

ZETRON
Model 4010 Radio Dispatch Console
Service Manual
Part No. 025-9228H

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2. The ringer equivalence number (REN) is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. The sum of ringer equivalence numbers for all devices connected to a single telephone line should not exceed five (5.0) for reliable operation. To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.
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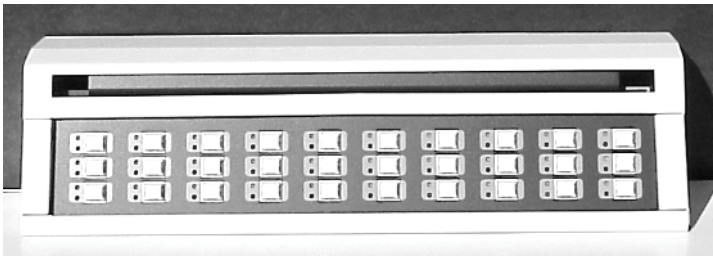
INTRODUCTION

MODEL 4010



The Model 4010 Radio Dispatch Console is a self-contained, multi-channel, desktop console. It is a single position console that interfaces directly to the radio transceivers and telephone lines. It is suitable for use in public safety applications, such as police and fire communications, as well as public service applications, such as utility and industrial communications. The Model 4010 may be tailored to fit the size of the system, from 2 to 12 channels, by adding dual channel cards as required. The channels can be configured to support a mix of control types: DC remote, tone remote, local control, and E&M control.

MODEL 4011



The Model 4011 Console Expander attaches to the top of desktop console and adds 30 programmable keys to the station.

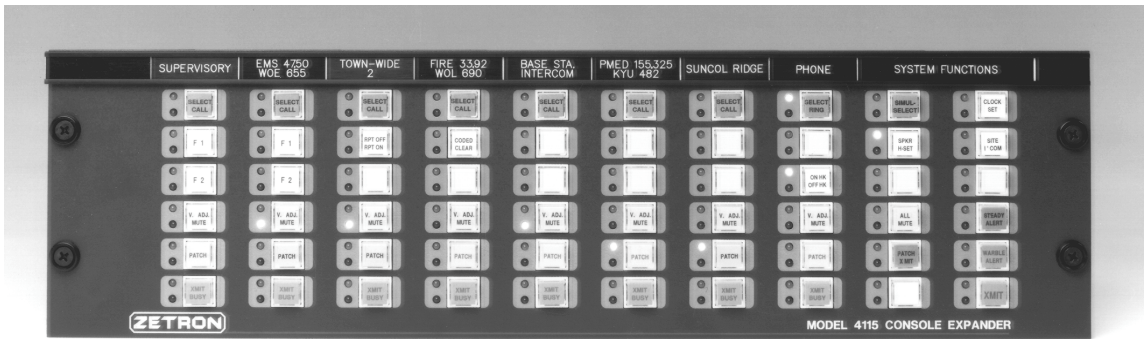
MODEL 4010R



The Model 4010R Radio Dispatch Console has the same functions and capabilities as the Model 4010.

In this manual both the Model 4010 and 4010R are referred to as the Model 4010 unless specifically stated otherwise.

MODEL 4115B



The Model 4115B Console Expander is a rackmount 60-button panel used to expand the number of programmable keys available to the Model 4010R.

MANUALS

Several manuals describe the operation, installation, service and programming of the Model 4010 Radio Dispatch Console. This manual includes the parts lists, schematics, and silkscreens for the Model 4010. Below is a list of the Model 4010 manuals and a description of their contents.

Manual Title	Zetron Part No.	Description
<i>Operator's Manual</i>	025-9226	Presents an overview of the console panels, a description of the functions of each button, and a detailed description of the Model 4010.
<i>Installation Manual</i>	025-9227	Presents a description of how to configure and install the model 4010 console and accessories.
<i>Service Manual</i>	025-9228	Presents the parts lists, schematic drawings, and silkscreens for the Model 4010.
<i>Programming Manual</i>	025-9229	Describes how to use the Console Programming System (CPS) to program the console keys.

SPECIFICATIONS

PHYSICAL SPECIFICATIONS

Model 4010	
Size	height = 9" x width = 18" x depth = 14"
Weight	15 pounds
Model 4010R	
Size	height = 10.5" x width = 19" x depth = 10.5"
Weight	15 pounds
Model 4115B	
Size	height = 5.25" x width = 19" x depth = 2.25"
Weight	4 pounds

TELEPHONE INTERFACE SPECIFICATIONS

Lines	Two end-to-end lines
Connector	RJ11 modular jack
Incoming Call	Ring detection on tip and ring pair
Call Answer	Off-hook, tip and ring current draw
Ringer Equivalency	1.2 B

TRANSMIT ELECTRICAL SPECIFICATIONS

Audio Output	+10 dBm max. into 600Ω
Output Impedance	Transmit: 600Ω balanced Idle: 600Ω or 3500Ω
Distortion	< 2% at full output. Signal-to-Noise > 50 dB Hum, Cross-Talk all -50 dB at full output
Microphone Input	-65 dBm for full output
Headset Input	-20 dBm for full output
Page/Spare Input	-15 dBm, not compressed
Freq. Response	-3 to +1 dB from 250 Hz to 5000 Hz
Compression	Input level increase of 30 dB above the knee of compression causes < 3 dB output increase

RECEIVE ELECTRICAL SPECIFICATIONS

Input Impedance	600 or 10 kΩ for 4-wire 3500 Ω for 2-wire
Line Balance	66 dB at 1000 Hz
Rx Sensitivity	-30 dBm max at knee of compression; adjustable
Freq. Response	-3 to +1 dB from 250-5000 Hz (except GT notch)
Compression	Input level increase of 30 dB above the knee of compression causes < 3 dB output increase
Distortion	< 2%
Call Light	Sensitivity -20 dB below knee of compression
Audio Output	5 watts each speaker
Mute	Adjustable to -28 dB (with Individual Volume Control Option) or full mute Mute time 1 second to indefinite

OTHER ELECTRICAL SPECIFICATIONS

Radio Control	Local, E&M, Tone Remote, DC Remote.
Radio Channels	2-wire simplex/half-duplex or 4-wire half/full duplex.
DC Control	Operable up to 8 kΩ loop resistance Current programmable 15 mA max in 2.5 mA increments. Accuracy ±0.25 mA.
Tone Control	15 standard tones supported, programmable (no trimmer adjustment) 650-2050 Hz High Level Guard Tone duration 120/600 milliseconds Function Tone Duration 40 milliseconds Guard Tone Frequency 2175 Hz, alterable Tone frequency accuracy ±0.2%, timing accuracy ±1.0 %
Local Control	PTT normally open relay contact rated 1.0 A at 24 V _{AC} /V _{DC}
E & M Control	Tx control via PTT relay, external 48 volts required
Busy Chan. Detect	Local Cross-Busy detection, Guard Tone or DC Control detection (LOTL) optional
Recorder Outputs	1 per channel (Tx/Rx audio summation), plus 1 output per console (various combinations of select, unselect, and microphone audio) 0 dBm level, 600 ohm, single-ended outputs
Capacity	12 channels plus phone patch
Operating Temp	+5 to +50 degrees Celsius

CONSOLE POWER REQUIREMENTS

Voltage	+13.5 V _{DC} +11.5 V _{DC} minimum — +15.0 V _{DC} maximum
Current	2.5 amperes maximum

POWER SUPPLY (802-0091) SPECIFICATIONS

Voltage	+13.5 V _{DC} ±0.5 V
Current	3.5 amperes
AC Input	95 to 250 V _{AC} 47 to 63 Hertz 1.2 amperes
Approvals	UL, CSA, VDE, and CE

THEORY OF OPERATION

SYSTEM DESCRIPTION

The Model 4010 Radio Dispatch Console is a single position unit that has many built-in features. The Model 4010 is a desktop unit, and the Model 4010R is a rackmount unit. Both units have identical features and capabilities and are referred to as the Model 4010 in this manual, unless specifically stated otherwise.

The console has individual channel volume, clock and volume meter, all-mute, simul-select, alerts, site intercom, instant transmit, and individual channel frequency/PL select. The unit can be configured for between two and twelve channels, in increments of two channels. The console is self-contained and interfaces directly to either a base station or repeater wire lines.

The Model 4010 has a built-in paging encoder that is capable of generating all popular signaling formats, including: Motorola/GE Two-tone, DTMF, Rotary Dial/1500Hz or 2805Hz, Plectron, Quick-Call 1 (2+2), and 5/6-Tone Sequential. With the Instant Call Paging option, these tones can be automatically routed to the proper channel. Without this option, the tones must be manually routed. This Instant Call Paging option also allows individual control buttons to be programmed to send an entire sequence of pages.

Each channel may be optioned to support a mix of control types: DC remote, tone remote, local control, and E&M control. The DC remote control requires one optional DC Control Daughter Board per DC channel. This DC Control Daughter board also has a line-operated transmit light (LOTL) to indicate if a line is already in use via another control point. The tone remote control requires one, optional Tone Remote System Adapter Board per system. Each channel that requires tone control can now be configured with channel option switches. If a channel requires a LOTL indication, a Tone Remote LOTL Daughter Board is then added for that specific channel.

A Phone Patch card is an option that allows the console operator to establish a patch between any radio channel and a telephone line. The card has two telephone interfaces. The console can also function as a push-to-talk, single-line telephone, giving the operator the ability to receive and place telephone calls from the console. Only one Phone Patch card can be added to a system. This card does not require one of the dual channel slots.

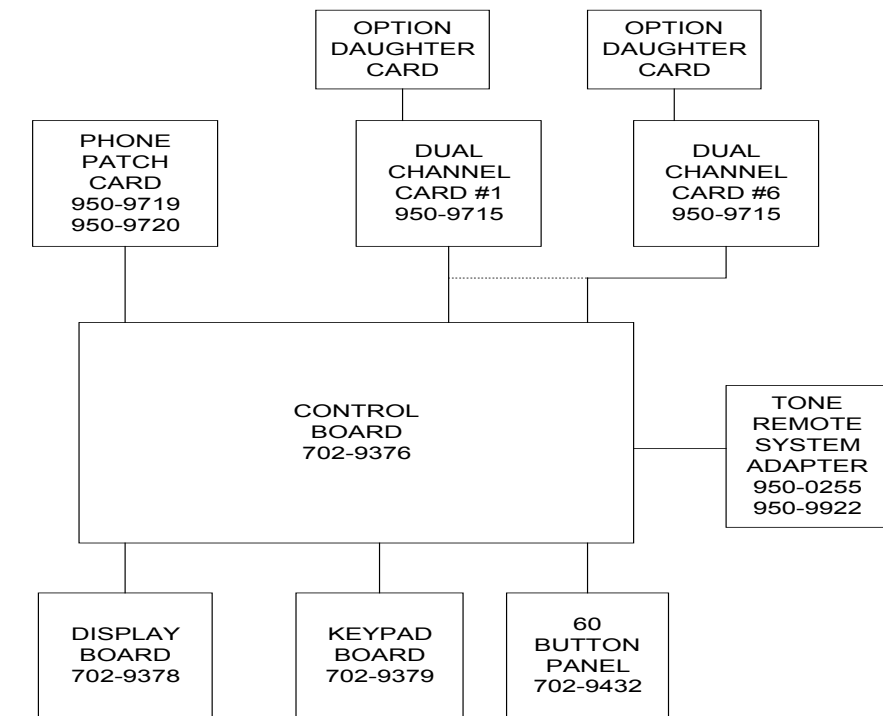
The Expanded Auxiliary I/O Card adds input and output capabilities over the standard eight inputs and eight outputs that come with every Model 4010. The Expanded Auxiliary I/O Card does require one of the Dual Channel Card slots.

The Model 4115B allows the system to be configured with an additional 60 programmable switches. The system can accept a maximum of two expansion panels. The Console Programming System (CPS) is used to define the function of any additional panels.

A variety of communications options may be configured with the console. The standard options are a desk microphone, a gooseneck microphone or PTT handset with cradle, and/or a headset.

BLOCK DIAGRAM

The M4010 electronics consists of four board assemblies and a variety of option assemblies, which are installed on the main Control Board. The main boards and option boards are listed below. A maximum of six channel cards of any mix can be installed on the Control Board.



M4010 PCB BLOCK DIAGRAM

In discussion of the system's operation, the associated U number of the ICs involved will be referred to. The schematics of the various M4010 assemblies will be required for clarity.

CONTROL BOARD (702-9376)

The Control Board has a Motorola processor 68HC11F1, which controls the operation of the system. The microprocessor is shown on sheet 2 of the schematic 008-9376. The system has 32K bytes of EEPROM memory (U29), which contains all the program storage. The data storage is in 32K bytes of battery backed RAM (U27). They connect to the microprocessor via an 8-bit data bus and 16-bit address bus. The data bus also connects to the input and output ports for interfacing to external signals. The other means of communication by the microprocessor is the serial peripheral interface (SPI) and the UART U40. The SPI bus communicates with the channel cards and tone generation module U15.

The microprocessor uses device selects to communicate with the components on the bus which are generated by the port outputs PG7 through PG4. PG4 is used to generate the other device selects of U32. These selects control the I/O ports on the data bus.

The timing circuits of U20 and U18 take the 8MHz signal from the microprocessor and divide the clock down to 4 MHz, 500 kHz, and 9615X16 Hz. The U40 UART used the 9615X16 clock to generate the RS232 baud rate.

The LOOP IN and LOOP OUT connectors J13, J14, and J15 are used for expansion panels, console parallel status, and programming the console. These connectors are driven by U45, a RS232 driver which generates its own + and – 10 volts for drive voltage. The 68B50 UART, U40, sends and receives the serial data and generates the IRQ* interrupt to the microprocessor.

The auxiliary input connector, P8, connects the general purpose inputs to the buffer U43. The microprocessor reads this port with the SICS* device select. The auxiliary output connector, P7, contains four open collector transistor outputs, U42, and four relay contact outputs, K2 through K5. U39 is an eight bit latch which latches the signal from the microprocessor using device select POR*.

The various PTT and hook switch signals in the system are the inputs of U16 and U19. The microprocessor monitors U16 and U19 to determine which audio source the operator wants to use. On sheet 3, U24 is a latch for steering the audio sources. The latched outputs of U24 drive U22, 74C906, which translates the 5V logic levels into 12V signals to drive the various audio switches.

The device selects (on sheet 3) for the SPI bus components is generated by CHSEL* and U36, U37 and U28. There 16 selects generated, CHEN0* to CHEN14* and the select to HC05. Each CHEN signal will enable the bidirectional communication bus for that channel. The SPI bus consists of the microprocessor signals D0 (data out), DI (data in) and the SCK* (500 kHz synchronous clock).

The 68HC705 (HC05) microprocessor of the schematic, generates all the tones (except for guard tones) that are required in the console. The commands to the HC05 are through the SPI bus. The tones are generated by the 8-bit output port PA, which has its data, latched into U14 by PB0. The output of the latch goes through a resistor ladder network to U7. U7 is a low pass filter which goes to a selectable volume control R62 to the tone bus driver U1. The tone bus goes to the channel card interfaces.

The input power is on connector J5. The nominal voltage is 13.5 VDC. An alternate source (battery backup) can be connected to J16. When the primary power is present, K1 is energized and a series of diodes are connected to J16. This ensures the battery voltage is below the primary power source to prevent a battery drain. When primary power is not present, K1 is released, and the series diodes are no longer in series with the battery. Regulator VR3 provides the 5Vdc for the system. VR2 provides the 5Vdc analog reference voltage and VR1 provides the 10Vdc analog power. R95, C98, R96, C88, and U44A provide a filter and a low impedance source for the analog reference.

Each of the audio amplifiers (sheet 4) for the desk microphone (U1A and R70), the headset microphone (U6B and R68) and the gooseneck microphone (U6A and R69) have an input adjustment potentiometer before being routed to the multiplexer U12. The fourth input comes from the HC05

tone generator through the adjustment potentiometer R67. The audio switches of U24 control the audio steering to U8A. U8A forms a 30dB AGC circuit whose output goes to the MIC BUS through U4B and to headset sidetone through U8B.

The select bus and unselect bus are the summing node of amplifiers U5B and U5A. The amplifier U10A is the summing node for the patch bus. The select audio goes through the switch U9A-3 to the buffer U10B, through the switch U9C-13 to the buffer U2A. This signal drives the select input of the Display Board. The unselect audio takes a similar path through U9B-1, U2B and to the Display Board. The select audio and unselect audio also are summed into amplifier U3A along with the Mic Bus. U3A drives the COMB AUDIO OUT signal on P1, the Auxiliary Audio connector, and amplifier U3B. The output of U3B goes through a peak detector circuit and forms the VU input for the microprocessor's analog to digital converter.

The AUXAUD input from P1 is an alternate source of audio that can be summed into the MIC BUS. The input is optionally terminated with 600 ohms by JP5 and amplitude adjusted by R63. The source is controlled by audio switch U11A and through the buffer U4A is sent to the summing node of U4B.

DISPLAY BOARD (702-9378)

The Display board contains the LCD display and the amplifier circuits for the select and unselect speakers. The microprocessor has a bidirectional data path using U39 to drive the interface connector P11. The read or writing to the LCD is controlled by LCDE, W/R* and A0 signals on P11. The LCD display, DS1 on the Display Board, is capable of displaying two rows of 16 ASCII characters. R21 is used to adjust the display's viewing angle and contrast. JP2 is used to set the brightness of the display. The three settings of JP2 change the display's backlight current from 120mA to 45mA and to 15mA.

The select audio from U2-1 and the unselect audio from U2-7 on the Control Board are sent to the interface connector P11. Both amplifier circuits work identically. The select circuit has R33 to adjust the audio level to the amplifier. R32 adjust the minimum audio level that R33 can be set to. R32 can be set to no audio. The push/pull amplifier circuit can deliver up to 5 watts to the speaker. The output of U4 is fed to the inverting input of U5 through R27. R34 is used to adjust the output DC level of U5 for 0 Vdc across the speaker connector JP3.

KEYBOARD (702-9379)

The system keypad and channel keypad of the M4010 are sequentially scanned by the microprocessor at a 50-millisecond interval. The scanning matrix is set up with U33 and U25 latches. P10 is the interface connector for the hex keypad and system keys.

The C0 to C6 latched signals are presented through P10 (renamed to Rx and Sx) to U3 and U4 on the Keypad Board. U3 and U4 outputs set the appropriate signal levels to the switch matrix. The individual switch status is on the COM1 output of U3, which the microprocessor reads during each matrix cycle.

The CLK1 signal from the microprocessor clocks the B0 to B7 matrix data into latches U1 and U2. The outputs of U1 and U2 drive the switch LEDs.

60-BUTTON PANEL (702-9432)

The scanning matrix outputs of U33 and U25 also go to the 60 Button Panel on P9. The C0 to C7 matrix data is connected to U10, U12, U23, U15 and U27 (renamed to Rx and Sx) on the 60 Button Panel. U10, U12 and U27A outputs set the appropriate signal levels to the switch matrix. The individual switch status is selected using RA through RC of U10 and the COM2 output is read by the microprocessor during each matrix cycle.

The B0 to B5 matrix data is buffered by U25 and connected to 20 74HCT244 latches. The CLK* and GRN/RED* signals are used to form the GRN CLK and RED CLK signals. The SA through SC signals are the addresses of the multiplexes U12 and U24. U12 selects the appropriate green LED latch, U1 through U9 and U26, that GRN CLK will clock the B0 to B5 data into. U24 does the same for RED CLK and the red LEDs latches U11 and U13 through U21.

DUAL CHANNEL CARD (950-9715)

The Dual Channel Cards (DCC) are installed on the Control Board in six connectors J7 through J12 on sheet 5 of the Control Board schematic. These connectors also interface the DCC to the output connectors J2, J3, and J4 as shown on sheet 6. Each DCC is capable of interfacing two radio channels with local control if no other optional cards are installed. The functionality of a channel can be enhanced by adding the Tone Remote System Adapter to add tone remote capability to each channel or adding the DC Remote Daughter Card to each channel that requires DC remote control.

The DCC schematic 008-9377 shows the interface connector on sheet 2. The SPI bus signals DI, DO, SCLK* and two enable signals ENCHA* and ENCHB*, are the digital communication to the board. The two channels function similar and only channel A will be followed. The data in from the microprocessor (DI) are synchronously clocked to the 16 bit serial shift register U20 and U21 using the CHWR* and ENCHA* signals. The data to the microprocessor (DO) is simultaneously clocked out of U15 and an 8-bit shift register on the daughter board if one is installed at connector P2. U20 and U21 form a 16-bit output latch, which controls the operation of the board. The outputs are buffered by U22 and U23, which convert the 5V signals to 12V to drive the various audio switches. U15 and the daughter card latch form a 16 bit input port which monitor the activity of the board.

The audio paths for channel A are shown on sheet 2. The four input audio busses are GT-BUS (guard tone bus), PAT-TX-BUS (patch transmit bus), TONE-BUS (ANI and alert tones) and MIC-BUS (operator's audio). These busses are switched by the three switches of U13 to the input of U2A. The audio switch U14B is used to select high or low level guard tone. U9A connects the output of U2A to transmitting amplifier U2B. The potentiometer R11 sets the transmit level to the radio. The maximum peak to peak level on each bus is -10 dBm. The maximum gain on the card is 20 dB, which gives the maximum output level of +10 dBm. The output of U2B goes the buffer U2C and the inverting buffer U3A, which form the push/pull amplifier to the transformer T1. Switches U1A and U1B send the transmitted audio through R4 while transmitting. R4 sets the transmit impedance to

600 ohms. During 2W (two wire) receive, the audio is switched through U1C. JP1 sets the receive impedance to 600 ohms if in position A and to 3500 ohms if in position B. CR1 and CR2 are protection diodes. The output transformer T1 has the DC blocking capacitor C5 on the center taps of the output windings.

The XMIT-UP-A signal control the transmit switches and relay K1. The relay contacts are routed through JP5 and form the isolated PTT signal on the external connector. The BUSY-OUT-A signal is driven by the open collector driver U30F to the external connector. The time of this signal is very similar to the transmit signal PTT. The JP4 jumper setting controls the guard tone switch U13B. Position A disables the guard tone switch and should be in this position for all channels that are not tone controlled. Position B allows the switch to be controlled by the ENGT-A signals, which is the normal position for tone control. Position C enables XMIT_UP_A to control the switch and is only used when retrofitting early production units.

The 2W receive from U1C goes to potentiometer R10 for setting the receive audio level to the summing amplifier U3A. The 4W (four wire) audio input signals 4W-RX-A+, or -, come into the 10K ohm transformer T2. JP2 sets the impedance of the 4W input to 600 ohms in position A or 10K ohms in position B. The output of T2 goes to potentiometer R9 which sets the receive level and to the summing amplifier U3A. The output of U3A goes to the AGC circuit formed by U3B. The receive level should be adjusted by inputting the minimum audio level expected in the field and setting the adjustment potentiometer for the knee of compression of the AGC circuit. The adjustment potentiometer for the audio receive circuit not use should be set for no audio (fully CCW) so the circuit does not add any noise to the summing node of U3A.

The signal level at the output of the AGC circuit (U3B-7) is limited to 1.2 V peak to peak. The AGC circuit will maintain this maximum peak level as long as the input is above the knee of compression and within the 30dB (minimum) range. This signal drives U4A whose output forms a peak detector and generates the CALLA signal when audio is present. The AGC output also drives the U4B amplifier, which sets the audio peak level to -10dBm for the RXA test point and the REC-A signal through U8B to the external interface. The RXA signal also goes to the PAT_RX_BUS through switch U9C. U12 multiplexes the RXA signal through a resistive network to give 4dB adjustment steps. The VOL signals to U12 selects which resistive path the audio takes and the MUTE_A signal will inhibit all switches from closing and provide a completed muted signal. The output amplifier U8A will drive either the SEL-BUS or UNS_BUS depending on the U28B switch setting. If no audio muting is required, the audio will be switched through R73 and the peak output level of U8A will be at -10dBm.

PHONE PATCH CARD (950-9719 OR 950-9720)

The Phone Patch interface to the Control Board is connector J6. This will interface either a Phone Patch Card (with one phone channel) or the Dual Phone Patch Card. The card will allow the operator to utilize a standard loop start telephone line. Both telephone circuits are identical. Only the operation of the A channel will be described.

The Phone Patch schematic 008-9403 (single) or 008-9522 (dual) shows the interface connector on sheet 2. The SPI bus signals DI, DO, SCLK* and two enable signals ENCHA* and ENCHB*, are the

digital communication to the board. The two channels function similar and only channel A will be followed. The data in from the microprocessor (DI) are synchronously clocked to the 16 bit serial shift register U26 and U29 using the CHWR* and ENCHA* signals. The data to the microprocessor (DO) is simultaneously clocked out of U35. U26 and U29 form a 16-bit output latch, which controls the operation of the board. The outputs are buffered by U18 and U23, which convert the 5V signals to 12V to drive the various audio switches. U35 is an 8-bit input port that specifies the board type and monitors the ring detector and call activity.

The telephone line's tip and ring are connected to J1. In the off-hook state, the signal goes through relay K1 to the ring detect circuit of U19. The signal flows through U22C, U22F and U28A to U35. The microprocessor reads the status of U35 with the SPI bus. The ring detect signal also goes through U18A to the tone generator U6. When a ring is detected, U6 generates a ringing tone at pin 14 and sums it on the audio receive bus at U3A. When the call is answered, relay K1 is activated with the AUXOUTA signal and the line is switched to relay T1.

The three input audio busses are PAT-TX-BUS (patch transmit bus), TONE-BUS (DTMF tones) and MIC-BUS (operator's audio). These busses are switched by U17A and U17B to the input of U8B. The output of U8B goes to the audio switch U15C is used to enable the audio to the output amplifier U4A. The audio also goes to U11, which forms a peak detector that prohibits the transmitted audio from exceeding -10dBm average for over 2 seconds. The output of the detector controls the audio switch U15C through U18C.

The center tap of the transformer T1 is connected to the line termination network of U1A. Potentiometer R16 set the resistive balance and is usually set for minimum sidetone. R21 is used for capacitive balance and is also adjusted for minimum sidetone. The audio receive amplifier, U1B, goes through the switch U15B and to the audio level adjustment R18. U3B form a peak detect circuit and generates the voice activated signal to U35. The receive audio also goes to the summing node of U3A. The audio signal goes to the switch U15A to the PATCH-RX-BUS and to U13, the volume control selector. U13 multiplexes the RXA signal through a resistive network to give 4dB adjustment steps. The A, B and C signals to U13 selects which resistive path the audio takes and the INH signal will inhibit all switches from closing and provide a completed muted signal. If no audio muting is selected, the audio will be switched through R72 giving the maximum signal level. The output amplifier U8A will drive either the SEL-BUS or UNS_BUS depending on the U17C switch setting.

AUXILIARY I/O CARD (950-9721)

The Auxiliary I/O Card will expand the I/O capability of the system by adding 6 outputs and 6 inputs. The card is installed in any of the six dual channel card slots and the connection to the I/O are on the interface connectors J2 through J4 depending on the slot(s) the card is installed in.

The I/O Card schematic 008-9448 shows the SPI bus signals DI, DO, SCLK* and enable signal ENCHA*. The data in from the microprocessor (DI) are synchronously clocked to the 8-bit serial shift register U2 and into the output latch using the CHWR* and ENCHA* signals. Six of the outputs use the transistor driver IC, U1, to control the output relays K1 through K6. The data to the microprocessor (DO) is simultaneously clocked out of U5 and U6. U5 monitors the six input signals and U6 identifies which card type is installed.

The inputs from the interface connector have a 10K-ohm pull-up to 12Vdc, a 10K-ohm series resistor, a Zener diode to limit the voltage level and a .01 microfarad capacitor for noise filtering. U4 is a 74HC14 that provides a Schmitt trigger input.

The relay outputs each have two jumpers associated with them. Output 1 has one connection RLY1A on P4-5 and the second connection RLY1B on P4-4. The RLY1A connects to JP7, which makes a normally open output in position A and a normally closed output in position B. The common connection of K4 goes to JP1, which is connected to RLY1B in position A. With JP1 in position B the relay common is connected to digital ground. With jumpers in both positions B and D the RLY1A signal is connected to ground when the output is on and RLY1B is connected to ground when the output is off.

TONE REMOTE SYSTEM ADAPTER (950-0255)

The Tone Remote System Adapter adds the tone remote capability to all the radio channels. The card adds the 2175Hz guard tone to the system and guard tone filters on the four audio busses. The schematic for the card is 008-0037.

From the Control Board's interface connector J1, the unselect bus (UNS IN), select bus (SEL IN), microphone bus (MIC IN) and the patch bus (PAT IN) all go through a low-pass filter to a 2175HZ notch filter. The switch capacitor filter (U19 through U22) is a 35dB notch filter centered at 2175Hz and a 200Hz bandwidth. The output of the notch filter, N/HPB, goes through a low-pass filter and back to the interface connector J1. The jumpers JP6 and JP7 allow the filters to be removed for the patch bus and mic bus.

U17 interface to the crystal Y1 and along with U14 and U16B form the 2175Hz oscillator. U18B and U15 form a filter and amplifier for the guard tone. R47 provides the amplitude adjustment.

Sheet 2 of the schematic is for audio delay, and the components are not included with this assembly.

TONE REMOTE SYSTEM ADAPTER W/AUDIO DELAY (950-9922)

The Tone Remote System Adapter with Audio Delay adds the tone remote capability to all the radio channels. The card adds the 2175Hz guard tone to the system and guard tone filters on the four audio busses. The card also provides a variable audio delay for two of the busses, patch bus and microphone bus. The schematic for the card is 008-9896.

From the Control Board's interface connector J1, the unselect bus (UNS IN), select bus (SEL IN), microphone bus (MIC IN) and the patch bus (PAT IN) all go through a low-pass filter to a 2175HZ notch filter. The switch capacitor filter (U19 through U22) is a 35dB notch filter centered at 2175Hz and a 200Hz bandwidth. The output of the notch filter goes through a low-pass filter. The select bus and unselect buses are then the UNS OUT and SEL OUT signals on connector J1. The patch bus and mic bus go to the jumpers JP6 and JP7 which allow the notch filters to be bypassed and then go to the audio delay circuits on sheet 2.

U17 interface to the crystal Y1 and along with U14 and U16B form the 2175Hz oscillator. U17 also provides the 3.48MHz clock for the audio delay circuit of sheet 2. U18B and U15 form a filter and amplifier for the guard tone. R47 provides the amplitude adjustment for the guard tone.

On sheet 2, the patch bus and mic bus go to a continuously variable slope delta (CVSD) modulator U12 and U13. The DIGOUT of the modulator is the digitized audio which goes to a buffer, U8, and is enabled to the DRAM input by /OE. The same DRAM data goes to the DATA input of U5 and U9, the CVSD demodulators. AOUT of U5 and U9 is the delay audio output, which is filtered and put back on the MIC OUT and PAT OUT signals of J1. The MIC delayed audio can be bypassed by activating the audio switch U4A, which the main processor has under software control. This switch is activated when using the Phone Patch Card. The jumpers JP2 and JP3 enable the delay circuit to be bypassed for either bus.

The cycle rate and synchronous signals for the audio delay circuit are generated by the PAL, U7. U16A divides the 3.28MHz clock by 8 and forms the master clock for the PAL's internal state machine. The PAL generates seven states for circuit timing at 62KHz cycle rate. JP1 selects the audio time delay options for the PAL at .25, .50, .75, and 1.0 seconds. The time settings determines when the CLR (clear) signal is generated to restart the address counters U2 and U11. The multi-plexers U3 and U10 are interleaved by /OE for the RAS and CAS addresses of the 4Meg DRAM, U6. The stored digitized data from RAM is clocked out to U5 and U9 in the first part of the clock cycle to form the delayed audio output. The received audio data from U12 and U13 is stored in RAM on the second part of the clock cycle.

DC REMOTE CHANNEL ADAPTER (950-9716)

The DC Remote daughter card adds the DC current control to the channel it is installed on. The card is capable generating a current source from zero to 15 milliamps in 0.5 milliamp increments. The card also provides the line operator transmit light (LOTL) indication if the channel is busy to the operator. The schematic for the card is 008-9380.

The interface to the line transformer's center taps is LOOP+ and LOOP- and the external line connections are BSY+ and BSY-. The signals associated with the DC current control is CURRENT*, CLEAR, HOLD and NEG-POL. The steady state levels provide a '1' at U4A-3 and keeps Q1 turned on. This causes current to flow in U5 and applies voltage at U5-4. This voltage is generated by the 150Vdc through R9 and regulated by the CR6 Zener to 6Vdc. With voltage applied, the inputs to U6A and U6B are both at '1'. This causes the clock and clear inputs of U7A and U7B to be in the inactive state. U7A and U7B form a 32 bit counter.

The CLEAR signal will turn off Q1 and the output of U5. The inputs of U6A and U6B will then start to discharge their input capacitors through their series 330K resistors and R11. The CLEAR signal will be maintained longer than the RC time constant formed by C8, R10, and R11 to generate a reset signal to U7.

When the HOLD signal is low, the CURRENT* signal enabled to turn off Q1. CURRENT* is a series of pulses which allows the input of U6B to discharge through R12 and R11 but are shorter in duration than the time required to trigger U6A. The U6B signal will generate a series of clock pulse

to the U7 counter. The count of zero is no current and the maximum count of 30 is for a 15 mA output current. The binary count goes to the resistor R/2R network RP1 and to the feedback amplifier U8B and Q2. The potentiometer R15 is adjusted so each binary count produces 0.25 mA of collector current through Q2 and the LOOP- signal when connected to a load through the output transformer. The relay K1 is driven by the NEG-POL signal to reverse the direction of current flow through the load.

The power source for the current generator is PS1, which is a 12Vdc to 150Vdc switching regulator. The 150V source goes through the blocking diode CR10 and relay K1 to the LOOP+ connection.

The BSY+ and BSY- signals come from the radio line inputs. If the line is in use by another parallel console, there will be a voltage potential across the signal pair. This voltage will charge C4 through R6. The diode bridge will connect the charge of C1 across the input of U2. The CURRENT* signal is a low going pulse which turns on U3 collector and dumps the C1 charge through U2 input. The collector of U2 produces a high at U1A-2 and the trailing edge of CURRENT* will latch the U1A-2 state into U1A. This BSY '1' state will cause the LOTL* signal at J1 to go low and light the LOTL LED on the rear panel.

When the radio line is no longer in use, the BSY lines have no voltage and C1 is discharged. The next CURRENT* pulse will clock a '0' into U1A returning LOTL* high. Jumper JP1 disables the LOTL circuit in the B position.

TONE REMOTE LOTL CHANNEL ADAPTER (950-9719)

The Tone LOTL Daughter Board will generate a LOTL signal if a tone remote parallel console is using the radio line. The schematic for the board is 008-9450. The board is the same as 950-9722 with the DTMF decoder circuit not installed.

From the Dual Channel Card's daughter board connector J1, the receive audio (RX) signal goes to an internal amplifier input AIN of U5. U5 is a band pass, switched capacitor filter that is tuned for a center frequency of 2175Hz at the CMOS and RC inputs. The C8, R15, R14, and R16 form the tuning circuit. When a high level guard tone at 2175Hz is passed through the filter, the amplifier U4A forms a peak detector to the input of U3A. The holding capacitor C5 will hold the detected peaks and provide a steady-state signal at U3B. With JP1 in position A, the signal will drive Q1 and the LOTL LED on the back panel and the feedback FET Q2. Q2 will lower the impedance in the input amplifier U4A and increase the gain. The gain will increase 30dB so the amplifier will keep locked on the low level guard tone signal. The LOTL* output to the channel card will remain low until the guard tone signal is dropped.

INDIVIDUAL CHANNEL DTMF ANI DECODER (950-9722)

The Tone LOTL/DTMF Decoder Daughter Board will decode any DTMF signals and generate a LOTL signal if a tone remote parallel console is using the radio line. The schematic for the board is 008-9535.

From the Dual Channel Card's daughter board connector J1, the DTMF decode circuit interfaces the receive audio (RX) signal. This signal goes to amplifier U4B and to the AIN input of U1, the DTMF decoder. When a valid DTMF signal is detected, the DV output high and clocks the latch U2B. When the microprocessor reads the status of the card with the SPI bus, the ENCH signal goes high and generates a load (LD) signal to U6. U6 will read the output of U2B (the latched DV signal) and the DTMF decoded digits of U1. The SPI clock (SCLK*) will shift out the latched data on the DATA line. The SCLK* signal will also clear the latched DV signal (U2B).

The RX signal also goes to an internal amplifier input AIN of U5. U5 is a band pass, switched capacitor filter that is tuned for a center frequency of 2175Hz at the CMOS and RC inputs. The C8, R15, R14, and R16 form the tuning circuit. When a high level guard tone at 2175Hz is passed through the filter, the amplifier U4A forms a peak detector to the input of U3A. The holding capacitor C5 will hold the detected peaks and provide a steady-state signal at U3B. With JP1 in position A, the signal will drive Q1 and the LOTL LED on the back panel and the feedback FET Q2. Q2 will lower the impedance in the input amplifier U4A and increase the gain. The gain will increase 30dB so the amplifier will keep locked on the low level guard tone signal. The LOTL* output to the channel card will remain low until the guard tone signal is dropped.

INDIVIDUAL CHANNEL 5-TONE ANI DECODER (950-9707, 950-9708)

The Channel 5-Tone ANI Decoder Board will monitor the receive audio signal and decode either ZVEI (950-9707) or CCIR/EEA (950-9708) tone received on the channel it is installed on. Both options use the same circuit board (schematic 008-0147, BOM 702-0147). They differ only in the software installed.

From the Dual Channel Card's daughter board connector J1, the receive audio RX signal goes through amplifier U4A, through a high-pass RCF filter (R3, C6), and to the 5-tone detector U2. When a valid tone is detected, U2 generates the IRQ output, which generates an interrupt on U1. The U1 microcontroller, a 68HC05 derivative, reads the tone from the decoder using the serial bus that connects the two chips (signals SERCLK, COMMAND, REPLY, and CS). After some additional processing to validate the tone, the microcontroller sends the tone to the M4010 main board using the SPI bus, signals SCLK*, ENCH*, and D0 signals.

INDIVIDUAL CHANNEL FSK ANI DECODER (950-9709)

The Channel FSK ANI Decoder Board will monitor the receive audio signal and decode the FSK tones received on the channel it is installed on. The schematic for the board is 008-9583.

From the Dual Channel Card's daughter board connector J1, the receive audio RX signal goes through amplifier U7A and to the 5-tone detector U3 (U2 and U4 are not installed). When a valid FSK pattern is detected, U3 will generate the RXSYN output, which is synchronous internally to the incoming data. This signal connects to Q1, which generates the IRQ* interrupt to U1. The U1 processor, 68HC05, will read the data on D4 and the carrier detect signal on D5 and place the data in the internal SPI bus register. The main microprocessor will read the information with the SCLK*, ENCH* and D0 signals.

INDIVIDUAL CHANNEL GE-STAR ANI DECODER (950-9625)

The Channel GE-Star ANI Decoder Board will monitor the receive audio signal and decode the tones received on the channel it is installed on. The schematic for the board is 008-9741.

From the Dual Channel Card's daughter board connector P1, the receive audio RX signal goes through amplifier U7B, the wave shaping circuits of U6 and the U5 comparator. The output of U5 is the IRQ interrupt to U2, 68HC05 microprocessor. U2 will convert the data into the ANI digits and place the data in the internal SPI bus register. The main microprocessor will read the information with the SCLK*, ENCH* and D0 signals.

SYSTEM REPAIR

DIAGNOSTIC MESSAGES

If the console’s continuous system diagnostics finds a problem, the console LCD will display a diagnostic message indicating the general nature of the problem. The following table shows the various diagnostics messages and their meanings.

Message	Meaning
THX nnn	An internal error has occurred on the console. The “nnn” is a three digit, decimal number that the factory can use to help isolate the condition. Be sure to record this number. This condition does not usually prevent normal operation.
CardErr	The programmed channel configuration of the console does not match the channel cards in the console. Channels that are affected will not operate until the problem is corrected.
CPSdataErr	The Model 4010 CPS configuration data has been corrupted or was never initialized. Reprogram the Model 4010. Refer to the Model 4010 Programming Manual (Part No. 025-9229) for more information.

CARD REMOVAL AND INSTALLATION

To remove and install the Dual Channel Card and other removable option cards, follow the steps below:

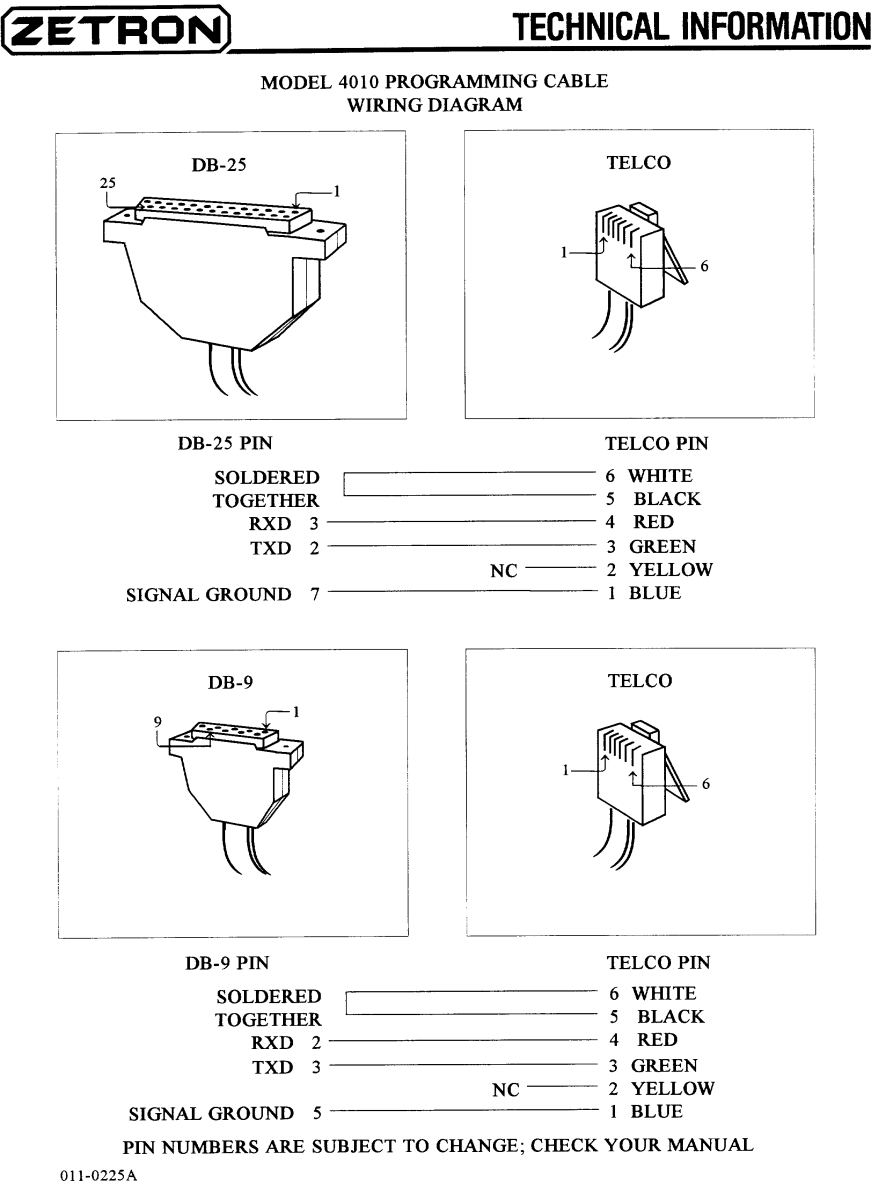
1. Disconnect power.
2. Open the console by unscrewing the two latches on the back of the console and lifting the top open.

Caution

Keep the front of the unit on the top of the table; do not let the front hang over the table edge. The console can easily be knocked off balance onto the floor when the front hangs off the table.

3. To remove a card, unscrew the single mounting screw on the rear of the console and rock and lift the card up and away from the back of the unit.
4. To install a card, insert the side away from the back panel in first, then rock the card towards the back panel into position. Take care that the LEDs get properly positioned. Secure the card by inserting the screw through the hole in the back panel into the bracket on the card.
5. Close the console and tighten the two latches on the back of the unit.
6. Connect to power; the configuration changes are sensed on power up.

