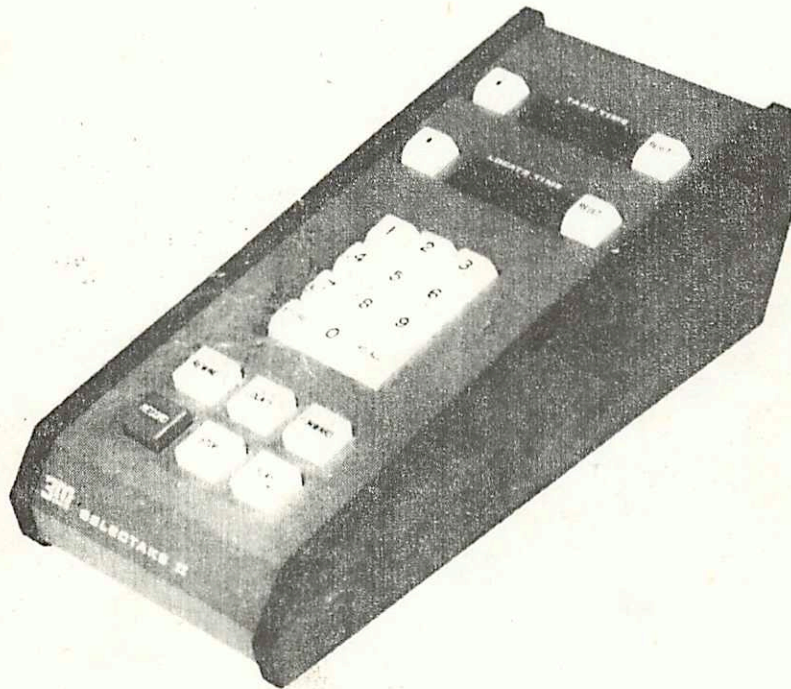


*MEMO SOUND*

**3M BRAND SELECTAKE II  
TAPE TIME LOCATOR**



**OPERATION AND  
MAINTENANCE MANUAL**

PROFESSIONAL AUDIO PRODUCTS  
**Mincom Division** **3M** COMPANY

# CAUTION NOTICE

JUNE 15, 1977

## SELECTAKE II TAPE TIME LOCATOR EQUIPMENT NON-COMPATIBILITY

**GENERAL:** The currently produced SELECTAKE II (68049B200 Remote Unit and 68049B250 Interface and Power Supply Module) are not compatible with the "A" assemblies previously produced. Forward compatibility can be achieved by incorporating the following changes to "A" configuration assemblies.

**68049A200 REMOTE UNIT.** To modify the "A" remote unit to function with the 68049B250 Interface and Power Supply Module make the following changes:

1. Change R50 to 33K ohms.
2. Remove the wire from E19 and connect it to E10, E11, or E22.
3. Connect a jumper wire between E19 and E18.
4. Remove the wire from E20 and connect it to E16 or E17.
5. Add wires from J4 pins 28, 29, and 30 to chassis (sheet metal) ground. (This change is already incorporated into many "A" units.)

**68049A250 Interface and Power Supply Module.** To modify the "A" interface and power supply module to function with the 68049B200 Remote Unit make the following changes:

1. Remove the wire between pin 18 of J8 and E17.
2. Connect a jumper wire between E13 or E14 and pin 18 of J8.
3. Remove the wire between pin 19 of J8 and E22.
4. Connect a jumper wire between E18, E19, E20, E21, or E25 and pin 19 of J8.
5. Add wires from J8-28, 29 and 30 to chassis ground.

## TABLE OF CONTENTS

|  | Page |
|--|------|
| <b>SPECIFICATIONS</b> .....                | 1    |
| <b>GENERAL DESCRIPTION</b> .....           | 2    |
| General .....                              | 2    |
| <b>INSTALLATION</b> .....                  | 3    |
| General .....                              | 3    |
| Location Considerations .....              | 3    |
| Signal Connection .....                    | 3    |
| Power Connection .....                     | 3    |
| <b>OPERATION</b> .....                     | 4    |
| General .....                              | 4    |
| Controls And Indicators .....              | 4    |
| Mode Controls .....                        | 4    |
| Operating Instructions .....               | 5    |
| Setting The Tape Time Zero Reference ..... | 5    |
| Remote Control Operation .....             | 5    |
| Identifying Locate Times .....             | 6    |
| Using The Memory Section .....             | 6    |
| Storing A Locate Time .....                | 6    |
| Recalling A Stored Locate Time .....       | 6    |
| Recalling Zero (0) .....                   | 7    |
| Locate Operation .....                     | 7    |
| <b>MAINTENANCE</b> .....                   | 8    |
| General .....                              | 8    |
| Test Equipment .....                       | 8    |
| Adjustment/Alignment .....                 | 8    |
| Procedure .....                            | 8    |
| Troubleshooting .....                      | 10   |
| Procedure .....                            | 10   |
| Factory Warranty and Repair Service .....  | 11   |
| Functional Description .....               | 13   |
| General .....                              | 13   |
| Remote Control .....                       | 13   |
| Microprocessor .....                       | 13   |
| <b>SCHEMATICS</b> .....                    | 17   |
| General .....                              | 17   |
| <b>PARTS LISTS</b> .....                   | 25   |
| General .....                              | 25   |

## SPECIFICATIONS

### TAPE TIME DISPLAY

Tape motion driven, digital time display covering times from 00.00 through 99.99 minutes.

Automatic "Hi-Low" speed switching (manual select for 7-1/2 - 15 ips and 15-30 ips ranges).

Associated RESET button allows independent "zeroing" and can be "set" to any desired time by shifting the Locate Time (covered below).

Associated ↓ (shift) button allows shifting of Tape Time into the Locate Time. This allows direct Locate Time entry while playing a tape.

Automatically set to 00.00 upon application of power.

Display "frozen" on tape runout. This allows rethreading without loss of location in the event of tape runout.

### LOCATE TIME DISPLAY

Digital display covering times from 00.00 through 99.99 minutes. (The displayed time is the tape time to which the machine will "home" if the locate function is initiated.)

Time entry is via the keyboard, shifting the Tape Time, or from one of nine memory points (covered below).

Associated RESET button allows independent "zeroing" of display without affecting the memory.

Display is automatically set to zero upon application of power.

Associated ↑ (shift) button allows shifting of the displayed Locate Time into the Tape Time display.

### KEYBOARD

Numbers 0 through 9 plus STORE and RECALL.

Used to enter locate times and to store times in memory (up to nine points - press STORE, then desired memory position number, 1 through 9) or to recall a previously stored time from memory (press RECALL, then desired memory position number).

### MODE CONTROLS

- LOCATE** - Backlighted pushbutton causes the tape to be driven at high speed to Locate Time and stop within  $\pm 1$  count without hunting. (See also PLAY.)
- During the LOCATE cycle, a PLAY command (machine or remote) can be stored then entered at the end of the cycle.
- Can be entered from any mode.
- Is cancelled by any (machine or remote) STOP, REWIND, or FORWARD command or tape runout.
- PLAY** - Backlighted pushbutton.
- Causes tape to be driven by the capstan.
- Can be entered from STOP, REWIND, and FORWARD.
- If entered in LOCATE the command (machine or remote) is stored until the cycle is complete, then the PLAY mode will be initiated.
- RECORD** - Backlighted pushbutton.
- Energized RECORD buss.
- Can only be entered in combination with PLAY when the tape is stopped or capstan driven.
- REWIND** - Backlighted pushbutton.
- Causes tape to wind at high speed on the supply reel.
- Can be entered from any mode.
- FORWARD** - Backlighted pushbutton.
- Causes the tape to wind on the take up reel at high speed.
- Can be entered from any mode.
- STOP** - Backlighted pushbutton.
- Causes tape motion to cease and places machine in a standby (ready for any mode command) status.
- Can be entered from any mode.

## GENERAL DESCRIPTION

### GENERAL

The Mincom Selectake II, Tape Time Locator uses the latest in microprocessor technology to provide a compact, reliable, tape position locator assembly. The unit is an accessory for use with Mincom Model 79 Professional Audio Recorders. A four digit readout displays tape time from an arbitrarily determined zero time reference. Tape time is derived from sensors in the M79 and is read out in minutes, tenths of minutes, and in hundredths of minutes. (Fractional minutes may be converted to equivalent seconds by multiplying the indicated decimal fraction by 60.) Points of interest on the tape are identified (for relocation) by logging the tape time readout corresponding with each event. The Selectake II has independently addressable memories which allow up to nine such tape time locations to be stored simultaneously. These location times may be entered directly during the recording process or they can be programmed into the Selectake II at a later time. The content of any memory can be recalled or rewritten at any time and in any order.

Locate times are entered on a second four digit display. The time indicated on the locate time display is the time to which the tape will home if the locate function is initiated.

Locate times can be entered directly into the display using the data entry keyboard; transferred from the tape time display by pressing a tape time transfer switch, or recalled from a previously loaded memory. The locate time display can also be used to set tape time. The tape time of an upcoming event is entered into the locate display; when the event occurs, the locate time transfer switch is pressed to transfer the locate time to the tape time display.

