



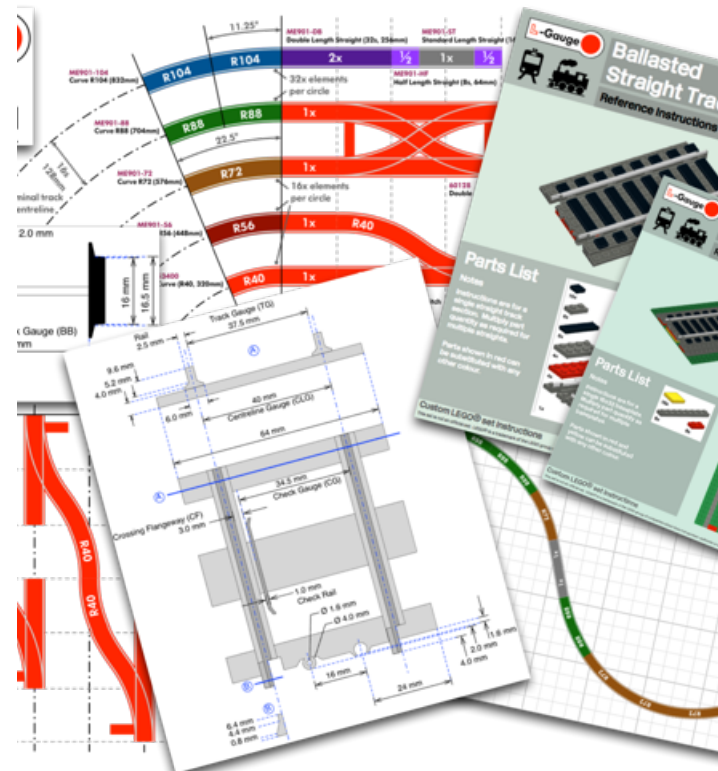
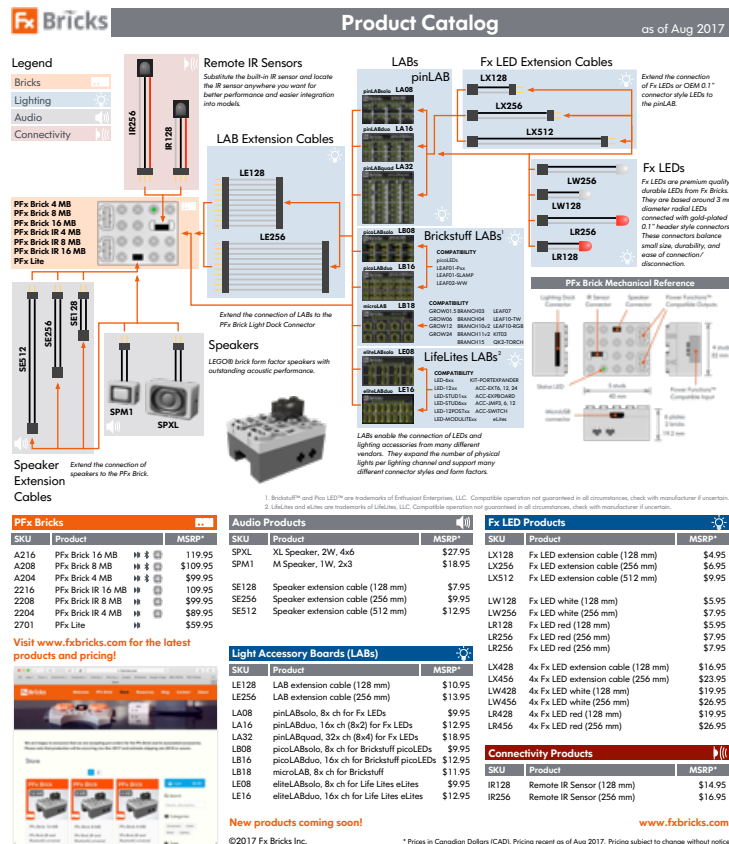
P R E L I M I N A R Y

Pushing the LEGO Train hobby forward





A plan to use the Fx Bricks brand...



...To develop a new system of LEGO train compatible products...

Whilst embracing the core founding principle of the LEGO group:



Problem

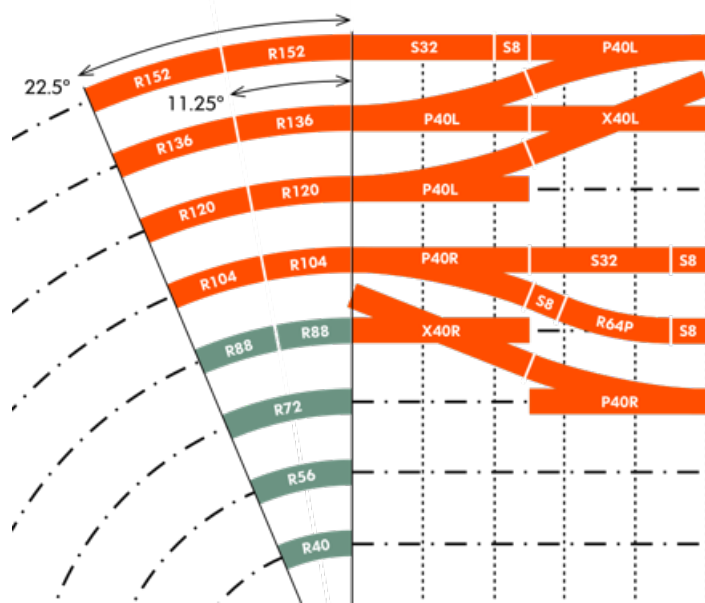
Not enough basic elements, i.e. track, wheels, accessories

Fragile and disconnected 3rd party alternatives

Metal track system displaced by plastic and battery power

No Coherence of system to pull everything together
Difficult to recruit new-comers to hobby

