OPERATING / SERVICE / PARTS MANUAL

SKILL CRANE
DOUBLE SKILL CRANE
TRIPLE SKILL CRANE

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Skill Crane
Double Skill Crane
Triple Skill Crane

OPERATING INSTRUCTIONS

ADDENDUM

Features:

The ETI microprocessor controlled Super Crane board offers many added features to the Super Crane, among which are skill control of the crane, and sound. Through switch selection, six different combinations of games can be offered to the customer. These are explained in detail at the end of this document.

Some additional functions and features have been added for security of the device. These are monitoring of the coin-in switch for "stringing", and prize chute security to prevent an unauthorized intrusion, each of which will sound en alarm and light the award beacon.

During a power failure, the microprocessor will retain, in most cases, the credits remaining for up to one hour.

Optional enhacements include a Dollar Bill acceptor, 2nd Coin acceptor, Winner Light, Joy Stick control, and Tocket Dispenser. The system has been designed for additional inputs and outputs to adapt to future options and requirements.

Game Operation:

At the time a coin or coins are inserted, the forward light blinks, and the credit/timer displays the number of game credits accumulated. A maximum of 20 credits are allowed before the coin-lockout is activated.

The Game is initiated by pushing the forward or Lateral play buttons or if the optional joy stick is installed the "Drop claw" button (which is the button on top of the joy stick).

Standard Game:

This selection retains all the features of the original game with push-buttons and allows the operator to optionally run the game till the timer has expired. The beginning of the game starts when either the forward or right buttons are depressed.
At time the motor sound begins as well as the timer starts its countdown phase.
Crane movement can start by pressing either button.
When both buttons have been pressed the crane will lower and attempt to pick-up a prize and return to the home position automatically.

Joy Stick Control:

This option enhances the Super Crane by allowing the customer control over the movement of the crane. In this mode, the crane motors are slowed down to inhibit excessive swaying motion of the crane claw assembly. Four configurations are possible with this feature. One modes allows the customer to lower the crane once by pressing the top button on the joy stick, the seconde mode. allows the customer to lower the crane gradually while depressing the top button. Both modes can be operated either on a one time basis or until the timer expires.

In the joy stick mode of operation, the customer depresses the joy stick button to begin the game. There is a brief pause and the sound of Charge is played while the crane is positioned in the center of the play-field. The motor sound signifies the beginning of the timer countdown as well as the timer itself begins to count down the time remaining.

After an attempt at a prize pick-up the crane will return to the home position and open the claws, then depending on the second switch setting, the crane will continue till the timer expires or stop.

If the crane is at the home position when the timer expires the crane motion will not cycle otherwise the crane will attempt one more pick-up.

On power-up the crane will reset to the home position.
If, on power-up the coin-in switch is held down, the crane will go into its test mode.

See TEST FEATURES for a complete description.

SWITCH CONFIGURATION

DIP SWITCH SETTINGS

0 = off. / open.
1 = on. / closed.

1 2 3 4 5 6 7 8

X X X X X X X X

TIME

0 0 = 30 sec.
1 0 = 15 sec.
0 1 = 20 sec.
1 1 = 10 sec.

PRIZE TICKET

0 = TICKET WITH EVERY GAME
1 = TICKET WITHOUT PRIZE

COINS

1 1 = ONE GAME PER - .25
0 1 = TWO GAMES PER - .25
1 0 = ONE GAME PER - .50
0 0 = THREE GAMES PER - .50

CRANE MOVEMENT

0 = RUN TILL TIMER EXPIRES
1 = ONE TIME CRANE MOVEMENT

GAME SELECT

0 0 = JOY STICK WITH CONTROLLED DECENT
0 1 = JOY STICK WITHOUT CONTROLLED DECENT
1 X = STANDARD GAME WITH PUSHBUTTONS

TIME

Dip switch positions 7 and 8, control the amount of time that a single game lasts.

PRIZE TICKET

The prize ticket option allows the operator to select whether a ticket is dispensed every game or only when a prize is won.

COINS

Dip switch position 4 and 5, control the number of games per coin and denomination.

CRANE MOVEMENT

Dip switch position 3, controls whether the game continues to play until the timer has expired or ends with one pick-up attempt.

GAME SELECT

Dip switch position 1 and 2, selects the game configuration.

TEST FEATURES

Enter the test functions by powering up the Super Crane while holding down the coin-in switch.
The timer display will show an "88" to indicate the test mode is activated.
Advance through the test functions by pressing the button on top of the joy stick. At the end of the test functions the game will resume normal operation.

TEST FUNCTIONS

1.- Bulb Test: This test lights all the lamps in the crane that are under microprocessor control.

2.- Crane Movement 1: The joy stick will control the operation of the cranes left, right, forward, and backward motion.

3.- Crane Movement 2: The joy stick will control the operation of the cranes up and down motion.

4.- Claw Position: The joy stick will control the opening and closing of the claw mechanism.

5.- Ticket Dispenser: The joy stick will control the operation of the ticket dispenser.

DESCRIPTIONS OF MODIFICATIONS
SEGA CRANE MICRO-PROCESSOR CONTROLLER

This document directs the Technician through the necessary harness changes to convert the original relay logic controlled crane to the micro-processor system.

These changes are simple and will require only a soldering iron and some shrink tubing to implement. Note that the wire color codes are referred to in order to identify the particular wires involved in the conversion, along with this reference will also be the location of the wires so in the event that color codes have change the conversion can still be accomplished.

1.- First locate Car SW2, there should be located on the terminals nearest to the play field, (inside of crane glassed area), orange/black and orange/brown wires. These wires are to be removed and soldered together, insulated and tied back out of the way of operation. Again these wires may be of different color so refer to the position.

2.- Next Simply remove the diode, by cutting out, that is placed between Car SW1 and Car SW2. This diode is locate on the terminals between the to switches.

3.- From Car SW1 you will find two gray wires, these must be removed from the switch and soldered together, insulated and tied back of the way of operation.

4.- Now looking at the crane carriage assembly it selft you must locate Car SW3. On the upper right terminals remove the red and green wires, these will have to be soldered together, insulated and again tied back out of the way.

5.- In the same area on Car SW3 lower terminal you will remove the white and red wires from their terminals and solder theses together, insulate and tie back.

6.- Now there should be a black wire on Car SW3 that runs into the lead-in harness, pull a little of this so you can cut the wire at least 2" back from the SW3 terminal that it is connected to. When you have done this insulate the free end, coming from the harness. Prepare the opposite end of the wire, which is still connected to the witch, to be soldered to the terminal indicated in the next instruction. Remove the red wire that is connected to Car SW4 and solder to the upper right hand terminal of Car SW3, now take the prepared free end of the black wire and connect to the terminal that you have just removed the red wire from.

7.- The last modification is done in the area of the coin acceptor. Locate the white/brown wire that is in common with the coin lock out coil and denomination illumination lamp, cut this wire back approximately 6" toward the direction of the cabinet harness and insulate the end that comes from the cabinet direction.

Take the end coming from the coin lock out coil and prepare it to be soldered to another wire. This wire will be the one tied to the coin switck Normally Open terminal or wire coming from such terminal, you can strip a small amount of insulation from this wire connected to the coin switch terminal and solder the coin lock out wire to the area of bare wire and insulate.

This completes the conversion process other installation of the ETI Crane controller PCB, Speaker, and Power Harness.

Supplied with the conversion kit is the Main Controller PCB and other options you may have ordered, Credit Display, Joy Stick, etc...

First you will have to remove the old relay control board and replace this with the new controller board. Position the new board so that the connectors match that of the old PCB this should be the 12 pin connector up. Next connect the original plugs to their appropiate header. The next thing to do is to solder the power harness, the two wire harness with dropping resistor, to the main power transformer taps marked Ov. and 14v. this sould be a parallel connection across the white/red and white/black going to the light controller PCB. This is a non polar connection and can be wired either way. The other end of this harness has a two pin plug that must be attached to the J5. This is the logic power input.

The next item to install is the speaker, this can be mounted anywhere inside the cabinet with grill to allow the sound to emanate towards the player. When you have accomplished this take the end of the speaker harness with the two pin plug and route to the PCB and connected to the J2 position.

If the credit display options is to be installed you will have to punch and appropiate hole in the play panel and mount the unit as described in the credit option literature. There will be with this unit a harness with suitable plugs for the display and controller PCB. Once you have the credit meter mounted and installed the plug can be installed in the J4 position on the Main Controller PCB.

If the Crane is to operate in the push button mode this will have accomplished the conversion and the crane can now be powered up and should operate in the same mode as the original crane, be sure to set the DIP-SW options as described in the options sections. One difference in operation in this mode is that the player can select to move the crane lateral or forward first instead of only forward first.

The joy stick installation is accomplished by removing the lateral button from the panel and mounting the Stick provided in this hole. You may have to remove some of the Playfield floor support bracket to allow this unit to clear it when the play panel is closed. Nesxt the four connectors that once were wired to the lateral button are connected to the four Normally open connectors from the Sticks switches. These are the direction controls and once the crane is powered up these can be checked for the proper location relative to the direction of movement of the crane carriage.

Note that provided with the Joy Stick is a harness connecting all the Common Positions together and with a free end that is tinned and stripped.
This wire will have to be sodered to the lamp that is installed in what was the forward movement button position.
On this lamp you will find connected two white/black wires and soldered to the socket, here is where this common wire from the switches is to be connected. Here also you will remove the connectors fron the Forward Switch and move these to the push button switch on the Joy Stick.
The white/black wire to the common and the other wire to the Normally Open point on the switch.
This white/black that was connected to the common of the forward switch can also be used for the other joystick switch common connections.

When This has been installed properly the crane can be power up and check for proper operation as described in the operation sections of this document.

NOTE: On the Main controller PCB there is a jumper position used for either JOY STICK or STANDARD BUTTON configuration, you should make sure that this is in the proper position, as indicated by the schematics, for the particular operation you intend to use.

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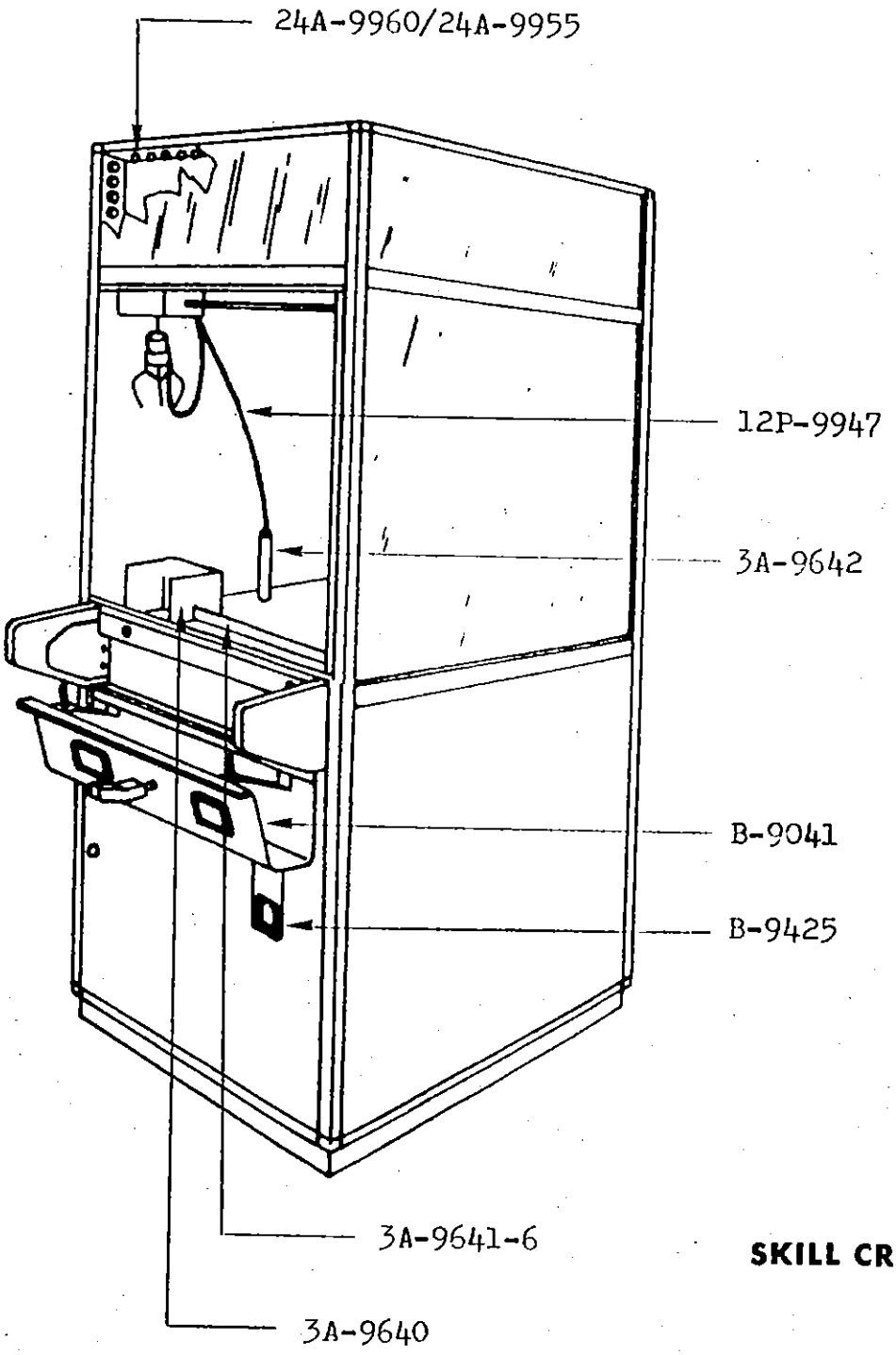
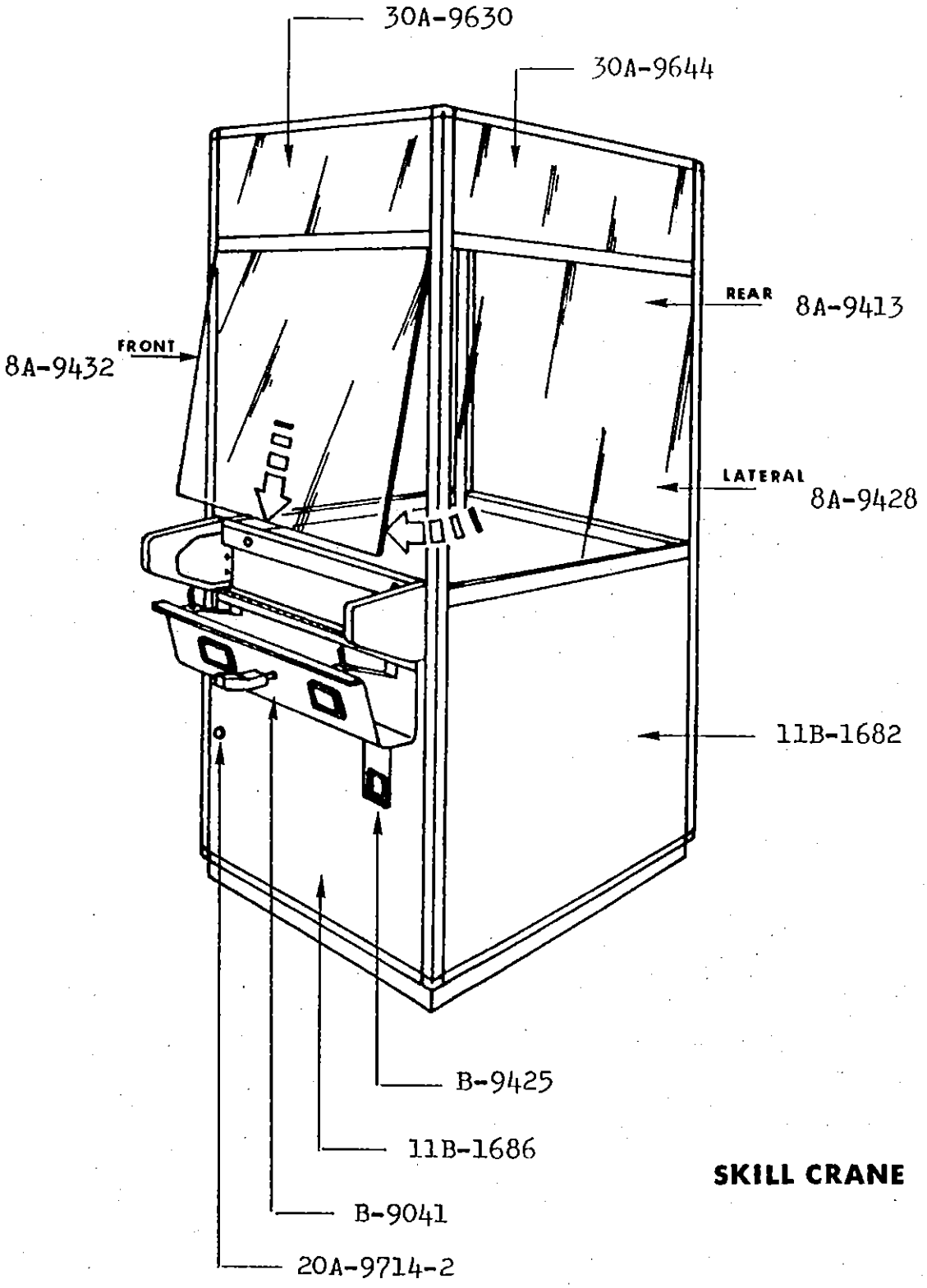
cabinet
mueble



