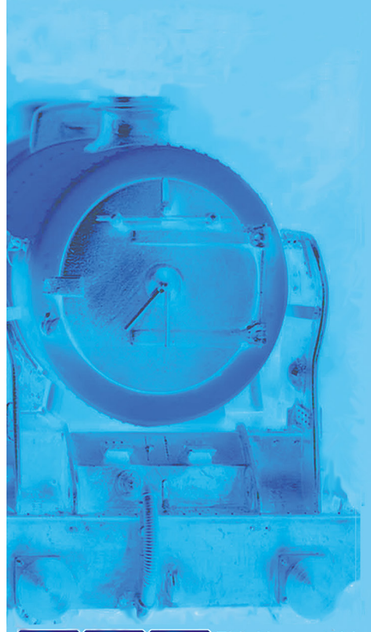
OWNERS
MANUAL

Cobalt ADS-4sx
Solenoid Decoder



DCC concepts
Thinking outside the square

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Overview: Cobalt ADS-4sx Decoders

ADS-4sx Solenoid decoders. Exceptional features make ADS-4sx the perfect way to change solenoids on DC or DCC layouts

Please be sure to read these instructions before installing your ADS-4sx decoder

DCCconcepts ADS-4sx decoders have been designed from the outset to work perfectly on both DC & DCC controlled layouts and each output is able to reliably change two Peco, Seep, Hornby, or any similar solenoid point motors simultaneously if wired correctly.

ADS-4sx decoders can be connected directly to DCC track power or a DCC accessory power bus and need no added power supply or wiring if used with DCC (15~18v DC is required for DC layouts).

Unlike other Accessory decoders which can just run out of energy, ADS-4sx decoders are able to reliably fire all outputs at once (for Route control, Diode matrix control, Macro or computer control) as each individual output stores all the power it needs on-board.

ADS-4sx decoders operate without draining your DCC track power.

Power use is intelligently managed on-board, so you don't need a big power supply even when used on DC layouts - a regulated 15v to 18v DC supply that can deliver 1.5 amps should be just fine!

ADS-4sx also has some exclusive added features:

ADS-4sx has all the features that solenoid users could wish for.

* **Power-off Memory for turnout, frog power and LED panel/signals.**
* **Frog polarity control for live frog (electro-frog) point-work.**
* **LED outputs ready for you to add lights to your control panel.**
* **Dual momentary contact switch option so you can have both digital & manual control of your points - switching contacts are triggerable with hall, diode matrix or detectors for automation.**
* **CDU discharge switch to power-down for safe wiring at any time.**

When connecting high current solenoid motors, the wiring techniques used and the wire size chosen are both important for reliable DC or DCC performance.

DCCconcepts ADS-4sx decoders have screw terminals for all common connections to make wiring easier for you. The use of all terminals is marked clearly on the PCB. (Also see diagrams here)

Please do NOT tin the wire ends when using screw connectors - it is less reliable long term. Just strip the wires carefully and twist them tightly.

We recommend the following wire choices for ADS-4sx;

(1) Solenoid wiring: DCCconcepts 32x0.2 3-plait wire. (DCW-PW25).
(if not available, please use 32x0.2 wire if possible, 16x0.2 is OK only for short runs (Plait it too if you can. Plaited wire is very tidy - and it reduces indiction in the wiring, improving power delivery and helping to manage the harmful voltage spikes created when a solenoid is operated).

(2) Switch, LED or IO wiring: 7x0.2 to 16x 0.2 OK (light wire is OK).
(Your choice may be different depending on where you put your ADS-4sx decoders, however 6-core alarm wire can be an excellent choice as it gives you 3 wires for switches and 3 for LEDs etc in one tidy cable).

(3) Frog Wiring: 16x 0.2 is ideal (ie: Dropper wire size).
(Please keep frog power wires as short as possible. We suggest you adopt a consistent colour for frog wires - green is the usual choice).

