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 1.17

Last Revised 12 January 2022

Contents

Notes

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

1 Introduction

This document provides an introduction for personnel planning to develop, deploy and manage site system solutions and applications with the Enabler Embedded.

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

1.1 Support contact information

For technical questions and access to ITL's website.	support@integration.co.nz
The Enabler Embedded Page	https://integration.co.nz/products/enabler-embedded/
Frequently Asked Questions (FAQ)	https://integration.co.nz/support/faq/?enabler-content=EMB-V1
Enabler Embedded Downloads Page	https://integration.co.nz/support/enabler-software-updates/?enabler-content=EMB-V1

1.2 Enabler Embedded SDK

The Enabler Embedded SDK (Software Development Kit) includes all the hardware, software, documentation and sample applications required to develop site solutions and applications for forecourt retail.

The latest Enabler Embedded SDK and Enabler Embedded software package is available to download from the Enabler Downloads page.

1.2.1 Hardware supplied with SDK

- Enabler Embedded
- Plug-in Distribution Module (PDM192) – RS485
- USB RS485 Dongle with Cable for the Pump Simulator

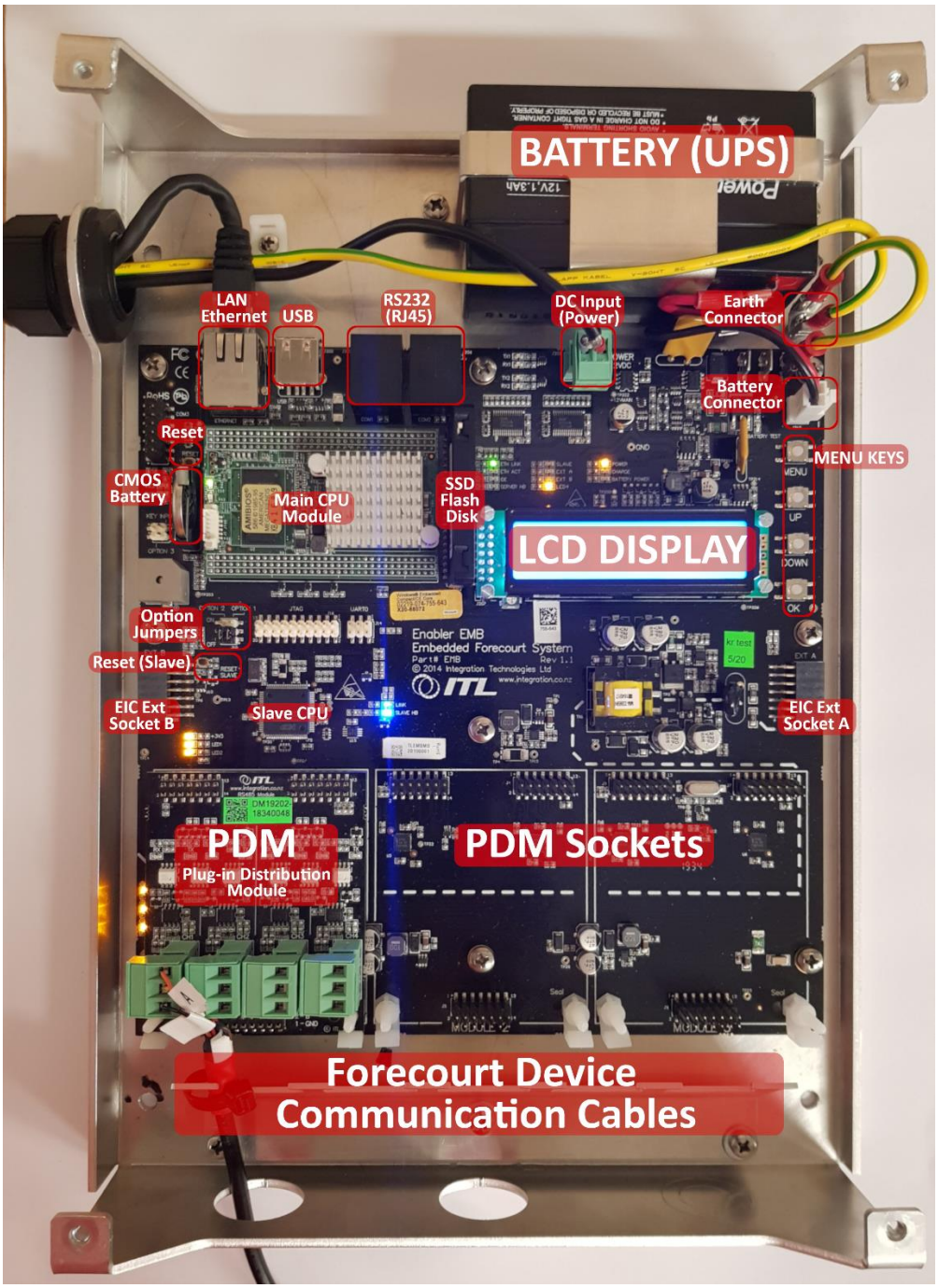
2 General Hardware Information

This section provides an overview of the Enabler Embedded hardware. The Enabler Embedded main board is often referred to in this document as **Enabler EMB**

2.1 Opening the Case

The case lid is secured by four (4) screws at the corners of the case, and when these are removed the lid can be lifted off.

Below is an Enabler Embedded fitted with one (1) PDM.



2.2 The Enabler EMB Main board

The Enabler EMB is the heart of the system and runs the core Enabler software services for operation, configuration and maintenance. The main hardware components are the CPU module, SSD Flash Disk, LCD Display and Battery (UPS).

It has connections for LAN Ethernet, RS232 (RJ45) Devices, DC Input (Power), USB (Support Tools) and up to three (3) Plug-in Distribution Modules (PDMs). It also has sockets at the sides of the board for additional EIC expansions.

The EMB board also contains diagnostic indicator LEDs. More information about these LEDs is available here:

https://integration.co.nz/support/faq/enabler-card-diagnostic-leds/?enabler-content=EMB-V1

2.3 Plug-in Distribution Modules (PDMs)

Plug-in Distribution Modules (PDMs) are the hardware modules fitted to the Enabler EMB (or EIC) to provide the physical interfaces to which forecourt devices are connected. Usually, each PDM provides four (4) separate channels for communication.