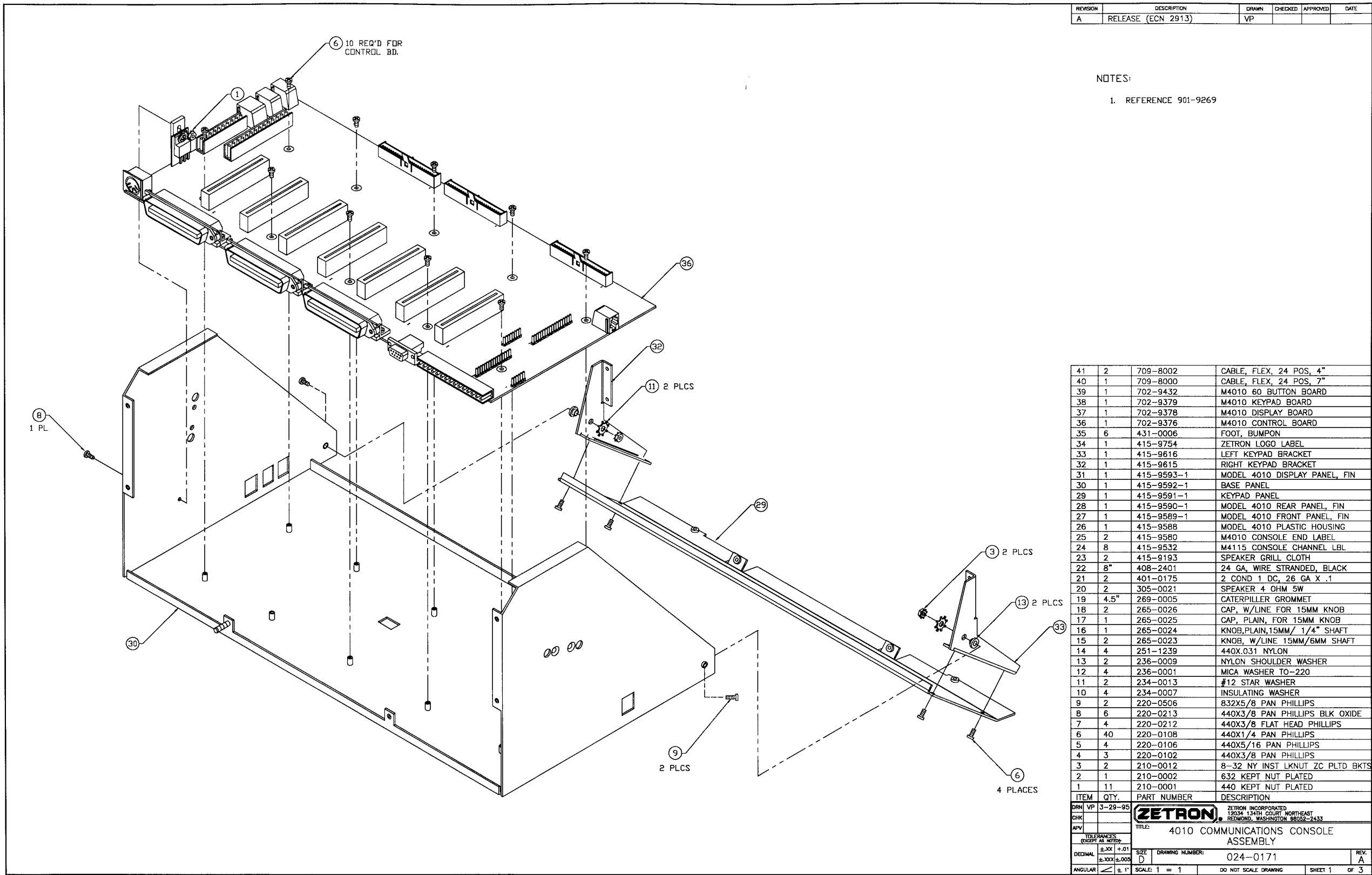
MODEL 4010 PROGRAMMING CABLE WIRING DIAGRAM



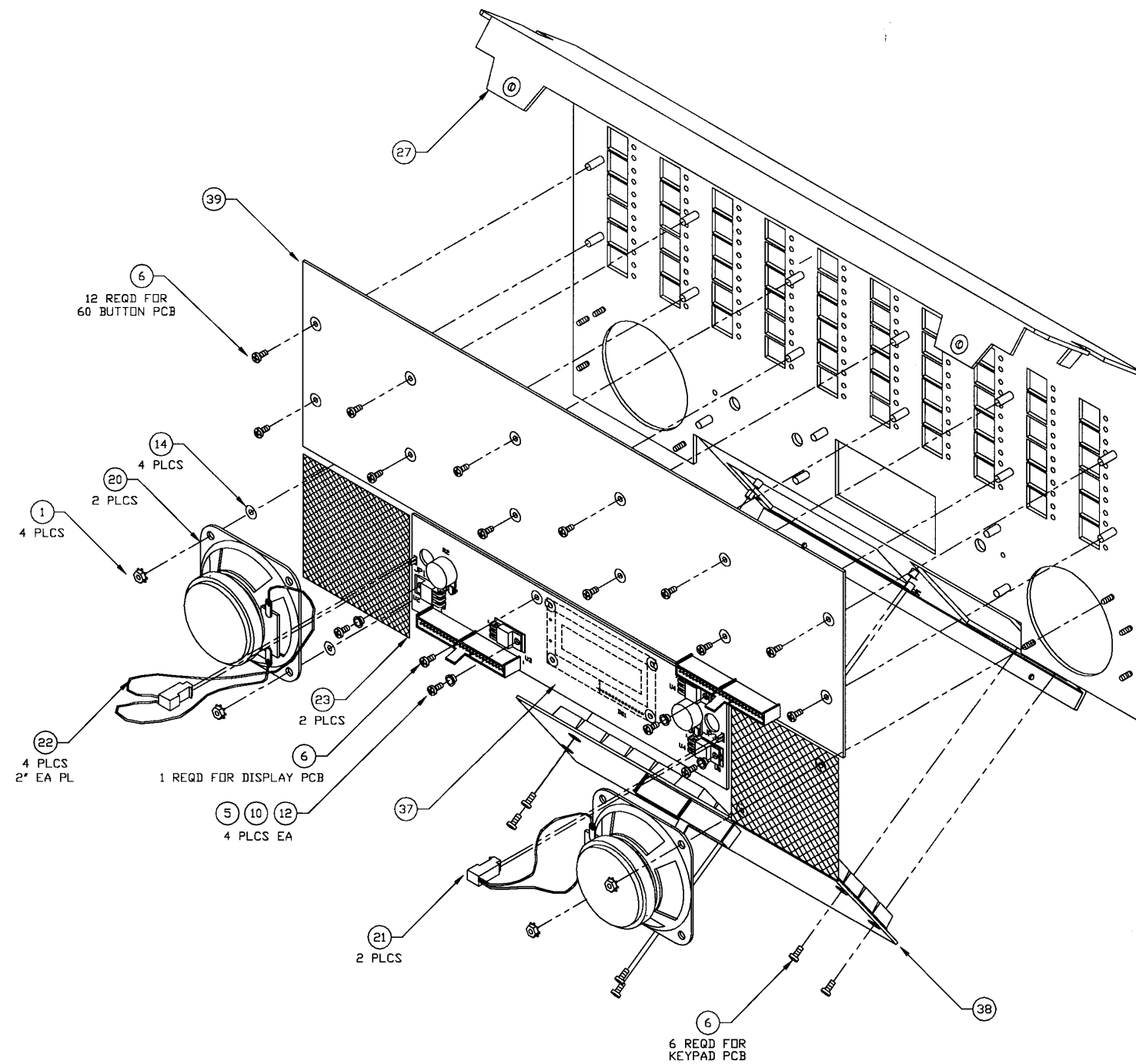
SERVICE DIAGRAMS

The remainder of this manual is devoted to the various PCB parts lists, schematics, component silk-screens, and assembly drawings that apply to the Model 4010 and Model 4115 consoles.

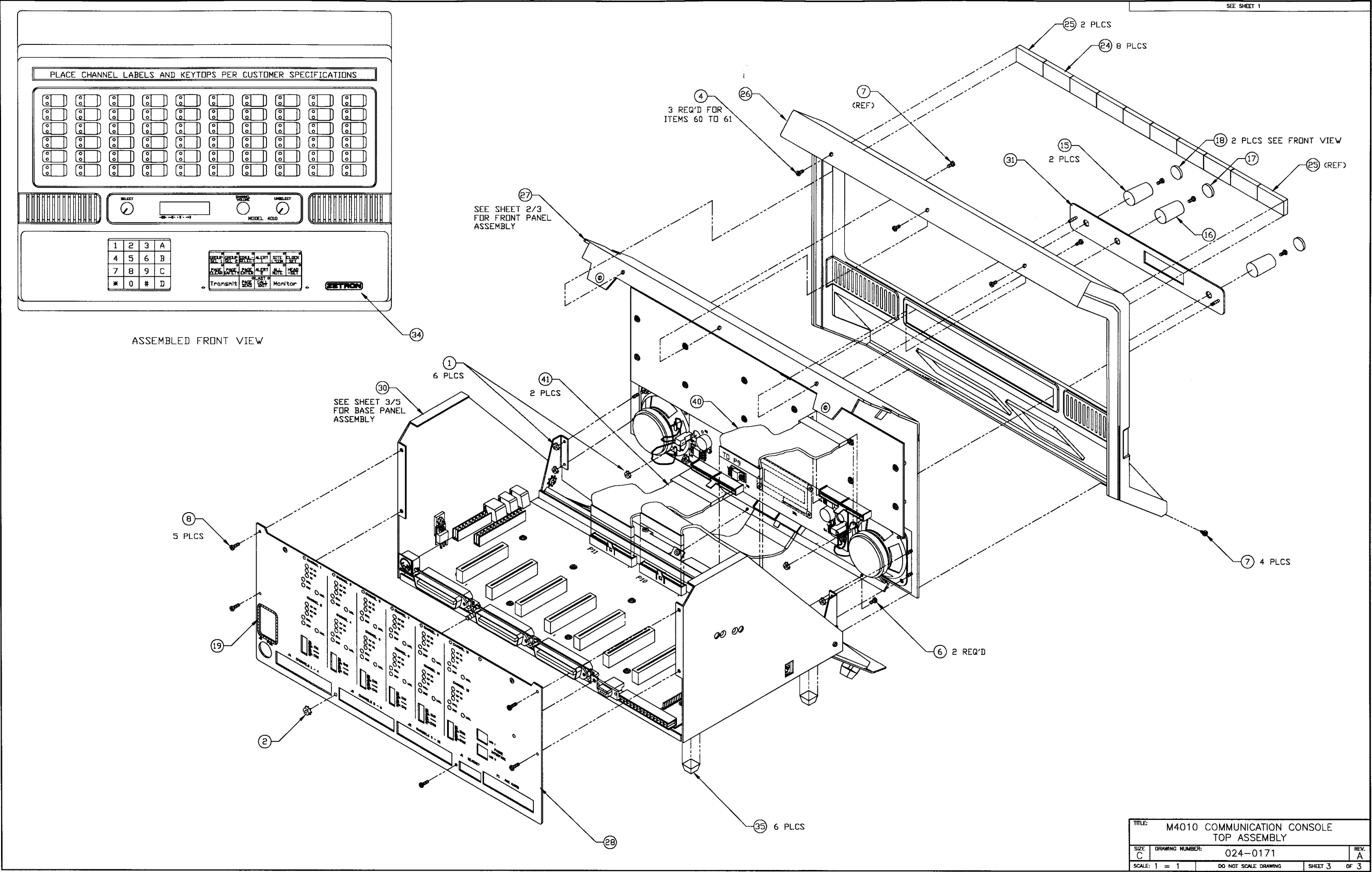
MODEL 4010 COMMUNICATIONS CONSOLE ASSEMBLY (024-0171A)



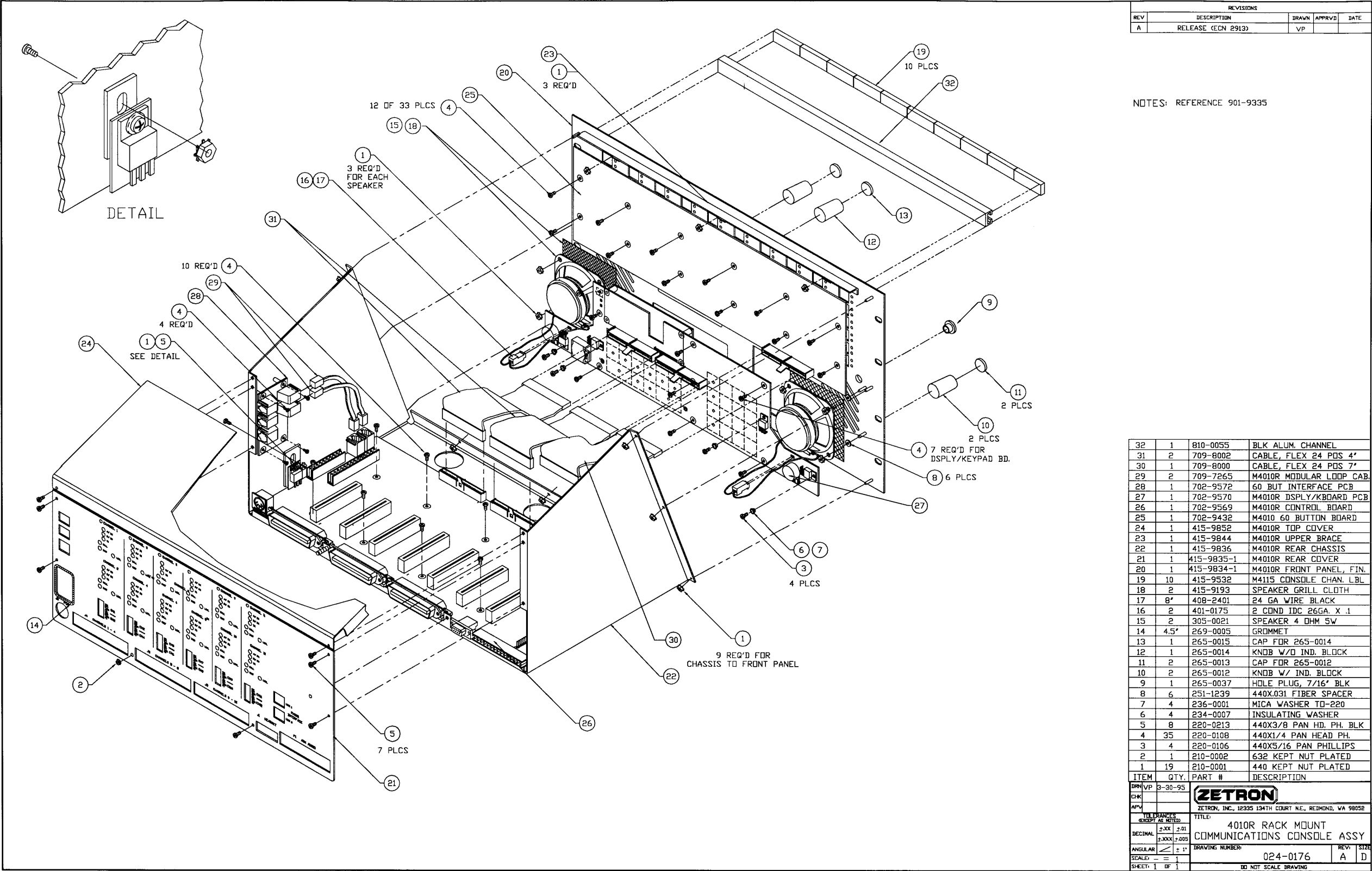
SEE SHEET 1



TITLE: M4010 COMMUNICATION CONSOLE ASSEMBLY			
SIZE C	DRAWING NUMBER: 024-0171	REV. A	
SCALE: 1 = 1	DO NOT SCALE DRAWING	SHEET 2	OF 3



MODEL 4010R RACKMOUNT CONSOLE ASSEMBLY (024-0176A)



MODEL 4010 BOARDS

Control Board Parts List (702-9376L)

LEGEND:
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

ZETRON MODEL 4010 CONTROL BOARD PARTS LIST:

Item	Qty	Reference	Part No.	Description	Part Value
1	1	R92	101-0025	10 OHM 1/4W 5% CARBON FILM	
2	3	R6,R20,R49	101-0049	100 OHM 1/4W 5% CARBON FILM	
3	5	R37,R43,R98,R99,R100	101-0057	220 OHM 1/4W 5% CARBON FILM	
4	3	R36,R84,R85	101-0061	330 OHM 1/4W 5% CARBON FILM	
5	2	R13,R53	101-0068	620 OHM 1/4W 5% CARBON FILM	
6	9	R2,R4,R8,R25,R30,R31,R32,R39,R91	101-0073	1.OK 1/4W 5% CARBON FILM	
7	6	R27,R28,R29,R58,R102,R103	101-0074	1.2K 1/4W 5% CARBON FILM	
8	1	R78	101-0085	3.3K 1/4W 5% CARBON FILM	
9	3	R5,R81,R97	101-0089	4.7K 1/4W 5% CARBON FILM	
10	21	R9,R35,R38,R48,R59,R60,R65,R66,R73,R74,R75,R76,R77,R79,R82,R83,R86,R88,R90,R95,R101	101-0097	10K 1/4W 5% CARBON FILM	
11	5	R12,R16,R21,R23,R24	101-0101	15K 1/4W 5% CARBON FILM	
12	1	R19	101-0103	18K 1/4W 5% CARBON FILM	
13	4	R14,R33,R51,R52	101-0104	20K 1/4W 5% CARBON FILM	
14	1	R89	101-0105	22K 1/4W 5% CARBON FILM	
15	1	R26	101-0106	24K 1/4W 5% CARBON FILM	
16	1	R15	101-0107	27K 1/4W 5% CARBON FILM	
17	2	R72,R40	101-0109	33K 1/4W 5% CARBON FILM	
18	1	R50	101-0111	39K 1/4W 5% CARBON FILM	
19	2	R46,R34	101-0113	47K 1/4W 5% CARBON FILM	
20	1	R3	101-0115	56K 1/4W 5% CARBON FILM	
21	15	R1,R10,R18,R22,R41,R47,R54,R55,R56,R57,R61,R64,R71,R80,R96	101-0121	100K 1/4W 5% CARBON FILM	
22	1	R45	101-0125	150K 1/4W 5% CARBON FILM	
23	2	R11,R44	101-0129	220K 1/4W 5% CARBON FILM	
24	1	R17	101-0141	680K 1/4W 5% CARBON FILM	
25	1	R42	101-0148	2.0M 1/4W 5% CARBON FILM	
26	1	R87	101-0160	10M 1/4W 5% CARBON FILM	
27	1	R94	103-0047	RESISTOR, 47 OHM 1W 5%	
28	1	R93	103-0175	RESISTOR, 75 OHM 2W 5%	
29	1	RV1	105-0002	VARISTOR 14V AC	
30	7	R7,R62,R63,R67,R68,R69,R70	108-0103	10K POT 4 TURN	
31	1	RP1	119-0003	3.3K x 7 BUSSED 8-PIN SIP	
32	1	RP5	119-0006	10K x 9 BUSSED 10-PIN SIP	
33	2	RP4,RP3	119-0008	10K x 7 BUSSED 8-PIN SIP	
34	1	RP2	119-0021	R/2R 100K/200K 10 PIN SIP	
35	7	C4,C5,C7,C17,C31,C32,C34,C86#	150-0096	1000 PF 1KV +-10% CERAMIC DISC YSP	
36	39	C35,C38,C40,C45,C48,C49,C50,C51,C52,C53,C56,C57,C58,C59,C60,C61,C63,C64,C65,C67,C68,C69,C71,C72,C73,C74,C75,C76,C77,C78,C79,C80,C81,C83,C84,C88,C99,C101,C103	150-0110	.01 UF 50V 80%-20% CERAMIC DISC	
37	1	C27	151-0010	100PF 100V/200V +-10%/5% CERAMIC NPO	
38	2	C54,C55	151-0022	22PF 100V/200V +-10%/5% CERAMIC NPO	
39	4	C3,C6,C21,C22	151-0028	270PF 100V/200V +-5% CERAMIC NPO	
40	1	C43	151-0080	.0022UF 100V +-10% CERAMIC X7R	
41	13	C9,C11,C16,C20,C33,C39,C41,C42,C44,C46,C91,C95,C97	151-0181	.1UF 50V +-10% CERAMIC X7R	
42	1	C26	152-0085	.01 UF 50V +- 5% POLYESTER	

43	1	C25	152-0088	.0047UF 50V +-5% POLYESTER	
44	23	C1,C2,C8,C10,C12,C13,C14, C15,C19,C24,C28,C29,C30,C36,C37,C62,C70,C82,C89,C104,C105,C106,C107	154-0025	1 UF 35V TANTALUM +- 10%	
45	9	C18,C23,C66,C87,C92,C96, C98,C100,C102	155-0052	10 UF 35V +-20% RADIAL ALUMINUM ELECTROLYTIC	
46	1	C47	155-0055	22 UF 35V +-20% AXIAL ALUMINUM ELECTROLYTIC	
47	4	C85,C90,C93,C94	155-0077	100UF 25V +-20% RADIAL ALUMINUM ELECTROLYTIC	
48	48	E1,E2,E3,E4,E5,E6,E7,E8,E9,E10,E11,E12,E13,E14,E15,E16,E17,E18,E19,E20,E21,E22,E23,E24,E25,E26,E27,E28,E29,E30,E31,E32,E33,E34,E35,E36,E37,E38,E39,E40,E41,E42,E43,E44,E48,E49,E50,E51	305-0001	FERRITE BEADS W/ LEADS	
49	3	E45,E46,E47	305-0306	EMI SUPPRESSION FILTER	
50	1	VR2	316-0005	REGULATOR 5V LOW POWER	78L05
51	1	U45	316-0232	RS232 DRIVER CMOS +5V POWER	232
52	9	U1,U2,U3,U4,U5,U6,U8,U10,U44	316-0353	OP, AMP DUAL BIFET	353
53	1	U7	316-0662	OP-AMP, CMOS, DUAL	C662
54	1	VR1	316-2940	REGULATOR, +5V, LOW DROPOUT	2940
55	1	U13	316-7705	POWER ON RESET	TL7705
56	1	VR3 NOTE 3	316-7805	REGULATOR, +5V 1.5A	7805
57	2	U16,U19	317-1489	QUAD RS-232 RECEIVER	1489
58	0	U15^	321-6805	ASIC 008	ASIC 008
59	1	U23	321-6813	UP-HC, NON-MUX W/CS	68HC11F1
60	1	U40	321-6851	UART 2MHZ	68B50
61	1	U27	321-8256	SRAM, 32K X 8, 100NS, 50UA FROM 0-70C	32KX8
62	1	U12	323-4052	DUAL 4-CHAN ANALOG MUX	4052
63	2	U9,U11	323-4053	ANALOG SWITCH, TRIPLE SPDT	4053
64	2	U21,U22	323-4906	HEX LEVEL SHIFT	74C906
65	0	U29^	323-8256	32K X 8 FLASH EPROM	28F256
66	2	U17,U26	324-4125	TRI-STATE QUAD BUFFER	74HC125
67	3	U28,U32,U37	324-4138	DECODER 1 OF 8	74HC138
68	1	U33	324-4373	OCTAL LATCH	74HC373
69	1	U20	324-4393	DUAL 4 BIT COUNTER	74HC393
70	2	U31,U34	324-7400	QUAD NAND	74HC00
71	1	U18	324-7408	QUAD 2 IN AND	74HC08
72	2	U30,U35	324-7414	HEX SCHMIDT	74HC14
73	1	U43	325-4244	OCTAL BUFFER	74HCT244
74	1	U38	325-4245	OCTAL XCVR	74HCT245
75	5	U14,U24,U25,U36,U39	325-4273	OCTAL DFF	74HCT273
77	1	Q1	340-0201	XSTR,JFET,N-CHANNEL,VGS > -1.5,TO-92	J201
76	2	U42,U41	340-2003	RELAY DRIVER 50V/.5A	2003
78	1	Q2	340-3906	PNP 40V/200MA, TO92	2N3906
79	1	Q3	340-5460	JFETP-CHAN, 40V, 5MA, TO92	2N5460
80	2	CR2,CR3	342-3009	DIODE, SILICON 100V 250MW	1N4148
81	6	CR12,CR13,CR14,CR15,CR16,CR17	342-3011	DIODE, SIL 1A 1KV	1N4007
82	6	CR5,CR6,CR7,CR8,CR9,CR10	342-5400	DIODE, SIL 3A 50V	1N5400
83	1	CR4	343-3029	1W 5.1V +-5% MOTOROLA ONLY	1N4733A
84	1	CR11	343-3108	ZENER, 15V 1W +-5%	1N4744A
85	1	SW1 NOTE 2	371-0012	SPDT .1 CENTERS	
86	1	Y1 NOTE 1	376-0800	XTAL, 8.000MHZ, HC-49 CL=SERIES	8.000MHZ
87	5	K1,K2,K3,K4,K5	380-0030	DPDT 12V COIL MINI RELAY 360 OHM	
88	1	P1	401-0059	HEADER, 15-POS R/A 0.200"	
89	1	J16	401-0060	3-POS TERM BLK	
90	7	J6,J7,J8,J9,J10,J11,J12	401-0063	50 PIN CARD EDGE	
91	1	J13	401-0080	6-PIN LO PRO R/A TELCO	
92	3	J2,J3,J4	401-0206	50 PIN RJ21 CONN MALE	
93	1	J5	401-0217	5 PIN DIN	
94	1	J1	401-0664	CONN, D-SUB, 9-PIN FEMALE, PC-R/A METAL, 590	
95	1	P7	401-1101	14 POS HEADER	
96	3	P9,P10,P11	401-2421	CONN, LOCKING HEADER, 24 POS	
97	1	P8	401-3592	10-POS BLOCK MALE VERT	
98	3	J14,J15,J17	401-5202	4 PIN TELCO, RT ANGLE	
99	4	P3,JP8,JP9,P12	403-0002	2 OF 401-0052	

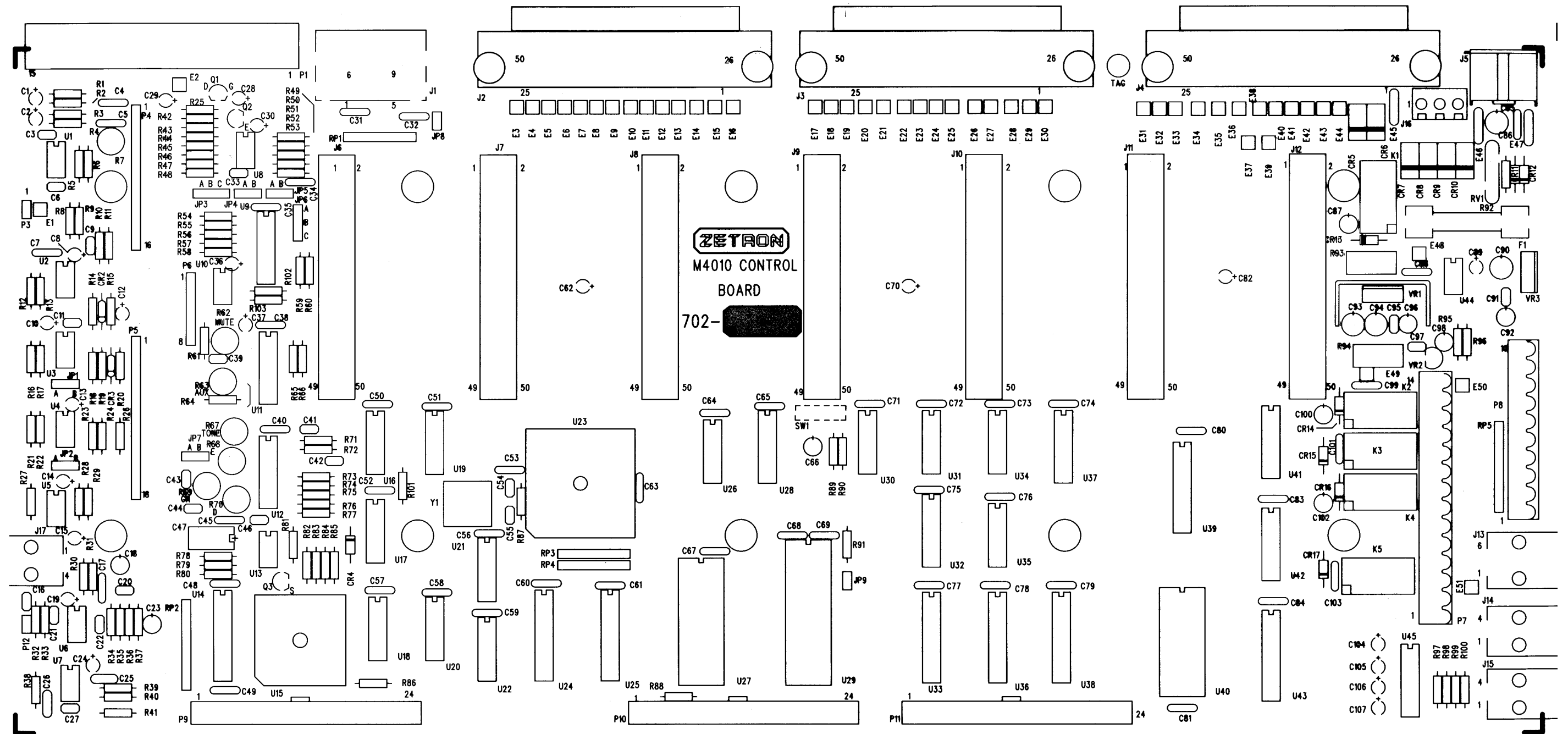
Model 4010 Radio Dispatch Console Service Manual

100	5	JP1,JP2,JP4,JP5,JP7	403-0003	3 OF 401-0052	
101	2	JP3,JP6	403-0004	4 OF 401-0052	
102	1	P6	403-0008	8 OF 401-0052	
103	1	P4	403-0016	16 OF 401-0052	
104	1	P5	403-0018	18 OF 401-0052	
105	1	F1	416-6025	FUSE 2.5A SLO-BLOW SPIRAL WOUND	2.5A
106	1	XVR1	210-0001	NUT,KEP, 4-40, S-ZN	
107	6	XJ2,3, 4 (2 EA)	220-0106	4-40 X 5/16 PAN HD PHIL	
108	2	XVR1,3	220-0108	4-40 X 1/4 PAN HD PHIL	
109	1	XVR3 NOTE 3	234-0007	#4 TEFLON SHOULDER WASHER	
110	1	XVR3 NOTE 3	236-0001	MICA WASHER TO-220	
111	1	XVR3 NOTE 3	251-1239	#4 X .032 FIBER WASHER	
112	1	XVR1	381-0003	HEATSINK, TO-220, SMALL STAMPING	
113	13	XJP1-7 (POS A)	402-3040	MINI JUMPER, .1 X .2 X .37"	
		XP4 (PINS 1-2,3-4,5-6,7-8)			
		XP5,6 (PINS 1-2)			
114	11	XU1-8,10,13,44	407-0008	SKT, 08 PIN DIP	
115	12	XU16-22,26,30,31,34,35	407-0014	SKT, 14 PIN DIP	
116	9	XU9,11,12,28,32,37,41,42,45	407-0016	SKT, 16 PIN DIP	
117	8	XU14,24,25,33,36,38,39,43	407-0020	SKT, 20 PIN DIP	
118	1	XU40	407-0024	SKT, 24 PIN DIP	
119	1	XU27	407-0028	SKT, 28 PIN DIP	
120	1	XU29	407-0032	SKT, 32 PIN DIP	
121	1	XU15	407-0044	SKT, 44 PIN PLCC	
122	1	XU23	407-0068	SKT, 68 PIN PLCC	
123	1	PCB, BARE	410-9376C	M4010 CONTROL BOARD, PCB	
124	1	XVR3 NOTE 3	415-9597A	M4010 REGULATOR HEATSINK	
125	1	XU27	416-1217	28 PIN BATT/WATCH 8K/32K	DS1216C
126	2	XF1	416-3040	FUSE CLIP	

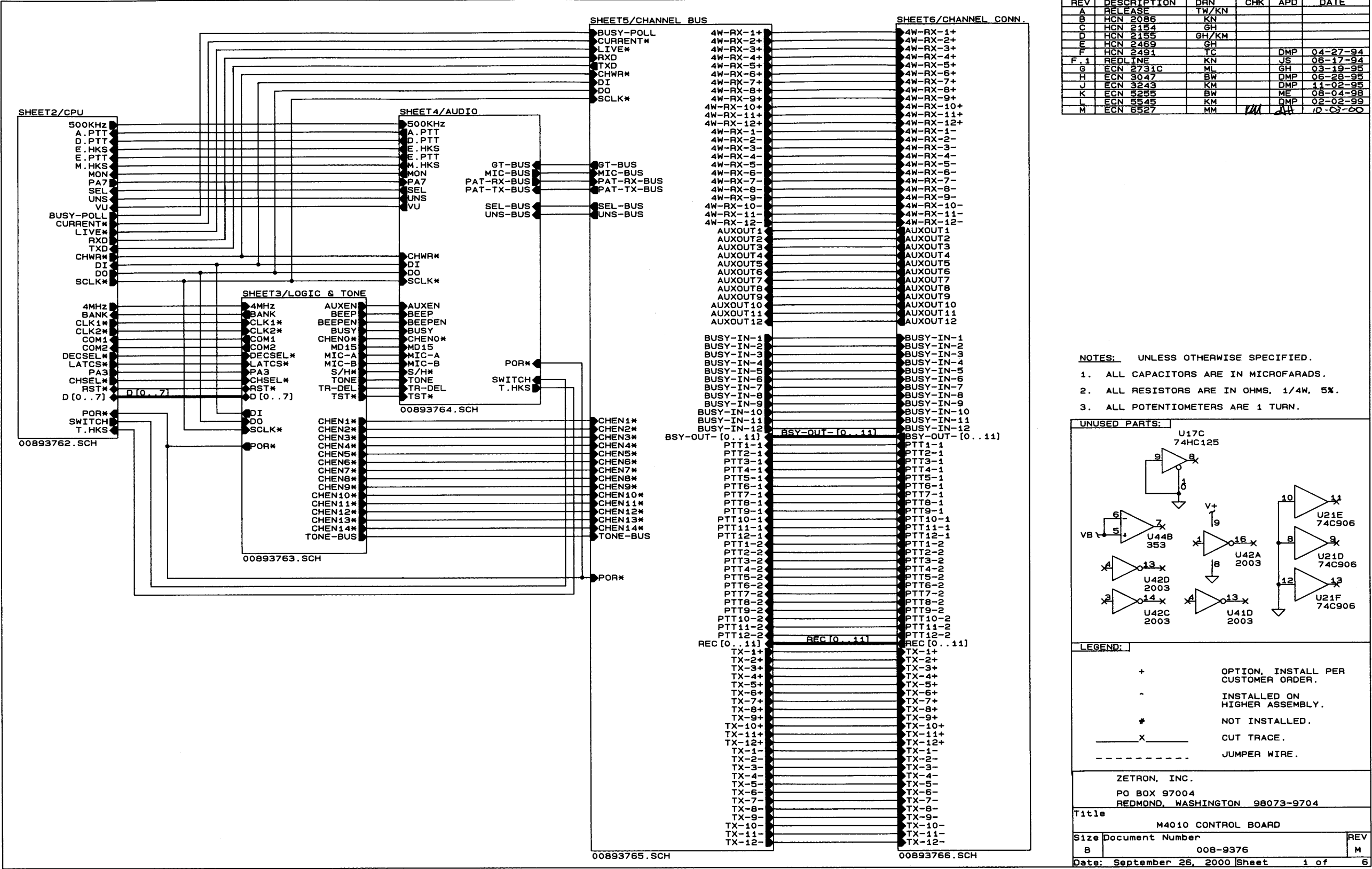
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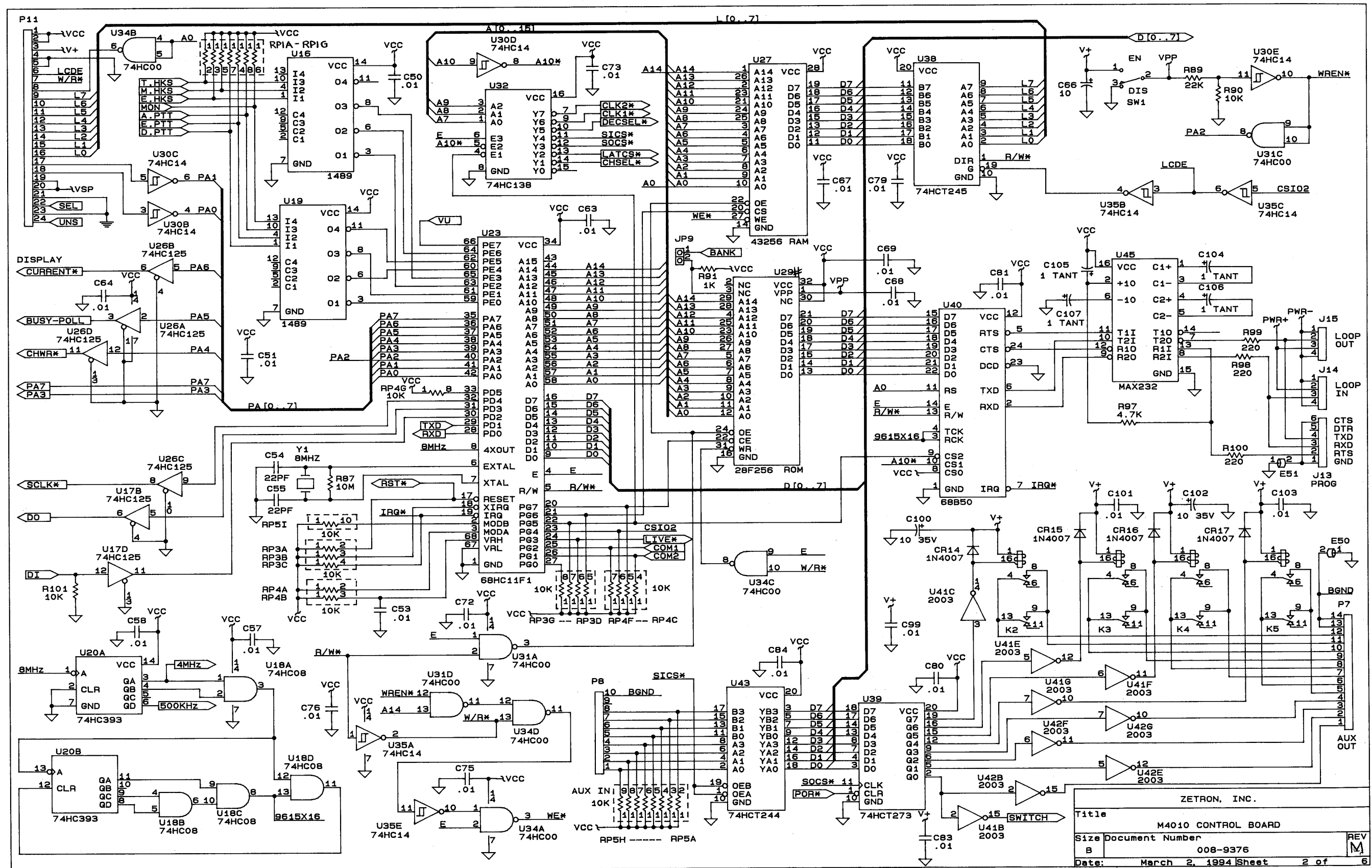
NOTES: (Notes are for production use only.)

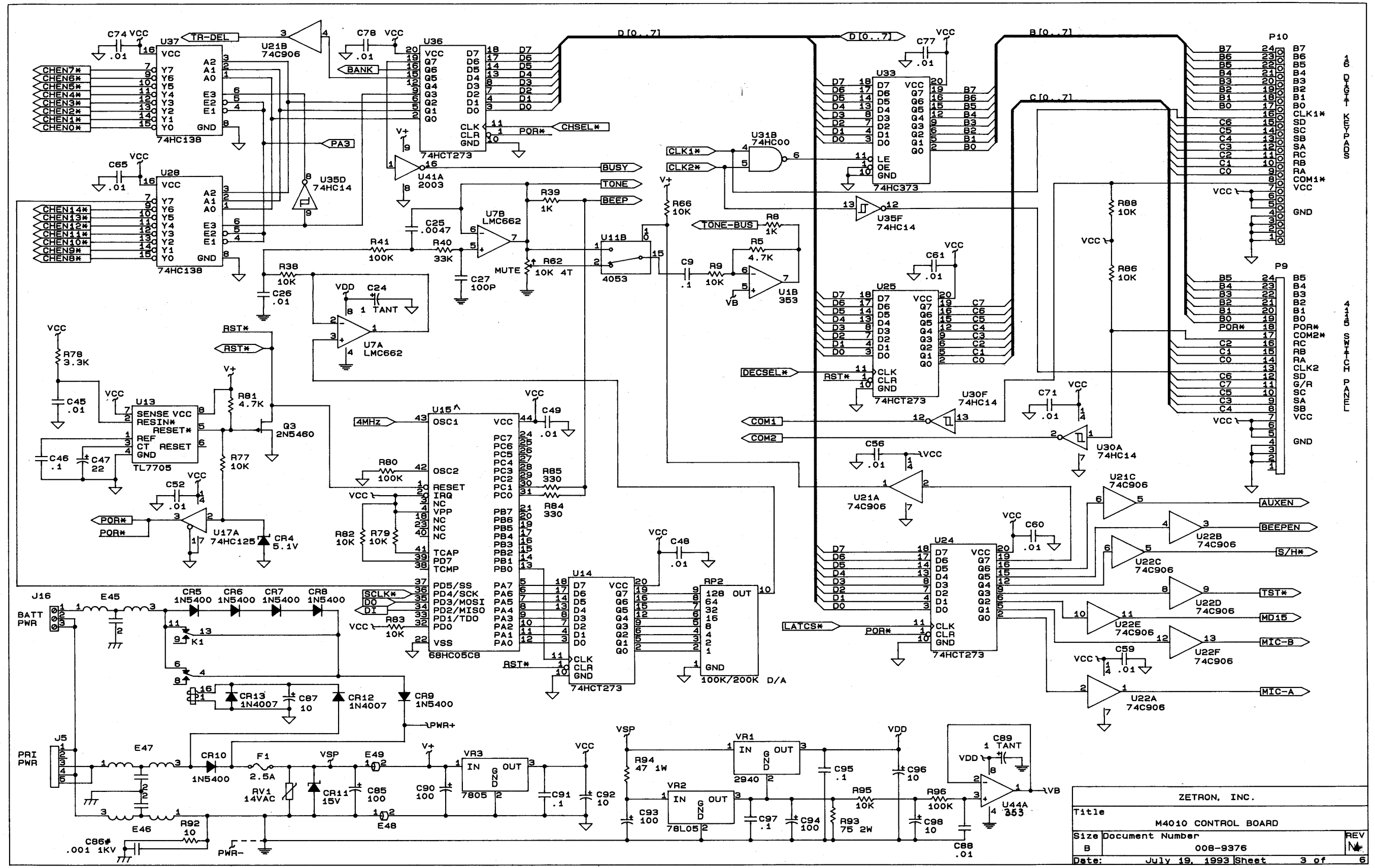
Control Board Silkscreen

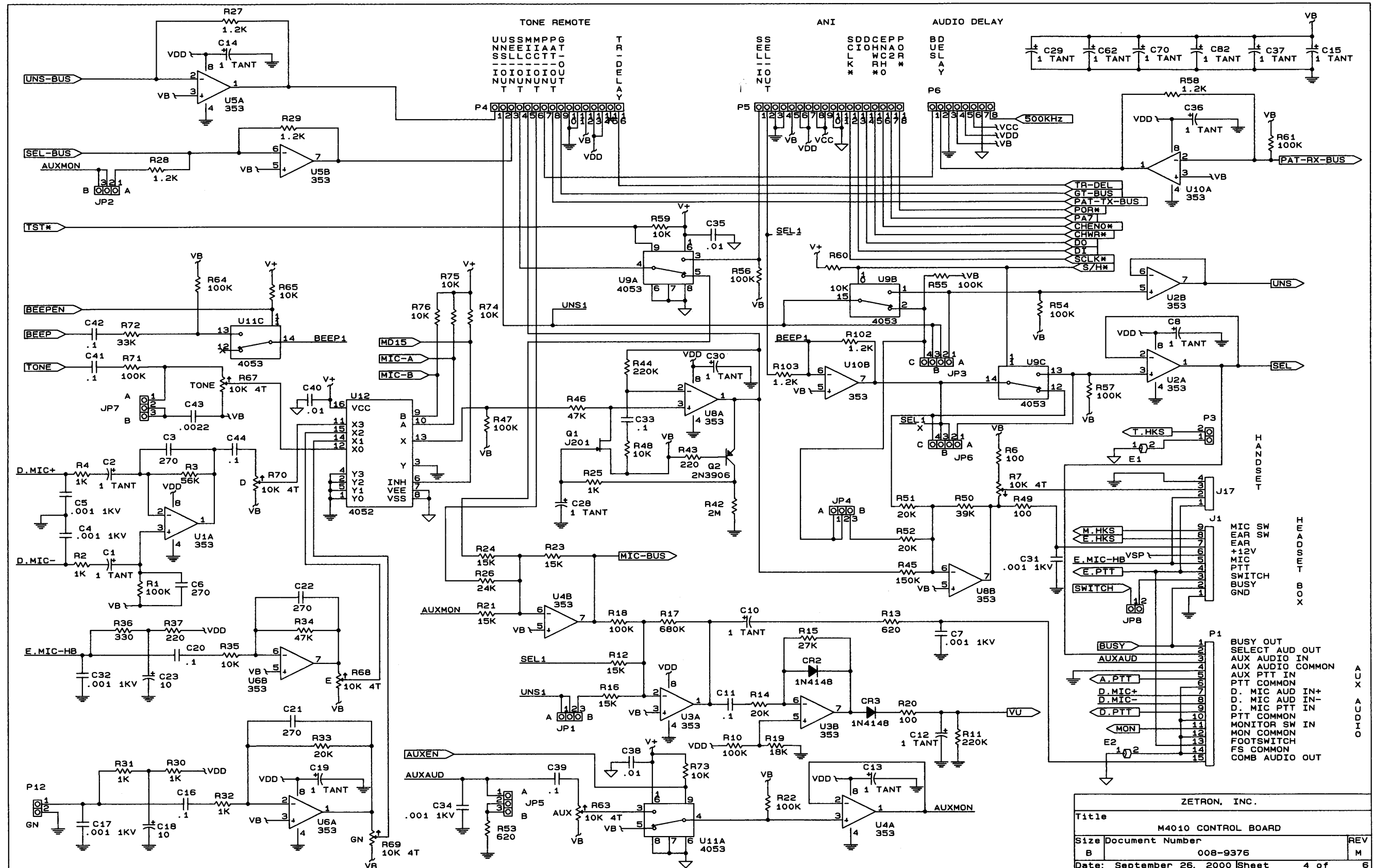


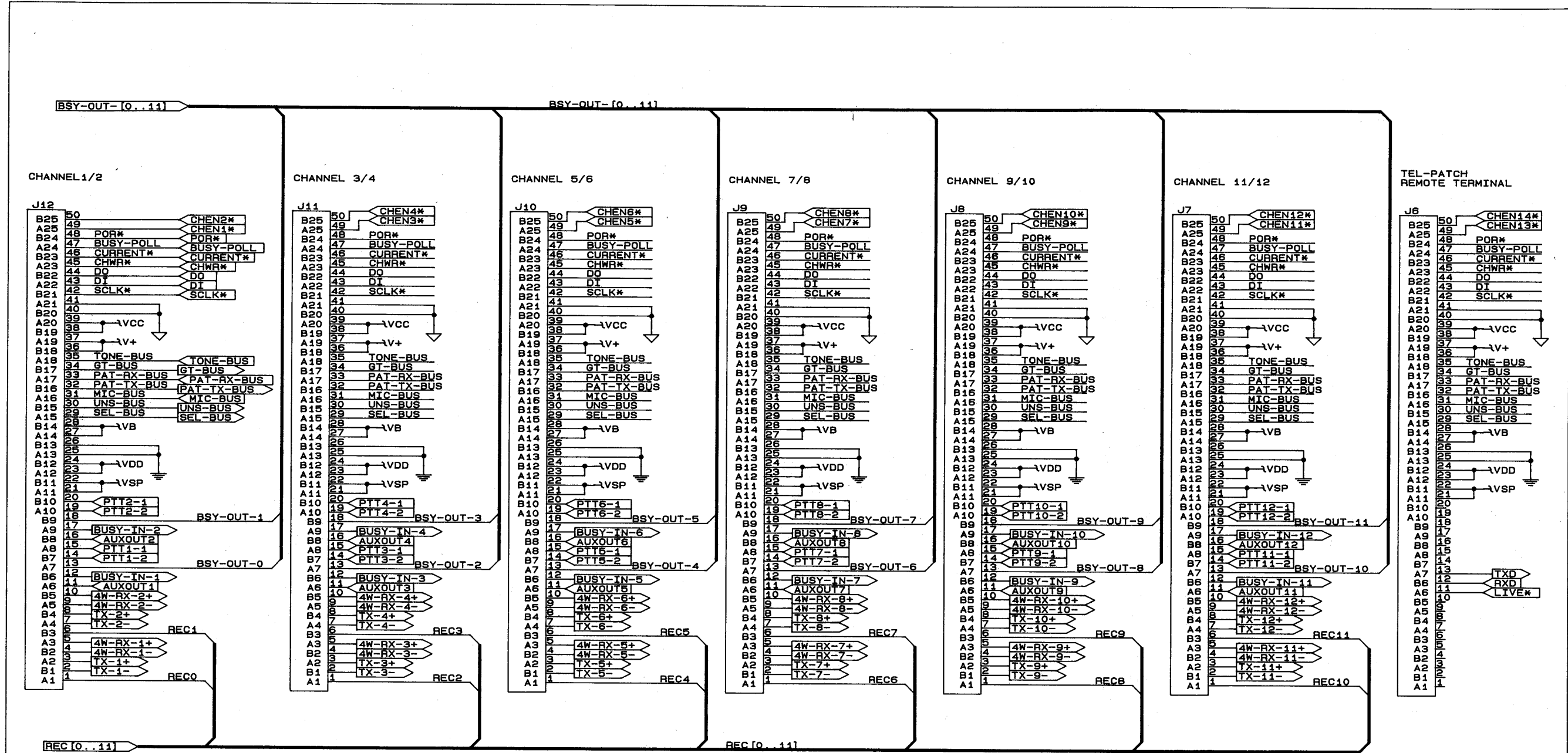
Control Board Schematic (008-9376M)



