

HP 13220

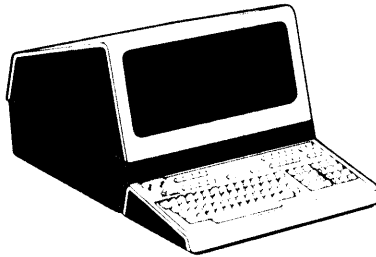
KEYBOARD MODULE

Manual Part Number 13220-91001

Revised

JAN-15-80

DATA TERMINAL TECHNICAL INFORMATION



HEWLETT  PACKARD

HP 13220

KEYBOARD MODULE

Manual Part Number 13220-91001

Revised

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NOTE: This document is part of the 262XX DATA TERMINAL product series Technical Information Package (HP 13220).

1.0 INTRODUCTION.

The Keyboard Module scans the keys and returns their status to the Processor PCA. It also carries the "Bell" loudspeaker.

2.0 OPERATING PARAMETERS.

A summary of operating parameters for the Keyboard Module is contained in tables 1.0 through 4.0.

Table 1.0 Physical Parameters

| Part Number | Nomenclature | Size (L x W x D) +/-2.5mm | Weight kgs |
|-------------|---------------|------------------------------|---------------|
| 02620-60001 | Keyboard PCA | 325 x 150 x 50 | 0.7 |
| 02620-60070 | Intl Kybd PCA | 325 x 150 x 50 | 0.7 |

Table 2.0 Reliability and Environmental Information

| |
|---|
| Environmental: (x) HP Class B () Other: |
| Restrictions: Type tested at product level |
| Failure rate: 1.33620 (percent per 1000 hours) |

Table 3.0 Power Supply Requirements

| |
|--|
| +5V to +12V at 100mA max |
| A resistor on the Processor PCA controls the bell current to |
| 100 mA. The CMOS and associated circuits draw less than 10mA |

Table 4.0 Connector Information

| Connector and Pin No | Signal Name | Description |
|-------------------------|----------------|--|
| J1-1 | Keya1 | Key address 1 |
| J1-2 | Keya2 | Key address 2 |
| J1-3 | Keya3 | Key address 3 |
| J1-4 | Keya4 | Key address 4 |
| J1-5 | Keya5 | Key address 5 |
| J1-6 | Keya6 | Key address 6 |
| J1-7 | Keya7 | Key address 7 |
| J1-8 | | Not used |
| J1-9 | Keyactn | Response line low if addressed key is pressed |
| J1-10 | Ground | |
| J1-11 | Bell | Drive for bell |
| J1-12 | Positive | Vcc |
| Spade Lug | Shield | |

3.0 FUNCTIONAL DESCRIPTION.

Refer to the block diagram (figure 1), schematic diagram (figure 2), timing diagram (figure 3), component location diagram (figure 4), and parts list (02620-60001), located in the appendix.

The keyboard scanning system comprises a CMOS BCD to decimal decoder, which addresses the columns of the key switch array, and a 1-of-8 multiplexer which scans the rows. These rows and columns do not refer to physical placement of the keys.

3.1 KEYSWITCH ARRAY.

Each keyswitch has the cathode of a diode attached to it. The anode of each diode connects to the 1-of-10 decoder line corresponding to that column. The diodes are to prevent "phantom" keys when several adjacent keys are pressed.

3.2 COLUMN DRIVE.

An address presented to the 1-of-10 decoder raises one line to a higher voltage.

3.3 ROW SCANNER.

An address presented to the 1-of-8 multiplexer selects one of the rows, and passes its state to a transistor pair which drive the response line. The rows are usually pulled low by resistors, but when a key is depressed, the row takes on the voltage state of the column connected to that key. The transistors turn on only when a key selected by both the row and column elements is pressed.

3.4 INPUT PROTECTION.

The addresses are sent from the Processor PCA through cable 02620-60028 to J1-1,-7, passed through resistor/capacitor pairs R1-7, C1-7, (Input Protection to reduce the effect of transients), to U1 and U3, the column driver and row scanner.

The transistors also have resistors and capacitors to reduce the effect of spurious switching transients as well as to supply bias current.