The Selectake II has a tenth recall address: RECALL "0". In this mode the locate time display reads out the absolute difference between the selected locate time and the tape time. All data entry keys are locked out in this mode. The function control switches grouped in the lower portion of the front panel remain active. The mode is terminated by pressing the RECALL switch.

The Selectake function control switches provide complete mode control of the Model 79 Recorder after power is applied, tape is threaded, and the system placed in Standby operation. (These functions must be accomplished at the console.) The control unit can be located at any site within a radius of approximately 50 feet dependent upon interconnecting cable length. (A 30 foot interconnecting cable is supplied.)

## INSTALLATION

### GENERAL

The Selectake II accessory consists of a reversing idler, two optical sensors, an exciter lamp, and a power supply and interface module (all incorporated into the Model 79 Professional Audio Recorder) and a control unit which is usually located remotely. Interconnection is by means of a point-to-point interconnect cable. The Selectake II accessory is normally factory installed prior to shipment. It can, however, be field retrofitted into any Model 79 machine. The field retrofit kit contains complete and detailed instructions for accomplishing the retrofit.

### LOCATION CONSIDERATIONS

The control unit of the Selectake II uses a calculator type data input keyboard and digital readouts. The unit should

be located on a flat surface at a convenient height for data entry and visual observation of digital displays.

### SIGNAL CONNECTION

Signal inputs to and from the control unit are through the interconnect cable.

### POWER CONNECTION

Power input to the control unit is through the interconnect cable.

## OPERATION

### GENERAL

The Selectake II functions as an integral part of the M79 Professional Audio Recorder. It accepts power and tape motion information from the M79 and delivers manual or automatic operating commands to it. Power is applied to the accessory when the M79 power is turned on. The function controls on the Selectake control unit are enabled after the M79 is put into the standby mode. This is accomplished at the M79 console by pressing the STOP switch (after the tape is threaded). When the STOP switch is illuminated, the M79 is in standby. The Selectake II functions as a standard remote control and as a programmable data location device.

A stop mode select switch located on the M79 must be placed in the Selectake II position when the Selectake is used. If the Selectake is disconnected, the switch must be placed in the alternate position for normal M79 operation. The switch is mounted to the right of the cage. Access is gained by raising the top of the M79 console.

### CONTROLS AND INDICATORS

All normal operating controls and indicators are located on the sloping front panel of the Selectake II control unit. A two position speed RANGE switch is located on the rear panel. This switch is set to correspond with the speed range of the M79. Figure 1 illustrates all front panel controls and indicators. Locator numbers are assigned to each and a brief description given. The applicable locator numbers are repeated at appropriate points in the individual operating procedures as a convenience and a cross reference.

- ① **TAPE TIME DISPLAY.** Four Digit Display indicates time from 00.00 through 99.99 minutes.
- ② **TAPE TIME DISPLAY SHIFT.** Allows shifting of tape time into locate time display.
- ③ **RESET.** Sets time display readout to 00.00 which automatically establishes tape time zero reference.
- ④ **LOCATE TIME DISPLAY.** Four Digit Display indicates time from 00.00 to 99.99 minutes. (Time displayed is tape time to which M79 will home if LOCATE is commanded.)
- ⑤ **LOCATE TIME DISPLAY SHIFT.** Allows tape time zero reference to be reset by shifting new time into tape time display.

- ⑥ **RESET.** Sets locate time display readout to 00.00.
- ⑦ **BASIC KEYBOARD.** Numbers 0 through 9 plus STORE and RECALL used to enter locate times and to store locate times in memory. RECALL permits recall of previously stored locate times. RECALL 0 is a special case which causes locate time display to indicate difference between selected locate time and tape time. All keyboard entries are inhibited in RECALL 0 operation. Condition released by pressing RECALL.

### MODE CONTROLS

- ⑧ **LOCATE.** Backlighted pushbutton switch causes the tape to be driven at high speed to Locate Time and stop within  $\pm 1$  count without hunting. (See also PLAY.) Is cancelled by any (machine or remote) STOP, REWIND, or FORWARD command or tape runout.
- ⑨ **PLAY.** Backlighted pushbutton switch which causes tape to be driven by the capstan. Can be entered from STOP, REWIND, and FORWARD.

If pressed during LOCATE, the command (machine or remote) is stored until the cycle is complete. Then the PLAY mode will be initiated.

- ⑩ **RECORD.** Backlighted pushbutton switch energizes RECORD Buss. Can only be entered in combination with PLAY when the tape is stopped or capstan driven.
- ⑪ **STOP.** Backlighted pushbutton causes motion to cease and returns machine to standby (ready for any mode command) status. Can be entered from any mode.
- ⑫ **REWIND.** Backlighted pushbutton switch causes tape to wind at high speed on the supply reel. Can be entered from any mode.
- ⑬ **FORWARD.** Backlighted pushbutton switch. Causes the tape to wind on the takeup reel at high speed. Can be entered from any mode.
- ⑭ **RANGE SWITCH.** Two position slide switch located on panel. Set to position with nomenclature corresponding to M79 operating speeds.



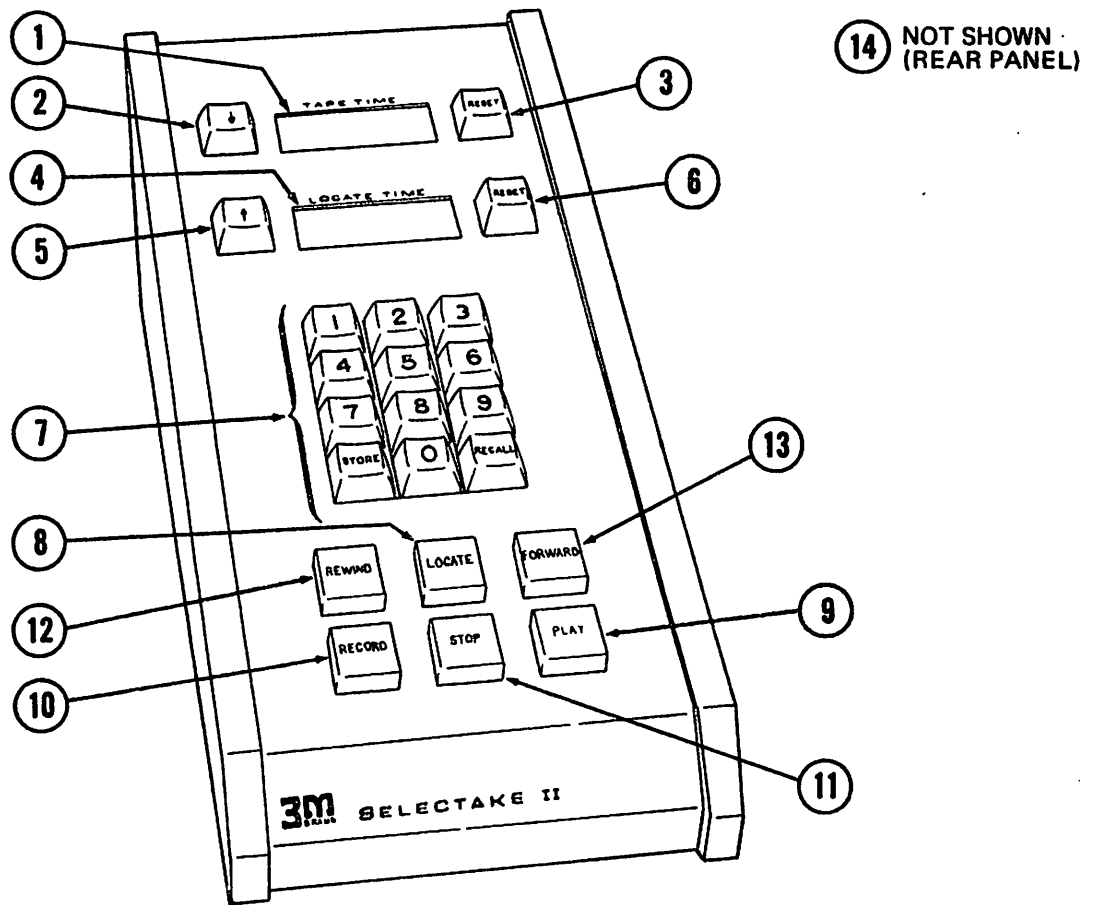


Figure 1. Controls and Indicators

## OPERATING INSTRUCTIONS

The Selectake II is a tape time locator. It identifies a specific tape position in terms of tape time elapsed from a zero tape time reference. Data is located by repositioning the tape to the tape time which occurred concurrently with the data. To accomplish this it is necessary to establish an arbitrary tape time zero reference or, in the case of a previously recorded tape, sync to the original reference.

