Section 5: Troubleshooting

INTRODUCTION

The CD-100A Phonograph incorporates several modules which plug in for rapid service. The most likely causes of phonograph problems are:

1. Continuous or intermittent opens in a harness. The cause can be wiring, a terminal, or a bad terminal crimp.
   - Check that all plugs are firmly seated.
   - Check that connector pins are not bent, broken or pushed through the back of connectors when mated.
   - Check for bad solder joints, especially at connector pins.
2. A defective module *(see table 5-1)*. Troubleshooting procedures are directed at module replacement, not repair.

Table 5-1 Replaceable Modules

Part No.	Description
40832201	Central Control Computer (CCC)
61030703	Mechanism Control and CD decoder
30933702	CD Player
40770607	Power Supply
40832301	Digital Display
61038904	OBA-2 Control Unit

TROUBLESHOOTING AIDS

The troubleshooting topics presented in this section are:

- A summary of the functions for each of the phonograph's replaceable modules
- A sequence of operation explanation and a Block Diagram *(figure 5-1)* to help you isolate the problem to a harness or a module.
- The RED LED STATUS lamps *(figure 5-2)*
- Instructions on how to use the ERROR and WARNING messages
- Modular Troubleshooting Charts that list the *Trouble*, *Symptom*, and *Probable Cause*
- A Sound System Quick Check

NOTE:

OBA RED STATUS lamps and error messages are presented in this section. The other OBA service procedures are described in *Section 4* of this manual.

REPLACING THE CCC EPROM

If you have changed the CCC EPROM, use the following procedure to reset the CCC:

1. Turn phonograph power off at the SERVICE switch.
2. Press and hold the keyboard 0 and 1 switches down and place the SERVICE switch power to ON; hold the 0 and 1 buttons down until the display shows LOADING DEFAULTS. Do not be concerned when the 14-04 WARNING appears, because it is just a status message indicating that the defaults were loaded. For a fresh start, clear out this warning (CODE 81).

FREE PLAY

1. Enter the SERVICE mode by setting the SERVICE switch to the SERVICE position.
2. Enter 55. This will place you in the PRICING menu, OPTION 5. Press and hold RESET and press 9. The display will change from FPLAY STATUS OFF to FPLAY STATUS ON. Press POPULAR to complete the change.

CD MODULE FUNCTIONS

Digital Display Module

- A "dumb" controller (i.e. cannot make any decisions)
- Displays information sent by CCC
- Contains the TITLE DISPLAY motor driver IC. The IC is controlled by the CCC.

CCC

- The master controller
- Has battery backed up RAM
- Controls all credit functions
- Stores all selections
- Controls all programming functions
- Makes all system decisions
- Mutes and unmutes the audio amplifier

Mechanism Control

- A slave controller
- Plays selections sent by the CCC
- Controls all mechanism functions
- Controls the CD player

OBA-2 Control Unit

- A slave controller
- Tells CCC when a valid bill is accepted.

Rowelink and the Power Bus (voltages, Commons & System Reset) are the only connections between CCC, mechanism control and OBA-2 control unit. Rowelink is a 2-wire communication channel that ties the system components together. The ROWELINK COMMAND (CCC), SYSTEM TRANSMIT/ROWELINK RESPONSE (mechanism control), and RS-485 STATUS (OBA control unit) LED's should always be flickering.

SEQUENCE OF OPERATION

This sequence of operation describes the phonograph cycle and jobs performed by each module shown in the Block Diagram *(figure 5-1)*.

In the Block Diagram, the TITLE DISPLAY switches are shown in the PAGE 1 position. The mechanism OUTER CAM and INNER CAM switches are shown in the MAGAZINE ROTATE position.

Step 1. Power is turned on, voltages and commons are applied to modules and components.

At Line Voltage	Voltages Labeled	Should Measure
115 VAC	28 VAC	26 to 30 VAC
115 VAC	+28 VDC	+23 to +30 VDC
95 to 135 VAC	+8 VDC	+8.2 to +9.4 VDC
115 VAC	9.5 VAC	8.75 to 10 VAC

Step 2. The modules sense power turn on, no selections or credit in memory, and the SERVICE switch is in the NORMAL position.

CCC

- +5 VDC LED lights
- BOARD ERROR LED flashes 3 times to indicate that ROM, RAM and real time calendar clock have tested OK.
- ROWELINK COMMAND LED flickers, indicating that serial communication commands are being sent from the master (CCC) to the slaves (mechanism control and OBA-2).

Mechanism Control

- +5 VDC LED lights
- BOARD ERROR LED flashes 3 times to indicate that ROM, RAM and other checks have tested OK.
- SYSTEM TRANSMIT (Rowelink response) LED flickers indicating that communication is occurring between the mechanism control (a slave) and CCC (the master). Each time it flickers, communication has successfully occurred.

OBA-2 Control Unit

- +5 VDC LED lights
- +24 VDC LED lights
- BA STATUS LED flashes 1 time
- RS-485 STATUS LED flashes 1 time
- RS-485 STATUS LED flickers indicating communication occurring between OBA-2 control unit (a slave) and CCC (the master). Each time it flickers, communication successfully occurred.

Digital Display

- +5 VDC LED lights
- CCC serially sends information (via TX data, clock) and display shows:

- Checksum = XXXX
- RAM test passed
- 0 (selections remaining)
- After 10 seconds, the moving messages ROWE, CD PHONOGRAPH and PLAY THE MUSIC appear.

Step 3. Customer deposits money. Play credit is established.

- Money is deposited
- OBA-2 control unit tells CCC if a bill was validated and stacked.
  - CCC senses coins from the closed coin switches.
  - CCC uses pricing information (COIN SWITCH VALUES, PRICE LEVELS, PLAYS @ LEVEL and MULTIPLIER) stored in it, to convert money deposited into play credits.
- CCC sends (via TX data, clock) credits to digital display and they appear above the SELECTIONS REMAINING legend.
  - CCC tells the mechanism control the money's value and the mechanism control increments the money counter.

Step 4. Customer makes a selection.

- CCC determines that a switch is closed or open by sending out strobes and sensing returns.
- Customer finds the selection that he wants to make by using the keyboard IN (> <) and OUT (< >) switches.
- CCC sends out Strobes 1, 9 and 10 to the DIGITAL DISPLAY.
  - The motor driver in the DIGITAL DISPLAY uses Strobe 9 to control speed and Strobe 10 to control direction.
  - CCC determines when to stop the motor (i.e. a page has flipped) by sensing the state of the INDEX switch on return RET 1.
  - CCC determines when to change directions by sensing the state of the LIMIT switch on return RET 0, or using PAGE IN, OUT data in the ATTRACT menu.
  - Customer enters 4 digits (a 2-digit disc number and a 2-digit track number).
  - CCC senses the pushed keys by sending out Strobes 2, 3, 4, 5 and sensing returns RET 0, 1, 2 and 3.
  - Digital display shows digits as they are entered above the SELECTION BEING MADE.
  - Selection stored in the CCC's memory.
  - Credit is cancelled.
  - Selection is displayed for approximately 4 seconds after it is made.

Step 5. Selection is located and played.

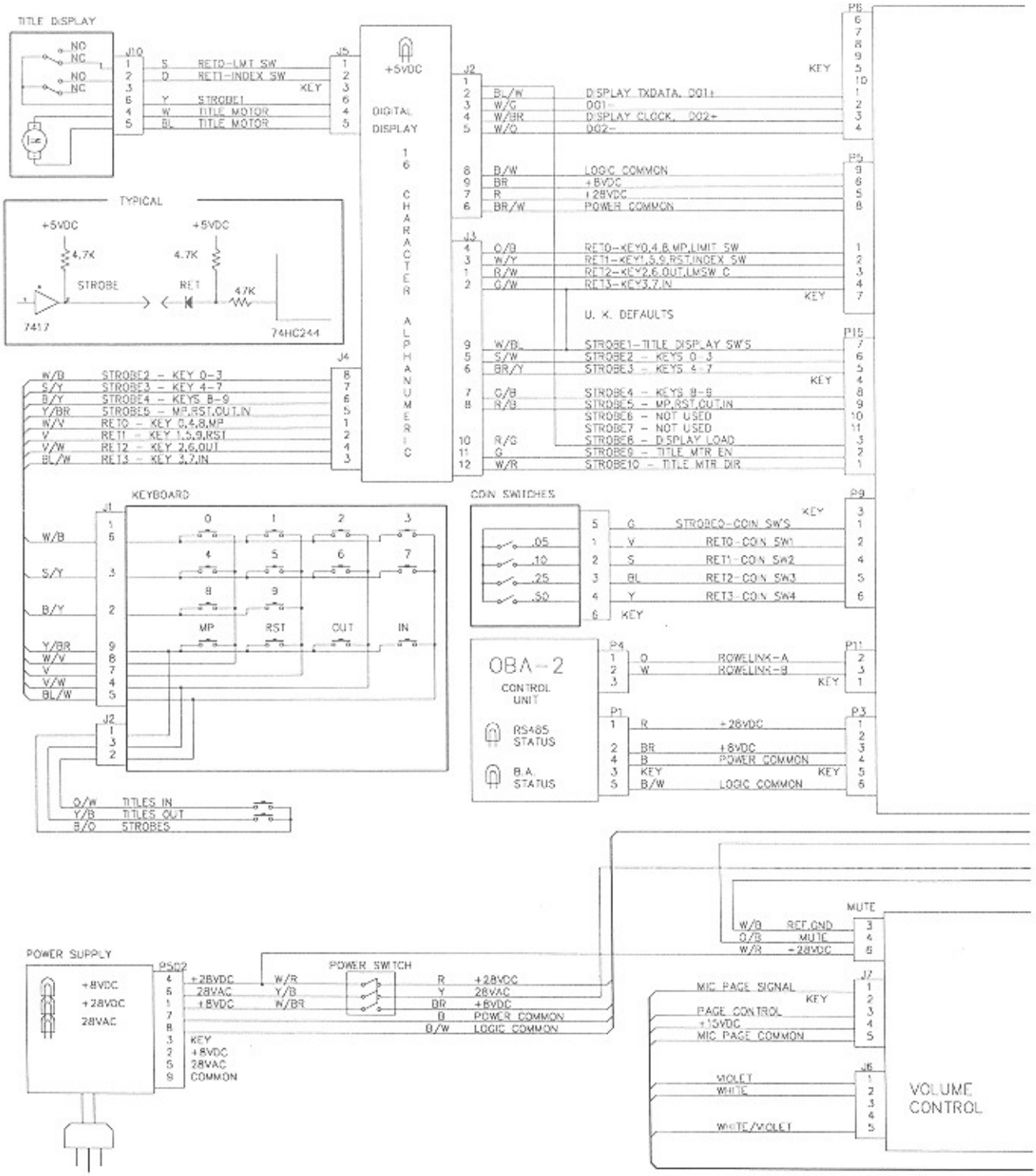
- CCC sends the selection to the mechanism control.
- Mechanism Control searches for the disc.
  - Detent coil is energized and the magazine unlocks.
  - Magazine motor rotates the magazine.
  - Mechanism control SCAN/TRANSFER LED lights.
  - Digital display shows the selection playing as — — — — .
  - Mechanism control locates the disc by counting gear teeth interruptions of the INDEX optical switch light beam.
- Disc located and transferred to the play position.
  - Magazine motor stops and the magazine locks (detented).
  - Transfer motor runs and the disc is placed in the play position.
  - Outer cam Common connected to the N.O. contact.
- Mechanism control SCAN/TRANSFER LED goes OFF.
- Mechanism control tells the CDM-3 what track (i.e. selection) to play.
- CDM-3 tells the mechanism control that the track has been located.
- Selection plays
  - Mechanism control tells the CCC that the selection is playing.
  - CCC unmutes the audio amplifier.
  - Selection is erased from CCC's memory.
  - Digital display shows that the selection is playing.
  - Mechanism control monitors the disc condition and tells the CCC if disc problems occur.

Step 6. Selection ends, the disc returns to magazine, the CCC searches selection memory.

- Mechanism control tells the CCC that the selection is over.
- CCC mutes the audio amplifier
- Transfer motor runs and the disc is returned to the magazine
  - Inner cam Common connects to the N.O. contact when the disc is in the magazine.
- CCC searches its selection memory. If it contains one or more selections, steps 5 and 6 are repeated.

Step 7. Phono returns to STANDBY and AUTOPLAY timing begins.

- All selections have played.
- Digital display shows moving messages: ROWE, CD PHONOGRAPH, and PLAY THE MUSIC.


TITLE DISPLAY
NC
NC
NO
NC
J10
S RET0-LMT SW
D RET1-INDEX SW
KEY
Y STROBE1
W TITLE MOTOR
BL TITLE MOTOR
J5
+5VDC
DIGITAL DISPLAY
1
6
CHARACTER ALPHANUMERIC
TYPICAL
+5VDC
+5VDC
4.7K
4.7K
STROBE
RET
47K
7417
74HC244
J4
W/B STROBE2 - KEY 0-3
S/Y STROBE3 - KEY 4-7
B/Y STROBE4 - KEYS 8-9
Y/BR STROBE5 - MP,RST,CUT,IN
W/V RET0 - KEY 0,4,8,MP
V RET1 - KEY 1,5,9,RST
V/W RET2 - KEY 2,6,OUT
BL/W RET3 - KEY 3,7,IN
KEYBOARD
J1
0 1 2 3
4 5 6 7
8 9
MP RST CUT IN
W/B
S/Y
B/Y
Y/BR
W/V
V
V/W
BL/W
J2
O/W TITLES IN
Y/B TITLES OUT
B/O STROBES
J2
KEY
BL/W DISPLAY TXDATA, D01+
W/G D01-
W/BR DISPLAY CLOCK, D02+
W/O D02-
B/W LOGIC COMMON
BR +8VDC
R +28VDC
BR/W POWER COMMON
J3
O/B RET0-KEY0,4,8,MP,LIMIT SW
W/Y RET1-KEY1,5,9,RST,INDEX SW
R/W RET2-KEY2,6,OUT,LMSW C
O/W RET3-KEY3,7,IN
KEY
U. K. DEFAULTS
W/BL STROBE1-TITLE DISPLAY SWS
S/W STROBE2 - KEYS 0-3
BR/Y STROBE3 - KEYS 4-7
KEY
O/B STROBE4 - KEYS 8-9
R/B STROBE5 - MP,RST,CUT,IN
STROBE6 - NOT USED
STROBE7 - NOT USED
R/G STROBE8 - DISPLAY LOAD
G STROBE9 - TITLE MTR EN
W/R STROBE10 - TITLE MTR DIR
P8
KEY
P5
P15
COIN SWITCHES
.05
.10
.25
.50
KEY
G STROBE9-COIN SW'S
V RET0-COIN SW1
S RET1-COIN SW2
BL RET2-COIN SW3
Y RET3-COIN SW4
P9
KEY
OBA-2
CONTROL UNIT
RS485 STATUS
B.A. STATUS
P4
O ROWELINK-A
W ROWELINK-B
KEY
P11
P1
R +28VDC
BR +8VDC
B POWER COMMON
KEY KEY
B/W LOGIC COMMON
P3
POWER SUPPLY
+8VDC
+28VDC
28VAC
PS02
+28VDC
28VAC
+8VDC
KEY
+8VDC
28VAC
COMMON
POWER SWITCH
W/R
Y/B
N/BR
R +28VDC
Y 28VAC
BR +8VDC
B POWER COMMON
O/W LOGIC COMMON
MUTE
W/B REF GND
O/B MUTE
W/R +28VDC
MIC PAGE SIGNAL
KEY
PAGE CONTROL
+10VDC
MIC PAGE COMMON
J7
VIOLET
WHITE
WHITE/VIOLET
J6
VOLUME CONTROL

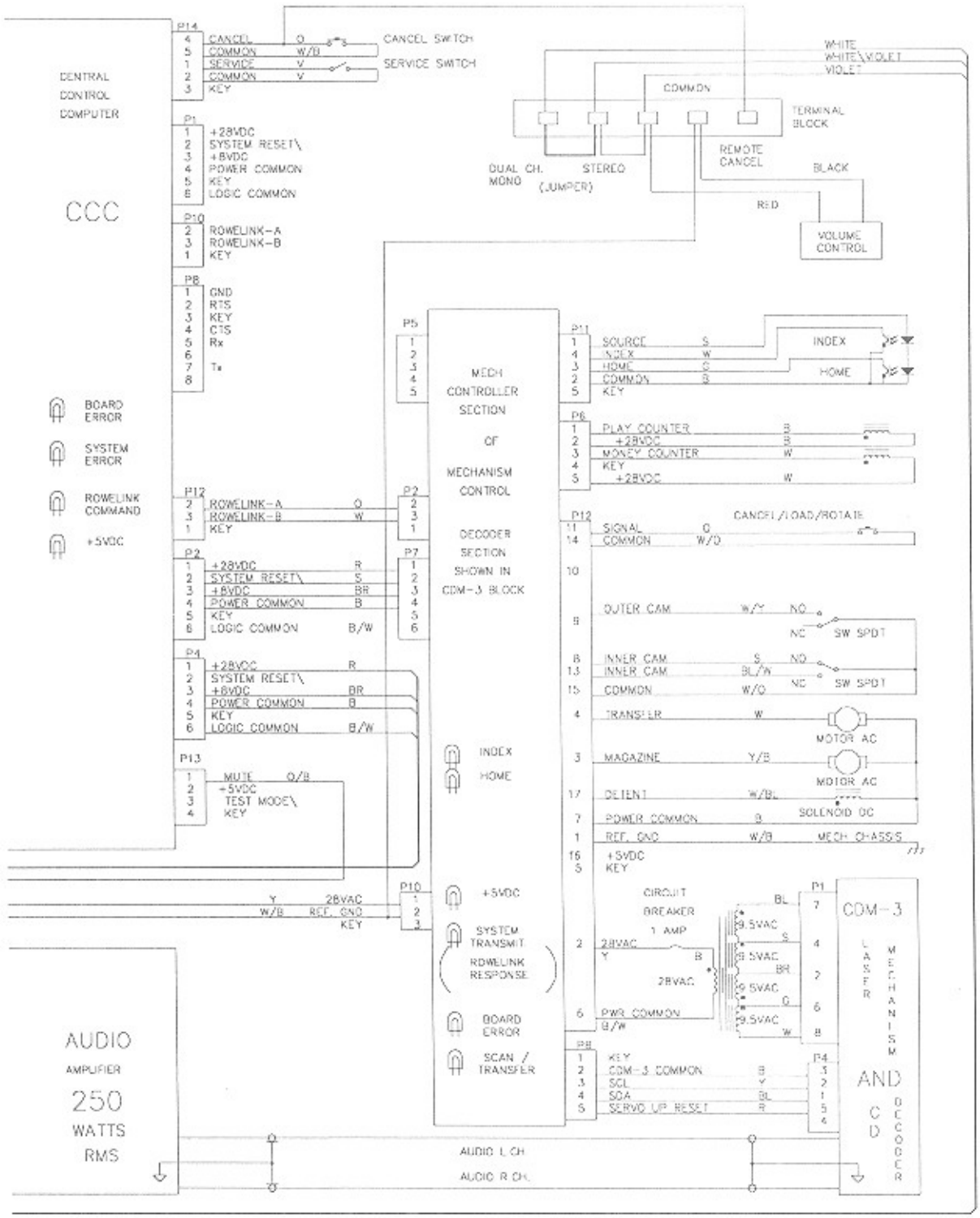


Figure 5-1. CD-100A Block Diagram

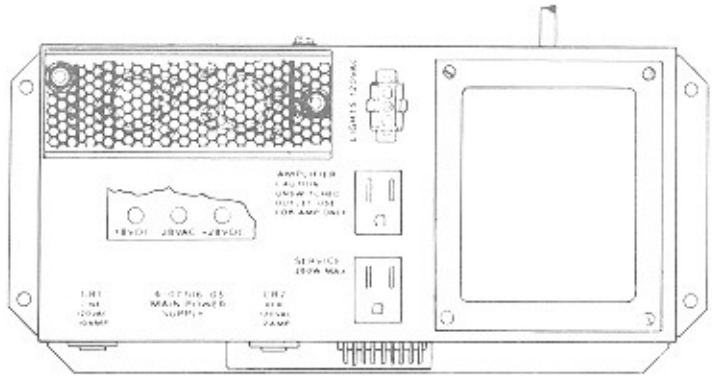
STATUS LAMPS

The red LED indicators are connected to various strategic points in the phonograph's circuits to indicate the status of power and signal circuits.

Main Power Supply LED's

+8 Volts DC
+28 Volts DC
28 Volts AC

These indicators light when their corresponding voltages are present and no wiring shorts are present.



Main Power Supply

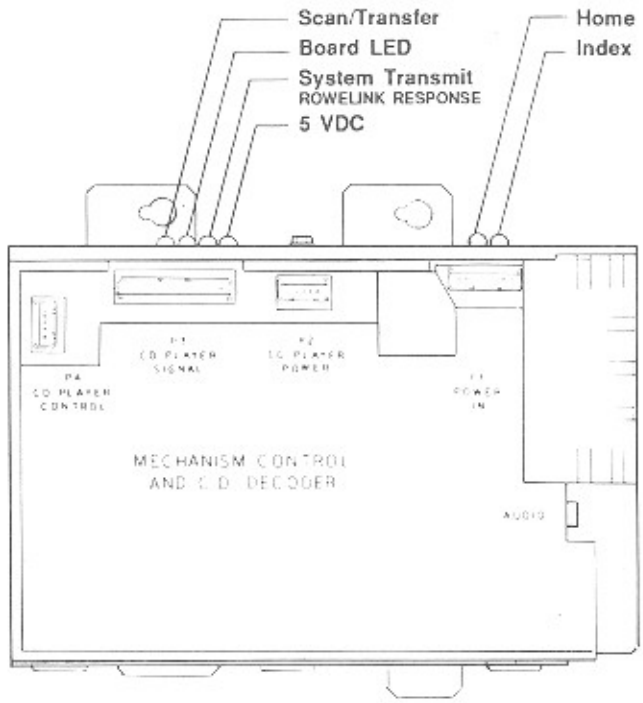
Mechanism Control And CD Decoder

OPT. SW. INDEX — Lights when the index section of the optical switch sees a tooth space of the magazine drive gear. Flickers when the magazine rotates.

OPT. SW. HOME — Lights when the HOME section of the optical switch sees the hole in the magazine drive gear. Flickers when the magazine CD Position 99 passes the transfer position.

5 VDC — Lights as long as 5 VDC is present from the main power supply.

SYSTEM TRANSMIT (ROWELINK RESPONSE) — Flashes when the CD mechanism is transmitting to the CCC.



Mechanism Control And CD Decoder

BOARD ERROR — Blinks on and off three times on power up. Any other time, this LED indicates that a fatal mechanism error (phonograph out of service) has occurred.

SCAN/TRANSFER — Lights when either the scan or the transfer motor is activated.

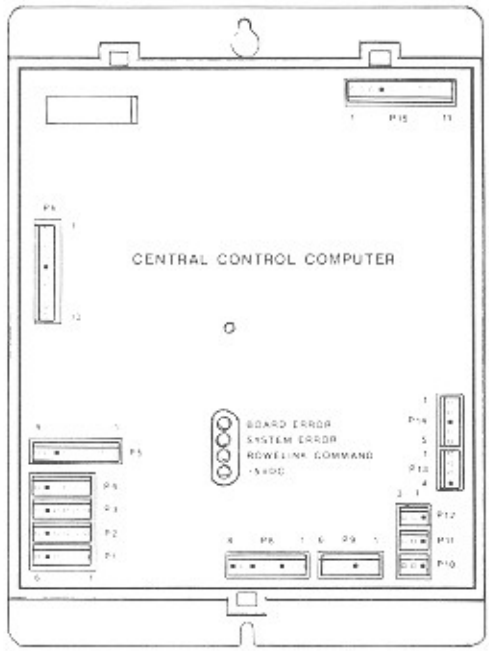
Central Control Computer

BOARD ERROR — Blinks 3 times on power up. If it stays on, an error has been detected.

SYSTEM ERROR — Lit only when the phonograph is out of order. The type of error that caused the shutdown can be examined from the SERVICE mode.

ROWELINK COMMAND — Flashes when the CCC is transmitting messages to slave devices (i.e. mechanism, OBA control).

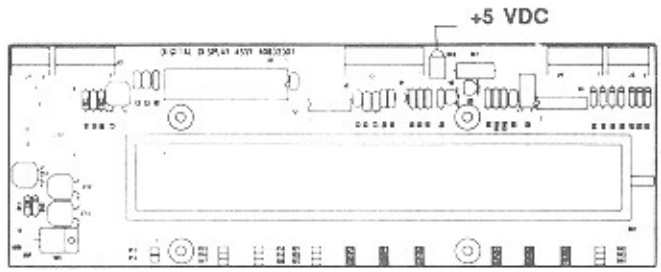
+5 VDC — +5 VDC is present.



Central Control Computer

Digital Display

+5 VDC — +5 VDC is present.



Digital Display

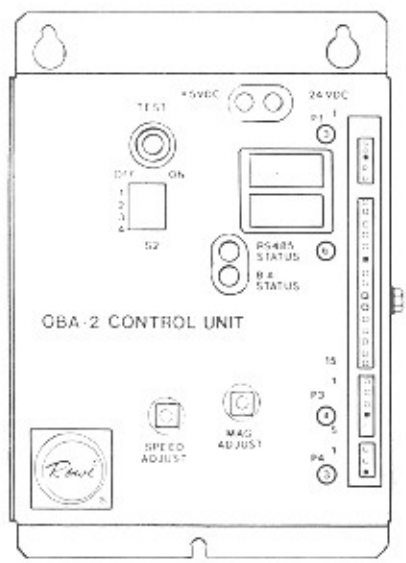
OBA-2 Control Unit

RS-485 STATUS — Flashes when the OBA– 2 is transmitting to the CCC.

BA STATUS — Indicates faults and aids in adjusting the magnetic gain and motor speed.

+5 VDC — +5 VDC is present.

+24 VDC — +24 VDC is present.



OBA–2 Control Unit

Figure 5-2. Status Indicators

ERRORS AND WARNINGS

Basic Concepts

When you switch to SERVICE mode, you will see one of two displays:

If the phonograph has not encountered any errors or warnings, * SERVICE MODE * will be displayed.

If the phonograph has encountered errors or warnings, --ERRORS EXIST-- will be displayed. This message will only appear as you enter SERVICE mode, and it will not change menu or command operation.

ERRORS (ERR)

- Cause phonograph shutdown and show the OUT OF ORDER message.
- Usually require a service call, component replacement, adjustment, or harness repair.
- Are always shown as active (A), even if they cleared up.

If you turn power OFF and ON, the phonograph will operate if error cleared up. If the error is still present, the phonograph will shutdown. Errors that clear up usually do not require service unless the location says that the phonograph is malfunctioning.

WARNINGS (WARN)

- Do not cause phonograph shutdown.
- Phonograph may or may not operate.
- Service personnel are made aware by the --ERRORS EXIST-- message appearing upon entering the service mode.
- Shown as active (A) until the problem clears up.
- Not active (N) warnings usually do not require service unless the location says that the phonograph is malfunctioning.

VIEWING THE ERRORS (ERR OR WARN)

NOTE:

1. **If the CCC thinks that a key other than RESET is closed, it will not accept other keys. This problem will not allow you to view the errors. The probable cause is a short in the keyboard, a short in RET 0, 1, 2 or 3 wiring, defective CCC, or a short in < > page > < switch or wiring.**
2. **This procedure can be started over by holding RESET and repeatedly pushing POPULAR until the display shows * SERVICE MODE *. Then start at step 2.**

Steps	Display Shows
1. Enter SERVICE mode	--Errors Exist--
2. Type 8	* STATUS *
3. Type 0 *(see note 1)*	Error History
4. Push POPULAR	X WARN XX-XX XX A = Active N = Not Active Source of error Type of error Number of occurrences **OR** X ERR XX-XX XX A = Active Source of error Type of error Number of occurrences
5. Hold RESET, push 9	START XX:XX XX/XX Time of first occurrence Month/day of first occurrence
6. Hold RESET, push 9	END XX:XX XX/XX Time it last cleared up (not active) Month/day it last cleared up (not active) 00:00 00/00 if first occurrence and still active, or ERR message
7. Hold RESET, push 3	Next ERR or WARN if a different error exists. Otherwise stays the same.

8. Repeat steps 5, 6, and 7 as often as necessary (*See the Notes that follow*).

NOTE:

3. You can review the WARN or ERR, START or END by holding RESET and pushing 9 as often as desired.
4. Steps 4 and 5 can be skipped.
5. Hold RESET, push 2 to search backwards through errors.

EXAMPLE 1:

N WARN 06-02 15
START 14:30 06/01
END 15:00 06/01

Message means

- OBA-2 control unit thinks bill transport V1 cell was blocked 15 times.
- First occurrence was 2:30 p.m. on June 1.
- Last occurrence cleared up 3:00 p.m. on June 1.

Probable cause

- Someone tried to obtain free credit by inserting a foreign object.

EXAMPLE 2:

A ERR 05-63 03
START 09:10 07/13
END 00:00 00/00

Message means

- Mechanism control failed to communicate with the CCC through the Rowelink.
- First occurrence was 9:10 a.m. on July 13.

NOTE:

6. A (Active symbol) always proceeds ERR, even if the problem is not active now.
7. An ERR message always shows 00:00 and 00/00 for the END time and date.

ERROR SUMMARY

The following list summarizes all possible errors that can be displayed. For details of error causes and corrective action, *see Description Of Errors And Probable Causes* that follows this summary.

Coin Switches (01)

01-17	#1 coin switch
01-18	#2 coin switch
01-19	#3 coin switch
01-20	#4 coin switch
01-31	Multiple coin switches

Keyboard Switches (02)

02-16	Key 0
02-17	Key 1
02-18	Key 2
02-19	Key 3
02-20	Key 4
02-21	Key 5
02-22	Key 6
02-23	Key 7
02-24	Key 8
02-25	Key 9
02-26	Most Popular key
02-27	Reset key
02-28	<> key
02-29	>< key
02-31	Multiple keys
02-32	Cancel button

Mechanism Controller (05)

05-02	Cancel button
05-05	Mech. cannot determine magazine position
05-08	EPROM checksum error
05-09	RAM test failed.

Fatal Errors

These error codes (05-50 through 05-64) will cause a system reset and after five errors, the phonograph will go out of order.

05-50	Inner cam switch
05-51	Inner cam switch
05-52	Outer cam switch
05-53	Outer cam switch
05-56	Index LED
05-57	Index LED
05-58	Home LED
05-59	Home LED
05-62	CDM-to-CCC communication lost
05-63	Mech-to-CCC communication lost
05-64	Gripper bow position undetermined

OBA Controller (06)

06-01	Communication to the OBA has been lost
06-02	V1 cell or inlet cell
06-03	Jammed bill
06-04	Bill stacker is full

Wallbox Controller (07-10)

07-01	Communication to wallbox #1 has been lost
08-01	Communication to wallbox #2 has been lost
09-01	Communication to wallbox #3 has been lost
10-01	Communication to wallbox #4 has been lost

Central Control Computer (14)

14-01	EPROM checksum error
14-02	RAM failed
14-03	Real time clock error
14-04	Factory defaults have been loaded
14-05	RAM checksum error
14-06	Low battery

Description Of Errors And Probable Causes

ERROR SOURCE 01 (COIN SWITCH ERRORS)

WARN 01-17	#1 coin switch
01-18	#2 coin switch
01-19	#3 coin switch
01-20	#4 coin switch
01-31	Multiple coin switches

Message Means:

CCC thinks one or more coin switches are closed for more than 5 seconds.

Probable cause:

1. A manual operation of coin switches
2. A jammed coin or switch
3. A short in wiring
4. A defective CCC

ERROR SOURCE 02 (KEYBOARD ERRORS)

WARN 02-16	Key 0
02-17	Key 1
02-18	Key 2
02-19	Key 3
02-20	Key 4
02-21	Key 5
02-22	Key 6
02-23	Key 7
02-24	Key 8
02-25	Key 9
02-26	MOST POPULAR key
02-27	RESET key
02-28	< > key
02-29	> < key
02-30	-------
02-31	Multiple keys
02-32	External CANCEL button

Message Means:

CCC thinks one or more switches were closed for more than 10 minutes.

Probable cause:

1. Someone held it closed. Nothing needs repairing or replacing.
2. A short in associated wiring *(see the Block Diagram in this section).*
3. A defective CCC.

ERR 05-64

Message Means:

Both the inner and outer cam switches are operating, but the gripper bow position is uncertain.

Probable cause:

1. A defective cam switch
2. A loose connection in wire/terminal at cam switch
3. A defective mechanism control

ERROR SOURCE 06 (OBA ERRORS)

WARN 06-01

Message Means:

OBA communication failure

Probable Cause:

1. A loose connection in wire/terminal a the Rowelink communication line.
2. A defective OBA—2 control unit.

WARN 06-02

Message Means:

OBA-2 control unit thinks that the transport V1 cell is blocked.

Probable cause:

1. An object in transport covering V1 cell
2. A defective transport
3. A defective OBA-2 control unit

WARN 06-03

Message Means:

OBA-2 control unit thinks that a bill is jammed in the transport.

Probable cause:

1. An object is or was in transport activating anti-pullback lever.
2. A defective transport
3. A defective OBA-2 control unit

WARN 06-04

Message Means:

OBA-2 control unit thinks that the bill stacker is full.