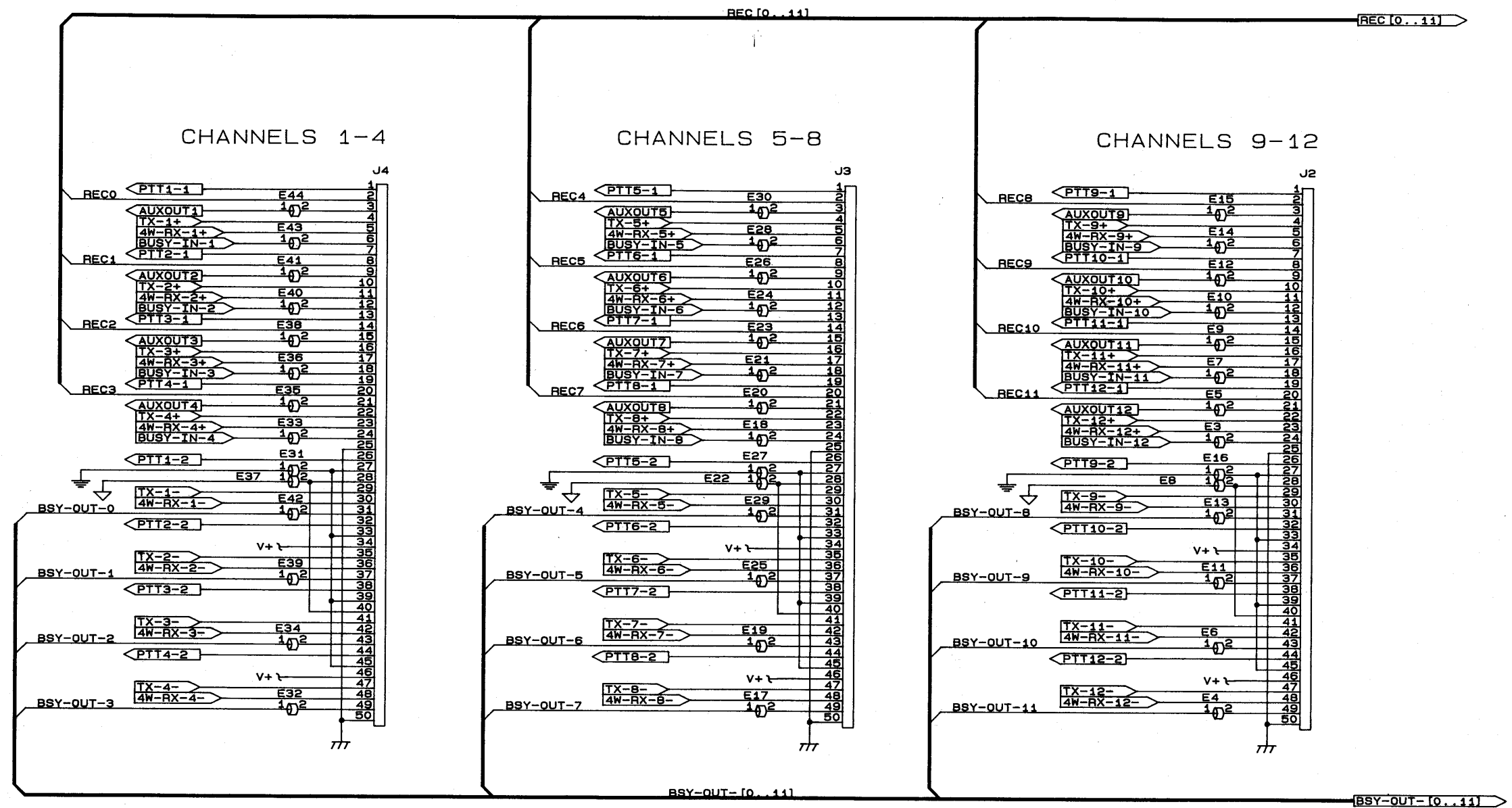








ZETRON, INC.		
Title		
M4010 CONTROL BOARD		
Size	Document Number	REV
B	008-9376	NA
Date:	July 19, 1993	Sheet 5 of 6



ZETRON, INC.		
Title	M4010 CONTROL BOARD	
Size	Document Number	REV
B	008-9376	1
Date:	July 19, 1993	Sheet 6 of 6

Model 4010 Radio Dispatch Console Service Manual

Display Board Parts List (702-9378E)

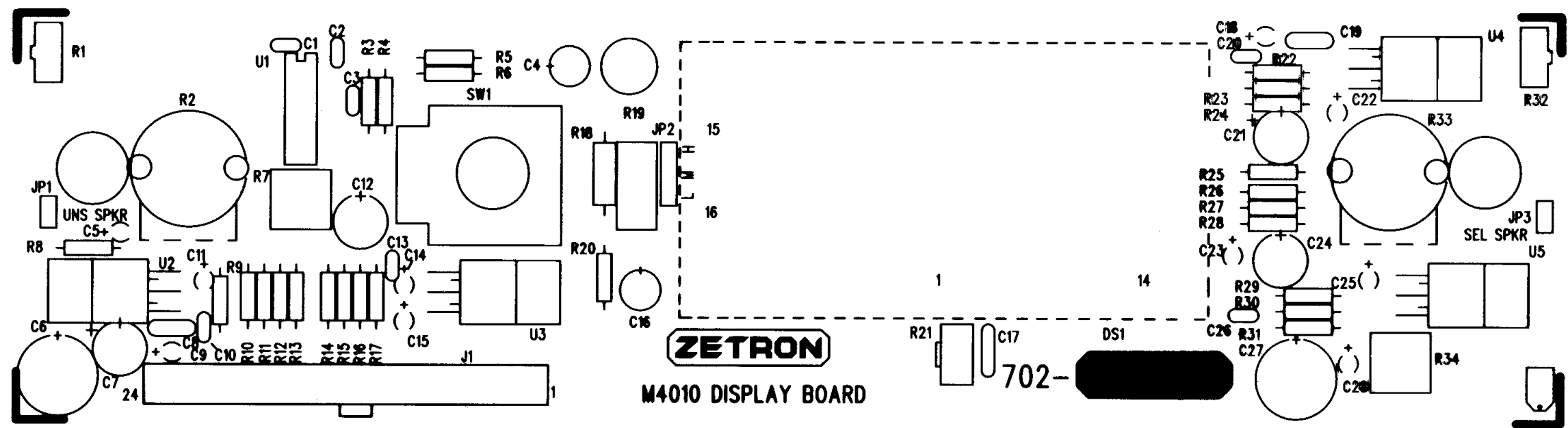
LEGEND:
+ = OPTION
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY

ZETRON M4010 DISPLAY BOARD PARTS LIST (702-9378E)

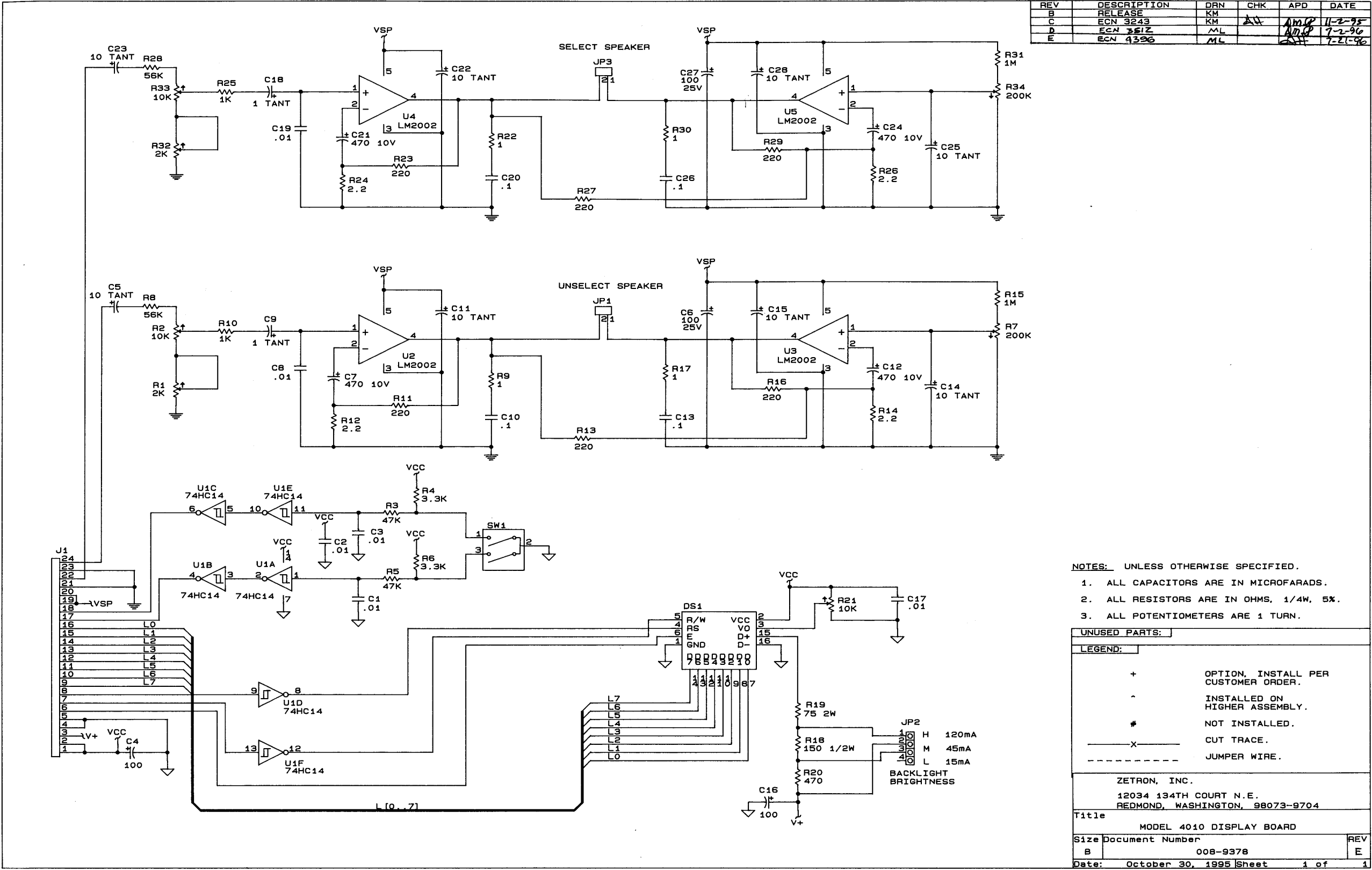
Item	Qty	Reference	Part	Description	Mfg.Part No.
1	4	R9,R17,R22,R30	101-0010	1.0 OHM 1/4W 5% CARBON FILM	
2	4	R12,R14,R24,R26	101-0013	2.2 OHM 1/4W 5% CARBON FILM	
3	6	R11,R13,R16,R23,R27,R29	101-0057	220 OHM 1/4W 5% CARBON FILM	
4	1	R20	101-0065	470 OHM 1/4W 5% CARBON FILM	
5	2	R10,R25	101-0073	1.OK 1/4W 5% CARBON FILM	
6	2	R6,R4	101-0085	3.3K 1/4W 5% CARBON FILM	
7	2	R5,R3	101-0113	47K 1/4W 5% CARBON FILM	
8	2	R28,R8	101-0115	56K 1/4W 5% CARBON FILM	
9	2	R15,R31	101-0145	1.0M 1/4W 5% CARBON FILM	
10	1	R18	102-0052	150 OHM 1/2W 5% CARBON FILM	
11	1	R19	103-0175	RESISTOR, 75 OHM 2W 5%	
12	2	R2,R33	107-0002	POT, 10K ROTORY POT, LINEAR TAPER	
13	2	R1,R32	107-0003	2K POT 1 TURN R/A	
14	1	R21	107-0010	10K POT 1 TURN R/A	
15	2	R7,R34	107-0504	200K POT 1 TURN	
16	1	C17	150-0110	.01 UF 50V 80%-20% CERAMIC DISC	
17	3	C1,C2,C3	151-0120	.01UF 50V/100V +-10% CERAMIC X7R	
18	4	C10,C13,C20,C26	151-0181	.1UF 50V +-10% CERAMIC X7R	
19	2	C8,C19	152-0085	.01 UF 50V +- 5% POLYESTER	
20	2	C18,C9	154-0025	1 UF 35V TANTALUM +- 10%	
21	8	C5,C11,C14,C15,C22,C23,C25,C28	154-0100	10 UF 16V TANTALUM +-10%	
22	2	C4,C16	155-0077	100UF 25V +-20% RADIAL ALUMINUM ELECTROLYTIC	
23	4	C7,C12,C21,C24	155-0083	470 UF 10 VOLT RADIAL ALUMINUM ELECTROLYTIC	
24	2	C6,C27	155-0090	1000 UF 25V +-20% RADIAL ALUMINUM ELECTROLYTIC	
25	1	DS1 NOTE 1	311-1621	DISPLAY, LCD, 16 X 2 CHAR BACKLIGHT	
26	4	U2,U3,U4,U5	316-2003	8W AUDIO AMP HORIZ MOUNT	LM383
27	1	U1	324-7414	HEX SCHMIDT	74HC14
28	1	SW1	371-0015	ROTARY ENCODER WITH 1/4" SHAFT	
29	1	J1	401-2421	CONN, LOCKING HEADER, 24 POS	
30	1	JP2	403-0004	4 OF 401-0052	
31	2	JP3,JP1	404-1002	2 OF 401-1364	
32	2	XDS1 NOTE 1	210-0006	2-56 NUT	
33	2	XDS1 NOTE 1	220-0012	256x1/2 PAN HEAD SLOTTED	
34	2	XDS1 NOTE 1	234-0003	#2 SPLIT LOCK WASHER	
34.5	2	XDS1 NOTE 1	251-1239	440x.031 FIBER WASHER	
35	4	XDS1 NOTE 1	251-1240	440x.062 FIBER WASHER	
36	1	XJP2 (POS H)	402-3040	MINI JUMPER	
37	2	XDS1 (PINS 15,16)	403-0001	1 OF 401-0052	
38	1	XDS1 (PINS 1-14)	403-0014	14 OF 401-0052	
39	1	XU1	407-0014	SKT, 14 PIN DIP	
40	1	PCB	410-9378C	M4010 DISPLAY BOARD	

NOTES: (Notes are for production use only.)

Display Board Silkscreen



Display Board Schematic (008-9378E)



Keypad Board Parts List (702-9379C.3)

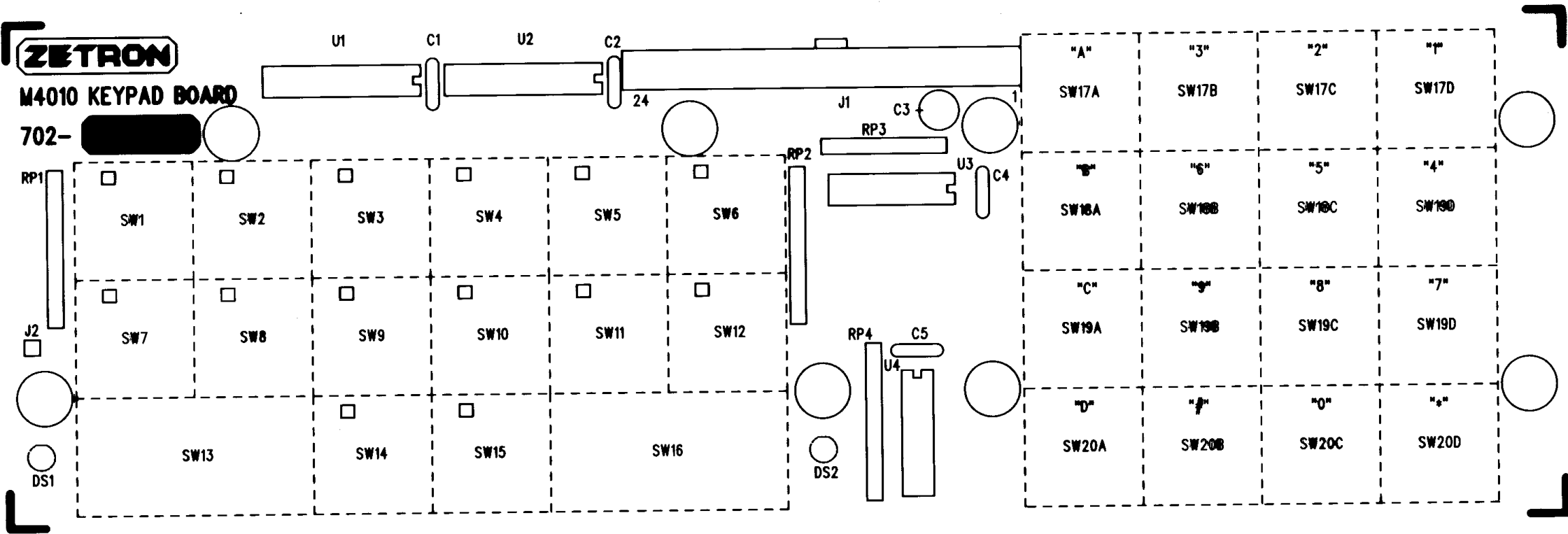
LEGEND:
+ = OPTION
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY

ZETRON M4010 KEYPAD BOARD PARTS LIST (702-9379C.3)

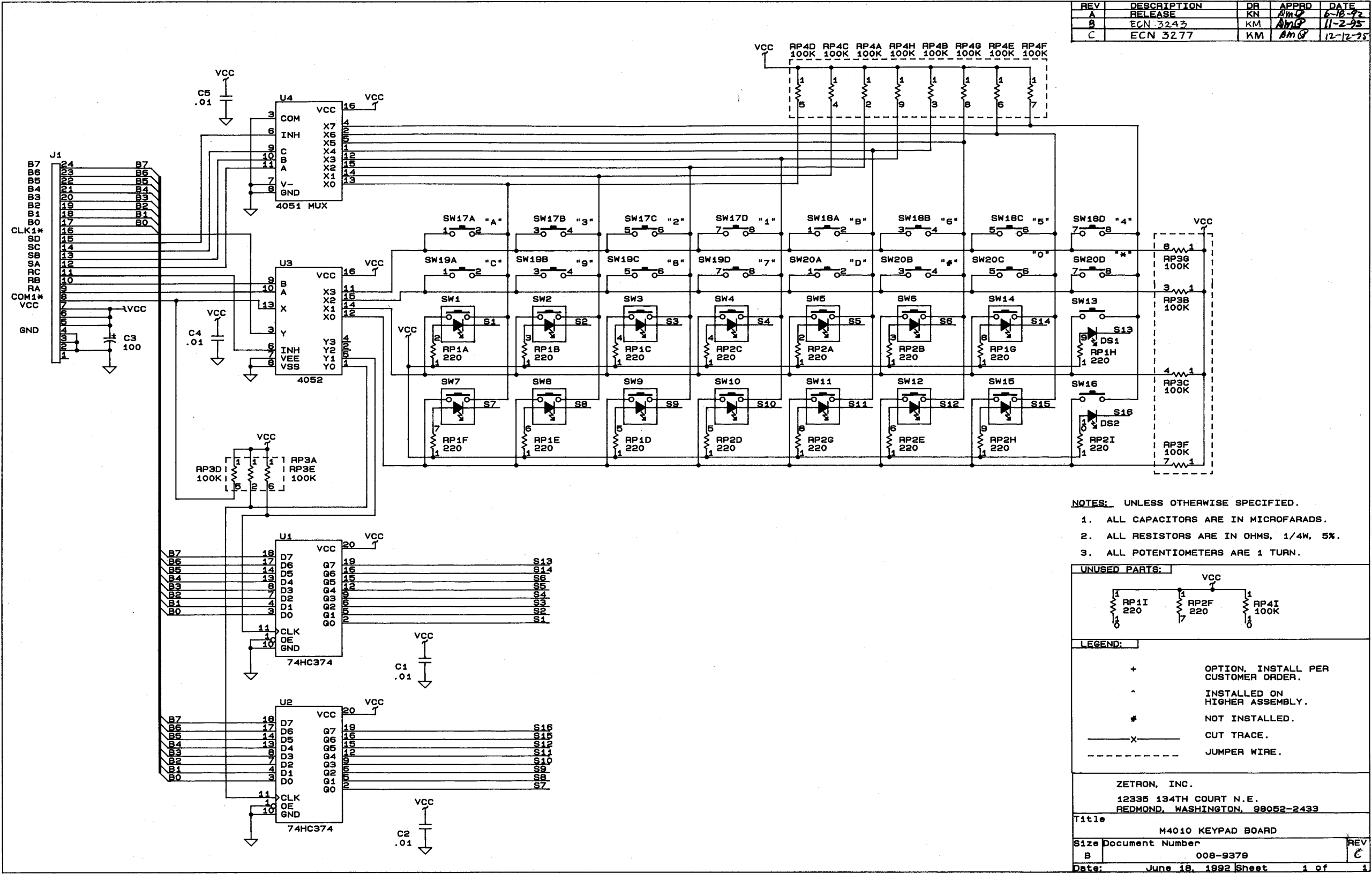
Item	Qty	Reference	Part	Description	Mfg.Part No.
1	1	RP3	119-0007	100K x 7 BUSSED 8-PIN SIP	
2	2	RP1,RP2	119-0011	220 x 9 BUSSED 10-PIN SIP	
3	1	RP4	119-0015	100K x 9 BUSSED 10-PIN SIP	
4	4	C1,C2,C4,C5	150-0110	.01 UF 50V 80%-20% CERAMIC DISC	
5	1	C3	155-0077	100UF 25V +-20% RADIAL ALUMINUM ELECTROLYTIC	
6	2	DS2,DS1	311-0022	LED RED, T-1	
7	1	U4	323-4051	1-TO-8 ANALOG MUX/DEMUX	4051
8	1	U3	323-4052	DUAL 4-CHAN ANALOG MUX	4052
9	2	U1,U2	324-4374	OCTAL DFF REG	74HC374
10	1	J1	401-2421	CONN, LOCKING HEADER, 24 POS	
11	29	XSW1-20	220-0075	#3 X 5/16 SELF-TAP TYPE 25, PAN HD PHIL	
12	2	XDS1,2	251-1250	440 X 1/8 SPACER	
13	14	XSW1-12,14,15	311-4222	LED RED, T-1 TRANSPARENT	
14	16	XSW1-16	373-1100	CT 1X1 LED/KEY HOUSING	11-A2-0008-01-0000
15	4	XSW17,18,19,20	373-1101	CT 1X4 KEY HOUSING	11-A2-0001-04-0000
16	32	XSW1-16 (1 EA) XSW17-20 (4 EA)	373-1102	CT KEY PLUNGER	
17	32	XSW1-16 XSW17-20 (4 EA) NOTES 2, 3	373-1103	CT 1 X 1 KEYPAD ELASTOMER	
18	7"	NOTE 6	408-0012	22 GA BARE WIRE	
19	1	PCB	410-9379B	M4010 KEYPAD BOARD	

NOTES: (Notes are for production use only.)

Keypad Board Silkscreen



Keypad Board Schematic (008-9379C)



60-Button Panel Parts List (702-9432A)

LEGEND:
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
+ = OPTION (INSTALLED PER CUSTOMER ORDER)

ZETRON MODEL 4010 60 BUTTON PANEL PART LIST (702-9432A)

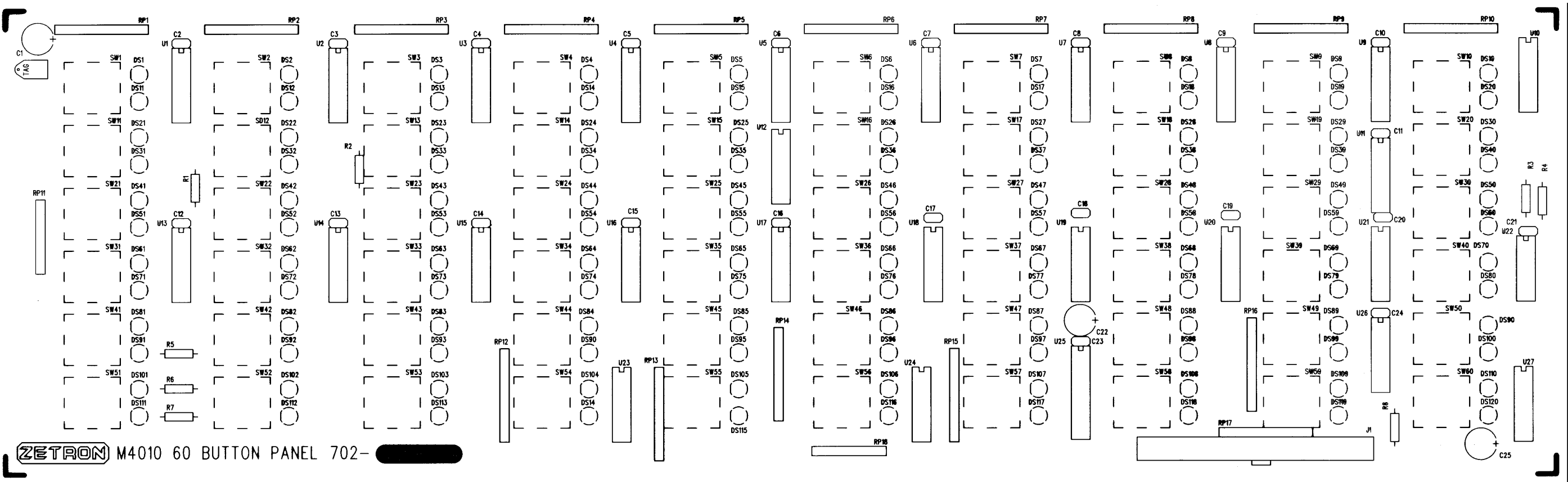
Item	Qty	Reference	Part	Description	Mfg.Part No.
1	3	R5,R6,R7	101-0065	470 OHM 1/4W 5% CARBON FILM	
2	1	R8	101-0097	10K 1/4W 5% CARBON FILM	
3	4	R1,R2,R3,R4	101-0121	100K 1/4W 5% CARBON FILM	
4	3	RP13,RP15,RP17	119-0006	10K x 9 R-SIP	4610X-101-103
5	2	RP18,RP11	119-0007	100K x 7 R-SIP	4608X-101-104
6	13	RP1,RP2,RP3,RP4,RP5,RP6,RP7,RP8,RP9,RP10,RP12,RP14,RP16	119-0027	470 OHM X 9 R-SIP	
7	22	C2,C3,C4,C5,C6,C7,C8,C9,C10,C11,C12,C13,C14,C15,C16,C17,C18,C19,C20,C21,C23,C24	151-0120	.01 UF 50V +-10% CERAMIC, TEMP. STABLE	CW15C103K
8	3	C1,C22,C25	155-0083	470 UF 10 VOLT RADIAL ALUM. ELECT.	ECEA-1AU471
9	60	DS1,DS2,DS3,DS4,DS5,DS6,DS7,DS8,DS9,DS10,DS21,DS22,DS23,DS24,DS25,DS26,DS27,DS28,DS29,DS30,DS41,DS42,DS43,DS44,DS45,DS46,DS47,DS48,DS49,DS50,DS61,DS62,DS63,DS64,DS65,DS66,DS67,DS68,DS69,DS70,DS81,DS82,DS83,DS84,DS85,DS86,DS87,DS88,DS89,DS90,DS101,DS102,DS103,DS104,DS105,DS106,DS107,DS108,DS109,DS110,	311-0021	LED GREEN, T-1	LTL-4231
10	60	DS11,DS12,DS13,DS14,DS15,DS16,DS17,DS18,DS19,DS20,DS31,DS32,DS33,DS34,DS35,DS36,DS37,DS38,DS39,DS40,DS51,DS52,DS53,DS54,DS55,DS56,DS57,DS58,DS59,DS60,DS71,DS72,DS73,DS74,DS75,DS76,DS77,DS78,DS79,DS80,DS91,DS92,DS93,DS94,DS95,DS96,DS97,DS98,DS99,DS100,DS111,DS112,DS113,DS114,DS115,DS116,DS117,DS118,DS119,DS120	311-0022	LED RED, T-1	LTL-4221
11	4	U10,U12,U23,U24	323-4051	1-TO-8 ANALOG MUX/DEMUX	MC14051B
12	1	U27	323-4053	3PDT SWITCH	MC144053
13	1	U22	324-7400	QUAD NAND	MC74HC00
14	20	U1,U2,U3,U4,U5,U6,U7,U8,U9,U11,U13,U14,U15,U16,U17,U18,U19,U20,U21,U26	325-4174	HEX D. F/F	KS74HCT1174
15	1	U25	325-4244	OCTAL BUFFER	KS74HCT244
16	60	SW1,SW2,SW3,SW4,SW5,SW6,SW7,SW8,SW9,SW10,SW11,SW12,SW13,SW14,SW15,SW16,SW17,SW18,SW19,SW20,SW21,SW22,SW23,SW24,SW25,SW26,SW27,SW28,SW29,SW30,SW31,SW32,SW33,SW34,SW35,SW36,SW37,SW38,SW39,SW40,SW41,SW42,SW43,SW44,SW45,SW46,SW47,SW48,SW49,	371-0003	SINGLE KEY-NO LIGHT	JM2005#01

Model 4010 Radio Dispatch Console Service Manual

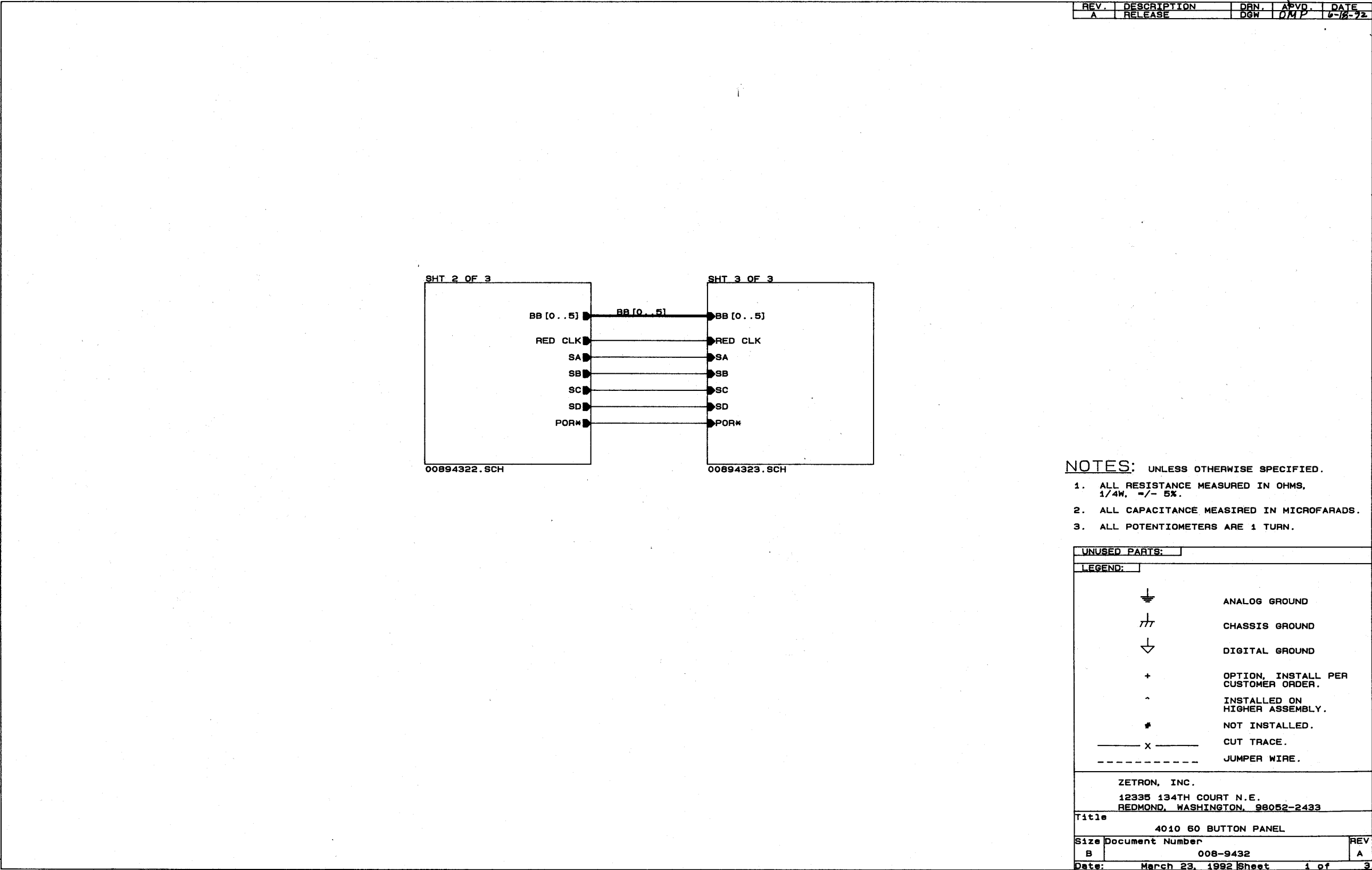
			SW50, SW51, SW52, SW53, SW54, SW55, SW56, SW57, SW58, SW59, SW60		
17	1	J1	401-2421	CONN, LOCKING HEADER, 24 POS	FPH-2421T
18	1	XU22	407-0014	SKT, 14 PIN DIP	
19	24	XU1, XU2, XU3, XU4, XU5, XU6, XU7, XU8, XU9, XU10, XU11, XU13, XU14, XU15, XU16, XU17, XU18, XU19, XU20, XU21, XU23, XU24, XU26, XU27	407-0016	SKT, 16 PIN DIP	
20	1	XU25	407-0020	SKT, 20 PIN DIP	
21	1	PCB	410-9432A	M4010 60 BUTTON PANEL	
22	10	XDS1-120	415-9536	LED SPACER	

NOTES: (Notes are for production use only.)

60-Button Panel Silkscreen



60-Button Panel Schematic (008-9432A)



NOTES: UNLESS OTHERWISE SPECIFIED.

1.

ALL RESISTANCE MEASURED IN OHMS,
1/4W, +/- 5%.

2.

ALL CAPACITANCE MEASURED IN MICROFARADS.

3.

ALL POTENTIOMETERS ARE 1 TURN.

UNUSED PARTS:

LEGEND:



ANALOG GROUND



CHASSIS GROUND



DIGITAL GROUND



OPTION, INSTALL PER
CUSTOMER ORDER.



INSTALLED ON
HIGHER ASSEMBLY.



NOT INSTALLED.



CUT TRACE.



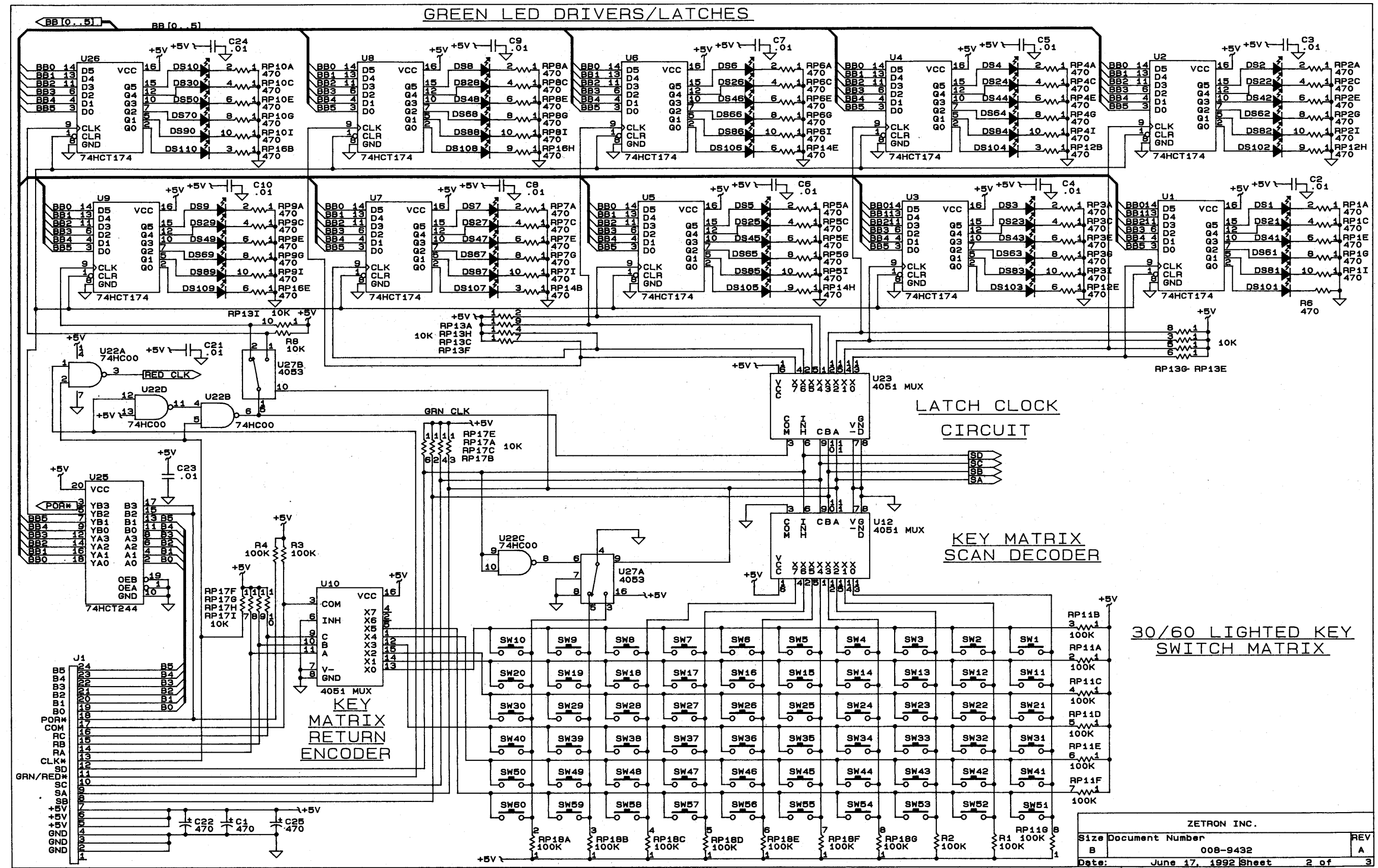
JUMPER WIRE.