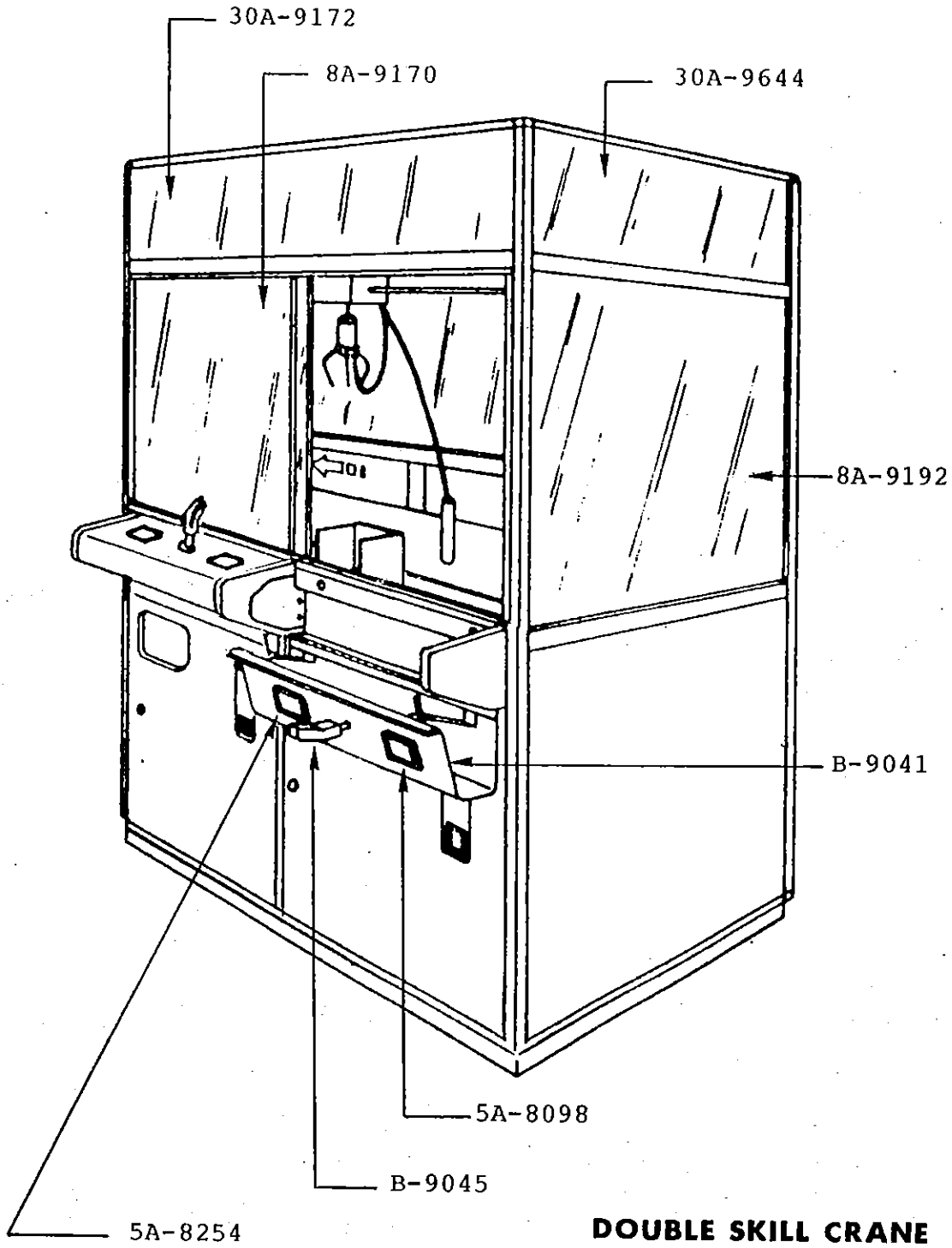
SKILL CRANE

cabinet
mueble



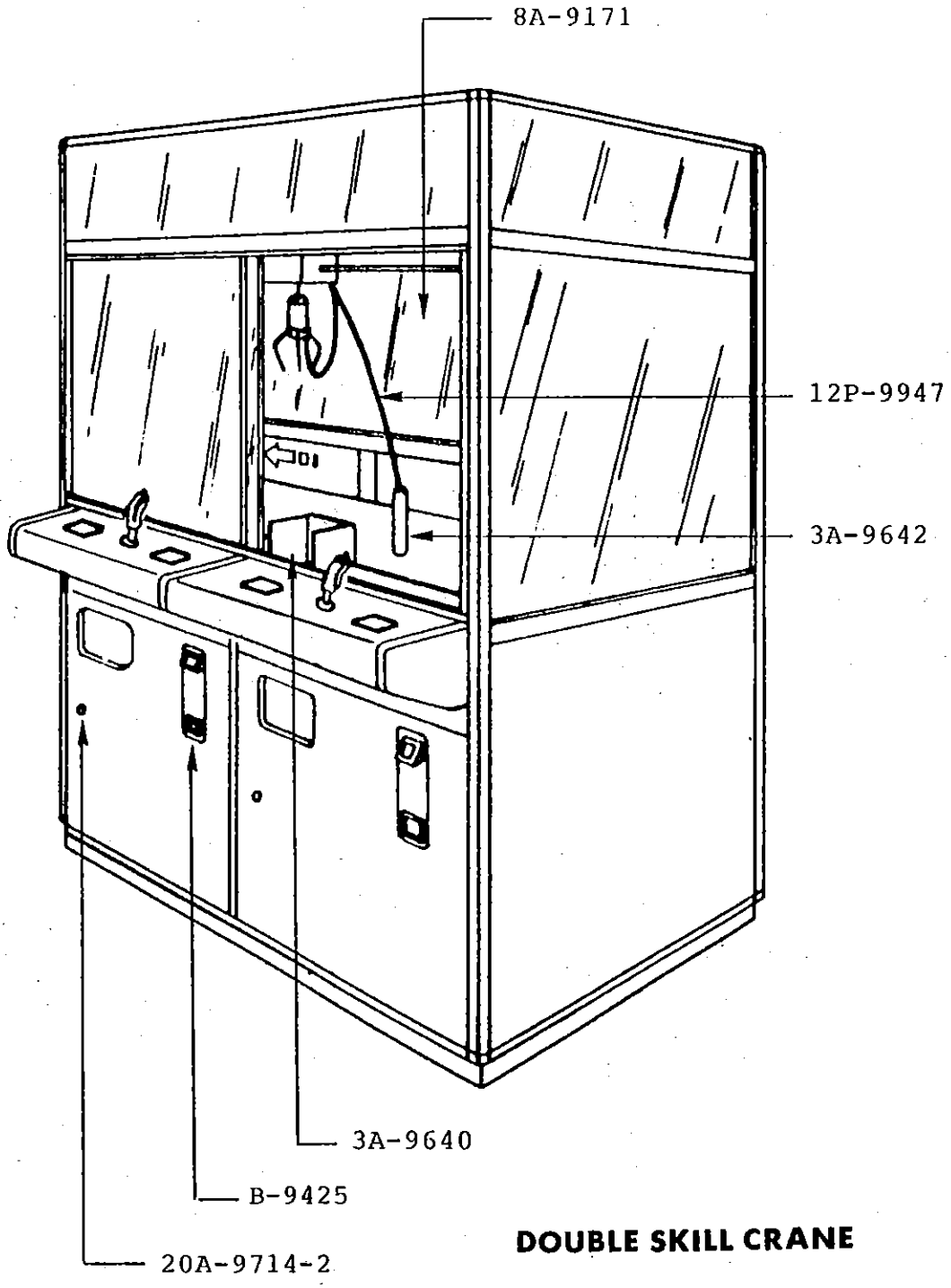
SKILL CRANE

cabinet
mueble



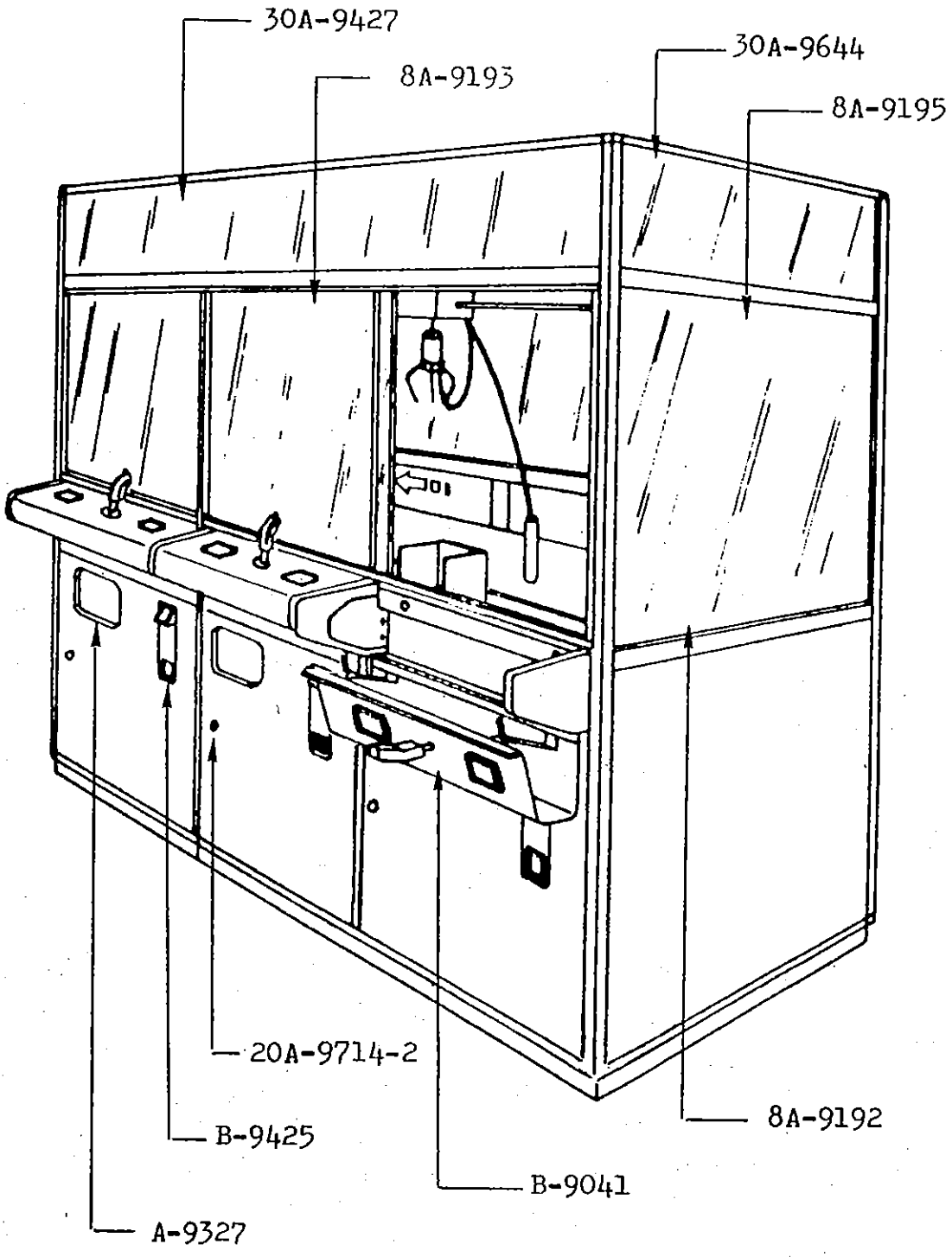
DOUBLE SKILL CRANE

cabinet
mueble



DOUBLE SKILL CRANE

cabinet
mueble



TRIPLE SKILL CRANE

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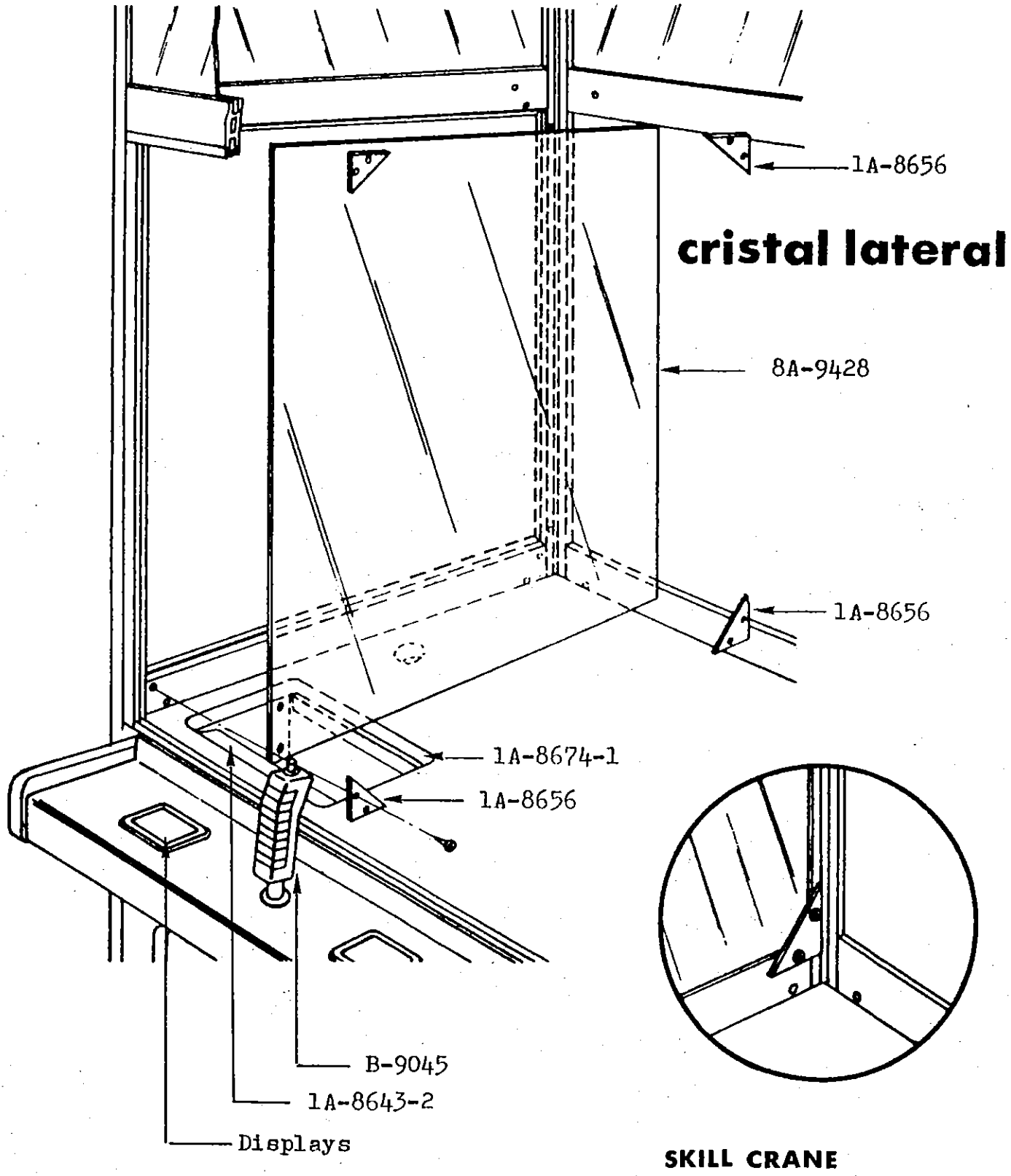