Probable cause:

1. The bill stacker is full
2. The bill stacker is jammed in the OFF HOME position
3. The bill stacker HOME switch is out of adjustment
4. A defective bill stacker
5. A defective OBA-2 control unit

Wallbox Errors

ERROR SOURCE 07 (WALLBOX ADDRESS 70)

07-01 Wallbox lost communication for more than 1 minute

ERROR SOURCE 08 (WALLBOX ADDRESS 71)

08-01 Wallbox lost communication for more than 1 minute

ERROR SOURCE 09 (WALLBOX ADDRESS 72)

09-01 Wallbox lost communication for more than 1 minute

ERROR SOURCE 10 (WALLBOX ADDRESS 73)

10-01 Wallbox lost communication for more than 1 minute

Message Means:

Rowelink communications was established with this wallbox then it was lost for more than 1 minute.

Probable Cause:

1. The Rowelink wiring to the wallbox or wallbox interface
2. A wallbox power supply
3. A wallbox or wallbox interface

ERROR SOURCES 11-13 ARE NOT DEFINED

SOURCE 14 (INTERNAL CCC ERRORS)

14-01	CCC EPROM checksum error
14-02	CCC RAM error
14-03	CCC real-time clock error
14-04	CCC factory defaults requested and loaded
14-05	CCC programmed RAM checksum error
14-06	CCC battery voltage is low

Message Means:

All except 04 indicate a CCC internal fault. The 04 indicates factory defaults were loaded into programmed RAM because:

1. An 14-05 error occurred
2. Someone used the factory load procedure

Probable cause:

1. A defective CCC for all except 04
2. A defective CCC if 04 occurs frequently
3. Someone loaded factory defaults, causing 04 error.

CLEARING ERRORS FROM MEMORY

Errors stored in the phonograph's memory can be cleared by:

STEPS	DISPLAY SHOWS
1. Enter SERVICE mode	-- ERRORS EXIST --
2. Press 8.	* STATUS *
3. Press 1.	* CLEAR ERRORS *
4. Press POPULAR.	CLEAR ERRORS Will blink and then reappear.

NOTE:

If already in SERVICE mode, or you want to start over, hold RESET and repeatedly press POPULAR until display shows * SERVICE MODE *. Then start at step 2.

DISC CONDITIONS

Basic Concepts

Compact Discs are very rugged, but sometimes they develop problems similar to vinyl records. Skips and dropouts are not uncommon CD faults and may be caused by: a dirty disc, dirty CD player lens, or CD manufacturing defects. On rare occasions, the CD player may be unable to play any tracks on a disc. This failure to play any tracks may have the same cause as skips and dropouts.

Programmable Disc Condition Logging

The CD-100A has a built-in disc condition logging feature that records disc play problems found on a disc or track. Three programmable options determine when these conditions are placed into the Disc Condition Log:

SKIP LOG (SERVICE CODE 35)

The number of skips, over one second, to occur before recording the error in the condition log. The recommended setting is 3.

SKIP CANCEL (SERVICE CODE 36)

The number of skips, over one second, to occur before recording the error in the condition log and canceling the selection. The recommended setting is 5.

TIME CANCEL (SERVICE CODE 37)

The absolute time difference, in seconds, between the current playing position, coming off the CD, and the calculated position. The recommended setting is 10.

Factory Settings

The factory settings for the SKIP LOG, SKIP CANCEL, and TIME CANCEL are 99. The reason for the difference between defaults and recommended settings is that we want the CD-100A, when shipped, to play discs of practically any condition without early canceling.

Non-Programmable Disc Condition Logging

Two non-programmable disc condition events are also recorded in the condition log. These events are:

LOGGED TRACK NUMBER EQUALS 00

This entry in the log means that the CD player was unable to read the CD Table Of Contents (TOC).

NOTE:

The TOC is read every time the disc is placed on the turntable. The TOC contains the location of each track on the disc, so without it the player is unable to play any track.

LOGGED CANCL AND SKIP EQUALS 99

This entry means that the CD player was able to read the TOC, but was unable to locate the track.

The CD-100A has an automatic method to lock out selections that have logged too many errors. You can set this number of condition occurrences to any number from 1 to 99. Once the LOCKOUT COUNT, Code 693, has exceeded the number of occurrences on a selection, that selection is automatically placed into LOCKOUTS list, Code 60. To remove a condition generated lockout, *refer to the Section 2* on editing the Lockout List.

Viewing Disc Conditions

Steps	Display Shows
1. Enter SERVICE mode.	* SERVICE MODE *
2. Type 8.	* SERVICE MODE *
3. Type 6.	DISC CONDITIONS
4. Press POPULAR	- NO CONDITIONS -
	-OR-
	SEL ditr OCC oo
	The small letters mean: di - Disc number tr - Track number oo - Number of occurrences
5. Hold RESET, press 9	CANCL tt SKIP ss
	tt - Absolute time difference, in seconds, when the condition was logged.
	ss - Number of skips, greater than one second in duration, when the condition was logged.
6. Hold RESET, press 9	TIME hh:mm mm/dd
	hh -Hour when condition occurred. mm - Minute when condition occurred. mm - Month when condition occurred. dd - Day when condition occurred.

7. Hold RESET, Press 3 to view next disc condition.
8. Hold RESET, Press 2 to view previous disc condition.
9. Repeat steps 5, 6, 7, and 8 as often as necessary.

Example 1:

SEL 1500 OCC 05
CANCL 00 SKIP 00
TIME 12:15 7/19

Condition Means

The CD player could not read the TOC (track number equals 00) of disc 15 on 5 selected occasions. The most resent condition was logged on July 19th at 12:15 (24 hour time).

Probable Cause

1. Disc installed backward.
2. Absent disc. This disc location may not have been initialized, allowing it to be accidentally selected.
3. Dirty disc. For this type of a condition the dirt would be located around the inner most diameter of the disc. This is where the TOC information is located. See disc cleaning section.
4. Dirty CD player LASER lens. Expect to see various conditions logged on many of the discs selected *(see table 3-3, Lens Cleaning).*

Remedy

1. Check to see if the disc was inserted backward. If inserted backward, re-install it correctly and initialize that disc.
2. Check to see if the disc is present. If not present, initialize that disc location.
3. Remove the disc from the magazine, then inspect the inner diameter, TOC area, for dirt or damage. If you find dirt or damage clean it up. See disc cleaning section. Clear out the conditions and select a track on this disc to see if the CD player is able to read the TOC. If the CD player is still unable to read the TOC, try further cleaning or replace the disc.
4. Clean the CD player LASER lens *(see table 3-3, Lens Cleaning).*

Example 2:

SEL 1505 OCC 01
CANCL 99 SKIP 99
TIME 12:30 7/12

Condition Means

The CD player read the TOC successfully, but was unable to start playing the track (no music would have been heard) on 1 occasions. The most resent condition was logged on July 12th at 12:30 (24 hour time).

Probable Cause

1. The disc is dirty. For this type of a condition the dirt would be located some where between the inner most diameter of the disc and the track selected. See disc cleaning section.

2. Dirty CD player LASER lens. Expect to see various conditions logged on many of the discs selected *(see table 3-3, Lens Cleaning).*

Remedy

1. Remove the disc from the magazine, then inspect it for dirt or damage. If you find dirt or damage clean it up. See disc cleaning section. Clear out the conditions and select 1505 again to see if the CD player is able to play it. If the CD player is still unable to play it, try further cleaning, lock out tracks 5 and greater on disc 15, or replace the disc.

2. Clean the CD player LASER lens *(see table 3-3, Lens Cleaning).*

Example 3:

SEL 2302 OCC 01
CANCL 10 SKIP 3
TIME 23:30 5/20

Condition Means

1. The CD player was playing selection 2302, but while it was playing 3 skips occurred, skips over 1 second, with an overall time loss of 10 seconds on 1 occasions. The most resent condition was logged on May 20th at 23:30 (24 hour time).

Probable Cause

1. Dirty disc. For this type of a condition the dirt would be located some where within track 2. See disc cleaning section.

2. Dirty CD player LASER lens. Expect to see various conditions logged on many of the discs selected *(see table 3-3, Lens Cleaning).*

3. An outside jarring of the jukebox.

Remedy

1. Remove the disc from the magazine, then inspect it for dirt or damage. If you find dirt or damage clean it up. See disc cleaning section. Clear out the conditions and select 2302 again to see if the CD player is able to play it. If the CD player is still unable to play it, try further cleaning, lock out track 2 on disc 23, or replace the disc.

2. Clean the CD player LASER lens *(see table 3-3, Lens Cleaning).*

Clearing Disc Conditions From Memory

Disc condition messages stay in memory until you perform the following steps:

NOTE:

If already in SERVICE **mode, or you want to start over, hold** RESET **and repeatedly press** POPULAR **until display shows** * SERVICE MODE *. **Then start at step 2.**

STEPS SHOWS	DISPLAY
1. Enter SERVICE mode	* SERVICE MODE * or -- ERRORS EXIST --
2. Press 8.	* STATUS *
3. Push 7.	* CLEAR CONDITIONS *
4. Press POPULAR.	CLEAR CONDITIONS will blink and then reappear.

TROUBLESHOOTING CHARTS

One of the best ways to isolate a problem is to determine the exact state of the phonograph when the failure occurs. This means recording the condition of digital display, STATUS LED's, gripper bow, detent pawl, magazine, cam switches, etc.

This information can help you identify the cause of intermittent or continuous failures.

Refer to figure 5-1 for descriptions and locations of the LED's referred to in *the Modular Troubleshooting Chart that follows in table 5-2.*

The chart has the following three columns:

- The trouble column lists different types of failures.
- The symptom column shows the state of the phonograph when the failure occurs.
- The last column shows the probable cause.

Refer to figure 5-1, the Block Diagram for harnessing information.

Table 5-2. Modular Troubleshooting Chart

Trouble	Symptom	Probable Cause
Phonograph fails to operate when power is turned ON	LED's on power supply and fluorescent lights fail to light	1. Rear power switch OFF 2. Plug not in wall 3. Wall circuit is dead 4. 10 amp circuit breaker tripped 5. Wiring to rear power switch 6. Rear power switch
	LED's on power supply fail to light but fluorescent lamps are ON	1. 2 amp circuit breaker tripped 2. Power supply 3. 28 VAC overload from magazine, transfer or T.T. motor
	The +8 VDC or +28 VDC LED on power supply fails to light but lights when phono harness at power supply is unplugged	1. Central control computer 2. Mechanism control 3. Digital display 4. OBA-2 control unit 5. Power Supply 6. Service switch 7. Short circuit in wiring 8. Detent coil 9. Money or play counter

NOTE:

To locate the problem, reconnect the phono harness and unplug the connectors in the order shown in the following 10 steps. If the LED lights, replace the last module unplugged or repair the short in the harness.

1. Digital display module (J2)
2. Harness at the CCC (P5)
3. OBA-2 control unit module (P1)
4. Harness at CCC (P3)
5. Harness at mechanism control (P12 and P6). Check harnesses, detent coil, and counters.
6. Mechanism control module (P7)
7. Harness at CCC (P2)
8. CCC module (P4)
9. Check power switch and wiring between it, the power supply, and CCC (P4).
10. Replace the power supply or the circuit board inside it.

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
Phonograph fails to operate when power is turned ON (*Continued*)	CCC ROWELINK COMMAND LED is always OFF or always ON (not flickering)	1. Central control computer
	CCC ROWELINK COMMAND LED flickering 4 times a second and the display shows OUT OF ORDER, and Error A ERR 05-63 is logged in	1. If the OBA-2 control unit RS-485 STATUS LED is flickering, the cause is: a. mech control b. open wiring in mechanism 2. If the mechanism SYSTEM TRANSMIT LED is not flickering, the cause is: a. mechanism control b. OBA-2 control c. a short in the Rowelink wiring

NOTE:

The CCC sends OUT OF ORDER to the display and logs the A ERR 05-63 Error one minute after power up if it cannot establish Rowelink communication with the mechanism control and the phonograph is in the NORMAL mode (i.e. not SERVICE).

To isolate the problem to a module or its associated Rowelink wiring, put the SERVICE switch in the SERVICE position and unplug the connectors in the following order. If the mechanism SYSTEM TRANSMIT LED starts flickering, replace the last module unplugged or repair the short in the harness. If the LED never starts flickering, the cause is a defective mechanism control, CCC, or a short in the Rowelink harness between them.

1. **Unplug P4 at the OBA control unit.**
2. **Unplug the other end of the harness at the CCC (the Block diagram indicates that this connector is P12, but it could be P10, P11, or P12.**

Magazine does not rotate when a selection is made	SCAN/TRANSFER LED ON, detent is actuated	1. Power supply 2. Wiring to mag. motor 3. Magazine motor 4. Mech control board

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
Magazine does not rotate when a selection is made *(Continued)*	SCAN/TRANSFER LED OFF	1. Mech control board 2. Central control computer 3. Wiring from central control computer to mech control board
Magazine rotates continuously	SCAN/TRANSFER LED OFF	1. Wiring to magazine motor 2. Mech control board
	SCAN/TRANSFER LED is ON, OPT. SW. INDEX LED is not flashing, and/or OPT. SW. HOME LED does not flash at Disc Number 99.	1. Optical switch 2. Wiring to optical switch 3. Mech control board
	SCAN/TRANS LED ON and both optical switch LED's normal	1. Mech control board
Magazine stops at wrong disc	Stops at random CD anywhere in magazine	1. Faulty optical switch 2. Wiring to optical switch 3. Heavy dirt buildup in optical switch
	Stops one or two discs before disc selected	1. Optical switch adjustment 2. Magazine not full of CD's (out of balance) 3. Broken sprag lever guide
	Stops one or two discs after disc selected	1. Optical switch adjustment 2. Magazine not full of CD's (out of balance) 3. Broken sprag lever guide
	Stops one or two discs after disc selected	1. Faulty optical switch 2. Optical switch adjustment 3. Broken sprag gear 4. Sprag linkage binding
	Stops one-Half to one disc position off before or after disc selected	1. Broken sprag gear 2. Broken sprag guide 3. Sprag linkage binding or needs adjustment
Disc does not transfer	SCAN/TRANSFER LED is ON	1. Wiring to transfer motor 2. Mech control board 3. Transfer motor
	SCAN/TRANSFER LED is OFF	1. Mech control board 2. Central control computer 3. Wiring from central control computer to mech control board

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
Transfer starts when power is applied and runs continuously	SCAN/TRANSFER LED is OFF	1. Mech control board 2. Wiring to motor
	SCAN/TRANSFER LED is ON	1. Mech control board 2. Open circuit at inner cam switch N.O. contact 3. Open circuit at inner cam switch Common 4. Outer cam switch N.O. shorted to Common
Transfer starts and runs continuously after selection is located	SCAN/TRANSFER LED comes ON when motor starts and stays ON	1. Wiring to outer cam switch 2. Outer cam switch 3. Mech control board 4. Inner cam switch N.O. contact shorted to Common. 5. Open circuit in outer cam switch Common
No sound	Always muted	1. Central control computer 2. Amplifier
Motor noise in speakers	Never muted	1. Central control computer 2. Wiring between CCC and amplifier 3. Amplifier
All discs cancel without playing	Disc spins but will not play	1. Short in cancel switch wiring 2. Cancel switch 3. Mech control board 4. CD player 5. Bad/upside down disc
	Disc will not spin	1. Mech control board 2. CD player 3. Wiring between the CD player and the mech control
Some discs cancel without playing		1. Defective discs (check disc conditions) 2. Mechanism control 3. CD player
Money counter or play counter fails to count	Fails to count	1. Wiring to counter 2. Counter 3. Mech control board

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
Phonograph is always in SERVICE mode of operation	* SERVICE MODE * is always displayed after power up	1. SERVICE switch 2. SERVICE switch wiring 3. Central control computer 4. Central control computer set for programming with the front door closed (the VOID SERVICE SWITCH option is ON)
Phonograph will not go into SERVICE mode	Display will not show * SERVICE MODE * or ERRORS EXIST when SERVICE switch is in SERVICE	1. Central control computer 2. SERVICE switch wiring 3. SERVICE switch
Some CD's Skip		1. Dirty discs or dirty lens on CD player (see *table 3-3* for lens cleaning procedure) 2. Defective discs (check disc conditions) 3. Mechanism control 4. CD player
All CD's skip		1. Dirty lens on CD player (see *table 3-3* for lens cleaning procedure) 2. CD player 3. Mechanism control
No credit	No credit given by coins and dollar bills	1. Central control computer
	No credit given by coins but dollar bill gives credit	1. Coin switch Common wiring 2. Central control computer
	One value of coin will not give credit	1. Coin rejected 2. Wiring to coin switch 3. Coin switch 4. Central control computer
	Dollar bill will not give credit	1. Bill acceptor 2. Wiring to bill acceptor 3. Central control computer
Wrong credit	Credit for amount deposited does not agree with price card setting	1. One or more coins or bills did not register (*see No Credit*). 2. Central control computer programmed incorrectly. 3. Central control computer
System does not respond to keyboard	0 Credits on SELECTION REMAINING display	1. Insufficient credit
	Credits remain, but entire keyboard does not work	1. Shorted keyboard switch 2. Central control computer 3. Short in keyboard wiring

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
System does not respond to keyboard Continued	Credits remain, but certain keys do not work	1. Wiring from keyboard to display board 2. Keyboard 3. Digital display board 4. Central control computer
Digital display does not work	Display lights, but shows wrong information	1. Digital display 2. Central control computer
Title pages do not operate normally	Title pages do not move at all or movement is very slight	1. Mechanical jam in the mechanism—Try to rotate the motor by hand—Disassemble to locate the jam. 2. The motor will not run—faulty motor—test for voltage at the motor—Try rotating the motor by hand. Remove the motor and test it. 3. The switches are not adjusted properly—Adjust according to the procedure in *Section 6*. 4. The title page harness is not plugged in.
	Two pages on a side try to turn at the same time	The metal fingers on the back of the top of the page are bent because the pages were forced. Remove the racks from the back side of the assembly—Inspect the metal fingers and straighten any bent fingers.
	Pages continue to flip past the next page	1. Index switch on the title display is defective or out of adjustment. 2. Harness between title display and J5 of the digital display. 3. Harness between J3 of the digital display and P5 or P15 of the central control computer. 4. Defective digital display module. 5. Defective central control computer.
	Cannot get the desired page	1. PAGE IN/OUT limits are not set correctly—*See Section 2*. 2. Limit switch on the title display is defective or out of adjustment. 3. Harness between the title display and J5 of the digital display. 4. Harness between J3 of the digital display and P5 or P15 of the central control computer. 5. Defective digital display module. 6. Defective central control computer.

Table 5-2. Modular Troubleshooting Chart
Continued

Trouble	Symptom	Probable Cause
Title pages do not operate normally *(Continued)*	Pages do not operate from keyboard OUT/IN switches or from the titles OUT/IN switch	1. Defective title motor. 2. Defective digital display module. 3. Defective central control computer. 4. Harness between title display and J5 of the digital display. 5. Harness between J3 of the digital display and P5 or P15 of the central control computer. 6. Defective keyboard. 7. Harness between J1 of the keyboard and J4 of the digital display.
	Pages do not operate from the keyboard OUT/IN switches, but do operate from the titles OUT/IN switch	Defective keyboard
	Pages do not operate from the titles OUT/IN switch, but do operate from the keyboard OUT/IN switches	1. Defective titles OUT/IN switch 2. Harness between titles OUT/IN switch and J2 of the keyboard. 3. Defective keyboard.
Miscellaneous problems	any malfunction not described above	1. Main power supply 2. Central control computer

SOUND SYSTEM QUICK CHECK

Rowe solid state sound systems are service designed for fast, easy repair. The following check list will enable you to locate troubles with basic tools. *Refer to figures 5-1 and 5-4 as needed.*

CAUTION:

Do not plug in or unplug circuit boards with power ON. Checks should be made with the changer in the record playing position. Perform all service checks in the order listed.

No Sound — Both Channels

POWER - SECOND LEVEL

1. Check that the amplifier is plugged-in and is receiving power from the power supply.
2. Disconnect the mute plug.
3. Press the circuit breaker reset pushbutton on the amplifier chassis to make sure that it is not tripped. The amplifier should cause an audible "thump" in the speakers when the power is turned ON.

VOLUME CONTROL

Disconnect the volume control plug from the amplifier chassis and short out Pin 3 (Common) to Pins 1, 2 and 4, 5. Full volume indicates an open volume control or line. If full volume at all times is the problem and disconnecting the volume control plug does not kill the sound, replace the preamp board.

EXTENSION SPEAKERS

Check the OVERLOAD indicators (*see figure 1-6*), then disconnect the extension speakers from the transformer package receptacle (*figure 1-7 also*) and look at the OVERLOAD indicators again. If either or both OVERLOAD indicators were ON, but are now OFF, the overload is in the extension speakers.

Check that the phonograph is not overloaded by performing the following four steps:

1. Make sure that the phonograph and extension speakers are connected to the proper speaker taps.
2. Set the volume control fully clockwise (maximum volume) and make a selection.
3. While the music is playing, an acceptable load will allow the OVERLOAD INDICATORS(S) to be off or occasionally flicker in a random manner. If the OVERLOAD INDICATOR(S) are always lit or flicker continuously, the amplifier is overloaded and you must perform *Step 4*.
4. Do this step only if the OVERLOAD INDICATOR(S) came on as described in the previous step. Find the source of the overload (shorted speaker wires or too many speakers on line) and repeat *Step 3*.

OUTPUT DEVICES

Visually inspect the driver board for blown fuses. If a fuse is blown, replace the associated output device. The two devices used in each channel are not interchangeable. Check the part number on the case and install an identical or equivalent replacement. Before mounting the device onto the heat sink, be sure that the heat sink surface is flat and no burrs are around the mounting holes to cause a short. Be sure that one, and only one, mica insulator is between the device and the heat sink and heat transfer compound (*Rowe Specification 0-00053-00*) is on both sides of insulator.

FILTER CAPACITORS

Check for plus and minus 40 VDC in the amplifier power supply. Connect the negative meter lead to ground and check the voltage at the terminals of the large electrolytic filter capacitors located on the amplifier chassis next to the power transformer. When taking readings on the capacitor with the outer shell isolated from chassis to one of the shell tabs, check that the voltage on each capacitor terminal is the same. A lowered voltage at one of the capacitor pins indicates that the capacitor may be defective and should be replaced, or that the bridge rectifier is defective. Another indication of defective filter capacitors is excessive hum in the sound output.

PREAMP OUTPUT

Short all five of the volume control pins located on amp. Press your finger against Pins 1 or 3 (outside pins) labeled PHONO CARTRIDGE INPUT, and check for approximately 1 VAC at preamp output (Pins 3 or 5 of 13 pin connector to chassis Common). Replace the preamp board if voltage is not present. If voltage is present check the center pin of the output driver board for approximately 16 VAC. If voltage is not present, make sure your finger is pressed against the same outside pin with respect to the channel that is being checked with the voltmeter.

No Sound, Low Sound Or Distorted Sound Right Or Left Channel Only

EXTENSION SPEAKERS

Check the OVERLOAD indicators (*see figure 1-6*), then disconnect the extension speakers from the transformer package receptacle (*figure 1-7*) and look at the OVERLOAD indicators again. If either or both OVERLOAD indicators were ON, but are now OFF, the overload is in the extension speakers.

Check that the phonograph is not overloaded by performing the following four steps:

1. Make sure that the phonograph and extension speakers are connected to the proper speaker taps.

2. Set the volume control fully clockwise (maximum volume) and make a selection.

3. While the music is playing, an acceptable load will allow the OVERLOAD INDICATORS(S) to be off or occasionally flicker in a random manner. If the OVERLOAD INDICATOR(S) are always lit or flicker continuously, the amplifier is overloaded and you must perform *step D.*

4. Do this step only if the OVERLOAD INDICATOR(S) came on as described in the previous step. Find the source of the overload (shorted speaker wires or too many speakers on line) and repeat *Step 3.*

OUTPUT DEVICES

Visually inspect the driver board for blown fuses. If a fuse is blown, replace the associated output device. The two devices used in each channel are not interchangeable. Check the part number on the case and install an identical or equivalent replacement. Before mounting the device onto the heat sink, be sure that the heat sink surface is flat and no burrs are around the mounting holes to cause a short. Be sure that one, and only one, mica insulator is between the device and the heat sink and heat transfer compound (*Rowe Specification 0-00053-00*) is on both sides of insulator.

FILTER CAPACITORS

Check for plus and minus 40 VDC in the amplifier power supply. Connect the negative meter lead to ground and check the voltage at the terminals of the large electrolytic filter capacitors located on the amplifier chassis next to the power transformer. When taking readings on the capacitor with the outer shell isolated from chassis to one of the shell tabs, check that the voltage on each capacitor terminal is the same. A lowered voltage at one of the capacitor pins indicates that the capacitor may be defective and should be replaced, or that the bridge rectifier is defective. Another indication of defective filter capacitors is excessive hum in the sound output.

DRIVER BOARDS

If one driver board is defective, switch the input to "Mono" and use the good channel temporarily.

Constant High Volume — Cannot Adjust

VOLUME CONTROL

Disconnect volume control plug from amplifier chassis. No sound indicates a short in the volume control line.

PREAMP

If full volume is heard with control plug disconnected, replace the preamplifier board.

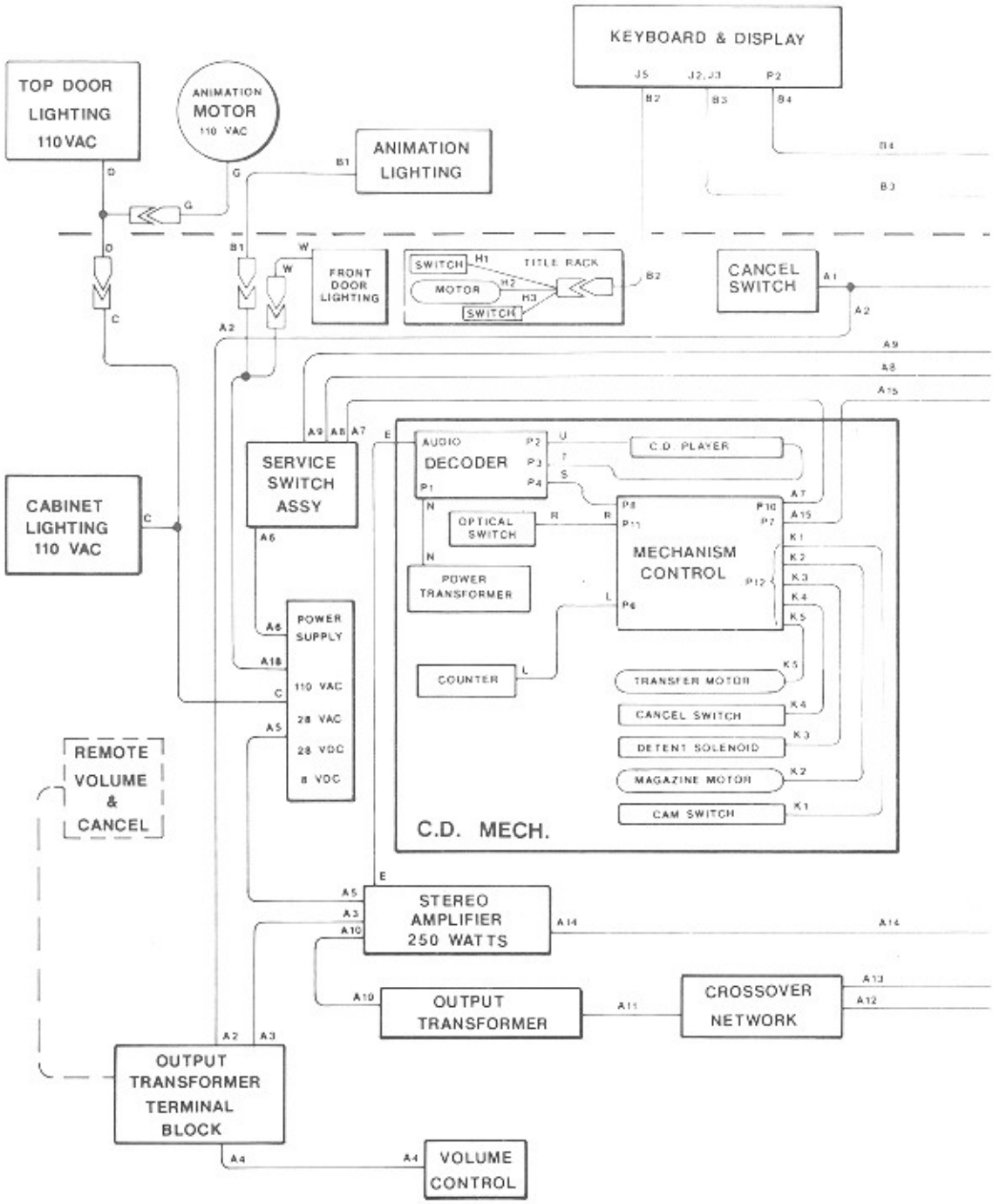
Excessive Hum

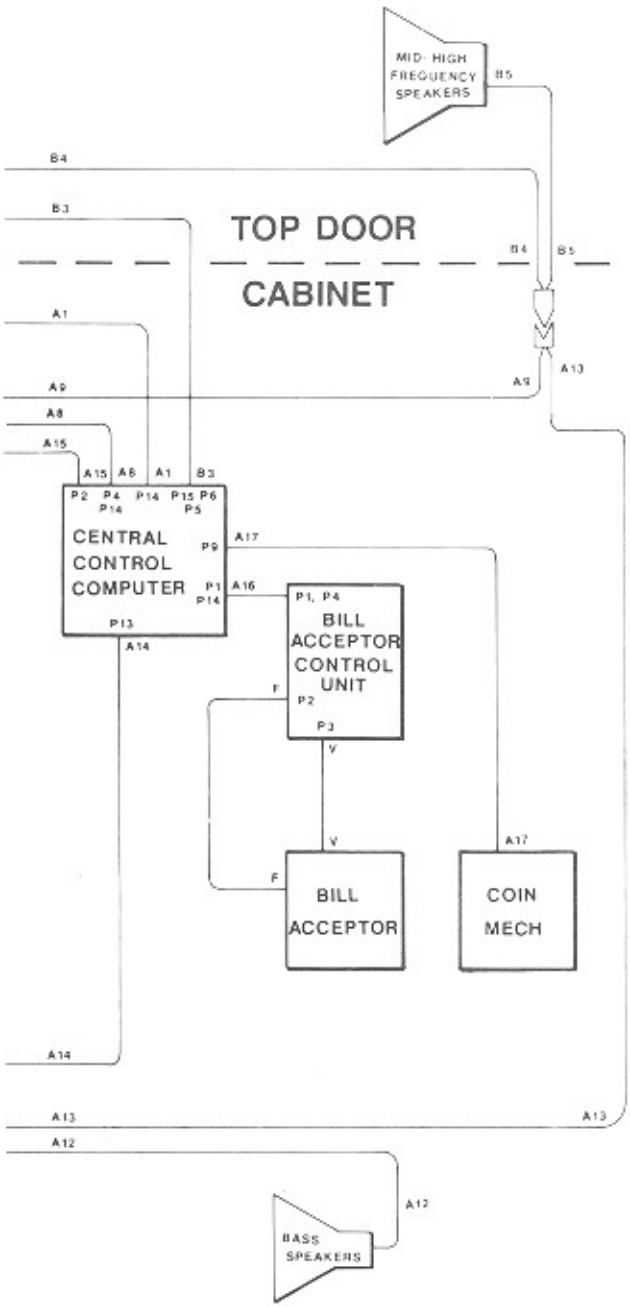
OPEN SHIELD

Be sure that shield or wires are not broken between CD player and the amplifier input plug.

FILTER CAPACITORS

Check filter capacitor, parallel an extra 500 Mfd. 50V capacitor in chassis. If hum drops; replace the capacitor. If external inputs are used, the equipment driving those inputs must not be tied to Earth Ground.