ADS-4sx has all wiring positions clearly marked on the PCB. Before wiring your ADS-4sx decoder please read these instructions from start to finish and then take note of the following advice:

* **Plan your wiring colour codes.** A little forethought makes it much easier to maintain your layout as time goes on.
* **Make sure your soldering iron is ESD safe.** A soldering iron with voltage or mains leakage is dangerous and WILL damage electronics.

* **Make sure the mounting or work surface is clean.** Also make sure it is clear of metal objects that can cause accidental short circuits.
* **Make sure that ADS-4sx is disconnected AND that you have fully discharged the onboard CDU's by pressing the button until the blue LED is totally "Off" before adding any wiring to yourADS-4sx**

Addressing CROSSOVERS and LOOPS:

Instead of having independant addresses needing two operations to set crossovers and loop end point-work, you'll find it easier to set BOTH of the ADS-4sx outputs to the same address, changing them both at once. To make this easy, When carrying out Step 4/P6 addressing, just have both of the ADS-4sx outputs switched to SET mode at the same time, and they will simultaneously adopt the number you want.

Using the FROG Terminals:

The Frog switching is independent of other connections. The terminals are marked L (Left) C (Common) R (Right). The Frog wire goes to the (C) terminal, with L and R connected left and right rails. You MAY need to swap over the wires from the rails (Depends on how the point is installed relative to other track).

Using the SWITCH Terminals:

These are marked L (Left) C (Common) and R (Right). Use use any "Normally off" push-button switch or Centre-off SPDT toggle switch to add manual control to each of the eight ADS-4sx outputs. You can also use any form of detector automation switch on these terminals PROVIDING that it has standard switching or VERY low voltage (3~5v absolute maximum) IO type outputs. If you connect higher voltage detector outputs you WILL cause damage to your ADS-4sx that will NOT be covered by warranty.

Using the LED or I.O. Terminals:

These are marked L (Left) C (Common) and R (Right). You may use any standard "Control-panel type" LEDs on these terminals.

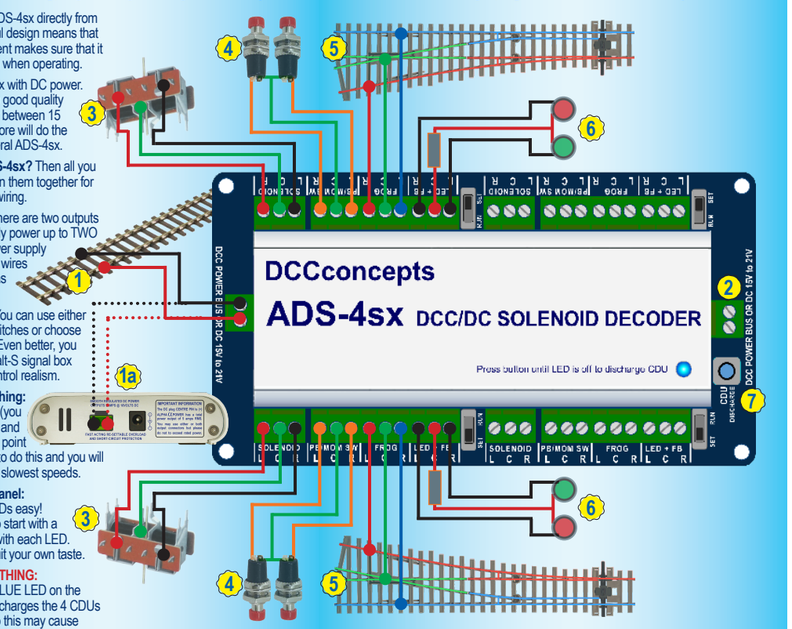
Power is regulated at a low level but a resistor is still needed to current limit the LED and control illumination level. Because of this so-called "12v LEDs cannot be used. We suggest you start with a 560 ohm resistor in series with your LED and vary this value up and down until you find the light level that you prefer.

If you want to use 3-wire red+green LEDs or ANY dual colour combo, you will need different resistors for each colour (and they must be common + positive).

