

The EVOLUTION of the Cobalt range: Detail comparisons

From its initial concept and creation, Cobalt and its associated product range have been a significant addition to the hobby in the area of turnout motor control.

Of course, while we have enjoyed exceptional results from the entire range, we have also been learning constantly - especially from our customers. The very wide diversity of modeller understanding and their varying ability, different approaches to power use on layouts and endlessly creative installation ideas (plus requests for additional functionality in DCC accessory decoders that were received from consumers) have all been food for thought.

At the same time, we have had some real challenges.

Foremost among them has been the strangely inconsistent approach to power on layouts.

Surprisingly, the big challenges weren't consumer issues - they were created by other manufacturers.

This is especially true within the DCC industry, which, in an attempt to be inclusive (and we presume while also trying to cater for legacy products like early Märklin digital or larger scales) has ignored DCC rail voltage standards for N and HO and adopted foolishly high default track voltages.

DC controllers didn't help either... the habitual use of low cost unregulated DC power outputs and what is in reality "wrong labelling of DC controller outputs" has also challenged us considerably.

So: we've really wanted to take Cobalt to the next level for some time now....

Of course... we could have simply done as the computer industry does, and "patch" things to fix some issues, but we don't work like that. We have taken all that we have learned, listened to all feedback, good and bad, and looked at the whole range with a critical eye.

We made three lists:

- * One was simply things we thought we could do better: Things like even less noise when operating, perhaps making power draw even lower, increasing versatility of installation and adding more functionality.

- * The second was about user issues or problems that we wanted to "design out" of Cobalt: The first of these was to remove any possible power problems by compensating for the various overly-high voltages used by DCC manufacturers and to properly acknowledge that average user understanding of correct voltages is low... Leading to the conclusion that a full re-design of power management was needed.

- * Finally, we summarised all the feedback we'd received from the "Cobalt user". You asked us for more versatile switching within Cobalt. You asked us for computer IO feedback. You asked us for a choice of one or two button control PLUS "Direction flip" for Digital versions - and an answer for of voltage issues.

In accessory decoders, you asked for LED connections directly from our accessory decoders, and those still using solenoids, who loved the fact that our ADS2 and ADS8 already powered Peco, Seep and Hornby solenoids better than any other brand, also asked us time and again about frog power switching.

Armed with those three lists, spent a year or so re-evaluating everything. We have been trying new things, adding new features and in some cases, we have been able to do even more than we anticipated.

We are pleased to announce these models :

This includes the new Cobalt Classic Ω , Cobalt iP Analog and new Cobalt iP Digital turnout motors... and they are accompanied by all accessory decoders - AD-2fx/AD-8fx for Cobalt and AD-S2sx/AD-S8sx Accessory Decoders for solenoid users.

These do not make your existing Cobalt turnout motors and AD Accessory Decoders redundant as they can all happily coexist on the same layout.

You will be able to use the same power supplies or DCC accessory power bus you are using now.

You will also be able to connect them in a similar way and, for example.... you can even use "Original and New" models together on the same crossover.

They DO in some cases look very similar from the outside... They ARE very different though, so we've created this detailed document to explain the changes.

We have also added lots of detail to assist you in choosing which Cobalt product you should select and tell you more about its abilities. We hope you will find it useful.

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Comparison #1: Cobalt Classic vs Cobalt Classic Ω

Model Name	Cobalt Classic	Cobalt Classic Ω (omega)
Body Size:	52mm high, 40mm wide, 34mm thick (67 x 52 x 34 over connector/feet)	52mm high, 40mm wide, 34mm thick (67 x 52 x 34 over connector/feet)
Pre-Centered when delivered?	No	Yes (also any ADfx can auto-center it)
Current draw:	Dependent on drive volts, avg 22mA	Dependent on drive volts, avg 18mA
Connector type:	8 way solder-free spring connector	9 way solder-free spring connector
Power input / Acceptable voltage range:	7~13v DC (sensitive to over-voltage)	Range Switch. 6~12v and 12~18v DC
SPDT switch linked to power inputs?	No.	Yes, diode switched vs input for panel LED, signalling, feedback/computer
Additional "High power" SPDT switches?	Yes, two (each has a 5amp power ability)	Yes, two (each has a 5 amp power ability)
Power input terminals:	Terminal 1 and 8	Terminals 1 and 2