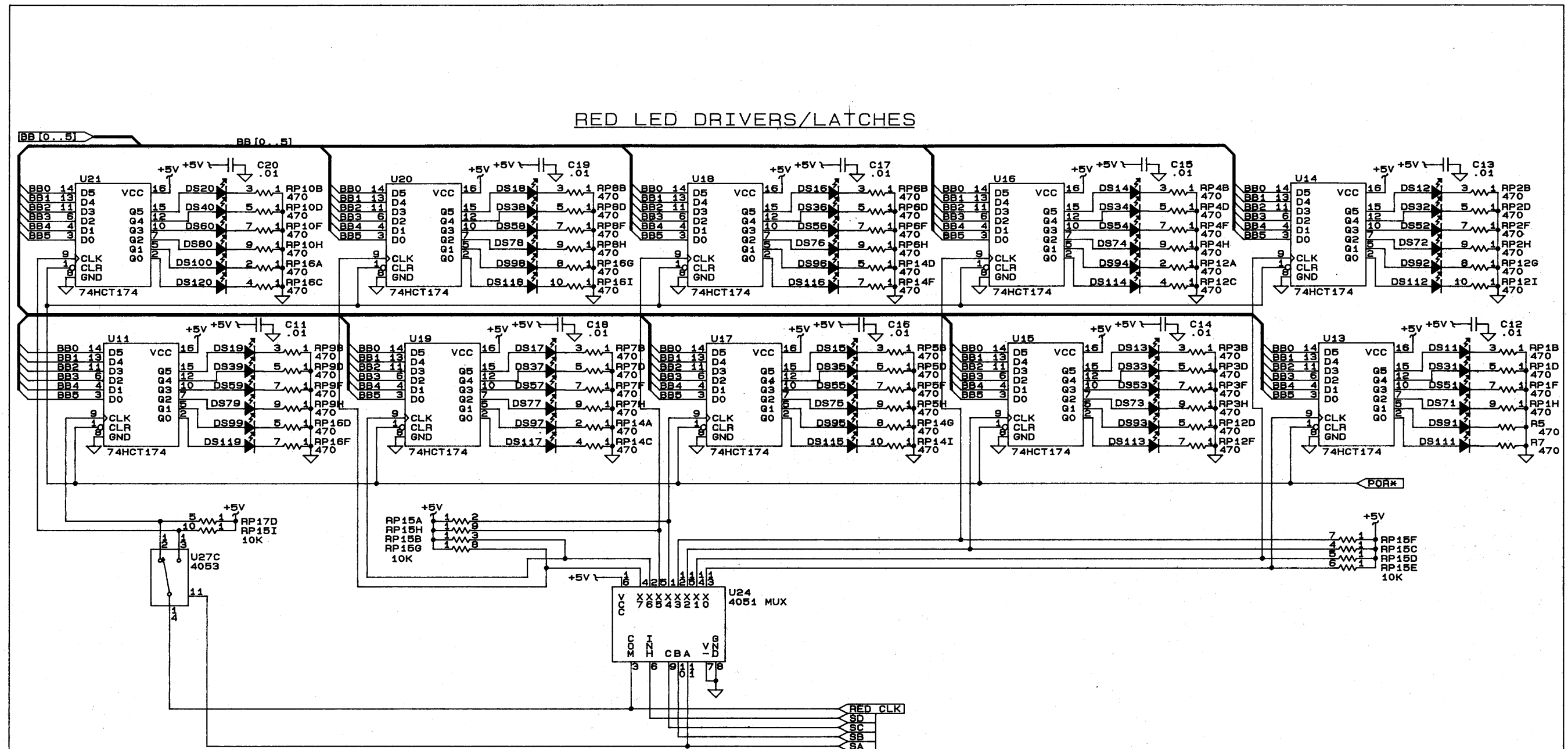
ZETRON, INC.
12335 134TH COURT N.E.
REDMOND, WASHINGTON, 98052-2433

Title4010 60 BUTTON PANEL

Size	Document Number	REV
B	008-9432	A

Date:	March 23, 1992	Sheet	1 of 3
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ZETRON, INC.		
Size	Document Number	REV
B	008-9432	A
Date:	June 18, 1992	Sheet 3 of 3

DUAL CHANNEL OPTION 950-9715

Dual Channel Board Part List (702-9377L)

LEGEND :
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

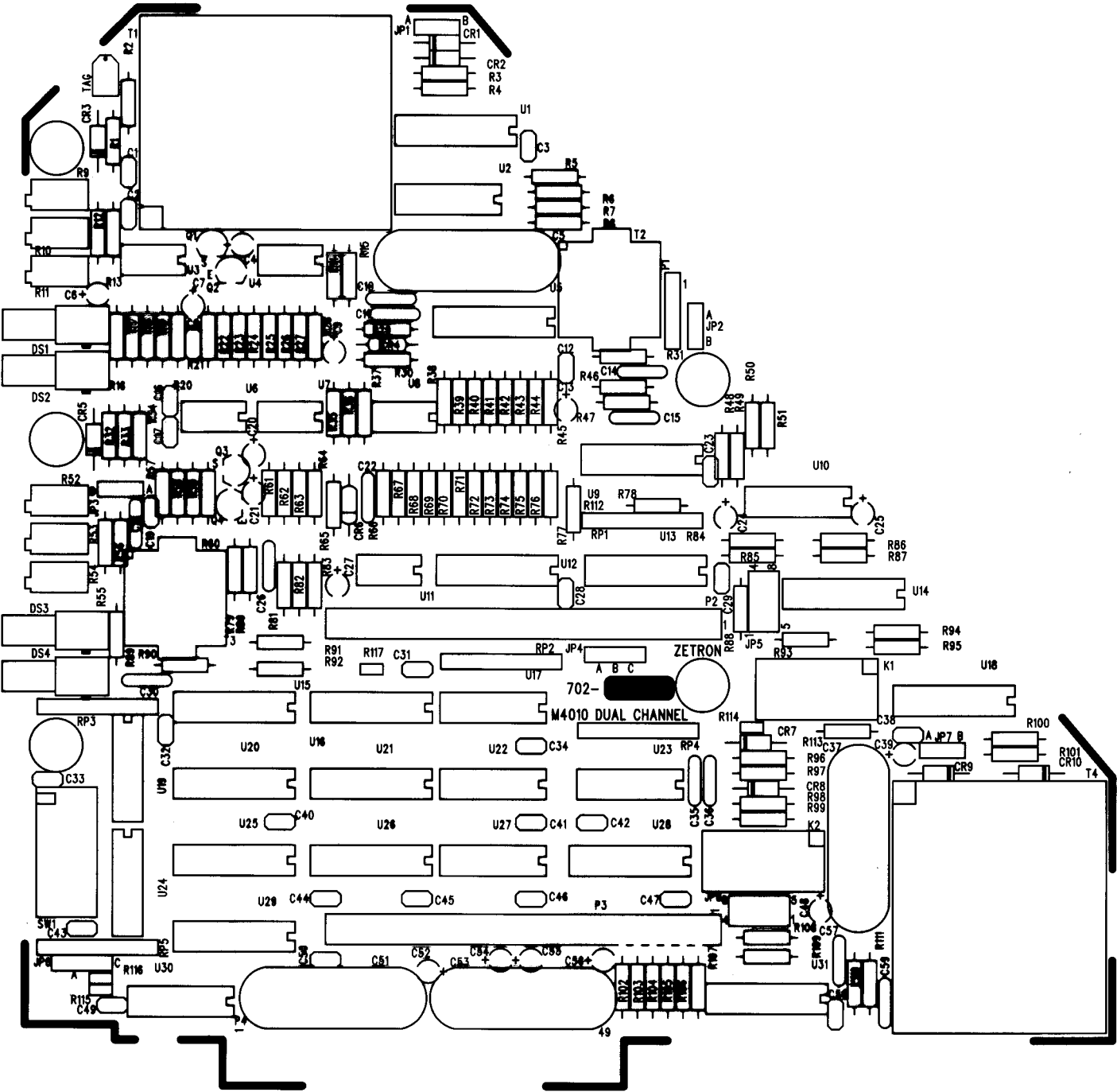
ZETRON MODEL 4010 DUAL CHANNEL BOARD PARTS LIST:

Item	Qty	Reference	Part	Description	Mfg.Part No.
1	4	R14,R15,R110,R111	101-0047	47 OHM 1/4W 5% CARBON FILM	
2	6	R3,R4,R22,R80,R100,R101	101-0057	220 OHM 1/4W 5% CARBON FILM	
3	2	R26,R64	101-0058	240 OHM 1/4W 5% CARBON FILM	
4	4	R47,R55,R66,R81	101-0068	620 OHM 1/4W 5% CARBON FILM	
5	12	R16,R31,R46,R56,R89,R90,R102,R103,R104,R105,R106,R107	101-0073	1.OK 1/4W 5% CARBON FILM	
6	2	R17,R92	101-0080	2.0K 1/4W 5% CARBON FILM	
7	2	R97,R99	101-0085	3.3K 1/4W 5% CARBON FILM	
8	2	R24,R62	101-0089	4.7K 1/4W 5% CARBON FILM	
9	4	R6,R19,R50,R61	101-0095	8.2K 1/4W 5% CARBON FILM	
10	21	R7,R8,R21,R29,R36,R57,R67R78,R83,R84,R85,R86,R88R93,R94,R96,R98,R108,R109,R112,R113	101-0097	10K 1/4W 5% CARBON FILM	
11	4	R39,R69,R73,R91	101-0100	13K 1/4W 5% CARBON FILM	
12	4	R25,R30,R37,R63	101-0101	15K 1/4W 5% CARBON FILM	
13	2	R76,R40	101-0104	20K 1/4W 5% CARBON FILM	
14	6	R5,R13,R18,R49,R58,R59	101-0105	22K 1/4W 5% CARBON FILM	
15	2	R48,R51	101-0107	27K 1/4W 5% CARBON FILM	
16	2	R68,R82	101-0108	30K 1/4W 5% CARBON FILM	
17	2	R70,R38	101-0109	33K 1/4W 5% CARBON FILM	
18	2	R77,R45	101-0114	51K 1/4W 5% CARBON FILM	
19	4	R1,R12,R32,R33	101-0118	75K 1/4W 5% CARBON FILM	
20	2	R71,R41	101-0119	82K 1/4W 5% CARBON FILM	
21	2	R28,R35	101-0121	100K 1/4W 5% CARBON FILM	
22	4	R2,R34,R44,R75	101-0123	120K 1/4W 5% CARBON FILM	
23	2	R20,R60	101-0125	150K 1/4W 5% CARBON FILM	
24	2	R74,R43	101-0129	220K 1/4W 5% CARBON FILM	
25	6	R27,R42,R65,R72,R87,R95	101-0133	330K 1/4W 5% CARBON FILM	
26	2	R23,R79	101-0148	2.0M 1/4W 5%CARBON FILM	
27	6	R9,R10,R11,R52,R53,R54	108-1003	10K POT 10 TURN R/A	
28	4	R114,R115,R116,R117	109-0097	10K 1/8W 5 %	
29	5	RP1,RP2,RP3,RP4,RP5	119-0008	10K x 7 BUSSED 8-PIN SIP	
30	12	C10,C11,C14,C15,C18,C22,C26,C30,C35,C36,C57,C59	150-0096	1000 PF 1KV +-10% CERAMIC DISC YSP	
31	2	C2,C16	151-0010	100PF 100V/200V +-10%/5% CERAMIC NPO	
32	21	C3,C12,C23,C28,C29,C31,C32,C33,C34,C38,C40,C41,C42,C43,C44,C45,C46,C47,C49,C50,C58	151-0120	.01UF 50V/100V +-10% CERAMIC X7R	
33	4	C1,C8,C17,C19	151-0181	.1UF 50V +-10% CERAMIC X7R	
34	4	C5,C37,C51,C53	152-0030	2.2 UF 250V +-10% POLYESTER	
35	5	C4,C9,C13,C21,C27	154-0025	1 UF 35V TANTALUM +- 10%	
36	11	C6,C7,C20,C24,C25,C39,C48,C52,C54,C55,C56	154-0100	10 UF 16V TANTALUM +-10%	
37	2	T4,T1	305-0018	PHONE HYBRID XFMR	
38	2	T2,T3	305-0104	10K:10K OHM AUDIO	
39	2	DS3,DS1	311-0009	LED GREEN	
40	2	DS2,DS4	311-0010	LED RED DIFFUSED TI-3/4	
41	4	U3,U6,U8,U11	316-0353	OP, AMP DUAL BIFET	353
42	2	U4,U7	316-0662	OP-AMP, CMOS, DUAL	C662
43	2	U10,U2	316-3403	QUAD BIPOLAR OP-AMP	3403

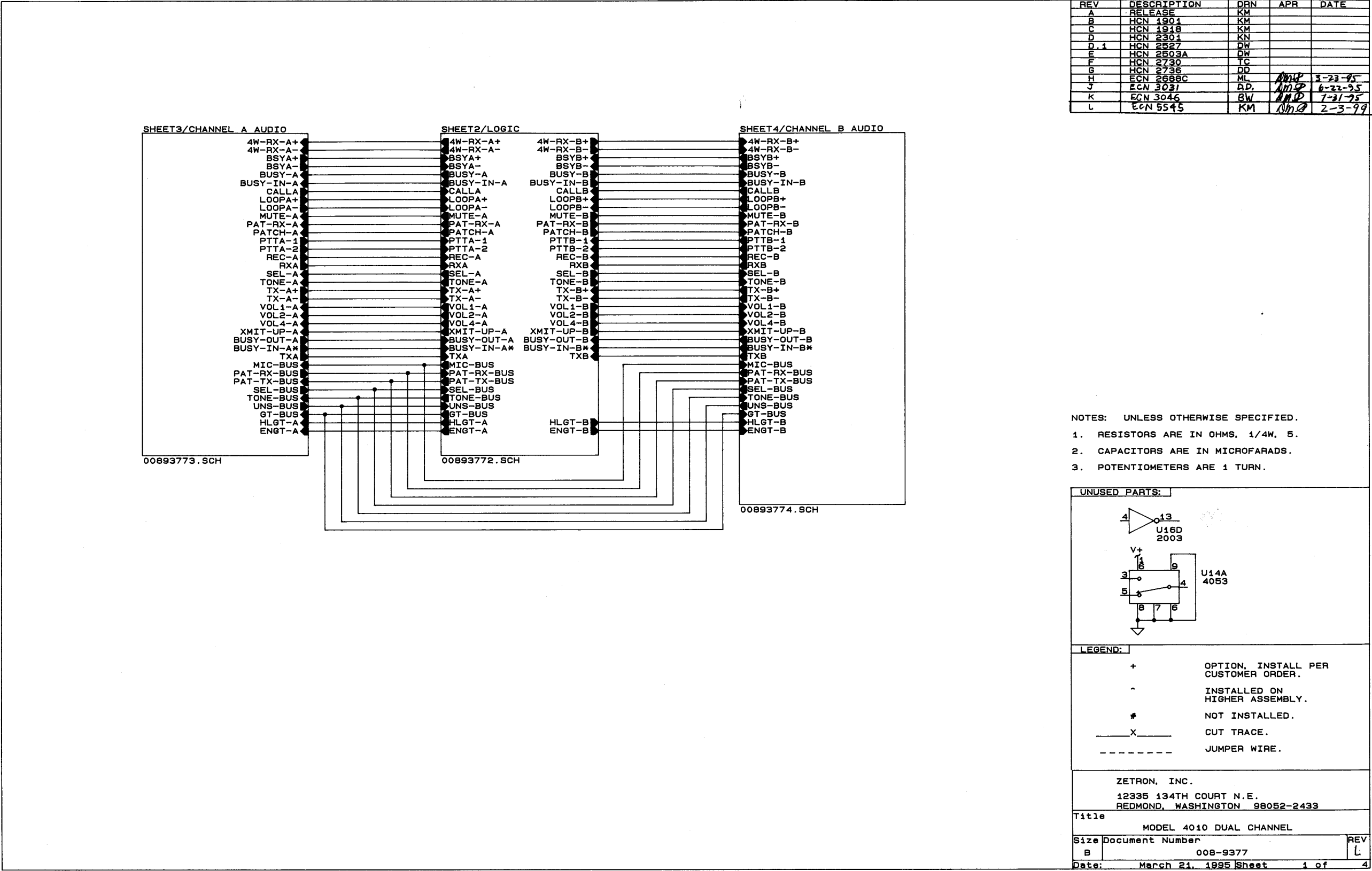
44	1	U19	323-4001	QUAD NOR GATE	4001
45	2	U12,U5	323-4051	1-TO-8 ANALOG MUX/DEMUX	4051
46	7	U1,U9,U13,U14,U18, U28,U31	323-4053	ANALOG SWITCH, TRIPLE SPDT	4053
47	4	U20,U21,U25,U26	323-4094	8 STAGE SERIAL REG	4094
48	4	U22,U23,U27,U30	323-4906	HEX LEVEL SHIFT	74C906
49	1	U24	324-4125	TRI-STATE QUAD BUFFER	74HC125
50	2	U29,U15	324-4165	SERIAL IN, PARALLEL OUT, 8-BIT SHIFT REGISTER	74HC165
51	1	U17	324-7414	HEX SCHMIDT	74HC14
52	2	Q1,Q3	340-0201	XSTR,JFET,N-CHANNEL,VGS > -1.5,TO-92	J201
53	1	U16	340-2003	RELAY DRIVER 50V/.5A	2003
54	2	Q2,Q4	340-3906	PNP 40V/200MA, TO92	2N3906
55	2	CR6,CR4	342-3009	DIODE, SILICON 100V 250MW	1N4148
56	2	CR7,CR8	343-3029	1W 5.1V +-5% MOTOROLA ONLY	1N4733A
57	2	CR3,CR5	343-3035	ZENER, 12V 1W +-5%	1N4742A
58	4	CR1,CR2,CR9,CR10	343-3108	ZENER, 15V 1W +-5%	1N4744A
59	1	SW1	371-0008	DIP SW, 8-POS, SIDE-ACTUATED	
60	2	K1,K2	380-0030	DPDT 12V COIL MINI RELAY 360 OHM	
61	4	JP1,JP2,JP3,JP7	403-0003	3 OF 401-0052	
62	2	JP4,JP6	403-0004	4 OF 401-0052	
63	1	P1	403-0005	5 OF 401-0052	
64	0	P3#,P2#	403-1026	26 OF 401-0036	
65	1	BRACKET	210-0001	NUT,KEP, 4-40, S-ZN	
66	1	BRACKET	220-0108	440 X 1/4 PAN PHILLIPS	
67	1	BRACKET	220-0199	632 X 1/4 PAN HD PHIL, BLACK	
68	1	NOTE 2	372-1002	KEYTOP RED, XMIT	
69	1	NOTE 2	372-1006	KEYTOP BLU, PATCH	
70	1	NOTE 2	372-1015	KEYTOP GRN, SELECT/RING	
71	1	NOTE 2	372-1054	KEYTOP YEL, V-ADJ/MUTE	
72	1	NOTE 2	372-1079	KEYTOP WHT, OnHK/OffHK	
73	1	NOTE 2	372-1089	KEYTOP WHT, HOOK-FLASH	
74	1	NOTE 1	401-0614	BRACKET, RA, #6-32 TAP	
75	6	XJP1-4,6,7 (POS A)	402-3040	MINI JUMPER	
76	6	XU3,4,6,7,8,11	407-0008	SKT, 08 PIN DIP	
77	9	XU2,10,17,19,22-24, 27,30	407-0014	SKT, 14 PIN DIP	
78	16	XU1,5,9,12-16,18, 20,21,25,26,28, 29,31	407-0016	SKT, 16 PIN DIP	
79	4	XP2,3 (2 EA)	407-0110	SKT, 10 PIN SIP	
80	2	XP2,3 (1 EA)	407-0112	SKT, 6 PIN SIP	
81	8	XJP5 (PINS 1-2, 3-4, 5-6, 7-8)	408-0001	WIRE JUMPER	
		XJP8 (PINS 1-2, 3-4, 5-6, 7-8)			
82	1	PCB	410-9377F	M4010 DUAL CHANNEL BOARD	
83	4	XDS1-4	417-0010	LED MOUNT RA	
84	1		449-9018	BAG, PLASTIC 3x5 .004 GUAGE	

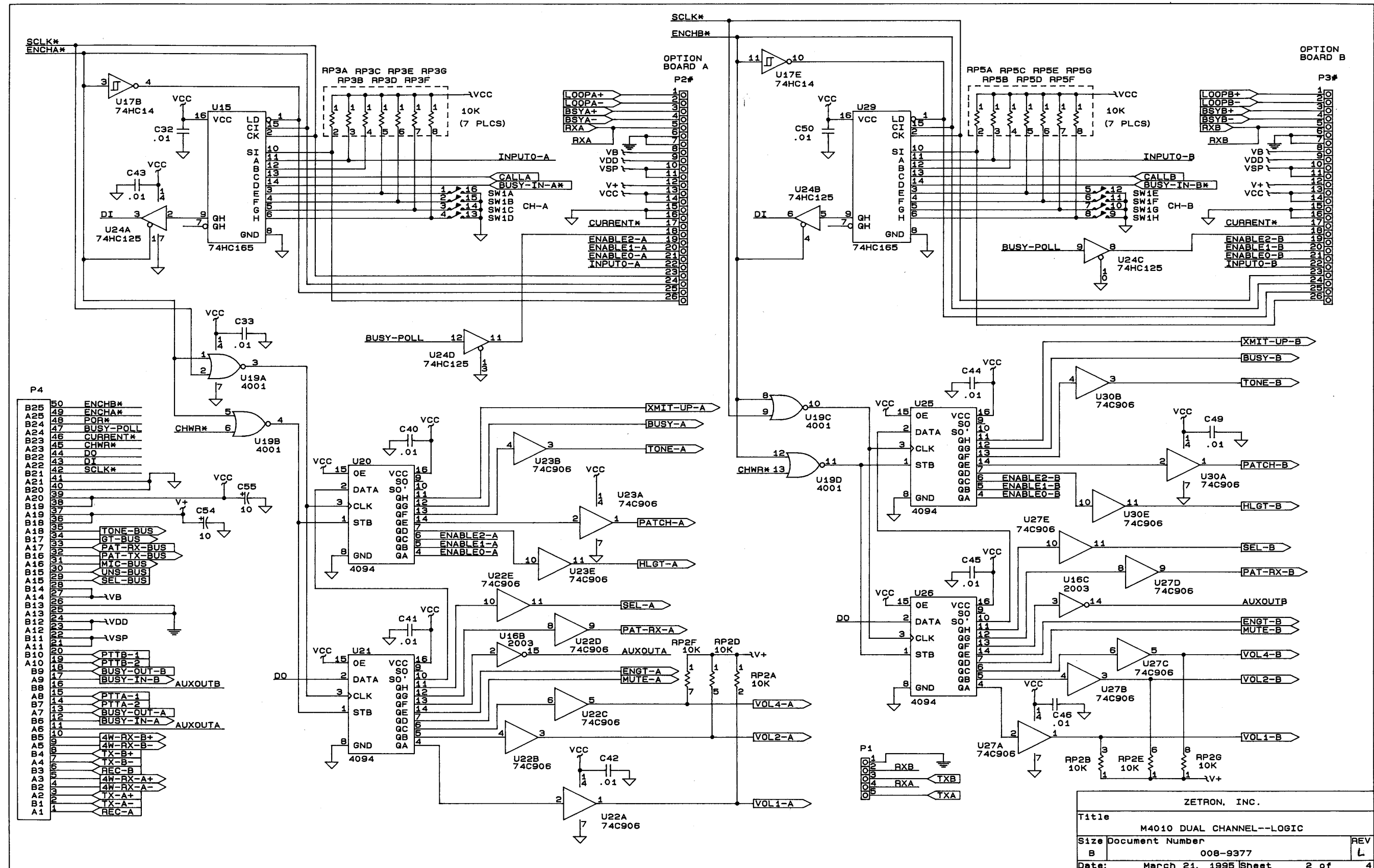
NOTES: (Notes are for production use only>)

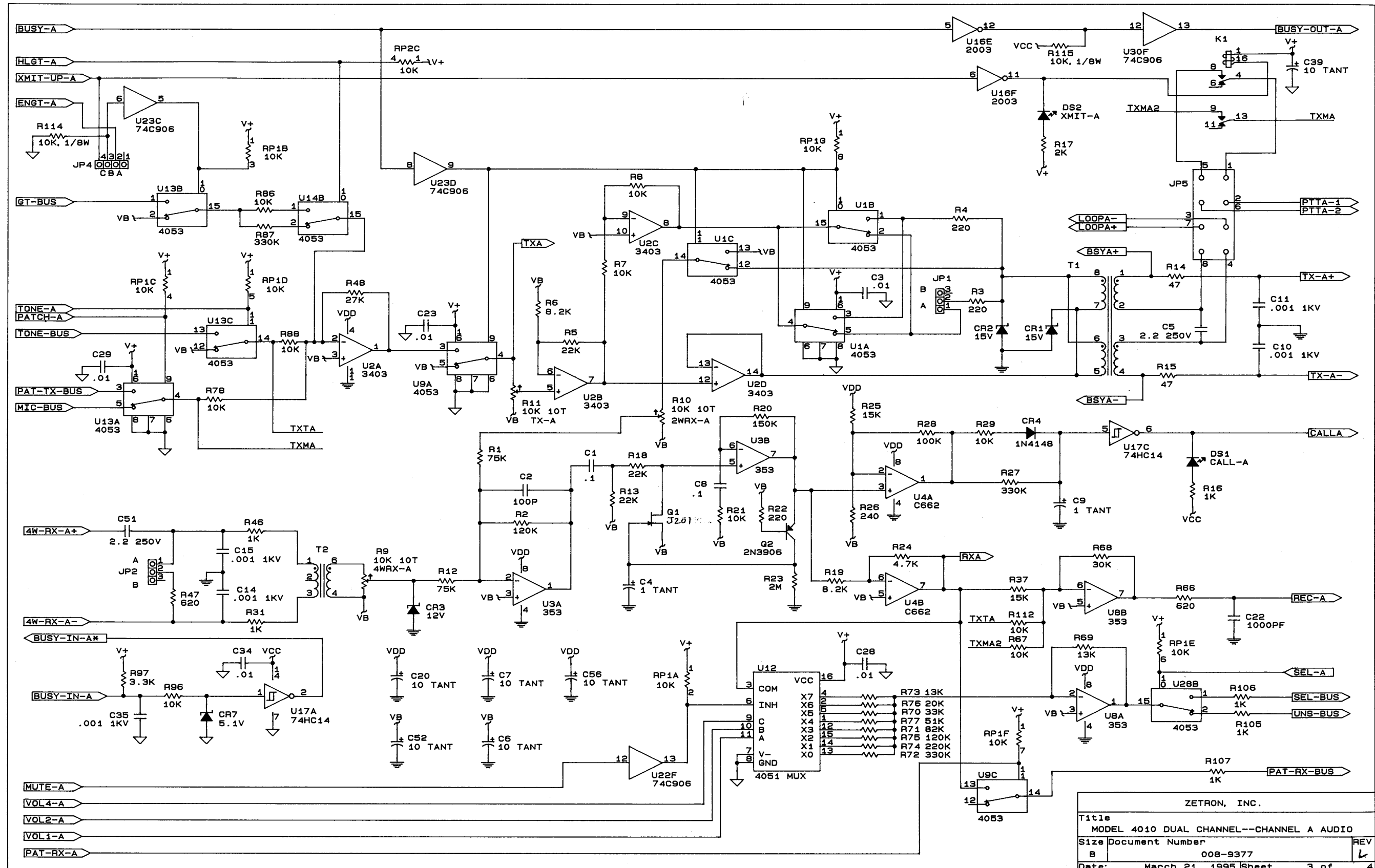
Dual Channel Board Silkscreen

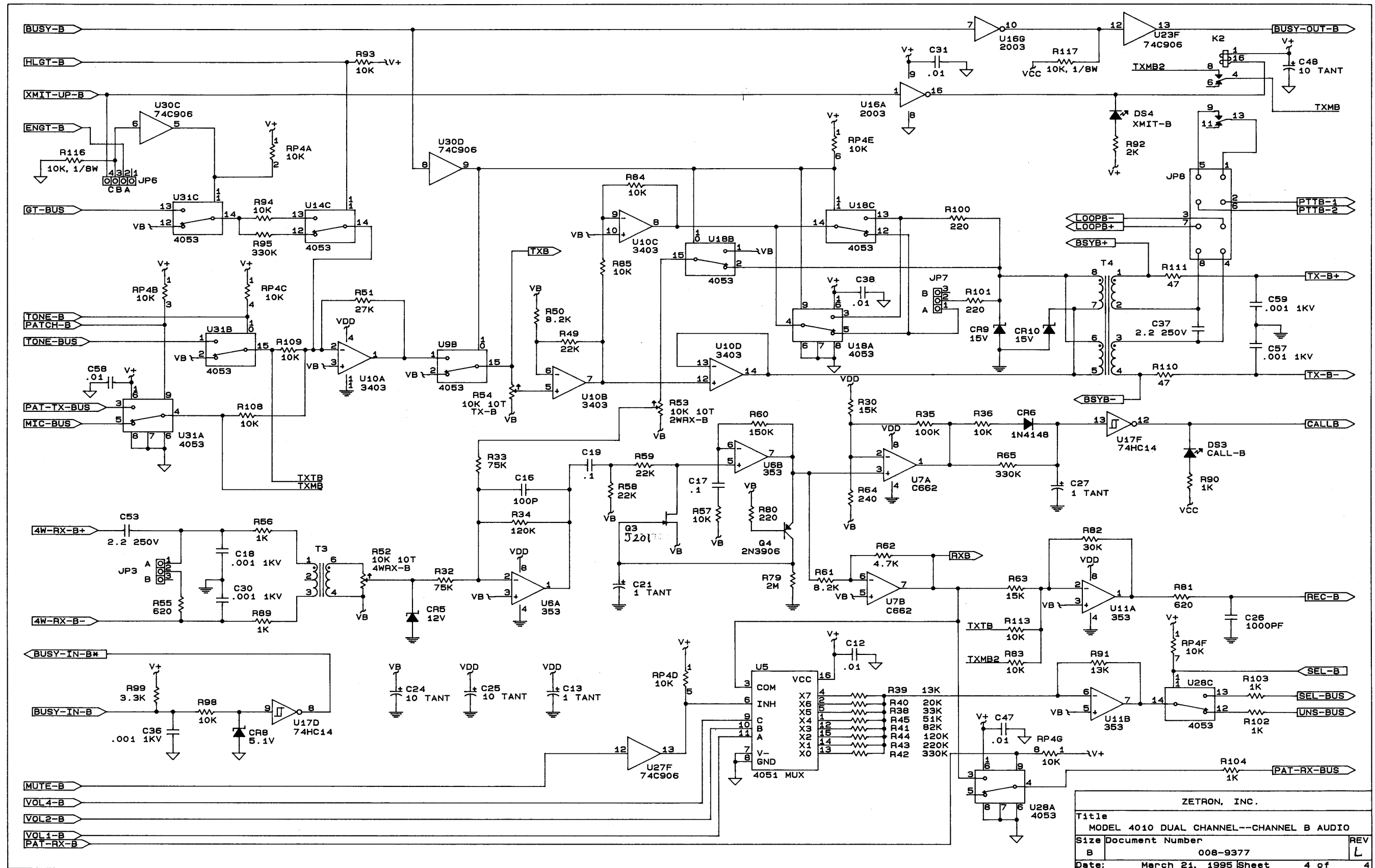


Dual Channel Board Schematic (008-9377L)









DC REMOTE OPTION (950-9716)

DC Remote Daughter Board Part List (702-9380E)

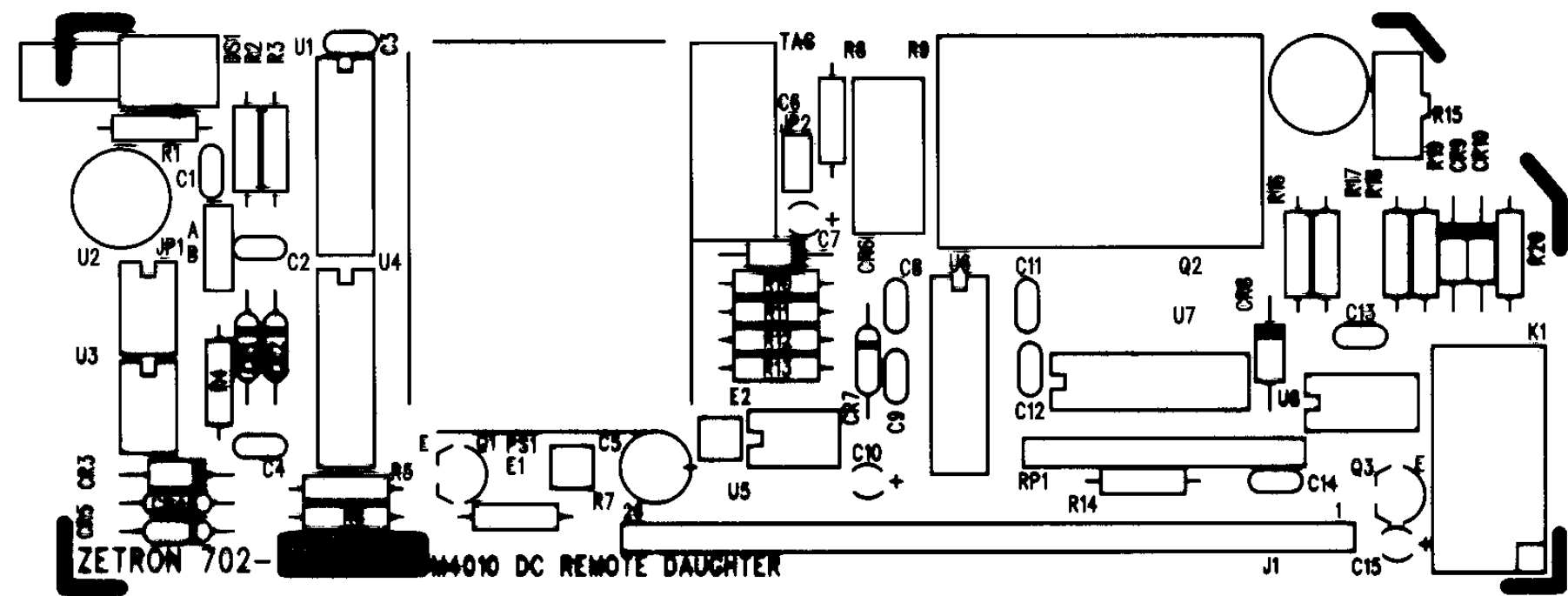
LEGEND:
+ = OPTION
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY

ZETRON M4010 DC REMOTE DAUGHTER BOARD PARTS LIST (702-9380E)

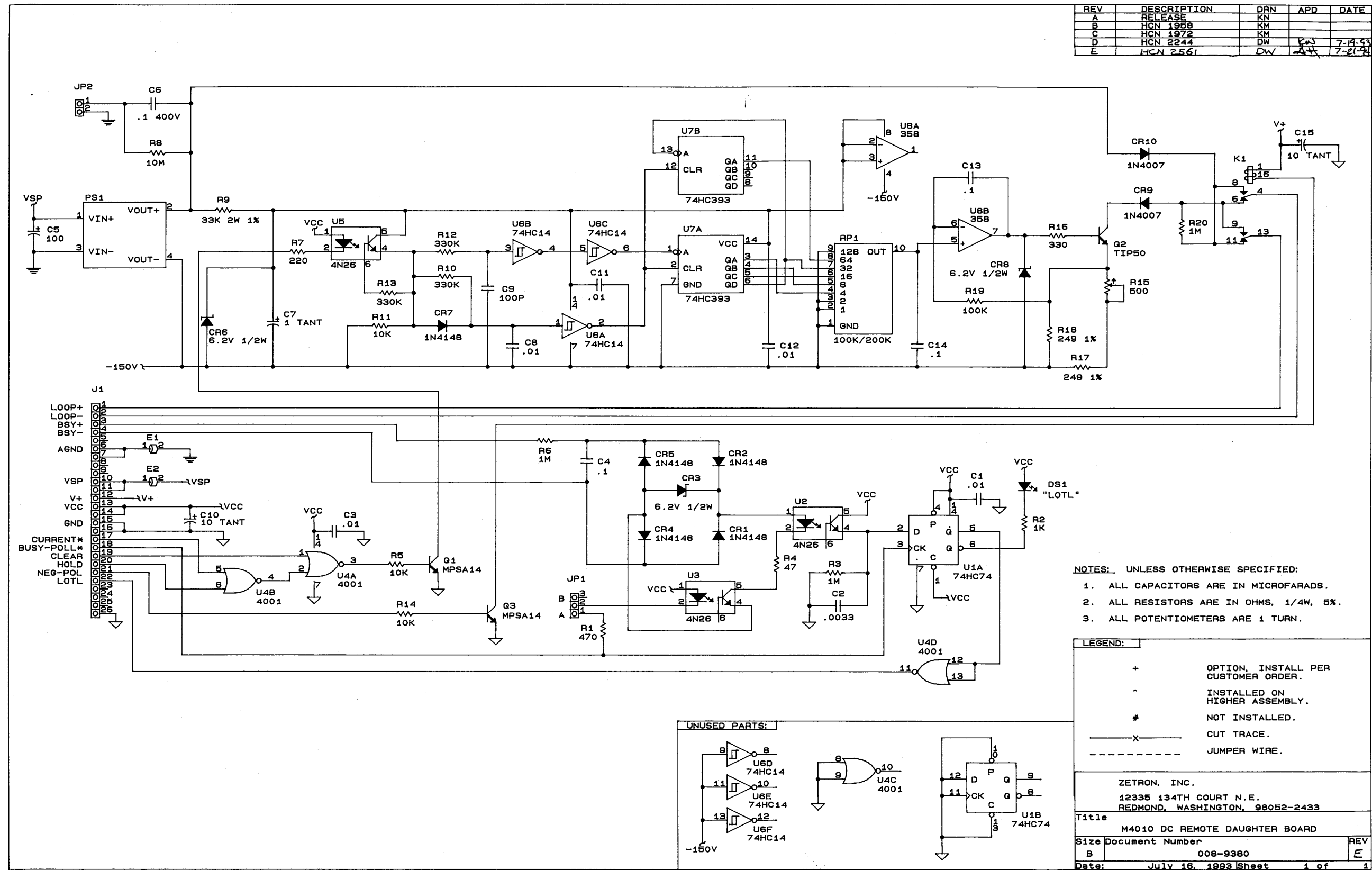
Item	Qty	Reference	Part	Description	Mfg.Part No.
1	1	R4	101-0047	47 OHM 1/4W 5% CARBON FILM	
2	1	R7	101-0057	220 OHM 1/4W 5% CARBON FILM	
3	1	R16	101-0061	330 OHM 1/4W 5% CARBON FILM	
4	1	R1	101-0065	470 OHM 1/4W 5% CARBON FILM	
5	1	R2	101-0073	1K 1/4W 5% CARBON FILM	
6	3	R5,R11,R14	101-0097	10K 1/4W 5% CARBON FILM	
7	1	R19	101-0121	100K 1/4W 5% CARBON FILM	
8	3	R10,R12,R13	101-0133	330K 1/4W 5% CARBON FILM	
9	3	R3,R6,R20	101-0145	1M 1/4W 5% CARBON FILM	
10	1	R8	101-0160	10M 1/4W 5% CARBON FILM	
11	1	R9	103-3312	33K 2W 5% CARBON FILM	
12	2	R18,R17	104-0047	249 OHM 1/4W 1%	
13	1	R15	107-0004	500 POT 1 TURN R/A	
14	1	RP1	119-0021	R/2R 100K/200K 10 PIN SIP	
15	1	C9	151-0010	100PF 100V/200V +-10%/5% CERAMIC NPO	
16	1	C2	151-0091	.0033UF 100V +-5% CERAMIC NPO	
17	5	C1,C3,C8,C11,C12	151-0120	.01UF 50V +-10% CERAMIC X7R	
18	2	C13,C14	151-0180	.1UF 50V +-20% CERAMIC Z5U	
19	1	C4	151-0181	.1UF 50V +-10% CERAMIC X7R	
20	1	C6	152-0011	.1 UF 400V +-10% POLYESTER	
21	1	C7	154-0025	1 UF 35V TANTALUM +- 10%	
22	2	C15,C10	154-0100	10 UF 16V TANTALUM +-10%	
23	1	C5	155-0077	100UF 25V +-20% RADIAL ALUMINUM ELECTROLYTIC	
24	2	E1,E2	305-0001	FERRITE BEADS W/ LEADS	
25	3	U2,U3,U5	311-0008	OPTO ISOLATOR	4N26
26	1	DS1	311-0010	LED RED DIFFUSED TI-3/4	
27	1	U8	316-0358	OP-AMP, DUAL	358
28	1	U4	323-4001	QUAD NOR GATE	4001
29	1	U7	324-4393	DUAL 4 BIT COUNTER	74HC393
30	1	U6	324-7414	HEX SCHMIDT	74HC14
31	1	U1	324-7474	DUAL D FLIP FLOP	74HC74
32	2	Q1,Q3	340-0014	NPN DARLINGTON	MPSA14
33	1	Q2	340-0050	400V 1A NPN	TIP50
34	5	CR1,CR2,CR4,CR5,CR7	342-3009	SILICON	1N4148
35	2	CR10,CR9	342-3011	SILICON 1A 1000V	1N4007
36	3	CR3,CR6,CR8	343-3017	1/2 6.2V 5%	1N5234B
37	1	K1	380-0030	DPDT 12V COIL MINI RELAY 360OHM	
38	1	JP2	403-0002	2 OF 401-0052	
39	1	JP1	403-0003	3 OF 401-0052	
40	1	J1	405-1026	26 OF 401-0065	
41	1	PS1	802-0090	DC-DC CONVERTER, 3W, 150V	
42	3	XQ2,STUDS (NOTE 2)	210-0001	440 KEPT NUT PLATED	
43	1	XQ2	220-0102	440 X 3/8 PAN PHILLIPS	
44	2	STUDS (NOTE 2)	220-0108	440X1/4 PAN PHILLIPS	
45	2	(NOTE 2)	250-0103	440x3/4 W/STUD	
46	1	XQ2	381-0010	HEATSINK TO-220 BLACK	
47	1	XJP1 (POS A)	402-3040	MINI JUMPER	
48	3	XU2,XU3,XU5	407-0006	SKT, 06 PIN DIP	
49	1	XU8	407-0008	SKT, 08 PIN DIP	
50	4	XU1,XU4,XU6,XU7	407-0014	SKT, 14 PIN DIP	
51	1	DS1	417-0010	LED MOUNT RA	
52	1	PCB	410-9380B	MODEL 4010 DC REMOTE DAUGHTER BOARD	

NOTES: (Notes are for production use only.)

DC Remote Daughter Board Silkscreen



DC Remote Daughter Board Schematic (008-9380E)



TONE REMOTE SYSTEM ADAPTER OPTION (950-9717)

Tone Remote System Adapter Parts List (702-9433B)

LEGEND:

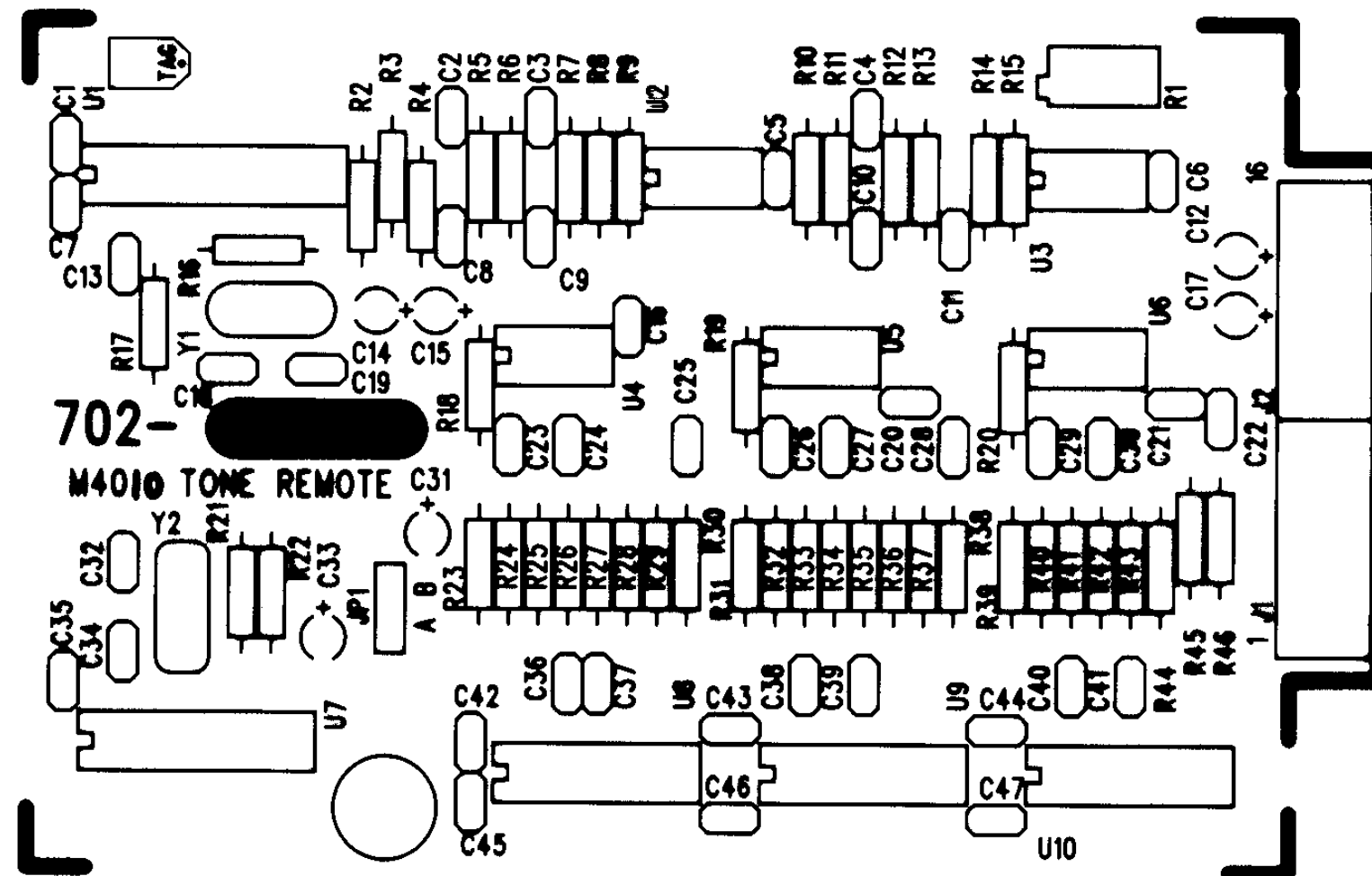
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
+ = OPTION (INSTALLED PER CUSTOMER ORDER)

ZETRON MODEL 4010 TONE REMOTE SYSTEM ADAPTER PART LIST (702-9433B)

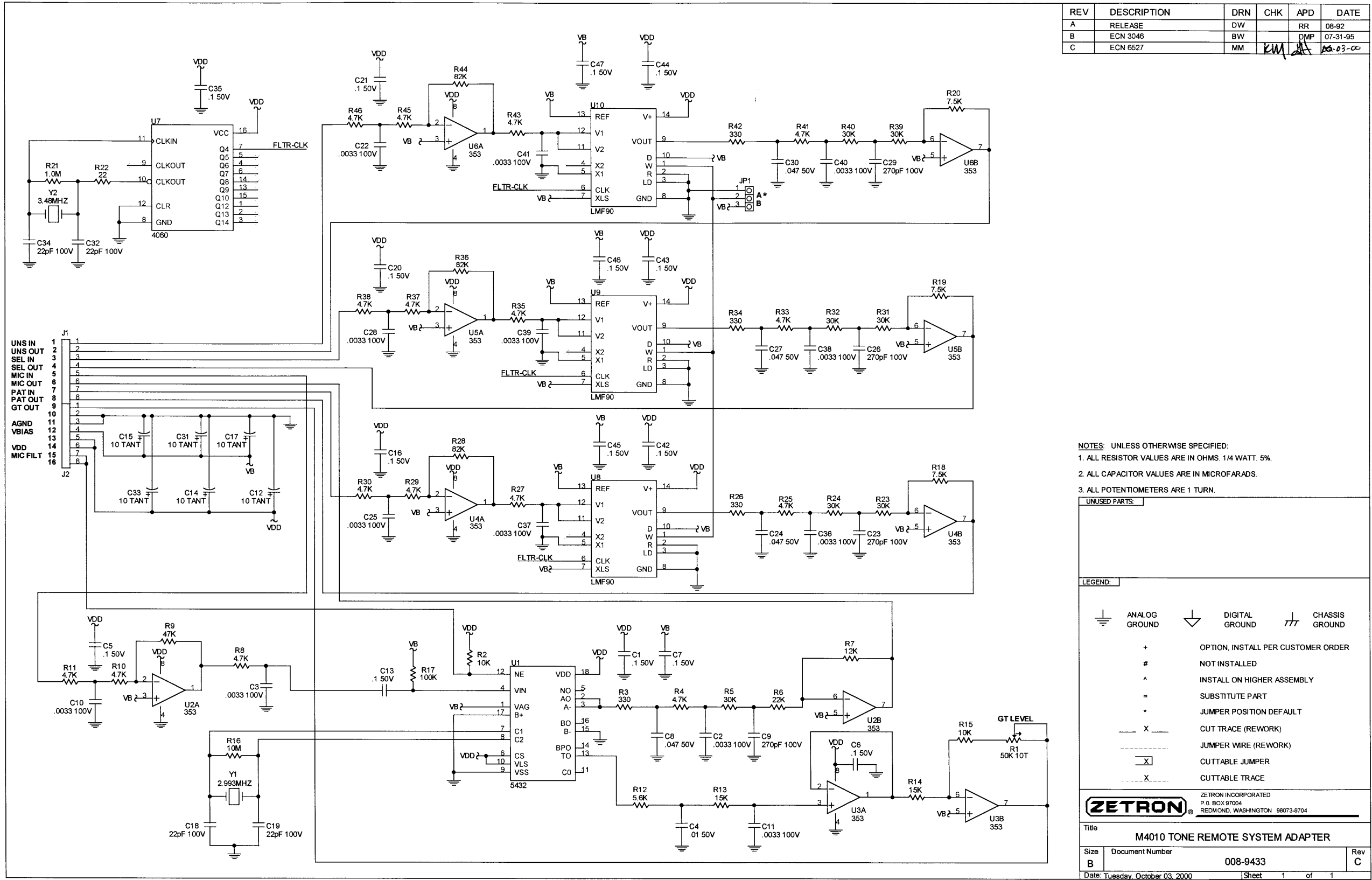
Item	Qty	Reference	Part	Description	Mfg.Part No.
1	1	R22	101-0033	22 OHM 1/4W 5% CARBON FILM	
2	4	R3,R26,R34,R42	101-0061	330 OHM 1/4W 5% CARBON FILM	
3	16	R4,R8,R10,R11,R25, R27,R29,R30,R33,R35, R37,R38,R41,R43,R45,R46	101-0089	4.7K 1/4W 5% CARBON FILM	
4	1	R12	101-0091	5.6K 1/4W 5% CARBON FILM	
5	3	R18,R19,R20	101-0094	7.5K 1/4W 5% CARBON FILM	
6	2	R2,R15	101-0097	10K 1/4W 5% CARBON FILM	
7	1	R7	101-0099	12K 1/4W 5% CARBON FILM	
8	2	R13,R14	101-0101	15K 1/4W 5% CARBON FILM	
9	1	R6	101-0105	22K 1/4W 5% CARBON FILM	
10	7	R5,R23,R24,R31,R32, R39,R40	101-0108	30K 1/4W 5% CARBON FILM	
11	1	R9	101-0113	47K 1/4W 5% CARBON FILM	
12	3	R28,R36,R44	101-0119	82K 1/4W 5% CARBON FILM	
13	1	R17	101-0121	100K 1/4W 5% CARBON FILM	
14	1	R21	101-0145	1M 1/4W 5% CARBON FILM	
15	1	R16	101-0160	10M 1/4W 5% CARBON FILM	
16	1	R1	108-1503	50K POT 10 TURN R/A	3296X-1-1503
17	4	C18,C19,C32,C34	151-0022	22PF 50V +-10%	CN15C220K
18	4	C9,C23,C26,C29	151-0027	270 PF 50V +-10% CERAMIC, TEMP. STABLE	CW15C271K
19	13	C2,C3,C10,C11,C22, C25,C28,C36,C37,C38, C39,C40,C41	151-0090	.0033 UF 50V +-10% CERAMIC, TEMP. STABLE	CW15C332K
20	1	C4	151-0120	.01 UF 50V +-10% CERAMIC, TEMP. STABLE	CW15C103K
21	4	C8,C24,C27,C30	151-0130	.047 UF 50V +-10% CERAMIC, TEMP. STABLE	CW20C473M
22	15	C1,C5,C6,C7,C13, C16,C20,C21,C35,C42, C43,C44,C45,C46,C47	151-0180	.1 UF 50V +-10% CERAMIC, UNSTABLE	AVXSR205E104MAA
23	6	C12,C14,C15,C17, C31,C33	154-0100	10 UF 16V TANTALUM	ECS-FICE106K
30	3	U8,U9,U10	316-0090	SWITCHED NOTCH FILTER	LMF90CCM
24	5	U2,U3,U4,U5,U6	316-0353	DUAL OP-AMP, DUAL BIFET	LF353
25	1	U1	316-5432	SF FILTER	MC145432P
29	1	U7	323-4060	14 BIT COUNTER	MC14060B
31	1	Y2	376-0348	3.48MHZ, HC-18 CASE	FOX3.48MHZ
26	1	Y1 NOTE 2	376-2993	CRYSTAL	CCL-6-2.993MHzP32
27	2	J1,J2	401-0168	CON SHELL 8 PIN R/A	22-15-2086
28	1	JP1	403-0003	3 OF 401-0052	
29	1	BRACKET	210-0001	440 KEPT NUT PLATED	
30	1	BRACKET	220-0108	440 X 1/4 PAN PHILLIPS	
30.5	1	BRACKET	220-0199	632x1/4 PAN HD PHIL, BLACK	
32	1	NOTE 1	401-0614	BRACKET, RA, #6-32 TAP	
33	1	XJP1 (POS A)	402-3040	MINI JUMPER	
34	5	XU2,XU3,XU4,XU5,XU6	407-0008	SKT, 08 PIN DIP	
35	3	XU8,XU9,XU10	407-0014	SKT, 14 PIN DIP	
36	1	XU7	407-0016	SKT, 16 PIN DIP	
37	1	XU1	407-0018	SKT, 18 PIN DIP	
38	1	PCB	410-9433A	PCB, M4010 TONE REMOTE SYSTEM ADAPTER	

NOTES: (Notes are for production use only.)

