ALTRONICS INC
High Performance Electronic Components
1411 S. Roselle Rd, Schaumburg, IL 60193
Phone 847-923-0002 Fax 847-923-0004
www.AltronicsInc.com

DataQuest

INSTRUCTIONS

Table of Contents

System Overview

Thank you for purchasing DATAQUEST!

DATAQUEST utilizes the latest technology in visual high speed, networked, and modular data acquisition systems. Expandable to a 43 channel capacity.

DATAQUEST's components are comprised of a Main Control Unit (MCU), Networked Sensor Nodes (SN), high resolution Full Color **Touch Screen** Dash Display (TSD) (optional), and high capacity SD card Memory.

Main Control Unit (MCU):
The MCU provides 11 high speed Digital and Analog channels recording @1000 Samples/Sec. . (Dim 6.5"x4.12"x1.12")
These built in channels include Engine Rpm, Drive Shaft RPM, Clutch or Converter RPM, Battery Voltage, 3-Axis Accelerometer, and 4 Auxiliary sensor channels (suitable for general purpose or suspension analysis sensing).
MCU contains secure locking wire harness connections for sub system components, removable SD memory card for data storage, USB port for Real-Time data monitoring and downloadable firmware updates to a PC, and GPS port for track mapping capability.
MCU has 4 programmable relayed outputs that can be activated by any channel or sensor value or warning limit.

See MCU Wiring for details.

Networked Sensor Nodes (SN):
DATAQUEST's Sensor Node Modules are connected via a high speed CAN Network recording@100 Sample/Sec.
Each SN can provide 4 sensor inputs for Analog, Digital, EGT, Temperature, Air/Fuel, Position, Flow, or any other sensor type. Clearly labeled terminal blocks inside the SN allow for easy wire connections (water resistant) and field trim able cable lengths for clean and easy system installation. Up to eight SN's/ 32 sensors can be daisy chain linked through a Single cable.

See NODE Wiring for details.

Touch Screen Dash Display (TSD):
TSD is a full color, high brightness Touch Panel Display. (Dim 8.25"x4.5"x1.25")
This Optional component truly sets the DATAQUEST system apart from the rest. TSD features System Setup, Real-Time, Record, and Playback modes in both Graph and Gauge screen formats. TSD will completely replace conventional dash gauges by being able to display up to 40 different vehicle parameters on a programmable screen. 10 selectable screens can be customized to show engine RPM and any 4 of up to 40 available channels. Each channel has programmable High/Low warning limits that can trip outputs and change color on warning. TSD provides recorded data

playback directly on screen, eliminating need for PC downloading. Select any recorded run and see data on a Gauge or Graphing formatted Screens. Play, Pause, Fast Forward, or Rewind your data! TSD can display Shift and Warnings directly on screen eliminating need for "shift" or "warning" lights.

See TSD for details.

SD card memory:

DATAQUEST utilizes Secure Digital (SD) card memory to hold all recorded data, system configuration file, and error file. These high capacity cards allow for storing literally hundreds of drag race runs, many road course laps, or hours of straight data recording. The removable SD card allows for easy transfer of data to your PC for storage and analysis with the Dataquest's full featured graphing review software for you PC.

CFG.bin File

The SD card stores the systems Configuration file (CFG.bin). The CFG.bin file holds the setup of the entire system and should never be deleted from SD card.

Run#.bin File

The SD card also holds the recorded data files. The data files will be labeled as RunX.bin, where X is the Run # (Example Run1.bin, Run2.bin, Run3.bin,… etc.) Run numbers are automatically incremented at each recording and can be deleted at any time. Run files can also be copied to your PC and renamed appropriately.

EFILE.txt Error File

Any time there is an error in the DATAQUEST there will be an EFILE.txt File generated on the SD card. IF there are NO system errors the SD card will NOT have an EFILE on it. Any existing EFILE.txt will automatically be delected when error is corrected and system is rebooted. This file can be opened with any text editing program, such as Microsoft WORD or Notepad, to see list of errors. See Trouble Shooting for explaination or errors found on EFILE.exe

Instructual Videos:

There are several instructional videos that are highly recommended for viewing in order to learn how to use your DATAQUEST system. These videos are available on the www.AltronicsInc.com web site, the included Ultralog CD, and via the ***Ultralog*** system **HELP**.

DATAQUEST SYSTEM SOFTWARE

ULTRALOG Electronic Racing Logbook Software:

The ***Ultralog*** *Electronic Logbook* software comes with your DATAQUEST system and not only provides a complete electronic racing logbook, but also provides the Configuration and Data Analysis/Review Software for the DATAQUEST.

Help for using the ***Ultralog*** is built into the software and can be found via the **HELP** menu on the main screen.

DATAQUEST SYSTEM CONFIGURATION:

The DATAQUEST system is configured (setup) via the ***Ultralog*** software. The system SD card contains a file CFG,bin. This configuration file is generated from the software. This file should be copied to your PC for backup. TO access the configuration utilitly select **CONFIG** from the DATAQUEST pull-down Menu from the main *Ultralog* window.

Your system will be fully configured upon receipt. You will only need to edit the CFG.bin if you want to make changes. A copy of your CFG.bin file is also kept at Altronics and you can email a request for a change to your config via email Tech@AltronicsInc.com and we can make the changes for you.