### Setting The Tape Time Zero Reference:

1. The Selectake II is automatically set to a zero reference when the M79 is turned on.
2. An alternate zero reference can be established at any tape location by pressing the TAPE TIME display RESET (3) switch. The RESET switch used in conjunction with a slate tone or other electrical or physical reference establishes a particularly convenient zero reference.

3. To recover the zero reference of a previously recorded tape, use the function controls (9) (11) (12) (13) to position the tape on an event for which the tape time is known then:
  - a. Use the keyboard (7) to enter the tape time of the event into the LOCATE TIME display (4). Four digits must be entered reading from left to right. The first digit entered appears at the right in the display and advances to the left as additional digits are entered. Multiple digit entries are electronically inhibited, data is only accepted one digit at a time.
  - b. Press the locate time transfer ↑ switch (5) to shift the time into the TAPE TIME display (1).

### Remote Control Operation:

Control switches (9) through (14) duplicate those on the M79 control console and function identically. The Selectake STOP switch (11), however, cannot be used to initiate the standby mode. There is no priority override. Either set of controls can be used to operate the M79.



Also grouped with the control switches is the LOCATE switch (8). This switch instructs the microprocessor circuitry to perform the locate sequence. The LOCATE command will override any existing machine command and can, in turn, be overridden by the STOP (11), REWIND (12), and FORWARD (13) switches. A PLAY switch (9) command will be accepted during the locate sequence but will not be executed until the sequence is completed. The RECORD switch (10) is disabled during the locate sequence.

#### Identifying Locate Times:

The tape time readout is presented with data. When a point-of-interest occurs, the concurrent tape time readout must be noted or stored. One event time can be noted and stored directly in the LOCATE TIME display (4) by pressing the tape time transfer ↓ switch (2). Where more than one event is anticipated, each event should be logged to permit the next location to be entered into the display. If immediate use is intended, the locate time can be stored directly into one of the nine memory locations. A log should be made of the significant contents of the memory section to retain the locate times against accidental loss and to identify the memories still available.

#### Using The Memory Section

The input and output of the memory section is through the LOCATE TIME display (4). To store, the memory section is addressed by pressing the STORE key on the basic keyboard (7). To recall, the memory section is addressed by pressing the RECALL key. The specific memory is selected by pressing the appropriately numbered key on the basic keyboard.

#### Storing A Locate Time

1. Insert the number to be stored into the LOCATE TIME display (4) by:
  - a. Transfer the time from the TAPE TIME display (1) by pressing the tape time transfer switch ↓ (2).

#### NOTE

There is normally a human response lag between event occurrence and operating the transfer key. Locate accuracy can be improved by changing the LOCATE TIME display reading (subtract normal response time) to allow for the response time error.

- b. Use the basic keyboard (7) to enter the desired locate time into the LOCATE TIME display (4).
2. Press the STORE key.
3. Press the selected memory key.

#### NOTE

The data entered into the LOCATE TIME display is not effected by the storing operation.

A log should be kept of the significant contents of the memory section to retain the stored locate times against accidental loss and to identify the memories still available.

#### Recalling A Stored Locate Time:

1. Press the RECALL key on the basic keyboard (7).
2. Press the numbered key (basic keyboard) of the memory containing the locate time to be recalled.
3. The contents of the selected memory will appear in the LOCATE TIME display (4).

### Recalling Zero (0):

The RECALL "0" address initiates a difference mode. The LOCATE TIME display (4) reads out the absolute difference between the locate time and the tape time.

1. Press the RECALL key (7).
2. Press the "0" key (7).
3. The LOCATE TIME display (4) will indicate the difference reading.

#### NOTE

All address keys except RECALL are locked out in this mode.

4. The RECALL "0" mode is terminated by pressing the RECALL key. Operation of the Selectake will return to normal and the LOCATE TIME display (4) will return to the reading which existed prior to initiating RECALL "0".

### Locate Operation:

1. Enter the location time in the LOCATE TIME display:
  - a. Directly using the keyboard, or
  - b. by recalling the locate time from the memory section.
2. Press the LOCATE switch (8). The M79 tape transport will begin a high speed tape transfer in the direction required to bring the TAPE TIME display (1) to the time entered in the LOCATE TIME display (4). The high speed transfer will automatically slow as the locate time is approached and stop when the TAPE TIME display reads within  $\pm 1$  count of the locate time.

## MAINTENANCE

### GENERAL

The Selectake II is a precision solid state device designed to give long, trouble free service without maintenance or adjustment. If a malfunction should occur follow the procedures in this section to locate the problem.

#### NOTE

The control unit of the Selectake II (PL68049-A200) is a sealed assembly. If the seal is broken during the warranty period the warranty on the module is voided.

### TEST EQUIPMENT

The test equipment recommended for servicing the Selectake II is listed in table 1. Alternate instruments may be used if their specifications and performance are generally equal to those of the instruments recommended.

Table 1. Recommended Test Equipment

| TYPE                   | MODEL         |
|------------------------|---------------|
| ACVM                   | HP400EL       |
| Multimeter             | Triplett 630  |
| Oscilloscope*          | Tektronix 454 |
| *Use isolation probes. |               |

### ADJUSTMENT/ALIGNMENT

The adjustment procedure presented covers setup of the motion sensors associated with the Selectake. (The Selectake II has no other adjustments.) The adjustment procedure is accomplished when the Selectake II is installed and normally will require readjustment only if tape handling during the locate mode becomes inaccurate (i.e., relocation is not on a one to one basis).

The sensor adjustments are located in the power supply and interface module. To gain access, remove the protective cover from the module. (The module is mounted to the inside of the left side panel of the M79 when viewed from the rear.)

### NOTE

Before accomplishing the sensor alignment procedure, clean the mirrored surfaces on the reversing idler with a DRY cotton swab. **THE MIRRORED SURFACES ARE A PLASTIC FINISH. DO NOT USE A CLEANING AGENT.** If the surfaces are dirty, cleaning may eliminate the operational difficulty.

#### Procedure:

1. Set the speed range switch on the rear panel of the Selectake II control unit to correspond with the machine operating range.
2. Turn the M79 power on and thread a tape. Enable the standby mode at this time.
3. Connect the two vertical inputs of the oscilloscope to TP1 and TP2 respectively (see Figure 2).
4. Set up the scope for common time base and connect for external sweep triggering on the TP1 input.
5. Put the M79 into fast forward operation and observe the scope display. Adjust the scope controls as necessary to obtain common signal amplitudes and to position the TP1 signal above the TP2 signal. The horizontal sweep rate will have to be set as required to obtain the referenced waveform in the various steps.
6. Adjust R4 (see Figure 2) to obtain a stable waveform (see note) at TP1.

### NOTE

The waveform observed at TP1 and TP2 will be a complex appearing waveform which roughly approximates a square wave. The key word in the alignment procedure is stable. The individual transitions must be distinct (not tend to overlap one another) over the normal operating speed range of the M79.

7. Repeat step 6 except that R9 is to be adjusted to obtain a stable signal at TP2. (Stop the M79 after adjustment is completed.)
8. Move the TP1 probe to TP3 and the TP2 probe to R12 (see Figure 2).
9. Put the M79 into fast forward operation and touch up the adjustment of R4 to obtain best symmetry of the square wave at TP3.
10. Touch up the adjustment of R9 as needed to maintain a stable signal and obtain a waveform relationship as shown below.
11. Put the M79 into rewind operation. Observe the scope. The waveforms should remain stable. If necessary, again touch up R4 and/or R9 to maintain a waveform relation as shown in step 10. (The phase relationship will be reversed.)
12. Observe the tape time indication on the control unit. It should be counting up if the machine is operating in a forward mode or down if the machine is in rewind. If the count is reversed, set switch S1 (see Figure 2) to its alternate position.
13. Put the M79 into play operation and perform a tape time locate operation. If the locate count is correct the adjustment is satisfactory.
14. Disconnect probes and replace the protective cover.