3.5 RESPONSE DRIVER.

J1-9 provides the path (through the cable) to the Processor PCA for sensing the key state.

J1-10 and J1-12 are the positive and negative supplies.

3.5 BELL SPEAKER.

J1-11 connects to the "bell" speaker. The associated diode is to allow the current stored in the inductance of the speaker coil to be shunted when the drive is removed.

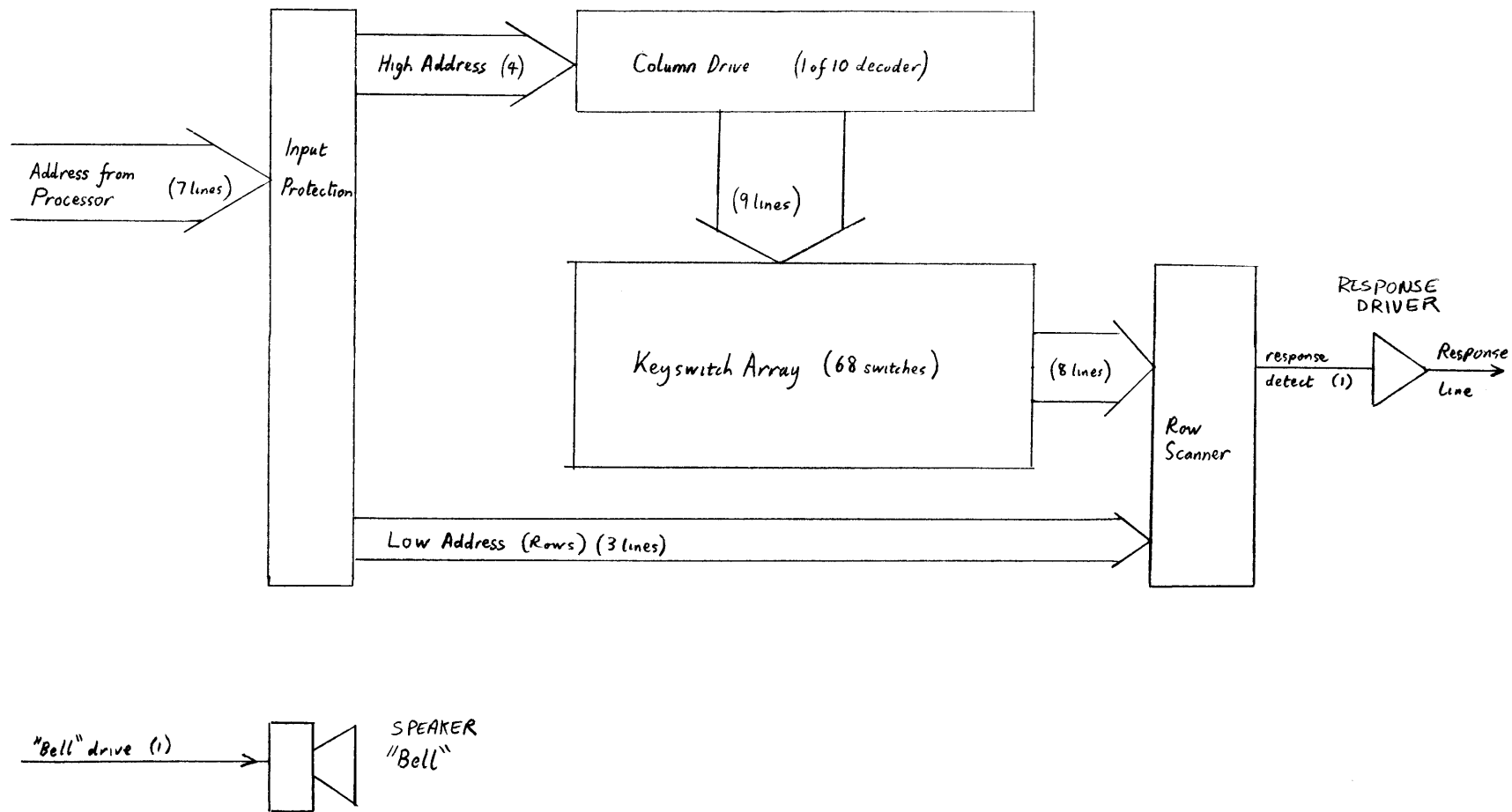


