



# GRAFIX

Graphical Display Instrument System

INSTALLATION AND OPERATION MANUAL

*Please read this before beginning installation or wiring.*

**IMPORTANT NOTE!** This system has an odometer preset option that is only available for the first 100 miles of operation. See odometer preset section (p. 31) for instructions and setup information.



Phone (605) 332-6513  
dakotasupport@dakotadigital.com

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## **Introduction**

Thank you for purchasing a GRAFIX system from DAKOTA DIGITAL. The GRAFIX series represents the latest in aftermarket electronic dashboard technology for car and truck enthusiasts. The GRAFIX system combines modern digital electronics with user configuration flexibility not found in any other aftermarket Instrument Cluster. This combined with the accurate system information and ease of operation expected from Dakota Digital make the GRAFIX lineup stand out from other aftermarket instrumentation. The GRAFIX system boasts excellent daytime visibility with its daylight readable TFT displays, which can be automatically controlled via on panel ambient light detection, or manually controlled to the driver's preference – for both daytime and night time driving conditions. The included standard definition camera input and configuration capability, add another dimension to the GRAFIX series not found in other aftermarket systems.

Through the monitoring of Dakota Digital's supplied solid-state sensors, the GRAFIX Instrument Cluster gives the driver unparalleled accuracy and real time feedback. The user defined, customizable display readings and features, which are not typically found on aftermarket instrumentation – are now standard on the GRAFIX system. This digital accuracy and solid-state reliability will give you quality service for miles down the road, and also includes a limited lifetime warranty on a product engineered and manufactured in the USA!

## **GRAFIX Series System Features**

### Full Color TFT(s)

- Four (4) factory preset, user configurable layouts
- User configurable layout parameters including:
  - Theme selection, Colors, Gauge arrangement, Message Center assignments
- Analog and Digital readouts
- Built in ambient light detection
- High visibility (HI VIZ) daytime mode
- Configurable Daytime and Nighttime display colors

### Four (4) Factory Installed Themes (Graphical styles)

- Standard: Basic analog gauge look and feel
- Performance: Easy to read bar-gauges and digital readouts
- Modern: Contemporary styling details
- Era: Factory installed 'period correct' per GRAFIX application

### Built in GPS (Global Positioning System) receiver

- For use with speed data, compass heading, real time clock
- Accelerometer included for improved speed stability
- Built in satellite antenna w/ interface for external antenna (sold separately)

### User Interface

- Single Rotary Control Knob with user configurable lighting and audible feedback
- Easy to follow/straight forward menu structure
- Downloadable Application for IOS and Android devices

### Mileage readings

- Million-mile odometer
- Two (A/B) re-settable trip mileage (0-9999.9)
- Re-settable service mileage (0-9999 countdown)
- Range (fuel) to empty

## Performance readings

Each of the can be manually reset during Normal Operation\*

- High speed recall.
- High RPM recall.
- 0-60 MPH (0-100 km/h) time.
- ¼ mile time and end speed (trap speed).
- ½ mile time and end speed (trap speed).

## Hour meter

- Resettable hours (0-999.9)

## English/metric conversion

- Configurable speed and temperature readings can be displayed

## Built-in Indicators

- Standard Analog gauge and Digital warnings
- High visibility, configurable warning LED
- Left/Right Turn signals
- High Beam, Check Engine, Brake, Cruise Control
- 4x4 indicator (Configurable with custom label)
- Wait to start indicator (Configurable with custom label)
- Gear position w/ use of Dakota Digital **GSS universal gear shift kit** (purchased separately)
- Two extra indicators (EX+, EX-) inputs with customizable labels

## Built-in Audible feedback

- Warning notification and User Interface feedback
- Fully configurable: on/off, volume, tone, notification style
- No additional wiring or mounting requirements

## Special outputs

- RPM shift output to activate external light
- Selectable 2000ppm or 4000ppm speed output for cruise or ECM
- Buffered tachometer output for cruise control
- User configurable Control Box warning output

## Demonstration mode

- Automatically cycle through the configured GRAFIX layouts and colors

## Camera interface

- Standard composite video input w/ multiple user definable trigger options
- Can be used for backup camera (sold separately)

## G-force/accelerometer display

## Bus Interface Module (**BIM**) capable

- Interface to Dakota Digital's full line of expansion modules

## Update Port

- Field update capable (Themes, Instrument Cluster, and Control Box software)
- Custom Startup Image download
- Standard interface connector (flash thumb drive not included)

***\*Note: Normal Operation is defined as no menu items or warning boxes being displayed on the Instrument Cluster.***

## **General Information**

# WARNING

*These are precision instruments and must be handled with care. Do not disassemble gauges.*

**Never open the system as there is the risk of electrostatic damage to the sensitive internal circuits. There is also the risk of getting dust or other contaminants on the TFT(s) or behind the lens.**

### **Care and Cleaning**

The tinted lens on the front of the GRAFIX system can be cleaned with a mild soap and water solution or common glass cleaners on a damp cloth. Use a soft cloth such as a micro-fiber for wiping the lens clean.

### **GRAFIX System Installation**

Most GRAFIX systems and kits will come with a separate instruction document with Instrument Cluster mounting details for the particular vehicle application. Follow the installation document for mounting the GRAFIX Instrument Cluster in the vehicle, and then refer to this manual for wiring and operation instructions.

### **Control Box Mounting**

Once the Instrument Cluster is in place, mount the Control Box within reach of the supplied display cable (approximately three (3) feet). The decision will need to be made whether the onboard GPS receiver and its associated GRAFIX features will be used. If the GPS receiver in the Control Box will be required, and use of the internal satellite antenna is desired, a location that allows adequate reception should be identified. See the SYSTEM-INFO-GPS section in this manual for more specific GPS use and Control Box mounting guidelines. Also, be sure to choose a mounting location that will allow you proper access in order to wire all of the inputs on either side of the Control Box. Double sided tape, hook and loop fasteners or screws in the two tabs on the case work fine for securing the Control Box under the dash.

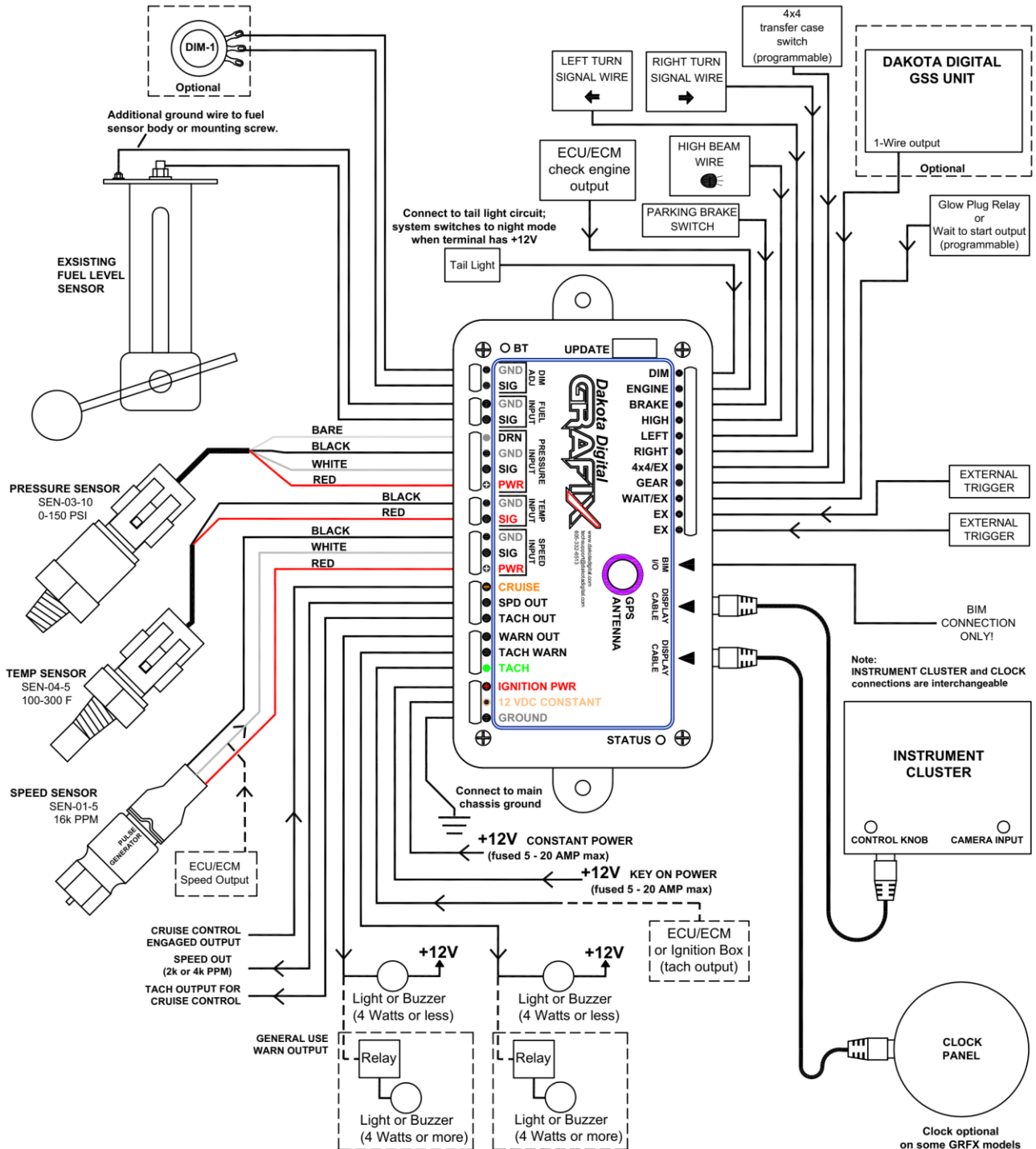
The GRAFIX Control Box also includes a built-in audible tone generator, which is primarily used for system warning notification. If the expectation is to be able to hear the tones, attention should be paid to the Control Box mounting location, so as to make sure the sound is not blocked or dampened – thus restricting the ability to hear the alarms.

***Note: When selecting a mounting location, avoid placing the Control Box module next to or just opposite of the firewall from ignition components, i.e.: Ignition coil, HEI, etc. Ignition components can emit tremendous amounts of electrical noise, affecting the operation of electrical components which can cause erratic operation. Also, avoid mounting the Control Box where it may get wet.***

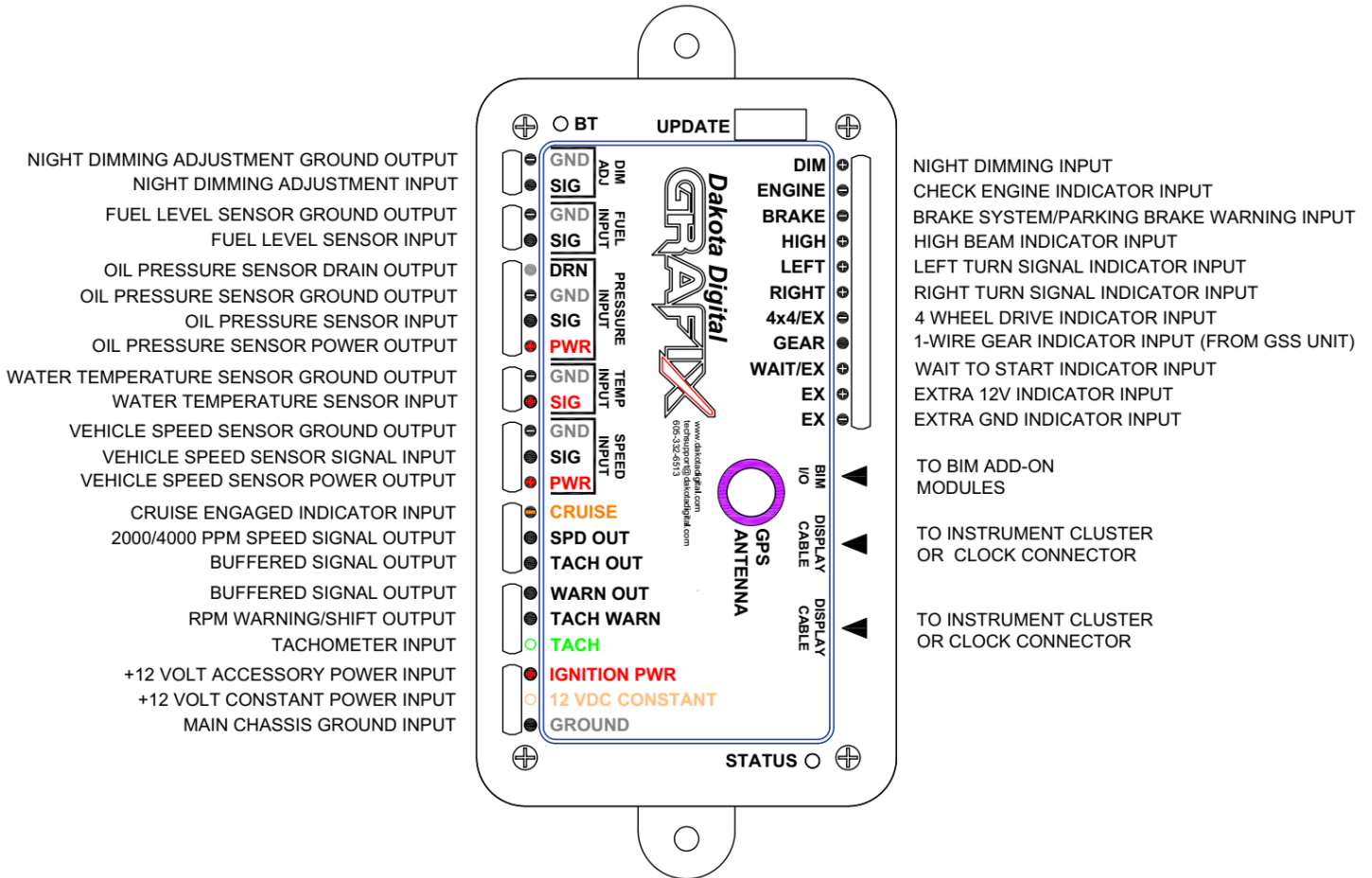
# Wiring

While the Control Box contains several connections, the wiring is straightforward. Depending on how many auxiliary functions the user wants displayed, not every terminal will be used in most applications. On the pages that follow, we describe the function of each terminal, what they do, and how to wire them. To get up and running quickly, see the supplied GRAFIX QUICK START GUIDE.

Below is a simplified block diagram showing Control Box connections in a typical application.



# Terminal Descriptions



## UPDATE Port

The UPDATE port found on the top side of the GRAFIX Control Box is used to keep the installed GRAFIX up to date with all the latest system enhancements and new features from Dakota Digital – without removing either the Control Box or the Instrument Cluster from the vehicle.

- To update the Control Box software with the Control Box wired in a vehicle, follow these simple directions:
  - Format a flash thumb drive with FAT/FAT16 or FAT 32
  - Download the latest Control Box update file from Dakota Digital, and load it on to the formatted flash thumb drive
  - Turn the ignition switch to the 'OFF' position, i.e. no power on the IGNITION PWR terminal (+12V ACCESSORY POWER)
  - Disconnect the +12 VOLT CONSTANT POWER INPUT to the Control Box either by removing the wire to the Control Box terminal, or disconnecting the battery terminal on the vehicle (disconnecting the battery may be preferred)
  - Insert the thumb drive with the downloaded update file in to the UPDATE port
  - Apply +12V to the CONSTANT power pin by reconnecting the battery.
  - The STATUS LED on the Control Box will flash and then turn 'steady' red as the file transfer is taking place.
  - When the STATUS LED starts to flash, the transfer is complete
  - Turn the ignition switch 'on' to confirm the GRAFIX does function normally

- To update the GRAFIX Instrument Cluster software, see the MAIN-SYSTEM-UPDATE section below for details on downloading and installing Instrument Cluster update files (themes, operational software, custom startup images, etc.)

### STATUS LED

- This LED is located at the corner of the Control Box, near the DISPLAY CABLE connections. The LED is used for diagnostics and for a quick visual check if power is present.
- A steady green flash indicates the system is powered and operating normally.
- An alternating red and yellow flash indicates the system is in setup mode.
- A short red flash once every three seconds indicates the 12 VDC CONSTANT terminal is powered and the system is in stand-by mode.
- A solid green indicates there is no Instrument Cluster detected.
- Not flashing or lighting indicates loss of power or ground.

### BT LED

- This LED is located at the corner of the Control Box, near the DIM ADJ connections. The LED is used for checking the Bluetooth module status.
- A single blue flash indicates the module is in standby waiting to connect to a device.
- Two blue flashes indicate the module is currently connected to a device.
- No light indicates the Bluetooth module is powered down. (see MAIN-SETUP-BLUETOOTH)

### DISPLAY CABLE connections (2)

- There are two (2) DISPLAY CABLE connections found on the Control Box module. To ease installation and cable routing, either connection can be used to connect the 8 pin cable from the Instrument Cluster. If an optional clock module is included in the GRAFIX installation, it too can connect to either of these connections.

### GROUND

- This is the main ground for the GRAFIX system. A wire should be run from this terminal to the vehicle's main chassis ground. Use 18 AWG or larger wire to ensure sufficient grounding. Proper vehicle grounding is extremely important for any gauge (or electronics) to operate correctly. The engine block should have heavy ground cables to the battery, frame, firewall, and body. ***Failure to properly ground the engine block or the Control Box can cause incorrect or erratic operation.***

### 12 VDC CONSTANT

- Connect the 12 VDC CONSTANT terminal to a fused +12V power source that is 'hot' all of the time. This is typically a connection from the fuse panel, or a fused wire directly to the battery. This terminal should have power all of the time and should be a fused 5 - 20 amp circuit. The GRAFIX system draws less than 5 amps, so sharing an existing constant power circuit will generally be fine. Use 18 AWG wire or larger to ensure the GRAFIX system receives sufficient power. This constant +12V terminal keeps the clock memory powered when the key is off. If the GPS satellite signal is used for speed detection or calibration, this terminal pin keeps the satellite location active for up to 2 weeks after the key is turned off. This allows for faster GPS speed detection when the system is powered back on and the vehicle requires the speedometer reading.