Tone Remote System Adapter Silkscreen



Tone Remote System Adapter Schematic (008-9433C)



TONE REMOTE SYSTEM ADAPTER OPTION (950-0255)

Tone Remote Board Parts List (702-0037A)

LEGEND:
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

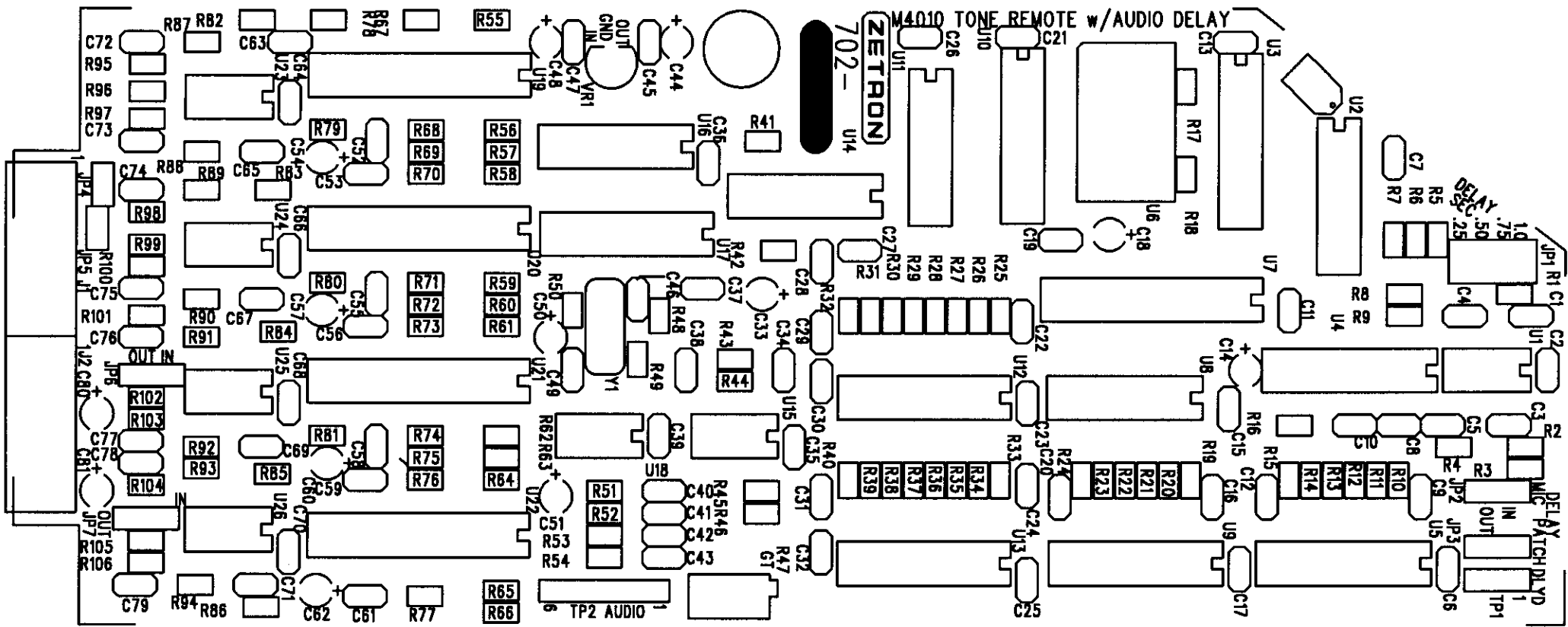
ZETRON MODEL 4010 TONE REMOTE BOARD PARTS LIST:

Item	Qty	Reference	Part	Description	Mfg.Part No.
1	1	R47	108-1503	POT,50K OHM,10 TURN,R/A	50K 10T
2	1	R50	109-0020	RESISTOR,33 OHM,1/8W,5%,CARBON FILM	33 1/8W
3	0	R53#,R54#	109-0059	RESISTOR,270 OHM,1/8W,5%,CARBON FILM	270 1/8W
4	0	R13#,R22#,R25#,R29#,R33#,R37#	109-0073	RESISTOR,1.0K OHM,1/8W,5%,CARBON FILM	1.0K 1/8W
5	0	R12#,R21#,R28#,R36#	109-0080	RESISTOR,2.0K OHM,1/8W,5%,CARBON FILM	2.0K 1/8W
6	0	R14#,R23#,R30#,R38#	109-0085	RESISTOR,3.3K OHM,1/8W,5%,CARBON FILM	3.3K 1/8W
7	9	R51,R87,R89,R91,R93,R95,R98,R101,R104	109-0087	RESISTOR,4.3K OHM,1/8W,5%,CARBON FILM	4.3K 1/8W
8	20	R56,R59,R62,R65,R67,R68,R69,R70,R71,R72,R73,R74,R75,R76,R77,R78,R79,R80,R81,R86	109-0089	RESISTOR,4.7K OHM,1/8W,5%,CARBON FILM	4.7K 1/8W
9	1	R45	109-0094	RESISTOR,7.5K OHM,1/8W,5%,CARBON FILM	7.5K 1/8W
10	7	R1#,R2#,R4#,R5#,R6#,R7#,R9#,R16#,R17#,R18#,R44,R48,R52,R82,R83,R84,R85	109-0097	RESISTOR,10K OHM,1/8W,5%,CARBON FILM	10K 1/8W
11	1	R43	109-0098	RESISTOR,12K OHM,1/8W,5%,CARBON FILM	12K 1/8W
12	0	R15#,R24#,R31#,R39#	109-0105	RESISTOR,22K OHM,1/8W,5%,CARBON FILM	22K 1/8W
13	9	R46,R88,R90,R92,R94,R97,R100,R103,R106	109-0108	RESISTOR,30K OHM,1/8W,5%,CARBON FILM	30K 1/8W
14	0	R32#,R40#	109-0113	RESISTOR,47K OHM,1/8W,5%,CARBON FILM	47K 1/8W
15	4	R96,R99,R102,R105	109-0116	RESISTOR,62K OHM,1/8W,5%,CARBON FILM	62K 1/8W
16	8	R55,R57,R58,R60,R61,R63,R64,R66	109-0118	RESISTOR,75K OHM,1/8W,5%,CARBON FILM	75K 1/8W
17	0	R3#,R8#,R11#,R20#,R26#,R34#,R42#	109-0121	RESISTOR,100K OHM,1/8W,5%,CARBON FILM	100K 1/8W
18	2	R49,R41	109-0145	RESISTOR,1.0M OHM,1/8W,5%,CARBON FILM	1.0M 1/8W
19	0	R10#,R19#,R27#,R35#	109-0160	RESISTOR,10M OHM,1/8W,5%,CARBON FILM	10M 1/8W
20	2	C49,C46	151-0022	CAP,22pF,100V,10%,CERAMIC,NPO	22pF 100V
21	4	C73,C75,C77,C79	151-0028	CAP,270pF,100V,5%,CERAMIC,NPO	270pF 100V
22	0	C5#,C4#	151-0080	CAP,.0022uF,100V,10%,CERAMIC,X7R	.0022 100V
23	5	C8#,C10#,C41,C42#,C43#,C52,C55,C58,C61	151-0085	CAP,.22uF,50V,20%,CERAMIC Z5U	.22 50V
24	9	C38,C65,C67,C69,C71,C72,C74,C76,C78	151-0090	CAP,.0033uF,100V,10%,CERAMIC,X7R	.0033 100V
25	0	C1#,C3#	151-0095	CAP,.0047uF,100V,10%,CERAMIC X7R	.0047 100V
26	2	C40,C34	151-0120	CAP,.01uF,50V,10%,CERAMIC,X7R	.01 50V
27	0	C9#,C12#,C16#,C20#,C22#,C24#,C30#,C32#	151-0130	CAP,.047uF,50V,10%,CERAMIC,X7R	.047
28	16	C2#,C6#,C7#,C11#,C13#,C15,C17#,C19#,C21#,C23#,C25#,C26#,C27,C28#,C29#,C31#,C35,C36,C37,C39,C45,C47,C53,C56,C59,C63,C64,C66,C68,C70	151-0180	CAP,.1uF,50V,20%,CERAMIC,Z5U	.1 50V
29	4	C54,C57,C60,C62	154-0035	CAP,2.2uF,25V,10%,TANTALUM	2.2 TANT
30	8	C14,C18#,C33,C44,C48,C50,C51,C80,C81	154-0100	CAP,10uF,16V,10%,TANTALUM	10 TANT 16V
31	1	VR1	316-0005	REGULATOR,5V,LOW POWER,TO-92	78L05
32	4	U19,U20,U21,U22	316-0010	FILTER,UNIVERSAL,SWITCHED CAPACITOR,DUAL,DIP-20	C10
33	6	U1#,U15,U18,U23,U24,U25,U26	316-0353	OP-AMP,BIFET,DUAL,DIP-8	353
34	0	U6#	321-1400	DRAM,1M x 4,80nS,16mS REFRESH,SOJ	1M x 4 DRAM
35	0	U7#	322-0025	PEEL,18CV8,DIP-20	18CV8 PEEL
36	0	U5#,U9#,U12#,U13#	323-3418	CVSD VOICE DIGITIZER,DIP-16	MC3418
37	0	U4#	324-4053	MUX/DEMUX,ANALOG,2 INPUT,TRIPLE,DIP-16	HC4053

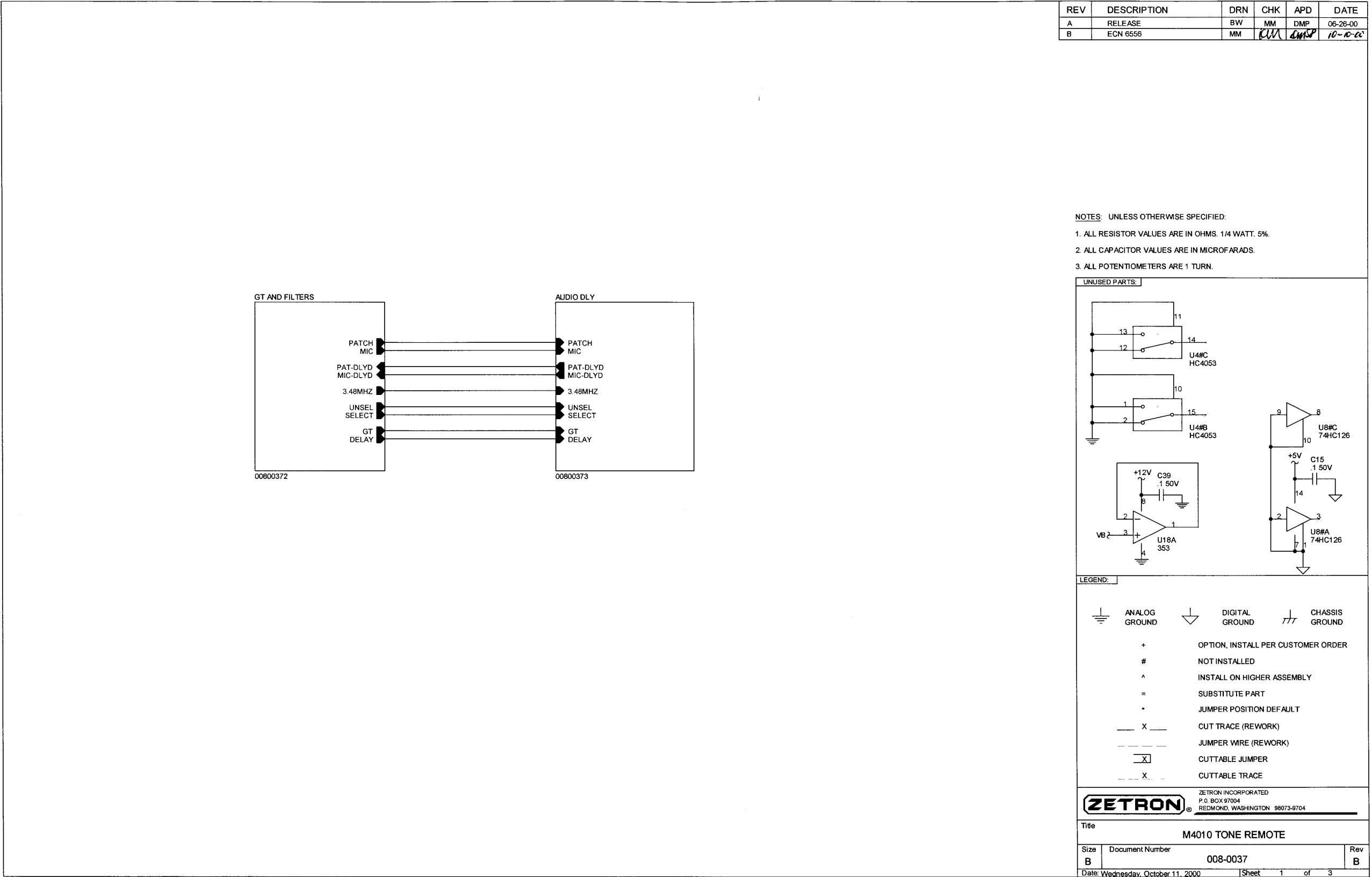
Model 4010 Radio Dispatch Console Service Manual

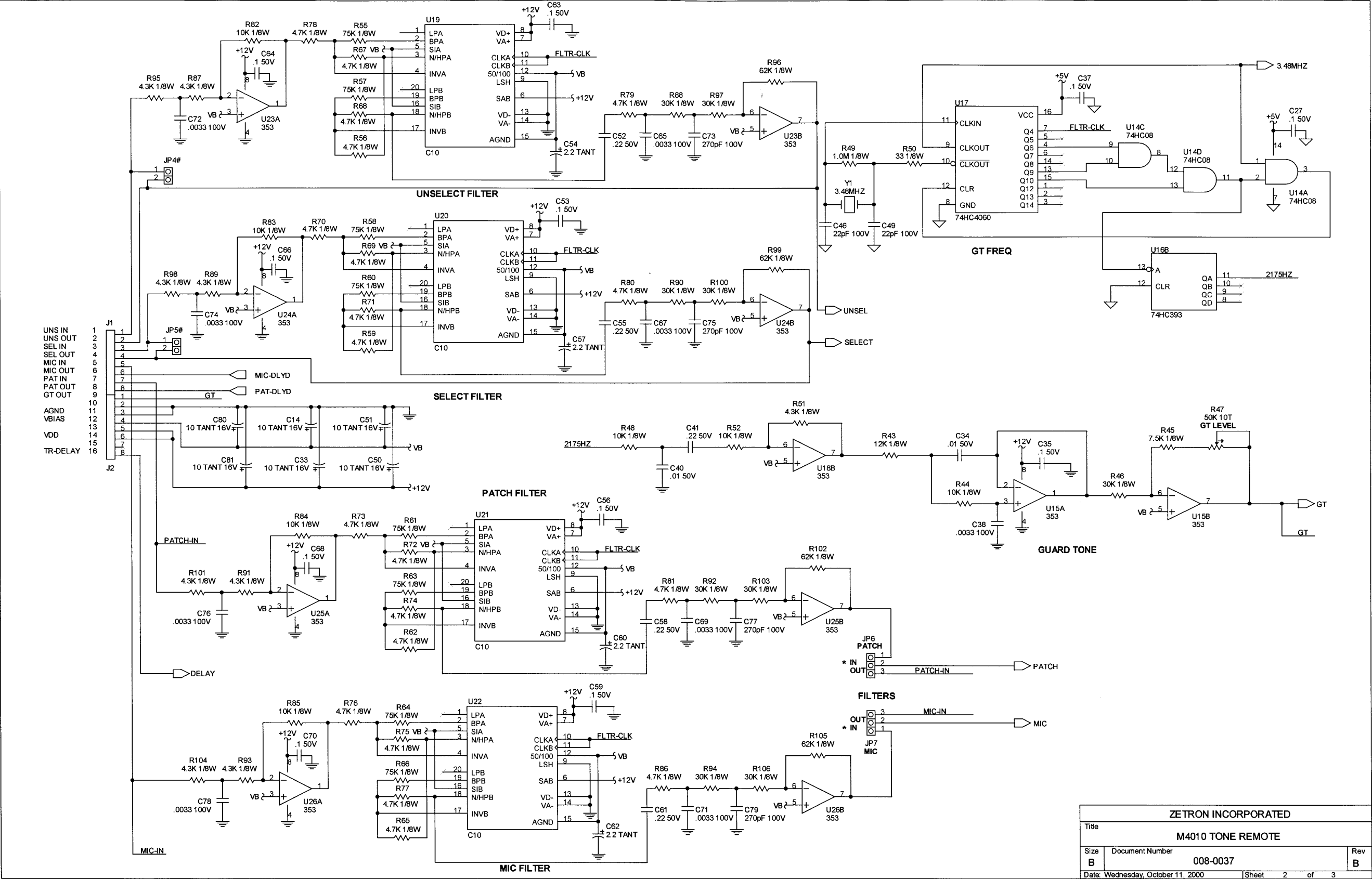
38	1	U17	324-4060	COUNTER, BINARY, RIPPLE, 14-BIT, W/OSCILLATOR	74HC4060
39	0	U8#	324-4126	BUFFER, 3-STATE, ACT. HI OUTPUT ENAB., QUAD	74HC126
40	0	U10#, U3#	324-4157	MUX, 2 INPUT, QUAD, DIP-16	74HC157
41	1	U2#, U11#, U16	324-4393	COUNTER, HC, 4-BIT, DUAL	74HC393
42	1	U14	324-7408	AND, HC, 2 INPUT, QUAD, DIP-14	74HC08
43	1	Y1	376-0348	XTAL, 3.48MHZ, HC-18	3.48MHZ
44	2	J1, J2	401-0168	CONN, SHELL, 8, PIN R/A	
45	0	JP5#, JP4#	403-0002	02 OF 401-0052	
46	2	TP1#, JP2#, JP3#, JP6, JP7	403-0003	03 OF 401-0052	
47	1	TP2	403-0006	06 OF 401-0052	
48	0	JP1#	403-0204	08 OF 401-0552 [4 x 2]	
49	2	XJP6, 7 (POS IN)	402-3040	MINI JUMPER, .1 X .2 X .37"	
50	2	XJP2, 3 (POS OUT)	408-0001	WIRE JUMPER	
51	1	PCB	410-9896B	MODEL 4010 TONE REMOTE W/AUDIO DELAY	

Tone Remote Board Silkscreen

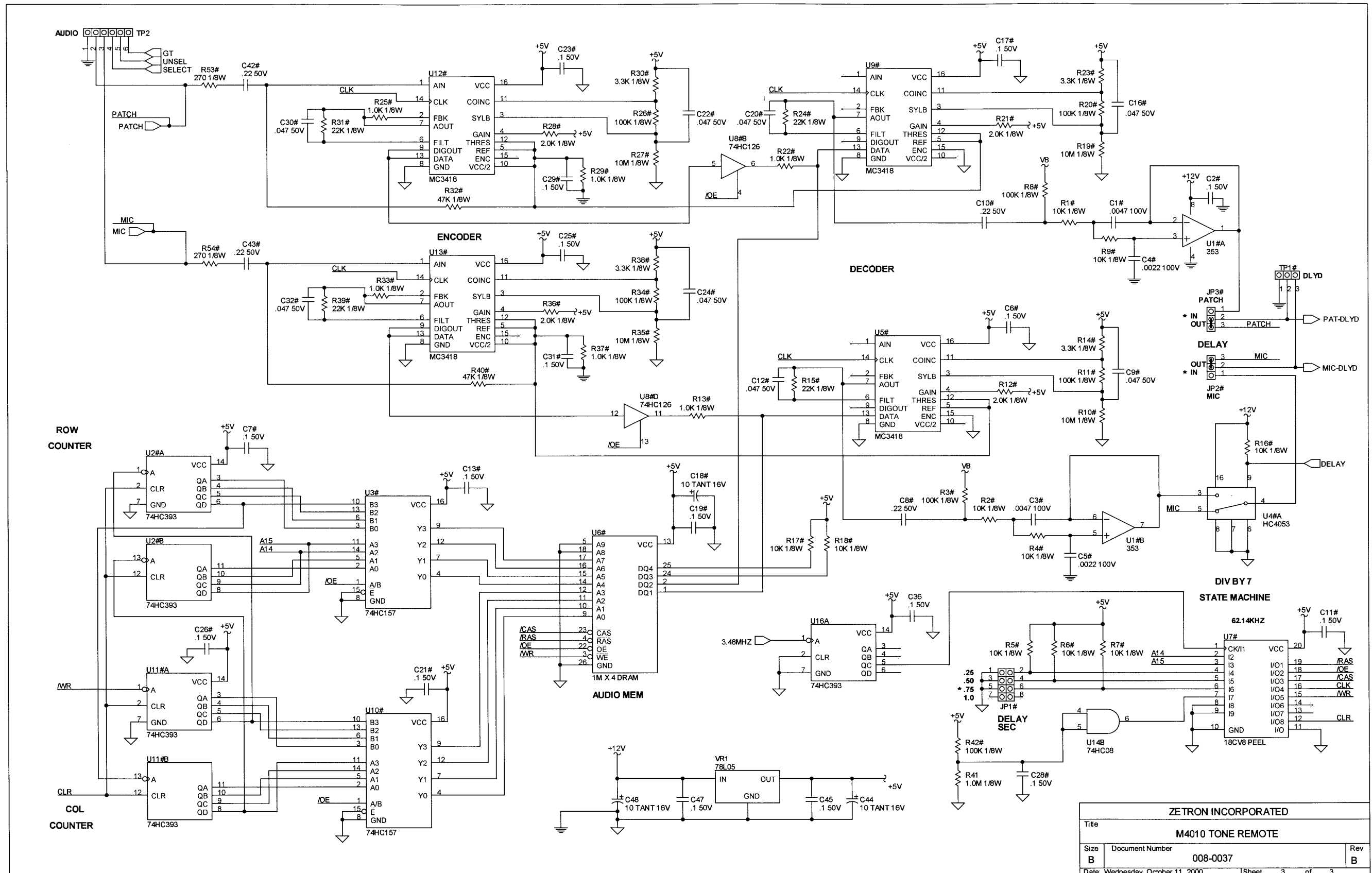


Tone Remote Board Schematic (008-0037A)





ZETRON INCORPORATED		
Title		
M4010 TONE REMOTE		
Size	Document Number	Rev
B	008-0037	B
Date: Wednesday, October 11, 2000		
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ZETRON INCORPORATED			
Title			
M4010 TONE REMOTE			
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TONE REMOTE WITH AUDIO DELAY OPTION (950-9922)

Tone Remote w/Audio Delay Parts List (702-9896C)

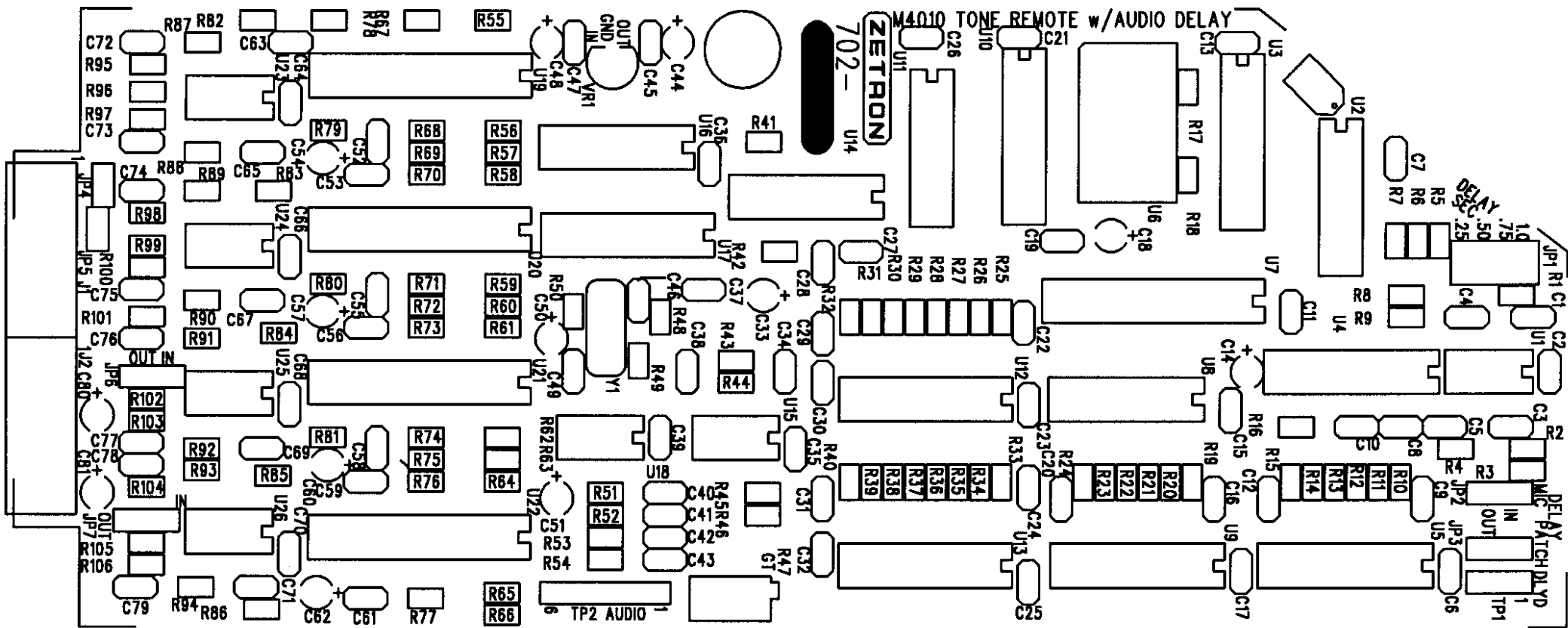
LEGEND :
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

ZETRON MODEL 4010 TONE REMOTE W/AUDIO DELAY PARTS LIST: 702-9896

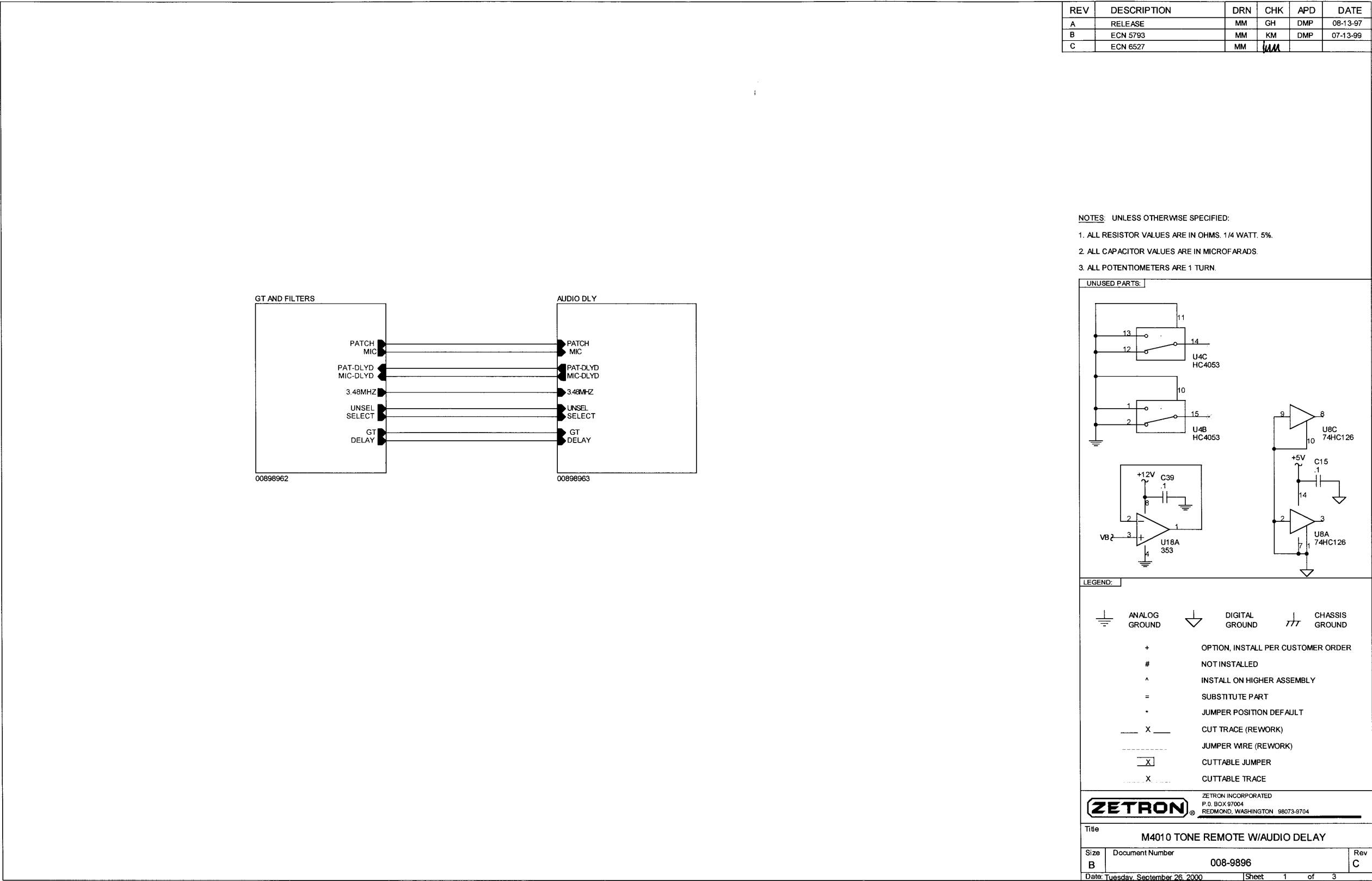
Item	Qty	Reference	Part No.	Description	Part Value
1	1	R47	108-1503	POT,50K OHM,10 TURN,R/A	50K 10T
2	1	R50	109-0020	RESISTOR,33 OHM,1/8W,5%,CARBON FILM	33 1/8W
3	2	R54,R53	109-0059	RESISTOR,270 OHM,1/8W,5%,CARBON FILM	270 1/8W
4	6	R13,R22,R25,R29,R33,R37	109-0073	RESISTOR,1.0K OHM,1/8W,5%,CARBON FILM	1.0K 1/8W
5	4	R12,R21,R28,R36	109-0080	RESISTOR,2.0K OHM,1/8W,5%,CARBON FILM	2.0K 1/8W
6	4	R14,R23,R30,R38	109-0085	RESISTOR,3.3K OHM,1/8W,5%,CARBON FILM	3.3K 1/8W
7	9	R51,R87,R89,R91,R93,R95,R98,R101,R104	109-0087	RESISTOR,4.3K OHM,1/8W,5%,CARBON FILM	4.3K 1/8W
8	20	R56,R59,R62,R65,R67,R68,R69,R70,R71,R72,R73,R74,R75,R76,R77,R78,R79,R80,R81,R86	109-0089	RESISTOR,4.7K OHM,1/8W,5%,CARBON FILM	4.7K 1/8W
9	1	R45	109-0094	RESISTOR,7.5K OHM,1/8W,5%,CARBON FILM	7.5K 1/8W
10	17	R1,R2,R4,R5,R6,R7,R9,R16,R17,R18,R44,R48,R52,R82,R83,R84,R85	109-0097	RESISTOR,10K OHM,1/8W,5%,CARBON FILM	10K 1/8W
11	1	R43	109-0098	RESISTOR,12K OHM,1/8W,5%,CARBON FILM	12K 1/8W
12	4	R15,R24,R31,R39	109-0105	RESISTOR,22K OHM,1/8W,5%,CARBON FILM	22K 1/8W
13	9	R46,R88,R90,R92,R94,R97,R100,R103,R106	109-0108	RESISTOR,30K OHM,1/8W,5%,CARBON FILM	30K 1/8W
14	2	R40,R32	109-0113	RESISTOR,47K OHM,1/8W,5%,CARBON FILM	47K 1/8W
15	4	R96,R99,R102,R105	109-0116	RESISTOR,62K OHM,1/8W,5%,CARBON FILM	62K 1/8W
16	8	R55,R57,R58,R60,R61,R63,R64,R66	109-0118	RESISTOR,75K OHM,1/8W,5%,CARBON FILM	75K 1/8W
17	7	R3,R8,R11,R20,R26,R34,R42	109-0121	RESISTOR,100K OHM,1/8W,5%,CARBON FILM	100K 1/8W
18	2	R49,R41	109-0145	RESISTOR,1.0M OHM,1/8W,5%,CARBON FILM	1.0M 1/8W
19	4	R10,R19,R27,R35	109-0160	RESISTOR,10M OHM,1/8W,5%,CARBON FILM	10M 1/8W
20	2	C46,C49	151-0022	CAP,22pF,100V,10%,CERAMIC NPO	22pF
21	4	C73,C75,C77,C79	151-0028	CAP,270pF,100V,5%,CERAMIC NPO	270pF
22	2	C4,C5	151-0080	CAP,.0022uF,100V,10%,CERAMIC X7R	.0022
23	9	C8,C10,C41,C42,C43,C52,C55,C58,C61	151-0085	CAP,.22uF,50V,20%,CERAMIC Z5U	.22
24	9	C38,C65,C67,C69,C71,C72,C74,C76,C78	151-0090	CAP,.0033uF,100V,10%,CERAMIC X7R	.0033
25	2	C1,C3	151-0095	CAP,.0047uF,100V,10%,CERAMIC X7R	.0047
26	2	C34,C40	151-0120	CAP,.01uF,50V,10%,CERAMIC X7R	.01
27	8	C9,C12,C16,C20,C22,C24,C30,C32	151-0130	CAP,.047uF,50V,10%,CERAMIC X7R	.047
28	30	C2,C6,C7,C11,C13,C15,C17,C19,C21,C23,C25,C26,C27,C28,C29,C31,C35,C36,C37,C39,C45,C47,C53,C56,C59,C63,C64,C66,C68,C70	151-0180	CAP,.1uF,50V,20%,CERAMIC Z5U	.1
29	4	C54,C57,C60,C62	154-0035	CAP,2.2uF,25V,10%,TANTALUM	2.2 TANT
30	9	C14,C18,C33,C44,C48,C50,C51,C80,C81	154-0100	CAP,10uF,16V,10%,TANTALUM	10 TANT
31	1	VR1	316-0005	REGULATOR,5V,LOW POWER,TO-92	78L05
32	4	U19,U20,U21,U22	316-0010	FILTER,UNIVERSAL,SWITCHED CAPACITOR,DUAL,DIP-20	C10
33	7	U1,U15,U18,U23,U24,U25,U26	316-0353	OP-AMP,BIFET,DUAL,DIP-8	353
34	1	U6	321-1400	DRAM,1M x 4,80nS,16mS REFRESH,SOJ	1M x 4 DRAM
35	0	U7^	322-0025	PEEL,18CV8,DIP-20	18CV8 PEEL
36	4	U5,U9,U12,U13	323-3418	CVSD VOICE DIGITIZER,DIP-16	MC3418
37	1	U4	324-4053	MUX/DEMUX,ANALOG,2 INPUT,TRIPLE,DIP-16	HC4053
38	1	U17	324-4060	COUNTER,BINARY,RIPPLE,14-BIT,W/OSC.	74HC4060
39	1	U8	324-4126	BUFFER,3-STATE,ACTIVE HI OUTPUT ENAB.,QUAD	74HC126

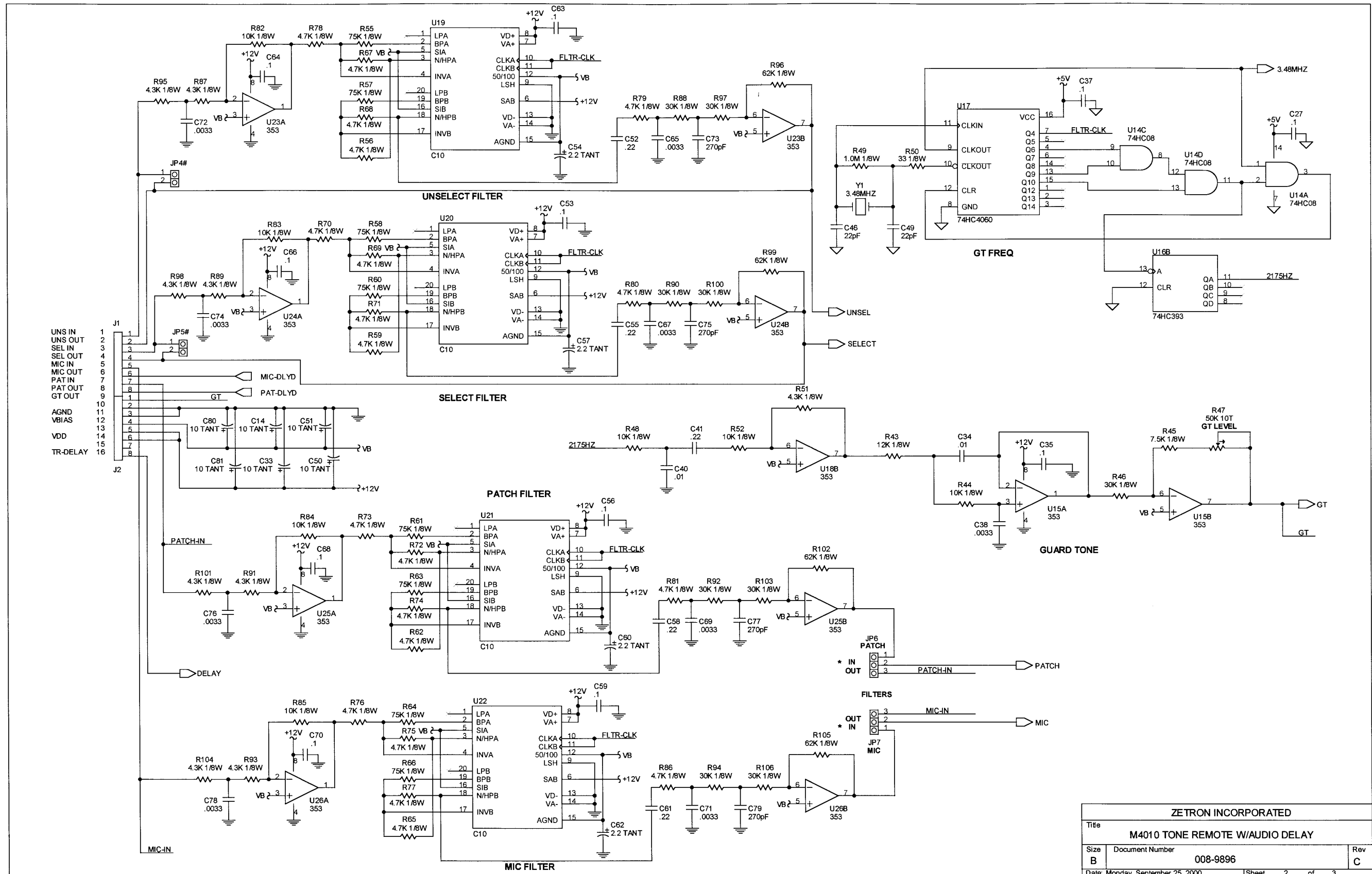
40	2	U3,U10	324-4157	MUX,2 INPUT,QUAD,DIP-16	74HC157
41	3	U2,U11,U16	324-4393	COUNTER,HC,4-BIT,DUAL	74HC393
42	1	U14	324-7408	AND,HC,2 INPUT,QUAD,DIP-14	74HC08
43	1	Y1	376-0348	XTAL,3.48MHZ,HC-18	3.48MHZ
44	2	J2,J1	401-0400	CONN,8 POS, 0.1" FEMALE, PC-RA, GOLD	
45	0	JP4#,JP5#	403-0002	02 OF 401-0052	
46	5	TP1,JP2,JP3,JP6,JP7	403-0003	03 OF 401-0052	
47	1	TP2	403-0006	06 OF 401-0052	
48	1	JP1	403-0204	08 OF 401-0552 [4 x 2]	
49	5	XJP2,3,6,7 (POS IN) XJP1 (POS .75)	402-3040	MINI JUMPER, .1 X .2 X .37"	
50	1	XU7	407-0020	SKT, 20 PIN DIP	
51	1	PCB	410-9896B	MODEL 4010 TONE REMOTE W/AUDIO DELAY	

Tone Remote w/Audio Delay Silkscreen

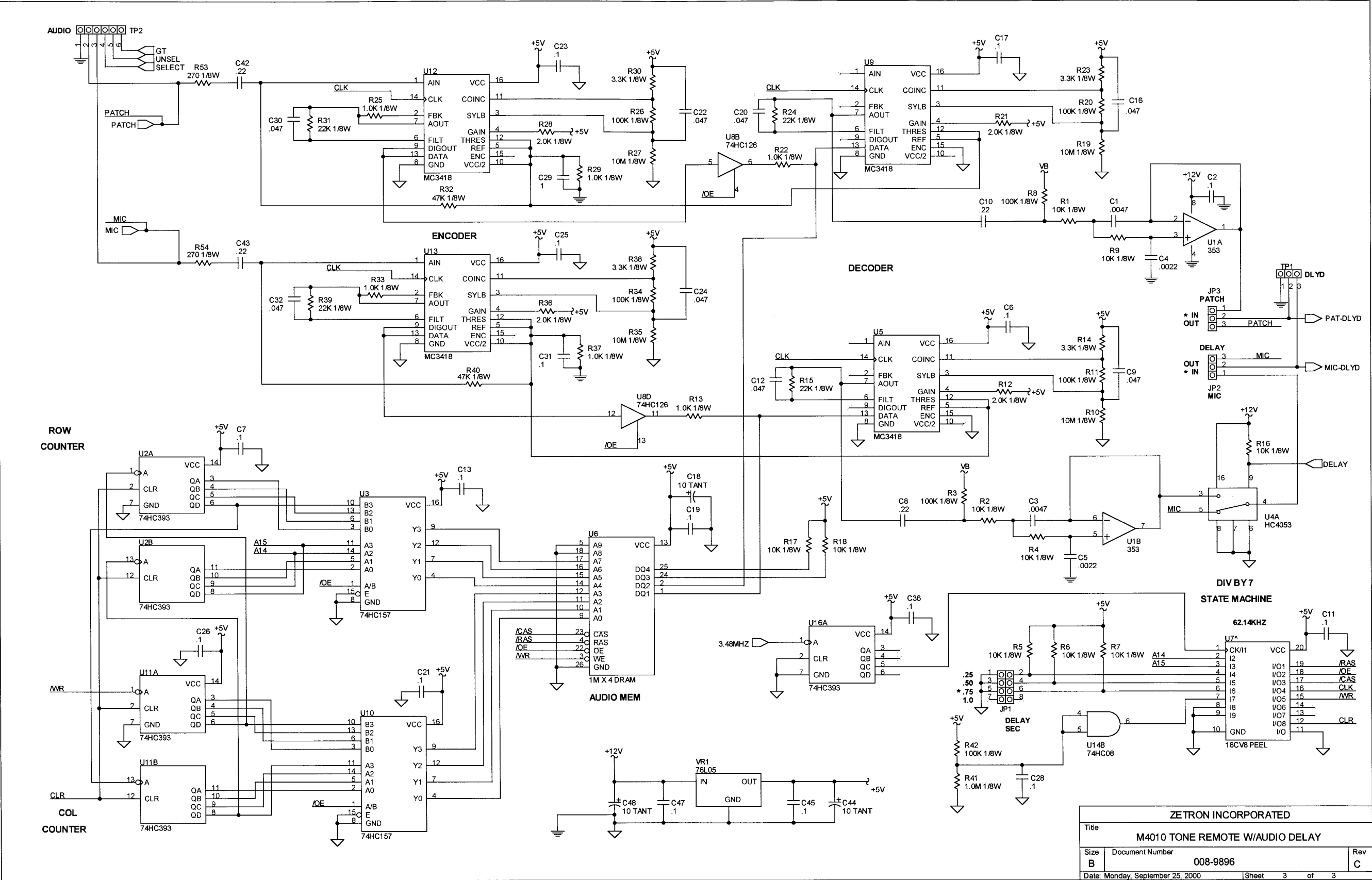


Tone Remote w/Audio Delay Schematic (008-9896C)





