



ST8110 Race Turbo Display System

User's Guide Addendum

Preface

Congratulations

Congratulations on choosing the Stack ST8110 Display System. This system will give you a wealth of information to enable you to obtain the maximum safe performance from your vehicle.

Purpose of this addendum

In conjunction with the ST8100 User Guide, this addendum will help you install and use the Stack ST8110 Display System. It explains how to set up and configure the system for your vehicle.

Edition Notice

This edition is for all versions of the ST8110 Display System distributed to customers world wide. The units of measurement used to illustrate the use of the Display System in this edition are for the UK version. Units used in the various versions are shown in the following table.

Parameter Type	UK Version	US Version	EC Version
Boost	psi/Bar	psi/Bar	psi/Bar
Speed	mph	mph	km/h
Wheel Circumference	millimetres	inches	millimetres
Temperature	Degrees C	Degrees F	Degrees C
Pressure	psi	psi	Bar

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Chapter 1. Introducing the Display System

The Stack ST8110 Display System monitors and displays a range of values, known as performance parameters, needed for effective car and driver management in most competitive situations.

The system combines an analog tachometer with a digital display for the following performance parameters:

1. Engine speed (RPM)
2. Boost pressure
3. Oil pressure
4. Oil temperature
5. Water temperature
6. Fuel pressure
7. Battery voltage
8. Wheel speed (optional)
9. Lap times (optional)

You can view the peak values (tell-tales) for all the parameters.

The system provides a range of warning messages based on preset alarm values for the following performance parameters:

1. Oil pressure
2. Oil temperature
3. Boost pressure
4. Fuel pressure
5. Water temperature
6. Battery voltage

You can enable or disable the warning system for each parameter individually.

You can redefine the preset alarm value for each parameter to a value that is more suitable for your vehicle.

The system provides a gear shift warning light that is based on an RPM value that you define for your vehicle.

How to Use this Manual

Stack recommends that you unpack and connect the components in the system **before** you install it in your vehicle. This will enable you to familiarize yourself with operating the display and configuring it for the vehicle in which you intend to install it.

Please use the ST8100 User Guide to install the system, referring to the corresponding section in this addendum to see whether there are special requirements for the ST8110 system.

Chapter 2. Getting Started

The sensors supplied with the ST8110 system differ from those supplied for the ST8100.

Standard ST8110 Display System Items

The ST8110 Display System is supplied with the following standard components:

Quantity	Description
1	Display Module (ST867) with 2 mounting brackets
1	Wiring Harness (ST872)
1	Oil Pressure Sensor (ST744, ST745, ST746)
1	Fuel Pressure Sensor (ST741, ST742, ST744, ST745, ST746)
2	Temperature Sensors (ST760, ST761, ST762, ST764)
1	0-3.5 Bar Boost Sensor with interface (ST453)
1	1.4m Extender Cable for Boost Sensor
4	Switches (supplied with and to be connected to the wiring harness)

Optional ST8110 Display System Items

The ST8110 Display System can be used with the following optional components:

Quantity	Description
1	RPM Sensor (ST696 Opto Isolator or ST697 H.T. Pick-up)
1	Wheel Speed Sensor (ST670 or ST671)
1	Infra-red Lap Time Receiver (ST543)
1	Infra-red Lap Time Beacon (ST544)
1	External Gear Shift Warning Lamp
1	External Alarm Warning Lamp
1	Corner Speed option. Note: The ST8109 Corner Speed option is delivered prefitted in the Display Module

Wiring Harness

The ST8110 harness connections are slightly different to those of the ST8100.

Labels on short cables	Connection To
S1 to S4	Switches 1 to 4
WS	Wheel Speed sensor
LAP	Lap timing sensor
SL	Gear shift warning light
AL	Alarm warning light
NET	Data logging expansion pack

Labels on Long Cables:	Connection To
ES	Engine Speed (RPM)
OT	Oil temperature sensor
WT	Water temperature sensor
OP	Oil pressure sensor
F	Fuel pressure sensor
A	Boost pressure sensor
B+	Battery Positive
B-	Battery Negative (Chassis)

Chapter 3. Operating the Display System

The operation of the ST8110 is basically the same as that of the ST8100. This section highlights any differences.

