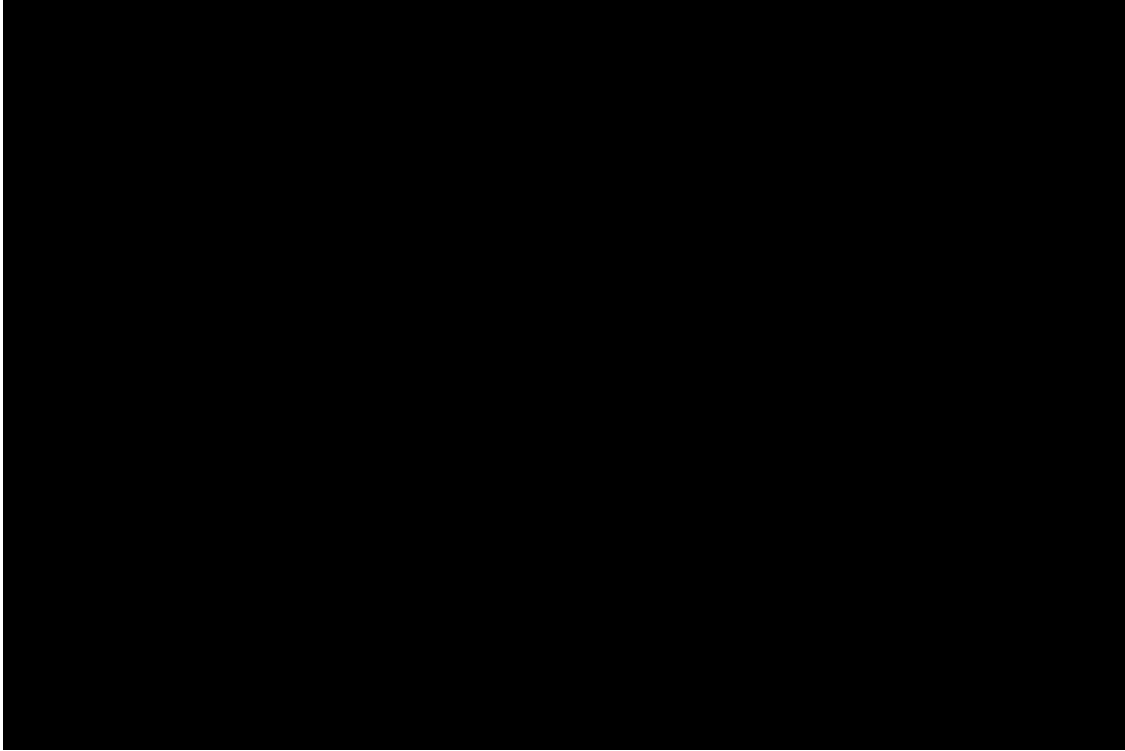


Sabertooth 2x32



C C D BE E C E B E CC C C
B CB C C AC C C CE E F E G
BCACB C C C A C C
BB C CE D BC C E C IE C CC CE BC C
DA C CC C C C C C D B C E E BC
BCBC IE B C C AG C C E IE
BC C B C C CE BC BC C E
C C C E CE A BE BCBC B C
IE C C C D C C C C BC CC BC C
CE E C C C AH B E E C CE C
CE IE C C C D B C C G CE C
E A CC C C C C C C
C B B C C C D EDE
BC EC B C E E A CB A

A

A

BC

C C D

Contents

I	B	
	C	
	BC	
	BCBC	
	BC	
	B E	
	C	
H		
	CE	
	E	
	CE	
	E	
	B	
	E	
	C	
F	C	
F	E	
G		
G		
	C	
J	EC	
	E C	
	C	
	E C	
	E G C	
	C BCBC	
	BCBC	
	C C	

A

A

BC

C C D

E B
 G
 B C
 E C
 B C
 C E B C

A A B C C C D

Features

Dual motor driver with mixed and independent options

C C D E C C C C B B A D
C C C C E B E A C E E E
C C F E G C C E A

USB input

C C C C G C A C
C E B C E A H B C C
BC C C C K B F B D G E B C C C C C
C C C B C C C B A

Auxiliary inputs and outputs

C C D C C E B C B C C C C E C C
C C C C E C C C B E C C B C E A
C C D E C E B C C E C E C C A

User-created operating modes for custom applications

H C C C E C C E B C C
A C C C E D B C E C
E B C D C E E G B C B C B C
E C B C C E A B C C E C A
C C E C C E C E C B C C C C D A

Self-tuning PID control using the optional Kangaroo x2 expansion board

H B C C C E D D C C D C K B B
C C C C C C E C E A B C E B B
C B C B C E A

High resolution Synchronous regenerative drive with ultrasonic switching frequency

C C D B B C B C C C C C E
C C A C K B L C C C A
B C B C C C E C C E
C C C E A

Adjustable current limit, ramp rates and thermal protection

B C C B E C C C C D C E A
B C C C B E C C E A

Easy mounting and setup

C C D B C E E B B A B C
E C B A E C E E
E E K B C C C B G E A

A A B C C C D

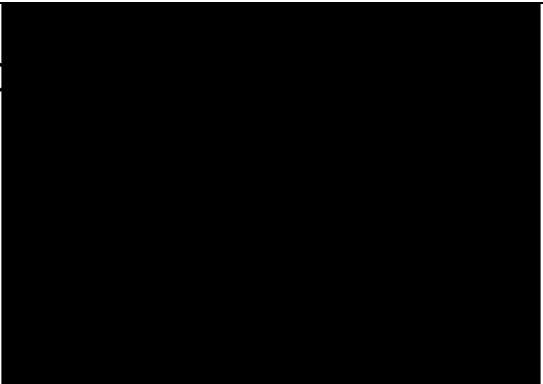
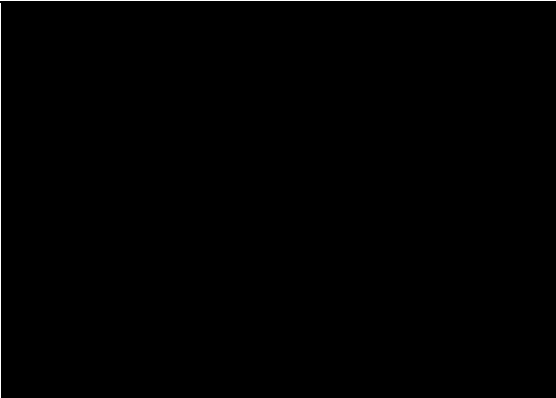
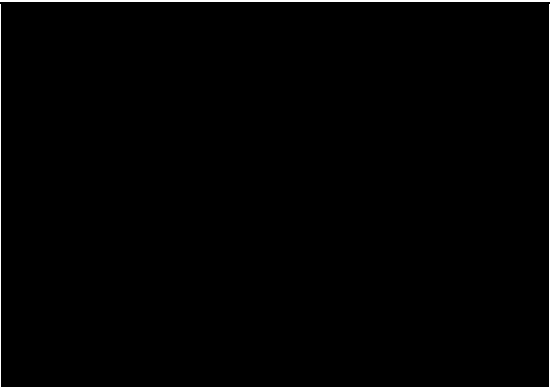
[illegible]

Specifications

	Mechanical specifications		
	A D A D A D		
H	A B		
	E		D E
H C	B	B	B
H C	B	B	B
H	B	B	B
C C E	I	I	I
	Electrical Characteristics		
	E		D E
BC EC M	A I	I	A I
C B B B C			
B C			
BCBCB C			
BCBC EC	N E EC		N BC EC
EC			BC EC W
BCBCB C			
BCBC EC	/		/
BCBCB C			
BC EC	/	C	
EC	/	C	
BCBC EC			/

DB CBB BCBCB C C E E QAC CC DB CBB BCBCB C
EA
B C C
C C E E EC EC EC C C C D

Inputs

<div><p>Main Signal Inputs</p><p>E BC E Es1 s2 A C</p><p>E C E C B C A B</p><p>E C C C C A</p></div>	<div><p>E BC E Es1 s2</p></div>
<div><p>Auxiliary Inputs</p><p>BC E E Es1 A2 A</p><p>B C E C E C B C A</p><p>B C E C C C A</p></div>	<div><p>BC E BC E Es1 A2</p></div>
<div><p>USB Input</p><p>BC A C C C C G</p><p>C A BD C E C C D C</p><p>C A G C E B C C B C</p><p>C C B C C C D A</p></div>	<div><p>G BC A G BC E E A</p></div>

C C D BE BC A E BC

E A E AEC C

G C B CE

B C C BC BC CB B

A

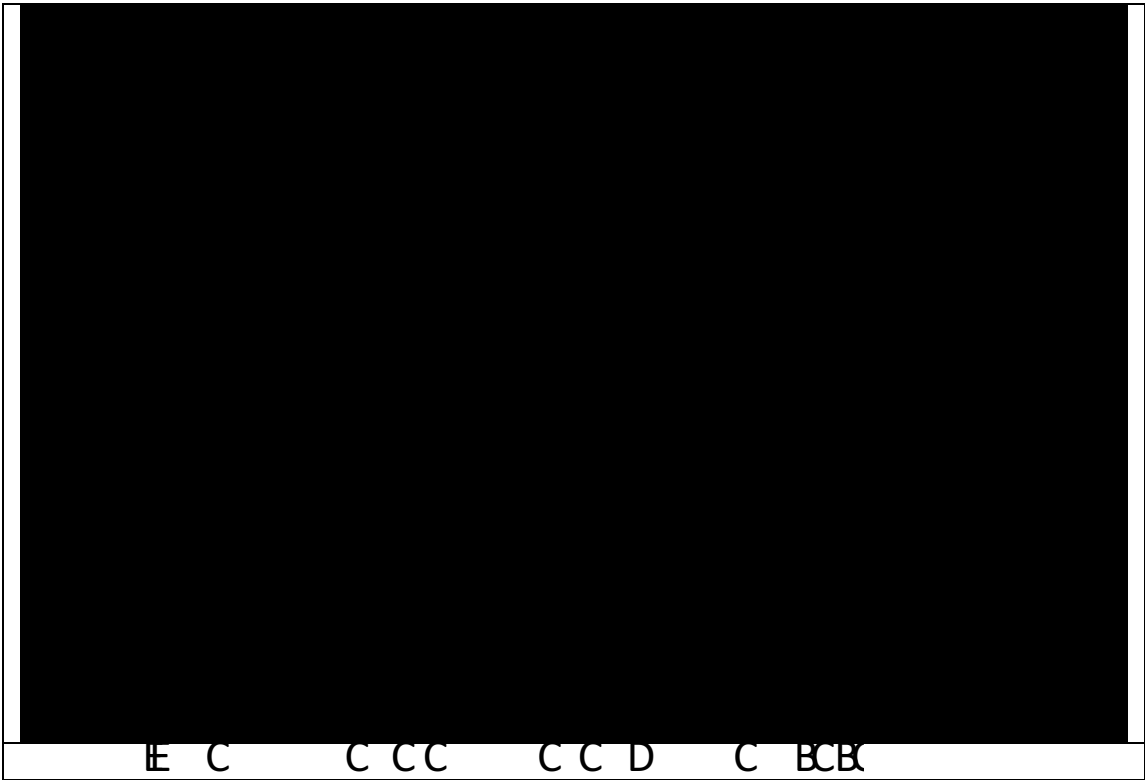
A BC C C D

Outputs

C C D BE C C C CB C CBB
B C EA C C C C BCBC C E
C BCBCA

Motor Outputs

C C D C BCBC C B C C A
C KB L E C C A E E B C
E C E EC E C C E E E C
ECE EC BCBC C E C C EA
E C B C C C D B C E C C C
E C C C C C B C E C A C
C C C C A C C C E B C
E E E C E EC C C B A C
E B E C B C C EA B C E C B A



