STRUCTURE

1x25 bar

45 degree gusset

90 degree flat gusset

5x25 plate

90 degree vertical gusset

cross gusset

1x2x25 rail

1x2x35 rail

L gusset

arc gusset

2x2x35 L

3x3x35 L

hinge

90 degree corner gusset

1x2x1x35 C

L coupler

C coupler
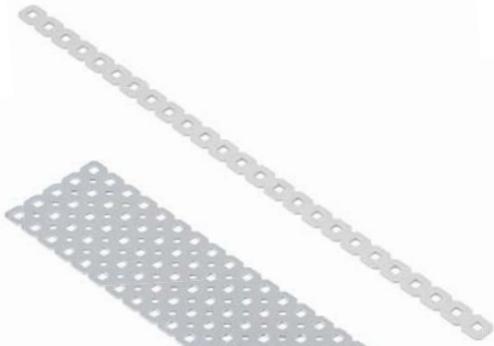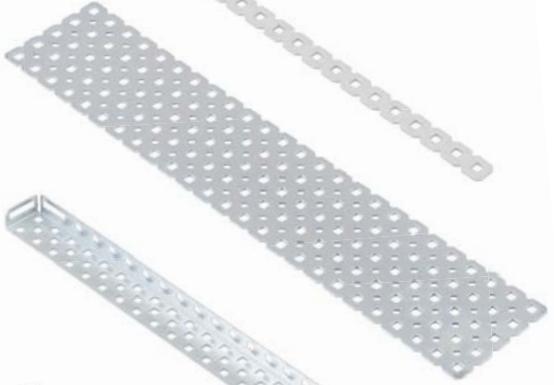
1x3x1x35 C

1x5x1x35 C

Main structural members shown in their maximum available length.
Units are the number of 1/2"-spaced holes per face.
At the VEX store, rails are steel, all other members are aluminum.
McCallum has many of these in steel.
For modularity cut members in 5 unit increments when possible.

FASTENERS, SPACERS and WRENCHES

1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"

1-1/4"	1-1/2"	1-3/4"	2"
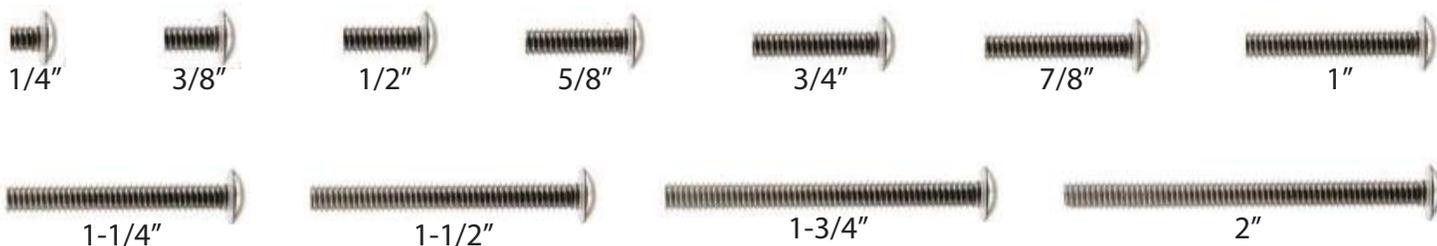
8-32 screws with 3/32 hex head.
Used for all structural connections,
can be black or silver.

steel washer	teflon washer	4.6mm black spacer	8mm black spacer	1/8" white spacer	1/4" white spacer	3/8" white spacer	1/2" white spacer

8-32 keps nut	8-32 nylock nut	open wrench with 11/32" end (nuts) 1/4" end (standoffs)	3/32" hex wrench

1/2" standoff	1" standoff	2" standoff	1/2"	1"	8-32 set screw with 5/64 hex head (for standard shaft collar)

aluminum standoffs with 8-32 threaded ends
also available at: 1/4", 3/4", 1-1/2", 2-1/2", 3", 4", 5", 6"

8-32 coupling screws
with 5/64 hex head
(used to join standoffs)

1/4" M	1/2" M

6-32 screws with 5/64 hex head.
Only used for motor and rack connections,
can be black or brass.

