM, UTILITIES, and DOCUMENTATION. Underneath the navigation menu is a secondary menu with tabs: Date & Time, Device Name, Network, DNS, Default Route, Programs, Password, and Update. The "Default Route" tab is selected. The main content area is titled "Default Route (Gateway) Settings". It contains a checkbox labeled "Enable Default Route:" which is currently unchecked. Below the checkbox is a text input field for the "Default Route:" with a dotted separator and four empty input boxes for IP address segments. At the bottom of the settings area are two buttons: "Submit Default Route Configuration Changes" and "Reset".

- **Default Route Configuration** – You may set up a new default route address. Check the **Enable Default Route** box and fill in the default address. Click on **Submit Default Route Configuration Changes** to accept the new default configuration. A confirmation of the change will be displayed.

The **Reset** button will return the settings to the previous parameters.

The screenshot displays the Beacon web interface. At the top left is the DG TECHNOLOGIES logo with the tagline 'Vehicle Network Solutions'. At the top right is the 'beacon' logo. Below these are navigation tabs: HOME, CHANNELS, CONFIGURATION, PINOUTS, SYSTEM, UTILITIES, and DOCUMENTATION. Under the CONFIGURATION tab, there are sub-tabs: Date & Time, Device Name, Network, DNS, Default Route, Programs, Password, and Update. The 'Programs' sub-tab is selected, showing the 'Startup Programs / Services' section. This section contains four items with checkboxes: USDT (USDT Layer), CPULOAD (Sys Utilization), J1939 (J1939 Protocol layer), and LOGGER (Data Logger). A 'Submit changes' button is located at the bottom of this section.

- **Startup Programs / Services** – A checkmark indicates that a program is currently active on this hardware unit. Any changes are subject to the capabilities of current firmware.

If you want a program to run that is not currently enabled, then check the box, and reboot the Beacon. The program will run after the Beacon has been rebooted.

The screenshot shows the Beacon web interface. At the top left is the DG TECHNOLOGIES logo with the text 'Vehicle Network Solutions'. At the top right is the 'beacon' logo. Below the logos is a navigation menu with tabs: HOME, CHANNELS, CONFIGURATION, PINOUTS, SYSTEM, UTILITIES, and DOCUMENTATION. Underneath the navigation menu is a secondary menu with tabs: Date & Time, Device Name, Network, DNS, Default Route, Programs, Password, and Update. The 'Password' tab is selected. The main content area is titled 'Change Sysadmin Password'. It contains the following text: 'This password controls access to this web page only! Use the **passwd** command from a login shell to change login passwords.' Below this text are two input fields: 'New password:' and 'Verify new password:'. At the bottom of the form are two buttons: 'Submit Password Change' and 'Reset'.

- **Change Sysadmin Password** – You may enter a new sysadmin password and then click **Submit Password Change**.

Clicking on **Reset** will revert to the previous password.

Note: Please be advised that only the **sysadmin** password, **not the root password**, will change.

The screenshot displays the DG Technologies web interface. At the top left is the DG Technologies logo with the text "DG TECHNOLOGIES Vehicle Network Solutions". At the top right is the lodestar logo with "GRYPHON Technology" underneath. Below the logos is a navigation menu with tabs: HOME, CHANNELS, CONFIGURATION, PINOUTS, SYSTEM, UTILITIES, DATA FILES, and DOCUMENTATION. Under the CONFIGURATION tab, there are sub-tabs: Date & Time, Device Name, Network, DNS, Default Route, Programs, LCD, Password, and Update. The Update sub-tab is active, showing a section titled "Update Firmware". Inside this section, it says "Update:" followed by "Select update file:" and a "Choose File" button. To the right of the button is the text "No file chosen" and an "Upload File" button. At the bottom of the interface, there is a small copyright notice: "© 2000-2019 DG Technologies".

- **Update Firmware** – From time to time, a firmware change may be released as a patch rather than a complete firmware update. This may be used to add a new feature or program, for example.

In order to use the update feature, the new firmware patch will need to be downloaded to your host PC. Clicking on the **Choose File** button will allow you to browse on your host PC to find the update file.

An update file will have a filename in the form of DGA8_Update_yyyymmdd.tgz, for example DGA8_Update_20181115.tgz

Click on the update file and then click on the Upload File button to begin the update process. A progress message will appear on the host PC to tell you when the process is complete. It usually only takes a few seconds to do an update. After updating the firmware, a power cycle is required.

4.3 Pinouts Tab

Network Group A (HD15-F)

Pin	Channel	Function
1	2	CAN-L
2	1	CAN-L
3	3	CAN-H
4		GND
5		GND
6	2	CAN-H
7	1	CAN-H
8	4	CAN-H
9	4	CAN-L
10		POWER GND
11	3	CAN-L
12	7	SWCAN
13	8	FTSCAN-L
14	8	FTSCAN-H
15		VBAT +

Network Group B (DE9-F)

Pin	Channel	Function
1	6	CAN-L
2	5	CAN-L
3	9	LIN
4		GND
5		GND
6	6	CAN-H
7	5	CAN-H
8	10	LIN
9		VBAT +

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Under the Pinouts tab is a list of all protocol channels, with their associated pin outs and channel ID assignments.