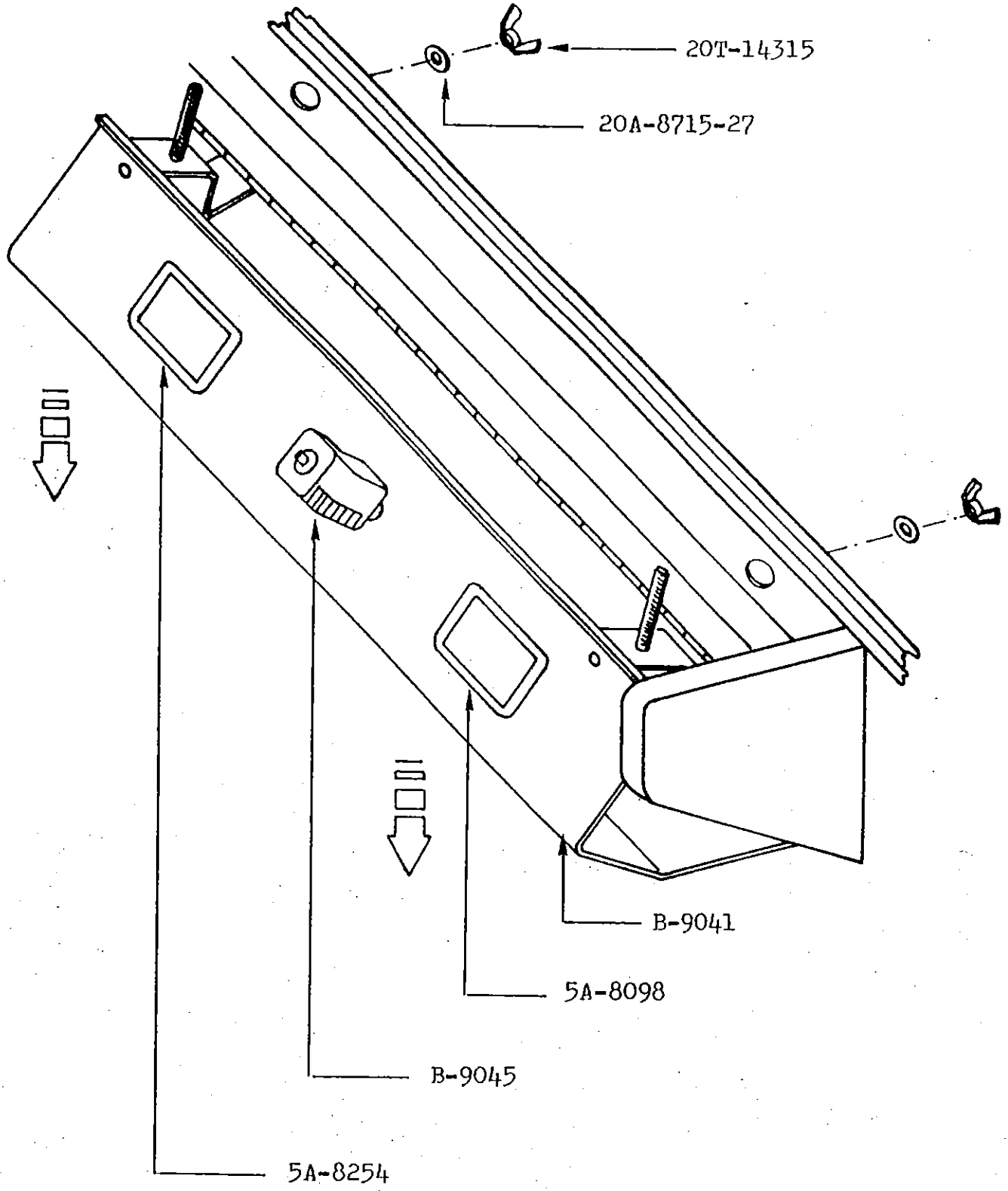


SKILL CRANE

control panel
panel de mando



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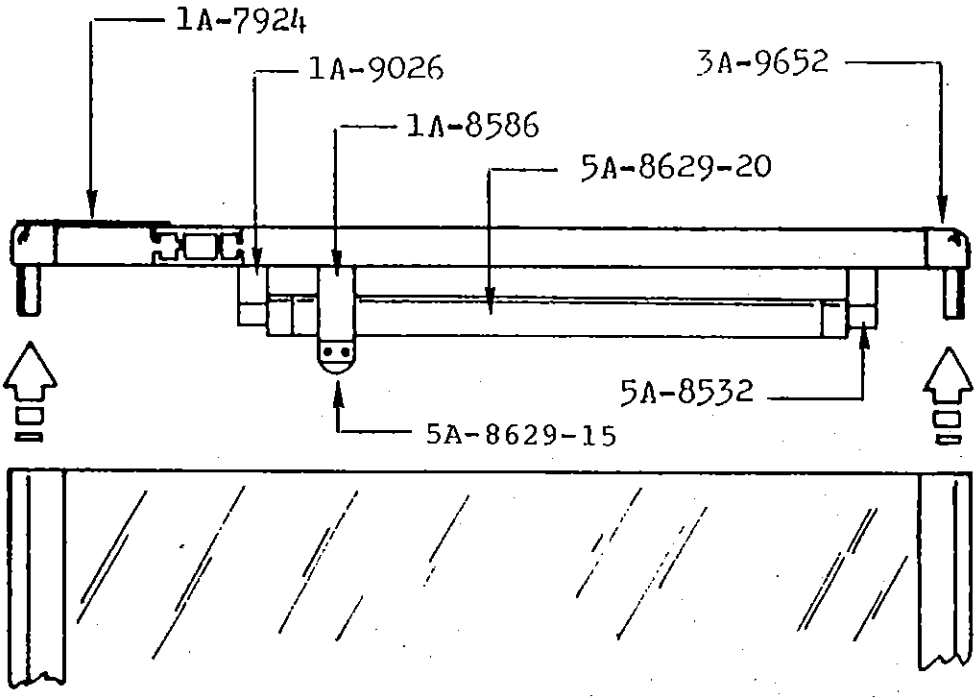
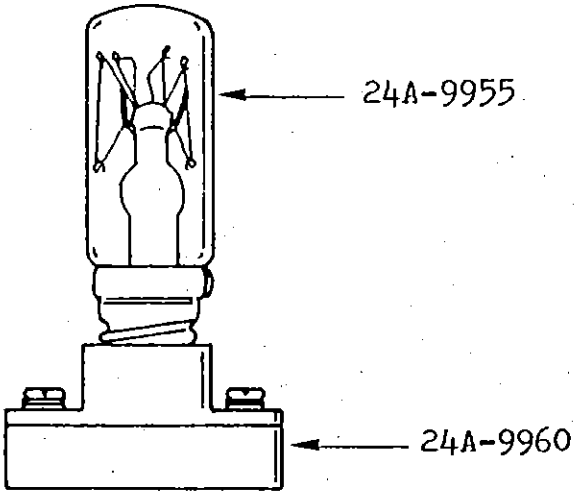
parte superior



SKILL CRANE



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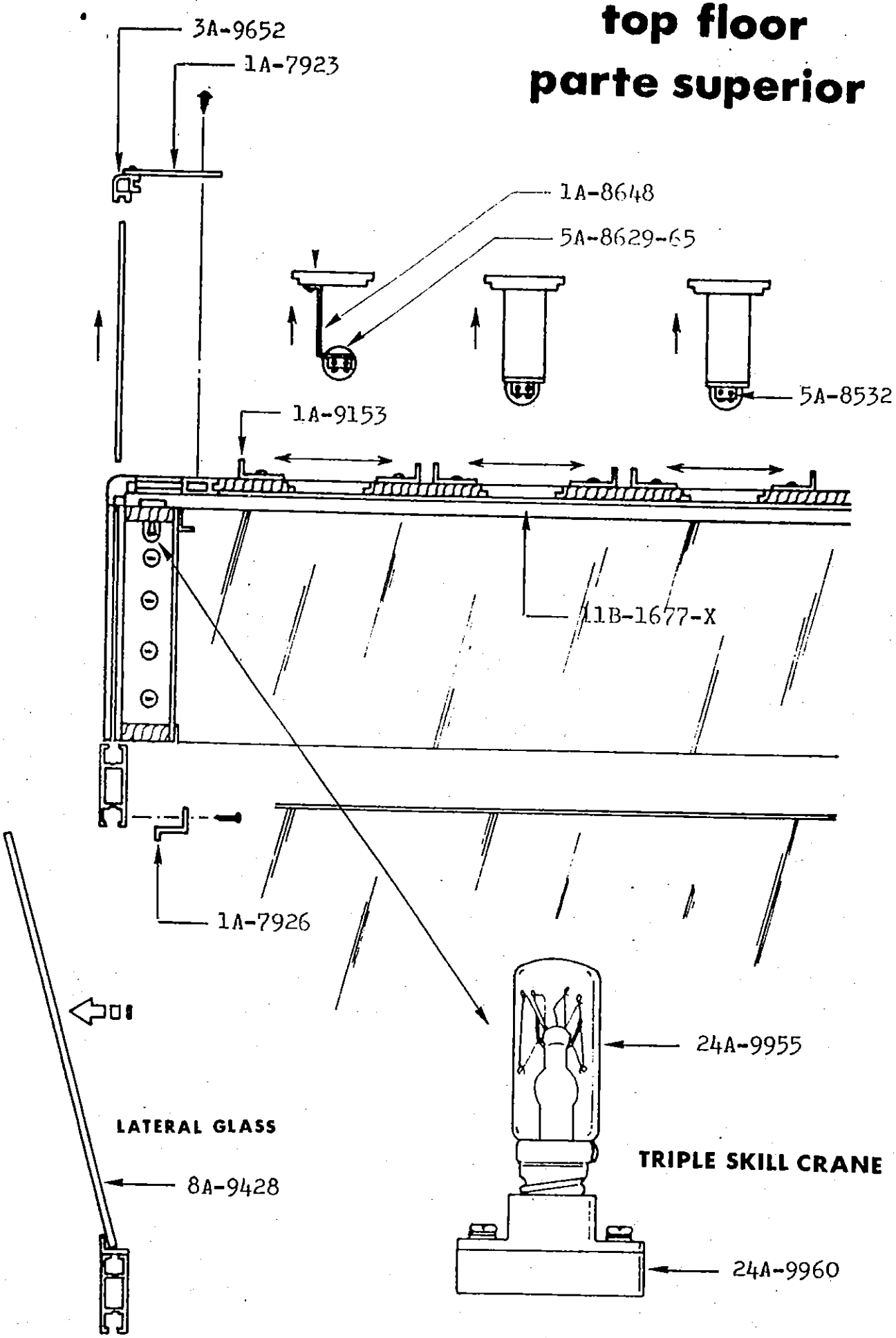