KEYBOARD & DISPLAY
J5
J2, J3
P2
B2
B3
B4
TOP DOOR LIGHTING 110 VAC
ANIMATION MOTOR 110 VAC
ANIMATION LIGHTING
B1
D
G
W
FRONT DOOR LIGHTING
SWITCH
H1
TITLE RACK
MOTOR
H2
H3
SWITCH
B2
CANCEL SWITCH
A1
A2
C
A9
A8
A15
A7
E
SERVICE SWITCH ASSY
AUDIO DECODER
P2
P3
P4
P1
U
T
S
C.D. PLAYER
CABINET LIGHTING 110 VAC
N
OPTICAL SWITCH
R
P8
P11
P10
P7
MECHANISM CONTROL
P12
P6
L
K1
K2
K3
K4
K5
POWER TRANSFORMER
POWER SUPPLY
A6
A18
110 VAC
28 VAC
28 VDC
8 VDC
COUNTER
TRANSFER MOTOR
CANCEL SWITCH
DETENT SOLENOID
MAGAZINE MOTOR
CAM SWITCH
C.D. MECH.
REMOTE VOLUME & CANCEL
A5
A3
A10
STEREO AMPLIFIER 250 WATTS
A14
OUTPUT TRANSFORMER
A11
CROSSOVER NETWORK
A13
A12
OUTPUT TRANSFORMER TERMINAL BLOCK
A4
VOLUME CONTROL



A > HARNESS & SWITCH ASSY ____ 61035502
1. CANCEL TO COMPUTER
2. CANCEL LINE TO TERMINAL BLOCK
3. REMOTE VOLUME & VOLUME CONTROL FROM AMPLIFIER
4. VOLUME CONTROL
5. 110 VAC TO AMPLIFIER
6. LOW VOLTAGE POWER TO SWITCH
7. 28 VAC TO C. D. PLAYER
8. LOW VOLTAGE POWER TO COMPUTER
9. PAGE CONTROL
10. AMPLIFIER OUTPUT (AUDIO)
11. AUDIO OUTPUT TO CROSSOVER
12. AUDIO OUTPUT TO BASS SPEAKERS
13. AUDIO OUTPUT TO MID-HIGH FREQUENCY SPEAKERS
14. MUTE
15. SIGNAL & VDC POWER TO C.D. PLAYER
16. SIGNAL & VDC POWER TO CONTROL UNIT
17. SIGNAL-COIN MECHANISM
18. 28 VAC POWER TO ANIMATION AND FRONT DOOR LIGHTING

B > HARNESS ASSY - DISPLAY ____ 40833402
1. 28 VAC POWER TO ANIMATION LIGHTING
2. SIGNAL AND VDC POWER TO TITLE RACK
3. SIGNAL AND VDC POWER TO KEYBOARD / DISPLAY
4. PAGE CONTROL
5. AUDIO INPUT TO MID-HIGH FREQUENCY SPEAKERS

C > HARNESS ASSY -110VAC 60/50 HZ ____ 40832901,02

D > HARNESS ASSY-TOP DOOR LIGHTING ____ 40834501

E > CABLE ASSY - AUDIO ____ 30934201

F > HARNESS ASSY-INTERCONNECT ____ 45070203

G > MOTOR & HARNESS ASSY ____ 40824302

H > HARNESS ASSY-INTERCONNECT ____ 30938501
1. SWITCH-SIGNAL TO DISPLAY
2. SWITCH-SIGNAL TO DISPLAY
3. VDC POWER FROM DISPLAY

K > HARNESS ASSY - C. D. MECH. ____ 40830002
1. CAM SWITCH------ TO MECH CONTROL
2. MAGAZINE MOTOR-- TO MECH CONTROL
3. DETENT SOLENOID- TO MECH CONTROL
4. CANCEL SWITCH--- TO MECH CONTROL
5. TRANSFER MOTOR-- TO MECH CONTROL

L > COUNTER & PLUG ASSY ____ 30933301

N > TRANSFORMER ASSY-POWER ____ 40830401

R > OPTICAL SWITCH ASSY ____ 30906801

S > HARNESS ASSY- PLAYER CONTROL ____ 30930501

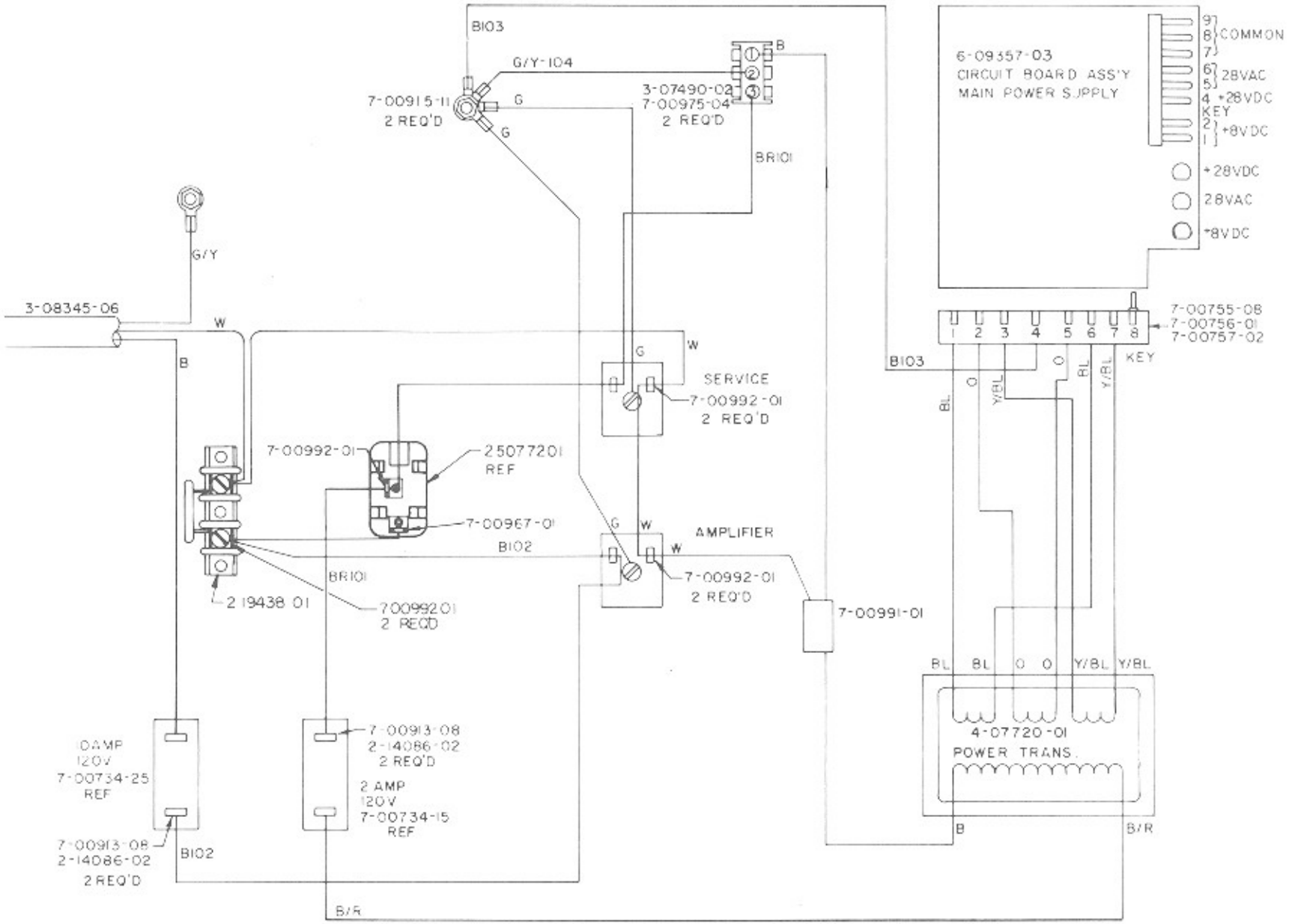
T > HARNESS ASSY-C.D. MECH (SIGNAL) ____ 30930701

U > HARNESS ASSY- C.D. MECH (POWER) ____ 30930601

V > HARNESS ASSY- D.C. BILL STACKER ____ 45062308

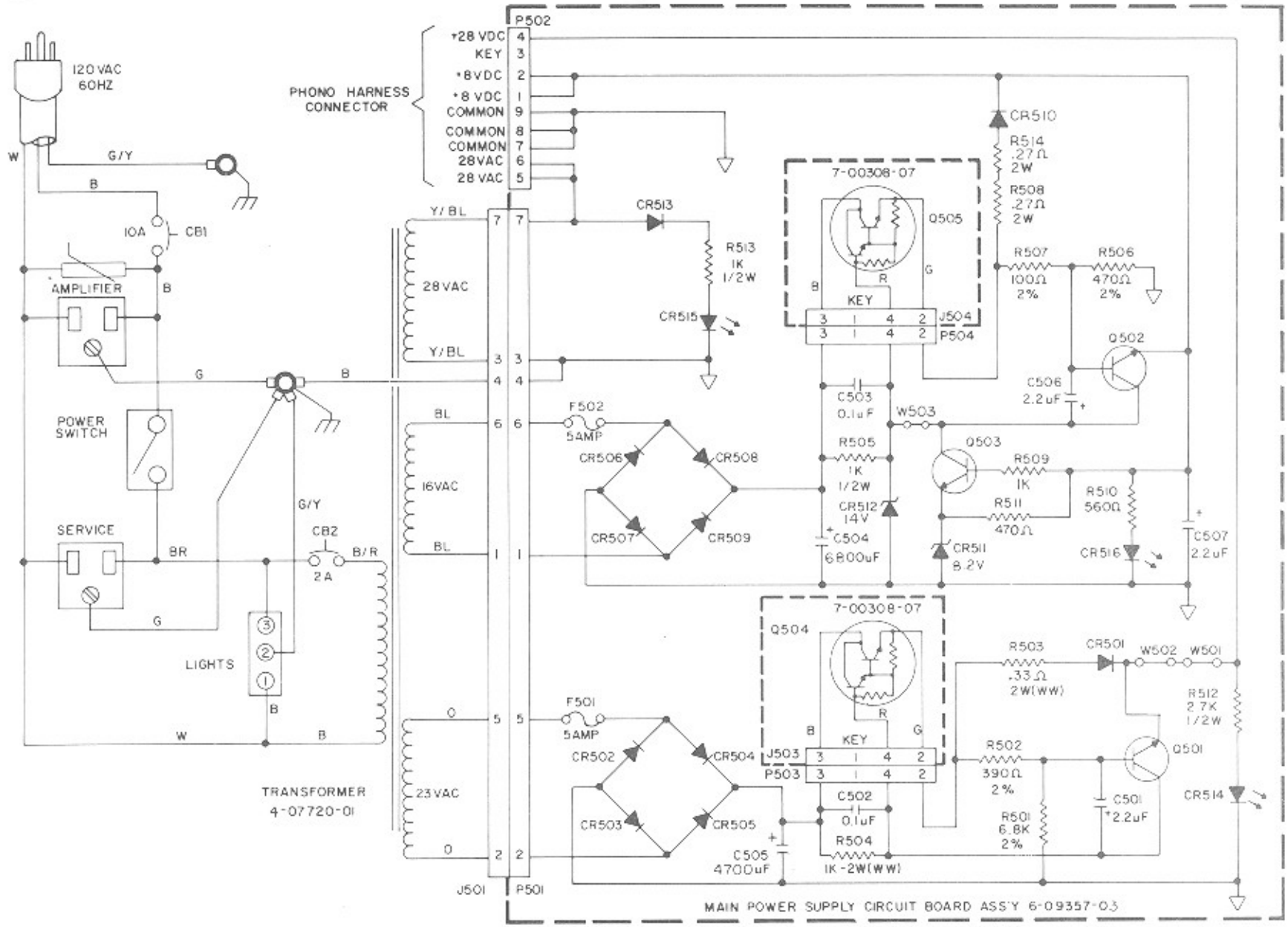
W > HARNESS ASSY- DOOR LIGHT ____ 30951701

Figure 5-4. CD-100A Harness Diagram



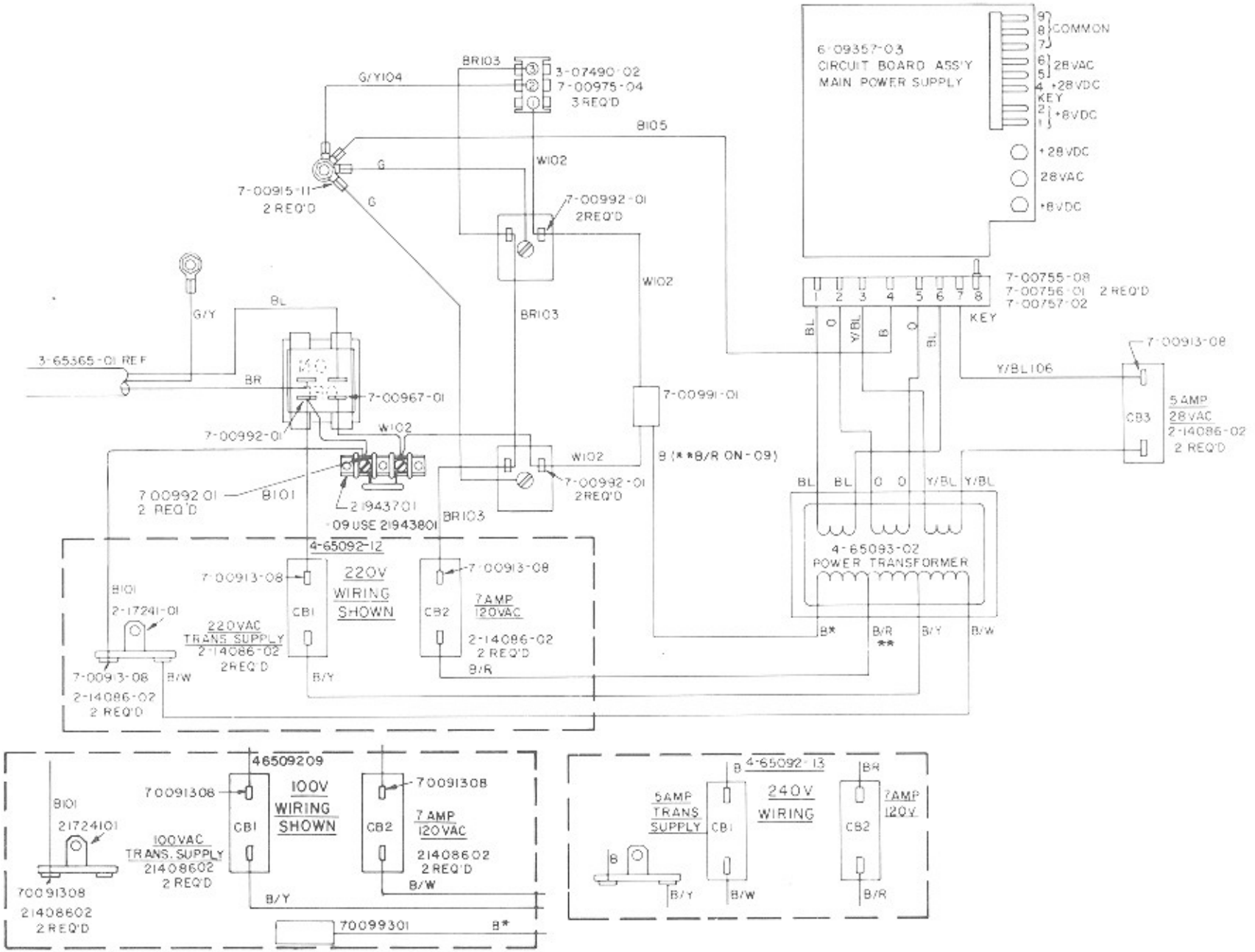
For Equivalent Engineering Drawing See 40770607-Q1 A

Figure 5-5A. Main Power Supply Wiring Diagram - Domestic



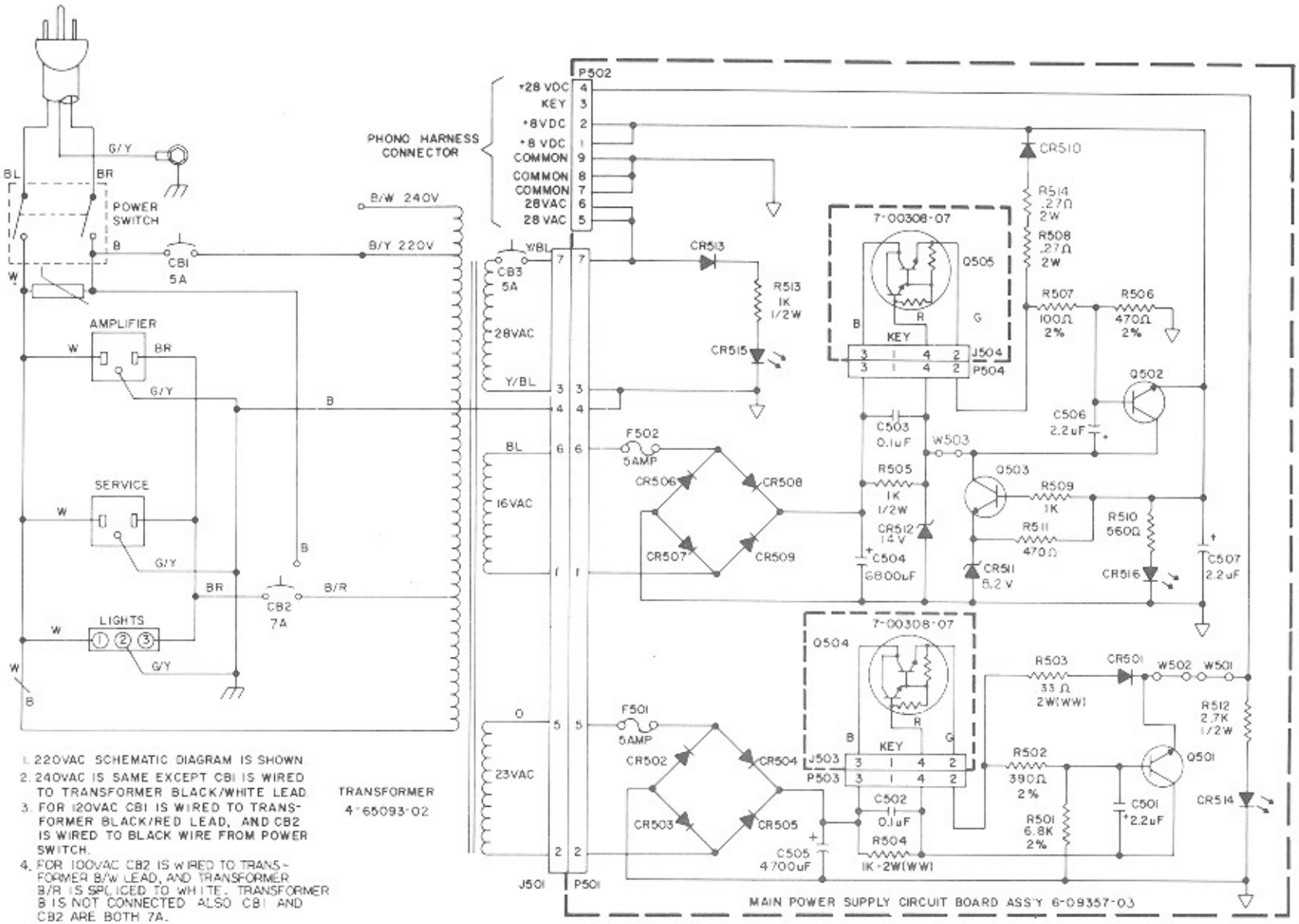
For Equivalent Engineering Drawing See 40770607-Q2 B

Figure 5-5B. Main Power Supply Schematic - Domestic



For Equivalent Engineering Drawing See 46509212/13-Q1 A

Figure 5-6A. Main Power Supply Wiring Diagram - Export



1. 220VAC SCHEMATIC DIAGRAM IS SHOWN
2. 240VAC IS SAME EXCEPT CB1 IS WIRED TO TRANSFORMER BLACK/WHITE LEAD.
3. FOR 120VAC CB1 IS WIRED TO TRANSFORMER BLACK/RED LEAD, AND CB2 IS WIRED TO BLACK WIRE FROM POWER SWITCH.
4. FOR 100VAC CB2 IS WIRED TO TRANSFORMER B/W LEAD, AND TRANSFORMER B/R IS SPLICED TO WHITE. TRANSFORMER B IS NOT CONNECTED. ALSO CB1 AND CB2 ARE BOTH 7A.

46509209 IS 100VAC
46509212 IS 220VAC
46509213 IS 240VAC

For Equivalent Engineering Drawing See 46509212/13-Q2 B

Figure 5-6B. Main Power Supply Schematic - Export

COMPONENTS LIST FOR MAIN POWER SUPPLY CIRCUIT BOARD 60935703

C501	Capacitor - Electrolytic	2.2 mf @ 50V	70023805
C502	Capacitor - Monolithic Ceramic	0.1 mf @ 50V	70028511
C503	Capacitor - Monolithic Ceramic	0.1 mf @ 50V	70028511
C504	Capacitor - Electrolytic	6800 mf @ 35V	70023601
C505	Capacitor - Electrolytic	4700 mf @ 50V	70023604
C506	Capacitor - Electrolytic	2.2 mf @ 50V	70023805
C507	Capacitor - Electrolytic	2.2 mf @ 50V	70023805

CR501-CR510	Diode - Silicon	70035004
CR511	Diode - Zener (8.2 V, 5%)	70035528
CR512	Diode - Zener (14 V, 5%)	70035529
CR513	Diode - Silicon	70035005
CR514-CR516	Diode - Light Emitting	70035303

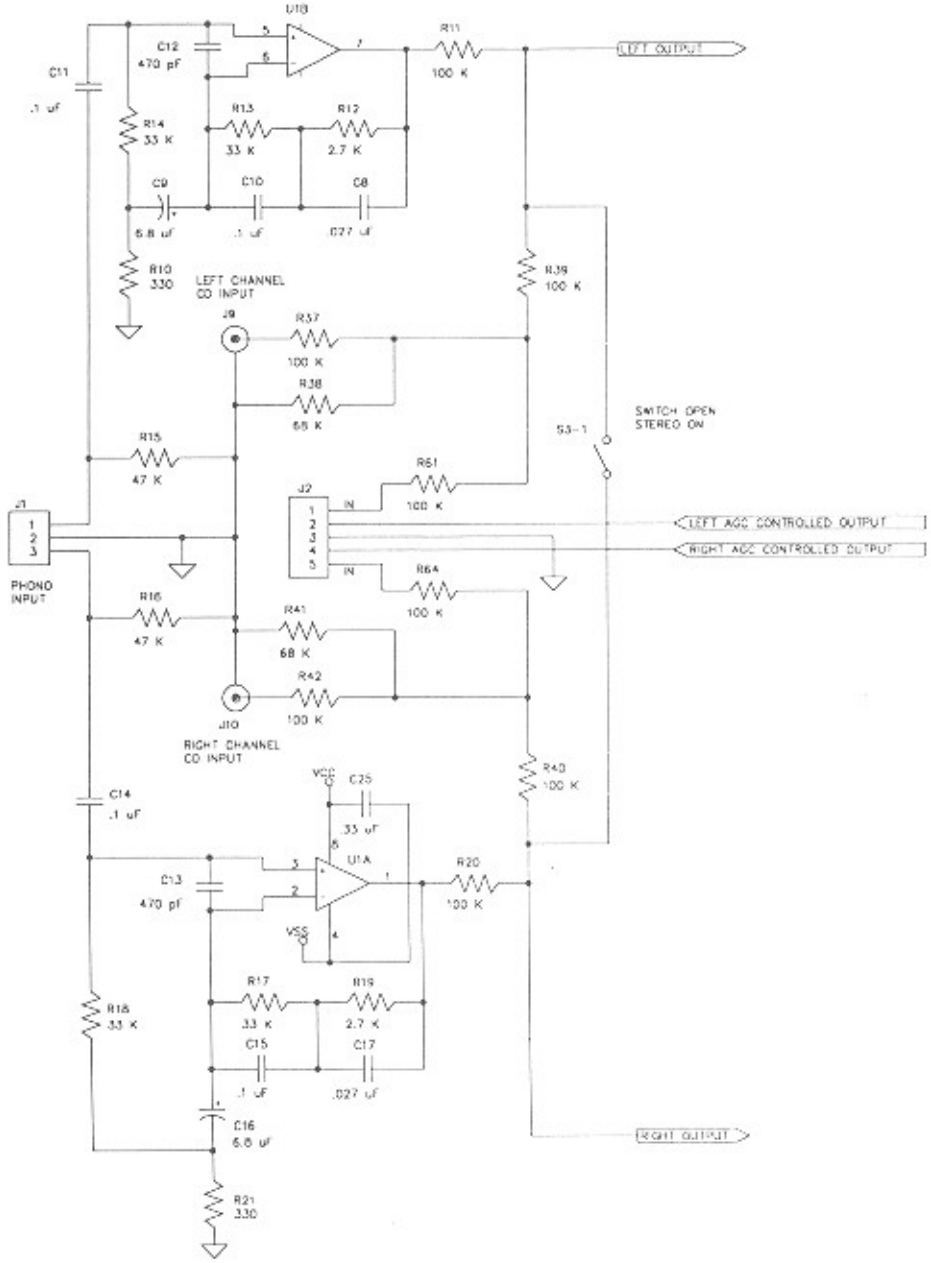
F501-F502	Fuse - 5 Amp	70072106

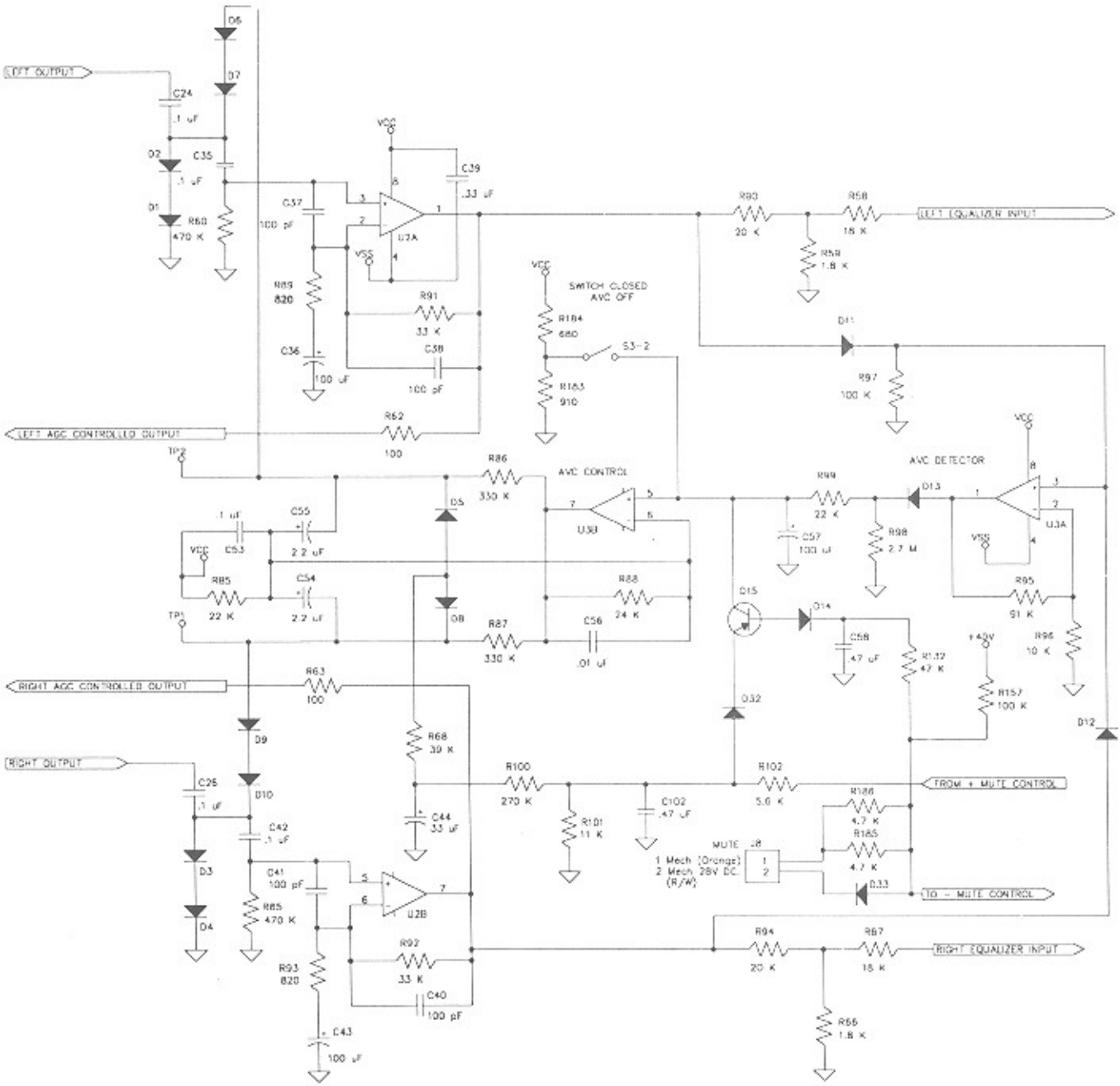
P501	Polarizing Wafer Assembly	70075007
P502	Polarizing Wafer Assembly - Right-angle mount	70076009
P503-P504	Polarizing Wafer Assembly	70075003

Q501-Q502	Transistor - Silicon	(NPN)	70033005
Q503	Transistor - Silicon	(NPN)	70030008

Note: All resistors are ¼ watt 5%, unless otherwise noted.

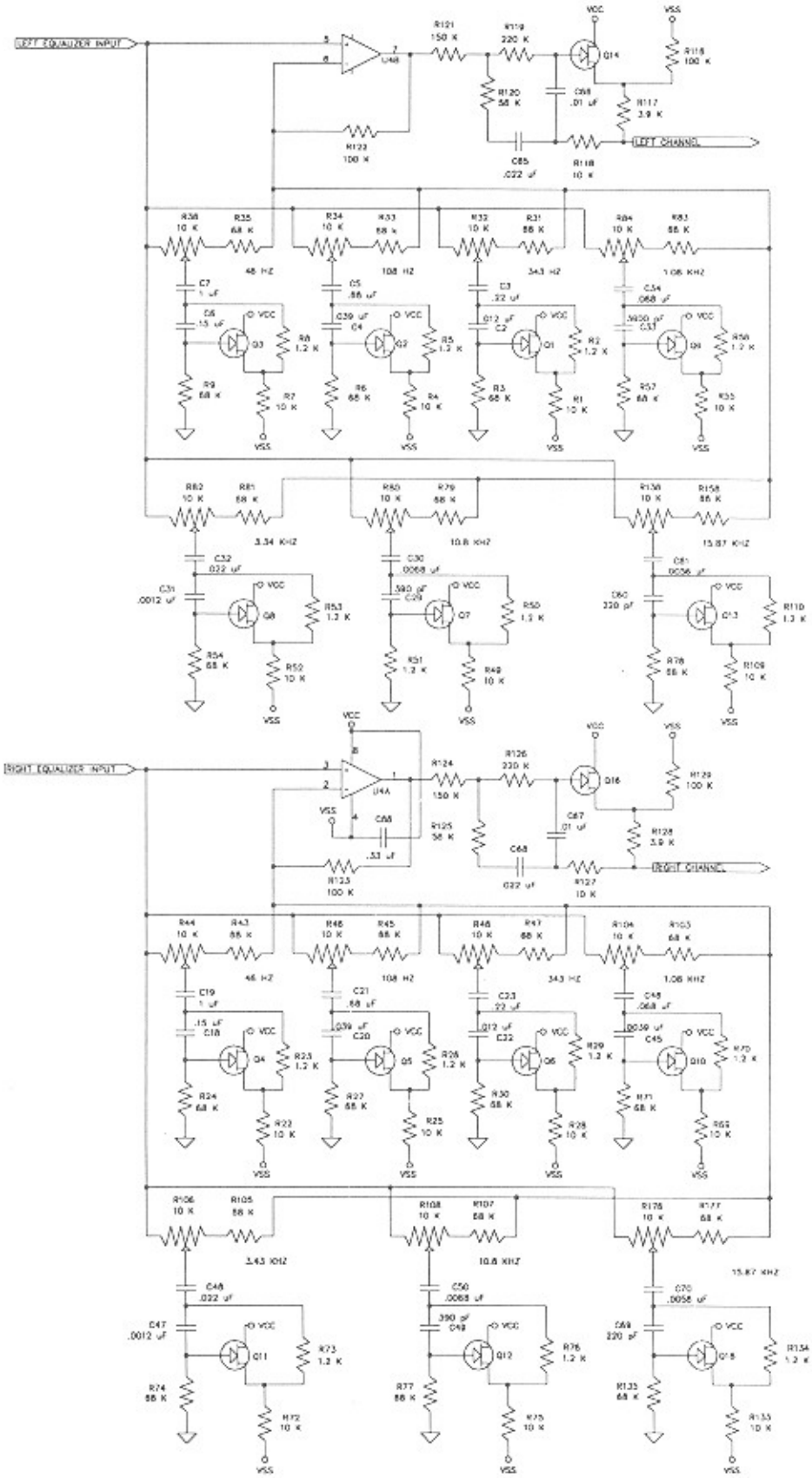
R501	Resistor - Carbon	6.8 K	(¼ w, 2%)	79902682
R502	Resistor - Carbon	390 Ohm	(¼ w, 2%)	79902391
R503	Resistor - Wire Wound	0.33 Ohm	(2 w, 5%)	79920338
R504	Resistor - Wire Wound	1 K	(2 w, 10%)	79920102
R505	Resistor - Carbon	1 K	(½ w, 10%)	70010619
R506	Resistor - Carbon	470 Ohm	(¼ w, 2%)	79902471
R507	Resistor - Carbon	100 Ohm	(¼ w, 2%)	79902101
R508	Resistor - Wire Wound	0.27 Ohm	(2 w, 5%)	79920278
R509	Resistor - Carbon	1 K	(¼ w, 5%)	79901102
R510	Resistor - Carbon	560 Ohm	(¼ w, 5%)	79901561
R511	Resistor - Carbon	470 Ohm	(¼ w, 5%)	79901471
R512	Resistor - Carbon	2.7 K	(½ w, 5%)	70012007
R513	Resistor - Carbon	1 K	(½ w, 10%)	70010619
R514	Resistor - Carbon	.27 Ohm	(2 w, 5%)	79920278