Comparison #2: Cobalt Classic Ω vs Cobalt iP Analog (iP = intelligent power)

Model Name	Cobalt Classic Ω (omega)	Cobalt iP Analog
Body Size:	52mm high, 40mm wide, 34mm thick (67 x 52 x 34 over connector/feet)	52mm high, 40mm wide, 34mm thick (67 x 52 x 34 over connector/feet)
Pre-Centered when delivered?	Yes (also any ADfx can auto-center)	Yes (also any ADfx can auto-center)
Current draw:	Dependent on drive volts, av. 18mA	<5mA static, avg 50mA when moving
Connector type:	9 way solderless spring connector	9 way solderless spring connector
Power input / Acceptable voltage range:	Range Switch. 6~12v and 12~18v DC	Auto ranging, (quite happy @ 7~23v DC)
"Flip direction" for computer diagram?	No. Need to change wiring	Yes, located beside the connector strip
SPDT switch linked to power inputs:	Yes, diode switched vs input for panel LED, signalling, feedback/computer	Yes, diode switched vs input for panel LED, signalling, feedback/computer
Additional High power SPDT switches?	Yes, two (each has a 5amp power ability)	Yes, two (each has a 5amp power ability)
Power input terminals:	Terminals 1 and 2	Terminals 1 and 2

At first sight the differences may appear small, however there is much more there than meets the eye. There are also significant internal tooling changes to reduce case resonances and modify the gear structure.

Important note for existing Cobalt users: Cobalt Classic Ω has been kept 100% compatible for existing Cobalt Classic users, so even though production of original Cobalt Classic has ceased, you can just transfer any new purchases to the all new Cobalt Classic Ω or, of course Cobalt iP Analog and be comfortable with the transition as the new models simply add more features and there is only a small change in the wiring.

New Cobalt users: You can choose between Cobalt Classic Ω, iP Analog or digital. Especially for DCC users and those with larger layouts and many turnout motors, flexible voltage and low current draw are a real iP bonus. ("Larger Scale" users with high voltages will REALLY appreciate the voltage range abilities of Cobalt iP).

A very note about accessory decoder choices:

While Cobalt Classic and Classic Ω are comfortable with various brands of "stall motor decoders", the interactive way that Cobalt iP handles power means that with very few exceptions, ONLY the original AD-HP or new DCCconcepts AD-2fx or AD-8fx accessory decoders should be used with Cobalt iP Analog for best possible performance.

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Comparison #3: Original Cobalt Digital vs Cobalt iP Digital

Model Name	Cobalt Classic Digital	Cobalt iP Digital
Body Size:	52mm high, 40mm wide, 34mm thick (67 x 52 x 34 over connector/feet)	52mm high, 40mm wide, 34mm thick (67 x 52 x 34mm over connector/feet)
Pre-Centered when delivered?	No (it really needs 12v DC/DCC power directly to the Cobalt motors to do it)	Yes, pre-centered. Also has a selectable and defeatable self-centering function, activated by "command 199" and defeated by "command 198" which are just as easy as to use as setting the address.
Simple address setting?	Yes, via a very small micro switch under the connector PCB	Yes, by a new, larger and easier to use switch conveniently placed alongside the connector terminals.
Current draw:	Dependent on drive volts, avg 18~25mA (constant power draw)	<5mA when static, avg 50mA for less than 3 seconds and ONLY when moving
Connector type:	8 way solderless spring connector	9 way solderless spring connector
Power input / Acceptable voltage range:	Limited, 9~12v DC or DCC	Auto ranging (quite happy @ 7~23v DC)
"Flip direction" for computer diagram?	No. Need to change wiring OR remount facing the opposite way	Yes, using "command 197". This easy to use command reverses direction of throw
Manual control option?	Yes, by single push-button switch	Yes, can be controlled by single push button OR two independent pushbuttons
SPDT switch linked to power inputs:	Yes, for frog connection or similar uses. This switch has a 5amp power ability	Yes, for frog connection or similar uses. This switch has a 5amp power ability
Additional 2nd High power SPDT switch?	Yes, switch has a 5amp power ability	Yes, switch has a 5amp power ability
Power input terminals:	Terminals 1 and 2	Terminals 1 and 2

As you can see from the chart above, there are some quite important differences between original Classic Digital and the Cobalt iP Digital. Together they make Cobalt iP Digital a very powerful product.

