sales@integration.co.nz
www.integration.co.nz

INTEGRATION TECHNOLOGIES LIMITED
136B The Square, Palmerston North 4410, New Zealand

Enabler Embedded

Getting Started Guide

Revision 1.13

Last Revised 13 March 2019

Contents

1 Introduction 4
1.1 Support contact information 4
1.2 Enabler Embedded SDK 4
1.2.1 Hardware supplied with SDK 4
2 General Hardware Information 5
2.1 Opening the Case 5
2.2 The Enabler EMB Main board 6
2.3 Enabler Interface Card (EIC) 6
2.4 Plugin Distribution Modules (PDMs) 6
2.4.1 Current PDMs available 7
2.4.2 RS485 PDM 7
2.5 Battery 8
3 Enabler Embedded Installation 9
3.1 Connecting Earth, Power and Network 9
3.2 System Earth 9
3.3 Installing a PDM on the EMB/EIC 11
3.4 Removing a PDM 12
3.5 Installation of Pump/Device cables 13
3.6 Installation of Extension EIC boards 15
4 System start and service menu 16
4.1 Service Menus 17
4.2 Network menu 17
4.3 Power menu 19
4.4 Set Date/Time menu 19
4.5 Software 19
4.6 Service menu 20
5 Enabler Embedded UPS 21

6 System Configuration 22
7 Initial setup of system 23
7.1 Initial setup of system 23
7.2 Initial setup of Forecourt 23
7.3 Connecting Clients/POS 23
7.4 Backup 23
7.5 Connecting PDM to Pumps (or MPPSIM) 24
7.6 Activation 24
8 Migrating from Enabler Desktop 25
8.1 Enabler V4 25
8.2 Desktop Solution 25
8.2.1 Forecourt Control 26
8.2.2 User Applications 26
8.2.3 Data Access 27
8.3 Embedded Solution 28
9 Appendix: Case and Bill of Materials 29
9.1 Battery Cable 30
9.2 Internal Earth Connector Cable 30
9.3 External Earth Connector Cable 31

Notes

- This document is formatted for A4 paper size; changing paper size in electronic versions may cause formatting problems.

1 Introduction

This document is an introduction to the Enabler Embedded system for people who are planning to install and / or development application to work with the system.

It covers the Enabler Embedded hardware and an overview of the software.

1.1 Support contact information

For any questions or support email	support@integration.co.nz
Enabler Embedded support web site	https://www.integration.co.nz/embedded
The Enabler main web site	https://www.integration.co.nz

1.2 Enabler Embedded SDK

The SDK includes all the software, documentation, samples and hardware required to develop client applications.

The latest Enabler Embedded SDK release is available for download from the Enabler Embedded support web site.

1.2.1 Hardware supplied with SDK

- Enabler Embedded base unit with 1 Enabler Interface Card
- Plug-in Device Module(PDM) – RS485
- Pump simulator Cable

2 General Hardware Information

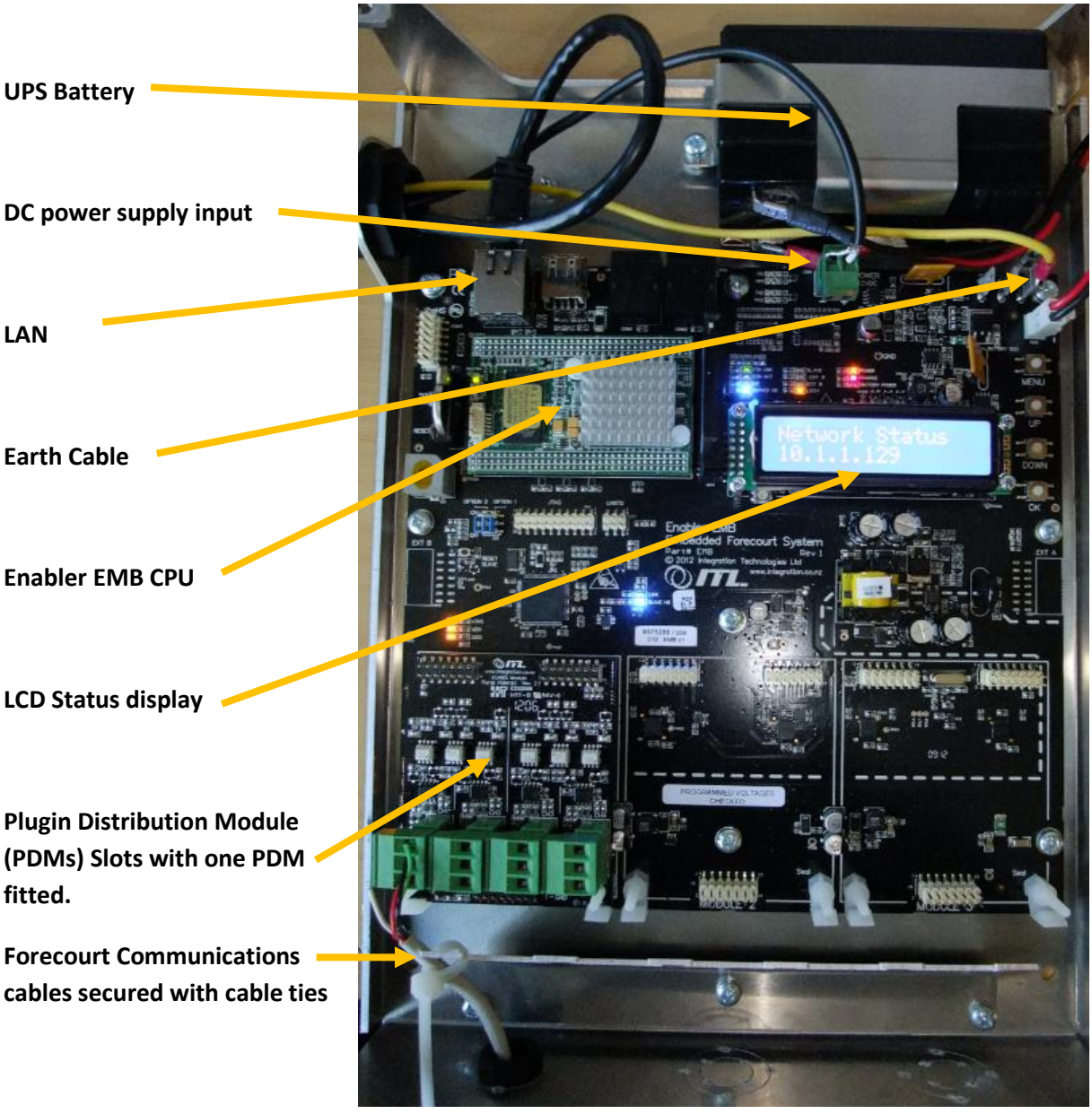
This section describes the Enabler Embedded hardware.

