Dart2 Installation Guide

This guide is useful for helping resellers and installers with wiring in, setting up and testing the Dart2.

The Dart2 is a compact cellular 2G or 4G Cat-M1/NB-IoT tracking device with a variety of inputs and outputs, and driver-ID capability, to cater for entry-level tracking and fleet management applications, without sacrificing performance or reliability.
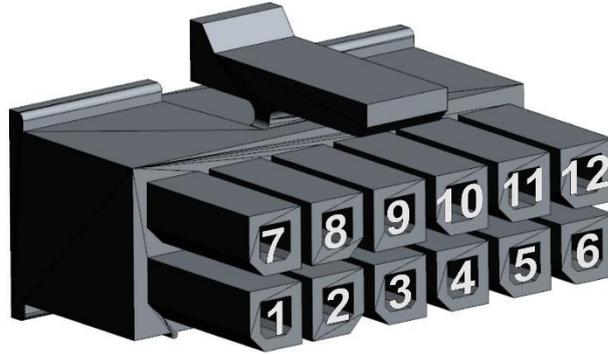
Its compact housing contains the GPS and cellular antennas, and the 12-wire connector means that all of the Dart's functionality can be easily accessed - and makes installation a breeze.

Wiring Harness

DART Harness Diagram

Version 1.0
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```
 7  8  9  10  11  12
 1  2  3  4   5   6
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* TTL EXPANSION BUS

WIRE DEFINITION:

Pin	Color		Definition	Pin	Color		Definition
Pin 1 (RED)	🟥		**+VIN** / BATT	Pin 7 (BLACK)	⬛		GROUND
Pin 2 (BLACK)	⬛		**MAIN** GROUND	Pin 8 (WHITE)	⬜		IGNITION INPUT
*Pin 3 (PURPLE)	🟪		VOUT	*Pin 9 (BLACK)	⬛		GROUND
*Pin 4 (GREEN)	🟩		TTL RX	*Pin 10 (BROWN)	🟫		TTL TX
Pin 5 (PINK)	🟧		DIGITAL IN 1	Pin 11 (BLUE)	🟦		DIGITAL IN 2
Pin 6 (BLACK)	⬛		GROUND	Pin 12 (YELLOW)	🟨		SW GND OUT 1

Getting Started

The Dart2 may be damaged by electrostatic discharge if not handled correctly. Ensure adequate static precautions are taken. Consider wearing an anti-static wrist guard. Avoid touching the antennae and any of the electronic components on the PCB. Take special care not to touch the ceramic GPS antenna as static can damage the sensitive GPS circuitry.

Inserting the SIM

The Dart 2 uses a Micro SIM card–form factor 3FF. The SIM holder is on the top of the PCB. When handling the Dart 2 be careful not to touch the GPS antenna, to minimise the risk of damaging the sensitive GPS amplifiers with static discharge.

Unlock the SIM holder by sliding it towards the battery sideof the device. Open the holder up on its hinge.

Insert the SIM with the contacts down and the keyed corner pointing away from the battery side of the device

Put the holder back down on the PCB and slide it towards the closest side of the device to lock it in place.

To easily get up and running:

- The SIM should not have a PIN on it, unless you use the device specific PIN.
- The SIM should have credit or airtime
- The SIM should use one of the APN's built into the firmware. It is possible to set APN's by SMS

Connect the Battery

The Dart 2 comes with a 200mAh battery

Leave the battery in the position it is stuck down, away from the antennas

Plug the battery into the socket shown in the image, positive (red) wire closest to battery.

The LED should start to flash.

Checking the Device is Connected

LED Behaviour

The battery should come pre-charged. Once you insert it, the internal LED will come on and flash.

The LED will flash slowly at first. When it opens a connection to the server, it will flash fast. Once data is sent, it will go solid briefly, and revert to flashing fast. When the device goes to sleep, the LED will switch off.

If the battery is too low, use the harness to provide external power.

If the LED flashes but the Dart2 does not connect, check the SIM is in the holder correctly and check that the SIM is working. Further troubleshooting steps are discussed further on in this document.

