

# D3S

## User Manual

For hardware revision December 2015



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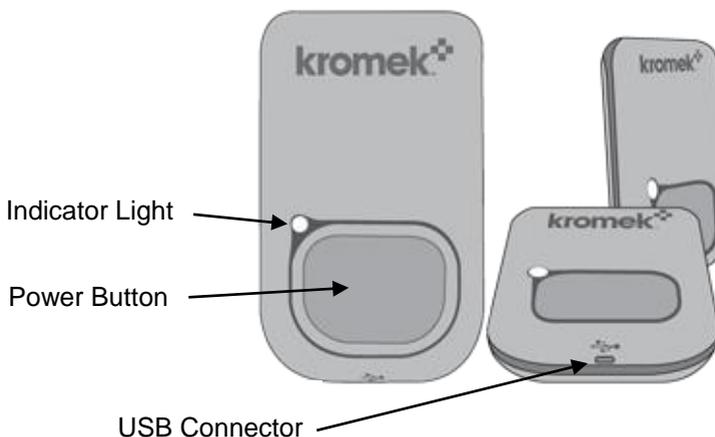
## Introduction

The **D3S** is a combination of two of Kromek's leading technologies: a non-He3 compact thermal neutron scintillator detector and a CsI(Tl)/silicon photo-multiplier-based gamma detector.

The **D3S** hybrid gamma/neutron platform neatly combines high sensitivity with small form factor together with a long-life battery power source making it ideal as a portable instrument.

USB connection allow communications with Kromek's own **KSpect** and **MultiSpect Analysis** acquisition and analysis software. Bluetooth connections are available for data connections to other portable devices.

Communications protocols are available for users to interface to their own software infrastructure, such as mobile phone apps.



## Powering on and off

To switch the unit on press the large power button on the **D3S** for 1 second. A yellow light shows it is ready to establish a data connection.

To turn the **D3S** off press and hold the power button for 5 seconds. The light will turn off or if the device is still connected to power it will turn white.

## Data connection

Turn the D3S on. If no data connection exists the indicator light will be yellow.

### USB cable connection

To establish a connection between a PC and a **D3S** virtual COM port drivers must have been installed on the PC. These are installed as part of the 'Kromek D3S DFU Manager' software described on page 9.

Connect a USB cable between the socket on the base of the detector and the PC or Smartphone. When the software on the PC or Smartphone establishes a USB data connection the light on the **D3S** will turn from yellow to green. Note that when the USB connection has been made the device cannot be used simultaneously with Bluetooth.

### Bluetooth connection

Ensure the light on the front of the D3S is yellow showing no connection exists. It can then be paired over Bluetooth using the Bluetooth settings on the PC or Smartphone. The **D3S** detector will appear in the list of available devices on the PC or Smartphone identified by its serial number. When the Bluetooth data connection is successfully established the **D3S's** light will turn blue.

## Low battery warning

If the battery level is running low there will be a fast pulse on the light to warn the user to recharge the device.

## Charging the device

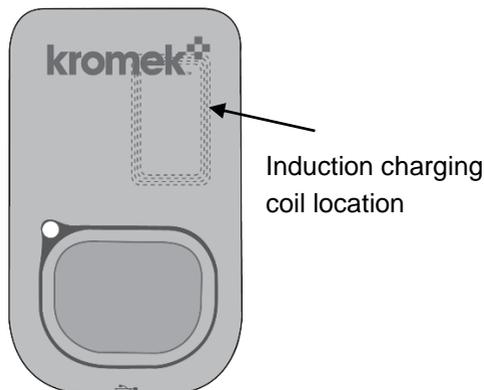
The D3S can be charged either via connecting a USB cable or by placing the **D3S** on a Qi induction charging station.

### USB charging

Connecting power via a USB cable will start charging the device and the light on the front will pulse. When fully charged the light will turn solid. If the device is charging while off the **D3S's** light will be white.

### Qi inductive charging

The induction charging coils are on the rear of the device as shown below. Place the unit face up on a Qi compatible charging station and the charging cycle will run automatically.



# Indicator light

The indicator light on the front of the **D3S** shows the state of the unit.

During normal battery operation the light will flash once every five seconds. A fast flash will show when battery power is low.

When connected to power the light will 'wave' while charging and be solid when fully charged.