Any time CFG.bin it changed system Power must be cycled after SD card is inserted back into MCU.

Please view the Configuration Tutorial video for instructions.

DATAQUEST DATA ANALYSIS/REVIEW:

The DATAQUEST collected data can be reviewed via the ***Ultralog*** software. The system SD card contains the data files RunX,bin. These data files can be copied to your PC for backup and renamed appropriately if desired. To access the review application select **REVIEW** from the DATAQUEST pull-down Menu from the main *Ultralog* window.

Please view the Review Tutorial video for instructions.

DATAQUEST REAL-TIME Data Viewing:

The DATAQUEST can stream Real-Time data to the ***Ultralog*** software via the DATAQUEST Review software. The DATAQUEST **MCU** must be connected to your PC via a USB cable To access the Real-Time application select **Realtime** from the DATAQUEST **REVIEW** application menu in the ***ULTRALOG***.

When DATAQUEST is first connected to your PC via a USB cable it will request to install a DRIVER. When prompted go to the following directory to locate the correct driver. C:\Ultralog\DataQuest\USB Driver\atm6124_cdc.inf

Please view the Real-Time Tutorial video for instructions.

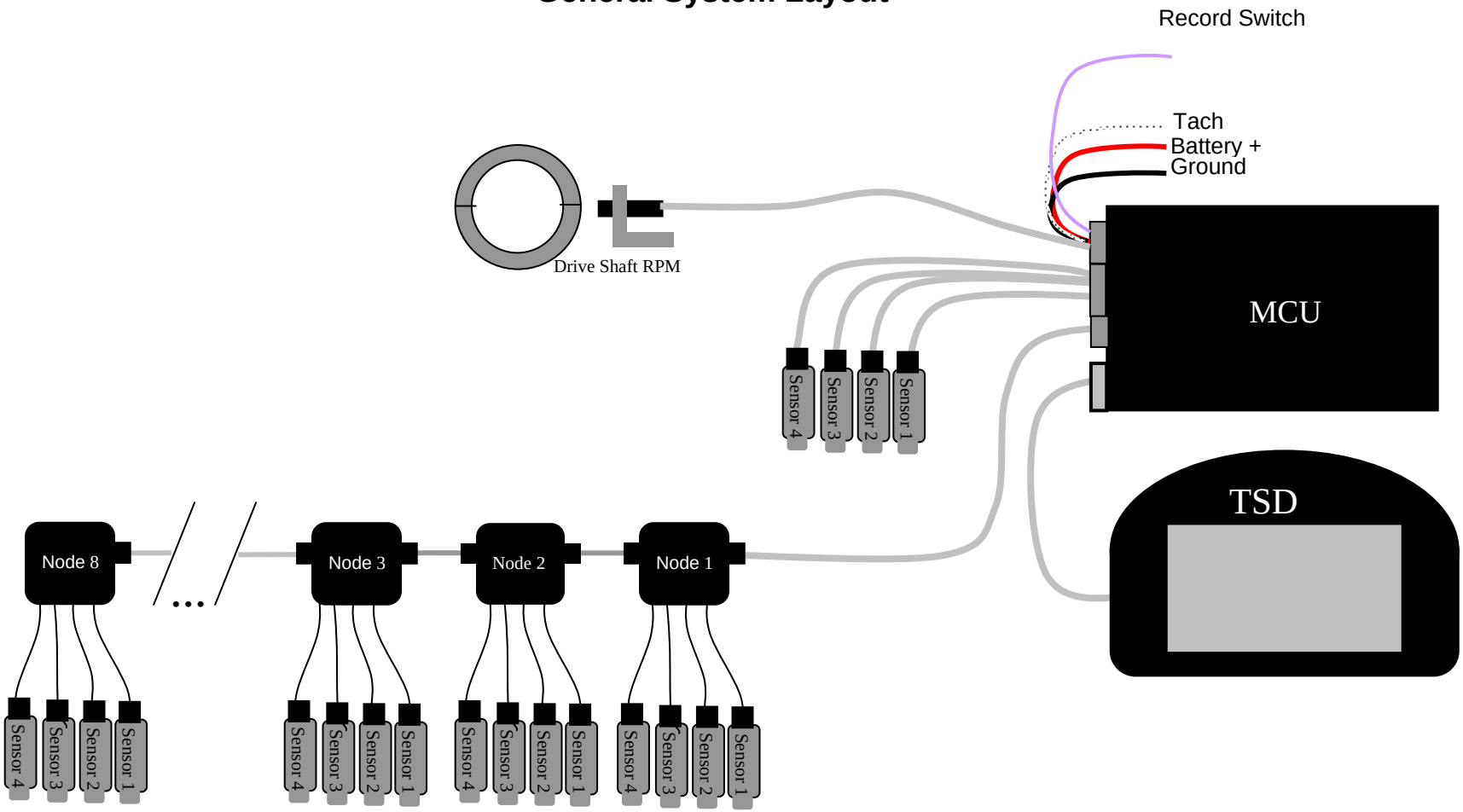
DATAQUEST Firmware and Software Updates:

MCU firmware updates are done via the USB port. Supplied MCU Analog jumper connector must ONLY be used when updating system. DO NOT plug in this connector unless you are prepared to update system. Contact Altronics via email Tech@AltronicsInc.com for complete instructions.

All software is Windows® Compatible.