Figure 1
 Keyboard Module Block Diagram
 DEC-05-78 13220-91001

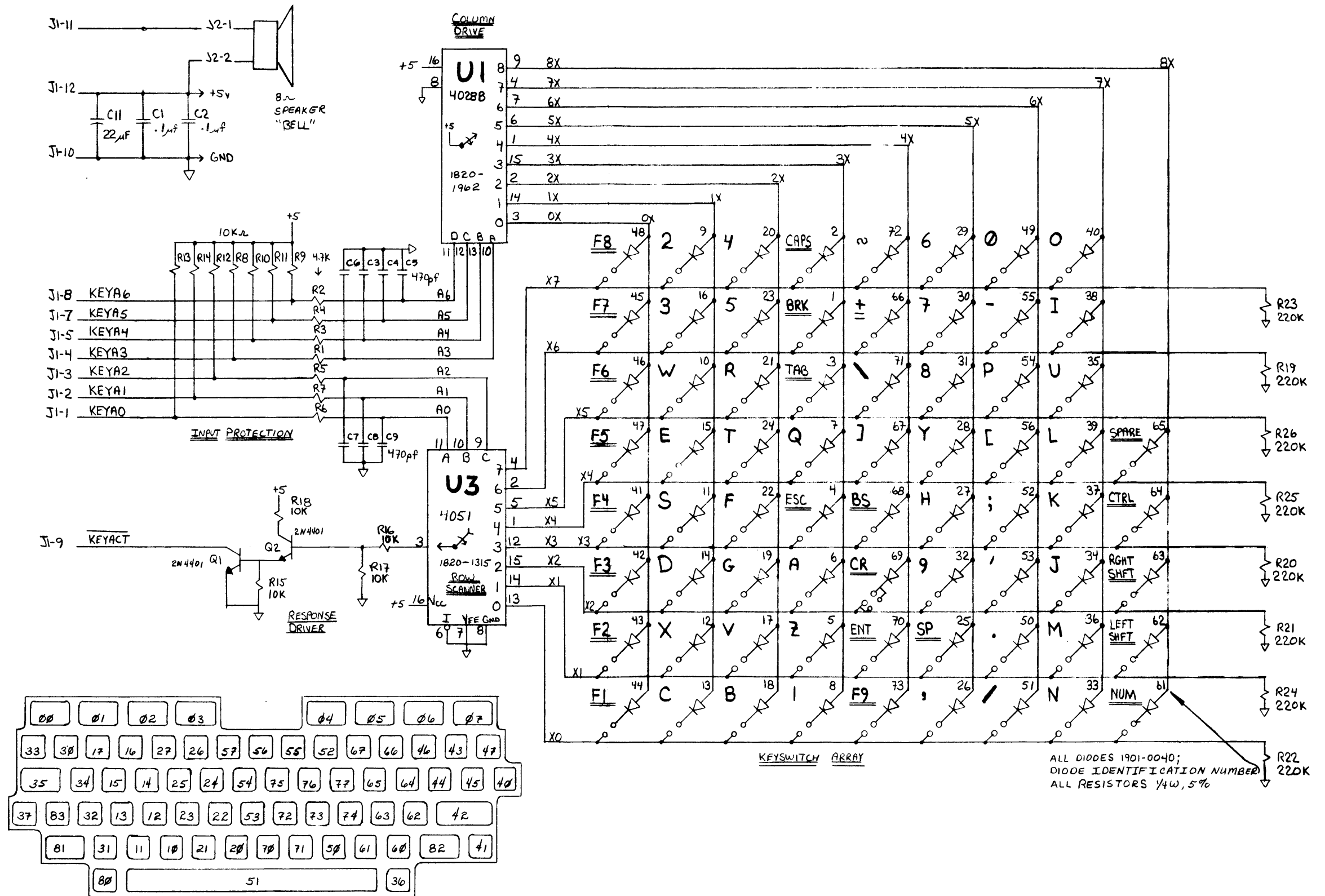
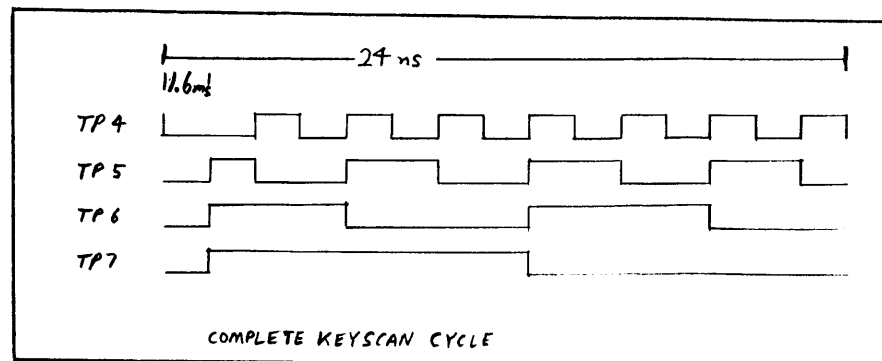
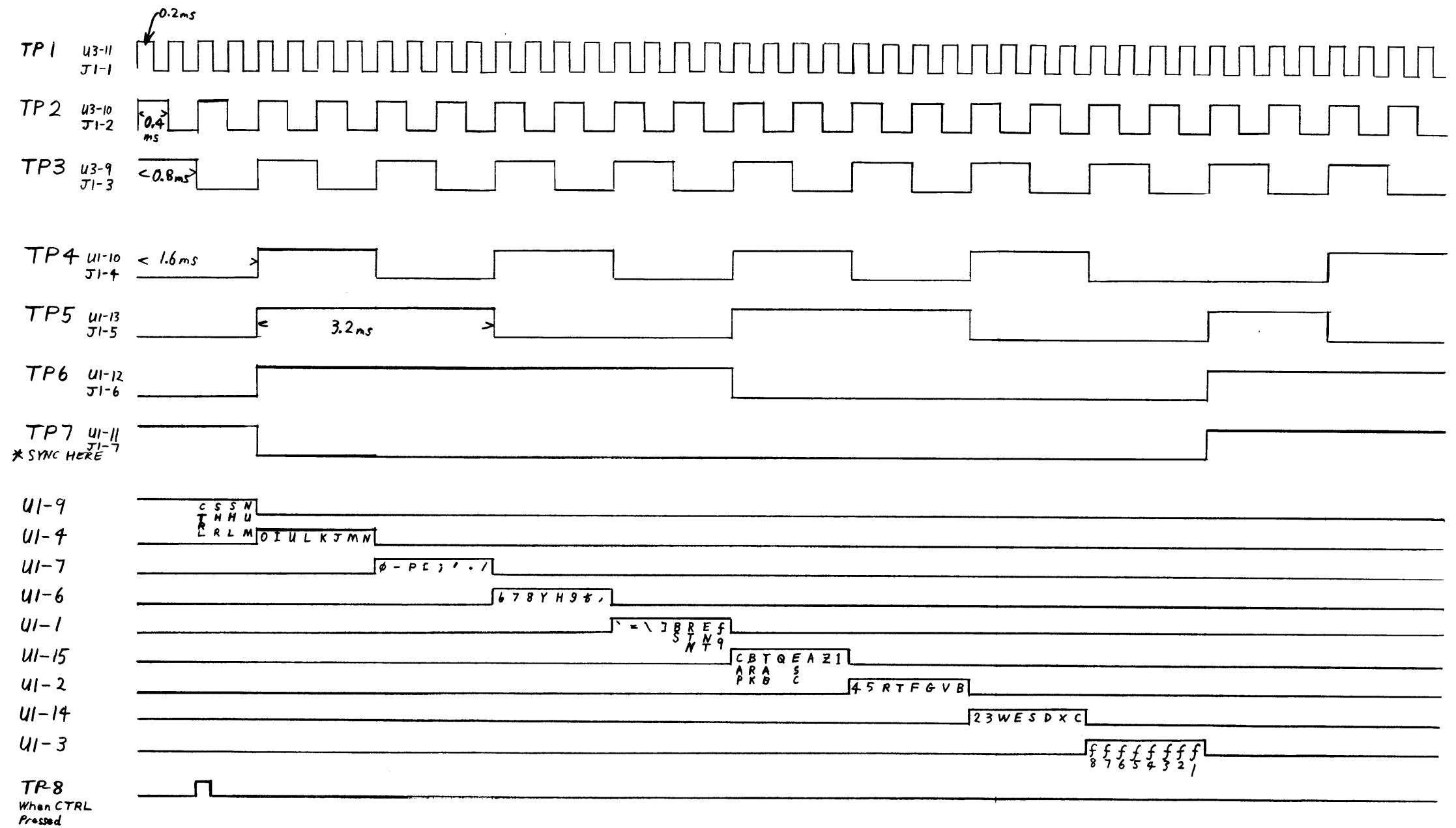