Using the LED terminals for feedback: Most feedback is simply "voltage high or low". We have successfully tested this use of the LED terminals with ESU EcOS, Lenz Set 100 and many others. Email us if you have questions please.

Instruction and overview: Cobalt ADS-4sx features and wiring

ADS-4sx has solder-free wiring, separated power inputs & clearly marked screw terminals. Add simple, logical connections & it's easy for all to use!



1. **DCC Users...** can power ADS-4sx directly from the track power bus. Careful design means that ADS-4sx power management makes sure that it will NOT affect loco running when operating.

   DC Users... power ADS-4sx with DC power. Current draw isnt high, so a good quality regulated DC power supply between 15 and 20 volts @ 1 amp or more will do the job fine and will power several ADS-4sx.

2. **Using more than one ADS-4sx?** Then all you will need to do is daisy-chain them together for simple, easy and very tidy wiring.

3. **Connecting Solenoids:** There are two outputs and each output can actually power up to TWO Solenoids if the correct power supply voltage & adequate "equal" wires are used. Wiring is simple as we show in the diagram.

4. **Control panel switches:** You can use either momentary push-button switches or choose centre-off toggle switches. Even better, you can utilise the realistic Cobalt-S signal box levers for the ultimate in control realism.

5. **Adding Frog power switching:** Simple! Follow the diagram (you may need to swap the blue and red wires depending on the point direction). Take the trouble to do this and you will have reliable running at the slowest speeds.

6. **LED indicators for your panel:** ADS-4sx makes adding LEDs easy! LED brightness can vary so start with a 560 ohm resistor in series with each LED. Vary the resistor value to suit your own taste.

7. **BEFORE YOU WIRE ANYTHING:** Press this button until the BLUE LED on the case is totally OFF. This discharges the 4 CDUs for safe wiring! Failure to do this may cause damage!

There are FOUR outputs on the ADS-4sx. Rather than create a confusing drawing, we have used only TWO sets of connections here.

Addressing your Cobalt ADS-4sx Setting the ADS-4sx address is a simple "learning" process. These guidelines will help users of many common DCC brands.

SPECIFIC GUIDELINES FOR SOME POPULAR DCC SYSTEM BRANDS

ESU EcOS system

* Before attempting to set an address you must first create a link for the turnout in the EcOS system's memory. Refer page 24 of the EcOS manual. Once this is done, follow the instructions on page 6 of **this** manual. (Note: for step #4 - to change a point/turnout with EcOS, use EcOS manual p24)

Roco Z21 system

* Z21 is delivered with an offset problem in Accessory addressing. Please download and use Z21 maintenance software (Win 7~10) to correct this first.

* Before attempting to set an address you must first create a link for the turnout in the Z21 system's memory. Refer to page 57 of the Z21 manual. Once this is done, follow the instructions on page 6 of **this** manual. (Note: For step #4 - to change a turnout with Z21, refer to Z21 operating screen)

Hornby E-link system and Rail-master software.

* Before attempting to set an address in ADS-4sx, you must first create a link for the turnout in the E-link system. To do this follow E-link instructions and use the Track Design screen, adding the turnout and giving it a number- then return to the driving screen that shows the turnout in the layout plan.

Once this is done, follow the instructions on page 6 of **this** manual. (Note: For step #4 - please do NOT use the in-build drop down addressing screens - to change a point or turnout with E-link, just click on it with the mouse)

Please note:

Make sure E-link is communicating properly when you're setting addresses. E-link has a somewhat messy DCC waveform that CAN cause problems if wiring isn't tidy. We also strongly recommend adding a BT2 bus terminator to the ends of the DCC power bus to improve communication quanity

Lenz system (Various full system model numbers)

* Lenz systems do not currently require entry into a database/system memory prior to operating DCC accessory decoders with their handsets.

* Simply follow the instructions on page 6 of **this** manual. For step 4 Lenz users will find the instructions for changing a point/turnout on page 37 of the LH100 v36 manual. LH90 users, please use LH90 V3.6 manual page 30/31.