Indicator Outputs

C E BC B E C E A E BCBCA C E B C
F C CE E E C C E A C BCBC
A A BC C C D

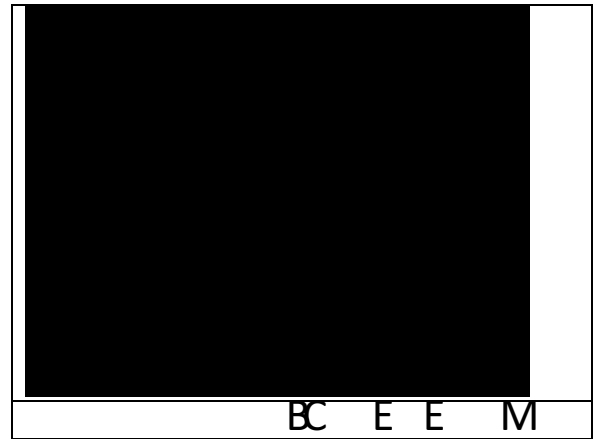
Controllable Output

I E C BCBC B
C E E BCBCA E B C
E B A E B C E
G BC BC G A C E E BCBC BC E C A

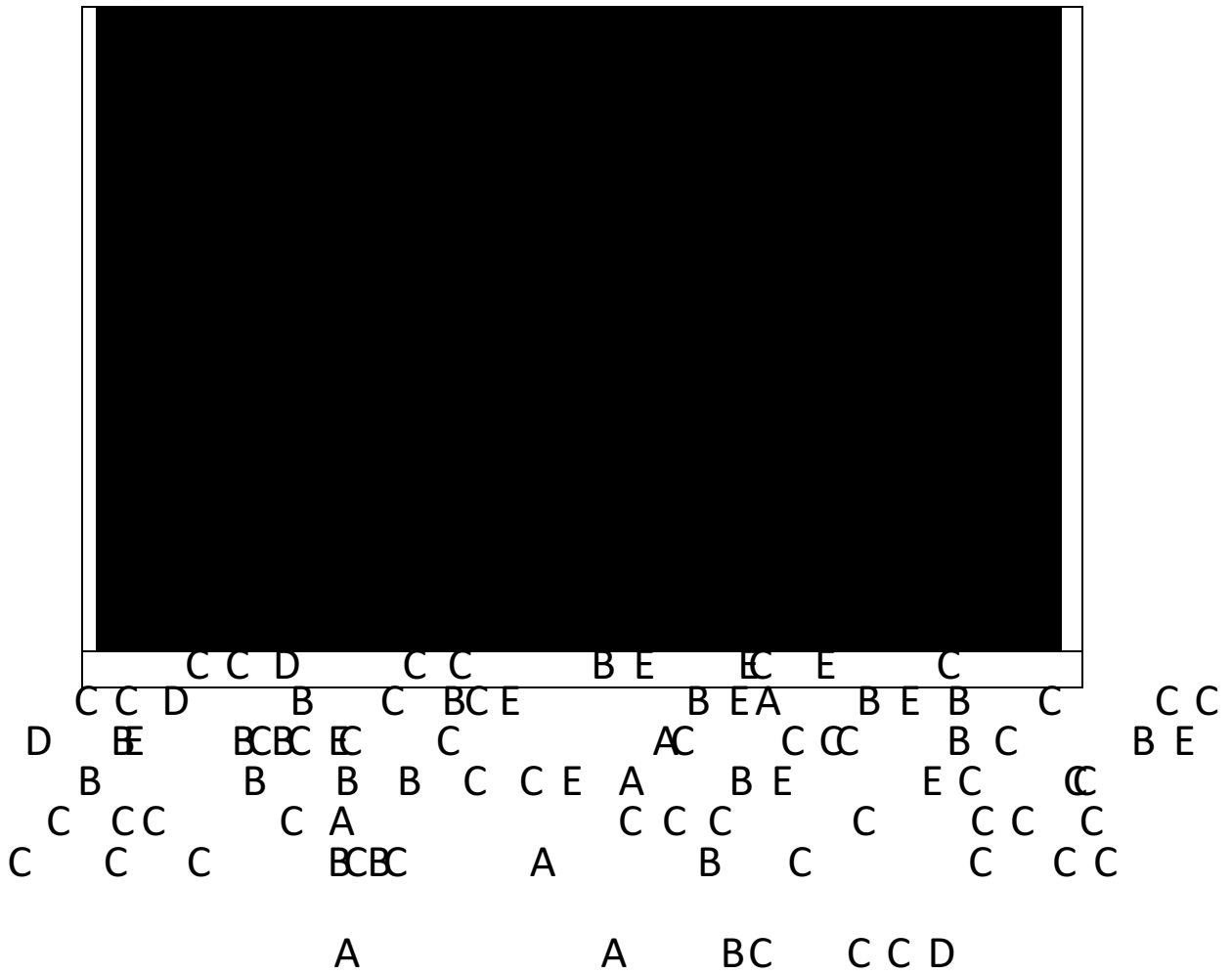
A A BC C C D

Input Power

C C D B C B E
C A B C C C C
C E E E M A B C
C C C D A C A A
B C B C C C B
C E E B C A B C
E C B C B C C
C E A



Power Supply



CC	C B C	C C	E	C A E C B
B E	C BC C	C C C	C	A E E C C
	C E	C C	C	A E C C
BCBC	E	B	E	B E A

A

A

BC

C C D

[illegible]

\mathbb{C}	B	E	E	\mathbb{C}
FCB	E	FCB	A	C
$FCBI$	CH	C	A	C
F	C	\mathbb{C}	C	C
E	CH	I	C	A
E	B	C	A	C
BC	C			

~~B~~ ~~C~~ ~~C~~ ~~B~~ ~~E~~ ~~B~~ ~~C~~ ~~E~~ ~~C~~ ~~C~~ ~~A~~ ~~C~~ ~~C~~ ~~B~~ ~~C~~ ~~C~~ ~~E~~
~~B~~ ~~C~~ ~~A~~ ~~B~~ ~~C~~ ~~E~~ ~~C~~ ~~B~~ ~~E~~ ~~B~~ ~~C~~ ~~C~~ ~~C~~ ~~C~~ ~~E~~ ~~C~~ ~~E~~
~~B~~ ~~C~~ ~~C~~ ~~E~~ ~~A~~

A A BC C C D

Wiring

Power connections

E E CB B E B C C C C C EC
C E C C C C E AG B E CC C
E C E C C B C C C D EA
C C C C C D C C A C
CE E C EA C E E C C B AG C
C E C B C B C C C EA C
C B E B C C C C BBE A C
C C E B E B C E E C A
C CCC C EA C CCC C EA
B B C BCBC C E C C CCC
C E C C CCC M EA B C C CC
C C BCC B B C C CC C C
CEA CEA BCC BCBC B C E A
B B C BCBC E C C C C C
CC M EA C C CC C C C
B C CC A C CB B BC CC BCBC
B C C A
B B C BCBC C E C C C C E C B C B
E CC C C CC CB E E A B B BC E B C
BCBC C E C B E C E C C E A

Signal connections

E C E C BDE BCBC CCC E
C E C C C A E BC C E C A A
CE BC E C C C EC EC A
A E C BCC E EC EC A
G G C B C C C EC C E A EC G
C C C E BC C C BC C BC
BCBCC E E CA B EC E C C B C C
C BC C C A BC CC C E B EC B C
C C D CEC A A BC C C D
A A BC C C D

C E B C C C D A C C E C C A
 BCBC B E B C B C C C
 C E A
 E B C C EC C C A B C C
 E C A
 E B C C EC C C A B C C
 E A E C C C BCBA
 B E B C C EC C C A B C C
 C C A E
 C C BCBA

Wiring Summary

	C	EC	B
	BC C	/	
	BC C		
	C BC	/	
	C BC	/	
	C BC	/	
	C BC	/	
	F B	EA C EC	
	BC		
	E B		
	E BC E		
	BC B		
	BC BC E		
	BCBC A	/	
	EC B C EA		
	BCBC A	/	
	EC B C EA		
G	G		

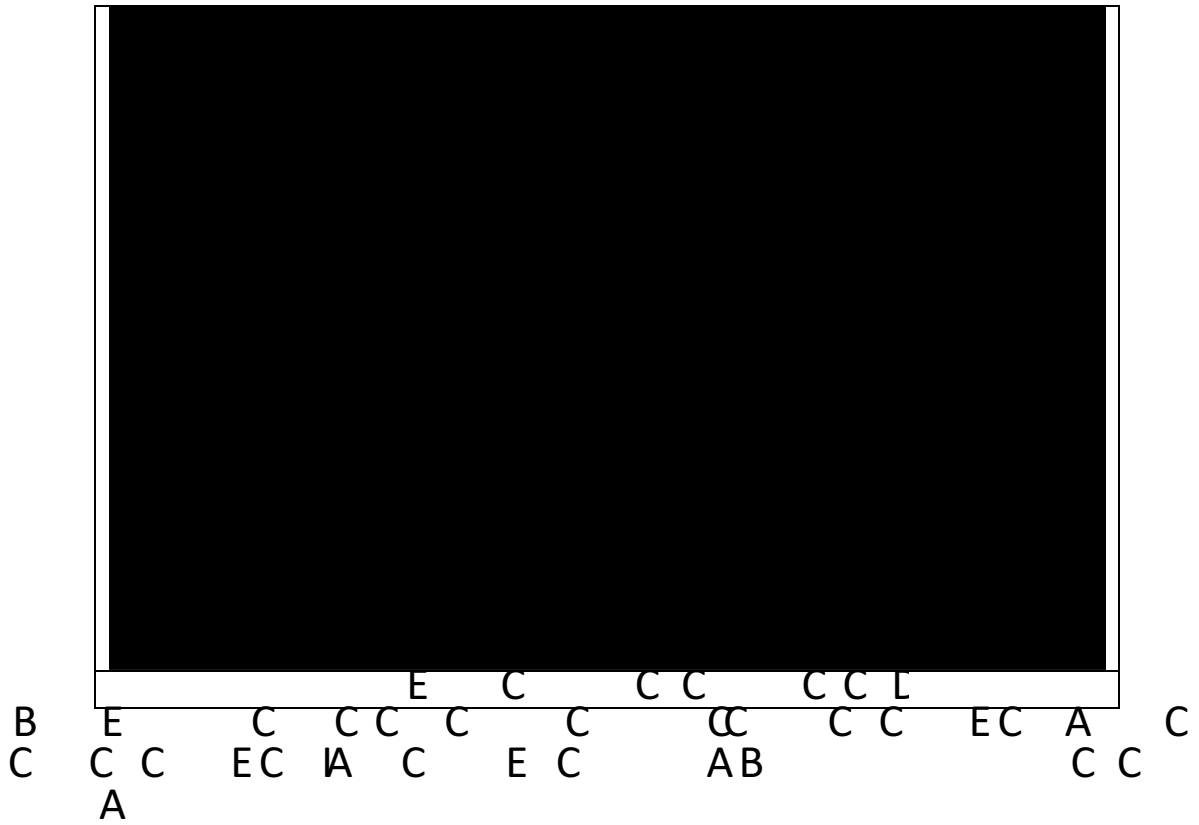
A A BC C C D

Control Modes

$$\begin{array}{ccccccc}
 & C & C & D & & B & & C E \\
 B C & & & C E & & A & C E & \\
 C & & C E & & & & C &
 \end{array}
 \quad
 \begin{array}{ccccccc}
 & B & & E G & & C & C & B & C & C \\
 E & C & & C & D & & & & & E C \\
 & E & C & & C & & C & & C E & A
 \end{array}$$

Analog

E C E B E C C C C C D A C E C
 C C E C C A E C C C C C C C
 C E C E C A B C E C C C
 C C A E C C C C C C C
 C E B C C C C E A



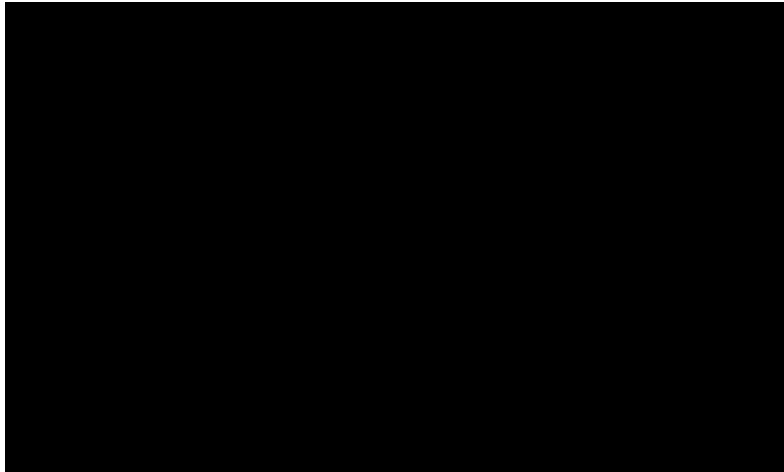
A

A

BC

C C D

Analog Mode DIP Switch Settings



DIP switch 4 selects between mixed and independent mode.