The standard Enabler EMB has three (3) PDM sockets which provide twelve (12) forecourt communications channels – sufficient to connect 24 fuelling points.

The Enabler EMB can be expanded with additional EICs for up to nine (9) PDMs - sufficient to connect 72 fuelling points. See Section 2.5 Enabler Interface Card (EIC).

For more information about connection limits, see:

https://integration.co.nz/support/faq/how-many-pumps-and-nozzles-can-enabler-support/?enabler-content=EMB-V1.

2.3.1 Current PDMs available

The list of PDM modules available are as follows.

PDM number	Interface	PDM number	Interface
PDM071	Current Loop	PDM203	RS422
PDM104	Tokheim	PDM236*	HongYang
PDM115	NZ Protocol	PDM247	RS232
PDM192	RS485	PDM258	IFSF LON

** Please contact ITL Support if you wish to use PDM236 HongYang*

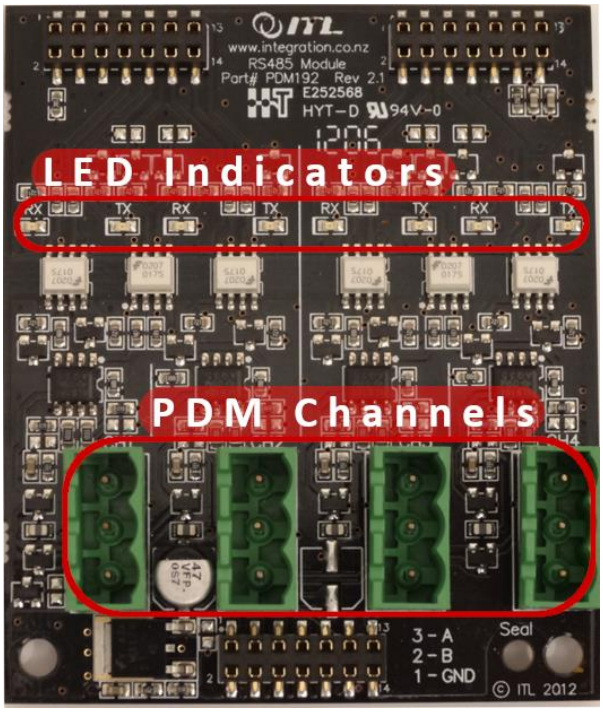
Additional PDMs may be available in the future.

For a detailed list of all supported pump types and their corresponding PDMs, see:

https://integration.co.nz/support/connect-pumps/?enabler-content=EMB-V1

2.3.2 PDM Example

Below is PDM192 – the RS485 PDM. This can be used to connect forecourt devices using the RS485 interface.



The **LED indicators** provide transmit and receive communication status, while the **PDM channels** are the connectors for the forecourt devices. The number of LED indicators and PDM channels may differ among the PDM variations.

More information about the PDM LEDs is available here:

https://integration.co.nz/support/faq/pdm-leds/

2.4 Battery (UPS)

The Enabler EMB is provided with a 12V sealed lead acid (SLA) battery of 1.2AH. This for the UPS (Uninterruptible Power Supply) which is designed to sustain the Enabler Embedded when the mains power is interrupted, and allows the Enabler Embedded to perform a clean shutdown if mains power is not returned after several minutes.

The battery must be disconnected when the Enabler Embedded is shipped or when the Enabler Embedded is in storage for extended periods.

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

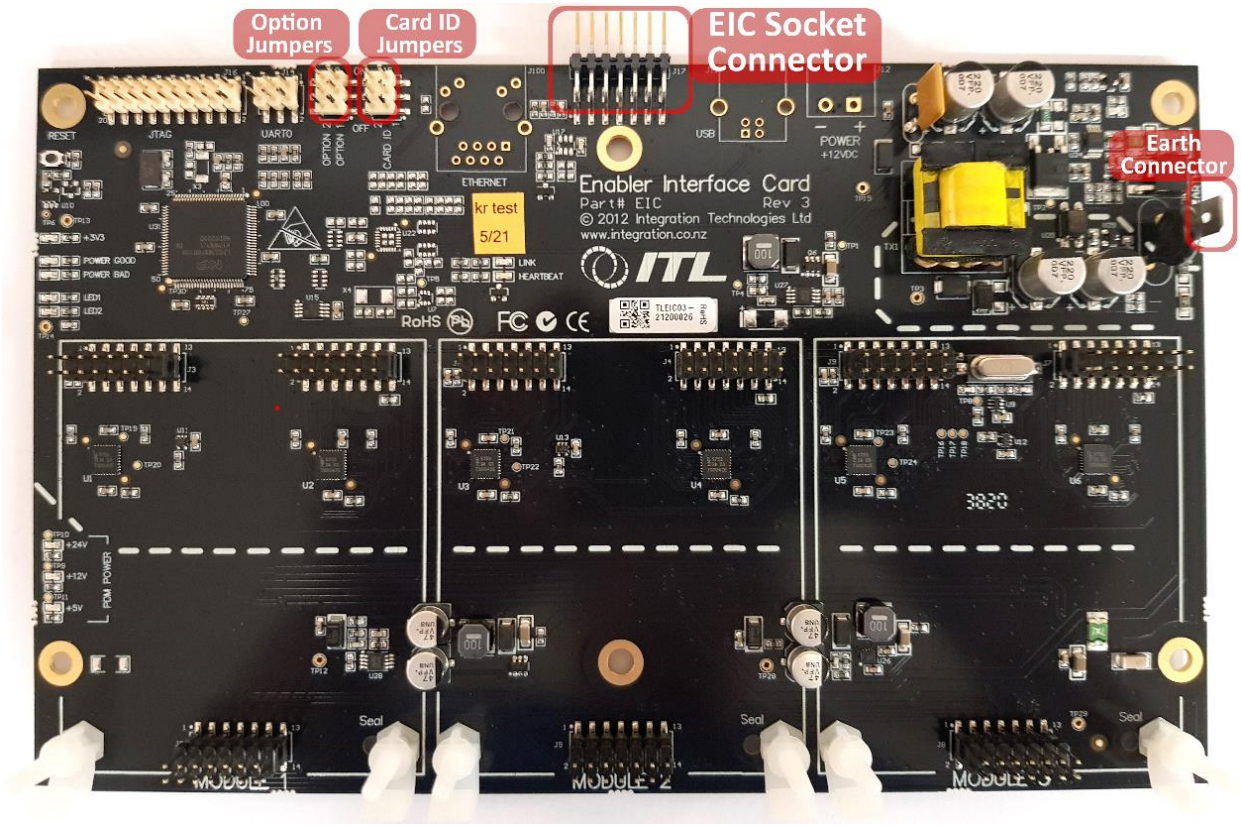
- The battery is fully charged before being stored.
- The battery is stored in a cool dry place – ideal storage temperature for SLA battery is 0 to 20 °C.
- If battery voltage drops below 12.4V it should be recharged to avoid loss of battery capacity.