DataQuest

General System Layout



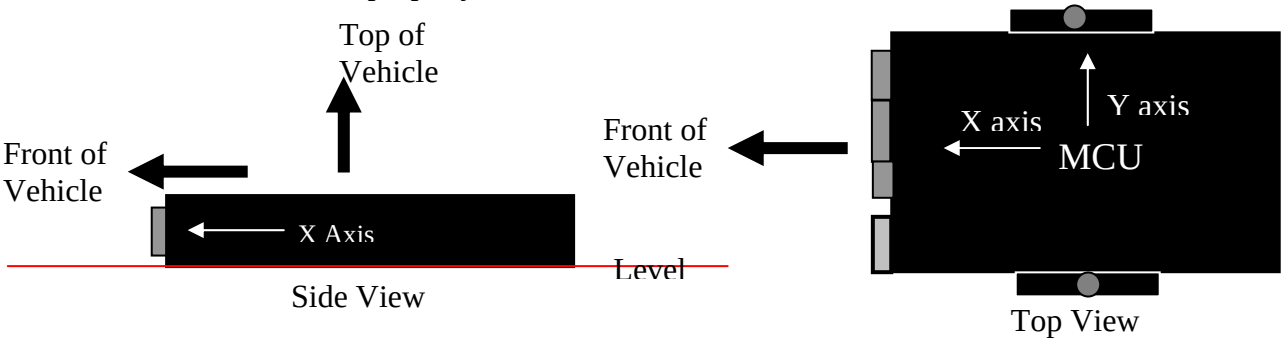
General Component Install and Wiring

*******IMPORTANT*******

****Magneto Ignitions: Suppression spark plug wires must be used or solid core spark plug wires must be shielded properly Contact Altronics Inc for Info****

Mounting MCU

The Main Control Unit (MCU) should be mounted in a location that allows access to memory card and USB ports on back of box. It should also be mounted away from heat sources and at least 18" away from ignition components. MCU should be mounted level and orientated per the drawing below in order for the internal 3 axis accelerometer to function properly. A small amount of angle can be calibrated out if unit can not be mounted level.

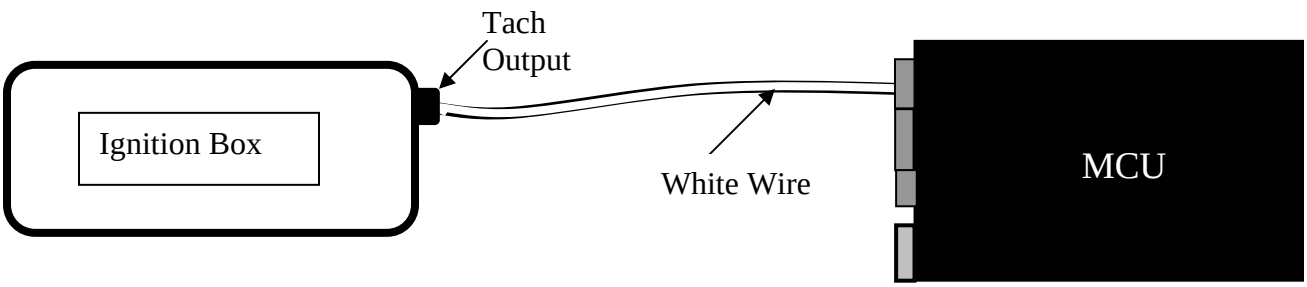


POWER CONNECTIONS

1) Power to the DATAQUEST must be supplied from the battery of the car.
2) Red wire (POWER) with in-line (5 amp) fuse must be attached to the (+) Positive terminal of battery.
3) Black wire (Ground) should be attached to the (-)Negative Terminal of Battery or common system chassis ground point.

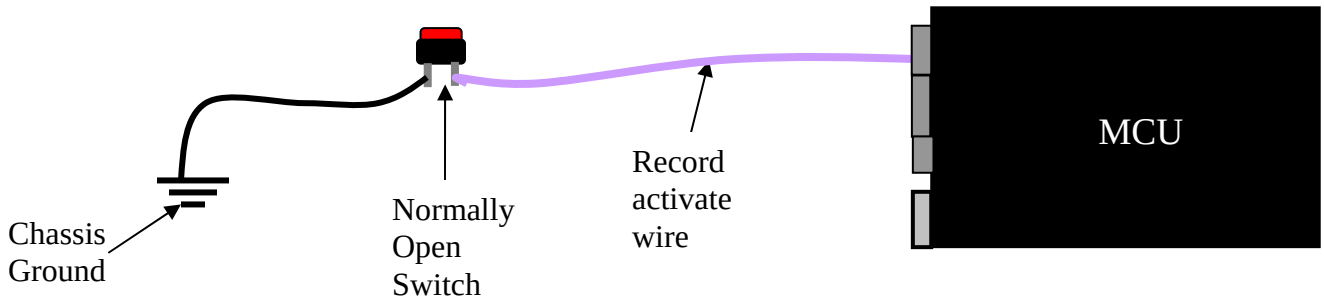
TACH/Engine RPM

1) The Tach/Engine Rpm needs to be spliced into the DIGITAL rpm signal output of MSD or similar ignition system. DO NOT Connect to Ignition Coil. For ignition systems without DIGITAL rpm signal contact Altronics for proper adapter.
2) Connect WHITE wire from Main Connector of MCU box to Tach Ouput.



