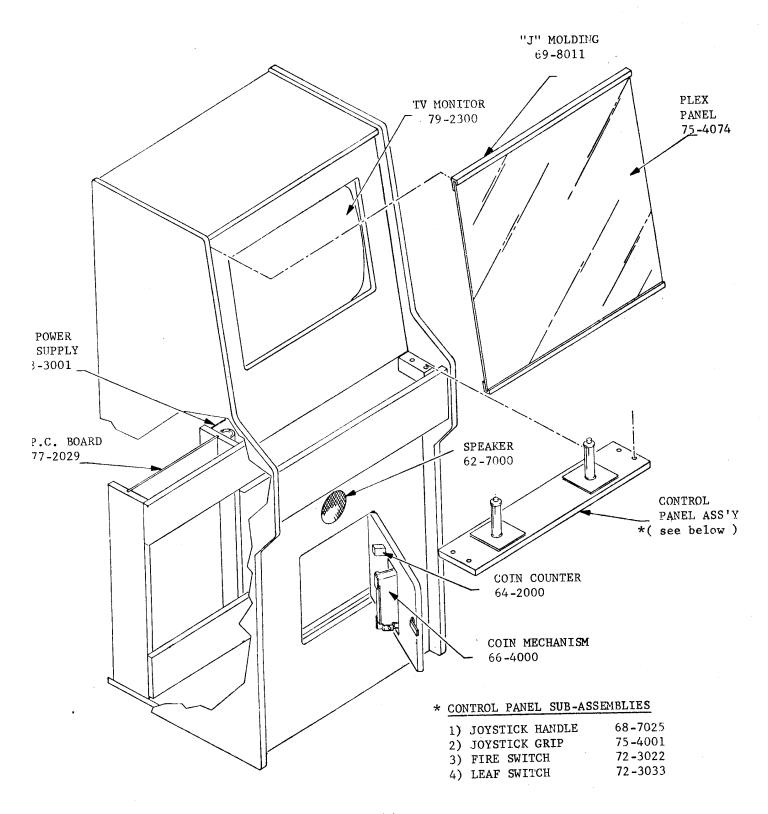
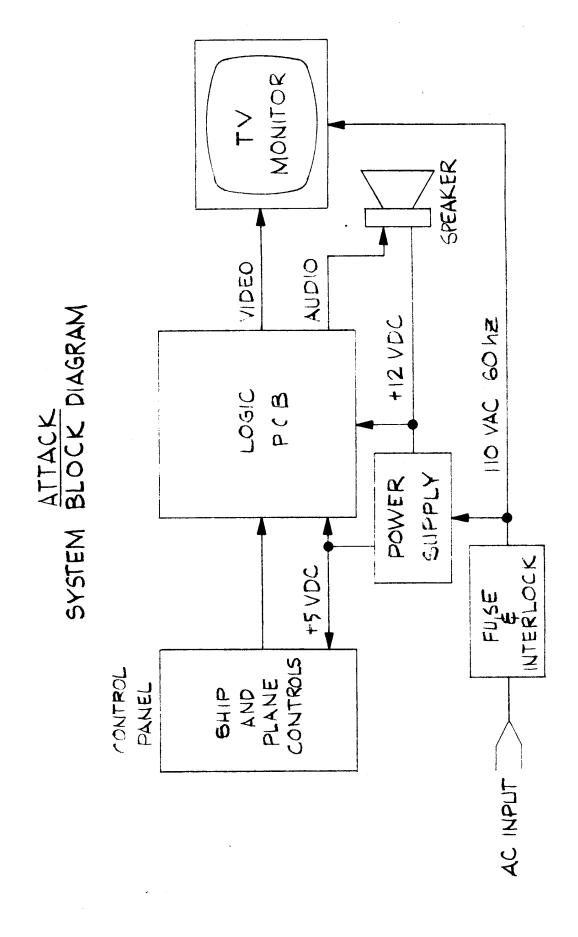
BY Exidy

**SERVICE MANUAL** 

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P.C. Board Logic Diagram Back of	Manua1





#### I. Adjustments

#### A. Power Supply Adjustment

Proper operation of this game is absolutely dependent on proper adjustment of the +5vdc power supply.

Before attempting to operate or troubleshoot this game, measure and adjust, as necessary, the +5vdc power supply voltage.

Measure voltage with meter leads contacting +5vdc and ground traces on P.C.B., near the 6 pin connector.

The power supply voltage is set at the factory, but shocks due to shipping and handling may cause this setting to vary.

#### B. Volume Adjustment

Sound volume is adjustable using the pot on the P.C.B. nearest the 22 pin connector.

#### C. Game Time Adjustment

Game time (length of game) is adjustable using the pot on the P.C.B. nearest the 6 pin connector.