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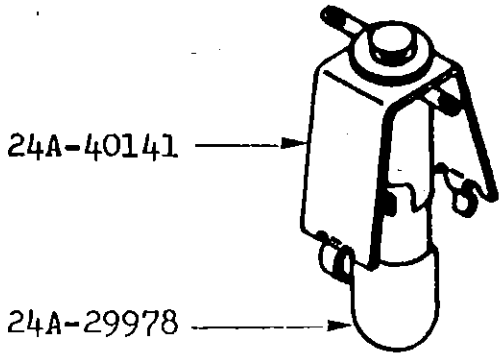
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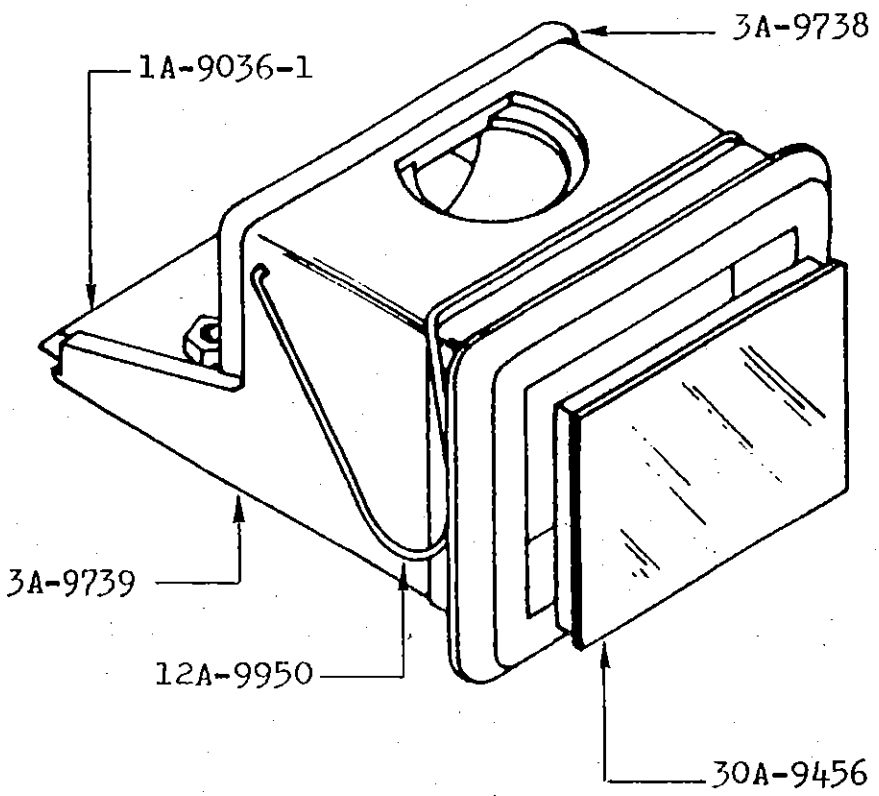
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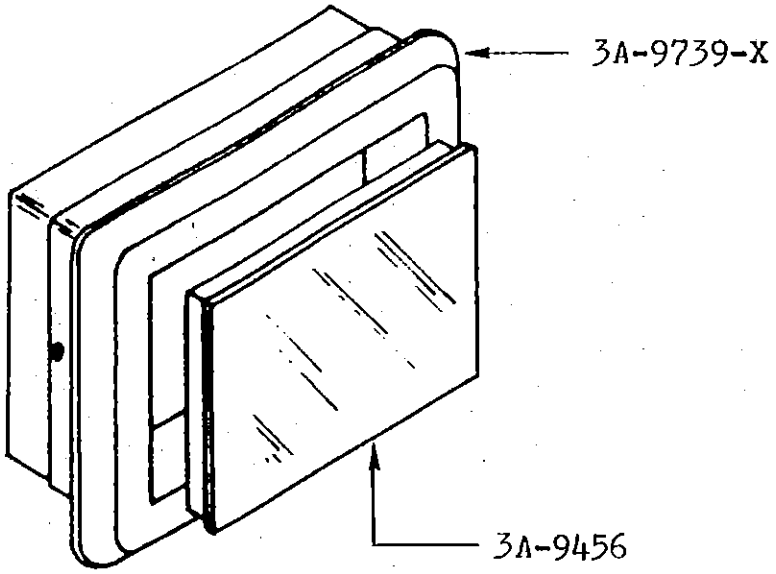
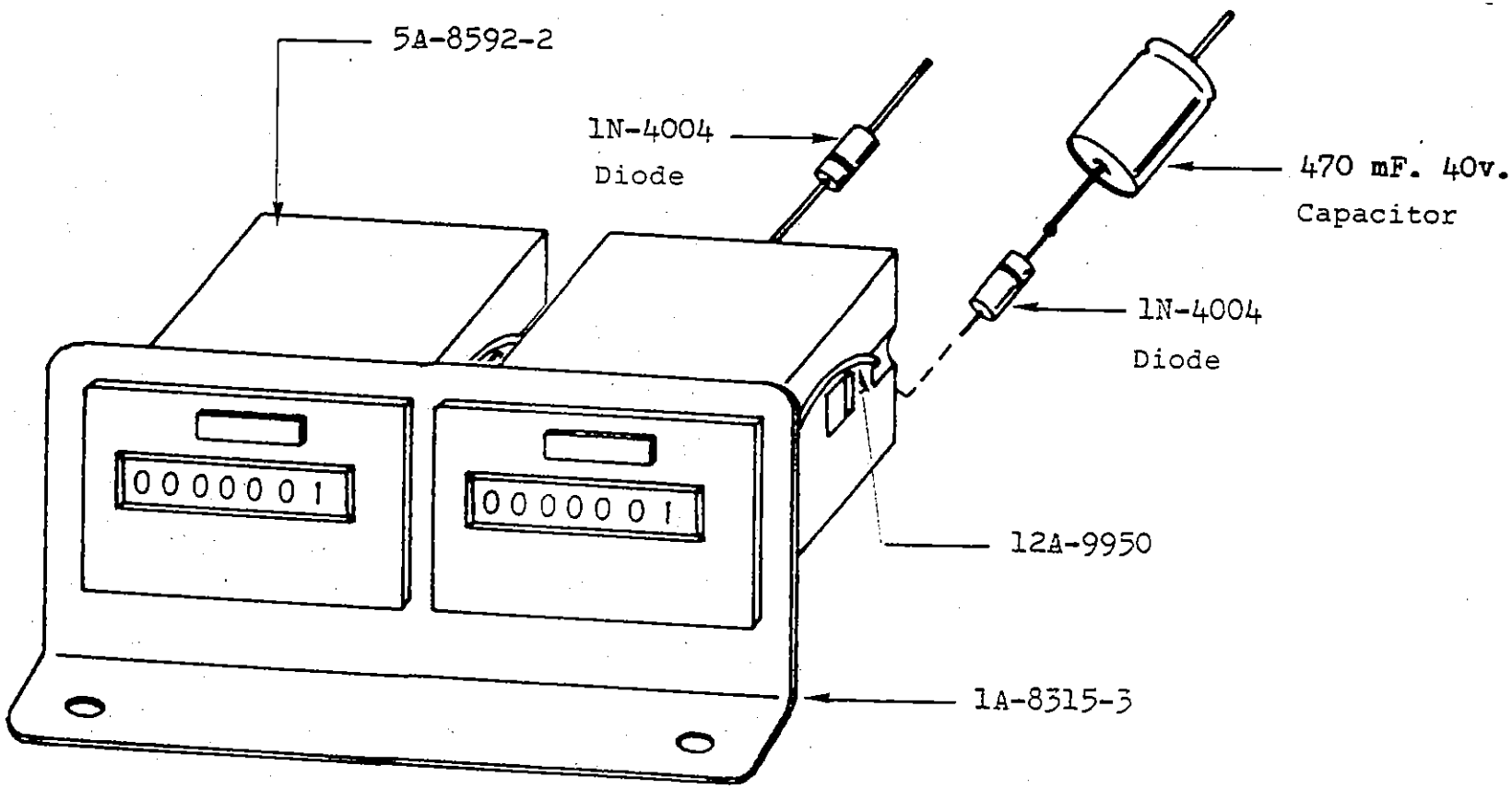
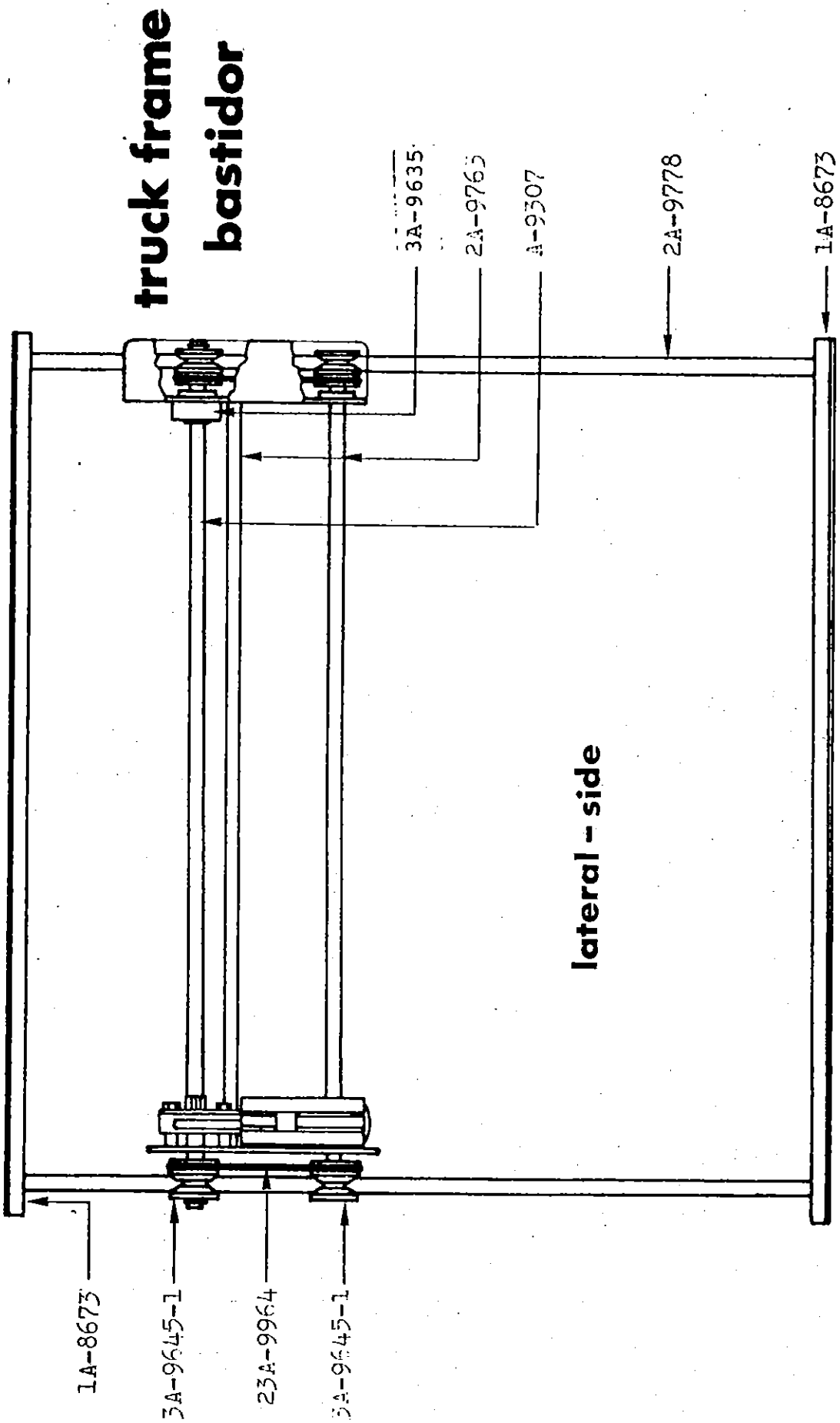
12A-9950
30A-9456