2.1 Opening the Case

The case is secured by 2 screws along the bottom edge of the case. When these are removed the lid can be removed by hooking off the top of the case. For extra security there is a loop on the case for attaching a security device.

What's in the box?

The picture below shows an EMB system with one PDM fitted.



2.2 The Enabler EMB Main board

The EMB board is the heart of the system and runs the core Enabler software and Web applications for configuration and maintenance. The main components are the CPU module, Flash disk, LCD Status display and UPS.

It also has connections for LAN, Power and up to 3 Plugin Distribution Modules to be fitted.

2.3 Enabler Interface Card (EIC)

Enabler Interface Cards (EICs) are expansion cards available for the EMB board. The EMB includes space for three PDMs, EIC cards can be connected to the main EMB board to provide additional pump connectors. Each EIC has space for three PDMs.

Up to two EIC cards can be connected to the main EMB board – giving a total of 9 PDM cards when fully expanded. See section Installation of Extension EIC boards for more information.

2.4 Plugin Distribution Modules (PDMs)

PDM cards are used to personalise the EMB/EIC to the physical interface used by the connected devices.

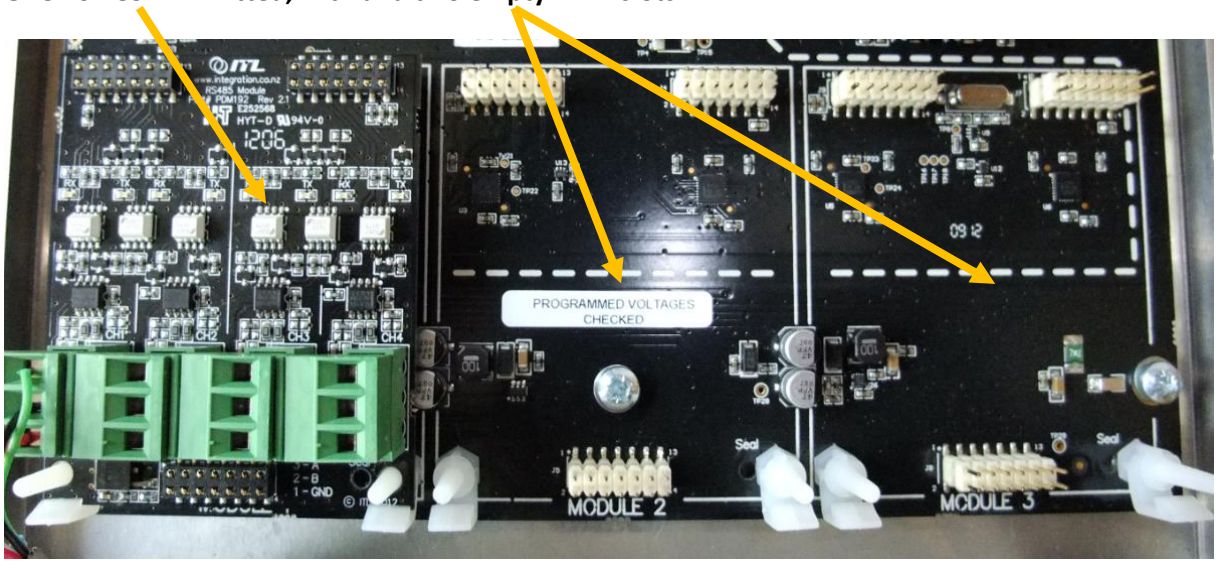
The EMB (and EIC) boards have space for 3 PDMs to be fitted.

Each PDM provides 4 channels for communication with forecourt equipment (usually pumps).

With 3 PDMs fitted, the EMB provides 12 forecourt communications channels – sufficient to connect 24 dispensers.

Photo of PDM section of the EMB:

One RS-485 PDM fitted, with and two empty PDM slots.



2.4.1 Current PDMs available

PDM number	Interface
PDM071	Current Loop
PDM104	Tokheim
PDM115	NZ Protocol
PDM192	RS485
PDM203	RS422
PDM247	RS232
PDM258	IFSF LON

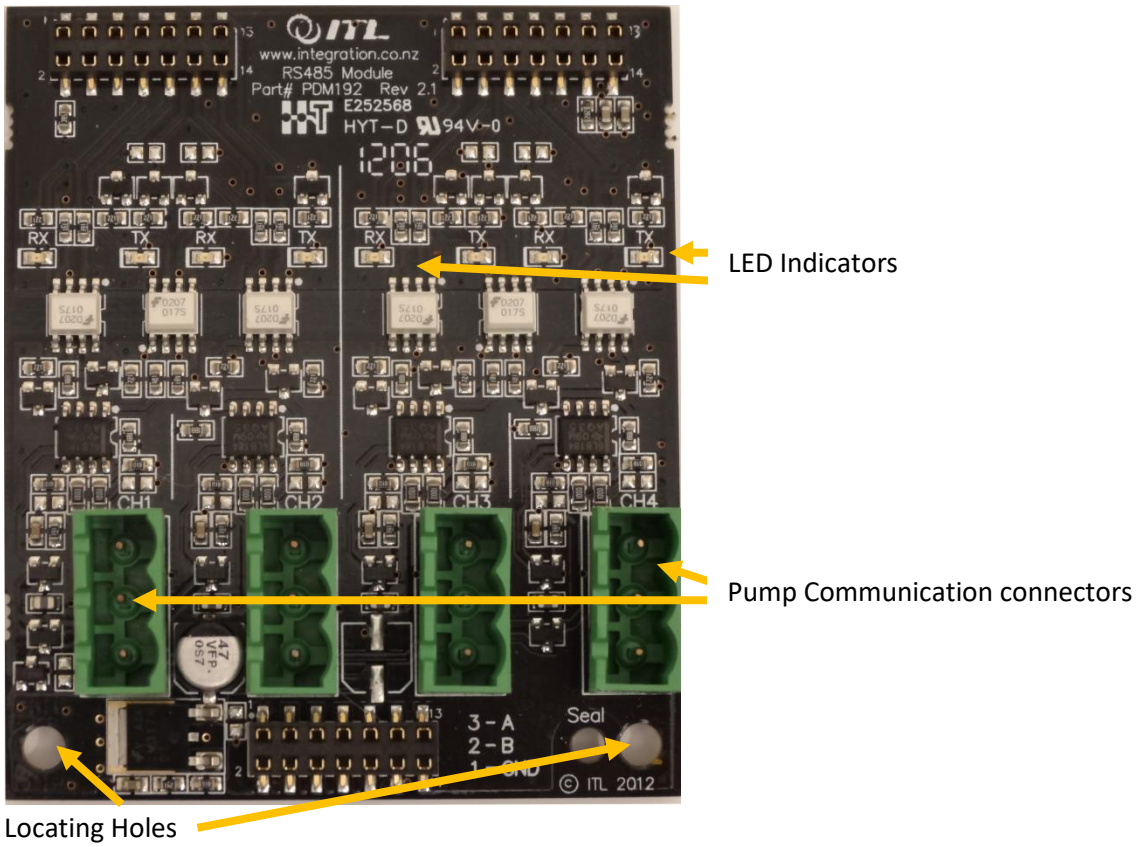
On the initial release we had 4 different PDMs available, and additional PDMs may be available in the future.