Solution



**Develop a complete
System of new LEGO
train components:**

Track

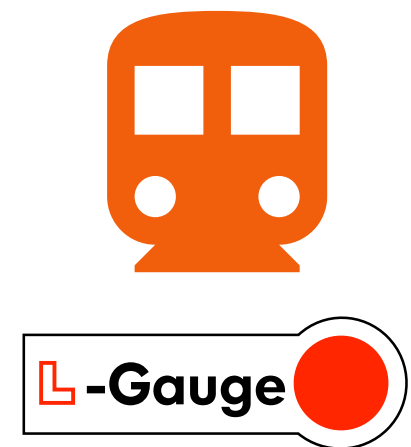
Electrics

Sets / Kits

Accessories



**Fully stocked online store
Worldwide fulfillment
and distribution**



**Build a world-class
model train company
and galvanize the
legitimacy of L-Gauge
among the broader
model train community**

Market

AFOLs Adult Fans of LEGO, existing LEGO train fans

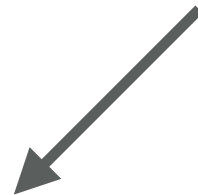
Traditional railway modellers, collectors

Newcomers young and old alike curious about LEGO trains

Product Portfolio

Product Portfolio

Core product silos

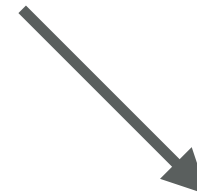


Track System

All new LEGO® compatible
metal track system

Metal wheelsets

Power feed/distribution



Power System

“PFx System”

Fixed / variable supplies

Connectors and wires

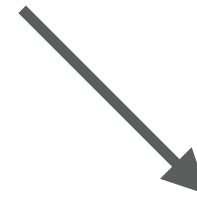
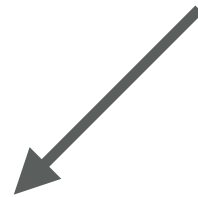
Motor drives

Electrical accessories

Control systems

Product Portfolio

Future product silos



Train Accessories

Couplers

Steam coupling rods/valve gear

Alternative wheels

Train Kits

Turn-key rolling stock kits

Licensed/premium fan models

Track System

Track System

Design Principles

Compatible with LEGO® 9V / RC track geometry/interconnect

Metal running rails similar in design to LEGO® 9V
(folded/crimped metal rail head)

Conductive metal wheel sets for power pickup

Dark bluish grey ABS plastic

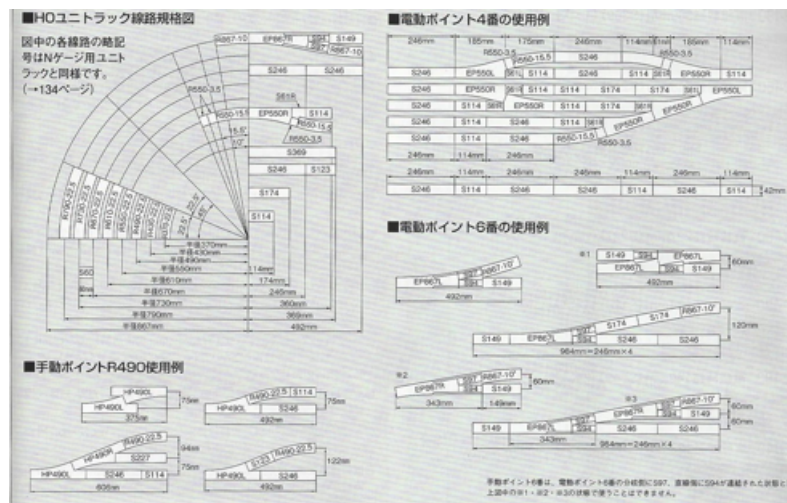
Gentle system geometry closer to model trains and less toy-like

Versatile selection of elements to build interesting layouts

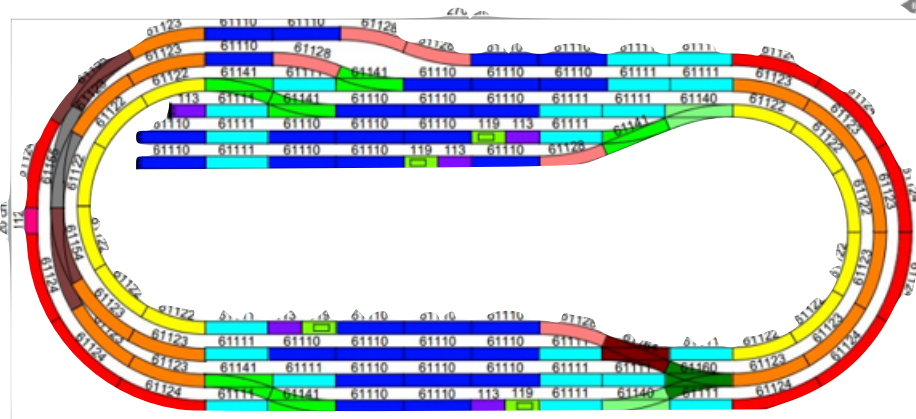
Other Track Systems

A sample survey of some major model train brands...