Manual Record Activation Switch

If you are going to use the supplied manual record switch instead of the Engine RPM signal to activate DATAQUEST recording, then connect the VIOLET wire from the Main Connector on the MCU to one side (terminal) of the Normally Open switch. Connect the other side (terminal) of the switch to ground. Recording is activated when switch "switches" to ground.



Drive Shaft RPM Sensor

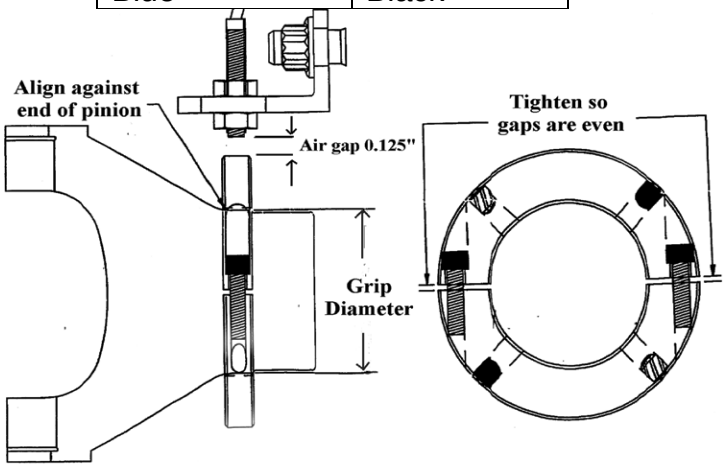
1) Install drive shaft ring of correct size on yolk of rear end housing.
   To determine correct ring size measure grip diameter. (refer to drawing below)

Standard Ring Sizes

Ring Part Number	Ring Size
R1 - Standard 9" Ford	1.875" I.D.
R2 - Large 9" Ford	2.187" I.D.
R3 - 12 Bolt	1.75" I.D.
R4 - Custom	Contact ALTRONICS INC. for more info.

2) With your car in neutral, spin drive shaft to make sure ring is spinning straight.
3) Install pickup bracket using bolt or stud on rear end housing.
4) Install pickup on bracket Air gap between bottom of pickup and ring should be about 0.100"
5) Connect sensor to Drive Shaft RPM Cable from MCU.

Sensor cable	MCU DS RPM cable
Brown	Red
Black	Green
Blue	Black



System Sensor Configuration worksheet

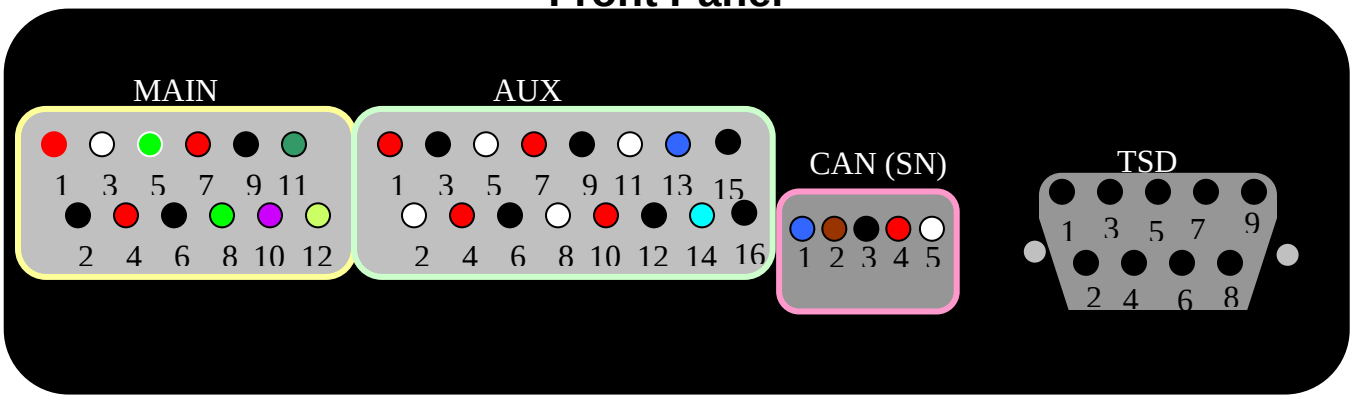
Default parameters and sensors are in BLUE. Fill out additionally installed sensors.

Channel	Name	Enabled	Type	System Connection	Node	Port	Volt min	Volt max	Value min	Value max	Sample rate
0	Tachometer	Y	RPM	MCU	NA	NA	0	12	0	15000	1000S/Sec
1	Drive Shaft	Y	RPM	MCU	NA	NA	0	5	0	15000	1000S/Sec
2	CC Input Shaft	Y	RPM	MCU	NA	NA	0	5	0	15000	1000S/Sec
3	Battery	Y	Voltage	MCU	NA	NA	0		0		1000S/Sec
4			Voltage	MCU	NA	NA					1000S/Sec
5			Voltage	MCU	NA	NA					1000S/Sec
6			Voltage	MCU	NA	NA					1000S/Sec
7			Voltage	MCU	NA	NA					1000S/Sec
8	Acceleration X	Y	G Force	MCU Internal	NA	NA	NA	NA	-6g	6g	1000S/Sec
9	Acceleration Y	Y	G Force	MCU Internal	NA	NA	NA	NA	-6g	6g	1000S/Sec
10	Acceleration Z	Y	G Force	MCU Internal	NA	NA	NA	NA	-6g	6g	1000S/Sec
11				NETWORK	1	1					100S/Sec
12				NETWORK	1	2					100S/Sec
13				NETWORK	1	3					100S/Sec
14				NETWORK	1	4					100S/Sec
15				NETWORK	2	1					100S/Sec
16				NETWORK	2	2					100S/Sec
17				NETWORK	2	3					100S/Sec
18				NETWORK	2	4					100S/Sec
19				NETWORK	3	1					100S/Sec
20				NETWORK	3	2					100S/Sec