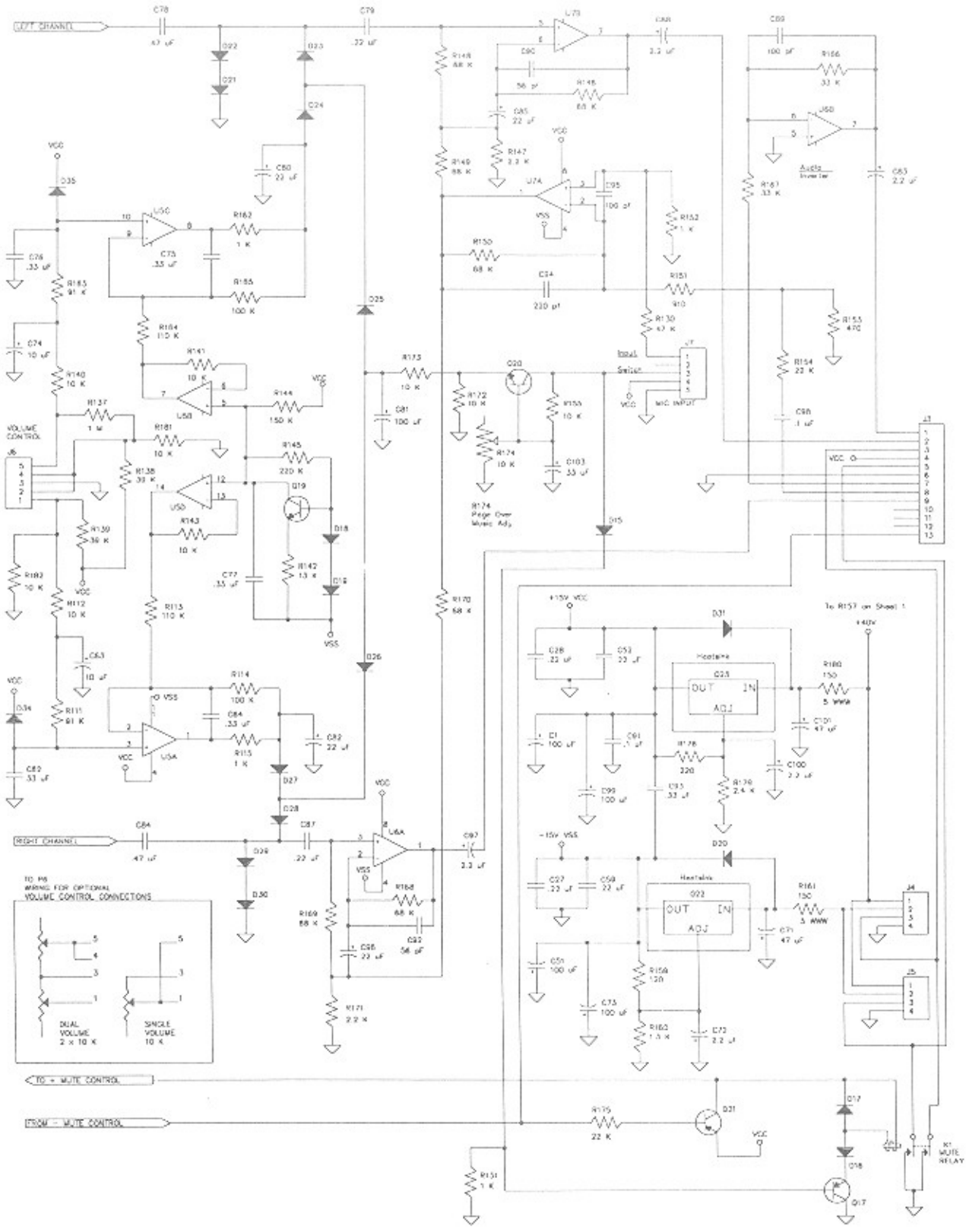

U1B
C12
470 pF
C11
.1 uF
R11
100 K
LEFT OUTPUT
R14
33 K
R13
33 K
R12
2.7 K
C9
6.8 uF
C10
.1 uF
C8
.027 uF
R10
330
LEFT CHANNEL
CD INPUT
R39
100 K
J9
R37
100 K
R38
68 K
SWITCH OPEN
STEREO ON
S3-1
R15
47 K
R61
100 K
J2
IN
LEFT AGC CONTROLLED OUTPUT
RIGHT AGC CONTROLLED OUTPUT
R64
100 K
J1
PHONO
INPUT
R16
47 K
R41
68 K
R42
100 K
J10
RIGHT CHANNEL
CD INPUT
R43
100 K
VCC
C25
.33 uF
C14
.1 uF
U1A
C13
470 pF
R20
100 K
VSS
R17
33 K
R19
2.7 K
C15
.1 uF
C17
.027 uF
R18
33 K
C16
6.8 uF
RIGHT OUTPUT
R21
330



For Equivalent Engineering Drawing See 61023702 B

Figure 5-7A. Schematic Diagram - Stereo Preamp Assembly, Sheet 1


LEFT EQUALIZER INPUT
RIGHT EQUALIZER INPUT
LEFT CHANNEL
RIGHT CHANNEL
VCC
VSS
46 HZ
108 HZ
343 HZ
1.08 KHZ
3.34 KHZ
10.8 KHZ
15.87 KHZ
3.43 KHZ
10.8 KHZ
15.87 KHZ



For Equivalent Engineering Drawing See 61023702 B

Figure 5-7A. Schematic Diagram - Stereo Preamp Assembly, Sheet 2

COMPONENT LIST FOR PREAMPLIFIER BOARD (61023702-B)

C1	Capacitor - Electrolytic	100 mf	70023814
C2	Capacitor - Monolithic Ceramic	.012 mf	70028638
C3	Capacitor - Monolithic Ceramic	.22 mf	70028510
C4	Capacitor - Monolithic Ceramic	.039 mf	70028644
C5	Capacitor - Monolithic Ceramic	.68 mf	70028522
C6	Capacitor - Monolithic Ceramic	.15 mf	70028512
C7	Capacitor - Monolithic Ceramic	1 mf	70028521
C8	Capacitor - Monolithic Ceramic	.027 mf	70028642
C9	Capacitor - Electrolytic	6.8 mf	70023807
C10	Capacitor - Monolithic Ceramic	.1 mf	70028649
C11	Capacitor - Monolithic Ceramic	.1 mf	70028649
C12	Capacitor - Monolithic Ceramic	470 pf	70028612
C13	Capacitor - Monolithic Ceramic	470 pf	70028612
C14	Capacitor - Monolithic Ceramic	.1 mf	70028649
C15	Capacitor - Monolithic Ceramic	.1 mf	70028649
C16	Capacitor - Electrolytic	6.8 mf	70023807
C17	Capacitor - Monolithic Ceramic	.027 mf	70028642
C18	Capacitor - Monolithic Ceramic	.15 mf	70028512
C19	Capacitor - Monolithic Ceramic	1 mf	70028521
C20	Capacitor - Monolithic Ceramic	.039 mf	70028644
C21	Capacitor - Monolithic Ceramic	.68 mf	70028522
C22	Capacitor - Monolithic Ceramic	.012 mf	70028638
C23	Capacitor - Monolithic Ceramic	.22 mf	70028510
C24	Capacitor - Monolithic Ceramic	.1 mf	70028649
C25	Capacitor - Monolithic Ceramic	.33 mf	70028515
C26	Capacitor - Monolithic Ceramic	.1 mf	70028649
C27	Capacitor - Monolithic Ceramic	.22 mf	70028510
C28	Capacitor - Monolithic Ceramic	.22 mf	70028510
C29	Capacitor - Monolithic Ceramic	390 pf	70028611
C30	Capacitor - Monolithic Ceramic	.0068 mf	70028633
C31	Capacitor - Monolithic Ceramic	.0012 mf	70028620
C32	Capacitor - Monolithic Ceramic	.022 mf	70028641
C33	Capacitor - Monolithic Ceramic	.0039 mf	70028629
C34	Capacitor - Monolithic Ceramic	.068 mf	70028647
C35	Capacitor - Monolithic Ceramic	.1 mf	70028649
C36	Capacitor - Electrolytic	100 mf	70023814
C37	Capacitor - Monolithic Ceramic	100 pf	70028601
C38	Capacitor - Monolithic Ceramic	100 pf	70028601
C39	Capacitor - Monolithic Ceramic	.33 mf	70028515
C40	Capacitor - Monolithic Ceramic	100 pf	70028601
C41	Capacitor - Monolithic Ceramic	100 pf	70028601
C42	Capacitor - Monolithic Ceramic	.1 mf	70028649
C43	Capacitor - Electrolytic	100 mf	70023814
C44	Capacitor - Electrolytic	33 mf	70023811
C45	Capacitor - Monolithic Ceramic	.0039 mf	70028629
C46	Capacitor - Monolithic Ceramic	.068 mf	70028647
C47	Capacitor - Monolithic Ceramic	.0012 mf	70028620
C48	Capacitor - Monolithic Ceramic	.022 mf	70028641
C49	Capacitor - Monolithic Ceramic	390 pf	70028611
C50	Capacitor - Monolithic Ceramic	.0056 mf	70028632
C51	Capacitor - Electrolytic	100 mf	70023814

C52	Capacitor - Monolithic Ceramic	.22 mf	70028510
C53	Capacitor - Monolithic Ceramic	.1 mf	70028649
C54	Capacitor - Electrolytic	2.2 mf	70023805
C55	Capacitor - Electrolytic	2.2 mf	70023805
C56	Capacitor - Monolithic Ceramic	.01 mf	70028636
C57	Capacitor - Electrolytic	100 mf	70023814
C58	Capacitor - Electrolytic	2.2 mf	70023805
C59	Capacitor - Monolithic Ceramic	.22 mf	70028510
C60	Capacitor - Monolithic Ceramic	220 pf	70028606
C61	Capacitor - Monolithic Ceramic	.0056 mf	70028632
C62	Capacitor - Monolithic Ceramic	.33 mf	70028515
C63	Capacitor - Electrolytic	10 mf	70023808
C64	Capacitor - Monolithic Ceramic	.33 mf	70028515
C65	Capacitor - Monolithic Ceramic	.022 mf	70028641
C66	Capacitor - Monolithic Ceramic	.01 mf	70028636
C67	Capacitor - Monolithic Ceramic	.01 mf	70028636
C68	Capacitor - Monolithic Ceramic	.022 mf	70028641
C69	Capacitor - Monolithic Ceramic	220 pf	70028606
C70	Capacitor - Monolithic Ceramic	.0056 mf	70028632
C71	Capacitor - Electrolytic	47 mf	70023812
C72	Capacitor - Electrolytic	2.2 mf	70023805
C73	Capacitor - Electrolytic	100 mf	70023814
C74	Capacitor - Electrolytic	10 mf	70023808
C75	Capacitor - Monolithic Ceramic	.33 mf	70028515
C76	Capacitor - Monolithic Ceramic	.33 mf	70028515
C77	Capacitor - Monolithic Ceramic	.33 mf	70028515
C78	Capacitor - Monolithic Ceramic	.47 mf	70028516
C79	Capacitor - Monolithic Ceramic	.22 mf	70028510
C80	Capacitor - Electrolytic	22 mf	70023810
C81	Capacitor - Electrolytic	100 mf	70023814
C82	Capacitor - Electrolytic	22 mf	70023810
C83	Capacitor - Electrolytic	2.2 mf	70023805
C84	Capacitor - Monolithic Ceramic	.47 mf	70028516
C85	Capacitor - Electrolytic	22 mf	70023810
C86	Capacitor - Monolithic Ceramic	.33 mf	70028515
C87	Capacitor - Monolithic Ceramic	.22 mf	70028510
C88	Capacitor - Electrolytic	2.2 mf	70023805
C89	Capacitor - Monolithic Ceramic	100 pf	70028601
C90	Capacitor - Monolithic Ceramic	56 pf	70028710
C91	Capacitor - Monolithic Ceramic	.1 mf	70028649
C92	Capacitor - Monolithic Ceramic	56 pf	70028710
C93	Capacitor - Monolithic Ceramic	.33 mf	70028515
C94	Capacitor - Monolithic Ceramic	220 pf	70028606
C95	Capacitor - Monolithic Ceramic	100 pf	70028601
C96	Capacitor - Electrolytic	22 mf	70023810
C97	Capacitor - Electrolytic	2.2 mf	70023805
C98	Capacitor - Monolithic Ceramic	.1 mf	70028649
C99	Capacitor - Electrolytic	100 mf	70023814
C100	Capacitor - Electrolytic	2.2 mf	70023805
C101	Capacitor - Electrolytic	47 mf	70023812
C102	Capacitor - Monolithic Ceramic	.47 mf	70028516
C103	Capacitor - Electrolytic	33 mf	70023811

COMPONENT LIST FOR PREAMPLIFIER BOARD
(Continued)

D1	Diode - Silicon	1N4148	70035012
D2	Diode - Silicon	1N4148	70035012
D3	Diode - Silicon	1N4148	70035012
D4	Diode - Silicon	1N4148	70035012
D5	Diode - Silicon	1N4148	70035012
D6	Diode - Silicon	1N4148	70035012
D7	Diode - Silicon	1N4148	70035012
D8	Diode - Silicon	1N4148	70035012
D9	Diode - Silicon	1N4148	70035012
D10	Diode - Silicon	1N4148	70035012
D11	Diode - Silicon	1N4148	70035012
D12	Diode - Silicon	1N4148	70035012
D13	Diode - Silicon	1N4148	70035012
D14	Diode - Silicon	1N4148	70035012
D15	Diode - Silicon	1N4148	70035012
D16	Diode - Silicon	1N4148	70035012
D17	Diode - Silicon	1N4148	70035012
D18	Diode - Silicon	1N4148	70035012
D19	Diode - Silicon	1N4148	70035012
D20	Diode - Silicon	1N4148	70035012
D21	Diode - Silicon	1N4148	70035012
D22	Diode - Silicon	1N4148	70035012
D23	Diode - Silicon	1N4148	70035012
D24	Diode - Silicon	1N4148	70035012
D25	Diode - Silicon	1N4148	70035012
D26	Diode - Silicon	1N4148	70035012
D27	Diode - Silicon	1N4148	70035012
D28	Diode - Silicon	1N4148	70035012
D29	Diode - Silicon	1N4148	70035012
D30	Diode - Silicon	1N4148	70035012
D31	Diode - Silicon	1N4148	70035012
D32	Diode - Silicon	1N4148	70035012
D33	Diode - Silicon	1N4148	70035012
D34	Diode - Silicon	1N4148	70035012
D35	Diode - Silicon	1N4148	70035012
HS1	Heatsink - Vertical Mount		21541405
HS2	Heatsink - Vertical Mount		21541405
P1	Header - Non-Polarizing (3 CKT)		70074921
P2	Header - Non-Polarizing (5 CKT)		70074923
P3	Header - Non-Polarizing (13 CKT)		70074931
P4	Connector - Top Entry (4 CKT)		70074802
P5	Connector - Top Entry (4 CKT)		70074802
P6	Header - Non-Polarizing (5 CKT)		70074923
P7	Header - Non-Polarizing (5 CKT)		70074923
P8	Header - Polarizing (2 CKT)		70075002
P9	Receptacle - Phono Jack		21540902
P10	Receptacle - Phono Jack		21540902
K1	Relay - Reed		70042208

Q1	Transistor - J-FET (N-channel)	2N5484	70030901
Q2	Transistor - J-FET (N-Channel)	2N5484	70030901
Q3	Transistor - J-FET (N-Channel)	2N5484	70030901
Q4	Transistor - J-FET (N-Channel)	2N5484	70030901
Q5	Transistor - J-FET (N-Channel)	2N5484	70030901
Q6	Transistor - J-FET (N-Channel)	2N5484	70030901
Q7	Transistor - J-FET (N-Channel)	2N5484	70030901
Q8	Transistor - J-FET (N-Channel)	2N5484	70030901
Q9	Transistor - J-FET (N-Channel)	2N5484	70030901
Q10	Transistor - J-FET (N-Channel)	2N5484	70030901
Q11	Transistor - J-FET (N-Channel)	2N5484	70030901
Q12	Transistor - J-FET (N-Channel)	2N5484	70030901
Q13	Transistor - J-FET (N-Channel)	2N5484	70030901
Q14	Transistor - J-FET (N-Channel)	2N5484	70030901
Q15	Transistor - Silicon (PNP)	MPSA56	70030104
Q16	Transistor - J-FET (N-Channel)	2N5484	70030901
Q17	Transistor - Silicon (PNP)	MPSA56	70030104
Q18	Transistor - J-FET (N-Channel)	2N5484	70030901
Q19	Transistor - Silicon (NPN)	MPSA06	70030008
Q20	Transistor - Silicon (NPN)	MPSA06	70030008
Q21	Transistor - Silicon (PNP)	MPSA56	70030104
Q22	Regulator - Voltage (ADJ NEG)	LM337T	70036508
Q23	Regulator - Voltage (ADJ POS)	LM317T	70036507

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor - Carbon	10 K	79901103
R2	Resistor - Carbon	1.2 K	79901122
R3	Resistor - Carbon	68 K	79901683
R4	Resistor - Carbon	10 K	79901103
R5	Resistor - Carbon	1.2 K	79901122
R6	Resistor - Carbon	68 K	79901683
R7	Resistor - Carbon	10 K	79901103
R8	Resistor - Carbon	1.2 K	79901122
R9	Resistor - Carbon	68 K	79901683
R10	Resistor - Carbon	330 Ohm	79901331
R11	Resistor - Carbon	100 K	79901104
R12	Resistor - Carbon	2.7 K	79901272
R13	Resistor - Carbon	33 K	79901333
R14	Resistor - Carbon	33 K	79901333
R15	Resistor - Carbon	47 K	79901473
R16	Resistor - Carbon	47 K	79901473
R17	Resistor - Carbon	33 K	79901333
R18	Resistor - Carbon	33 K	79901333
R19	Resistor - Carbon	2.7 K	79901272
R20	Resistor - Carbon	100 K	79901104
R21	Resistor - Carbon	330 Ohm	79901331
R22	Resistor - Carbon	10 K	79901103
R23	Resistor - Carbon	1.2 K	79901122
R24	Resistor - Carbon	68 K	79901683
R25	Resistor - Carbon	10 K	79901103

R26	Resistor - Carbon	1.2 K	79901122
R27	Resistor - Carbon	68 K	79901683
R28	Resistor - Carbon	10 K	79901103
R29	Resistor - Carbon	1.2 K	79901122
R30	Resistor - Carbon	68 K	79901683
R31	Resistor - Carbon	68 K	79901683
R32	Potentiometer - Special	10 K	70040018
R33	Resistor - Carbon	68 K	79901683
R34	Potentiometer - Special	10 K	70040018
R35	Resistor - Carbon	68 K	79901683
R36	Potentiometer - Special	10 K	70040018
R37	Resistor - Carbon	100 K	79901104
R38	Resistor - Carbon	68 K	79901683
R39	Resistor - Carbon	100 K	79901104
R40	Resistor - Carbon	100 K	79901104
R41	Resistor - Carbon	68 K	79901683
R42	Resistor - Carbon	100 K	79901104
R43	Resistor - Carbon	68 K	79901683
R44	Potentiometer - Special	10 K	70040018
R45	Resistor - Carbon	68 K	79901683
R46	Potentiometer - Special	10 K	70040018
R47	Resistor - Carbon	68 K	79901683
R48	Potentiometer - Special	10 K	70040018
R49	Resistor - Carbon	10 K	79901103
R50	Resistor - Carbon	1.2 K	79901122
R51	Resistor - Carbon	68 K	79901683
R52	Resistor - Carbon	10 K	79901103
R53	Resistor - Carbon	1.2 K	79901122
R54	Resistor - Carbon	68 K	79901683
R55	Resistor - Carbon	10 K	79901103
R56	Resistor - Carbon	1.2 K	79901122
R57	Resistor - Carbon	68 K	79901683
R58	Resistor - Carbon	18 K	79901183
R59	Resistor - Carbon	1.8 K	79901182
R60	Resistor - Carbon	470 K	79901474
R61	Resistor - Carbon	100 K	79901104
R62	Resistor - Carbon	100 Ohm	79901101
R63	Resistor - Carbon	100 Ohm	79901101
R64	Resistor - Carbon	100 K	79901104
R65	Resistor - Carbon	470 K	79901474
R66	Resistor - Carbon	1.8 K	79901182
R67	Resistor - Carbon	18 K	79901183
R68	Resistor - Carbon	39 K	79901393
R69	Resistor - Carbon	10 K	79901103
R70	Resistor - Carbon	1.2 K	79901122
R71	Resistor - Carbon	68 K	79901683
R72	Resistor - Carbon	10 K	79901103
R73	Resistor - Carbon	1.2 K	79901122
R74	Resistor - Carbon	68 K	79901683
R75	Resistor - Carbon	10 K	79901103
R76	Resistor - Carbon	1.2 K	79901122

R77	Resistor - Carbon	68 K	79901683
R78	Resistor - Carbon	68 K	79901683
R79	Resistor - Carbon	68 K	79901683
R80	Potentiometer - Special	10 K	70040018
R81	Resistor - Carbon	68 K	79901683
R82	Potentiometer - Special	10 K	70040018
R83	Resistor - Carbon	68 K	79901683
R84	Potentiometer - Special	10 K	70040018
R85	Resistor - Carbon	22 K	79901223
R86	Resistor - Carbon	330 K	79901334
R87	Resistor - Carbon	330 K	79901334
R88	Resistor - Carbon	24 K	79901243
R89	Resistor - Carbon	820 Ohm	79901821
R90	Resistor - Carbon	20 K	79901203
R91	Resistor - Carbon	33 K	79901333
R92	Resistor - Carbon	33 K	79901333
R93	Resistor - Carbon	820 Ohm	79901821
R94	Resistor - Carbon	20 K	79901203
R95	Resistor - Carbon	91 K	79901913
R96	Resistor - Carbon	10 K	79901103
R97	Resistor - Carbon	100 K	79901104
R98	Resistor - Carbon	2.7 M	79901275
R99	Resistor - Carbon	22 K	79901223
R100	Resistor - Carbon	270 K	79901274
R101	Resistor - Carbon	11 K	79901113
R102	Resistor - Carbon	5.6 K	79901562
R103	Resistor - Carbon	68 K	79901683
R104	Potentiometer - Special	10 K	70040018
R105	Resistor - Carbon	68 K	79901683
R106	Potentiometer - Special	10 K	70040018
R107	Resistor - Carbon	68 K	79901683
R108	Potentiometer - Special	10 K	70040018
R109	Resistor - Carbon	10 K	79901103
R110	Resistor - Carbon	1.2 K	79901122
R111	Resistor - Carbon	91 K	79901913
R112	Resistor - Carbon	10 K	79901103
R113	Resistor - Carbon	110 K	79901114
R114	Resistor - Carbon	100 K	79901104
R115	Resistor - Carbon	1 K	79901102
R116	Resistor - Carbon	100 K	79901104
R117	Resistor - Carbon	3.9 K	79901392
R118	Resistor - Carbon	10 K	79901103
R119	Resistor - Carbon	220 K	79901224
R120	Resistor - Carbon	56 K	79901563
R121	Resistor - Carbon	150 K	79901154
R122	Resistor - Carbon	100 K	79901104
R123	Resistor - Carbon	100 K	79901104
R124	Resistor - Carbon	150 K	79901154
R125	Resistor - Carbon	56 K	79901563
R126	Resistor - Carbon	220 K	79901224
R127	Resistor - Carbon	10 K	79901103

COMPONENT LIST FOR PREAMPLIFIER BOARD
(Continued)

R128	Resistor - Carbon	3.9 K	79901392
R129	Resistor - Carbon	100 K	79901104
R130	Resistor - Carbon	47 K	79901473
R131	Resistor - Carbon	1 K	79901102
R132	Resistor - Carbon	47 K	79901473
R133	Resistor - Carbon	10 K	79901103
R134	Resistor - Carbon	1.2 K	79901122
R135	Resistor - Carbon	68 K	79901683
R136	Potentiometer - Special	10 K	70040018
R137	Resistor - Carbon	1 M	79901105
R138	Resistor - Carbon	39 K	79901393
R139	Resistor - Carbon	39 K	79901393
R140	Resistor - Carbon	10 K	79901103
R141	Resistor - Carbon	10 K	79901103
R142	Resistor - Carbon	13 K	79901133
R143	Resistor - Carbon	10 K	79901103
R144	Resistor - Carbon	150 K	79901154
R145	Resistor - Carbon	220 K	79901224
R146	Resistor - Carbon	68 K	79901683
R147	Resistor - Carbon	2.2 K	79901222
R148	Resistor - Carbon	68 K	79901683
R149	Resistor - Carbon	68 K	79901683
R150	Resistor - Carbon	68 K	79901683
R151	Resistor - Carbon	910 Ohm	79901911
R152	Resistor - Carbon	1 K	79901102
R153	Resistor - Carbon	470 Ohm	79901471
R154	Resistor - Carbon	22 K	79901223
R155	Resistor - Carbon	10 K	79901103
R156	NOT USED		
R157	Resistor - Carbon	100 K	79901104
R158	Resistor - Carbon	68 K	79901683
R159	Resistor - Carbon	120 Ohm (¼ W, 2%)	71102121
R160	Resistor - Carbon	1.3 K (¼ W, 2%)	79902132
R161	Resistor - Wirewound	150 Ohm (5 Watt)	70012510
R162	Resistor - Carbon	1 K	79901102
R163	Resistor - Carbon	91 K	79901913
R164	Resistor - Carbon	110 K	79901114
R165	Resistor - Carbon	100 K	79901104
R166	Resistor - Carbon	33 K	79901333
R167	Resistor - Carbon	33 K	79901333
R168	Resistor - Carbon	68 K	79901683
R169	Resistor - Carbon	68 K	79901683
R170	Resistor - Carbon	68 K	79901683
R171	Resistor - Carbon	2.2 K	79901222
R172	Resistor - Carbon	10 K	79901103
R173	Resistor - Carbon	10 K	79901103
R174	Potentiometer	10 K	70040014
R175	Resistor - Carbon	22 K	79901223
R176	Potentiometer - Special	10 K	70040018
R177	Resistor - Carbon	68 K	79901683
R178	Resistor - Carbon	220 Ohm (¼ W, 2%)	79902221

R179	Resistor - Carbon	2.4 K (¼ W, 2%)	79902242
R180	Resistor - Wirewound	150 Ohm (5 Watt)	70012510
R181	Resistor -Carbon	10 K	79901103
R182	Resistor -Carbon	10 K	79901103
R183	Resistor - Carbon	910 Ohm	79901911
R184	Resistor - Carbon	680 Ohm	79901681
R185	Resistor - Carbon	4.7 K	79901472
R186	Resistor - Carbon	4.7 K	79901472
S3	Switch - DIP		70043302 OR 70042902
U1	IC - Dual OP Amp.	(LM833 or XR1458/4558)	30800238
U2	IC - Dual OP Amp.	(LM833 or XR1458/4558)	30800238
U3	IC - Dual OP Amp.	(LM833 or XR1458/4558)	30800238
U4	IC - Dual OP Amp.	(LM833 or XR1458/4558)	30800238
U5	IC - Quad OP Amp.	(LM348 or XR-4741)	30800215
U6	IC - Dual OP Amp.	(LM833 or XR1458/4558)	30800238
U7	IC - Dual OP Amp.	(LM833 or XR1458/4558)	30800238

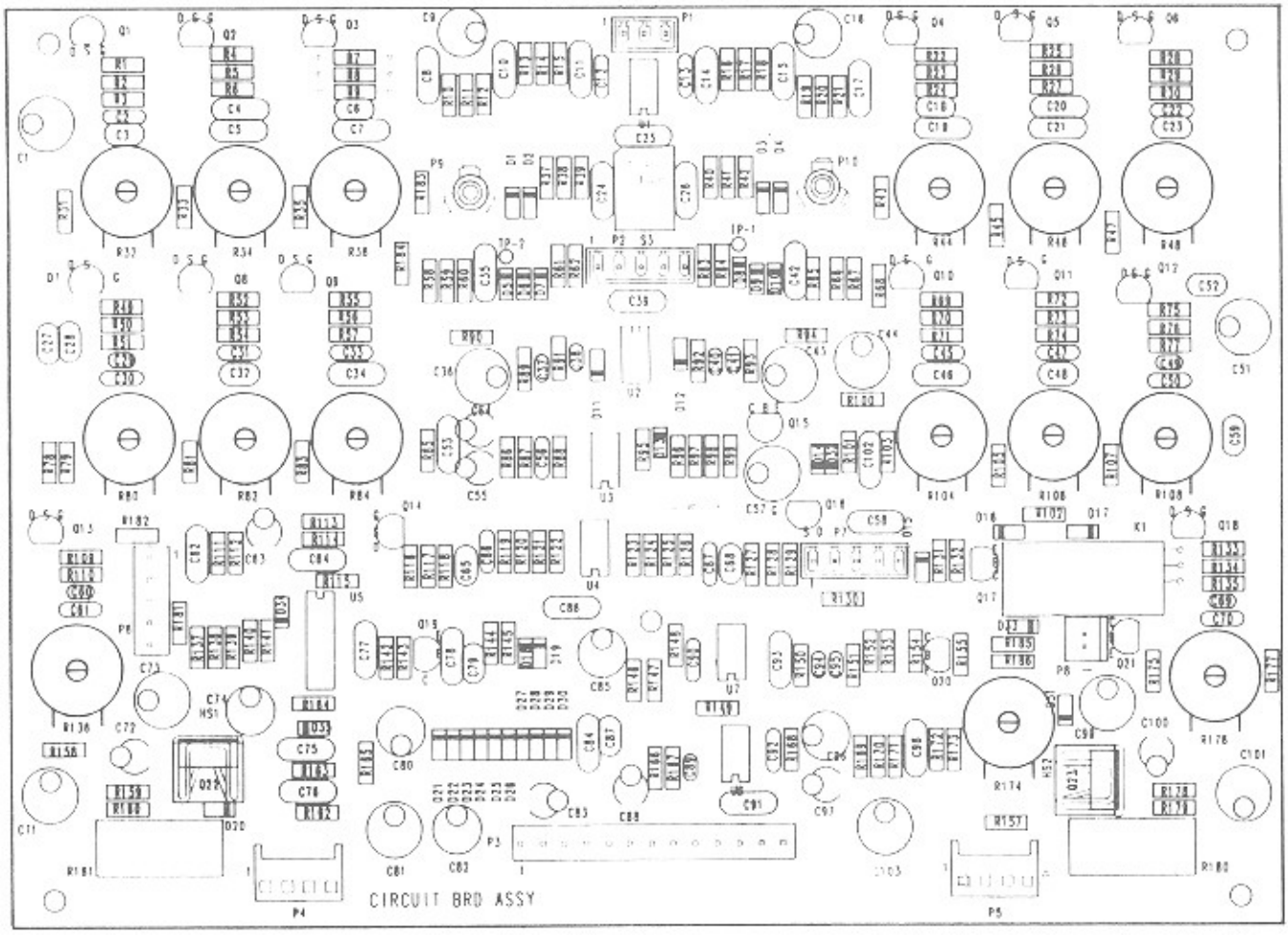
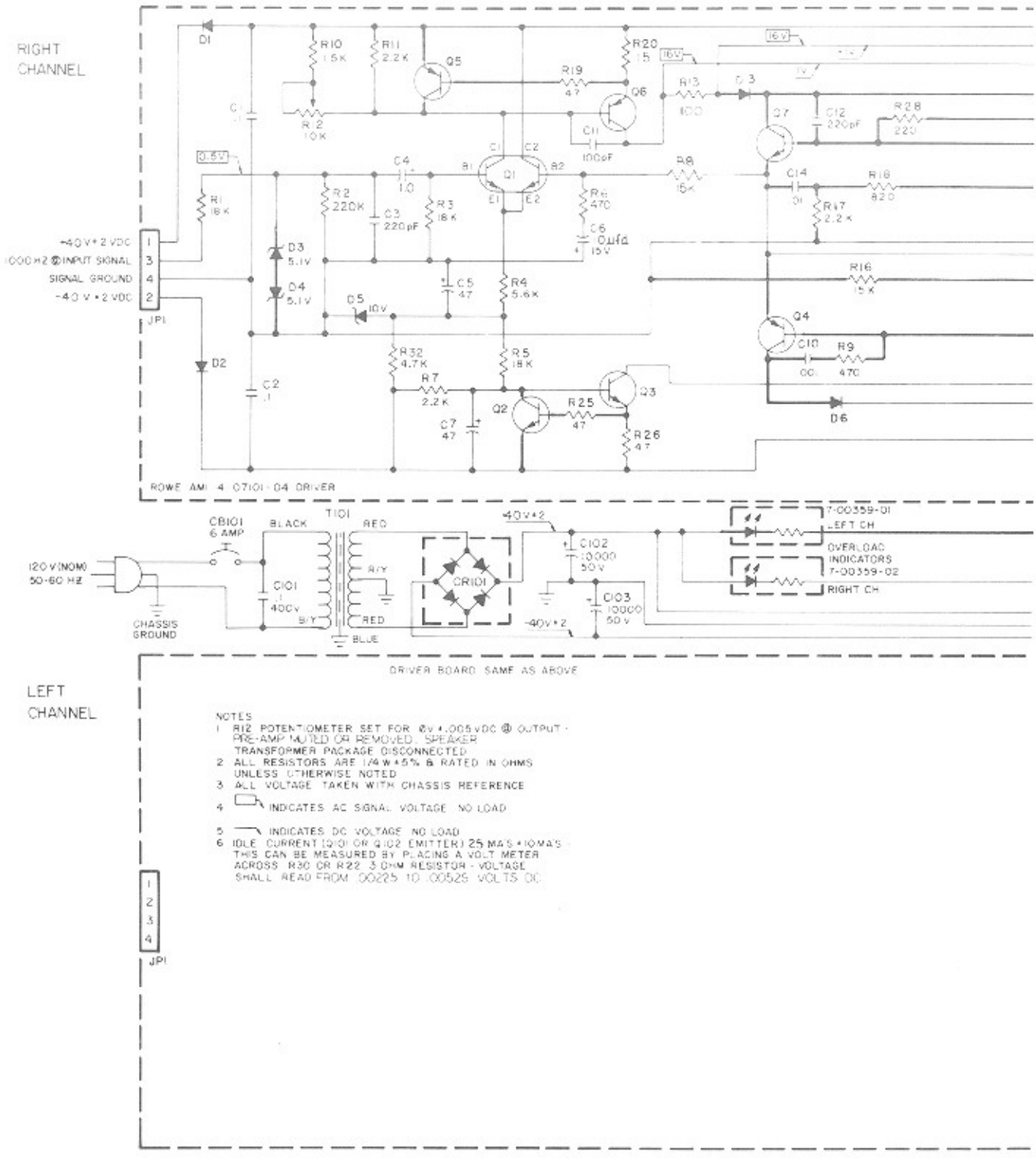
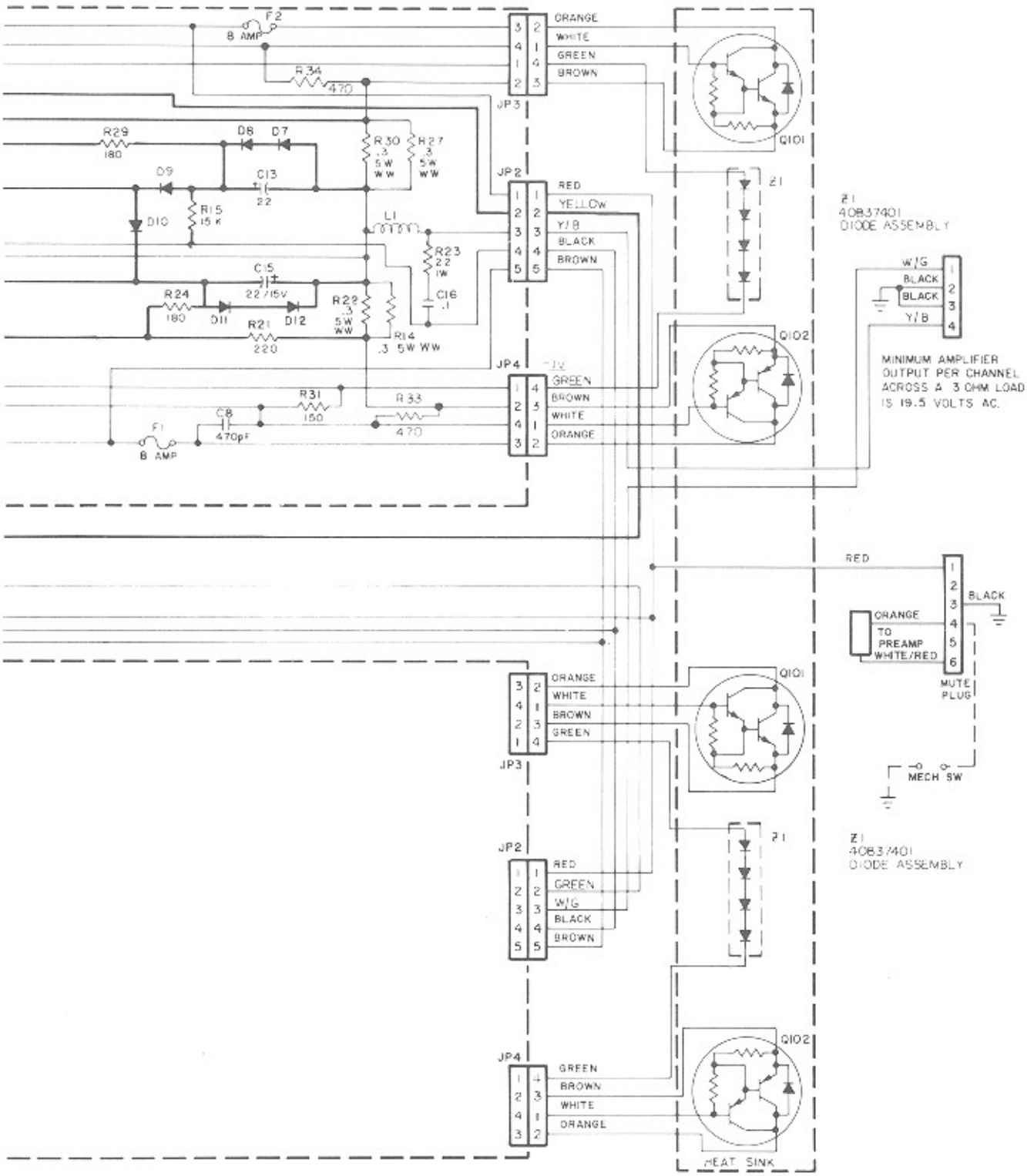