D E C C C A D E B C
 CE E E A E C CEC C C A
 C A E C CEC C C A
 C E C C C C C C C A C E C
 C C C C C C C C C C C E C E
 C C C C C C C C C C C E C E
 E C C C C C C C C C C E C E

DIP switch 5 selects between linear and exponential control.

F C E C C BCBC C E C ECC BC EC A C C
 C C E C BC C E A C E E C C C C
 C C A
 D CE CE C C E B C CA B E
 CE E C E C ECC E A D CE
 C C C C C C C AEC B C E
 D CE B B C C C C C C BCBCB C E A

DIP switch 6 selects between bidirection and single direction modes.

C CE EC C C C C A C BC E
 A EC C A EC C A EC B C C C EC E C
 A EC B C C C A
 E C EC C C C C C A C C C E
 C C C C C C C A C C C B C E
 C BCA B C C C C C EC C
 A A BC C C D

C C E C A E E C E C
C A

Speed ramping

E E D C E C E E C C C B C C E C
C C E C C A D E A B E C C C C C C C C
B C B C E C A D E C E C C C C C C C C C C
C E E C C B C E E C C C C C C C C C C C C
C
C C E C C C C C C C C C C C C C C C C C
C A

Maximum speed

E E D C E C E E C C C B C C C C C C
D B C C B C B C B C C C C C C C C C C
E E C B C A B C C C C C C C C C C C C
C E E C C C C C C C C C C C C C C C C
C A C B C C C C C C C C C C C C C C C C
B C E D C B E E C C C C C C C C C C C
C E C E C B C C E C E E B C C
C A B E B C C B C E C E A

A A BC C C D

Radio Control

C E B E C C C C C D A E
C C C C E A C C C C
E B C C C C C A C E C C
B C C B C E A B C B C B C
C C C B C E C A



B C C E C C L
E C E C E C A B
C C A C C A C C C E B
C A C C D E A C C C E K B A

A A B C C C D

[REDACTED]

D E C C C C C A D E
B CE E CA E C CEC C C A
C C A E C CEC CB C C A
C C E C C C C II C A C
C C C C CC BCBC C E C E CC
CC C BCA C C C BCBC C E C E

F CE C C BCBC C CE C ECC BC EA C
 CE C E CE A CE EC C C C CC
 C A
 D CE CE C C E B A B E CE
 E C E CE C ECC BE AC EB BE CE
 C E A D CE CC CC

[illegible]

A A BC C C D

C E E C B C H A C E C B C E
 D A B E C B E C C B E A E
 E C E C C C C C C C A
 B C C C B C BC E C
 C BC C AG C E C E C
 C C C C E C E BC C E C C
 C A

Speed ramping

E E C C B D E BC C E C C C E
 C C A B E C C C C C C C E C A
 D E E C C C C C C C C C C C
 C C C BC C E E E BC C E C C A B C E
 C C E C BC C A C E C B C
 C A

Flip input

B D E BC E B C C E E E A D E
 C B C E C C C C C B C E C C
 E C A B E C C C B C C B B
 A C C E B E C C E C C A

A

A

BC

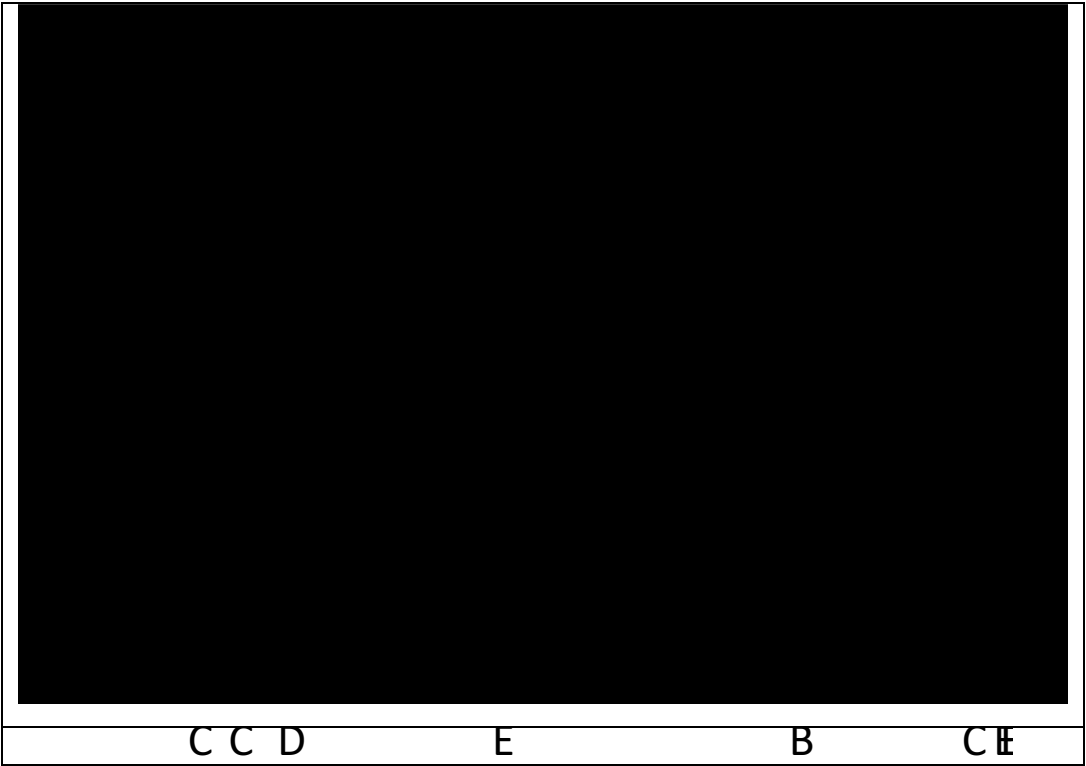
C C D

Serial

E B C C E C C C D C E A

Setup

 C E B C C E C C B C C C D A E C
E C B B F E E A B C B C
 C A

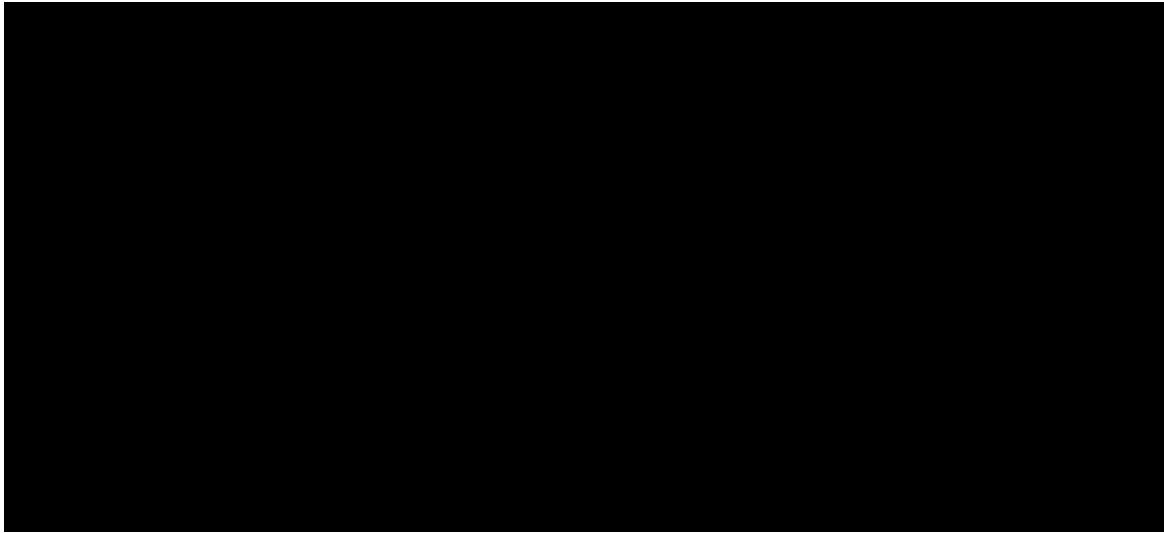


Wiring

H C C C C C D C C E B C E A B
 C C C C C C C D C E
 B C E A C E C C C C D
 B C B C B C C C C E A

A A B C C C D

Serial Mode DIP Switch Settings



DIP Switch 4 selects between packet/plain text serial and legacy simplified serial.

C C C C C C D EC C E E C D E
 AC IE BC C IE C C C A
 C C II C C C C D EC E E E
 A B E C C E B E
 C ECA B E B C
 C EA

DIP Switch 5 selects the packet serial address.

C E C CC C E A C C
 C II C CC C B E EC CA BCC
 C A C E B C B BCE C C C
 C IE A
 B E C D E C CA
 E E E C E C C B C B
 C EC C II

DIP Switch 6 enables or disables emergency stops.