3A-9739-X
3A-9456

meters ~ contadores




truck frame
bastidor
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2A-9765
A-9307
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1A-8673
lateral - side
1A-8673
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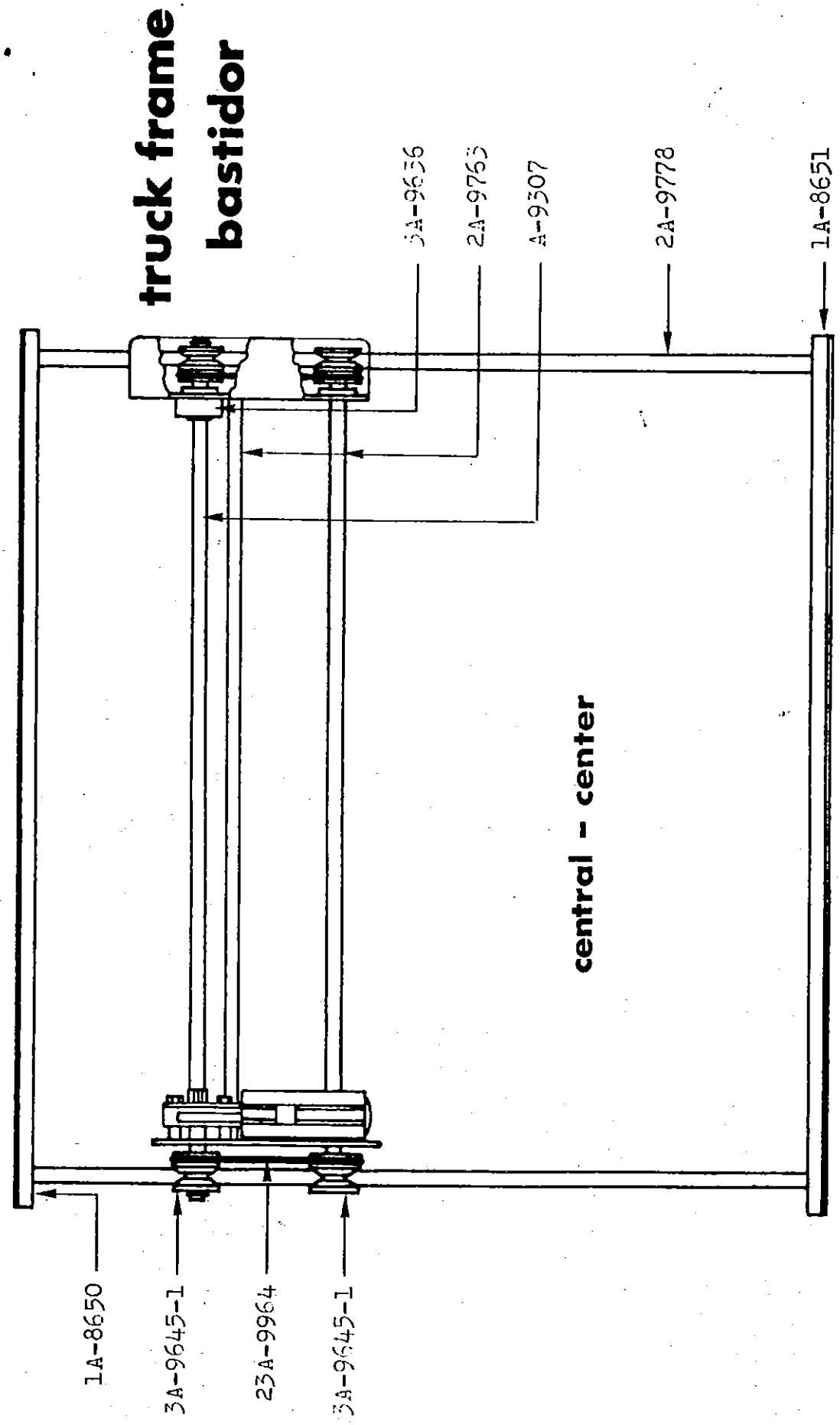
23A-9964
3A-9645-1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central - center
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23A-9964
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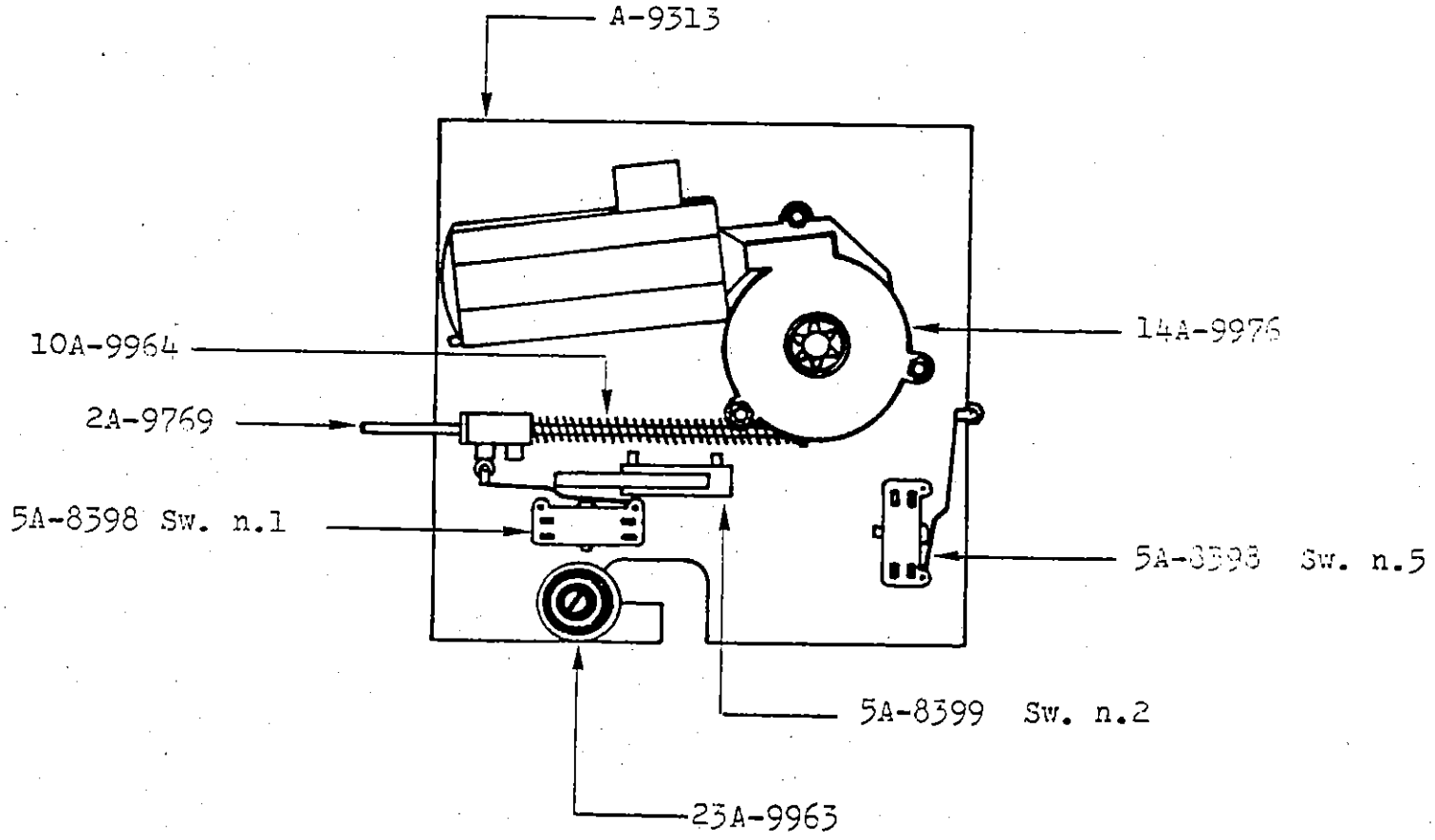
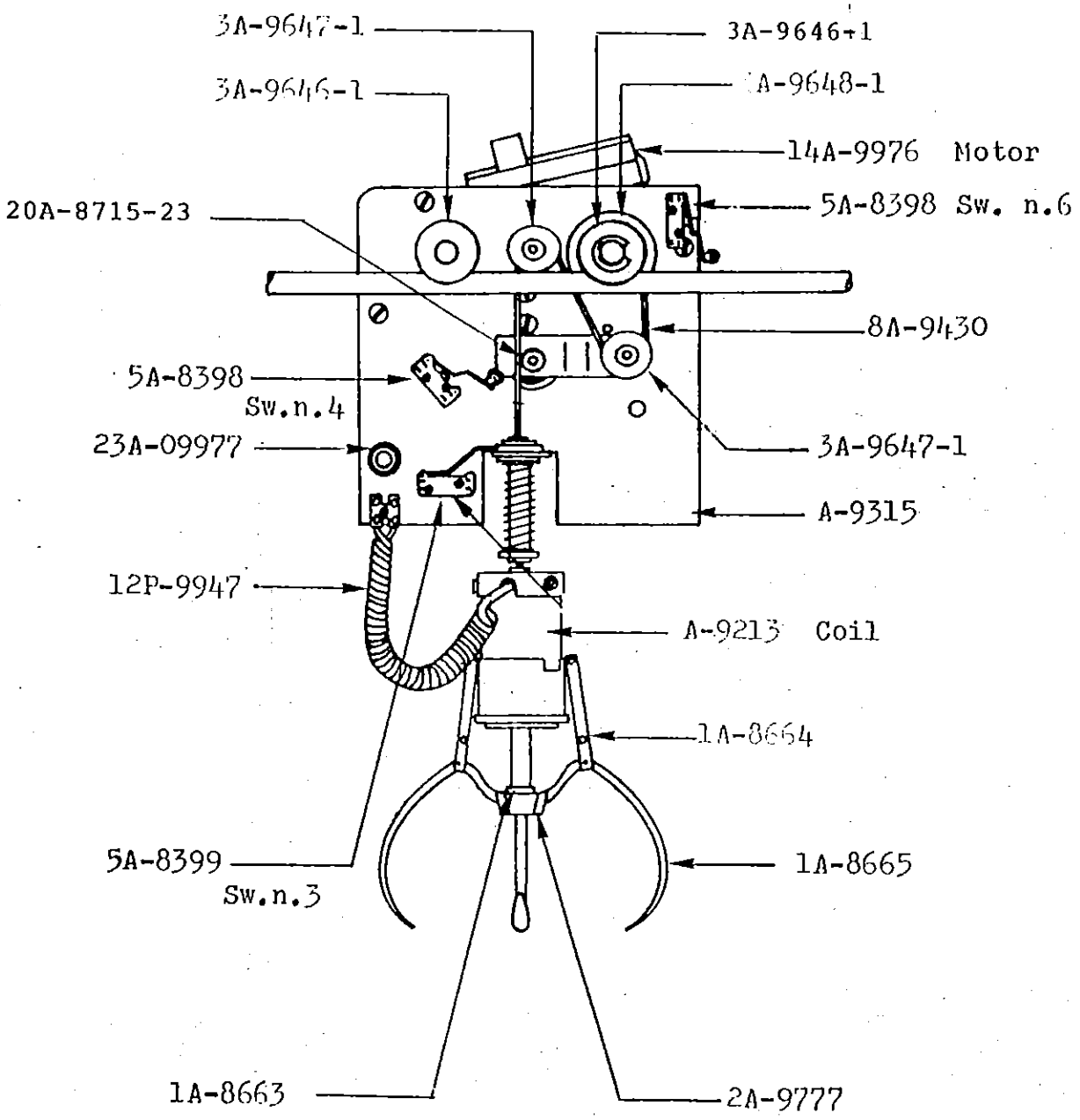
motor sw.

micros motor



mechanism
mecanismos



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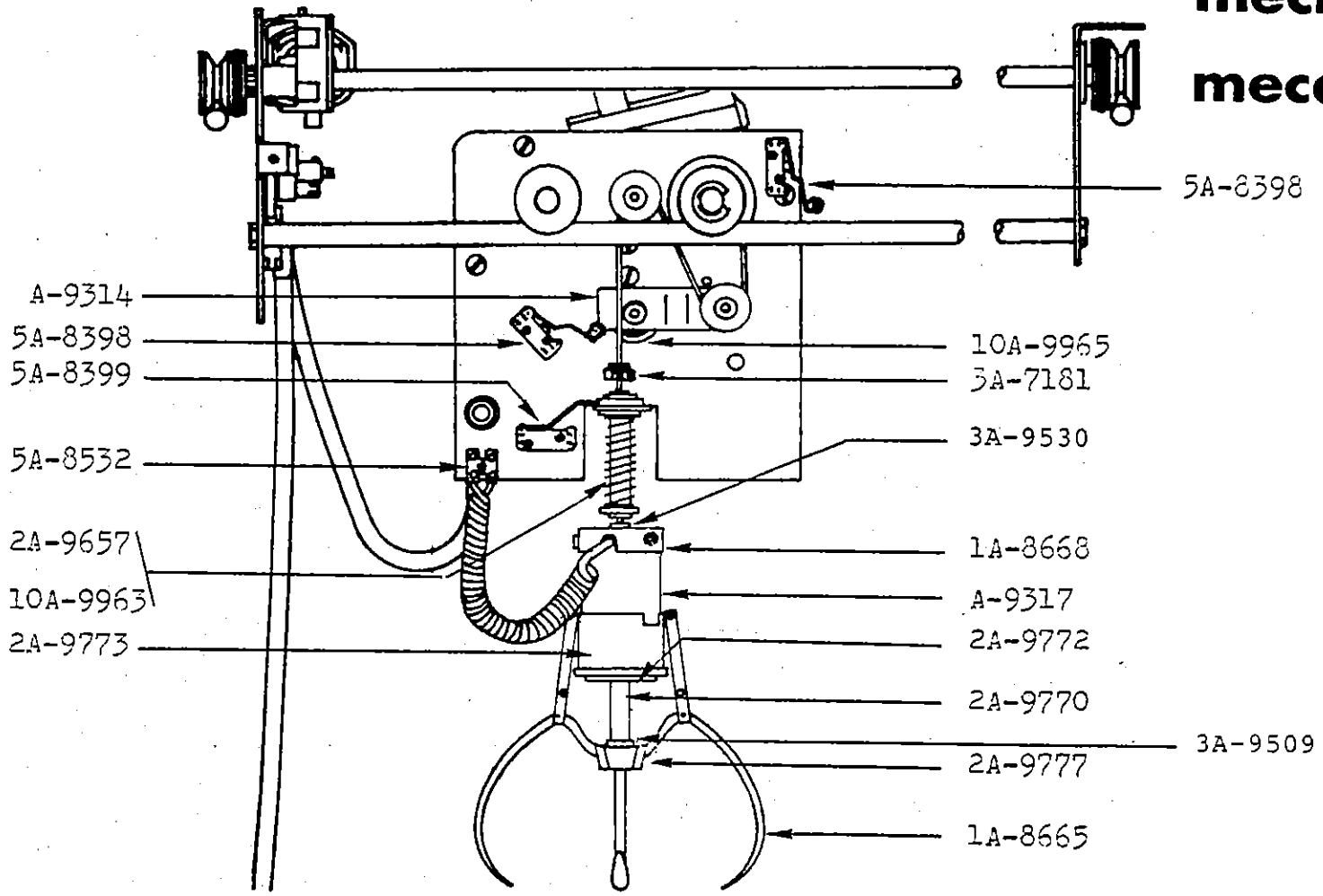
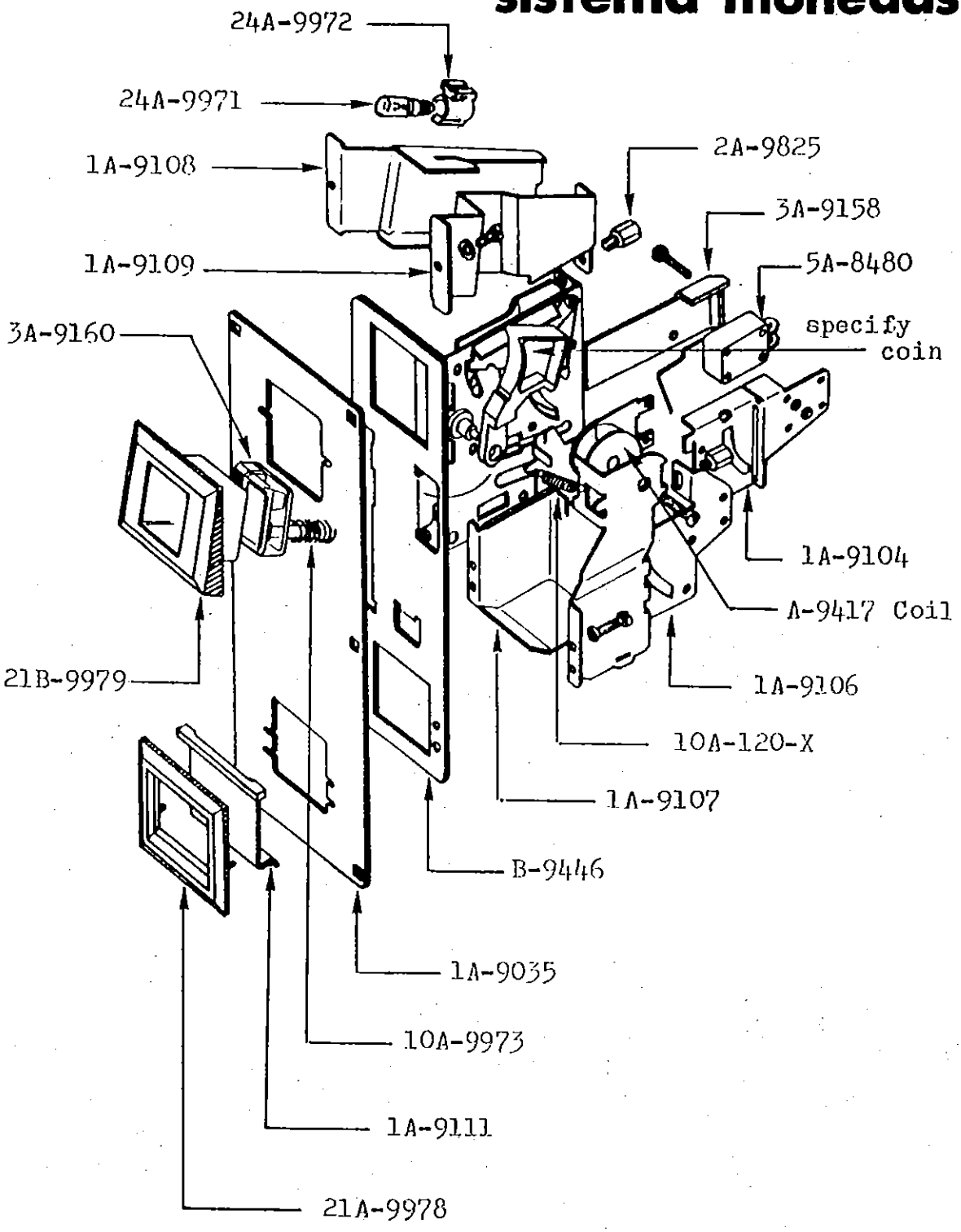