### IGNITION PWR

- Connect the IGNITION PWR terminal to accessory +12V power from the fuse panel or vehicle wiring harness. This terminal should have power when the key is on or in the 'accessory' position. In addition to turning on the Instrument Cluster, this is also where the voltmeter gauge senses the vehicle electrical system voltage. The accessory +12V supply source should be a fused 5 - 20 amp circuit. This terminal draws less than 1 amp, so sharing an existing



accessory circuit will generally be fine. Use an 18 AWG wire to ensure the system receives a sufficient power feed.

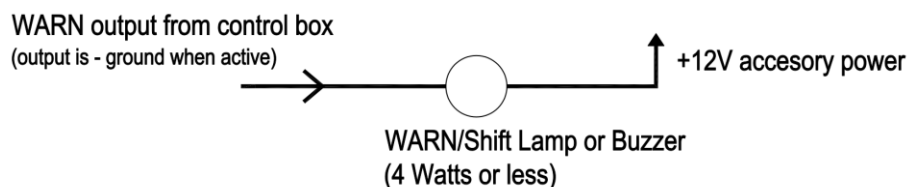
**\*\*\* Never connect any power terminal to a battery charger alone. The system needs to have a 12 volt battery connected to it. Battery chargers have an unregulated voltage output that will cause the system to not operate properly and may cause damage to the Control Box.**

## TACH

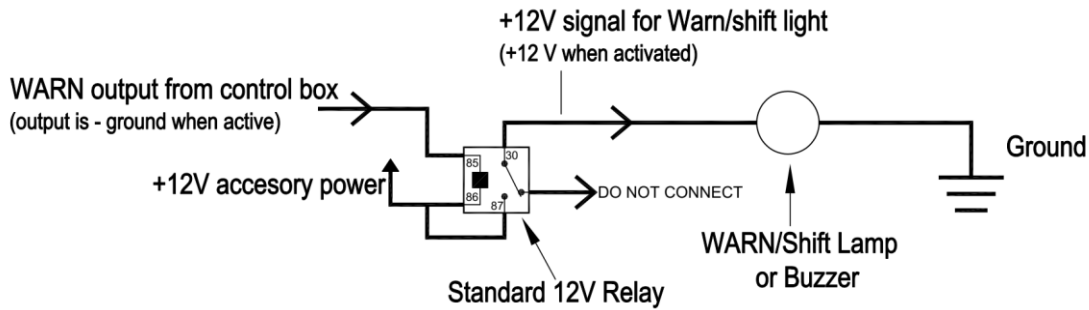
- Connect the TACH terminal to the ignition system
  - On vehicles using a separate ignition coil, connect to the negative side of the coil. The negative side of the coil will be the wire that goes to the points or electronic ignition module.
  - For GM HEI ignition equipped engines, connect to the terminal marked "TACH" or on some systems, a single white wire with a spade terminal on it.
  - On some aftermarket ignition systems, connect to the TACH output terminal.
  - On computer controlled ignition systems, consult a service manual for the wire color and location.
  - With a magneto system, connect to the kill wire for the tach signal.
  - If using a BIM-01-x module for the tach reading nothing will connect to this terminal.
- To ensure that the ignition system does not interfere with any other dashboard functions, do not run the tachometer wire alongside any other sensor or input wires. **DO NOT USE SOLID CORE SPARK PLUG WIRES WITH THIS DASHBOARD SYSTEM.** Solid core ignition wires cause a large amount of electromagnetic and radio frequency interference which can disrupt the system operation. **Do not connect the TACH terminal to the secondary, or high voltage, side of the ignition coil.**
- The tachometer is compatible with almost all gasoline engines. The engine cylinder selection, display update rate, tach signal type, and RPM warning point can be adjusted in the SETUP menu under "TACH". If a diesel engine is being used, you will need a tach interface such as Dakota Digital's **SGI-100BT**. Be aware of the cylinder setting when using computer outputs or reading the tach signal from an ECU. Some GM LS-based engines require the tach to be set up for a 4 cylinder, low voltage signal when reading from the ECU even though it is a V8 engine.

## TACH WARN

- The TACH WARN terminal is an output to activate a small light or relay for a red-line or shift indicator. The output is ground-activated when the preset warn RPM limit is exceeded. This output can turn on a 4 Watt or smaller 12V bulb or can activate a relay to turn on a larger bulb or buzzer. To wire a warning light to this output, connect one wire from the bulb to 12 volt accessory power and connect the other wire to the TACH WARN terminal.

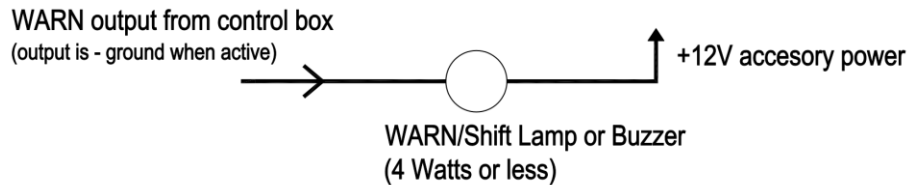


- If you need the warn output to be “active high” or provide a +12V voltage to power something larger than 4 Watt, a standard 12V relay such as Dakota Digital RLY-1 can be used to accomplish this.

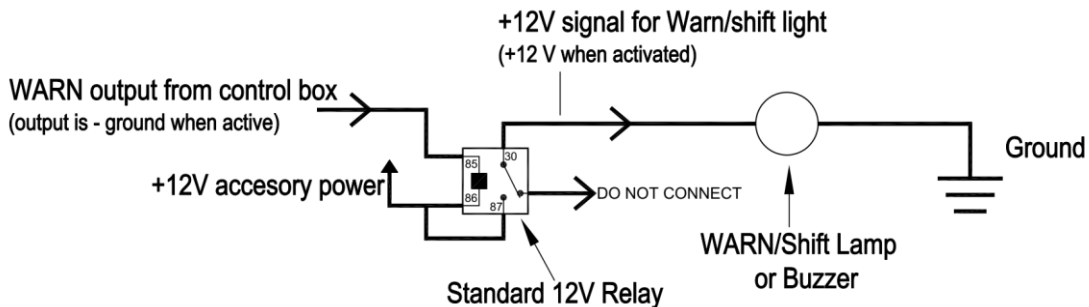


### WARN OUT

- The WARN OUT terminal is an output to activate a small light or relay for a gauge warning indicator. Alternatively, it can be used to activate reverse lights when using a GSS-3000 or BIM-01 when in the REVERSE gear position. The output is ground-activated when any of the activated gauge warnings are exceeded. This output can turn on a 4 Watt or smaller 12V bulb or can activate a relay to turn on a larger bulb or buzzer. To wire a warning light to this output, connect one wire from the bulb to 12 volt accessory power and connect the other wire to the WARN OUT terminal.



- If you need the warn output to be “active high” or provide a +12V voltage to power something larger than 4 Watt, a standard 12V relay can be used to accomplish this.



## TACH OUT

- This terminal can be used to supply a buffered tach signal to auxiliary devices such as a cruise control.  
**\*\*\*If you are using the “bus” tach signal option, with the output from a BIM-01-X module, this output will NOT work.**

## SPD OUT

- This terminal can be used to supply a speed signal to auxiliary devices such as a cruise control or radio volume adjustment. The output is scaled to the input speed signal coming into the SPD SIG terminal. It can be set to 2,000 PPM or 4,000 PPM.  
**\*\*\*If you are using the GPS speed signal option or the bus speed signal option, with the output from a BIM-01-X module, this output will NOT work.**

## CRUISE (-)

- The CRUISE terminal can be used as a “cruise engaged” indicator. The CRUISE input is activated by a ground signal from a compatible cruise control harness. Whenever the CRUISE input is grounded, the system will display a small green “cruise engaged” indicator.

## SPEED INPUT - PWR

- This terminal is used to supply power to Dakota Digital speed sensor **SEN-01-5**. This supplies 5V DC to the sensor and should not be hooked up to anything else. Connect the red wire from the **SEN-01-5** to this terminal.
- If you are using a 1-wire VSS output from a computer or a two-wire pulse generator this terminal should be left open.  
**\*\*\*DO NOT use this terminal to power any other devices; it is a low current +5V output.**

## SPEED INPUT - SIG

- This is where the vehicle speed sensor (VSS) connects. The signal supplied to this terminal will be used by the Control Box to calculate the speed reading on the display and also for calculating and saving odometer mileage. If a **BIM-01-x** module is used to obtain the speedometer reading then this terminal will not be connected.
- Dakota Digital supplies a 3-wire sensor for most of its kits, **SEN-01-5**. If you are using this sensor, the white wire is the speed signal; connect to SPD SIG. The red and black wires in the cable are power and ground (5V DC) and their connection is discussed in the SPEED INPUT – PWR and –GND sections.
- For two wire speed sensors such as a cable driven pulse generator, the polarity of the wires does not matter. Connect one wire to the SPEED INPUT - GND and the other to the SPEED INPUT - SIG terminal. The speed sensor ground wire should be brought back to the Control Box to ensure a proper signal is received. Twisting the ground and signal wires around each other provides an additional level of interference protection. The speed signal wire should not be routed alongside tach, ignition, or other high current or high voltage wires.
- For vehicles which have a vehicle speed signal from a transmission sensor or ECM, tap into the VSS wire and connect it to the SIG terminal. Consult a vehicle service manual or wiring diagram to determine wire color and location.
- This system can accept 2,000 ppm – 250,000 ppm speed signals. The speedometer is fully adjustable and calibration is discussed in a later section. The TFT will display “PLEASE CALIBRATE SPEED” in the Message Area until the speedometer has been calibrated.  
**\*\*\*Failure to calibrate the speedometer may cause your odometer mileage to increase very rapidly if the speedometer is reading too fast.**  
**\*\*\* The speed signal wire should NOT be routed alongside ignition or other high current/voltage wires.**

## SPEED INPUT - GND

- This terminal is used for speed sensor ground. Connect the black wire from the **SEN-01-5** here. This insures a proper ground as well as providing proper hook-up for a twisted pair of

wires, or a solid state sensor. Only ground the speed sensor here. If you are using a single wire output from a computer for the VSS then this terminal should be left open.

#### TEMP INPUT - SIG

- ***The water temperature sensor included with this system must be used. Other sensors will cause incorrect readings or damage to the Control Box. If using a BIM-01-x module to obtain engine temperature then this terminal will not be connected.***
- The supplied sensor, Dakota Digital **SEN-04-5**, is a 100-300°F(40-150°C) temp sensor. The sensor mounts on the engine block or into the intake manifold so that the end of the sensor is in the engine coolant flow. It has 1/8" NPT threads; adaptor bushings may be used to adapt it for various applications.
- The water temp sensor has two wires coming from the harness. One wire will connect to the SIG terminal; the other wire will connect to the GND terminal. It does not matter which wire goes into either location.
- Due to the construction of the sensor, readings at temperatures below 100°F will be inaccurate. The sensor is designed to be accurate from approximately 100°F - 300°F.
- If the water temperature rises above an adjustable warning point, a red warning light will turn on and the digital reading will be shown on the TFT display. The default warning point is 250°F. If "WATER SHORTED" is shown this indicates that the Control Box is sensing a short to ground or out-of-range error from the sensor or sensor wire. If "WATER OPEN" is shown this indicates that the Control Box is sensing an open circuit or out-of-range error from the sensor. If either indication remains on the display, inspect the sensor wire for damage, check the routing of the sensor wire, and check that the correct sensor is connected.

#### TEMP INPUT - GND

- This is the ground reference used for two-wire water temp sensors. This will connect to one of the wires from the Dakota Digital **SEN-04-5**. The other wire will connect to the SIG terminal, and it doesn't matter which wire goes into either location.

#### PRESSURE INPUT - PWR

- This terminal is used to supply power to Dakota Digital pressure sensor **SEN-03-10**. This supplies 5V DC to the sensor and should not be connected to anything else. Connect the red wire from the **SEN-03-10** to this terminal.  
**\*\*\*DO NOT use this terminal to power any other devices; it is a low current +5V output.**

#### PRESSURE INPUT - SIG

***Note: A Dakota Digital oil pressure sensor must be used. Other sensors will cause incorrect readings and/or can cause damage to the Control Box. The standard sensor provided with the GRFX system is a 0-150 psi sensor (Dakota Digital SEN-03-10). Other sensors are also available if required: a 0-300 psi sensor (SEN-03-9), and a 0-100 psi sensor (SEN-03-8) are also supported. If using a BIM-01-x to obtain engine oil pressure then this terminal will not be connected.***

- The supplied sensor, Dakota Digital **SEN-03-150**, is a 0-150 psi solid state pressure sensor. The sensor can mount on the engine block or in an oil pressure line off of the block. The sensor has 1/8" NPT threads. Adaptor bushings may be used to adapt it for various applications.
- The oil pressure sensor has four wires coming from the harness, which includes a bare shield drain wire. The WHITE wire will connect to the SIG terminal, the RED to PWR (5V DC), the BLACK to GND, and bare shield wire to DRN. Do not route the oil sensor wire alongside a spark plug wire or other high current or high voltage wires. Doing so can cause incorrect or erratic gauge readings.
- If the oil pressure drops below an adjustable warning point a red warning light will turn on and the digital reading will be shown on the TFT display. The default warning point is 10 psi. If "OIL FAIL LOW" is shown this indicates that the Control Box is sensing a short to ground or

out-of-range error from the sensor or sensor wire. If “OIL FAIL HIGH” is shown this indicates that the Control Box is sensing an open circuit or out-of-range error from the sensor. If either indication remains on the display, inspect the sensor wire for damage, check the routing of the sensor wire, check the sending unit grounding, and check that the correct sending unit is connected.

#### **PRESSURE INPUT - GND**

- This is the ground reference used for three-wire pressure sensor. This will connect to the black wire from the Dakota Digital **SEN-03-10**.

**\*\*\*DO NOT connect this terminal to any other devices**

#### **PRESSURE INPUT - DRN**

- This is the cable shield for three-wire pressure sensor. This will connect to the bare silver shield wire from the Dakota Digital **SEN-03-10**.

**\*\*\*DO NOT connect this terminal to any other devices**

#### **FUEL INPUT - SIG**

- The fuel gauge sending unit is not normally supplied because the Instrument Cluster can use the existing resistive fuel sending unit that is already in the tank in many cases. Most OEM and aftermarket fuel sending units are compatible with this system. It is also possible to manually program a setting for sensors that are not pre-programmed into the system.
- Dakota Digital recommends that you run two wires back to the fuel level sensor to insure proper grounds. Use the FUEL INPUT - GND and FUEL INPUT - SIG terminals and run a twisted pair of wires back to your fuel level sensor. Connect the GND terminal to the fuel level sensor body or a mounting screw to ensure the sensor is sufficiently grounded. The other wire is the sensor signal which goes to the SIG terminal.
- If your wiring harness already has a single wire routed through the vehicle for the fuel sensor then it may be used. If using a wire from an existing harness, make sure that the wire does not have power. Fuel sensors reference their ground from the sensor mounting plate. Make sure that a ground wire is connected from one of the sensor’s mounting bolts to the vehicle frame.
- The fuel sensor type is selected using the fuel setup menu under “INPUT”. The settings are discussed later in the setup section. Anytime the fuel level is below 10% a red warning light will turn on.
- The MESSAGE AREA on the GRAFIX Instrument Cluster will display “PLEASE CALIBRATE FUEL” until the fuel sensor type has been set. If the message display shows “FUEL SHORTED” this indicates that the Control Box is sensing a short to ground or out-of-range error from the sensor or sensor wire. If the message display shows “FUEL OPEN” this indicates that the Control Box is sensing an open circuit or out-of-range error from the sensor. If either indication remains on the display, inspect the sensor wire for damage, check the routing of the sensor wire, check the sending unit grounding, and check that the sensor selection is set correctly for the sending unit that is connected.

#### **FUEL INPUT - GND**

- This terminal is used to provide a ground connection for the fuel level sensor. Dakota Digital recommends that you use the FUEL INPUT - GND terminal and run a twisted pair of wires back to your fuel level sensor. Connect the GND terminal to the fuel level sensor body or a mounting screw to insure the sensor is sufficiently grounded. One terminal on the sensor is the signal which goes to the FUEL INPUT - SIG terminal.

**\*\*\*For fuel level sensors that are attached to an electric fuel pump, or if you have an electric fuel pump in the tank, make sure that the fuel pump is externally grounded to the vehicle chassis. Attempting to ground the fuel pump to the Dakota Digital Control Box will result in erratic operation and damage to the Control Box.**

## DIM ADJ - SIG

- The DIM ADJ - SIG terminal is an optionally used input that allows you to have control over the dimming brightness. By default, the system will dim the displays when the DIM terminal has power (+12V) to a level that is adjustable in the SYSTEM-DISPLAY menu. Using the DIM ADJ terminal allows you to have a dash mounted control to vary the brightness while the headlights are on. This requires Dakota Digital's **DIM-1** kit; a stock headlight rheostat will not work.
- The DIM-1 has two wires, one connects to the SIG terminal and the other connects to GND. The dash mounted dimmer will only vary the display brightness when the DIM terminal has power, +12V.

## DIM ADJ - GND

- This terminal provides a ground reference for the optionally installed **DIM-1** for dash mounted dimming control. One wire from the **DIM-1** will connect to the DIM ADJ - SIG terminal, the other connects to the DIM ADJ - GND terminal.  
***\*This terminal should not be used for grounding other sensors or devices or damage to the Control Box will occur. If not using a Dakota Digital DIM-1, this terminal should be left open. Do not ground this terminal.***

## EX- (-)

- This is an extra indicator input that is activated by grounding. When activated, a message is displayed in the Message Area on the GRAFIX Instrument Cluster. The label can appear temporarily when the state changes or remain displayed while active. The label and operation can be changed in the MAIN-SYSTEM-DISPLAY-EXTRA LABEL setup menu. This input can also be set up to connect a grounded dome light switch to activate the system entry screen when the door is opened.

## EX+ (+)

- This is an extra indicator input that is activated by +12V. When activated, a message is displayed in the Message Area on the GRAFIX Instrument Cluster. The label can appear temporarily when the state changes or remain displayed while active. The label and operation can be changed in the MAIN-SYSTEM-DISPLAY-EXTRA LABEL setup menu. This input can also be set up to connect to a powered dome light switch to activate the system entry screen when the door is opened. This input can also be connected and configured as a camera input trigger to switch the GRAFIX display to the camera video input.