Figure 2
 Keyboard PCA Schematic Diagram
 JAN-15-80 13220-91001



ALL "HIGH'S" APPROX 5V
 ALL "LOW'S" APPROX 0V

Figure 3
 Keyboard Timing Diagram
 DEC-05-78 13220-91001

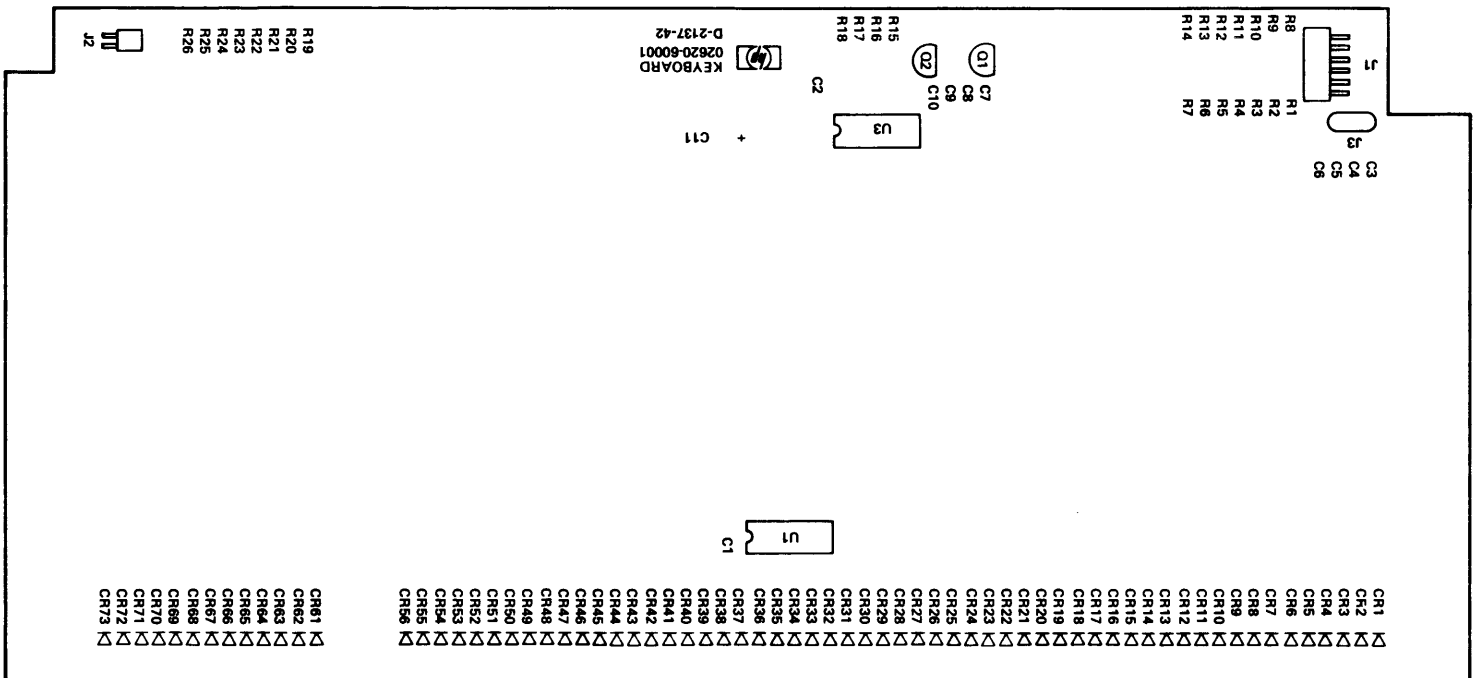


Figure 4
 Keyboard Location Diagram
 JAN-15-80 13220-91001

02620-60001 Keyboard PCA

DATE CODE: D-2137-42

| | | | | |
|--------|-------------------|-------------|------|----|
| C3-C10 | CAP 470PF 10% | 0160-3335 | 7.00 | EA |
| C1,C2 | CAP .1UF 20% 50V | 0160-4557 | 2.00 | EA |
| C11 | CAP 22 UF 25V | 0180-2879 | 1.00 | EA |
| | ETCHED BOARD | 02620-80001 | 1.00 | EA |
| | KEYCAP A COC BRN | 0371-1219 | 1.00 | EA |
| | KEYCAP B COC BRN | 0371-1220 | 1.00 | EA |
| | KEYCAP C COC BRN | 0371-1221 | 1.00 | EA |
| | KEYCAP D COC BRN | 0371-1222 | 1.00 | EA |
| | KEYCAP E COC BRN | 0371-1223 | 1.00 | EA |
| | KEYCAP F COC BRN | 0371-1224 | 1.00 | EA |
| | KEYCAP G COC BRN | 0371-1225 | 1.00 | EA |
| | KEYCAP H COC BRN | 0371-1226 | 1.00 | EA |
| | KEYCAP I5 COC BR | 0371-1227 | 1.00 | EA |
| | KEYCAP J1 COC BR | 0371-1228 | 1.00 | EA |
| | KEYCAP K2 COC BR | 0371-1229 | 1.00 | EA |
| | KEYCAP L3 COC BR | 0371-1230 | 1.00 | EA |
| | KEYCAP MO COC BR | 0371-1231 | 1.00 | EA |
| | KEYCAP N COC BRN | 0371-1232 | 1.00 | EA |
| | KEYCAP O6 COC BR | 0371-1233 | 1.00 | EA |
| | KEYCAP P COC BRN | 0371-1234 | 1.00 | EA |
| | KEYCAP Q COC BRN | 0371-1235 | 1.00 | EA |