For a detailed list of all supported pump types and the setup of the pumps. See our website:

https://www.integration.co.nz/embedded

Please contact the ITL support team if your integrator does not already have access to this page.

2.4.2 RS485 PDM



2.5 Battery

This is a 12V sealed lead acid (SLA) battery of 1.2AH. It is used to run the system when there is a power interruption until alternative power comes online, and to enable a clean shutdown of the system if power is not returned.

The battery must be disconnected when the system is shipped or when the system is not in use for an extended period.

If the system is not used for a long period of time the battery will degrade. For best results ensure:

- The battery is fully charged before being stored.
- The battery is stored in a cool dry place – ideal storage temperature for SLA battery is 0 to 20 °C.
- If battery voltage drops below 12.4V it should be recharged to avoid loss of battery capacity.

The battery must be connected to EMB or the system will not start. If the battery is not connected properly an error will be shown on the 2-line LCD display.

3 Enabler Embedded Installation

The case has been designed to be mounted on a wall with the dispenser/device cabling coming through the grommets on the bottom of the case.

The case can be screwed to the wall using the 4 holes in the back of the case. These are accessible from inside of the case in the corners.

3.1 Connecting Earth, Power and Network

On the top right of the case is a gland for the Power, LAN and Earth cables.

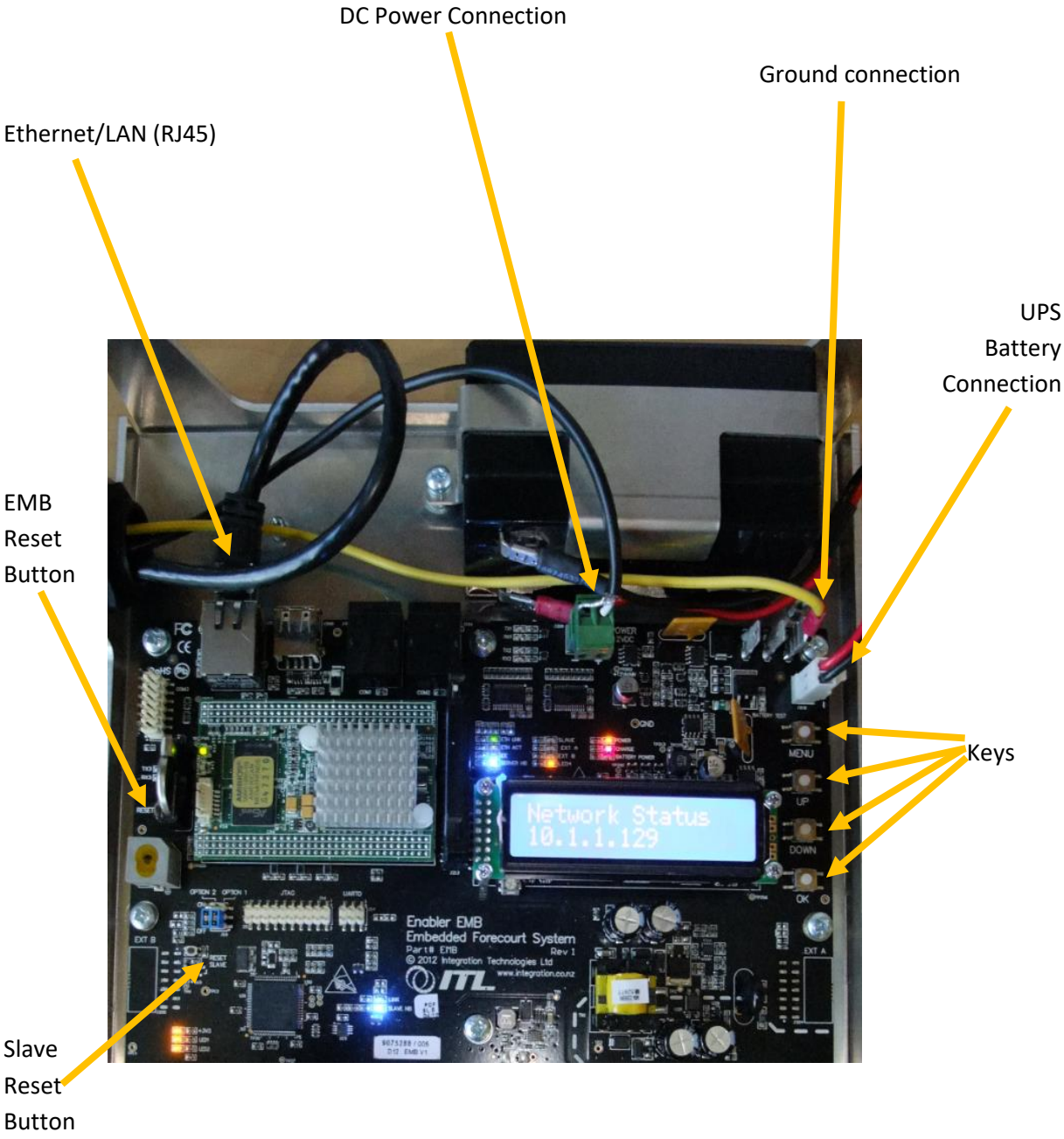
- Loosen the cap of the gland.
- Supplied with the case is a universal power supply (100vac -> 240vac). This needs to be mounted outside the case and the 12v DC lead feed through the top right gland and plugged into the 2 pin green socket on the EMB.
- Feed the network cable through gland and attach to RJ45 network connection on EMB.
- Feed the supplied 3m Earth cable through the top right gland and attach to a suitable earth connection. The other end should already be securely attached to an earthing tag inside the case.
- Tighten gland to hold cables.