C C II C C E A C C E
 C IE IE A EC BCBC CC C EC A C E
 BCBC CC C EC AC C C C
 E C C IE C CEA C B C C E
 IE C E C E C C C C CE EA

A

A

BC

C C D

Plain Text Serial

E C D E B C E C D C C C E C C C D A
E B C E C E C C C
B C C E A G E D E E E
C E C C C D A C E C D C C C C
C D B B C C E A E C D E C E B B C B C
C K B A C C C C B B E B C C B K B A
E E C A E C C E C C E
E E C E C A D E M1: -532(Enter)

Basic commands

BCBC C E C C C E E E C
C E E A C C C C A BC
C E A B B C E C C C
C C E C C A

C C	C
	C
	C
	E A C C I A D
	B E A C A C C D
	BCB
	BCB
	C C
	C C
	B E E
	B E E

D	I
∞	C E E
∞	C E C E
∞ ∞	C E C
∞ ∞	C E B E C C A E C C C C B C C D B C C B BC C C B C C C C A B C C C C C B E C B C C C E C B C A C C A
∞	BCBC E C E A C C C BCBC E C E C C C E B C B C C A

	C C E C E E E
∞	CC CC CC C EC C CC C C C B B D CE C C C C C E A
∞	BC C C CE C E C E A C C B E E C C EA I E E C C BC C C C B C E C C C E C A C C C C C C B E A BC CC C C C C C C A C C C E C C C C A C C C C C C B E A B C C C C C B C C C C C C C A
C ∞ C E C E A	BC BC B B B C B C

Get Commands

B C BC C E C BC BC B C C A C C C
 C BC C E CC B C B C A C C D E
 C CC E C C C C C B E
 E A C C C B G C C E E E
 B B E A E E B A

	E	D E
∞ 60	B C BC E C BCBC E A C E	C B ∞
∞ 60	B C BC E C BCBCA BCBC E AC BCBC B E C B B C C BCBCE A	C B ∞ C B ∞ C B ∞
∞ 60	B C BC B C BCA G E BC C C E BCA E C A C B	C B ∞ C B ∞ 60

A A BC C C D

	BCC A CC C	C E
∞ ∞	B C BC B C BCA E A E	∞ C B ∞

Extended Get commands

C CC B BCBC C C C B C B C C E
 B C C C A B C C B C C B
 C CB B E E A C C C C B A C C C
 EC C A C E C C C C B A B B C
 C E C C C E C E B C B A

	E	D E
∞ C∞	B C C E C C EA C A E E C	C B ∞ ∞
∞ C∞	B C C B C C C AE CC BC E E A EA C B C B C C B C C C C A	C B ∞ ∞ C∞ C B ∞
∞ C∞	B C C B C C BCBC A C E	C B ∞ C∞ C B ∞

C ∞ C E C E BC BC B B B C B
 C CC C A

Additional commands

	E	D E
BC ∞ BC ∞	BC C C BCBA G C BC E BCC C CCA	BC ∞ BC ∞
C E ∞ C B ∞	B C C E C A BC CCC	C E ∞ C B ∞

A A BC C C D

Packet Serial

C E B B C E C D E BC
C B C C E C E E B A B
E B CC C C ECEA C E

Legacy Packet Serial

I C EC C DC C C D B CC C C E
C C B C C C AG C E E
C C BCBC C BC C E E CC
BCC C E C E C A C C D EBC C E CC
C C E C C B C C EAG C E C
C C CA C B C C C B C
E C E B C C E C C
CA

Legacy Simplified Serial

I C EC C DC C C D B CF E E
C C E E B C C A C C
C C BE BC CB A

A

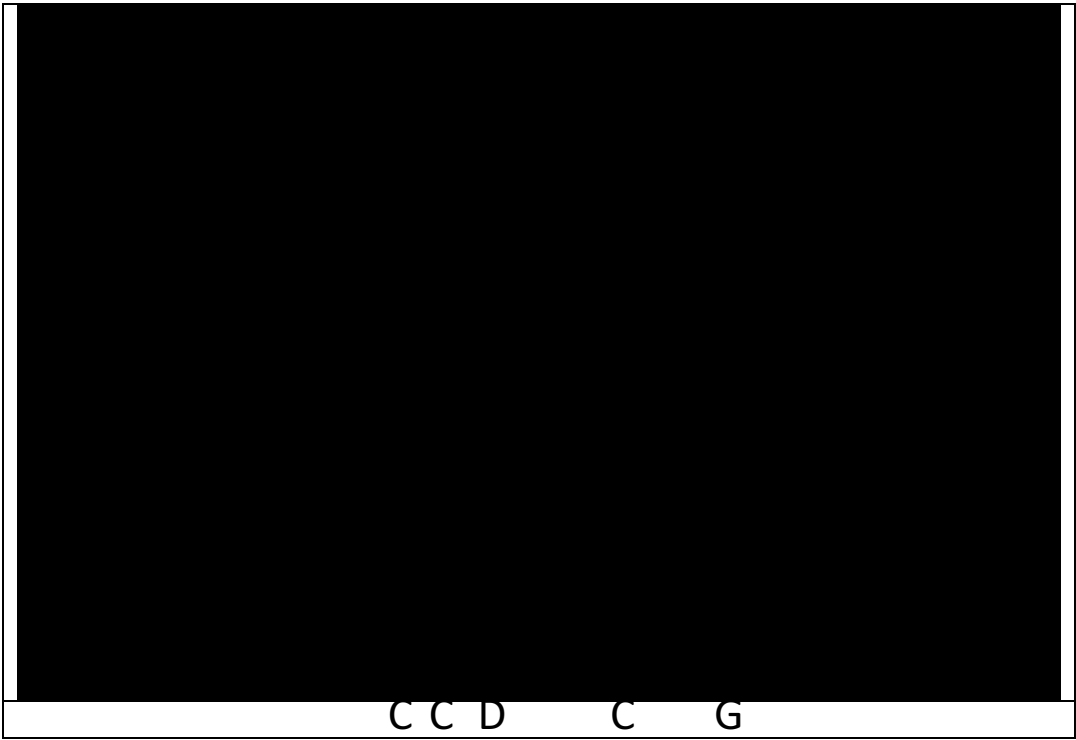
A

BC

C C D

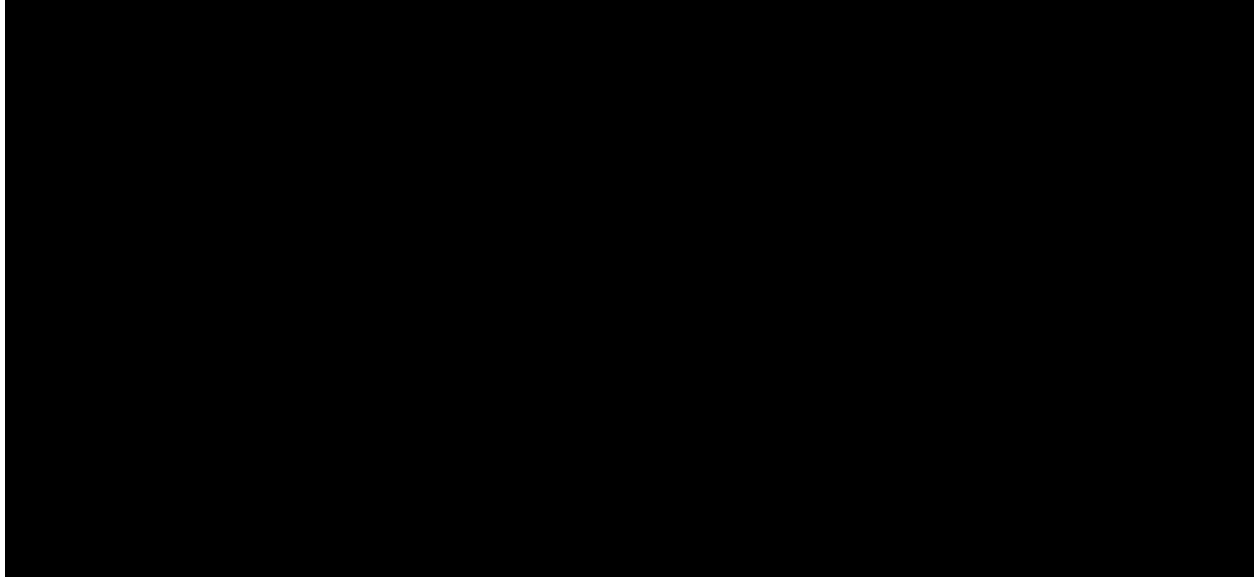
USB Mode

G C BC C G CB C C E AG
C E B C C C D G C E C C E C C
C E B C C C C C D C CE A



C G E C C G E C
C E C E C C A C B C E C D A C C G E C
B C A E B C A B C B C E B C E C C G C

USB Mode DIP Switch Settings



DIP switch 4 in the ON position selects USB mode.

G C B C C E C L A C C D E C C
 C C C E C C A G B E C E C B E
 E D E C C C A E B E C B E
 C E C E C A G C C C C C E
 C E C E A C E G E C C E E
 C C C C C B C E A

DIP switch 5 enables or disables USB serial converter mode.

E C B B C G C C C C C C D
 E E C C C A C C C C D
 C E C B C C C A
 C B C C C CE D C CE E C C C
 C C D A E E C C DC B C C C A B C
 E C C C C C C C C C C C C
 C E C C C C A C C C C C C D
 C C C G E C DA C C C E C C
 D C C C E C DA C C C E C C

E C E B C CE C E C C C C C E A
 E C E C C C C C C C C C C

A A BC C C D

C E C C C D C C C E C C E C C C C A
 CC C EC C EC E C C B CA

DIP Switch 6 enables or disables emergency stops.

C C II C C E A C C E
 C IE IE A EC BCBC CC C EC A EC
 BCBC CC C EC AC C C C
 E C C EC CEA C B C C C E
 IE C E C E C C C C C E EA
 C C BC C C C BC E B IE
 C KB EC CA C C KB
 EC A C C E E B E C A