## WAIT/EX (+)

- The WAIT terminal can be used as a "wait to start" or glow plug indicator. The WAIT input is activated by a 12 volt signal from the glow plugs. If the WAIT label has not been changed from factory default, a yellow wait 'symbol' indicator will be shown on GRAFIX Instrument Cluster. The Message Area will also indicate the WAIT terminal has been activated with a "WAIT TO START" message. This WAIT input can also be set with a custom label for other uses or used for Door Open, as configured in the MAIN-SYSTEM-DISPLAY-EXTRA LABEL setup menu. This input can also be connected and configured as a camera input trigger to switch the GRAFIX display to the camera video input.

## GEAR (1 wire)

- The GEAR terminal is used for the gear shift indicator. The indicator is built into every system, but will not light up unless a Dakota Digital **GSS-** gear shift sending unit is connected, telling the system what gear the transmission is in. The gear shift sending unit is not included with the system and must be purchased separately if desired. A **BIM-01-x** may also be able to provide gear indication if the vehicle has a compatible ECM and transmission.
- The GEAR terminal will connect to the FIRST terminal on a **GSS-1000** or to the 1-WIRE terminal on a **GSS-2000 and higher**. Follow the instructions in the GSS manual for use with a single wire Instrument Cluster. When the gear shift sending unit is connected the gear indicator will be shown on the GRAPHIX Instrument Cluster.

#### **4x4/EX (-)**

- The 4x4 terminal can be used on four wheel drive vehicles. The 4x4 input is activated by a ground signal from a switch on the transfer case. Connect a wire from this terminal to the switch on the transfer case. Whenever the 4x4 input is grounded and the 4X4 label has not been changed from factory default, a yellow 4x4 indicator will be shown on GRAFIX Instrument Cluster. The Message Area will indicate the “4x4” terminal has been activated. This 4X4 input can also be set with a custom label for other uses or used for Door Open, as configured in the MAIN-SYSTEM-DISPLAY-EXTRA LABEL setup menu.

#### **RIGHT (+)**

- The RIGHT terminal is activated by a 12 volt signal from the turn signal flasher. When this terminal has 12 volts, a green arrow will light up on the GRAFIX Instrument Cluster. An existing wire from the vehicle for the right turn indicator can be used or a new wire can be connected from the turn signal flasher or power wire feeding the right turn signal bulb. This terminal is also monitored by the turn signal reminder. If the turn signal remains active for more than ¾ mile, a warning message will be shown.

#### **LEFT (+)**

- The LEFT terminal is activated by a 12 volt signal from the turn signal flasher. When this terminal has 12 volts, a green arrow will light up on the GRAFIX Instrument Cluster. An existing wire from the vehicle for the left turn indicator can be used or a new wire can be connected from the turn signal flasher or power wire feeding the left turn signal bulb. This terminal is also monitored by the turn signal reminder. If the turn signal remains active for more than ¾ mile, a warning message will be shown.

#### **HIGH (+)**

- The HIGH terminal is activated by a 12 volt signal from the headlight high beam wire. When the terminal has 12 volts, a blue high beam indicator will light up on the Instrument Cluster. An existing wire from the vehicle for the high beam indicator can be used or a new wire can be connected from the high beam side of the high/low beam switch.

#### **BRAKE (-)**

- The BRAKE terminal can be used as a brake system warning indicator. The BRAKE input is activated by a ground signal from the brake pressure switch on the master cylinder or from the parking brake set switch. Connect a wire from this terminal to the pressure switch on the master cylinder or consult a vehicle service manual to determine color and location of an existing wire. Whenever the BRAKE input is grounded, the system will display a red exclamation indicator on the GRAFIX Instrument Cluster.

#### **ENGINE (-)**

- The check engine terminal is used with fuel injection ECM's to indicate engine problems and trouble codes. The ENGINE input is activated by a ground signal from the ECM. Whenever the check input is grounded, the system will display a red check engine indicator on the Instrument Cluster.
- For certain ECM's, when placed into diagnostic mode, trouble codes can be read by counting the flashes of the check engine indicator. Consult a service manual for the fuel injection system that you have for further information on trouble codes or if that is how your system operates. With some ECM's, a 12 volt light bulb may need to be connected in addition to the ENGINE input in order to provide proper current loading. In this case, both the bulb and our Instrument Cluster's indicator would come on when the check engine wire is “active”.

**Note: The GRAFIX system will not generate any error codes or display the error codes from the ECM. It will only indicate that an error has occurred by illuminating the ENGINE symbol on the Instrument Cluster.**

- **Emissions Note:** If your vehicle requires emissions testing in your area then the ENGINE terminal must be connected to the ECM service engine wire. A **BIM-01-x** or **STA-1000** cannot be used to supply the Check Engine or Service Engine indicator.

#### **DIM (+)**

- The display parameters on the TFTs of the GRAFIX system are designed to change color when the headlights are turned on, i.e. night time driving. Connect the DIM terminal to the taillight or parking light circuit so it has +12 volts whenever the headlights are on. When power is applied to the DIM terminal (headlights on), the Instrument Cluster TFTs will illuminate at a preset brightness level and with the display parameter color settings. These colors can be the default colors for the selected layout(s) from the factory, or customized via settings by the user in MAIN-SYSTEM-LAYOUT X-COLORS-DAY&NIGHT or NIGHT MODE, using either the defined schemes or the customizable settings for all of the display parameters. When the DIM terminal does not have power (headlights off), the colors displayed on the TFTs will be the colors configured in SYSTEM-LAYOUT X-COLORS-DAY&NIGHT or DAY MODE, which too are configured to the user's preferences.
- The night brightness level is adjustable three different ways. Two methods are through the SYSTEM-DISPLAY-INTENSITY menus either fully manual or via the built in ambient light sensor. For the third method, see the DIM ADJ terminal description.
- It is also possible to override the night dimming. If you need the headlights on during the day for a parade or other event but still want the gauges in daytime mode, toggle the headlight switch off and on three times. "DIM DISABLED" will briefly be displayed in the Message Area, and the gauges will remain in daytime mode with the headlights on.  
**\*\*\*To disable the 'night dimming' override, simply turn the headlights off for approximately 3 seconds and then back on to return to normal night time operation.**

#### **BIM I/O**

- This connector is used to connect bus expansion modules (BIM). Do not attempt to plug in any other device to this jack or damage to the Control Box will occur. This connector should be left open, unless using a Dakota Digital product designed for it. Operation is discussed with BIM units purchased separately from Dakota Digital.

#### **GPS ANTENNA**

- The GRAFIX Control Box includes an internal GPS antenna and receiver, as well as a connector for attaching an external GPS antenna (Dakota Digital 600041 sold separately). If the GRAFIX is configured to use the GPS signal (for speed, compass, or clock/real time), but the mounting location of the Control Box does not allow an adequate signal to be detected by the internal antenna and GPS receiver, the external antenna will need to be used. If an external GPS antenna is connected, the GRAFIX system will detect the external antenna and automatically switch to it with no user setup required. The picture below is showing the satellite compass 'gauge', and the symbol shown in the center area indicates that an adequate satellite signal is not detected, or that satellite information is still being acquired.





## CAMERA (Video Input on Instrument Cluster)

- The GRAFIX Instrument Cluster comes standard with a port for the input of NTSC composite video signal. This video can be supplied by a backup camera (camera sold separately), and when configured with an external trigger to the Control Box, the camera's video will be visible on the Instrument Cluster's TFT. See MAIN-SETUP-CAMERA below for trigger configuration and operation details. The camera port itself is the female yellow RCA on the rear of the GRAFIX Instrument Cluster.

## Global Feature Details

### Control Knob

The GRAFIX system's Instrument Cluster is equipped with an interface knob that is attached to an internal push button/rotary encoder. This single interface will be referred to as the 'Control Knob' or simply just 'knob' in this document. Like the remote application (available to download for both IOS and Android devices), the Control Knob allows the user to access the GRAFIX menu structure, and all of the user accessible features of the GRAFIX system.

The main user actions performed on the Control Knob and referenced in the following sections are:

- Rotate or Scroll: Turning the Control Knob clockwise (CW) or counter clock wise (CCW) to go through the listed available menu items. The 'cursor' is indicated on the menu by the highlighted item as the user maneuvers through the menu list.
- Tap: Press and immediately release the Control Knob in order to select or activate the highlighted menu item.
- Hold: Press and hold the Control Knob to activate an on-display timer. When performing the 'hold' action and the appropriate time has elapsed as indicated in the menu window, the menu will automatically go to the next menu or action item, or return to the previous menu list.

### Message Center

Most of the GRAFIX user interaction is accomplished through the use of the MAIN MENU and the operation details that follow below. An exception to using the MAIN MENU, is the navigation through information and warning the messages displayed in the Message Center.



Message Center shown in 'Normal Operation'



Message Areas (2) highlighted with 'graphical boxes' to allow Message Group change

For ease of use and quick access to the messages configured and displayed in the Message Center(s) when the GRAFIX is in 'Normal Operation', the user can simply rotate and tap the Control Knob to navigate through the messages in order to change the Message Group that is displayed, or the user can rotate the knob to select a specific Message Area item for clearing the previously captured data.

**Note: 'Normal Operation' is when there are: no warnings, no menu box, and no 'red' Message Areas on the GRAFIX Instrument Cluster. The Message Center's line items must be clearly visible as seen in the pictures above. If a Message Area is 'red' with a warning or information as described below, access to the Message Center is not allowed.**

**Also worth noting, some GRAFIX systems may have two (or more) Message Centers, so the 'base' Message Center is typically found on the TFT on the Instrument Cluster where the menu box is displayed, and the 'base' Message Center by default is typically programmed at the factory to include the odometer and Trip A readings in Message Group A.**

#### **Change Message Center Group:**

- In normal operation (no warnings, no menu box displayed, and no red Message Areas), rotate the Control Knob until all Message Areas are highlighted, i.e. a graphical box is seen around each Message Area line item. (see diagram above)
- With a 'graphical box' around all Message Areas, tap the Control Knob to cycle through all of the Message Groups that are configured for the system. See SYSTEM-LAYOUTS-LAYOUT<X>-MSG GROUPS-GROUP MAX for details on Message Group setup.
- By stopping the 'tap' on a particular highlighted Message Group (MSG GROUP), this group will be selected to remain in the Message Area during 'normal operation'. Turn the Control Knob until all highlighted boxes around all Message Areas are gone. If the Control Knob is not turned, the highlight boxes will clear automatically in approximately 4 seconds, and the displayed/selected Message Group will remain.

#### **Clearing Message Area Line Item:**

- Rotate the Control Knob until a single message is highlighted. By being able to be highlighted separately, this indicates the Message Area line item can be cleared, such as TRIP A mileage, TIMER, 1/4 MILE speed and time, etc. Hold the knob in to clear the item.
- To clear a Message Area warning, hold the Control Knob in when a Message Area item is selected (selected = has a graphical box around area). 'HOLD TO CLR' will pop up in that message area along with a progress bar that will increase to the right. Hold the knob in, until the bar moves completely to the right, and the reading will be cleared. Release the knob.

**Note: If the Message Area is configured to display the odometer or a system reading such as Volts, Fuel, etc., these cannot be highlighted individually as they cannot be cleared by the user.**

#### **Warning Area Message:**

- When a system reading that is not configured to be monitored in the Message Area goes in to a warning condition, the top Message Area of the 'base' Message Center will indicate the warning. This warning can be cleared by holding the Control Knob in - as described in Clearing Message Areas above.
- If the reading is configured to be monitored in a Message Area and a warning occurs for that reading; that Message Area will turn red, but cannot be selected and cleared. It will only be cleared when proper corrective action is taken.

### Info Area Message:

- If there is a system notification that needs attention, such as FUEL or SPEED calibration is required, the bottom Message Area line item of the 'base' Message Center will indicate what needs attention.
- If this bottom Message Area is red, it can be cleared manually by holding the Control Knob and waiting for the 'HOLD TO CLEAR' progress bar to complete. If corrective action is not taken, this notification will occur whenever the ignition is turned off and back on.

**Note: Any 'Base' Message Center warnings and info messages must be cleared in order for the user to access the Message Center selection features above. Additional warning features are discussed in the MAIN-SETUP-WARN menus below.**

## GRAFIX Warning System

The GRAFIX instrument series comes standard with several warning mechanisms built in to provide necessary feedback for all configured vehicle systems so that the user is informed if any of the warning set points are violated. These mechanisms can be found globally across the installed and configured gauges and installed sensors (unless otherwise noted in associated sections throughout this document).

User warning feedback mechanisms include:

- Configurable MESSAGE CENTER Warning and Information messages (see above)
  - Associated MESSAGE AREA will turn 'red' indicating a violation
- All analog gauges include warning indicator in the gauge face that will illuminate
- Digital readouts will be displayed in a 'red' box with white text
- Configurable output terminals on the Control Box (TACH and WARN)
  - See MAIN-SETUP for details
- Configurable audible tone
- Configurable red LED indicator on the Instrument Cluster and associated popup message

## MAIN MENU

The following section will go through the MAIN MENU line items. At the end of this section find more in-depth details on the SYSTEM and SETUP sub-menu items. There is also a Glossary of Terms towards the end of this document with descriptions of some of the items and terms mentioned.

**Note: Because of the extensive flexibility of configuring the GRAFIX systems, most of the sub-menus contain a BACK menu item at the bottom of their respective lists. The BACK can be selected by scrolling CW down the list with the Control Knob until BACK is highlighted. The user can then 'tap' the Control knob to jump back (up) one sub-menu.**

**Note: By 'holding' the Control Knob in when BACK is highlighted in the sub-menu lists, user instructions and a timer progress bar will appear in the menu box. Upon completion of the timer progressing to the left side of the menu box, the user will return to the MAIN MENU, thus bypassing what can be several required 'BACK-TAP' operations.**

To access the GRAFIX user interface and menu structure, 'tap' the Control Knob. The MAIN MENU list of items pictured below will pop up in the menu box on the Instrument Cluster. This is the MAIN MENU, and is the 'root' menu for access to all of the GRAFIX's sub-menus (other than the Message Groups mentioned above).



MAIN MENU in the Menu Box on the GRAFIX Instrument Cluster

**HI VIZ (High Visibility ON or OFF):**

HI VIZ toggles the Instrument Cluster TFTs to white text and graphics on a black background for ease of visibility in bright ambient light conditions. Because the MAIN MENU initially comes up with the HI VIZ highlighted, an immediate 2<sup>nd</sup> tap will toggle the GRAFIX display to high visibility mode (ON). Another tap will return it to normal operation (OFF). This 'double tap' capability allows for quick display mode changes which can be needed as driving conditions change.

**Note: Selection of the HI VIZ (ON), will set the display intensity to maximum, unless the DIM terminal of the control box is pulled high (i.e. headlights on)**

**LAYOUTS (#):**

Where (#) can be number 1, 2, 3 or 4, and indicates which of the four stored layouts is currently being displayed. With LAYOUTS (#) highlighted in the MAIN MENU, 'tap' the Control Knob to cycle the 4 stored layouts in ascending order, and then wrapping back around to layout #1. Observe that the associated layout parameters change on the Instrument Cluster TFTs, including: THEME, COLORS, GAUGES, and assigned MESSAGE GROUPS. Editing the layouts will be explained in more detail in SYSTEM sub-menu operation section below. To exit the layout selection function, simply rotate the Control Knob in either direction or wait approximately 3 seconds to return to the Main Menu list.

**SYSTEM:**

Access to sub-menus for layout and display customization – such as theme and gauge assignments, color selection, display brightness and intensity, Message Center notification assignments, etc. Also, specific system and display items such as installed software versions, Control Knob setup parameters, and system update interface - are also accessible in the SYSTEM sub-menu. In depth operation details of the SYSTEM sub-menu items are below in the Detailed Instructions section of this manual.

**SETUP:**

Access to sub-menus for the setup of interfaces and other GRAFIX features such as BIMs and sensors, warning points, camera setup, system demonstration routine, and full system reset. In depth operation details of the SETUP sub-menu items are below in the Detailed Instructions section of the manual.

**EXIT:**

Clears the MAIN MENU box from the display area.

**Note: If the MAIN MENU is left unattended for approximately 4 seconds, it will automatically clear from the GRFX display. This is the only menu that will clear itself, as many of the sub-menus require a response and/or input from the user. To recall the MAIN MENU, simply tap the Control Knob.**

## **SYSTEM sub-menu ‘Quick view’**

Below is the list of MAIN-SYSTEM sub-menu items. There is a brief description of use here, and there is also popup guidance on the GRAFIX Instrument Cluster TFT as the user steps through the sub-menus with the Control Knob. For most of the items, find more detailed descriptions and use in the **Detailed Instructions** below.

The SYSTEM sub-menu is selectable in the MAIN MENU by tapping on **SYSTEM** when highlighted. An asterisk “\*” will be displayed by the currently saved setting in each of the sub-menus unless noted otherwise. Selecting “BACK” will make no changes in the current menu and will go back up one level in the menu structure.