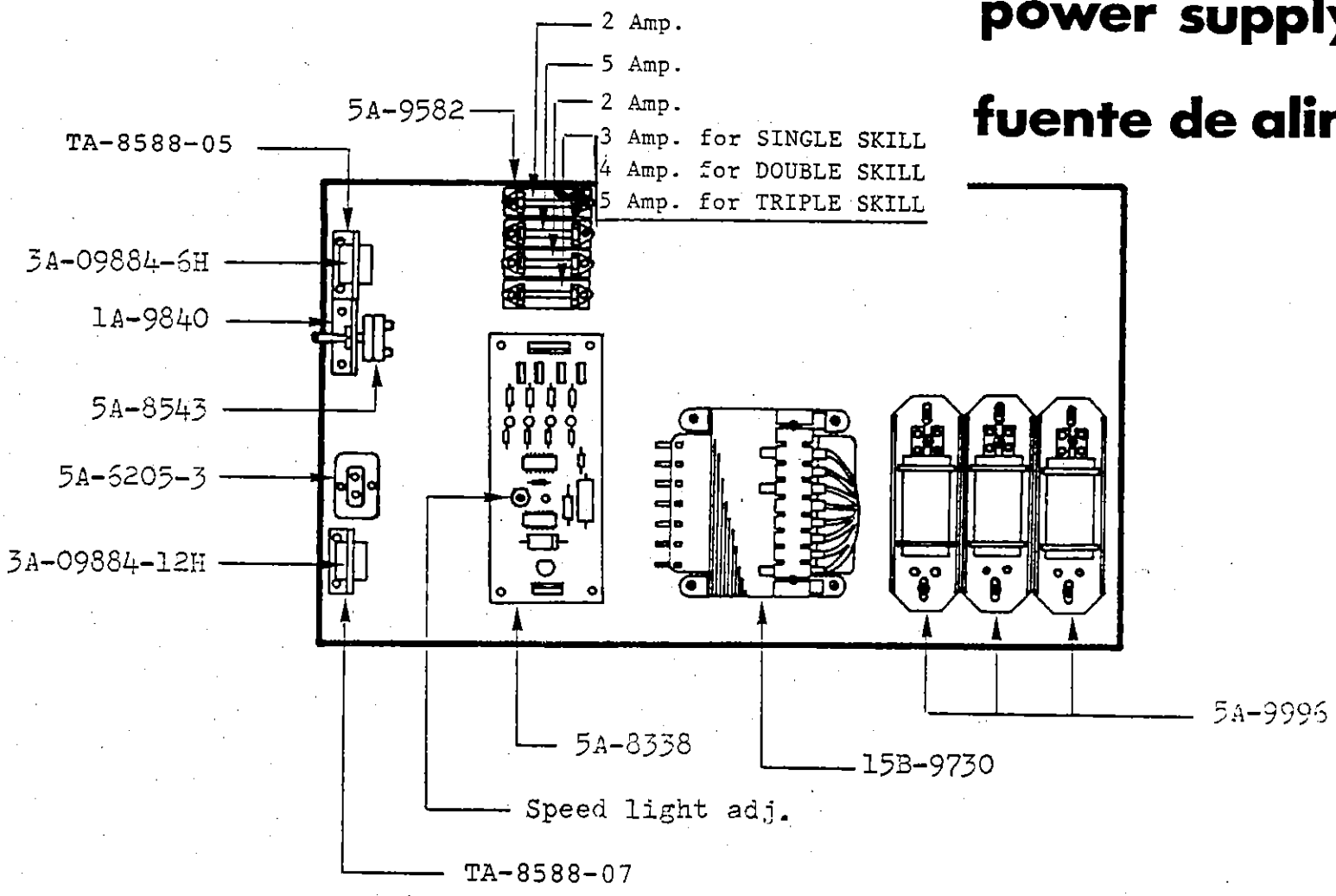
coin entry sistem

sistema monedas



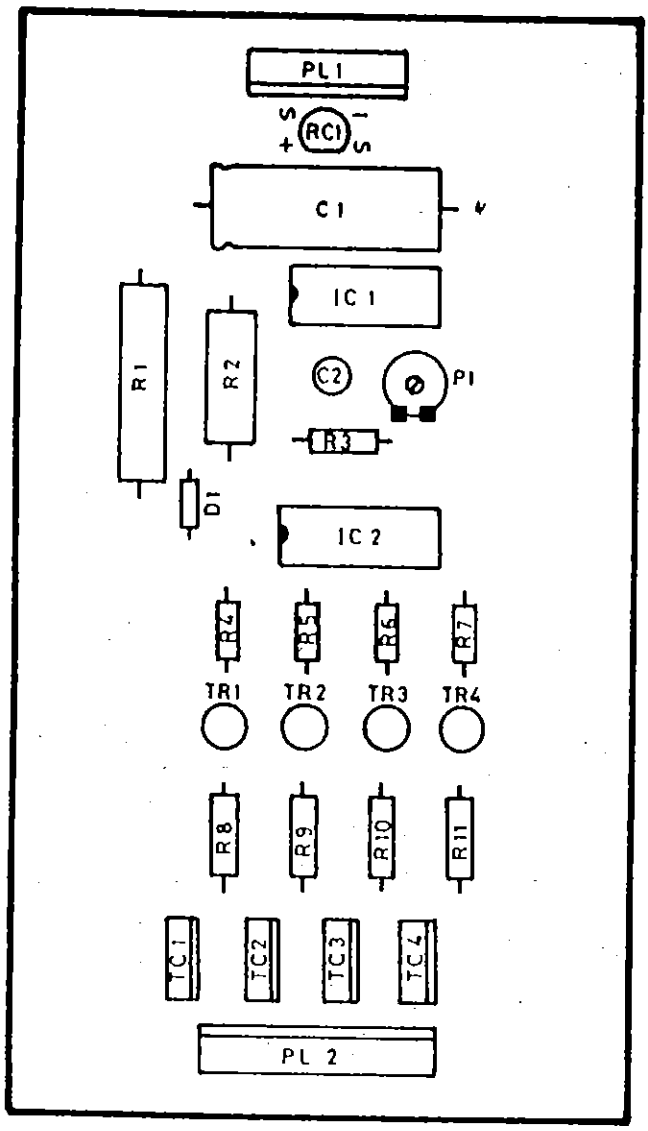
power supply

fuente de alimentacion



lights pcb.

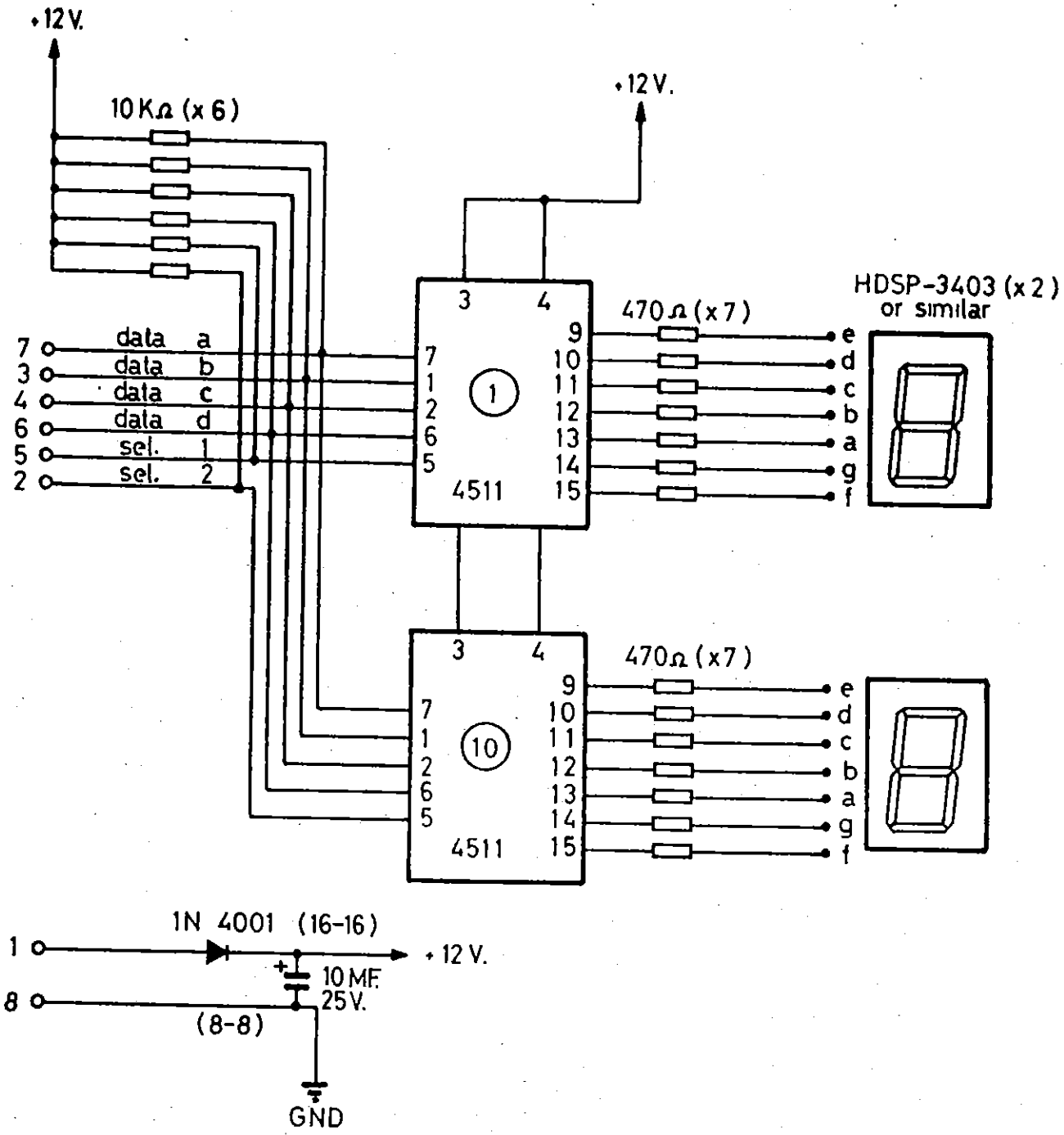
placa luces

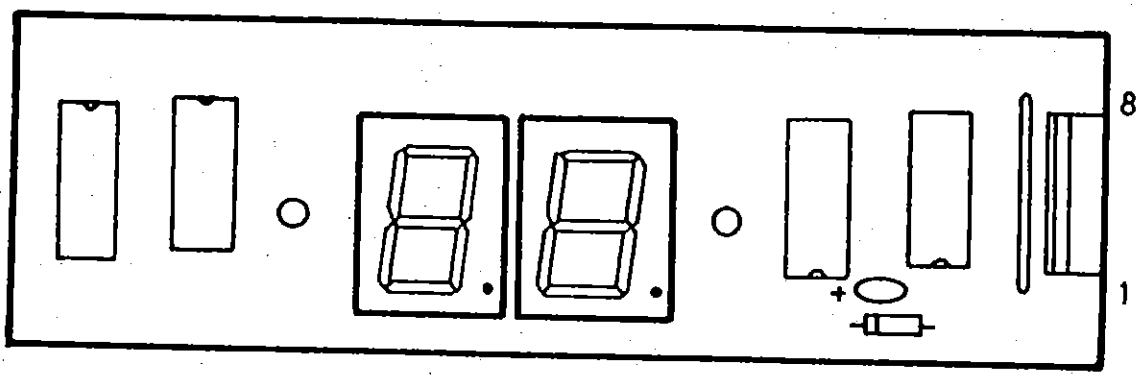


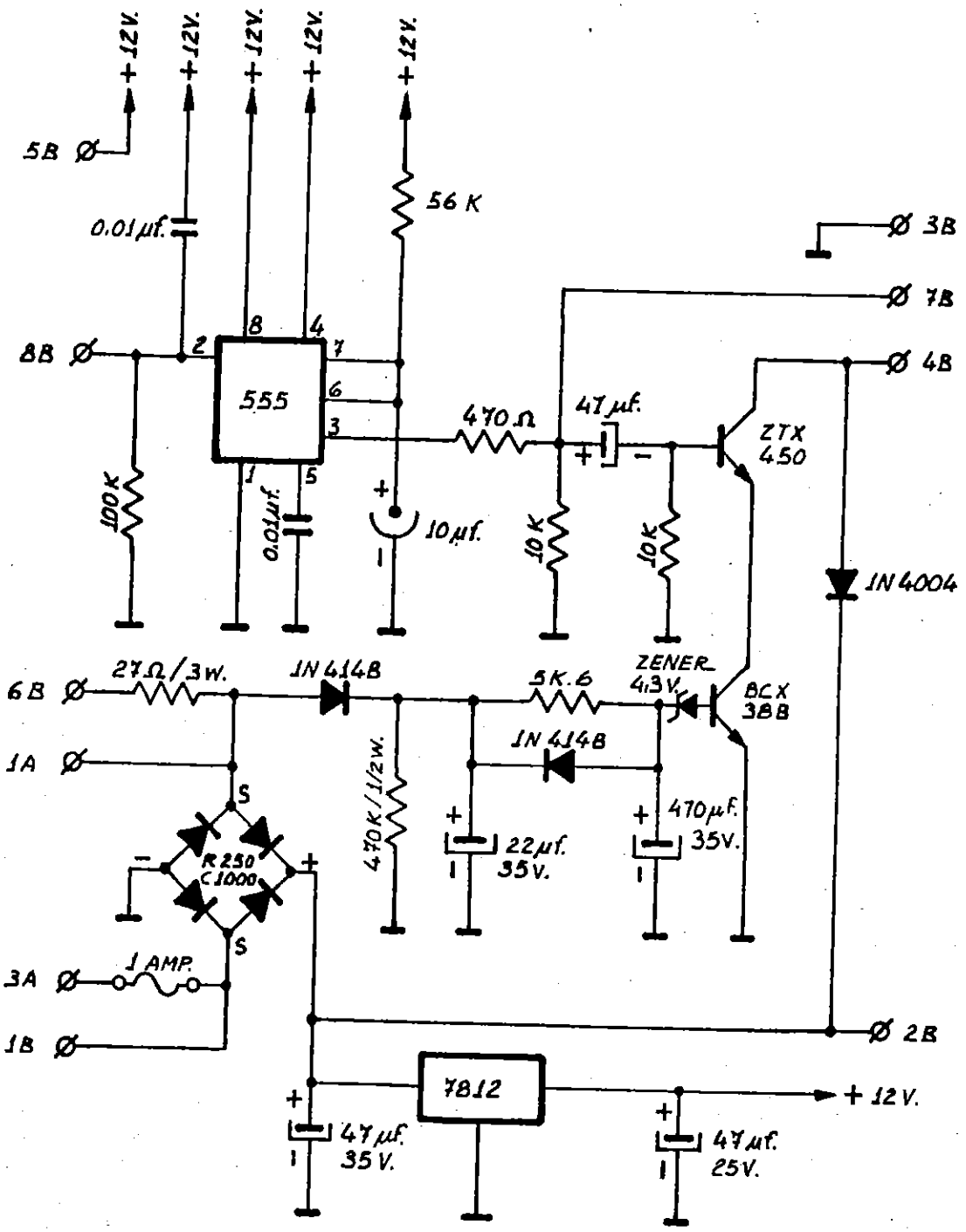
Resistor	220 ohm.	5w.	R-1
"	27 ohm.	1w.	R-2
"	470 ohm.	½w.	R-8/11
"	10 K.	¼w.	R-4/7
"	56 K.	¼w.	R-3
Capacitor	50 mF.	100v.	C-1
"	4'7 mF.	35v.	C-2
Integrated circuit	4069		IC-1
" "	14017		IC-2
Bridge rectifier	8027		RC-1
Transistor	BC204		TR-1/4
Triac	Y1031		TC-1/4
Diode Zener	ZF 15		D-1
Variable resistor	47 K.		P-1