Figure 5-7B. Preamplifier Circuit Board Layout


RIGHT CHANNEL
LEFT CHANNEL
+40V±2 VDC
1000 Hz @ INPUT SIGNAL
SIGNAL GROUND
-40 V ±2 VDC
JP1
ROWE AMI 4 07101-04 DRIVER
120 V (NOM) 50-60 HZ
CHASSIS GROUND
CB101 6 AMP
T101
C101 400V
C102 10000 50 V
C103 10000 50 V
CR101
7-00359-01 LEFT CH
OVERLOAD INDICATORS
7-00359-02 RIGHT CH
DRIVER BOARD SAME AS ABOVE
NOTES
1 R12 POTENTIOMETER SET FOR @ V ± .005 VDC @ OUTPUT - PRE-AMP MUTED OR REMOVED, SPEAKER TRANSFORMER PACKAGE DISCONNECTED
2 ALL RESISTORS ARE 1/4 W ± 5% & RATED IN OHMS UNLESS OTHERWISE NOTED
3 ALL VOLTAGE TAKEN WITH CHASSIS REFERENCE
4 INDICATES AC SIGNAL VOLTAGE NO LOAD
5 INDICATES DC VOLTAGE NO LOAD
6 IDLE CURRENT (Q101 OR Q102 EMITTER) 25 MA ± 10 MA'S - THIS CAN BE MEASURED BY PLACING A VOLT METER ACROSS R30 OR R22 .5 OHM RESISTOR - VOLTAGE SHALL READ FROM .00225 TO .00525 VOLTS DC



(See Figure 8-15 for the pictorial view of the heat sink)

For Equivalent Engineering Drawing See 61024901/02-Q2 D

Figure 5-8A. Schematic Diagram - 250 Watt Power Amp

COMPONENT LIST FOR AMPLIFIER DRIVER BOARD 40710104-K

C1	Capacitor - Mylar	.1 mf	70021549
C2	Capacitor - Mylar	.1 mf	70021549
C3	Capacitor - Monolithic Ceramic	220 pf	70028606
C4	Capacitor - Electrolytic	1 mf	70023804
C5	Capacitor - Electrolytic	47 mf	70023812
C6	Capacitor - Electrolytic	10 mf	70023808
C7	Capacitor - Electrolytic	47 mf	70023812
C8	Capacitor - Monolithic Ceramic	470 pf	70028612
C9	NOT USED		
C10	Capacitor - Monolithic Ceramic	.001 mf	70028618
C11	Capacitor - Monolithic Ceramic	100 pf	70028601
C12	Capacitor - Monolithic Ceramic	220 pf	70028606
C13	Capacitor - Electrolytic	22 mf	70023810
C14	Capacitor - Monolithic Ceramic	.01 mf	70028636
C15	Capacitor - Electrolytic	22 mf	70023810
C16	Capacitor - Mylar	.1 mf	70021549
CR1	Diode - Silicon		70035005
CR2	Diode - Silicon		70035005
CR3	Diode - Zener	(5.1 V)	70035527
CR4	Diode - Zener	(5.1 V)	70035527
CR5	Diode - Zener	(10 V)	70035514
CR6	Diode - Silicon		70035005
CR7	Diode - Silicon		70035005
CR8	Diode - Silicon		70035005
CR9	Diode - Silicon		70035005
CR10	Diode - Silicon		70035005
CR11	Diode - Silicon		70035005
CR12	Diode - Silicon		70035005
CR13	Diode - Silicon		70035005
F1	Fuse (8 Amp)		70072002
F2	Fuse (8 Amp)		70072002
L1	Inductor - Coil		21940701
P1	Wafer - Non-Polarizing	(4 CKT)	70074904
P2	Wafer - Polarizing	(5 CKT)	70075005
P3	Wafer - Polarizing	(4 CKT)	70075004
P4	Wafer - Polarizing	(4 CKT)	70075004
Q1	Transistor - Silicon (Dual)	(NPN)	70030301
Q2	Transistor - Silicon	(NPN)	70030008
Q3	Transistor - Silicon	(NPN)	70033006
Q4	Transistor - Silicon	(PNP)	70030104
Q5	Transistor - Silicon	(PNP)	70030104
Q6	Transistor - Silicon	(PNP)	70030403
Q7	Transistor - Silicon	(NPN)	70030008

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor - Carbon	18 K	79901183
R2	Resistor - Carbon	220 K	79901224
R3	Resistor - Carbon	18 K	79901183
R4	Resistor - Carbon	5.6 K	79901562
R5	Resistor - Carbon	18 K	79901183
R6	Resistor - Carbon	470 Ohm	79901471
R7	Resistor - Carbon	2.2 K	79901222
R8	Resistor - Carbon	15 K	79901153
R9	Resistor - Carbon	470 Ohm	79901471
R10	Resistor - Carbon	1.5 K	79901152
R11	Resistor - Carbon	2.2 K	79901222
R12	Resistor - Potentiometer	10 K	70040014
R13	Resistor - Carbon	100 Ohm	79901101
R14	Resistor - Wire Wound	.3 Ohm	70011805
R15	Resistor - Carbon	15 K	79901153
R16	Resistor - Carbon	15 K	79901153
R17	Resistor - Carbon	2.2 K	79901222
R18	Resistor - Carbon	820 Ohm	79901821
R19	Resistor - Carbon	47 Ohm	79901470
R20	Resistor - Carbon	15 Ohm	79901150
R21	Resistor - Carbon	180 Ohm	79901181
R22	Resistor - Wire Wound	.3 Ohm	70011805
R23	Resistor - Wire Wound	22 Ohm	79920220
R24	Resistor - Carbon	180 Ohm	79901181
R25	Resistor - Carbon	47 Ohm	79901470
R26	Resistor - Carbon	47 Ohm	79901470
R27	Resistor - Wire Wound	.3 Ohm (5 W, 10%)	70011805
R28	Resistor - Carbon	180 Ohm	79901181
R29	Resistor - Carbon	180 Ohm	79901181
R30	Resistor - Wire Wound	.3 Ohm (5 W, 10%)	70011805
R31	Resistor - Carbon	220 Ohm	79901221
R32	Resistor - Carbon	4.7 K	79901472
R33	Resistor - Carbon	470 Ohm	79901471
R34	Resistor - Carbon	470 Ohm	79901471

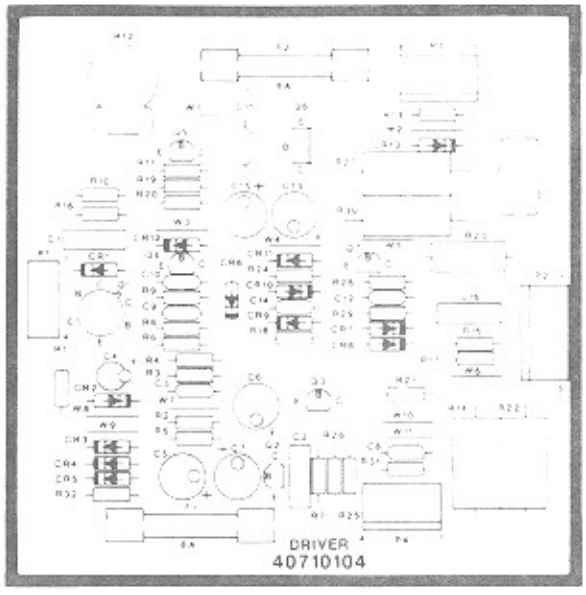
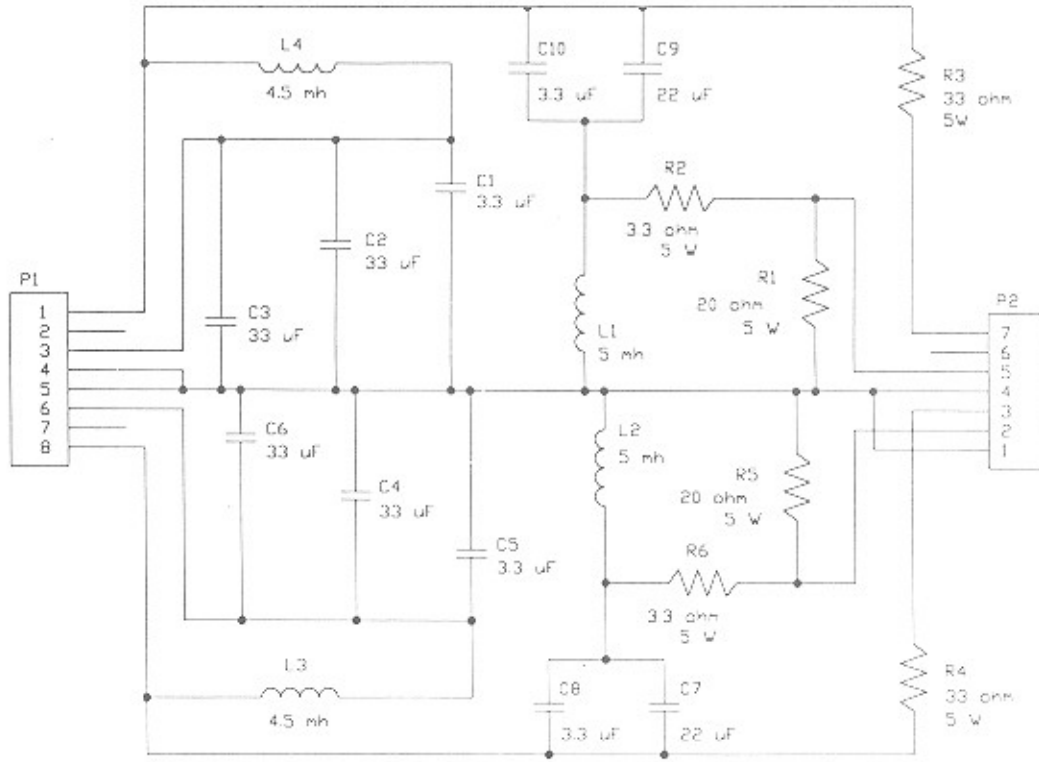


Figure 5-8B. Amplifier Driver Board Layout



For Equivalent Engineering Drawing See 61052701-Q2 A

Figure 5-8C. Schematic Diagram - Crossover Network

COMPONENTS LIST FOR CROSSOVER NETWORK (61052701)

C1	Capacitor - Bi-Polar Electrolytic	3.3 uF	70022801
C2	Capacitor - Bi-Polar Electrolytic	33 uF	70022811
C3	Capacitor - Bi-Polar Electrolytic	33 uF	70022811
C4	Capacitor - Bi-Polar Electrolytic	33 uF	70022811
C5	Capacitor - Bi-Polar Electrolytic	3.3 uF	70022801
C6	Capacitor - Bi-Polar Electrolytic	33 uF	70022811
C7	Capacitor - Bi-Polar Electrolytic	22 uF	70022809
C8	Capacitor - Bi-Polar Electrolytic	3.3 uF	70022801
C9	Capacitor - Bi-Polar Electrolytic	22 uF	70022809
C10	Capacitor - Bi-Polar Electrolytic	3.3 uF	70022801
L1	Inductor	5 mH	70041302
L2	Inductor	5 mH	70041302
L3	Inductor	4.5 mH	70041301
L4	Inductor	4.5 mH	70041301
P1	Header - Vertical Polarized (8 CKT)		70075008
P2	Header - Vertical Polarized (7 CKT)		70075007
R1	Resistor - Wire Wound 5W	20 Ω	70012514
R2	Resistor - Wire Wound 5W	3.3 Ω	70012513
R3	Resistor - Wire Wound 5W	33 Ω	70012512
R4	Resistor - Wire Wound 5W	33 Ω	70012512
R5	Resistor - Wire Wound 5W	20 Ω	70012514
R6	Resistor - Wire Wound 5W	3.3 Ω	70012513

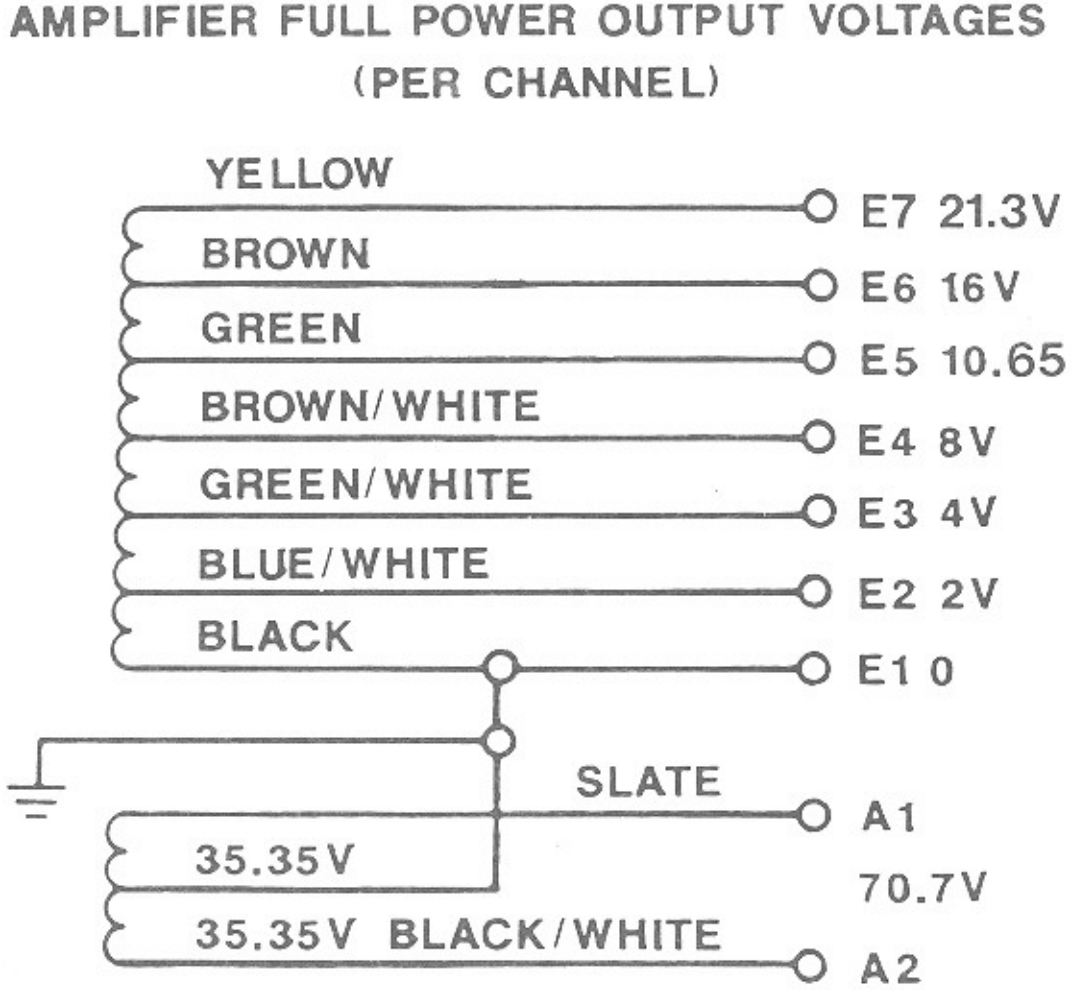
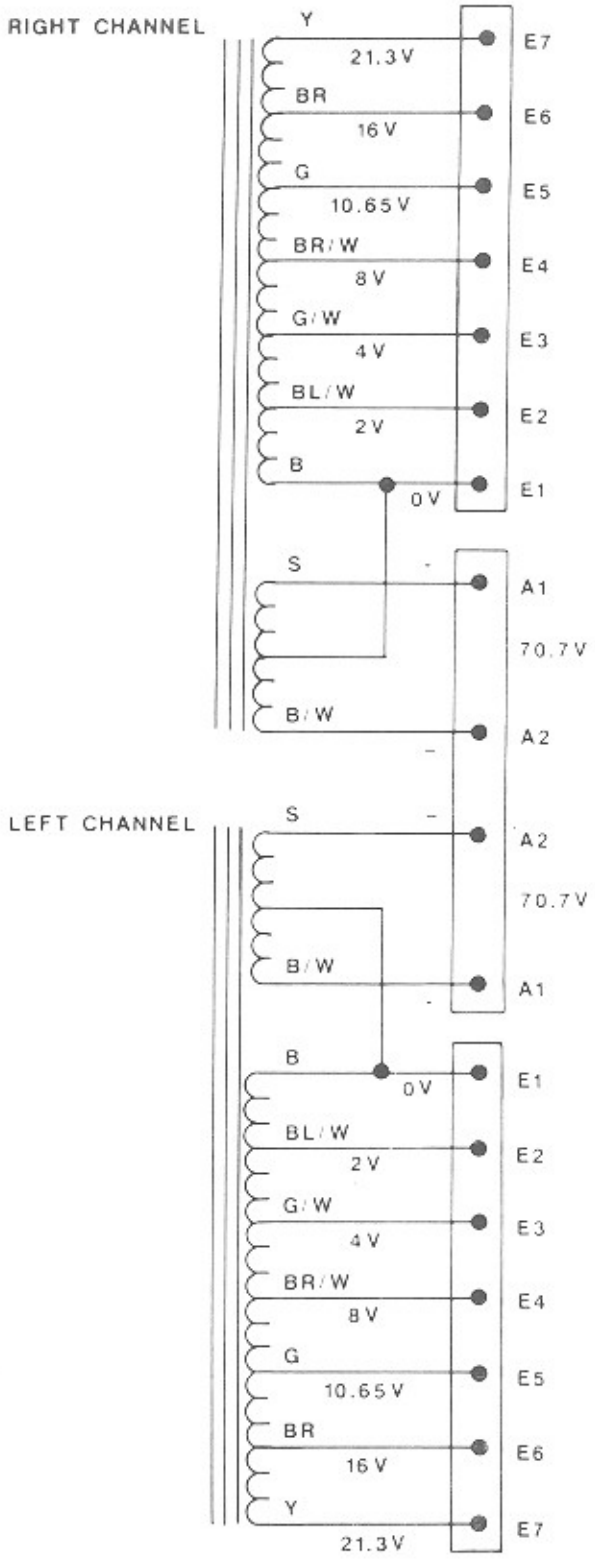
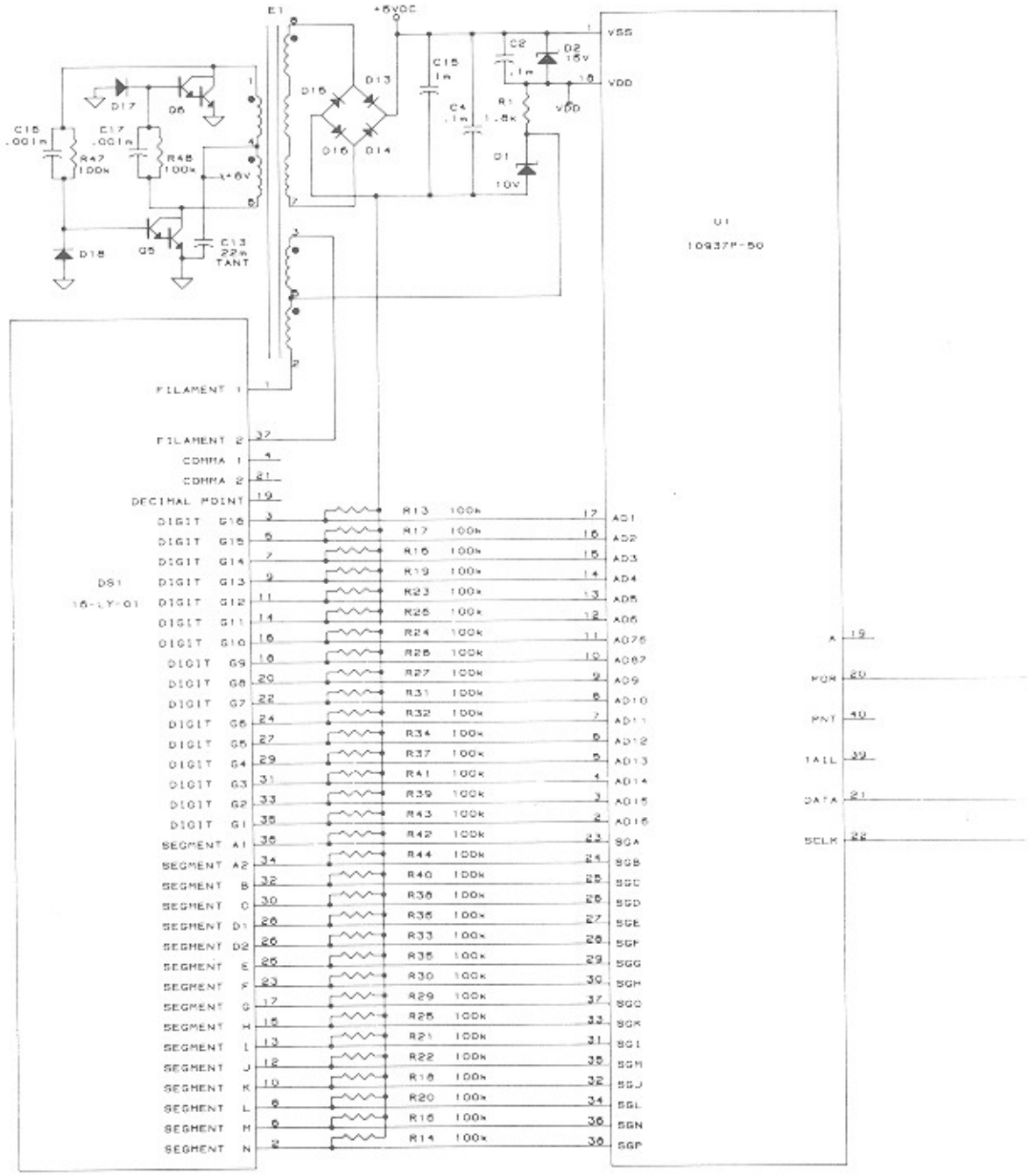


Figure 5-9. Transformer Output Voltages



For Equivalent Engineering Drawing See 40832101-Q2 A

Figure 5-10. Transformer Wiring Diagram


T1
+5VDC
VSS
VDD
C2
.1m
D2
16V
C15
1m
C4
.1m
R1
1.8K
D1
10V
D15
D13
D16
D14
D17
Q6
C16
.001m
C17
.001m
R47
100K
R48
100K
+16V
D18
Q5
C13
22m
TANT
U1
10937P-50
DS1
16-LY-01
FILAMENT 1
FILAMENT 2
COMMA 1
COMMA 2
DECIMAL POINT
DIGIT G16
DIGIT G15
DIGIT G14
DIGIT G13
DIGIT G12
DIGIT G11
DIGIT G10
DIGIT G9
DIGIT G8
DIGIT G7
DIGIT G6
DIGIT G5
DIGIT G4
DIGIT G3
DIGIT G2
DIGIT G1
SEGMENT A1
SEGMENT A2
SEGMENT B
SEGMENT C
SEGMENT D1
SEGMENT D2
SEGMENT E
SEGMENT F
SEGMENT G
SEGMENT H
SEGMENT L
SEGMENT J
SEGMENT K
SEGMENT L
SEGMENT M
SEGMENT N
R13 100K
R17 100K
R16 100K
R19 100K
R23 100K
R26 100K
R24 100K
R28 100K
R27 100K
R31 100K
R32 100K
R34 100K
R37 100K
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R39 100K
R43 100K
R42 100K
R44 100K
R40 100K
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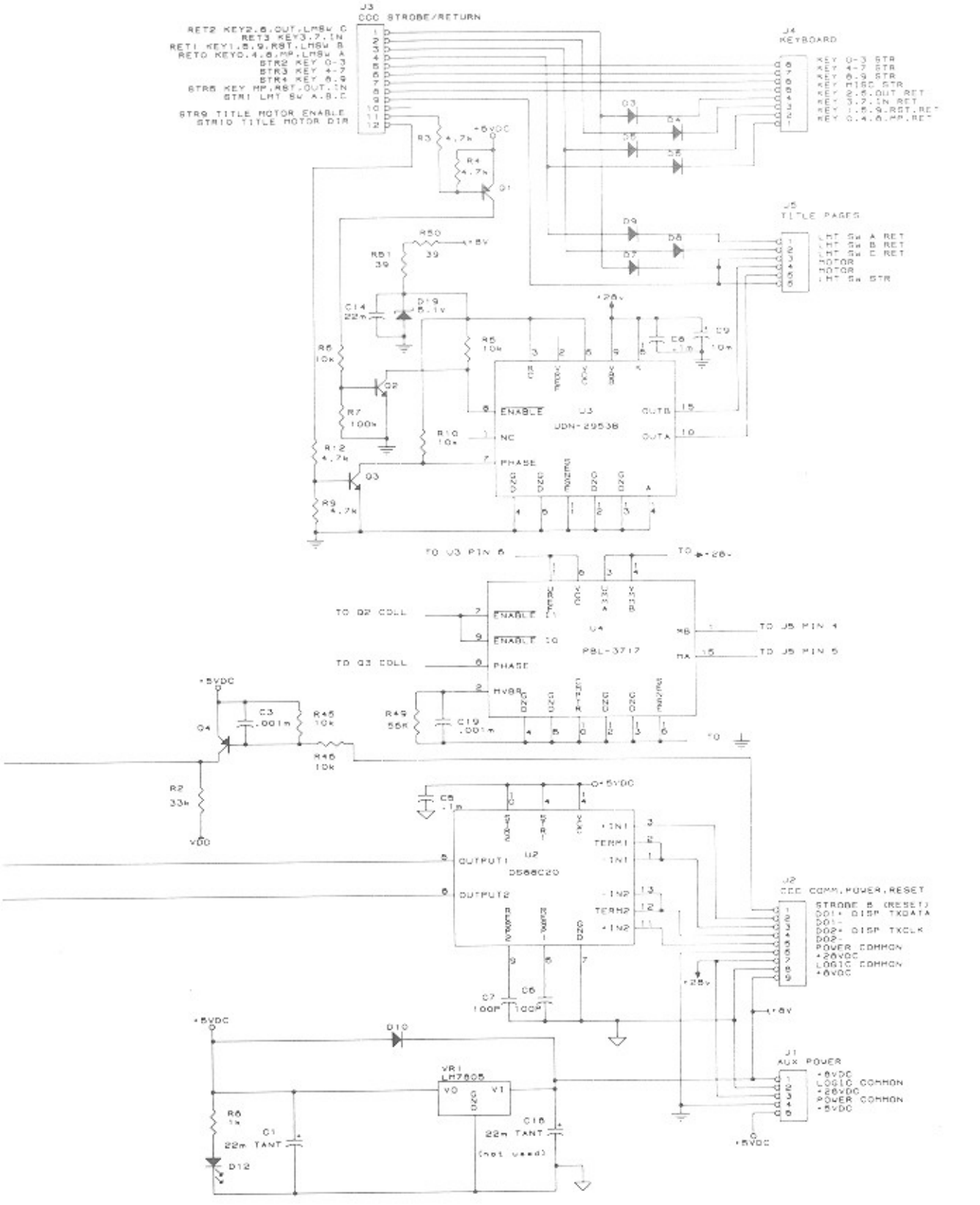
R25 100K
R21 100K
R22 100K
R18 100K
R20 100K
R15 100K
R14 100K
AD1
AD2
AD3
AD4
AD5
AD6
AD7&6
AD8&7
AD9
AD10
AD11
AD12
AD13
AD14
AD15
AD16
SGA
SGB
SGC
SGD
SGE
SGF
SGG
SGH
SGC
SGK
SGI
SGM
SGJ
SGL
SGN
SGP
A
POR
PNT
TAIL
DATA
SCLK



For Equivalent Engineering Drawing See 40832301-Q2 H

Figure 5-11. Display Assembly

COMPONENT LIST FOR THE DISPLAY ASSEMBLY (40832301-H)