5/64" hex wrench

8-32 rubber link

WHEELS

2.75" traction

2.75" omni,
allows smooth turning for
drives with more than 2 wheels

1.5" intake roller

3.25" traction
1/4" center for HS shaft
or inserts

3.25" omni
1/4" center for HS shaft
or inserts

5" traction

4" traction

4" omni

4" traction

4" mecanum,
allows strafing drive

6" leg,
for rugged ground

GEARS

Standard gears,
each gear is 24 teeth larger,
ratio to 12 in ( )

High strength gears,
center holds inserts or 1/4" drive shaft

Other gears

12T (1)

36T (3)

60T (5)

84T (7)

84T (7)

bevel gear

rack gear

60T (5)

worm gear

round insert

worm wheel

square insert

36T (3)

differential frame

12T (1)
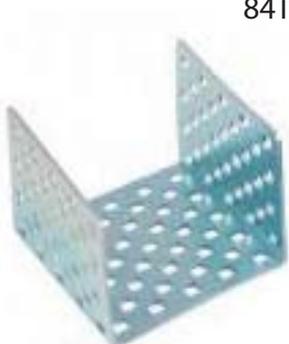
Pulley gearbox

Rack gearbox
also holds main battery well
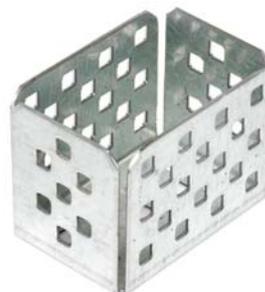
Worm gearbox

Bevel gearbox

SPROCKET, CHAIN, and TREAD

High strength sprockets,
each sprocket is 6 teeth larger
ratio to 6 in ( )

6T (1)

12T (2)

18T (3)

24T (4)

30T (5)

High strength chain

Attachment links

Tread

Specialty treads

Tread sprocket (18 teeth)

Tread guides

DRIVE SHAFT RELATED ITEMS

standard drive shaft, 1/8" square
can be purchased in 2", 3", 4" and 12"
or cut to length

bar lock
alligns shaft at 90 degrees
to structure

adjustable bar lock
center can be set at
many angles

rubber shaft collar
secures to shaft by
friction alone

standard shaft collar
secures to shaft with
8-32 set screw using
5/64 hex wrench

clamping shaft collar
secures to shaft with
8-32 screw and
nylock nut

universal joint

shaft coupler

clutch

shaft bearing

shaft bearing, flat

bearing rivet
quickly connects
flat bearing to structure

high strength drive shaft, 1/4" square
can be purchased in 2", 3", 4" and 12"
or cut to length

HS clamping collar

HS bearing, flat

HS spacers

MOTORS and SENSORS

393 motor

refurb gears

standard gears 100 rpm

speed gears 160 rpm

turbo gears 240 rpm

393 motor with encoder back, counts motor rotations, allows PID control

optical shaft encoder, counts shaft rotations

potentiometer, senses shaft angle

gyroscope, senses rotation in the plane of its base

accelerometer, senses X, Y and Z acceleration

LED indicator, red, yellow or green

limit switch, very sensitive

bumper switch, requires more force

jumper, acts as pressed button

LCD display, connests to UART port with a special cable

ultrasonic sensor, detects distance

line tracker, typically used in sets of three

light sensor, detects light intensity, not useful in competition

speaker module

POWER and CONTROL

Cortex microcontroller,
ARM cpu with multiple I/O ports,
stores and runs programs

VEXnet joystick,
four button groups,
two joystics

VEXnet key,
NOT a usb drive,
but a 2.4GHz
transmitter/receiver

main battery,
7.2V, 3000mah

main battery clamp
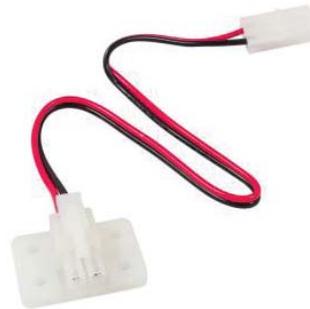
main battery
extension wire

power expander,
allows two main batteries

9V backup battery
wire and holder

MC29 motor controller wire,
used in ports 2-8

wire clip, holds
ends toghether

2-wire extender,
available in many lengths

3-wire Y splitter,
allows two motors to
run from one port

3-wire extender,
available in many lengths
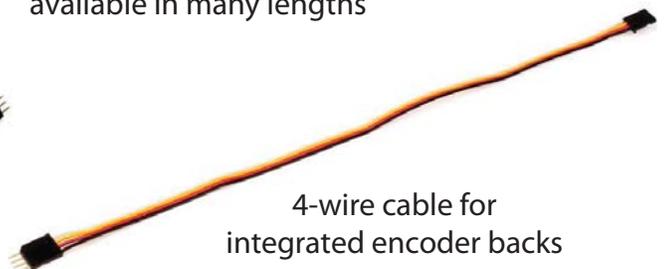
4-wire cable for
integrated encoder backs