OEM Installer Page

The OEM Installer page is designed to verify than an installation has been done correctly. We will be using it going forward in this document.

It is not password protected, and as such is designed to not give any sensitive information away.

To access the page, go to www.oemserver.com/installer
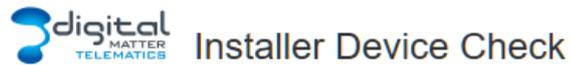
Work through these steps in order, to check the device is connecting in and getting a GPS fix. If an earlier step fails, the data in later steps may not be accurate. For example, if the device is not connecting, the Battery Voltage will be based on older data, and will not be current.

1. Check Last Connection (1) to check that the device connected recently. This means the device is connecting to OEM. The time shown should be around about the time you inserted the SIM and battery to power on the unit.
2. If device is connecting (1) check Last Commit (2) to see if it is sending data. If the connector is set, it must be setup on the software platform that is meant to receive the data. e.g. Telematics Guru.
3. Check the time of the last GPS update (3). It should be recent.
4. Check the battery level (4) is acceptable for the device type. It should be between 3.5-4.2V (around 3.5V is flat)
5. The device is Enabled in OEM Server Device Operations > Set Enabled
6. Firmware is up to date
7. System parameters have been synced between OEM Server and Device
8. Connector has been set and is transmitting

Troubleshooting

- If the device does not connect (1) check the following:
- If the sim card has been inserted correctly.
- If the sim card has enough mobile data on it and is active (contact your reseller if required)
- If external voltage is connected properly.
- If the device is running, based on LED flashes (see above)
- The device is using the correct APN – contact your reseller if you are unsure

If the device does not commit (2) check the following:

- If the device is setup on the platform that the connector points to. e.g. Telematics Guru. Check that both the serial number and device type are correct on the platform. (Contact your reseller for assistance)

If the device does not update GPS (3) check the following:

- The device has a clear view of the sky
- If there are crosses showing for (5), (6), (7) or (8);
  - If a firmware or parameter update is pending, the update will be downloaded on the next connection.
  - Updates will not be applied while the device is in trip.
  - To speed up applying updates, power cycle the external power on the device, this triggers an upload.

Alternatively cycle the ignition, though remember leaving the ignition on means the device will stay connected to the server and not apply its updates.

You can now continue with the installation

Housing Installation

The housing closes with clips and does not need screws.

To close the housing, line up the top and bottom parts. Push the housing together firmly.

To open the housing, insert a flat screw driver into the opening highlighted below. Carefully lever the two halves apart.

Installation Location

The housing has mounting holes for screws, bolts or cable ties. There are a few considerations for the final mounting position of the Dart2.

The Dart2 has been engineered to have the best possible GPS reception. It will work from inside engine bays, body panels, under dashboards and other places where other GPS devices simply fail to operate reliably.

Although the Dart2 will work in these locations it is always advisable to install the Dart2 where it is best able to get signals from the GPS satellites, with the optimum position being a location with a clear 180-degree view of the sky

Installation Procedure

1) Connect Power & Ignition
Connect the following wires to the vehicle:

**Red**(external power) to the vehicle positive - 8 to 36V (MAX).

Verify this supply is constant, even when the vehicle is switched off. Sometimes other (non-constant) signal lines can appear to be a 12 or 24V constant supply.

Black (Ground) to the chassis ground

White (Ignition) to an ignition source – something that will be on when the vehicle ignition is on, and off when the ignition is off.