C1	Capacitor-Tantalum	22 Mf	70025104
C2	Capacitor-Monolithic Ceramic	.1 Mf	70028511
C3	Capacitor-Monolithic Ceramic	.001 Mf	70028518
C4	Capacitor-Monolithic Ceramic	.1 Mf	70028511
C5	Capacitor-Monolithic Ceramic	.1 Mf	70028511
C6	Capacitor-Monolithic Ceramic	100 Pf	70028601
C7	Capacitor-Monolithic Ceramic	100 Pf	70028601
C8	Capacitor-Monolithic Ceramic	.1 Mf	70028511
C9	Capacitor-Electrolytic	10 Mf	70023808
C13	Capacitor-Tantalum	22 Mf	70025104
C14	Capacitor-Tantalum	22 Mf	70025104
C15	Capacitor-Electrolytic	1 Mf	70028029
C16	Capacitor-Monolithic Ceramic	.001 Mf	70028518
C17	Capacitor-Monolithic Ceramic	.001 Mf	70028518
C18	NOT USED		
C19	Capacitor-Monolithic Ceramic	.001 Mf	70028518
D1	Diode-Zener	10 V	70035514
D2	Diode-Zener	15 V	70035522
D3-D10	Diode-Silicon		70035005
D11	NOT USED		
D12	LED-Block (90)		70035201
D13-D16	Diode-Silicon		70035005
D17	Diode-Silicon		70035012
D18	Diode-Silicon		70035012
D19	Diode - Zener	5.1 V	70035526
DS1	Display-VAC FLU (16 Character)		30933201
E1	Transformer, DC-DC/AC		30942101
J1	Wafer-Polarizing 90 (5 CKT)		70074405
J2	Wafer-Polarizing 90 (9 CKT)		70074409
J3	Wafer-Polarizing 90 (12 CKT)		70074412
J4	Wafer-Polarizing 90 (8 CKT)		70074408
J5	Wafer-Polarizing 90 (6 CKT)		70074406

Q1	Transistor-Silicon (PNP)	70030104
Q2	Transistor-Silicon (NPN)	70030008
Q3	Transistor-Silicon (NPN)	70030008
Q4	Transistor-Silicon (PNP)	70030104
Q5	Transistor-Darlington (NPN)	70030213
Q6	Transistor-Darlington (NPN)	70030213

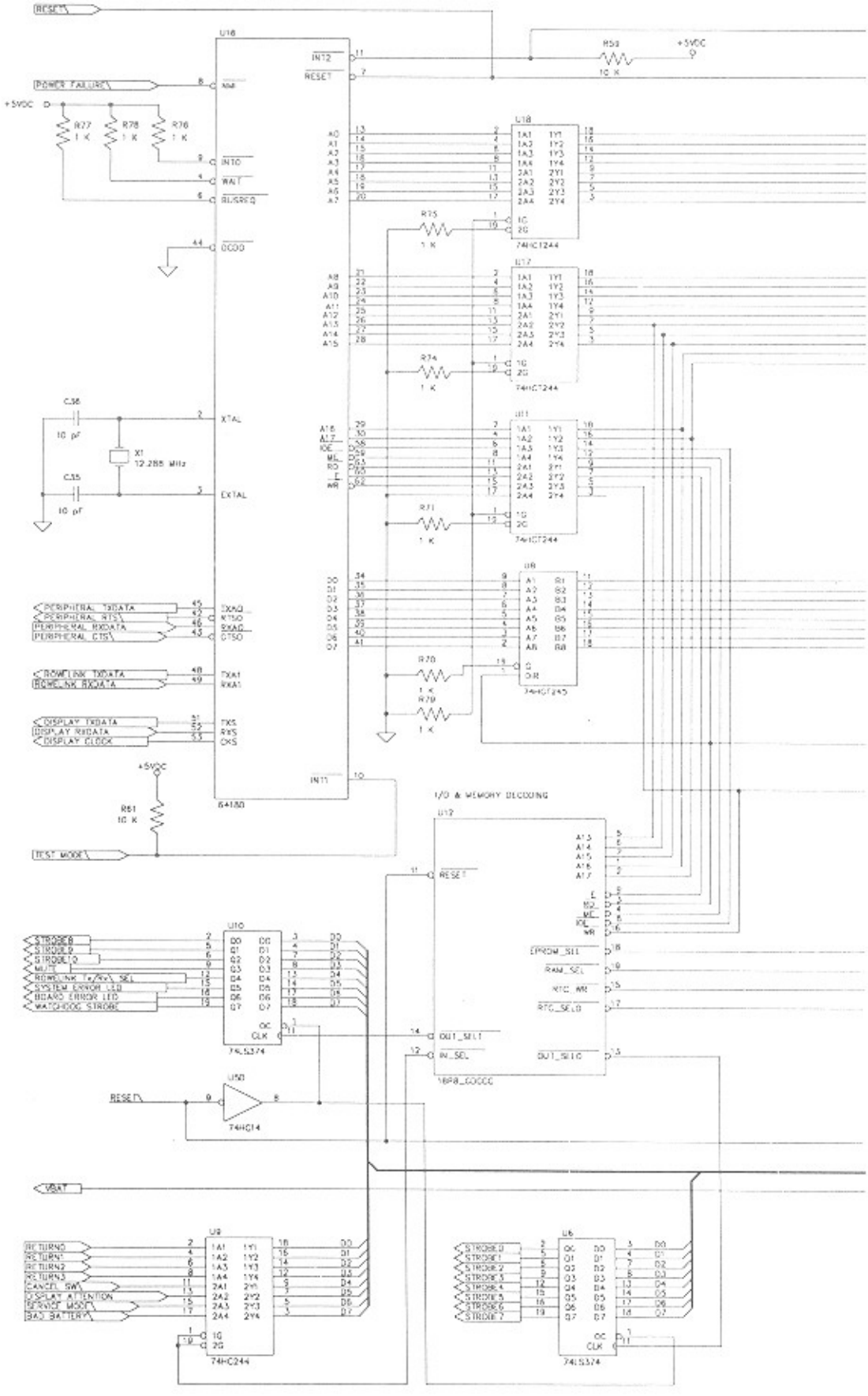
Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor-Carbon	1.8 K	79901182
R2	Resistor-Carbon	33 K	79901333
R3	Resistor-Carbon	4.7 K	79901472
R4	Resistor-Carbon	4.7 K	79901472
R5	Resistor-Carbon	10 K	79901103
R6	Resistor-Carbon	10 K	79901103
R7	Resistor-Carbon	100 K (1/8 W)	79905104
R8	Resistor-Carbon	1 K	79901102
R9	Resistor-Carbon	4.7 K	79901472
R10	Resistor-Carbon	10 K	79901103
R12	Resistor-Carbon	4.7 K	79901472
R13 Thru R44	Resistor-Carbon	100 K (1/8 W)	79905104
R45	Resistor-Carbon	10 K	79901103
R46	Resistor-Carbon	10 K	79901103
R47	Resistor-Carbon	100 K (1/8 W)	79905104
R48	Resistor-Carbon	100 K (1/8 W)	79905104
R49	Resistor-Carbon	56 K	79901563
R50	Resistor - Carbon	39 Ohm	79901390
R51	Resistor - Carbon	39 Ohm	79901390

U1	Driver-Display (VAC FLU) (10937)	30800237
U2	Receiver-Dual (RS-422)	30800228
U3	Driver-Motor (Full Bridge) (UDN-2953B)	30800229[1]
U4	Driver-Motor (Full Bridge) (PBL-3717)	30800241[1]

VR1	Regulator-Voltage (Linear IC)	70036506

[1] Use either 30800229 in the U3 position, or use 30800241 in the U4 position.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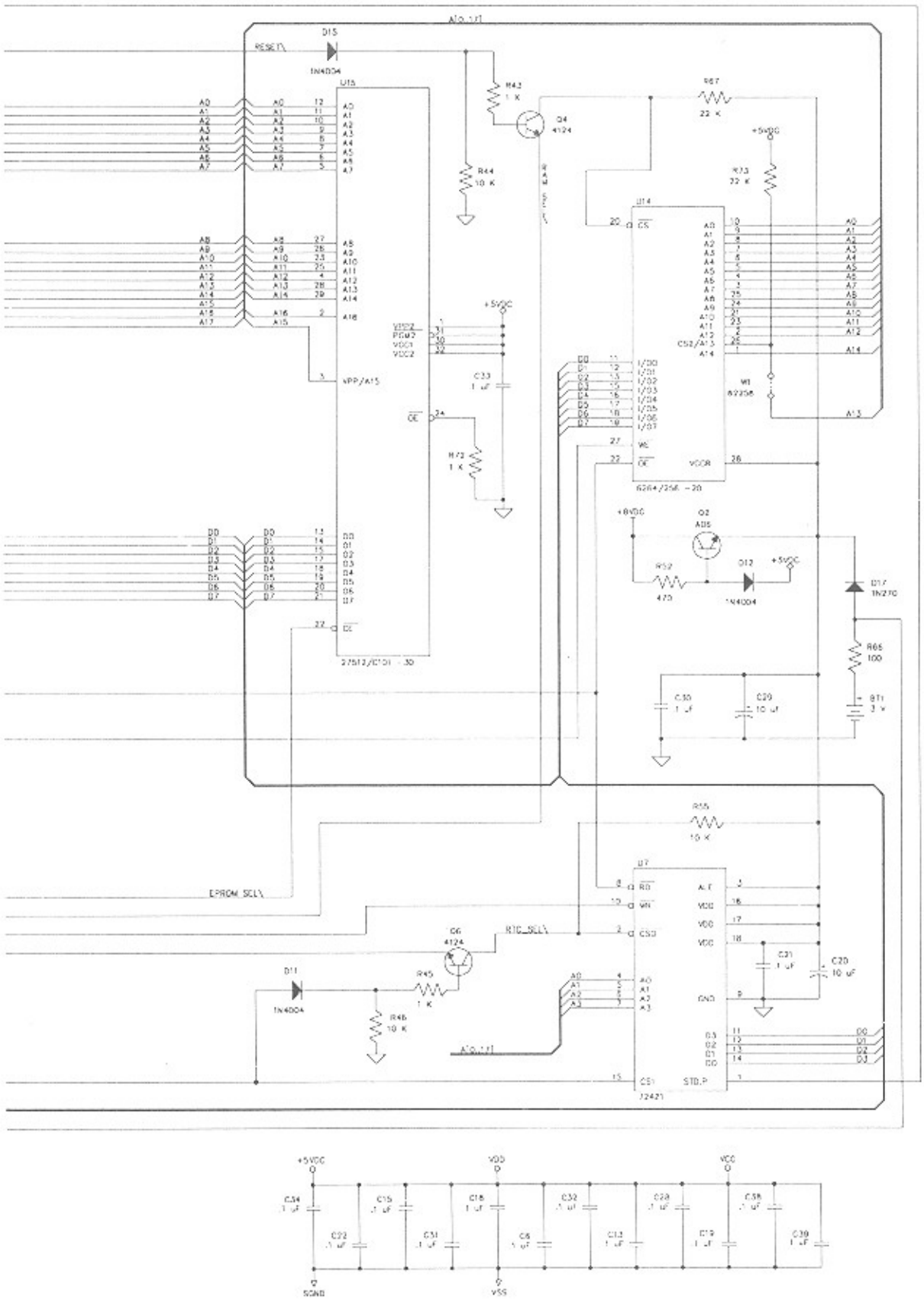
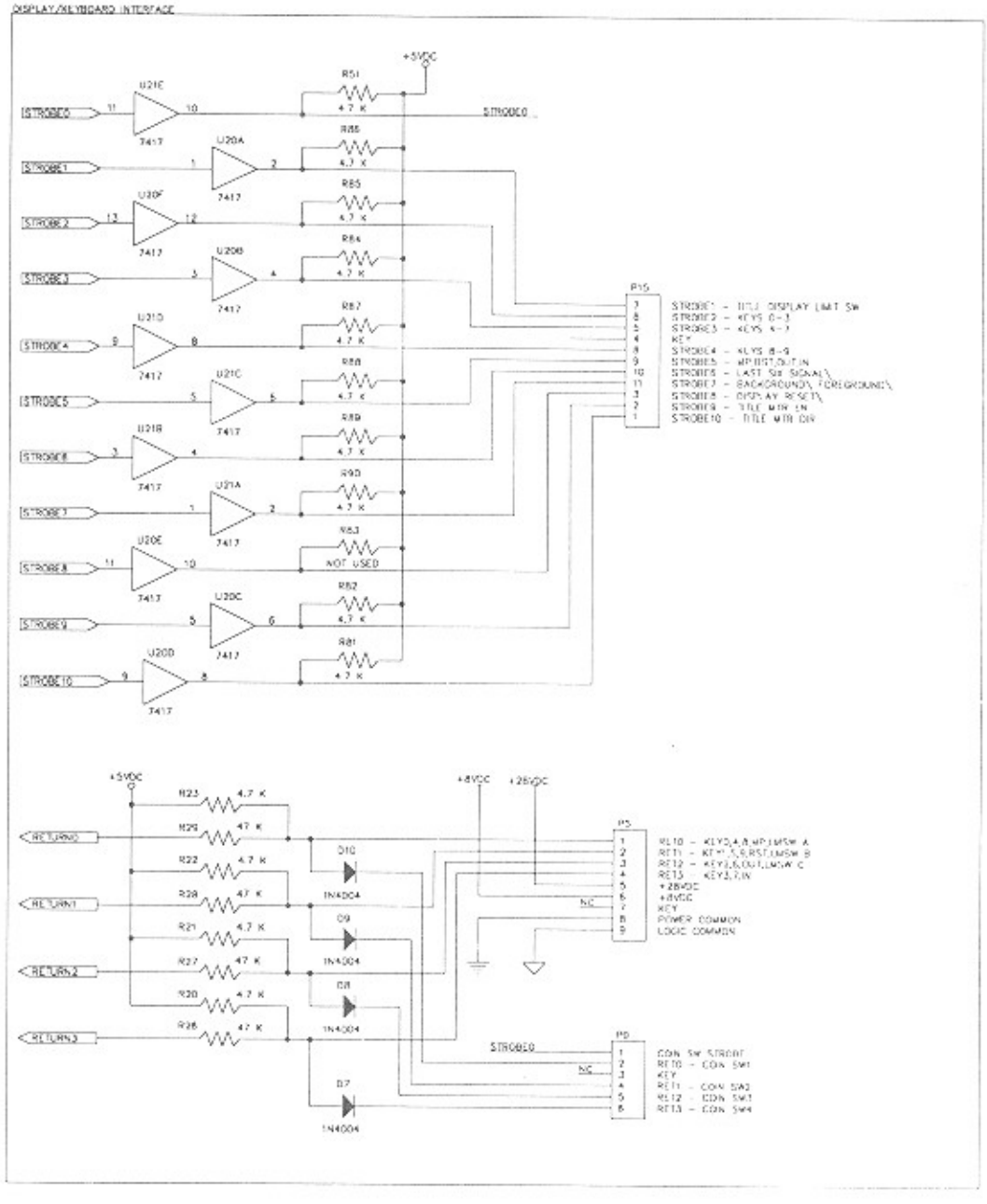
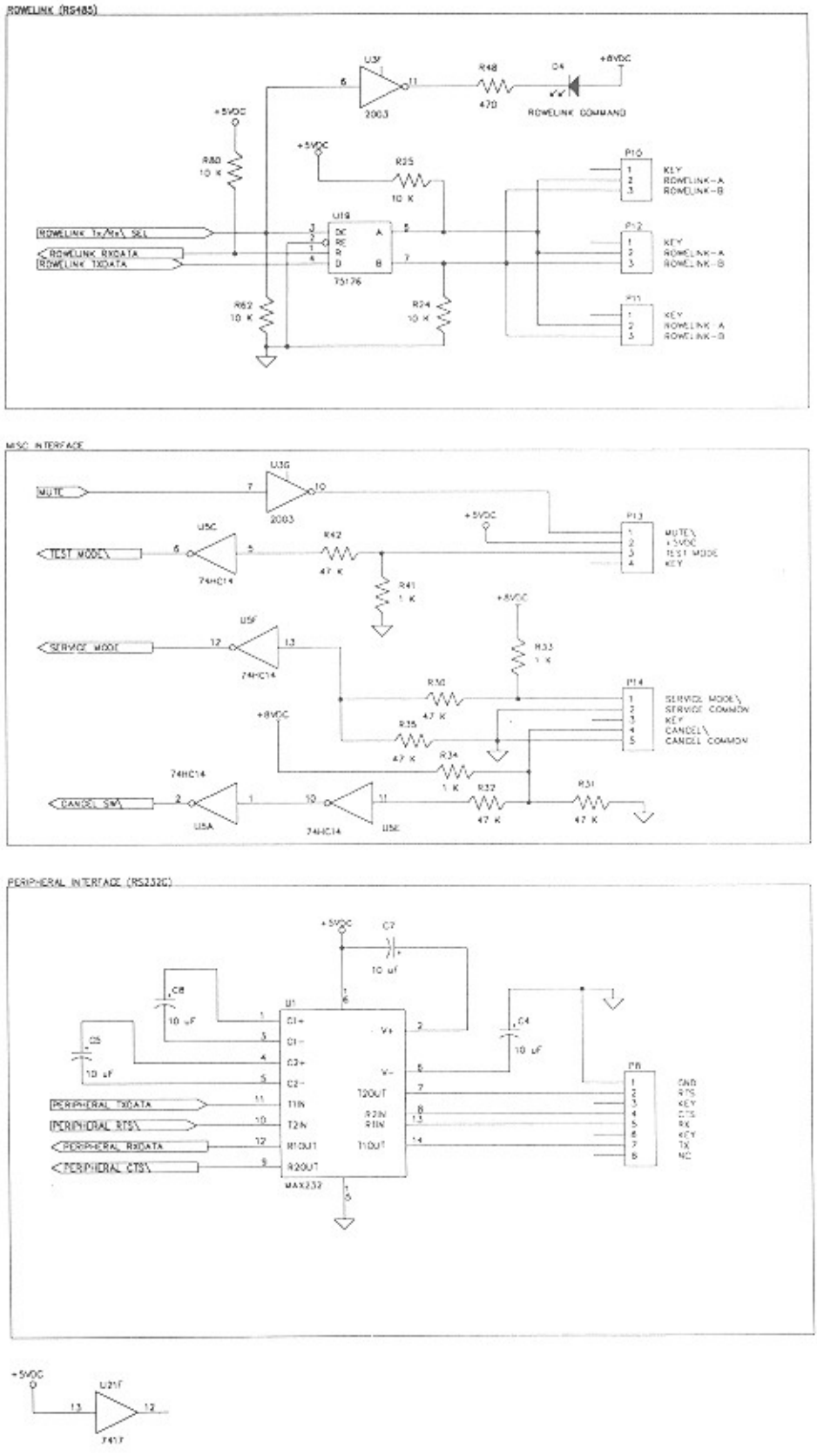
U16
INT2
RESET
R53
+5VDC
10 K
POWER FAILURE\
+5VDC
R77 1 K
R78 1 K
R76 1 K
INT0
WAIT
BUSRQ
OCOD
U18
74HCT244
R35 1 K
U17
74HCT244
R34 1 K
C36 10 pF
X1 12.288 MHz
C35 10 pF
XTAL
EXTAL
U11
74HCT244
R31 1 K
U8
74HCT245
R70 1 K
R79 1 K
PERIPHERAL TXDATA
PERIPHERAL RTS\
PERIPHERAL RXDATA
PERIPHERAL CTS\
DXAO
RTSO
RXAO
CTSO
ROWLINK TXDATA
ROWLINK RXDATA
TXA1
RXA1
DISPLAY TXDATA
DISPLAY RXDATA
DISPLAY CLOCK
TXS
RXS
CKS
INT1
64180
+5VDC
R51 10 K
TEST MODE\
I/O & MEMORY DECODING
U12
RESET
EPROM_SEL
RAM_SEL
RTC_WR
RTC_SEL0
OUT_SEL
IN_SEL
OUT_SEL0
U10
74LS374
U20
74HC14
RESET\
VBAT
U9
74HC244
U6
74LS374



For Equivalent Engineering Drawing See 61031101-Q2 D

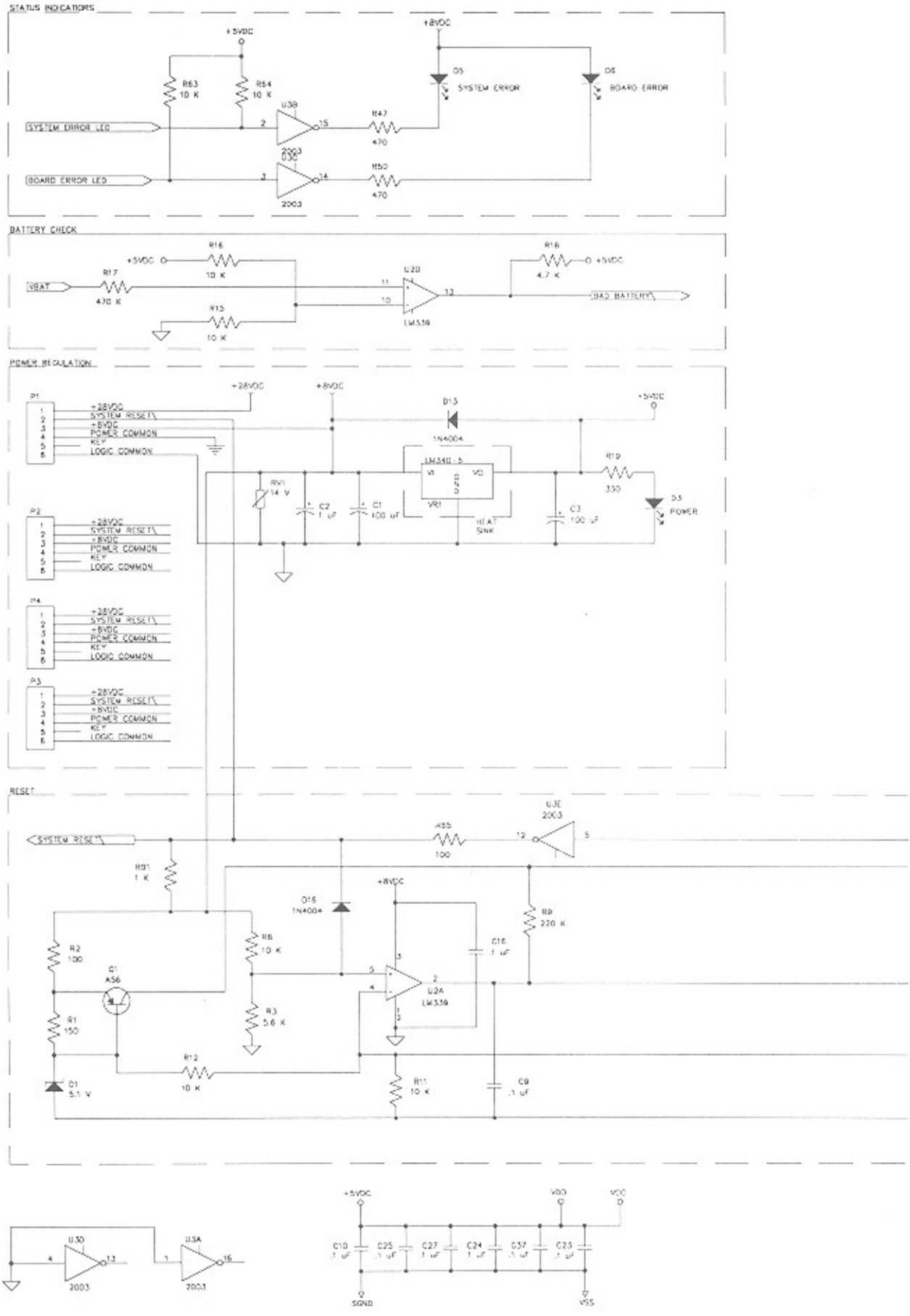
Figure 5-12A. Central Control Computer Schematic, Sheet 1

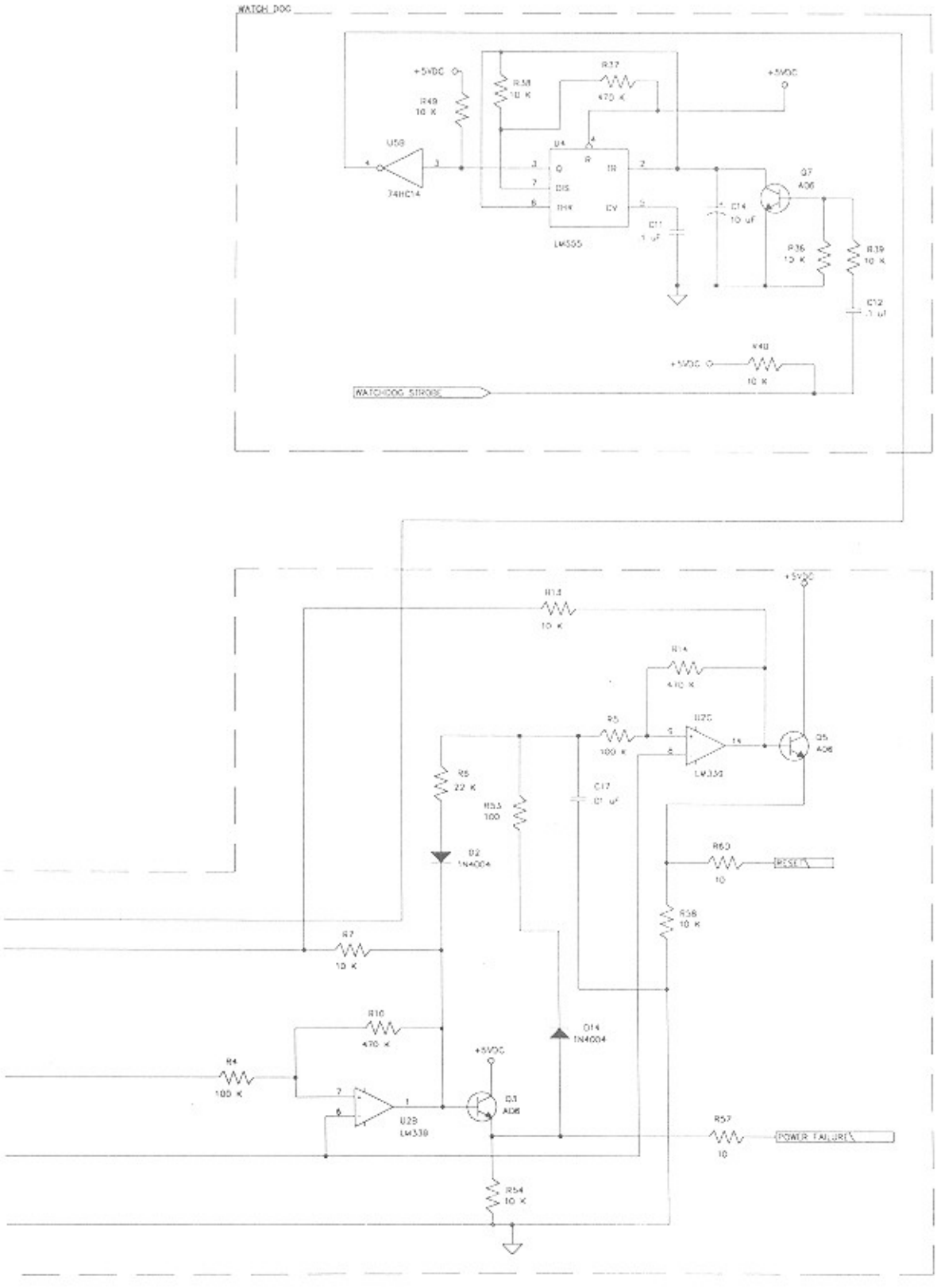

DISPLAY/KEYBOARD INTERFACE
+5VDC
STROBE0
STROBE1
STROBE2
STROBE3
STROBE4
STROBE5
STROBE6
STROBE7
STROBE8
STROBE9
STROBE10
U21E
U20A
U20F
U20B
U21D
U21C
U21B
U21A
U20E
U20C
U20D
7417
R51
R55
R54
R84
R87
R86
R89
R90
R83
R82
R81
4.7 K
NOT USED
P15
STROBE1 - TITLE DISPLAY LIMIT SW
STROBE2 - KEYS 0-3
STROBE3 - KEYS 4-7
KEY
STROBE4 - KEYS 8-9
STROBE5 - MP RST OUT IN
STROBE6 - LAST SIX SIGNAL\
STROBE7 - BACKGROUND\ FOREGROUND\
STROBE8 - DISPLAY RESET\
STROBE9 - TITLE MTR ON
STROBE10 - TITLE MTR DIR
+5VDC
+8VDC
+28VDC
RETURN0
RETURN1
RETURN2
RETURN3
R23
R29
R22
R28
R21
R27
R20
R26
4.7 K
47 K
D10
D9
D8
D7
1N4004
P5
KEY0,4,8 MP LIMSW A
KEY1,5,9 RST LIMSW B
KEY2,6 DOT LIMSW C
KEY3,7 IN
+28VDC
+8VDC
KEY
POWER COMMON
LOGIC COMMON
NC
P9
COIN SW STROBE
RET0 - COIN SW1
KEY
RET1 - COIN SW2
KEY12 COIN SW3
RET3 - COIN SW4
DISPLAY INTERFACE (RS422)
U13
DS8923
DISPLAY TXDATA
DISPLAY CLOCK
DISPLAY RXDATA
DISPLAY ATTENTION
SYSTEM RESET\
DI1
DI2
RO1
RO2
DEN
REN
DO1+
DO1-
DO2+
DO2-
RI1+
RI1-
RI2+
RI2-
R59
R58
100
P6
DO1+ DISPLAY TXDATA
DO1- (OUT)
DO2+ DISPLAY CLOCK
DO2- (OUT)
KEY
RI1+ DISPLAY RXDATA
RI1- (IN)
RI2+ DISPLAY ATTENTION
RI2- (IN)
SYSTEM RESET\



For Equivalent Engineering Drawing See 61031101-Q2 D

Figure 5-12A. Central Control Computer Schematic, Sheet 2


STATUS INDICATORS
+5VDC
+8VDC
R63 10 K
R64 10 K
D5 SYSTEM ERROR
D6 BOARD ERROR
U3B
SYSTEM ERROR LED
BOARD ERROR LED
R47 470
R50 470
2003
BATTERY CHECK
R16 10 K
R17 470 K
R15 10 K
U2B LM339
R18 4.7 K
BAD BATTERY\
VBAT
POWER REGULATION
P1
P2
P3
P4
+28VDC
SYSTEM RESET\
+8VDC
POWER COMMON
KEY
LOGIC COMMON
D13 1N4004
LM340 - 5
RV1 14 V
C2 1 uF
C1 100 uF
C3 100 uF
R19 330
D3 POWER
HEAT SINK
RESET
U3E 2003
R55 100
R31 1 K
D16 1N4004
R9 220 K
C16 .1 uF
R6 10 K
R2 100
Q1 A56
R1 150
R3 5.6 K
R12 10 K
R11 10 K
C9 .1 uF
D1 5.1 V
U2A LM339
U3D 2003
U3A 2003
+5VDC
VDD
VCC
C10 .1 uF
C25 .1 uF
C27 .1 uF
C24 .1 uF
C37 .1 uF
C23 .1 uF
SGND
VSS



For Equivalent Engineering Drawing See 61031101-Q2 D

Figure 5-12A. Central Control Computer Schematic, Sheet 3

CD-100A C.C.C IC Power And Common Pin Chart					
		Power		Common	
Ref.	Generic Part #	+5 VDC	+8 VDC	Logic	Power
U1	MAX232	16	—	15	—
U2	LM339	—	3	12	—
U3	2003	—	—	8	—
U4	LM555	8	—	1	—
U5	74HC14	14	—	7	—
U6	74LS374	20	—	10	—
U7	72421	16,17,18	—	9	—
U8	74HCT245	20	—	10	—
U9	74HC244	20	—	10	—
U10	74LS374	20	—	10	—
U11	74HCT244	20	—	10	—
U12	18P8_CDCCC	20	—	10	—
U13	DS8923	3	—	6	—
U14	6264/6256	28	—	14	—
U15	27512/27C101	32,30	—	16	—
U16	64180	32	—	1,33	—
U17	74HCT244	20	—	10	—
U18	74HCT244	20	—	10	—
U19	75176	8	—	5	—
U20	7417	14	—	7	—
U21	7417	14	—	7	—