**Note: When navigating through the various menus and sub-menus with the Control Knob, many selections have popups on the GRAFIX TFT for the user to follow. Pay close attention to the menus and popup options as incorrect settings can cause faulty readings on the Instrument Cluster.**

<b>SYSTEM</b>	<b>Sub-Menu</b>	<b>Description</b>
	LAYOUTS	
	LAYOUT X	List of 4 layouts that can to be edited
	<b>Note: &lt;LAYOUT #&gt; in the list is the currently selected/displayed layout</b>	
	THEME	Allows selection from 1 of 4 installed themes
	COLORS	Allows custom selection of colors for day and/or night
	DAY&NIGHT	Color setup for both day and night operation
	SCHEME	List of 12 predefined color combinations available for layouts
	CUSTOMISE	List of 7 Instrument Cluster parameters
	ACCENT,LABEL,READING,SCALE,POINTER/BAR,WARN IND,SWITCH	
	BACK	Exit CUSTOMISE
	RESET COLOR	Reset all <LAYOUT #> parameters to factory defaults
	BACK	Exit DAY&NIGHT
	DAY MODE	Color setup for daytime operation (see *Note below)
	NIGHT MODE	Color setup for night time operation (see *Note below)
	BACK	Exit COLORS
	<b>*Note: Settings for DAY MODE and NIGHT MODE are the same when the DAY&amp;NIGHT selection is used. In real time vehicle operation, the switching of the DAY and NIGHT mode is controlled by the signal on the Control Box DIM terminal.</b>	
	GAUGES	See Gauge setup below in <b>DETAILED INSTRUCTIONS</b>
	MSG GROUPS	
	GROUP MAX	Select which display groups are available to the user
	Groups: AB, ABC, ABCD, ABCDE are available	
	GROUP SET	Select readings to be shown in each of the groups
	BACK	Exit MSP GROUPS
	COPY FROM	
	LAYOUT ‘list’	List of layouts to available to copy from to this LAYOUT X
	BACK	Exit COPY FROM layout selection list
	RESET ALL	Return all display settings to factory default
	BACK	Exit LAYOUTS sub-menu

## DISPLAY

INTENSITY	
DAYTIME	Selection of the TFT brightness for daytime use
MANUAL	Selection will set as the default and allow manual setting from dim to max intensity
AUTO	In auto mode, allows Ambient Sensitivity response setting of Low, Med, and High
BACK	Exit DAYTIME setup
NIGHTTIME	Same settings as DAYTIME
	<b>Note: if the DIM-1 is connected to the Control Box terminals, NIGHTTIME will not be accessible by the user in this menu, and will be grayed out.</b>
HI VISIBILITY	Automatic control of HI VIZ graphic switching
OFF	Disable automatic switching to HI VIZ
AUTO	In auto mode, allows Ambient Sensitivity response setting of Low, Med, and High for auto switch to HI VIZ
BACK	Exit HI VISIBILITY setup
BACK	Exit INTENSITY setup
TURN REMIND	
HIDE TURN IND	Hide turn signal indicators, but allow turn signal reminder functionality
SHOW TRN IND	Connected turn signals will be displayed on system
BACK	Exit TURN REMIND setup
GEAR	List of gear indications
	(PRNODSL, PRNOD21, PRND321, PRN421R, PN D21R, PRN1234, PRN12DO)
BACK	Exit GEAR setup
SET ODOM	Preset odometer reading with current vehicle miles (see page 31)
EXTRA LABEL	
EX+, EX-, WAIT, 4x4	List of available items to change labels on
LABEL	Change the 8 letter label for this input
DISPLAY	Select always active or only momentarily when it changes
TYPE	
WARN	Select label as a warning
INFO	Select label as an information message type
BACK	Exit TYPE sub-menu
BACK	Exit EXTRA LABEL INPUT sub-menu
DOOR OPEN	Configuration of DOOR OPEN trigger
BACK	Exit EXTRA LABEL sub-menu
START IMAGE	
DEFAULT	Display factory GRAFIX on start up
CUSTOM	Display custom image
BACK	Exit START IMAGE sub-menu
BACK	Exit DISPLAY sub-menu

## INFO

SENSOR	
LIST of settings/detected	SPEED, TACH, OIL PSI, FUEL TYP, WATER, OIL V, FUEL ohm
BACK	Exit SENSOR sub-menu
GPS	Listing of satellite parameters, internal/external antenna
BACK	Exit GPS sub-menu
VERSION	
DISPLAY	Software versions in Instrument Cluster
SWITCH	Rotary encoder module SW version
DISPx	List of software for each detected TFT display (Operational SW, CONFIG, THEMES 1-4)
BACK	Exit SWITCH/ DISP software versions
CONTROL BOX	Software version on Control box
BACK	Exit VERSION sub-menu
DISPLAY	List of system parameter info: Internal temp, system current,

		voltage on each TFT module.
	BACK	Exit DISPLAY sub-menu
	BACK	Exit INFO sub-menu
SWITCH		
	DURATION	Select length of Control Knob rotation tone
	VOLUME	Select the sound level of the rotation tone
	TONE	Select the frequency of the rotation tone
	SPD CNT VOL	Select the tone level for monitoring speed counts
	BACK	Exit SWITCH sub-menu
UPDATE		
	AUTO UPD	
	DSP1, DSP2, etc.	List of displays modules to select for auto update
	BACK	Exit AUTO UPD sub-menu
	THEME LOAD	
	STANDARD, PERF, etc.	List of themes to load to ALL display modules
	BACK	Exit THEME LOAD sub-menu
	START IMAGE	
	DEFAULT	Use the factory default start image
	CUSTOM	Use a loaded custom start image
	LOAD	Select a display to load custom start image to from the thumb drive
	BACK	Exit START IMAGE sub-menu
	MANUAL UPD	Select a display to update software from the thumb drive
	BOOT TEST	Run a display boot test (diagnostic that may be needed for tech assistance)
	BACK	Exit UPDATE sub-menu
BACK		Exit SYSTEM sub-menu, return to MAIN MENU

**Note: You can exit the SYSTEM sub-menu at any time by switching off the keyed power to the Control Box. Any setting changes that have been made will be saved.**

## SETUP sub-menu ‘Quick view’

Below is the list of MAIN-SETUP sub-menu items. There is a brief description of use here, and there is also popup guidance on the GRAFIX as the user steps through the sub-menus on the Instrument Cluster with the Control Knob. For some of the items, find more descriptions and use in the **Detailed Instructions** below.

The SETUP sub-menu is entered through the MAIN MENU and by tapping on the Control Knob when **SETUP** is highlighted. An asterisk “\*” will be displayed by the currently saved setting in each of the menus. Selecting “BACK” will make no changes in the current menu and go will go back up one level in the menu structure.

**Note: When navigating through the various menus and sub-menus with the Control Knob, many selections have popups on the GRAFIX TFT for the user to follow. Pay close attention to menus and popup options as incorrect settings can cause faulty readings on the Instrument Cluster.**

SETUP	Sub-Menu	Description
BLUETOOTH	{DEVICE}	Displays the system’s device name in place of {DEVICE}
	OFF	Disable Bluetooth connections
	SETUP ONLY	Allow Bluetooth connections only while in setup
	ALWAYS ON	Allow Bluetooth connections when key is on
	BACK	Exit BLUETOOTH setup menu
CLOCK	MANUAL	Manually enter time
	GPS	Clock will be set to the time received from satellite
	BACK	Exit CLOCK setup menu
SPEED	CAL TO GPS	
	AUTO CAL	Calibrate speed by driving a measured mile or km
	ADJUST	Adjust the speed calibration
	SERVICE (500 – 7500)	Select the service countdown reset value
	UNIT (MPH, km/h)	Select speed unit
	INPUT	
	SIGNAL (SENSOR, BIM, GPS)	Select between a wired sensor, BIM or GPS data
	PULLUP (ON, OFF)	Select input pullup state
	BACK	Exit INPUT setup menu
	OUTPUT	
2K PPM or 4K PPM	Select output speed signal PPM setting	
BACK	Exit OUTPUT setup menu	
BACK	Exit SPEED setup menu	
TACH	INPUT	
	CYLINDER (BIM, 1 – 16)	Set engine cylinder count or BIM data input
	TYPE (5V LOW, 12V HI)	Select RPM signal voltage level
	BACK	Exit INPUT setup menu
	UPDATE RATE	
	(SLOW, MID, FAST)	Set RPM update rate
BACK	Exit UPDATE RATE setup menu	



	SHIFT LIGHT (2000 – 15000) BACK	Set RPM shift warning point Exit TACH setup menu
VOLT	WARN LO (10.0 – 13.1) WARN HI (16.5 – 20.0) BACK	Set low volt warning point Set high volt warning point Exit VOLT setup menu
WATER	INPUT SENSOR DD DD CUSTOM OFFEST BACK BIM BACK UNIT F C BACK WARNING (150-305F / 65 -152c) BACK	Select between a wired sensor Select standard Dakota Digital sensor Select customized DD reading Select offset to sensor reading (-20F - +20F or -11C - +11C) Exit SENSOR menu Select BIM data Exit INPUT setup menu Select Fahrenheit temperature units Select Celsius temperature units Exit UNIT setup menu Set high temp warning point Exit WATER setup menu
OIL	INPUT (SENSOR PSI: 100, 150, 300 or from BIM)  WARN (LOW 5 – 36) BACK	Select between a wired sensor or BIM data Set low pressure warning point Exit OIL setup menu
FUEL	INPUT (MANUAL ADJ, GM 0-30, GM 0-90, 63 VETTE, GM 40-250, GM 250-40, FORD 73-10, FORD 20-150, VDO 10-180, SW 240-33, IMPRT 112-4, BIM) MANUAL ADJ -> PROGRAM Back	Select sensor type Calibrate/manual adjust fuel sensor Exit MANUAL ADJ.
	RANGE LEARN RESET BACK	Clear and restart learning range to empty Exit FUEL setup menu
BIM	BACK	Menu options depend on BIM(s) attached. Exit BIM setup menu
WARN	WARN OUT OUTPUT SET (ON/OFF) WARN AUDIO BUZZER SET (ON/OFF) BUZZER STYLE (0-10) BUZZER VOL (0-10) BUZZER TONE (1-3) SPD CNT VOL (OFF, LOW, MID, HIGH) BACK	Select BIMs, gauges, misc. that trigger warn output Select BIMs, gauges, misc. that trigger warn buzzer Select style of audible tone Select the warning buzzer volume Select the warning buzzer sound Select the speed-controlled volume setting Exit the WARN AUDIO setup menu
	WARN LED OUTPUT SET (ON/OFF) BACK	Select BIMs, gauges, misc. that trigger warn LED Exit WARN setup menu

## GFORCE

LEVEL (SET LEVEL parked on level surface, flat ground)  
FORWARD (START/ACCEL in straight line to calibrate)  
BACK Exit GFORCE setup menu

## CAMERA

TRIGGER (GEAR-REVERSE, EX+, WAIT, DISABLE)  
Select the trigger that Will switch to camera video input  
BACK Exit CAMERA setup menu

## DEMO MODE

START Initiate demo on Instrument Cluster  
BACK Exit DEMO MODE menu

## FULL RESET

TO FACTORY (NO, YES) Reset  
CONFIRM RESET (NO, YES) If YES, reset GRAFIX to factory defaults  
BACK Exit RESET menu

## BACK

Exit SETUP sub-menu, return to MAIN MENU

**Note:** You can exit the **SETUP** sub-menu at any time by switching off the keyed power to the Control Box. Any setting changes that have been made will be saved.

## Detailed Instructions

### SYSTEM

**Note:** In order to reduce the risk of accidents or injury, access to the **SYSTEM** menu features are only allowed when the vehicle is not moving. If a speed signal is detected, **SYSTEM** will be grayed out in the **MAIN MENU** list, making it non-selectable by the user. Also, if a gear position indicator is configured in the vehicle or detected by the Control Box, the gear position must be in either the park or the neutral position. Any other position will also result in the **SYSTEM** menu item to be grayed out and non-selectable.

#### **LAYOUTS (Theme selection, Color/Gauge customization, Message Group setup)**

Directly from the factory, the GRAFIX Series is a very unique and appealing dash platform for any classic car or hot rod enthusiast, just as it is. But digging deeper into the feature set, the user will find that the configurability is virtually limitless, and a lot of that flexibility can be found in the **SYSTEM-LAYOUTS** sub-menus which we will go through here.

The 4 factory default layouts show off the installed themes and color sets that will easily meet the demands of many users. Connect the sensors as described in this document or the Quickstart guide, and get an initial taste of what the GRAFIX is all about. But then, press the Control Knob and navigate to **SYSTEM-LAYOUTS** in the **MAIN MENU** and the GRAFIX experience truly takes off.

- Start with the engine off and the vehicle in park or neutral (if neutral, be sure the wheels are appropriately blocked/secured)
- Turn the key to the accessory or on position
- Tap Control Knob on the Instrument Cluster to bring up the **MAIN MENU**

- If there are popup warning boxes in the menu box, or messages in the Message Areas at this time, multiple taps or hold to 'clear' operations may be required to get to the MAIN MENU.
  - Any warnings will be addressed in the SETUP section below
  - Rotate the Control Knob CW until **SYSTEM** is highlighted and tap the knob
  - A menu list: LAYOUTS, DISPLAY, INFO, SWITCH, UPDATE, and BACK will be displayed
- Note: Refer to the Glossary section of this document for a description of terms as needed.**

### LAYOUT Editing

A 'LAYOUT' is a set of display and reading parameters in a specific style and configuration. There are 4 factory default layouts, and each layout includes its own user configurable parameters (described below), including: selectable themes, colors, gauge presentation, and message feedback groups. By selecting a layout, that layout can be edited to the user's preference for these parameters, and also saved for future recall. At anytime a modified layout can be restored to the factory settings, and this will be discussed below as well.

With **LAYOUTS** highlighted in the MAIN-SYSTEM menu list, tap to enter the LAYOUT sub-menu:

- A list of 4 layouts will be displayed, with the currently displayed layout presented in brackets (<LAYOUT X>) and highlighted
- From this list you can select the current <layout x> to edit, or navigate to any one of the other three layouts in the list
- For this exercise let's pick **LAYOUT 3**, rotate the knob to it and select with a simple tap.
 

**Note: If the selected layout is not the currently displayed layout, the GRAFIX Instrument Cluster will update to the settings of the saved <LAYOUT 3> selection. In this situation, when editing of the layout is completed, the GRAFIX will continue to display the <LAYOUT 3>.**

**Note: If 'BLANK' appears in the upper left and right corners of larger TFTs where there was not a 'gauge' seen previously, these are available 'regions' that will be selectable in the GAUGE section below. Due to physical limitations of some vehicle dashes and bezels, not all system's Instrument Clusters have these additional gauge areas available.**
- LAYOUT 3 will appear at the top of the menu box, as it is the layout being edited
- Next notice a menu list containing: THEME, COLORS, GAUGES, MSG GROUPS, COPY FROM and RESET ALL and BACK will be listed in the menu box

### THEME Selection

A theme is any one of four installed graphics packages which each present a unique gauge style, its own fonts, and its own presentation of the measured readings. The theme used in a layout can be changed to any one of these four themes. When scrolling through themes, the highlighted theme will be seen on the GRAFIX Instrument Cluster, allowing a visual 'preview' before the theme selection.

- Rotate the Control Knob to highlight **THEME**, tap the knob to select
  - A list of the 4 installed themes will appear, with the current theme for the displayed layout presented with an asterisk (\*) in front of the name
  - Rotate the knob to preview each theme on the GRAFIX Instrument Cluster
  - With the desired theme highlighted for LAYOUT 3, tap to select
    - The selected theme will be saved for Layout 3, and the Layout sub-menu will return in the menu box: THEME, COLORS, GAUGES, MSG GROUPS, COPY FROM, RESET ALL, and BACK

## COLOR editing

This menu selection allows the user to change the daytime and nighttime display colors, by either selecting a defined factory scheme, or by creating a color combination completely based on user preference.

- From the MAIN-SYSTEM-LAYOUT-<LAYOUT X> menu, rotate the knob to **COLORS**, tap the knob
  - A menu with DAY&NIGHT, DAY MODE, NIGHT MODE, and BACK will appear  
Do notice at the top of the menu box, LAYOUT 3 is still indicated
  - With **DAY&NIGHT** highlighted, tap the knob
  - Sub-menu will list: SCHEME, CUSTOMIZE, RESET COLOR, and BACK, Rotate the knob to highlight the desired item, tap to select
    - SCHEME: A list of 12 predefined color combinations for the items in CUSTOMIZE below will be presented to the user as a specific SCHEME. As you scroll the list, the gauges and readings on the Instrument Cluster will change to the colors defined in that highlighted SCHEME. Tap to select, or select BACK to return and retain the previous colors.
    - CUSTOMIZE: A list of available colors from which the user can select for each of the display parameters in the layout being edited. The current color is indicated with an asterisk "\*", and as the user scrolls through the available colors the associated parameter on the GRAFIX display will change to the highlighted color, tap the knob to select the color and return to the parameter list.
      - ACCENT: Graphical details on the some of the GRAFIX themes
      - LABEL: MPH, RPM x1000, VOLT, etc.
      - READING: Measured "values" i.e. "55" MPH, "15.5" VOLTS, etc.
      - SCALE: Scale 'ticks' and numerical scale values on analog gauges
      - POINTER/BAR (Pointer/Bar-gauge): Needle and bar-gauge
      - WARN IND (Warning Indicator): Analog gauge warning indicator
      - SWITCH: Illuminated center of rotary Control Knob
      - BACK:
  - **\*\*\*Notice that as the above are selected, the item will change colors as the user scrolls through the color list.**
  - RESET COLOR: Return all the colors of selected layout to the factory defaults for the current layout theme
  - BACK: Will return to menu list containing: THEME, COLORS, GAUGES, MSG GROUPS, COPY FROM and RESET ALL and BACK, (with LAYOUT 3 still indicated at the top)

**Note: DAY&NIGHT will set colors for both day and night operation to the same colors. By selecting and setting DAY MODE and NIGHT MODE individually, both modes can be set to their own color combination. Switching between day and night modes on the GRAFIX system is controlled by the signal applied to the DIM terminal on the Control Box, and is typically connected to the headlight switch.**

**Note: The HI VIZ (high visibility) mode colors are set at the factory and cannot be changed.**

## GAUGE Setup

The gauge setup sub-menu is where the user can configure the GRAFIX to display the available system readings in their own preferred gauge style and location on the Instrument Cluster. The best way to experience this unmatched flexibility is to go through the menus below.

**User tip:** When editing a layout and making a selection in any of the items below, the first Control Knob ‘tap’ clears the interface menu, and this ‘tap’ is not a ‘selection’ in the layout setup parameter. A tap after clearing the menu will initiate the editing process for the selected parameter.

- From menu list containing: THEME, COLORS, GAUGES, MSG GROUPS, COPY FROM and RESET ALL and BACK,

**Note:** Follow the ‘TAP’ and ‘HOLD’ instructions in the Menu box as prompted

- Rotate to highlight **GAUGES** in the list, and tap knob to select
- Following the instruction popup on TFT, rotate knob
  - While rotating, notice the editable areas will highlight on the GRAFIX Instrument Cluster
  - When the desired **REGION** is highlighted, tap to select

*(This step is skipped for some Regions which only have one arrangement)*

- Rotate to select the Arrangement
  - While rotating, notice the available Arrangements for the selected Region
  - When the desired **ARRANGEMENT** style is on the display, tap to select

*(This step occurs only if an Arrangement has more than one ‘gauge’ area)*

- Rotate until the desired gauge location is highlighted
  - tap to edit the selected gauge location
- Rotate to select the Reading
  - While rotating, notice that the available readings for that gauge are displayed
  - When the desired **READING** is displayed, tap to select

*(This step occurs only if Reading has multiple ‘scales’ to select from)*

- Rotate to select the Scale
  - While rotating, notice that the available scales for the selected reading will be displayed
  - When the desired **SCALE** is on the display, tap to select

**Note:** Depending on the selected Arrangement and Gauge, the Scale may be available as either an analog or a digital readout.