4.4 Channels Tab

The screenshot shows the 'Installed Channels' tab in the Beacon software. The interface includes a navigation menu with options: HOME, CHANNELS, CONFIGURATION, PINOUTS, SYSTEM, UTILITIES, and DOCUMENTATION. The main content area is titled 'Installed Channels' and lists 10 channels, each with a large number (1-10) and a 'Configure' button. Channel 1-6 are CANFD Ver: 1.0, Channel 7 is SWCAN Ver: 1.0, Channel 8 is FTCCAN Ver: 1.0, and Channels 9-10 are S_LIN Ver: 1.0. Each channel entry shows its bitrate, mode, sample point, and termination settings. Channel 5 and 6 also show a data bitrate. Each channel entry includes a 'Configure' button and a 'Driver info' link.

Channel	Version	Bitrate	Mode	Sample Point	SJW	Termination	Additional Settings
1	CANFD Ver: 1.0	500000	CAN	AUTO	1	ON	
2	CANFD Ver: 1.0	500000	CAN	AUTO	1	ON	
3	CANFD Ver: 1.0	500000	CAN	AUTO	1	ON	
4	CANFD Ver: 1.0	500000	CAN	AUTO	1	ON	
5	CANFD Ver: 1.0	500000	CAN-FD (Pre-ISO)	AUTO	1	ON	Data Bitrate: 2000000
6	CANFD Ver: 1.0	500000	CAN-FD (Pre-ISO)	AUTO	1	ON	Data Bitrate: 2000000
7	SWCAN Ver: 1.0	33333	CAN	AUTO	1	OFF	Tool Resistance: OFF
8	FTCCAN Ver: 1.0	125000	CAN	80%	1		
9	S_LIN Ver: 1.0	19200					
10	S_LIN Ver: 1.0	19200					

Under the Channels tab is a listing (by channel with version and serial number) of the modules installed on the hardware. It also contains Channel Statistics and driver information.

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

- Mode (CAN, CAN FD, CAN/CAN FD Mixed)
- Bitrate
- Sample Point percentage
- SJW
- Termination ON or OFF
- Error reporting
- Bus speed (customized or one of several presets). For Speed changes to become valid, check the **Apply** button on the Beacon Channel Setup screen.

Please see the following view of the Channel Setup screen.

1

CANFD Ver: 1.0

Mode: CAN FD

Bitrate: 500000

Sample Point 0 % **SJW** 1
0 = Automatic

Data Bitrate: 0

Sample Point 0 % **SJW** 1
0 = Automatic

Termination: **Error Events:**

Cancel **Apply** **Save as startup defaults**

4.5 System Tab

DG TECHNOLOGIES
Vehicle Network Solutions

beacon

HOME CHANNELS CONFIGURATION PINOUTS SYSTEM UTILITIES DOCUMENTATION

DG Beacon System Information

Load Averages

1 minute	5 minutes	15 minutes
0.08	0.06	0.05

User Memory

Total = 521,900,032 bytes
Used = 25,432,064 bytes (4.9%)
Free = 496,467,968 bytes (95.1%)

```
devs. size=11
dev[1]. fd=5 inited=1 maxpayload=68
      txpos=0 txlen=0 txbuf=0x1fc3ba8 txdrops=0
dev[2]. fd=6 inited=1 maxpayload=68
      txpos=0 txlen=0 txbuf=0x1fc6468 txdrops=0
dev[3]. fd=7 inited=1 maxpayload=68
      txpos=0 txlen=0 txbuf=0x1fc8d28 txdrops=0
dev[4]. fd=8 inited=1 maxpayload=68
      txpos=0 txlen=0 txbuf=0x1fcb5e8 txdrops=0
dev[5]. fd=9 inited=1 maxpayload=68
      txpos=0 txlen=0 txbuf=0x1fcdca8 txdrops=0
dev[6]. fd=10 inited=1 maxpayload=68
      txpos=0 txlen=0 txbuf=0x1fd0768 txdrops=0
dev[7]. fd=11 inited=1 maxpayload=12
      txpos=0 txlen=0 txbuf=0x1fd3028 txdrops=0
dev[8]. fd=12 inited=1 maxpayload=12
      txpos=0 txlen=0 txbuf=0x1fd58e8 txdrops=0
dev[9]. fd=13 inited=1 maxpayload=10
      txpos=0 txlen=0 txbuf=0x1fd8298 txdrops=0
dev[10]. fd=14 inited=1 maxpayload=10
      txpos=0 txlen=0 txbuf=0x1fdab58 txdrops=0
dev[31]. fd=4 inited=0 maxpayload=0
      txpos=0 txlen=0 txbuf=0x1fc12e8 txdrops=0

clients. size=4
client[0]. fd=15 sdnnum=0x18 id=0x00 auth=1 eventon=0x1fe3c28
          rxpos=0 rxlen=0 rxbuf=0x1fdd418 rxdrops=0
          txread=0 txbuf=0x1fe1420 txdrops=0
client[1]. fd=16 sdnnum=0x23 id=0x01 auth=1 eventon=0x1fea840
```