Note: The battery must be connected to the Enabler EMB on startup. Otherwise, an error will be shown on the LCD display.

2.5 Enabler Interface Card (EIC)

Enabler Interface Cards (EICs) are expansion cards for the Enabler EMB.

If the **base** Enabler EMB (with 3 PDMs) does not have enough connections for forecourt devices, then EICs can be used.



The EICs are connected to the base EMB board via the EIC sockets (**EIC Socket A** and **EIC Socket B**) at the sides. Below is an Enabler Interface Card (EIC).

The EIC **Socket Connector** can be plugged at the left or right side of the Enabler EMB – giving a total of nine (9) PDMs when fully expanded with two EICs.

The **Card ID Jumpers** can be used to identify EIC Card ID 1 and EIC Card ID 2. See Section 3.6 Installation of EIC for more information.

The **Option Jumpers** (default both OFF) can be used to test the EIC and the PDMs.

Note: A larger case is required if EICs are to be fitted with the Enabler EMB. This is provided when purchasing the EMB Expanded or EMB Double Expanded from ITL.

2.6 Miscellaneous Hardware Components

The following are miscellaneous hardware components on the Enabler EMB.

Component Name	Description
SSD Flash Disk	The storage media wherein the Enabler EMB software and data is stored.
USB (Universal Serial Bus)	A USB flash drive with EMB Support Tools can be plugged in for troubleshooting.
RS232 (RJ45)	Tank Gauges or RS232 forecourt devices can be connected here.
Reset	Button that can be pressed to restart the Enabler EMB. May be needed for troubleshooting.
CMOS Battery	Battery to keep date time and other miscellaneous settings for the Enabler EMB.
Slave CPU	A secondary CPU that controls the PDMs.
Reset (Slave)	Button that can be pressed to restart the Slave CPU. May be needed for troubleshooting.
Option Jumpers	Test Jumpers for the Slave CPU and PDMs. Both Jumpers should be **OFF** for normal operation.

3 Enabler Embedded Installation

The case has been designed to be mounted on a wall with the forecourt device cabling coming through the grommets at 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 located inside of the case near the corners.

3.1 Connecting Earth, Power and Network

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

- To connect the cables, first loosen the cap of the gland.
- Supplied with the case is a universal (100-240vac) 12V DC power supply. This needs to be mounted outside the case with the DC power lead feed through the gland and plugged into the green 2-pin **DC Input (Power)** socket on the Enabler EMB board.
- Feed the network cable through gland and attach to **LAN Ethernet** RJ45 connector on the Enabler EMB.
- Feed the Earth cable through the top right gland and attach it to the FastOn tab **Earth Connector** on the Enabler EMB board. The other end should be attached to a suitable earth connection.
- Once all the cables are inserted, tighten the gland to hold the cables.

For connector locations, refer to Section 2.1 Opening the Case.

3.1.1 System Earth

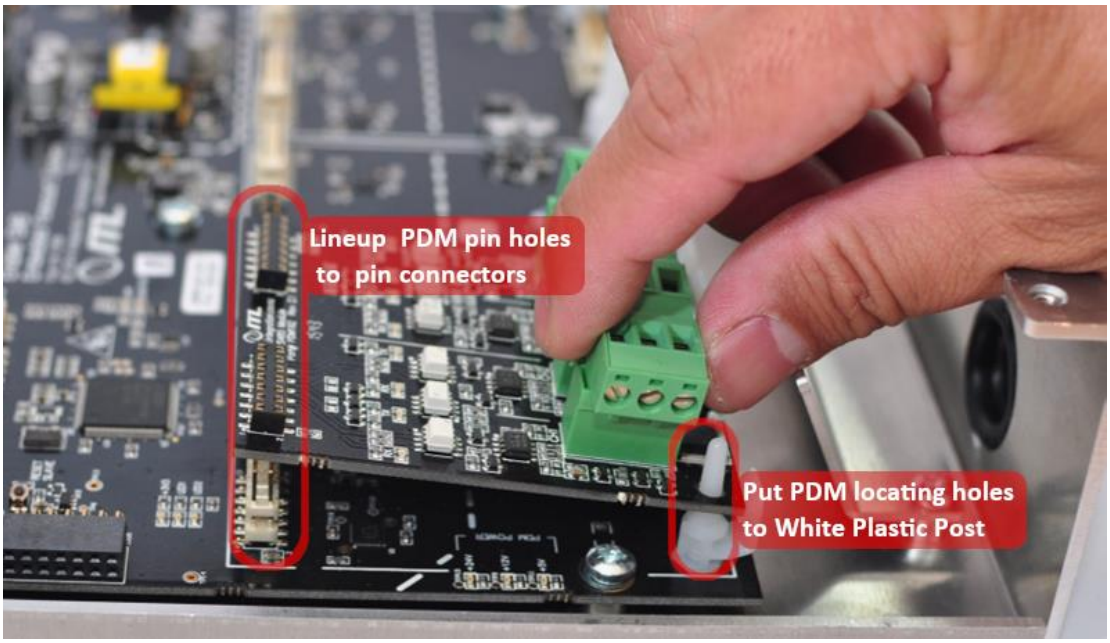
The Enabler EMB must have ground connection to protect it and other attached devices. An Earth cable which connects to a mains socket is provided with the Enabler EMB for some countries only. If you were not provided an Earth cable, then you must source/assemble one yourself.

