Backbox Wiring

- Coils Detailed Chart Table
- Backbox I/O Power Driver Board Detailed Wiring Diagram
- Backbox Board Layout Wiring Diagram
  - 128 X 32 Dot Matrix Display PCB (USA) 520-5052-15
  - 128 X 32 Dot Matrix CES-LED // EURO ONLY RoHS // 520-5052-15

Playfield Wiring

- General Illumination Circuit Detailed Wiring Diagram
- Playfield Switch Wiring Diagram
- Playfield Lamp Wiring Diagram
- Playfield Terminal Strips, Fuses & Misc. Wiring Descriptions & Locations
- #-Flipper Circuit Wiring Diagram

Cabinet and Coin Door Wiring

- Transformer Power Wiring Diagram
- Cabinet Wiring Diagram
- Coin Door Wiring Diagram
- Cabinet Universal Voltage Jumper Plugs (for use with Universal AC Cable, 036-5530-00 ONLY)

I/O and CPU — SCHEMATICS

COILS DETAILED CHART TABLE

	High Current Coils Group 1	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1	▲ I/O Power Driver ▼	YEL-VIO	J10-P9/10	50VDC	BRN-BLK	J8-P1	28-1200 090-5044-ND
#2	AUTO LAUNCH	Q2		YEL-VIO	J10-P9/10	50VDC	BRN-RED	J8-P3	24-940 090-5036-ND
#3	LOWER PLAYFIELD EJECT	Q3		YEL-VIO	J10-P9/10	50VDC	BRN-ORG	J8-P4	28-1200 090-5044-ND
#4	LOWER PLAYFIELD LEFT FLIPPER	Q4		GRY-YEL	J10-P9/10	50VDC	BRN-YEL	J8-P5	22-1080 090-5032-ND
#5	LOWER PLAYFIELD RIGHT FLIPPER	Q5		BLU-YEL	J10-P9/10	50VDC	BRN-GRN	J8-P6	22-1080 090-5032-ND
#6	LEFT 5- BANK DROP RESET (X2)	Q6		YEL-VIO	J10-P9/10	50VDC	BRN-BLU	J8-P7	25-1240 090-5034-ND
#7	CENTER 3- BANK DROP RESET	Q7		YEL-VIO	J10-P9/10	50VDC	BRN-VIO	J8-P8	25-1240 090-5034-ND
#8	SHAKER MOTOR (OPTIONAL)	Q8		RED-WHT	J17-P7	16VAC	BRN-GRY	J8-P9	502-5027-00
	High Current Coils Group 2	**Drive Transistor**	**Driver Output PCB**	**Power Line Color**	**Power Line Connection**	**Power Voltage**	**Drive Transistor Control Line Color**	**D.T. Control Line Connect**	**Coil GA-Turn or Bulb Type**
#9	LEFT POP BUMPER	Q9	▲ I/O Power Driver ▼	YEL-VIO	J10-P9/10	50VDC	BLU-BRN	J8-P1	28-1200 090-5044-ND
#10	RIGHT POP BUMPER	Q10		YEL-VIO	J10-P9/10	50VDC	BLU-RED	J8-P2	28-1200 090-5044-ND
#11	BOTTOM POP BUMPER	Q11		YEL-VIO	J10-P9/10	50VDC	BLU-ORG	J8-P4	28-1200 090-5044-ND
#12	TOP EJECT	Q12		YEL/VIO	J10-P9/10	50VDC	BLU-YEL	J8-P5	23-800 090-5001-ND
#13	LEFT SLINGSHOT	Q13		YEL-VIO	J10-P9/10	50VDC	BLU-GRN	J8-P6	28-1200 090-5044-ND
#14	RIGHT SLINGSHOT	Q14		YEL-VIO	J10-P9/10	50VDC	BLU-BLU	J8-P7	28-1200 090-5044-ND
#15	**LEFT FLIPPER (50V RED/YEL)**	Q15		GRY-YEL~3A Fuse~RED-YEL	J10-P6/7	50VDC	ORG-GRY	J8-P8	22-1080 090-5032-ND
#16	**RIGHT FLIPPER (50V RED/YEL)**	Q16		GRY-YEL~3A Fuse~RED-YEL	J10-P6/7	50VDC	ORG-VIO	J8-P9	22-1080 090-5032-ND
	Low Current Coils Group 1	**Drive Transistor**	**Driver Output PCB**	**Power Line Color**	**Power Line Connection**	**Power Voltage**	**Drive Transistor Control Line Color**	**D.T. Control Line Connect**	**Coil GA-Turn or Bulb Type**
#17	TRAIN FLASHER	Q17	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	VIO-BRN	J7-P2	# 89 BULB 165-5000-89
#18	DETONATOR	Q18		BRN	J7-P1	20VDC	VIO-RED	J7-P3	28-1400 090-5072-03
#19	BOTTOM ARCH FLASHER (X2)	Q19		ORG	J6-P10	20VDC	VIO-ORG	J7-P4	LED BD. 520-5328-00
#20	LEFT RAMP FLASHER	Q20		ORG	J6-P10	20VDC	VIO-YEL	J7-P6	#89 BULB 165-5000-89
#21	LEFT SIDE FLASHER	Q21		ORG	J6-P10	20VDC	VIO-GRN	J7-P7	# 89 BULB 165-5000-89
#22	BACK PANEL FLASHER	Q22		ORG	J6-P10	20VDC	VIO-BLU	J7-P8	# 89 BULB 165-5000-89
#23	TOP EJECT FLASHER	Q23		ORG	J6-P10	20VDC	VIO-BLK	J7-P9	# 89 BULB 165-5000-89
#24	OPTIONAL (e.g. COIN METER)	Q24		RED	J16-P4-8	5VDC	VIO-GRY	J7-P10	COIN METER

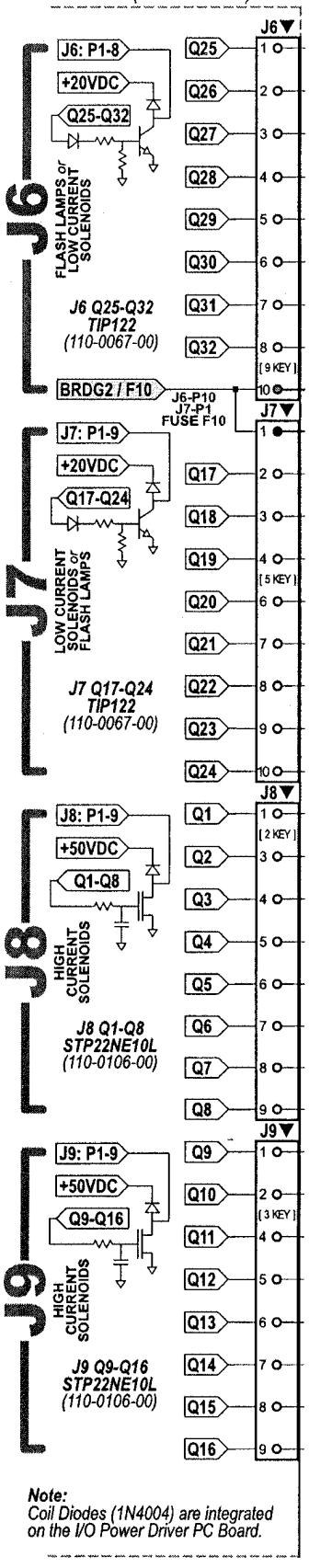
	Low Current Coils Group 2	Drive Transistor	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Transistor Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#25	POP BUMPERS FLASH (X3)	Q25	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	BLK-BRN	J6-P1	# 89 BULB 165-5000-89
#26	BELL ARROW FLASHER	Q26		ORG	J6-P10	20VDC	BLK-RED	J6-P2	# 89 BULB 165-5000-89
#27	LEFT RAMP LEFT SIDE FLASHER	Q27		ORG	J6-P10	20VDC	BLK-ORG	J6-P3	# 161 BULB 165-5032-00
#28	LEFT RAMP RIGHT SIDE FLASHER	Q28		ORG	J6-P10	20VDC	BLK-YEL	J6-P4	# 161 BULB 165-5032-00
#29	RIGHT RAMP RIGHT SIDE FLASHER	Q29		ORG	J6-P10	20VDC	BLK-GRN	J6-P5	# 161 BULB 165-5032-00
#30	RIGHT RAMP FLASHER	Q30		ORG	J6-P10	20VDC	BLK-BLU	J6-P6	# 89 BULB 165-5000-89
#31	RIGHT SIDE FLASHER	Q31		ORG	J6-P10	20VDC	BLK-VIO	J6-P7	# 89 BULB 165-5000-89
#32	CANNON MOTOR	Q32		BRN	J7-P1	20VDC	BLK-GRY	J6-P8	MOTOR 041-5111-00

Backbox I/O Power Driver Board
(Coils Q1-Q32)
Detailed Wiring Diagram

Partial View (520-5249-00)

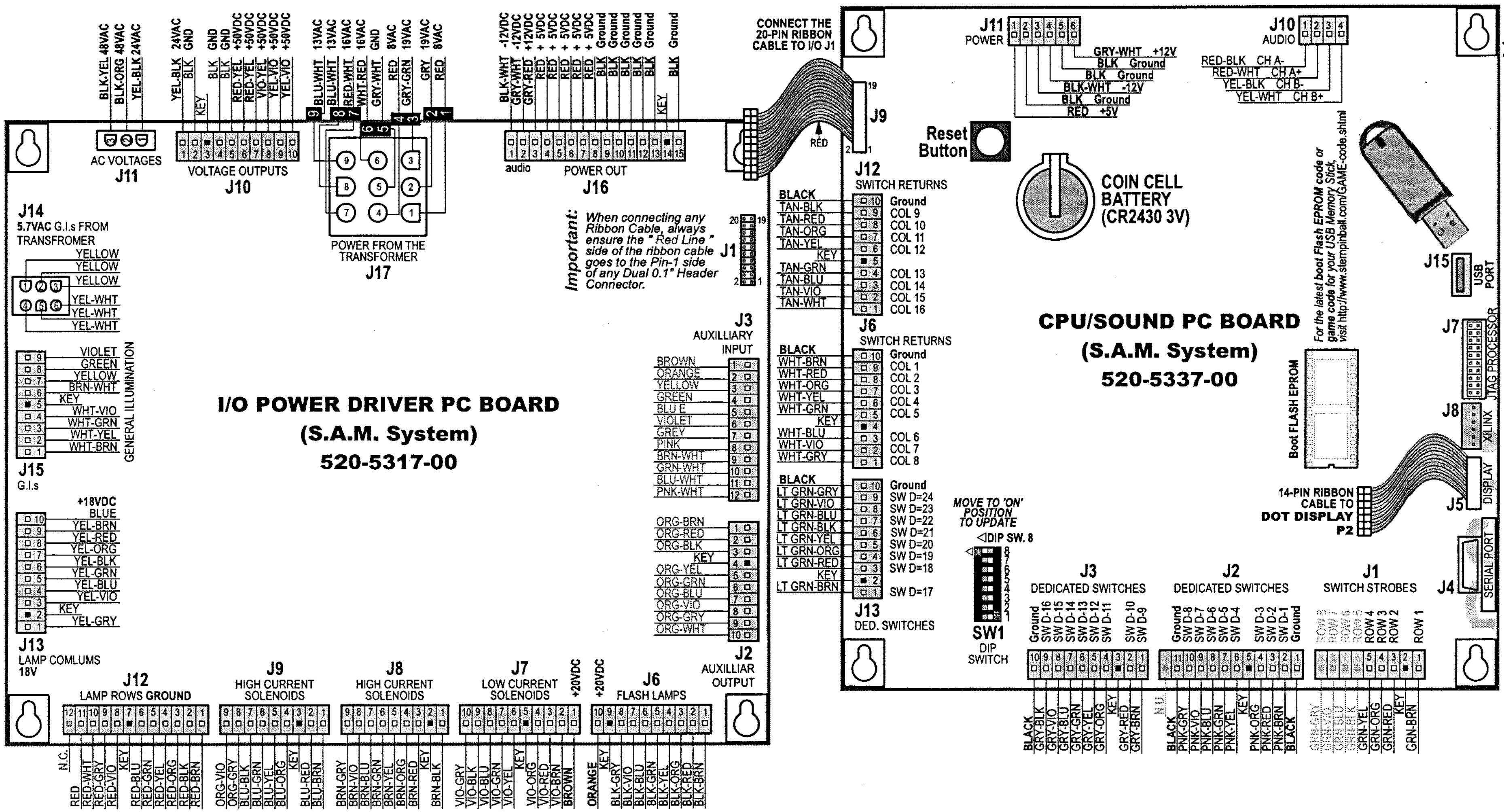
ALL FUSES RATED 250V SLO-BLO
I/O FUSE CHART INFO IN BACKBOX & PAGE DR. 1

*For complete and detailed schematics of the Connectors, Coils, Flash Lamps, Bridges and Fuses noted below, see the I/O Power Driver PCB (Sheets **1** & **2** of **4**) in Section **5**, Chapter **4**, Printed Circuit Boards (PCBs).*



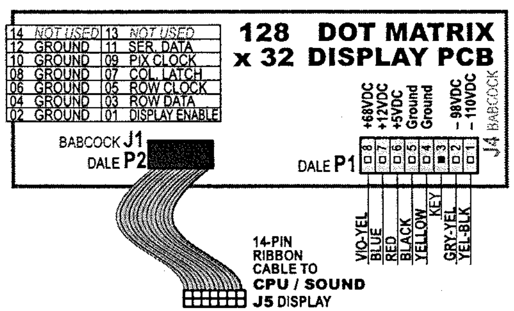
Note:
Coil Diodes (1N4004) are integrated on the I/O Power Driver PC Board.

#33 – #35 Note: *If this game is equiped with an optional Ticket Dispenser & Meter, see the end of Sec. **5**, Chapter **4** for wiring information. Ensure Std. Adj. **56**, **Ticket Dispenser = YES**.*



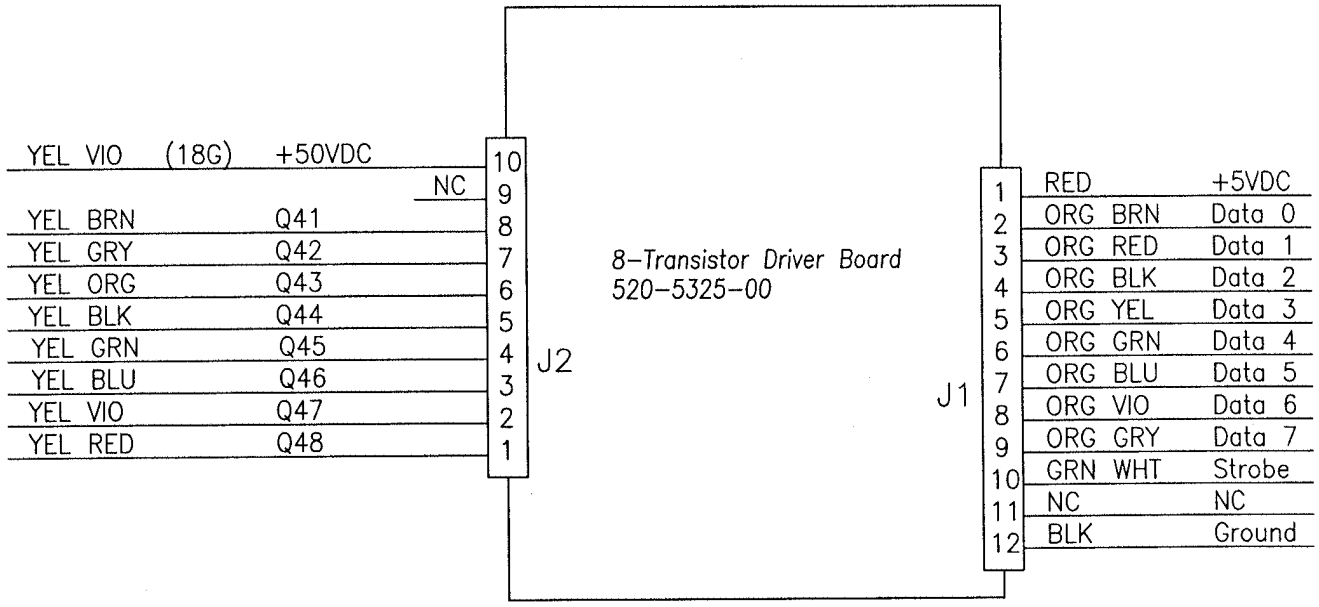
Backbox Board Layout Wiring Diagram

128 X 32 Dot Matrix Display PCB	1	520-5052-15
// EURO ONLY RoHS // 128 X 32 DM CES PCB		520-5052-15
// EURO ONLY RoHS // Dot Matrix Bezel		545-6281-00
Ribbon Cable, 14-Pin (33")		036-5260-33
// EURO ONLY RoHS // LED Ribbon Cable Filter PCB		520-5259-00
Display Cable *(Wiring Harness)*		036-5454-01
// EURO ONLY RoHS // LED Display Adapter Harness		036-5520-00