| | KEYCAP R COC BRN | 0371-1236 | 1.00 | EA |
| | KEYCAP T COC BRN | 0371-1238 | 1.00 | EA |
| | KEYCAP U4 COC BR | 0371-1239 | 1.00 | EA |
| | KEYCAP V COC BRN | 0371-1240 | 1.00 | EA |
| | KEYCAP W COC BRN | 0371-1241 | 1.00 | EA |
| | KEYCAP X COC BRN | 0371-1242 | 1.00 | EA |
| | KEYCAP Y COC BRN | 0371-1243 | 1.00 | EA |
| | KEYCAP Z COC BRN | 0371-1244 | 1.00 | EA |
| | KEYCAP 1! COC BR | 0371-1245 | 1.00 | EA |
| | KEYCAP 2@ COC BR | 0371-1246 | 1.00 | EA |
| | KEYCAP 3# COC BR | 0371-1247 | 1.00 | EA |
| | KEYCAP 4\$ COC BR | 0371-1248 | 1.00 | EA |
| | KEYCAP 5% COC BR | 0371-1249 | 1.00 | EA |
| | CAP 6 CAROT CBR | 0371-1250 | 1.00 | EA |
| | KEYCAP 7& COC BR | 0371-1251 | 1.00 | EA |
| | KEYCAP 8* COC BR | 0371-1252 | 1.00 | EA |
| | KEYCAP 9(COC BR | 0371-1253 | 1.00 | EA |
| | KEYCAP 0) COC BR | 0371-1254 | 1.00 | EA |
| | CAP UDLINE CBR | 0371-1255 | 1.00 | EA |
| | KEYCAP =+ COC BR | 0371-1256 | 1.00 | EA |
| | CAP TILDE-GRV | 0371-1257 | 1.00 | EA |
| | CAP LT BKTPAR CB | 0371-1258 | 1.00 | EA |
| | CAP RT BKTPAR CB | 0371-1259 | 1.00 | EA |
| | CAP BKSLH BAR CB | 0371-1260 | 1.00 | EA |
| | KEYCAP ;: COC BR | 0371-1261 | 1.00 | EA |
| | KEYCAP '" COC BR | 0371-1262 | 1.00 | EA |
| | KEYCAP ,< COC BR | 0371-1263 | 1.00 | EA |
| | KEYCAP .> COC BR | 0371-1264 | 1.00 | EA |
| | KEYCAP /? COC BR | 0371-1265 | 1.00 | EA |