## Troubleshooting Tips

Blown fuse   Replace   Replace   Check switch alignment   Repair or replace   Bad TV Monitor   Repair or replace   Bad TV Monitor   Repair or replace   Bad TV Monitor   Repair or replace   Check output of power supply for +5vdc. If not present, replace power supply for +5vdc. If not present, replace power supply harness. Wire attached to cap should have +12vdc.   Repair or replace	SYMPTOM	POSSIBLE CAUSE	SOLUTION
Bad TV Monitor   Repair or replace   Bad power supply   Repair or replace		Blown fuse	Replace
Bad TV Monitor   Repair or replace   Bad power supply   Repair or replace	Nothing happens	Interlock switch not closing	check switch alignment
Bad P.C.B.  Bad TV Monitor  No +5vdc  Repair or replace Check output of power supply for +5vdc. If not present, replace power supply.  Repair or replace Repair or replace Repair or replace Repair or replace Power supply.  Repair or replace Repair or replace Repair or replace Check power supply harness. Wire attached to cap should have +12vdc. Replace Repair or replace Repair or replace Repair or replace Check microswitch and mechanism.  All controls completely inoperative  Bad P.C.B.  Ground wire to control harness open (disconnected)  Bad P.C.B.  Repair or replace Repair  Repair or replace Some to work OK sometimes, other times not.  Bad P.C.B. Repair or replace Solder 12" long 22 awg. Game is static Weather		Bad TV Monitor	Repair or replace
Game has sound but no picture  Bad TV Monitor  No +5vdc  No +5vdc  Bad TV Monitor  No +5vdc  Repair or replace  Repair or replace  Check output of power supply for +5vdc. If not present, replace power supply.  Repair or replace  Check power supply harness. Wire attached to cap should have +12vdc.  Replace  Game does not start with coin  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Repair or replace  Check microswitch and mechanism.  All controls completely inoperative  Bad P.C.B.  Ground wire to control harness open (disconnected)  Bad P.C.B.  Bad leaf switches in control panel  Control panel  Came is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad leaf switches in control panel  Carpet  Carpet  Carpet  Solder 12" long 22 awg.  Game is static	Game blows fuses	Bad power supply	Repair or replace
Game has sound but no picture  No +5vdc  No +5vdc  Check output of power supply for +5vdc. If not present, replace power supply.  Bad P.C.B.  Bad P.C.B.  Repair or replace  Check power supply.  Repair or replace  Check power supply harness. Wire attached to cap should have +12vdc.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Cround wire to control harness open (disconnected)  Bad P.C.B.  Some controls  inoperative  Bad P.C.B.  Some controls  Bad P.C.B.  Came is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Carpet  Carpet  Carpet  Solder 12" long 22 awg.  Game is static  Weather  Solder 12" long 22 awg.  Game in supplicate  Check output of power supply.  Repair or replace  Check power supply harness. Wire attached to cap should have +12vdc.  Repair or replace  Solder 12" long 22 awg.  insulated wire to pin	Game has sound but		Repair or replace
No +5vdc  Check output of power supply for +5vdc. If not present, replace power supply.  Bad P.C.B. Repair or replace  Check power supply harness. Wire attached to cap should have +12vdc.  Bad speaker Replace  Same does not start with coin  All controls completely inoperative  Bad P.C.B. Repair or replace  Check microswitch and mechanism.  Repair or replace  Check microswitch and mechanism.  Repair or replace  Some controls is unreliable.  Adjust power supply.  Measure voltage with test leads on P.C.B. (near 6 pin connector).  Repair or replace  Solder 12" long 22 awg.  Game is static  Weather  Check microswitch and mechanism.  Repair or replace  Solder 12" long 22 awg.  insulated wire to pin			Repair or replace
Supply for +5vdc. If not present, replace power supply.  Bad P.C.B. Repair or replace Check power supply harness. Wire attached to cap should have +12vdc.  Bad speaker Repair or replace Came does not start with coin  All controls completely inoperative  Bad P.C.B. Repair or replace  Cround wire to control harness open (disconnected)  Bad P.C.B. Repair or replace  Some controls inoperative  Some is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B. Repair or replace  Bad P.C.B. Repair or replace  Replace (even if just bent). Once bent, switch is unreliable.  Adjust power supply.  Measure voltage with test leads on P.C.B. (near 6 pin connector).  Repair or replace  Solder 12" long 22 awg.  Game is static  Weather  Solder 12" long 22 awg.  insulated wire to pin		No +5vdc	Check output of power
Game has picture but no sound  Bad P.C.B.  Bad P.C.B.  No +12vdc  Check power supply harness. Wire attached to cap should have +12vdc.  Replace  Game does not start with coin  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Ground wire to control harness open (disconnected)  Bad P.C.B.  Some controls inoperative  Bad P.C.B.  Bad leaf switches in control panel  Came is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad leaf switches in control panel  Came is static  Bad P.C.B.  Bad P.C			supply for +5vdc. If
Game has picture but no sound  Bad P.C.B.  Bad P.C.B.  No +12vdc  Check power supply harness. Wire attached to cap should have +12vdc.  Replace  Game does not start with coin  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Ground wire to control harness open (disconnected)  Bad P.C.B.  Some controls inoperative  Bad P.C.B.  Bad leaf switches in control panel  Came is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad leaf switches in control panel  Came is static  Bad P.C.B.  Bad P.C			not present, replace
Game has picture but no sound  Bad P.C.B.  No +12vdc  Check power supply harness. Wire attached to cap should have +12vdc.  Replace  Bad speaker  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad coin mechanism  All controls completely inoperative  Bad P.C.B.  Some controls inoperative  Some controls  inoperative  Came is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad leaf switches in control panel  Came is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad leaf switches in control panel  Came is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Carpet  Carpet  Solder 12" long 22 awg. insulated wire to pin		·	