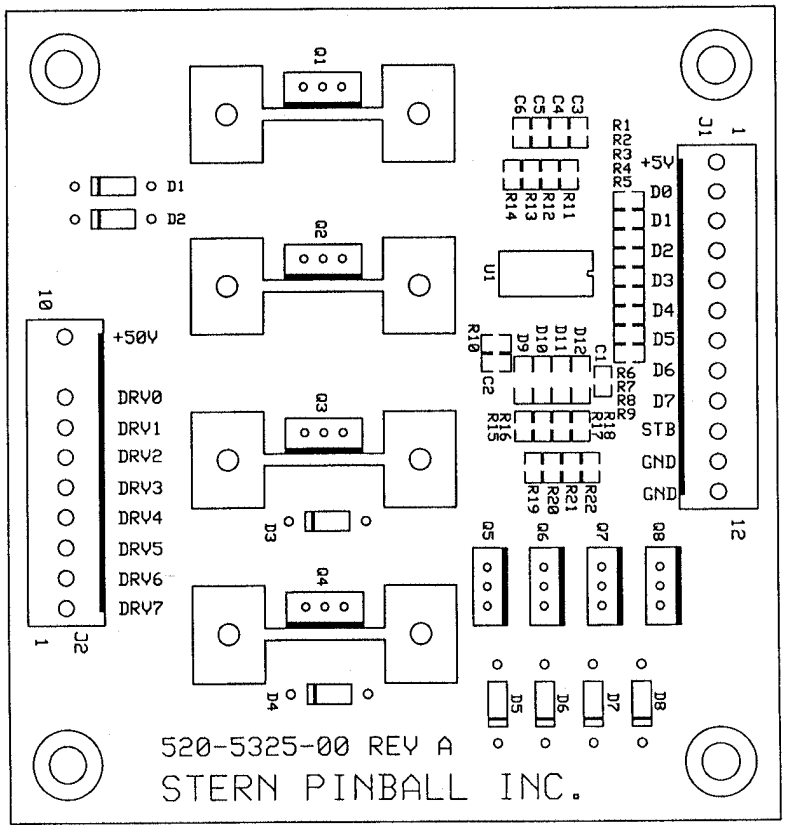


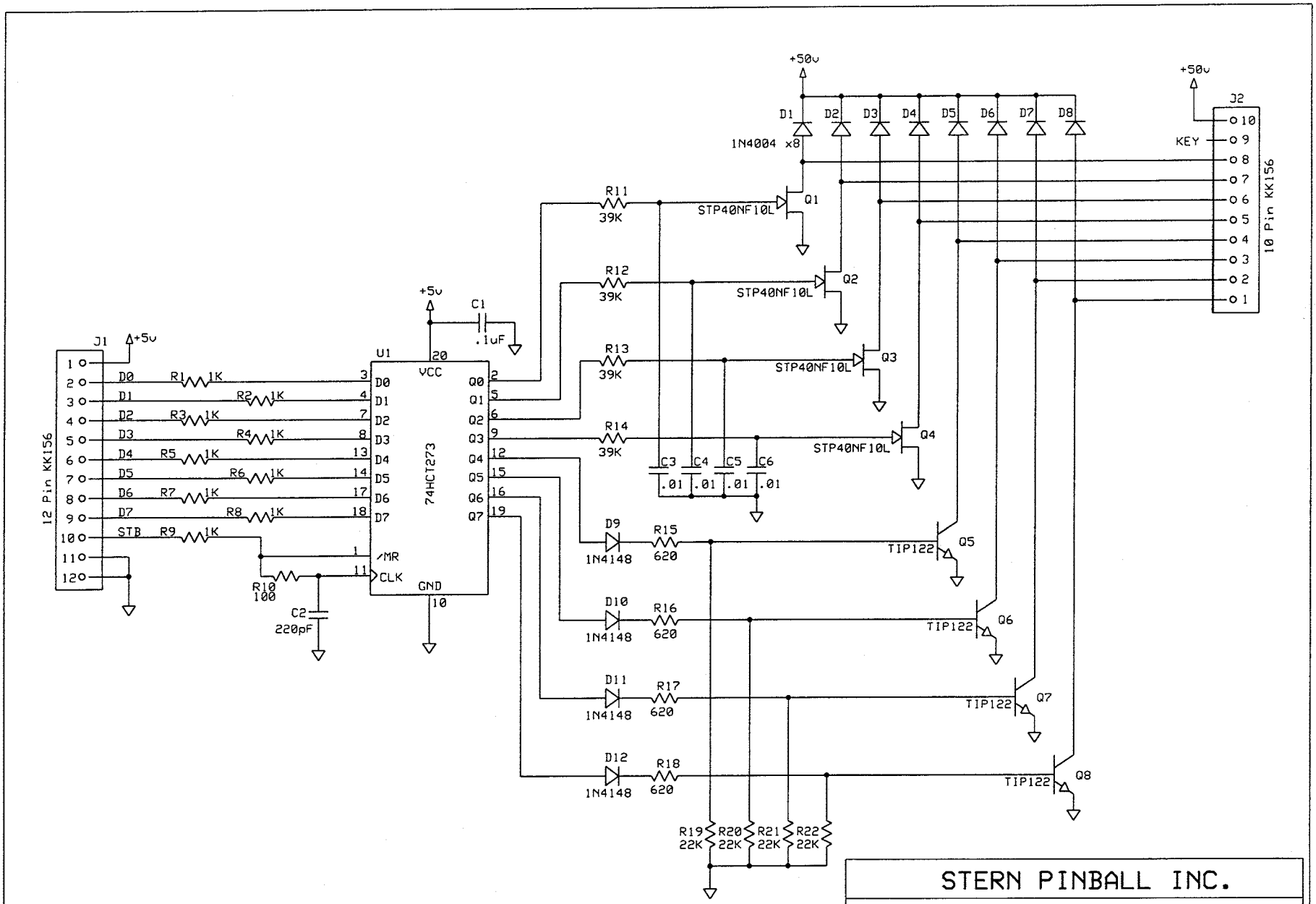
AC-DC PREMIUM

Wiring for the 8-Transistor driver board, 520-5325-00

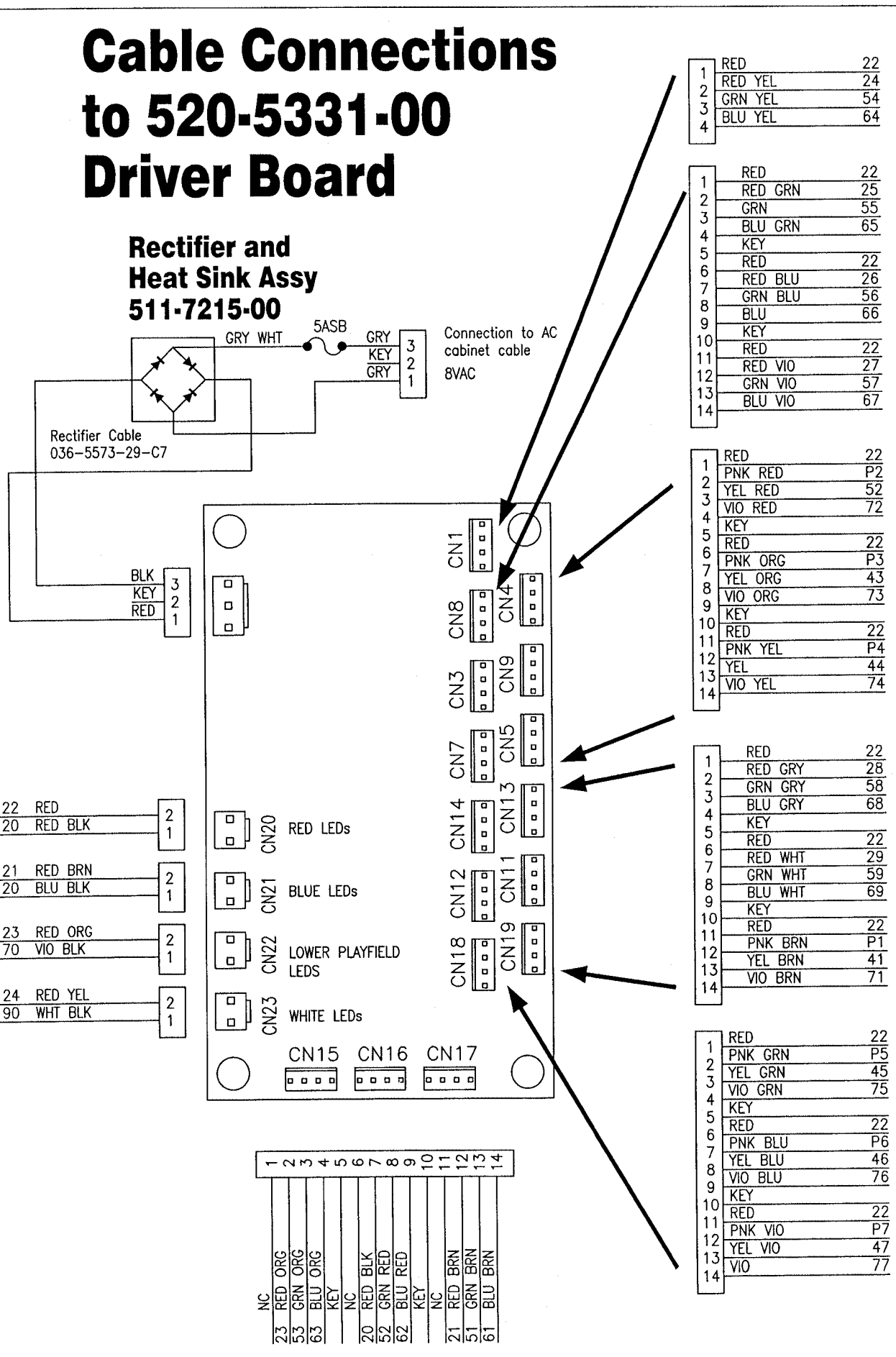


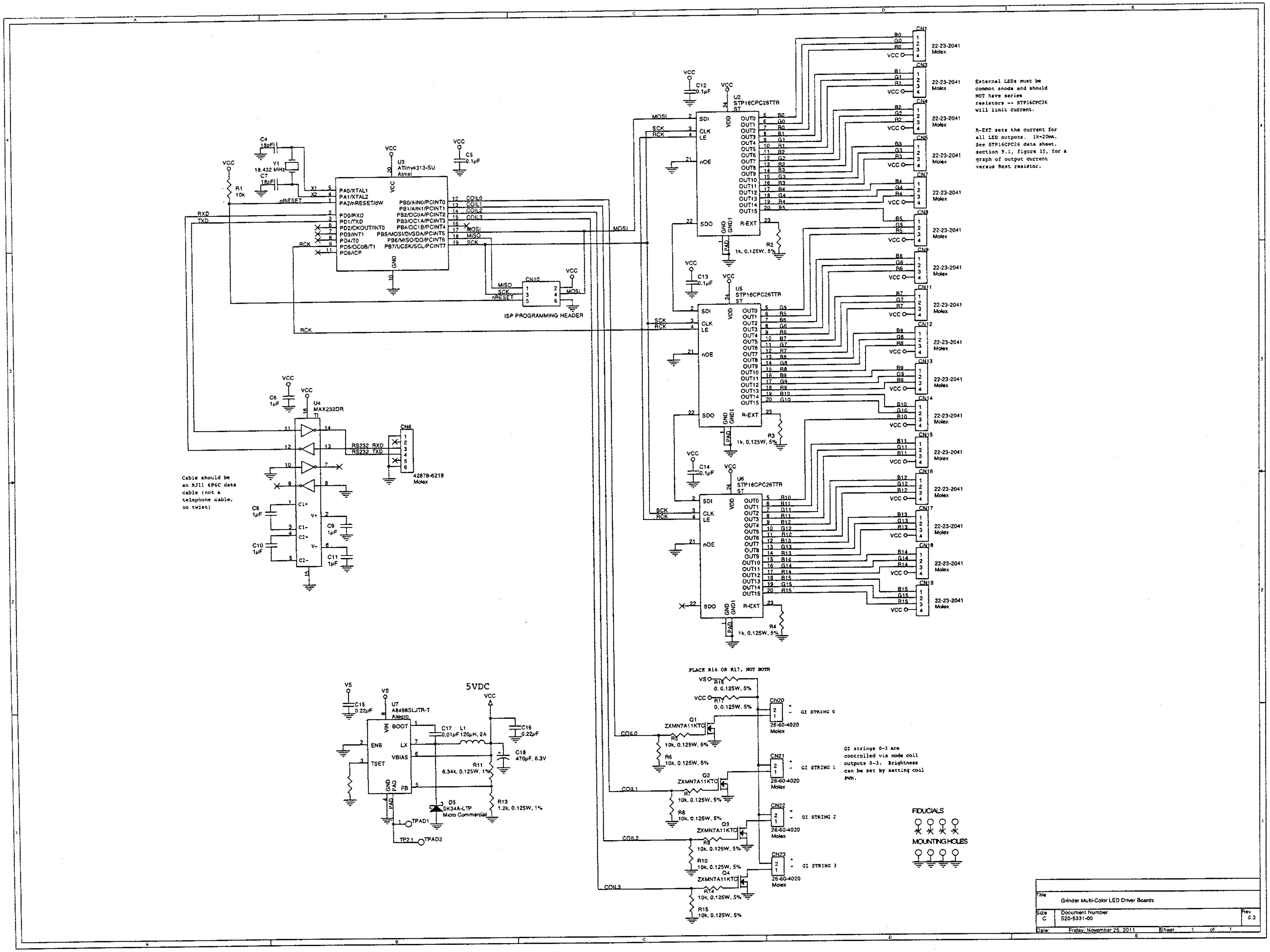
Actual Board Layout



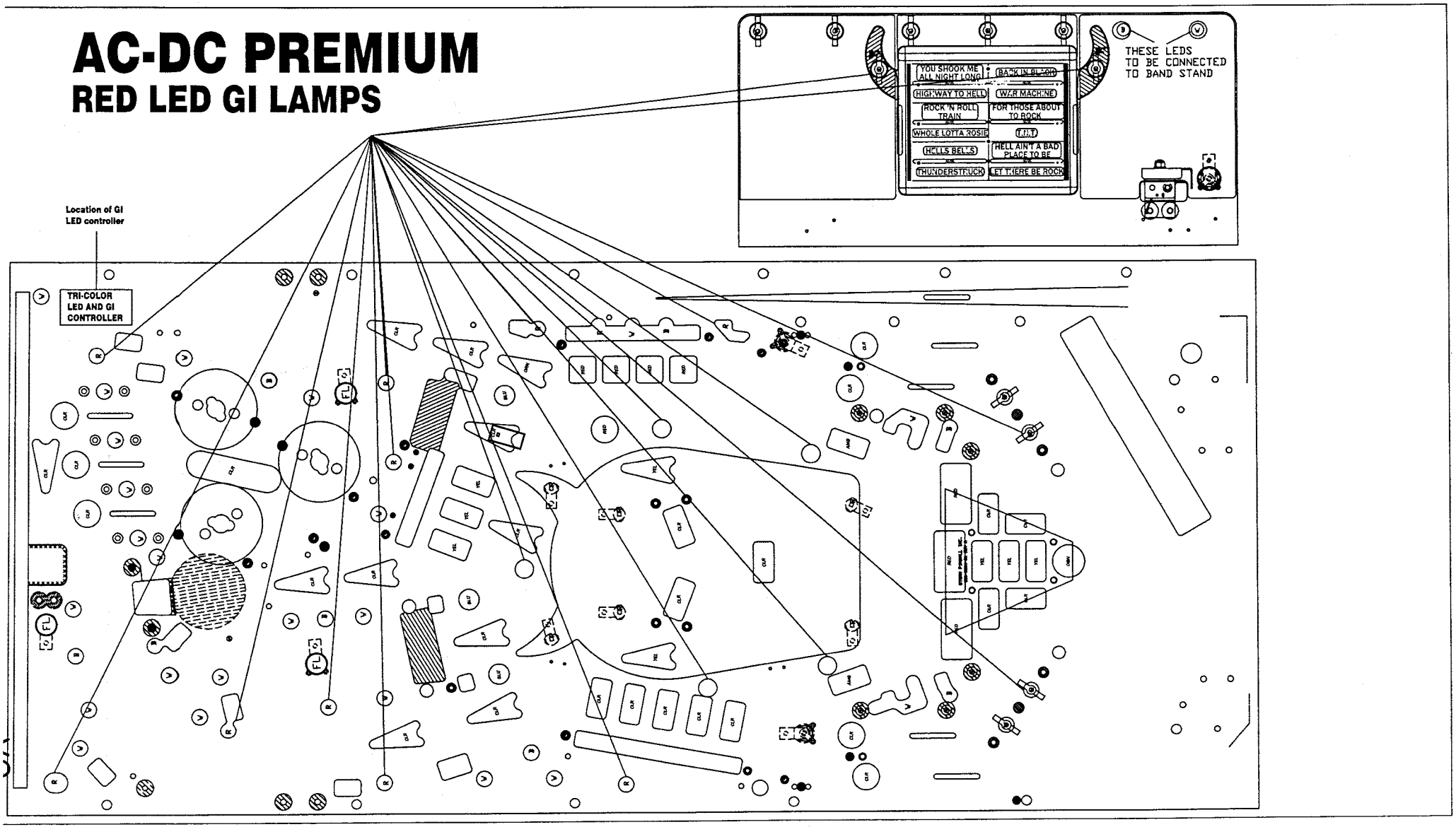

+50v
D1
D2
D3
D4
D5
D6
D7
D8
1N4004 x8
J2
KEY
10 Pin KK156
R11
39K
Q1
STP40NF10L
R12
39K
Q2
STP40NF10L
R13
39K
Q3
STP40NF10L
R14
39K
Q4
STP40NF10L
+5v
C1
.1uF
J1
12 Pin KK156
U1
74HCT273
VCC
GND
D0
D1
D2
D3
D4
D5
D6
D7
STB
R1 1K
R2 1K
R3 1K
R4 1K
R5 1K
R6 1K
R7 1K
R8 1K
R9 1K
R10
100
C2
220pF
/MR
CLK
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
C3 .01
C4 .01
C5 .01
C6 .01
D9
1N4148
R15
620
TIP122
Q5
D10
1N4148
R16
620
TIP122
Q6
D11
1N4148
R17
620
TIP122
Q7
D12
1N4148
R18
620
TIP122
Q8
R19 22K
R20 22K
R21 22K
R22 22K
STERN PINBALL INC.
8 Auxiliary Driver
520-5325-00
Rev A
9/22/2011
Page 1 of 1

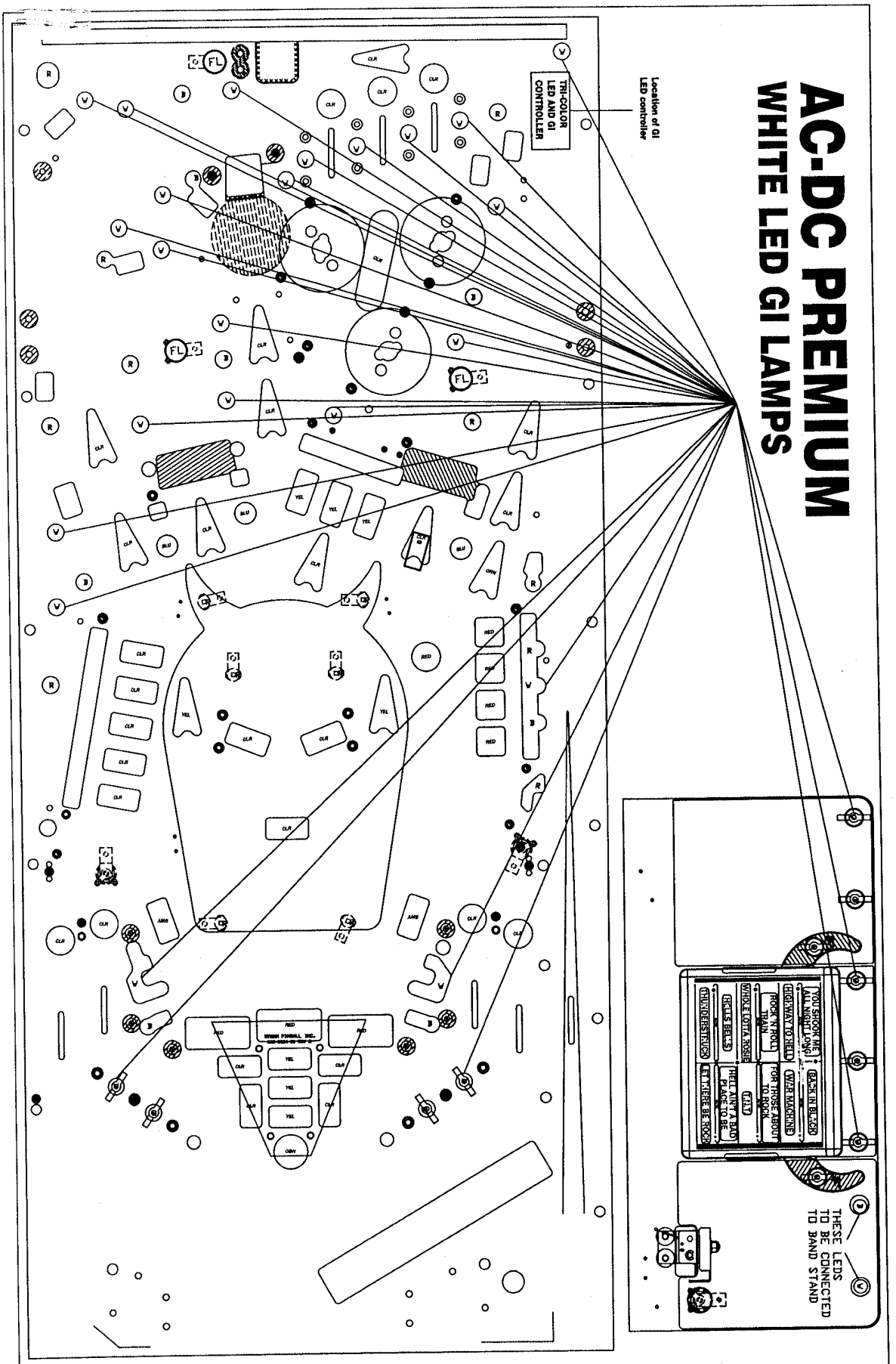
Cable Connections to 520-5331-00 Driver Board



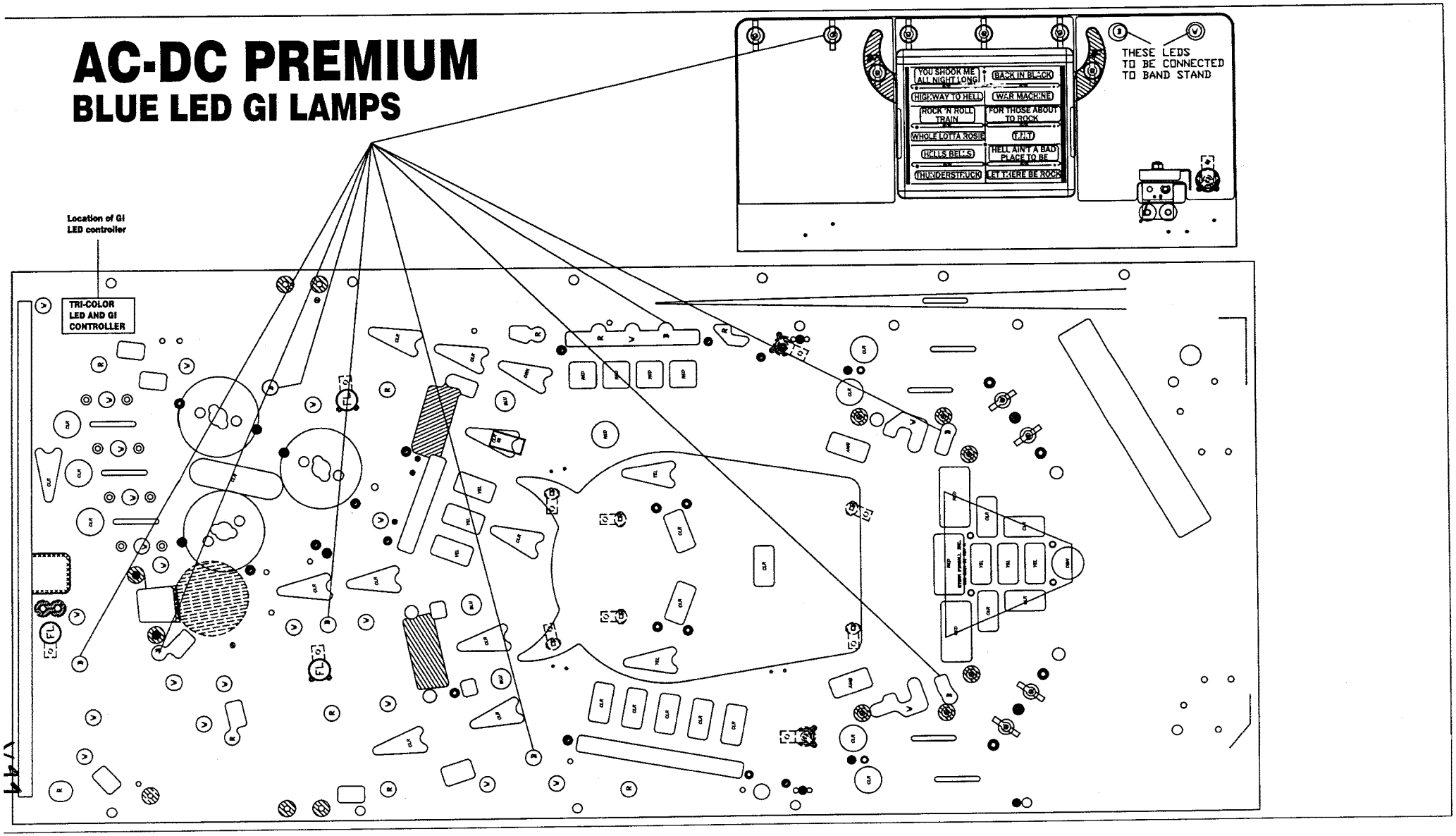

External LEDs must be common anode and should NOT have series resistors -- STP16CPC26 will limit current.
R-EXT sets the current for all LED outputs. 1k=20mA. See STP16CPC26 data sheet, section 9.1, figure 15, for a graph of output current versus Rext resistor.
Cable should be an RJ11 6P6C data cable (not a telephone cable, no twist)
ISP PROGRAMMING HEADER
PLACE R16 OR R17, NOT BOTH
GI strings 0-3 are controlled via node coil outputs 0-3. Brightness can be set by setting coil PWM.
5VDC
FIDUCIALS
MOUNTING HOLES
Title
Grinder Multi-Color LED Driver Boards
Size
C
Document Number
520-5331-00
Rev
0.3
Date: Friday, November 25, 2011
Sheet 1 of 1