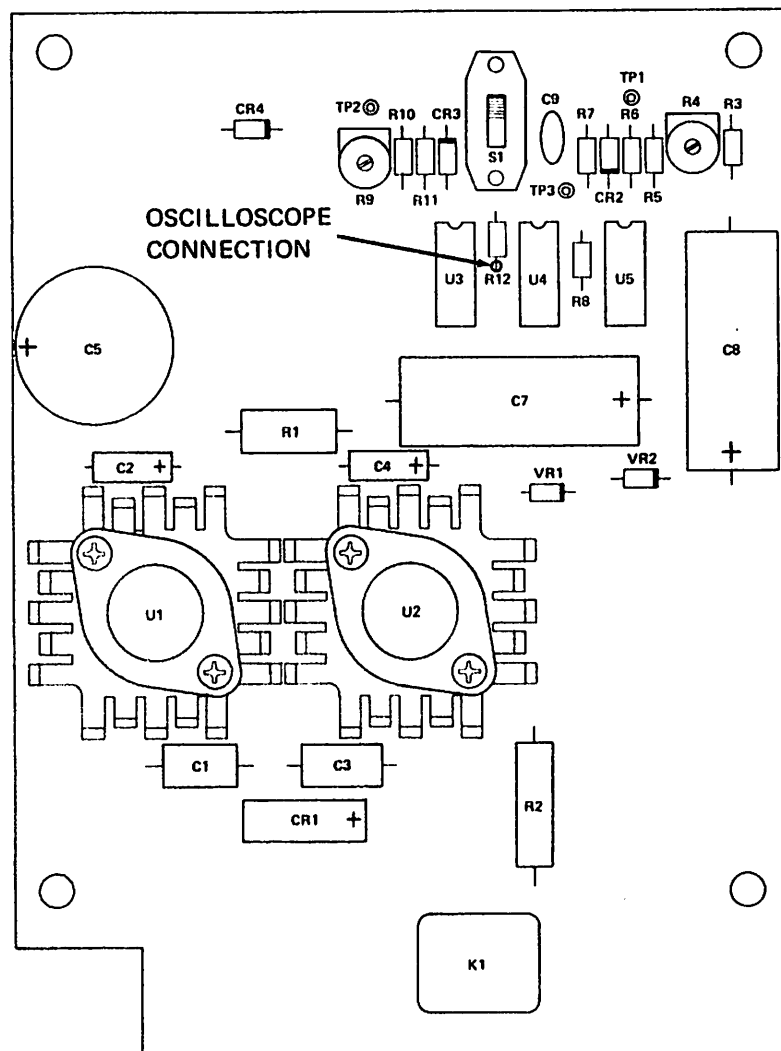
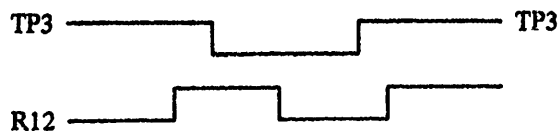


Figure 2. Test Point and Adjustment Location Diagram

## TROUBLESHOOTING

The heart of the Selectake II is a complete preprogrammed microprocessor including input/output circuitry, central logic circuitry, memories, control logic, etc. The interrelationships and interdependencies between the basic elements are sufficiently complex as to make field analysis difficult if not impossible. Troubleshooting within the microprocessor circuitry is more likely to create additional problems than to locate existing ones. It is recommended that once a problem is isolated to the microprocessor circuitry, the unit be returned to the factory for analysis and repair. The basic alternative is component substitution.

### Procedure:

The following procedure should be followed in the event of a Selectake problem. The procedure isolates the malfunction to the remotely located control unit or to that portion of the Selectake circuitry located within the M79 console.

1. Turn off power to the M79 and allow time for the illuminated displays on the Selectake control unit to go dark.
2. Disconnect the Selectake interconnecting cable at the control unit.
3. Turn the M79 power on but *do not* put the machine into the standby mode.
4. Make the following power measurements at the connector. (See Figure 3 for pin locations. The pins are not otherwise identified.)
  - a. Measure between pin 5 and ground. The meter shall read 28 vdc  $\pm$ 2 volts.
  - b. Measure between pin 14 and ground, then between pin 15 and ground. The meter shall read +5 vdc  $\pm$ .25 volts in each instance.
  - c. Measure between pin 16 and ground, then between pin 17 and ground. The meter shall read +5 vdc  $\pm$ .25 volts in each instance.
  - d. Measure between pin 18 and ground. The meter shall read +5 vdc  $\pm$ .25 volts.

## NOTE

If any voltage is not acceptable refer to schematic diagram E68049B250 (the power supply and interface module). If the problem is in the input voltages to the interface module, refer to the M79 instruction manual.

5. Tape Motion Signal Check:
  - a. Connect the oscilloscope between pin 25 and ground. Set time base for continuous sweep and vertical sensitivity to .5 volts per major division.
  - b. Spin the reversing idler by hand. An approximate square wave should appear on the scope.
  - c. Connect the scope between pin 24 and ground. Set up the scope to measure a dc input.
  - d. Spin the reversing idler (by hand) first clockwise, then counterclockwise. The dc level at pin 24 should shift to 0 or +5 vdc each time the reversing idler direction is changed.

## NOTE

If either sensor signal is not present (steps b and d), refer to schematic diagram E68049B250. Signal trace the sensor signals from the sensors through the sensor direction logic. Remember that it is necessary to spin the idler to generate a sensor signal.

6. Turn M79 power off and reconnect the control unit to the interconnect cable, then turn power back on.
7. Perform a static program checkout per table 2.
8. Put the M79 into the standby mode.
9. Use the function controls on the Selectake to put the M79 through a normal operating sequence which uses each mode control (except LOCATE). If the machine will not function normally the problem may be in the Selectake II or in the M79. Make the following checks to determine which.
  - a. Turn off the M79 power.
  - b. Disconnect the Selectake control unit cable.

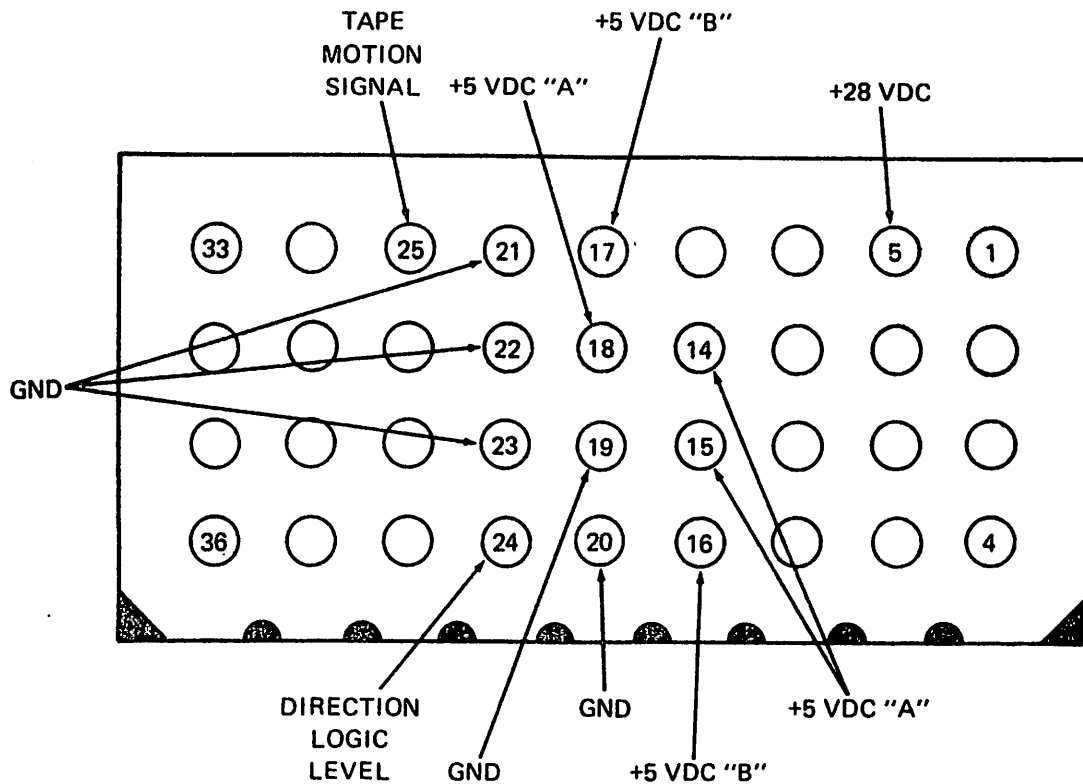


Figure 3. Remote Cable Connector (Control Unit Disconnected)

c. Lift the M79 console top and place the stop mode select switch in the NORMAL position. (The switch is mounted on the right hand side of the transport wraparound.)

d. Turn on M79 power and put the machine into the standby mode.

e. Use the M79 function control to put the machine through a normal operating sequence which uses each control. If the machine functions normally, the problem is in the Selectake II control unit (or in wiring continuity to and from it). If not, the problem is in the M79.

10. Insert an arbitrary locate time in the LOCATE TIME display.

11. Press the LOCATE switch and observe that the tape is moved smoothly to a point where the LOCATE TIME and the TAPE TIME displays read identically.

a. If the relocation is not on a one-to-one time relationship or if there is under or overshoot, perform the sensor alignment procedure. (If the error relationship is 2:1, check the position of the SPEED RANGE switch on the back panel of the control unit.)

b. If sensor alignment does not correct the difficulty, the automatic command logic in the control unit is probably defective.

#### FACTORY WARRANTY AND REPAIR SERVICE

All assemblies returned to the factory for service should be carefully packaged, insured, and shipping costs prepaid.

1. Indicate the symptom of defect. State as completely as possible, both on an instrument tag and on the order form, the nature of the problem encountered. Too much information is far better than too little. If the trouble is intermittent, please be specific in describing the instrument's performance history.
2. Give special instructions. If any changes in the instrument or assembly have been made, and it is desired to retain the modified form, please indicate this specifically.
3. To expedite repair, your Contract or Purchase Order authorizing the work should be directed to 3M Company, 3M Center, Mincom Division \* Bldg. 236-GN, St. Paul, MN 55101. ATTN: Professional Audio Department.