For Equivalent Engineering Drawing See 61031101-Q2 D

Figure 5-12A. Central Control Computer Schematic, Sheet 4

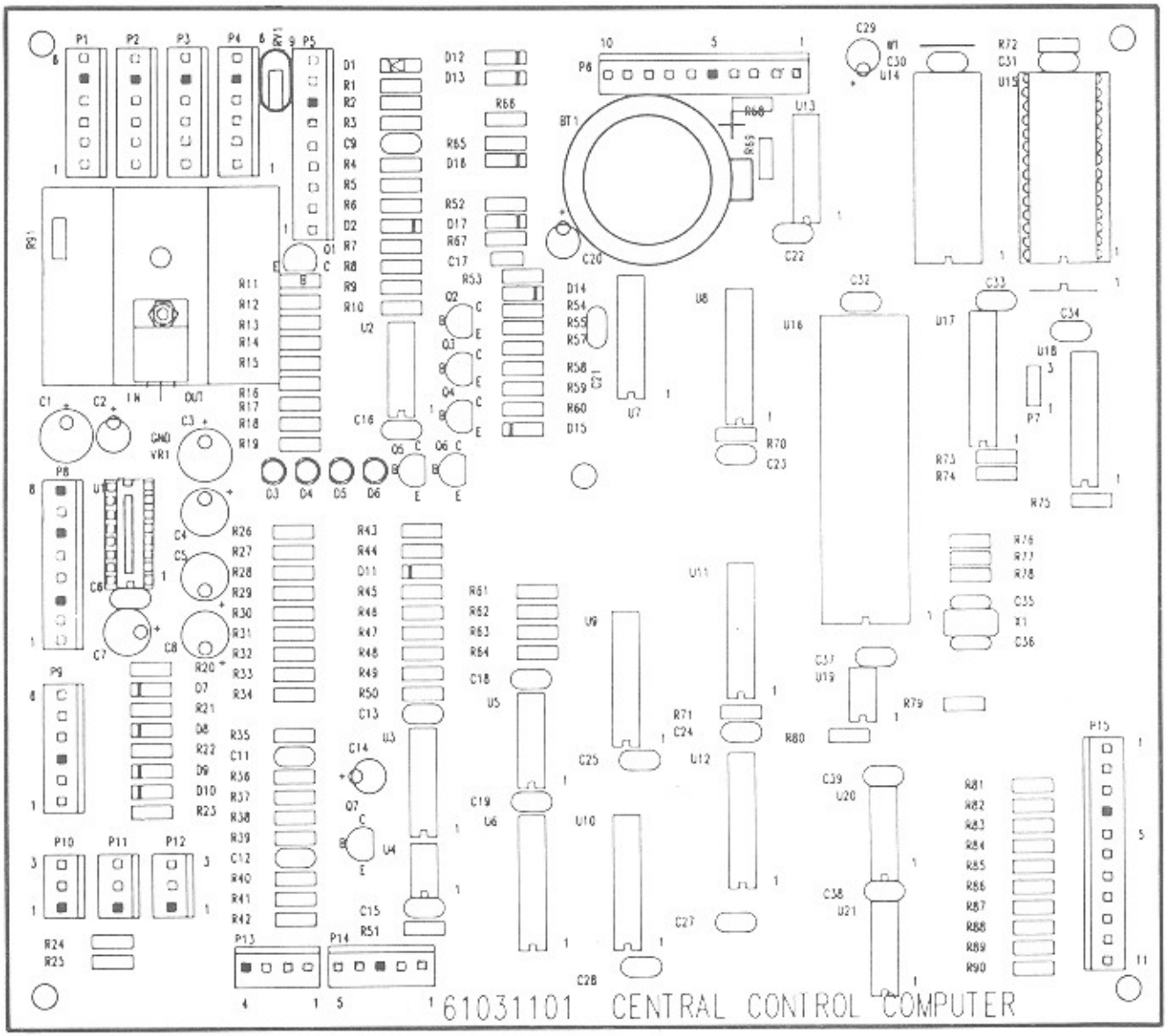


Figure 5-12B. Central Control Computer Circuit Board Layout

COMPONENT LIST FOR CENTRAL CONTROL COMPUTER (61031101-J)

BT1	Battery - Lithium	750 mah 3V	40788901
		OR 160 mah 3V	30873101
C1	Capacitor - Electrolytic	100 mf	70023814
C2	Capacitor - Tantalum	1 mf	70025121
C3	Capacitor - Electrolytic	100 mf	70023814
C4	Capacitor - Electrolytic	10 mf	70023808
C5	Capacitor - Electrolytic	10 mf	70023808
C6	Capacitor - Monolithic Ceramic	.1 mf	70028511
C7	Capacitor - Electrolytic	10 mf	70023808
C8	Capacitor - Electrolytic	10 mf	70023808
C9	Capacitor - Monolithic Ceramic	.1 mf	70028511
C10	Capacitor - Monolithic Ceramic	.1 mf	70028511
C11	Capacitor - Monolithic Ceramic	.1 mf	70028511
C12	Capacitor - Monolithic Ceramic	.1 mf	70028511
C13	Capacitor - Monolithic Ceramic	.1 mf	70028511
C14	Capacitor - Electrolytic	10 mf	70023808
C15	Capacitor - Monolithic Ceramic	.1 mf	70028511
C16	Capacitor - Monolithic Ceramic	.1 mf	70028511
C17	Capacitor - Monolithic Ceramic	.01 mf	70028502
C18	Capacitor - Monolithic Ceramic	.1 mf	70028511
C19	Capacitor - Monolithic Ceramic	.1 mf	70028511
C20	Capacitor - Electrolytic	10 mf	70023808
C21	Capacitor - Monolithic Ceramic	.1 mf	70028511
C22	Capacitor - Monolithic Ceramic	.1 mf	70028511
C23	Capacitor - Monolithic Ceramic	.1 mf	70028511
C24	Capacitor - Monolithic Ceramic	.1 mf	70028511
C25	Capacitor - Monolithic Ceramic	.1 mf	70028511
C27	Capacitor - Monolithic Ceramic	.1 mf	70028511
C28	Capacitor - Monolithic Ceramic	.1 mf	70028511
C29	Capacitor - Electrolytic	10 mf	70023808
C30	Capacitor - Monolithic Ceramic	.1 mf	70028511
C31	Capacitor - Monolithic Ceramic	.1 mf	70028511
C32	Capacitor - Monolithic Ceramic	.1 mf	70028511
C33	Capacitor - Monolithic Ceramic	.1 mf	70028511
C34	Capacitor - Monolithic Ceramic	.1 mf	70028511
C35	Capacitor - Monolithic Ceramic	10 pf	70028701
C36	Capacitor - Monolithic Ceramic	10 pf	70028701
C37	Capacitor - Monolithic Ceramic	.1 mf	70028511
C38	Capacitor - Monolithic Ceramic	.1 mf	70028511
C39	Capacitor - Monolithic Ceramic	.1 mf	70028511
D1	Diode - Zener (5.1 V)		70035526
D2	Diode - Silicon	IN4004	70035005
D3	Diode - Light Emitting		70035305
D4	Diode - Light Emitting		70035305
D5	Diode - Light Emitting		70035305
D6	Diode - Light Emitting		70035305
D7	Diode - Silicon	IN4004	70035005
D8	Diode - Silicon	IN4004	70035005
D9	Diode - Silicon	IN4004	70035005
D10	Diode - Silicon	IN4004	70035005
D11	Diode - Silicon	IN4004	70035005
D12	Diode - Silicon	IN4004	70035005
D13	Diode - Silicon	IN4004	70035005
D14	Diode - Silicon	IN4004	70035005
D15	Diode - Silicon	IN4004	70035005
D16	Diode - Silicon	IN4004	70035005
D17	Diode - Germanium	IN270	70035101

P1	Wafer - Polarizing	6 CKT	70075006
P2	Wafer - Polarizing	6 CKT	70075006
P3	Wafer - Polarizing	6 CKT	70075006
P4	Wafer - Polarizing	6 CKT	70075006
P5	Wafer - Polarizing	9 CKT	70075009
P6	Wafer - Polarizing	10 CKT	70075010
P7	NOT USED		
P8	Wafer - Polarizing	8 CKT	70075008
P9	Wafer - Polarizing	6 CKT	70075006
P10	Wafer - Polarizing	3 CKT	70075003
P11	Wafer - Polarizing	3 CKT	70075003
P12	Wafer - Polarizing	3 CKT	70075003
P13	Wafer - Polarizing	4 CKT	70075004
P14	Wafer - Polarizing	5 CKT	70075005
P15	Wafer - Polarizing	11 CKT	70075011

Q1	Transistor - Silicon (PNP)		70030104
Q2	Transistor - Silicon (NPN)		70030008
Q3	Transistor - Silicon (NPN)		70030008
Q4	Transistor - Silicon (NPN)		70031301
Q5	Transistor - Silicon (NPN)		70030008
Q6	Transistor - Silicon (NPN)		70031301
Q7	Transistor - Silicon (NPN)		70030008

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor - Carbon	150 Ohm	79901151
R2	Resistor - Carbon	100 Ohm	79901101
R3	Resistor - Carbon	5.6 K (¼ W, 2%)	79902562
R4	Resistor - Carbon	100 K	79901104
R5	Resistor - Carbon	100 K	79901104
R6	Resistor - Carbon	22 K	79901223
R7	Resistor - Carbon	10 K	79901103
R8	Resistor - Carbon Film	10 K (¼ W, 2%)	79902103
R9	Resistor - Carbon	220 K	79901224
R10	Resistor - Carbon	470 K	79901474
R11	Resistor - Carbon Film	10 K (¼ W, 2%)	79902103
R12	Resistor - Carbon Film	10 K (¼ W, 2%)	79902103
R13	Resistor - Carbon	10 K	79901103
R14	Resistor - Carbon	470 K	79901474
R15	Resistor - Carbon	10 K	79901103
R16	Resistor - Carbon	10 K	79901103
R17	Resistor - Carbon	470 K	79901474
R18	Resistor - Carbon	4.7 K	79901472
R19	Resistor - Carbon	330 Ohm	79901331
R20	Resistor - Carbon	4.7 K	79901472
R21	Resistor - Carbon	4.7 K	79901472
R22	Resistor - Carbon	4.7 K	79901472
R23	Resistor - Carbon	4.7 K	79901472
R24	Resistor - Carbon	10 K	79901103

R25	Resistor - Carbon	10 K	79901103
R26	Resistor - Carbon	47 K	79901473
R27	Resistor - Carbon	47 K	79901473
R28	Resistor - Carbon	47 K	79901473
R29	Resistor - Carbon	47 K	79901473
R30	Resistor - Carbon	47 K	79901473
R31	Resistor - Carbon	47 K	79901473
R32	Resistor - Carbon	47 K	79901473
R33	Resistor - Carbon	1 K	79901102
R34	Resistor - Carbon	1 K	79901102
R35	Resistor - Carbon	47 K	79901473
R36	Resistor - Carbon	10 K	79901103
R37	Resistor - Carbon	470 K	79901474
R38	Resistor - Carbon	10 K	79901103
R39	Resistor - Carbon	10 K	79901103
R40	Resistor - Carbon	10 K	79901103
R41	Resistor - Carbon	1 K	79901102
R42	Resistor - Carbon	47 K	79901473
R43	Resistor - Carbon	1 K	79901102
R44	Resistor - Carbon	10 K	79901103
R45	Resistor - Carbon	1 K	79901102
R46	Resistor - Carbon	10 K	79901103
R47	Resistor - Carbon	470 Ohm	79901471
R48	Resistor - Carbon	470 Ohm	79901471
R49	Resistor - Carbon	10 K	79901103
R50	Resistor - Carbon	470 Ohm	79901471
R51	Resistor - Carbon	4.7 K	79901472
R52	Resistor - Carbon	470 Ohm	79901471
R53	Resistor - Carbon	100 Ohm	79901101
R54	Resistor - Carbon	10 K	79901103
R55	Resistor - Carbon	10 K	79901103
R57	Resistor - Carbon	10 Ohm	79901100
R58	Resistor - Carbon	10 K	79901103
R59	Resistor - Carbon	10 K	79901103
R60	Resistor - Carbon	10 Ohm	79901100
R61	Resistor - Carbon	10 K	79901103
R62	Resistor - Carbon	10 K	79901103
R63	Resistor - Carbon	10 K	79901103
R64	Resistor - Carbon	10 K	79901103
R65	Resistor - Carbon	100 Ohm	79901101
R66	Resistor - Carbon	100 Ohm	79901101
R67	Resistor - Carbon	22 K	79901223
R68	Resistor - Carbon	100 Ohm	79901101
R69	Resistor - Carbon	100 Ohm	79901101
R70	Resistor - Carbon	1 K	79901102
R71	Resistor - Carbon	1 K	79901102
R72	Resistor - Carbon	1 K	79901102
R73	Resistor - Carbon	22 K	79901223
R74	Resistor - Carbon	1 K	79901102
R75	Resistor - Carbon	1 K	79901102
R76	Resistor - Carbon	1 K	79901102

R77	Resistor - Carbon	1 K		79901102
R78	Resistor - Carbon	1 K		79901102
R79	Resistor - Carbon	1 K		79901102
R80	Resistor - Carbon	10 K		79901103
R81	Resistor - Carbon	4.7 K		79901472
R82	Resistor - Carbon	4.7 K		79901472
R83	NOT USED			
R84	Resistor - Carbon	4.7 K		79901472
R85	Resistor - Carbon	4.7 K		79901472
R86	Resistor - Carbon	4.7 K		79901472
R87	Resistor - Carbon	4.7 K		79901472
R88	Resistor - Carbon	4.7 K		79901472
R89	Resistor - Carbon	4.7 K		79901472
R90	Resistor - Carbon	4.7 K		79901472
R91	Resistor - Carbon	1 K		79901102
RV1	Metal Oxide Varistor	11 V (OR 14V)	OR	70037505 OR 70037507
U1	NOT USED			
U2	I.C. - Quad Comparator (LM339)	(3302)		70036801
U3	I.C. - Darlington Array	(2003)		70036901
U4	I.C. - Timer	(LM555)		70033801
U5	I.C. - HCT (Hex Schmitt Trigger)	74HC14		79940014
U6	I.C. - Octal Edge Triggered F/F	74LS374		70037111
U7	I.C. - Calendar Clock	72421		30800236
U8	I.C. - HCT (Octal Bus Transceiver)	74HCT245		79930245
U9	I.C. - HC-Tristate Octal Buffer	74HC244		79940244
U10	I.C. - Octal Edge Triggered F/F	74LS374		70037111
U11	I.C. - HCT (Octal Buffer/Line Driver)	74HCT244		79930244
U12	I.C. - PAL 18P8-CDCCC			30800232
U13	I.C. - RS-422 Dual Driver/Rcvr	DS8923		30800230
U14	I.C. - CMOS RAM 8K X 8	6264		70036604
U15	I.C. - 64K X 8 EPROM	27512		70039903
U16	I.C. - Microprocessor	64180		70039126
U17	I.C. - HCT (Octal Buffer/Line DRIVER)	74HCT244		79930244
U18	I.C. - HCT (octal Buffer/Line Driver)	74HCT244		79930244
U19	I.C. - Transceiver (RS-485)	75176		70037801
U20	I.C. - TTL Buffer (Open Collector)	7417		70036305
U21	I.C. - TTL Buffer (Open Collector)	7417		70036305
VR1	Regulator - Voltage (Linear I.C.)	LM340-5		70036505
W1	Not Used			
X1	Crystal - Quartz (12.288 Mhz)			25167314

The chart below shows the various combinations of strobes (outputs from the CCC) and returns (inputs to the CCC) and their corresponding functions.

Strobes 0 through 5 appear on Returns 0 through 3 when the indicated switches are activated.

For Example: If you need to be sure that Key 5 is working, find Key 5 in table 5-3. This matrix entry indicates that, when Strobe 3 is active and Key 5 is pressed, Return 1 becomes active.

Not all of the strobes and returns operate in this matrix mode; Returns 4 through 7 and Strobes 7 through 15 have unique functions, which are listed in the table.

Table 5-3. CD-100A CCC I/O Matrix

OUTPUTS		INPUTS							
		RETURNS				DEDICATED			
		0	1	2	3	4	5	6	7
STROBES	0	5¢ Coin Switch	10¢ Coin Switch	25¢ Coin Switch	50¢ Coin Switch	CANCEL SWITCH	DISPLAY ATTENTION	SERVICE SWITCH	LOW BATTERY DET
	1	Title Disp Limit	Title Disp Index	Reserved	UK Defaults				
	2	Key 0	Key 1	Key 2	Key 3				
	3	Key 4	Key 5	Key 6	Key 7				
	4	Key 8	Key 9		Audit Report Start Button				
	5	POPULAR	RESET	OUT	IN				
DEDICATED	6	Not Used							
	7	Background Music Active							
	8	Display Reset - Controls hardware reset on the display driver chip							
	9	Sends speed info to motor chip							
	10	Sends direction info to motor chip							
	11	Mute							
	12	ROWELINK Tx/$\overline{Rx}$ Select							
	13	SYSTEM ERROR LED							
	14	BOARD ERROR LED							
	15	Watchdog Strobe							

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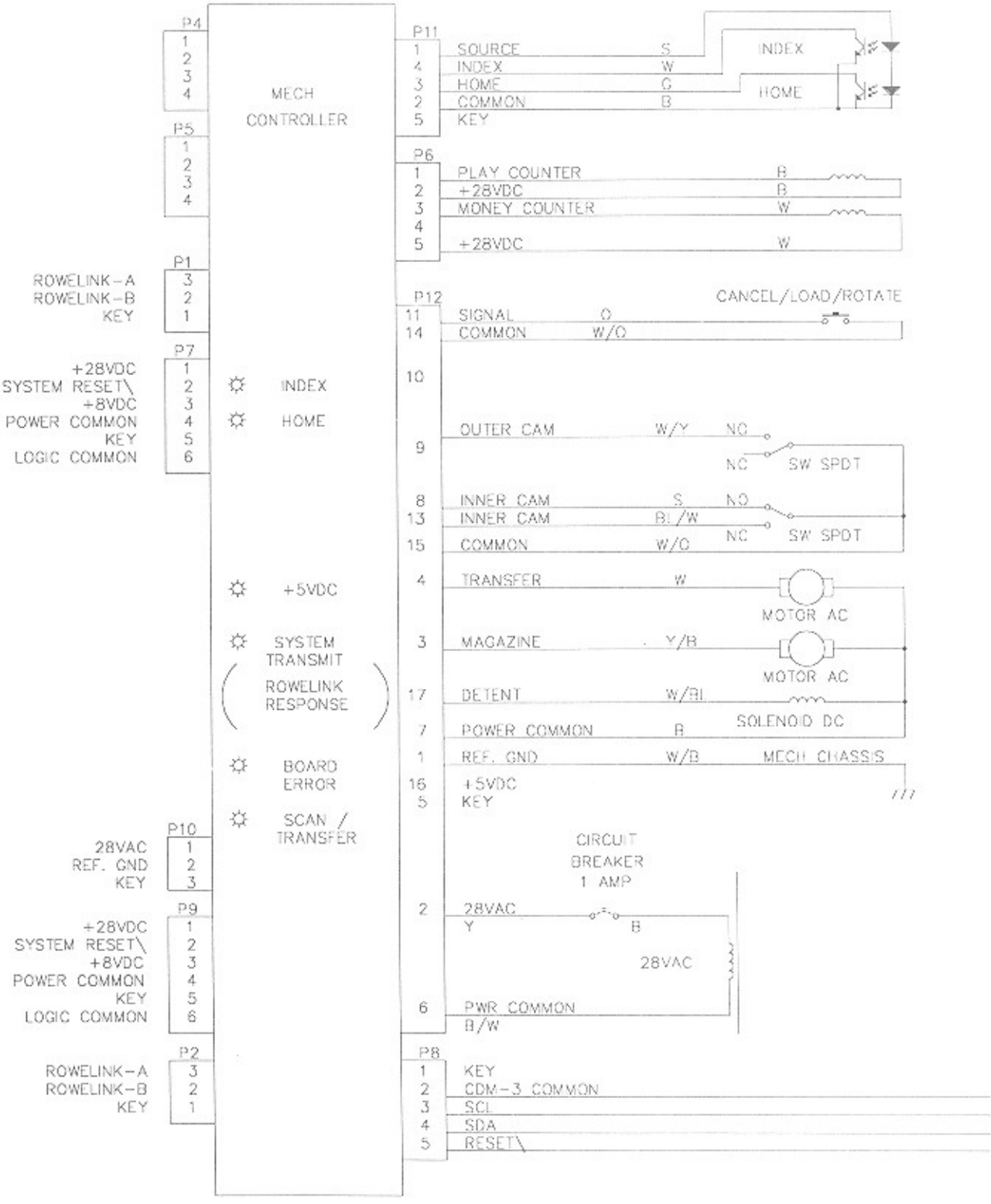

P4
P5
P1
P7
P10
P9
P2
MECH CONTROLLER
ROWELINK-A
ROWELINK-B
KEY
+28VDC
SYSTEM RESET\
+8VDC
POWER COMMON
KEY
LOGIC COMMON
INDEX
HOME
+5VDC
SYSTEM TRANSMIT
ROWELINK RESPONSE
BOARD ERROR
SCAN / TRANSFER
28VAC
REF. GND
P11
SOURCE S
INDEX W
HOME G
COMMON B
KEY
INDEX
HOME
P6
PLAY COUNTER B
+28VDC B
MONEY COUNTER W
+28VDC W
P12
CANCEL/LOAD/ROTATE
SIGNAL O
COMMON W/O
OUTER CAM W/Y NO
NC SW SPDT
INNER CAM S NO
INNER CAM BL/W
COMMON W/O NC SW SPDT
TRANSFER W
MOTOR AC
MAGAZINE Y/B
MOTOR AC
DETENT W/BL
SOLENOID DC
POWER COMMON B
REF. GND W/B MECH CHASSIS
+5VDC
KEY
CIRCUIT BREAKER 1 AMP
28VAC Y B
28VAC
PWR COMMON B/W
P8
KEY
CDM-3 COMMON
SCL
SDA
RESET\

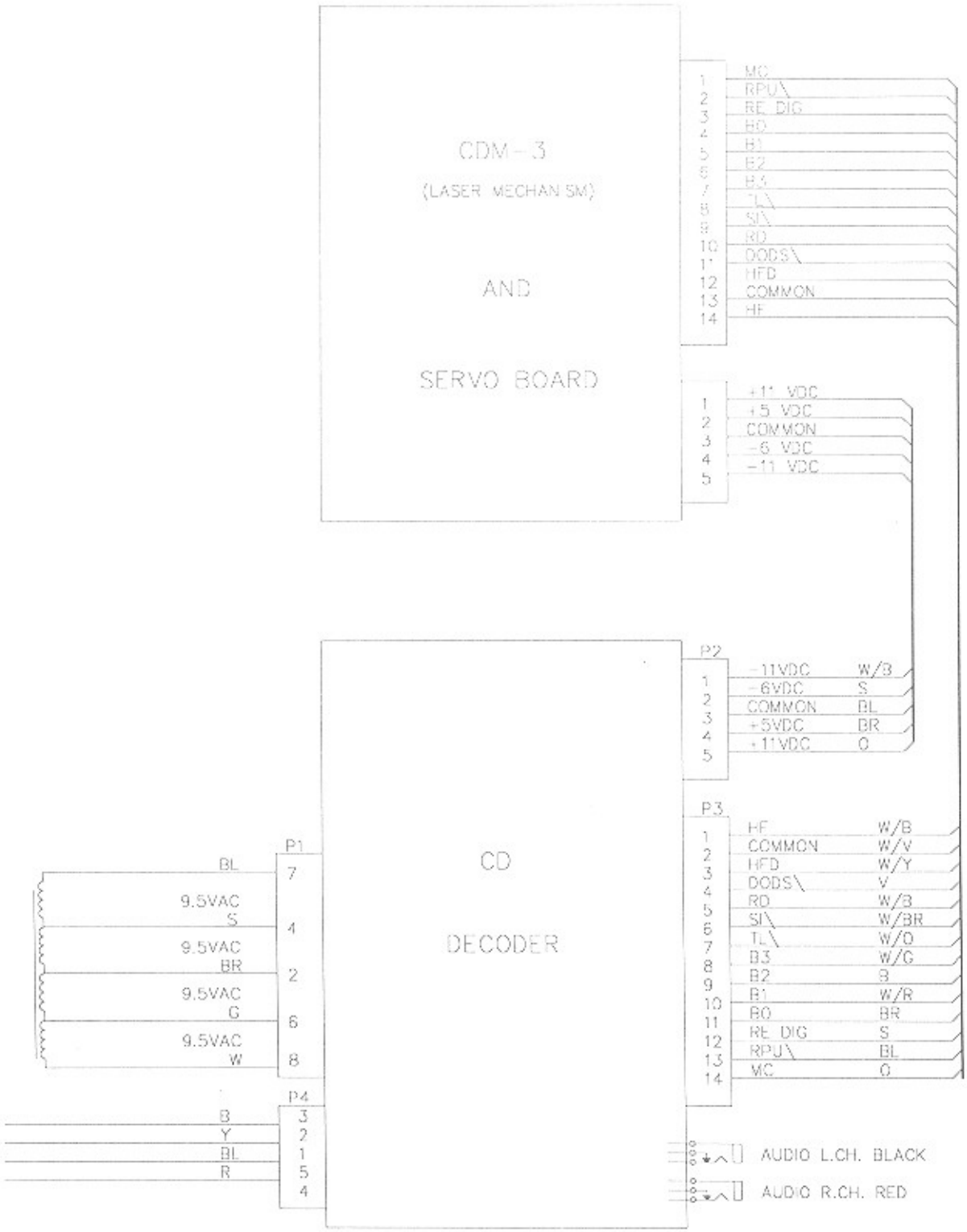
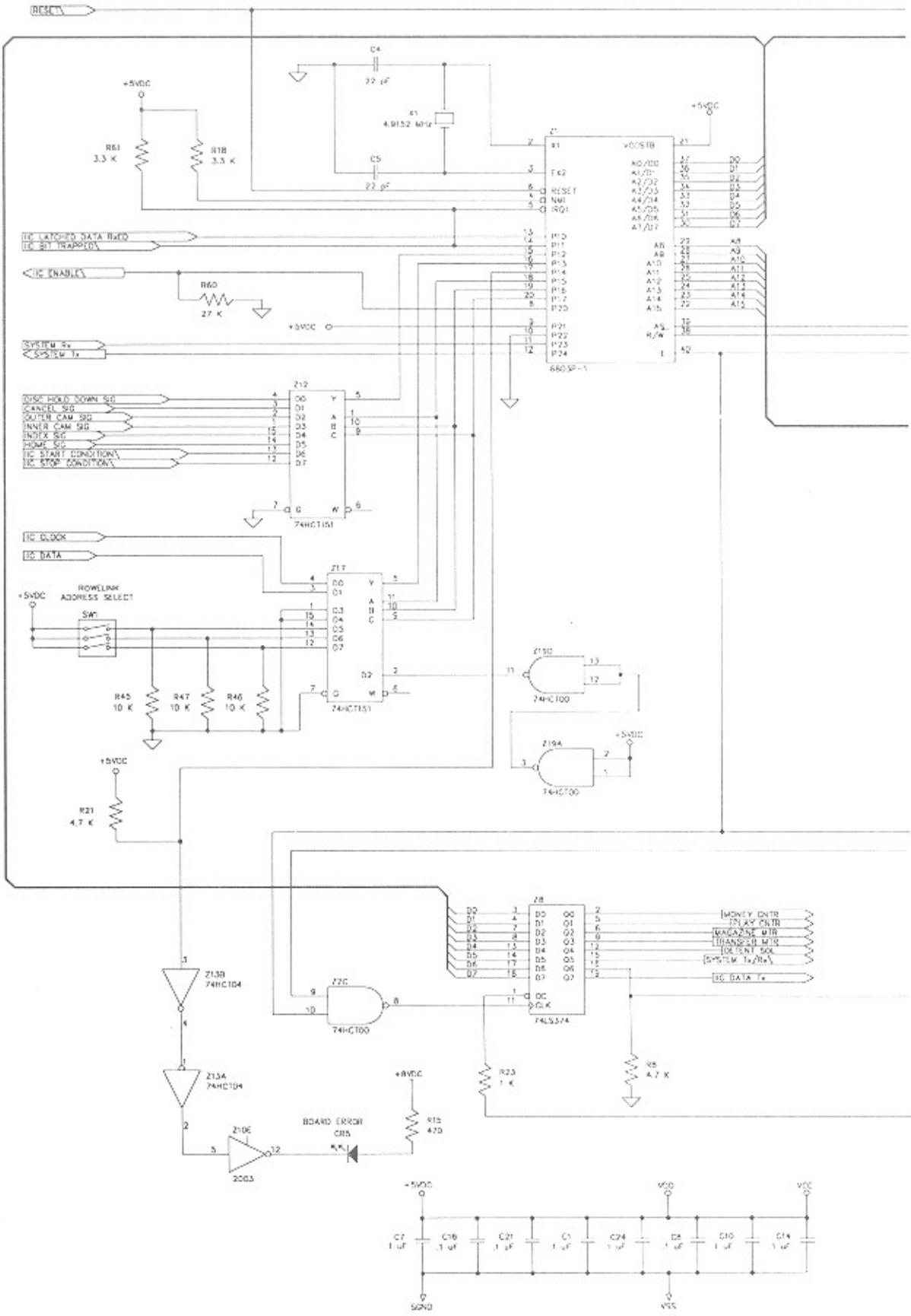
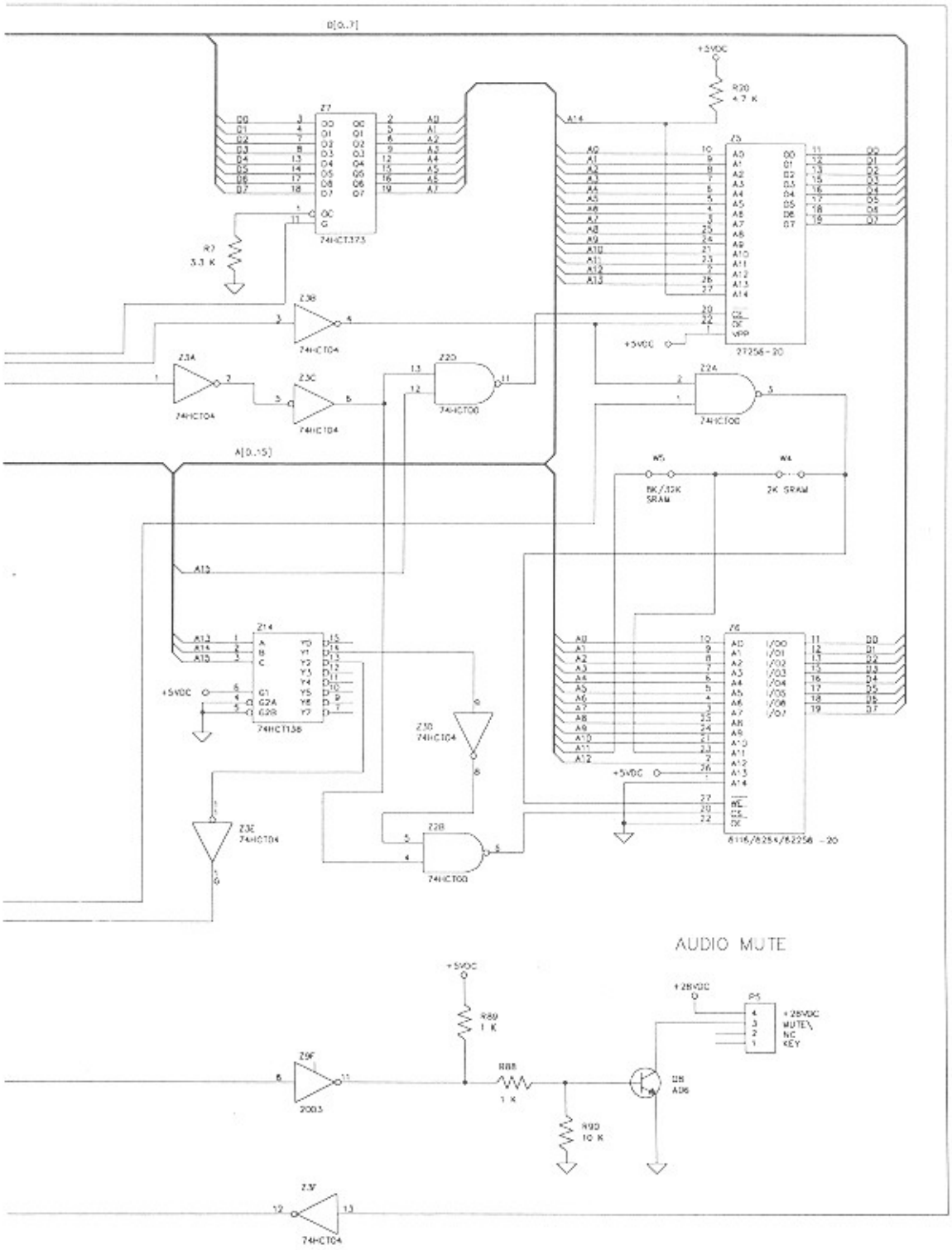