3.2 System Earth

Ground the unit to with the ground connection to protect the system and attached devices.

Failure to ground the unit will void the warranty.

EMB Connections (Rev1 motherboard shown)

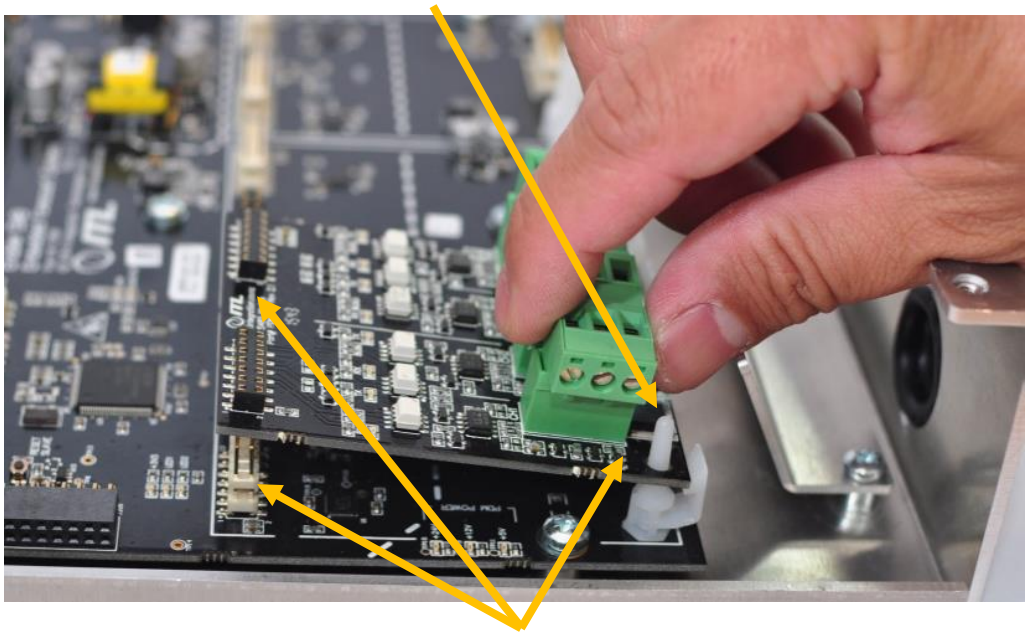


3.3 Installing a PDM on the EMB/EIC

Make sure you have correct PDM for the pump to be attached.

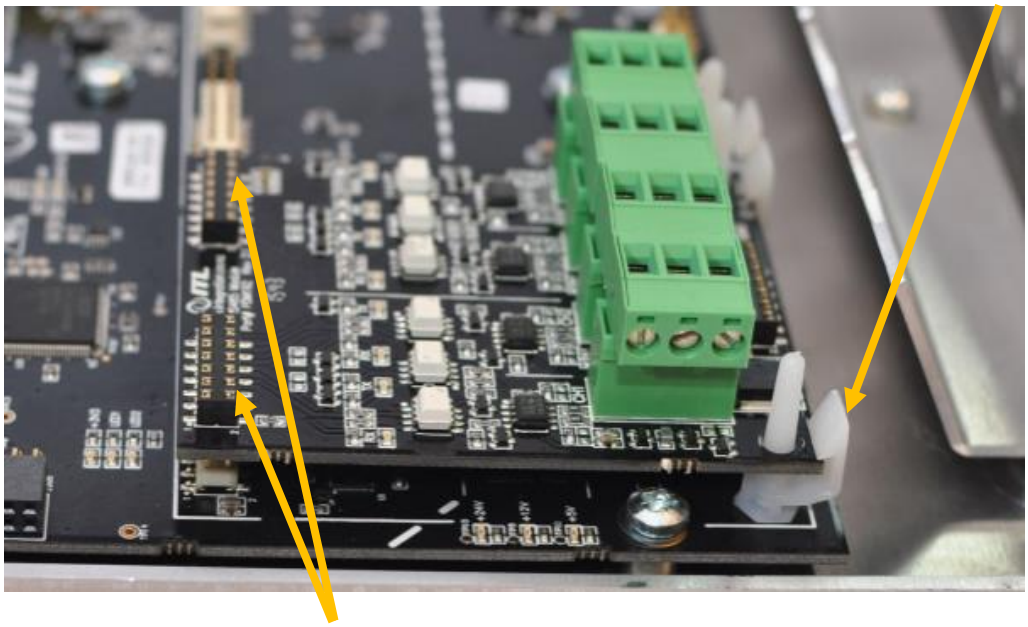
See the section: **Pumps Protocols Supported and PDM** to use in this guide or check the ITL web site for the latest information on Pump types, PDM and Enabler EMB setup information.

Each PDM has 2 locating holes at one end of the module next to the pump connectors. Holding the PDM by the green connectors, place the location holes of the PDM over the white location pins on the EMB/EIC.



This should line up all three pin connectors.

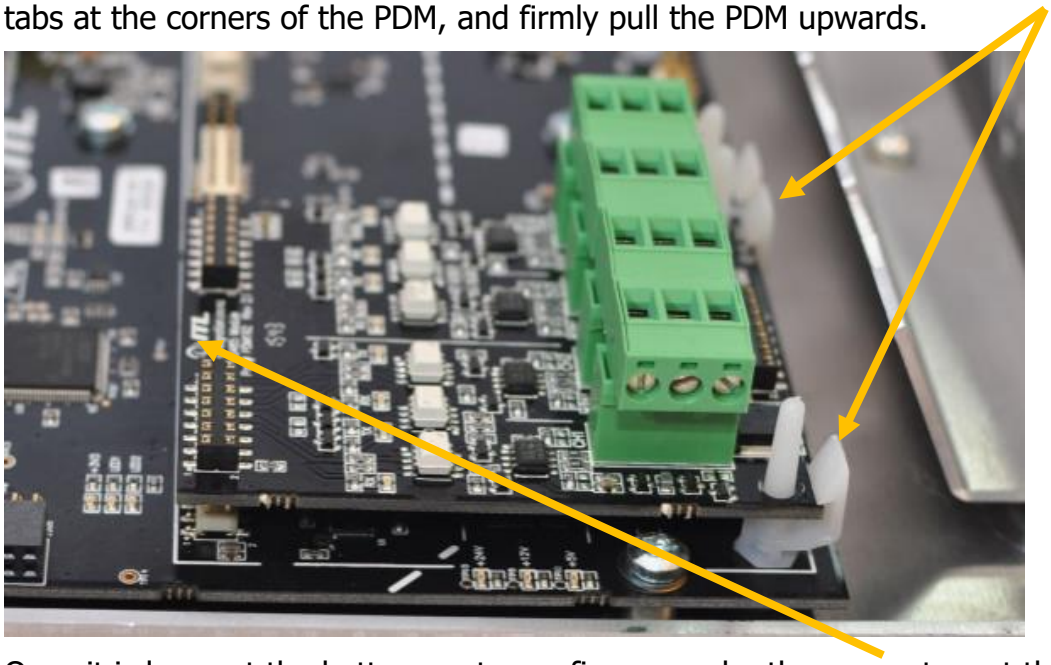
The PDM can then be gently pushed down until locked by the locking tabs.