AC-DC PREMIUM
RED LED GI LAMPS

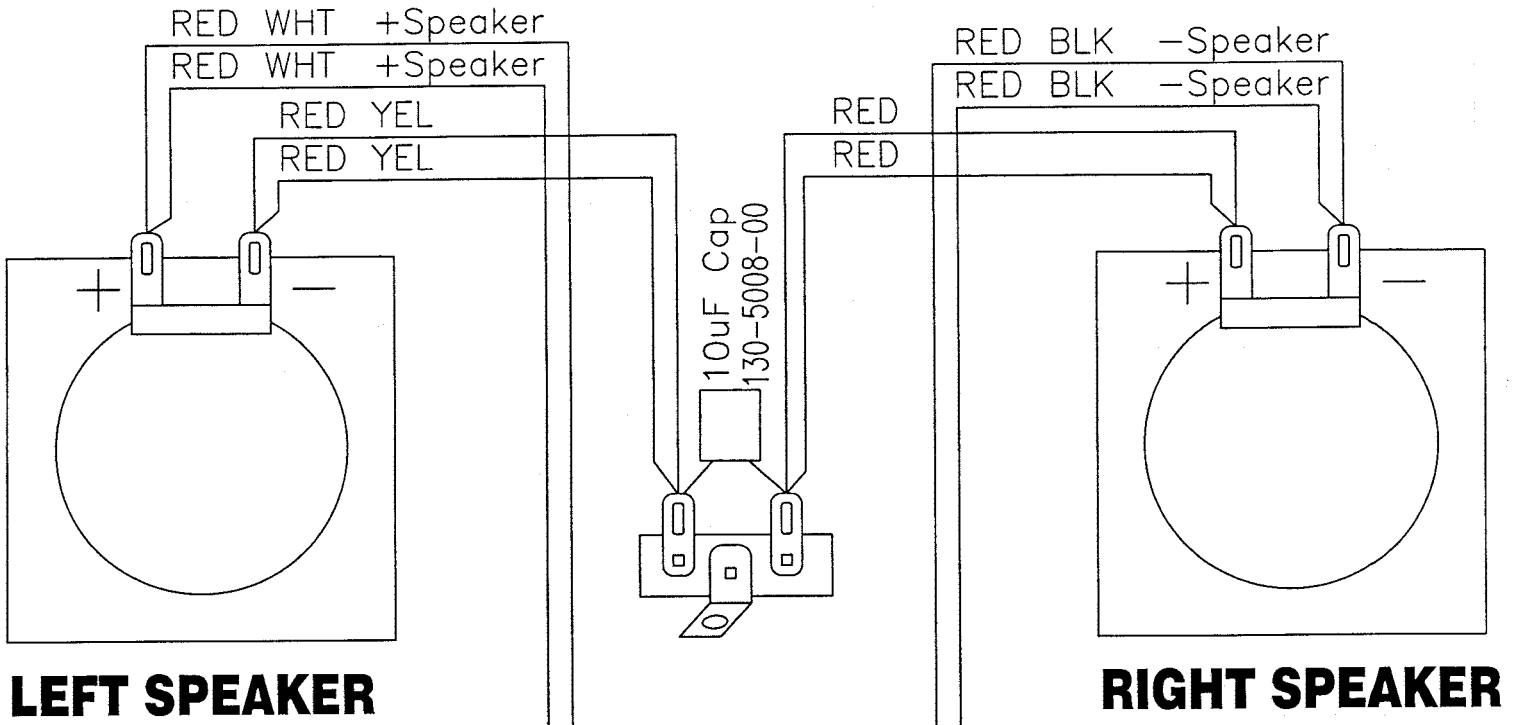


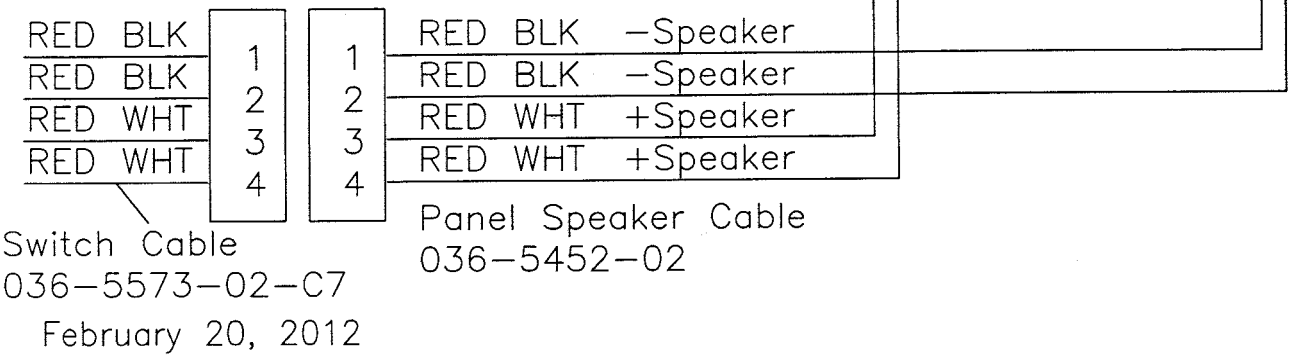

AC-DC PREMIUM
WHITE LED GI LAMPS
TRI-COLOR LED AND GI CONTROLLER
Location of GI LED controller
THESE LEDS TO BE CONNECTED TO BAND STAND

AC-DC PREMIUM
BLUE LED GI LAMPS

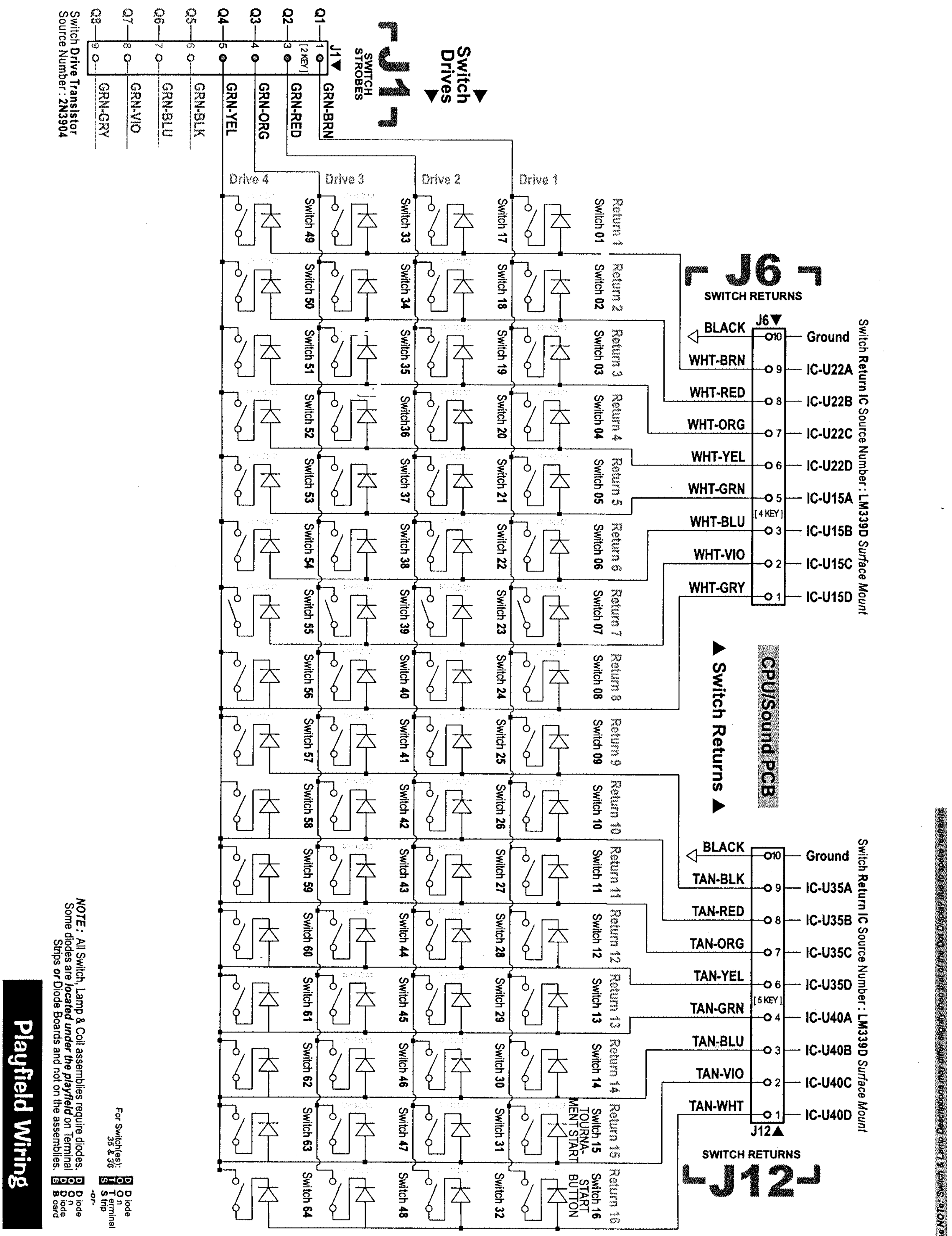


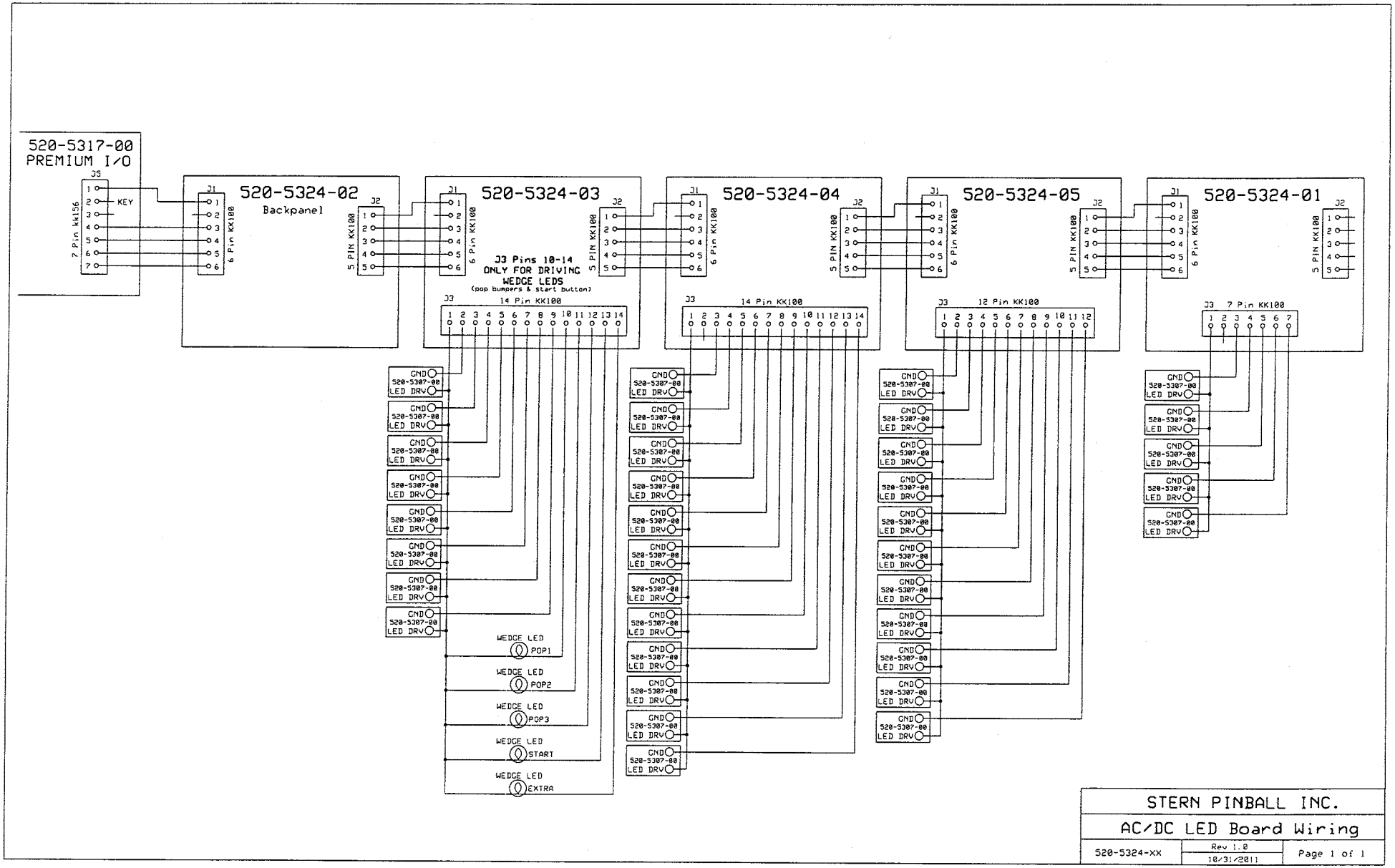
SPEAKER PANEL ASSY AC-DC PREMIUM

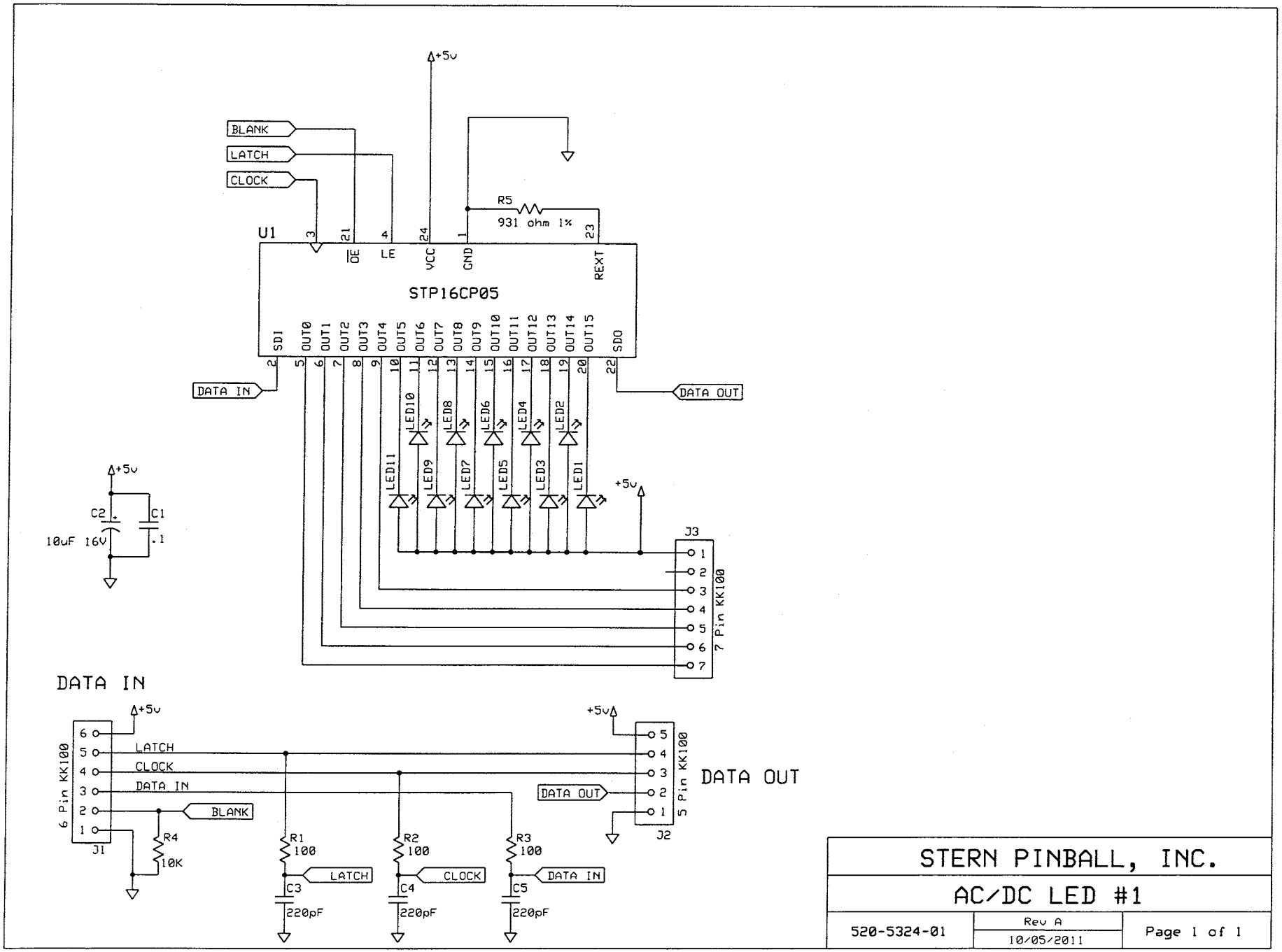




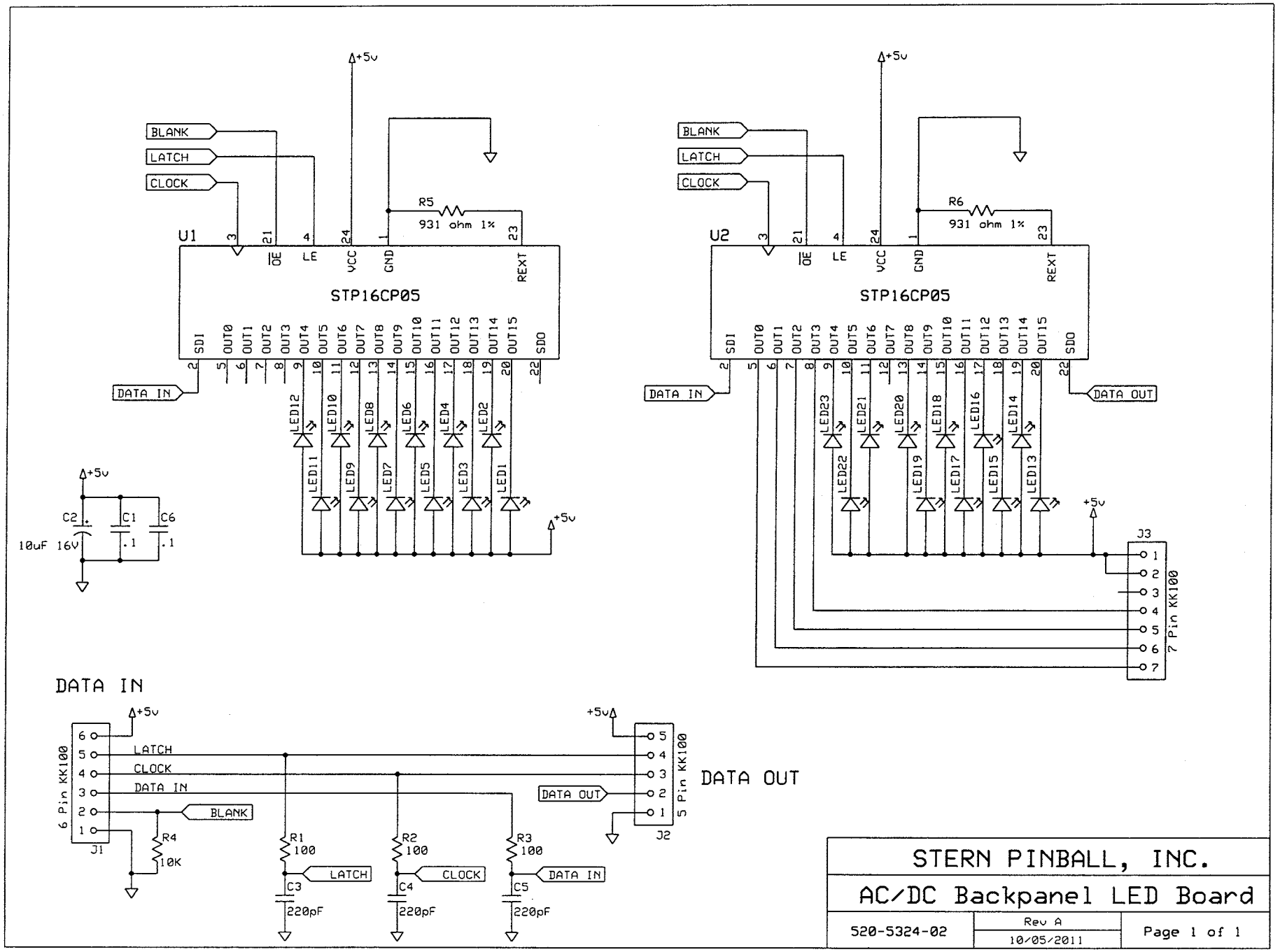
Playfield Switch Wiring Diagram



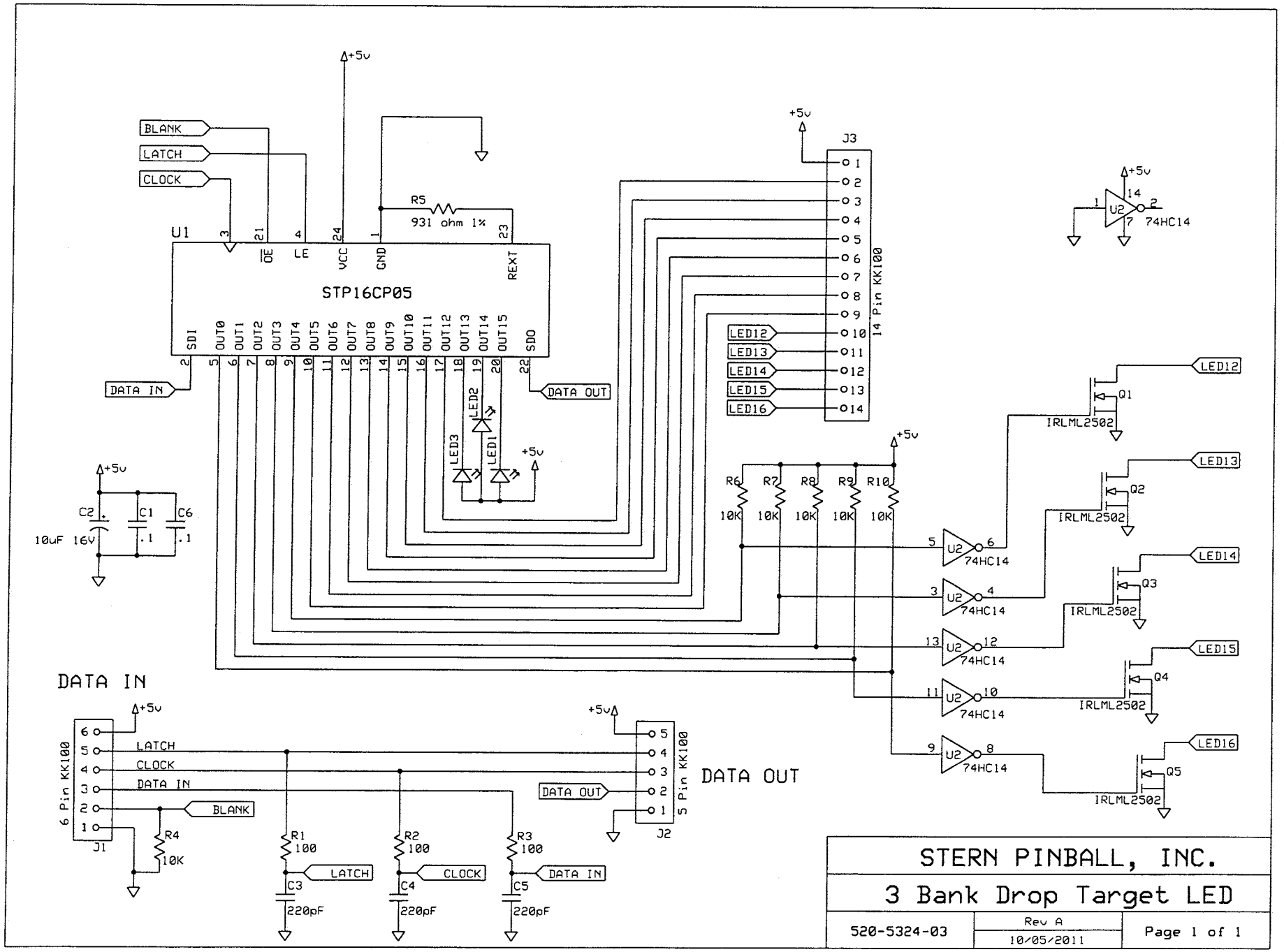

520-5317-00
PREMIUM I/O
J5
7 Pin KK156
KEY
520-5324-02
Backpanel
J1
J2
6 Pin KK100
5 PIN KK100
520-5324-03
J3 Pins 10-14
ONLY FOR DRIVING
WEDGE LEDS
(pop bumpers & start button)
J3
14 Pin KK100
520-5324-04
520-5324-05
12 Pin KK100
520-5324-01
7 Pin KK100
GND
520-5307-00
LED DRV
WEDGE LED
POP1
POP2
POP3
START
EXTRA
STERN PINBALL INC.
AC/DC LED Board Wiring
520-5324-XX
Rev 1.0
10/31/2011
Page 1 of 1