Table 2. Static Program Checkout

| ACTION   | RESULT   | PROBABLE CAUSE   | RECOMMENDED CORRECTIVE ACTION  |
|--|--|--|--|
| 1. Observe TAPE TIME DISPLAY                             | <p>00.00<br/>PRESENT</p> <p>YES</p>                              | <p>NO</p> <p>1 MHz OSC (U9) out<br/>2 ms OSC (U10) out<br/>Indicator defective<br/>Program failure</p> | <p>Diagnose and repair*<br/>Diagnose and repair*<br/>Replace assembly*<br/>Return for repair</p> |
| 2. Observe the LOCATE TIME Display                       | <p>00.00<br/>PRESENT</p> <p>YES</p>                              | <p>NO</p> <p>Indicator defective<br/>Program failure</p>   | <p>Replace assembly*<br/>Return for repair</p>   |
| 3. Use Keyboard to enter 12.34 into LOCATE TIME Display  | <p>12.34<br/>APPEARS IN<br/>LOCATE<br/>DISPLAY</p> <p>YES</p>    | <p>NO</p> <p>Keyboard failure<br/>Program failure</p>  | <p>Replace assembly*<br/>Return for repair</p>   |
| 4. Press ↑ transfer key                                  | <p>12.34<br/>APPEARS IN<br/>TAPE TIME<br/>DISPLAY</p> <p>YES</p> | <p>NO</p> <p>Key failure<br/>Program failure</p>   | <p>Replace key*<br/>Return for repair</p>  |
| 5. Enter 56.78 into LOCATE TIME Display                  | <p>56.78<br/>APPEARS IN<br/>DISPLAY</p> <p>YES</p>               | <p>NO</p> <p>Keyboard failure<br/>Program failure</p>  | <p>Replace assembly*<br/>Return for repair</p>   |
| 6. Press RECALL, then "O" Keys                           | <p>44.44<br/>APPEARS IN<br/>LOCATE<br/>DISPLAY</p> <p>YES</p>    | <p>NO</p> <p>Keyboard failure<br/>Program failure</p>  | <p>Replace assembly*<br/>Return for repair</p>   |
| 7. Press RECALL  | <p>56.78<br/>REAPPEARS<br/>IN LOCATE<br/>DISPLAY</p> <p>YES</p>  | <p>NO</p> <p>Keyboard failure<br/>Program failure</p>  | <p>Replace assembly*<br/>Return for repair</p>   |
| 8. Press STORE<br>Press Key 1<br>Press LOCATE TIME Reset | <p>00.00<br/>APPEARS IN<br/>LOCATE<br/>DISPLAY</p> <p>YES</p>    | <p>NO</p> <p>Keyboard failure<br/>Program failure</p>  | <p>Replace assembly*<br/>Return for repair</p>   |
| 9. Press RECALL<br>Press Key 1                           | <p>56.78<br/>APPEARS IN<br/>LOCATE<br/>DISPLAY</p> <p>YES</p>    | <p>NO</p> <p>Keyboard failure<br/>Program failure</p>  | <p>Replace assembly*<br/>Return for repair</p>   |
| 10. REPEAT Steps 8 and 9 for each memory                 |  |  |  |

\*After warranty expiration



## FUNCTIONAL DESCRIPTION

### GENERAL

This section contains a brief functional description of the Selectake II. Discussion is at the conceptual level and keyed to a simplified block diagram. No significant description of circuitry is provided.

The Selectake II combines the functions of a standard remote control unit with a special purpose stored program microprocessor. The microprocessor is used to provide a versatile, easily operated, tape time location capability. The processor has direct control of the M79 tape transport during a locate sequence.

### REMOTE CONTROL

The remote control portion of the Selectake II consists of 6 function switches located in the lower quadrant of the remote unit. With the exception of the LOCATE switch, these controls parallel those on the M79 console and function in the same manner. The Selectake STOP switch, however, does not include the wiring necessary to initiate the standby mode. The LOCATE switch commands the microprocessor to accomplish the locate procedure.

### MICROPROCESSOR

Figure 4 is a simplified block diagram of the microprocessor. The semiconductor reference designators and/or part numbers included in some of the blocks provide correlation between the diagram and the schematic diagrams located in the back of the manual.

The reset circuit (U9) automatically resets the microprocessor each time power is turned on. This insures the computer of an accurate and reliable starting reference.

U1 and U2 are the input and output devices. These peripheral interface adapters (PIA's) accept and store input and output commands. The PIA status is scanned every 150 microseconds (provided the microprocessor is not otherwise occupied) to determine if the input status has changed. If no change has occurred, no action is taken, otherwise, the MPU chip (U3) takes whatever steps are required to update the outputs to reflect the change in input status. U3 obtains its instructions from the fixed program stored in read-only memory (ROM) chip U5.

Information is delivered to the PIA's from the Selectake keyboard and function command switches and from the M79 recorder. With the exception of the tape time signal (from the M79), all information inputs are HI/LO commands initiated directly or indirectly from manually selected switches. Most command inputs are delivered to PIA1 (U1) which, in turn, supplies data to microprocessing unit (MPU) U3.

PIA2 (U2) controls the readout of the tape time and locate time displays. The displays are scanned on a multiplex basis approximately 60 times a second. This scanning rate provides a flicker free display which appears to be continuous.

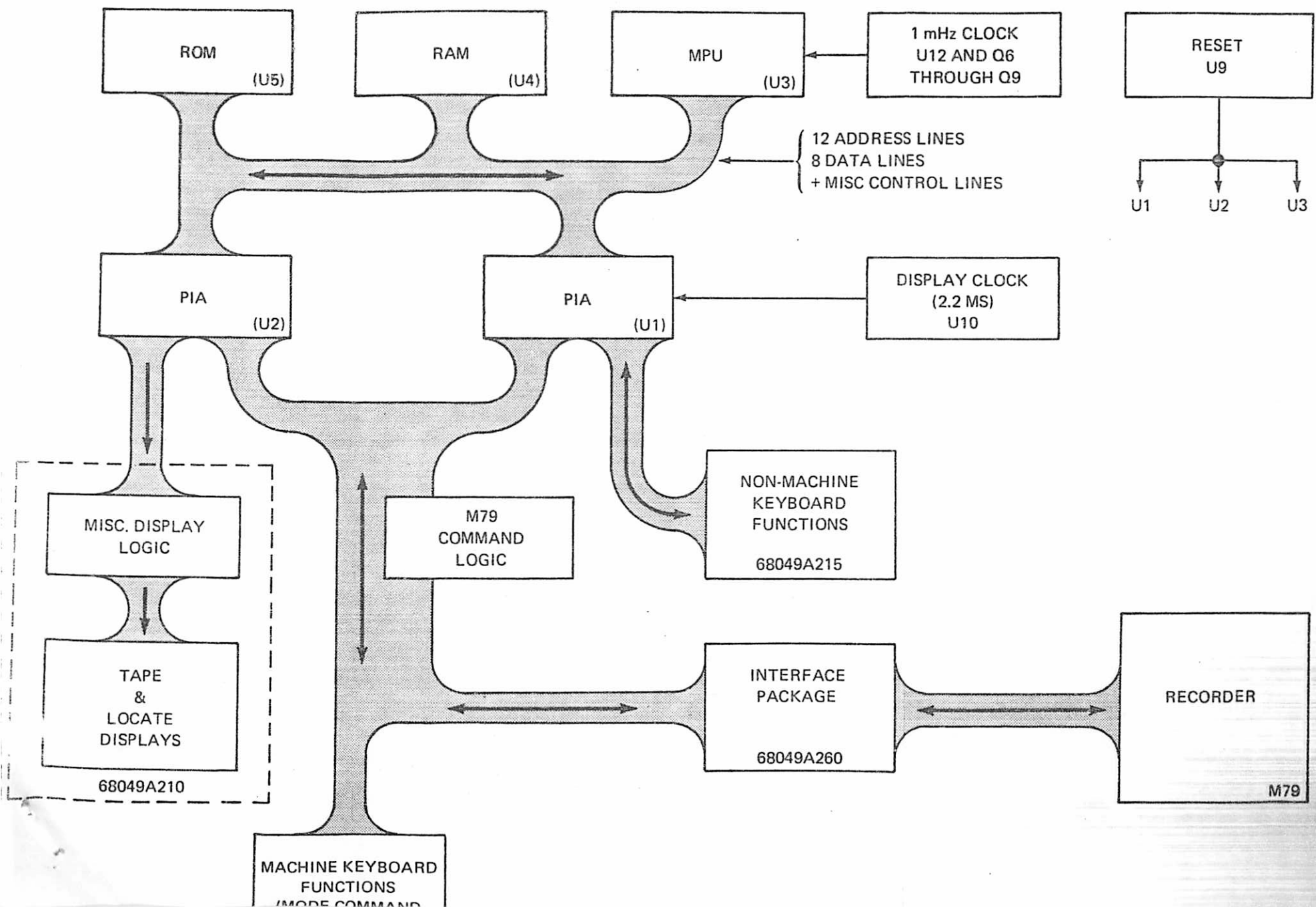
Microprocessing unit (MPU) U3 is the arithmetic-logic unit of the Selectake II. It accomplishes required arithmetic operations and logical operations such as detection of equality. It obtains instructions for necessary subroutines and sequences from ROM chip U5.