NCE systems (Powercab, Power Pro)

* NCE systems such as Powercab and Power Pro do not require any entry into a database or system memory prior to operating accessory decoders.

All actions are carried out directly with their handsets.

* Simply follow the instructions on page 6 of **this** manual.

* For step 4 (operating turnouts) -for NCE PowerHouse Pro, use instructions on page 42 of the manual. PowerCab users, use page 33 of the manual.

DCCconcepts Cobalt ALPHA Central:

* Cobalt ALPHA Central turnout controller and ALPHA devices in general give a direct digital command to any Accessory decoder used on your layout.

* This makes Cobalt ALPHA the easiest Switch-based control interface there is.

* It also makes using Cobalt ALPHA the simplest way to address an ADS-4sx

Just move the switch on ADS-4sx to SET position, press the appropriate button on the Cobalt ALPHA unit, then return the ADS-4sx switch to RUN.

Important: ADS-4sx has a high power CDU on each of its outputs. This stores a large amount of energy to assist the changing of solenoids. Therefore you MUST be careful when wiring as incorrect connection may result in immediate failure if CDU power is accidentally cross-connected. If you need to change wiring at any time, ALWAYS use the CDU Discharge button, pressing it until the Blue LED is totally off before changing ANY wiring on your ADS-4sx Decoder.

ADS-4sx multifold instructions revised 30 11 19.indd 1 2/12/2019 4:21:43 PM

Setting the Address of your Cobalt ADS-4sx

Setting the ADS-4sx address is just a simple "learning" process

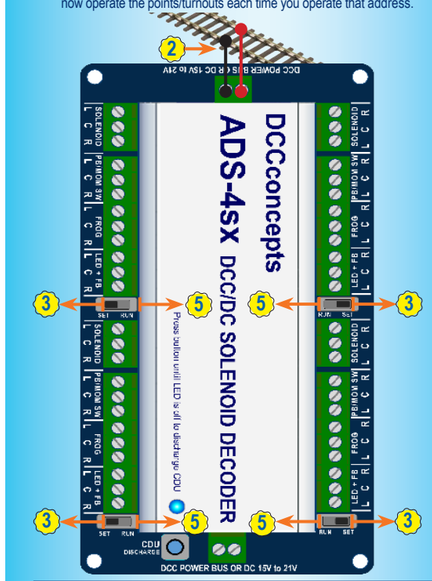
Giving your DCCconcepts ADS decoder its own address is very easy.

While the DCCconcepts ADS-4sx is made to comply with the DCC standards, there are varying approaches to the setting of DCC addresses. Because of this **please use ONLY these DCCconcepts instructions for setting the address of your ADS-4sx decoder** outputs, as your DCC controllers accessory decoder instructions may not be valid for DCCconcepts or some other brand products.

You do NOT ever need to connect ADS decoders to a programming track!

1. **Decide which Address number that you wish the solenoid point motor that you connected to the ADS-4sx output to respond to.**
2. **Connect your ADS-4sx to the DCC track power bus OR if you have creat5ed it, the DCC accessory power bus.**
3. **Move the "SET/RUN" Switch to the SET position.**
4. **Follow your DCC system instructions for changing the Solenoid, Point / Turnout** at the address you chose.

   (ADS-4sx, being in SET mode will "hear" the number, learn it, adding it to its memory as its own address for future use).
5. **Return the ADS-4sx Switch to the RUN position**. Your ADS-4sx will now operate the points/turnouts each time you operate that address.

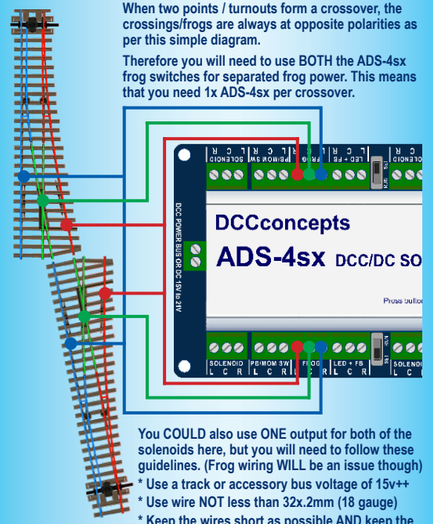


Need help or advice? Email us at
sales@dcccconcepts.com
To find out more visit our website and look in "Manuals and Advice"
www.dcccconcepts.com

