



RTX

Retrotech Analog / Digital Instrument System

INSTALLATION AND START MANUAL

Vänligen läs detta innan du påbörjar installation eller kabeldragning

VIKTIG NOTERING! Det här systemet har ett förinställt alternativ för hastighetsmätare som endast är tillgängligt för de första 100 milen. Se avsnittet om förinställning av vägmätaren (sid 28) för instruktioner och inställningsinformation.



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Tack för att du köpte ett RTX-system från DAKOTA DIGITAL.

RTX-systemet, som representerar den senaste elektroniska instrument-tekniken för både entusiaster, bilar och lastbilar, kombinerar modern digital elektronik med ett traditionellt utseende för att ge föraren uppdaterad och korrekt information om driften av hans eller hennes fordon.

Fullt upplysta färgnålar, bakgrundsbelysta färgytor och mycket synliga TFT-meddelandecentraler i färg är några funktioner som gör att RTX-sortimentet sticker ut från andra eftermarknadsinstrument. RTX-systemet har utmärkt sikt under dagtid och under datorkontroll, fullt bakgrundsbelyst och dimbar för nattkörning. Övervakar solid state-sensorer med mikroprocessorteknik och kör precisionsstegmotorer, RTX-instrumentbrädan ger föraren oöverträffad noggrannhet.

Användaranpassningsbar displayfeedback och ytterligare funktioner som vanligtvis inte finns på något annat märke eller typ av instrumentering är standard i RTX-systemet. Digital noggrannhet och solid state-tillförlitlighet kommer att ge dig, föraren, kvalitetsservice för mil på vägen som inkluderar en begränsad livstidsgaranti på en produkt som är konstruerad och tillverkad i USA!

RTX INSTRUMENT SYSTEM FEATURES

- Var och en av de analoga mätarna kan visas här samt ytterligare funktioner listade nedan.

Kilometeravläsningar

- Miljonmiljonsmätare
- Två (A/B) återställbar trippsträcka (0-9999,9)
- Återställbar servicesträcka (0-9999 nedräkning)
- Räckvidd (bränsle) till tom tank

Prestandaavläsningar

- Höghastighetsåterkallning. Detta kan återställas manuellt under normal drift.
- Högt varvtal återkallas. Detta kan återställas manuellt under normal drift.
- 0-60 MPH (0-100 km/h) tid. Detta kan återställas manuellt under normal drift.
- ¼ mils tid och sluthastighet (fällhastighet). Detta kan återställas manuellt under normal drift.
- 1/8 mils tid och sluthastighet (fällhastighet). Detta kan återställas manuellt under normal drift.

Timmätare

- Återställbara timmar (0-999.9)

Engelsk/metrisk konvertering

- Alternativ hastighet och temperatur kan visas i TFT-display.

Inbyggda indikeringslampor

- Varningsindikatorer inbyggda i mätarna för bränsle, volt, vatten, olja och varvtal.
- Vänster/höger Blinkers
- Helljusindikator
- Kontrollera motorn
- Bromsvarningsindikator
- 4x4-indikator (konfigurerbar med anpassad etikett)
- Vänta tills start-indikator (konfigurerbar med anpassad etikett)
- Farthållarindikator
- Växellägesindikator med användning av Dakota Digital GSS universell växlingssats (köps separat)
- Två extra indikatoringångar med programmerbara etiketter.

Särskilda utgångar

- RPM shift-utgång för att aktivera externt ljus
- Valbar 2000ppm eller 4000ppm hastighetsutgång för kryssning eller ECM
- Bufferad varvräknarutgång för farthållare
- Varningsutgång som kan programmeras att aktiveras när en eller flera av mätarna är utanför räckvidd. Denna utgång kan även användas för att aktivera backljus vid användning av en GSS-3000 eller BIM-01.

Demo Mode

- Tillgänglig från inställningsmenyn kommer detta att starta systemet att gå igenom en förinställd sekvens av avläsningar. Stäng av nyckeln för att lämna demoläget. Du kan också koppla upp en separat strömbrytare för att driva mätarna för demoläge utan att strömförsörja hela fordonet.

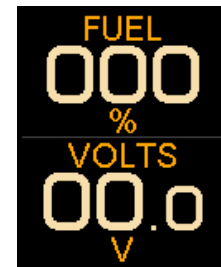
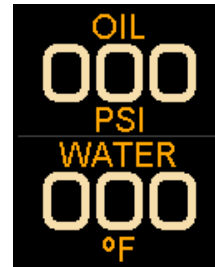
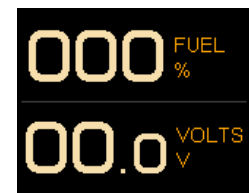
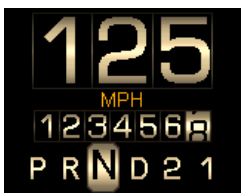
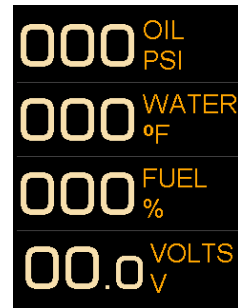
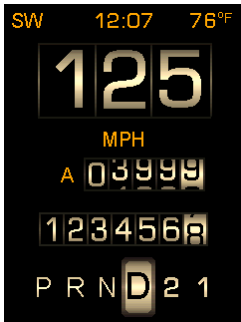
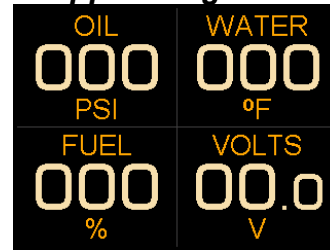
Hjälp-mätaravläsningar i TFT-meddelandedisplayer med expansionsbussgränssnittsmoduler (BIM)

VANLIGA RTX TFT VISNINGSLÄGEN

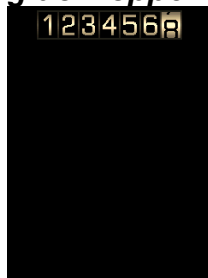
Hemskärm



Gruppvisning



Visning dörr öppen



Indikeringar:

LEFT TURN	CHECK ENGINE	HIGH BEAM	CRUISE ENGAGED	PARKING BRAKE	RIGHT TURN
GREEN	RED	BLUE	GREEN	RED	GREEN

VARNING

Dessa är precisionsinstrument och måste hanteras med försiktighet. Ta inte isär mätare

SKÖTSEL OCH RENGÖRING

Öppna aldrig systemet eller försök att ta bort nålarna eftersom kalibreringen av instrumentsystemet kan kastas av. Alla system är kalibrerade och testade innan de lämnar Dakota Digital.

Den genomskinliga linsen på framsidan av RTX-systemet kan rengöras med en mild tvål och vattenlösning eller vanliga glasrengöringsmedel. Använd en mjuk trasa som en mikrofiber för att torka rent linsen.

MONTERINGSSYSTEM

De flesta RTX-system och -satser kommer med ett separat instruktionsblad med monteringsdetaljer. Följ det här bladet för montering av själva instrumentgruppen i instrumentbrädan, och hänvisa sedan till denna manual för ledningsdragning och driftsinstruktioner.

MONTERING AV KONTROLLBOX

När instrumentklustret är på plats, montera kontrollboxen inom räckhåll för den medföljande bildskärmskabeln (ungefär tre (3) fot). Välj en monteringsplats som ger dig tillgång till alla ingångar på vardera sidan av kontrollboxen. Dubbelhäftande tejp, kardborrefästen eller skruvar i de två flikarna på höljet fungerar bra för att säkra kontrollboxen under instrumentbrädan.

När du väljer en monteringsplats, undvik att placera kontrollmodulen bredvid eller precis mittemot brandväggen från tändkomponenter, dvs: Tändspole, HEI, etc. Tändkomponenter kan avge enorma mängder elektriskt brus, vilket påverkar funktionen av elektriska komponenter som kan orsaka oregelbunden drift. Undvik att montera kontrollboxen där den kan bli blöt.