- If an Arrangement has more than one available ‘gauge’
  - Repeat the above sequence for all of the available gauges
  - Hold knob in when finished setting gauges to return to Arrangement selection
- Else if the region Arrangement only has one available ‘gauge’
  - The user will be directed to select the next Region
  - Again, repeat the above until all display Regions are presented as desired
- Hold the knob in to exit out of the GAUGES sub-menu and return to LAYOUT <X> list
  - After GAUGE setup, the menu list containing THEME, COLORS, GAUGES, MSG GROUPS, COPY FROM and RESET ALL and BACK will return with LAYOUT X (current layout being edited) still indicated at the top in the menu box

**Note:** Due to the configuration flexibility of the GRAFIX Instrument Cluster and the user’s ability to assign ARRANGEMENTS, GAUGES and READINGS, there can be layout configurations that are not allowed or invalid. If the ‘NOT SUPPORTED’ message appears in a gauge location, this indicates that the selected READING is not available for the selected ARRANGEMENT. If this message appears, either select a different READING in the GAUGE location, or select a different ARRANGEMENT in the REGION.

## MSG GROUPS setup

- Rotate the Control Knob to highlight **MSG GROUPS**, tap to select
- A list containing GROUP MAX, GROUP SET and BACK will appear
- Rotate the knob and highlight **GROUP MAX**, tap to select
  - This sets the number of message groups for the layout that will be available in the MESSAGE CENTER when stepping through MESSAGE AREAS in Normal Operation.
  - Each group can be up to two MESSAGE AREA lines in a single MESSAGE CENTER, and depending on the system's configuration, multiple MESSAGE CENTERS may be available on the GRAFIX Instrument Cluster
  - A list of AB (2 groups), ABC (3 groups), ABCD (4 groups), ABCDE (5 groups) and BACK will be displayed

The typical default Message Groups are:

  - Grp A: ODOMETER, TRIP A
  - Grp B: TRIP B, TIMER
  - Grp C: SPEED, HIGH MPH
  - Grp D: 0-60 time, ¼ mile
  - Grp E: 1/8 mile, HIGH RPM

Without the addition of external BIMs, the available message readings are:  
Odometer, trip A, trip B, Service, Timer, Speed km/h, Speed MPH, High MPH, 0-60, ¼ mile MPH and time, 1/8 mile MPH and time, Tach RPM, High RPM, Water temp, Oil PSI, Volts, Fuel %, Clock, Compass

  - Highlight the desired number of groups for the layout, tap to select
  - Menu will return to GROUIP MAX, GROUP SET, and BACK
- Rotate the knob to highlight **GROUP SET**, and tap to select
  - A list containing the groups chosen above will be displayed
  - Rotate to the group to be edited and tap
  - A pop up will be displayed and the MESSAGE AREA will be highlighted on the TFT
  - Rotate the knob to the desired MESSAGE AREA, and tap to edit
  - Rotate to cycle through all of the available settings for the MESSAGE AREA, and tap to select the desired reading
  - Continue to follow the onscreen directions for each of the GROUPS to be edited
    - Select **BACK** to return to LAYOUT edit menu

## COPY FROM existing layout

- Once a desired LAYOUT is setup/designed on the GRAFIX system, the COPY FROM feature allows the user to easily start from that layout and then make specific changes, without needing to go through all the above steps.
  - From the THEME, COLORS, GAUGES, MSG GROUPS, COPY FROM and RESET ALL and BACK menu list, rotate the Control Knob to highlight **COPY FROM**, tap to select
  - Notice the 'current' layout being edited is at the top of the menu box, and the other three layouts are available to select
- Note: The selection of an available layout in the list will copy all of that selected layout's information to the 'current' layout. Any customizing or edits performed on the 'current' layout up to that point will be lost.**

## RESET ALL

- By selecting the Reset All, all of the settings for the 'current' layout (as indicated at the top of the Menu Box), will be reset to the factory defaults for that layout. Any user customized settings for colors, gauges selection, etc. performed above will be lost.

## BACK

- Returns the user to MAIN-SYSTEM-LAYOUTS Layout # menu list

## **DISPLAY (Intensity, Turn remind, Gear, Set ODO, Extra Label, Start Image)**

The MAIN-SYSTEM-DISPLAY sub-menu contains a collection of items to assist with and enhance the GRAFIX visual presentation. Most of these are configured once at install, but can be edited anytime depending on user preference or vehicle alterations.

- With MAIN-SYSTEM menu list: LAYOUTS, DISPLAY, INFO, SWITCH, UPDATE, and BACK displayed in menu box, rotate control knob until **DISPLAY** is highlighted, tap to select
- INTENSITY, TURN REMIND, GEAR, SET ODOM, EXTRA LABEL, START IMAGE, and BACK will be displayed.

## INTENSITY

The brightness of the GRAFIX Instrument Cluster can be configured for each of the DAYTIME and NIGHTTIME driving modes, as well as how the display will respond when in the MAIN-HI VIZ (high visibility) mode. DAYTIME and NIGHTTIME can be set to the MANUAL mode giving the user settings of 1-30 (1 = lowest brightness available, and 30 = highest). DAY and NIGHT can also be set to AUTO mode similar to the HI VIZ mode. In the AUTO mode, ambient light is monitored via a sensor on the Instrument Cluster. LOW, MED, and HIGH ambient light sensitivity levels can be set in AUTO mode, and are based on the amount of ambient light detected before an Instrument Cluster intensity change is initiated.

**Note: If the GRAFIX is connected to a separately purchased DIM-1 kit from Dakota Digital, the NIGHTTIME selection will be grayed out in this menu and not available to edit. Instead, when the DIM terminal on the Control Box has power applied to it – i.e. headlight switch is pulled on the DIM-1, the nighttime brightness level is controlled with the twist of the DIM-1 knob.**

**Note: If the HI VIZ (high visibility) mode is 'ON' in the Main Menu, the intensity will go to maximum level in DAYTIME operation regardless of the MANUAL INTENSITY setting.**

## TURN REMIND

If the turn indicators are wired to the GRAFIX Control Box, this setting allows a turn indicator to be shown on the GRAFIX Instrument Cluster when the vehicle turn signal is 'engaged', and the SHOW TRN IND is enabled. When enabled and the turn signal remains 'engaged' for more than  $\frac{3}{4}$  mile, a warning message will be shown in the MESSAGE AREA. The user can also select HIDE TURN IND, in which case the indicator will not be shown on the Instrument Cluster but the warning still shows.

## GEAR

If using a Dakota Digital **GSS** gear shift sender or a **BIM-01-X** connected to the Control Box is receiving gear information from the ECM, the gear display will be active on the TFT display. You can customize how the gears are displayed by selecting the appropriate gear order from the list provided. The display will show the letter for the current gear in a large font in the center of the gear window, with the other gears to either side in a smaller size.

## SET ODOM

The Control Box will allow you to set the odometer miles to match your current odometer reading. This can be done until you have driven 100 miles. **Once you have driven more than 100 miles, this menu option will be grayed out and no longer available. Make sure you have correctly**

***calibrated your speedometer so you don't accumulate extra miles. You can preset the miles as many times as needed to get it correct until you have driven 100 miles.***

In the MAIN-SYSTEM-DISPLAY

- Rotate the Control knob to highlight **SET ODOM**, tap to select
- The current miles will be displayed with the left most digit flashing
- Rotate the knob to the desired digit (0-9), tap knob to select that digit or rotate the knob until BACK is highlighted and tap to return one digit to the left.
- The digit will be displayed and the next digit to the right will start to flash
- Again rotate the knob to the desired digit, tap to select
- Continue this process until the right most digit has been set.

**Note: Tenths of a mile cannot be entered.**

- The system will return to the DISPLAY menu with SET ODOM highlighted.

### EXTRA LABEL

This is a list of hardware triggers that can be can be wired to the GRAFIX Control Box. As discussed below these include defined default factory triggers, as well as user defined triggers that include custom labels that will be displayed on the GRAFIX Instrument Cluster when activated.

The two extra, universal inputs are indicated on the Control Box as EX- and EX+. EX- is activated by grounding the input and the EX+ is activated by an active high input. When the input is activated, a message will be shown on the GRAFIX Message Area display. The user can customize the text label for these inputs with up to 8 characters, and can select whether the message is shown for only a few seconds or whether it should remain until the input is released. The user can also select whether the message is for information purposes only or as a system warning. As a warning the message will be highlighted in red in the Message Area. For added flexibility and if more inputs are needed, the WAIT input and 4x4 input can also be configured to be 'extra', universal inputs instead of being used for their default operation.

Also, any one of these 4 inputs (EX+, EX-, WAIT/EX, and 4x4/EX) can be configured as the trigger to light up the GRAFIX gauge system when a door is opened. When used as DOOR OPEN trigger, the Instrument Cluster will light up with the splash screens as configured, and the odometer reading will remain on for approximately 1 minute or until the key (ignition) is turned on. The EX+ and the WAIT/EX inputs can also be configured as the trigger for the camera input, and when activated will display the GRAFIX camera port's video on the Instrument Cluster.

***Note: If an input (EX+, EX-, WAIT, or 4x4) is configured as a trigger for either the 'DOOR OPEN' or the 'CAMERA', they will grayed out in the MAIN-SYSTEM-DISPLAY-EXTRA LABEL sub-menu list, and cannot be configured/used as other GRAFIX trigger inputs.***

In the MAIN-SYSTEM-DISPLAY

- Rotate the Control knob to highlight **EXTRA LABEL**, tap to select
- Menu list: EX+, EX-, WAIT, 4X4, DOOR OPEN, and BACK will be displayed
- Rotate the knob if needed to highlight **EX+**, tap to select
- Menu options shown are "LABEL", "DISPLAY", "TYPE", and "BACK"
- Rotate the knob to any of the menu items, tap to select
- Following the instructions below for the menu selection chosen

LABEL (Message label setup)

The default GRAFIX labels are EX+, EX-, WAIT, and 4X4. These can be customized with up to 8 characters – including: letters, numbers, "/", ".", "-", ",", "+", "\*", "!", and " "(blank space).



There is also a BACKSPACE and a RESET selection available at the bottom of the character list to aide in the label entry as well.

After selecting the LABEL to edit, the left most character will be flashing. Rotate the Control Knob to the desired character, and then tap the knob to select. The next character position to the right in the label name will start to flash, so repeat the character selection process. Take notice the “|” symbol in the eighth position of the label name. Even if less than 8 characters are desired in the new label, enter empty spaces (“ ”) in the label name to clear this “|” character. Clearing this “|” symbol will act as a line terminator, and the new label will now be displayed as entered. Some experimenting may be needed, so use the BACKSPACE and RESET to help get the label as desired.

**Note: If the label names are changed, the EXTRA LABEL menu list will still indicate EX+, EX-, WAIT, and 4X4. These factory default names remain in the list to indicate which terminal pin on the Control Box is associated with the item being configured.**

**Note: By default from the factory, the WAIT and 4x4 inputs will display an associated symbol on the GRAFIX Instrument Cluster if triggered (see INDICATOR section below). If the ‘LABEL’ name is changed as described above, the associated symbol will not appear on the Instrument Cluster, but the WARNING or INFO message (as configured by TYPE below) will appear in the Message Area.**

DISPLAY (Message display duration)

The duration the message is shown can be changed. The ALWAYS setting will keep the message displayed as long as the terminal is active. The ON CHANGE setting will show the message briefly for a few seconds when it is activated and the message along with the word OFF for a few seconds when it is released. The DISPLAY option is not available for the WAIT or 4x4 inputs unless their respective label has first been changed.

TYPE (Message type)

The message shown in the Message Center can be either an information type (INFO) or a warning type (WARN), and a warning message will be shown in ‘red’. The TYPE option is not available for WAIT or 4x4 unless their respective label has first been changed.

DOOR OPEN (Door Open input trigger)

The options for this are: NONE, EX+, EX-, WAIT, 4X4, and BACK. If an input is selected to operate as the door input trigger, it cannot be used as a Message Area display input. When DOOR OPEN is configured and triggered, the GRAFIX will display the splash screens (as configured), and then display the odometer mileage and the clock time in the Menu box area. The DOOR OPEN is typically connected to a dome light wire.

BACK (Return to MAIN-SYSTEM-DISPLAY menu)

START IMAGE: menu

On power up of the GRAFIX, the ‘DAKOTA DIGITAL’ logo and the factory installed ‘GRAFIX’ logo will be displayed on the Instrument Cluster. A ‘CUSTOM’ image can be displayed in place of the GRAFIX logo at startup (key on) by selecting the CUSTOM setting in the MAIN-SYSTEM-DISPLAY-START menu list. To download a custom image to the GRAFIX via a thumb drive inserted in to the UPDATE port on the Control Box, see the MAIN-SYSTEM-UPDATE for details and the image format required.

BACK: Exit EXTRA LABEL and return to MAIN-SYSTEM menu

### **INFO (Sensor, GPS, Version, Display)**

The MAIN-SYSTEM-INFO sub-menu contains a collection of informational items for quick reference, and there are no settable sub-menu items.

- From MAIN-SYSTEM menu list: LAYOUTS, DISPLAY, INFO, SWITCH, UPDATE, and BACK displayed in menu box, rotate control knob until **INFO** is highlighted, tap to select
- SENSOR, GPS, VERSION, DISPLAY, and BACK will be displayed.
- Rotate the Control Knob to the desired selection, tap to select

SENSOR: List of all detected sensors connected to the Control Box, and the current settings that are set in MAIN-SETUP, as well as the current reading if available.

GPS: If a satellite signal is detected, this is a list of associated parameters for that the signal.

VERSION: Contains a DISPLAY, CONTROL BOX, and BACK menu list can be selected to verify the GRAFIX software that is installed. These release versions are beneficial to know when checking if updates are available, or in case factory support is required.

- Rotate the Control Knob to **DISPLAY**, tap knob to select
  - A list of the GRAFIX system's TFTs will be displayed: DISP1, DISP2, etc.
  - As the knob is rotated through the list, the associated TFT on the Instrument Cluster will be highlighted, as the other display intensities is reduced, tap knob to select
    - Note: If there is only one TFT in the GRAFIX system, only DISP1 will be selectable.**
  - The associated software for the selected display will be listed:
    - Operational code version (DISP hardware)
    - Configuration version (specific system setup)
  - Theme 1- 4 version (version for each of the stored themes 1 - 4)
  - Tap BACK to exit Display version
- Rotate the Control Knob to **CONTROL BOX**, tap to select
  - The version of currently installed software will be displayed
  - Tap the highlighted item or BACK to exit CONTROL BOX version
- Rotate to BACK, tap to exit VERSION

DISPLAY: Is a list of system items to assist in monitoring the GRAFIX operational status.

- TEMP (measured GRAFIX internal temp)
- SYSTEM (measured GRAFIX system current) (*may not be present on some systems*)
- DISP X (measured voltage on the GRAFIX module(s))
- Tap the highlighted item or BACK to exit

BACK: Exit VERSION and returns to MAIN-SYSTEM menu

### **SWITCH (Control Knob settings)**

The MAIN-SYSTEM-SWITCH sub-menu is a list of settings for the Control Knob, specifically the audible parameters.

- With MAIN-SYSTEM menu list: LAYOUTS, DISPLAY, INFO, SWITCH, UPDATE, and BACK displayed in menu box, rotate control knob until **SWITCH** is highlighted, tap to select
- DURATION, VOLUME, TONE, SPD CNT VOL, and BACK be displayed.
- Rotate the Control Knob to the desired selection, tap to select

DURATION: Is the length of time a detected 'click' will be audible as the Control Knob is rotated. This can be set in a range of 0 (no click) to 10 (longest available audible sound).

VOLUME: The audible sound level of the Control Knob 'click' heard while rotating. Available range is 0 (off) – 10 (loudest available).

**TONE:** This sets the frequency of the Control Knob audible 'click', and allows the user to make a selection based on personal preference or vehicle cabin noise.

**SPD CNT VOL:** This allows the switch volume to increase as you drive faster. The OFF, LOW, MID, and HIGH settings change how much the volume increases at a given speed.

**BACK:** Exit SWITCH and return to MAIN-SYSTEM menu

### **UPDATE (Themes, Operational SW, Start Image)**

The MAIN-SYSTEM-UPDATE sub-menu is used to update the GRAFIX system while it remains installed in the vehicle. Update files can include newly released operational software or updated theme information downloaded or received from Dakota Digital. A user defined 'custom' start image can also be downloaded and used in place of the default 'GRAFIX' image that is seen when the GRAFIX system is powered on.

**Note: If a thumb drive is not detected in the UPDATE port on the Control Box, the MAIN-SYSTEM-UPDATE menu item will be grayed out and will be inaccessible by the user. Also as mentioned previously, the term DISP# referenced here and on the GRAFIX Instrument Cluster, refers to a specific TFT in the GRAFIX system configuration.**

- With the key in either the On or OFF position, insert the thumb drive with the required GRAFIX files in to the **UPDATE** port on the Control Box
- With the key in the ON position and the GRAFIX system in Normal Operation, tap the knob
- The MAIN MENU will be displayed, rotate knob to **SYSTEM**, tap to select
- The sub-menu list: LAYOUTS, DISPLAY, INFO, SWITCH, UPDATE, and BACK will be displayed in menu box. When the thumb drive is detected, notice that the MAIN-SYSTEM-UPDATE sub-menu item is not 'grayed out', and is user selectable
- Rotate the Control Knob to **UPDATE**, tap to select
- The sub-menu list will be displayed: AUTO UPD, THEME LOAD, START IMAGE, MANUAL UPD, BOOT TEST, and BACK. Rotate the knob to the desired operation, tap to select

**Note: If a thumb drive is detected, but no GRAFIX update files are found, the 'NO UPDATE FILES FOUND' message will be displayed.**

**AUTO UPD (Auto Update):** This selection is used to check if newer GRFX files are on the installed thumb drive. By selecting **AUTO UPD**, if files found on the GRAFIX system are older than the files found on the thumb drive, then the TFT modules (DISP1, DISP2, etc.) with these deviations will be listed. The user can rotate the Control Knob to a specific DISP# module in the list and then 'tap' the knob to update that DISP module. Notice that as the user rotates through the DISPs in the update list, the corresponding TFT display on the GRAFIX Instrument Cluster will be highlighted. Depending on the selected module and the file size, this update can take a few minutes. When the DISP update has completed, the GRAFIX will reboot, and the updated DISP will no longer be highlighted or selectable in the AUTO UPD list. The user can then proceed to the next DISP until all are updated with the newer files found on the thumb drive.