Note: Failure to earth or ground the Enabler EMB will void the warranty.

3.2 Installing a PDM on the Enabler EMB / EIC

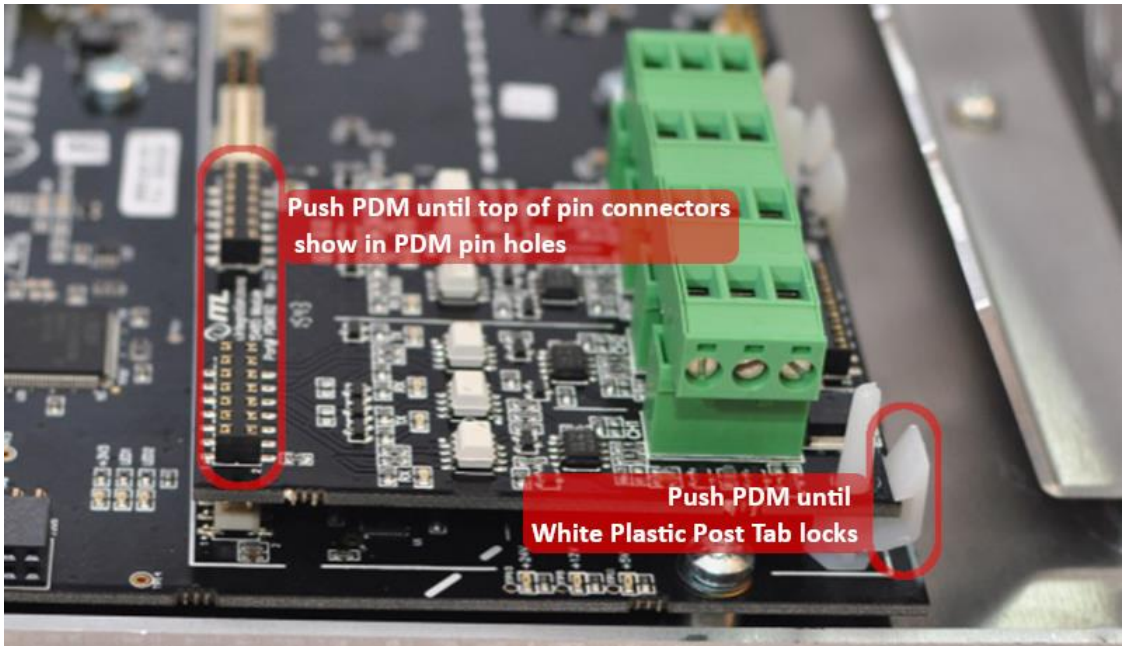
Each PDM has 2 locating holes at the bottom end of the module next to the pump connectors.

Holding the PDM by the green connectors, place the PDM's location holes over the white location pins on the Enabler EMB or EIC.



The location pins should line up all three pin connectors.

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

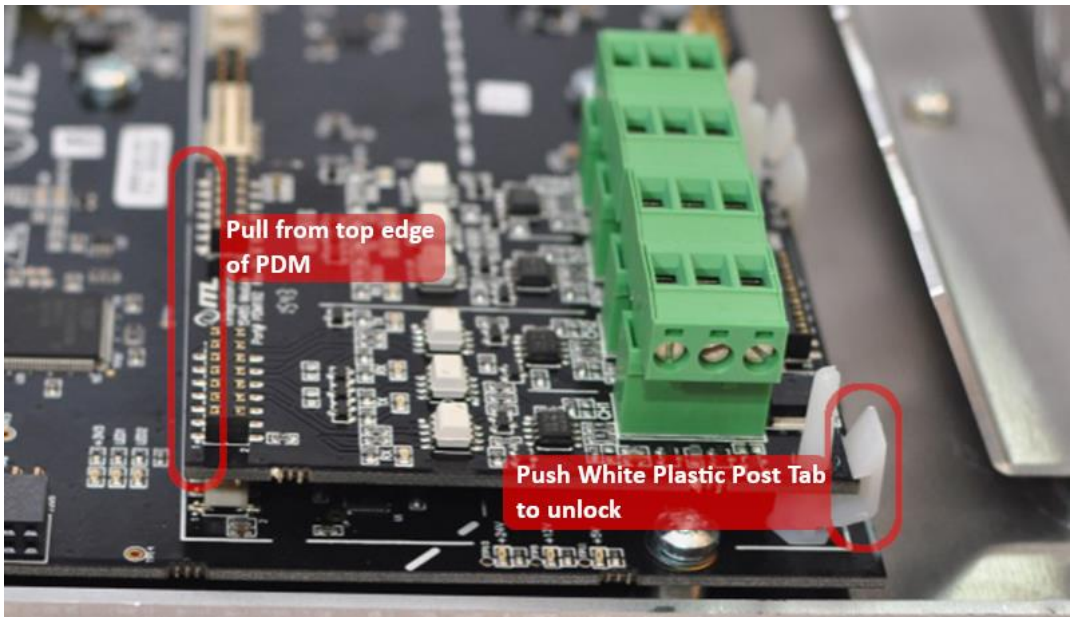


Make sure the pin connectors are fully engaged at the top end of the module.

Note: Make sure you have the correct PDM for your pumps.

3.3 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 bottom of the PDM upwards.



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

Note: Do not pull the top edge of the PDM until the bottom is released, and take care to ensure the pin connectors are not bent.

3.4 Installation of Pump/Device cables

The cables are installed through grommets directly beneath the PDMs at the bottom of the case.

The grommets are not supplied with the Enabler EMB - you must source these yourself. You will need to punch out the holes in the EMB case and attach the grommets.