As with other variants, there are also significant internal tooling changes to reduce case resonances and modify the gear structure. Again, there is no reason to rush to change existing installations or change over - those wishing to continue with the original digital should feel comfortable in doing so.

We do strongly suggest however that for those intending to use either DC, DCC or computer control, there are significant advantages in adopting the Cobalt iP Digital with its two button analog control option as it's also usable for parallel "Sensor triggering" from detectors and Hall etc... Of course the easy "software reversal" of drive direction to match computer displays is also a real bonus to all users.

We have shown the overall connection structure of each of the new Cobalt models below.

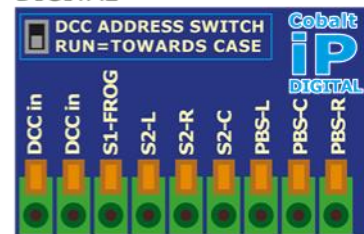
COBALT OMEGA ANALOG



COBALT iP ANALOG



COBALT iP DIGITAL



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Comparison #4: Cobalt AD1 and AD4 vs Cobalt AD-2fx and AD-8fx

Model Name	Cobalt AD1 and AD4	Cobalt AD2fx and AD8fx
Overall PCB size is greatly reduced!	36mm x 50mm (AD1) 140mm x 50mm (AD4)	36mm x 50mm (AD2fx) 144mm x 50mm (AD8fx)
The # of individually addressable outputs?	1x (AD1) 4x (AD4)	2x (AD2fx) and 8x (AD8fx) (the number of individual outputs has been doubled)
Pre-Centering ability for Cobalt IP motor?	No . The original motors needed to be centered prior to installation and their attachment to the AD1 or AD4 decoder	New AD decoders have a selectable and defeatable centering ability activated by "command 199" and defeated by "command 198" (Just as easy as to use as setting the address). flip the direction via "command 197" is also included)
Simple address setting is retained?	Yes, direct learn ability while installed. Activated by simple "learn / run" switch. Cobalt AD decoders need NO CV setting	Yes, direct learn ability while installed. Activated by simple "learn / run" switch. Cobalt AD decoders need NO CV setting
Power usage and current draw:	<5mA plus constant draw of power from Cobalt Classic Motor. Output limit is less than 50mA (max: 2 Cobalt motors are possible if the drive voltage is adequate)	<5mA when static, avg 50mA for less than 3s—a very short peak. Power drawn only when the motor is moving. Each individual output can power more than six Cobalt iP Analog/Classic motors at once.
Connector type:	6/8-way Screw Connectors / solderless.	9-way Screw Connectors / solderless.
Acceptable voltage inputs?	Limited, 9~12v DC or DCC 15v max	Acceptable voltage input is increased Auto ranging. (quite happy @ 7~23v DC)
Feedback or computer IO ability?	No	Yes, via FB terminal plus common terminal of the PB switch OR via LED positions
Manual control options:	Yes, by single push-button switch	Yes, it can be controlled by either one OR two independent pushbutton switches. It can also be triggered by any detector, Hall trigger, reed or similar devices
Ability to connect control panel LED or for direct connection of low power devices?	No	Yes, we have added three terminals for direct connection of control panel LEDs
Power input terminals:	Alongside other connections	Single pair at the end of the PCB

Again there are many positive differences between original Cobalt AD and Cobalt ADfx decoders.

There is a significant increase in features and a doubling of outputs, plus MUCH more drive power on every output. We also want to focus on the additional ways that ADfx decoders can now be controlled... so we now also offer 1 and 2 button control options. The switch-contact points are also usable for "Sensor triggering" from Reed, Hall trigger or detectors etc.