MONTERING AV BUZZER

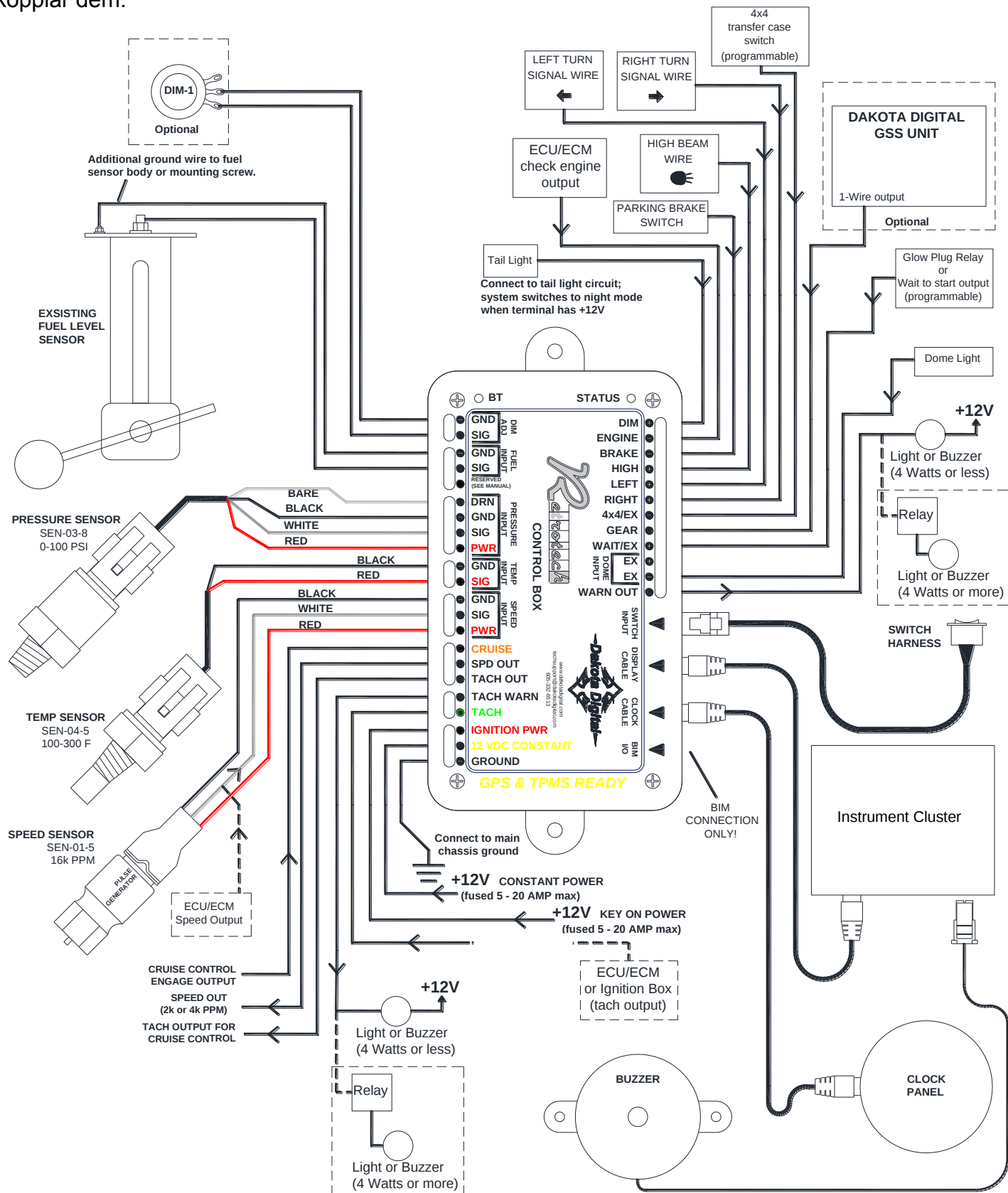
Summern ansluts till baksidan av instrumentgruppen och har en tre (3) fots kabel. Summern ska monteras under instrumentbrädan. Den kan monteras nära kontrollboxen eller på annan plats som inte hindrar ljudet. Dubbelhäftande tejp, kardborrefästen eller skruvar kan användas för att fästa summern. Undvik att montera summern där den kan bli blöt.

MONTERING AV SWITCH

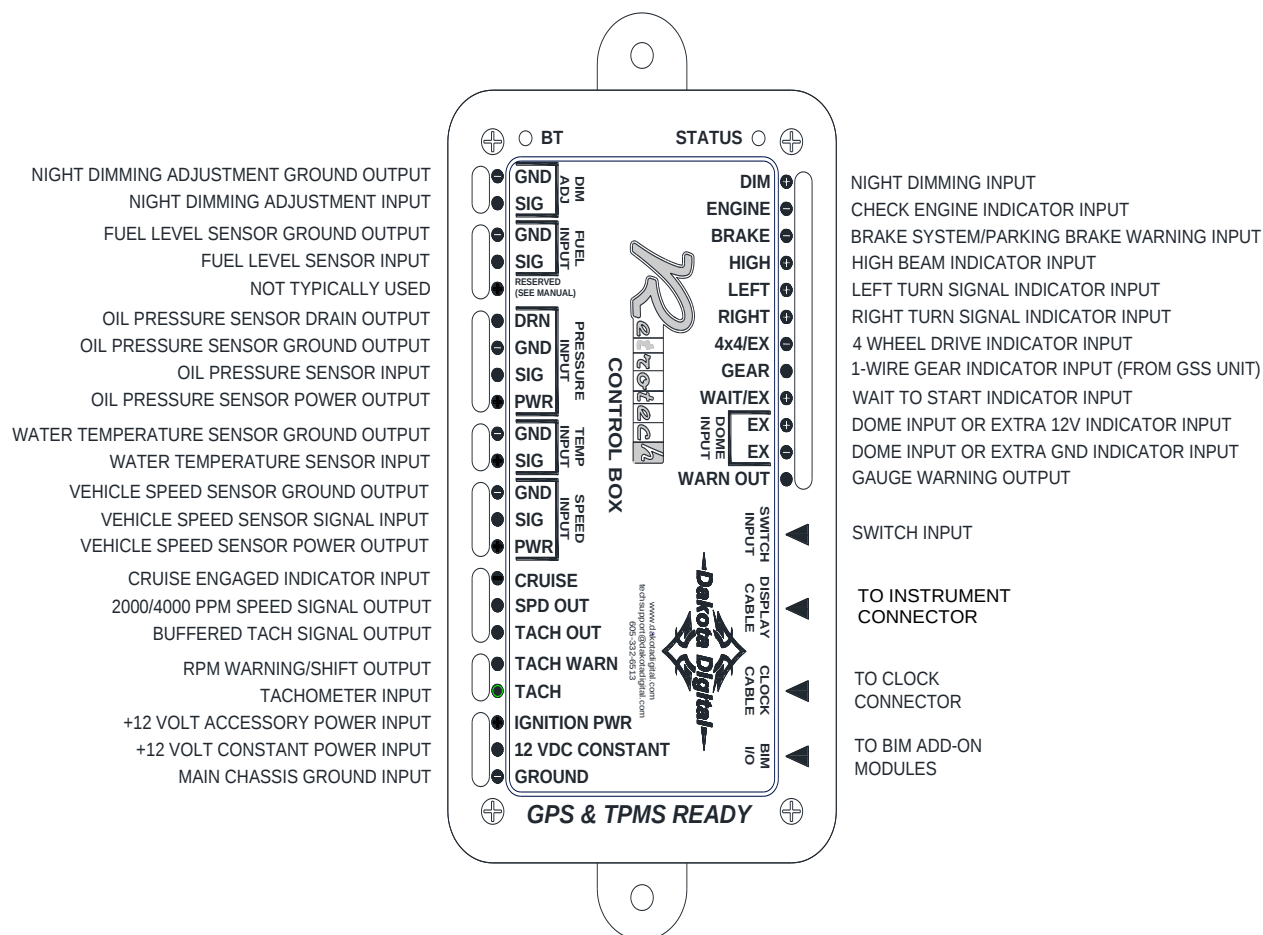
Omkopplaren ansluts till sidan av kontrollboxen bredvid displaykabeln. En monteringsplatta medföljer för att göra omkopplaren lättare att montera under din instrumentpanel eller så kan omkopplaren monteras i ett 13/16" hål. Omkopplaren används för att ändra displayval, återställa avläsningar och ställa in de olika systemparametrarna.

WIRING

Även om kontrollboxen innehåller många anslutningar är ledningsdragningen enkel. Beroende på hur många hjälpfunktioner du vill ska visas, kommer inte alla terminaler att användas i de flesta applikationer. På sidorna som följer beskriver vi funktionen för varje terminal, vad de gör och hur man kopplar dem.



TERMINAL DESCRIPTIONS



STATUS LED

Denna lysdiod är placerad i hörnet av kontrollboxen, nära DIM-terminalen. Lysdioden används för diagnostik och för en snabb visuell kontroll om ström är närvarande.

- En fast grön blinkning indikerar att systemet är påslaget och fungerar normalt.
- En omväxlande röd och gul blinkning indikerar att systemet är i inställningsläge.
- En fast röd lampa indikerar att systemet är i DEMO-läge.
- En kort röd blinkning en gång var fjärde sekund indikerar att 12 VDC CONSTANT-uttaget är strömsatt och systemet är i standby-läge.
- En gul-röd-grön blinkning indikerar att inget instrumentkluster har upptäckts.
- Att inte blinka eller lysa indikerar strömbavbrott eller jord.

BT LED

Denna lysdiod är placerad i hörnet av kontrollboxen, nära sensoranslutningarna. Lysdioden används för att kontrollera Bluetooth-modulens status.

- En blå blinkning indikerar att modulen är i standby-läge och väntar på att ansluta till en enhet.
- Två blå blinkningar indikerar att modulen för närvarande är ansluten till en enhet.
- Inget ljus indikerar att Bluetooth-modulen är avstängd.