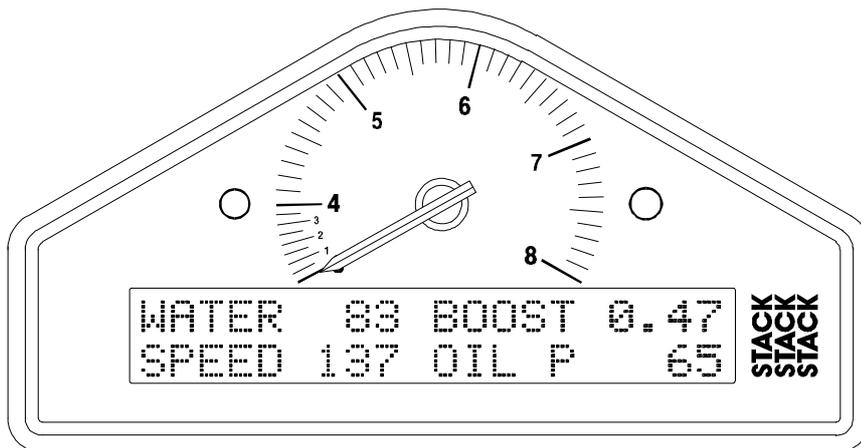
Changing the display layers

The ST8110 has four standard display layers. Layer 1 differs slightly from the standard ST8100 and is shown below.

Each of the display layers can be displayed in turn by pressing switch 3. Press switch 3 when displaying last layer to return to display layer 1.

- ⇒ **The format of the values in these displays will vary for systems supplied outside the UK, as the parameters are displayed in different units.**

Display Layer 1



Display layer 1 shows:

- Water Temperature (WATER)
- Boost Pressure (BOOST)

Note: This illustration shows the Boost Pressure in Bar. In all units this can also be shown in either Bar or psi - refer to *Chapter 4. Configuring the Display System*. The number

displayed is Gauge Pressure, where atmospheric is 0, boost shows as positive and vacuum as negative numbers. Due to atmospheric variations, the display may not show exactly 0.00 when the engine is stationary.

- Wheel Speed (SPEED)
- Oil Pressure (OIL P)

Press Switch 3 to see display layer 2.

Display Layers 2 to 5

These layers are the same as those of the ST8100 (Layer 5 only available if it has been installed as a customer specified option).

Note: When a low-range fuel pressure sensor (2Bar / 30psi) is fitted, the fuel pressure is displayed as 0.1 PSI (US and UK) and as 0.01 Bar (EC).

Peak Values (Tell Tales)

The system stores either a maximum or a minimum value as the peak value, depending on the parameter, as follows:

Parameter	Type of Peak Value	Gated to RPM
Engine Speed (RPM)	Maximum	Yes
Oil Temperature	Maximum	Yes
Water Temperature	Maximum	Yes
Oil Pressure	Minimum	Yes
Fuel Pressure	Minimum	Yes
Battery Voltage	Minimum	Yes
Boost Pressure	Maximum	Yes
Wheel Speed	Maximum	Yes

Resetting the Peak Values

The peak values for the channels will reset as follows:

Parameter	New Peak Value
Engine RPM	0 RPM
Wheel Speed	0 mph or 0 km/h
Boost Pressure	-999 psi or -9.9 Bar
Oil Pressure	999 PSI or 99.9 Bar
Fuel Pressure	999 PSI or 99.9 Bar
Oil Temperature	0C or 0F
Water Temperature	0C or 0F
Battery Voltage	26.0V

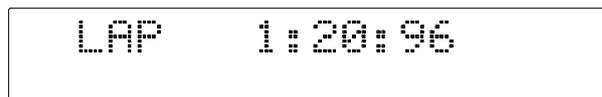
Alarms

The ST8110 Display System has the following built-in alarms:

Parameter	Alarm is triggered when the:	Gated to RPM
Oil Temperature	current value exceeds the preset value	Yes
Water Temperature	current value exceeds the preset value	Yes
Oil Pressure	current value drops below the preset value	No
Fuel Pressure	current value drops below the preset value	Yes
Battery Voltage	current value drops below the preset value	No
Boost Pressure	current value exceeds the preset value	No

Lap times

The lap time is displayed for eight seconds either when triggered by the infra-red lap time sensor on passing the lap time beacon or when the driver presses Switch 4. The popup duration can be changed, or this popup can be turned off completely using the configuration menu (see *Chapter 4. Configuring the Display System*).