21				NETWORK	3	3					100S/Sec
22				NETWORK	3	4					100S/Sec
23				NETWORK	4	1					100S/Sec
24				NETWORK	4	2					100S/Sec
25				NETWORK	4	3					100S/Sec
26				NETWORK	4	4					100S/Sec
27				NETWORK	5	1					100S/Sec
28				NETWORK	5	2					100S/Sec
29				NETWORK	5	3					100S/Sec
30				NETWORK	5	4					100S/Sec
31				NETWORK	6	1					100S/Sec
32				NETWORK	6	2					100S/Sec
33				NETWORK	6	3					100S/Sec
34				NETWORK	6	4					100S/Sec
35				NETWORK	7	1					100S/Sec
36				NETWORK	7	2					100S/Sec
37				NETWORK	7	3					100S/Sec
38				NETWORK	7	4					100S/Sec
39				NETWORK	8	1					100S/Sec
40				NETWORK	8	2					100S/Sec
41				NETWORK	8	3					100S/Sec
42				NETWORK	8	4					100S/Sec

Main Control Unit (MCU)

Front Panel



MAIN Connector:

Terminal	Signal	Connecting Sensor	Wire Color	Cable Name
1	Battery Power +		RED	
2	Ground -		BLACK	
3	TACH/RPM INPUT		WHITE	
4	DS PWR	Drive Shaft RPM	RED	DS RPM
5	DS Signal	Drive Shaft RPM	GREEN	DS RPM
6	DS GND	Drive Shaft RPM	BLACK	DS RPM
7	CC PWR	Input Shaft RPM	RED	CC RPM
8	CC Signal	Input Shaft RPM	GREEN	CC RPM
9	CC GND	Input Shaft RPM	BLACK	CC RPM
10	RECORD	Record Switch	VIOLET	
11	OUTPUT 1		GREEN	
12	OUTPUT 2		LT GREEN	

AUXILLARY Connector:

Terminal	Signal	Connecting Sensor	Wire Color	Cable Name
1	A1 PWR	Analog 1	RED	ANALOG 1
2	A1 Signal	Analog 1	WHITE	ANALOG 1
3	A1 GND	Analog 1	BLACK	ANALOG 1
4	A2 PWR	Analog 2	RED	ANALOG 2
5	A2 Signal	Analog 2	WHITE	ANALOG 2
6	A2 GND	Analog 2	BLACK	ANALOG 2

7	A3 PWR	Analog 3	RED	ANALOG 3
8	A3 Signal	Analog 3	WHITE	ANALOG 3
9	A3 GND	Analog 3	BLACK	ANALOG 3
10	A4 PWR	Analog 4	RED	ANALOG 4
11	A4 Signal	Analog 4	WHITE	ANALOG 4
12	A4 GND	Analog 4	BLACK	ANALOG 4
13	OUTPUT 3		BLUE	
14	OUTPUT 4		LT BLUE	
15	FirmwareUpdate	Jumper Connector	Do Not Connect	
16	FirmwareUpdate	Jumper Connector	See Firmware	Updates

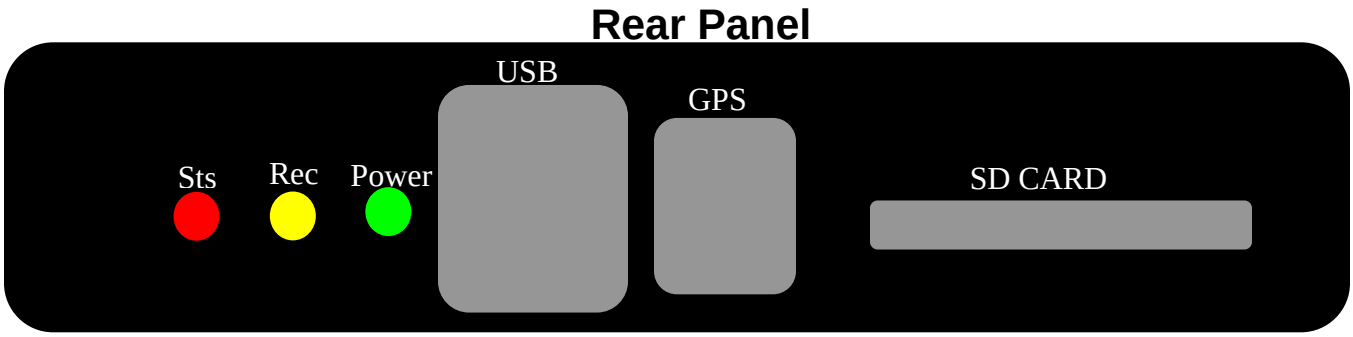
OUPUT CHANNELS 1-4: Output channels are activated on warnings set up in the DataQuest System Configuration software. Outputs are Normally Open and with activated warning close to provide 12 volts (Battery Voltage). They have a Maximum 1 AMP capacity, so if switching more then a 1 AMP load a secondary relay should be used.