PLACA DE DISPLAYS

DISPLAYS BOARD







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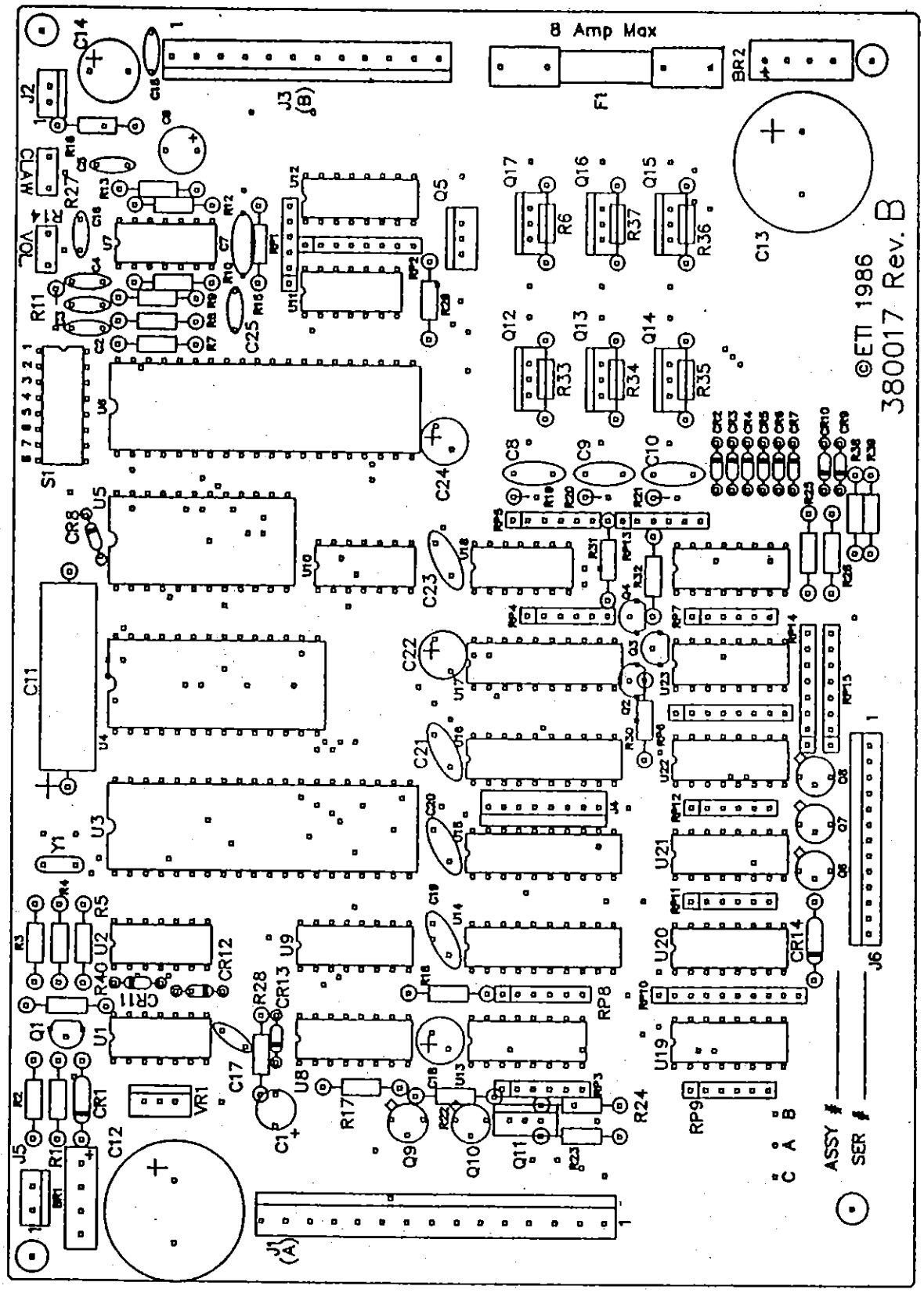

8 Amp Max
©ETI 1986
380017 Rev. B
ASSY #
SER #

P.C.B.

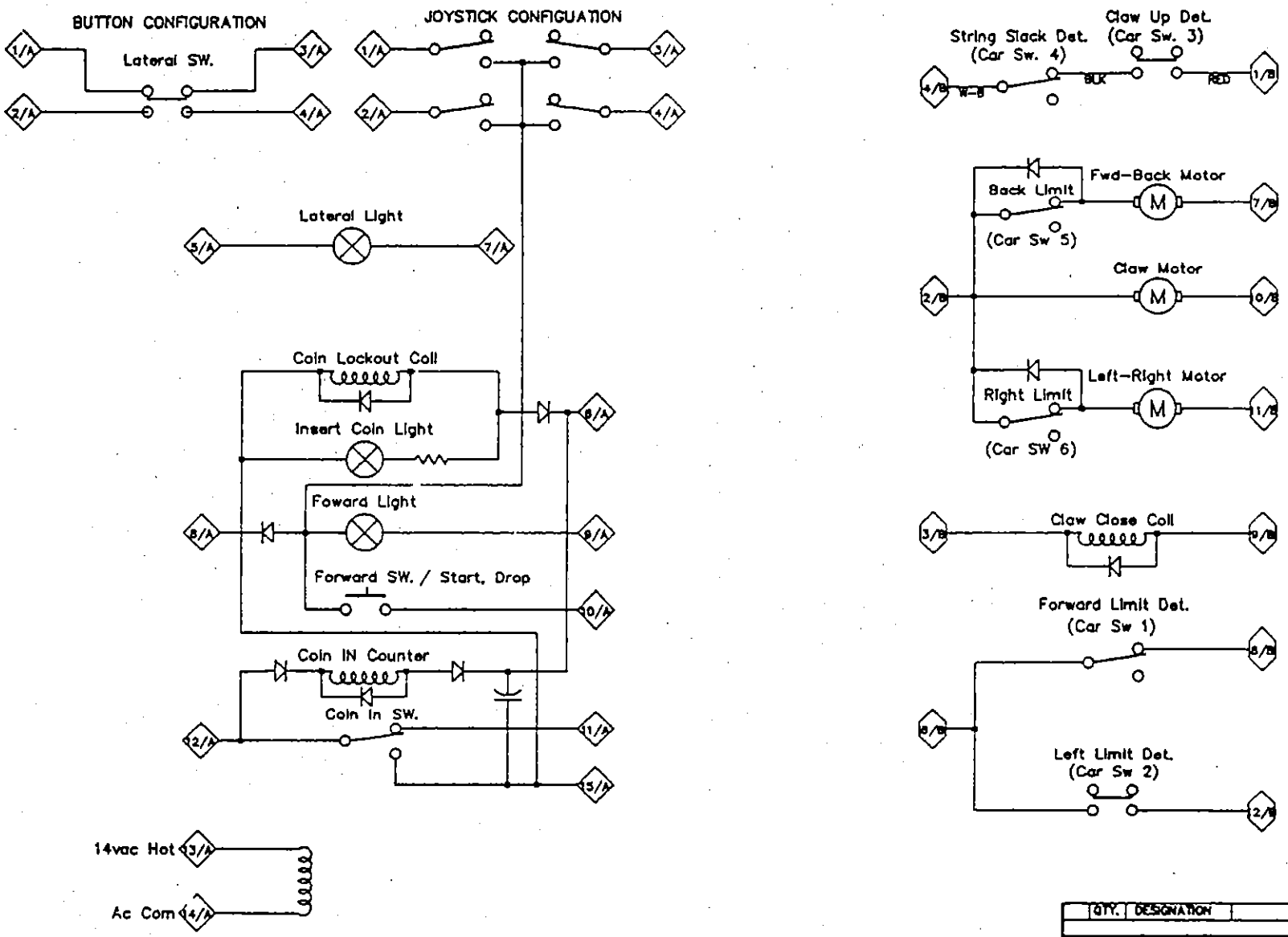
DESCRIPTION				QTY.	DESG.
Capacitor	Axial	1000 mF.	6v.	1	C-11
	Radial	3300 mF.	25v.	2	C-12,13
	Radial	470 mF.	16v.	1	C-14
	Ceramic	.1 mF.	50v.	2	C-15,17
	Ceramic	2200 pF.	50v.	1	C-16
	Radial	10 mF.	16v.	4	C-1,18,22,24
	Ceramic	.001 oh.	50v.	1	C-25
	Radial	220 mF.	16v.	1	C-6
	Ceramic	.47 mF.	16v.	1	C-7
	Ceramic	.1 mF.	12v.	11	C-2/5,8/10 19/21,23
Resistor		1K.	¼w.	6	R-1,5,7/9,11
		1M.	¼w.	2	R-10,12
		1K2	¼w.	3	R-17,38,39
		220 ohm.	¼w.	1	R-29
		470 ohm.	¼w.	2	R-3,4
		100 ohm.	¼w.	5	R-2,19/21,40
		2'2K.	¼w.	5	R-18,22/24
		10K.	¼w.	9	R-13,15,16 25,26,28 30/32
Variable Resistor		50K.		1	R-14
		2K.		1	R-27
Resistor PK.		2'2K-9R		1	RP-10
		2'2K-5R		1	RP-12
		1'2K-3R		1	RP-1
		4'7K-4R		2	RP-14,15
		2'2K-7R		1	RP-2
		220-3R		1	RP-3
		4K7-3R		1	RP-4
		220-7R		1	RP-6
		100-3R		3	RP-5,7,13
		2'2K-3R		1	RP-8
		1'2K-5R		2	RP-9,11

P.C.B.

DESCRIPTION		QTY.	DESG.
Integrated circuits			
Schmitt Trigger	MC14093B	1	U-1
Nor Gate	74HC02	1	U-10
Quad Opte	ILQ74	8	U-12,13,19,24
Octal Buffer	74LS244	1	U-14
Octal Latch	74LS374	3	U-15/17
Hex Buffer DR.	74LS05	1	U-18
Hex Schmitt	74HC14P	2	U-2,11
Microprocessor Z80	Z8400A	1	U-3
Eprom 32KX8	27128	1	U-4
Ram 2KX8	HM6116-3	1	U-5
Sound Chip	AY-3-8910	1	U-6
Dual 2 Watt	LM1877-9	1	U-7
14 Bit Binary	MC14020B	1	U-8
1 of 8 Decoder	74LS138	1	U-9
Transistor	2N4403	4	Q-1/4
	TIP121	2	Q-5,11
	2N2222A	3	Q-7,8,10
	2N2907	1	Q-9
	BD-437	1	Q-6
Diode Zener	3'9 v.	2	CR-1,14
Diode	1N914	12	CR-2/13
Tiristor	S2800A	6	Q-12/17
Voltage Regulador	7805	1	VR-1
Crystal 4MHZ	MPS040	1	Y-1
Fuse clip	5A-8100	1	F-1'
Fuse 8 amp.	5A-8KO-632	1	F-1
Bridge rectifier 1 amp.	5A-8096	2	BR-1,2
PCB Crane Controller	1B-2001-162	1	-
Heat Sink	1A-7791	7	Q-5,12/17
Heat Sink	1A-7790	1	VR-1
Heat Sink	1A-8096	1	U-7

P.C.B.

DESCRIPTION		QTY.	DESG.
Spacers, nylon captive	3A-9813	4	-
Dip-switch 8 position	5A-8515-8	1	S-1
Connector 2 pin	5A-8516-2	1	J-5
12 pin	5A-8516-12	1	J-3 b.
15 pin	5A-8516-15	1	J-1 a.
2 pin	5A-8439-2	1	J-2
8 pin	5A-8439-8	1	J-4
13 pin	5A-8439-13	1	J-6



QTY.	DESIGNATION	DESCRIPTION	SPEC. / PR
PARTS LIST			

TOLERANCES ARE:

MATERIAL

FINISH

DO NOT SCALE DWG

APPROVALS	DATE

NEXT ASSY | USED ON

APPLICATION

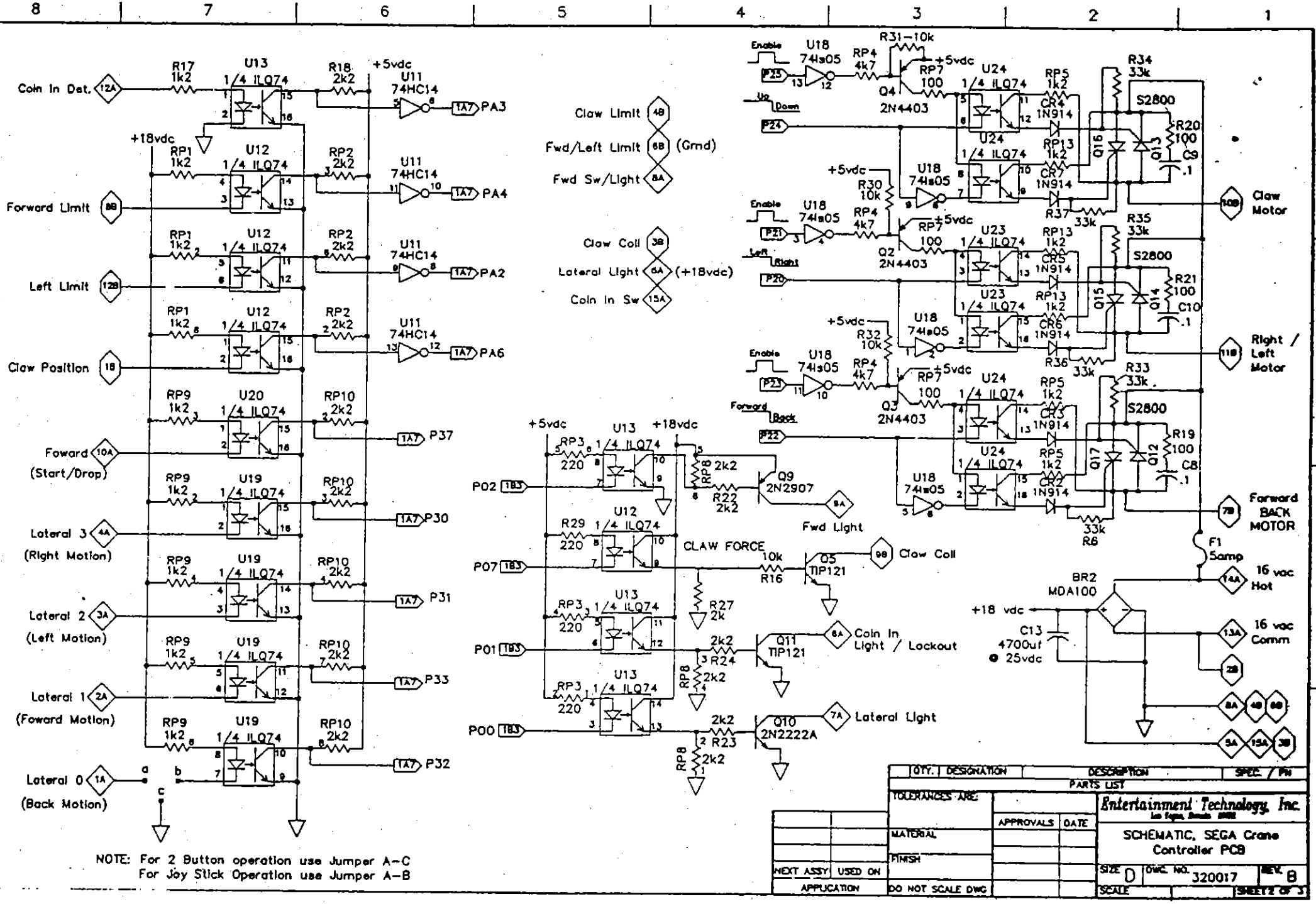
Entertainment Technology, Inc.