KLOCKANS KABELANSLUTNING

Det är en 6-polig kabel som ansluts från systemklockan till kontrollboxen.

DISPLAY KABELANSLUTNING

Det är här den 8-poliga kabeln från instrumenthuset ansluts till kontrollboxen.

JORD (-)

*** Anslut aldrig någon strömterminal till en batteriladdare ensam. Systemet måste ha ett 12 volts batteri anslutet till det. Batteriladdare har en oreglerad spänningsutgång som gör att systemet inte fungerar korrekt och kan orsaka skada på kontrollboxen. **Om motorblocket eller kontrollboxen inte jordas korrekt kan det orsaka felaktig eller oregelbunden drift.**

12 VDC KONSTANT (+)

Anslut 12 VDC CONSTANT-uttaget till en +12V-ström från säkringspanelen som är "het" hela tiden, eller en säkrad ledning (5-20 amp) direkt till batteriström. Denna terminal ska ha ström hela tiden. Den konstanta +12V matningskällan bör vara en säkrad 5 - 20 amp krets, systemet drar mindre än 1 amp, så att dela en befintlig konstant strömkrets kommer i allmänhet att vara bra. Använd 18 AWG-kabel för att säkerställa att systemet får tillräckligt med ström. Denna terminal håller klockminnet och återställer nålarna till noll när systemet stängs av.

TÄNDNINGSTRÖM PWR (+)

Anslut IGNITION PWR-terminalen till tillbehör +12V ström från säkringspanelen eller fordonets ledningsnät. Denna terminal ska ha ström när nyckeln är på eller i "tillbehörsläge". Förutom att slå på instrumentklustret är det också här som voltmätaren känner av fordonets elektriska systemspänning. Tillbehörets +12V matningskälla bör vara en säkrad 5 - 20 amp krets, systemet drar mindre än 1 amp, så att dela en befintlig tillbehörskrets är i allmänhet bra. Använd 18 AWG-kabel för att säkerställa att systemet får tillräckligt med ström.

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TACH - RPM

Anslut TACH-uttaget till tändsystemet.

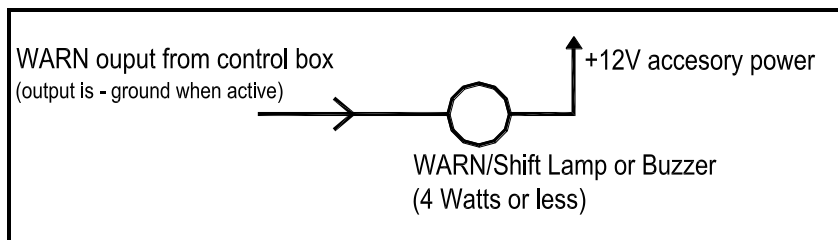
- På fordon som använder en separat tändspole, anslut till spolens negativa sida. Den negativa sidan av spolen kommer att vara tråden som går till punkterna eller elektronisk tändningsmodul.
- För GM HEI-tändningsutrustade motorer, anslut till terminalen märkt "TACH" eller på vissa system, en enda vit tråd med en spadeterminal på.
- På vissa eftermarknadständningssystem, anslut till TACH-utgången.
- På datorstyrda tändsystem, konsultera en servicemanual för kabelns färg och placering.
- Med ett magnetosystem, anslut till dödningskabeln för tach-signalen.
- Om du använder en BIM-01-x-modul för tach-avläsning kommer ingenting att ansluta till denna terminal.

För att säkerställa att tändningssystemet inte stör några andra funktioner på instrumentbrädan, dra inte varvräknarkabeln bredvid någon annan sensor eller ingångskablar. **DANVÄND INTE SOLIDA TÄNDKABLAR MED DESSA SYSTEM.** Tändkablar med fast kärna orsakar en stor mängd elektromagnetiska och radiofrekventa störningar som kan störa systemets funktion. **Anslut inte TACH-uttaget till sekundär- eller högspänningssidan av tändspolen.**

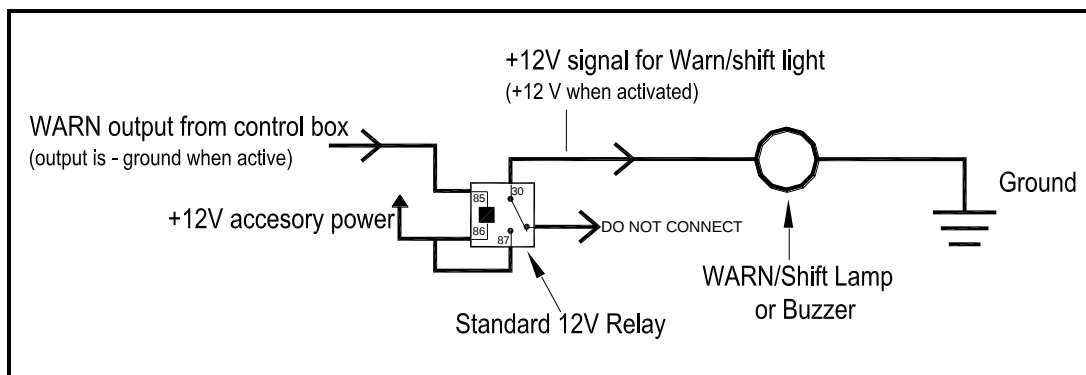
Varvräknaren är kompatibel med nästan alla bensinmotorer. Val av motorcylinder, displayuppdateringshastighet, varvtalssignaltyp och varvtalsvarningspunkt kan justeras i inställningsmenyn under "TACH". Om en dieselmotor används behöver du ett tach-gränssnitt som Dakota Digital's **DSL-1E** eller **DSL-2E**. Var medveten om cylinderinställningen när du använder datorutgångar eller läser tach-signalen från en ECU. Vissa GM LS-baserade motorer kräver att tach-enheten är inställd för en 4-cylindrig lågspänningssignal vid avläsning från ECU:n trots att det är en V8-motor.

TACH WARN

TACH WARN-terminalen är en utgång för att aktivera en diod eller relä för en röd varning eller växlingsindikator. Utgången är jord-aktiverad när den förinställda varningsgränsen överskrids. Denna utgång kan slå på en 4 Watt eller mindre 12V-lampa eller kan aktivera ett relä för att slå på en större lampa eller summer. För att koppla en varningslampa till denna utgång, anslut en ledning från glödlampen till 12 volt tillbehörsström och anslut den andra ledningen till TACH WARN-uttaget gnd.



Om du behöver att varningsutgången ska vara "aktiv hög" eller tillhandahålla en +12V spänning för att driva något större än 4 Watt, kan ett standardrelä på 12V som Dakota Digital RLY-1 användas för att åstadkomma detta.



TACH OUT

Denna terminal kan användas för att leverera en buffrad tach-signal till hjälpanordningar såsom en farthållare.

*****Om du använder bussvarvräknarsignalalternativet, med utgången från en BIM-01-X-modul, kommer denna utgång INTE att fungera.**

SPD OUT

Denna terminal kan användas för att ge en hastighetssignal till hjälpanordningar som en farthållare eller radiovolymjustering. Utsignalen skals till ingångshastighetssignalen som kommer till SPD SIG-terminalen. Den kan ställas in på 2,000 PPM or 4,000 PPM.

*****Om du använder busshastighetssignalalternativet, med utgången från en BIM-01-X-modul, kommer denna utgång INTE att fungera.**

CRUISE (-)

CRUISE-terminalen kan användas som en "cruise engaged"-indikator. CRUISE-ingången aktiveras av en jordsignal från en kompatibel farthållarsele. Närhelst CRUISE-ingången är jordad, visar systemet en liten grön "cruise engaged"-indikator.

SPEED INPUT - PWR

Denna terminal används för att mata ström till Dakota Digital hastighetssensor **SEN-01-5**. Denna förser sensorn med 5V DC och bör inte kopplas till något annat. Anslut den röda ledningen från **SEN-01-5** till denna 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.

*****ANVÄND INTE denna för att driva några andra enheter; det är en lågström +5V utgång.**

SPEED INPUT - SIG

Det är här fordonshastighetssensorn (VSS) ansluter. Signalen som levereras till denna terminal kommer att användas av kontrollboxen för att beräkna hastighetsavläsningen på displayen och även för att beräkna och spara vägmätarens körsträcka. Om en **BIM-01-x**-modul används för att få hastighetsmätaravläsningen kommer denna terminal inte att anslutas.

Dakota Digital levererar en 3-trådsensor till de flesta av sina kit, **SEN-01-5**. Om du använder den här sensorn är den vita tråden hastighetssignalen; anslut till SPD SIG. De röda och svarta ledningarna i kabeln är ström och jord (5V DC) och deras anslutning diskuteras i avsnitten **SPEED INPUT -PWR** och **-GND**.