CAN Network Connector:

Terminal	Signal	Sensor	Wire Color
1	CANH	Sensor Nodes	BLUE
2	CANL	Sensor Nodes	BROWN
3	GND	Sensor Nodes	BLACK
4	BATTERY +	Sensor Nodes	RED
5	5 VOLT +	Sensor Nodes	WHITE

TSD Touch Screen Display Connector:

Terminated cable, no connections required.



LEDS:

Power – Solid when system powered
Rec- Blicks during normal mode, Solid during recording mode
Sts – System error status. No light – OK, Solid - system or memory card error.

USB:

Connect for REAL-TIME interface to PC and System Firmware updates

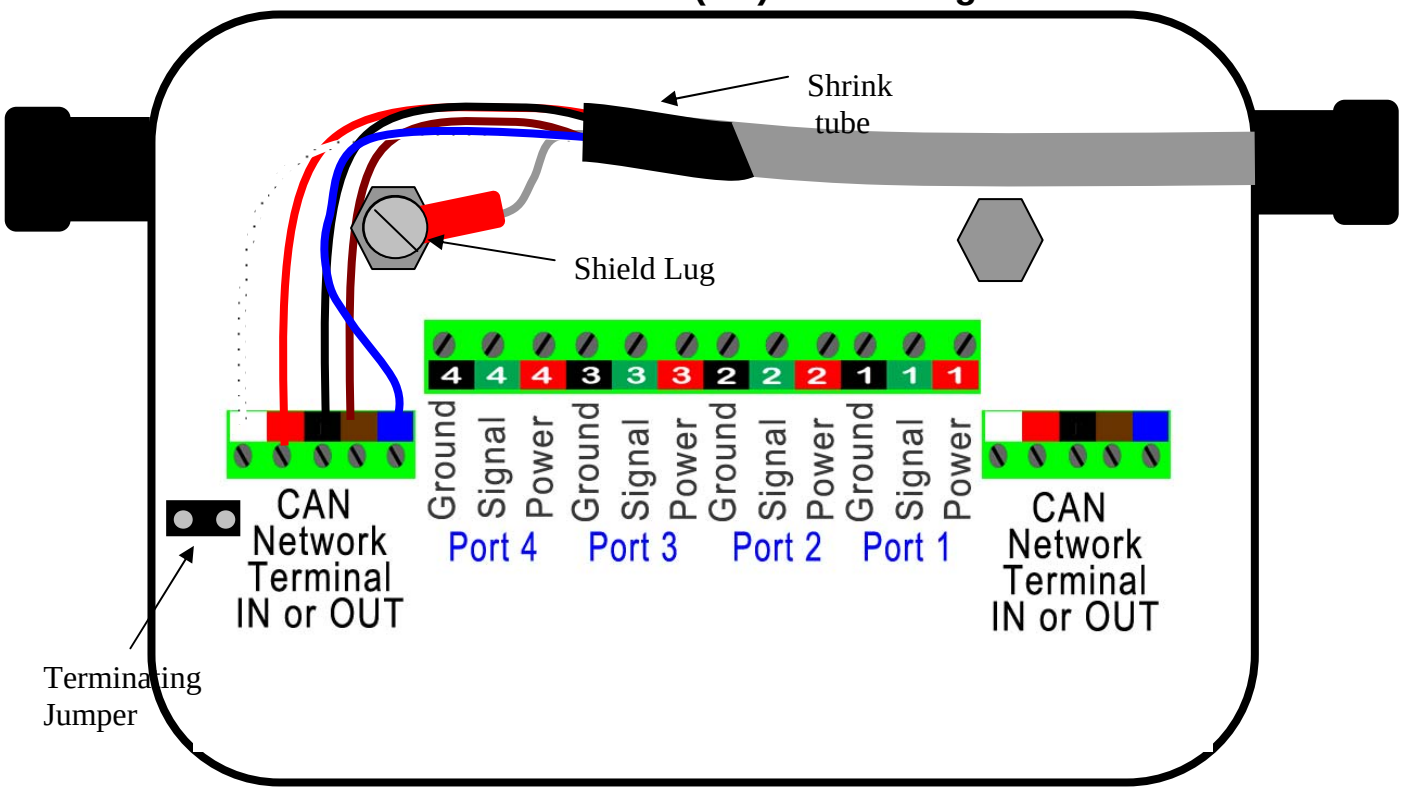
GPS:

Connect to GPS module

SD Card:

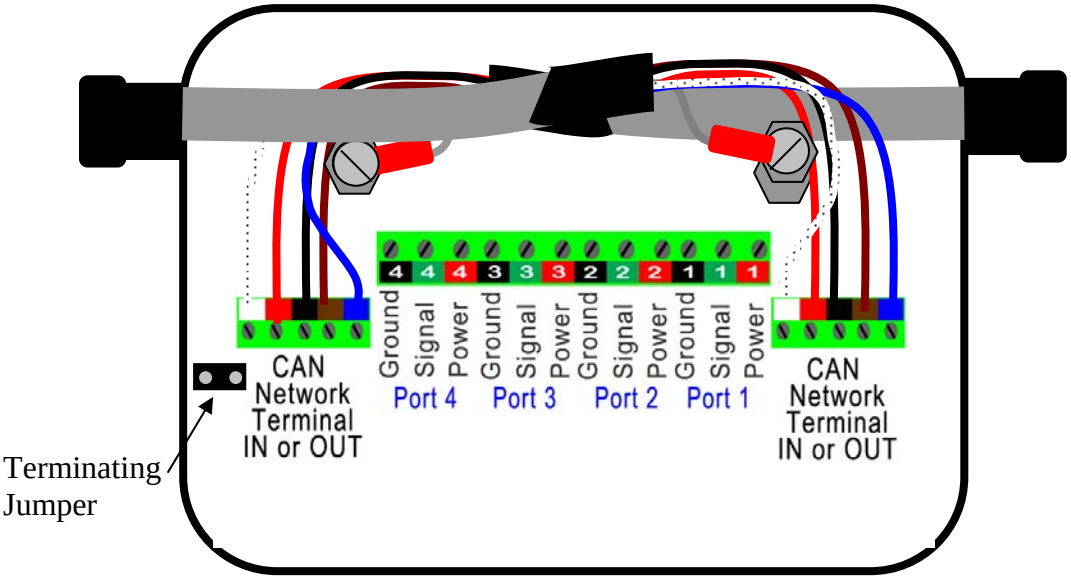
Sd Memory card – Supplied by Altronics, do not use other memory card.

Sensor Node (SN) Box Wiring



Sensor Node (SN) boxes are wired from MCU CAN Network connector. SN's DO NOT have to be wired in their numbered order. (Example: If your system has 3 SN boxes, you can connect SN box #1, then 3, then 2 in the chain.)

1) Measure wire length to extend to other end of Node box.
2) Trim off 2" of insulation taking care not to nick shield wire.
3) Remove foil and trim of green wire even with end of insulation. Slide 1" of heat shrink of end of insulation and shrink it.
4) Trim 3/16" of insulation from each wire. It is recommended to tin the end of each wire with solder if available. It makes it easier to put wire into terminal and holds better when tightened.
5) Crimp solder-less terminal to end of shield wire and screw to Shield Lug.
6) IMPORTANT. If the Node is the **Last** one in the network (at the end of the cable farthest from the MCU) you must place JUMPER on the Terminating Jumper.



7) If additional Nodes are being connected then install second Network Cable in same fashion.
8) IMPORTANT – If this Node is **NOT** the Last Node in Network DO NOT install Terminating Jumper.

See back cover of Node Box for Wiring Diagram.

Touch Screen Display (TSD)

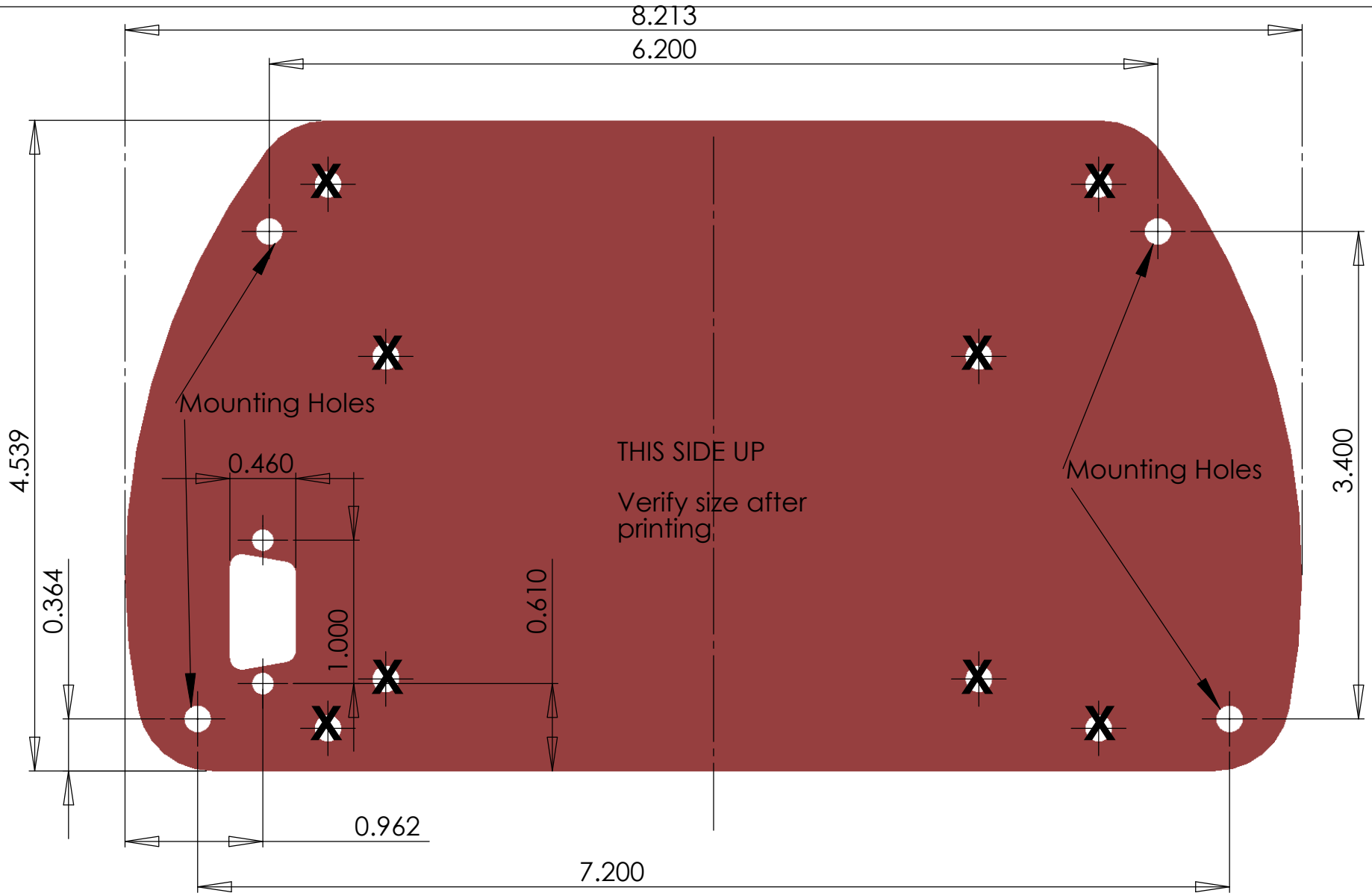
The TSD connects to the MCU via the supplied cable. The TSD should be mounted in a location that is assecible and visible to the driver. It should also be mounted away from heat sources and at least 18” away from ignition components.