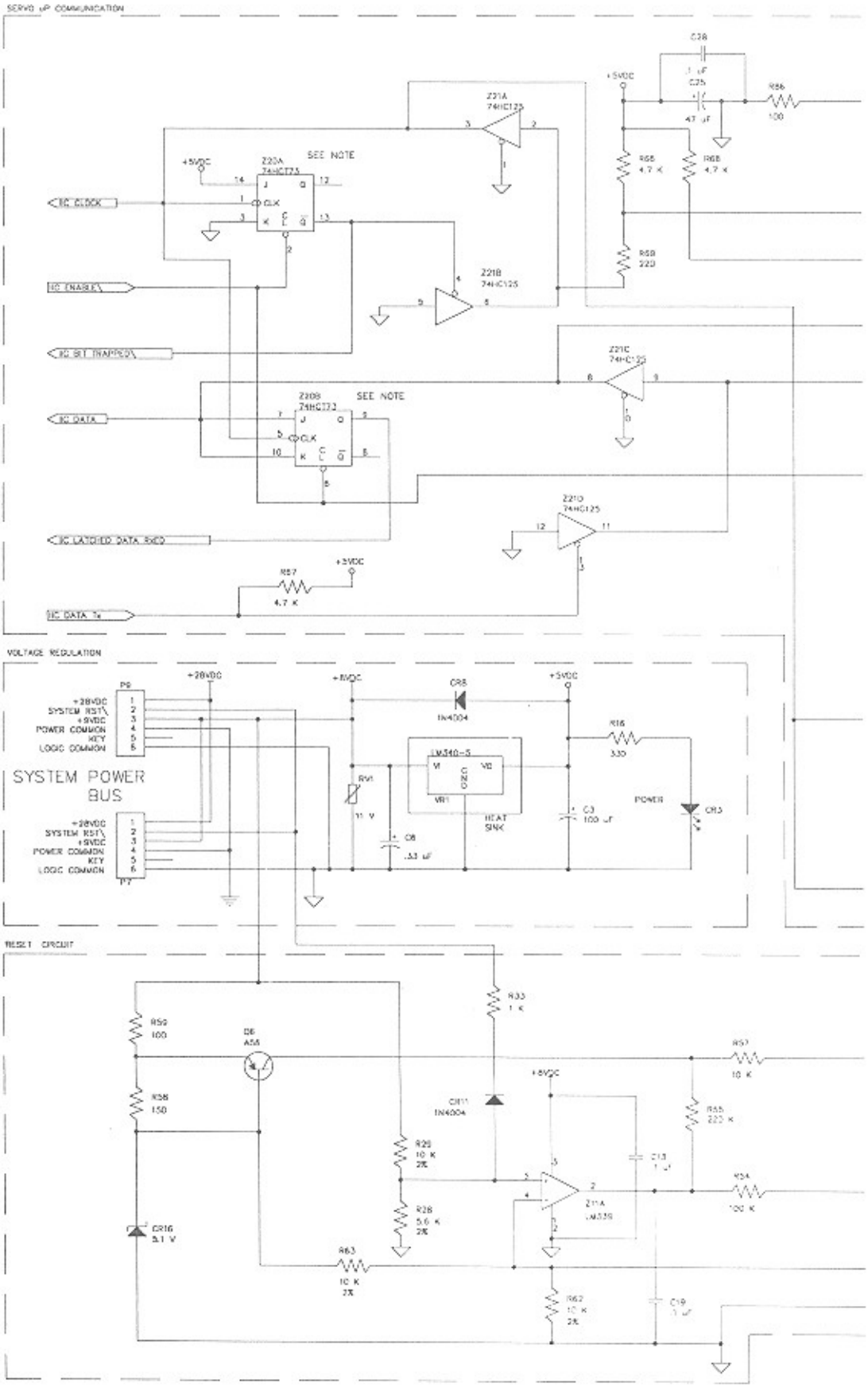
Figure 5-13A. Mechanism Control Assembly Block Diagram

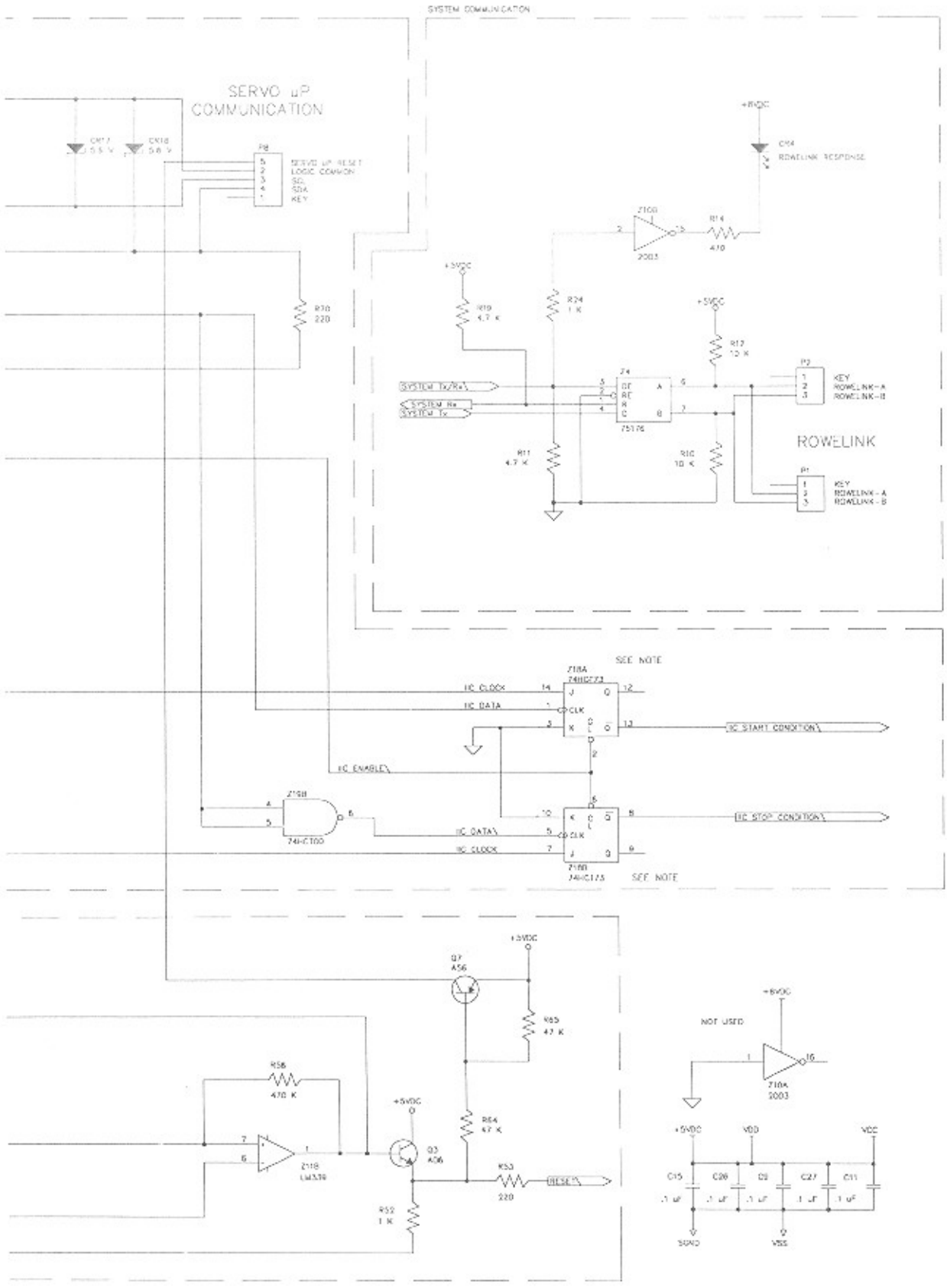

RESET\
+5VDC
C4
22 pF
X1
4.9152 MHz
C5
22 pF
R61
3.3 K
R18
3.3 K
Z1
68SP-1
+VCCSTB
I2C LATCHED DATA RxED
I2C BIT TRAPPED\
I2C ENABLE\
R60
27 K
SYSTEM Rx
SYSTEM Tx
Z12
74HCT151
DISC HOLD DOWN SIG
CANCEL SIG
OUTER CAM SIG
INNER CAM SIG
NOTCH SIG
HOME SIG
I2C START CONDITION\
I2C STOP CONDITION\
I2C CLOCK
I2C DATA
Z17
74HCT151
ROWELINK
ADDRESS SELECT
SW1
R45
10 K
R47
10 K
R46
10 K
Z15D
74HCT00
Z19A
74HCT00
R21
4.7 K
Z8
74LS374
MONEY CNTR
DISPLAY CNTR
MAGAZINE MTR
TRANSFER MTR
DEBIT SOL
SYSTEM Tx/Rx\
I2C DATA Tx
Z13B
74HCT04
Z2C
74HCT00
Z13A
74HCT04
Z10E
2003
BOARD ERROR
CR5
R15
470
R23
1 K
R5
4.7 K
C7
.1 uF
C16
.1 uF
C21
.1 uF
C1
.1 uF
C24
.1 uF
C8
.1 uF
C10
.1 uF
C14
.1 uF
SGND
VSS
VDD



For Equivalent Engineering Drawing See 61030603-Q2 A

Figure 5-13B. Mechanism Control Assembly Schematic, Sheet 1


SERVO uP COMMUNICATION
SEE NOTE
SEE NOTE
SC CLOCK
SC ENABLE\
SC BIT INVERTED\
SC DATA
SC LATCHED DATA RCD
SC DATA TX
+5VDC
VOLTAGE REGULATION
+28VDC
SYSTEM RST\
+5VDC
POWER COMMON
KEY
LOGIC COMMON
SYSTEM POWER BUS
LM340-5
HEAT SINK
POWER
RESET CIRCUIT

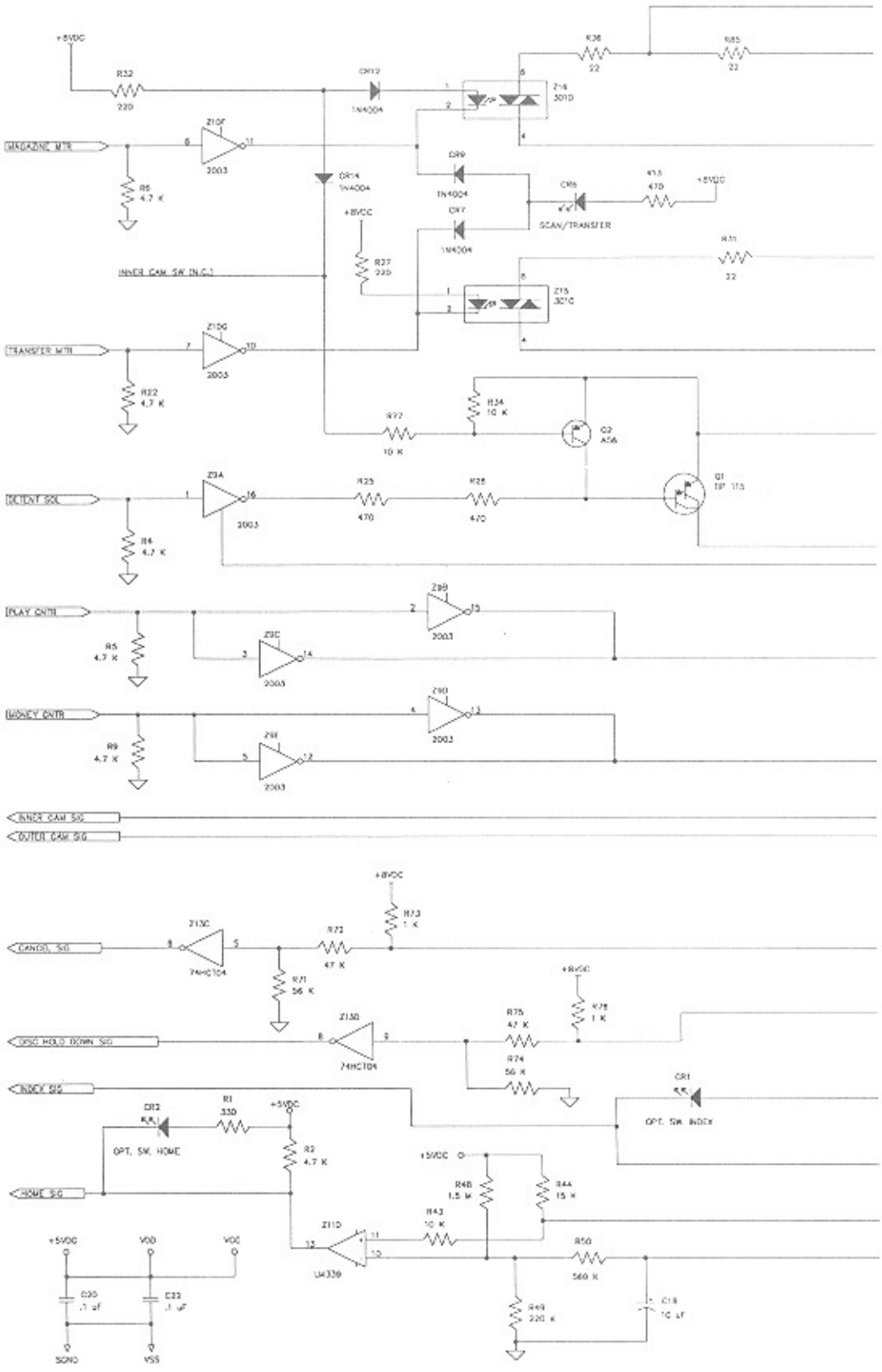


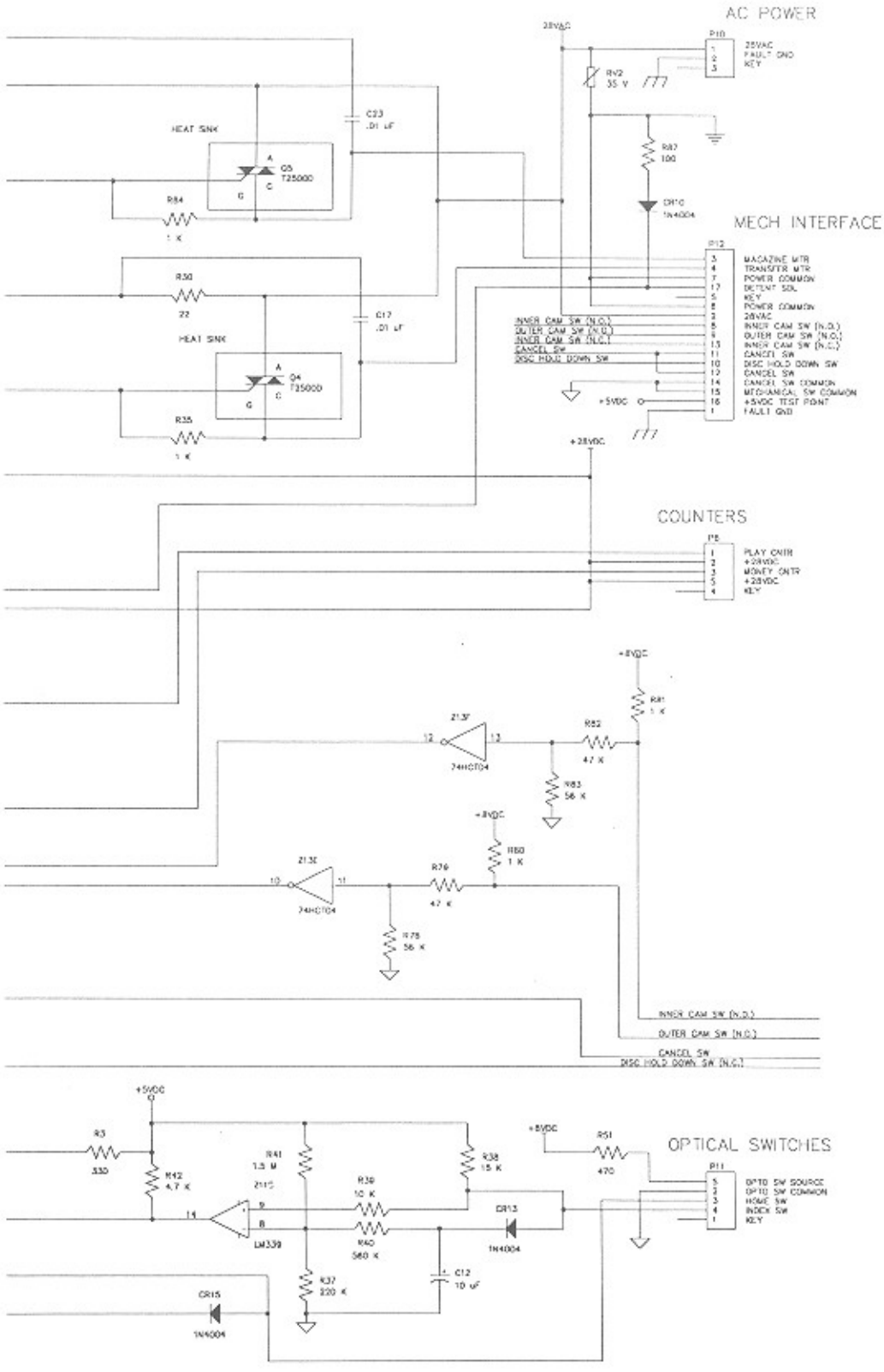
NOTE:

WHEN Z1 IS A 68030-1 USE ONLY HCT I.C.'s FOR Z1B & Z2D.

For Equivalent Engineering Drawing See 61030603-Q2 A

Figure 5-13B. Mechanism Control Assembly Schematic, Sheet 2


+8VDC
R32
220
CR12
1N4004
Z1E
3010
R36
22
R35
22
Z1F
2003
MAGAZINE MTR
R6
4.7 K
CR14
1N4004
CR9
1N4004
CR6
SCAN/TRANSFER
R13
470
+8VDC
CR7
1N4004
+8VDC
R27
220
R31
22
INNER CAM SW (N.C.)
Z1E
3010
Z1G
2003
TRANSFER MTR
R22
4.7 K
R24
10 K
R17
10 K
Q2
A56
Z3A
2003
DETENT SOL
R4
4.7 K
R23
470
R25
470
Q1
TIP 115
Z2B
2003
PLAY CNTR
R5
4.7 K
Z2C
2003
Z2D
2003
MONEY CNTR
R9
4.7 K
Z2E
2003
INNER CAM SIG
OUTER CAM SIG
+8VDC
R73
1 K
Z13C
74HC104
CANCEL SIG
R72
47 K
R71
56 K
+8VDC
R75
47 K
R78
1 K
Z13D
74HC104
DISC HOLD DOWN SIG
R74
56 K
INDEX SIG
CR1
OPT. SW. INDEX
CR2
OPT. SW. HOME
R1
330
+5VDC
R2
4.7 K
HOME SIG
+5VDC
R46
1.5 M
R44
15 K
R43
10 K
Z11D
LM339
R50
560 K
+5VDC
VDD
VDD
C35
.1 uF
C32
.1 uF
SGND
VSS
R49
220 K
C18
10 uF



For Equivalent Engineering Drawing See 61030603-Q2 A

Figure 5-13B. Mechanism Control Assembly Schematic, Sheet 3

CD-100A Mech. Controller IC Power And Common Pin Chart					
		Power		Common	
Ref.	Generic Part #	+5 VDC	+8 VDC	Logic	Power
Z1	6803P-1	7	—	1	—
Z2	74HCT00	14	—	7	—
Z3	74HCT04	14	—	7	—
Z4	75176	8	—	5	—
Z5	27256-20	28	—	14	—
Z6	6116/6264/62256-20	28	—	14	—
Z7	74HCT373	20	—	10	—
Z8	74LS374	20	—	10	—
Z9	2003	—	—	8	—
Z10	2003	—	—	8	—
Z11	LM339	—	3	12	—
Z12	74HCT151	16	—	8	—
Z13	74HCT04	14	—	7	—
Z14	74HCT138	16	—	8	—
Z15	3010	—	—	—	—
Z16	3010	—	—	—	—
Z17	74HCT151	16	—	8	—
Z18	74HCT73	4	—	11	—
Z19	74CT00	14	—	7	—
Z20	74HCT73	4	—	11	—
Z21	74HC125	14	—	7	—

For Equivalent Engineering Drawing See 61030603-Q2 A

Figure 5-13B. Mechanism Control Assembly Schematic, Sheet 4

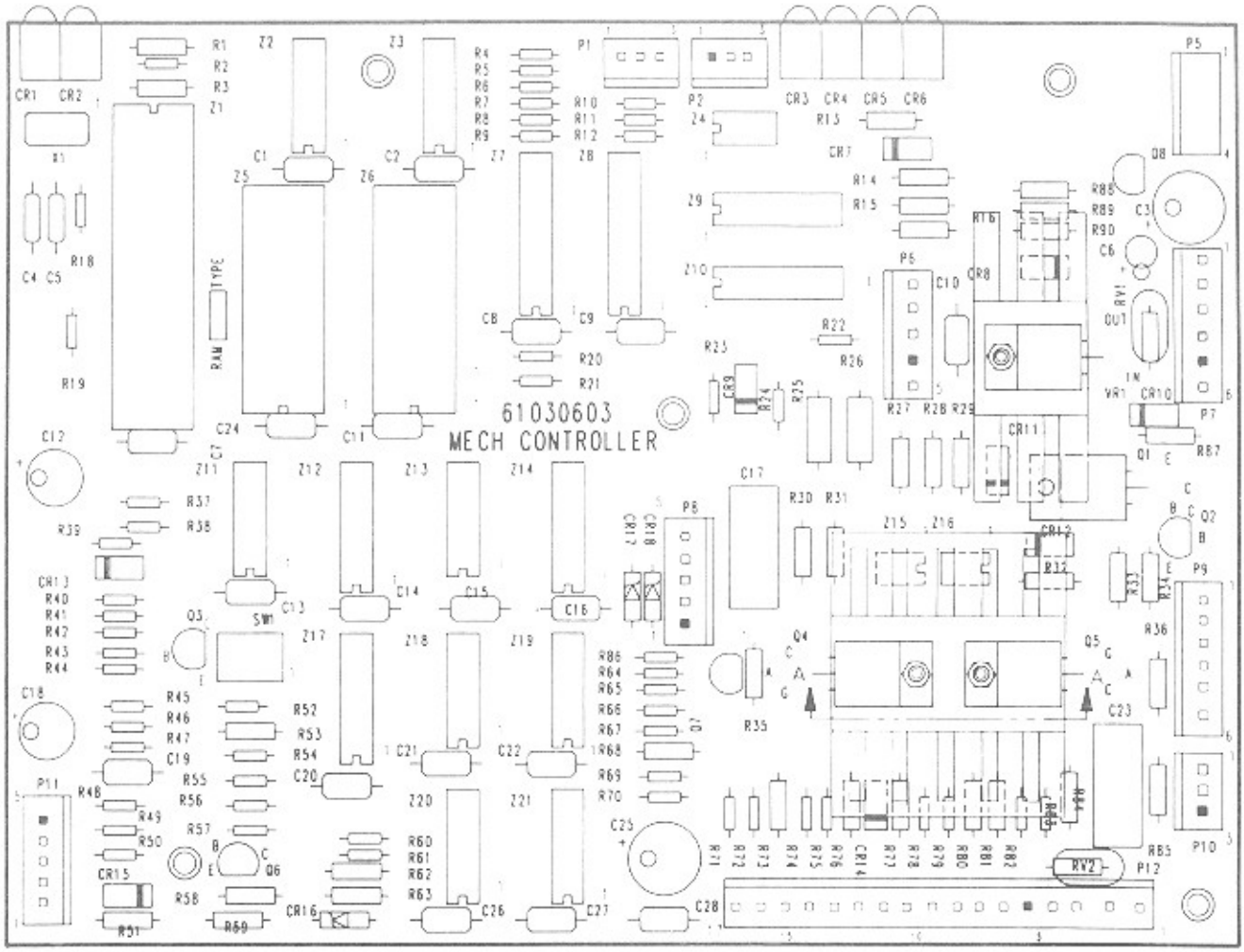


Figure 5-13C. Mechanism Control Assembly Circuit Board Layout

COMPONENT LIST FOR MECHANISM CONTROL BOARD (61030603-F)

C1	Capacitor - Monolithic Ceramic	.1 mf	70028511
C2	Capacitor - Monolithic Ceramic	.1 mf	70028511
C3	Capacitor - Electrolytic	100 mf	70023814
C4	Capacitor - Monolithic Ceramic	22 pf	70028705
C5	Capacitor - Monolithic Ceramic	22 pf	70028705
C6	Capacitor - Tantalum	.33 mf	70025119
C7	Capacitor - Monolithic Ceramic	.1 mf	70028511
C8	Capacitor - Monolithic Ceramic	.1 mf	70028511
C9	Capacitor - Monolithic Ceramic	.1 mf	70028511
C10	Capacitor - Monolithic Ceramic	.1 mf	70028511
C11	Capacitor - Monolithic Ceramic	.1 mf	70028511
C12	Capacitor - Electrolytic	10 mf	70023808
C13	Capacitor - Monolithic Ceramic	.1 mf	70028511
C14	Capacitor - Monolithic Ceramic	.1 mf	70028511
C15	Capacitor - Monolithic Ceramic	.1 mf	70028511
C16	Capacitor - Monolithic Ceramic	.1 mf	70028511
C17	Capacitor - FILM FOIL	.01 mf	70024013
C18	Capacitor - Electrolytic	10 mf	70023808
C19	Capacitor - Monolithic Ceramic	.1 mf	70028511
C20	Capacitor - Monolithic Ceramic	.1 mf	70028511
C21	Capacitor - Monolithic Ceramic	.1 mf	70028511
C22	Capacitor - Monolithic Ceramic	.1 mf	70028511
C23	Capacitor - FILM FOIL	.01 mf	70024013
C24	Capacitor - Monolithic Ceramic	.1 mf	70028511
C25	Capacitor - Electrolytic	47 mf	70023812
C26	Capacitor - Monolithic Ceramic	.1 mf	70028511
C27	Capacitor - Monolithic Ceramic	.1 mf	70028511
C28	Capacitor - Monolithic Ceramic	.1 mf	70028511

CR1	LED - Block		70035201
CR2	LED - Block		70035201
CR3	LED - Block		70035201
CR4	LED - Block		70035201
CR5	LED - Block		70035201
CR6	LED - Block		70035201
CR7	Diode - Silicon		70035005
CR8	Diode - Silicon		70035005
CR9	Diode - Silicon		70035005
CR10	Diode - Silicon		70035005
CR11	Diode - Silicon		70035005
CR12	Diode - Silicon		70035005
CR13	Diode - Silicon		70035005
CR14	Diode - Silicon		70035005
CR15	Diode - Silicon		70035005
CR16	Diode - Zener	5.1 V	70035526
CR17	Diode - Zener	5.6 V	70035507
CR18	Diode - Zener	5.6 V	70035507

K1	NOT USED	

P1	NOT USED		
P2	Wafer - Polarizing	3 CKT	70075003
P3	NOT USED		
P4	NOT USED		
P5	NOT USED		
P6	Wafer - Polarizing	5 CKT	70075005
P7	Wafer - Polarizing	6 CKT	70075006
P8	Wafer - Polarizing	5 CKT	70075005
P9	NOT USED		
P10	Wafer - Polarizing	3 CKT	70075003
P11	Wafer - Polarizing	5 CKT	70075005
P12	Wafer - Polarizing	17 CKT	70075017

Q1	Transistor - Darlington	(PNP)	70030805
Q2	Transistor - Silicon	(PNP)	70030104
Q3	Transistor - Silicon	(NPN)	70030008
Q4	THYRISTOR - Triac		70038102
Q5	THYRISTOR - Triac		70038102
Q6	Transistor - Silicon	(PNP)	70030104
Q7	Transistor - Silicon	(PNP)	70030104
Q8	NOT USED		

Note: All resistors are ¼ watt 5%, unless otherwise noted.

R1	Resistor - Carbon	330 Ohm	79901331
R2	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R3	Resistor - Carbon	330 Ohm	79901331
R4	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R5	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R6	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R7	Resistor - Carbon	3.3 K (1/8 W, 5%)	79905332
R8	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R9	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R10	Resistor - Carbon	10 K (1/8 W, 5%)	79905103
R11	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R12	Resistor - Carbon	10 K (1/8 W, 5%)	79905103
R13	Resistor - Carbon	470 Ohm	79901471
R14	Resistor - Carbon	470 Ohm	79901471
R15	Resistor - Carbon	470 Ohm	79901471
R16	Resistor - Carbon	330 Ohm	79901331
R17	NOT USED		
R18	Resistor - Carbon	3.3 K (1/8 W, 5%)	79905332
R19	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R20	NOT USED		
R21	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R22	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R23	Resistor - Carbon	1 K (1/8 W, 5%)	79905102
R24	Resistor - Carbon	1 K (1/8 W, 5%)	79905102
R25	Resistor - Metal Film	470 Ohm (½ W, 5%)	79904471
R26	Resistor - Metal Film	470 Ohm (½ W, 5%)	79904471
R27	Resistor - Carbon	220 Ohm	79901221

R28	Resistor - Carbon	5.6 K (¼ W, 2%)	79902562
R29	Resistor - Carbon	10 K (¼ W, 2%)	79902103
R30	Resistor - Carbon	22 Ohm	79901220
R31	Resistor - Carbon	22 Ohm	79901220
R32	Resistor - Carbon	220 Ohm	79901221
R33	Resistor - Carbon	1 K	79901102
R34	Resistor - Carbon	10 K	79901103
R35	Resistor - Carbon	1 K	79901102
R36	Resistor - Carbon	22 Ohm	79901220
R37	Resistor - Carbon	220 K (1/8 W, 5%)	79905224
R38	Resistor - Carbon	15 K (1/8 W, 5%)	79905153
R39	Resistor - Carbon	10 K (1/8 W, 5%)	79905103
R40	Resistor - Carbon	560 K (1/8 W, 5%)	79905564
R41	Resistor - Carbon	1.5 Meg (1/8 W, 5%)	79905155
R42	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R43	Resistor - Carbon	10 K (1/8 W, 5%)	79905103
R44	Resistor - Carbon	15 K (1/8 W, 5%)	79905153
R45	Resistor - Carbon	10 K (1/8 W, 5%)	79905103
R46	Resistor - Carbon	10 K (1/8 W, 5%)	79905103
R47	Resistor - Carbon	10 K (1/8 W, 5%)	79905103
R48	Resistor - Carbon	1.5 Meg (1/8 W, 5%)	79905155
R49	Resistor - Carbon	220 K (1/8 W, 5%)	79905224
R50	Resistor - Carbon	560 K (1/8 W, 5%)	79905564
R51	Resistor - Carbon	470 Ohm	79901471
R52	Resistor - Carbon	1 K (1/8 W, 5%)	79905102
R53	Resistor - Carbon	220 Ohm	79901221
R54	Resistor - Carbon	100 K (1/8 W, 5%)	79905104
R55	Resistor - Carbon	220 K (1/8 W, 5%)	79905224
R56	Resistor - Carbon	470 K (1/8 W, 5%)	79905474
R57	Resistor - Carbon	10 K (1/8 W, 5%)	79905103
R58	Resistor - Carbon	150 Ohm	79901151
R59	Resistor - Carbon	100 Ohm	79901101
R60	Resistor - Carbon	27 K (1/8 W, 5%)	79905273
R61	Resistor - Carbon	3.3 K (1/8 W, 5%)	79905332
R62	Resistor - Carbon	10 K	79902103
R63	Resistor - Carbon	10 K	79902103
R64	Resistor - Carbon	47 K (1/8 W, 5%)	79905473
R65	Resistor - Carbon	47 K (1/8 W, 5%)	79905473
R66	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R67	Resistor - Carbon	4.7 K (1/8 W, 5%)	79905472
R68	Resistor - Carbon	4.7 K	79901472
R69	Resistor - Carbon	220 Ohm (1/8 W, 5%)	79905221
R70	Resistor - Carbon	220 Ohm (1/8 W, 5%)	79905221
R71	Resistor - Carbon	56 K (1/8 W, 5%)	79905563
R72	Resistor - Carbon	47 K (1/8 W, 5%)	79905473
R73	Resistor - Carbon	1 K	79901102
R74	Resistor - Carbon	56 K (1/8 W, 5%)	79905563
R75	Resistor - Carbon	47 K (1/8 W, 5%)	79905473
R76	Resistor - Carbon	1 K	79901102
R77	Resistor - Carbon	10 K	79901103
R78	Resistor - Carbon	56 K (1/8 W, 5%)	79905563

R79	Resistor - Carbon	47 K (1/8 W, 5%)		79905473
R80	Resistor - Carbon	1 K		79901102
R81	Resistor - Carbon	1 K		79901102
R82	Resistor - Carbon	47 K (1/8 W, 5%)		79905473
R83	Resistor - Carbon	56 K (1/8 W, 5%)		79905563
R84	Resistor - Carbon	1 K		79901102
R85	Resistor - Carbon	22 Ohm		79901220
R86	Resistor - Carbon	100 Ohm (¼ W, 5%)		79901101
R87	Resistor - Carbon	100 Ohm (¼ W, 5%)		79901101
R88	NOT USED			
R89	NOT USED			
R90	NOT USED			
RV1	Varistor - Metal Oxide	11 V		70037505
RV2	Varistor - Metal Oxide	35 V		70037506
SW1	NOT USED			
VR1	Regulator - Voltage			70036505
X1	Crystal - Quartz (4.9152 MHZ)			25167313
Z1	IC - Microprocessor (63A03R OR 6803-1)			70039125
			OR	70039128
Z2	IC - HCT (QUAD 2 Input NAND)			79930000
Z3	IC - HCT (HEX Inverter)			79930004
Z4	IC - Transceiver (RS-485)			70037801
Z5	IC - 32K X 8 EPROM (27256-20)			70038318
Z6	IC - CMOS RAM (8K X 8)			70036604
Z7	IC - HCT (Octal D-Type)			79930373
Z8	IC - LS (Octal Edge Triggered FF)			70037111
Z9	IC - Darlington Array			70036901
Z10	IC - Darlington Array			70036901
Z11	IC - QUAD Comparator			70036801
Z12	IC - HCT (8 Input Data SEL)			79930151
Z13	IC - HCT (HEX Inverter)			79930004
Z14	IC - HCT (3-To-8 Line Decoder)			79930138
Z15	IC - OPTO Triac			70033703
Z16	IC - OPTO Triac			70033703
Z17	IC - HCT (8 Input Data SEL)			79930151
Z18	IC - HCT (DUAL JK Flip-Flop)			79930073
Z19	IC - HCT (QUAD 2 INPUT NAND)			79930000
Z20	IC - HCT (DUAL JK Flip-Flop)			79930073
Z21	IC - HC (Quad Buffer)			79940125