A

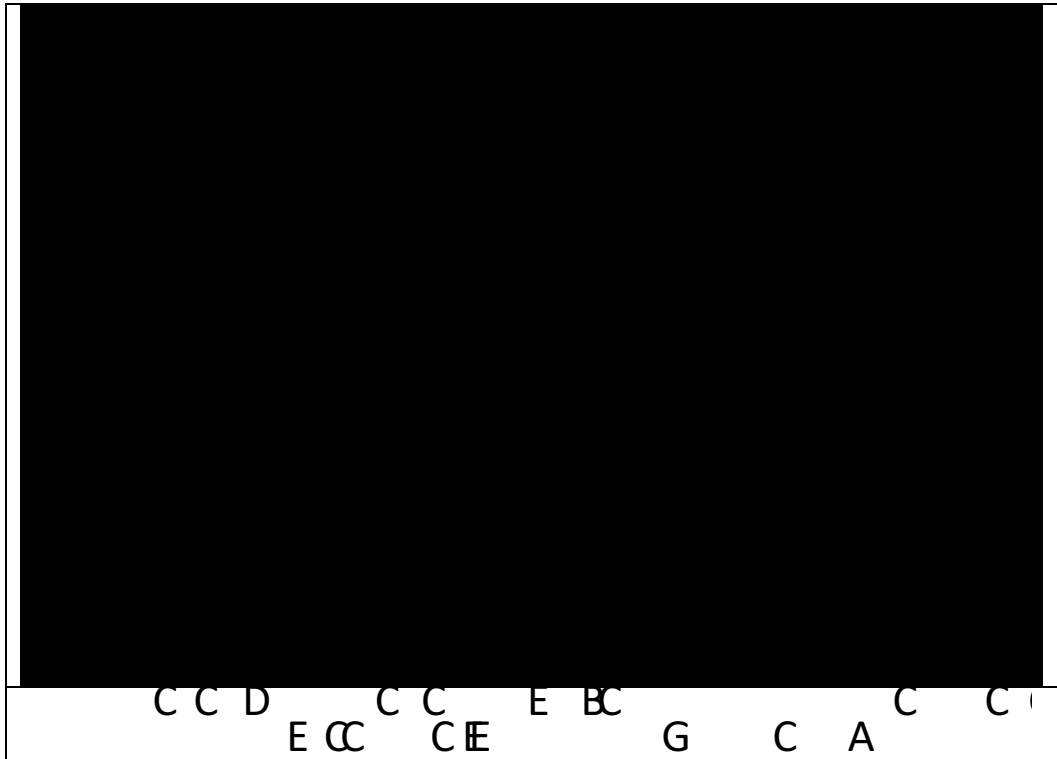
A

BC

C C D

User Mode

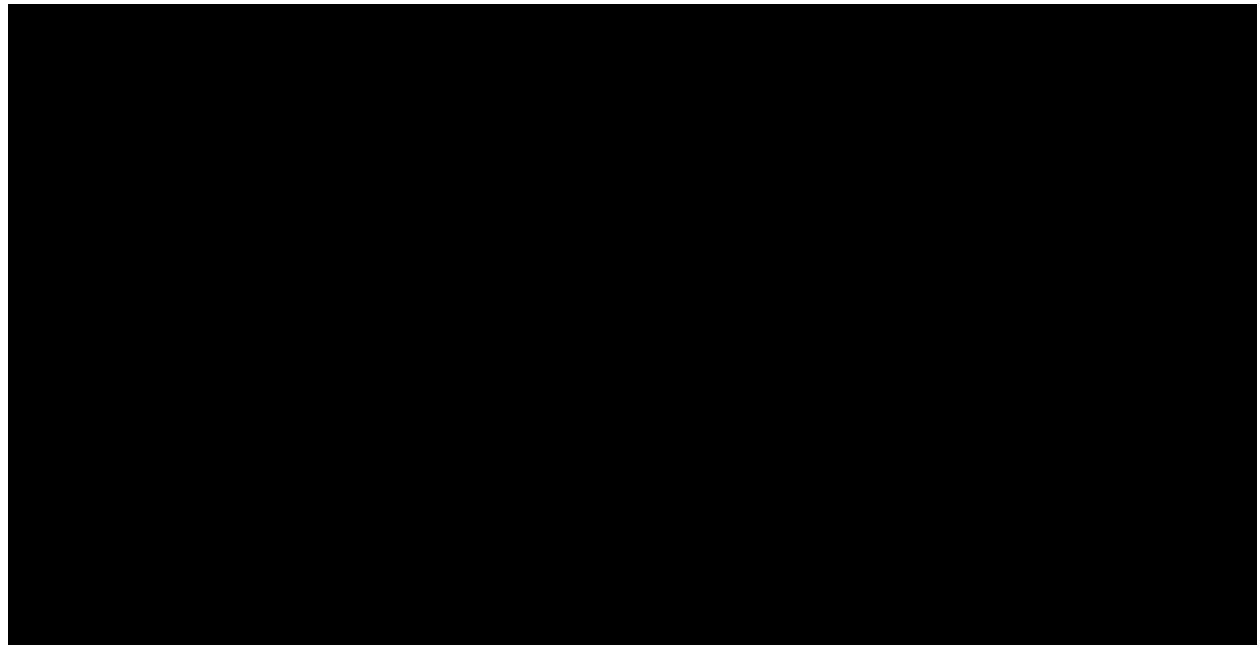
G C BC C C C C C E A BC
C B C C C C CE BC E C C A BC
C C C C C BC E C C B C ECA



G C C C A BC C C BC A BC E C

A A BC C C D

User Mode DIP Switch Settings



DIP switch 4 in the OFF position selects User Mode.

G BC CC CC A

DIP switch 5 selects between User Mode program 1 and User Mode program 2.

CC D C CG A C C
G E C A C C II C G
E C A

DIP switch 6 is used inside the User Mode programs.

C EC EEC C CG C E A
I D E CC CE EC C B C EC C C EC
B CC C CCE A

Default User mode programs

CC D CC CB A C EBC C D
B C EC C D E C C A

Default program 1: Serial Autopilot with R/C takeover

BC BE B C C CE C AC B C
CC B BC BE D C C C BE CE B
C C C BC EC EB C A
CB E C C B E A
CB BC C D E C A
A A BC C C D

E C C CE C C C CC E BC C
 BCA C C E CC E C C C C C C C A C
 C C C E C C C C C C C C EA
 CB BC C BC C E C CE D A
 C BC C CC E C E C C C A
 C C C BC C CC E E C C C A

Default program 2: Analog with remote Indicator LEDs and current display

BC E B C C C CE EA
 C BE C C C D B CE C C
 F C EAE E C C B EC E C E B CC
 C A BCBC B C E E C C
 E E B C C A
 C D E C C CB C C C C C C C E
 C A
 C CB C C C CEA C C C C CE
 C BCBC C C C BCBC CEC C A
 C C BCBC C F AC F B C F C
 C E E B CA
 C C C E B C E B C C C BCBC C E E BCBC
 E C C A B C E E E BCBCA C
 C C C E B C E B C C C BCBC C E E BCBC
 E C C A B C E E E BCBCA C
 C C C D E G KB E C C C C E
 B C D E E A

A

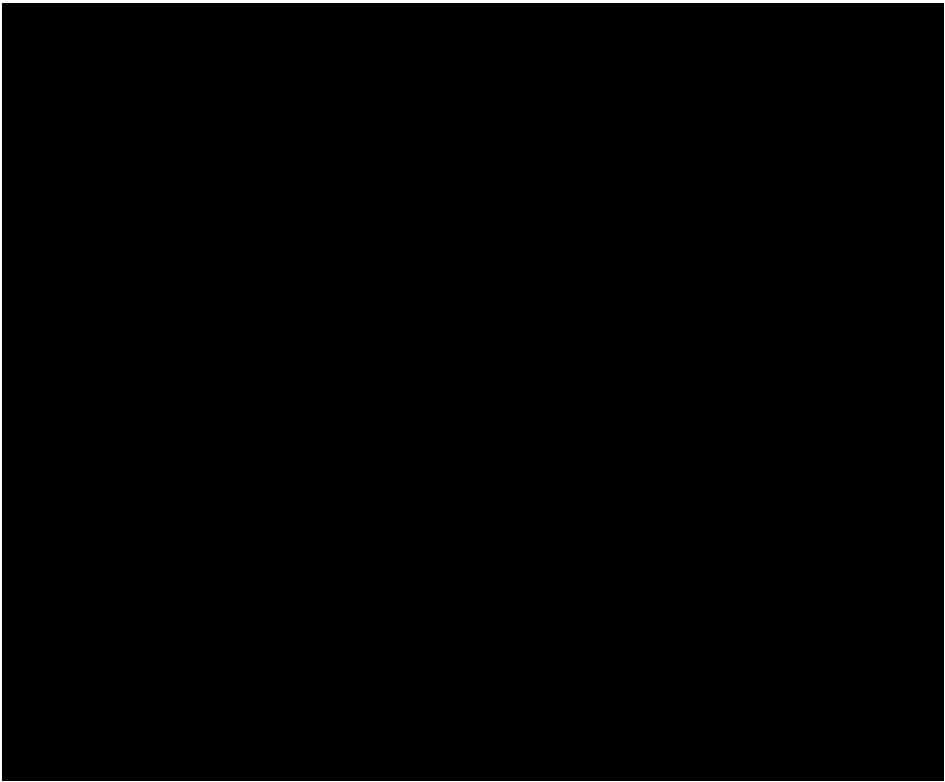
A

BC

C C D

DEscribe PC software

C C A E C C C BC AC CE CH C B C C
C C C C E C C D E B EA C
C C CA C BCA E
B



Getting Started

B C C D C G EA B CE C
CC C C D C C CC AB C C CC C C
BC C BC B C CHC BC CC C C CB
F F EE C C C CG A E C E
CC EC AB B C C B C C D G C
B C C C C A
HCC C C D C C G EB AB CC IE AE
Connect and Download Settings C CC CC C C D A IE B IE CC CC
C CC C CA B CC BE E
E CA Connect E D IE AE C BC CC E IE E E C
C C D A B C C D C G C C AE
A A BC C C D

A E E C B C C A C B C C C C
C C E C *Upload Settings to Device* B C A

A

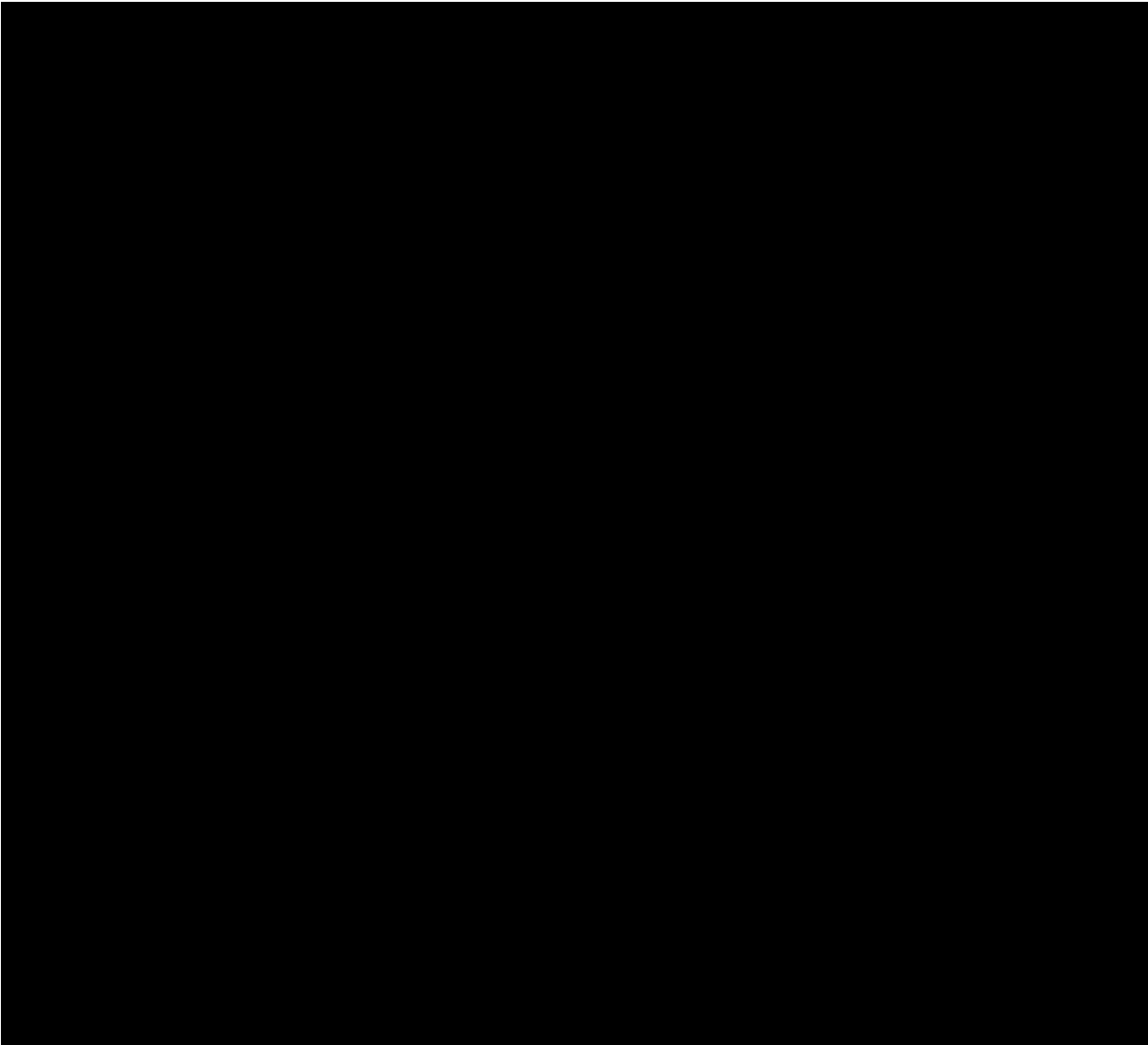
A

BC

C C D

General tab

J EC C CC CC CC D E E BCBCA



Startup Delay

CB E C E C CC D C C E C A
E C E C CE C C CC E EC CC EA

Min Voltage and Max Voltage

EC D EC CC BC EC C C CC D E C
EAC BC EC BC C E C BCBC E A

A A BC CC D

Battery

CC E CC C CC B C B EAC E EC CE
 EC BC CC A CC C C C C C II CA
 C CC C CEA

Exponential-Mode Mappings

C C D B C B C C BC EC BCBC EA
 B C C C C C C C C E
 BC C C C B A D CE C C B A
 B CE CA E C CE C C C
 C B AH D CE B BCBC E C C C
 CC CC C C A
 C C C C B C C C D CE C BC
 BC C CC C BCBC A E BC C EAE C D CE
 C E C B EC D CE B C D CEB CA
 CCE CA
 I BC B C C E CA C C C
 IE C E CC E CC CC C E C B B C A
 CC C B E C E C E C E C
 E CA C E CC ECCE E C C B C A
 C B C E CC C C C B CF C CA
 B C BC D CE C C C B CC E B
 ECA CC E E I E C E A
 E B A BC D CE B C E C BBEC
 E CC C A C CB E B A