ZETRON INCORPORATED			
Title	M4010 TONE REMOTE W/AUDIO DELAY		
Size	Document Number	008-9896	Rev C
B			
Date: Monday, September 25, 2000		Sheet	2 of 3



TONE REMOTE LOTL OPTION (950-9718)

Tone Remote LOTL Board Part List (702-9450D.1)

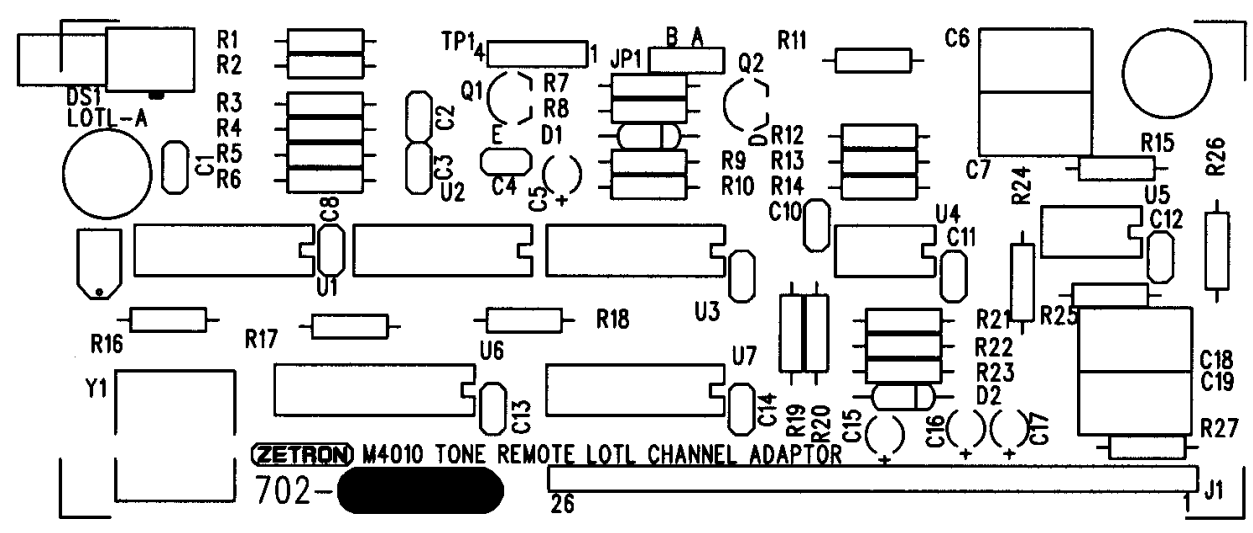
LEGEND:
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= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

ZETRON MODEL 4010 TONE REMOTE LOTL DAUGHTER BOARD PARTS LIST:

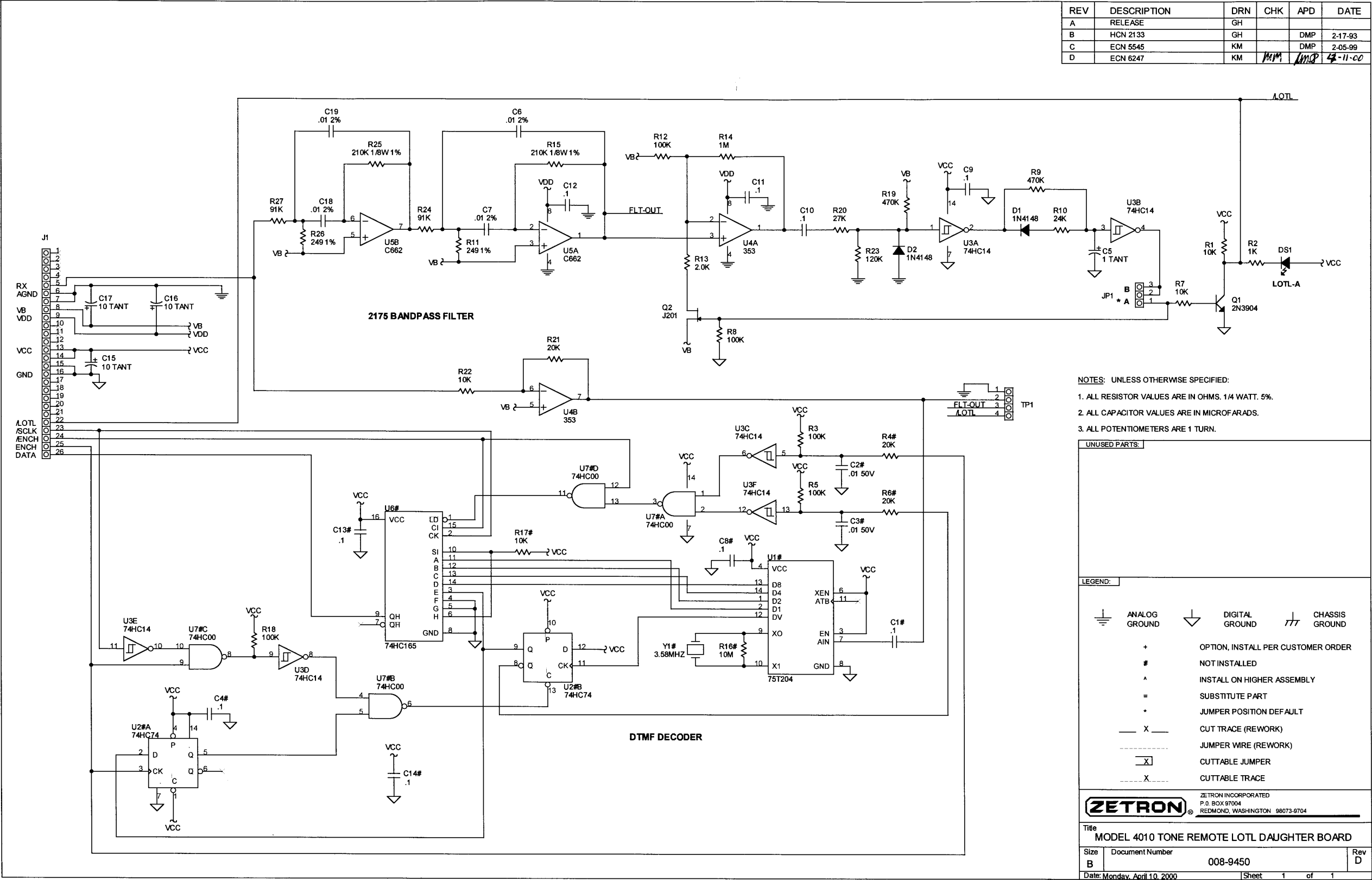
Item	Qty	Reference	Part No.	Description	Part Value
1	1	R2	101-0073	RESISTOR,1.0K OHM,1/4W,5%,CARBON FILM	1.0K
2	1	R13	101-0080	RESISTOR,2.0K OHM,1/4W,5%,CARBON FILM	2.0K
3	3	R1,R7,R17#,R22	101-0097	RESISTOR,10K OHM,1/4W,5%,CARBON FILM	10K
4	1	R4#,R6#,R21	101-0104	RESISTOR,20K OHM,1/4W,5%,CARBON FILM	20K
5	1	R10	101-0106	RESISTOR,24K OHM,1/4W,5%,CARBON FILM	24K
6	1	R20	101-0107	RESISTOR,27K OHM,1/4W,5%,CARBON FILM	27K
7	2	R24,R27	101-0120	RESISTOR,91K OHM,1/4W,5%,CARBON FILM	91K
8	5	R3,R5,R8,R12,R18	101-0121	RESISTOR,100K OHM,1/4W,5%,CARBON FILM	100K
9	1	R23	101-0123	RESISTOR,120K OHM,1/4W,5%,CARBON FILM	120K
10	2	R9,R19	101-0137	RESISTOR,470K OHM,1/4W,5%,CARBON FILM	470K
11	1	R14	101-0145	RESISTOR,1.0M OHM,1/4W,5%,CARBON FILM	1.0M
12	0	R16#	101-0160	RESISTOR,10M OHM,1/4W,5%,CARBON FILM	10M
13	2	R11,R26	104-0047	RESISTOR,249 OHM,1/4W,1%,100PPM/C,METAL FILM	249 1%
14	2	R15,R25 NOTE 4	110-2103	RESISTOR,210K OHM,1/8W,1%,100PPM/C,METAL FLM	210K 1/8W 1
15	0	C2#,C3#	151-0120	CAP,.01uF,50V,10%,CERAMIC X7R	.01
16	4	C1#,C4#,C8#,C9,C10, C11,C12,C13#,C14# NOTE 5	151-0180	CAP,.1uF,50V,20%,CERAMIC Z5U	.1
17	4	C6,C7,C18,C19	152-0100	CAP,.01uF,100V,2%,POLYPROPYLENE,AXIAL	.01 2%
18	1	C5	154-0025	CAP,1uF,35V,10%,TANTALUM	1 TANT
19	3	C15,C16,C17	154-0100	CAP,10uF,16V,10%,TANTALUM	10 TANT
20	1	DS1	311-0010	LED,RED,DIFFUSED,T1-3/4	
21	1	U4	316-0353	OP-AMP,BIFET,DUAL,DIP-8	353
22	1	U5	316-0662	OP-AMP,CMOS,DUAL,DIP-8	C662
23	0	U1#	321-0204	RCVR,DTMF,DIP-14	75T204
24	0	U6#	324-4165	SIP-INPUT,SERIAL OUTPUT 8-BIT SR,HC	74HC165
25	0	U7#	324-7400	NAND,HC,2 INPUT,QUAD,DIP-14	74HC00
26	1	U3	324-7414	INVERTER,SCHMITT,MOTOROLA THRESHOLDS,HEX,DIP-14	74HC14
27	0	U2#	324-7474	FLIP-FLOP,D,HC,DUAL,DIP-14	74HC74
28	1	Q2	340-0201	XSTR,JFET,N-CHANNEL,VGS > -1.5,TO-92	J201
29	1	Q1	340-3904	XSTR,NPN,40V/200MA,TO92	2N3904
30	2	D1,D2	342-3009	DIODE,SILICON,100V,250MW	1N4148
31	0	Y1#	376-0358	XTAL,3.579545MHZ,CL=18pF,HC-49	3.58MHZ
32	1	JP1	403-0003	03 OF 401-0052	
33	1	TP1	403-0004	04 OF 401-0052	
34	1	J1 NOTE 1	403-1026	26 OF 401-0036	
35	2	NOTE 2	210-0001	NUT,KEP, 4-40, S-ZN	
36	2	NOTE 2	220-0108	440 X 1/4 PAN PHILLIPS SCREW	
37	2	NOTE 2	250-0103	3/4" STUD STANDOFF	
38	1	XJP1 (POS A)	402-3040	MINI JUMPER	
39	1	PCB NOTE 3	410-9450C	M4010 TONE REMOTE LOTL DAUGHTER BOARD	
40	1	XDS1	417-0010	LED MOUNT RA	

NOTES: (Notes are for production use only.)

Tone Remote LOTL Board Silkscreen



Tone Remote LOTL Board Schematic (008-9450D)



SINGLE PHONE PATCH OPTION (950-9719)

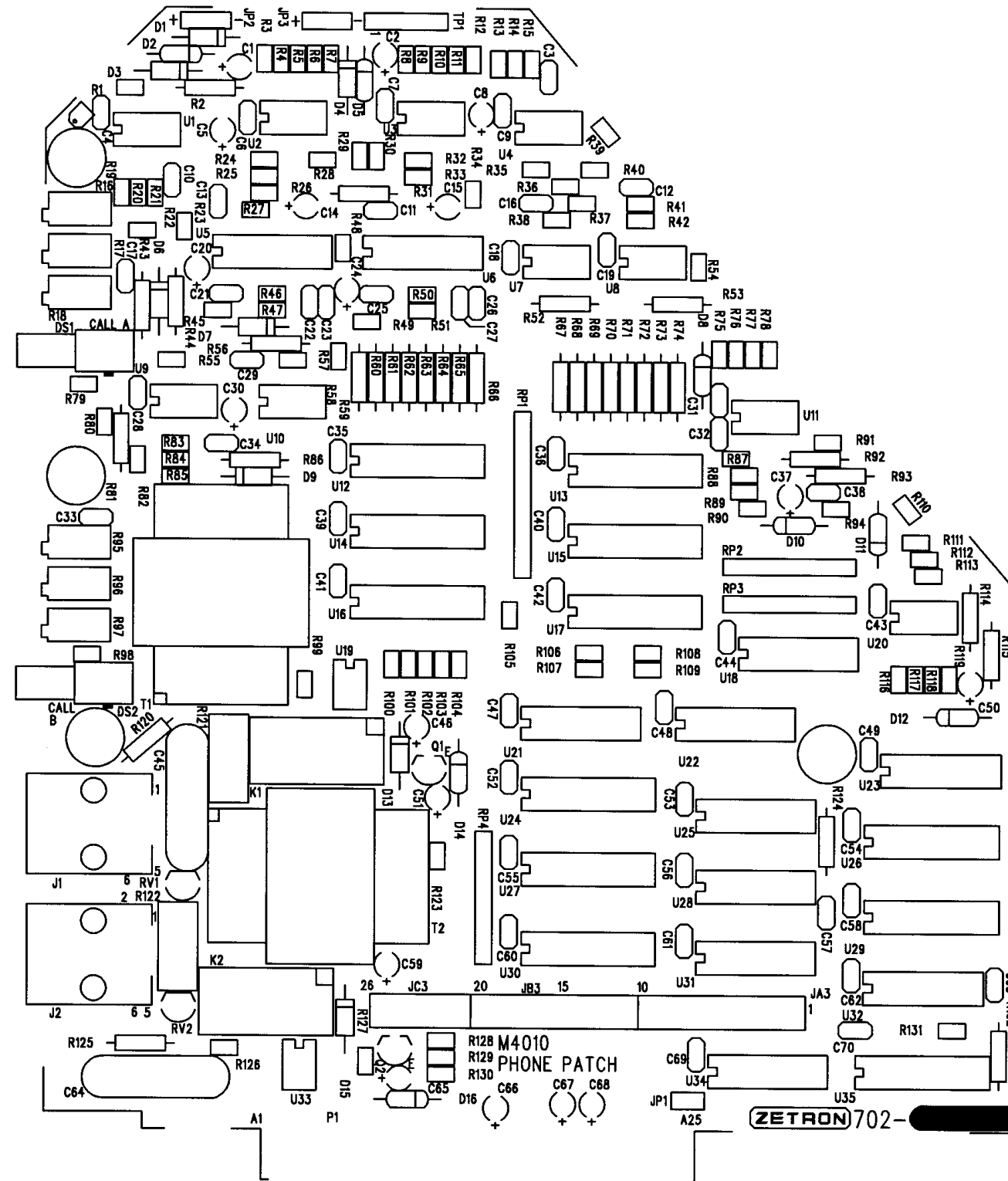
Single Phone Patch Card Parts List (702-9403H)

LEGEND :
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

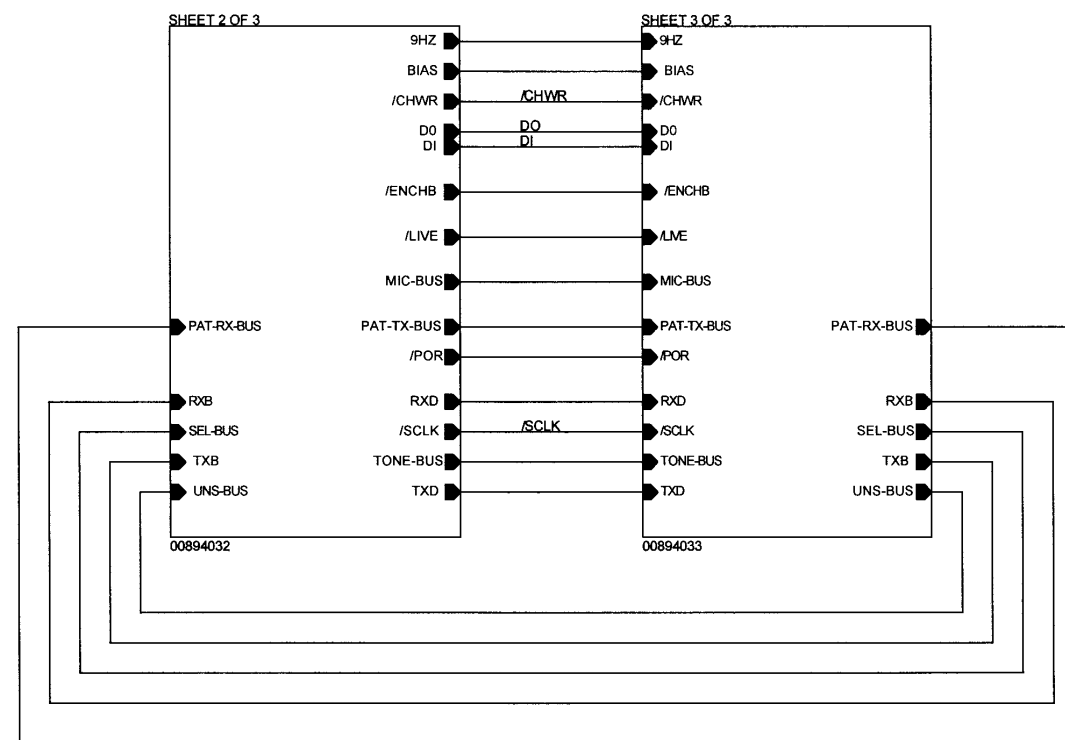
ZETRON MODEL 4010 PHONE PATCH, SINGLE BOARD PARTS LIST:

Item	Qty	Reference	Part No.	Description	Part Value
1	2	R2,R44#,R56#,R86	101-0066	RESISTOR,510 OHM,1/4W,5%,CARBON FILM	510
2	1	R31	101-0087	RESISTOR,3.9K OHM,1/4W,5%,CARBON FILM	3.9K
3	2	R92,R93,R114#,R115#	101-0092	RESISTOR,6.2K OHM,1/4W,5%,CARBON FILM	6.2K
4	2	R52#,R53,R65#,R72	101-0100	RESISTOR,13K OHM,1/4W,5%,CARBON FILM	13K
5	1	R68,R62#	101-0104	RESISTOR,20K OHM,1/4W,5%,CARBON FILM	20K
6	1	R120,R125#	101-0105	RESISTOR,22K OHM,1/4W,5%,CARBON FILM	22K
7	1	R74,R66#	101-0109	RESISTOR,33K OHM,1/4W,5%,CARBON FILM	33K
8	1	R67,R59#	101-0114	RESISTOR,51K OHM,1/4W,5%,CARBON FILM	51K
9	2	R43,R64#,R73,R81#	101-0119	RESISTOR,82K OHM,1/4W,5%,CARBON FILM	82K
10	1	R69,R60#	101-0123	RESISTOR,120K OHM,1/4W,5%,CARBON FILM	120K
11	1	R70,R61#	101-0129	RESISTOR,220K OHM,1/4W,5%,CARBON FILM	220K
12	1	R71,R63#	101-0133	RESISTOR,330K OHM,1/4W,5%,CARBON FILM	330K
13	1	R124,R132#	101-0141	RESISTOR,680K OHM,1/4W,5%,CARBON FILM	680K
14	1	RV1,RV2#	105-3100	SIDACTOR,275-350VDC,250 AMP,TO-92	250AMP
15	1	R121,R122#	106-6015	POLYSWITCH,TELCO	600-150
16	1	R18,R97#	108-1501	POT,2K OHM,10 TURN,R/A	2K 10T
17	1	R16,R95#	108-1502	POT,5K OHM,10 TURN,R/A	5K 10T
18	1	R17,R96#	108-1503	POT,50K OHM,10 TURN,R/A	50K 10T
19	1	R12,R6#	109-0046	RESISTOR,75 OHM,1/8W,5%,CARBON FILM	75 1/8W
20	1	R19,R84#	109-0049	RESISTOR,100 OHM,1/8W,5%,CARBON FILM	100 1/8W
21	9	R4#,R8,R20,R22,R75, R79,R80#,R85#,R94#, R98#,R103#,R104#,R106, R107,R108#,R109,R123,R130#	109-0073	RESISTOR,1.0K OHM,1/8W,5%,CARBON FILM	1.0K 1/8W
22	1	R21,R83#	109-0075	RESISTOR,1.5K OHM,1/8W,5%,CARBON FILM	1.5K 1/8W
23	1	R91,R113#	109-0081	RESISTOR,2.2K OHM,1/8W 5%,CARBON FILM	2.2K 1/8W
24	11	R13,R14,R24#,R33, R34,R37#,R39,R40,R42, R48#,R58#,R89,R99,R101, R105#,R116#,R126#,R128#,R131	109-0097	RESISTOR,10K OHM,1/8W,5 %,CARBON FILM	10K 1/8W
25	3	R1,R36#,R46#,R50, R54,R55#	109-0098	RESISTOR,12K OHM,1/8W,5%,CARBON FILM	12K 1/8W
26	1	R32,R28#	109-0100	RESISTOR,18K OHM,1/8W,5%,CARBON FILM	18K 1/8W
27	2	R7#,R11,R35,R57#	109-0101	RESISTOR,15K OHM,1/8W,5%,CARBON FILM	15K 1/8W
28	1	R100,R127#	109-0102	RESISTOR,20K OHM,1/8W,5%,CARBON FILM	20K 1/8W
29	1	R41,R38#	109-0107	RESISTOR,27K OHM,1/8W,5%,CARBON FILM	27K 1/8W
30	1	R51,R47#	109-0114	RESISTOR,51K OHM,1/8W,5%,CARBON FILM	51K 1/8W
31	4	R5#,R10,R78,R87, R102,R111#,R118#,R129#	109-0121	RESISTOR,100K OHM,1/8W,5%,CARBON FILM	100K 1/8W
32	3	R25#,R30,R76,R90, R110#,R119#	109-0129	RESISTOR,220K OHM,1/8W,5%,CARBON FILM	220K 1/8W
33	1	R9,R3#	109-0133	RESISTOR,330K OHM,1/8W,5%,CARBON FILM	330K 1/8W
34	2	R15,R88,R117#	109-0145	RESISTOR,1.0M OHM,1/8W,5%,CARBON FILM	1.0M 1/8W
35	2	R45#,R49,R77,R112#	109-0160	RESISTOR,10M OHM,1/8W,5%,CARBON FILM	10M 1/8W
36	1	R27	109-0512	RESISTOR,5.1K OHM,1/8W,5%,CARBON FILM	5.1K 1/8W
37	1	R29,R26#	109-1203	RESISTOR,120K OHM,1/8W,5% CARBON FILM	120K 1/8W
38	1	R23,R82#	109-4700	RESISTOR,470 OHM,1/8W,5%,CARBON FILM	470 1/8W
39	0	RP1#	119-0006	R-NETWORK,10K OHM x 9,BUSSED,SIP-10	10K
40	2	RP2,RP3,RP4#	119-0008	R-NETWORK,10K OHM x 7,BUSSED,SIP-08	10K
41	1	C34#,C10	151-0020	CAP,.001uF,100V,10%,CERAMIC X7R	.001
42	2	C12,C16#,C32,C38#	151-0085	CAP,.22uF,50V,20%,CERAMIC Z5U	.22
43	17	C4,C6#,C7,C9,C18#, C19,C28#,C29#,C31,C35#, C36,C39#,C40,C41#,C42, C43,C44,C47#,C48,C49, C52#,C53#,C54,C55#,C56, C58,C60#,C61#,C62#,C69,C70	151-0120	CAP,.01uF,50V,10%,CERAMIC X7R	.01
44	7	C3,C11,C13#,C17, C21#,C22#,C23#,C25, C26,C27,C33#,C57,C63#	151-0181	CAP,.1uF,50V,10%,CERAMIC X7R	.1

45	1	C64#,C45	152-0021	CAP, .47uF,250V,10%,POLYESTER	.47 250V
46	7	C1#,C2,C5,C8,C14#, C15,C20#,C24,C30,C51, C65#	154-0025	CAP,1uF,35V,10%,TANTALUM	1 TANT
47	5	C37,C46,C50#,C59#, C66,C67,C68	154-0100	CAP,10uF,16V,10%,TANTALUM	10 TANT
48	1	T1,T2#	305-1540	XFMR, TELCO HYBRID, SMALL SIZE	
49	1	DS2#,DS1	311-0009	LED, GREEN, DIFFUSED, T1-3/4	
50	1	U19,U33#	311-1001	OPTO ISOLATOR, BI-POLAR	H11AA1
51	3	U1,U4,U7#,U8,U9#, U10#	316-0353	OP-AMP, BIFET, DUAL, DIP-8	353
52	2	U2#,U3,U11,U20#	316-0662	OP-AMP, CMOS, DUAL, DIP-8	C662
53	1	U28,U31#	323-4001	NOR, QUAD, DIP-14	4001
54	1	U13,U12#	323-4051	MUX/DEMUX, ANALOG, 1-TO-8, DIP-16	4051
55	2	U14#,U15,U16#,U17	323-4053	ANALOG SWITCH, TRIPLE SPDT, DIP-16	4053
56	2	U24#,U26,U27#,U29	323-4094	SERIAL REGSISTER, 8 STAGE, DIP-16	4094
57	2	U18,U21#,U23,U25#	323-4906	LEVEL SHIFTER, HEX, DIP-14	74C906
58	1	U34	324-4125	BUFFER, 3-STATE, ACTIVE LOW OUTPUT ENABLES, QUAD	74HC125
59	1	U35,U30#	324-4165	SIP-INPUT, SERIAL OUTPUT 8-BIT SR, HC	74HC165
60	1	U22,U32#	324-7414	INVERTER, SCHMITT, MOTOROLA THRESHOLDS, HEX, DIP-14	74HC14
61	1	Q1,Q2#	340-0014	XSTR, NPN, DARLINGTON, 0.5A 30V, BETA >10,000, TO-92	MPSA14
62	1	D13,D15#	342-0001	DIODE, SILICON, 1A, 100V, D0-41	1N4002
63	4	D2#,D5,D8,D10,D11#, D12#,D14,D16#	342-0103	DIODE, SCHOTTKY, 0.37V @ 1MA TYP	SD103A
64	1	D4,D3#	343-3030	DIODE, ZENER, 6.2V, 1W, 5%	6.2V
65	2	D1,D6#,D7#,D9	343-3035	DIODE, ZENER, 12V, 1W, 5%	12V
66	1	U6,U5#	376-5001	VOLTAGE CONTROLLED OSCILLATOR	2207 VCO
67	1	K1,K2#	380-0030	RELAY, DPDT, 12 V COIL, MINI-DIP	
68	1	J1,J2#	401-0080	6-PIN LO PRO R/A TELCO	
69	1	JP1	403-0002	02 OF 401-0052	
70	1	JP3,JP2#	403-0003	03 OF 401-0052	
71	1	TP1	403-0005	05 OF 401-0052	
72	0	JA3#,JB3#	407-0110	SKT, SIP-10 PIN	
73	0	JC3#	407-0112	SKT, SIP-6 PIN	
74	2	XJP1 (IN) XJP3 (POS +)	402-3040	MINI JUMPER, .1 X .2 X .37"	
75	1	XU19	407-0006	SKT, 06 PIN DIP	
76	2	XU1,4	407-0008	SKT, 08 PIN DIP	
77	1	PCB	410-9403D	MODEL 4010 PHONE PATCH	
78	1	XDS1	417-0010	LED MOUNT RA	



Single Phone Patch Card Schematic (008-9403H)

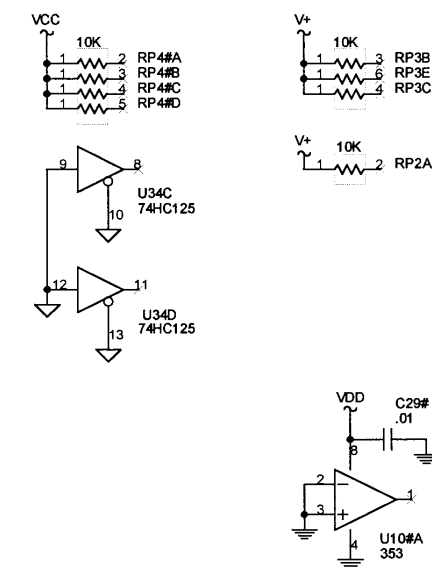


REV	DESCRIPTION	DRN	CHK	APD	DATE
H	ECN 5744	KM	mm	ADMP	4/24/00

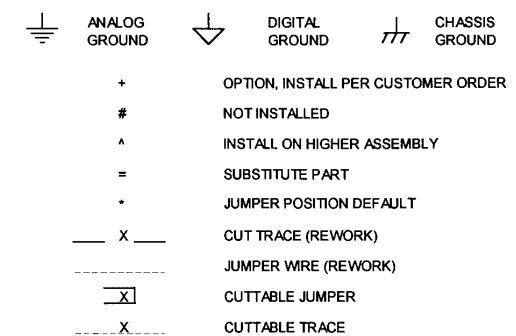
NOTES: UNLESS OTHERWISE SPECIFIED:

1. ALL RESISTOR VALUES ARE IN OHMS. 1/4 WATT. 5%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. ALL POTENTIOMETERS ARE 1 TURN.

UNUSED PARTS:



LEGEND:

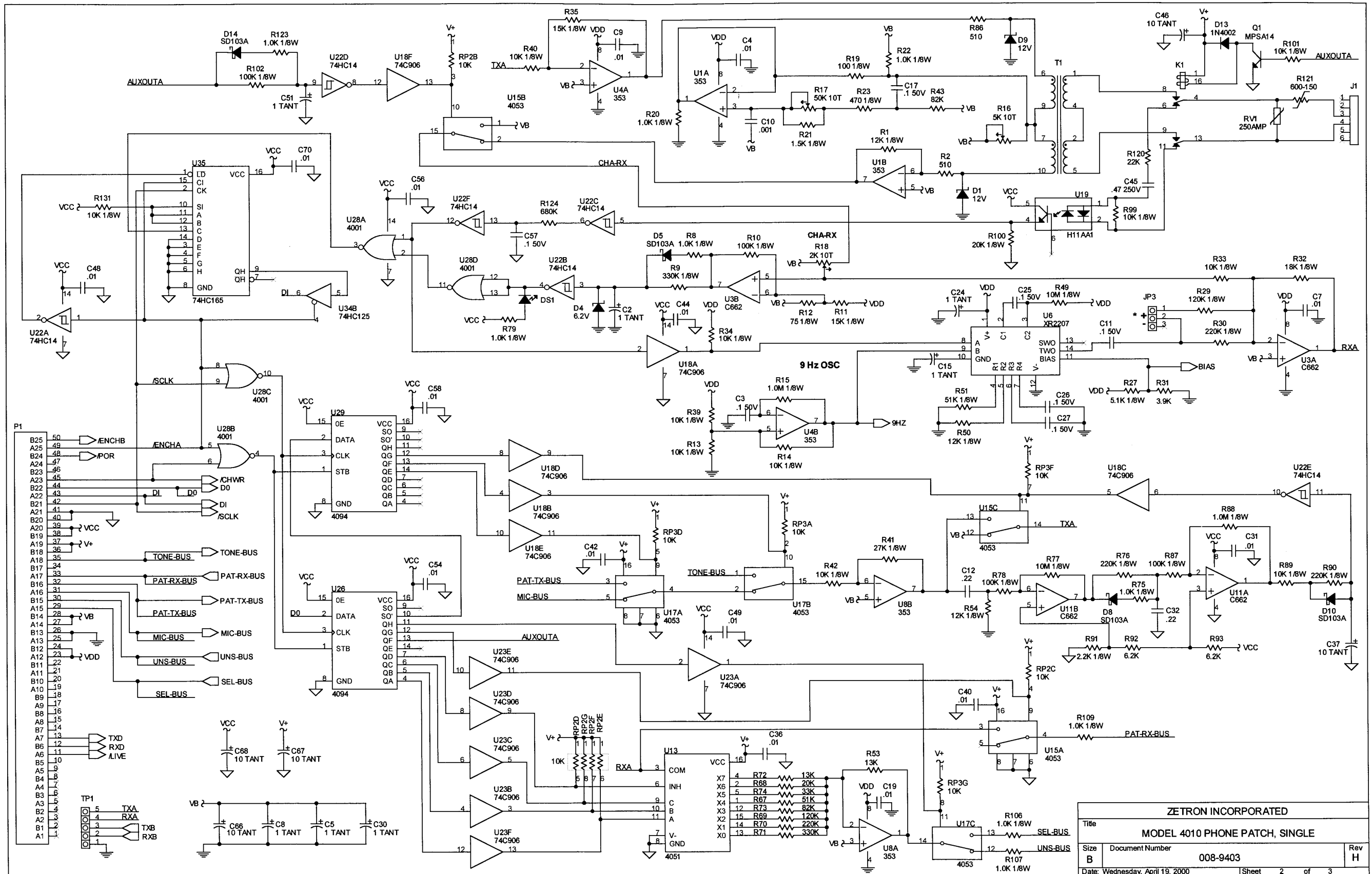


ZETRON®

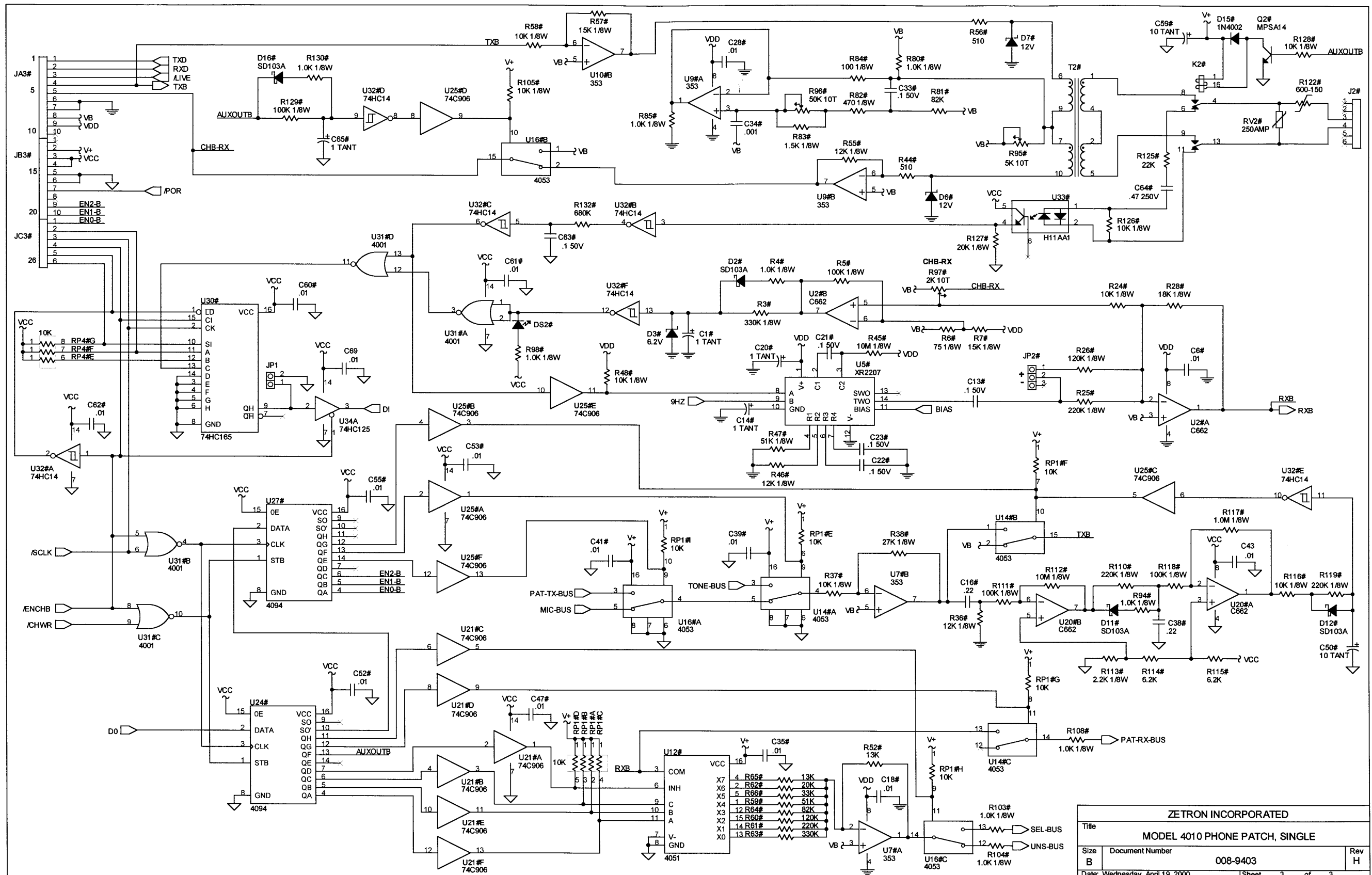
ZETRON INCORPORATED
P.O. BOX 97004
REDMOND, WASHINGTON 98073-9704

Title	MODEL 4010 PHONE PATCH, SINGLE
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Size B	Document Number 008-9403	Rev H
Date: Tuesday, April 18, 2000		Sheet 1 of 3



ZETRON INCORPORATED			
Title			
MODEL 4010 PHONE PATCH, SINGLE			
Size	Document Number	Rev	
B	008-9403	H	
Date: Wednesday, April 19, 2000		Sheet 2 of 3	



DUAL PHONE PATCH OPTION (950-9720)

Dual Phone Patch Parts List (702-9522G)

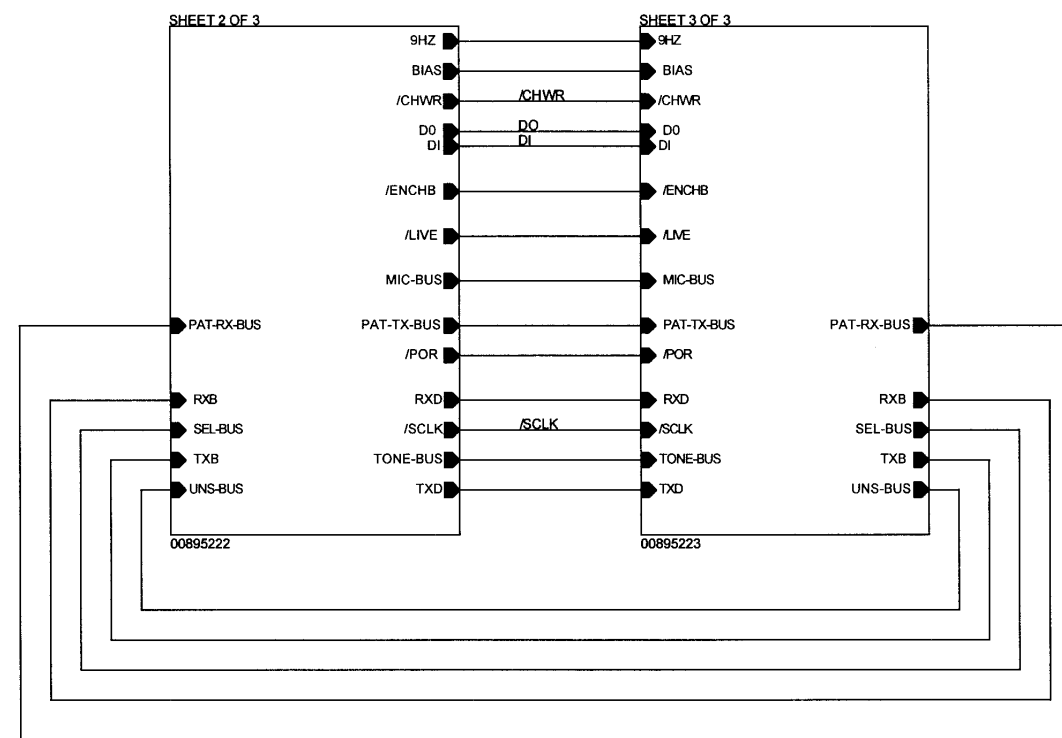
LEGEND :
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

ZETRON MODEL 4010 PHONE PATCH, DUAL BOARD PARTS LIST:

Item	Qty	Reference	Part No.	Description	Part Value
1	4	R2,R44,R56,R86	101-0066	RESISTOR,510 OHM,1/4W,5%,CARBON FILM	510
2	1	R31	101-0087	RESISTOR,3.9K OHM,1/4W,5%,CARBON FILM	3.9K
3	4	R92,R93,R114,R115	101-0092	RESISTOR,6.2K OHM,1/4W,5%,CARBON FILM	6.2K
4	4	R52,R53,R65,R72	101-0100	RESISTOR,13K OHM,1/4W,5%,CARBON FILM	13K
5	2	R68,R62	101-0104	RESISTOR,20K OHM,1/4W,5%,CARBON FILM	20K
6	2	R120,R125	101-0105	RESISTOR,22K OHM,1/4W,5%,CARBON FILM	22K
7	2	R74,R66	101-0109	RESISTOR,33K OHM,1/4W,5%,CARBON FILM	33K
8	2	R67,R59	101-0114	RESISTOR,51K OHM,1/4W,5%,CARBON FILM	51K
9	4	R43,R64,R73,R81	101-0119	RESISTOR,82K OHM,1/4W,5%,CARBON FILM	82K
10	2	R69,R60	101-0123	RESISTOR,120K OHM,1/4W,5%,CARBON FILM	120K
11	2	R70,R61	101-0129	RESISTOR,220K OHM,1/4W,5%,CARBON FILM	220K
12	2	R71,R63	101-0133	RESISTOR,330K OHM,1/4W,5%,CARBON FILM	330K
13	2	R124,R132	101-0141	RESISTOR,680K OHM,1/4W,5%,CARBON FILM	680K
14	2	RV1,RV2	105-3100	SIDACTOR,275-350VDC,250 AMP,TO-92	250AMP
15	2	R121,R122	106-6015	POLYSWITCH,TELCO	600-150
16	2	R18,R97	108-1501	POT,2K OHM,10 TURN,R/A	2K 10T
17	2	R16,R95	108-1502	POT,5K OHM,10 TURN,R/A	5K 10T
18	2	R17,R96	108-1503	POT,50K OHM,10 TURN,R/A	50K 10T
19	2	R12,R6	109-0046	RESISTOR,75 OHM,1/8W,5%,CARBON FILM	75 1/8W
20	2	R19,R84	109-0049	RESISTOR,100 OHM,1/8W,5%,CARBON FILM	100 1/8W
21	18	R4,R8,R20,R22,R75, R79,R80,R85,R94,R98, R103,R104,R106,R107, R108,R109,R123,R130	109-0073	RESISTOR,1.0K OHM,1/8W,5%,CARBON FILM	1.0K 1/8W
22	2	R21,R83	109-0075	RESISTOR,1.5K OHM,1/8W,5%,CARBON FILM	1.5K 1/8W
23	2	R91,R113	109-0081	RESISTOR,2.2K OHM,1/8W 5%,CARBON FILM	2.2K 1/8W
24	19	R13,R14,R24,R33,R34, R37,R39,R40,R42,R48, R58,R89,R99,R101,R105, R116,R126,R128,R131	109-0097	RESISTOR,10K OHM,1/8W,5 %,CARBON FILM	10K 1/8W
25	6	R1,R36,R46,R50, R54,R55	109-0098	RESISTOR,12K OHM,1/8W,5%,CARBON FILM	12K 1/8W
26	2	R32,R28	109-0100	RESISTOR,18K OHM,1/8W,5%,CARBON FILM	18K 1/8W
27	4	R7,R11,R35,R57	109-0101	RESISTOR,15K OHM,1/8W,5%,CARBON FILM	15K 1/8W
28	2	R100,R127	109-0102	RESISTOR,20K OHM,1/8W,5%,CARBON FILM	20K 1/8W
29	2	R41,R38	109-0107	RESISTOR,27K OHM,1/8W,5%,CARBON FILM	27K 1/8W
30	2	R51,R47	109-0114	RESISTOR,51K OHM,1/8W,5%,CARBON FILM	51K 1/8W
31	8	R5,R10,R78,R87,R102, R111,R118,R129	109-0121	RESISTOR,100K OHM,1/8W,5%,CARBON FILM	100K 1/8W
32	6	R25,R30,R76,R90, R110,R119	109-0129	RESISTOR,220K OHM,1/8W,5%,CARBON FILM	220K 1/8W
33	2	R9,R3	109-0133	RESISTOR,330K OHM,1/8W,5%,CARBON FILM	330K 1/8W
34	3	R15,R88,R117	109-0145	RESISTOR,1.0M OHM,1/8W,5%,CARBON FILM	1.0M 1/8W
35	4	R45,R49,R77,R112	109-0160	RESISTOR,10M OHM,1/8W,5%,CARBON FILM	10M 1/8W
36	1	R27	109-0512	RESISTOR,5.1K OHM,1/8W,5%,CARBON FILM	5.1K 1/8W
37	2	R29,R26	109-1203	RESISTOR,120K OHM,1/8W,5% CARBON FILM	120K 1/8W
38	2	R23,R82	109-4700	RESISTOR,470 OHM,1/8W,5%,CARBON FILM	470 1/8W
39	1	RP1	119-0006	R-NETWORK,10K OHM x 9,BUSSED,SIP-10	10K
40	3	RP2,RP3,RP4	119-0008	R-NETWORK,10K OHM x 7,BUSSED,SIP-08	10K
41	2	C34,C10	151-0020	CAP,.001uF,100V,10%,CERAMIC X7R	.001
42	4	C12,C16,C32,C38	151-0085	CAP,.22uF,50V,20%,CERAMIC Z5U	.22
43	31	C4,C6,C7,C9,C18,C19, C28,C29,C31,C35,C36, C39,C40,C41,C42,C43, C44,C47,C48,C49,C52, C53,C54,C55,C56,C58, C60,C61,C62,C69,C70	151-0120	CAP,.01uF,50V,10%,CERAMIC X7R	.01
44	13	C3,C11,C13,C17,C21, C22,C23,C25,C26,C27, C33,C57,C63	151-0181	CAP,.1uF,50V,10%,CERAMIC X7R	.1

45	2	C64,C45	152-0021	CAP, .47uF,250V,10%,POLYESTER	.47 250V
46	11	C1,C2,C5,C8,C14, C15,C20,C24,C30,C51, C65	154-0025	CAP,1uF,35V,10%,TANTALUM	1 TANT
47	7	C37,C46,C50,C59, C66,C67,C68	154-0100	CAP,10uF,16V,10%,TANTALUM	10 TANT
48	2	T1,T2	305-1540	XFMR, TELCO HYBRID, SMALL SIZE	
49	2	DS2,DS1	311-0009	LED, GREEN, DIFFUSED, T1-3/4	
50	2	U19,U33	311-1001	OPTO ISOLATOR, BI-POLAR	H11AA1
51	6	U1,U4,U7,U8,U9,U10	316-0353	OP-AMP, BIFET, DUAL, DIP-8	353
52	4	U2,U3,U11,U20	316-0662	OP-AMP, CMOS, DUAL, DIP-8	C662
53	2	U28,U31	323-4001	NOR, QUAD, DIP-14	4001
54	2	U13,U12	323-4051	MUX/DEMUX, ANALOG, 1-TO-8, DIP-16	4051
55	4	U14,U15,U16,U17	323-4053	ANALOG SWITCH, TRIPLE SPDT, DIP-16	4053
56	4	U24,U26,U27,U29	323-4094	SERIAL REGSISTER, 8 STAGE, DIP-16	4094
57	4	U18,U21,U23,U25	323-4906	LEVEL SHIFTER, HEX, DIP-14	74C906
58	1	U34	324-4125	BUFFER, 3-STATE, ACTIVE LOW ENABLES, QUAD, DIP-14	74HC125
59	2	U35,U30	324-4165	SIP-INPUT, SERIAL OUTPUT 8-BIT SR, HC	74HC165
60	2	U22,U32	324-7414	INVERTER, SCHMITT, MOTOROLA THRESHOLDS, HEX, DIP-14	74HC14
61	2	Q1,Q2	340-0014	XSTR, NPN, DARLINGTON, 0.5A 30V, BETA >10,000, TO-92	MPSA14
62	2	D13,D15	342-0001	DIODE, SILICON, 1A, 100V, D0-41	1N4002
63	8	D2,D5,D8,D10,D11, D12,D14,D16	342-0103	DIODE, SCHOTTKY, 0.37V @ 1MA TYP	SD103A
64	2	D4,D3	343-3030	DIODE, ZENER, 6.2V, 1W, 5%	6.2V
65	4	D1,D6,D7,D9	343-3035	DIODE, ZENER, 12V, 1W, 5%	12V
66	2	U6,U5	376-5001	VOLTAGE CONTROLLED OSCILLATOR	2207 VCO
67	2	K1,K2	380-0030	RELAY, DPDT, 12 V COIL, MINI-DIP	
68	2	J1,J2	401-0080	6-PIN LO PRO R/A TELCO	
69	1	JP1	403-0002	02 OF 401-0052	
70	2	JP3,JP2	403-0003	03 OF 401-0052	
71	1	TP1	403-0005	05 OF 401-0052	
72	0	JA3#,JB3#	407-0110	SKT, SIP-10 PIN	
73	0	JC3#	407-0112	SKT, SIP-6 PIN	
74	3	XJP1 (IN) XJP2,3 (POS +)	402-3040	MINI JUMPER, .1 X .2 X .37"	
75	2	XU19,33	407-0006	SKT, 06 PIN DIP	
76	4	XU1,4,9,10	407-0008	SKT, 08 PIN DIP	
77	1	PCB	410-9403D	MODEL 4010 PHONE PATCH	
78	1	XDS1	417-0010	LED MOUNT RA	

Dual Phone Patch Schematic (008-9522G)

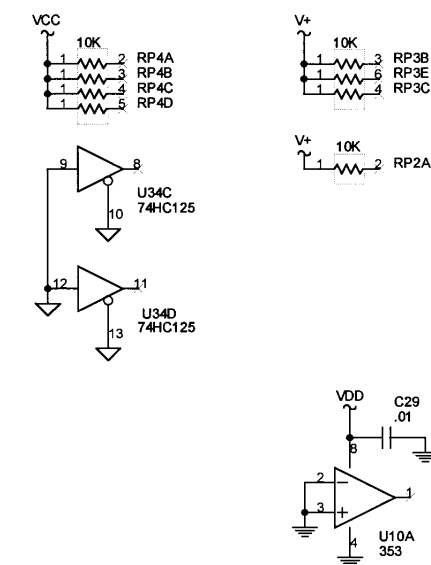


REV	DESCRIPTION	DRN	CHK	APD	DATE
G	ECN 5744	KM	11/11/00	11/24/00	11/24/00

NOTES: UNLESS OTHERWISE SPECIFIED:

1. ALL RESISTOR VALUES ARE IN OHMS. 1/4 WATT. 5%.
2. ALL CAPACITOR VALUES ARE IN MICROFARADS.
3. ALL POTENTIOMETERS ARE 1 TURN.