The connection status is shown by the indicator colour:

Yellow	Waiting for a data connection
Blue	Connected for data transfer over Bluetooth
Green	Connected for data transfer over USB
White	Off and charging
Red	Ready for a firmware upgrade over USB

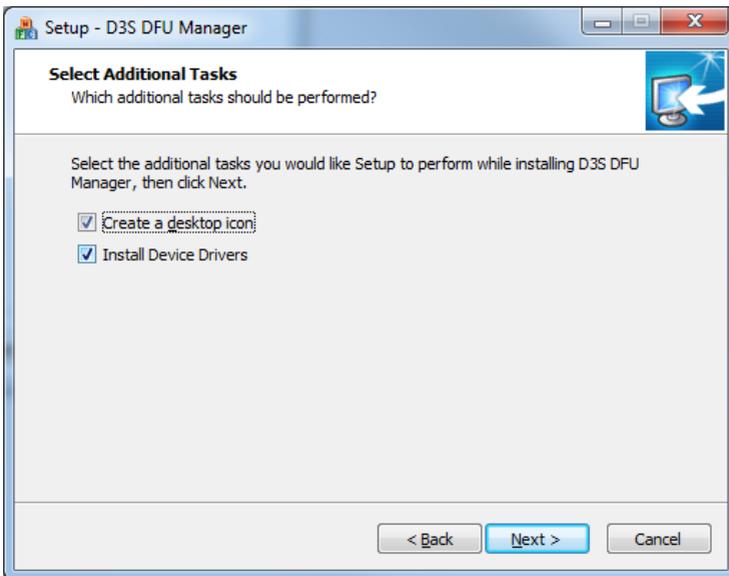
At any point the power switch can be pressed to force the indicator to show the connection status. Please note that holding the switch for 5s or more will turn the device off.

## Device Firmware Upgrade (DFU)

The firmware on the **D3S** can be upgraded from a PC over USB using the **D3S DFU manager** software

### Software installation

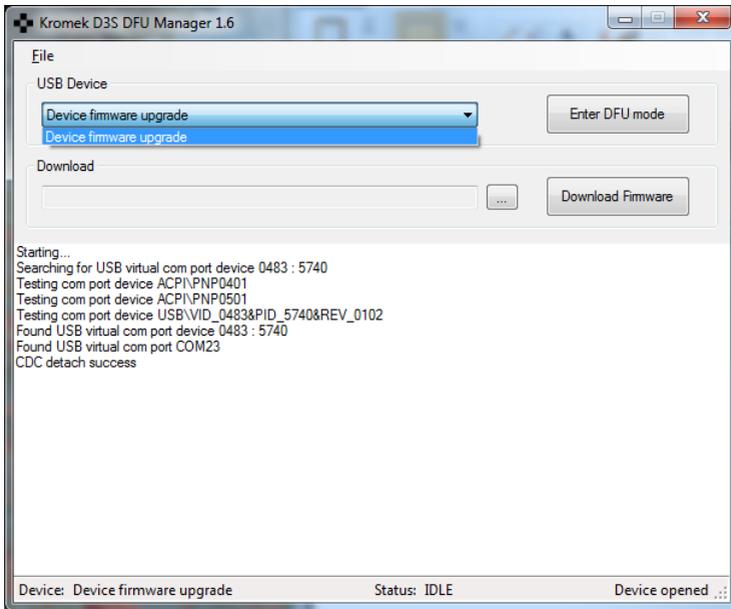
To install the software double click the supplied *setup.exe* file and follow the onscreen instructions. Check the 'install device drivers' checkbox to install all necessary drivers to communicate with the D3S if they have not previously been installed on the PC.



## Upgrading the firmware

Break any Bluetooth connection to the **D3S**, the **D3S**'s indicator light should be yellow, and connect it to the PC with a USB cable. Only one **D3S** can be connected and programmed at a time.

From the **D3S DFU Manager** software click "Enter DFU mode". The indicator light on the front of the D3S will turn from yellow to red. Select 'Device Firmware Upgrade' from the drop down list.



Next select the new firmware to be written to the **D3S** in the 'download' section and then press 'Download Firmware' to write the firmware to the **D3S**.

After the firmware has been upgraded the **D3S** will restart and show a white light.

## Troubleshooting

Disconnecting the USB before programming is complete will corrupt the firmware on the device. If this has occurred DFU mode on the **D3S** can be instigated manually by the following process. This will then allow **D3S DFU Manager** to write the new firmware.

- Start with the **D3S** unit switched off and disconnected from USB
- Turn the unit on by pressing the power button, keeping it pressed after the indicator turns yellow
- Without releasing the power button connect the USB cable from the computer to the **D3S**
- Continue to hold the power button until the LED indicator turns red.

Note that the USB connection to the computer must be made within 5 seconds of the yellow indicator appearing and that the power button is held down throughout the process.

After releasing the power button use **D3S DFU manager** to write the software as described above.



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