A

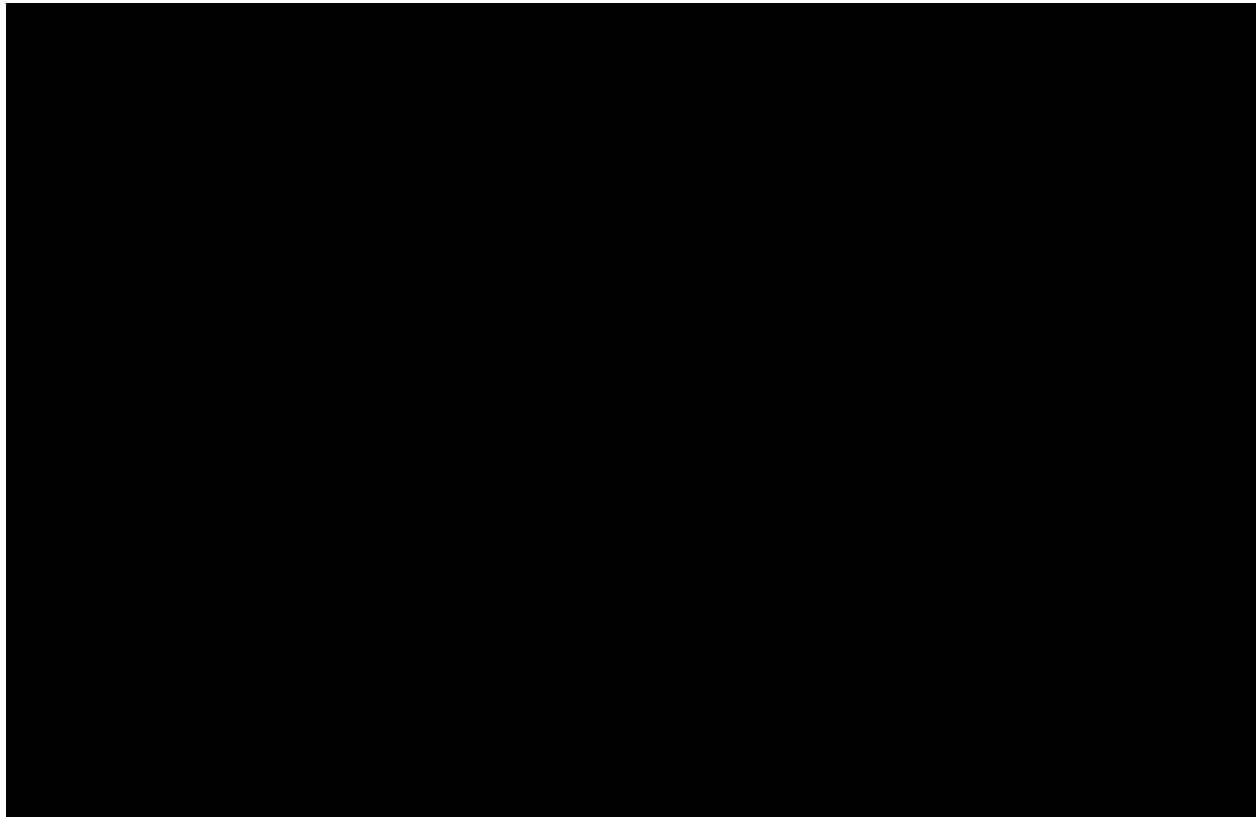
A

BC

C C D

Analog tab

E C C C C C C E A C B E
 BC C C AE C C C E BCC B
 A



Calibration

C C C BC E CE C C C CA
 H C C C C E C C EC C BA

Fixed Calibration

HQ D E C C C E E B DB
 C B C A B C C C C
 BCC C E CEA C C C E B B I D
 E C A B I D E C B C BC D BC C
 B A D E B C E C C C D B BCBC
 C A C B E C BC C A BC C C AA

Automatic Calibration

HC BC C E C C C E E E C C C BA
 E E B C BC ECCE C B C A B C
 A A BC C C D

E C E C E C C C EC C EC E E C CC
 BC B C C C CC AC EC C EE C E C EC
 EC C CC B C B BE ABC C
 E C E E E B E C C C C C EC C
 C B A CB BC C E C C C C C C
 C C C C C C C C C C C C
 CA

Joystick Calibration

HC C E C EC C C E C C C C BA
 B BE C BC BC DB A CE
 C C C C D EC C BC E C C A KBEC
 C EC C BCBC EC BB E C BC C E C C
 C B A

Saved Calibration

E C C D EE BC C E C C CC C B C
 EC C C BCC CC D E C B C CC C C C
 C A EB BC CC C EC C C C CE C
 C C CEC C C C BC C E CC BC C E C A

Exponential-Mode Map

B C E C C B B C E CA E CC
 C EC IE E C EAE CC CC EB E
 C CC II C A

A

A

BC

C C D

$\begin{array}{ccccccc} & & C & & C & & C \\ B & & E & & C & & C \\ & C & & & & & C \end{array}$

H C C C C BC E CE CC CA
C C C EC C E C C BA C
C C BC EE C BC C E C A

HQ D E C C B B D B
C B C A B B C E C E
E B B E E B D E C A B D E C B C
D C B A E B B D E C C B C
B E C C C E B E C B A
C C D B C C C B B B C C
C A

C C D

Automatic Calibration

Joystick Calibration

Saved Calibration

Timeout

A note on certain receivers

Exponential-Mode Map

B	C	E	C	C	B	B	C	E	A	E	CC
C	E	C	E	E	C	E	CC	CC	E	B	
C	C	C	C	C	A	C	C	C	C	C	

C C D

Serial and USB tab

E G C C C C C C E G AG E
B C B C C EA



Enable Line Sharing

C E C E C C C B C C E A C
E C C C C C E E C
A

Baud Rate

C B C C E A C
B A C A B C C C C BC C C C C
C E A

Simplified Serial Addresses

B E C E C C B C E C C
A D E C C C E C C C C
B A C B C E EC C
A A BC C C D

C C BCBC B A
C CA

EC EC BCBC C

Serial Timeout

C C C C C C BC C C E B C C
E B BC C C A E E B C C
C C A C Infinity C C EB CC EC A

Alternate Address

C B C CC C E C C CA B B C C
C E A B E C E CC DA

Command sets

C EC C CCB C CA EC EC C
BC B B C C CA

Exponential

B EC E C C B C D CE A B
C E C C A

A

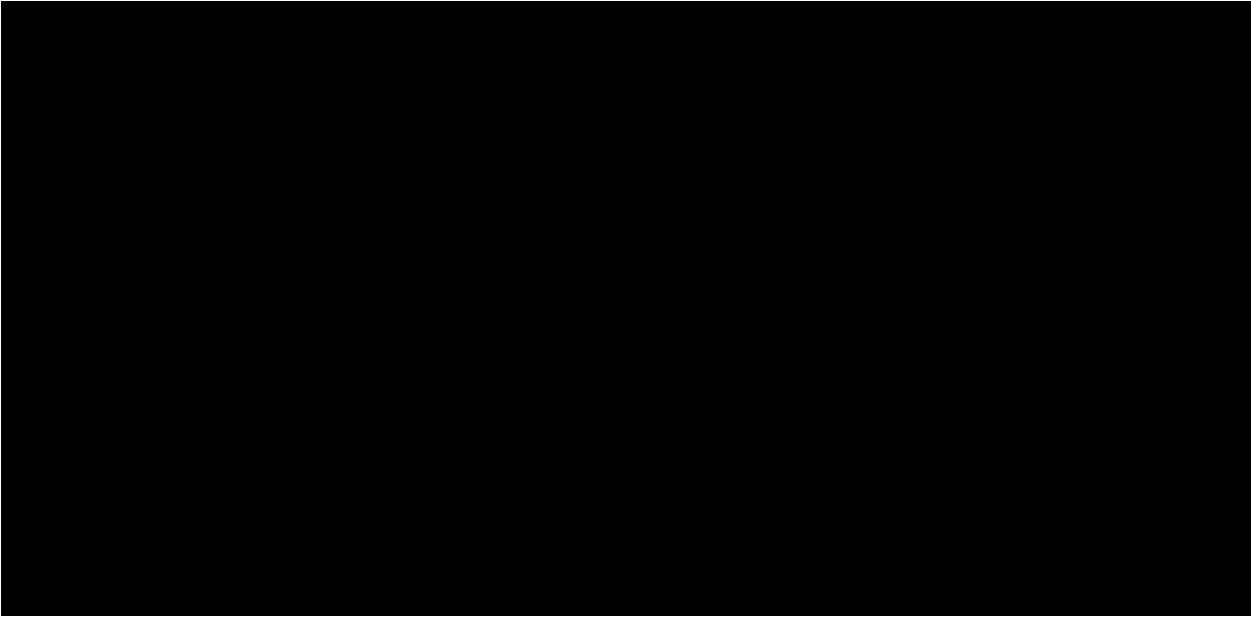
A

BC

C C D

Motor Outputs tab

C C C BCBC IE A



Current Limit

C C C DB B C C C BCBC C C C B C
C C C C BCBC BC E IE B IA C C D C BCBC
E C BE C CBA E D B IE C EE E C
BCIE C C C C C A C D B IE C D CE
C C C C C C A

Current Limit Smoothing

C KB EC B IE C A C IE B C C C
C IE B C C C A

Dead time

C E C C C C C IE C C C C C C C C
C C C E C C IE C C C C C BCBC IE BC
C C BC CCA C C IE C CE C C C

Deadband

C BC EC C C C C C C C C C C
E C Default C C C C C IA D E E C
BC A C A EC AC C Custom C D IE
A C B C E C C IE B IE A
A A BC C C D

Ramping

CC C BC C C C E EC C C BE C BE AC
CC E C Default C C B C C C A BC E
C C C C E E E CC A BC E G
C C C C E A C E C Custom
E D A C C C C BE C C BE
C BE A

Battery Compensation

BC C C C C C A CC C
EC C BE E A E CC EB E A EC BE EC BE
A CC B C EB C BE CC C EC A
C C D E B C BC EC C EC C C
EC C C C A E E BE C E E CEA
CC C E C BCBC C C EC BC E C
KECC B D C BC EC A CC C E CC B C
BC EC EA C C C BC C C EB CC C
C B BA C EE B E EA