Make sure the pin connectors are fully engaged at the top end of the module.

3.4 Removing a PDM

To remove a PDM, hold the PDM by the green connectors, push the white unlocking tabs at the corners of the PDM, and firmly pull the PDM upwards.



Once it is loose at the bottom, get your fingers under the connectors at the top and wiggle the module gently while pulling until the PDM is free.

Take care to be sure you do not bend the connector pins.

3.5 Installation of Pump/Device cables

The cables are installed through the grommet directly beneath the PDM at the bottom of the case.

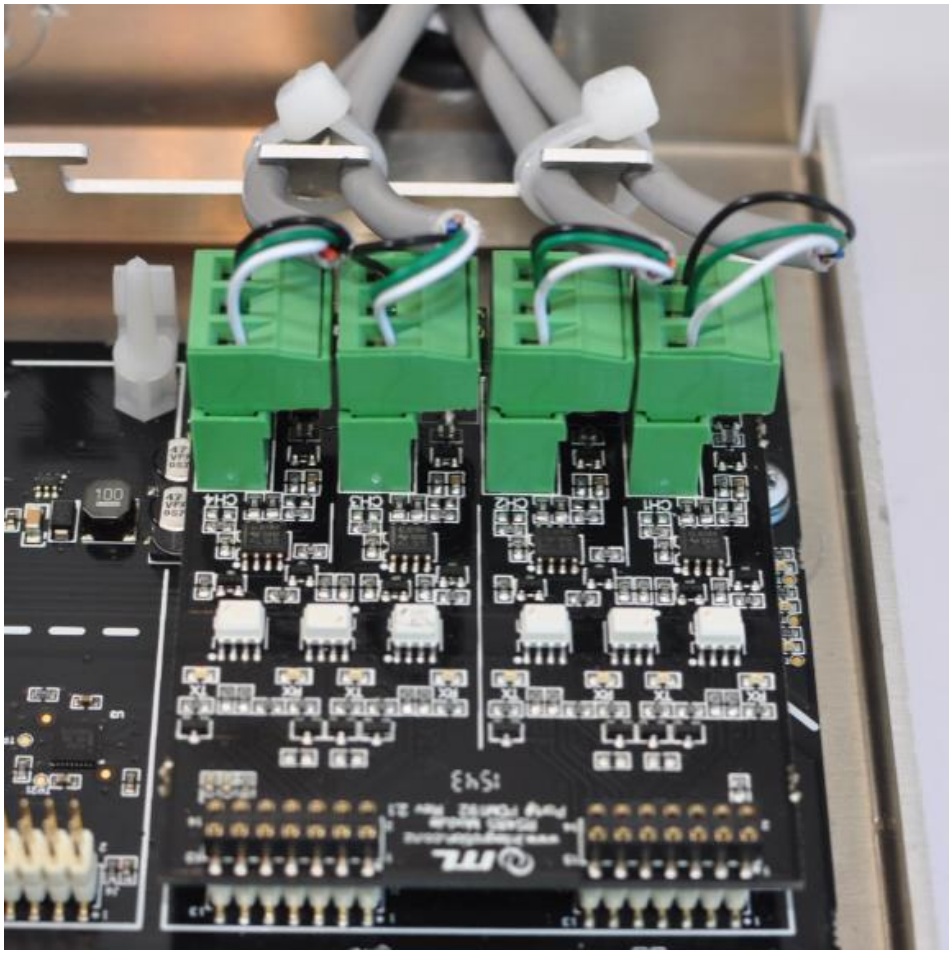
Feed the cables through it until you have enough length to attach the plugs using the wiring key marked on each PDM.

Unplug the spare plug from the PDM and attach to the cable.

Once all the plugs are attached to the cables, plug the cables into the PDM and pull the cable back through the grommets until the slack is taken up.

The cable bundle for the PDM can then be secured using the supplied cable ties.

RS485 PDM with cables attached

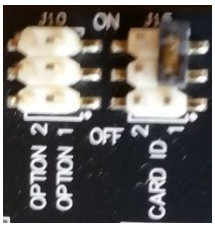
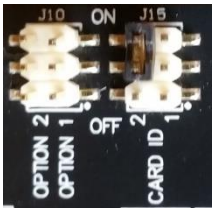


Top view showing the cable ties

3.6 Installation of Extension EIC boards

The EIC board is used to extend the main board by another 3 PDMs. 2 Extension boards can be added to the main board. These are plugged in to each side of the main EMB board via the connectors EXT A or Ext B. These cannot be connected using the standard EMB case and require a different case.

The Card ID jumpers need to be set on the extension boards as follows:-

Extension Board	Jumper setting
1	 With no jumpers it will also default to extension board 1
2	

The EIC board must be grounded to the main board or chassis via EIC earth spade connector.

4 System start and service menu

The Enabler Embedded has a built in website which is used as the primary way of configuration of the device.

See the Enabler Web Reference Manual.

When first plugged into a network it will use DHCP to get its network address and use its default network name of **WINDOWSCE**. If the system can't find a DHCP server it will revert to an automatic IP address (169.254.x.x) after about 2 minutes.

When the system is powered up the current status will always be displayed on the Service display.

When booting the following messages will be displayed:-

`Loading 100%`	Booting the system
`Starting Enabled Embedded`	Starting the system

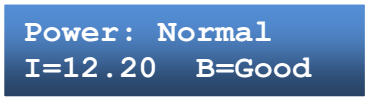
At this point the blue heartbeat led will start flashing on the EMB and the system will start running its diagnostic checks

`Checking Battery`	Checking the battery is connected and charged.
`Checking Database`	Checking the database is accessible and valid.
`Integrity check Database`	Checking the database for corruption. **This only happens if the system is not powered down properly** (e.g. faulty UPS battery).
`Database OK`	Database check complete

Once all the checks are complete and there are no problems detected, the system will go into its running state. The display will sequence between the following various status displays.