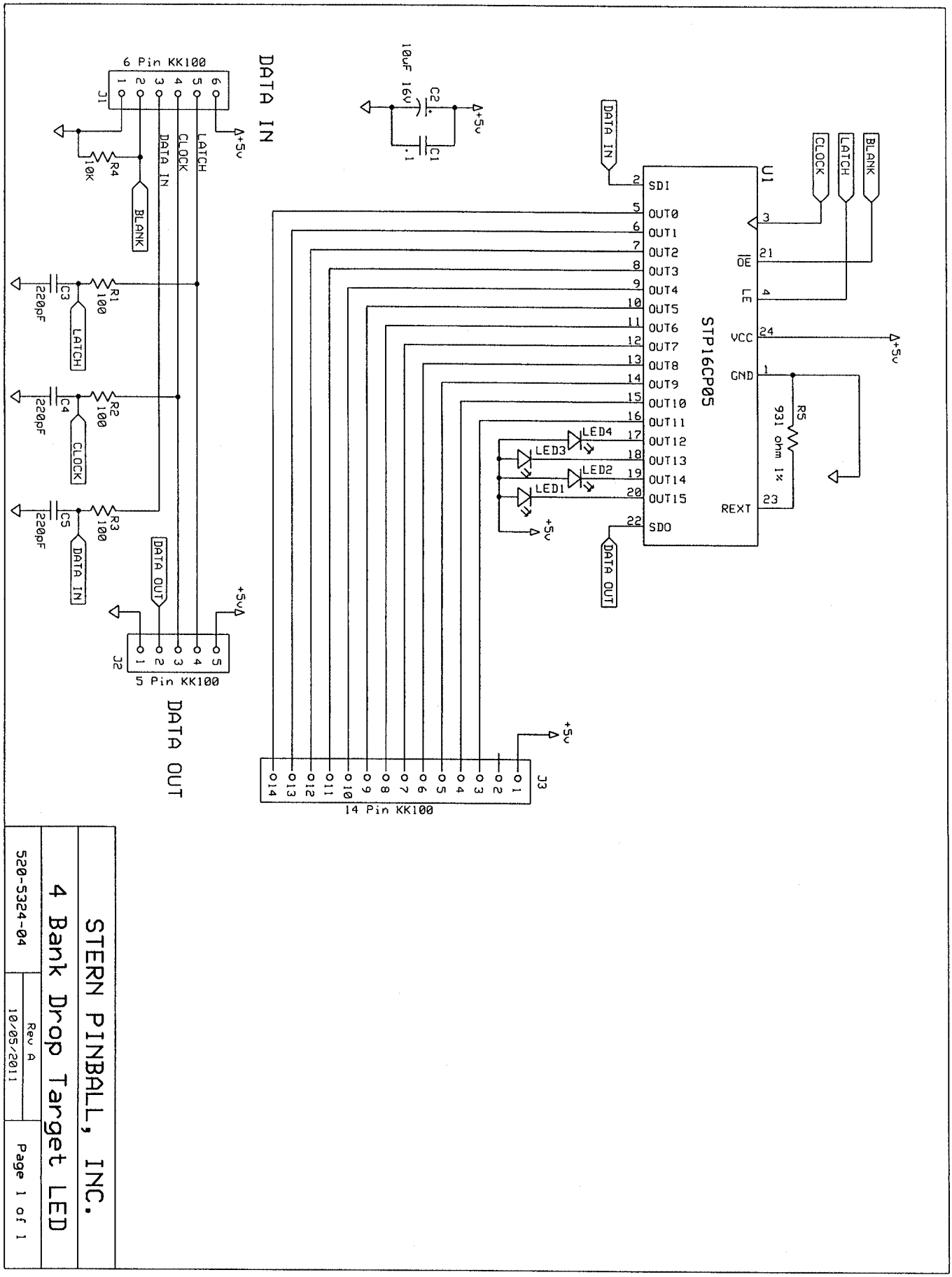
STERN PINBALL, INC.		
AC/DC LED #1		
520-5324-01	Rev A 10/05/2011	Page 1 of 1



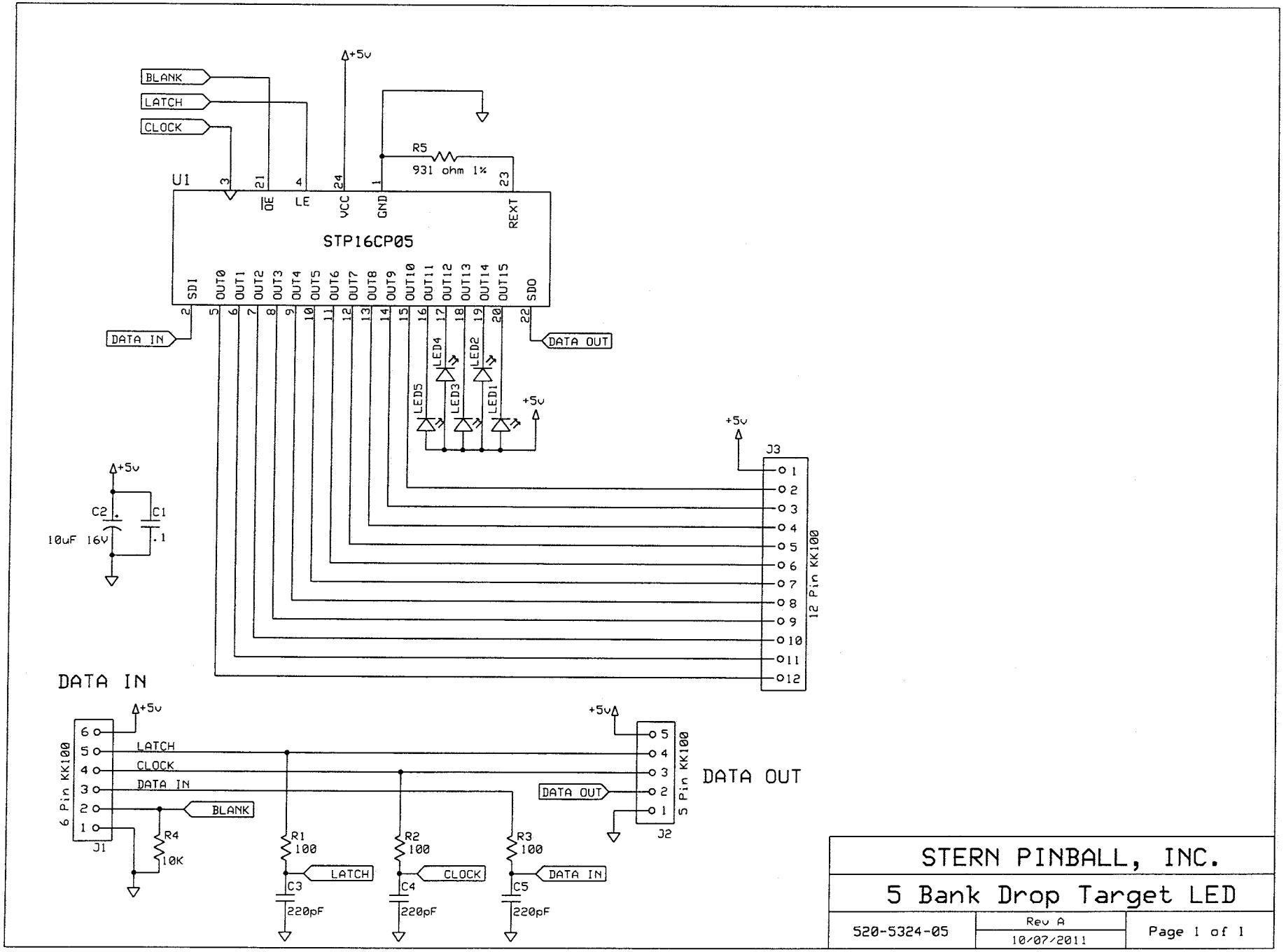
STERN PINBALL, INC.		
AC/DC Backpanel LED Board		
520-5324-02	Rev A 10/05/2011	Page 1 of 1


BLANK
LATCH
CLOCK
+5v
U1
STP16CP05
R5
931 ohm 1%
DATA IN
DATA OUT
J3
14 Pin KK100
LED12
LED13
LED14
LED15
LED16
LED1
LED2
LED3
R6
R7
R8
R9
R10
10K
Q1
Q2
Q3
Q4
Q5
IRLML2502
U2
74HC14
C1
C2
C6
10uF 16V
.1
DATA IN
6 Pin KK100
J1
R4
10K
R1
R2
R3
100
C3
C4
C5
220pF
5 Pin KK100
J2
DATA OUT
STERN PINBALL, INC.
3 Bank Drop Target LED
520-5324-03
Rev A
10/05/2011
Page 1 of 1

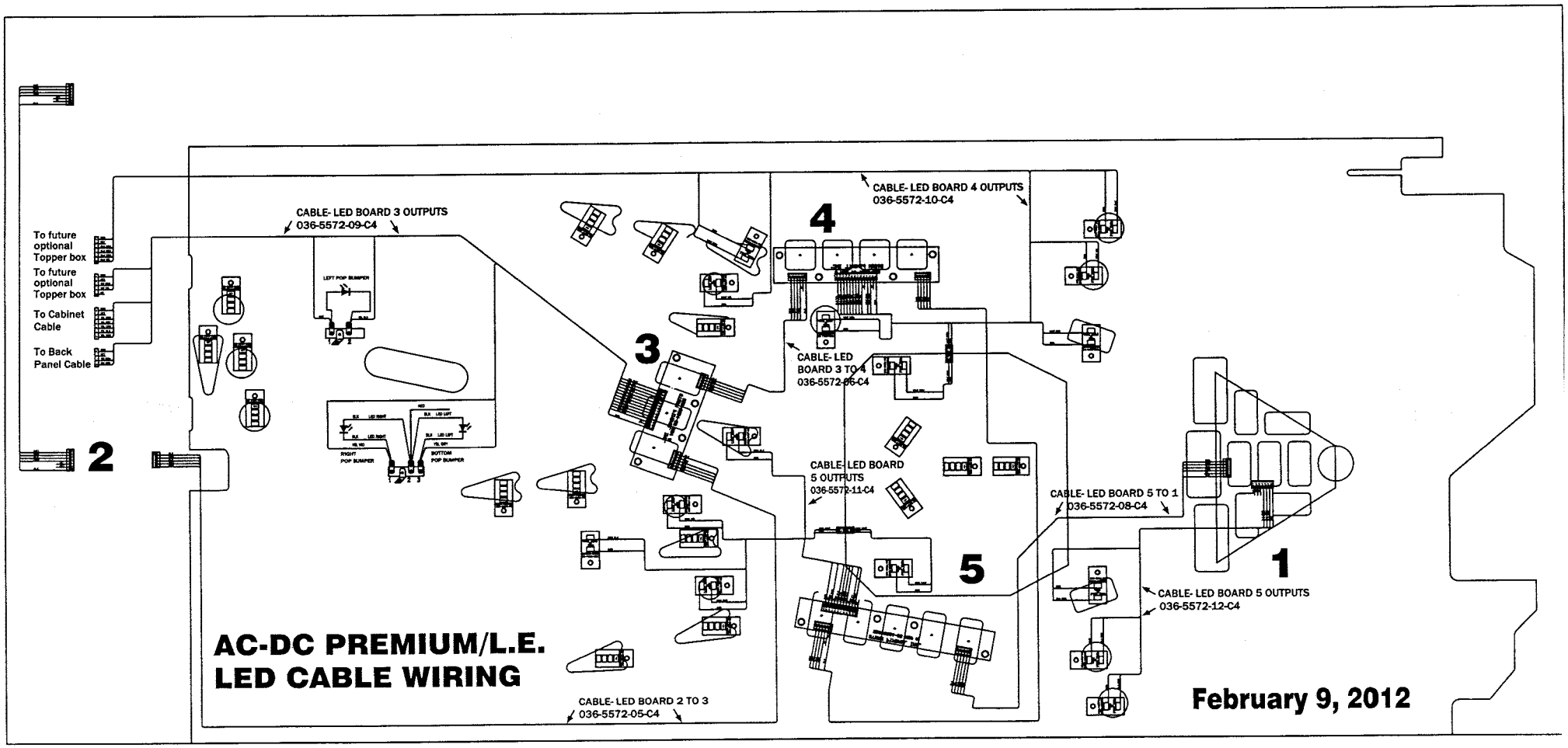
V17


DATA IN
6 Pin KK100
J1
1
2
3
4
5
6
+5v
10K
R4
BLANK
DATA IN
CLOCK
LATCH
220pF
C3
R1
100
LATCH
220pF
C4
R2
100
CLOCK
220pF
C5
R3
100
DATA IN
DATA OUT
+5v
J2
5 Pin KK100
DATA OUT
10uF 16v
C2
C1
.1
+5v
DATA IN
U1
SDI
OUT0
OUT1
OUT2
OUT3
OUT4
OUT5
OUT6
OUT7
OUT8
OUT9
OUT10
OUT11
OUT12
OUT13
OUT14
OUT15
SDO
OE
LE
VCC
GND
REXT
STP16CP05
CLOCK
LATCH
BLANK
+5v
R5
931 ohm 1%
LED4
LED3
LED2
LED1
+5v
DATA OUT
+5v
J3
14 Pin KK100
STERN PINBALL, INC.
4 Bank Drop Target LED
520-5324-04
Rev A
10/05/2011
Page 1 of 1

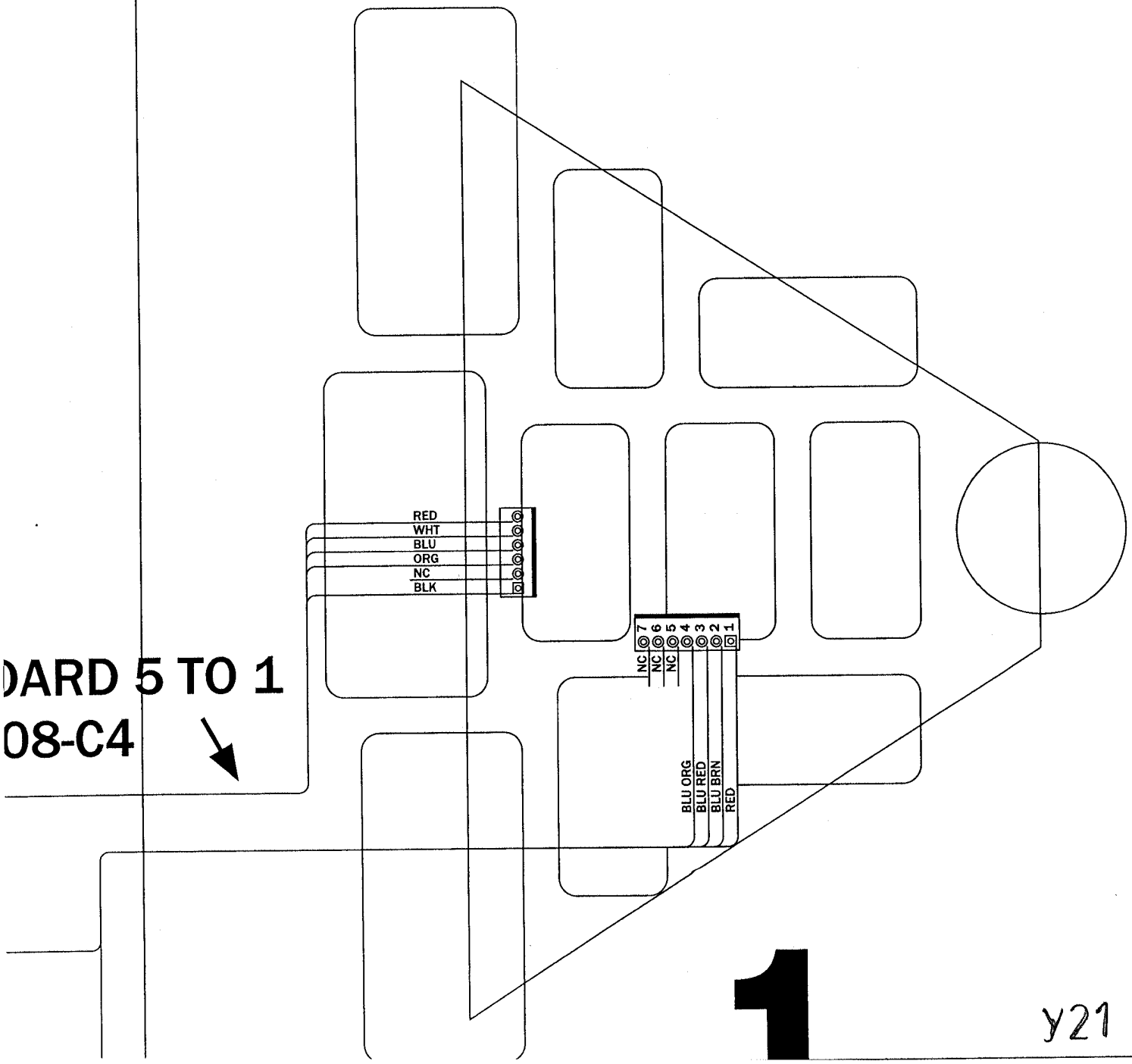
Y18



STERN PINBALL, INC.		
5 Bank Drop Target LED		
520-5324-05	Rev A 10/07/2011	Page 1 of 1


To future optional Topper box
To future optional Topper box
To Cabinet Cable
To Back Panel Cable
CABLE- LED BOARD 3 OUTPUTS
036-5572-09-C4
CABLE- LED BOARD 4 OUTPUTS
036-5572-10-C4
CABLE- LED BOARD 3 TO 4
036-5572-06-C4
CABLE- LED BOARD 5 OUTPUTS
036-5572-11-C4
CABLE- LED BOARD 5 TO 1
036-5572-08-C4
CABLE- LED BOARD 5 OUTPUTS
036-5572-12-C4
CABLE- LED BOARD 2 TO 3
036-5572-05-C4
1
2
3
4
5
AC-DC PREMIUM/L.E.
LED CABLE WIRING
February 9, 2012

LED BOARD WIRING
Detail of Board 1 Input and Output wiring



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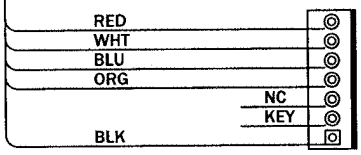
Y21



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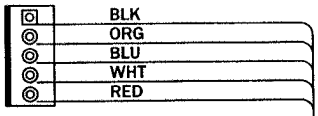