The TSD can be mounted utilizing a 5”x4” piece of industrial Velcro or using 4 mounting holes on the back of the panel. Rubber mounted standoffs can be used in place of mounting screws(Contact Altronics for more info) Remove one screw at a time from mounting location holes and replace with standoff.

Use caution in mounting TSD and verify it is secure.

Use the TSD Mounting template on following page as a reference.

IMPORTANT: After connecting and powering system. Go to the MAIN Menu on the TSD and Verify the system “READY” message is present. If “ERROR” message is present go to Trouble Shooting section.



Mounting Methods A or B
A) 5"x4" Adhesive velcro

B) Replace mounting screws with rubber mounted standoffs from Altronics. (Note: Do not remove all 4 mounting screws at once, replace each one at a time.)

Altronics Inc

TITLE:
DataQuest TSD
Mounting Template

SIZE	DWG. NO.	REV
A	1011	1.2

SCALE: 1	WEIGHT:	SHEET 1 OF 1

5 4 3 2 1

TECHNICAL SUPPORT

Email: Tech@AltronicsInc.com

When sending a unit in for repair or update: Fill out a "Service Form" which is available from the Technical Support Section of our website-> www.AltronicsInc.com

WARRANTY

The DATAQUEST by ALTRONICS INC is warranted for 1 Year against any defect in materials and workmanship from date of purchase. ALL WARRANTIES AND GUARANTEES ARE VOID if the DATAQUEST enclosures are opened or altered or is equiptement is connected to system that is not supplied or authorized by Altronics Inc. Sensors are warranted for 30 days.

ALTRONICS INC shall not be liable for injury, consequential, or other types of damages resulting from the use or misuse of the DATAQUEST.

DATAQUEST is to be used for racing purposes only!

Trouble Shooting

The indication of an Error Message on the TSD or Error Light on the MCU will generate an EFILE on the SD card. Copy this EFILE to your PC and open it with a text editor program such as Microsoft WORD or Notepad. You will see an error listed that will explain the problem.

EFILE Error Codes

Error Message	Possible Problem	Possible Solution
Node # error	Node "#" is not responsing	Check Connection and Make Sure Node Power and status Led are indicating correctly
Node # did not ack config address XXXX	Node '#" did not receive configuration data at location XXXX	Reboot system. Check Connection and Make Sure Node Power and Status Led are indicating correctly
IOERR:Log	System not responding during recording	Reboot and check for EFILE,SD card corrupt
Error = X X X X	System not receiving data samples	Reboot and check for EFILE,SD card corrupt

If Error Light is lit and there is no EFILE.txt on SD card:

1) There is no SD card in MCU!!!, Put SD card in MCU and reboot system.
2) The SD CARD is LOCKED, unLOCK SD card in MCU and reboot system.

If there is any error message on TSD and you correct the error, you will still need to reboot system to remove error message from TSD.

Email Tech@AltronicsInc.com with Error Code and EFILE.txt to resolve error code issues.

Appendix

Channel	A connection between a sensor or signal and data recorder.
Analog	Channel or sensor that has many input/ouput levels typically between 0-5 volts.
Digital	Channel or sensor the has only two input/output levels. ON or OFF, 0 or 1. Example: Toggle switch, Wide open throttle switch.
SD card	Memory card the holds data recorded from system. Typically has 2 GB (Giga byte of data)
MCU	Main Control Unit of DataQuest
Sensor Node	Control Box that connects various sensors to DataQuest system via CAN network cable.
TSD	Touch Screen Display Module for DataQuest.
CAN Network	Communication Bus that allows Sensor Nodes to communication and send data over a single cable.
USB Port	Universal Serial Bus port. Standard connection method Between PC and data recorder.
Firmware	Program Code that is programmed into the DataQuest system at chip level.
Software	Program code the runs on Personal Computer to operate Dataquest system
Reboot	Cycle Power on DataQuest to reinitialize system.