För två tråds-hastighetssensorer såsom en kabeldriven pulsgenerator spelar polariteten på ledningarna ingen roll. Anslut en ledning till **SPEED INPUT - GND** och den andra till **SPEED INPUT - SIG**-uttaget. Hastighetssensorns jordledning bör föras tillbaka till kontrollboxen för att säkerställa att en korrekt signal tas emot. Att vrida jord- och signalkablarna runt varandra ger en extra nivå av störningsskydd. Hastighetssignalkabeln bör INTE dras vid sidan av tach-, tändnings- eller andra högströms- eller högspänningsledningar.

För fordon som har en hastighetssignal från en transmissionssensor eller ECM, skarva in på VSS-kabeln och anslut den till SIG-terminalen. Konsultera en fordonsservicemanual eller kopplingsschema för att bestämma trådfärg och plats.

Detta system kan acceptera 2 000 ppm – 250 000 ppm hastighetssignaler. Hastighetsmätaren är fullt justerbar och kalibrering diskuteras i ett senare avsnitt. TFT-displayen visar "PLEASE CALIBRATE SPEED" tills hastighetsmätaren har kalibrerats.

*****Att inte kalibrera hastighetsmätaren kan leda till att din kilometertal ökar mycket snabbt om hastighetsmätaren visar fel.**

***** Hastighetssignalkabeln ska INTE dras längs tändnings- eller andra högströms-/spänningsledningar.**

SPEED INPUT - GND

Denna terminal används till hastighetssensorns jord. Anslut den svarta ledningen från **SEN-01-5** här. Detta säkerställer en ordentlig jordning samt ger korrekt anslutning för ett tvinnat par av ledningar eller en solid state-sensor. Jorda endast hastighetssensorn här. Om du använder en entrådsutgång från en dator för VSS ska denna terminal lämnas öppen.

TEMP INPUT - SIG

Vattentemperaturgivaren som medföljer detta system måste användas. Andra sensorer kommer att orsaka felaktiga avläsningar eller skada på kontrollboxen. Om du använder en BIM-01-x-modul för att erhålla motortemperatur kommer denna terminal inte att anslutas.

Den bifogade sensorn, Dakota Digital **SEN-04-5**, är 100-300°F(40-150°C) temp sensor. Sensorn monteras på motorblocket eller i insugningsgrenröret så att änden av sensorn är i motorns kylvätskeflöde. Den har 1/8" NPT-gångor; adapterbussningar kan användas för att anpassa den för olika applikationer.

Vattentempensorn har två ledningar som kommer från kabelnätet. En tråd kommer att anslutas till SIG-terminalen; den andra ledningen ansluts till GND-terminalen. Det spelar ingen roll vilken ledning som går till någon av ställena.

På grund av sensorns konstruktion kommer avläsningar vid lägre temperaturer under 100°F att vara felaktiga. Sensorn är designad för att vara exakt från cirka 100°F - 300°F. Om vattentemperaturen stiger över en justerbar varningspunkt tänds en röd varningslampa och den digitala avläsningen visas på TFT-displayen. Standardvarningspunkten är 250°F.

Om VATTEN VARNING" visas indikerar detta att kontrollboxen känner av ett kortslutningsfel till jord eller utanför räckvidd från sensorn eller sensorkabeln. Om "WATER OPEN" visas indikerar detta att kontrollboxen känner av en öppen krets eller ett fel utanför räckvidden från sensorn. Om någon av indikationerna finns kvar på displayen, inspektera sensorkabeln för skador, kontrollera dragningen av sensorkabeln och kontrollera att rätt sensor är ansluten.

TEMP INPUT - GND

Detta är jordreferensen som används för tvåtråds vattentempgivare. Detta kommer att anslutas till en av ledningarna från Dakota Digital **SEN-04-5**. Den andra ledningen kommer att anslutas till SIG-terminalen, och det spelar ingen roll vilken ledning som går till någondera platsen.

PRESSURE INPUT - PWR

Denna terminal används för att mata ström till Dakota Digital trycksensor **SEN-03-8**. Denna förser sensorn med 5V DC och ska inte kopplas till något annat. Anslut den röda ledningen från **SEN-03-8** till denna terminal.

*****ANVÄND INTE den här terminalen för att driva några andra enheter; det är en +5V utgång.**

PRESSURE INPUT - SIG

Oljetryckssensorn som medföljer detta system måste användas. Andra sensorer kommer att orsaka felaktiga avläsningar eller skada på kontrollboxen. Om du använder en BIM-01-x för att erhålla motoroljetrycket kommer denna terminal inte att anslutas.

Den medföljande sensorn, Dakota Digital **SEN-03-8**, är en 0-100 psi halvledartrycksensor. Sensorn kan monteras på motorblocket eller i en oljetrycksledning utanför blocket. Sensorn har 1/8" NPT-gångor. Adapterbussningar kan användas för att anpassa den för olika applikationer.

Oljetryckssensorn har tre ledningar som kommer från kabelnätet, plus en bar skärmtråd. Den VITA kabeln ansluts till SIG-terminalen, den RÖDA till PWR (5V DC), den SVART till GND och den blanka skärmkabeln till DRN. Dra inte oljesensorns ledning längs en tändstiftsledning eller andra högströms- eller högspänningsledningar. Om du gör det kan det orsaka felaktiga eller oregelbundna mätvärden.

Om oljetrycket faller under en justerbar varningspunkt kommer en röd varningslampa att tändas och den digitala avläsningen visas på TFT-displayen. Standardvarningspunkten är 10 psi. Om "**OIL FAIL LOW**" visas indikerar detta att kontrollboxen känner av ett kortslutningsfel till jord eller utanför området från sensorn eller sensorkabeln. Om "**OIL FAIL HIGH**" visas indikerar detta att kontrollboxen känner av en öppen krets eller ett fel utanför området från sensorn. Om någon av indikationerna finns kvar på displayen, inspektera sensorkabeln för skada, kontrollera dragningen av sensorkabeln, kontrollera sändningsenhetens jordning och kontrollera att rätt sändande enhet är ansluten.

PRESSURE INPUT - GND

Detta är jordreferensen som används för tretråds trycksensor. Detta kommer att anslutas till den svarta ledningen från Dakota Digital **SEN-03-8**.

*****Anslut INTE denna terminal till några andra enheter**

PRESSURE INPUT - DRN

Detta är kabelskärmen för tretråds tryckgivare. Detta kommer att anslutas till den blanka silverskyddskabeln från Dakota Digital **SEN-03-8**.

*****Anslut INTE denna terminal till några andra enheter**

RESERVED (FUEL INPUT – PWR)

This output is not typically used. It is a low current +12V supply for powering solid state fuel sensors. Currently, it does not have an application for any Dakota Digital fuel level sensors.

*****This terminal should not be used with a typical resistive type fuel sensor. For most applications, leave this terminal open. Do not try to power other devices from this terminal or damage to the control box will occur. Do not apply power to this terminal.**

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 insure 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 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 TFT display 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 turn on the back lights when the DIM terminal has power, +12V, but this level is adjustable in the LIGHTING setup 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.***

SWITCH INPUT

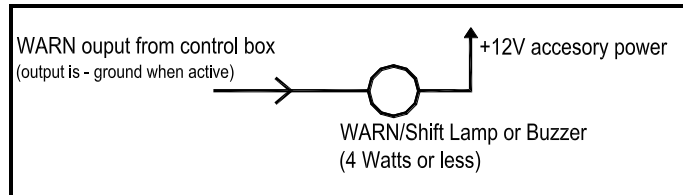
The switch input connector is for the included switch harness. If the system does not detect the switch harness connected then a "CONNECT SWITCH" warning message will be displayed briefly each time the key is turned on.

When the left button ("I") is tapped it changes the display focus within the current display, allowing individual readings to be reset or zeroed. The display focus is shown by arrows alongside the reading on the edge of the TFT screen. When the button is pressed and held for a few seconds any resettable information will be zeroed. When in setup mode this will move up in the menu or decrease the setting.

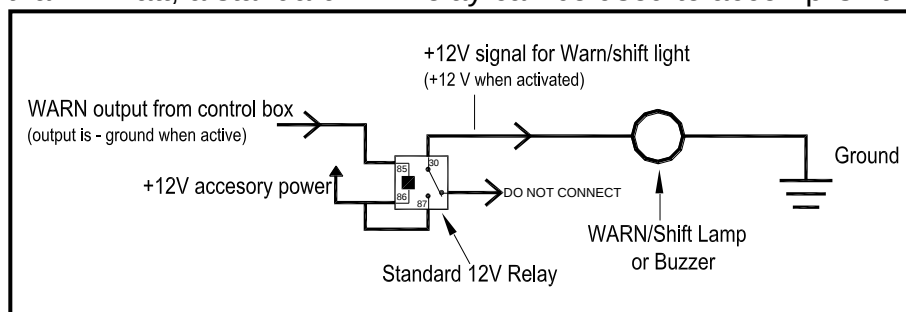
When the right button ("II") is tapped it changes the Group Screen. When the button is pressed and held for a few seconds, any re-settable information displayed will be zeroed. When in setup mode this will move down in the menu or increase the setting.