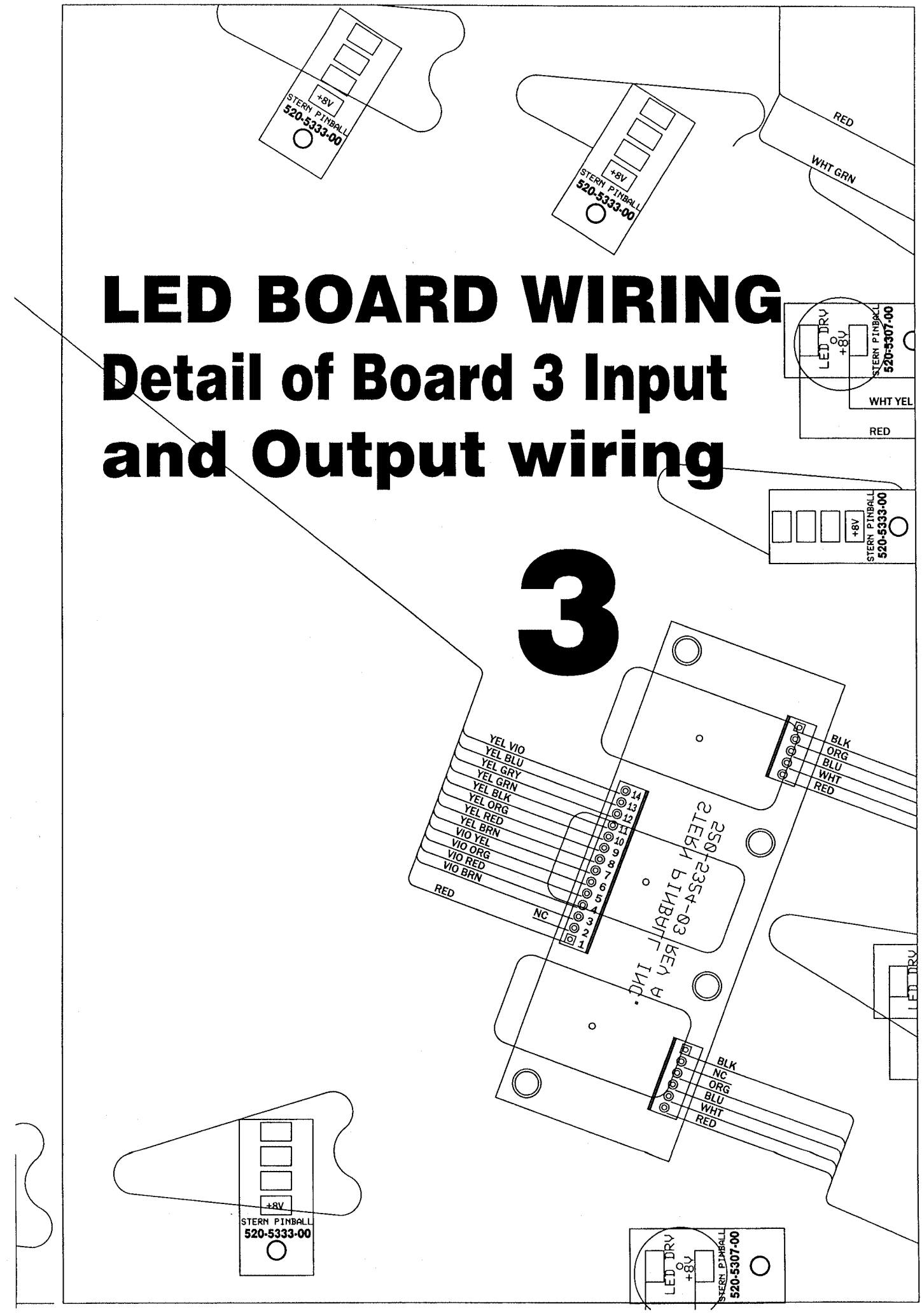
LED BOARD WIRING
Detail of Board 2 Input and Output wiring

Y22

LED BOARD WIRING

Detail of Board 3 Input and Output wiring

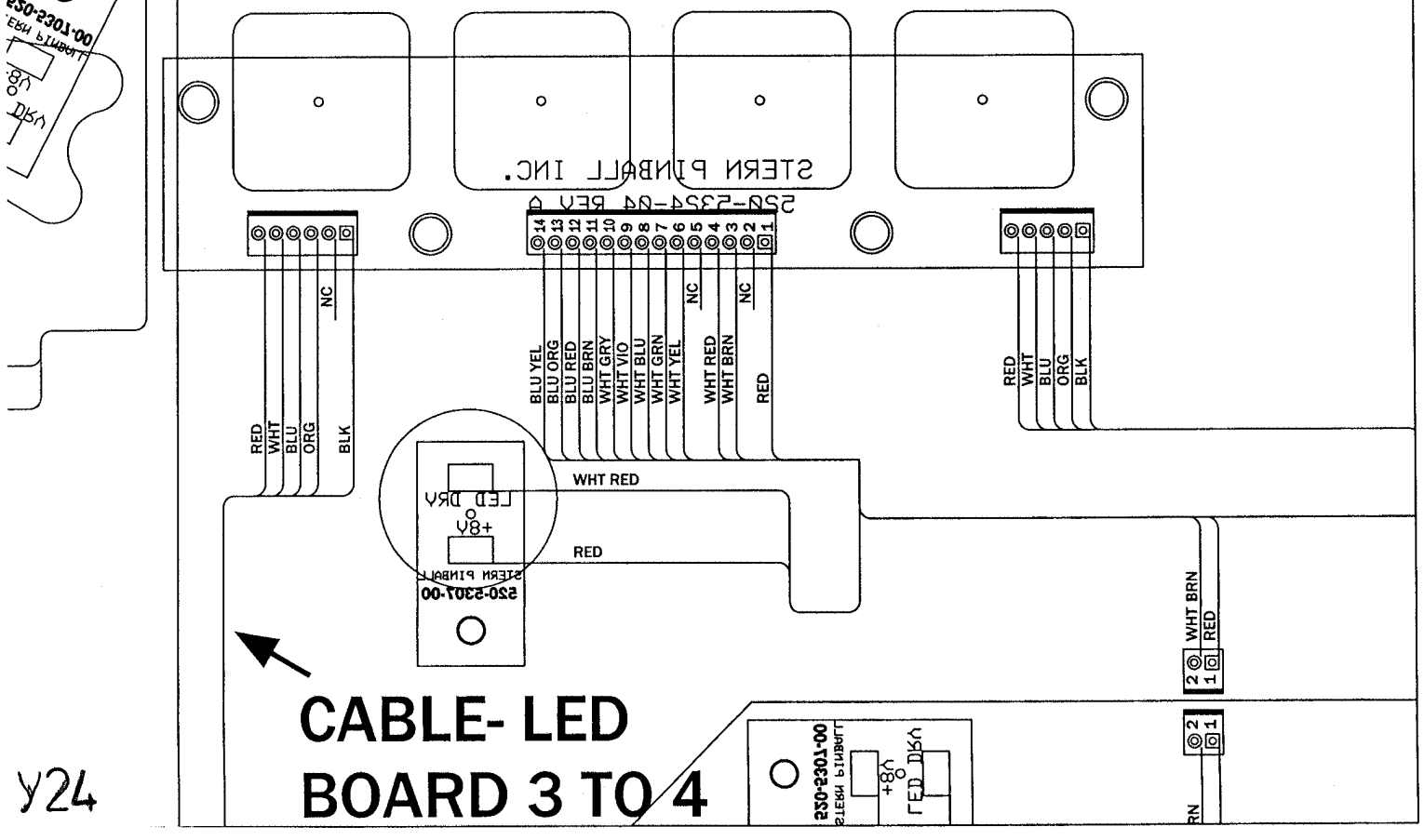
3



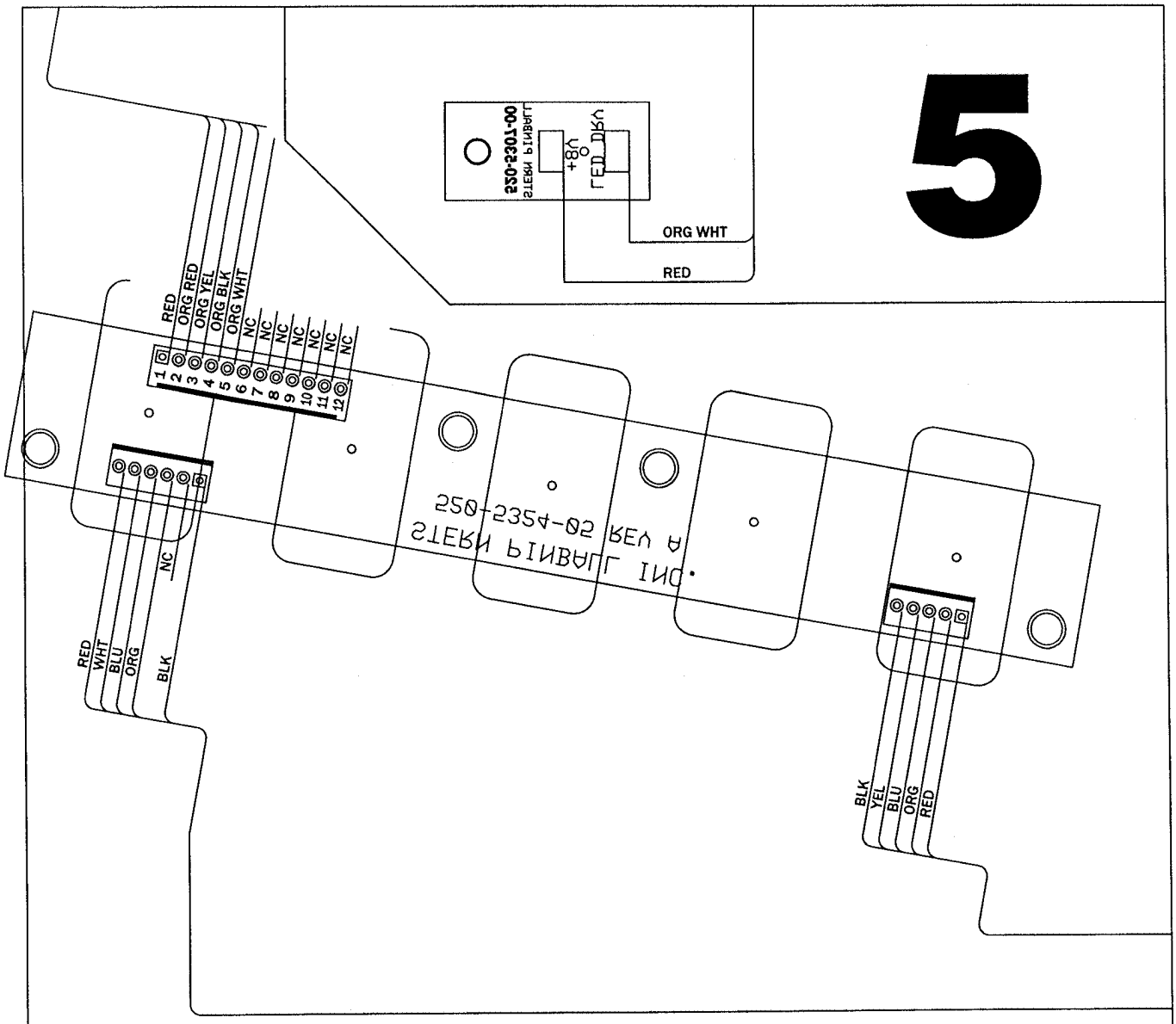
LED BOARD WIRING
Detail of Board 4 Input and Output wiring

CABLE- LED BOARD 4 C
036-5572-10-C4

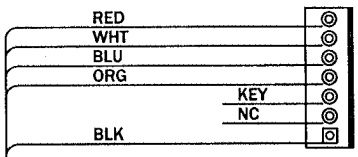
4



Y24



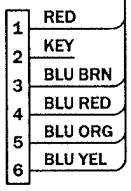
LED BOARD WIRING
Detail of Board 5 Input and Output wiring



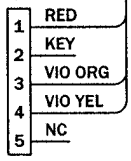
LED BOARD WIRING

Detail of Back panel, cabinet, and topper box connections

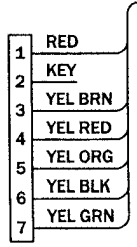
To future optional Topper box



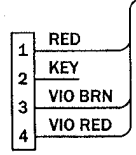
To future optional Topper box

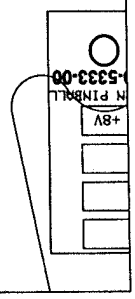


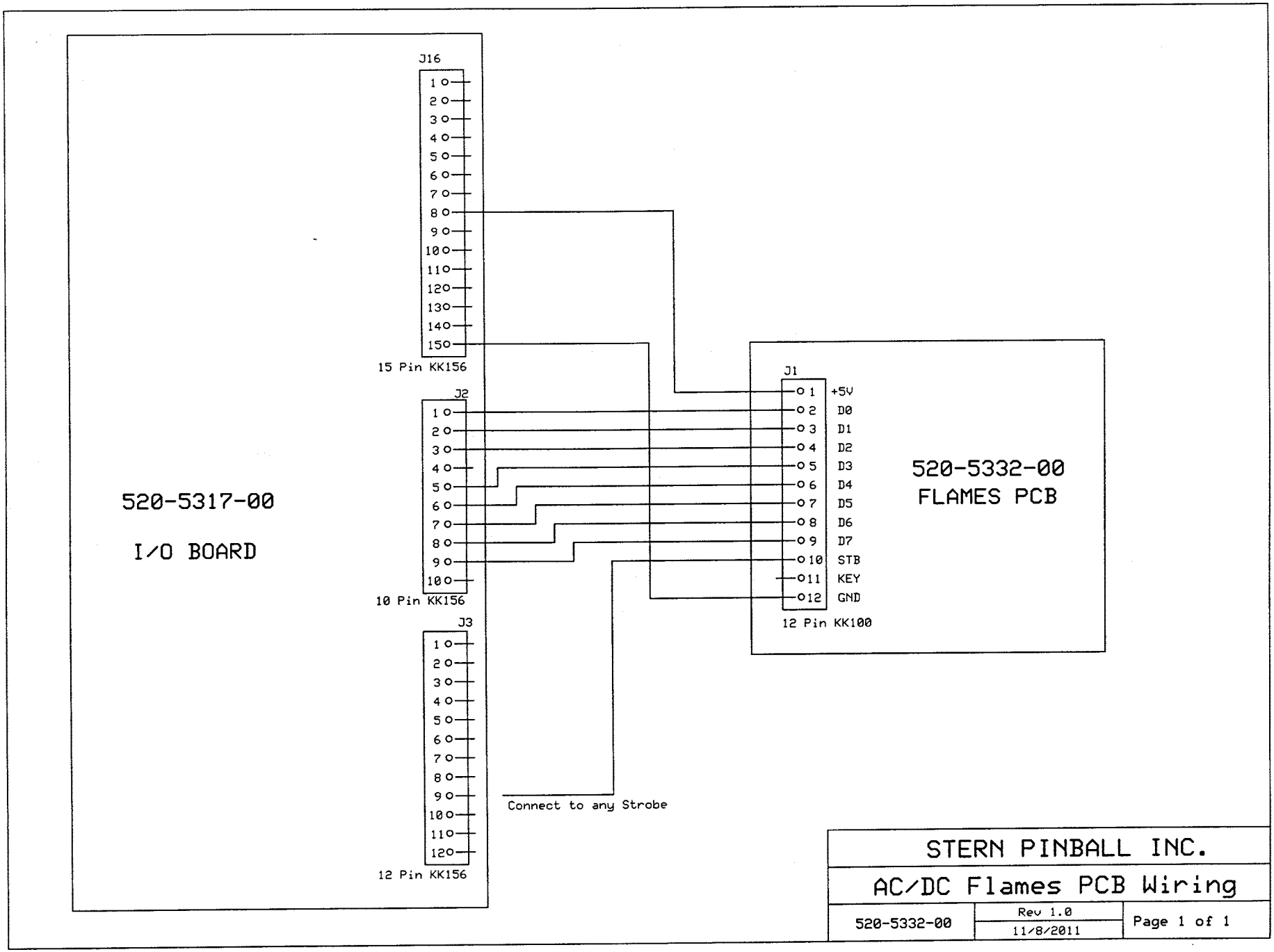
To Cabinet Cable



To Back Panel Cable



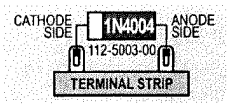




STERN PINBALL INC.		
AC/DC Flames PCB Wiring		
520-5332-00	Rev 1.0 11/8/2011	Page 1 of 1

LCA

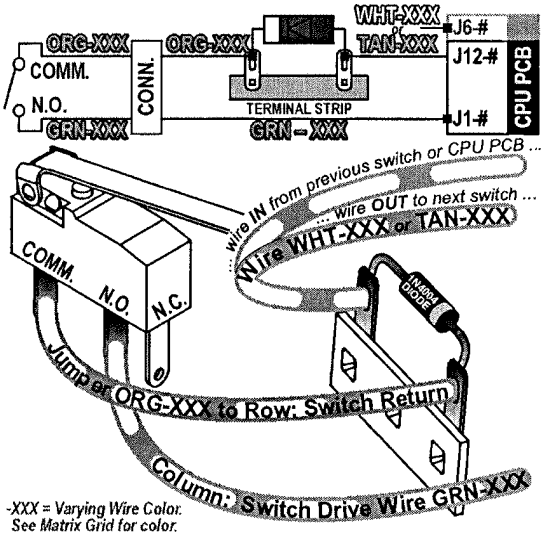
Playfield Terminal Strips



Explanation:
All Switches, Lamps & Coils require diodes. Coil diodes are located on the I/O Power Driver PCB *(in Backbox)*. Some diodes from switches *or* lamps are moved onto Terminal Strips (***located under the playfield)***. This is done where space constraints *or* excessive vibrations are present. *The Switch & Lamp Matrix Grids also note which Switch or Lamp has a diode on a Terminal Strip, noted by* ***DOTS*** *(**D**iode **O**n **T**erminal **S**trip).*

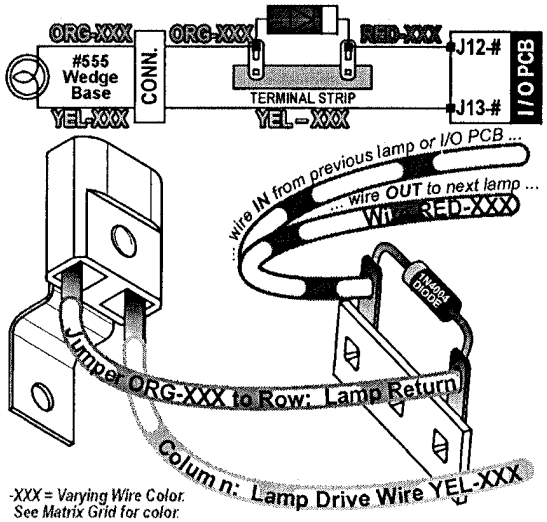
Note: *Some wires 'appear' to be doubled on the lugs. The switches and lamps are in a series, so you may see 1 or 2 wires depending where the switch or lamp is in the string.*

Typical Switch Wiring & Schematic
... with Switch Diode on a Terminal Strip (DOTS)



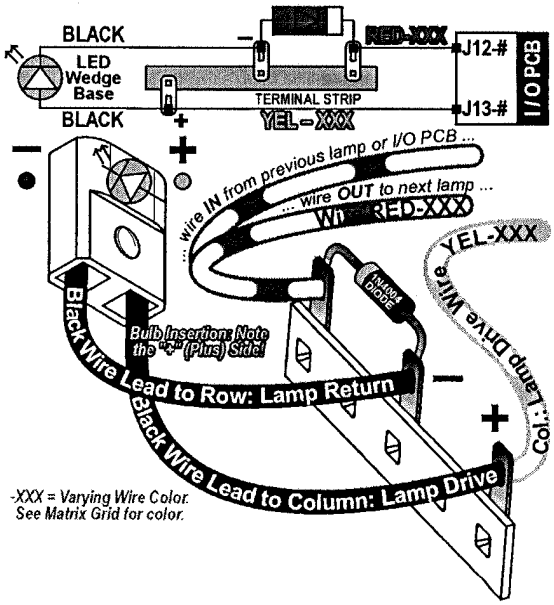
-XXX = Varying Wire Color.
See Matrix Grid for color.

Typical Lamp Wiring & Schematic
... with Lamp Diode on a Terminal Strip (DOTS)
Usually when a #555 Bulb is used as a Controlled Lamp for a Spot Light.



-XXX = Varying Wire Color.
See Matrix Grid for color.

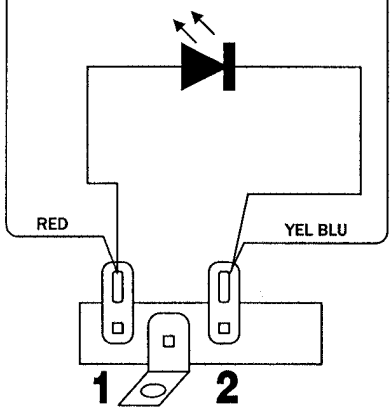
Typical Lamp Wiring & Schematic
... with Lamp Diode on a Terminal Strip (DOTS)
Usually when an LED Module is used as a Controlled Lamp for a Pop Bumper.

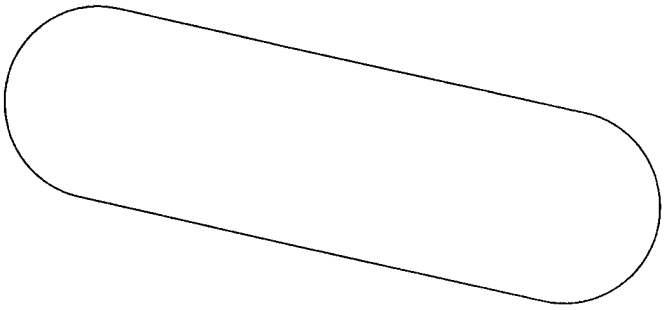


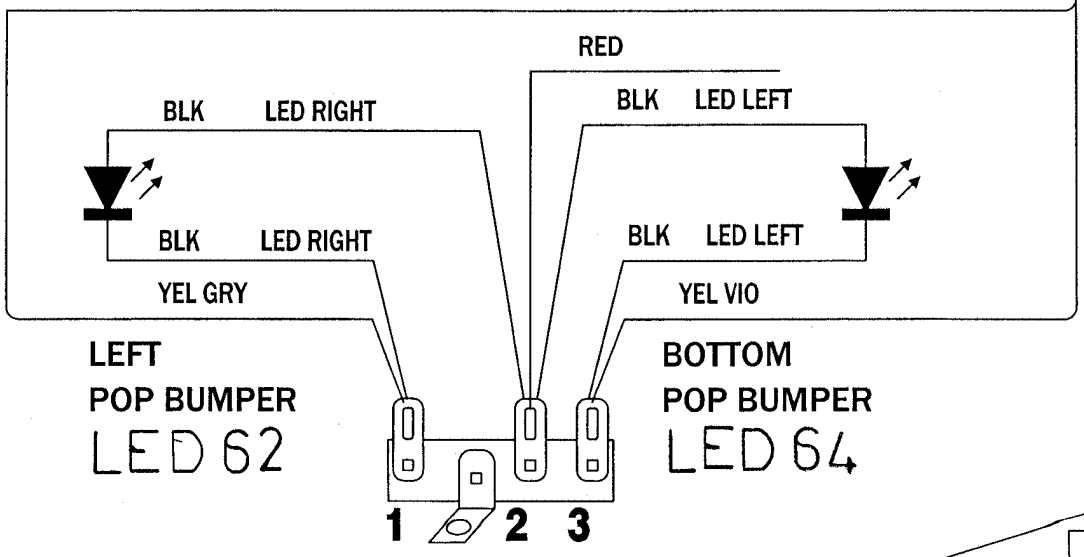
-XXX = Varying Wire Color.
See Matrix Grid for color.