Game has picture but no sound  Bad speaker Replace  Game does not start with coin  All controls completely inoperative  Some controls inoperative  Game is erratic. Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad leaf switches in control panel  Came is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad leaf switches in control panel  Came is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Carpet  Carpet  Solder 12" long 22 awg. insulated wire to pin	Came has nicture	Bad P.C.B.	
but no sound  Bad speaker  Game does not start with coin  All controls completely inoperative  Some controls inoperative  Game is erratic. Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad leaf switches in control panel			
Game does not start with coin  Bad speaker  Bad P.C.B.  Bad leaf switches in control panel bent). Once bent, switch is unreliable.  Game is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bepair or replace  Bad P.C.B.  Bad P.C	-		
Game does not start with coin  Bad P.C.B. Bad coin mechanism  All controls completely inoperative  Bad P.C.B.  Repair or replace  Repair  Repair or replace  Seems to work OK  Seems to work OK  Sometimes, other  times not.  Bad P.C.B.  Bad P.C.B.  Repair or replace  Solder 12" long 22 awg.  insulated wire to pin	300 110 300111		cap should have +12vdc.
Game does not start with coin  Bad P.C.B. Bad coin mechanism  All controls completely inoperative  Bad P.C.B.  Repair or replace  Repair  Repair or replace  Seems to work OK  Seems to work OK  Sometimes, other  times not.  Bad P.C.B.  Bad P.C.B.  Repair or replace  Solder 12" long 22 awg.  insulated wire to pin		Bad speaker	Replace
Start with coin  Bad coin mechanism  Check microswitch and mechanism.  Repair or replace  Repair  Sont control panel  bent). Once bent, switch  is unreliable.  Adjust power supply.  Measure voltage with test  leads on P.C.B. (near 6  pin connector).  Repair or replace  Solder 12" long 22 awg.  Game is static  Weather  Repair or replace  Solder 12" long 22 awg.  insulated wire to pin	Game does not		
All controls completely inoperative  Bad P.C.B.  Ground wire to control harness open (disconnected)  Bad P.C.B.  Some controls inoperative  Bad leaf switches in control panel  Game is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Bad leaf switches in control panel  Bad P.C.B.  Bad leaf switches in Replace (even if just bent). Once bent, switch is unreliable.  Adjust power supply.  Measure voltage with test leads on P.C.B. (near 6 pin connector).  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Carpet  Solder 12" long 22 awg.  Game is static  Weather  Insulated wire to pin		· · · · · · · · · · · · · · · · · · ·	
All controls completely inoperative  Bad P.C.B.  Ground wire to control harness open (disconnected)  Bad P.C.B.  Bad P.C.B.  Repair or replace Repair	Statt with com		mechanism.
pletely inoperative    Ground wire to control harness open (disconnected)   Bad P.C.B.   Repair or replace		Bad P.C.B.	Repair or replace
harness open (disconnected)  Bad P.C.B.  Some controls inoperative  Bad leaf switches in Replace (even if just bent). Once bent, switch is unreliable.  Game is erratic. Seems to work OK Sometimes, other times not.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Bad P.C.B.  Carpet  Carpet  Solder 12" long 22 awg. Game is static			Repair
Some controls inoperative  Game is erratic. Seems to work OK sometimes, other times not.  Bad leaf switches in control panel  Bad leaf switches in control panel  Control panel  Bad leaf switches in control panel  Low +5vdc power  Bad P.C.B.  Bad P.C.B.  Carpet  Carpet  Solder 12" long 22 awg.  Game is static  Weather  Replace (even if just bent). Once bent, switches in substance in sulated wire to pin		harness open (disconnected)	
inoperative control panel bent). Once bent, switch is unreliable.  Game is erratic.  Seems to work OK Sometimes, other times not.  Bad P.C.B.  Carpet Solder 12" long 22 awg.  Game is static Weather insulated wire to pin		Bad P.C.B.	
is unreliable.  Game is erratic.  Seems to work OK  sometimes, other  times not.  Bad P.C.B.  Carpet  Game is static  is unreliable.  Adjust power supply.  Measure voltage with test leads on P.C.B. (near 6 pin connector).  Repair or replace  Solder 12" long 22 awg.  insulated wire to pin	Some controls	Bad leaf switches in	
Game is erratic.  Seems to work OK sometimes, other times not.  Bad P.C.B.  Carpet Solder 12" long 22 awg.  Game is static lisunreliable.  Adjust power supply.  Measure voltage with tes leads on P.C.B. (near 6 pin connector).  Repair or replace Solder 12" long 22 awg.  insulated wire to pin	inoperative	control panel	bent). Once bent, switch
Seems to work OK sometimes, other times not.  Bad P.C.B. Repair or replace Solder 12" long 22 awg.  Game is static Weather insulated wire to pin	•		
sometimes, other times not.  Bad P.C.B. Repair or replace Carpet Solder 12" long 22 awg.  Game is static Weather insulated wire to pin	Seems to work OK sometimes, other		
times not.  Bad P.C.B.  Carpet  Game is static  pin connector).  Repair or replace  Solder 12" long 22 awg.  insulated wire to pin		Low +5vdc power	Measure voltage with test
Carpet Solder 12" long 22 awg.  Game is static Weather insulated wire to pin			
Game is static Weather insulated wire to pin		Bad P.C.B.	
	Game is static sensitive		
Nearly designs asserting 20 of TO /D C D 22 min		Weather	
		Nearby devices generating	20 of J2 (P.C.B. 22 pin
high voltages and/or connector). Leave one		high voltages and/or	1
		high frequencies.	end hanging loose, taking
care that wire is prop-			
			erly insulated. If game
			shuts off too easily then,
trim the wire shorter as			trim the wire shorter as
necessary.			necessary.