DCD-ADS-4sx

Special cases: Cobalt ADS-4sx Frog Wiring

FROG wiring differences - Wiring Frogs on a CROSSOVER



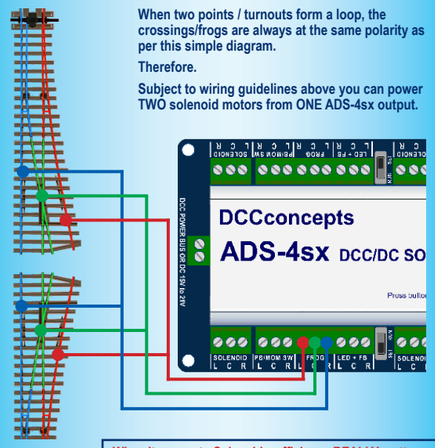
When two points / turnouts form a crossover, the crossings/frogs are always at opposite polarities as per this simple diagram.

Therefore you will need to use BOTH the ADS-4sx frog switches for separated frog power. This means that you need 1x ADS-4sx per crossover.

You COULD also use ONE output for both of the solenoids here, but you will need to follow these guidelines. (Frog wiring WILL be an issue though)

* **Use a track or accessory bus voltage of 15v++**
* **Use wire NOT less than 32x.2mm (18 gauge)**
* **Keep the wires short as possible AND keep the wires the SAME length to each of the solenoids.**

FROG wiring differences - Wiring Frogs on a STORAGE LOOP



When two points / turnouts form a loop, the crossings/frogs are always at the same polarity as per this simple diagram.

Therefore.

Subject to wiring guidelines above you can power TWO solenoid motors from ONE ADS-4sx output.

The DCCconcepts Cobalt Collection - Innovative design and a creative approach to layout control that greatly improves perfomance while simplifying installation and wiring.

While the first Cobalt product was a unique form of point motor, the DCCconcepts "Cobalt Collection" is steadily evolving to become everything needed for the control of your layout.

The Cobalt range now includes a wide range of Point Motors, Signal Levers and extremely high-feature level Accessory Decoders... accompanied by an economical and versatile range of Accessories. The range continues to evolve with the addition of Cobalt ALPHA, which digitises switching of all types and is almost totally "Plug and Play". Cobalt ALPHA lets you create professional looking control panels without fuss and with NO complicated wiring.

With a fullly featured DCCconcepts Control system nearing release, accompanied by sophisiticated, simple to use detection, overload protection devices and auto-reversers, the Cobalt Range keeps evolving towards tomorrow.

Cobalt iP Digital Point Motor

Cobalt iP Digital includes all of the features you can imagine!

Connection-wise, in addition to onboard FROG power switching and a second independent SPDT switch for any use you might imagine, we've also added a second set of momentary push button switch contacts for fully independent left / right "change direction" control (instead of 1-button toggled push-button control).

This gives you totally independent control panel and digital control making Cobalt iP Digital perfect for both DC and DCC users.

Cobalt iP Digital is comfortable with 7~23v DCC track power and is super-easy to install as it's delivered self-centred and ready to go!

Cobalt iP Digital also has three simple-to-use software commands built in. These convenience features are:

* Swap direction of motor throw
* Self Centering ON
* Self Centering OFF

These new software options are REALLY simple to use because all you need to do is move the switch to RUN and use standard "operate accessory" commands from your DCC control system.

Cobalt Digital meets all DCC standards and also integrates perfectly with DCCconcepts ALPHA products such as Alpha-Switch D, Alpha Central and of course, DCCconcepts exciting Alpha MIMIC system.

DCCconcepts ALPHA products make the creation of a control panel simple, reducing the need for wiring inside the panel by 95% or more!