Kato

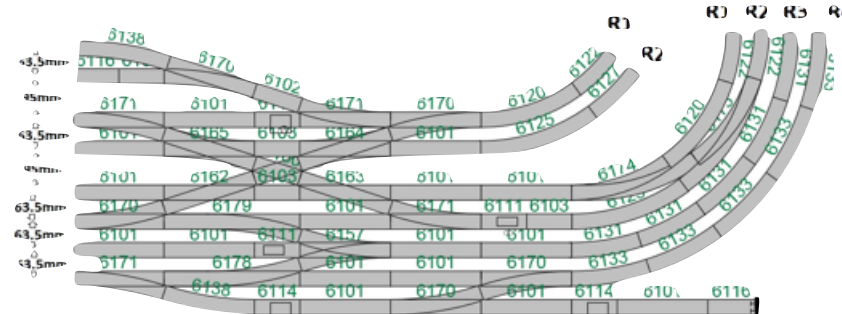


Roco



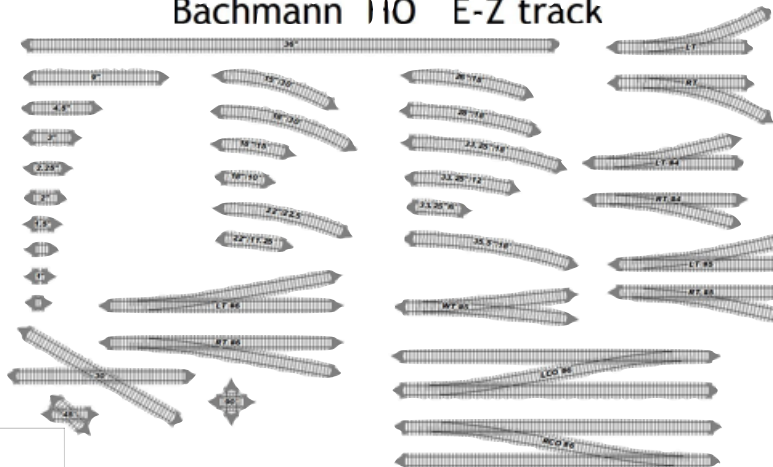
Fleischmann

R1 = 356.5mm
R2 = 420.0mm
R3 = 483.5mm
R4 = 547.0mm

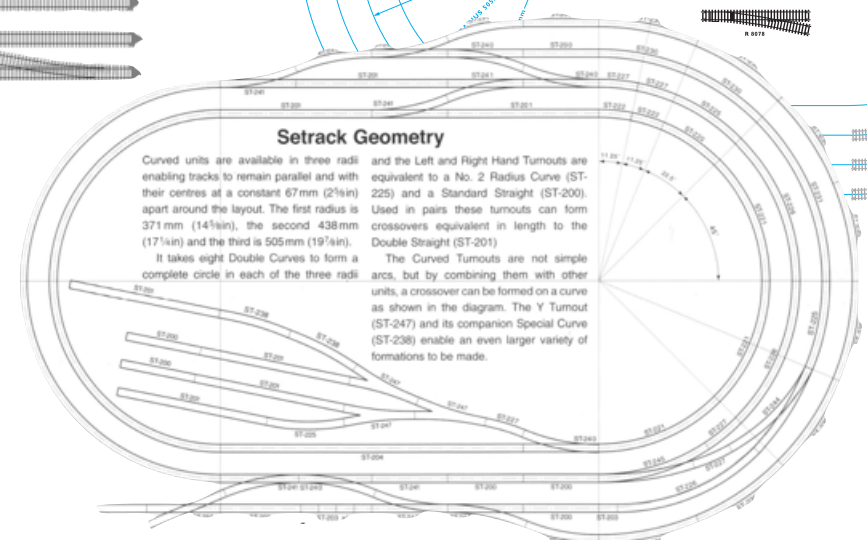


Bachmann

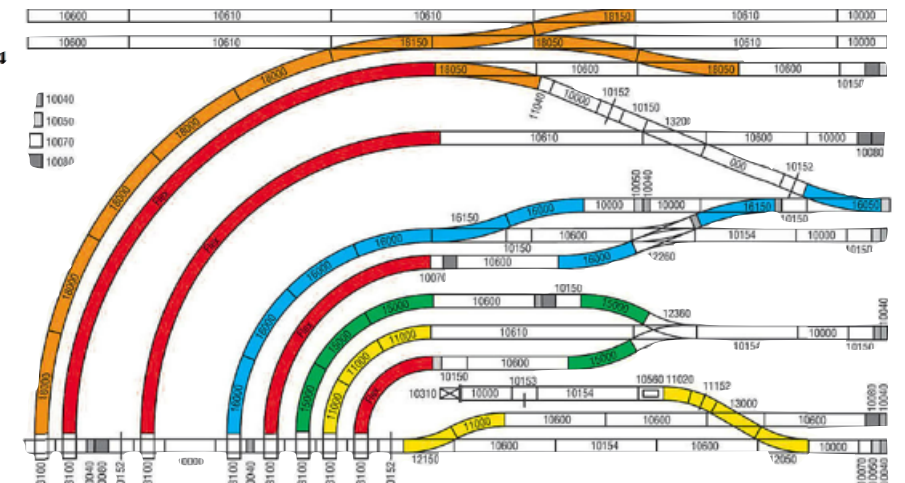
Bachmann HO E-Z track



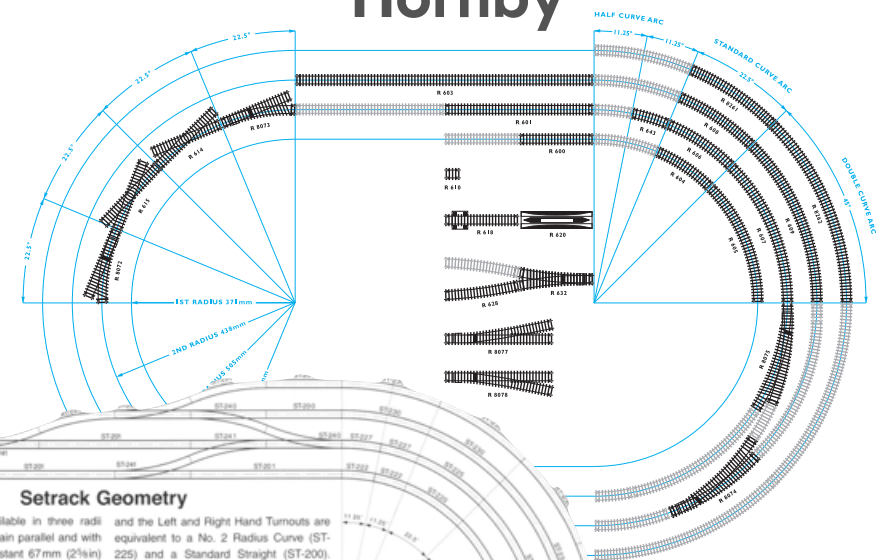
PECO



LGB



Hornby



Other Track Systems

Survey analysis

Manufacturer	Gauge	Origin	Number of Elements	Curve Radii	Straight Lengths	Switch Pairs	X-ings	Curve Switch	Y / 3-way