Random-access memory (RAM) chip U4 provides the temporary memory capacity required by the MPU chip U3 when performing its operations. The chip also provides the nine memory areas for storing locate times.

Read-only memory (ROM) chip U5 contains the permanent program required to accomplish the various subroutines which in combination control the Selectake II. This chip and the program it contains are the heart of the microprocessor.

The TAPE TIME and LOCATE TIME four digit displays are driven by a 7 segment decoder-driver and digit select circuits. (Discussed generally in most applications manuals.) The displays are driven from PIA2 (U2) whose input is, in turn, controlled by MPU U3.

Tape time is derived from a tape driven tone generator. The signal is generated by the M79 tape transport. The reversing idler has attached to it an 8 sided mirror. As the idler turns, it sequentially reflects light from a fixed source into two adjacently located phototransistors. The signals from the phototransistors are squared and digitally combined to produce a tone generator clock signal and a direction signal. The signal is routed to PIA1 (U1) and then processed by the MPU to produce a real time relationship. The two phase ( $\emptyset$ ) clock signal (1 MHz) is used by the microprocessor to synchronize all operations.



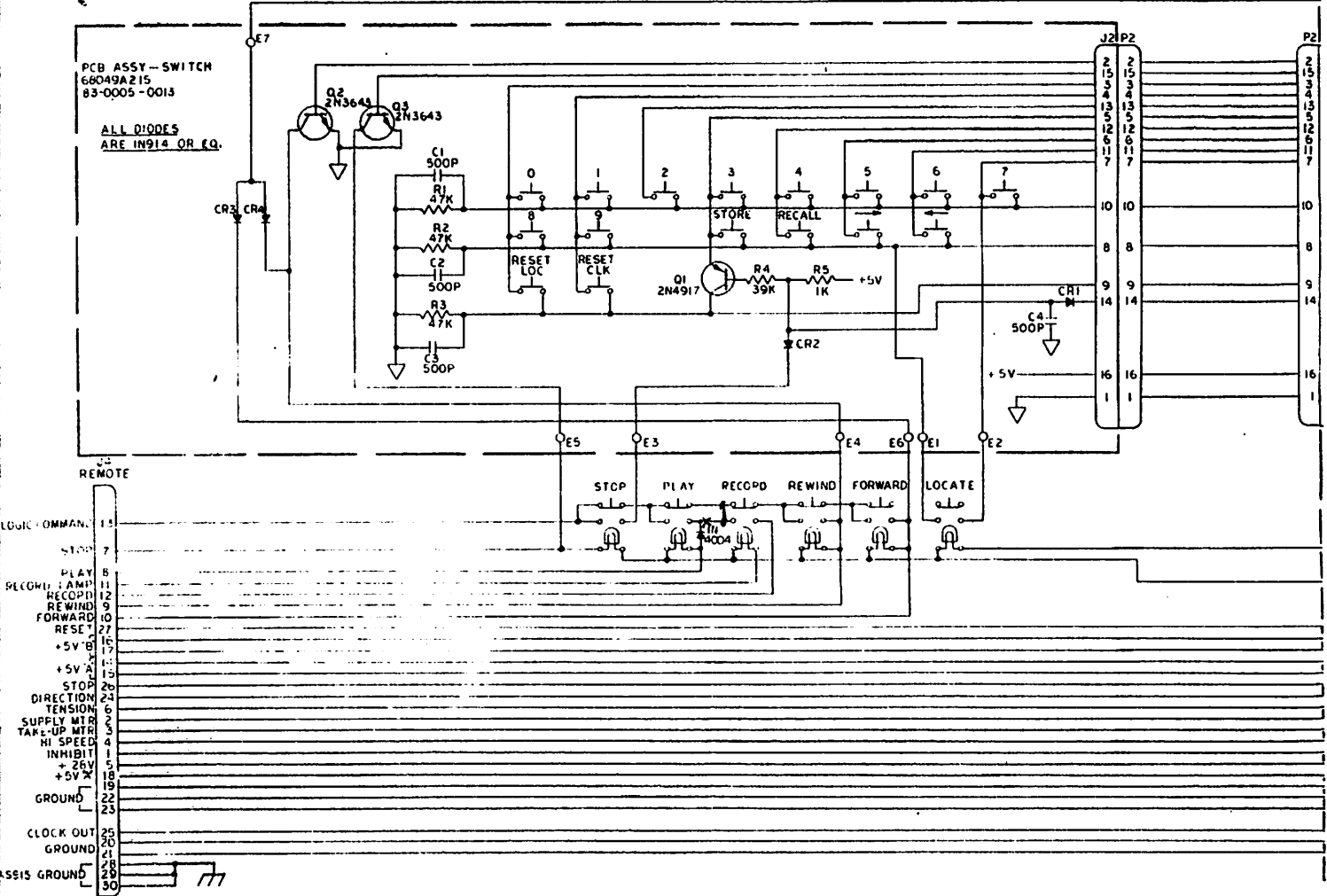
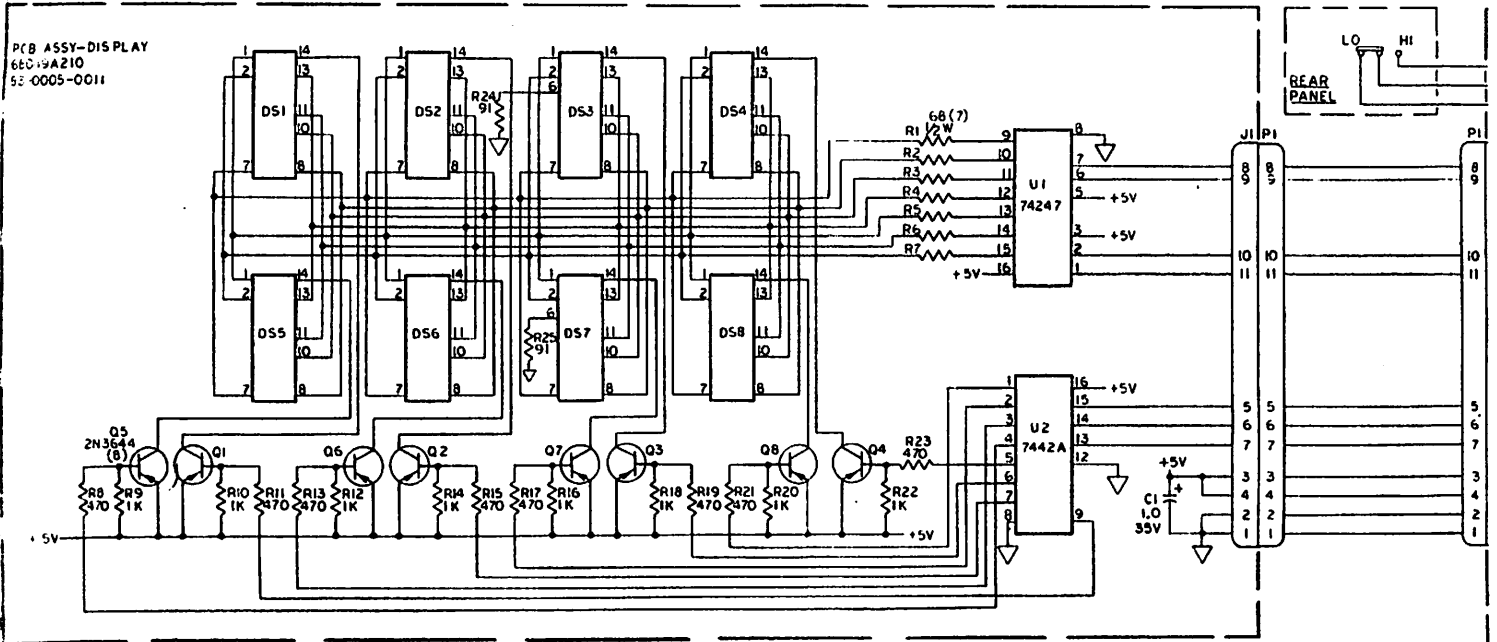
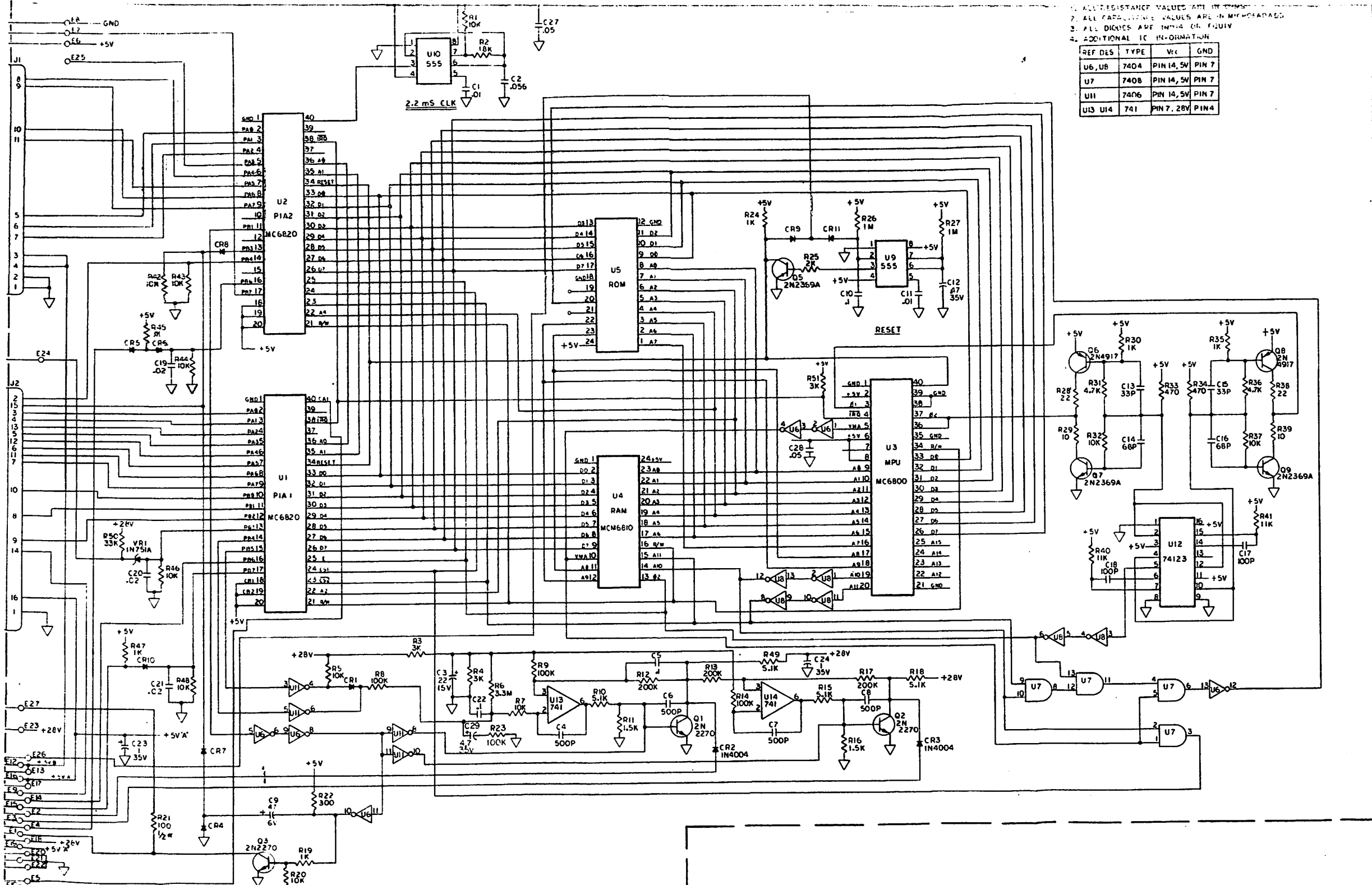