Enabler embedded software version.

Shows the current network status and IP address of the system.



Power status shows if it is running on mains powers or UPS and also the current input voltage and the status of the battery.

Forecourt status displays the number of pumps online and the number of deliveries in progress.
(*Not available in initial version of software*)

4.1 Service Menus

There are 4 keys available on the EMB to allow interaction with the system. (**Menu**, **Up**, **Down**, **Ok**)

Pressing any key on the EMB while Enabler Embedded is in its running mode will take you to the top level menu.

Use the **Up**/**Down** keys to move through the options in the menu level and **Ok** key to select an item.

Current top level menus are **Network**, **Date/Time and Service**

4.2 Network menu

Network Status

This item will show the current status of the network

Show MAC address

This will display the MAC address of the Ethernet port.

Network Reset to DHCP

This will reset the Network setting back to the default settings, which is to use DHCP. Use if you can no longer connect to Enabler Embedded.

Network Reset to 192.168.1.1

This will reset the Network setting to a fixed static address so that the system can be accessed where there is no DHCP server on the network.

Security

This sub-menu is for displaying and configuring the SSL (Secure Sockets Layer) setting for Enabler Embedded.

Security Status

Select this to display whether SSL is enabled or not.

Enable Security

Select this to enable SSL. The Enabler Embedded Host Name must be changed first through the Web Applications. The default Host Name of 'WindowsCE' will not be accepted.

Select **Yes** to select the Host Name. And select **Yes** to enable SSL.

The system will then display **Please wait...** After a few seconds, Enabler Embedded will then restart in SSL or secure mode.

Please proceed with caution as only a Factory Reset can turn the SSL setting OFF. See the **Enabler Web Reference Manual** for more details on how to restore configuration from a Factory Reset.

4.3 Power menu

Power OFF UPS

This will force the system to shut down while it is running on UPS. This happens whenever the power is removed and enables a user to quickly shutdown the system without having to wait for the system UPS max run time to run out.

*The system should **never** be shut down by removing the battery as this could cause corruptions to the database.*

Battery status

This runs a quick battery test and shows the current charge level and battery voltage.

4.4 Set Date/Time menu

Set Automatic Date/Time

This Enables or Disables the Automatic time synchronization.

When enabling or disabling, you may need to wait for 2 seconds for the display to change before pressing OK.

Set Date

This allows the system date to be set.

If Automatic time is enabled, then the Set Date option will only allow the Automatic Time to be synchronised.

Set Time

This allows the system time to be set

If Automatic time is enabled, then the Set Time option will only allow the Automatic Time to be synchronised.

These only need to be used if the web interface is not available.

4.5 Software

Uninstall software

This option allows an Enabler Embedded software package to be uninstalled.

Install software

This option allows an Enabler Embedded software package to be installed from the Embedded disk or from the USB stick \cabs directory.

These only need to be used if the web interface is not available.

4.6 Service menu

Serial Number

This displays the systems service number

Test EMB LEDs and display.

This runs a diagnostic on the LEDs and Service display on the EMB, press any key to stop the test.

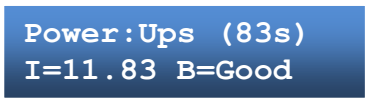
5 Enabler Embedded UPS

The UPS (Uninterruptible Power Supply) is designed to keep the system running if there is a brief power interruption until mains power returns, or an alternative power source is up and running.

It will hold the system running for 90 seconds then shutdown the system.

While running on UPS the system constantly monitors the battery state and if it detects the battery is getting low it will immediately close down the system.

If the power returns while running on UPS the system will automatically switch back to its normal running state.



Service display shows the power status when running on UPS, showing the remaining seconds of UPS runtime.

The system can be shutdown down earlier by selecting the **Shutdown when on UPS** on the service menu.

6 System Configuration

Configuration of Enabler EMB can be done through the built in webserver (web application). The web application on EMB may be accessed by using the IP address shown on the service display or by using its network name.

For a more detailed description of each page, see the Enabler Web Reference Manual.

The factory default configuration is for 4 MPPSIM pumps on the first PDM. This can be directly connected to the MPPSIM.exe application to simulate pumps. MPPSIM.exe is part of the Enabler EMB SDK which can be optionally installed when installing the Enabler EMB client software.

7 Initial setup of system

This section is a checklist list of the items that need to be set up to get a working system.

For a detailed list of all supported pump types and the setup of the pumps. See our website:

https://www.integration.co.nz/embedded

Please contact ITL for a valid user name/password to access this location.

7.1 Initial setup of system

- Date / Time, Time Zone and Regional settings
- Network settings
- Change password of admin user and set up any additional users

7.2 Initial setup of Forecourt

- Setup site settings, site name
- Set up correct protocols for Pumps and Gauges on Ports page
- Set up grades
- Set up tank gauges
- Set up tanks
- Set up Pumps

7.3 Connecting Clients/POS

- Install Enabler Embedded client on Client
- Setup a new user with corresponding user role in User management with the same User name / password as used by client.

7.4 Backup

- Backup the configuration and download to another system.

7.5 Connecting PDM to Pumps (or MPPSIM)

For MPPSIM configured pumps, the MPPSIM.exe application is provided with Embedded Enabler SDK to simulate pumps.

For non MPPSIM pumps, refer to ITL's website for PDM and pump specific connection.

7.6 Activation

If you have Enabler Embedded 1.2.0 installed, then you may skip this section.

If you have earlier versions, the EMB software needs **activation** before it can be used. The activation process requires a data exchange with our Activation Server.

The easiest way to do this is by online (internet) connection. After logging in to the EMB for the first time you should:

1. Go to the Activation page
2. Enter your Integrator Code
3. Click Activate Online to complete the activation process.

If you cannot connect EMB to a network with Internet access, you can use the file activation instead of online activation. In this process an activation file is generated that you can email to

support@integration.co.nz

We will send you a file in response which you can use to activate your EMB system.

For a more detailed description of the activation process, see the Enabler Web Reference Manual.

8 Migrating from Enabler Desktop

This section is for integrators who already have site solutions using the Enabler Desktop (PCI/PCI Express); and would like to use Enabler Embedded as their new forecourt platform. The following are guidelines on how to successfully migrate from the Desktop platform to Embedded.