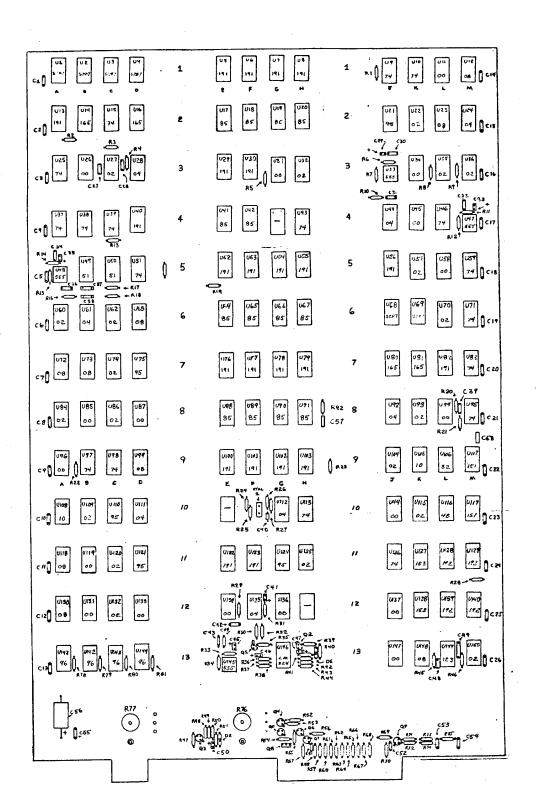
#### P.C. BOARD CONNECTOR PINOUT

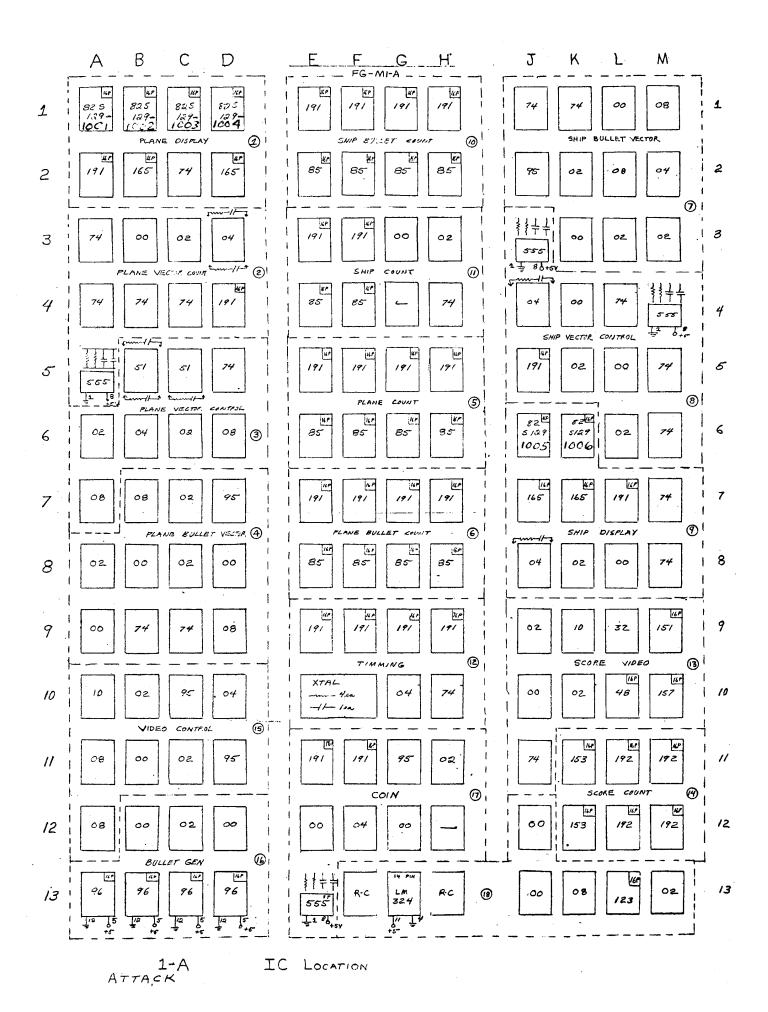
```
2. } GND
3. } +5V
4. } GND
6. } GND
```

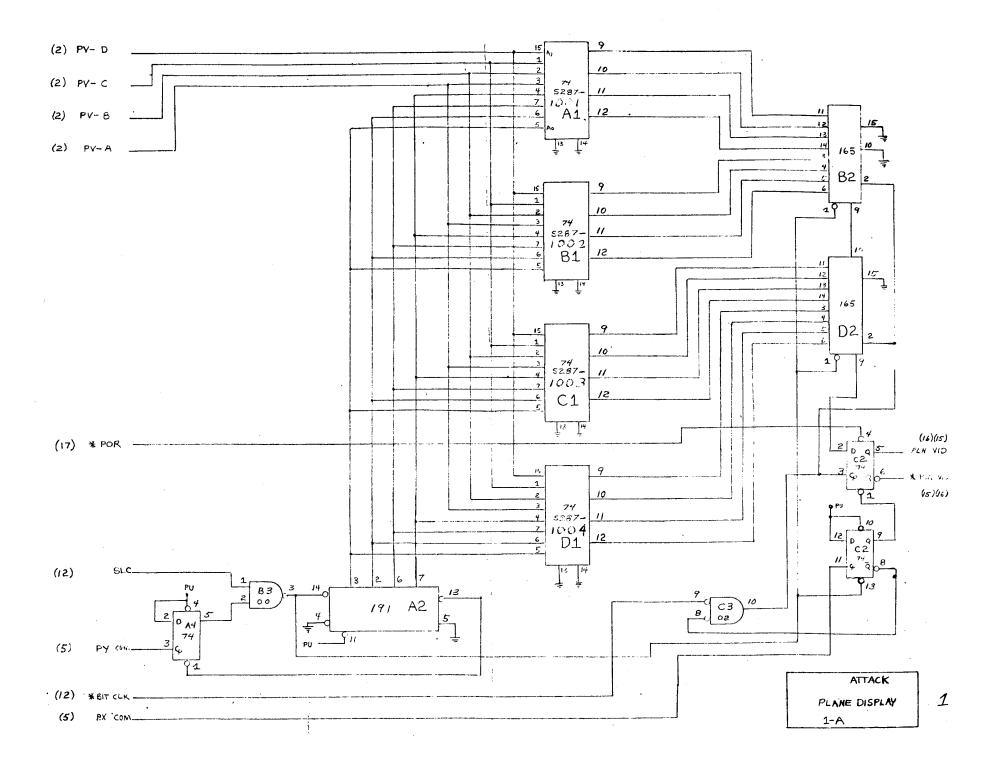
```
1. +12v (and one side of SPKR)
    SPKR (direct)
2.
3.
    GND
4.
5.
6.
    *SML....(ship move left)
7.
8.
    *SMR.....(ship move right)
    *SHP GR.....(ship gun right)
9.
10.
    *SHP GL....(ship gun left)
    *SBF NO.....(ship button fire)
11.
     SBF NC.....(ship button fire)
12.
         NO.....(plane button fire)
13.
    *PBF
    *PBF
         NC.....(plane button fire)
14.
    *PLN SPD FST...(plane speed fast)
15.
    *PLN RCCW.....(plane rotate counter-clockwise)
16.
17.
    *PLN RCW.....(plane rotate clockwise)
18.
     COIN.....(coin drop)
19.
20.
     ANT.....(anti-static antenna)
21.
     VIDEO RETURN
22.
     TV VIDEO
```