UNUSED PARTS:



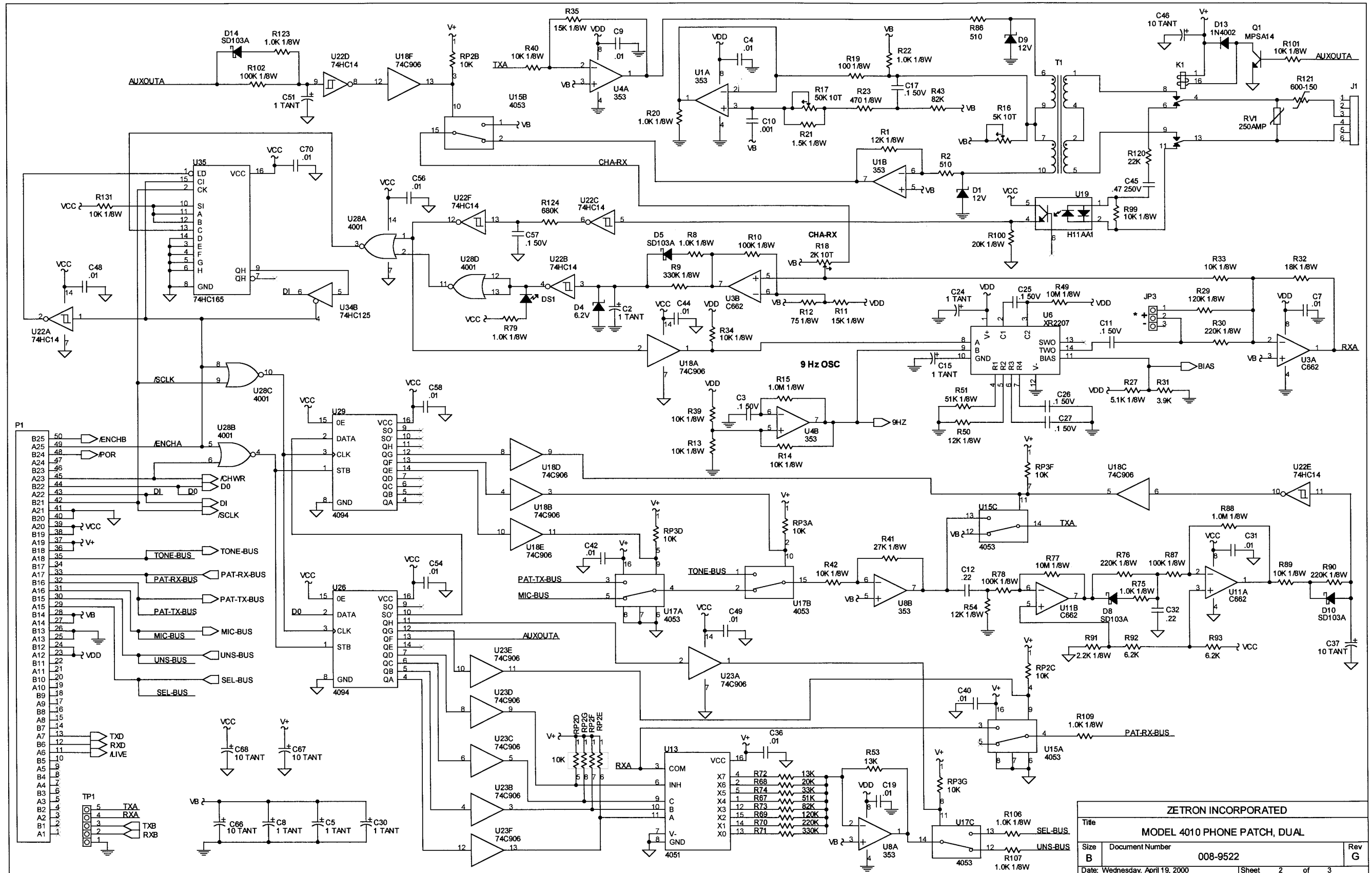
LEGEND:

	ANALOG GROUND		DIGITAL GROUND		CHASSIS GROUND
+			OPTION, INSTALL PER CUSTOMER ORDER		
#			NOT INSTALLED		
^			INSTALL ON HIGHER ASSEMBLY		
=			SUBSTITUTE PART		
*			JUMPER POSITION DEFAULT		
			CUT TRACE (REWORK)		
			JUMPER WIRE (REWORK)		
			CUTTABLE JUMPER		
			CUTTABLE TRACE		

ZETRON® ZETRON INCORPORATED
P.O. BOX 97004
REDMOND, WASHINGTON 98073-9704

Title	MODEL 4010 PHONE PATCH, DUAL
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Size B	Document Number 008-9522	R (
Date: Wednesday, April 19, 2000	Sheet 1 of 3	



AUXILIARY I/O OPTION (950-9721)

Auxiliary I/O Board Parts List (702-9448D)

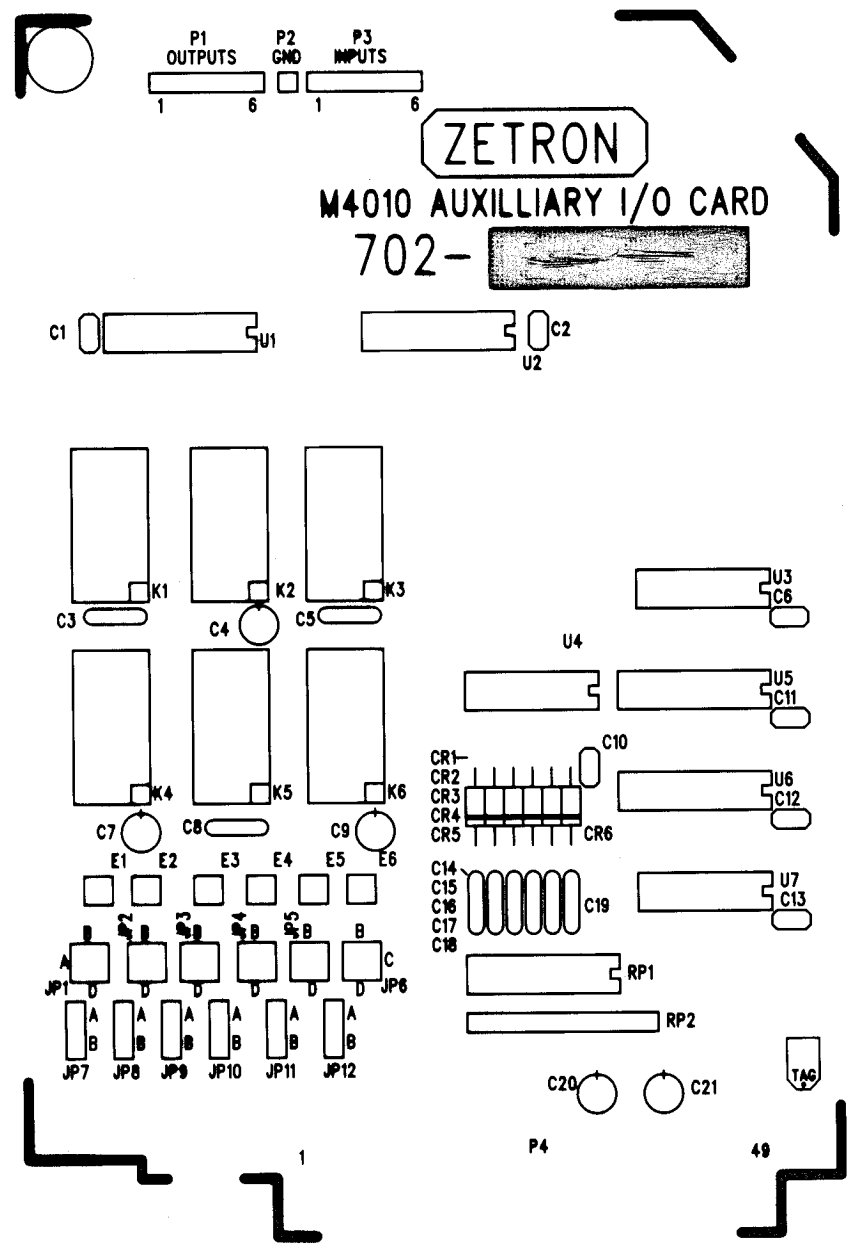
LEGEND:
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
+ = OPTION (INSTALLED PER CUSTOMER ORDER)

ZETRON MODEL 4010 AUXILLIARY I/O PARTS LIST (702-9448D)

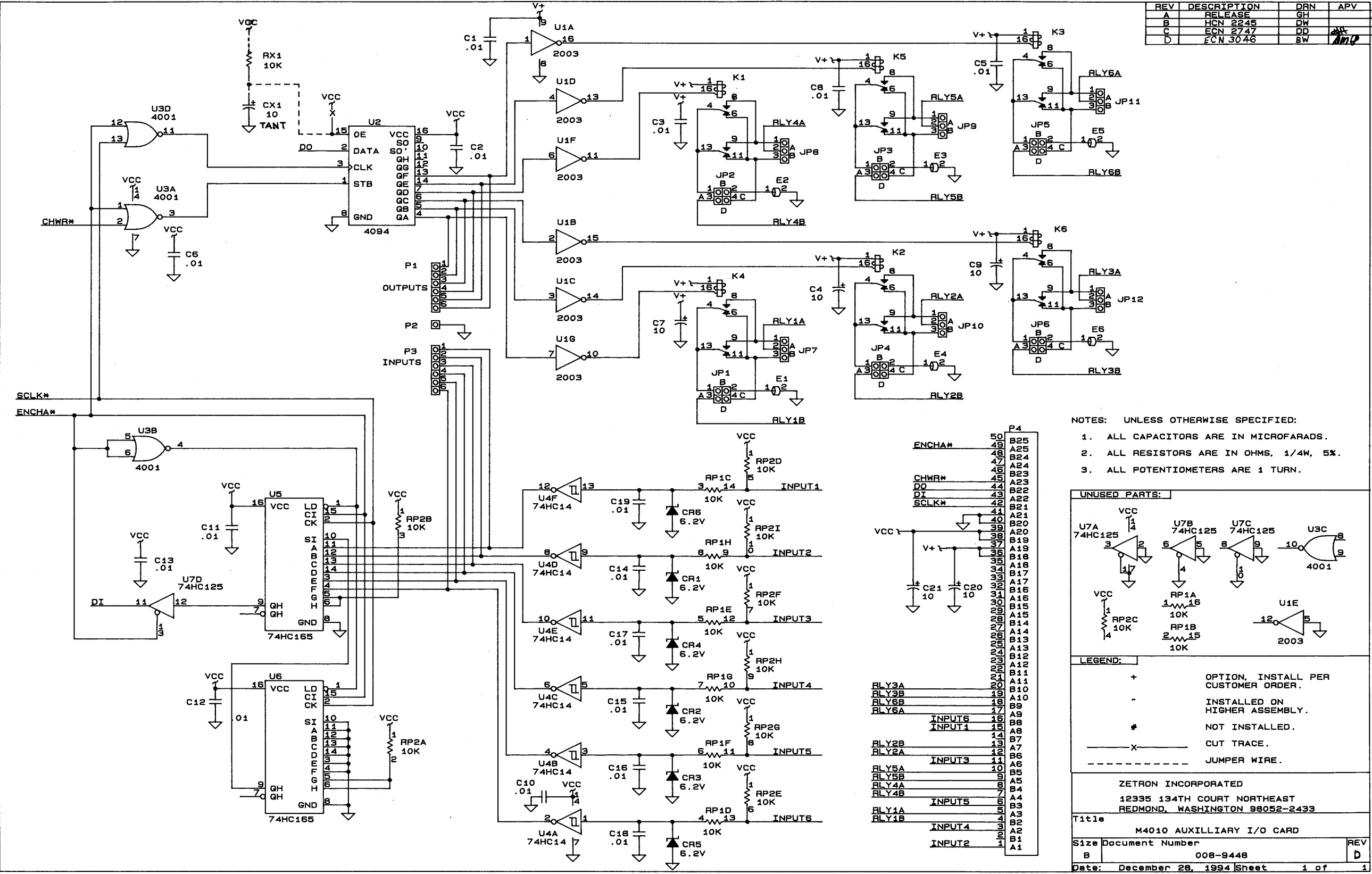
Item	Qty	Reference	Part No.	Description	Part Value
1	1	RX1 NOTE 3	101-0121	100K 1/4W 5% CARBON FILM	
2	1	RP2	119-0006	10K x 9 BUSSED 10-PIN SIP	
3	1	RP1	119-0024	10K X 8 ISOLATED 16-PIN DIP	
4	9	C3,C5,C8,C14,C15,C16,C17,C18,C19	150-0110	.01 UF 50V 80%-20% CERAMIC DISC	
5	7	C1,C2,C6,C10,C11,C12,C13	151-0120	.01UF 50V/100V +-10% CERAMIC X7R	
6	1	CX1 NOTE 4	154-0100	10 UF 16V TANTALUM +-10%	
7	5	C4,C7,C9,C20,C21	155-0052	10 UF 35V +-20% RADIAL ALUMINUM ELECTROLYTIC	
8	6	E1,E2,E3,E4,E5,E6	305-0001	FERRITE BEADS W/ LEADS	
9	1	U3	323-4001	QUAD NOR GATE	4001
10	1	U2	323-4094	8 STAGE SERIAL REG	4094
11	1	U7	324-4125	TRI-STATE QUAD BUFFER	74HC125
12	2	U5,U6	324-4165	SERIAL IN, PARALLEL OUT, 8-BIT SHIFT REGISTER	74HC165
13	1	U4	324-7414	HEX SCHMIDT	74HC14
14	1	U1	340-2003	RELAY DRIVER 50V/.5A	2003
15	6	CR1,CR2,CR3,CR4,CR5,CR6	343-3030	ZENER, 6.2V 1W +-5%	1N4735A
16	6	K1,K2,K3,K4,K5,K6	380-0030	DPDT 12V COIL MINI RELAY 360 OHM	
17	1	P2	403-0001	1 OF 401-0052	
18	6	JP7,JP8,JP9,JP10,JP11,JP12	403-0003	3 OF 401-0052	
19	2	P1,P3	403-0006	6 OF 401-0052	
20	6	JP1,JP2,JP3,JP4,JP5,JP6	403-0202	4 OF 401-0052 [2X2]	
21	1	BRACKET NOTE 1	210-0001	440 KEPT NUT	
22	1	BRACKET NOTE 1	220-0108	440x1/4 PAN PHILLIPS	
	1	BRACKET NOTE 1	220-0199	632x1/4 PAN HD PHIL, BLACK	
23	1	UPPER TOP CORNER 125 HOLE NOTE 1	401-0614	BRACKET, RA, #6-32 TAP	
24	18	XJP1-6 (POS B & D) XJP7-12 (POS A)	402-3040	MINI JUMPER	
25	3	XU3,4,7	407-0014	SKT, 14 PIN DIP	
26	4	XU1,2,5,6	407-0016	SKT, 16 PIN DIP	
27	1	PCB	410-9448A	PCB, M4010 AUXILLIARY I/O CARD - ZETRON	

NOTES: (Notes are for production use only.)

Auxiliary I/O Board Silkscreen



Auxiliary I/O Board Schematic (008-9448D)



TONE LOTL/DTMF DECODE DAUGHTER BOARD OPTION (950-9722)

Tone LOTL/DTMF Decoder Parts List (702-9535C)

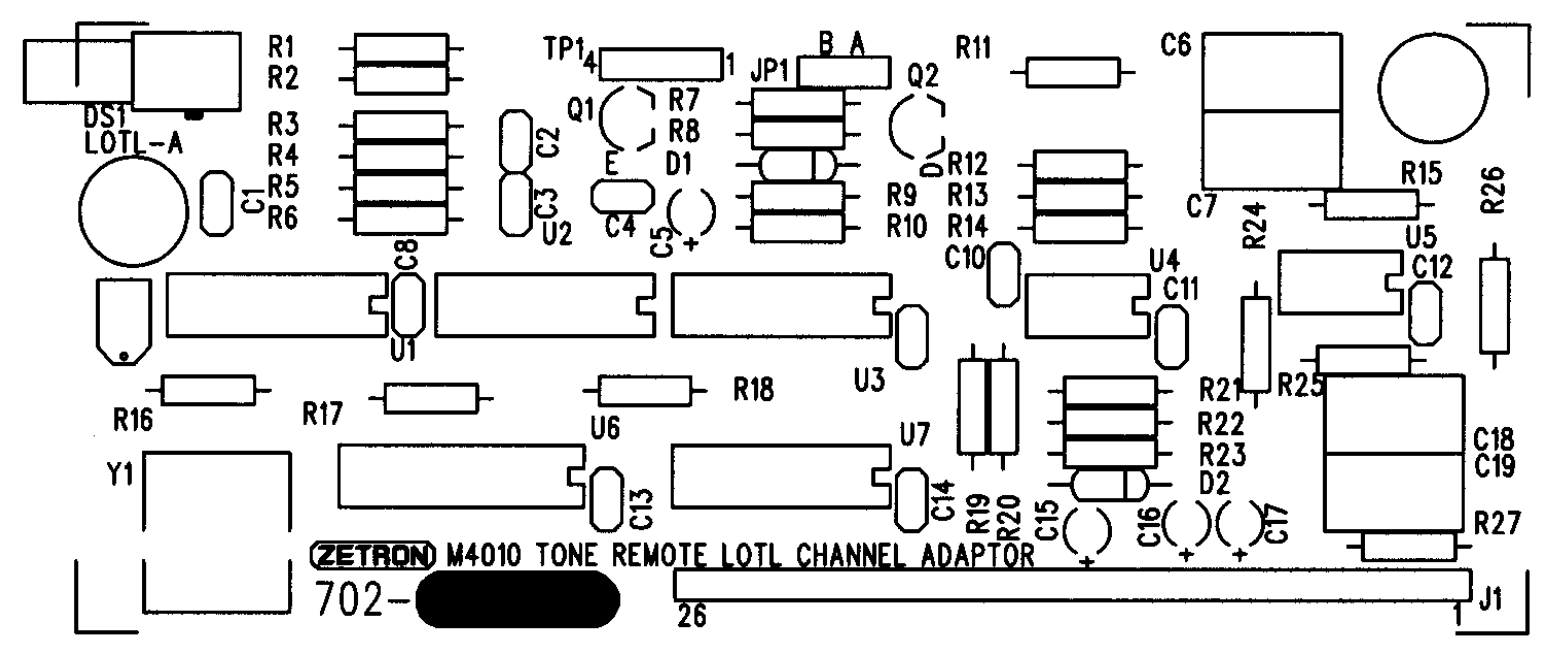
LEGEND:
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

ZETRON MODEL 4010 TONE LOTL/DTMF DECODE DAUGHTER BOARD PARTS LIST:

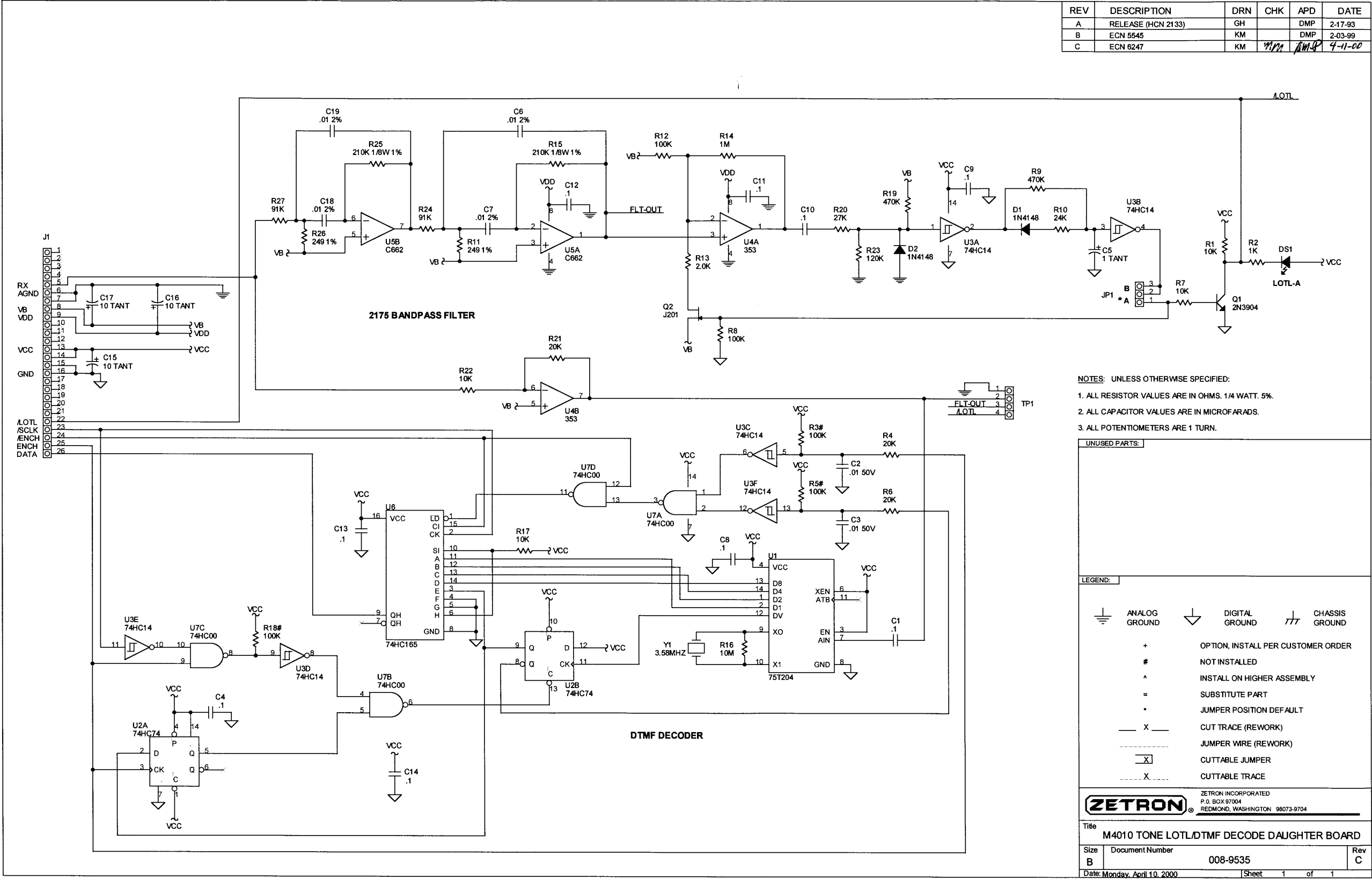
Item	Qty	Reference	Part No.	Description	Part Value
1	1	R2	101-0073	RESISTOR,1.0K OHM,1/4W,5%,CARBON FILM	1.0K
2	1	R13	101-0080	RESISTOR,2.0K OHM,1/4W,5%,CARBON FILM	2.0K
3	4	R1,R7,R17,R22	101-0097	RESISTOR,10K OHM,1/4W,5%,CARBON FILM	10K
4	3	R4,R6,R21	101-0104	RESISTOR,20K OHM,1/4W,5%,CARBON FILM	20K
5	1	R10	101-0106	RESISTOR,24K OHM,1/4W,5%,CARBON FILM	24K
6	1	R20	101-0107	RESISTOR,27K OHM,1/4W,5%,CARBON FILM	27K
7	2	R24,R27	101-0120	RESISTOR,91K OHM,1/4W,5%,CARBON FILM	91K
8	2	R3#,R5#,R8,R12,R18#	101-0121	RESISTOR,100K OHM,1/4W,5%,CARBON FILM	100K
9	1	R23	101-0123	RESISTOR,120K OHM,1/4W,5%,CARBON FILM	120K
10	2	R9,R19	101-0137	RESISTOR,470K OHM,1/4W,5%,CARBON FILM	470K
11	1	R14	101-0145	RESISTOR,1.0M OHM,1/4W,5%,CARBON FILM	1.0M
12	1	R16	101-0160	RESISTOR,10M OHM,1/4W,5%,CARBON FILM	10M
13	2	R11,R26	104-0047	RESISTOR,249 OHM,1/4W,1%,100PPM/C,METAL FILM	249 1%
14	2	R15,R25 NOTE 5	110-2103	RESISTOR,210K OHM,1/8W,1%,100PPM/C,METAL	210K 1/8W 1%
15	2	C2,C3	151-0120	CAP,.01uF,50V,10%,CERAMIC X7R	.01
16	9	C1,C4,C8,C9,C10,C11,C12,C13,C14	151-0180	CAP,.1uF,50V,20%,CERAMIC Z5U	.1
17	4	C6,C7,C18,C19	152-0100	CAP,.01uF,100V,2%,POLYPROPYLENE,AXIAL	.01 2%
18	1	C5	154-0025	CAP,1uF,35V,10%,TANTALUM	1 TANT
19	3	C15,C16,C17	154-0100	CAP,10uF,16V,10%,TANTALUM	10 TANT
20	1	DS1	311-0010	LED,RED,DIFFUSED,T1-3/4	
21	1	U4	316-0353	OP-AMP,BIFET,DUAL,DIP-8	353
22	1	U5	316-0662	OP-AMP,CMOS,DUAL,DIP-8	C662
23	1	U1	321-0204	RCVR,DTMF,DIP-14	75T204
24	1	U6	324-4165	SIP-INPUT,SERIAL OUTPUT 8-BIT SR,HC	74HC165
25	1	U7	324-7400	NAND,HC,2 INPUT,QUAD,DIP-14	74HC00
26	1	U3	324-7414	INVERTER,SCHMITT,MOTOROLA THRESHOLDS,HEX,DIP-14	74HC14
27	1	U2	324-7474	FLIP-FLOP,D,HC,DUAL,DIP-14	74HC74
28	1	Q2	340-0201	XSTR,JFET,N-CHANNEL,VGS > -1.5,TO-92	J201
29	1	Q1	340-3904	XSTR,NPN,40V/200MA,TO92	2N3904
30	2	D1,D2	342-3009	DIODE,SILICON,100V,250MW	1N4148
31	1	Y1 NOTE 4	376-0358	XTAL,3.579545MHZ,CL=18pF,HC-49	3.58MHZ
32	1	JP1	403-0003	03 OF 401-0052	
33	1	TP1	403-0004	04 OF 401-0052	
34	1	J1 NOTE 1	403-1026	26 OF 401-0036	
35	2	NOTE 2	210-0001	NUT,KEP, 4-40, S-ZN	
36	2	NOTE 2	220-0108	440 X 1/4 PAN PHILLIPS SCREW	
37	2	NOTE 2	250-0103	3/4" STUD STANDOFF	
38	1	XJP1 (POS A)	402-3040	MINI JUMPER	
39	1	PCB NOTE 3	410-9450C	M4010 TONE REMOTE LOTL DAUGHTER BOARD	
40	1	XDS1	417-0010	LED MOUNT RA	

NOTES: (Notes are for production use only.)

Tone LOTL/DTMF Decoder Silkscreen



Tone LOTL/DTMF Decoder Schematic (008-9535C)



CHANNEL 5-TONE ANI DECODER OPTION (950-9707, 950-9708)

Channel 5-Tone ANI Decoder Parts List (702-0147A)

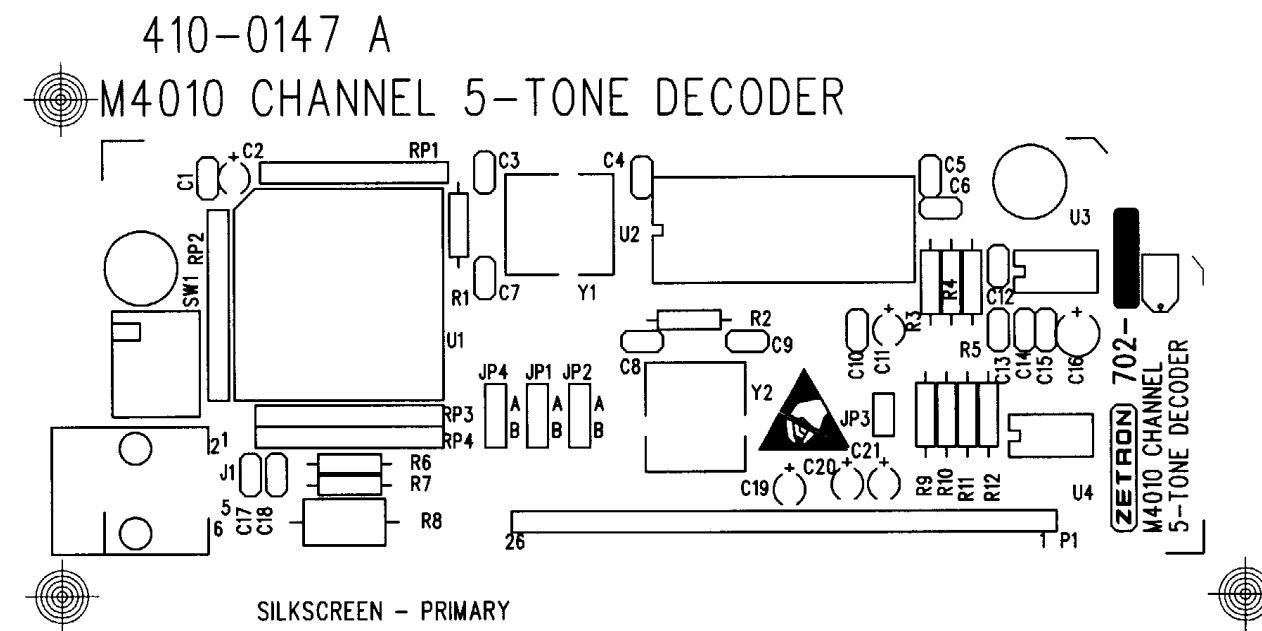
LEGEND:
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

ZETRON MODEL 4010 CHANNEL 5-TONE DECODER BOARD PARTS LIST:

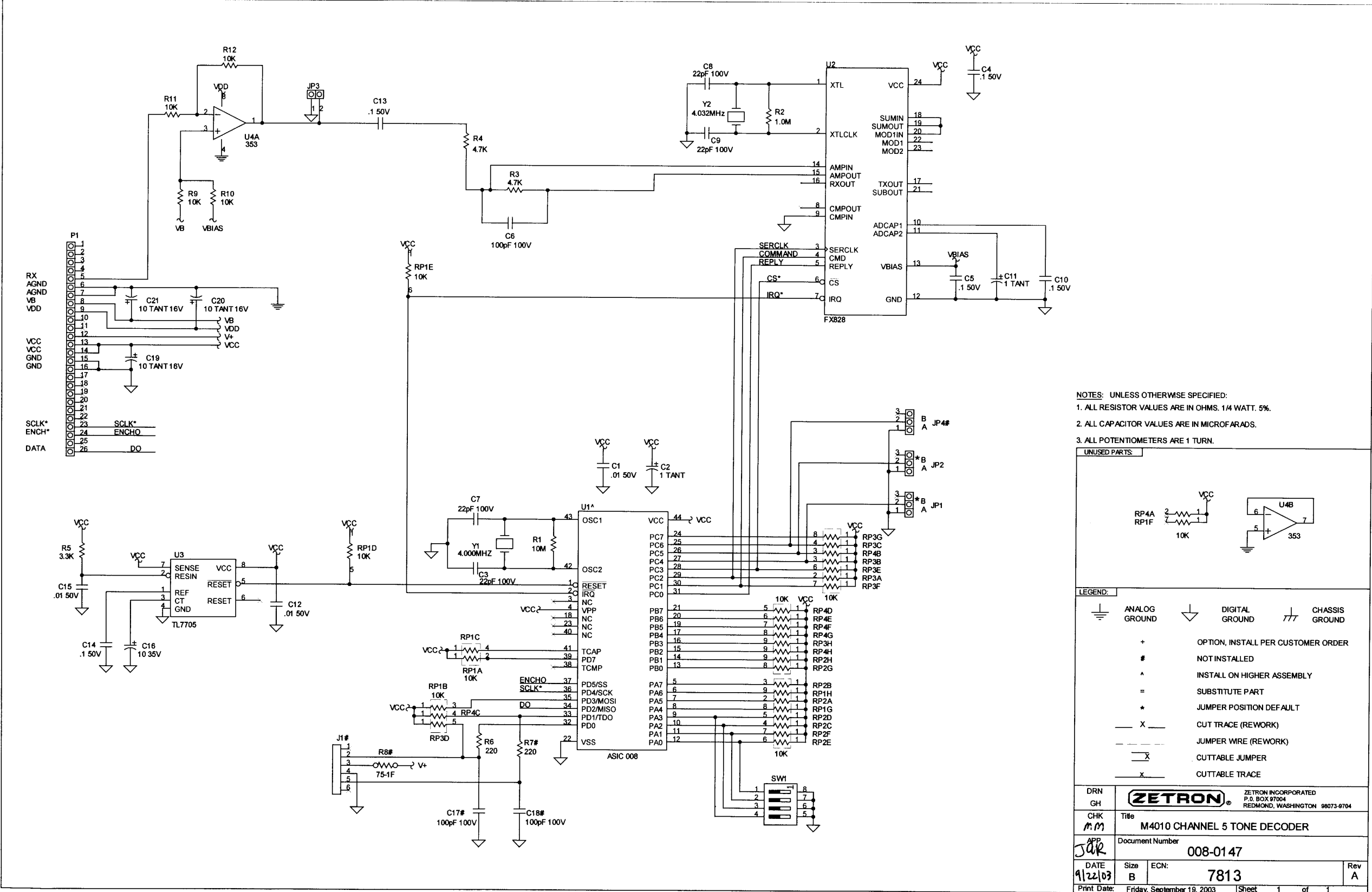
Item	Qty	Reference	Part No.	Description	Part Value
1.	1	R6,R7#	101-0057	RESISTOR,220 OHM,1/4W,5%,CARBON FILM	220
2.	1	R5	101-0085	RESISTOR,3.3K OHM,1/4W,5%,CARBON FILM	3.3K
3.	2	R3,R4	101-0089	RESISTOR,4.7K OHM,1/4W,5%,CARBON FILM	4.7K
4.	4	R9,R10,R11,R12	101-0097	RESISTOR,10K OHM,1/4W,5%,CARBON FILM	10K
5.	1	R2	101-0145	RESISTOR,1.0M OHM,1/4W,5%,CARBON FILM	1.0M
6.	1	R1	101-0160	RESISTOR,10M OHM,1/4W,5%,CARBON FILM	10M
7.	0	R8#	106-1175	RESISTOR,FUSIBLE,75 OHM,1W,5%	75 1F
8.	4	RP1,RP2,RP3,RP4	119-0056	R-NETWORK,10K OHM x 8,BUSSED,SIP-9	10K
9.	1	C6,C17#,C18#	151-0010	CAP,100pF,100V,10%,CERAMIC,NPO	100pF 100V
10.	4	C3,C7,C8,C9	151-0022	CAP,22pF,100V,10%,CERAMIC,NPO	22pF 100V
11.	3	C1,C12,C15	151-0120	CAP,.01uF,50V,10%,CERAMIC,X7R	.01 50V
12.	5	C4,C5,C10,C13,C14	151-0181	CAP,.1uF,50V,10%,CERAMIC,X7R	.1 50V
13.	2	C11,C2	154-0025	CAP,1uF,35V,10%,TANTALUM	1 35V TANT
14.	3	C19,C20,C21	154-0100	CAP,10uF,16V,10%,TANTALUM	10 16V TANT
15.	1	C16	155-0052	CAP,10uF,35V,20%,RADIAL,Al-E	10 35V
16.	1	U4	316-0353	OP-AMP,BIFET,DUAL,DIP-8	353
17.	1	U2	316-0828	ENCODER/DECODER,CTCSS,DCS,SELCALL,DIP-24	FX828
18.	1	U3	316-7705	POWER ON RESET,DIP-8	TL7705
19.	0	U1^	321-6805	8 BIT MICRO OTP (68HC705),PLCC-44	ASIC 008
20.	1	SW1	371-0025	SWITCH,DIP,04 POS,TOP ACTUATED	
21.	1	Y1	376-0004	XTAL,4.000MHZ,CL=18,20pF,HC-49	4.000MHZ
22.	1	Y2	376-4032	XTAL,4.032MHZ,CL=18,22pF,HC-49	4.032MHZ
23.	0	J1#	401-0080	6-PIN LO PRO R/A TziELCO	
24.	1	JP3	403-0002	02 OF 401-0052	
25.	2	JP1,JP2,JP4#	403-0003	03 OF 401-0052	
26.	1	P1	405-1026	26 OF 401-0065	
27.	2	STUDS	NOTE 2	210-0001	440 KEP NUT PLATED
28.	2	STUDS	NOTE 2	220-0108	440X1/4 PAN PHILLIPS
29.	2		NOTE 2	250-0103	440X3/4 W/STUD
30.	2	XJP1, 2	(POS B)	402-3040	MINI JUMPER
31.	1	XU1		407-0044	SKT, 44 PIN PLCC
32.	1	PCB		410-0147A	PCB, M4010 CHANNEL 5-TONE DECODER

NOTES:
1. PINS OF P1 SHOULD EXTEND THROUGH SOLDER SIDE .70" TO .76".
2. INSTALL STUDS (250-0103) INTO MOUNTING HOLES FROM SOLDER SIDE AND SECURE WITH NUT (210-0001) ON COMPONENT SIDE .INSTALL SCREWS (220-0108) INTO STUDS.