**THEME LOAD:** Selecting **THEME LOAD** will bring up a list of themes that were found on the thumb drive. After selecting a theme from this thumb drive list, a list of the 4 themes stored on the GRAFIX will be displayed, numbered 1-4. The user can then select which GRAFIX theme to replace with the file selected from the thumb drive. When the theme to replace is selected, the system will update all the DISPs with that theme.

**Note: Loading a full theme can take several minutes to complete. Be patient, and keep the system powered up until it is finished.**

**Note: When a theme is updated, any stored LAYOUT on the GRAFIX using that theme #, will now display the new theme when that layout is selected.**

**START IMAGE:** By default from the factory, most GRAFIX systems bootup displaying the “DAKOTA DIGITAL” and then the “GRAFIX” graphical logos. The “GRAPHIX” logo can be replaced with a user’s image of choice to give the installed GRAPHIX system that ‘custom’ look. The selected option will be preceded with ‘\*’. By selecting **START IMAGE**, the following list of items will be displayed:

- **DEFAULT:** Factory installed “GRAPHIX” logo
- **CUSTOM:** When selected, the image(s) loaded using the “LOAD” option below will be displayed at power on
- **LOAD:** Some GRAPHIX systems are configured to display ‘images’ on more than one display. Selecting LOAD builds a list of those available/configured displays, and the user can then select which display the custom image from the thumb drive will be loaded to.

**Note: The custom start images must be in a format specific to GRAFIX. Standard image file formats will not work. In order to format your image to the GRAFIX format, a utility is provided on the Dakota Digital website to convert your image.**

**MANUAL UPD (Manual Update):** Unlike the AUTO UPD above, this MANUAL UPD allows the user to specifically choose which files to update on a selected DISPx. This selection can include the ‘Operation software’ or any one of the 4 themes mentioned above.

**BOOT TEST:** This is a diagnostic selection that contains information that may be requested if factory support is needed.

**Note: Pressing BOOT TEST will require cycling power off and then back on to return to Normal Operation.**

**BACK:** Exit UPDATE and return to MAIN-SYSTEM menu

**BACK** (exit SYSTEM and return to MAIN MENU)

## SETUP

**Note: In order to reduce the risk of accidents or injury, with the exception of the ‘SPEED’ menu item, access to all other MAIN-SETUP menu features are only allowed when the vehicle is not moving. If a speed signal is detected, all SETUP sub-menu items other than SPEED will be grayed out, making them non-selectable by the user. Also, if a gear position indicator is configured in the vehicle and detected by the Control Box, the gear position must be in either the park or the neutral position. Any other position will also result in the MAIN-SETUP sub-menu items (other than SPEED) to be grayed out and non-selectable.**

- Start with the engine off and the vehicle in park or neutral (if neutral, be sure the wheels are appropriately blocked/secured)
- Turn the key to the accessory or on position
- Tap Control Knob on the Instrument Cluster to bring up the MAIN MENU
  - If there are popup warning boxes in the menu box area, or messages in the Message Areas at this time, multiple taps may be required to get to the MAIN MENU
  - Any warnings encountered (sensor failures, required calibration, etc.), will need to be cleared before the user can proceed through to the SETUP section below.
- Rotate the Control Knob CW until **SETUP** is highlighted, tap the Control Knob to select

- A menu list: BLUETOOTH, CLOCK, SPEED, TACH, VOLT, WATER, OIL, FUEL, BIM, WARN, GFORCE, CAMERA, DEMO MODE, FULL RESET, and BACK will be displayed

**Note: Refer to the Glossary section of this document for a description of terms as needed.**

### **BLUETOOTH (setting up Bluetooth)**

- Turn on ignition
- Tap Control Knob to enter MAIN MENU, rotate knob to highlight **SETUP**, tap to select
- Rotate Control Knob to **BLUETOOTH**, tap to select
- The sub-menu list: DDA-XXXX, OFF, SETUP ONLY, ALWAYS ON, and BACK, will appear in the menu box. Rotate knob to highlight the desired sub-menu item, tap to select  
DDA-XXXX: This is the GRAFIX unique Bluetooth ID, where 'DDA' = Dakota Digital Automotive, and the 'XXXX' digits are the last 4 digits of the GRAFIX Bluetooth device's address. When the Dakota Digital Bluetooth application is opened on a compatible device, selecting this ID will allow pairing and/or connection to the GRAFIX.

**Note: The DDA-XXXX line item can be highlighted and selected, but a tap will function as a BACK, and return user to the MAIN-SETUP sub-menu.**

OFF: Having 'OFF' selected will not allow the GRAFIX to be recognized or connected to by an external device via the Dakota Digital app.

SETUP ONLY: Allows Bluetooth connection only when the GRAFIX is in MAIN-SETUP

ALWAYS ON: Allows remote connection to the GRAFIX system at all times

BACK: Exit the Bluetooth setup sub-menu

### **CLOCK (setting clock)**

- Turn on ignition

**Note: Clock visibility and location depends on GRAFIX system configuration and layout**

- Tap Control Knob to enter MAIN MENU, rotate knob to highlight **SETUP**, tap to select
- Rotate Control Knob to **CLOCK**, tap to display current time and the clock sub-menu list: MANUAL, GPS, and BACK
  - With MANUAL highlighted, tap knob to enter **CLOCK** setup
    - The 'HOUR' will be flashing and a 1-12 list will be displayed with current hour highlighted and an "\*" . Scroll to the desired hour, tap to select
    - 'MINUTE' position will be flashing and a 0-59 list will be displayed with current minute highlighted and an "\*" . Scroll to desired minute, tap to select minute value
    - Display will return to the SETUP menu
  - If A GPS signal is detected and locked onto, GPS clock feature will be selectable.
    - From MAIN-SETUP-CLOCK menu, rotate Control Knob to **GPS**, tap to select
    - The 'HOUR' will be flashing and a 1-12 list will be displayed with current hour highlighted and an "\*" . Scroll to the desired hour, tap to select.
    - Time will now be displayed and updated as detected from the satellite signal and minutes will be automatically updated.

### **SPEED (Speedometer setup and calibration)**

There are three main methods for calibrating the speedometer: Cal to GPS, Auto Cal, and Adjust mode. Cal to GPS requires a detected and locked onto satellite signal. Auto Cal requires that you have one measured mile or kilometer marked out. Adjust mode requires you to follow another vehicle going at a set speed, use a handheld GPS with speedometer function, or time yourself over a mile to determine your speed. If you are using a BIM-01-x to provide the speedometer reading, neither the CAL to GPS or AUTO CAL options will be available.

**Note: If no GPS signal is available, Dakota Digital recommends you start with the Auto Cal method to get the speedometer close. If you find it's reading too fast/slow after the Auto Cal, then attempt the Adjust mode.**

- Turn on ignition
- Tap Control Knob to enter MAIN MENU, rotate knob to highlight **SETUP**, tap to select
- Rotate Control Knob to **SPEED**, tap to select
- A sub-menu list will appear: CAL TO GPS, AUTO CAL, ADJUST, SERVICE, UNIT, INPUT, OUTPUT, and BACK. Rotate the knob to the desired sub-menu, tap to select

### CAL TO GPS

**Note: A GPS signal must be detected in order to use this mode.**

You must be driving at least 30 MPH (50 km/h) to use the CAL TO GPS. Selecting this will attempt to calibrate the speed input to the reading from the internal GPS module. Make sure you are driving at a steady speed before selecting CAL TO GPS.

### AUTO CAL (Auto Calibration mode)

**Note: This option will be grayed out if SPEED-INPUT-BIM or SPEED-INPUT-GPS are selected in the MAIN-SETUP-INPUT as described below.**

AUTO CAL is used to calibrate the speed signal by driving a measured mile or kilometer. Start this procedure with the vehicle stopped at the beginning of a known measured mile or kilometer, then with the engine running, enter the MAIN-SETUP sub-menu list and rotate the Control Knob to AUTO CAL and tap the knob to select. Next "TAP TO SELECT" will be displayed in the menu box. By tapping the knob, either "DRIVE 1 MI" or "DRIVE 1 km" will be displayed with "0" below it. Start to drive the predefined/measured mile or kilometer.

The number will count pulses from the speed sensor as you drive. This number should stay at "0" until you start driving. If this number is increasing while stopped, you may have something wired wrong or are picking up interference and need to check connections and wire routing before continuing or you will have incorrect readings later. If the number stays at zero while you are driving then the speed sensor is not providing a reading and the wiring and mechanical connection will need to be checked.

Begin driving the measured mile/kilometer. The reading should start to increase as you travel, indicating the pulses received from the speed sensor or VSS. This is known as the pulses per mile (PPM). The acceptable range for this is about 2,000 – 250,000.

Once you reach the end of the marked mile/kilometer, or are passing the marker, tap the knob to finish and save the new calibration

**NOTES: You do not have to drive at a constant speed nor do you have to avoid stopping during Auto Cal. When completed, you do not need to stop, you may, but you can also just tap either switch as you pass the 1 mile mark.**

**The message display cannot be used to determine when the mile/kilometer has been driven, it's only there as a reference to indicate pulses are coming into the Control Box. Even if you have an 8,000 PPM sensor you may calibrate at 9xxx PPM (for example) due to gearing and tire size.**

**Also be aware that the odometer reading is calculated from the speedometer cal value; if it is not calibrated properly, the odometer reading could be higher/lower than actual.**

**\*\*\*If you do not receive more than 2,000 pulses during calibration the unit will error out and display "TOO LOW" and not update the speed calibration.**

### ADJUST (Adjust mode)

Adjust mode is slightly different depending on what your input signal is selected to in the SPEED-INPUT-SIGNAL menu.

If “SENSOR” is selected for the signal input type, it will allow you to adjust the signal that is being supplied to the SPEED INPUT - SIG terminal coming from a pulse generator or ECU. The fuel, volt, oil, water, and tach will operate normally during this calibration process. Depending on the configuration of the GRFX’s Instrument Cluster’s gauge(s), the speedometer needle and/or the TFT will display a digital speed reading. Begin driving at a known speed. Rotate the Control Knob CW (clockwise) one ‘click’ to go up by 1 MPH or rotate CCW (counter clockwise) to go down by 1 MPH. The new calibration will be saved when there is no Control knob activity for eight seconds. You can exit the ADJUST mode by turning the ignition key off.

If “BIM” is selected for the signal input type, the speed signal should be coming into the BIM I/O port through the use of a **BIM-01-x**. The adjustment ratio ranges from 75 – 125% on this setting as it is assumed that the signal from the external device is the correct pulse rate, there are only provisions for slight adjustment. The menu box will show the current cal ratio. Rotate the Control Knob CW to increase the speedometer, or rotate CCW to decrease it. Tap the Control Knob to save the cal ratio. If set to 100 the signal is uncorrected and whatever the BIM module is reading is displayed on the dash.

**NOTES: For adjust mode you can follow another vehicle, time yourself, or use a GPS as a reference. A chassis dyno is another excellent way to use the Adjust mode. Also be aware that the odometer reading is calculated from the speedometer cal value; if it is not calibrated properly, the odometer reading could be higher/lower than actual.**

**\*\*\*The following MAIN-SETUP-SPEED menu items SERVICE, UNIT, INPUT, and OUTPUT, will be grayed-out and non-selectable if the vehicle is not stopped and the gear indication (if equipped) is not in the park or neutral position.**

#### SERVICE (Service countdown meter)

The service countdown meter allows you to set a mileage value that will decrease as the odometer miles increase. When the value gets to zero, a message “SERVICE DUE” will appear on the TFT message display on power up to remind you that service is due. This can be used for routine maintenance reminders such as oil changes. The mileage that this is reset to can be adjusted from 500 – 7500 miles in 500 mile increments. This is the reading that the SERVICE message will reset to when you tap the knob with it selected. If you wish to disable the service mile feature you will need to go to the DISPLAYS -> GROUP SET menu and replace the SERVICE reading with a different reading. The “SERVICE DUE” reminder will only function if the SERVICE meter is enabled on one of the group display sets.

#### UNIT (Speed unit setup)

This menu is used to set the primary unit for the speedometer and odometer. Select MPH or km/h. These units are used for all speed, distance, and performance readings shown on the TFT. Make sure the correct unit is selected before beginning speed calibration. The unit can be changed at any time without causing problems with the stored odometer reading.

#### INPUT (Speed sensor setup)

This sub-menu is used to set the speed sensor input type. You can use the supplied pulse generator or existing speed sensor for most applications. You can also read the speed signal with the use of a bus interface module (**BIM**). Dakota Digital offers a **BIM-01-x** that will allow

you to read the speed signal from an ECU if you are installing the system in a vehicle equipped with the OBDII port or a drivetrain from a newer vehicle; most 1996 and newer vehicles have this.

**Note: If you are using a Dakota Digital pulse generator or feeding an ECU signal into the SPEED INPUT - SIG terminal, this is considered a SENSOR signal.**

Selecting the GPS input type, the GPS receiver in the Control Box will gather the location data from the satellites detected, and use this to display the vehicle speed. For weather, road and driving conditions where the satellite signal quality may be compromised, the GRFX system has a built-in accelerometer which is constantly being monitored to make any necessary stability corrections.

**Note: A GPS signal must be detected in order to use this INPUT mode.**

The options under this INPUT menu are: SIGNAL, PULLUP, and BACK.

SIGNAL: which has the following sub-menu items:

- SENSOR: speed signal wired into the SPEED INPUT – SIG terminal
- BIM: speed data provided through the BIM connector by a **BIM-01-X**
- GPS: speed data from the GRFX's internal GPS satellite receiver
- BACK: returns to the INPUT selection sub-menu

PULLUP which changes whether the resistive pullup is ON or OFF at the SPEED INPUT – SIG terminal. This should always be left ON unless directed by a technician to turn it OFF for special situations.

BACK exits the INPUT menu and returns to the SPEED menu.

#### OUTPUT (Speed Output)

This option will be grayed out if SPEED-INPUT is set to BIM or GPS.

If a speed signal is needed for an ECM or cruise control, the SPD out terminal on the Control Box can be used. This terminal can supply a 2,000 ppm (2K PPM) or 4,000 ppm (4K PPM) signal that is created from the SIG terminal – speed input signal.

BACK (exit SPEED setup sub-menu)

#### **TACH (Tachometer setup)**

The Control Box can be set to read from 1-16 cylinder ignition signals. It can also be set to read either 12 volt or 5 volt tach signals found on some engine computers. The digital tachometer update rate can be adjusted between slow, mid, and fast. The RPM warning/shift point can be adjusted from 2,200 – 14,800. The digital tachometer will read from 300 – 17,500 RPM.

You can also read the tach signal with the use of a bus interface module (BIM). Dakota Digital offers a BIM-01-X that will allow you to read the tachometer signal from an ECU if you are installing the system in a vehicle equipped with the OBDII port or a drivetrain from a newer vehicle, most 1996 and newer vehicles have this.

- Turn on ignition
- Tap Control Knob to enter MAIN MENU, rotate knob to highlight **SETUP**, tap to select
- Rotate Control Knob to **TACH**, tap to select
- A sub-menu list: INPUT, UPDATE RATE, SHIFT LIGHT, and BACK
- Rotate the knob to the desired sub-menu, tap to select

#### INPUT (Tachometer input setup)

This menu is used to set the tachometer input type. You can connect a wire from the ignition system or ECM or obtain RPM data from a BIM-01-X. Selecting INPUT will bring up the sub-menu: CYLINDER, TYPE, and BACK



**CYLINDER** will allow the RPM signal to be calibrated from 1 – 16 or BIM can be selected if a Dakota Digital BIM-01-X is connected. If the engine is running the tachometer needle will update as the settings are changed.

**TYPE** will select between two different tach-input types. A low voltage tach signal (5V LOW) or a high voltage tach signal (12V HIGH). A low voltage signal is usually one that would be obtained from the ECM. Low voltage may also be considered a 0-5V square wave. If you are getting the tach signal from the ignition coil or points, set this for the high voltage signal “12V HIGH”. To obtain a tach signal from a traditional ignition coil, connect a signal wire to the negative side of the coil.

**BACK** exits the INPUT menu and returns to the TACH menu.

***NOTE: When selecting the cylinder count, be aware of tach signals coming from ECMs, some V-8 engine computers may actually output a 4 cylinder tach signal. This would require the CYLINDER selection to be set for “4” not “8” as you might expect.***

#### UPDATE RATE (Display update setup)

The display update rate can be adjusted so the reading on the digital tachometer doesn't change so quickly. This is a personal preference and is just used to stabilize the reading by averaging. The value can be changed from SLOW, MID, or FAST.

#### SHIFT LIGHT (RPM warning setup)

This RPM set point is used for the turn-on point for the TACH output terminal on the Control Box as well as the trigger for the configured GRAFIX Warning Systems. When the RPM reading is above this setting, the TACH output terminal on the Control Box will activate, providing a ground signal. This low level signal can be used to turn on a shift light or other RPM based devices. The value is adjustable from 2,000 RPM – 15,000 RPM in 250 RPM increments. Other configured GRAFIX warning mechanisms will also be triggered.

BACK (exit TACH setup sub-menu)

#### ***VOLT (Voltmeter warning setup)***

The volt setup allows the user to set warnings point that will trigger the configured GRAFIX Warning Systems if violated. Whenever the voltage reading is above or below the warning values, and the engine is running, the warnings will occur. The low voltage point can be set from 10 -13.1 volts. The high voltage point can be set from 16.5 – 20.0 volts. If the engine is not running, the warning indicator will come on below 10 volts.