Kato	N	JP	46	11	5	3	4		1
Bachmann	HO	USA	36	7	10	4	3		1
LGB	G	DE	26	4	11	3	2		1
Fleischmann	N/HO	DE	25	4	6	2	5	1	1
Hornby	OO	UK	25	4	4	1	2	1	1
PECO	HO	UK	21	4	5	1	2	1	1
Roco	HO	AT	15	4	5	2	1	1	1
Average			28	5	7				

Other Track Systems

At least 5+ curve radii on average

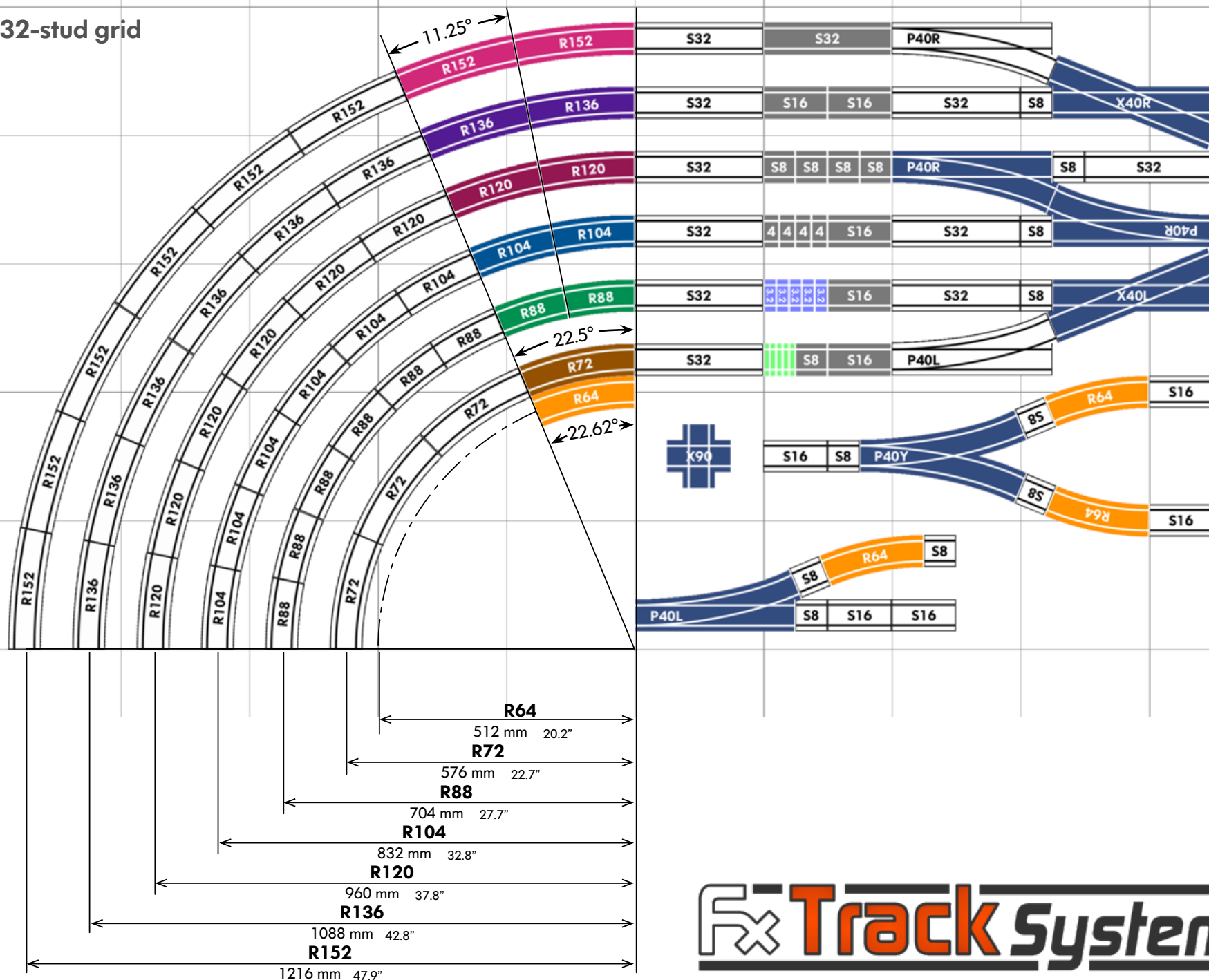
Almost all have “special” elements to align geometry (e.g. return curves, odd-length straights, etc.)