WARN OUT

The WARN OUT terminal is an output to activate a small light or relay for a gauge warning indicator. It can also 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.



EXTRA (-) or Door Open (-)

This is an extra indicator input that is activated by grounding. When activated, a custom label is displayed on the TFT. The label can appear temporarily when the state changes or remain displayed while active. The label and operation can be changed in the “EXTRA” 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.

EXTRA (+) or Door Open (+)

This is an extra indicator input that is activated by +12V. When activated, a custom label is displayed on the TFT. The label can appear temporarily when the state changes or remain displayed while active. The label and operation can be changed in the “EXTRA” 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.

WAIT (+)

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. Whenever the WAIT input is powered, +12V, the system will display “WAIT TO START” on the TFT display. This message can be cleared by pressing and holding either switch or once the WAIT terminal loses the +12V signal. This input can also be set with a custom label for other uses or used for Door Open in the “EXTRA” setup menu.

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 Home Screen. If a different Group Screen is being shown the gear position will light up temporarily any time the gear position changes.

4x4 (-)

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 a green 4x4 indicator will be shown on the Home Screen of the TFT display. If a different Group Screen is being shown “4x4” will be shown in the information area. This input can also be set with a custom label for other uses or used for Door Open in the “EXTRA” 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 display face. 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 $\frac{3}{4}$ 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 display face. 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 $\frac{3}{4}$ 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 display face. 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 display face.

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 display face.

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 indicator would come on when the check engine wire is "active".

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 backlights and needles in the RTX systems are designed to illuminate when the headlights are turned on. 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, the instruments will illuminate at a preset brightness level. When the DIM terminal does not have power, the backlighting will be off, unless they're enabled in setup to be on in day time operation.

The night brightness level is adjustable two different ways. This preset brightness is adjusted in the setup menu "LIGHTING". See DIM ADJ for a description of the second method.

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 and the gauges will remain in daytime mode with the headlights on.

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.

SETTING UP THE CONTROL BOX

Below is the list of setup menus. Setup mode is entered by holding either switch while turning the ignition key on. An "*" 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. A separate SETUP MENU GUIDE is also available to provide a more detailed, graphical listing of the setup menu. ***Pay close attention to Setup menus and options as incorrect settings will cause faulty readings on the displays.***

Main Menu	Sub Menu	Description
INFO		Current sensor & gauge settings
BLUETOOTH	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
SPEED	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)	Select between a wired sensor or BIM data
	PULLUP (ON, OFF)	Select input pullup state
	OUTPUT (2K PPM, 4K PPM)	Select output speed signal PPM setting
	BACK	Exit speed setup menu
TACH	INPUT	
	CYLINDER (BIM, 1 – 16)	Set engine cylinder count or BIM data input
	TYPE (5V LOW, 12V HIGH)	Select RPM signal voltage level
	UPDATE RATE (SLOW, MID, FAST)	Set RPM update rate
	SHIFT LIGHT (2200 – 14800)	Set RPM shift warning point
	BACK	Exit tach setup menu

Main Menu	Sub Menu	Description
VOLT		
	WARN LO (10.0 – 13.1)	Set low volt warning point
	WARN HI (16.5 – 20.0)	Set high volt warning point
	BACK	Exit volt setup menu
WATER		
	INPUT (SENSOR, BIM)	Select between a wired sensor or BIM data
	UNIT (F, C)	Select temperature unit
	WARNING (150-300F / 65 -148c)	Set high temp warning point
	BACK	Exit water setup menu
OIL		
	INPUT (SENSOR,BIM,300PSI,150PSI)	Select between a wired sensor or BIM data
	WARN (LOW 5 – 36)	Set low pressure warning point
	BACK	Exit oil setup menu
FUEL		
	INPUT	Select sensor type
	(BIM, SW 240-33, GM 0-30, GM 0-90, 63 VETTE, GM 40-250, GM 250-40, FORD 73-10, FORD 10-150, VDO 10-180, ASIA 112-4, MANUAL ADJ)	
	MANUAL ADJ -> PROGRAM	Calibrate manual adjust fuel sensor
	RANGE	
	LEARN RESET	Clear and restart learning range to empty
	BACK	Exit fuel setup menu
LIGHTING		
	THEME	
	DAY&NIGHT	Color theme preset for both day and night mode
	DAY	Color theme preset for day only
	NIGHT	Color theme preset for night only
	BACK	Exit theme setup menu
	DAY LIGHT (OFF, ON)	Change day time backlighting
	NIGHT LIGHT (1-30)	Change preset night dimming
	CUSTOMIZE	
	DAY MODE	
	FACE PLATE	Select day face backlight color
	NEEDLE	Select day needle color
	BAR GAUGE	Select bar gauge color if present
	BAR WARN	Select bar warn color if present
	DISPLAY	
	GAUGE	Select day TFT digital number color
	LABEL	Select day TFT text label color
	GRID	Select day TFT group separator line color
	INTENSITY	Set day TFT brightness
	BACK	Exit display setup menu
	BACK	Exit day mode setup menu
	NIGHT MODE	
	FACE PLATE	Select night face backlight color & brightness
	NEEDLE	Select night needle color & brightness
	BAR GAUGE	Select bar gauge color if present
	BAR WARN	Select bar warn color if present
	DISPLAY	
	GAUGE	Select night TFT digital number color
	LABEL	Select night TFT text label color
	GRID	Select night TFT group separator line color
	INTENSITY	Select night TFT brightness
	BACK	Exit display setup menu
	BACK	Exit night mode setup menu
	BACK	Exit customize setup menu
	NDL COLOR (AUTOMATIC, WHITE, ORANGE)	Optimize preset themes to match needle color
	RESET COLOR	Return all colors to factory default
	BACK	Exit lighting setup menu

Main Menu	Sub Menu	Description
BIM		Menu options depend on BIM attached.
DISPLAYS		
	INFO POPUP	Select display location for information messages
	WARN POPUP	Select display location for warning messages
	INDICATORS	Turn TFT display indicators on or off
	TURN REMIND	
	GAUGE	Turn indicators in the system face are displayed when wired to the control box
	OEM	Turn indicators in the system face are not displayed when wired to the control box
	BACK	Exit turn remind setup menu
	GROUP SET	
	GROUP (A,B,C)	Select readings shown in group display
	SCREEN (1,2,3,4)	Change reading for screen area shown
	SAVE	Save group display readings
	GROUP MAX (AB,ABC,ABCD,ABCDE)	Select how many display groups are available
	RESET ALL	Return all display settings to factory default
	BACK	Exit display setup menu
GEAR		Select gear position display style and order
	(PRNODSL, PRNOD21, PRN4321, PND21R, PRN1234, PRN12DO)	
SET ODOM		Preset odometer reading with current vehicle miles (see page 28)
WARN OUT		
	OUTPUT SET (ON/OFF)	Select gauges that trigger the warning output
	BUZZER SET (ON/OFF)	Select gauges that trigger the warning buzzer
	BUZZER TONE (0-10)	Select the warning buzzer sound
	BUZZER VOL (0-10)	Select the warning buzzer volume
	SPD CNT VOL (OFF, LOW, MID, HIGH)	Select the speed controlled volume setting
	BACK	Exit the warn out setup menu
SW SOUND		
	DURATION (0-10)	Select the switch buzzer click duration
	VOLUME (0-10)	Select the switch buzzer click volume
	SPD CNT VOL (OFF, LOW, MID, HIGH)	Select the speed controlled volume setting
	BACK	Exit the sw sound setup menu
EXTRA LABEL		
	EX+, EX-, WAIT, 4x4	
	LABEL	Change the 8 letter label for this input
	DISPLAY (ON CHANGE, ALWAYS)	Select always active or only momentarily when it changes
	TYPE (WARN, INFO)	Select warning or information message type
	BACK	Exit the extra label setup menu
	DOOR OPEN (EX+, EX-, WAIT, 4x4)	Select input that will light up the display when a door is opened
VERSION		View the control and display software version codes
DEMO MODE		
	BEGIN	Start the gauges in show demonstration mode.
	BACK	Exit the demo mode menu
EXIT SETUP		Exit the setup menu and return to normal operation

To enter the setup mode, hold either switch while turning the ignition key on. The display should light up and show SETUP on the TFT. Tapping the right switch (II) will move down through the menus and tapping the left switch (I) will move up through the menus. Holding either switch will select or save the current option.

You can exit setup at any time by switching off the keyed power or selecting “EXIT SETUP”.

SPEEDOMETER SETUP/CALIBRATION

There are two main methods for calibrating the speedometer, Auto Cal and Adjust. Auto Cal requires that you have one measured mile marked out. Adjust 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 or GPS-50-x to provide the speedometer reading, the AUTO CAL option will not be 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.**

Start with the key off. Hold either switch while turning the key on and starting the engine. Once the engine is running, release the switch. The TFT will light up and show "SETUP". Tap the right switch until SPEED is highlighted in the center. Press and hold either switch until "RELEASE" is shown. "SETUP" "SPEED" along with the current speed cal should be displayed.