2) Testing

Use the installer page to verify the External Power (1) and Ignition (2) is operating correctly. The Ignition input (2) should change from off to on when you toggle the vehicle's ignition.
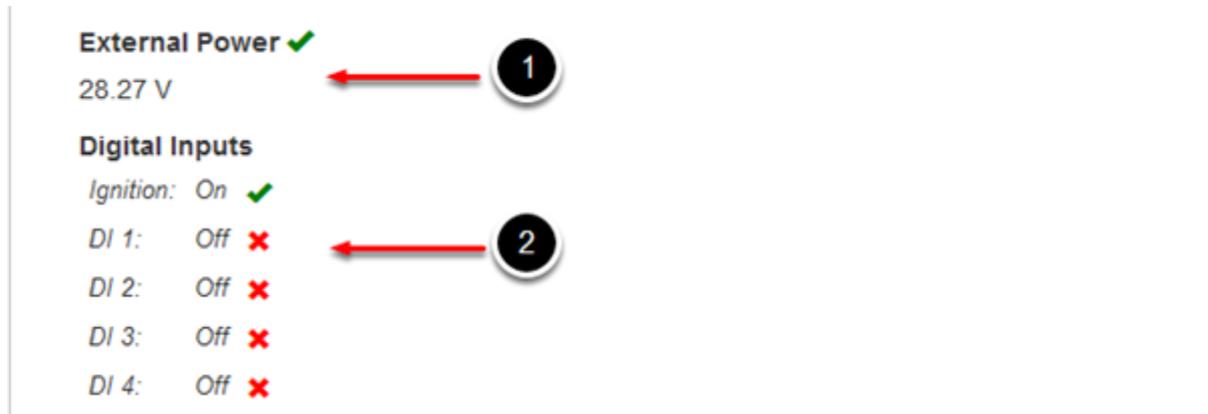
3) Driver ID

The Dart 2 can read RFID tags using the Dart Driver ID reader. This is different to the CAN RFID reader. The Digital Matter RFID reader is enabled by default.

If you plan to use a iButton with the Dart2, you'll have to remove the 4-Way Molex connector to access the wires for the install.

iButton Harness wire colours

Colour	Function
Red	iButton Signal Line
Black	Ground
Green	TTL Rx
Brown	TTL Tx
Yellow	LED Negative

The brown and green wires on Digital Matter harnesses have 1000-ohm resistors connected in series. For a more detailed explanation of connecting an iButton to a Dart2, please review the guide here

Connecting Digital Inputs

When installing digital inputs, make note of how they are installed, and how the 'switch' operates. It is useful to know so that your reseller can apply the correct settings to the device.

Digital Matter Devices have two important settings for digital inputs. Bias Resistor and Active Level.

- Bias Resistor: The bias resistor essentially determines the state of the input when nothing is connected to the input. Options are pull-up (hold input high), pull-down (hold low), and disable. The default is usually pull up
  - Active Level: Determines the physical line level which is logged as 'on' by the device.

Common examples of digital inputs are:

- Duress buttons –push button connected between a digital input wire and ground. Pushing the button closes the circuit to ground, which we want to register as 'Active'
  - In this scenario we would set Bias Resistor = Pull up, and Active Level = Low
- PTOs – Input wire on device is connected to high side of PTO, so when the machine is on and there is a voltage on this line we want the input to be 'ON' and 0V as 'OFF'.
  - In this scenario we would set Bias Resistor = Pull down, and Active Level = High

Testing

The installer page can again be used to verify that digital inputs are correctly wired.

Note: *By default, the device will not connect and report upon input changes – it simply logs them and uploads later (this can be changed) so you might not see them change quickly.*

However, when the ignition is on, the device will connect and stay connected to the server – so input changes will show immediately. Hence it is worthwhile testing your inputs with the ignition on if possible and safe to do so.

Toggle the inputs with the ignition on, and confirm they are correctly setup via the installer page.

If the settings described above have not yet been applied or are incorrect the physical on/off state of the input might not match what is shown in the Installer Page.

Wiring for Immobilisation

The Dart2 has a switched ground output (Yellow Wire). This type of output, when 'ON' provides a ground, and when 'OFF' is high impedance.

The switched ground output is used to control the negative side of a relay coil, which will open or close a circuit to provide a starter motor cut. The specific pins used vary dependent on use case, with the aim to ensure the energy is not energised when the vehicle is not running, causing a drain on the battery.