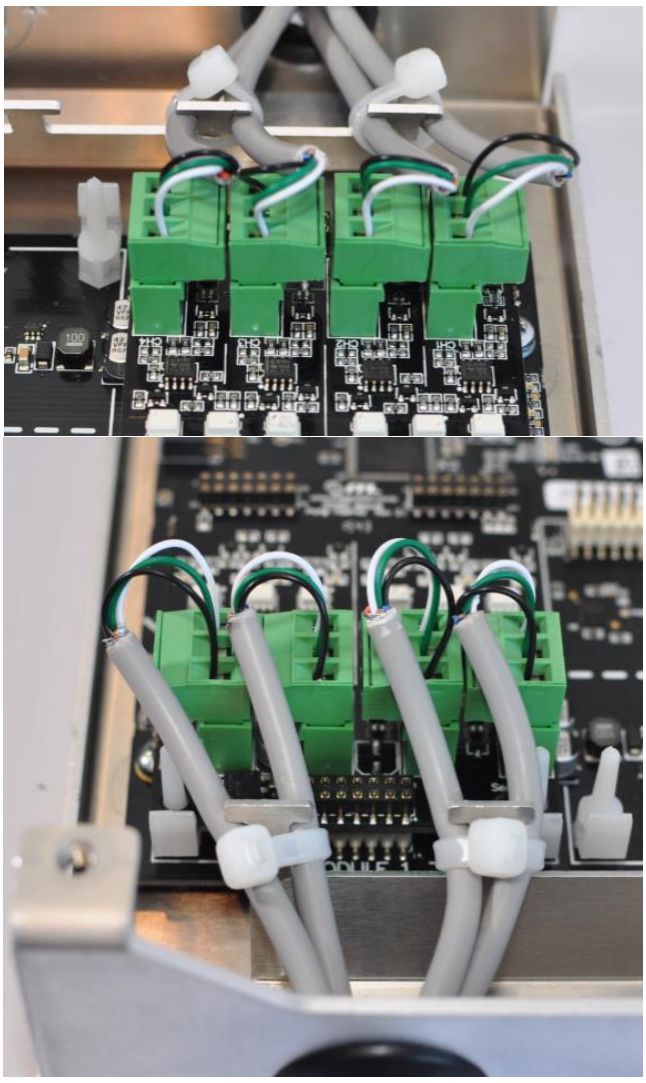
Feed the cables through it until you have enough length to attach the plugs using the wiring key marked on each PDM.

Unplug the spare plug(s) from the PDM and attach to the cable.

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

The cable bundles can then be secured using the cable tie mounting points.

Below is the PDM192 (RS485) with cables attached and secured.

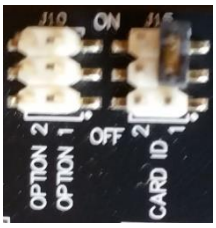
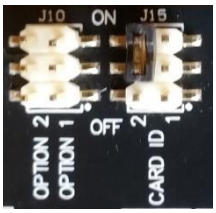


3.5 Installation of EIC

The EICs can be used to expand the number of forecourt devices that can be connected to the Enabler EMB. Two (2) EICs can be plugged at either the left or right side of the Enabler EMB via the connectors **EXT Socket A** or **EXT Socket B**.

These are already fitted in the EMB Expanded or EMB Double Expanded when purchased from ITL.

See below on how to set the Card ID for the EICs.

Extension Board	**Jumper setting**
1	CARD ID 1 - **ON** CARD ID 2 - OFF  With no jumpers, it will default to ID 1
2	CARD ID 1 - OFF CARD ID 2 - **ON** 

Note: The EIC must be also grounded to the main board or chassis via the EIC Earth Connector.

Refer to Section 2.5 Enabler Interface Card (EIC) for the location of these Card ID Jumpers and the Earth Connector.

4 LCD Display and Service Menu

When the Enabler Embedded is powered up, the status will be displayed on the **Service LCD**. The LCD is also used to navigate the EMB Service Menu.

4.1 System Start

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 Enabler EMB and it will start running its diagnostic checks.

`Checking Battery`	Checking the battery is connected and charged.
`Checking Database`	Checking the database is accessible and valid.

If the system was not shut down properly (e.g. mains and battery power removed, or faulty UPS battery) then an additional database integrity check will be performed.

`Integrity check Database`	Checking the database for corruption is starting.
`Database check.. Service# XXXXXXX`	Checking the database for corruption in progress.
`Database OK`	Database check complete

4.2 System Operation

Once all the checks are complete and there are no problems detected, it will go into its normal operating state. The display will sequence between the following status messages.

Enabler Embedded 09/08/08 14:46	Date and time of the EMB system. Note: Automatic Date/Time should be enabled via the Date/Time menu.
Power: Normal I=12.20 Bat=Good	Power status shows if the EMB is running on mains power or battery (UPS); the current input voltage and the status of the battery.
Forecourt: Del=1 4 of 16 online	Forecourt status displays the number of pumps online and the number of deliveries in progress.
Service# E012345 Version: 1.3.0	Enabler Embedded service number and software version.
Network Status 10.1.1.35	Network status shows the current IP address if connected to a network.

Note: When the Enabler Embedded is first plugged into a network it will use **DHCP** to get a network IP address. Its default Network Name is set to WINDOWSCE.

If the Enabler Embedded can't find a DHCP server, it will revert to an automatic IP address (169.254.x.x) after about 2 minutes.

The IP settings can be changed via the LCD menu and the Web Application.

4.3 UPS Operation

The Battery UPS (Uninterruptible Power Supply) is designed to keep the system running if there is a brief power interruption until the main power is restored. It will hold the system running for 90 seconds (or more) and then shut down the system.

Power: UPS (83s) I=11.83 B=Good	Service display shows the power/battery status when running on UPS, and the remaining seconds before shutdown.

While running on the UPS, the system also monitors the battery state and if it detects the battery is getting too low, it will shut down the system immediately.

The system can be shut down earlier by selecting the **Shutdown when on UPS** service menu item. See Section 4.4.2 Power menu for more details.

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

4.4 Service Menus

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

Pressing any key while the system is running will take you to the top-level menu.

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

4.4.1 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 Enabler EMB.