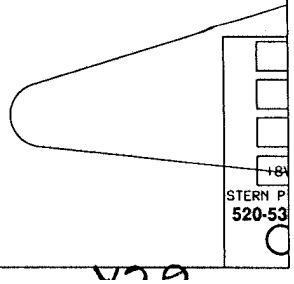
CABLE- LED BOARD 3 OUTPUTS
036-5572-09-C4

LED BOARD WIRING
Detail of Board Pop Bumper terminals

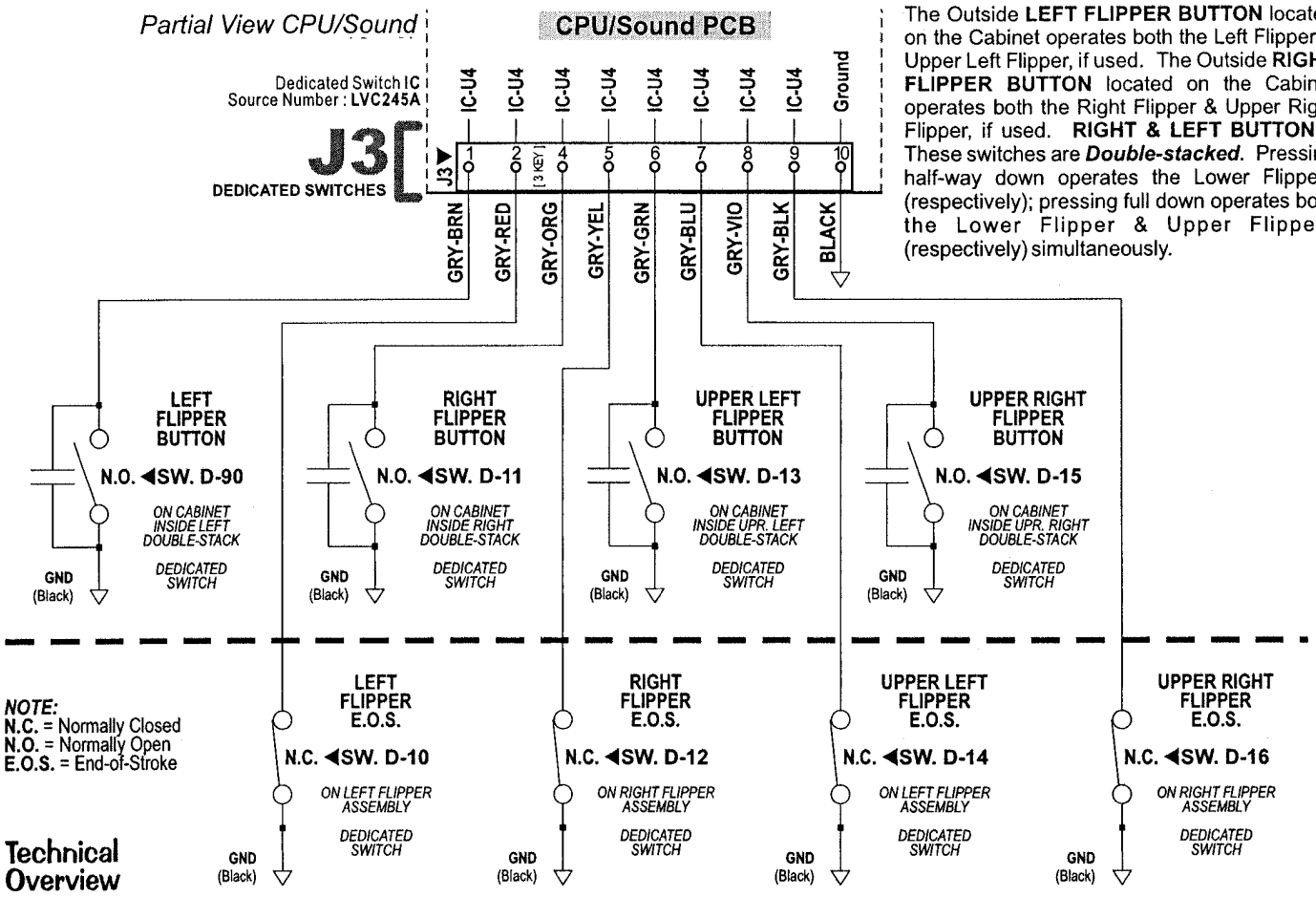








#-Flipper Circuit Wiring Diagram

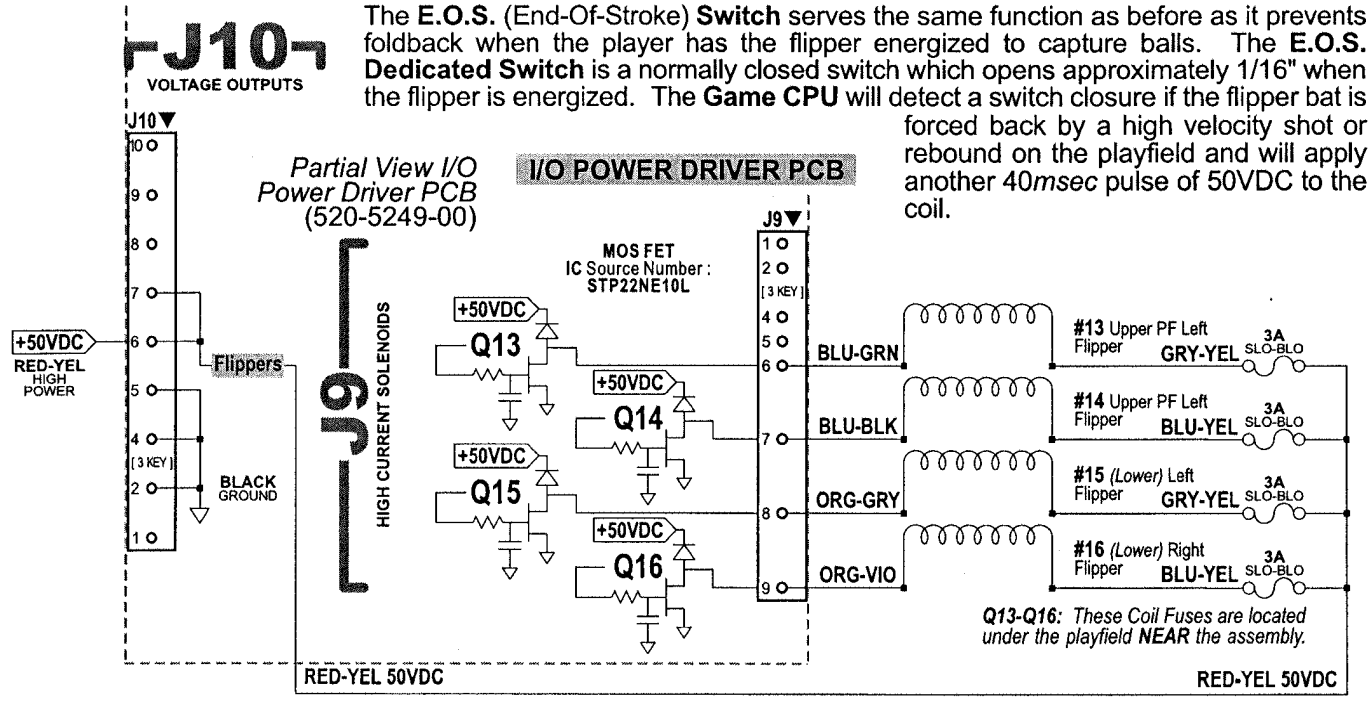


The Outside **LEFT FLIPPER BUTTON** located on the Cabinet operates both the Left Flipper & Upper Left Flipper, if used. The Outside **RIGHT FLIPPER BUTTON** located on the Cabinet operates both the Right Flipper & Upper Right Flipper, if used. **RIGHT & LEFT BUTTONS:** These switches are ***Double-stacked.*** Pressing half-way down operates the Lower Flippers (respectively); pressing full down operates both the Lower Flipper & Upper Flippers (respectively) simultaneously.

Technical Overview

Our ***Flipper System*** uses one supply voltage (+50VDC) for both ***kick*** & ***hold***. Once the **Game CPU** detects a Flipper Cabinet Switch closure *(during game play)* it applies a 40*msec* pulse to the gate of the Flipper Drive Transistor (STP22NE10L). If it continues to detect a Flipper Cabinet Switch closure *(the player holding the button in)* it will continue to pulse the flipper drive transistor 1*msec* every 12*msecs* for the duration of the hold cycle.

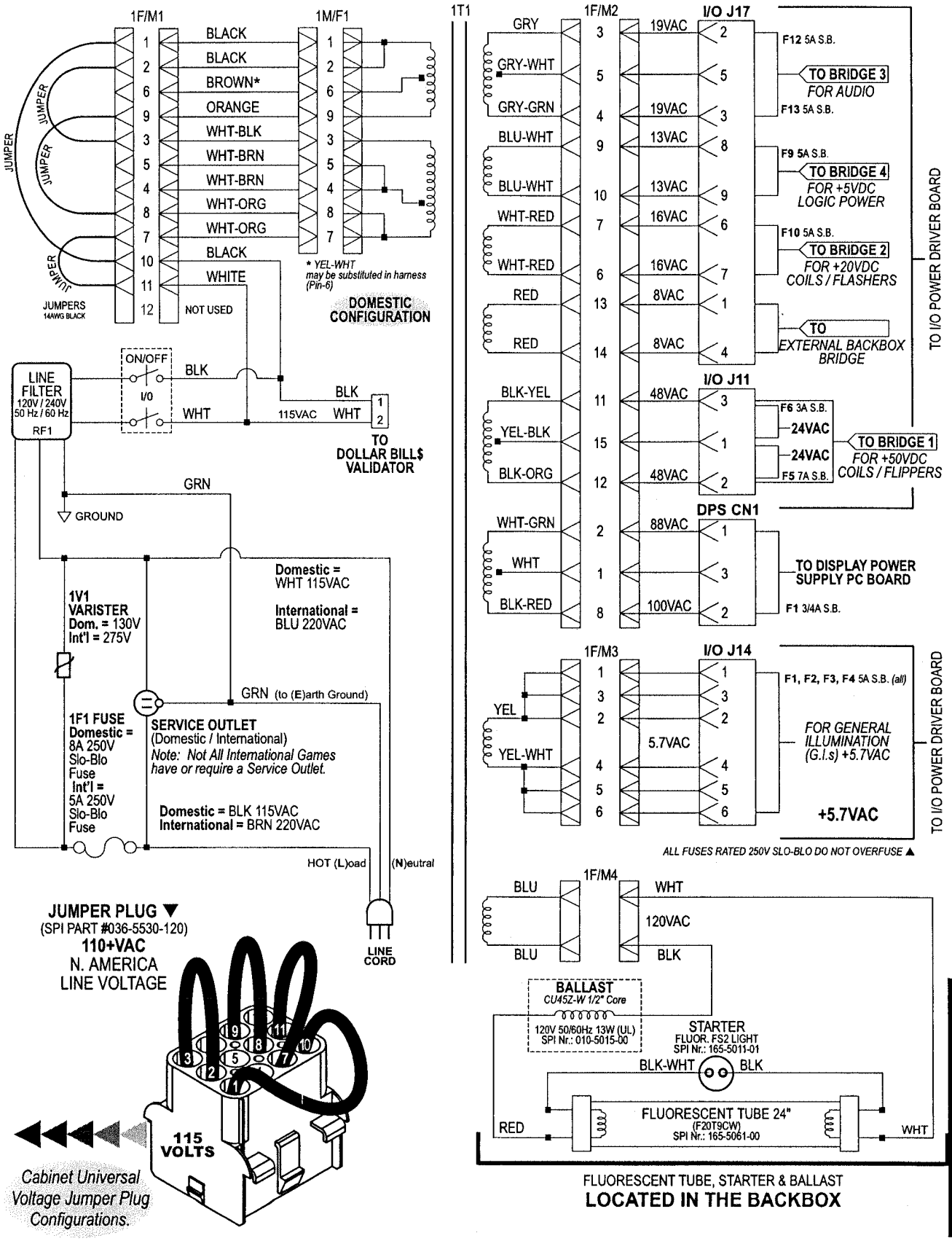
The **E.O.S.** (End-Of-Stroke) **Switch** serves the same function as before as it prevents foldback when the player has the flipper energized to capture balls. The **E.O.S. Dedicated Switch** is a normally closed switch which opens approximately 1/16" when the flipper is energized. The **Game CPU** will detect a switch closure if the flipper bat is forced back by a high velocity shot or rebound on the playfield and will apply another 40*msec* pulse of 50VDC to the coil.



Typical Under-Playfield Fuses are rated:
3A 250v Slo-Blo
Do Not Over-Fuse

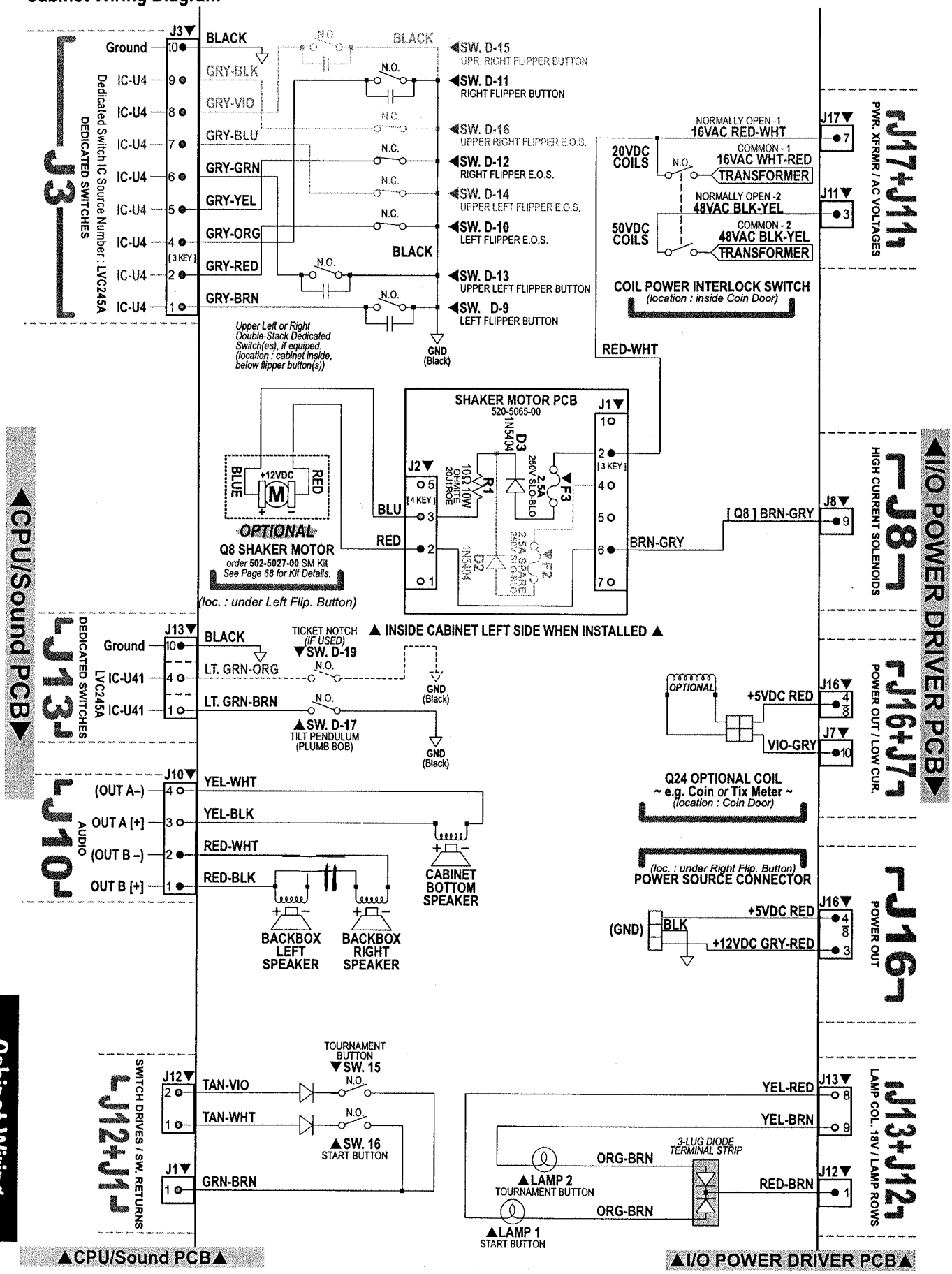
NOTe:
Coil Diodes (1N4004) are integrated on the I/O Power Driver PCB. See Coils Detailed Wiring Diagram for actual number of flippers used on this game.

Transformer Power Wiring Diagram



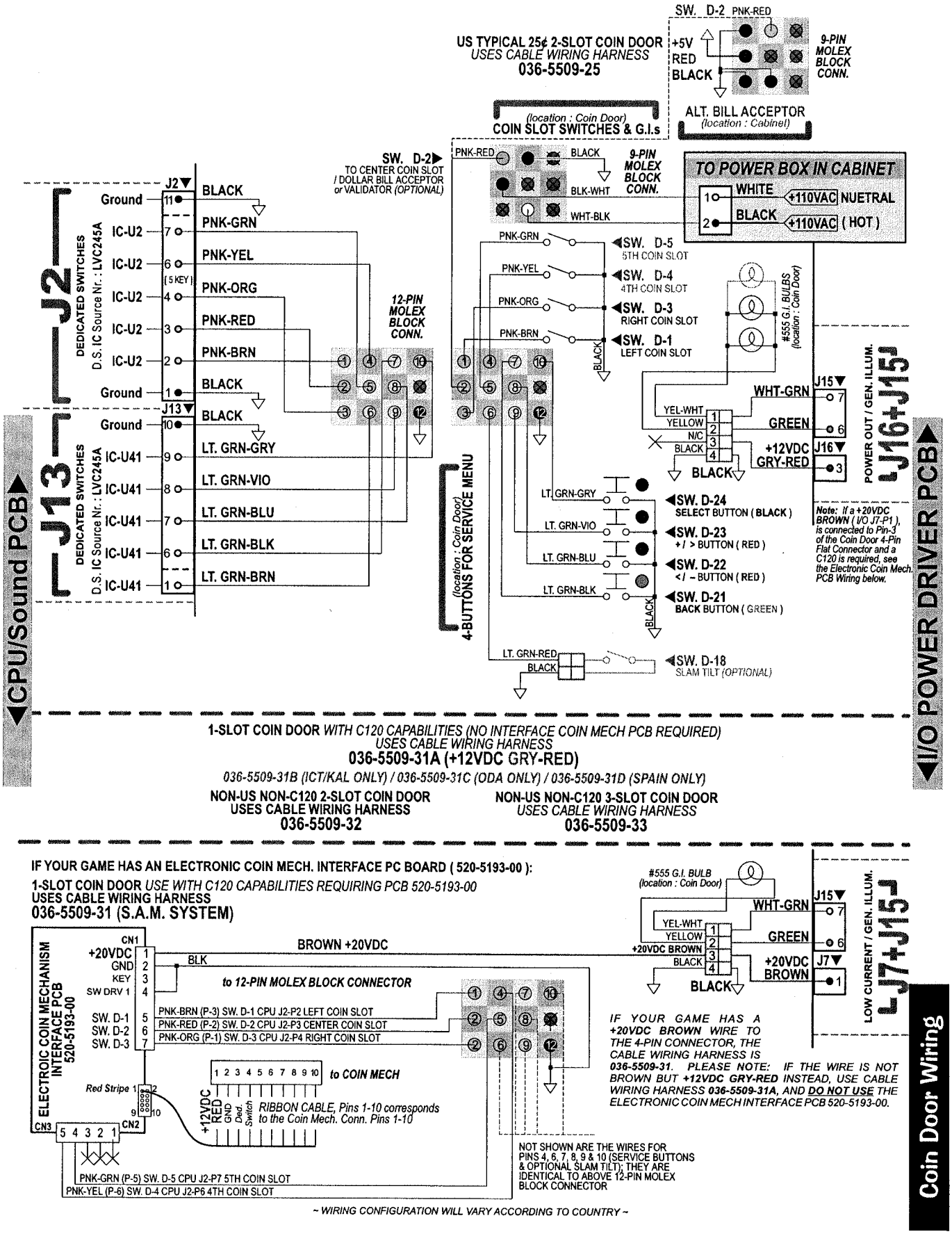
Cabinet and Coin Door Wiring

Cabinet Wiring Diagram



Cabinet and Coin Door Wiring

Coin Door Wiring Diagram



1-SLOT COIN DOOR *WITH C120 CAPABILITIES (NO INTERFACE COIN MECH PCB REQUIRED)*
USES CABLE WIRING HARNESS
036-5509-31A (+12VDC GRY-RED)

036-5509-31B (ICT/KAL ONLY) / 036-5509-31C (ODA ONLY) / 036-5509-31D (SPAIN ONLY)

NON-US NON-C120 2-SLOT COIN DOOR
USES CABLE WIRING HARNESS
036-5509-32

NON-US NON-C120 3-SLOT COIN DOOR
USES CABLE WIRING HARNESS
036-5509-33

IF YOUR GAME HAS AN ELECTRONIC COIN MECH. INTERFACE PC BOARD (520-5193-00):