The Dart2 support 2 kinds of immobilisation:

1. Driver ID - Vehicle is immobilised until the correct driver ID is entered, then immobilisation is turned off
2. Remote Immobilisation - Device can be sent a command to immobilise the vehicle

Wiring for Immobilisation with No Driver ID

See our Knowledge Base article on this: Dart2 Immobilisation with No Driver ID

1. Connect the relay coil positive (PIN 86), to the vehicle positive
2. Connect the relay coil negative (PIN 85), to the switched ground output (Yellow on Dart2)
3. Use the common (PIN 30) and Normally Open (PIN 87) contacts to control the starter motor.
4. In this configuration the relay is not energised until the driver ID is scanned, at which point it will be energised allowing the vehicle to be started

Immobilisation with Driver ID Wiring Diagram
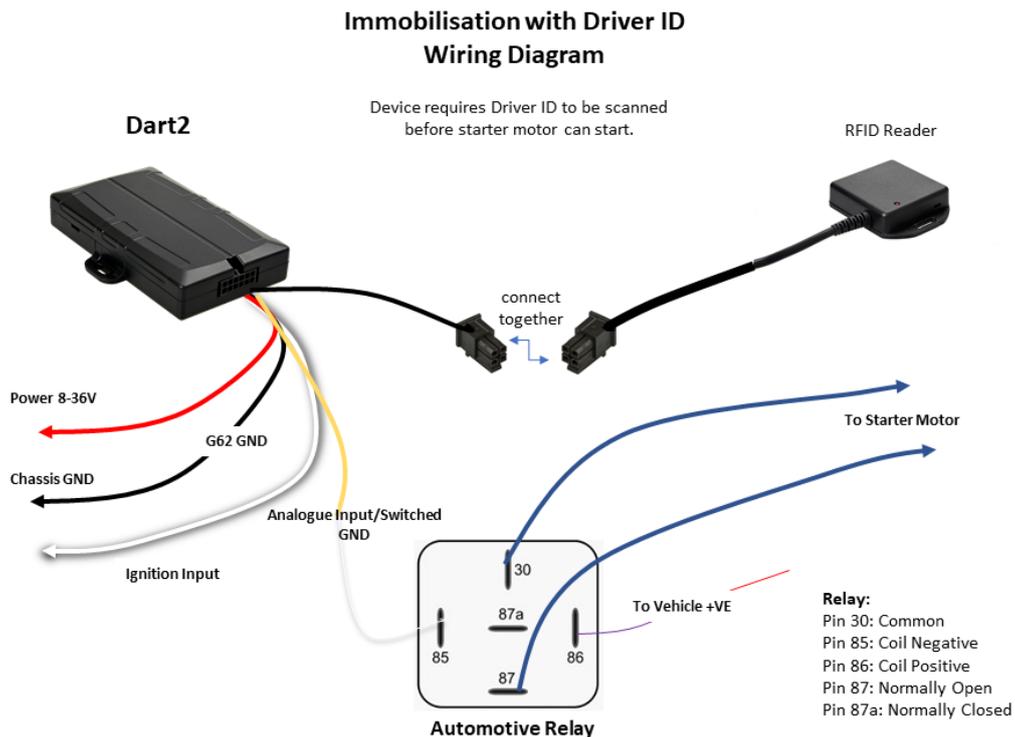
Wiring for Remote Immobilisation

1. Connect the relay coil positive (PIN 86), to the vehicle positive
2. Connect the relay coil negative (PIN 85), to the switched ground output (Yellow on Dart2)
3. Use the common (PIN 30) and **Normally Closed (PIN 87a)** contacts to control the starter motor.
4. In this configuration the relay is energised when the command is sent from the server to immobilise, and the starter motor is cut.

Immobilisation on ASYNC Message Wiring Diagram

Device works as normal until immobilise signal is sent from Telematics

Dart2

Power 8-36V

Chassis GND

G62 GND

Ignition Input

Analogue Input/Switched GND

To Starter Motor

To Vehicle +VE

Automotive Relay

30

87a

85

86

87

Relay:
Pin 30: Common
Pin 85: Coil Negative
Pin 86: Coil Positive
Pin 87: Normally Open
Pin 87a: Normally Closed