Despite these important improvements. We've never lost sight of the importance of value to our users, so while original AD & ADS were already very good, the new ADfx & ADSsx ranges are 100% unbeatable!

A VERY important note about accessory decoders for Cobalt Classic, Cobalt Omega and Cobalt iP ranges: If choosing accessory decoders for the original Cobalt Classic, New Cobalt Classic Ω or of course Cobalt iP Analog motors, we very strongly recommend that you use only our ADfx decoders, because no "other brand" Stall motor type accessory decoders currently available are actually able to do the job properly.

There is an added bonus in making this choice. The intelligent power management built into all DCCconcepts ADfx accessory decoders will never drain your power bus or stress the power supply. (the only viable alternative is actually our DCCconcepts SDC adapters used in combination with any of the more conventional 3-wire solenoid decoders).

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Comparison #5: Cobalt ADS2 and ADS8 vs Cobalt ADS2fx and ADS8fx

Model Name	Cobalt ADS2 and ADS8	Cobalt ADS2fx and ADS8fx
Overall PCB size:	36mm x 60mm (ADS2) 140mm x 60mm (ADS8)	45mm x 60mm (ADS2fx) 180mm x 60mm (ADS8fx)
The # of individually addressable outputs?	2x (ADS2) 8x (ADS8)	2x (ADS2fx) 8x (ADS8fx)
Built-in CDU?	Yes, each output has its own CDU. Each output easily changes 2x Peco PL10/PL12 or PL10E, Hornby or Seep solenoids.	Yes, each output has its own CDU. Each output easily changes 2x Peco PL10/PL12 or PL10E, Hornby or Seep solenoids.
Simple address setting is retained?	Yes, direct learn ability while installed. Activated by simple "learn / run" switch. Cobalt AD decoders need NO CV setting	Yes, direct learn ability while installed. Activated by simple "learn / run" switch. Cobalt AD decoders need NO CV setting.
Power usage and current draw: (NO extra power supply is needed)	Momentary peak of around 30mA per output when charging. Zero current draw when not being used. ADS decoders do NOT drain the DCC power bus when changing as they store power on-board	Momentary peak of around 30mA per output when charging. Zero current draw when not being used. ADS decoders do NOT drain the DCC power bus when changing as they store power on-board.
Connector type:	6/8-way Screw connectors / solderless.	9/11 way Screw connectors / solderless.
Acceptable voltage inputs:	Limited, 12~18v DC or DCC 18v	Acceptable voltage input is increased Auto ranging, (quite happy 12~30v DC).
Feedback or computer IO ability?	No	Yes, via two solder-pads on the PCB (the
Manual control options?	Yes, it can be controlled by Cobalt-S lever or two independent pushbutton switches.	Yes, it can be controlled by Cobalt-S lever or two independent pushbutton switches. It can also be triggered by any detector, Hall effect trigger, reed or similar devices.
Ability to directly connect LEDs/switch for direct connection of low power devices?	No	Yes, these can easily be powered (no resistor) via soldering to the LED terminals.
Additional High power SPDT switch?	No	Yes an SPDT Frog switch has been added!
Power input terminals:	One power input needed per decoder	One power input needed per decoder

Yet again, lots of new features and very big benefits have been added to our Cobalt ADS decoders.

As with the AD decoders, ADS2fx and ADS8fx featured things unheard of in an accessory decoder for solenoid motors. They broke totally new ground for solenoid users by adding frog power management and computer feedback... saving HUGE cost and effort in parts / layout wiring.

So - why would you choose anything else? ADSfx and the new ADSsx are the only decoders that will change two solenoids reliably and they do not need an extra power supply OR drain the power bus. The ADSsx also has a discharge button as well as Power-off memory. Our ADS decoders are also the ONLY solenoid decoder that can be reliably used with computer route control because by storing their power supply on-board, they are able to act instantly to any command without needing a recovery delay.

And... ADS2fx/sx and ADS8fx/sx are the ONLY solenoid decoders that will give you control of live frogs too. With the price per output having also being kept within reasonable limits... there is no need to say any more! They are arguably the "best solenoid decoder made", and have now become totally unbeatable!