Now you can tap either switch to scroll through the sub-menus, "AUTO CAL" "ADJUST" "SERVICE" "UNIT" "INPUT" "OUTPUT" or "BACK". When you get to the desired sub-menu, press and hold the switch to select it.

Speed sensor setup (INPUT)

This 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) or GPS-50-x. 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. The Dakota Digital GPS-50-X will provide a GPS satellite speed reading for the system.

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.

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

SIGNAL allows selection between SENSOR, which is a speed signal wired into the SPEED INPUT – SIG terminal, and BIM, which is speed data provided through the BIM connector by a BIM-01-x or GPS-50-x.

PULLUP 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.

Speed unit setup (UNIT)

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.

Auto Cal (AUTO CAL)

This option will be greyed out if SPEED -> INPUT -> BIM is selected.

This menu is used to calibrate the speed signal by driving a measured mile. Start this procedure with the vehicle stopped at the beginning of a known measured mile. Begin with the key off. Hold either switch while turning the key on and starting the engine. Once the engine is running release the switch. The TFT will light up and show "SETUP". Select the SPEED menu, and then select AUTO CAL.

"AUTO CAL" and either "DRIVE 1 MI" or "DRIVE 1 km" will be displayed with "0" below it.

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. 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, or are passing the marker, tap either switch 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 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 miles are calculated from the speedometer cal value; if it is not calibrated properly, the odometer miles 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 Mode (ADJUST)

Adjust 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. The speedometer needle will show the speed reading and the TFT display will display a digital speed reading. Begin driving at a known speed. Tap the right switch to go up by 1 MPH or tap the left switch to go down by 1 MPH. Holding either switch will make a continuous change in the speedometer reading until it is released. The new calibration will be saved when there is no switch press 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** or **GPS-50-x** module. 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 will show the current cal ratio. Tap the right switch to increase the speedometer or tap the left switch to decrease it. Hold either switch 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 miles are calculated from the speedometer cal value; if it is not calibrated properly, odometer miles could be higher/lower than actual.

Service countdown meter (SERVICE)

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 mileage will reset to when you hold a switch 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.

Speed Output (OUTPUT)

This option will be greyed out if SPEED -> INPUT -> BIM is selected.

If a speed signal is needed for an ECM or cruise control, the SPD OUT terminal 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 SPEED INPUT – SIG terminal.

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 tach signals 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.

Start with the key off. Hold either switch while turning the key on. Once “SETUP” is shown, release the switch. Tap either switch until TACH is highlighted in the center. Press and hold either switch until “RELEASE” is shown. “SETUP” “TACH” along with the current speed input setting should be displayed.

Now you can tap either switch to scroll through the sub-menus, “INPUT” “UPDATE RATE” “SHIFT LIGHT” or “BACK”. When you get to the desired sub-menu, press and hold the switch to select it.

Tachometer input setup (INPUT)

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.

The options under this menu are 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, oftentimes a V-8 engine computer 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.**

Display update setup (UPDATE)

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.

RPM warning setup (WARN)

This is used for the turn-on point for the TACH WARN output on the control box as well as the RED warning light on the instrument cluster. When the RPM reading is above this setting, the output will activate, providing a ground signal. It can be used to turn on a shift light or other RPM based devices. The value is adjustable from 2,200 RPM – 14,800 RPM in 100 RPM increments.

VOLT SETUP

The volt setup allows you set a warning point that will light a RED indicator on the instrument cluster and show a digital reading on the TFT whenever the voltage reading is above or below the warning values and the engine is running. 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.

Start with the key off. Hold either switch while turning the key on. Once “SETUP” is shown, release the switch. Tap either switch until VOLT is highlighted in the center. Press and hold either switch until “RELEASE” is shown. “SETUP” “VOLT” along with the current system voltage should be displayed.

Now you can tap either switch to scroll through the sub-menus, “WARN LO”, “WARN HI”, or “BACK”. When you get to the desired sub-menu, press and hold the switch to select it.

WATER TEMP SETUP

The water temp setup allows you select the units the temperature is displayed in, Fahrenheit or Celsius. The input type can be selected between SENSOR for the unit provided with the system or BIM if a Dakota Digital BIM-01-X is used. It also allows you to set a high temperature warning point that will light a RED indicator on the instrument cluster and show a digital reading on the TFT whenever the temperature is higher than the warning set point.

Start with the key off. Hold either switch while turning the key on. Once “SETUP” is shown, release the switch. Tap either switch until WATER is highlighted in the center. Press and hold either switch until “RELEASE” is shown. “SETUP” “WATER” along with the current sensor resistance should be displayed.

Now you can tap either switch to scroll through the sub-menus, “INPUT” “UNIT” “WARNING” or “BACK”. When you get to the desired sub-menu, press and hold the switch to select it.

Temp sensor setup (INPUT)

This menu is used to set the temp sensor type. Dakota Digital only offers one temp sensor for this system, it is **SEN-04-5**, 100-300 F(40-150 C), 1/8” NPT threads. You can use bushings to adapt the sensor to various locations. You will select “SENSOR” for this.

You can also read the temp with the use of a bus interface module (BIM). Dakota Digital offers a BIM-01-X that will allow you to read the engine temp 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. You will select “BIM” for this.

Temp unit setup (UNIT)

This menu is used to set the temperature unit, Fahrenheit (F) or Celsius (C). This will be used for all temperature readings on the system.

Temp warning setup (WARNING)

This menu will allow you to select the high temperature warning point. When the gauge value is higher than this point it will light a RED indicator on the instrument cluster and show a digital reading on the TFT. The value is adjustable from 150 – 300 F (65-148 C).

OIL PRESSURE SETUP

The standard Dakota Digital oil pressure sensor for this system is the **SEN-03-8**, 0-100 psi solid state sensor with 1/8" NPT threads. This is the "SENSOR" selection. A 0-300 psi sensor (SEN-03-9), and a 0-150 psi sensor (SEN-03-10) are also supported for engines with oil pressure exceeding 110 psi. 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 that will light a RED indicator on the instrument cluster and show a digital reading on the TFT whenever the pressure is lower than the warning set point and the engine is running.

With the key on, press and hold both switches. The TFT will show "ENTER SETUP" with a scrolling bar. Once "SETUP" "RELEASE" is shown, release both switches. Tap either switch until OIL is highlighted in the center. Press and hold either switch until "RELEASE" is shown. "SETUP" "OIL" along with the current sensor voltage should be displayed.

Now you can tap either switch to scroll through the sub-menus, "INPUT" "WARNING" or "BACK" When you get to the desired sub-menu, press and hold the switch to select it.

Oil pressure sensor setup (INPUT)

This menu will allow you to select the oil pressure sensor being used. "SENSOR" selects the supplied SEN-03-8 sensor. "BIM" allows for reading the oil pressure from a BIM module in a compatible vehicle. "300 PSI" selects the optional SEN-03-9 sensor and "150 PSI" selects the optional SEN-03-10 sensor.

Oil pressure warning setup (WARN)

This menu will allow you to select the low pressure warning point. When the display value is lower than this point and the engine is running it will light a RED indicator on the instrument cluster and show a digital reading on the TFT. The value is adjustable from 5 – 36 psi.

FUEL 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.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap either switch until FUEL is highlighted in the center. Press and hold either switch until "RELEASE" is shown. "SETUP" "FUEL" along with the current sensor resistance should be displayed.

Now you can tap either switch to scroll through the sub-menus, "INPUT" "RANGE" or "BACK". When you get to the desired sub-menu, press and hold the switch to select it.

Fuel sensor setup (INPUT)

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.

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

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.

Manual adjust fuel sensor curve setup (MANUAL ADJ -> PROGRAM)

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.

- When "PROGRAM" is highlighted press and hold either switch until "RELEASE" is shown.

The message display will show "MANUAL ADJ" "0%" 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 either switch.
- The message display will show "33%" and "XXXΩ". Move the float to 1/3 full and then tap either switch.
- The message display will show "66%" and "XXXΩ". Move the float to 2/3 full and then tap either switch.
- The message display will show "99%" and "XXXΩ". Move the float to the full position and then tap either switch. The new sensor curve is now stored under the "MANUAL ADJ" sensor selection.

*****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.**

Fuel range setup (RANGE)

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.**

LIGHTING SETUP

The lighting menu, "LIGHTING", allows you to change the daytime and nighttime display color themes, turn the daytime lighting on or off, adjust the nighttime lighting brightness levels, and create a custom color set.

If you are using the separately purchased **DIM-1** kit from Dakota Digital, the nighttime brightness level doesn't matter; when the DIM terminal has power applied to it, you have total control of the night brightness level with the twist of a knob. If the **DIM-1** is wired to the DIM ADJ -SIG and GND terminals; the dim preset will be overridden by the **DIM-1** knob.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap either switch until LIGHTING is highlighted in the center. Press and hold either switch until "RELEASE" is shown. "SETUP" "LIGHTING" should be displayed.