All have at least one crossing element and a Y-switch

Curved switches are not common

Proposed Track System

32-stud grid



- 7x Curve Radii
- 6x Straight Lengths
- R/L Switch Pair (40 studs long)
- R/L Crossing Pair (40 studs long)
- Y Switch (40 studs)
- 90° Crossing
- 19 elements total

FxTrackSystem

Proposed Track System

6x Main Curve Radii:

R72-22.5° **R120-11.25°**
R88-11.25° **R136-11.25°**
R104-11.25° **R152-11.25°**

16-stud parallel centrelines



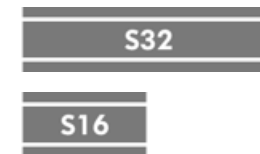
1x Special Return Curve Radius:

R64-22.62° Ensures perfect parallel
return curve at 16-stud
separation




4x Standard Length Straights:

S32 Double **S8** Half
S16 Single **S4** Quarter



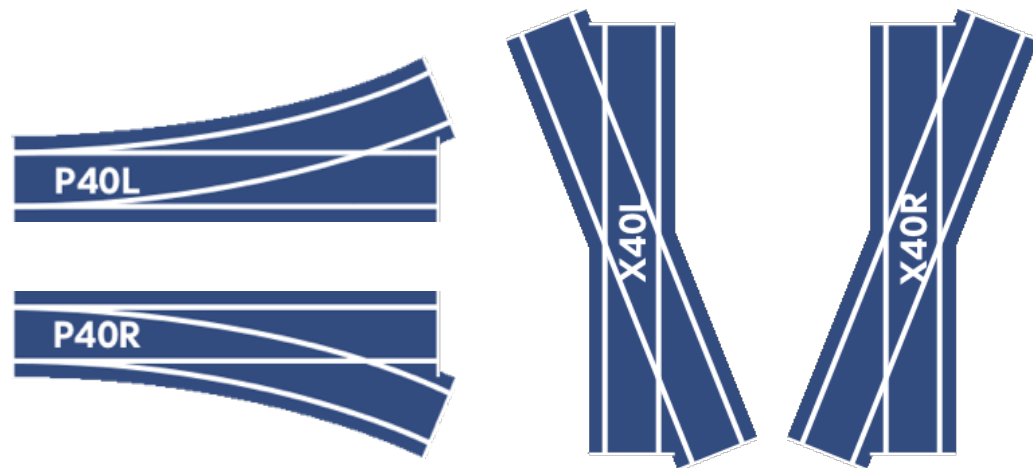
2x Special Length Straights:

S3.2 (5x/16-studs) 

S1.6 (5x/8-studs) 

Ensures perfect offset alignment for
any size yard ladder

Proposed Track System



40-stud Switch (Right/Left Pair)

40-stud Crossings (Right/Left Pair):

22.62° crossing vee

16-stud crossover parallel geometry



40-stud Y Switch:

±22.62° diverging routes

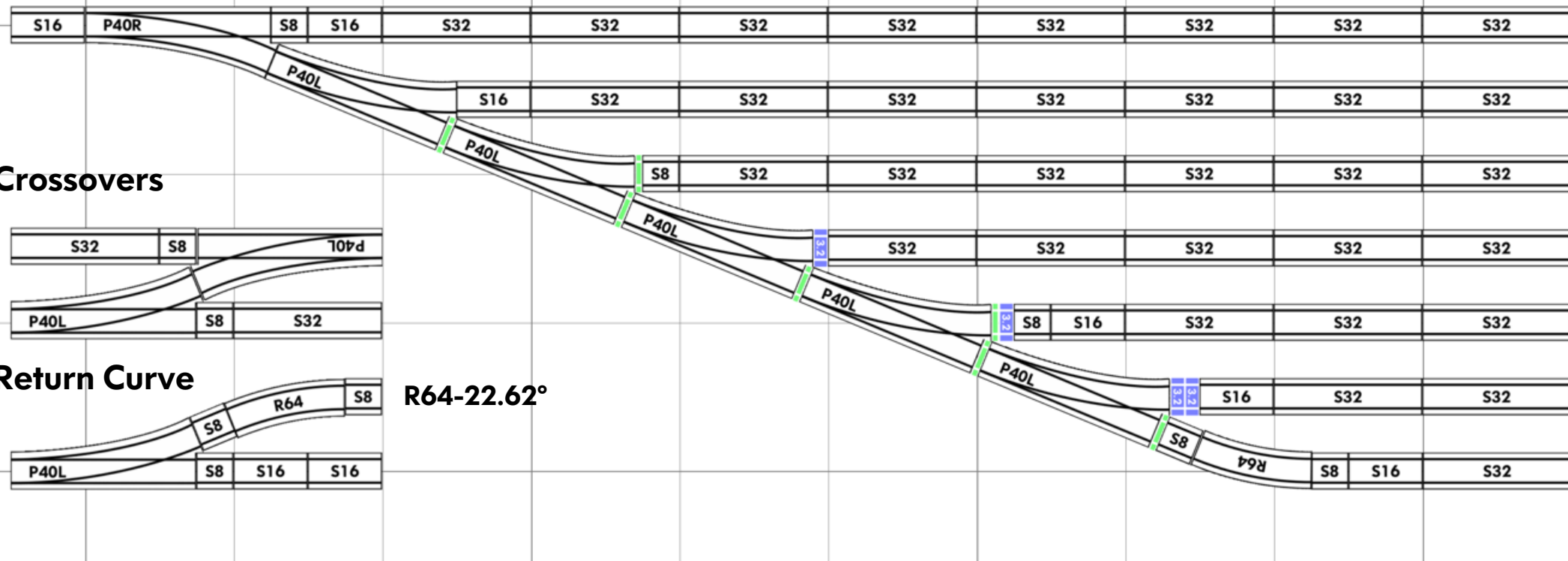
32-stud return curve
parallel geometry



90° Crossing

Proposed Track System

Grid Aligned Yard Ladders



R64-22.62° ensures perfectly aligned return curves for parallel sidings with Right/Left/Y switches and for yard ladder terminations

Repeating combinations of **S1.6** and **S3.2** ensure perfect 16-stud X-Y alignment

Power System

Power System

Support a variety of control schemes:

Variable 9V DC to track / direct motor speed control

Fixed 9V DC to track / replace PF battery box / use with LEGO® IR Receiver, S-Brick, PFx Brick, etc.