Network Reset to DHCP

This will reset the network settings back to the default settings, which is to use DHCP. A DHCP Server in the network may be required to obtain an IP address.

Network Reset to 192.168.1.1

This will reset the network settings to a fixed static address so that the system can be accessed when 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/secure mode.

Refer to the **Enabler Web Reference Manual.pdf** on how to turn off SSL.

Note: Older versions of the Enabler Embedded may require a Factory reset to turn SSL OFF.

4.4.2 Power menu

Power OFF UPS

This will force the system to shut down when the mains power is removed and it is running on Battery (UPS). This allows the EMB to be quickly shut down without having to wait several minutes for the automatic UPS shutdown.

Battery status

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

Note: The system should never be shut down by removing the battery as this could cause corruption on the data.

4.4.3 Set Date/Time menu

Set Automatic Date/Time

This Enables or Disables the Automatic time synchronization.

This first displays the current setting and then asks if you wish to change it.

Set Date

This allows the system date to be set.

Set Time

This allows the system time to be set.

Note: If **Automatic Date/Time** is enabled, then the date and time cannot be set manually, and the **Set Date / Time** options will prompt to run the synchronisation.

Note: Use this menu if the Enabler Web Applications is not accessible.

4.4.4 Software menu

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.

Note: Use this menu if the Enabler Web Applications is not accessible.

4.4.5 Service menu

Serial Number

This displays the systems service number

Test EMB LEDs and display

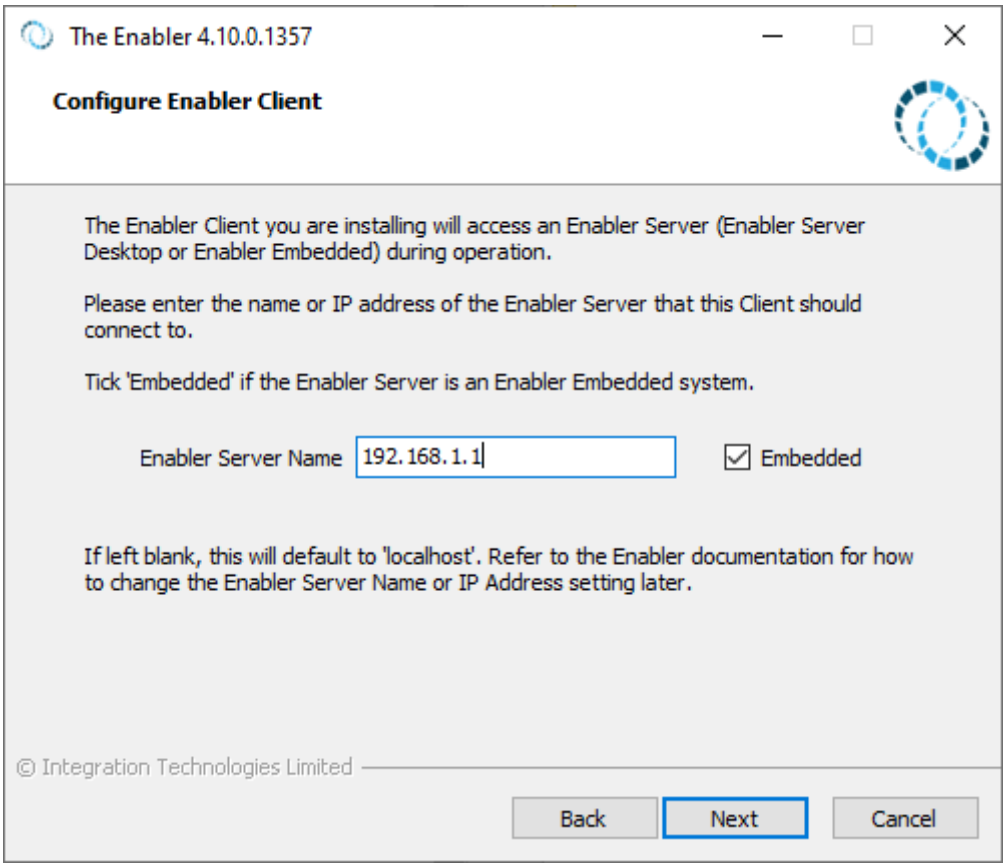
This runs a diagnostic on the LEDs and Service display on the EMB, press any key to stop the test.

5 Enabler SDK Installation

This section provides an overview on setting up an Enabler Client Terminal to connect to the Enabler Embedded. The Enabler SDK must be installed as an Enabler Client on a Windows Desktop PC.

5.1 Enabler Client Install

When installing the Enabler SDK select **Client Install**. The installer will then prompt for the following:



Enter the **Enabler Embedded Server Name or IP address** and then **tick the Embedded box**. Proceed with the prompts to complete the installation.

For more detailed information on installing the SDK, refer to the **Installation Instructions.pdf** accompanying the Enabler installer.

Afterwards, your Enabler Desktop PC will be set to connect to the Enabler Embedded specified above. For information on using the demo applications refer to **Enabler Demonstration POS Application Reference Manual.pdf** installed with SDK.

Note that any non-Windows application (Linux, iOS, Android, etc.) can be an Enabler Client or Terminal for Enabler Embedded, as long as the application uses one of Enabler's APIs (Application Programming Interface) documented in the Enabler SDK.

5.2 System Configuration

Configuration of the Enabler Embedded can be done through the Enabler Web Applications. The Enabler Embedded Web applications be accessed by browsing to the Embedded 's network name or IP address (shown on the **LCD Service Display** or in the **Service menu**).

For detailed information on how to use the Enabler Web Applications, refer to **Enabler Web Reference Manual.pdf**.

6 Initial setup of system

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

6.1 Initial setup of system

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

6.2 Initial setup of Forecourt

- Set up Site settings, Site name and Site Mode
- Set up Grades
- Set up Tanks
- Set up correct protocols for Pumps and Gauges on Ports page
- Set up Tank Gauges
- Set up Pumps

6.3 Connecting Clients or Terminals

- Install the Enabler SDK as a Client as described in Section 5.1 Client Install.
- Set up additional Clients/Terminals and Web logins via the Web Application **User/Roles page**. Refer to the **Enabler Web Reference Manual.pdf** for more details.