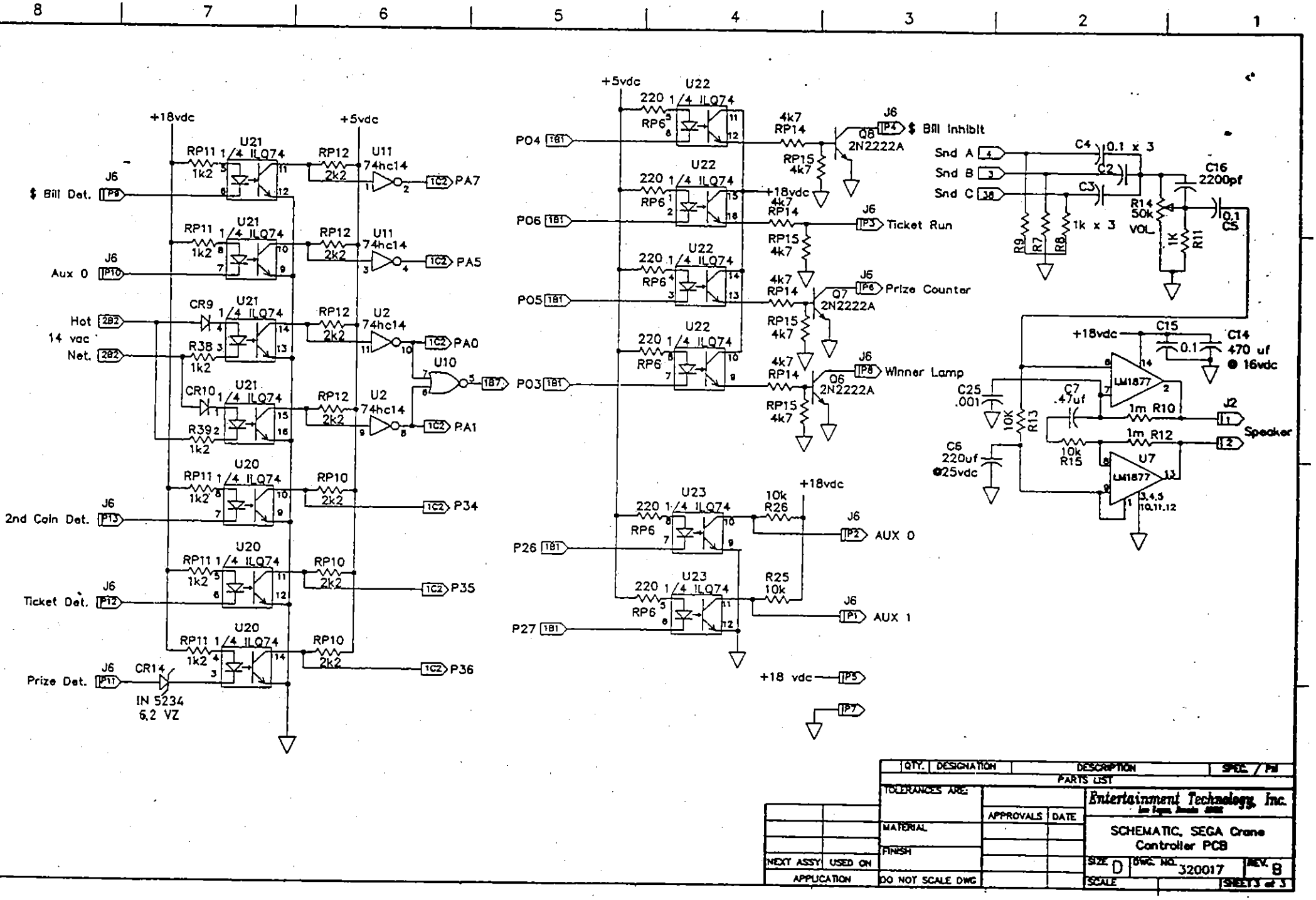
SCHEMATIC, SEGA Crane
Wire Diagram

SIZE D | DWG. NO. 340017 | REV. A

SCALE | SHEET 1 of 2

SONIC
SUPER CRANE
WITH COIN METER


Coin In Det.
Forward Limit
Left Limit
Claw Position
Foward (Start/Drop)
Lateral 3 (Right Motion)
Lateral 2 (Left Motion)
Lateral 1 (Foward Motion)
Lateral 0 (Back Motion)
Claw Limit
Fwd/Left Limit (Gnd)
Fwd Sw/Light
Claw Coil
Lateral Light (+18vdc)
Coin In Sw
Claw Motor
Right / Left Motor
Forward BACK MOTOR
Claw Coil
Coin In Light / Lockout
Lateral Light
Fwd Light
16 vac Hot
16 vac Comm
+18 vdc
C13 4700uf @ 25vdc
BR2 MDA100
F1 5amp
CLAW FORCE
NOTE: For 2 Button operation use Jumper A-C
For Joy Stick Operation use Jumper A-B
Entertainment Technology, Inc.
SCHEMATIC, SEGA Crane Controller PCB
DWG. NO. 320017
REV. B
SIZE D
SHEET 2 OF 3



QTY.	DESIGNATION	DESCRIPTION	SPEC. / Pal
		PARTS LIST	

TOLERANCES ARE:		Entertainment Technology, Inc.	
	APPROVALS	DATE	
MATERIAL			SCHEMATIC, SEGA Crane Controller PCB
FINISH			
NEXT ASSY	USED ON	SIZE D	DWG. NO. 320017 REV. B
APPLICATION	DO NOT SCALE DWG	SCALE	SHEET 3 of 3

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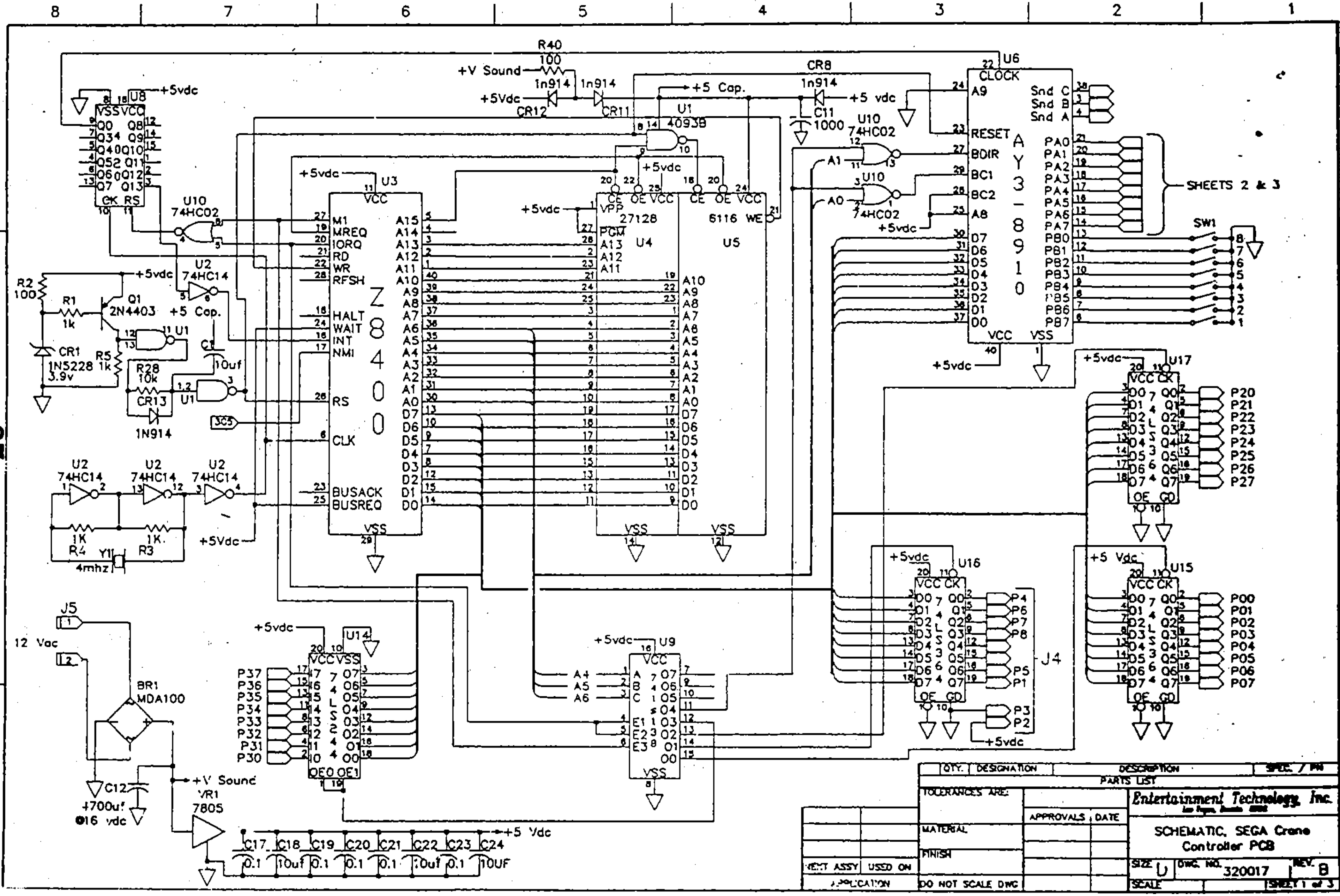
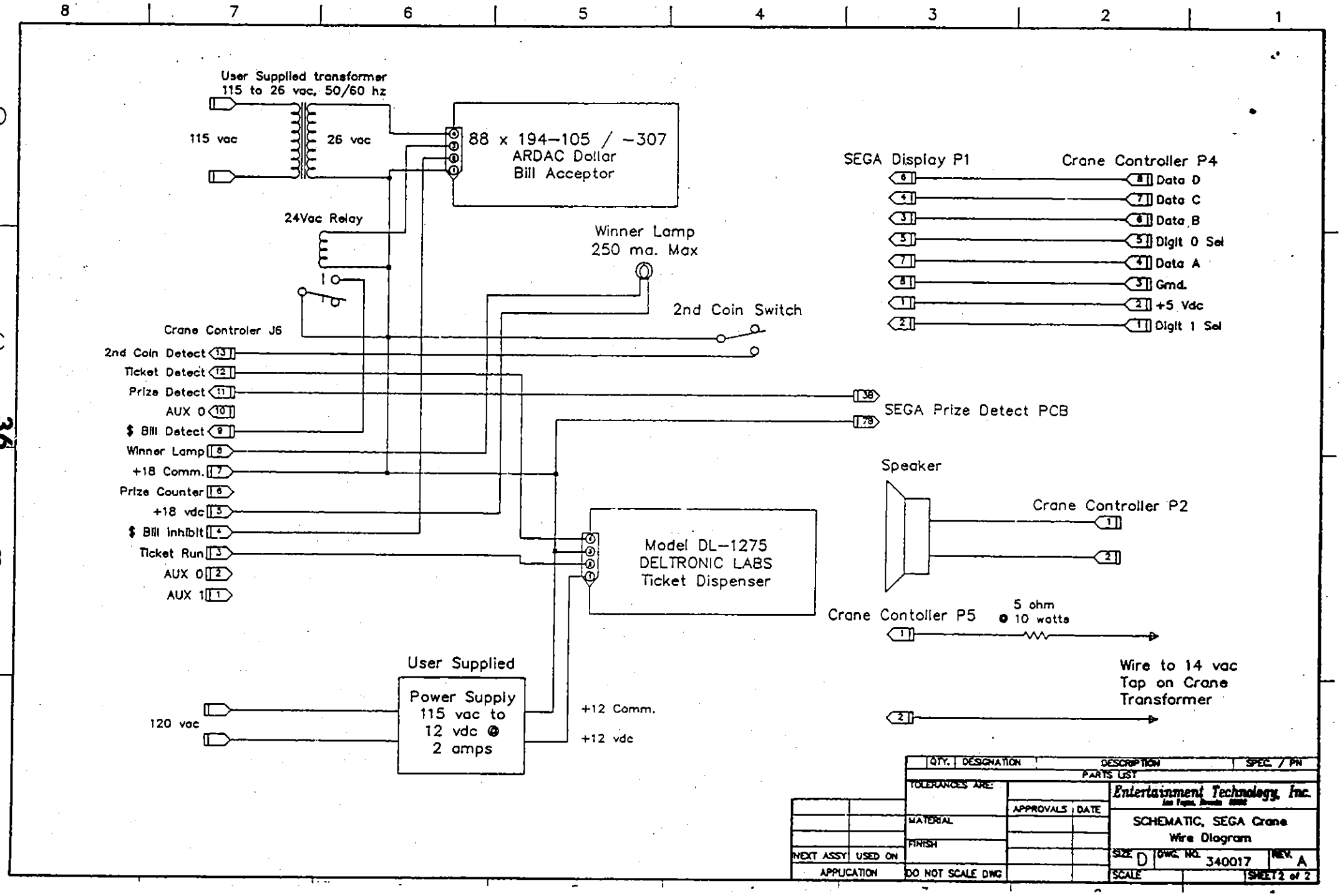


U6 AY-3-8910
U3 Z8400
U4 27128
U5 6116
U1 4093B
U10 74HC02
U2 74HC14
U8
U9
U14 74LS240
U15 74LS374
U16 74LS374
U17 74LS374
J4
J5
SW1
SHEETS 2 & 3
R40 100
+V Sound
CR8 1n914
CR11 1n914
CR12 1n914
C11 1000
+5 Cap.
+5 vdc
R2 100
R1 1k
Q1 2N4403
CR1 1N5228 3.9v
R5 1k
R28 10k
CR13 1N914
C1 10uf
R4 1K
R3 1K
Y1 4mhz
12 Vac
BR1 MDA100
C12 4700uf @16 vdc
VR1 7805
C17 C18 C19 C20 C21 C22 C23 C24
0.1 10uf 0.1 0.1 0.1 10uf 0.1 10UF
+5 Vdc
QTY. DESIGNATION DESCRIPTION SPEC. / P/N
PARTS LIST
TOLERANCES ARE:
APPROVALS DATE
MATERIAL
FINISH
NEXT ASSY USED ON
APPLICATION
DO NOT SCALE DWG
Entertainment Technology, Inc.
SCHEMATIC, SEGA Crane Controller PCB
SIZE D DWG. NO. 320017 REV. B
SCALE SHEET 1 of 3


User Supplied transformer
115 to 26 vac, 50/60 hz
115 vac
26 vac
88 x 194-105 / -307
ARDAC Dollar
Bill Acceptor
24Vac Relay
Winner Lamp
250 ma. Max
2nd Coin Switch
Crane Controler J6
2nd Coin Detect 13
Ticket Detect 12
Prize Detect 11
AUX 0 10
$ Bill Detect 9
Winner Lamp 8
+18 Comm. 7
Prize Counter 6
+18 vdc 5
$ Bill Inhibit 4
Ticket Run 3
AUX 0 2
AUX 1 1
SEGA Display P1
Crane Controller P4
6 Data D
4 Data C
3 Data B
5 Digit 0 Sel
7 Data A
8 Gnd.
1 +5 Vdc
2 Digit 1 Sel
36
78
SEGA Prize Detect PCB
Speaker
Crane Controller P2
1
2
Model DL-1275
DELTRONIC LABS
Ticket Dispenser
Crane Contoller P5
5 ohm
10 watts
1
Wire to 14 vac
Tap on Crane
Transformer
2
User Supplied
Power Supply
115 vac to
12 vdc @
2 amps
120 vac
+12 Comm.
+12 vdc
QTY. DESIGNATION DESCRIPTION SPEC. / PN
PARTS LIST
TOLERANCES ARE:
APPROVALS DATE
MATERIAL
FINISH
NEXT ASSY USED ON
APPLICATION
DO NOT SCALE DWG
Entertainment Technology, Inc.
SCHEMATIC, SEGA Crane
Wire Diagram
SIZE D DWG. NO. 340017 REV. A
SCALE SHEET 2 of 2

PARTS LIST

PARTS LIST

PARTS LIST

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8A-9413	Espejo trasero Mirror rear	11
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