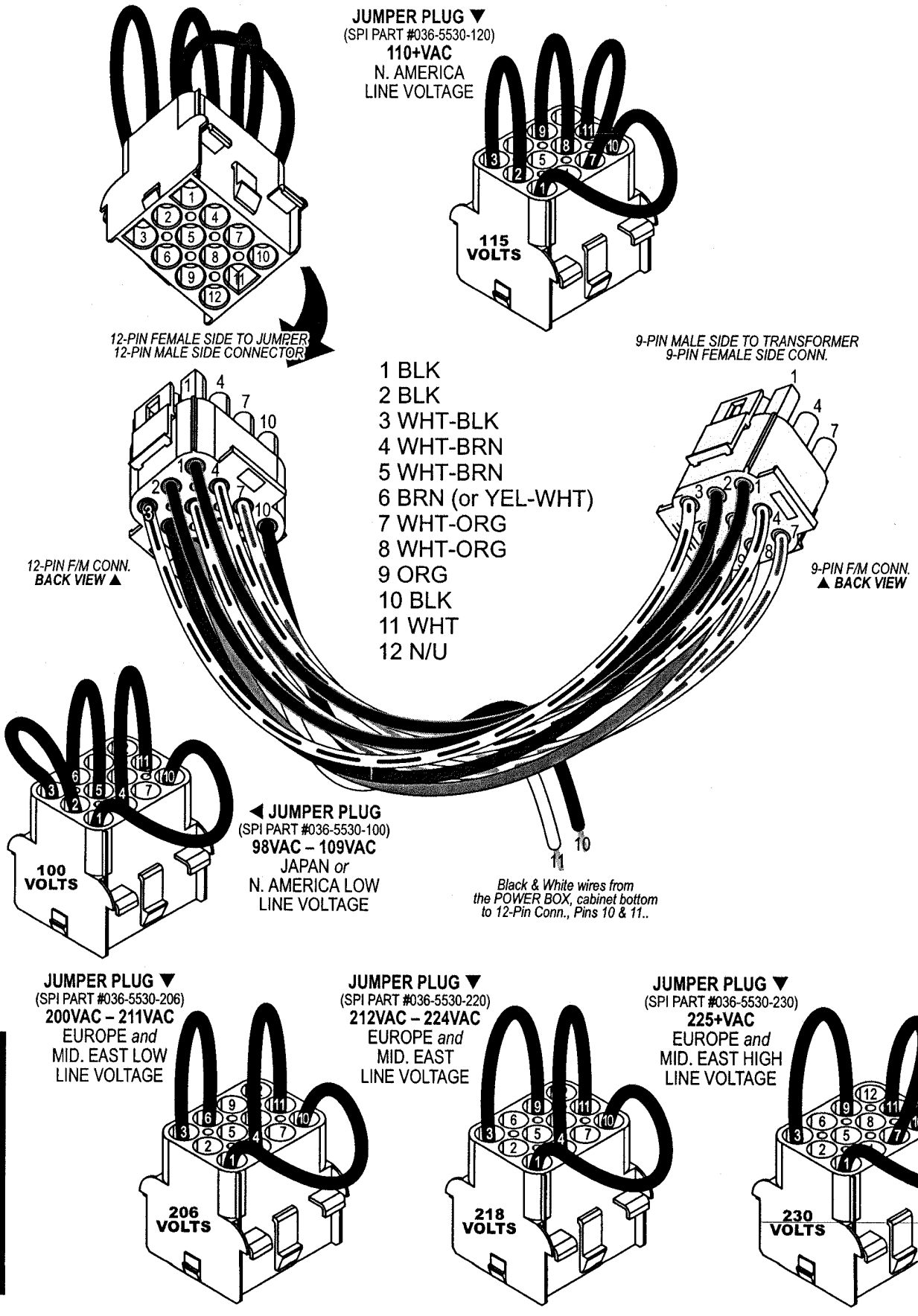
1-SLOT COIN DOOR *USE WITH C120 CAPABILITIES REQUIRING PCB 520-5193-00*
USES CABLE WIRING HARNESS
036-5509-31 (S.A.M. SYSTEM)

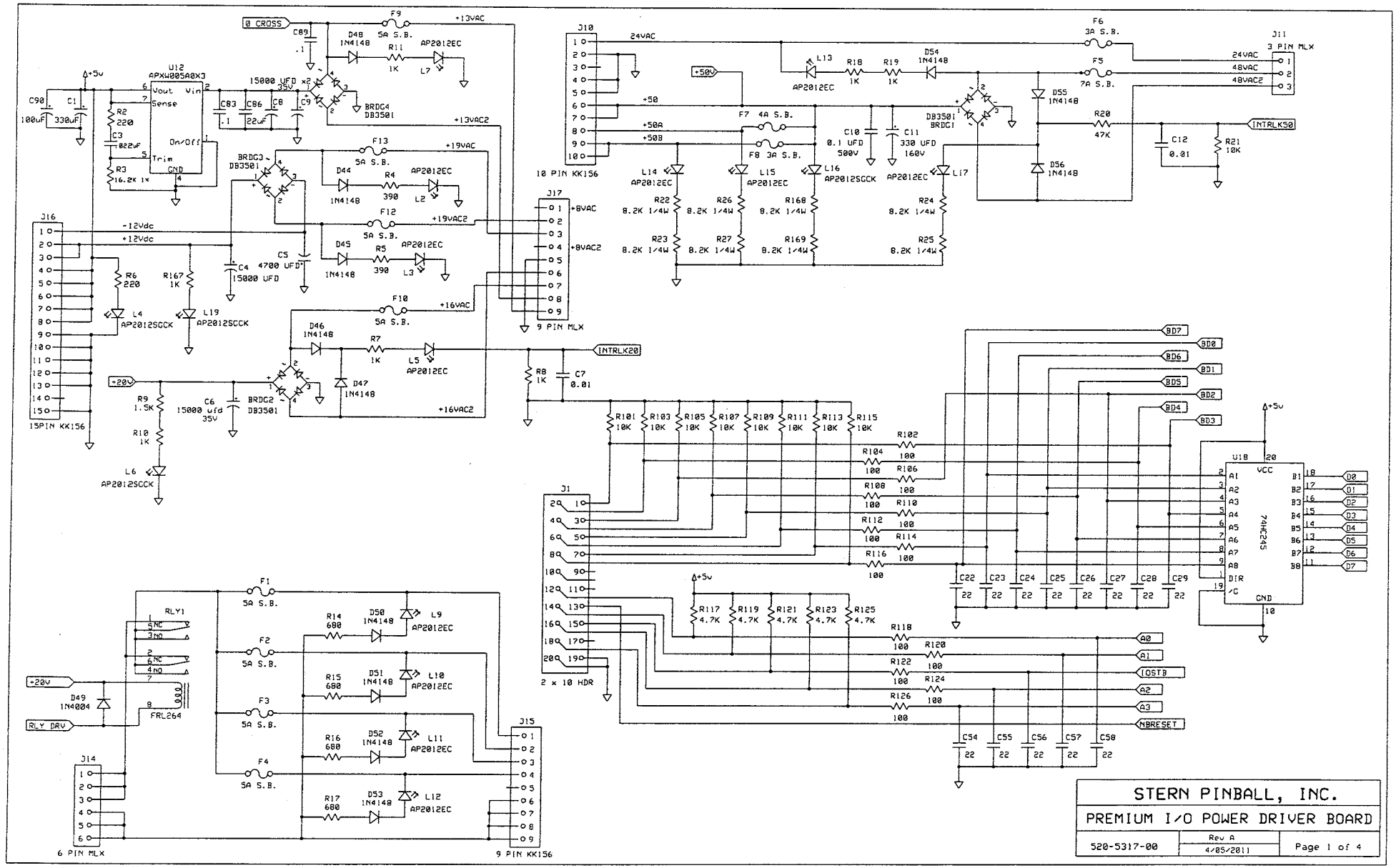
*IF YOUR GAME HAS A **+20VDC BROWN** WIRE TO THE 4-PIN CONNECTOR, THE CABLE WIRING HARNESS IS **036-5509-31**. PLEASE NOTE: IF THE WIRE IS NOT BROWN BUT **+12VDC GRY-RED** INSTEAD, USE CABLE WIRING HARNESS **036-5509-31A**, AND **DO NOT USE** THE ELECTRONIC COIN MECH INTERFACE PCB 520-5193-00.*

~ WIRING CONFIGURATION WILL VARY ACCORDING TO COUNTRY ~

Cabinet and Coin Door Wiring

Cabinet Universal Voltage Jumper Plugs *(for use with Universal AC Cable, 036-5530-00 ONLY)*

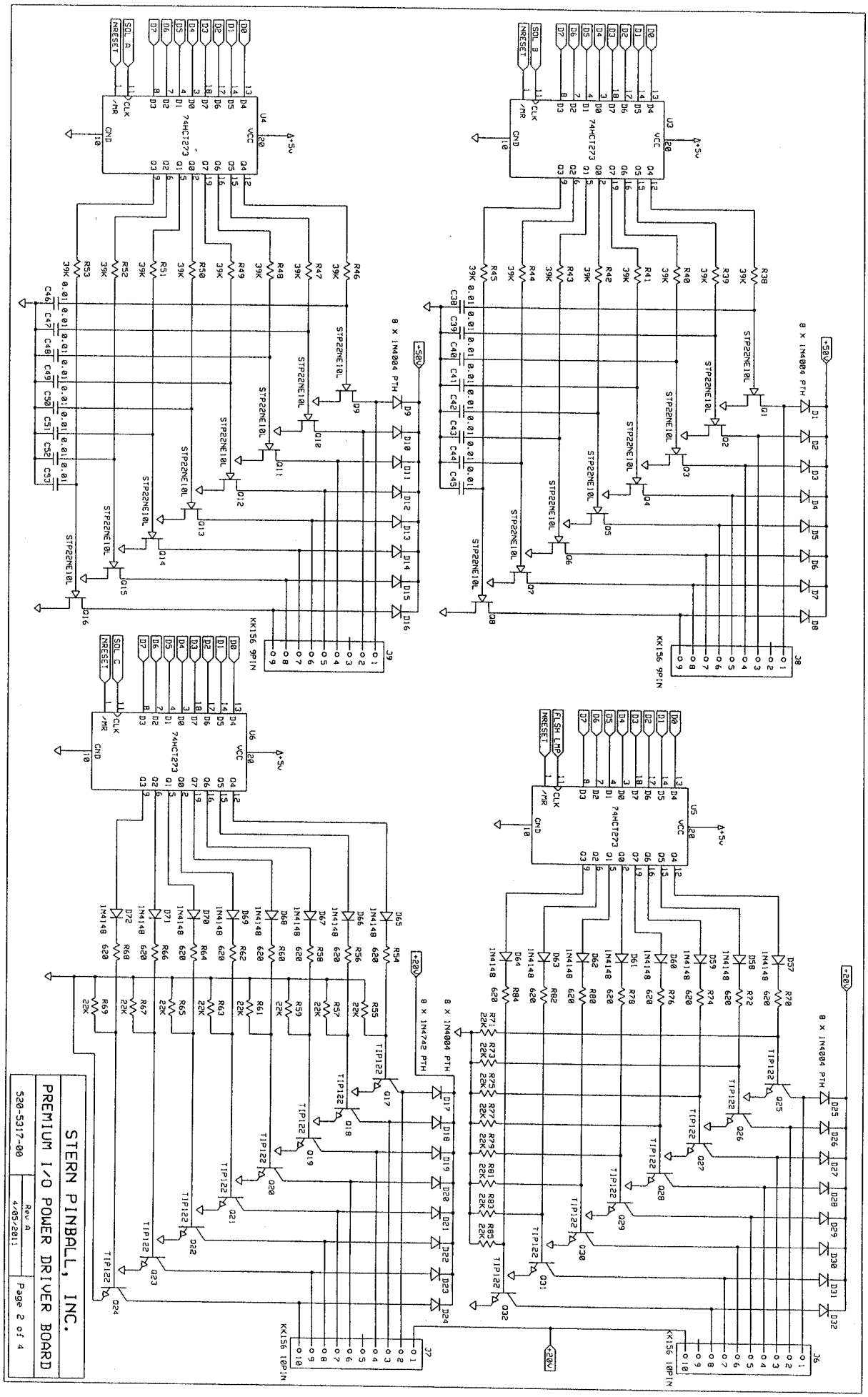


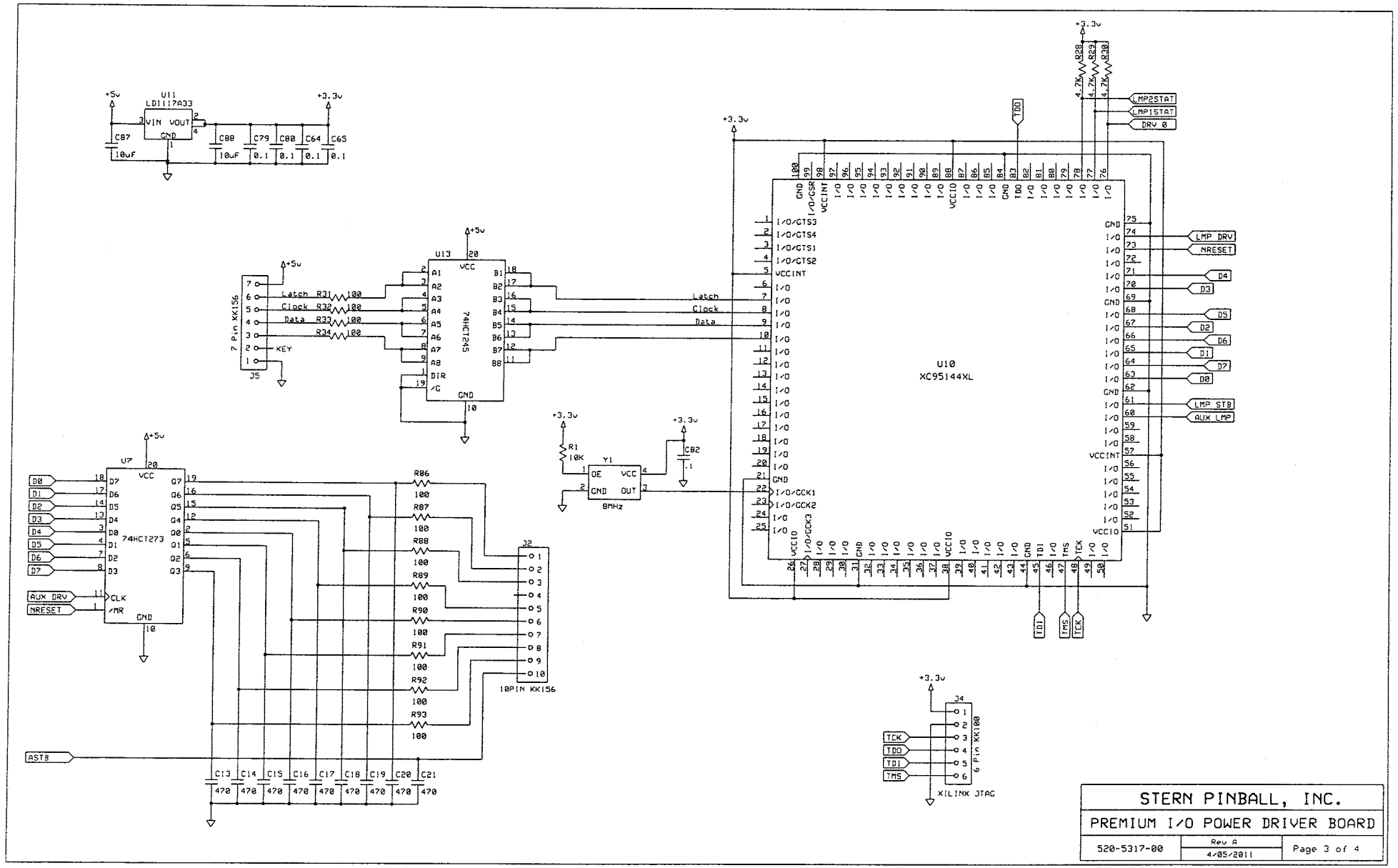


STERN PINBALL, INC.