6.4 Backup

- Backup the configuration and download to another system.

6.5 Connecting to Pumps (or MPPSIM)

The Enabler Embedded default configuration has four (4) MPP Simulator pumps on the first PDM.

The MPPSIM application can simulate real pumps for testing purposes and connects to the Embedded via the provided USB-RS485 Dongle.

The Enabler SDK installer has an option to install the Pump Software Simulator (**MPPSIM.exe**) application on the Enabler Desktop PC.

More details about the pump simulator are available here:

https://integration.co.nz/support/faq/using-the-itl-pump-simulator/?enabler-content=EMB-V1

For instructions on setting up real pumps, as well as a detailed list of all supported pump types with their corresponding PDMs is available here:

https://integration.co.nz/support/connect-pumps/?enabler-content=EMB-V1

7 Appendix

7.1 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 7.2	1
Internal (PCB) Earth cable	See section 7.3	1
External (case) Earth cable	See section 7.4	1
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]

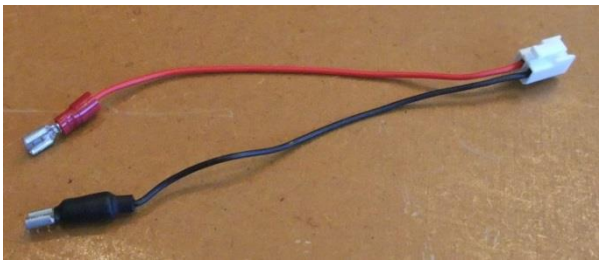
[1] Depending on the number and type of pumps connected.

7.2 Battery Cable

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

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

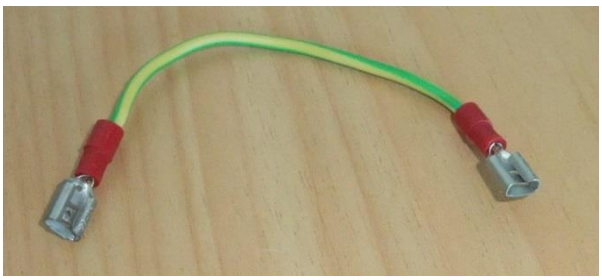
- JST-VH Shell: element14 Part #630470
- JST crimp socket to fit shell: element14 Part #630500
- JST-VH header element14 Part #9492003



7.3 Internal Earth Connector Cable

This connector is required to connect the Enabler EMB board to the Case Chassis.

- Cable: Green/yellow stripe, multi-strand, 1.5mm² area
- Connectors: 6.3mm crimp Faston receptacle, insulated (plastic shell) on each end.
- Length: 100mm



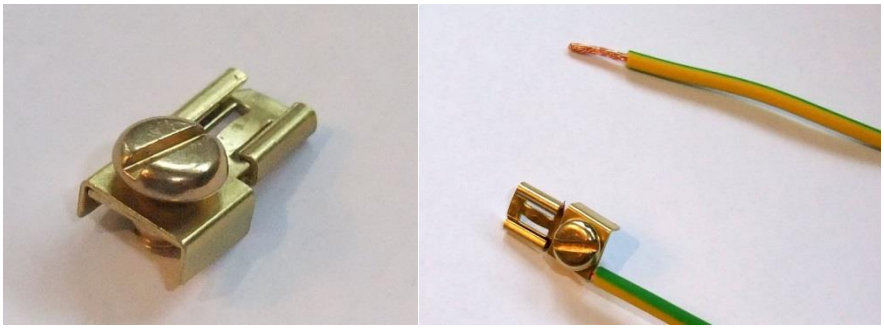
7.4 External Earth Connector Cable

The Enabler EMB must have ground connection to protect it and other attached devices. An Earth cable which connects to a mains socket is provided with the Enabler EMB for some countries only. If you were not provided an Earth cable, then you must source/assemble one yourself.

This cable length and connectors are a guide only - you must ensure the cable meets your own installation requirements.

- Connectors:
  - 6.3mm Faston receptacle, insulated (plastic shell) on one end.
  - 10mm bare wire, twisted (or soldered) to be connected to suitable earth (e.g. mains plug) on other end
- Length: 3 metres (or to suit installation)

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



Note: Failure to earth or ground the Enabler EMB will void the warranty.

7.5 Migrating from Enabler Express Desktop

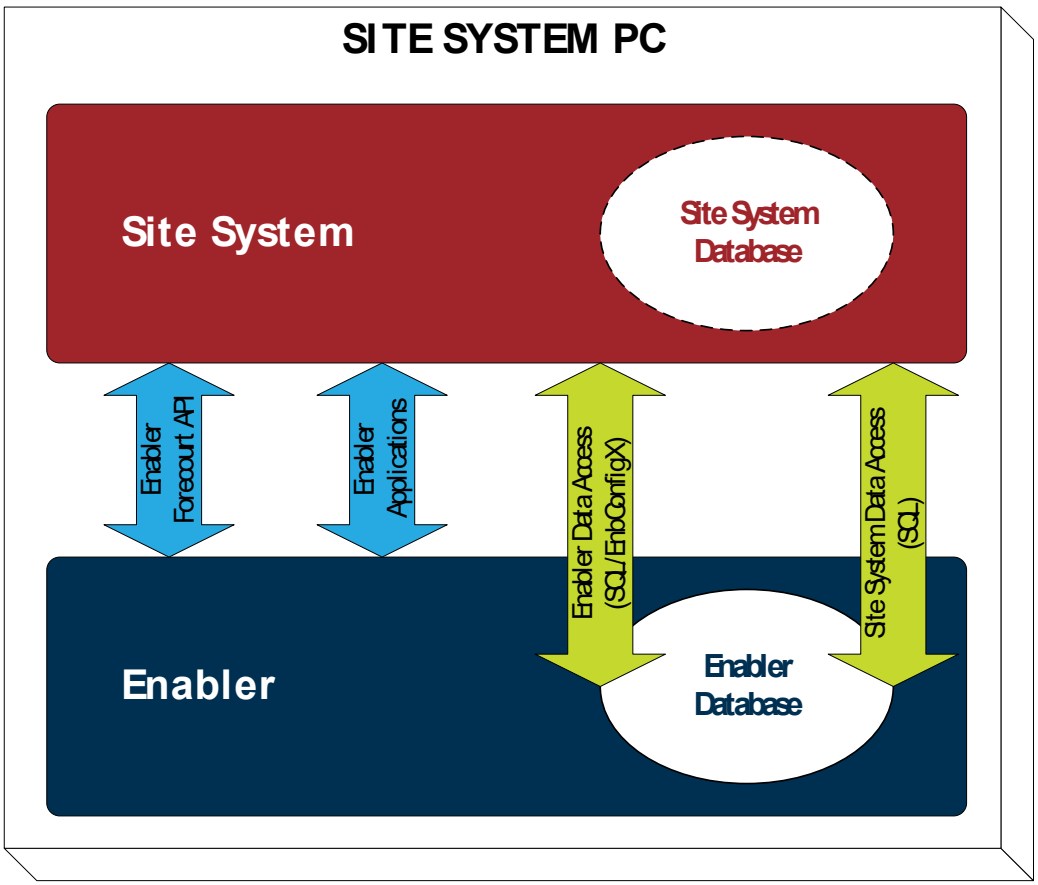
This section is for integrators who already have site solutions using the Enabler Desktop (PCI/PCI Express); and would like to use Enabler Embedded as their new forecourt platform. The following are guidelines on how to successfully migrate from the Enabler Express Desktop platform to Embedded.