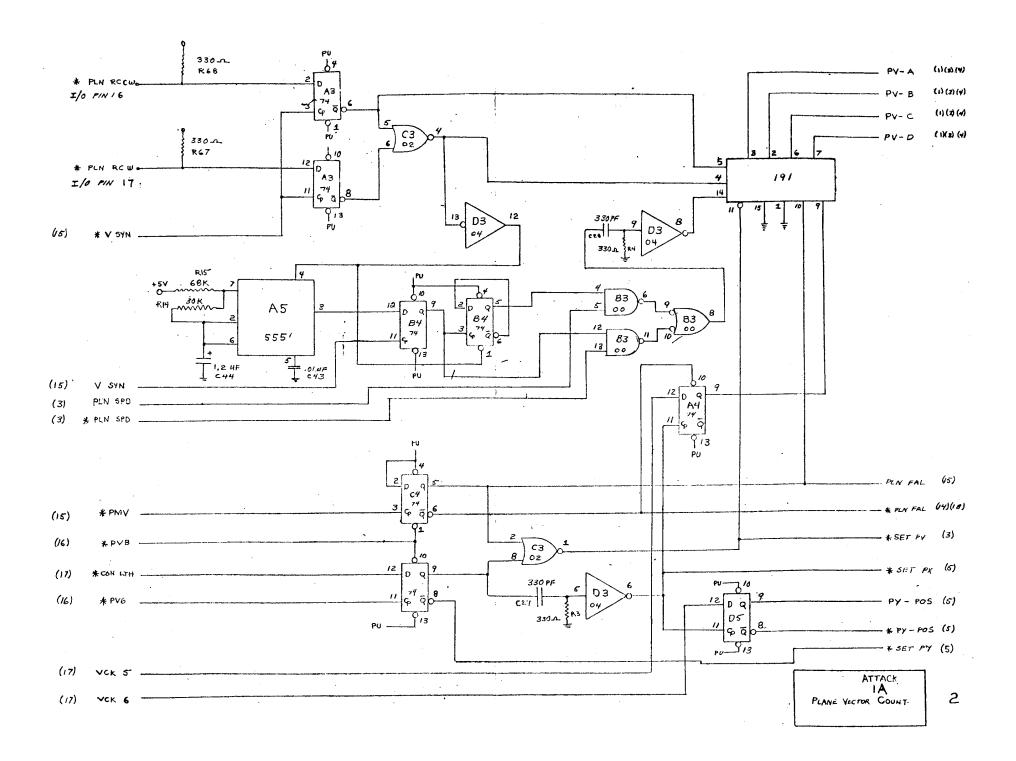
BY Exidy

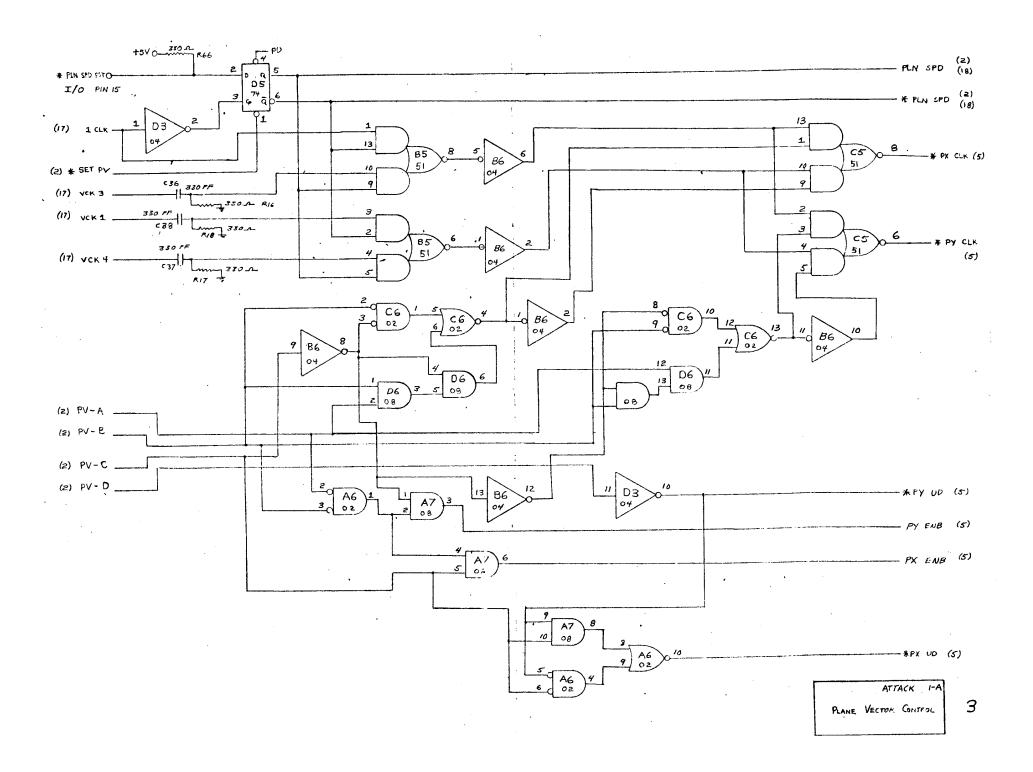
LOGIC DIAGRAM 1A

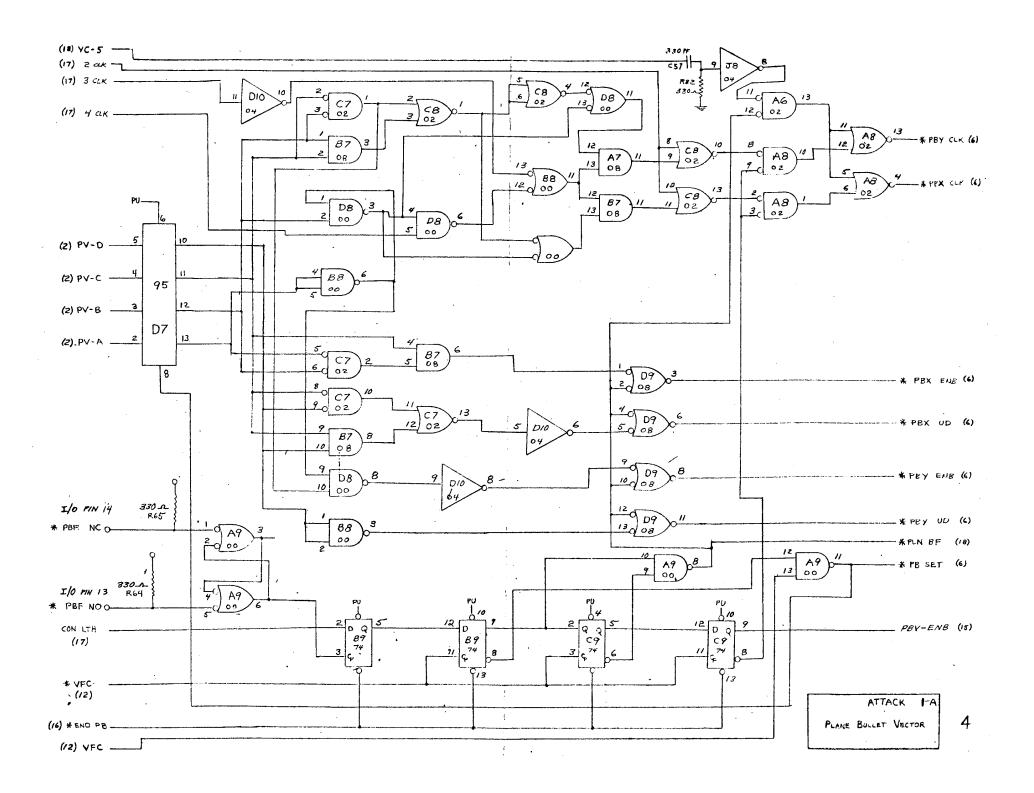