TOP TIP - Wiring multiple switches to one output.

Or indeed, multiple outputs to ONE switch! You can experiment with this as switches connected to an ADS-4sx can be used to set entire routes!

Pushbutton switches ONLY make contact when pressed, so you could, for example, just connect ONE switch to multiple ADS-4sx switch terminals so that it can control several points / turnouts all at the same time.

You could also connect two switches to ONE output so you can have control from two quite separate operating positions. Have fun and experiment carefully.

DCW-PW25 PLAITED WIRE MAKES GOOD SENSE!

DCCconcepts make a unique plaited 3-core wire for the connetion of solenoids. The plaiting cancels induction and helps to suppress the voltage spike generated by magnetic field collapse when the coil solenoid turns off.

Additionally of course it keeps your wiring looking tidy and professional while delivering power with no losses.

Accessory wiring just can't get any easier than this!

Cobalt Alpha Central is literally a complete, ready-to-use digital control panel for 12 points or turnouts... ready to go, in a box!

In fact it is so simple to set-up and use that the instructions could simply read "Unpack-Plug in-Change points"

Alpha Central can be connected directly to any NCE system - however other DCC brands are not forgotten. Low cost adapter leads are available and Alpha central can even be used by DC modellers when combined with Alpha Box or Alpha-Sniffer which creates a low cost Digital Accessory power bus generator. *(A clever move for DC users as "Digital Accessory Control" greatly reduces wiring complexity while extending layout control abilities)*

Alpha Central also combines very easily with the Alpha Box 5 Amp intelligent booster to create an accessory power bus, immediately increasing any DCC systems output power while adding the luxury of intelligent Alpha Accessory control to entry level systems such as Gaugemaster Express & Bachmanns EZ command entry level unit.

Do you already have a full feature DCC system? You will still benefit, as DCCconcepts Cobalt Alpha also adds the luxury of almost wire-free manual control-panel operation to a wide range of aftermarket systems of all brands, including the screen-based Z21 or EcOS. Multiple Alpha-Central units can be linked to control 2000+ Accessories & addressing your Accessory decoders becomes incredibly simple once you have installed Cobalt Alpha in ANY of its forms as your DCC control interface.

Cobalt-S Traditional Signal Levers

Cobalt-S is something very special. For the first time, the average modeller in ANY scale can have a signal-box lever that operates just like the real thing. Even better, the Cobalt-S lever really is the most versatile control device ever offered by anyone, as it can literally control everything ever made... by any brand - in any scale.

Cobalt-S includes both a momentary contact SPDT changeover switch and TWO on-on SPDT changeover switches, giving it the ability to work with AC, DC or DCC control and literally capable of operating every item ever designed for use with a model railway.

At 140mm high, it is a substantial product that is very satisfying to use... the lever and mechanism itself is solid brass, the contacts are high quality long-life phosphor bronze and the case is a tough engineering plastic.

Cobalt-S oozes quality and as a result it is guaranteed for life!

The full Cobalt-S range can be seen at www.dcccconcepts.com...

Please drop in and take a look soon!

Cobalt iP Analog Point Motor

While the shape is familiar, our Cobalt iP Analog has the same quiet operation and 3 on-board switches of Cobalt Ω & a simple to use "Swap direction" switch to let you synchronise the changing of direction with software / macros or route control.

We have also added something very special inside.... The iP in the Cobalt iP Analog name means Intelligent power control! Cobalt iP Analog self-manages power use for the same drive speed irrespective of voltage (7~23v is OK). When it's standing still, Cobalt iP Analog draws only enough power to listen for the next command and even when operating, it draws only 40~60mA. That is in fact less than the current draw of one super bright LED!

Cobalt iP Analog really is the best choice for larger, busy layouts!

When it comes to Solenoids, efficiency REALLY matters as they are generally VERY power-hungry. While there are no DCCconcepts Solenoids, we DO test them all when we make our accessory decoders. Our conclusion: Gaugemaster PM10, PM20 surface mount or the Hattons PM-01 are the best choices.