| | | | |
|-----------|------------------|-----------|---------|
| | CAP ESC DEL CBRN | 0371-1266 | 1.00 EA |
| | CAP BACKSPC CBRN | 0371-1267 | 1.00 EA |
| | CAP CAPS CO BRN | 0371-1268 | 1.00 EA |
| | CAP CTRL COC BRN | 0371-1269 | 1.00 EA |
| | CAP ENTER COC BR | 0371-1270 | 1.00 EA |
| | CAP NUM COC BRN | 0371-1271 | 1.00 EA |
| | CAP BREAK CO BRN | 0371-1272 | 1.00 EA |
| | CAP TAB/BKTB CBR | 0371-1273 | 1.00 EA |
| | CAP SHIFT CO BRN | 0371-1274 | 2.00 EA |
| | CAP(BLANK) ADBRN | 0371-1276 | 1.00 EA |
| | KEYCAP RETURN | 0371-2367 | 1.00 EA |
| | SCR-TPG 4-20 | 0624-0324 | 9.00 EA |
| R8-R18 | RES 10K 5% .25 | 0683-1035 | 1.00 EA |
| R19-R26 | RES 220K 5% .25 | 0683-2245 | 8.00 EA |
| R1-R7 | RES 4.7K 5% .25 | 0683-4725 | 7.00 EA |
| J2 | CONN 2 PIN M | 1251-5545 | 1.00 EA |
| J1 | CONN 11 PIN M | 1251-5551 | 1.00 EA |
| J3 | TERMINAL-PCB TAB | 1251-5613 | 1.00 EA |
| U3 | IC CD4051BE | 1820-1315 | 1.00 EA |
| U1 | IC MC14028BCP | 1820-1962 | 1.00 EA |
| Q1,Q2 | XSTR 2N4401 PL5 | 1854-0832 | 2.00 EA |
| CR1-CR56 | DIODE SIL | 1901-0040 | 9.00 EA |
| CR61-CR73 | | | |
| | SWITCH ARY 4X1LT | 3101-2448 | 1.00 EA |
| | SWITCH ARY 4X1RT | 3101-2449 | 1.00 EA |
| | KYSW SUB-ASSY | 3101-2554 | 1.00 EA |