Now you can tap either switch to scroll through the sub-menus, "THEME" "DAY LIGHT" "NIGHT LIGHT" "CUSTOMIZE" "RESET COLOR" or "BACK". When you get to the desired sub-menu, press and hold the switch to select it.

Color theme setup (THEME)

This menu is used to set the needle, backlight, and TFT colors.

The options under this menu are DAY&NIGHT, DAY MODE, NIGHT MODE, and BACK.

DAY&NIGHT sets both the daytime and nighttime modes to the same colors.

DAY MODE sets daytime colors only.

NIGHT MODE sets nighttime colors only.

BACK exits the THEME menu and returns to the LIGHTING menu.

Tap either switch until the desired setting mode is highlighted, then hold the switch until RELEASE is shown. BACK will now show the current colors. Tap either switch to change the color themes. The display colors will update as the selections are changed. Hold either switch to save the desired color theme.

Daytime backlight and needle setup (DAY LIGHT)

This menu is used to turn the lighting ON or OFF for the needle and backlight. The options under this menu are OFF, ON, and BACK.

Night brightness setup (NIGHT LIGHT)

This menu is used to adjust the brightness level when the headlights are turned on. A bar graph is shown to set the value from 1 (lowest) to 30 (brightest). Tap the left switch to decrease the brightness and tap the right switch to increase the brightness. Hold either switch to save the setting and go back.

Color customize setup (CUSTOMIZE)

This menu allows the colors and brightness to be individually changed for the needle, backlight, TFT gauge, TFT label and TFT separator grid. These changes are done for day mode and night mode separately.

The options under this menu are DAY MODE, NIGHT MODE, and BACK.

DAY MODE sets daytime colors only.

NIGHT MODE sets nighttime colors only.

BACK exits the CUSTOMIZE menu and returns to the LIGHTING menu.

Once DAY MODE or NIGHT MODE is selected the menu options are FACE PLATE, NEEDLE, DISPLAY, and BACK. If DISPLAY is selected then the next set of menu options are GAUGE, LABEL, GRID, INTENSITY, and BACK.

Color customize setup (continued)

Tap either switch until the desired setting mode is highlighted, then hold the switch until RELEASE is shown. BACK will now show the current color. Tap either switch to change the color. The colors will update as the selections are changed. Hold either switch to save the desired color.

NEEDLE sets the needle color. For NIGHT MODE the brightness will be set after the color.

FACE PLATE sets the face backlight color. For NIGHT MODE the brightness will be set after the color.

DISPLAY -> GAUGE sets the digital reading color on the TFT.

DISPLAY -> LABEL sets the display label color on the TFT.

DISPLAY -> GRID sets the color for the group display separator lines on the TFT.

DISPLAY -> INTENSITY sets the brightness of the TFT.

Set needle color theme selection (NDL COLOR)

The normal setting is automatic and the control box will read the system connected to determine if it has a white needle or a colored needle and adjust the theme selections to match. The automatic setting can be overridden by selecting either WHITE or ORANGE.

Reset colors to factory default (RESET COLOR)

This menu will reset the colors to the default theme set for both day and night.

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 display groups from the DISPLAYS -> GROUP SET menu. The setup and warning options for the BIM's are set from this menu.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap either switch until BIM is highlighted in the center. Press and hold either switch until "RELEASE" is shown. "SETUP" "BIM" should be displayed.

If no BIM's are detected, "NONE FOUND" will be displayed. Otherwise a scroll list of the BIM's detected will be shown. Tap either switch to select the desired BIM, hold the switch to begin setup. 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.

DISPLAY SETUP MENU

The RTX system allows for complete user adjustability, this includes allowing you to decide which reading you would like to display in the TFT groups, where information messages pop up, where warning messages pop up, where indicators are displayed, and how the turn signal reminder operates. In addition to the fixed Home Screen there are several Group Screens that can be customized with various readings.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap either switch until DISPLAY is highlighted in the center. Press and hold either switch until "RELEASE" is shown. "SETUP" "DISPLAY" should be displayed.

Now you can tap either switch to scroll through the sub-menus, "INFO POPUP" "WARN POPUP" "INDICATORS" "TURN REMIND" "GROUP SET" "GROUP MAX" "RESET ALL" or "BACK". When you get to the desired sub-menu, press and hold the switch to select it.

Information message location (INFO POPUP)

The information location is where messages like WAIT TO START, 4x4, PLEASE CALIBRATE SPEED, PLEASE CALIBRATE FUEL, and GEAR show up. The default location in the Group Screens is location 2 but any of the 4 Group Screen areas can be chosen.

An example location will be displayed along with the screen number. Tap either switch to change the location, hold either switch to save it and go back.

Gauge Warning location (WARN POPUP)

The gauge warning location is where the digital readout of any gauge that is out of range is shown. The default location in the Group Screens is location 2 but any of the four Group Screen areas can be chosen.

An example location will be displayed along with the screen number. Tap either switch to change the location, hold either switch to save it and go back.

Indicator display setup (INDICATORS)

Most systems have indicators built into the instrument cluster for the high beam, left turn, right turn, cruise control, check engine, and brake warn. These indicators can also be turned on inside the TFT. If the indicators are set to off they will only show up in the instrument cluster. If turned on they will show up in the TFT display as well.

The indicators will all be activated in the instrument cluster and if INDICATORS ON is selected, an example location will be displayed on the TFT. Tap either switch to change the setting, hold either switch to save it and go back.

Display message location (GROUP SET)

In addition to the fixed arrangement Home Screen, there are three other Group Screens that can be fully customized. Each group has four readings. Each reading in each of these groups can be customized to your preference. The default setting has RANGE, TRIP B, SERVICE, and HOUR TIMER in Group A; VOLTS, FUEL, WATER, and OIL in Group B; 0-60 TIME, HIGH SPEED RECALL, ¼ MILE SPEED & TIME, and 1/8 MILE SPEED & TIME in Group C.

To change one of the displayed readings, first select the group it is in. Tap the right or left switch to highlight GROUP A, GROUP B, or GROUP C. Hold either switch to select the group. All of the readings for this group will be shown together. Tapping either switch will change to displaying one reading at a time in its location or a SAVE GROUP menu option. When the single reading you want to change is shown, hold either switch to unlock it for change. Tap either switch to scroll through the available readings. Hold either switch to go back into the group reading menu. When finished changing the readings for this group, tap either switch until the SAVE Group Screen is shown. Hold either switch to save it and go back.

Number of display groups available (GROUP MAX)

The default is for three groups labeled A, B, and C. This can be changed to 2, 3, 4, or 5 groups depending on the number of information screens you wish to monitor. This can be useful if a large number of BIM's have been added to the system.

To change the number of groups available select A B, A B C, A B C D, or A B C D E.

Reset display options (RESET ALL)

This will return the message, warning, and indicator settings back to factory default as well as return all group readings back to the defaults.

GEAR MENU

If you are using a Dakota Digital GSS gear shift sender or have a BIM-01-X and are able to get gear information from the ECM, the gear display will be active on the TFT display. You can customize how the gears are displayed and in what order. The display will show the letter for the current gear with the gears to either side of it smaller.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch.. Tap either switch until GEAR is highlighted in the center. Press and hold either switch until "RELEASE" is shown. The current gear pattern will be shown. Tap either switch to scroll through the available gear patterns. Hold either switch to save it.

ODOMETER PRESET MENU

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 greyed out and no longer available. Make sure you have correctly calibrated your speedometer so you don't accumulate extra miles. Once you have preset the miles, you cannot change it again without sending the control box back to the factory.***

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap either switch until PRESET ODO is highlighted in the center. Press and hold either switch until "RELEASE" is shown.

The current miles will be displayed with the left most digit flashing. Tap the right switch to increase the flashing digit, tap the left switch to decrease the flashing digit, or hold either switch to move to the next digit to the right. After you finish setting the right most digit, the current reading along with "YES" and "NO" will be displayed. To continue changing or make a correction to the reading tap either switch until NO is highlighted and then hold the switch. To save the reading and go back, tap either switch until YES is highlighted and then hold the switch.

WARNING NOTIFICATION MENU

When a gauge or input reaches a warning point, a notification can be provided from either the WARN OUT terminal or by activating the attached buzzer. The gauges can individually be turned on or off from activating these. The buzzer tone and volume can also be adjusted.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap either switch until WARN OUT is highlighted in the center. Press and hold either switch until "RELEASE" is shown. "SETUP" "WARN OUT" should be displayed.

Now you can tap either switch to scroll through the sub-menus, "OUTPUT SET" "BUZZER SET" "BUZZER TONE" "BUZZER VOLUME" "SPD CNT VOL" or "BACK". When you get to the desired sub-menu, press and hold the switch to select it.

Warning output terminal setup (OUTPUT SET)

Any of the attached sensors or BIM's can activate the WARN OUT terminal when they exceed their warning limits. 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".** To turn readings on or off, tap either switch until the gauge, BIM or REVERSE is shown. The "*" will be next to the current setting. Hold either switch to toggle the setting on or off. To exit the OUTPUT SET menu, tap either switch until BACK is shown and then hold the switch to exit and go back to the WARN OUT menu.