Fixed Battery Compensation

H D CC C EC C BC E E E B C CBE
BC BCC C EC E C BA

Automatic Battery Compensation

BC C C B C CC BC EC C J EC C C C
EC A D E ECB E CC C BC EB B C C C
C E B E EA

Disable Regenerative Braking

C E C C A C C EB C EC C EC C
E CC C C A C C B B E EA C C
EE C E EA B B C BCC C B B E C
BBE CC CE C E B C BCBC C
EC E A

Reverse Direction

D E C C BCBC C EA C E E C
C EC C C B C C B E C
E C A

A

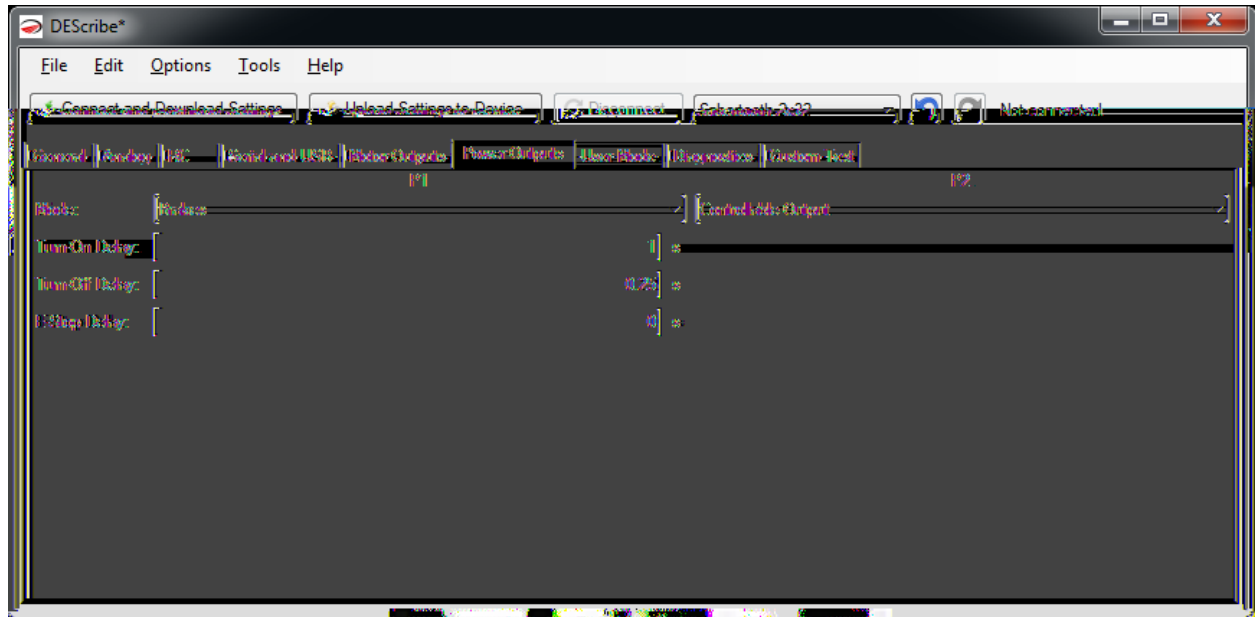
A

BC

C C D

Power Outputs tab

BCBC C E C C BCBC A



Mode

BCBC BC BC C C C C D C B C A

Voltage Clamp

C C BCBC E B C BC E A B C
C C C BCBC C C B E E C E C C A C
C C B E A C E C B C BCBC E B A
BC C C C C BC E C C BC E IE C
A C E E BC B E A

Brakes

C C BCBC B C C E C C A C C
H C C C C A C C C C C Turn-On Delay A
C B E C Turn-Off Delay E A C C E
C C C E-Stop delay E A C C E
E B C C E BC B B C A C
C C C A E C M C C C E C C BCBCAB E
C C C A

A A BC C C D

Controllable Output

C

C

CE C

BCBC

E

CEEA
C

CE C
A

C EE

A

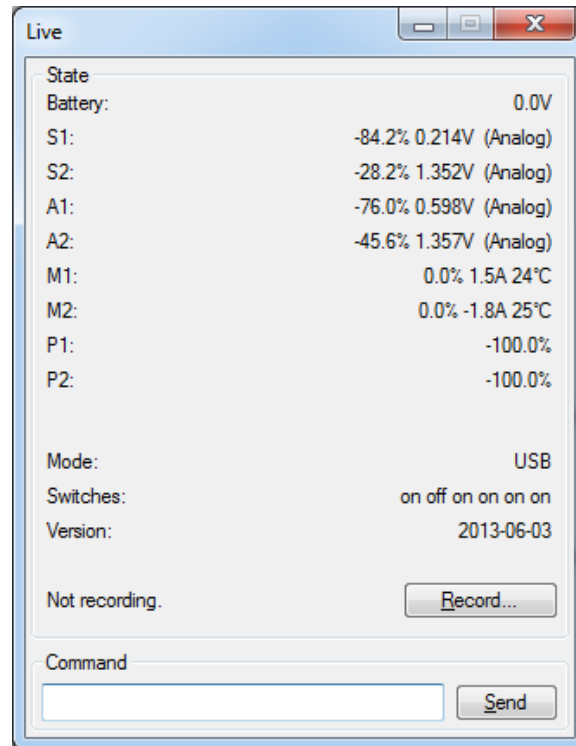
A

BC

C C D

Diagnostics tab

B C C C BC BCBC C C C D B C AE
 CShow Inputs/Outputs BC C B CLive C A



Battery C B C BC EC A
 E BC1 S2 A1 A2 CC BC B C C C C
 BC B CA B EC C B BC E C A
 C C BCBC M1 M2 C BCBC BC E BCBC B C C
 C B A
 C BCBC1 P2 C B C BCBC C A C C N
 C CC N EC A
 Mode EC C C EC B C C C A
 Switches C C B EC C C EA
 Version B EE CC CC DA
 Recording EC C C B C A E CA
 B EC CC C EC C C BC C EA
 A A BC CC D

B G Command B C C E C E B
B A C CC C C DC E C Send BC C C A

Tools menu

E B C C C C C C C E C E C B
C C D A

Calculator EEC A

Serial Terminal BC C E C CC C C D AC B C E
A

System Information B C C C BC B C C A B E
C C EC B C C C C C D

Update Firmware B CB CC B CC DA EE B
C B C D C BC C C A

Encoder Calculator B CK B C EEC C C E B A
CB EE CC D C CE A

A

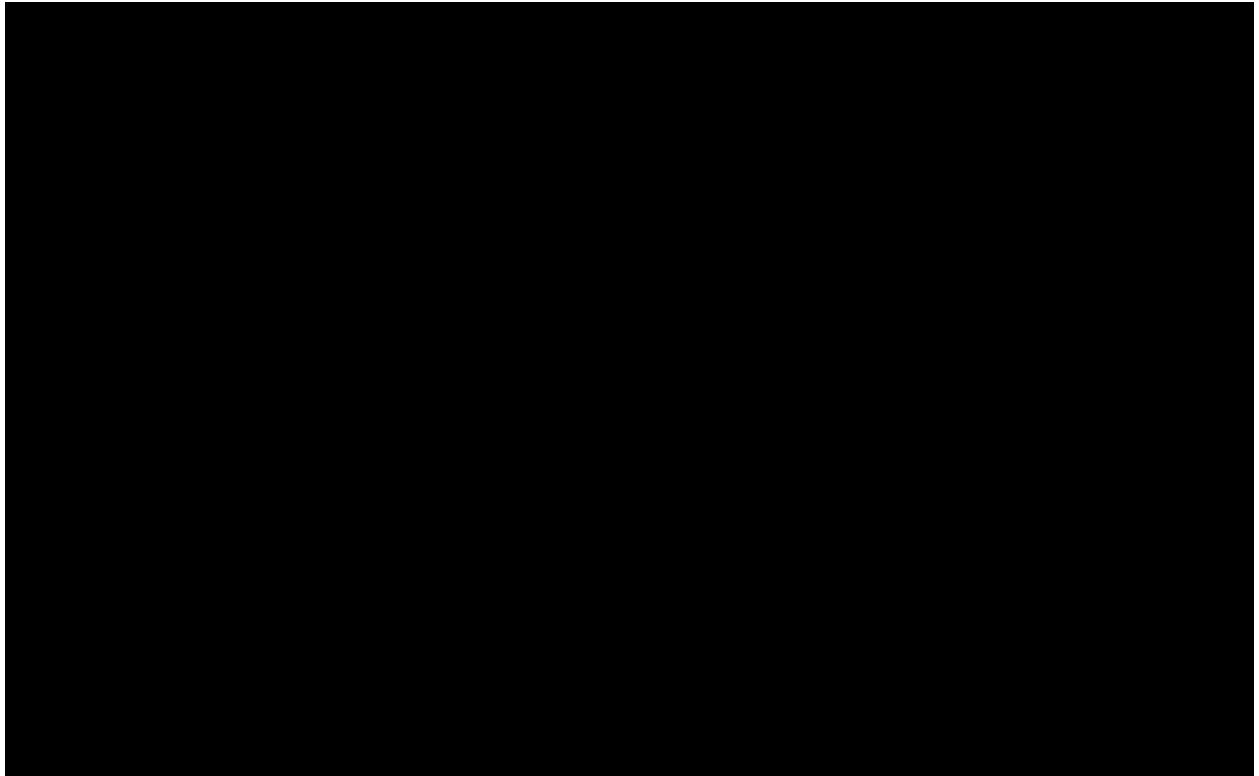
A

BC

C C D

[illegible]

C BC C CC C CB C BCA C BC EC
B EE C D BC B A B E C B C C BC B E C
C C EA

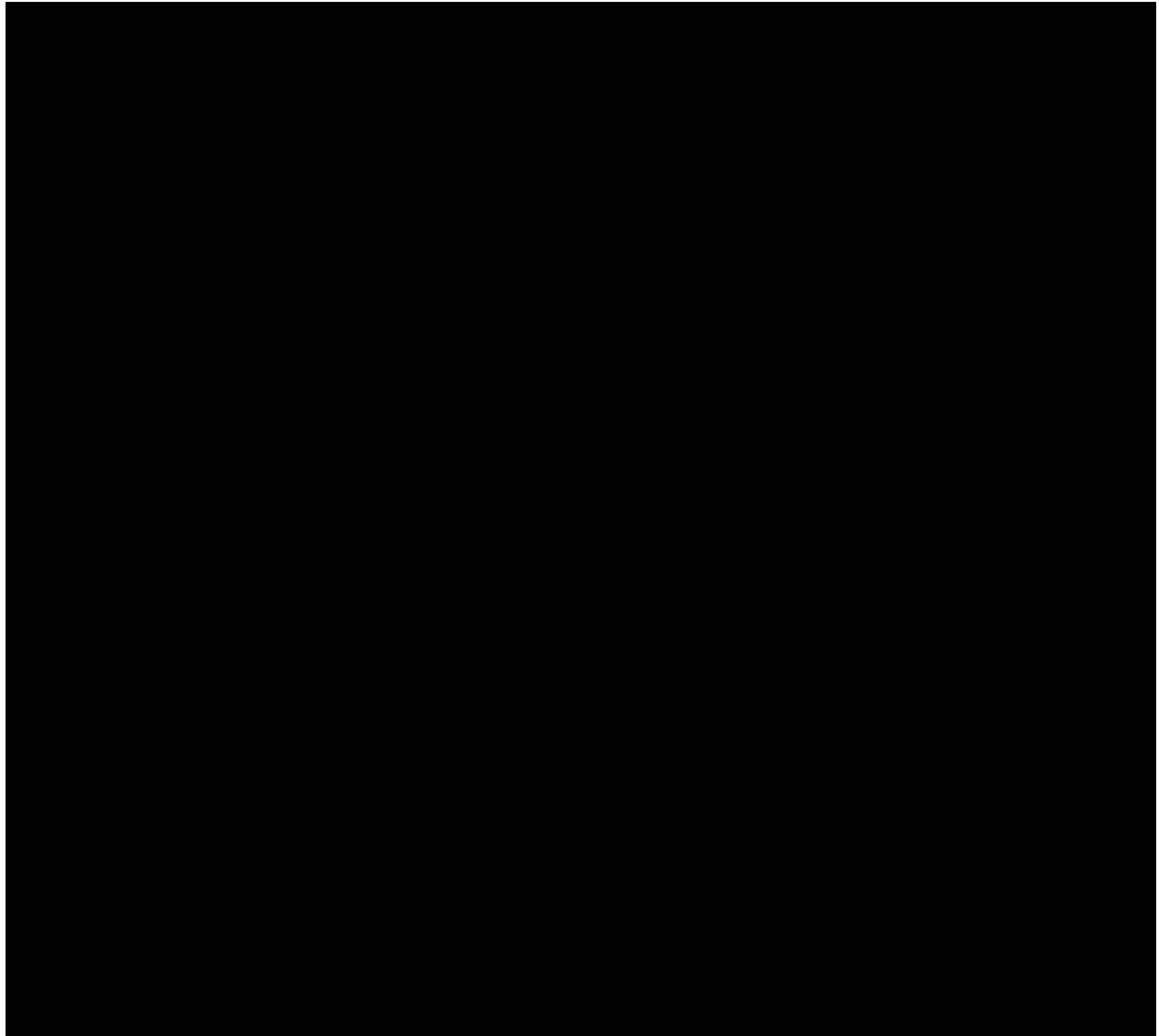


$\begin{array}{ccccccc} & C & & BC & E & & C & & E & C & A & & C & & C \\ C & C & & E & & EA & & & & & & & & & \end{array}$