02620-60070 International Keyboard

DATE CODE: D-2137-42

| | | | |
|--------|-------------------|-------------|---------|
| C3-C10 | CAP 470PF 10% | 0160-3335 | 7.00 EA |
| C1,C2 | CAP .1UF 20% 50V | 0160-4557 | 2.0 EA |
| | CAP 22 UF 25V | 0180-2879 | 1.00 EA |
| | ETCHED BOARD | 02620-80001 | 1.00 EA |
| | KEYCAP B COC BRN | 0371-1220 | 1.00 EA |
| | KEYCAP C COC BRN | 0371-1221 | 1.00 EA |
| | KEYCAP D COC BRN | 0371-1222 | 1.00 EA |
| | KEYCAP E COC BRN | 0371-1223 | 1.00 EA |
| | KEYCAP F COC BRN | 0371-1224 | 1.00 EA |
| | KEYCAP G COC BRN | 0371-1225 | 1.00 EA |
| | KEYCAP H COC BRN | 0371-1226 | 1.00 EA |
| | KEYCAP I5 COC BR | 0371-1227 | 1.00 EA |
| | KEYCAP J1 COC BR | 0371-1228 | 1.00 EA |
| | KEYCAP K2 COC BR | 0371-1229 | 1.00 EA |
| | KEYCAP L3 COC BR | 0371-1230 | 1.00 EA |
| | KEYCAP M0 COC BR | 0371-1231 | 1.00 EA |
| | KEYCAP N COC BRN | 0371-1232 | 1.00 EA |
| | KEYCAP O6 COC BR | 0371-1233 | 1.00 EA |
| | KEYCAP P COC BRN | 0371-1234 | 1.00 EA |
| | KEYCAP R COC BRN | 0371-1236 | 1.00 EA |
| | KEYCAP S COC BRN | 0371-1237 | 1.00 EA |
| | KEYCAP T COC BRN | 0371-1238 | 1.00 EA |
| | KEYCAP U4 COC BR | 0371-1239 | 1.00 EA |
| | KEYCAP V COC BRN | 0371-1240 | 1.00 EA |
| | KEYCAP X COC BRN | 0371-1242 | 1.00 EA |
| | KEYCAP 1! COC BR | 0371-1245 | 1.00 EA |
| | KEYCAP 4\$ COC BR | 0371-1248 | 1.00 EA |
| | KEYCAP 5% COC BR | 0371-1249 | 1.00 EA |
| | CAP UDLINE CBR | 0371-1255 | 1.00 EA |
| | CAP ESC DEL CBRN | 0371-1266 | 1.00 EA |
| | CAP BACKSPC CBRN | 0371-1267 | 1.00 EA |
| | CAP CAPS CO BRN | 0371-1268 | 1.00 EA |
| | CAP CTRL COC BRN | 0371-1269 | 1.00 EA |
| | CAP ENTER COC BR | 0371-1270 | 1.00 EA |
| | CAP NUM COC BRN | 0371-1271 | 1.00 EA |
| | CAP BREAK CO BRN | 0371-1272 | 1.00 EA |
| | CAP TAB/BKTB CBR | 0371-1273 | 1.00 EA |
| | CAP SHIFT CO BRN | 0371-1274 | 2.00 EA |
| | CAP(BLANK) ADBRN | 0371-1276 | 1.00 EA |
| | KCAP 2 " SQPGBRN | 0371-1864 | 1.00 EA |
| | KCAP 8 (SQPGBRN | 0371-1865 | 1.00 EA |
| | KCAP 9) SQPGBRN | 0371-1866 | 1.00 EA |
| | KCAP 0 = SQPGBRN | 0371-1867 | 1.00 EA |
| | KCAP , ; SQPGBRN | 0371-1868 | 1.00 EA |
| | KCAP . : SQPGBRN | 0371-1869 | 1.00 EA |
| | KCAP < > SQPGBRN | 0371-1874 | 1.00 EA |
| | KEYCAP RETURN | 0371-2367 | 1.00 EA |
| | SCR-TPG 4-20 | 0624-0324 | 9.00 EA |

| | | | |
|------------------------|------------------|-----------|---------|
| R8-R15 | RES 10K 5% .25 | 0683-1035 | 1.00 EA |
| R19-R26 | RES 220K 5% .25 | 0683-2245 | 8.00 EA |
| R1-R7, R18 | RES 4.7K 5% .25 | 0683-4725 | 7.00 EA |
| J2 | CONN 2 PIN M | 1251-5545 | 1.00 EA |
| J1 | CONN 11 PIN M | 1251-5551 | 1.00 EA |
| J3 | TERMINAL-PCB TAB | 1251-5613 | 1.00 EA |
| U3 | IC CD4051BE | 1820-1315 | 1.00 EA |
| U1 | IC MC14028BCP | 1820-1962 | 1.00 EA |
| Q1,Q2 | XSTR 2N4401 PL5 | 1854-0832 | 2.00 EA |
| CR1-CR57, CR61-CR73 | DIODE SIL | 1901-0040 | 9.00 EA |
| | SWITCH ARY 4X1LT | 3101-2448 | 1.00 EA |
| | SWITCH ARY 4X1RT | 3101-2449 | 1.00 EA |
| | KYSW SUB-ASSY | 3101-2554 | 1.00 EA |