Buzzer warning setup (BUZZER SET)

Any of the attached sensors or BIM's can activate the buzzer attached to the instrument cluster when they exceed their warning limits. To turn readings on or off, tap either switch until the gauge or BIM is shown. The "*" will be next to the current setting. Hold either switch to toggle the setting on or off. To exit the BUZZER SET menu, tap either switch until BACK is shown and then hold the switch to exit and go back to the WARN OUT menu.

Buzzer tone setup (BUZZER TONE)

The sound the buzzer makes for a warning can be adjusted. There are 10 different tones available, numbered 1 – 10 as well as 0 to turn it off. Tap either switch to change the tone, hold either switch to save that tone and go back to the WARN OUT menu. Each time a change is made to the setting the buzzer will sound an example tone.

Buzzer volume setup (BUZZER VOL)

The volume of the buzzer for a warning can be adjusted from 0 – 10. Tap the right switch to increase the volume and the left switch to decrease it. Hold either switch to save the volume and go back to the WARN OUT menu. Each time a change is made to the setting the buzzer will sound an example tone.

Speed controlled volume setup (SPD CNT VOL)

The buzzer volume can be set to increase as you drive faster. The available settings are OFF, LOW, MID, HIGH, and BACK. Tap either switch to change it, hold the switch to save it and go back to the WARN OUT menu.

SWITCH SOUND MENU

When either of the switches are pressed, the speaker attached to the instrument cluster can chirp or click to provide audible feedback. The click duration and volume can be adjusted.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap either switch until SW SOUND is highlighted in the center. Press and hold either switch until "RELEASE" is shown. "SETUP" "SW SOUND" should be displayed.

Now you can tap either switch to scroll through the sub-menus, "DURATION" "VOLUME" "SPD CNT VOL" or "BACK". When you get to the desired sub-menu, press and hold the switch to select it.

Switch click duration setup (DURATION)

The length of the sound the buzzer makes for a switch click can be adjusted. There are 10 different ones available, numbered 1 – 10 as well as 0 to turn it off. Tap either switch to change the duration, hold either switch to save that tone and go back to the SW SOUND menu. Any time a change is made to the setting the buzzer will sound an example click.

Switch volume setup (VOLUME)

The volume of the buzzer for a switch click can be adjusted from 0 – 10. Tap the right switch to increase the volume and the left switch to decrease it. Hold either switch to save the volume and go back to the SW SOUND menu. Any time a change is made to the setting the buzzer will sound an example click.

Speed controlled volume setup (SPD CNT VOL)

The switch click volume can be set to increase as you drive faster. The available settings are OFF, LOW, MID, HIGH, and BACK. Tap either switch to change it, hold the switch to save it and go back to the SW SOUND menu.

EXTRA INPUT MENU

There are two extra, universal inputs available that can be customized. One is activated by a grounding input (EX-) and the other is activated by a 12V input (EX+). When the input is activated a message will be shown on the TFT display. You can customize the text label with up to 8 characters. You can select whether the message is shown for only a few seconds or remains until the input is released. You can select whether the message is for information or a warning. If more inputs are needed, the WAIT input and 4x4 input can also be configured to be extra, universal inputs instead of their default operation. One of these inputs can also be selected to light up the gauge system when a door is opened. The entry screen will remain on for 2 minutes when the door is opened or until the key is turned.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap either switch until EXTRA INPUT is highlighted in the center. Press and hold either switch until "RELEASE" is shown. "SETUP" "EXTRA INPUT" should be displayed.

Now you can tap either switch to choose between the input terminals, "EX+" "EX-" "WAIT" "4x4" "DOOR OPEN" or "BACK". Select the desired input terminal, press and hold the switch to select it.

Once the input is selected, the menu options shown are "LABEL", "DISPLAY", "TYPE", or "BACK". Tap either switch until the desired option is shown, press and hold the switch to select it.

Message label setup (LABEL)

The default label is EX+ and EX-. These can be customized with up to 8 characters each. Letters, numbers, "/", ".", "-", ",", "+", "*", "!", and " " are available. After selecting LABEL, the left most character will be flashing. Tap either switch to change the character. Hold either switch to move one character to the right. After finishing the eighth character it will go back up one menu.

Message display duration (DISPLAY)

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. This option is not available for WAIT or 4x4 unless its label has first been changed.

Message type (TYPE)

The message shown can be either an information type (INFO) or a warning type (WARN). A warning message is shown in RED. This option is not available for WAIT or 4x4 unless its label has first been changed.

Door Open input trigger (DOOR OPEN)

The options for this are "NONE" "EX+" "EX-" "WAIT" "4X4" or "BACK". If an input is selected to operate as the door input trigger, it cannot be used as a message display input. The display will light up and show the odometer reading when the key is off and the input is triggered. This will typically be connected to a dome light wire.

VERSION MENU

The version menu, "VERSION" is used to display software code information. Should you have any troubles this information may be requested by the support technician. There will be several different version codes shown for the control and various display sections.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap the left switch until VERSION is highlighted in the center. Press and hold either switch until "RELEASE" is shown. If "MORE" is shown then the codes will be spanning multiple screens. Tap either switch to change between screens. Hold either switch to exit back to the main menu.

DEMO MENU

A show demonstration mode is available for the gauge system that sweeps the needles and changes the display colors. If this is done at a car show, a relay or other switch may be needed to avoid having the key on all of the time.

Start with the key off. Hold either switch while turning the key on. Once "SETUP" is shown, release the switch. Tap the left switch until DEMO MODE is highlighted in the center. Press and hold either switch until "RELEASE" is shown. Release the switch. BEGIN should be highlighted. Hold either switch to begin the demonstration mode.

To exit the demonstration mode turn the key off.

NORMAL OPERATION AND FUNCTION

Here we will describe the common functions and "normal" operation of the RTX system. Please follow the wiring and setup instructions to ensure you have your system calibrated and connected properly for your application. Avoiding setup or selecting incorrect options will cause the gauge readings to be incorrect.

All RTX systems have the obvious gauge sweeps, but the biggest difference between the RTX series and other analog style gauges are the information or message displays. Each RTX system has one or two full color message displays.

The message displays can display a wealth of auxiliary information as well as warning messages and even 16 additional channels with the use of the separately purchased BIM units, bus interface modules.

A push button rocker switch is included with the system and should be mounted within easy reach of the driver.

Tapping the left side switch (I) changes the focus within the display area to allow readings to be zeroed or reset. An arrow beside the reading indicates that it is selected. Holding the switch will reset or zero that reading if possible. When arrows are shown by all of the readings, holding the switch will reset or zero all readings at the same time. If a reading can be reset, a scrolling bar will begin moving with the text "HOLD TO CLR". If the switch is released before the bar is completely across then nothing will change. If a reading cannot be reset, the message "CANNOT CLEAR" will be shown.

Tapping the right side switch (II) changes the entire screen display. The Home Screen shows the speedometer, odometer, trip A, and clock. If available it will also show gear, outside temperature, and compass direction. There are 3-5 other screens that can be customized with various readings. The default selections are mileage readings for Group A, gauge readings for Group B, and performance readings for Group C.

Any message or warning screen that is shown on top of another reading can be temporarily cleared by holding either switch. A progress bar will be shown to provide feedback on how long to hold the switch.

SETTING TIME ON CLOCK

Turn the key on. If the clock is not shown, tap the right switch until it is shown. Tap the left switch until the focus arrow is beside the clock. Hold either switch. The display will show "HOLD TO SET". When "RELEASE" is displayed, release the switch. The hours will begin flashing. Tap the right switch to increase the hours, tap the left switch to decrease the hours. Press and hold either switch to save the hours. The minutes will flash. Tap the right switch to increase the minutes, tap the left switch to decrease the minutes. Press and hold either switch to return to normal operation.

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.

* 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 flashing YELLOW or YELLOW-RED-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 flashing YELLOW or YELLOW-RED-GREEN.	The display harness is damaged.	Check the instrument cluster wiring harness for broken or cut wires.
	The instrument cluster is not working.	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 calibrated.	Refer to the Speed Calibration section of the installation manual.
With the engine running and the vehicle sitting still, the 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 "CONNECT SWITCH"	Switch harness is not plugged into the control Switch harness is broken or damaged.	Connect the included switch harness to the control box. Check the switch harness for cuts or damage.
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.	Check the fuel sending unit with an electrical multi-meter.
	The fuel sensor may have a non-standard resistance range.	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.

RTX Series Specifications		
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 _{P-P}	> 1.4 V _{P-P}	
OUTPUT		
WARN, SPD	< 600 mA	
Current Draw		
IGN Off	≈ 0.3 mA	
IGN On	≈ 250 - 750 mA	

SERVICE AND REPAIR

DAKOTA DIGITAL offers complete service and repair of its product line. In addition, technical consultation 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.

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 UPS or insured Parcel Post. Be sure to include the RMA number on the package, and 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 bill you after repair.

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.

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