- Turn on ignition
- Tap Control Knob to enter MAIN MENU
- Rotate knob to highlight **SETUP**, tap to select
- Rotate knob to **VOLT**, tap to select
- A sub-menu list will appear: WARN LO, WARN HI, and BACK
- Rotate the knob to the desired sub-menu item, tap to select
  - WARN LO: Select low voltage warning point (10-13.1 volts)
  - WARN HI: Select high voltage warning point (16.5 – 20.0 volts)
  - BACK: exit voltmeter and return to MAIN-SETUP sub-menu

#### ***WATER (Water temperature setup)***

The water temperature setup parameters allow you to select the water temp input source, the units the temperature is displayed in (Fahrenheit or Celsius), and the high temp warning point.

- Turn on ignition

- Tap Control Knob to enter MAIN MENU
- Rotate knob to highlight **SETUP**, tap to select
- Rotate knob to **WATER**, tap to select
- A sub-menu list will appear: INPUT, UNIT, WARNING, and BACK
- Rotate the knob to the desired sub-menu item, tap to select
  - INPUT: This allows selection between:
    - SENSOR: This is selected to set the supplied sensor as the temperature reading source. Dakota Digital only offers one temp sensor, the **SEN-04-5** which is capable of reading 100-300 F (40-150 C). It has 1/8" NPT threads, and bushings can be used to adapt the sensor to various locations. The following sub-menu choices are also available:
      - DD: Will present the temperature from the SEN-04-5 as measured
      - DD CUSTOM: Allows the user to set an offset that will be added to the measured temperature. This offset range is -20 to +20 F (-11 to +11 C).
    - BIM: Temperature can also be read with the use of a bus interface module (BIM). The Dakota Digital BIM-01-X will allow you to read the engine temp signal from an ECU if you are installing the GRAFIX system in a vehicle equipped with the OBDII port or a drivetrain from a newer vehicle. Most 1996 and newer vehicles have this OBDII port.
  - UNIT: Choice of temp readings to be measured in Fahrenheit or Celsius. This selection will be used for all temperature readings on the GRAFIX system.
  - WARNING: This allows the selection of the high temperature warning point. When the temperature reading's value is higher than this point, this will trigger the configured GRAFIX Warning Systems. The warning value is adjustable from 150 – 300 F (65-148 C).
  - BACK: Exit water setup and return to MAIN-SETUP sub-menu

### ***OIL (Oil pressure setup)***

The standard Dakota Digital oil pressure sensor for this system is the **SEN-03-10**, 0-150 psi solid state sensor with 1/8" NPT threads. A 0-300 psi sensor (SEN-03-9) for higher pressure applications, and a 0-100 psi sensor (SEN-03-8) are also supported. If "BIM" is selected for the input type, the oil pressure reading should be coming into the BIM I/O port through the use of a BIM module. The oil pressure setup allows you set up a low pressure warning point to trigger the configured GRAFIX Warning Systems when the engine is running.

- Turn on ignition
- Tap Control Knob to enter MAIN MENU
- Rotate knob to highlight **SETUP**, tap to select
- Rotate knob to **OIL**, tap to select
- A sub-menu list will appear: INPUT, WARNING, and BACK
- Rotate the knob to the desired item, tap to select
  - INPUT: This allows selection of the installed sensor or BIM as oil pressure source
    - SENSOR 100: Selects the supplied SEN-03-8 sensor
    - SENSOR 150: Selects the optional SEN-03-10 sensor
    - SENSOR 300: Selects the optional SEN-03-9 sensor
    - BIM: allows reading of the oil pressure from a BIM module in a compatible vehicle
  - WARNING: This menu will allow you to select the low pressure warning point that will trigger the configured GRAFIX Warning Systems. The value is adjustable from 5–36 psi.
  - BACK: Exit oil setup and return to MAIN-SETUP sub-menu

## **FUEL (Fuel sender setup)**

The Control Box is able to read 10 of the most common fuel level sensors found in American-built vehicles 1955 and newer, as well as many aftermarket sensors. The vast majority of customers will use one of the preset options, but if your fuel gauge won't read correctly with one of the 10 presets, the system can be programmed to "learn" the curve of your particular sensor. If "BIM" is selected for the sensor type, the fuel level should be coming into the BIM I/O port through the use of a BIM module. Additionally, the system can learn how far you typically are able to drive on a tank of fuel and provide a range to empty reading.

- Turn on ignition
- Tap Control Knob to enter MAIN MENU
- Rotate knob to highlight **SETUP**, tap to select
- Rotate knob to **FUEL**, tap to select
- A sub-menu list will appear: INPUT, RANGE, and BACK
- Rotate the knob to the desired item, tap to select
  - INPUT (Sensor setup): This menu is used to select the fuel level sensor type. The table below shows the options and resistance ranges as well as the user programmable option. As the input selection is changed the fuel gauge will update immediately to the new reading.

<b>Sensor type</b>	<b>Menu</b>	<b>Empty R</b>	<b>Full R</b>
User programmed	<b>MANUAL ADJ</b>	User settable	User settable
GM 0-30 ohm (mid 60's-earlier)	<b>GM 0-30</b>	0 ohms	30 ohms
GM 0-90 ohm (mid 60's-late 90's)	<b>GM 0-90</b>	0 ohms	90 ohms
GM 90-0 ohm (63-67 Corvette)	<b>63 VETTE</b>	90 ohms	0 ohms
GM 40-250 ohm (late 90's-later)	<b>GM 40-250</b>	40 ohms	249 ohms
GM 250-40 ohm	<b>GM 250-40</b>	249 ohms	40 ohms
FORD 73-10 ohm (earlier -late 80's)	<b>FORD 73-10</b>	73 ohms	10 ohms
FORD 20-150 ohm (late 80's-later)	<b>FORD 20-150</b>	20 ohms	150 ohms
VDO 10-180 ohm	<b>VDO 10-180</b>	10 ohms	180 ohms
SW/SUN 33-240	<b>SW 240-33</b>	240 ohms	33 ohms
ASIA 112-4 ohm (various imports)	<b>IMPRT 112-4</b>	112 ohms	4 ohms
BIM-01-X ECM provided	<b>BIM</b>		

**Note: If you select MANUAL ADJ, you must program the curve to your specific fuel sensor. If you are selecting the MANUAL ADJ setting follow the steps below to program your sensor's resistance curve. You will need to have the sensor out of the tank, or begin with the tank empty and add fuel during the manual adjust fuel sensor setup.**

**MANUAL ADJ:** Used to manually adjust fuel sensor curve:

**PROGRAM:** The message display will show "BEGIN WITH 0% FUEL" and "XXXΩ", where xxx is the current resistance the Control Box is seeing from the fuel sensor. You should be able to move the float up and down at this point and see the resistance values follow the curve of your sensor.

- Now, with the float in the empty position, tap Control Knob
- The message display will show "33%" and "XXXΩ". Move the float to 1/3 full, tap Control Knob
- The message display will show "66%" and "XXXΩ". Move the float to 2/3 full, tap the Control Knob
- The message display will show "99%" and "XXXΩ". Move the float to the full position, tap Control Knob.

- The new sensor curve is now stored under the “MANUAL ADJ” sensor selection.

BACK: Exit the MANUAL ADJ. menu

**Note: If the resistances recorded during custom calibration are not in sequence you will get a “FAIL” message at the end of calibration. No values will be saved and calibration must be started again. Make sure the resistance of the sensor is linear from empty to full.**

- RANGE (Fuel range setup): This menu is used to reset the range to empty learning routine. Once reset, the system will begin a new learning routine on the next fill-up. The learning routine will not complete until the fuel level has gotten below ¼ tank remaining. The menu options are LEARN RESET or BACK.  
**\*\*\*Speed and Fuel must be properly calibrated for this option to work.**
- BACK: Exit fuel setup and return to MAIN-SETUP sub-menu

**Note: Low FUEL will trigger the GRAFIX Warning Systems. This level is not user configurable, but will be triggered when the fuel level reaches 10% of calibrated ‘full’ remaining.**

### **BIM (Bus Interface Module setup)**

The bus interface modules (BIM) are an add-on product to Dakota Digital instrumentation systems. They allow you to add auxiliary gauge functions, such as compass, outside temperature, fuel pressure, vac/boost, trans temp, etc., right into the system without having to add additional gauges.

These readings can be added into any of the GRAFIX Instrument Cluster layouts through the MAIN-SYSTEM-LAYOUTS-GAUGES menu and setting up the reading in the desired region. The Message Area groups for the BIM can also be setup from the MAIN-SYSTEM-LAYOUTS-MSG GROUPS menu. The setup and warning options for the BIM’s are set from this menu.

- Turn on ignition
- Tap Control Knob to enter MAIN MENU
- Rotate knob to highlight **SETUP**, tap to select
- Rotate knob to **BIM**, tap to select
- A sub-menu list will appear that will include the BIMs attached to the GRAFIX system. If no BIMs are connected, the “NONE FOUND” message will appear.
- Rotate the knob to the desired BIM, tap to select  
 The setup options available will depend on the type of BIM as well as the type of sensor attached to the BIM. Consult the specific BIM manual for detailed setup instructions.

### **WARN (Warning setup)**

As mentioned, when a gauge or input reaches a preset warning point, the GRAFIX Warning System will notify the user in several ways. These warnings include the illumination of an on-gauge indicator, a digital readout turning red, a warning message in the Message Area, and also the following configurable items: an audible tone, a WARN output terminal on the Control Box to drive an external device, or an onboard red flashing warning LED with a popup in the menu box on the Instrument Cluster.

- Turn on ignition
- Tap Control Knob to enter MAIN MENU
- Rotate knob to highlight **SETUP**, tap to select
- Rotate knob to **WARN**, tap to select
- A sub-menu list will appear in the menu box: WARN OUT, WARN AUDIO, WARN LED, and BACK. Rotate the knob to the desired item, tap to select:

WARN OUT: Will display a list of items that allow setting to either ON or OFF. An ON setting means the associated warning violation will trigger the WARN terminal on the Control Box. This terminal can also activate reverse lights when using a GSS-3000 or BIM-01.

**Note: When using this terminal for reverse lights, all other warnings will automatically be set to “OFF”.**

**Note: Regardless of the WARN OUT setting, a reading violation of a preset warning level will illuminate the associated indicator on the Instrument Cluster, and also indicate the violation in the Message Area.**

The available warning violations include: BIM CH 1-16 (where each installed/configured BIM accessory has an assigned channel #. If the BIM detects a violation, the GRAFIX will report the warning), TACH, WATER, OIL, VOLTS, FUEL, EX+, EX-, REVERSE, and BACK.

WARN AUDIO: A list of the parameters associated to the internal audio tone will be displayed: BUZZER SET, BUZZER STYLE, BUZZER VOL, BUZZER TONE, SPD CNT VOL, and BACK. Rotate the Control Knob to the desired item, tap to select

- BUZZER SET: Allows the user enable or disable with an ON/OFF setting - whether the audible tone will be heard for the possible warning violations: BIM CH 1-16 (where each installed/configured BIM accessory has an assigned channel #. If the BIM detects a violation, the GRAFIX will report the warning), TACH, WATER, OIL, VOLTS, FUEL, EX+, and EX-.
- BUZZER STYLE: Is a selection (0-10) of various types of audible pulses, of which the user can select the most pleasing or what is most audible for their installation. With the BUZZER VOL set to something other than 0 (i.e. volume not off), cycle through the settings, tap to select
- BUZZER VOL: Sets the volume in range of 0(off) to 10(max), tap to select
- BUZZER TONE: Is a list of 3 differing tones (TONE 1 – 3). With the BUZZER VOL set to something other than 0 (i.e. volume not off), cycle through the settings, tap to select
- SPD CNT VOL: The buzzer volume can be set to increase as measured speed increases. The available settings are OFF, LOW, MID, HIGH, and BACK. Rotate to the desired setting, tap to select
- BACK: Will exit Warn audio sub-menu

WARN LED: The Warning LED feature is another method of notification to the user that a system reading has violated a preset condition and needs attention. When Warn LED is selected a list of system readings is displayed, and each can be enabled or disabled: BIM CH 1-16 (where each installed/configured BIM accessory has an assigned channel #. If the BIM detects a violation, the GRAFIX will report the warning), TACH, WATER, OIL, VOLTS, FUEL, EX+, and EX-.

If the WARN LED is enabled for a specific system reading and a warning condition(fault) is encountered, a red LED on the Instrument Cluster will flash 3 times and a ‘warning box’ will be displayed in the menu box location. This warning box will indicate what the warning is and give the user the following 2 options.

TAP: ACCEPT – This is acknowledgement that the warning has occurred. With a tap, the warning box will be cleared and the LED immediately turned off, and will not reoccur during this error ‘instance’. With this ‘tap’, the warning will remain in the Message Area. If a MENU is accessed and then exited any time there is an ‘accepted’ warning, the above warning box and flash sequence will repeat.

HOLD: CLEAR - This will clear the warning box, stops the LED flash and ALSO – clears the warning in the Message Area.

If the WARN LED condition is NOT acknowledged with a 'tap' or cleared with a 'hold', the LED will flash 3 times as mentioned, and the box will clear automatically in 10 seconds. In approximately 45 seconds the Warn LED sequence above will repeat – until the driver acknowledges the warning with a 'tap', clears the warning by 'holding' the Control Knob, or the fault condition goes away.

**Note: A single 'tap' will NOT clear the warning in the Message Area, but if the user holds the Control Knob, the message area will be cleared....and a warning box or Warn LED will not reoccur unless the condition goes away and another subsequent fault is detected. This 'hold' to clear is the same operation used for clearing any warning, trip mileage, performance info, etc. in the Message Area.**

**Note: Even if the WARN LED is cleared above but the root cause is not addressed on the system, the 'warning indication' will remain on the respective reading as a warning indicator 'dot' on an analog gauge or as a 'red background' of a digital reading. Of course for these to be viewable, the reading has to be displayed in the current layout.**

BACK: Will exit the WARN sub-menu

### **GFORCE (GFORCE meter setup)**

The GRAFIX system comes standard with a built-in accelerometer. This allows the measuring and graphical display of g-forces exerted on the vehicle. Below is a picture of the G-FORCE gauge. The 'force' indicator is represented by the 'dot' in the center of the crosshairs. This measurement shown is of 'zero force', and was taken with the vehicle parked on a level surface.



**Note: Having the GFORCE gauge displayed on the Instrument Cluster while performing the GFORCE setup will aide in understanding its operation. See MAIN-SYSTEM-LAYOUTS-<LAYOUT x>-GAUGES above if the G-FORCE gauge is not currently displayed.**

- Turn on ignition
- Tap Control Knob to enter MAIN MENU
- Rotate knob to highlight **SETUP**, tap to select
- Rotate knob to **GFORCE**, tap to select
- A sub-menu list will appear in the menu box: LEVEL, FORWARD, and BACK
- Rotate the knob to highlight the desired item, tap to select
  - **LEVEL**: Pressing **LEVEL** will bring up menu: SET LEVEL and BACK
    - SET LEVEL: When the GRAFIX system is firmly installed in the vehicle, and the vehicle is in a level location, pressing this **SET LEVEL** will give the GRAFIX an orientation calibration value for this known X, Y and Z reference in this stopped position. Any reading observed will be referenced to this point.

- BACK: Will exit the LEVEL sub-menu
- FORWARD: With the reference LEVEL set, pressing **FORWARD** will bring up menu: START and BACK
  - START: Pressing **START** brings up the following message:
    - 'ACCELERATE IN A STRAIGHTLINE FORWARD'
 Moving forward, the GRAFIX will detect this 'force motion' for a defined amount of time XXX, and the GRAFIX system will automatically complete the accelerometer setup, and the following message will appear:
    - 'FORWARD SET COMPLETE'
 Tapping the knob will exit the G-FORCE setup.
    - BACK: Will exit the FORWARD sub-menu.
- BACK will exit the G-FORCE setup.

### **CAMERA (Camera trigger setup)**

The GRAFIX system comes standard with a video input port on the rear of the Instrument Cluster. This allows the ability for an external camera (optional) to be plugged in, and the camera's video to be seen on the GRAFIX Instrument Cluster. Typically, the video input port would be used as a backup camera input, but depending on the camera's configuration and capability, it may also be used as a forward camera for front mounting on the vehicle as well.

In order for the GRAFIX system to display the camera's video, the Instrument Cluster must be informed by an external trigger to switch to the camera video input. This can be handled in multiple ways, and are described below in the TRIGGER menu selection.

- Turn on ignition
- Tap Control Knob to enter MAIN MENU
- Rotate knob to highlight **SETUP**, tap to select
- Rotate knob to **CAMERA**, tap to select
- A sub-menu list will appear in the menu box: TRIGGER and BACK
- Rotate the knob to highlight the desired item, tap to select
  - TRIGGER: GEAR-REVERSE, EX+, WAIT, DISABLE, and BACK. Rotate the knob to the desired item, tap to select
    - GEAR-REVERSE: If the vehicle is configured with a Dakota Digital GSS gear position sensor module (optional), the output of the GSS can be used to trigger the GRAFIX to switch to the camera input when the reverse position is detected.
    - EX+: Use this menu selection when connecting the EX+ terminal of the Control Box to the vehicle's backup lights or reverse switch.
    - WAIT: Use this menu selection when connecting the WAIT terminal of the Control Box to the vehicle's backup lights or reverse switch.
    - DISABLE: Selecting DISABLE will not switch the GRAFIX display to the external camera input, regardless of the wiring or GSS gear position detected. (Select this option if a camera is not connected to the system)
    - BACK: Will exit the TRIGGER sub-menu
- BACK: Exit the CAMERA setup

**Note: The GRAFIX system does not come standard with a video camera. The Dakota Digital CAM-1000 or CAM-2000 can be purchased separately, or any +12V camera with an NTSC output, 1vpp with negative sync, 75 ohm impedance can be used. Regardless of the camera used, follow the specific camera's installation guide to properly configure the GRAFIX and to install and align the camera in the vehicle. See Camera Specifications at the end of this document for more details.**

**Note: If the configured camera trigger is 'triggered', but a valid video signal is not detected on the Instrument Cluster camera input port, the GRAFIX display will go to a solid blue raster.**

### **DEMO MODE (Demonstration mode activation)**

An exhibition or 'show' demonstration mode is available on the GRAFIX system. When activated the GRAFIX Instrument Cluster will step through the saved DAY and NIGHT color setups of all 4 stored layouts. As it steps through the DAY and Night colors of each layout, it will also sweep all analog gauges low to high then back, and also increase then decrease the digital readouts simultaneously as required.