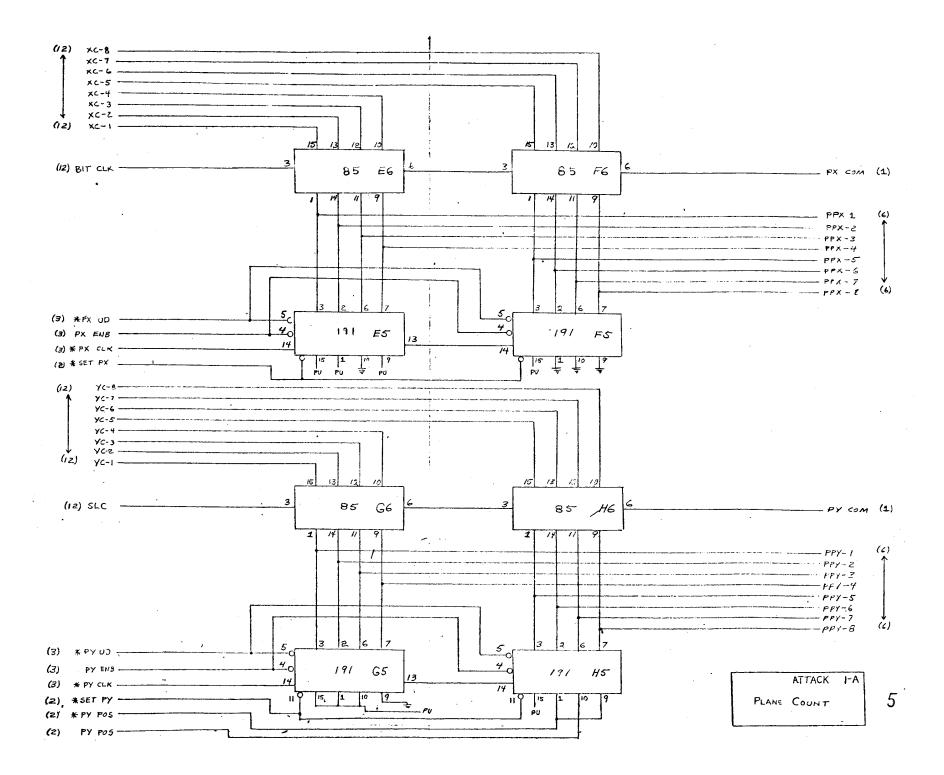


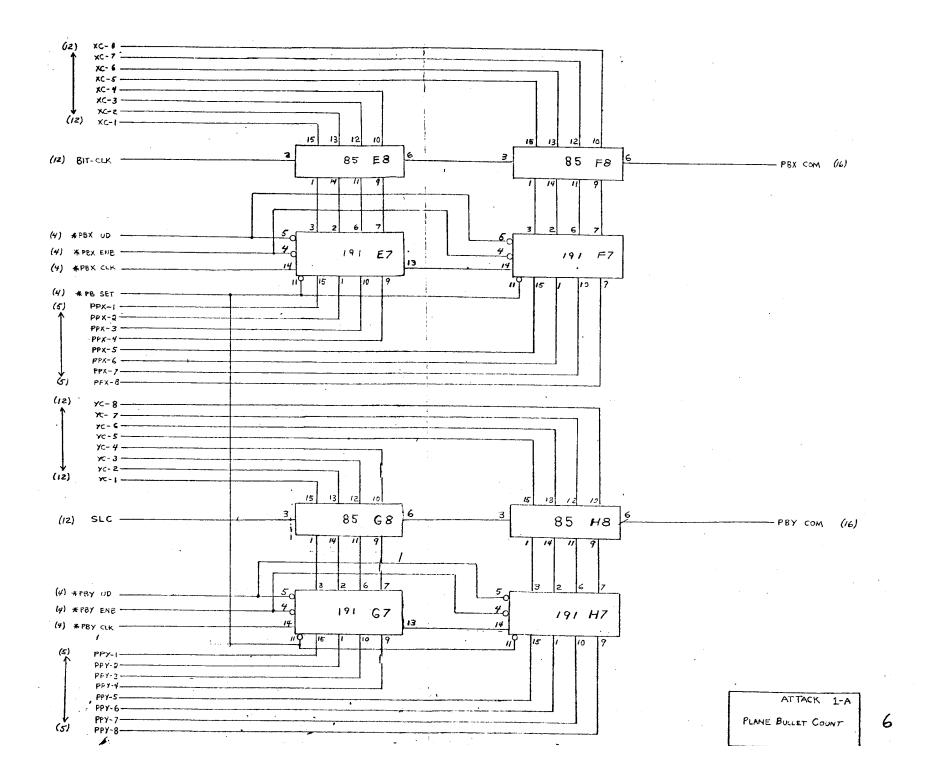


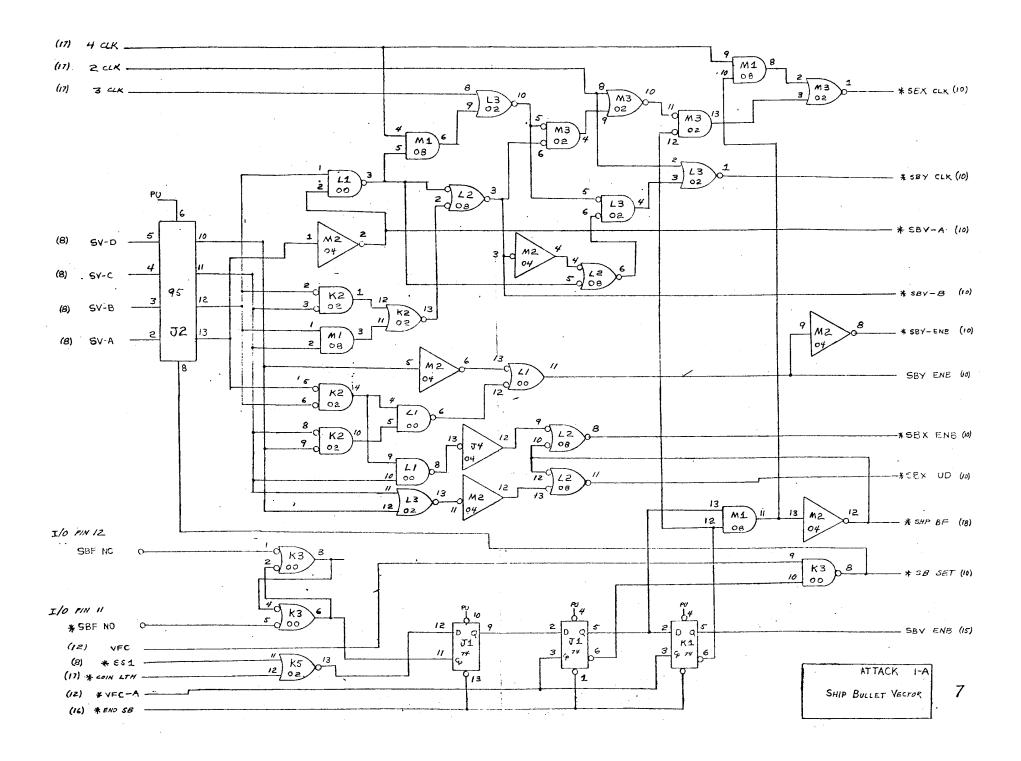