Clear Update

Message Responder trace is OFF Toggle

Running Programs Gryphon Server Info USDT Server Info
Scheduler Info Memory Info

This page provides information about the current state of the Beacon CPU and the Linux Operating System.

4.6 Utilities Tab

The screenshot displays the Beacon web interface. At the top, there are logos for DG TECHNOLOGIES Vehicle Network Solutions and beacon. Below the logos is a navigation menu with tabs: HOME, CHANNELS, CONFIGURATION, PINOUTS, SYSTEM, UTILITIES (selected), DATA FILES, and DOCUMENTATION. Under the UTILITIES tab, there are sub-tabs: Schedule (selected), Responder, Logger, Playback, LIN, J3138, DBC, and Mux. The main content area is titled "Schedule" and contains a sub-section "Manage Schedule Config Files" with a "Simple Schedule" sub-tab. This section is divided into two main areas: "Upload a Schedule Config File to the Beacon" and "Schedule Config Files on the Beacon".

Upload a Schedule Config File to the Beacon

File to upload: No file chosen
Description:

Schedule Config Files on the Beacon

Shift-click or Ctrl-click to select multiple files.

This page provides links to a number of on board utilities, including a utility to manage LIN Definition Files, utilities for use with the built-in data logger program, DBC file management and a programming multiplexor for interfacing to multiple ECUs in an End Of Line or programming environment.

4.7 Documentation Tab



The screenshot displays the Beacon web interface. At the top left is the DG TECHNOLOGIES logo with the tagline 'Vehicle Network Solutions'. To the right is the 'beacon' logo. Below the logos is a navigation menu with tabs: HOME, CHANNELS, CONFIGURATION, PINOUTS, SYSTEM, UTILITIES, and DOCUMENTATION. The DOCUMENTATION tab is selected. The main content area is titled 'Beacon: Technical Information' and contains three sections: 'Gryphon Communication Protocol' and 'Beacon Utils Documentation' (both with links); 'Examples, Source Code, and FAQs' with links to 'Unix client example source code (.tgz archive)', 'C header files (.tgz archive)', and 'Beacon Product Technical Support on DG's web site'; and 'User Supplied Documentation' with a link to 'List Available Documents'.

This page provides technical information for the Beacon.

In addition to DG supplied technical information, it is possible for the user to load their own technical documentation, such as PDF files or even flash video files for technical instruction. These user loaded files will be shown when List Available Documents is selected. Video files are streamed to the connected PC and viewed in the web browser.

Appendix A

BEACON 8 channel CAN FD Version - Overview

On a standard Beacon, CAN channel 7 supports Single Wire CAN, and CAN channel 8 supports Fault Tolerant CAN.

As a factory ordered option, channels 7 and 8 may be configured to support High Speed CAN/CAN-FD the same as CAN channels 1 to 6.

Identification

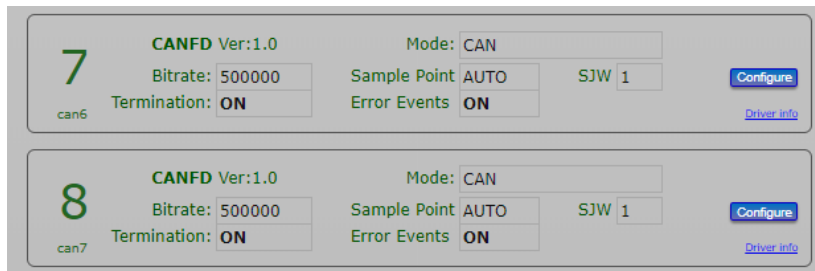
There will be a silver colored label on the top right-hand corner of the enclosure of the modified Beacon. This is the only visual indication of a modified unit.

If you connect to the Beacon's internal web page, you will see the ZeroConf name of the Beacon now indicates 8 CAN FD channels (Beacon-8xFD), along with the serial number.

Example:



This Beacon unit has been modified to change the transceivers supported on channels 7 and 8. Both channels now use high speed dual wire CAN transceivers to support both classic CAN and CAN FD. CAN channels 7 and 8 now operate the same as channels 1 through 6. Here is a screen shot of the default configuration settings for channels 7 and 8:



Single Wire CAN and Fault Tolerant CAN are not supported on this modified Beacon unit.