7.5.1 Enabler V4

The **Enabler V4 SDK** must be used when developing system site solutions for Enabler Embedded. The **Enabler V3 SDK** cannot be used since it is not compatible with Enabler Embedded.

7.5.2 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 provide the User Interface for Configuration, Site Management, and Report generation.
- The Enabler Data Access is the interface to read and update Enabler data. Typically, ODBC/SQL or the legacy Enabler 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.

7.5.3 Forecourt Control

Enabler V4 provides backwards compatibility for the V3 ActiveX controls. No change is required on your existing site systems for this. Enabler V4 also has support for .NET and Java, so you may choose to develop applications using these platforms.

7.5.4 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:

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.pdf** for more detailed information.

7.5.5 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.

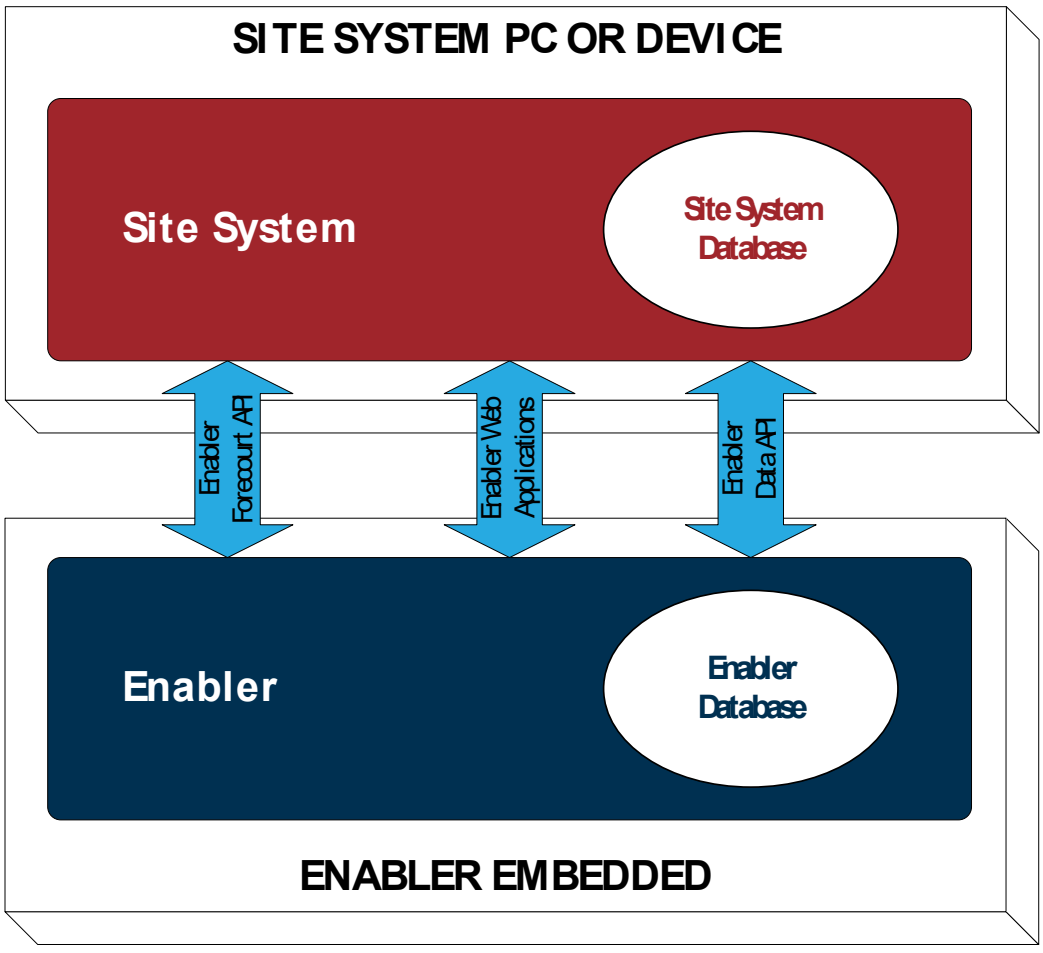
Due to the points above, Site Systems can no longer store its data directly to Enabler. However, this can easily be resolved by:

- 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 **REST API Reference.chm** or **Enabler Developers Reference.chm** for more detailed information.

7.5.6 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.

7.6 Activation

If you have Enabler Embedded 1.2.0 or later installed, then you may ignore this section.

If you have earlier versions, the Enabler 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.

More details on activation are available here:

https://integration.co.nz/support/faq/software-activation/