NMRA DCC to track / use with PFx Brick PRO or OEM DCC decoders

Power Distribution / Interconnect:

Simple 2-terminal conductive stud connectors

Stackable connectors

Variety of cable lengths

Used as the basis of all electrical interconnections

Power System

New high-performance / quality motor drive components

2-axle Motor Bogie similar form factor to PF train motor

Standalone Motor Brick similar form factor to PF XL motor with technic cross axle coupling

Use high quality OEM motors, e.g. Bühler, Canon, etc.

Future Migration to Accessory Products

Point switch machines

Magnetic De-coupler

Signals

Track occupancy detectors

Level crossing gates/lights

Power System

5x Product Categories:

1



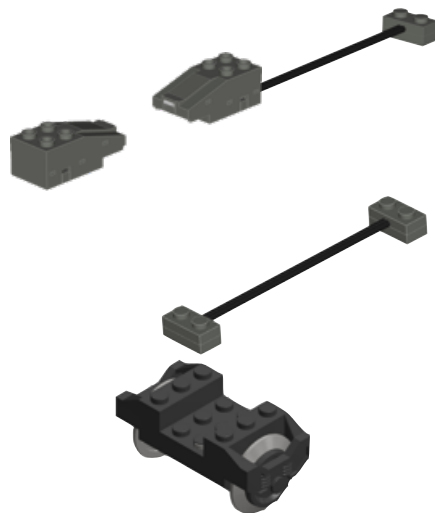
Power
Supplies



2



Track
Interface



3



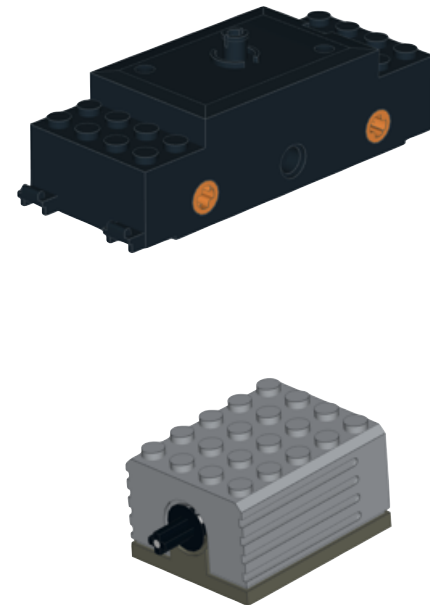
Control



4



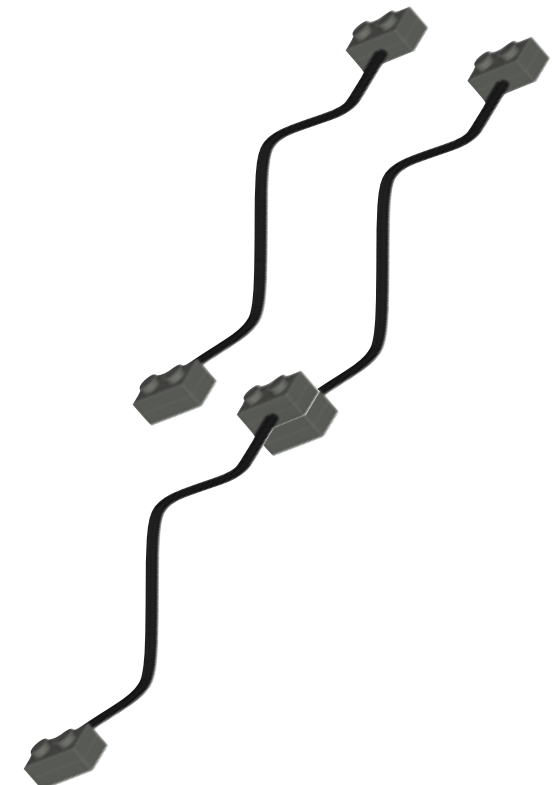
Motors



5



Interconnect



Power System

1 Power Supplies



Fixed 9 VDC - AC adapter

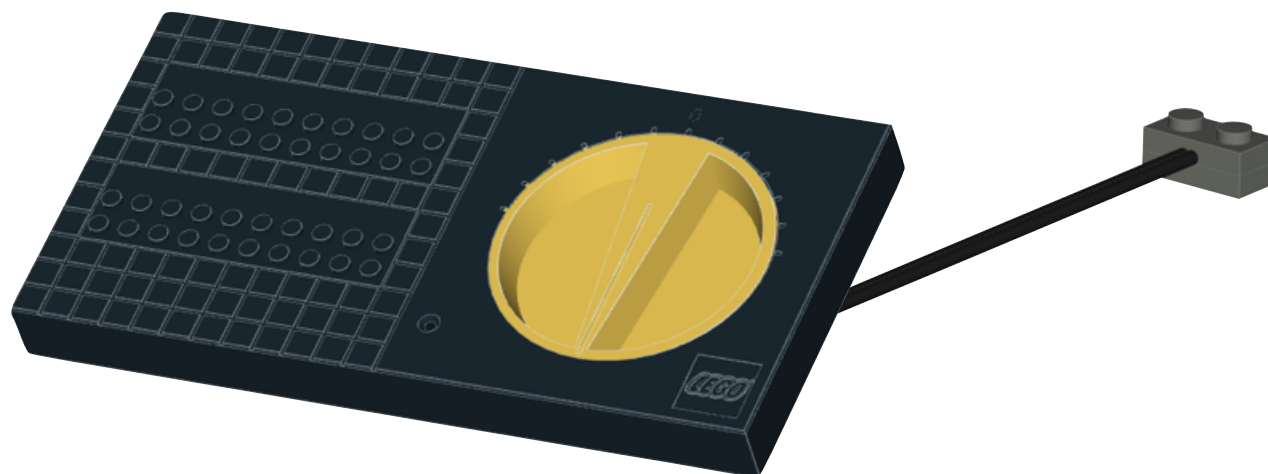
Terminated with 1.5m wire + 1x2 plate/conductive stud
“Battery replacement”