Chapter 4. Configuring the Display System

Configuration mode

The list of configurable parameters has changed significantly from that of the ST8100. Please note that the setting for the 30PSI/150PSI FUELP SENSOR (2BAR/10BAR for EC) must match the sensor fitted or incorrect readings will be shown.

Configurable Parameter	Setting Required
E.S.Cylinders	Number of cylinders in engine (for RPM)
GATE RPM	Minimum RPM for the Fuel Pressure, Oil Temperature and Pressure, and Water Temperature warnings to operate.
LOG RPM	RPM at which the logging option is started.
SHIFT RPM	RPM at which gear shift light is to come on
HIGH WATER	Maximum water temperature alarm
HIGH OIL T	Maximum oil temperature alarm
30PSI/150PSI FUELP SENSOR	To match the sensor fitted - ST744,ST745 & ST746 are 150psi/10Bar, ST741 & ST742 are 30psi/2Bar. After changing this setting, always check the following LOW FUEL P setting
LOW FUEL P	Minimum fuel pressure alarm
LOW OIL P	Minimum oil pressure alarm
LOW BATT	Minimum battery voltage alarm
BOOST BAR/PSI	BAR/PSI determines which units are displayed and used for the over-boost test. After changing this setting, always check the following HIGH BOOST setting
HIGH BOOST	Maximum boost pressure alarm
LAP TIME	Lap time popup duration, or disable

Setting or resetting configuration values

Use Switch 1 to decrease the value being configured and Switch 2 to increase it. The rate at which the value increases or decreases itself increases while the switch is being held down. Example of the displays for each of the configuration items are shown below.

Engine speed cylinders:

```
E.S. Cylinders 4
```

Gate RPM:

```
EDIT TEST  
GATE RPM 3000 on
```

Logging RPM:

```
EDIT TEST  
LOG RPM 3000 on
```

Shift RPM:

```
EDIT TEST  
SHIFT RPM 7000 on
```

High water temperature:

```
EDIT TEST  
HIGH WATER 105 on
```

High oil temperature:

```
EDIT TEST  
HIGH OIL T 130 on
```

High/Low fuel pressure sensor setting:

```
EDIT OPTION
30PSI FUELP SENSOR
```

Low fuel pressure:

```
EDIT TEST
LOW FUEL P    10  on
```

Low oil pressure:

```
EDIT TEST
LOW OIL P    35  on
```

Low battery voltage

```
EDIT TEST
LOW BATT    10.0  on
```

Boost pressure units setting:

```
EDIT OPTION
BOOST UNITS - BAR
```

High boost pressure

```
EDIT TEST
HIGH BOOST  0.80  on
```

Lap Time popup

```
EDIT POPUP
LAP TIME    8.0  on
```

Switching Alarms / Lap Time Popup on or off

You can be enable (switch on) or disable (switch off) each of the alarm warnings or the Lap Time popup by pressing and holding Switch 1 and then pressing Switch 2.

Note that you might change the preset value of the parameter slightly while pressing both switches. This does not matter if you are switching the alarm warning off and, if necessary, you can correct the preset value after you switch it on again.

Leaving configuration mode

When you wish to return to the normal display, press Switch 4.

Chapter 5. Installing the Display System

Boost Pressure sensor

Fitting the Boost Pressure sensors

The Display System is supplied with an ST453 (0-3.5Bar) sensor.