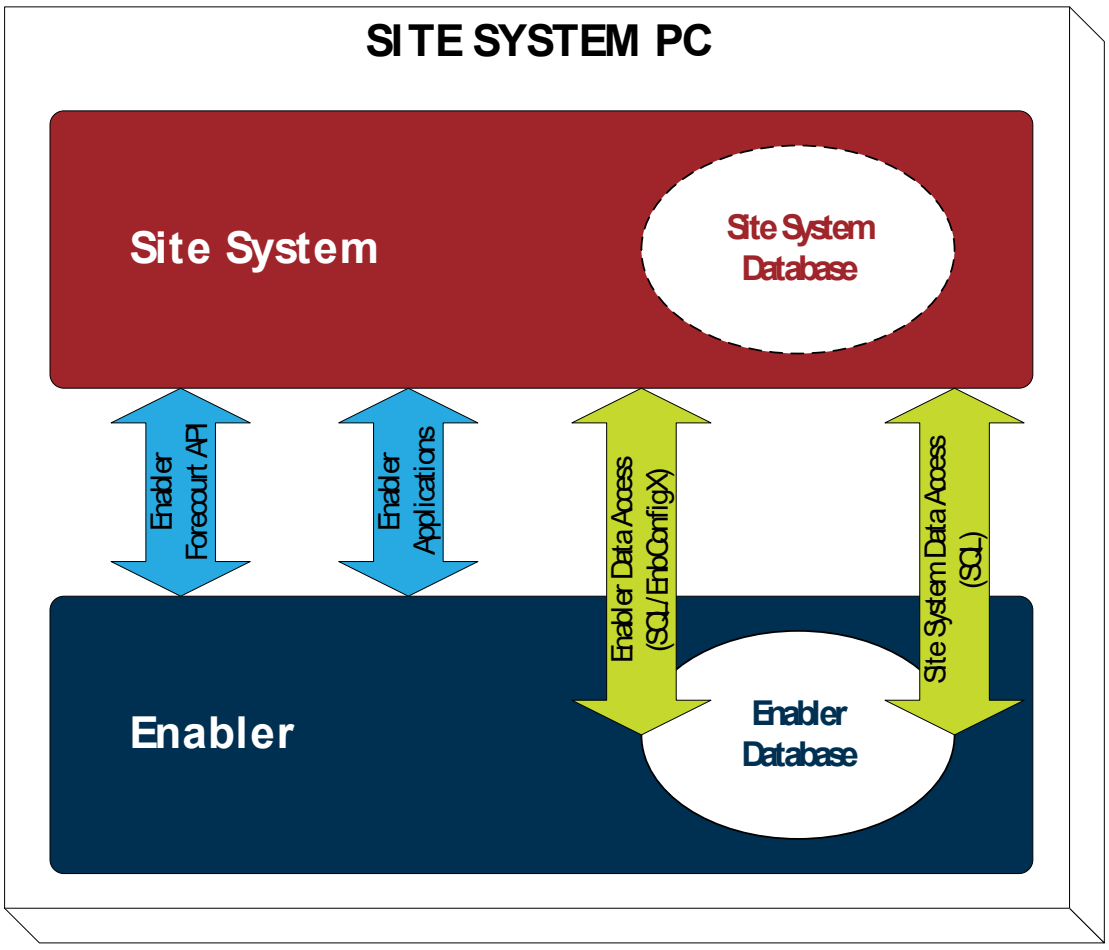
8.1 Enabler V4

The Enabler V4 SDK must be used when developing system site solutions for Enabler Embedded.

Enabler V3 SDK cannot be used since it is not compatible with Enabler EMB.

8.2 Desktop Solution

A typical block diagram for an Enabler Desktop Site System is provided below:



- The Enabler Forecourt API (Application Programming Interface) allows your application to control the pumps and other forecourt devices.

- The Enabler Applications refer to the Windows Executable Applications providing the User Interface for Configuration, Site Management, and Report generation.
- The Enabler Data Access is the interface to read and update Enabler data. This can either be ODBC/SQL; or via the legacy Enabler Configuration API ActiveX Control (EnbConfigX).
- We expect your Site System to have its own database tables as required. However we know that some Integrators choose to store data in The Enabler's Database.

8.2.1 Forecourt Control

Enabler V4 provides backwards compatibility for the V3 ActiveX controls. No change is required on your existing site systems for this.

V4 has support for .NET and Java, so you may decide to leverage these if you are developing applications using these platforms.

8.2.2 User Applications

The V3 Windows Applications are no longer available; but they have now been replaced with V4 Web Applications.

Any specific V3 Windows Applications that are referenced by your existing site system should now be mapped to a web link instead. The following is a quick map of the Windows Applications to Web Applications (assuming your Enabler Embedded has an IP of 10.1.1.160):

Enabler V3 Applications	Enabler V4 Web Application links
Enabler Configuration (EnbConfig.exe)	http://10.1.1.160/SiteSettings.aspx http://10.1.1.160/SiteConfiguration.aspx http://10.1.1.160/SiteModes.aspx http://10.1.1.160/Grades.aspx http://10.1.1.160/GradePricesScheduled.aspx http://10.1.1.160/Ports.aspx http://10.1.1.160/Pumps.aspx http://10.1.1.160/Tanks.aspx http://10.1.1.160/TankGauges.aspx
Enabler Maintenance (EnbMaint.exe)	http://10.1.1.160/GradePrices.aspx http://10.1.1.160/Blocking.aspx

	http://10.1.1.160/DeliveryHistory.aspx http://10.1.1.160/PumpTotals.aspx http://10.1.1.160/TankTotals.aspx http://10.1.1.160/Events.aspx
Wetstock Maintenance (wetstk.exe)	http://10.1.1.160/WetstockTankData.aspx http://10.1.1.160/WetstockPumpData.aspx
Forecourt Manager (Fcman.exe)	http://10.1.1.160/SiteMonitor.aspx

Refer to the **Enabler Web Reference Manual** for more detailed information.

8.2.3 Data Access

The following points must be noted about Embedded:

- It has limited storage space when compared to Desktop PCs; and
- It does not provide remote direct ODBC or SQL Server access.