Variable 9 VDC - AC adaptor

Similar form factor to LEGO® 9V regulator

Terminated with 1.5m wire + 1x2 plate/conductive stud



Power System

2 Track Interface



Power Feeder

Similar form factor to LEGO® 9V power feeder



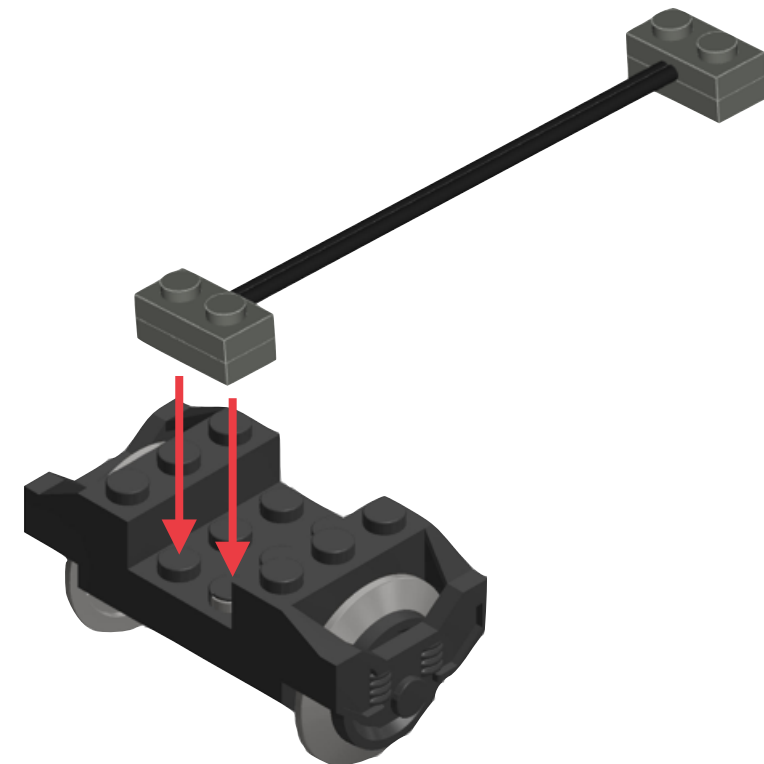
Metal Wheel Pickup

Similar form factor to LEGO® train wheel set

Metal wheel / plastic insulating hub

Sprung tabs against wheel back

Conductive stud terminals



Power System

3 Control

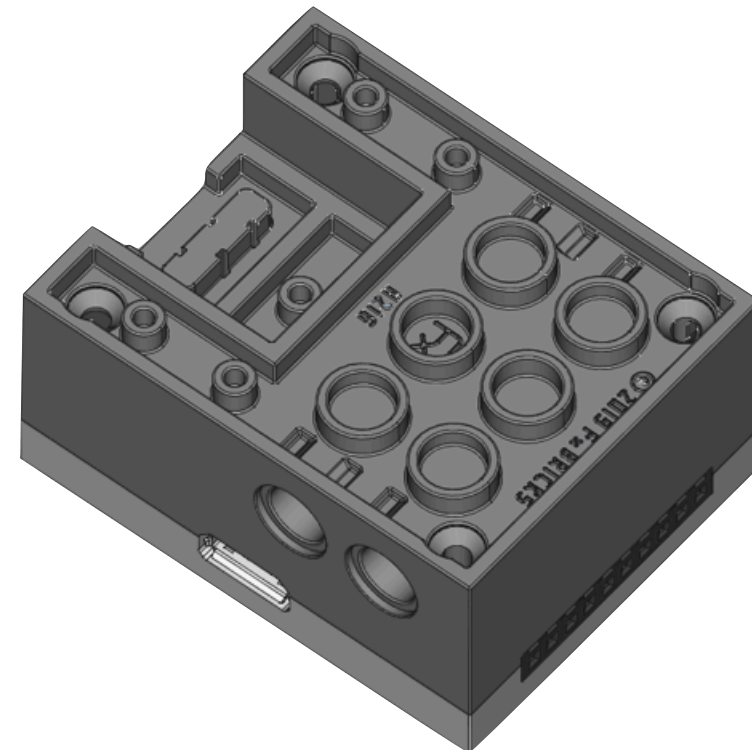
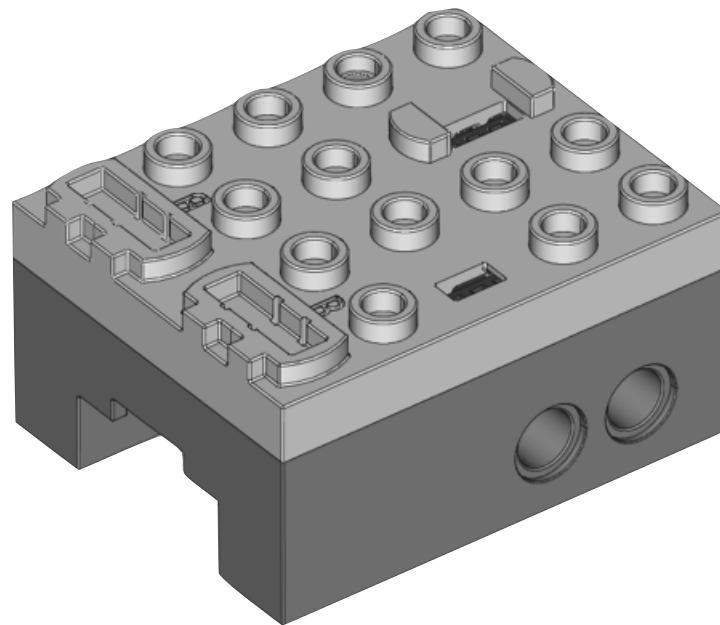