$\begin{array}{ccccccc} & C & E & & B & & E & E & BC & CA & & B & C \\ \textcircled{C} & F & & & & & \textcircled{C} & & C & B & BC & E & \textcircled{C} & B \\ C & C & CE & A & & & & & & & & & & \end{array}$

Program tabs

C CC BC CB C BCB A D E C C E C
 C C C E C C BCB A C C C C E B C C
 BC C BCB C A B C B AE
 C D E C C E BC E C C A C E C
 C C BCB EA C B E C C A C C E C
 C C B CC C BCB A



BCB A C BE CB BE C C A CC C E C
 C B B BC C C C BCB B NA CC C E
 E C E C BCB A
 A A BC C C D

Program commands

E A C C C E E B A C BCBC

C C E E C B E C E C A A E E C E
 D A C E E C C E A E C E C
 C E B E C C E A E B E C
 B A

If

D E C B C C C C C C
C B B C C B G C E E C CCIA C

CC CE BC C A

$$\begin{array}{cccccccccccccccc}
 & & C & C & C & & C & E & BC & & E & E & & A & E & & C & & E \\
 B & & E & C & & C & & BC & C & E & E & E & EA & & & & & &
 \end{array}$$

$\begin{array}{cccccccccccccccc} C & & & C & & E & & E & & & A & & & & C \\ E & C & C & E & & C & E & C & C & & C & E & C & C & B A \end{array}$

$\begin{array}{cccccccccccccccc} C & & & & CB & C & E & & E & C & & & E & B & A & C & & & E & C \\ E & & E & C & & & E & & B & A & & & & & & & & & & \end{array}$

Set

C C C IB C BCBC E IB CA
C B C C IA D E C C B CA
C set C C BCBC A

C C C C E BCE E B A

Calibrate

E C C E C C E C E E A C B C C
 B C B C A E C B C E C B C B
 E E A C C C C E C B C E C B C E C
 E E A

E C C C C E BC E E BC BC C BC D BCBC

Flip

I E C C E C C A D E C C B
 C B C I E C C E B C C E E A

I E C C C E BCA

A A BC C C D

C E B E E C Q A C E C
BC D E CE C BC C B A

Map

C C C BCBC E EA C BC BCC BCBC C BC CB C CIJ E
C C C BCBC E EA B D CE C BC C C C D

A

A

BC

C C D

C C C B C E BCBC BC BC D BCBC BCBC
DA

Special considerations

User Scripts U1 through U4

C E C B B E C C B C C E C C
B C C C C B C C C E B C C C C C C C
B C G C B G A C C C C A C C
C C E G G G G A
G C C E BC BC C C C
BCBCA C A

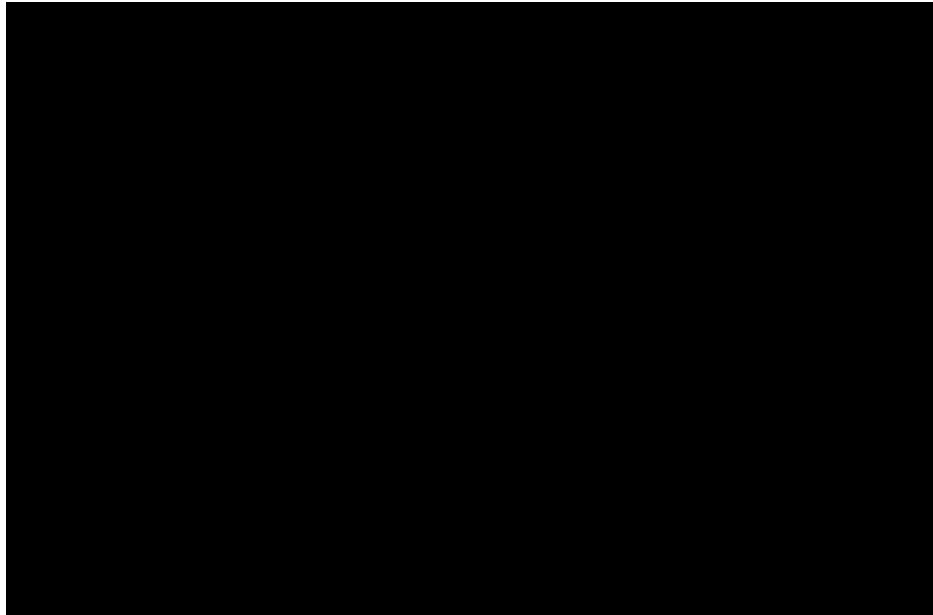
Output Scripts P1 and P2

C C C C C C C C C C C C C C C C
C C E E BCBC C C C C C C C C C C C C
B E E C A AC C C C C C C C C C C

A A BC C C D

Mounting

C C D B BC E
BC C E C B EA C C D E
C A C B C BC E C
C E C E A



C CE C E C CC EC C CC DAC CE
E EC CC E E BC C EC CC C C
E CC C C AC BC C E A
C EB EC C CC CB C C E A
B CC D C E B E BCC E CC
CBB BCBC C E C B AC E E C C
C C D C C E E CE C C AC B E
C C C C C C E B A
C E BC CC C BE B C C
E C C BC E A E CA E C C C D E E C
E

A

A

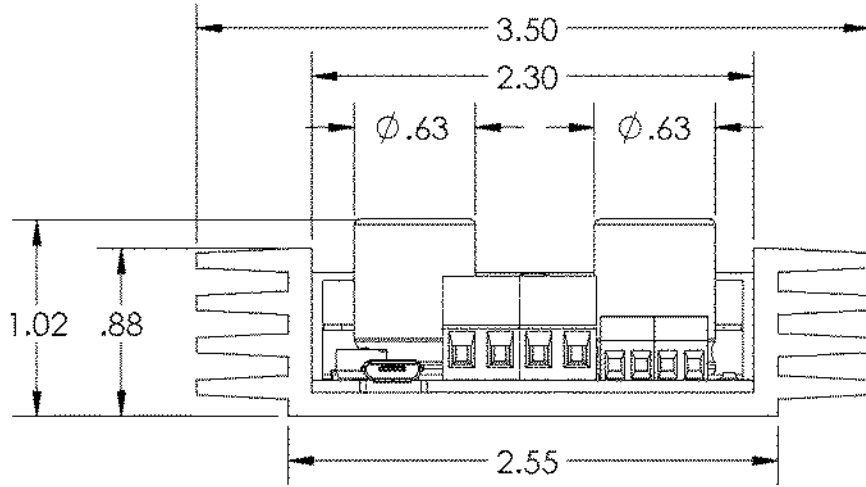
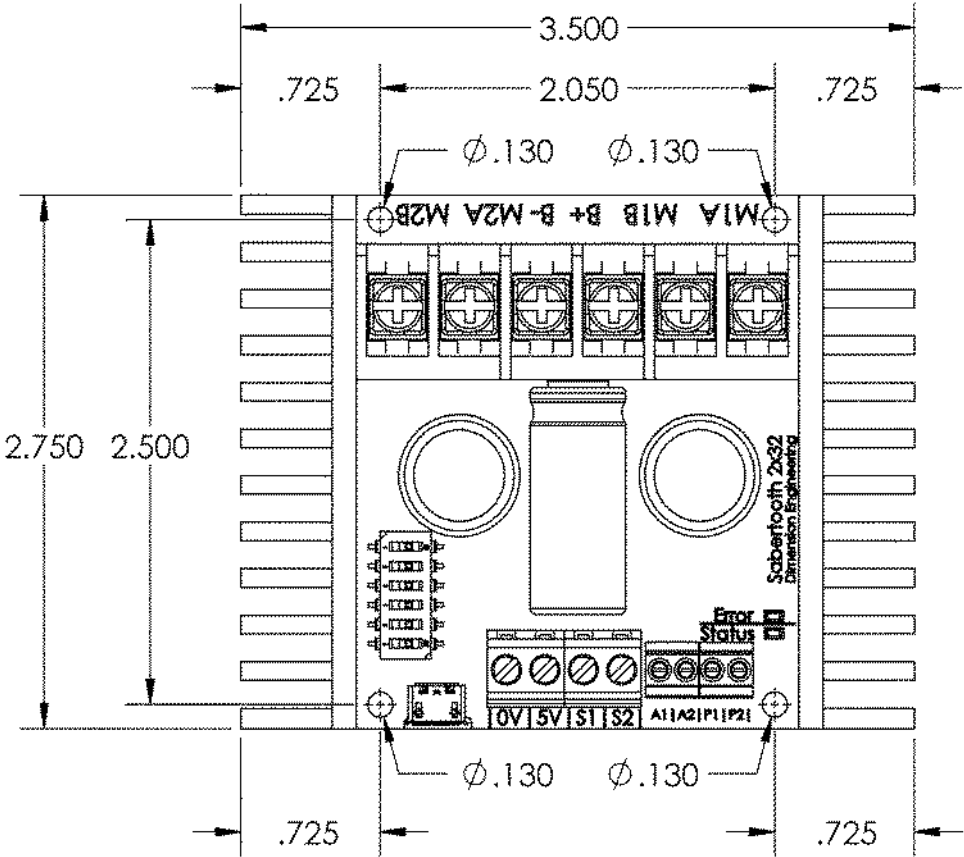
BC

C C D

Drawings

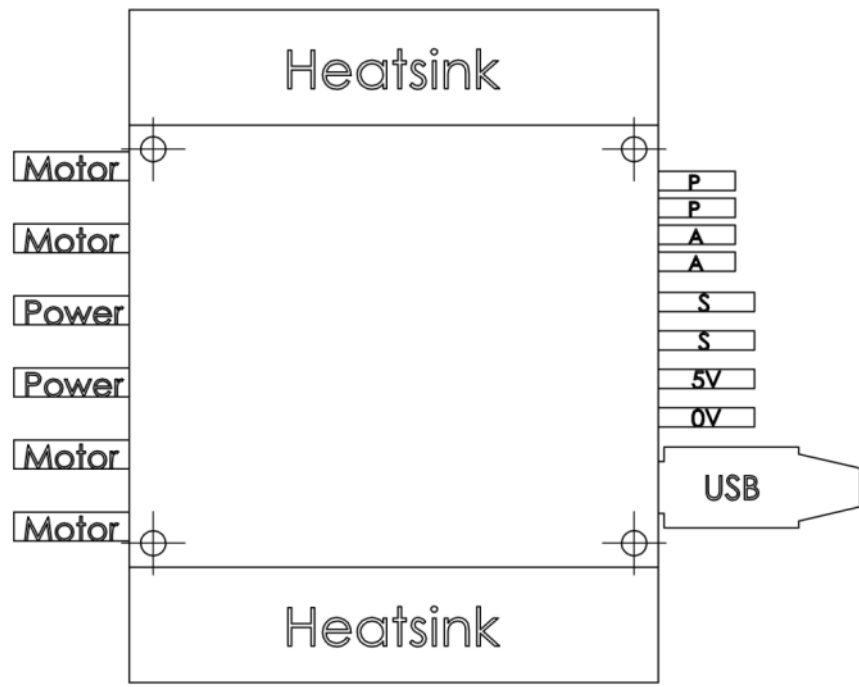
E J F E C E E E

CA



Printable mounting diagram

E C C C D A C C C BC BC
 B C ECC EC BC E A
 BC CE C BC BCBC E G
 E B A B C BC A



A A BC C C D