Installing the pressure sensors

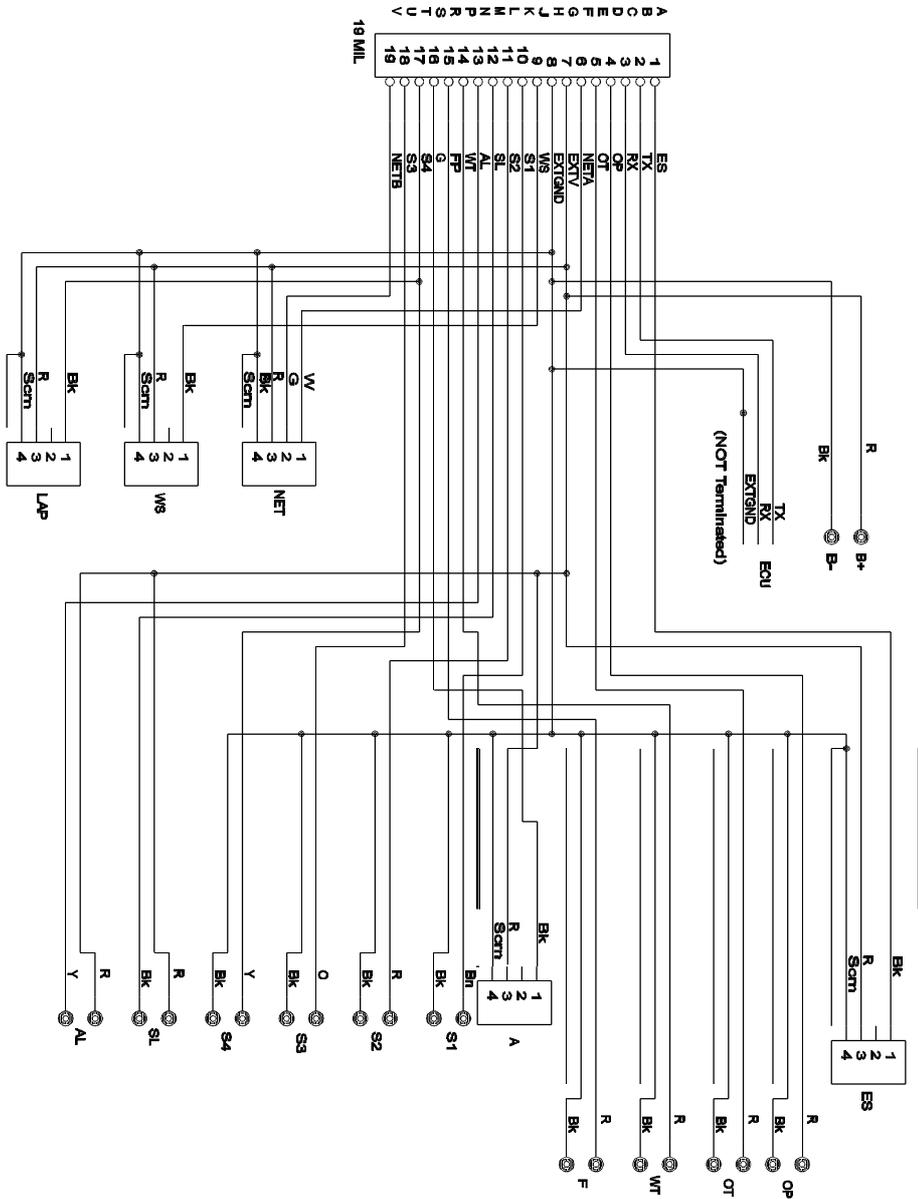
Please refer to the installation instructions supplied in the sensor package.

Chapter 6. Troubleshooting

Use this table in conjunction with the ST8100 manual.

No.	Symptom	Possible Cause	Remedy	Notes
1	Boost shows -9.99 (Bar) or -99.9 (psi)	ST453 disconnected	Reconnect	
		Faulty connections	Check connections	Refer to harness diagram
		ST453 faulty	Return for service	
2	Boost shows 0.00 (Bar) or 0.0 (psi) approximately	ST453 not connected to intake correctly	Check hose and fittings	
3	Boost display incorrect or inaccurate	Units (PSI/Bar) set wrongly	Modify setting	1 Bar is about 14.5 psi
4	Fuel Pressure display shows an incorrect reading	Wrong FUELP SENSOR setting	Modify setting	ST741,ST742 are 30psi/2Bar. Others are 150psi/10Bar

Appendix B. Wiring Harness Schematic Diagram



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