PFx Brick “Pro”

Similar form factor to existing PFx Brick

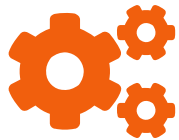
Added DCC compatible decoder firmware

Injection molded two-tone ABS enclosure



Power System

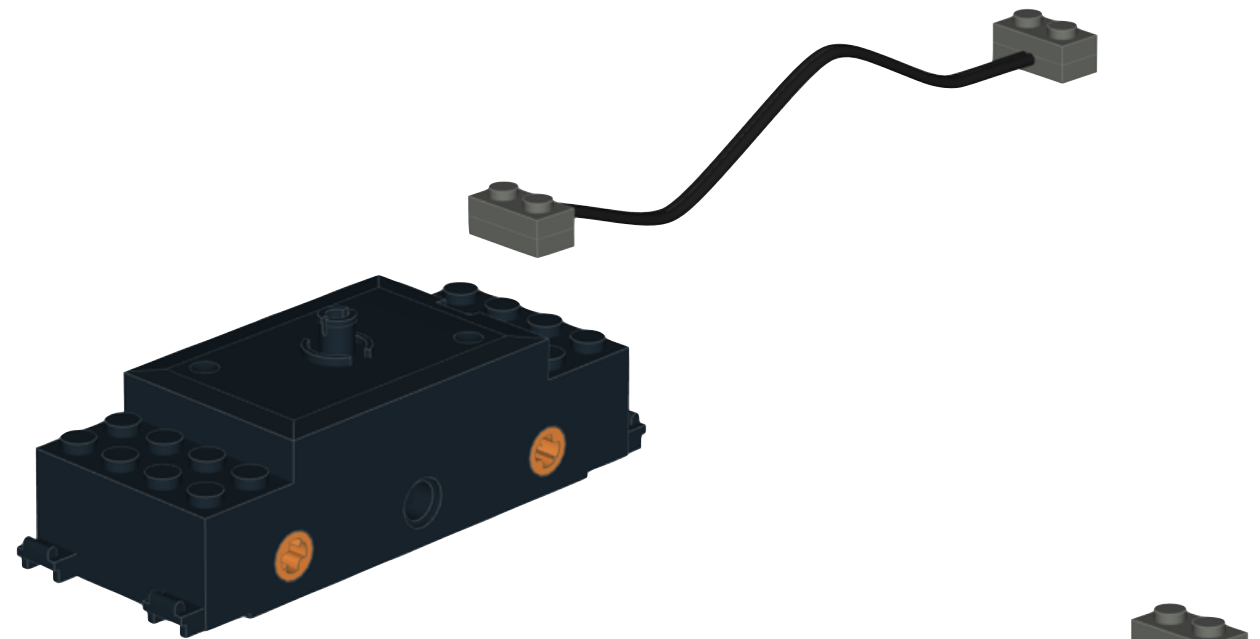
4 Motor Drives



2-axle Motor Bogie

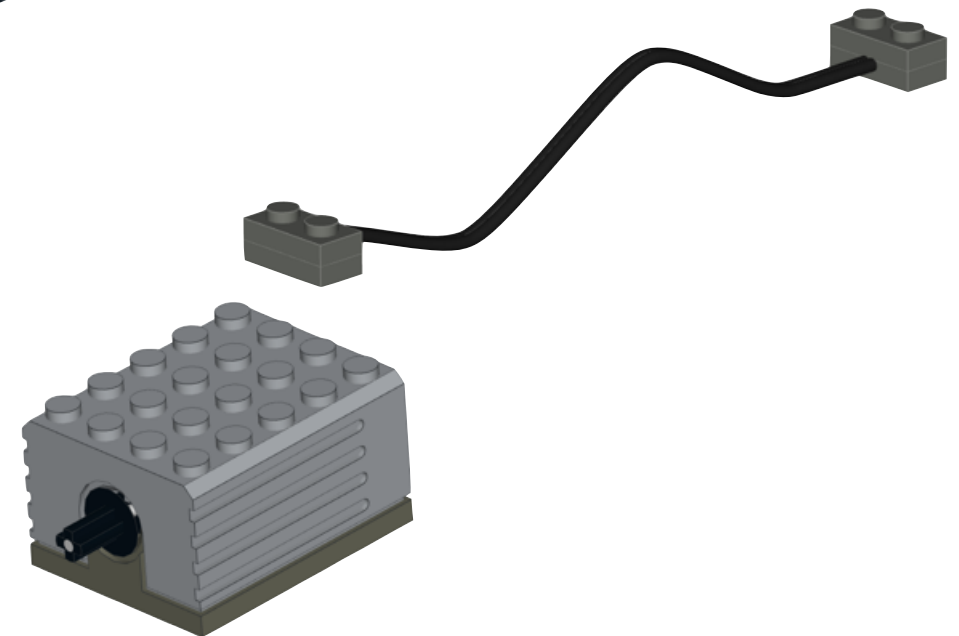
similar form factor to PF train motor

Cross-axle holes allow any choice of wheel type/colour



Standalone Motor Brick

brick form factor motor with technic cross axle coupling



Use high quality OEM motors, e.g. Bühler, Canon, etc.

Power System

5 Interconnect



1x2 plate — wire — 1x2 plate
Standardized cable assemblies

128 mm, 256 mm, 1m cable lengths

22-20 AWG wire pair

Conductive studs / anti-studs

Stackable connectors