PREMIUM I/O POWER DRIVER BOARD

520-5317-00	Rev A 4/05/2011	Page 1 of 4


STERN PINBALL, INC.
PREMIUM I/O POWER DRIVER BOARD
520-5317-00
Rev A
4-05-2011
Page 2 of 4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LD1117A33
VIN
VOUT
GND
C87
10uF
C88
10uF
C79
0.1
C80
0.1
C64
0.1
C65
0.1
+5v
+3.3v
U13
74HCT245
VCC
GND
DIR
/G
A1
A2
A3
A4
A5
A6
A7
A8
B1
B2
B3
B4
B5
B6
B7
B8
Latch R31 100
Clock R32 100
Data R33 100
R34 100
KEY
J5
7 Pin KK156
Latch
Clock
Data
U10
XC95144XL
TDO
TDI
TMS
TCK
LMP2STAT
LMP1STAT
DRV 0
LMP DRV
NRESET
D4
D3
D5
D2
D6
D1
D7
D0
LMP STB
AUX LMP
R28 4.7K
R29 4.7K
R30 4.7K
U7
74HCT273
D0
D1
D2
D3
D4
D5
D6
D7
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
CLK
/MR
AUX DRV
NRESET
R86 100
R87 100
R88 100
R89 100
R90 100
R91 100
R92 100
R93 100
J2
10PIN KK156
AST8
C13 470
C14 470
C15 470
C16 470
C17 470
C18 470
C19 470
C20 470
C21 470
R1 10K
Y1
OE
VCC
GND
OUT
8MHz
C82 .1
J4
6 Pin KK100
XILINX JTAG
STERN PINBALL, INC.
PREMIUM I/O POWER DRIVER BOARD
520-5317-00
Rev A
4/05/2011
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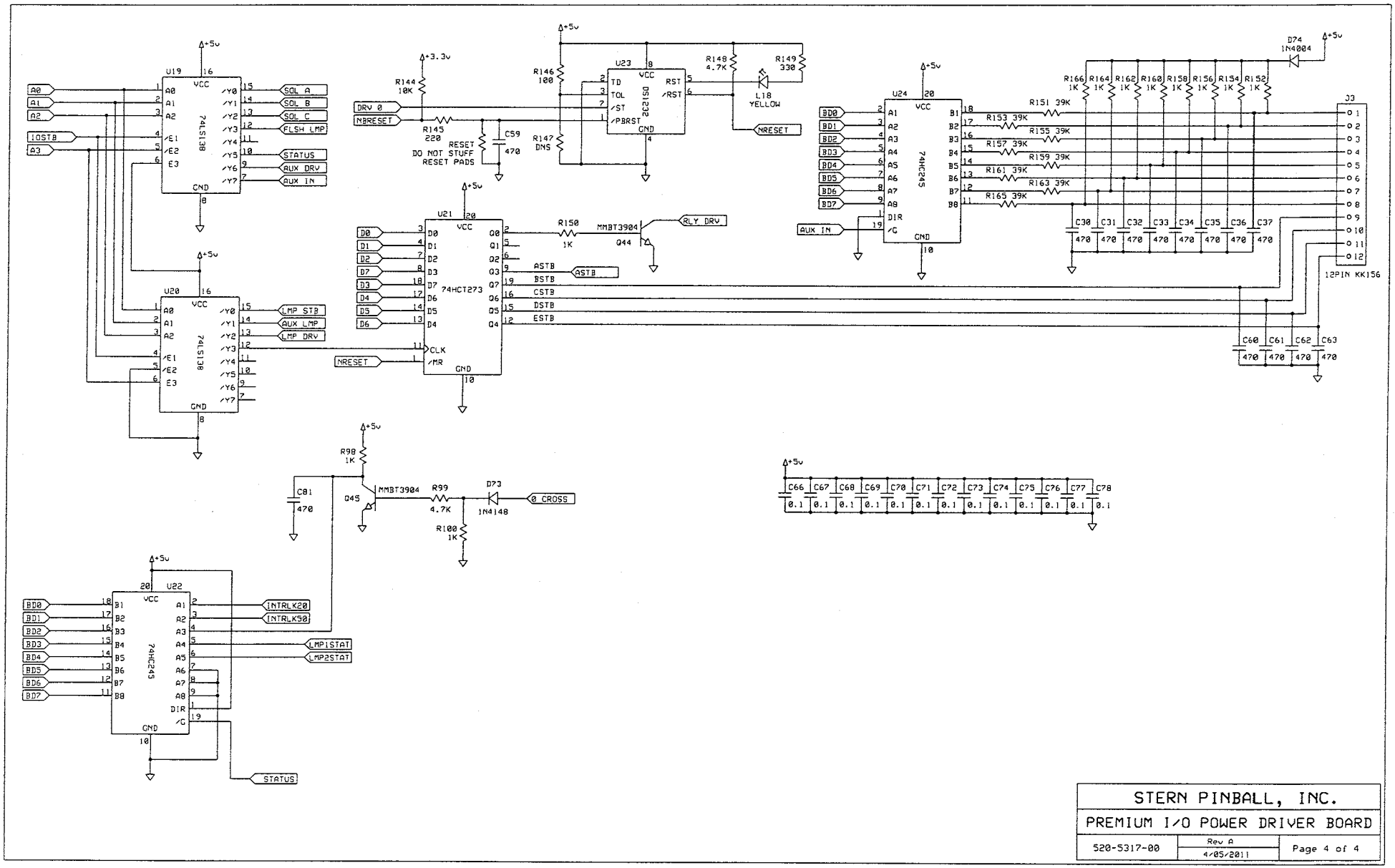
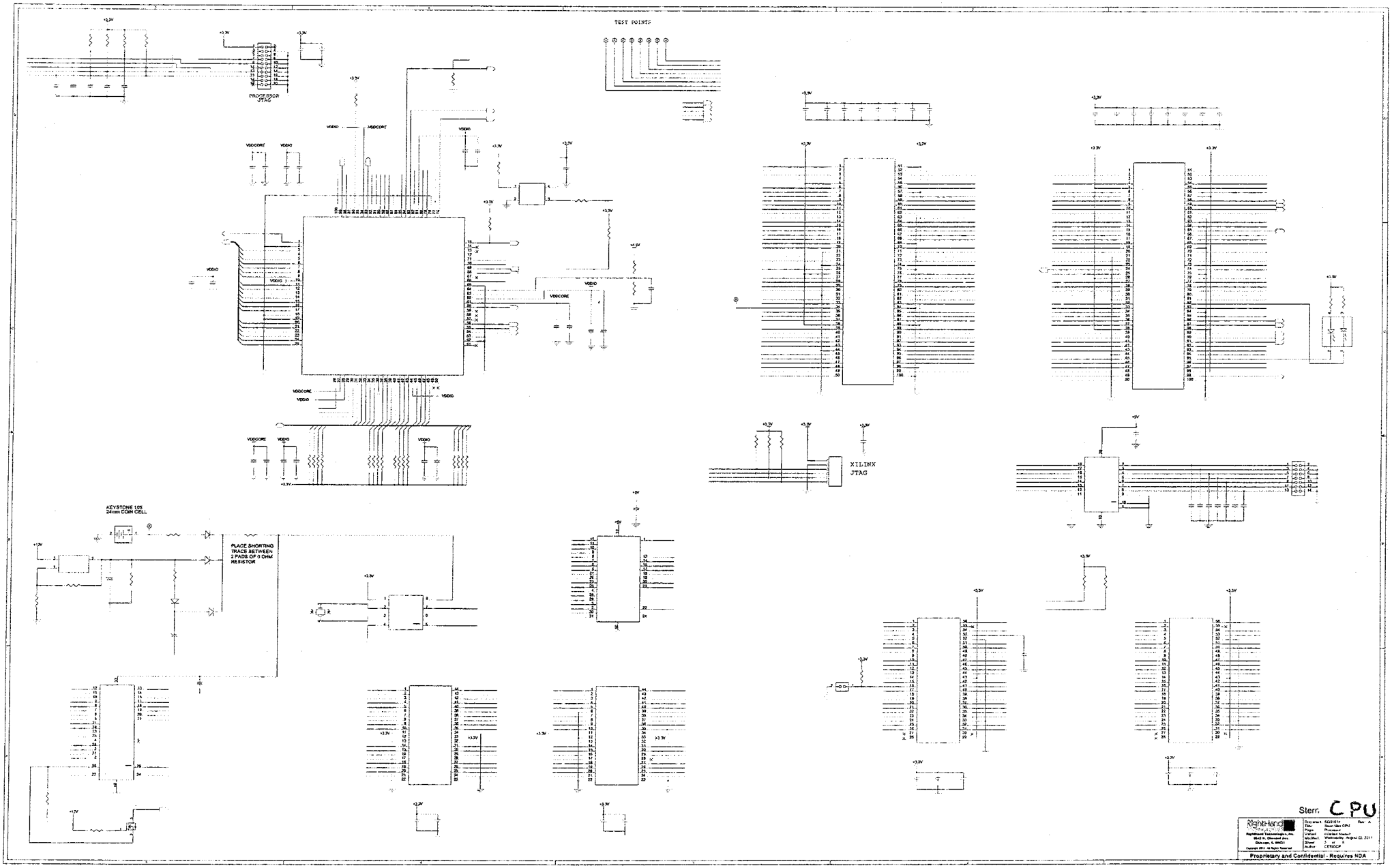
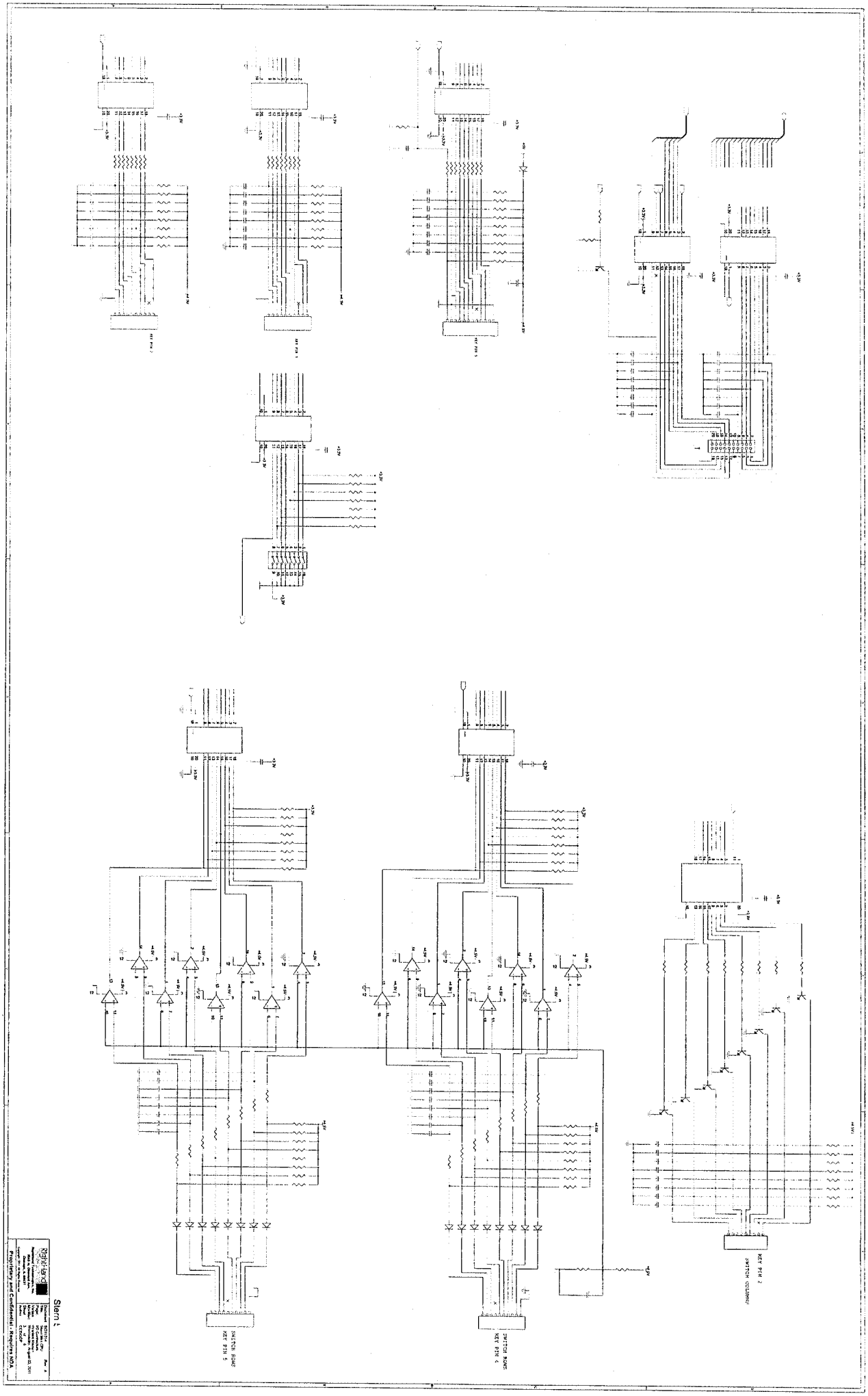
V27

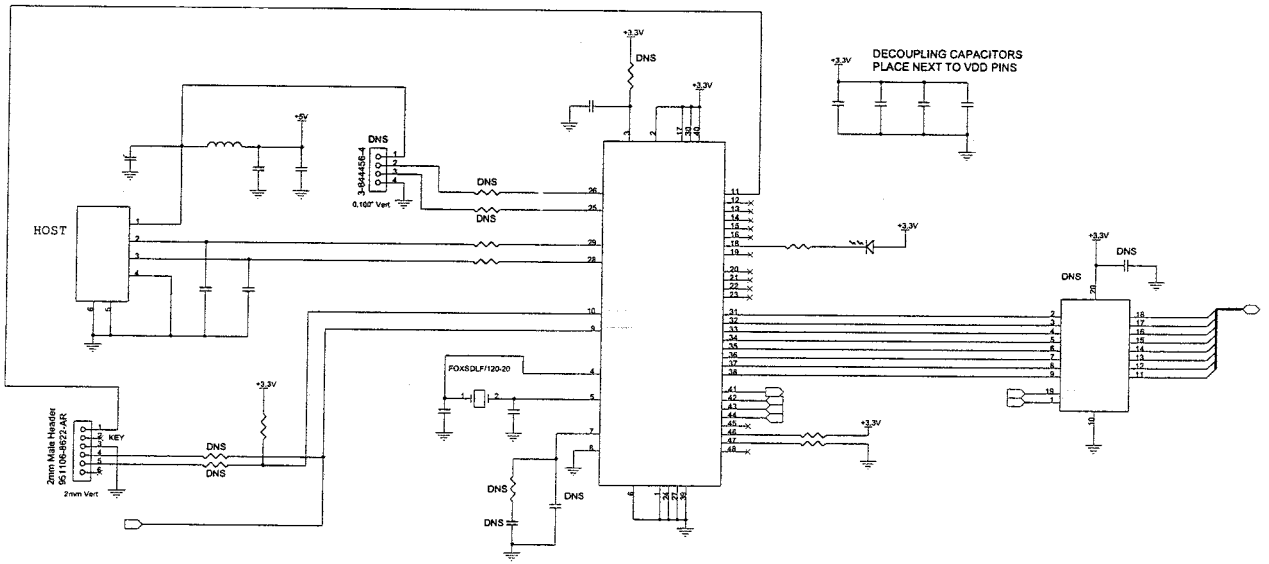

STERN PINBALL, INC.
PREMIUM I/O POWER DRIVER BOARD
520-5317-00
Rev A
4/05/2011
Page 4 of 4

A38


TEST POINTS
PROCESSOR JTAG
XILINX JTAG
KEYSTONE 105
24mm COIN CELL
PLACE SHORTING TRACE BETWEEN 2 PADS OF 0 OHM RESISTOR
Sterr. CPU
Proprietary and Confidential - Requires NDA

V29





Stern

RightHand Technologies, Inc.
6045 N. Olmsted Ave.
Chicago, IL 60631

Document: SCH1014 Rev: A
Title: Stern Mini CPU
Page: USB
Variant: <Variant Name>
Modified: Wednesday, August 03, 2011
Sheet: 4 of 6
Author: CES/GCP

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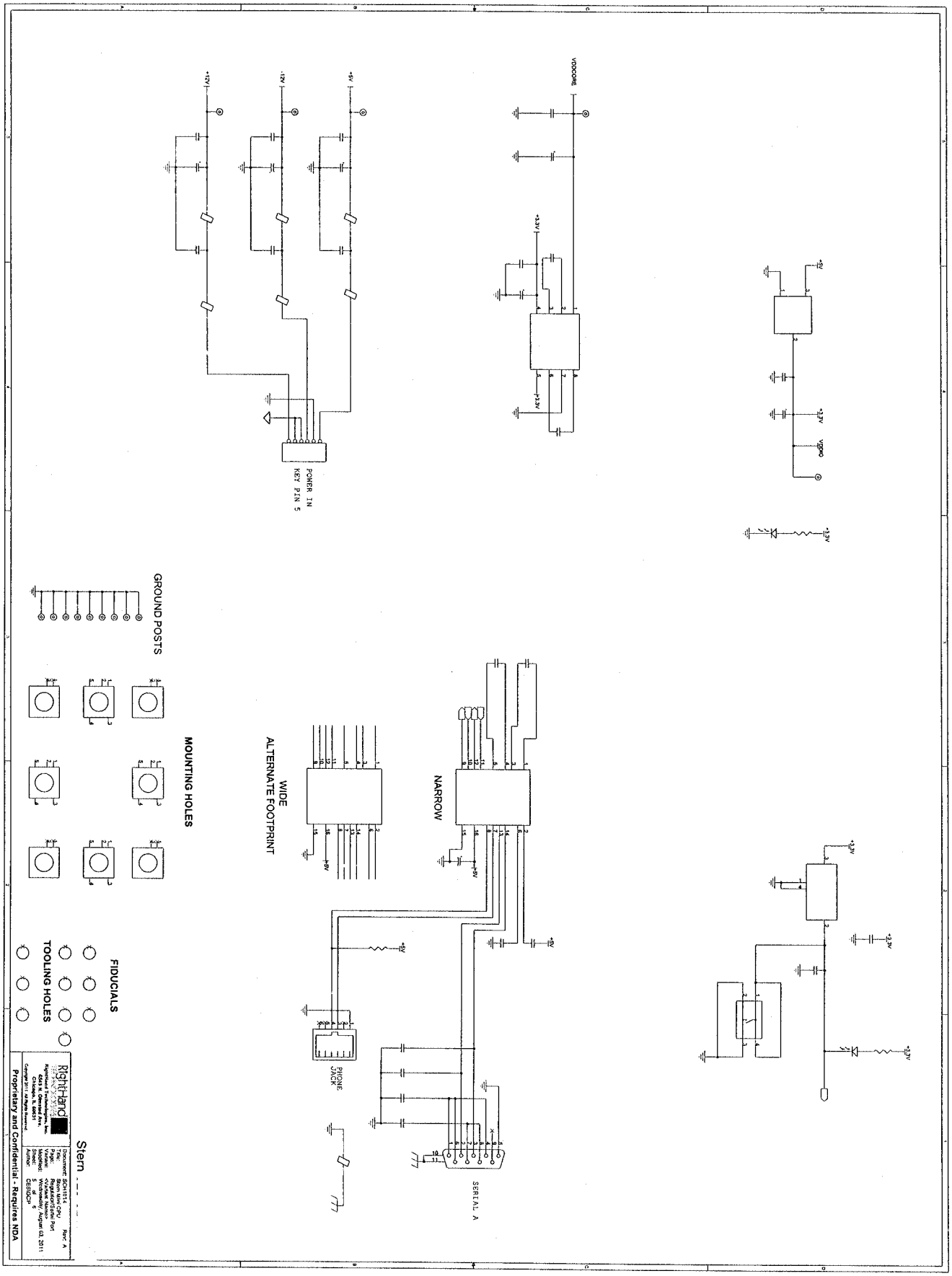
V1A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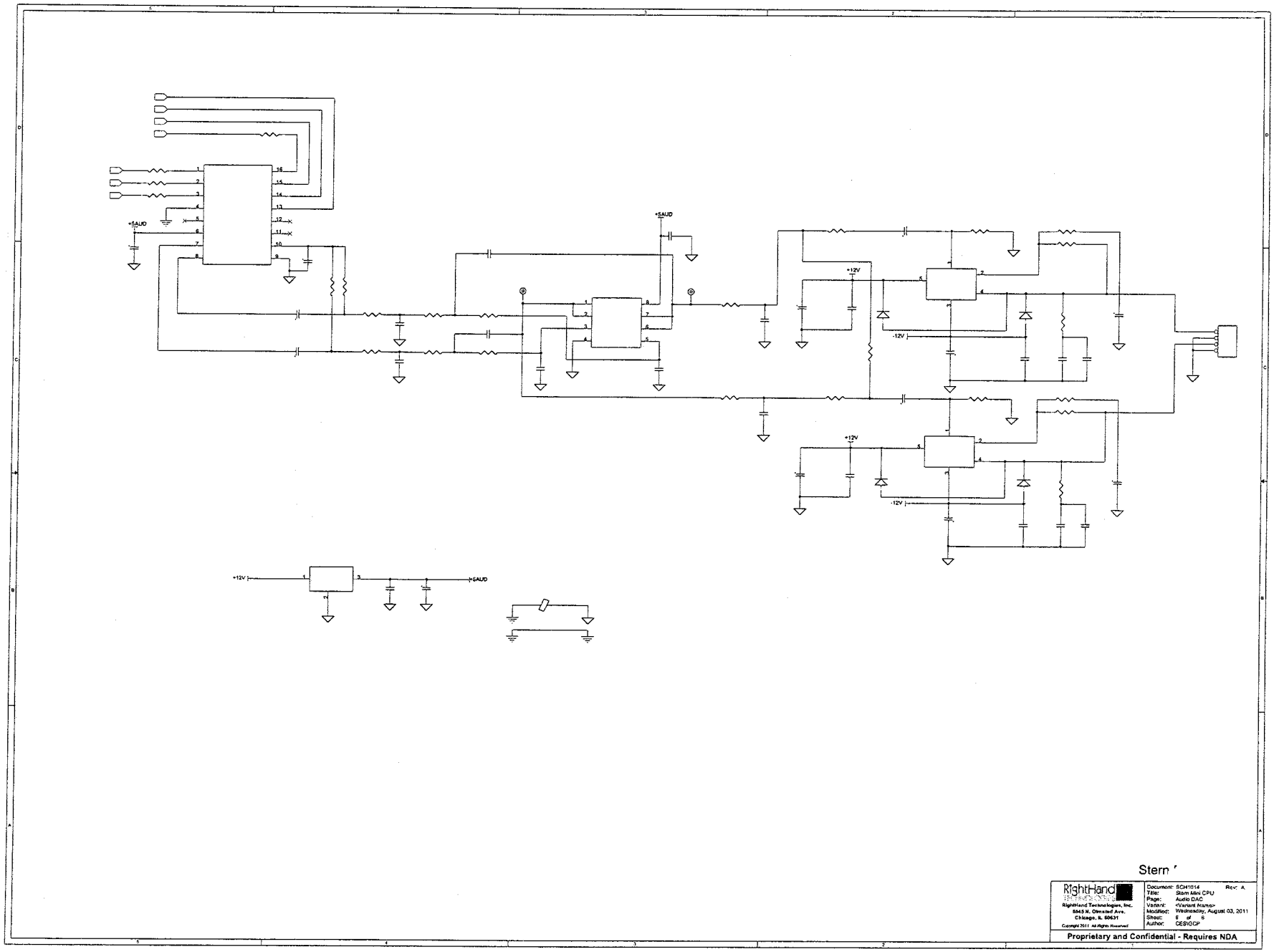
+5V
POWER IN
KEY PIN 5
+3.3V
VGPIO
GROUND POSTS
MOUNTING HOLES
WIDE
ALTERNATE FOOTPRINT
NARROW
PHONE
JACK
SERIAL A
TOOLING HOLES
FIDUCIALS
Stern
Proprietary and Confidential - Requires NDA

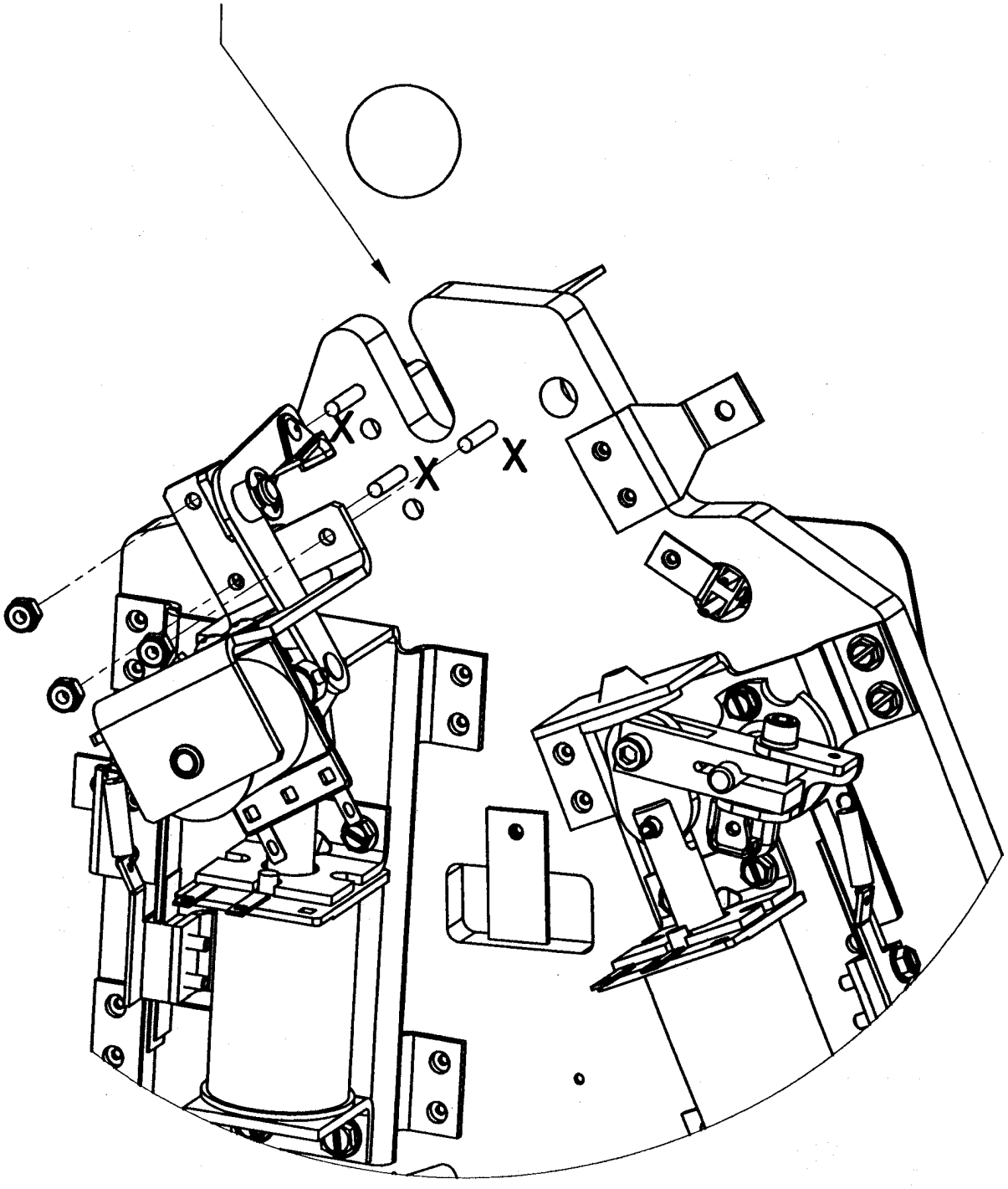
VI.2


+5AUD
+12V
-12V
Stern
RightHand Technologies, Inc.
8045 N. Olmsted Ave.
Chicago, IL 60631
Copyright 2011 All Rights Reserved
Document: SCH1014 Rev: A
Title: Stern Mini CPU
Page: Audio DAC
Variant: <Variant Name>
Modified: Wednesday, August 03, 2011
Sheet: 6 of 6
Author: CES\GCP
Proprietary and Confidential - Requires NDA

ATTENTION

REMOVE 3 NUTS MARKED "X" ON BACK OF LOWER PLAYFIELD AND REMOVE BALL EJECTOR UNIT.

INSERT 1 BALL, REPLACE EJECTOR UNIT AND TIGHTEN 3 NUTS CAREFULLY.



VI.1.