Figure 5. Selectake II (Sheet 1) (E68049B200)

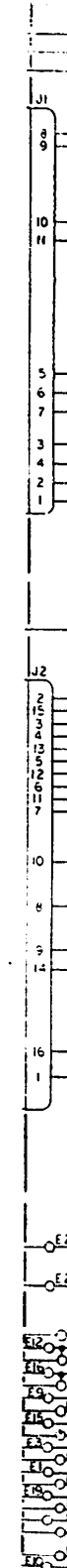
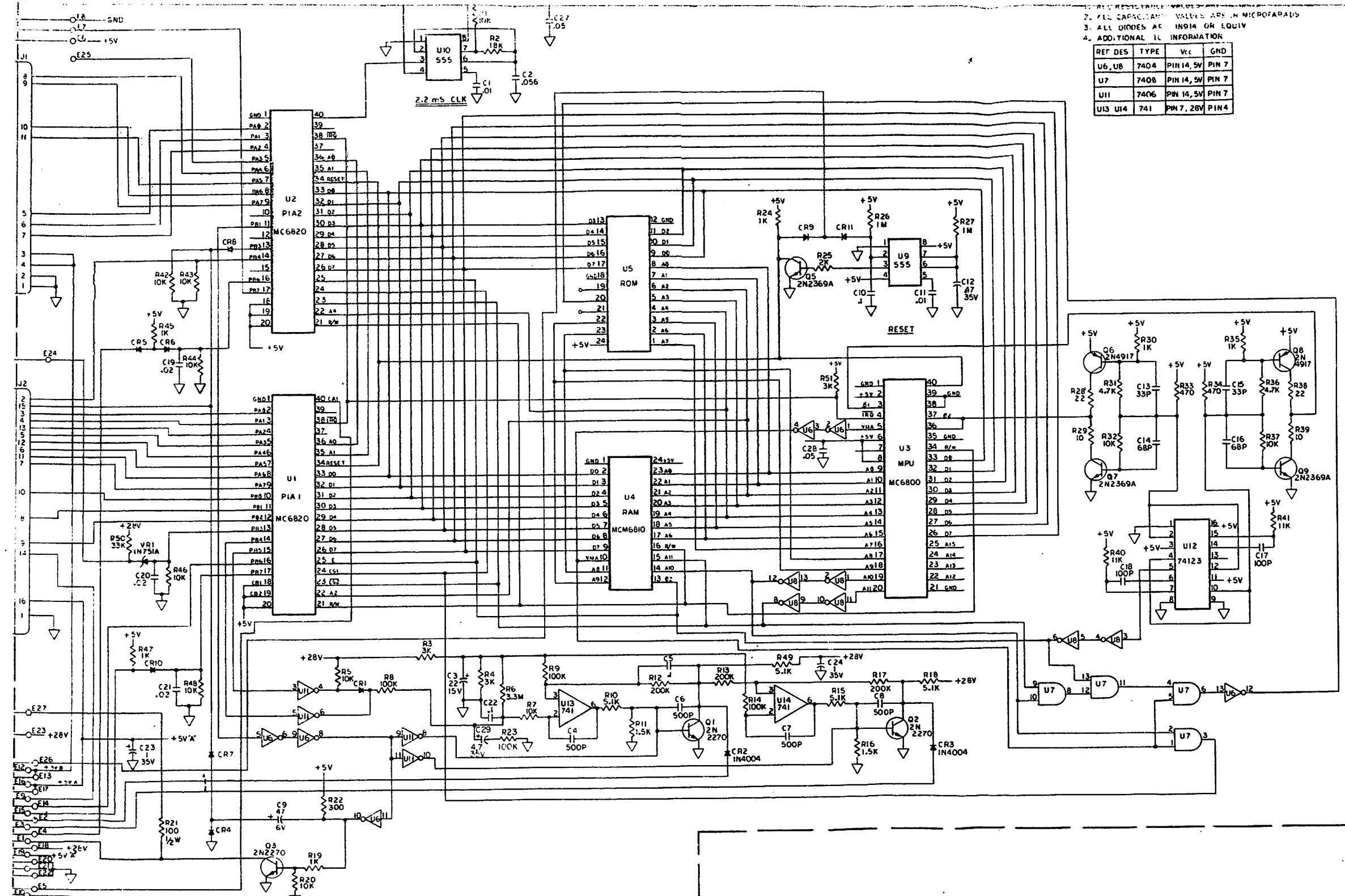


1. ALL RESISTANCE VALUES ARE IN OHMS
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS
3. ALL DIODES ARE 1N4148 OR EQUIV
4. ADDITIONAL IC INFORMATION

| REF DES  | TYPE | Vcc        | GND   |
|----------|------|------------|-------|
| U6, U8   | 7404 | PIN 14, 5V | PIN 7 |
| U7       | 7408 | PIN 14, 5V | PIN 7 |
| U11      | 7406 | PIN 14, 5V | PIN 7 |
| U13, U14 | 741  | PIN 7, 28V | PIN 4 |

1. ALL RESISTANCE VALUES ARE IN MICROHMS
2. ALL CAPACITANCE VALUES ARE IN MICROFARADS
3. ALL DIODES ARE INDIAN OR EQUIV
4. ADDITIONAL IC INFORMATION

| REF DES  | TYPE | Vcc        | GND   |
|----------|------|------------|-------|
| U6, U8   | 7404 | PIN 14, 5V | PIN 7 |
| U7       | 7406 | PIN 14, 5V | PIN 7 |
| U11      | 7406 | PIN 14, 5V | PIN 7 |
| U13, U14 | 741  | PIN 7, 28V | PIN 4 |