- By rotating the Control Knob counter clockwise during the Demo Mode execution, the user can cycle through all 12 default color schemes as the sweep demonstration is occurring. By rotating the knob clockwise, the user can cycle through the saved layouts.
- Tapping the Control Knob at any time will stop the Demo Mode, the menu box will return to MAIN-SETUP sub-menu, and the GRAFIX Instrument Cluster will return to the layout from which the Demo mode was initiated.

### **FULL RESET (Full factory reset)**

If there is ever a situation where the GRAFIX system needs to get back to default factory settings, this Full Reset will do just that. Maybe an engine or drivetrain swap? Maybe the GRAFIX system is removed from one vehicle and installed in another? May the user just doesn't like what they have done when setting it up? For whatever reason – Full Reset will return everything to the default configuration settings that it had as it left the factory.

Knowing that the GRAFIX is a very configurable system with many user settings, and that it can take considerable time to get setup... 'just the right way', doing a factory reset can be quite frustrating if it happens – but wasn't truly intended. This is why when the MAIN-SETUP-FULL RESET is pressed, the user is asked if they want to reset – Yes or No. Then again if Yes is selected, they are asked to confirm the reset – Yes or No. Then and only then, if a Yes is selected, all the layouts, all the colors, Message Areas, warning parameters, etc. – are all returned to factory defaults.

**Note: Selecting NO or BACK in either of the reset confirmation sub-menus will return to the user to MAIN-SETUP menu.**

**Note: Full Reset will not 'zero-out' the odometer miles. See SYSTEM-DISPLAY-SET ODOM above for more details.**

**BACK** (exit SETUP and return to MAIN MENU)



## **Glossary of Terms**

**Arrangement:** A user selectable 'gauge' configuration which the active TFT's display area being configured supports. These arrangements are display/LCD glass and system specific, and can include single or dual readouts, as well single, dual and even quad analog and/or digital 'gauge' configurations.

**Colors:** This sub-menu allows the user to select predefined factory schemes, or to customize graphics and other displayed items to their own preferred color for: graphical accents, labels, readings, scales, pointer/bar-gauge, warning indicators, and rotary control knob center illumination.  
**Note:** *Colors can be defined for both DAY and NIGHT operation, which is controlled by the DIM input terminal on the Control Box.*

**Instrument Cluster:** The physical 'gauge' cluster or 'gauges' that install in the vehicle dash, interfaces to the Control Box, and display the vehicle's information to the user.

**Gauge:** A specific area in the selected 'Arrangement' of the layout that relays a system reading to the user. Types of gauges include digital readings, analog-like meter movements, or even graphical images such as GFORCE, compass heading, and air pressure settings (i.e. Air Ride and Tire Pressure Monitoring System - TPMS).

**Layout:** Is a collection of display and reading parameters in a specific style and dash system configuration. There are 4 factory default layouts, and each layout includes its own user configurable parameters (described below): theme, colors, gauge preference, and message feedback groups. By selecting a layout, that layout can be edited to the user's preference and is then saved for future recall and use.

**Note:** *RESET ALL in the edit MAIN-SYSTEM-LAYOUT menu will reset the current layout to the factory defaults for that layout.*

**Normal Operation:** Is defined as the GRAFIX system not displaying any menu or warning boxes on the Instrument Cluster, and with the Message Center/Message Area line items clearly visible, along with the gauges and readings on the selected layout.

**Reading:** This is the selection of a particular 'function' that is desired to be displayed on the gauge being configured. These selectable readings include the factory included readings (such as speed, tach, oil, volt, water, fuel, etc.) as well as additional readings from any attached and configured BIMs. If an analog meter reading is chosen, the available scales for that reading will also be selectable.

**Region:** A specific location on the Instrument Cluster that the user can select and then edit for a specific 'Arrangement' of the available gauge styles. Gauge selection is then followed by user selectable reading and scale for that that gauge.

**Scale:** Refers to the desired sweep range of an analog meter, combined with the ticks and labels indicated. The scale selected is based on the vehicle install itself as well as the sensor that is providing the reading information.

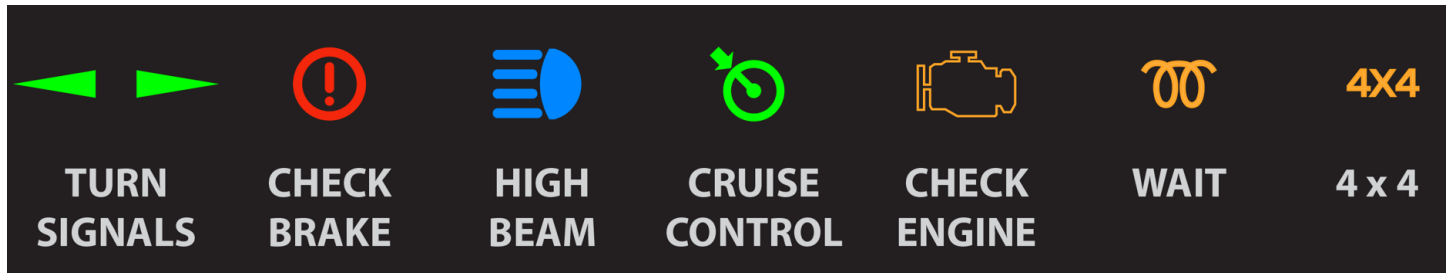
**Note:** *If a digital readout is available for the reading in the selected arrangement, that digital reading can be chosen in the scale selection.*

**Scheme:** One of 12 preset color combinations for the graphical accents, labels, readings, scales, pointer/bar-gauge, warning indicators, and rotary control knob center illumination.

**TFT:** Acronym for Twisted-Film-Transistor, and is a type of LCD (Liquid-Crystal Display) used in the GRAFIX system to display information to the user.

**Theme:** A theme is one of four factory installed graphics packages that present various gauge styles, fonts, and reading presentation options. The theme used in a layout can be changed to any one of the four installed themes. When scrolling to a theme while editing a layout, the highlighted theme will be seen on the cluster display(s), allowing visual ‘preview’ before the theme selection.

## **Indicators**



## **Update Port / Flash Thumb Drive Specifications**

To use the UPDATE port with a customer supplied flash thumb drive, below are some parameters to be aware of for proper operation:

Connector type:	Type A
USB versions supported:	1.x and 2.0
Format:	FAT/FAT16 or FAT32 only
Thumb drive size:	Minimum 1GB

**Note: Using FAT16 limits the size of the volume to 4GB. If the device is larger than 8GB, the drive must be resized to 4GB to use FAT16.**

**Warning: When reformatting a thumb drive to support either FAT/FAT16 or FAT32 format, all data on the drive will be erased. Be sure to save any existing data prior to reformatting.**

## **Optional Camera Specifications**

Video System:	NTSC
TV lines:	480
Output:	1 Vp-p, negative sync
Impedance:	75 ohms
Connector style:	Male RCA (mates with yellow female RCA input on Instrument Cluster)
Voltage:	9-16V (typical)

Water Proof:	IP67-IP68 (recommended)
Operating temp:	-30C – +70C (min)

**Note: In order to use a camera as a backup camera, the video output of the camera must be able to be mirrored. Be sure to follow the camera’s installation and setup guide when configuring, mounting and aligning in the vehicle.**

# **TROUBLESHOOTING GUIDE**

This is a list of some problems and their solutions which may be encountered when installing your instrumentation system. If you cannot determine what the problem is or how to solve it, please call our technical assistance line (605) 332-6513 or email [dakotasupport@dakotadigital.com](mailto:dakotasupport@dakotadigital.com).

## **\* A note on vehicle grounding \***

The most common cause of problems with electric gauges and other sensitive vehicle electronics is poor ground connections. The engine block has the highest ground currents of any point in the vehicle. The ignition system, some electric gauge sensors, starter, alternator, etc. all use the engine block for a ground point. Since the alternator is grounded directly to the engine block, all ground currents in the entire vehicle must pass through the engine block while the engine is running. A weak or loose connection can cause many unexpected problems that may be difficult to track down. The engine block should have heavy ground straps to **both the chassis and the body**. The main **negative cable from the battery should be connected directly to the engine block**.

Symptom	Possible Problem	Solution
System does not turn on and status LED is off.	Control Box may not be getting power.	Check if the Control Box always has 12 volts connected to it's constant power terminal and 12v to IGNITION PWR terminal when the key is on. Do not use a battery charger to power the system.
	Control Box may not be getting a ground. The Control Box may have an internal problem	Check if the Control Box has a proper ground connection. Contact Dakota Digital's service department with a description of the problem.
System does not turn on and LED flashes RED every 4 seconds.	Constant power connected but no ignition signal at IGNITION PWR terminal.	Check connection at IGNITION PWR terminal. There should be 12v when key is on, and 0v when key is off.
System does not turn on and LED is on solid GREEN	The Instrument Cluster may not be getting power.	Check the display cable between the Instrument Cluster and Control Box. Be sure the connectors are plugged in Control Box and display securely. Check the Instrument Cluster wiring harness for broken or cut wires.
System freezes or hangs and LED is on solid GREEN	The display harness is damaged. The Instrument Cluster is not working.	Check the Instrument Cluster wiring harness for broken or cut wires. Contact Dakota Digital's service department with a description of the problem.
The tachometer will not show a reading.	The Control Box is not connected to the engine properly.	Make sure the Control Box is connected to your particular ignition system properly.
	The engine cylinder setting is incorrect.	Refer to the tach setup section of the installation manual.
	The tach signal setting is incorrect.	Refer to the tach setup section of the installation manual.

Symptom	Possible Problem	Solution
The tachometer reading is incorrect.	The tachometer signal wire is loose or broken. The engine cylinder setting is incorrect.	Check the connections at both ends of the wire. Refer to the tach setup section of the installation manual.
The speedometer will not show a reading.	The speed sending unit is not connected to the Control Box properly. The speed sending unit being used is not compatible with the Control Box. The speed sending unit is not connected to the transmission properly. The sending unit wire is picking up noise from nearby wires.	Check that all speed sending unit wires are connected to the Control Box properly. Use the speed sending unit supplied with the instrument system. Check that sender is mounted properly. Check that transmission has the appropriate internal parts. Isolate the sending unit wire from motor and ignition wires.
The speedometer is reading too fast or too slow.	The speedometer is not cal'd.	Refer to the Speed Calibration section of the installation manual.
With the engine running and the vehicle sitting still, speedometer reads higher than zero.	A tachometer or ignition wire is too close to the speed sensor wire. There is a ground problem between the speed sensor and the control box.	Reroute or isolate the tachometer wire away from the speed wire. Make certain the ground wire for the speed sensor is connected directly to the Control Box ground.
A display shows "OPEN" or "FAIL HIGH"	Sending unit for that gauge is not connected to the control box. Sending unit is not properly grounded. On the water or oil, the sending unit is not the correct type. On the fuel, the Control Box may be set for the wrong fuel sensor.	Check the wire from sending unit to the Control Box for breaks or damage. Make sure that the sending unit is wired to the correct terminal. Make sure the sending unit is grounded properly at the Control Box. Use the water and oil sensors that were supplied with the system. Refer to "Fuel Setup" section of the installation manual to ensure that the settings match your fuel sensor.
A display shows "SHORTED" or "FAIL LOW"	The sending unit wire for that gauge is shorted to ground. On the oil, the sensor power wire is broken or not connected.	Repair or replace shorted wire. Make sure the RED wire from the oil pressure sensor is connected to PRESSURE INPUT – PWR.

Symptom	Possible Problem	Solution
The fuel gauge reads backwards, incorrectly, or does not change.	The Control Box may be set for the wrong type of fuel sensor.	Refer to "Fuel Setup" section of the installation manual to ensure that the settings match your fuel sensor.
	The fuel sensor may not be connected to the Control Box properly.	Check the connections at both ends of the fuel sensor wire. Make sure the fuel sensor is grounded properly. Ideally it should be grounded to the Control Box.
	The fuel sensor may not be operating properly. The fuel sensor may have a non-standard resistance range.	Check the fuel sending unit with an electrical multi-meter. Use the manual adj fuel sensor setup. See the Fuel Setup section of the manual for instructions.
The oil or water reading is incorrect.	The engine block may not be grounded to the chassis frame or body properly.	Use heavy ground cables from the battery to the engine block. Make sure both ends of the cable have clean metal-to-metal connections. Use a braided ground strap to ground the engine block to the chassis. Use a large braided ground strap to ground the engine block to the body or firewall.
	The sending units are not grounded at the Control Box.	Make sure wires are in correct terminals.
	The sending unit wire is picking up noise from nearby wires.	Isolate the sending unit wire from engine and ignition wires.
	The sending unit is not compatible with the Control Box	Use the sending unit provided with the instrument system.
	Water temperature sensor has an air pocket in the coolant near it.	Warm the engine up to pressurize the coolant system. Slowly loosen the sensor until coolant begins to seep out. Tighten the sensor up again.
The gear shift indicator does not light up.	The optional gear shift sending unit is not connected to the Control Box.	Connect the sending unit to the Control Box using the instructions supplied with the sending unit.
The gear shift indicator does not operate properly.	The gear shift decoder is not connected properly, or programmed correctly.	Check the connections to the transmission linkage and to the Control Box. Check gear shift decoder installation manual.
The internal turn signal or high beam indicators do not light up.	The Control Box is not connected to the vehicle's electrical system properly.	Check the wires connected to the HIGH, LEFT, and RIGHT terminals on the Control Box.
	The TURN REMIND setup menu is set to OEM.	Refer to "Display Setup" "TURN REMIND" section of the installation manual.

Symptom	Possible Problem	Solution
The check engine indicator does not operate properly.	The Control Box ENGINE terminal is not connected to an EFI control module.	This feature is designed to work with engine control systems that provide an active low signal.
The check engine indicator stays on all of the time.	The Engine Control Module (ECM) needs to see the load of a light connected to it.	Connect a light or similar load to the ECM along with the Control Box.
The clock doesn't keep time.	Constant power terminal is losing power.	Ensure constant power terminal has 12v even when key is off.
Display is too dark.	Brightness needs to be adjusted.	See manual for brightness adjusting instructions.
Back up camera not displaying video	Trigger not configured Camera not plugged in	Check setting in SETUP-CAMERA-TRIGGER Check wiring to Control Box Confirm trigger signal is valid
Display is blue when in reverse	Camera is not powered on or video is not at Instrument CLUSTER	Check power at camera when in reverse Make sure RCA connector is plugged in to the rear of the Instrument Cluster
Using GPS, speed reads 0	No GPS data received No satellites detected	GPS receiver may still be trying to acquire satellite, this may take 5-15 min, Metal structure may be blocking signals, so move vehicle outside, away from possible interference objects
'NO DATA' message	BIM providing information is not connected BIM is non setup properly Faulty BIM	Check wiring and BIM connection Refer to BIM manual for correct setup Replace BIM
'NOT SUPPORTED' message	READING or GAUGE selection not allowed for the ARRANGEMENT	Change the ARRANGEMENT to one that will support the desired READING or GAUGE
'XXX OPEN' message	No connection to selected sensor at control box Broken or cut wire	Check connection for loose or no contact Fix wire or replace sensor
'XXX SHORTED' message	Sensor wiring to control box terminals Pinched wire from sensor	Check connection for short Fix wire or replace sensor

<b>GRAFIX Series Specifications</b>		
SUPPLY		
Voltage Range (BAT)	8 to 23 V	
Ignition	> 8 V	
INPUTS (with 12V power)		
Active High		
	Low Max	Min High
High, Left, Right, Gear, Wait, DIM, EX+	4 V	8 V
Active Low		
	Low Max	Min High
SW:L,SW:R, Check, Brake, Cruise, 4x4, EX-	8 V	9 V
Tachometer		
Setting	Low Max	High Min
Normal	3 V	7.5 V
Low-Volt	1 V	4 V
Speedometer		
Square Wave	Sin Wave	
> 1.2 V <sub>P-P</sub>	> 1.4 V <sub>P-P</sub>	
OUTPUT		
WARN, SPD	< 600 mA	
Current Draw		
IGN Off	≈ 0.3 mA	
IGN On	≈ 500 - 2000 mA	

## **SERVICE AND REPAIR**

DAKOTA DIGITAL offers complete service and repair of its product line. In addition, technical support is available to help you work through any questions or problems you may be having installing one of our products. Please read through the Troubleshooting Guide. There, you will find the solution to most problems.

For additional support, please visit [www.dakotadigital.com](http://www.dakotadigital.com). A “**Product Support**” link will be found at the bottom of the home page.

**Should you ever need to send the unit back for repairs, please call our technical support line, (605) 332-6513, to request a Return Merchandise Authorization number.**

- Package the product in a good quality box along with plenty of packing material.
- Ship the product by a common carrier with tracking abilities.
- Be sure to include the RMA number on the package.
- Include a complete description of the problem, with RMA number, your full name and address (street address preferred), and a telephone number where you can be reached during the day.
- Any returns for warranty work must include a copy of the dated sales receipt from your place of purchase.
- Send no money. We will contact you for payment.

### **Dakota Digital Limited Lifetime Warranty**

DAKOTA DIGITAL warrants to the ORIGINAL PURCHASER of this product that should it, under normal use and condition, be proven defective in material or workmanship for the lifetime of the original vehicle it was installed in, such defect(s) will be repaired or replaced at Dakota Digital’s option.

This warranty does not cover nor extend to damage to the vehicle’s systems, and does not cover diagnosis, removal or reinstallation of the product. This Warranty does not apply to any product or part thereof which in the opinion of the Company has been damaged through alteration, improper installation, mishandling, misuse, neglect, or accident. Dakota Digital assumes no responsibility for loss of time, vehicle use, owner inconvenience nor related expenses.

Dakota Digital will cover the return standard freight once the product has been evaluated for warranty consideration, however the incoming transportation is to be covered by the owner.

This Warranty is in lieu of all other expressed warranties or liabilities. Any implied warranties, including any implied warranty of merchantability, shall be limited to the duration of this written warranty. No person or representative is authorized to assume, for Dakota Digital, any liability other than expressed herein in connection with the sale of this product.

**⚠ WARNING:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)



4510 W. 61st St. North  
Sioux Falls, SD 57107  
[www.dakotadigital.com](http://www.dakotadigital.com)  
[dakotasupport@dakotadigital.com](mailto:dakotasupport@dakotadigital.com)

Phone (605) 332-6513  
Fax (605) 339-4106

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