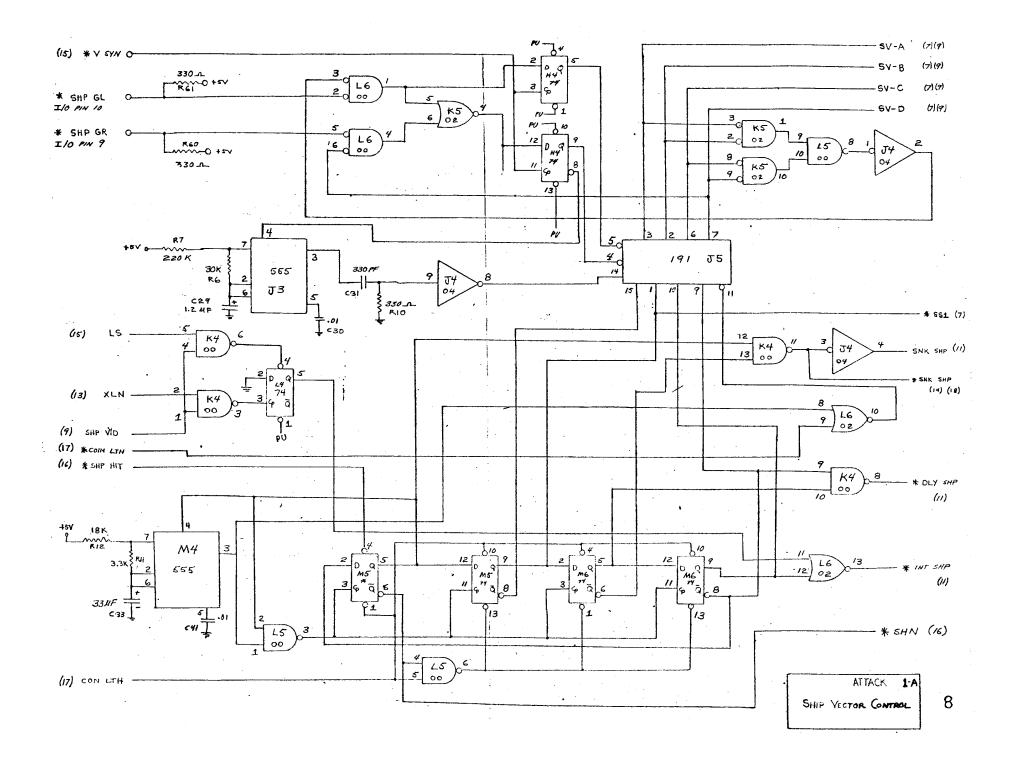


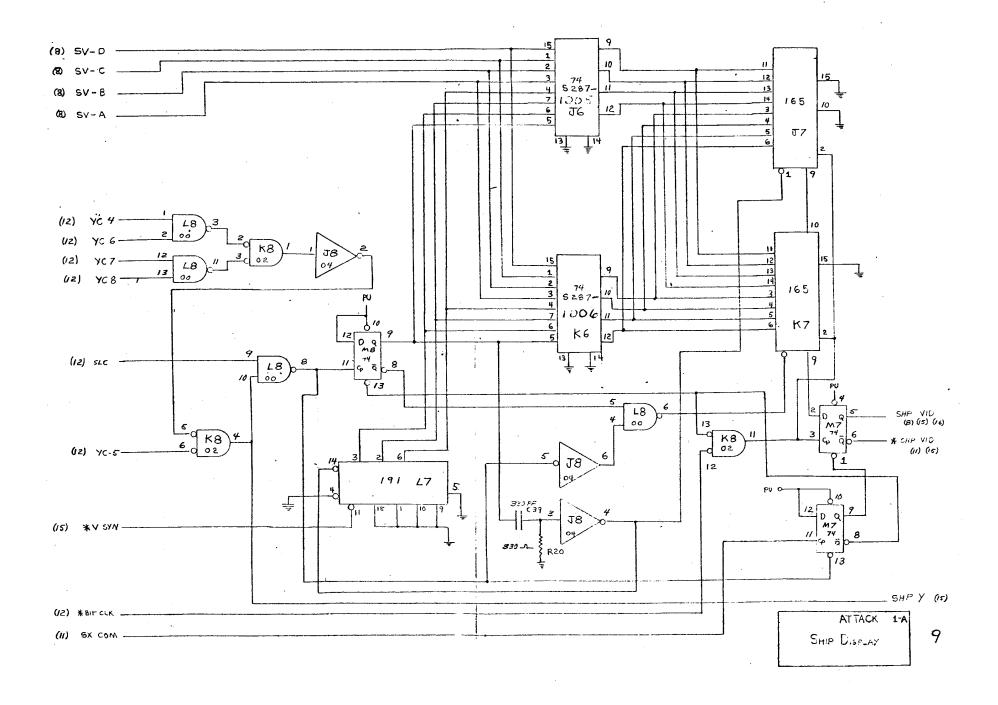


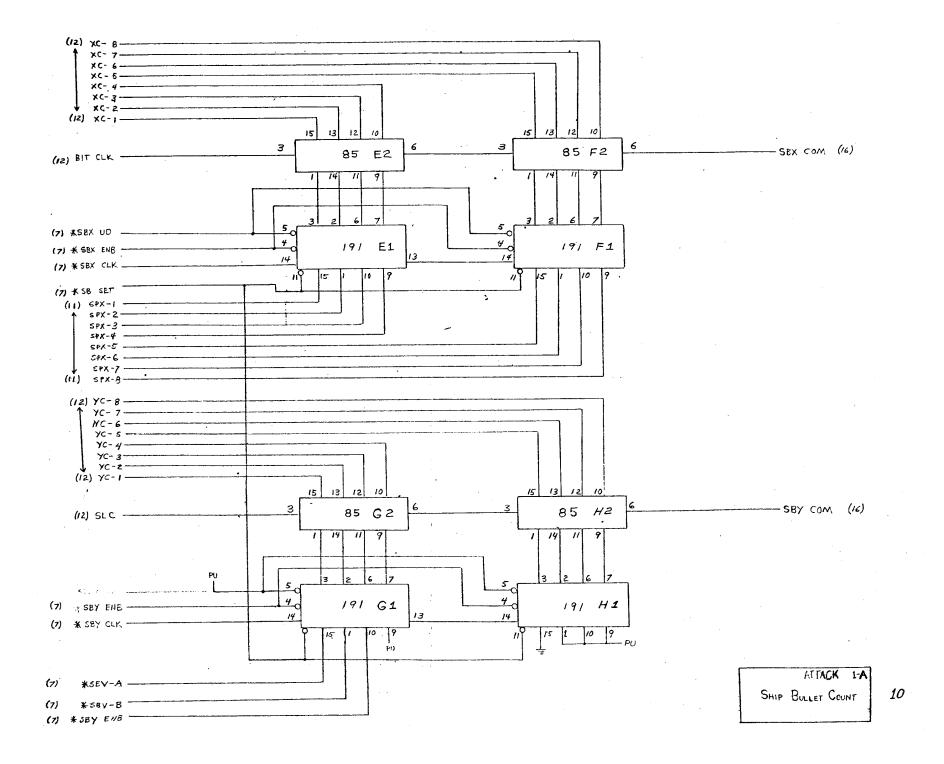