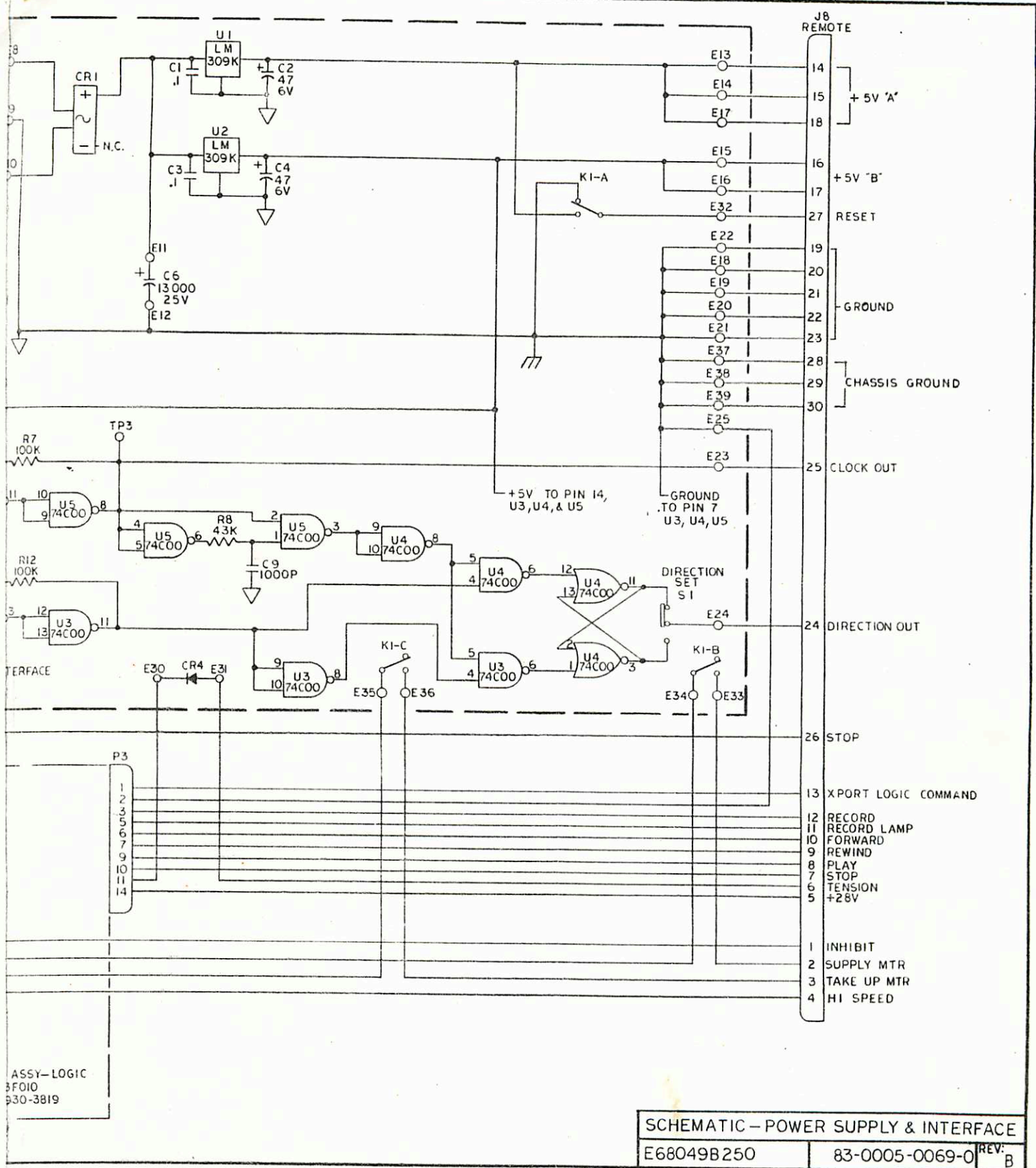
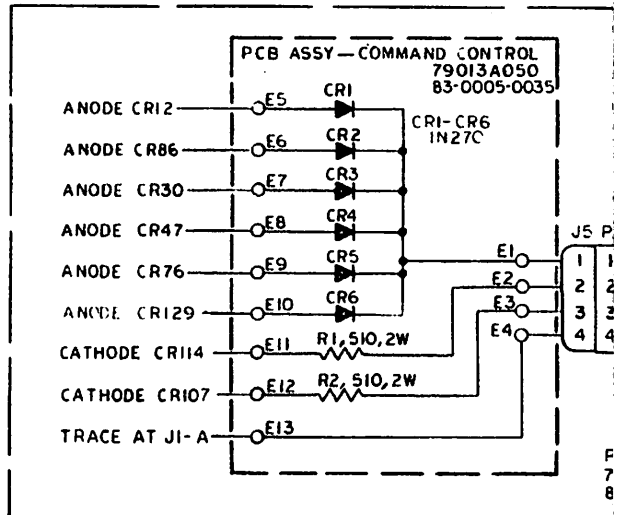
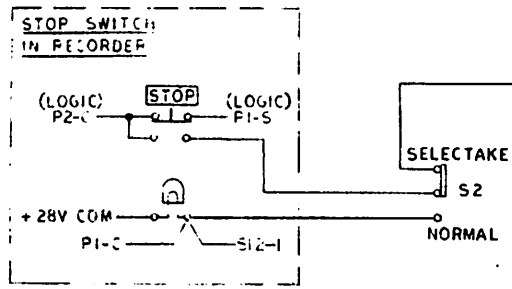
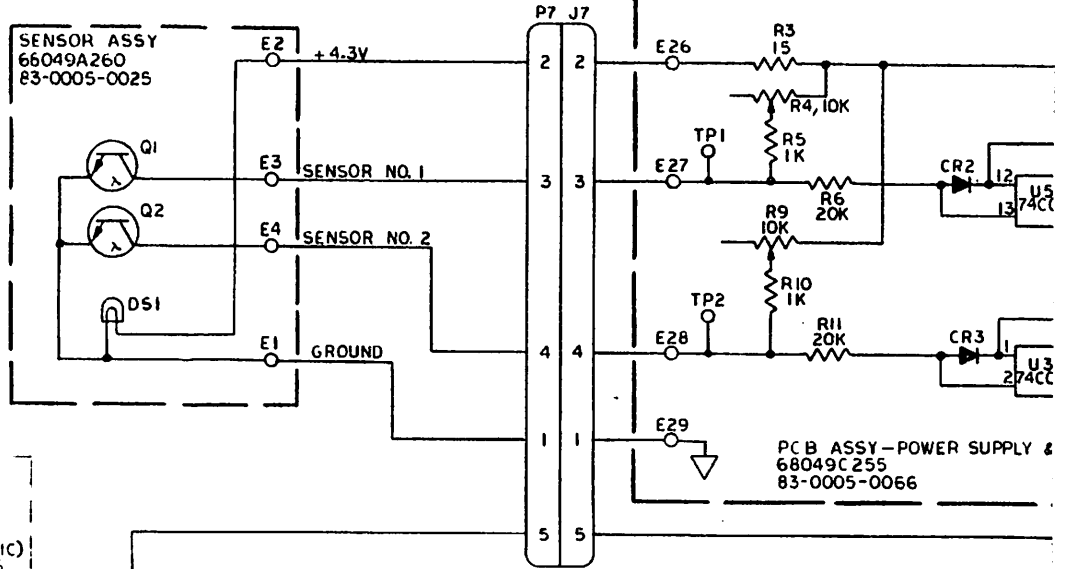
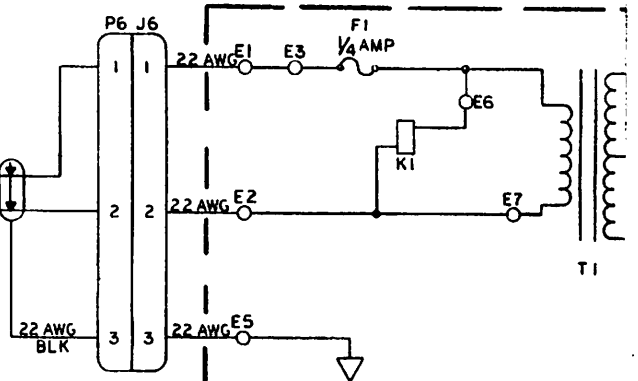
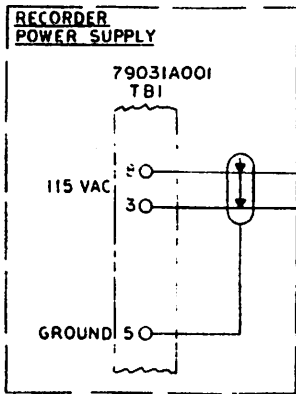


Figure 6. Power Supply and Interface



- NOTES: UNLESS OTHERWISE SPECIFIED**
1. ALL RESISTOR VALUES ARE IN OHMS
  2. ALL CAPACITOR VALUES ARE IN MICROFARADS
  3. ALL DIODES ARE IN914 OR EQUIV.
  4. ALL WIRE 24AWG, STRANDED, WHITE.