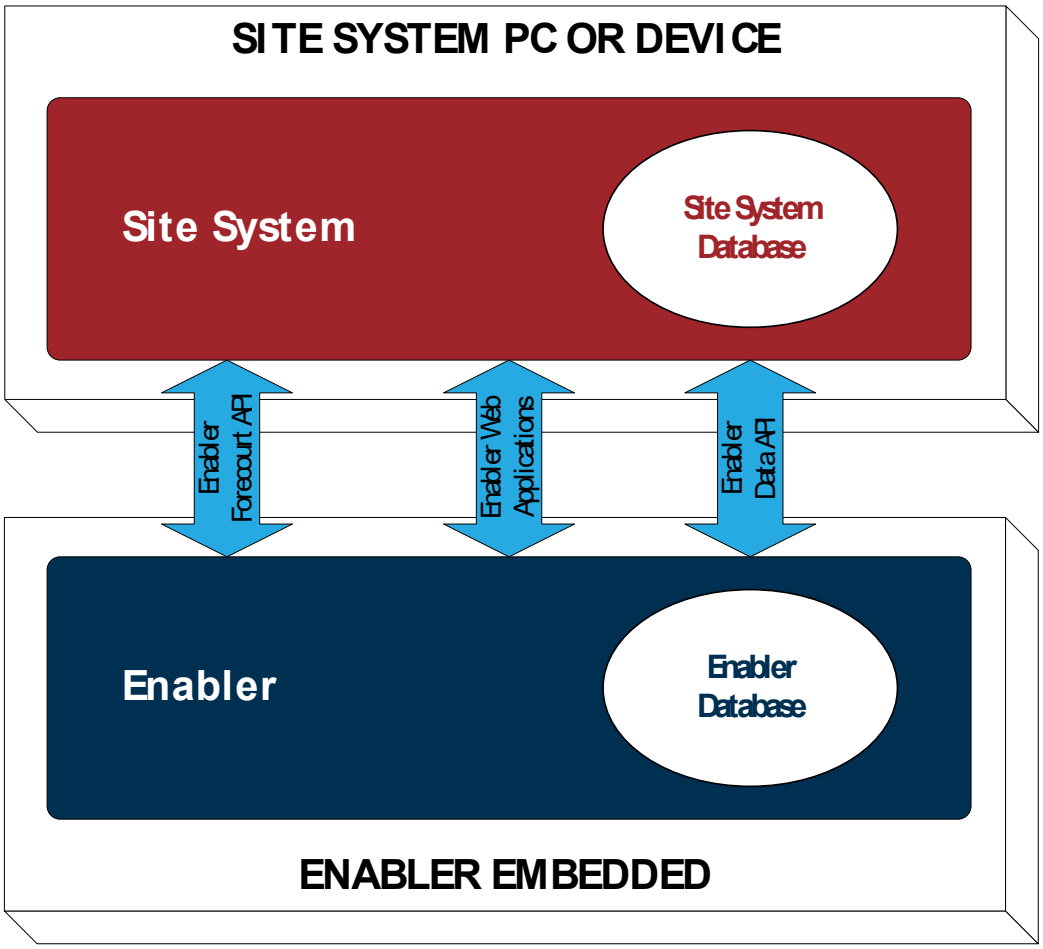
Due to the points above, Site Systems can no longer store its data directly to Enabler. However, this can easily be resolved by:

- Moving the Site System specific data from the Enabler database to its own database. We recommend this approach not only for Embedded but for Desktop solutions as well.
- Use the Enabler Data REST API available for accessing Enabler specific data.

Refer to the **Enabler Data REST API Reference** for more information about the new Data API.

8.3 Embedded Solution

A Site System using Enabler Embedded will look like this:



- The Enabler Forecourt API remains the same.
- The Enabler Applications now refer to web links for Enabler Web applications.
- The Enabler Data Access is now through the Enabler Data API.

9 Appendix: Case and Bill of Materials

For customers who want to fabricate their own case we can provide the design drawings for our customised case design. This will allow you to have a case made locally to your own requirements.

If you build cases using our design, you will require the following fittings to complete assembly of a working system:

Description	Part	Qty
SLA Battery	NP1.2-12 element 14 Part#147472	1
M4 x 8mm posi-drive pan head screws	BHPAM008Z	14
M4 star lock washers		14
M3 x 6mm posi-drive pan head screws	AHPAM006Z	2
M3 ZP spring washers		2
Battery cable	See section 9.1	1
Internal (case) Earth cable	See section 9.2	1
External Earth cable	See section 9.3	
Mains-12VDC Power supply	AMTEX AEB70US12	1
M25 Gland (cable entry for power and Ethernet)	PV516A	1
2-way Euro plug (power)	element14 Part# 4540025	1
2-way 6.3mm Faston tab with screw terminal	element14 Part # 2311702 or element14 Part # 1346440 or 2 x elemenet14 Part#2311723	1
Cable tie mount	HC-1S	1
Cable ties (200mm x 7-8mm)		10[1]

[1] Depending on the number and type of pumps connected.

9.1 Battery Cable

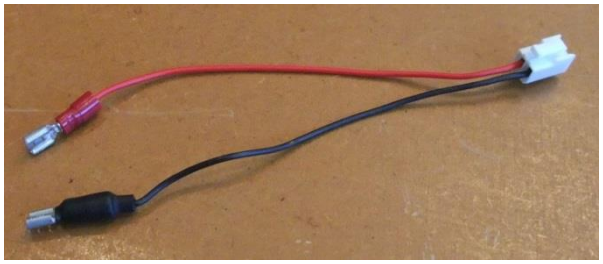
JST-VH 2pin plug to two 4.8x0.8mm crimp Faston receptacle, insulated (plastic shell). Red plastic shell on the negative connector should be covered with black heat-shrink.

Orientation: Pin 1 is positive (red). Pin 2 is negative (black). See picture.

JST-VH Shell: element14 Part #630470

JST crimp socket to fit shell: element14 Part #630500

JST-VH header element14 Part #9492003



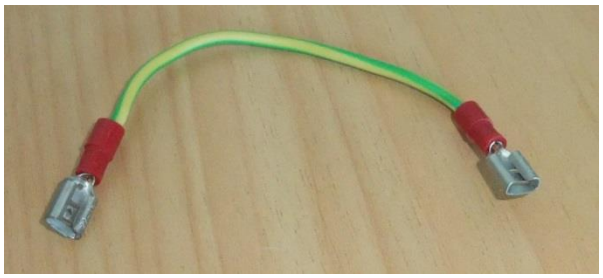
9.2 Internal Earth Connector Cable

This connector is required to connect the EMB board to the Case Chassis ensuring

Cable: Green/yellow stripe, multi-strand, 1.5mm² area

Connectors: 6.3mm crimp Faston receptacle, insulated (plastic shell) on each end.

Length: 100mm



9.3 External Earth Connector Cable

This provides external earth connection – Enabler Embedded **must be earthed**. We recommend you ensure this cable meets your installation requirements - this cable length and connectors are a guide.

Connectors: One end: 6.3mm Faston receptacle, insulated (plastic shell) on ONE end.

Other end: 10mm bare wire, twisted (or soldered) to be connected to suitable earth (e.g. mains plug)

Length: 3 metres (or to suit installation)

The picture below shows alternative Utilux H1954/D25 screw fit connector.