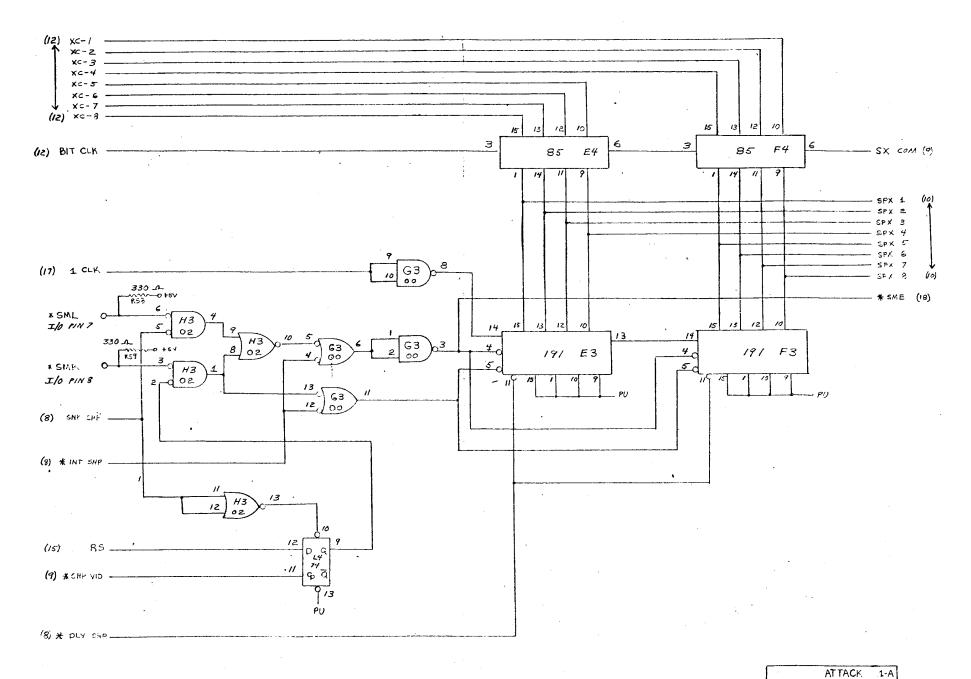






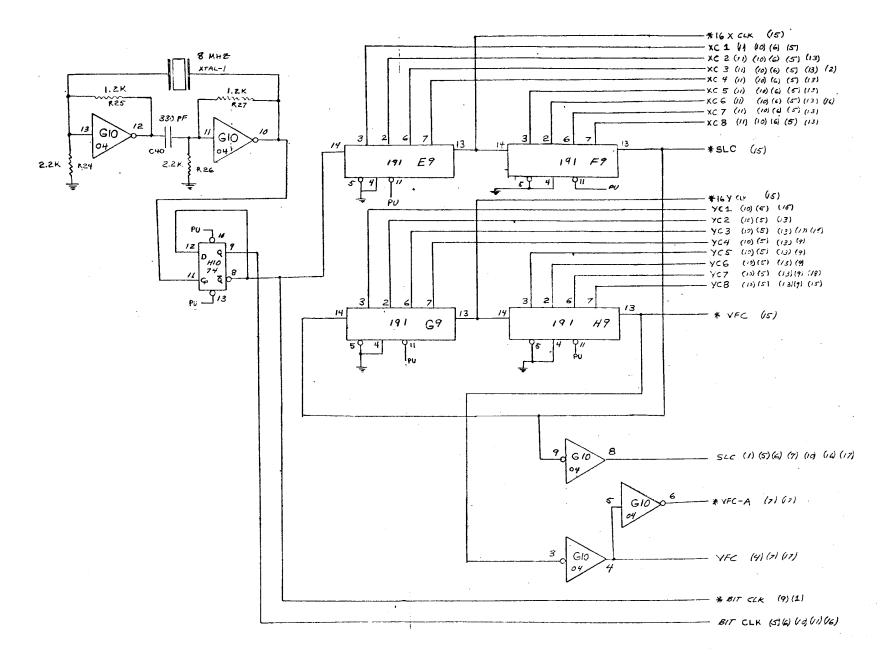






SHIP X COUNT

11



ATTACK 1-A