Channel 5-Tone ANI Decoder Silkscreen



Channel 5-Tone ANI Decoder Schematic (008-0147A)



CHANNEL ANI FSK DECODER OPTION (950-9709)

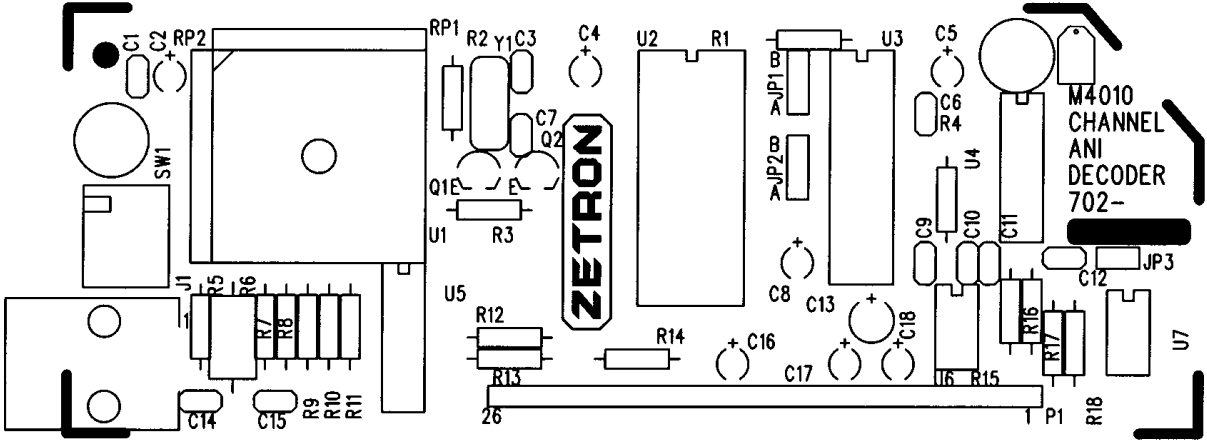
Channel ANI FSK Decoder Parts list (702-9583C.2)

LEGEND:
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

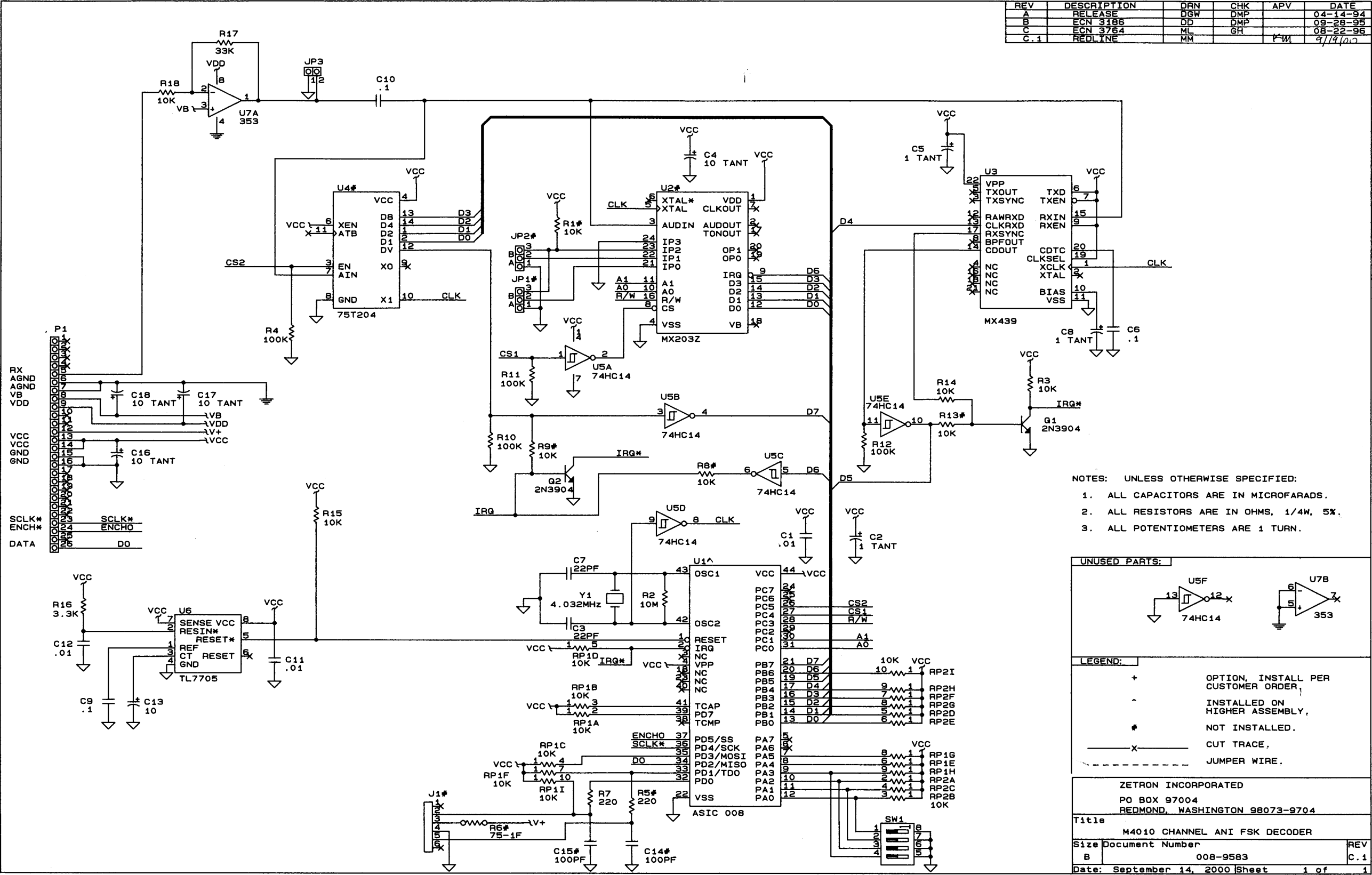
ZETRON M4010 CHANNEL ANI 'FSK' DECODER PARTS LIST:

Item	Qty	Reference	Part No.	Description	Part Value
1	1	R7,R5#	101-0057	220 OHM 1/4W 5% CARBON FILM	
2	1	R16	101-0085	3.3K 1/4W 5% CARBON FILM	
3	4	R1#,R3,R8#,R9#,R13#,R14,R15,R18	101-0097	10K 1/4W 5% CARBON FILM	
4	1	R17	101-0109	33K 1/4W 5% CARBON FILM	
5	4	R4,R10,R11,R12	101-0121	100K 1/4W 5% CARBON FILM	
6	1	R2	101-0160	10M 1/4W 5% CARBON FILM	
7	0	R6#	106-1175	75 OHM 1W 5% FUSIBLE	BW1F-75OHM5%B
8	2	RP1,RP2	119-0006	10K x 9 R-SIP	4610X-101-103
9	0	C14#,C15#	151-0010	100PF 50V/100V +-10%/5% CERAMIC, TEMP. STABLE	CW15C101K
10	2	C3,C7	151-0022	22PF 50V +-10%/5%	CN15C220K
11	3	C1,C11,C12	151-0120	.01UF 50V +-10% CERAMIC, TEMP. STABLE	CW15C103K
12	3	C6,C9,C10	151-0181	.1UF .1SPACE 50V CERAMIC, TEMP. STABLE	CW20C104K
13	3	C2,C5,C8	154-0025	1 UF 35V TANTALUM	ECS-F-35E1
14	4	C4,C16,C17,C18	154-0100	10 UF 16V TANTALUM	ECS-FICE106K
15	1	C13	155-0052	10 UF 35V +-20% RADIAL ALUM. ELECT.	ECEA1VU100
16	0	U2#	316-0203	5/6 TONE X-CEIVER-ZVEI	MX203QZJ
17	1	U7	316-0353	DUAL OP-AMP, DUAL BIFET	LF353
18	1	U6	316-7705	POWER ON RESET	TL7705
19	0	U4#	321-0204	DTMF RECEIVER	75T204
20	1	U3	321-0439	FFSK MODEM 22 DIP	MX439P
21	0	U1^	321-6805	ASIC 008	
22	1	U5	324-7414	HEX SCHMIDT	74HC14
23	2	Q2,Q1	340-3904	NPN 40V/200MA	2N3904
24	1	SW1	371-0025	4 POS DIP SWITCH	206-4ST
25	1	Y1	376-4032	4.032 MHz HC-18 CASE	CTS MP043
26	0	J1#	401-0080	6-PIN LO PRO R/A TELCO	520250-3
27	1	JP3	403-0002	2 OF 401-0052	
28	0	JP2#,JP1#	403-0003	3 OF 401-0052	
29	1	P1 NOTE 2	405-1026	26 OF 401-0065	
30	3	XQ2, STUDS NOTE 3	210-0001	440 KEP NUT PLATED	
31	2	STUDS NOTE 3	220-0108	440X1/4 PAN PHILLIPS	
32	2	NOTE 3	250-0103	440X3/4 W/STUD	
33	1	XU1	407-0044	SKT, 44 PIN PLCC	
34	1	PCB	410-9580A	PCB, M4010 CHANNEL ANI DECODER	

Channel ANI FSK Decoder Silkscreen



Channel ANI FSK Decoder Schematic (008-9583C.1)



MODEL 4010R BOARDS

Control Board Parts List (702-9569H.1)

LEGEND:
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

ZETRON MODEL 4010R CONTROL BOARD PARTS LIST:

Item	Qty	Reference	Part No.	Description	Part Value
1	1	R92	101-0025	10 OHM 1/4W 5% CARBON FILM	
2	3	R6,R20,R49	101-0049	100 OHM 1/4W 5% CARBON FILM	
3	5	R37,R43,R98,R99,R100	101-0057	220 OHM 1/4W 5% CARBON FILM	
4	3	R36,R84,R85	101-0061	330 OHM 1/4W 5% CARBON FILM	
5	2	R13,R53	101-0068	620 OHM 1/4W 5% CARBON FILM	
6	9	R2,R4,R8,R25,R30,R31,R32,R39,R91	101-0073	1K 1/4W 5%CARBON FILM	
7	6	R27,R28,R29,R58,R102,R103	101-0074	1.2K 1/4W 5% CARBON FILM	
8	1	R78	101-0085	3.3K 1/4W 5% CARBON FILM	
9	3	R5,R81,R97	101-0089	4.7K 1/4W 5% CARBON FILM	
10	21	R9,R35,R38,R48,R59,R60,R65,R66,R73,R74,R75,R76,R77,R79,R82,R83,R86,R88,R90,R95,R101	101-0097	10K 1/4W 5% CARBON FILM	
11	5	R12,R16,R21,R23,R24	101-0101	15K 1/4W 5% CARBON FILM	
12	1	R19	101-0103	18K 1/4W 5% CARBON FILM	
13	4	R14,R33,R51,R52	101-0104	20K 1/4W 5% CARBON FILM	
14	1	R89	101-0105	22K 1/4W 5% CARBON FILM	
15	1	R26	101-0106	24K 1/4W 5% CARBON FILM	
16	1	R15	101-0107	27K 1/4W 5% CARBON FILM	
17	2	R40,R72	101-0109	33K 1/4W 5% CARBON FILM	
18	1	R50	101-0111	39K 1/4W 5% CARBON FILM	
19	2	R46,R34	101-0113	47K 1/4W 5% CARBON FILM	
20	1	R3	101-0115	56K 1/4W 5% CARBON FILM	
21	15	R1,R10,R18,R22,R41,R47,R54,R55,R56,R57,R61,R64,R71,R80,R96	101-0121	100K 1/4W 5% CARBON FILM	
22	1	R45	101-0125	150K 1/4W 5% CARBON FILM	
23	2	R11,R44	101-0129	220K 1/4W 5% CARBON FILM	
24	1	R17	101-0141	680K 1/4W 5% CARBON FILM	
25	1	R42	101-0148	2M 1/4W 5%CARBON FILM	
26	1	R87	101-0160	10M 1/4W 5% CARBON FILM	
27	1	R94	103-0047	47 OHM 1W 5%	
28	1	R93	103-0175	75 OHM 2W 5%	RD-200BJ75
29	1	RV1	105-0002	VARISTOR 14V AC	V22ZA3
30	7	R7,R62,R63,R67,R68,R69,R70	108-0103	10K POT 4 TURN	1102P-1-103K
31	1	RP1	119-0003	3.3K x 7 R-SIP	4608X-101-332
32	1	RP5	119-0006	10K x 9 R-SIP	4610X-101-103
33	2	RP4,RP3	119-0008	10K x 7 R-SIP	EXB-F8E103G /J
34	1	RP2	119-0021	R/2R 100K/200K 10 PIN	RSC10L104G
35	7	C4,C5,C7,C17,C31,C32,C34,C86#	150-0096	1000 PF 1KV +-20% CERAMIC DISC	GP210
36	39	C35,C38,C40,C45,C48,C49,C50,C51,C52,C53,C56,C57,C58,C59,C60,C61,C63,C64,C65,C67,C68,C69,C71,C72,C73,C74,C75,C76,C77,C78,C79,C80,C81,C83,C84,C88,C99,C101,C103	150-0110	.01 UF 50V 80%-20% CERAMIC DISC	DF-103Z
37	1	C27	151-0010	100PF 50V/100V +-10%/5% CERAMIC, TEMP STABLE	CW15C101K
38	2	C54,C55	151-0022	22PF 50V +-10%/5%	CN15C220K
39	4	C3,C6,C21,C22	151-0028	270PF 50V+-5% CERAMIC, TEMP STABLE	CN15C271J
40	1	C43	151-0080	.0022UF 50V+-10% CERAMIC, TEMPERATURE STABLE	CW15C222K
41	13	C9,C11,C16,C20,C33,C39,C41,C42,C44,C46,C91,C95,C97	151-0181	.1UF .1SPACE 50V CERAMIC, TEMP. STABLE	CW20C104K
42	1	C26	152-0085	.01 UF 50V +- 5%POLYESTER	ECQ-V1H103JZ

Model 4010 Radio Dispatch Console Service Manual

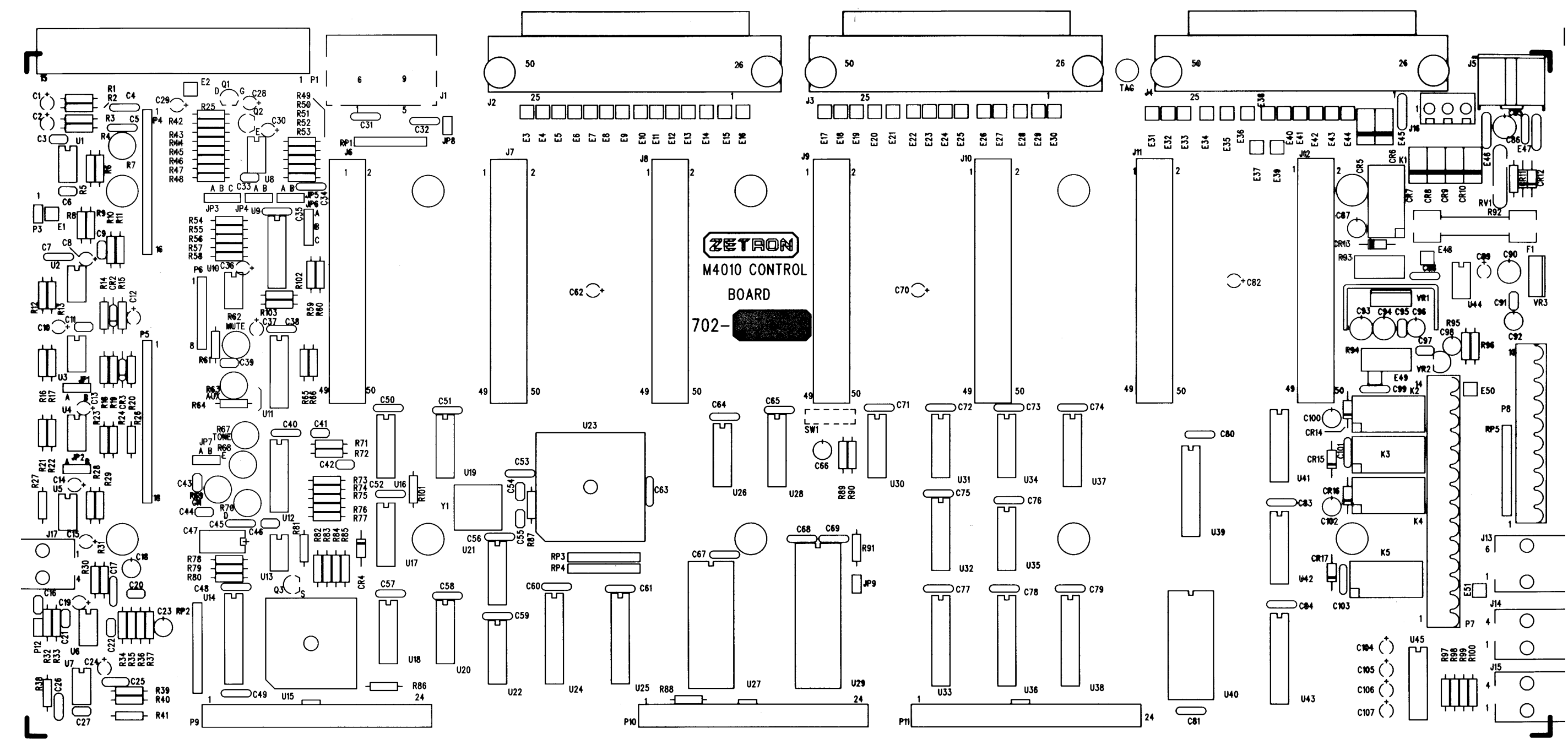
43	1	C25	152-0088	.0047UF 50V +-5%POLYESTER	ECQ-B1H472JZ
44	23	C1,C2,C8,C10,C12, C13,C14,C15,C19,C24, C28,C29,C30,C36,C37, C62,C70,C82,C89,C104, C105,C106,C107	154-0025	1 UF 35V TANTALUM	ECS-F-35E1
45	9	C18,C23,C66,C87,C92, C96,C98,C100,C102	155-0052	10 UF 35V +-20% RADIAL ALUM. ELECT.	ECEA1VU100
46	1	C47	155-0055	22 UF 25V +50%-10% AXIAL ALUM. ELECT.	TLBIE220M
47	4	C85,C90,C93,C94	155-0077	100UF 25V +-20% RADIALALUM. ELECT.	ECEA1EU101
48	48	E1,E2,E3,E4,E5,E6, E7,E8,E9,E10,E11,E12, E13,E14,E15,E16,E17, E18,E19,E20,E21,E22, E23,E24,E25,E26,E27, E28,E29,E30,E31,E32, E33,E34,E35,E36,E37, E38,E39,E40,E41,E42, E43,E44,E48,E49,E50,E51	305-0001	FERRITE BEADS W/ LEADS	11413-3B
49	3	E45,E46,E47	305-0306	EMI SUPPRESSION FILTER	DSS3055FZ103N
50	1	VR2	316-0005	REGULATOR 5V LOW POWER	LM78L05ACZ
51	1	U45	316-0232	RS232 DRIVER CMOS	ADM232LJN
52	9	U1,U2,U3,U4,U5,U6, U8,U10,U44	316-0353	DUAL OP-AMP, DUAL BIFET	LF353N
53	1	U7	316-0662	OP-AMP, CMOS, DUAL	LMC662CN
54	1	VR1	316-2940	REGULATOR, +5V, LOW DROPOUT	LM2940CT-5.0
55	1	U13	316-7705	POWER ON RESET	TL7705
56	1	VR3 NOTE 3	316-7805	REGULATOR, +5V 1.5A	LM340T-5.0
57	2	U16,U19	317-1489	QUAD RS-232 RECEIVER	MC1489A
58	0	U15^	321-6805	ASIC 008	
59	1	U23	321-6813	UP-HC, NON-MUX W/CS	MC68HC11F1
60	1	U40	321-6851	VART 2MHZ	MC68B50P
61	1	U27	321-8256	32K X 8 SRAM LP	HPD43256-15L
62	1	U12	323-4052	DUAL 4-CHAN ANALOG MUX	MC14052B
63	2	U9,U11	323-4053	3PDT SWITCH	MC144053
64	2	U21,U22	323-4906	HEX LEVEL SHIFT	MM74C906N
65	0	U29^	323-8256	32K X 8 FLASH EPROM	P28F256A-150
66	2	U17,U26	324-4125	TRI-STATE QUAD BUFFER	MM74HC125
67	3	U28,U32,U37	324-4138	DECODER 1 OF 8	MCH74HC138
68	1	U33	324-4373	OCTAL LATCH	MC74HC373
69	1	U20	324-4393	DUAL 4 BIT COUNTER	MC74HC393N
70	2	U31,U34	324-7400	QUAD NAND	MC74HC00N
71	1	U18	324-7408	QUAD 2 IN AND	MC74HC08AN
72	2	U30,U35	324-7414	HEX SCHMIDT	SN74HC14N
73	1	U43	325-4244	BUFFER,HCT,3-STATE,OCTAL,DIP-20	74HCT244
74	1	U38	325-4245	OCTAL XCVR	MC74HCT245AN
75	5	U14,U24,U25,U36,U39	325-4273	OCTAL DFF	MM74HCT273
76	1	Q1	340-0201	XSTR,JFET,N-CHANNEL,VGS > -1.5,TO-92	J201
77	2	U42,U41	340-2003	RELAY DRIVER 50V/.5A	ULN2003
78	1	Q2	340-3906	PNP 40V/200MA	2N3906
79	1	Q3	340-5460	JFETP-CHAN	2N5460
80	2	CR2,CR3	342-3009	SILICON .50 SP	1N4148
81	6	CR12,CR13,CR14,CR15, CR16,CR17	342-3011	SILICON 1A 1000V .50 SP	1N4007
82	6	CR5,CR6,CR7,CR8, CR9,CR10	342-5400	SIL 3A 50V .50 SP	1N5400
83	1	CR4	343-3029	1W 5.1V +-5% .50 SP	1N4733A
84	1	CR11	343-3108	1W 15V +-5% .50 SP	1N4744A
85	1	SW1 NOTE 2	371-0012	SPDT .1 CENTERS	MMS-12
86	1	Y1 NOTE 1	376-0800	8MHz XTAL HC-18	FOX080
87	5	K1,K2,K3,K4,K5	380-0030	DPDT 12V COIL MINI RELAY	G5V-2
88	1	J1	401-0664	DB9 S	DEP-9S-CA
89	1	P1	401-0059	15 POS R/A HEADER	6923.6
90	1	J16	401-0060	3-POS TERM BLK	2MV-03
91	7	J6,J7,J8,J9,J10, J11,J12	401-0063	50 PIN CARD EDGE	A8D25DS28C
92	2	J14,J15,J17#	401-0078	4 PIN TELCO MNT	520257-2
93	0	J13#	401-0080	6-PIN LO PRO R/A TELCO	520250-3
94	3	J2,J3,J4	401-0206	50 PIN RJ21 CONN MALE	552726-1
95	1	J5	401-0217	5 PIN DIN	WMPCBA
96	1	P7	401-1101	14 POS HEADER	1101.6
97	3	P9,P10,P11	401-2421	CONN, LOCKING HEADER, 24 POS	FPH-2421T
98	1	P8	401-3592	10-POS BLOCK MALE VERT	1105.6
99	4	P3,JP8,JP9,P12	403-0002	2 OF 401-0052	
100	5	JP1,JP2,JP4,JP5,JP7	403-0003	3 OF 401-0052	

101	2	JP3, JP6	403-0004	4 OF 401-0052	
102	1	P6	403-0008	8 OF 401-0052	
103	1	P4	403-0016	16 OF 401-0052	
104	1	P5	403-0018	18 OF 401-0052	
105	1	F1	416-6025	FUSE AGC 2.5ASB-LITTLEFUSE	MDL 2.5ASB
106	1	XVR1	210-0001	NUT, KEP, 4-40, S-ZN	
107	6	XJ2-4 (2 EA)	220-0106	SCREW, 4-40 x 5/16, PAN, PHL, S-Zn	
108	2	XVR1, 3	220-0108	SCREW, 4-40 x 1/4, PAN, PHL, S-Zn	
109	1	XVR3 NOTE 3	234-0007	WASHER, SHOULDER, #4, FIBRE	
110	1	XVR3 NOTE 3	236-0001	INSULATOR, TO-220, MICA	
111	1	XVR3 NOTE 3	251-1239	WASHER, FLAT, #4, .250"OD/.120"ID/.032"THK, FIBRE	
112	1	XVR1	381-0003	HEATSINK, TO-220, SMALL STAMPING	
113	13	XJP1-7 (POS A)	402-3040	MINI JUMPER, .1 X .2 X .37"	
		XP4 (PINS 1-2, 3-4, 5-6, 7-8)			
		XP5, 6 (PINS 1-2)			
114	6	XU1, 3, 6, 8, 10, 44	407-0008	SKT, 08 PIN DIP	
115	2	XU16, 19	407-0014	SKT, 14 PIN DIP	
116	4	XU11, 41, 42, 45	407-0016	SKT, 16 PIN DIP	
117	2	XU39, 43	407-0020	SKT, 20 PIN DIP	
118	1	XU40	407-0024	SKT, 24 PIN DIP	
119	1	XU27	407-0028	SKT, 28 PIN DIP	
120	1	XU29	407-0032	SKT, 32 PIN DIP	
121	1	XU15	407-0044	SKT, 44 PIN PLCC	
122	1	XU23	407-0068	SKT, 68 PIN PLCC	
123	1	PCB, BARE	410-9376C	M4010 CONTROL BRD.	
124	1	XVR3 NOTE 3	415-9597A	M4010 REGULATOR HEATSINK	
125	1	XU27	416-1217	28 PIN BATT/WATCH 8K/32K	DS1216C
126	2	XF1	416-3040	FUSE CLIP	

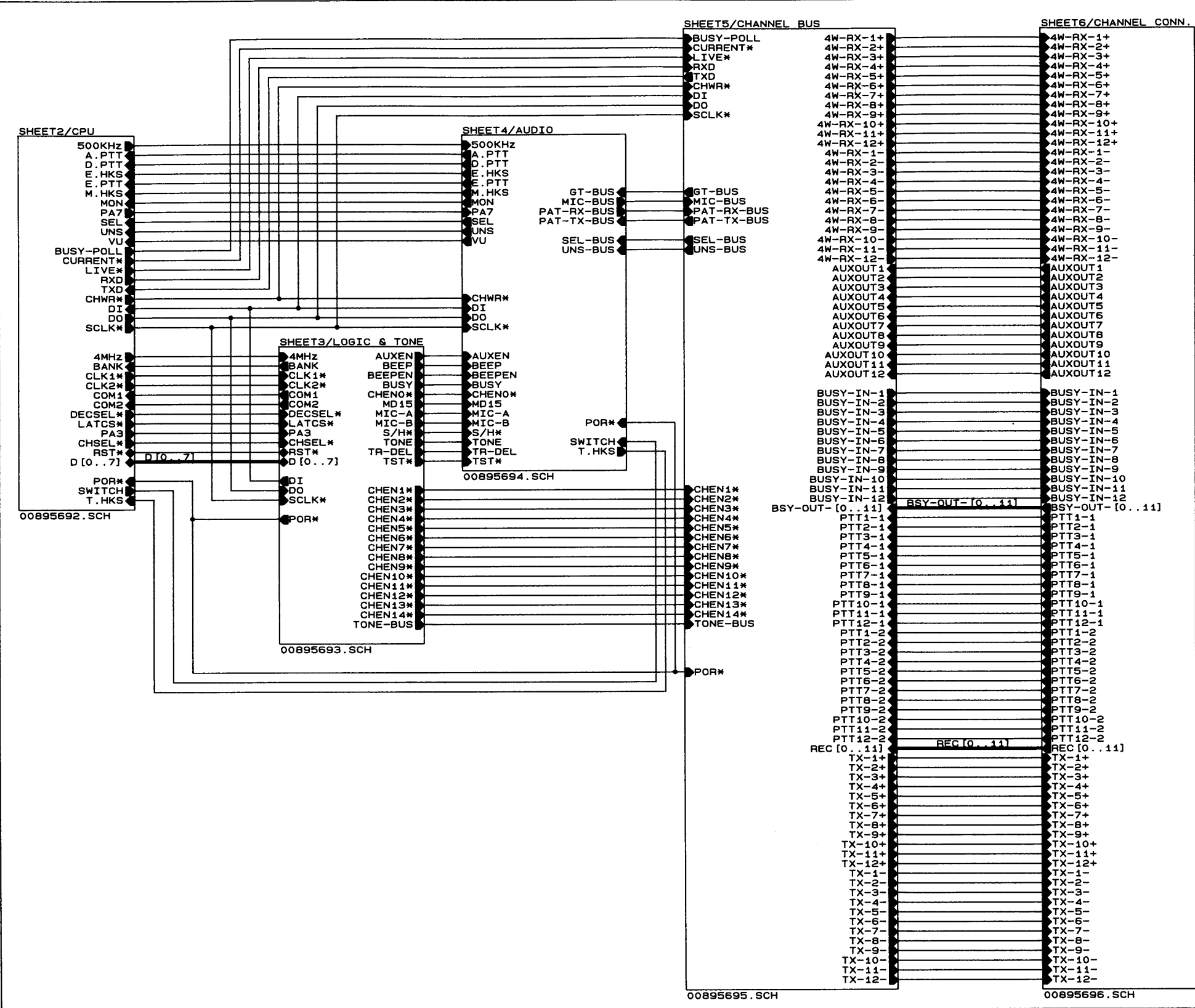
REFERENCE DESIGNATORS NOT USED: P2, CR1

NOTES: (Notes are for production use only.)

Control Board Silkscreen

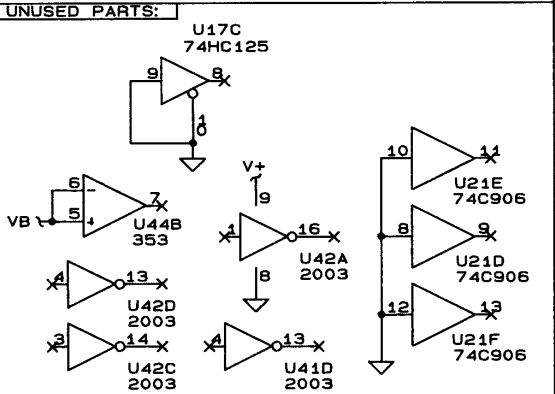


Control Board Schematic (008-9569J)



REV	DESCRIPTION	DRN	CHK	APD	DATE
A	RELEASE	KJN			
B	HCN 2469	GWH			
C	HCN 2491	TC		DMP	04-27-94
C.1	REDLINE	KN		JS	05-17-94
D	ECN 2731C	ML		GH	03-15-95
E	ECN 3047	BW		DMP	06-28-95
F	ECN 3241	DD		DMP	11-08-95
G	ECN 5255	BW		ME	08-05-98
H	ECN 5545	KM		DMP	09-26-00
J	ECN 6527	MM	VLM	AK	10-03-00

- NOTES: UNLESS OTHERWISE SPECIFIED.
1. ALL CAPACITORS ARE IN MICROFARADS.
 2. ALL RESISTORS ARE IN OHMS, 1/4W, 5%.
 3. ALL POTENTIOMETERS ARE 1 TURN.



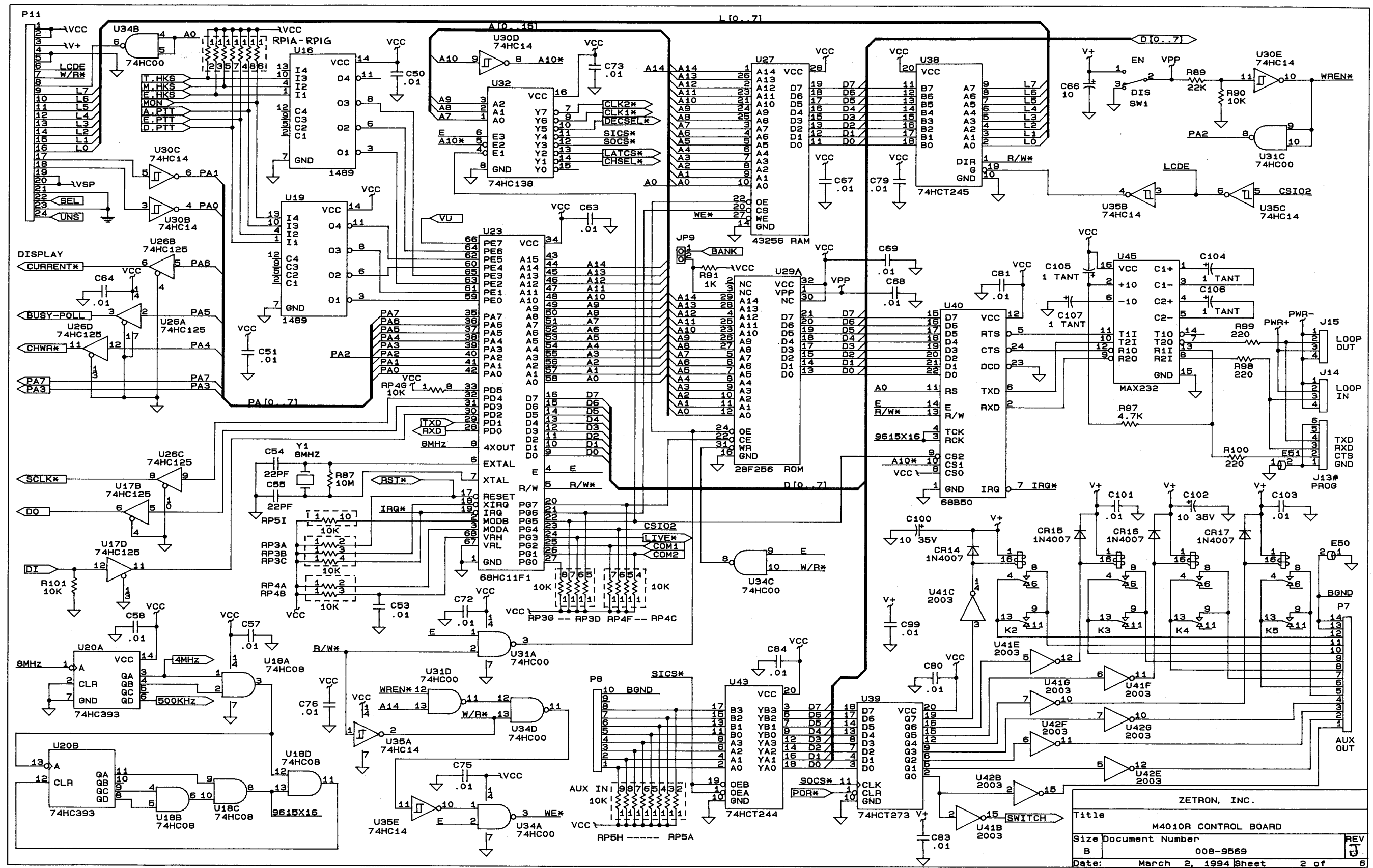
- LEGEND:
- + OPTION, INSTALL PER CUSTOMER ORDER.
 - ~ INSTALLED ON HIGHER ASSEMBLY.
 - # NOT INSTALLED.
 - x CUT TRACE.
 - JUMPER WIRE.

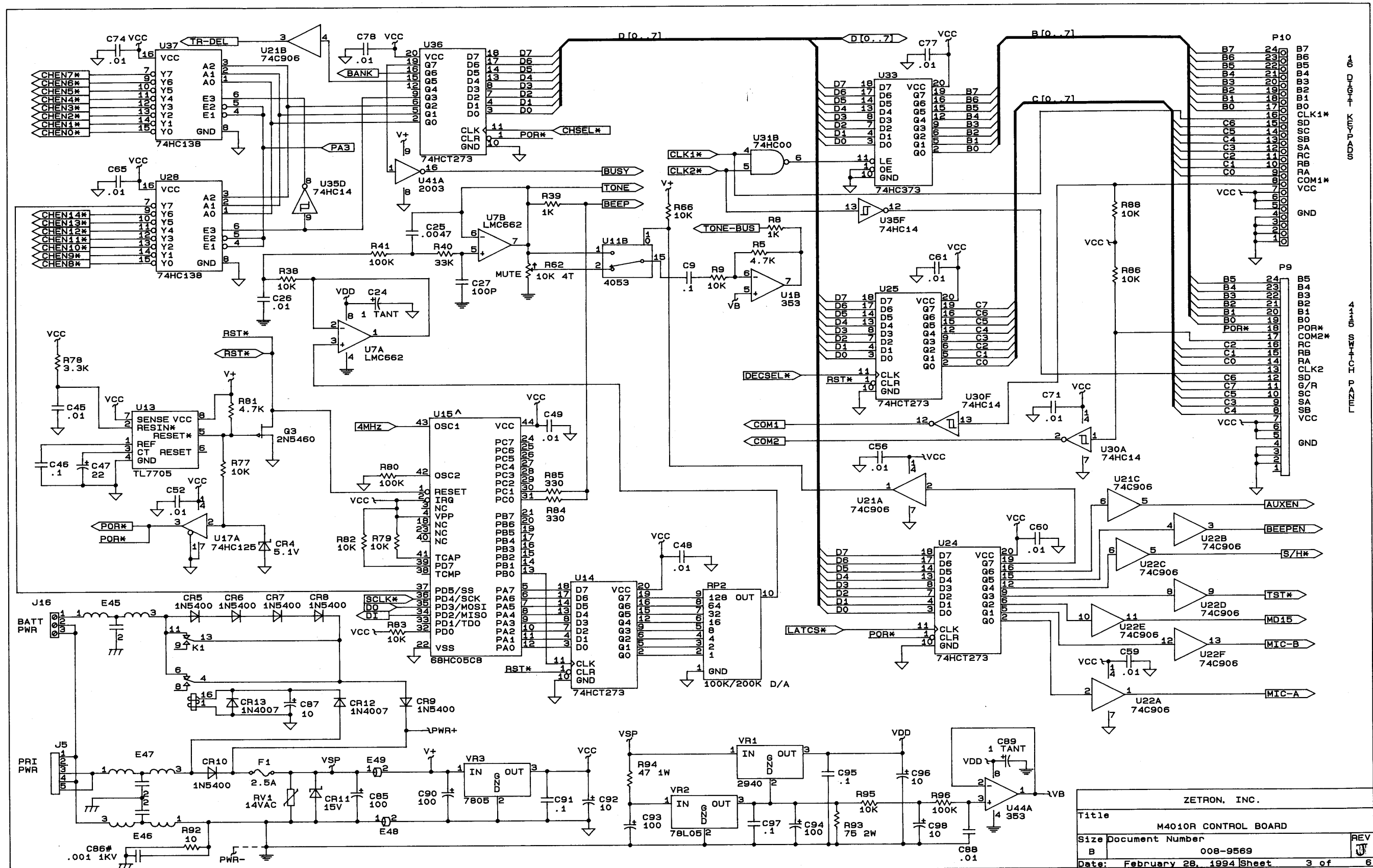
ZETRON, INC.
PO BOX 97004
REDMOND, WASHINGTON 98073-9704

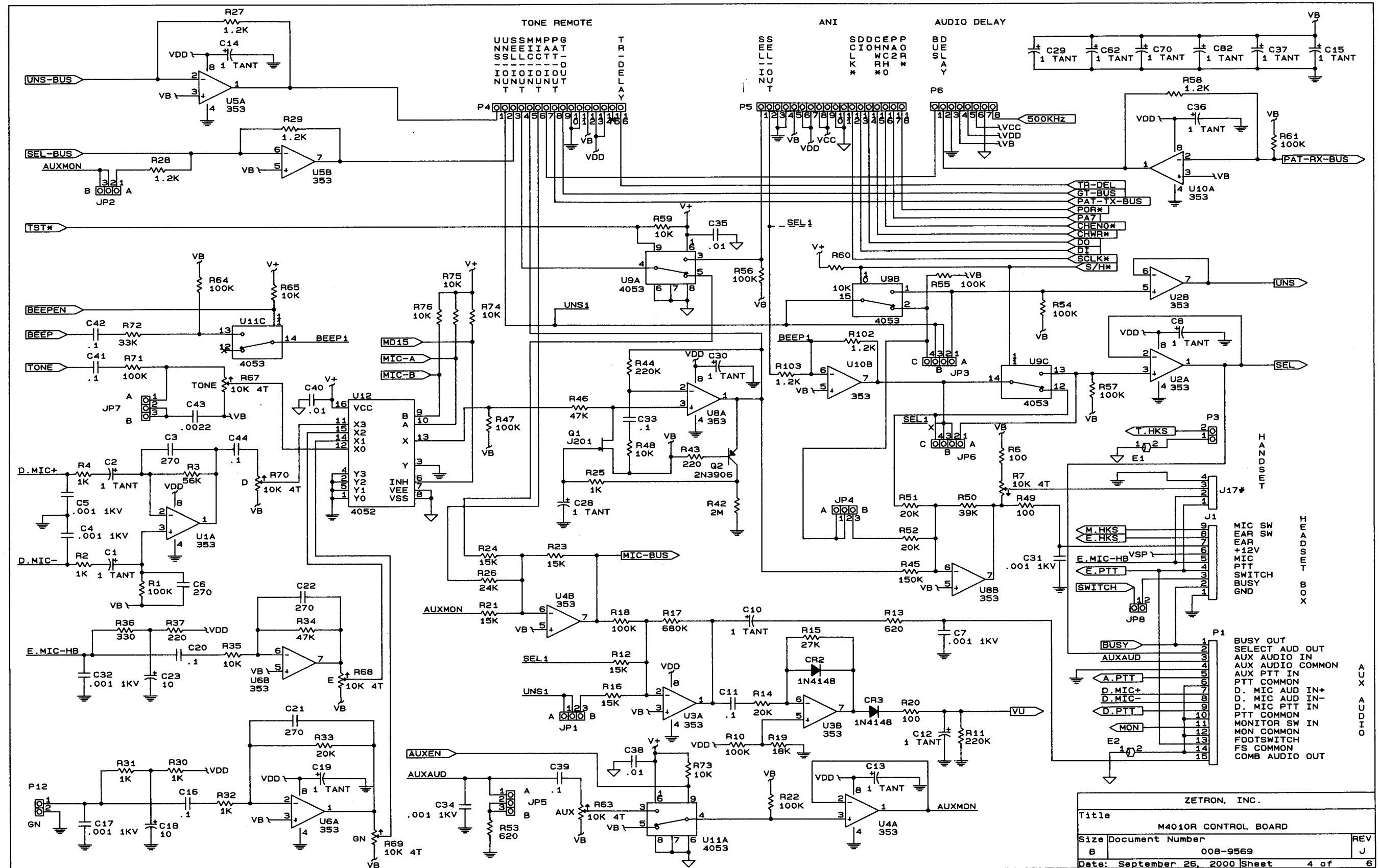
Title M4010R CONTROL BOARD

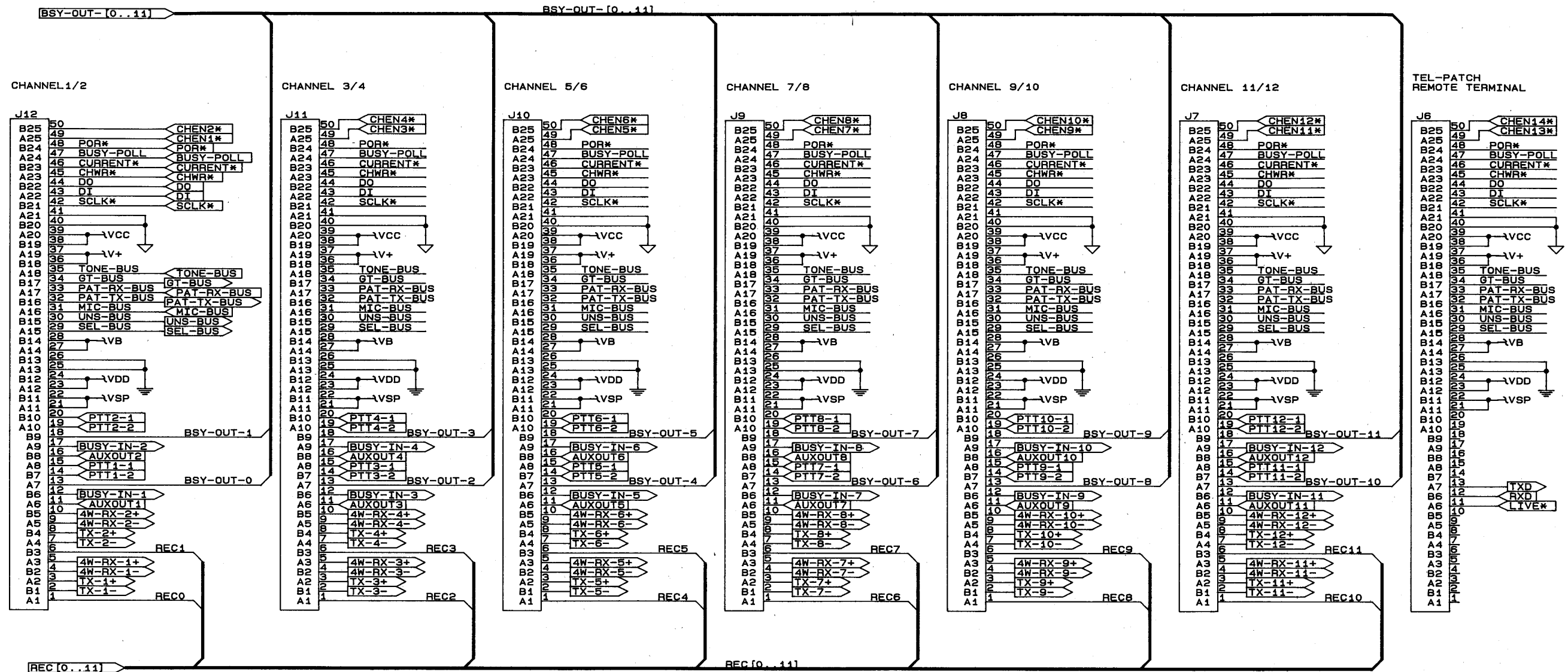
Size	Document Number	REV
B	008-9569	J

Date: September 26, 2000 Sheet 1 of 6

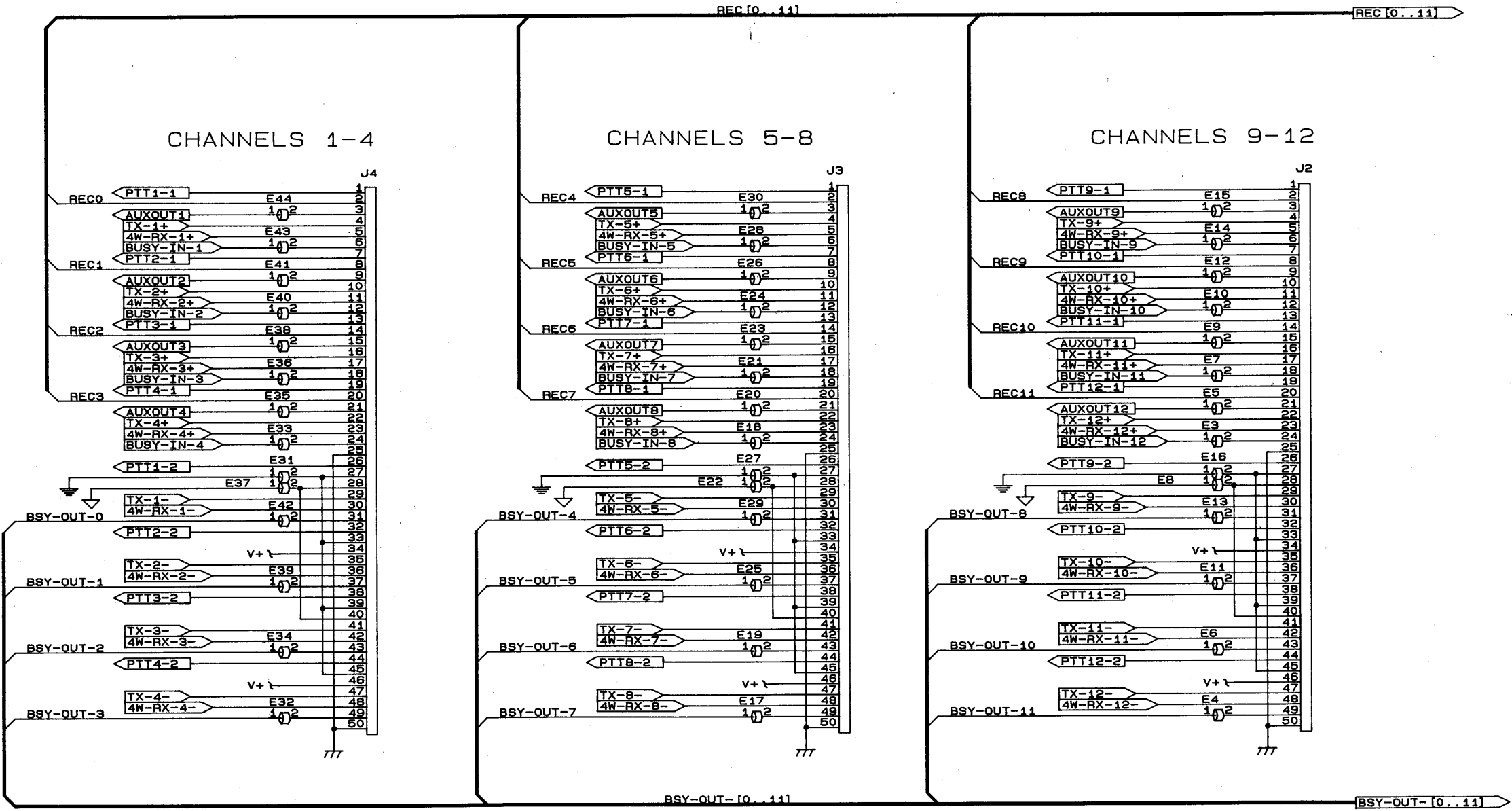








ZETRON, INC.			
Title	M4010R CONTROL BOARD		
Size	Document Number	008-9569	REV
B			J
Date:	July 23, 1993	Sheet	5 of 6



ZETRON, INC.			
Title			
M4010R CONTROL BOARD			
Size	Document Number		REV
B	008-9569		1
Date:	July 23, 1993 Sheet 6 of 6		

Display/Keyboard Parts List (702-9570D.5)

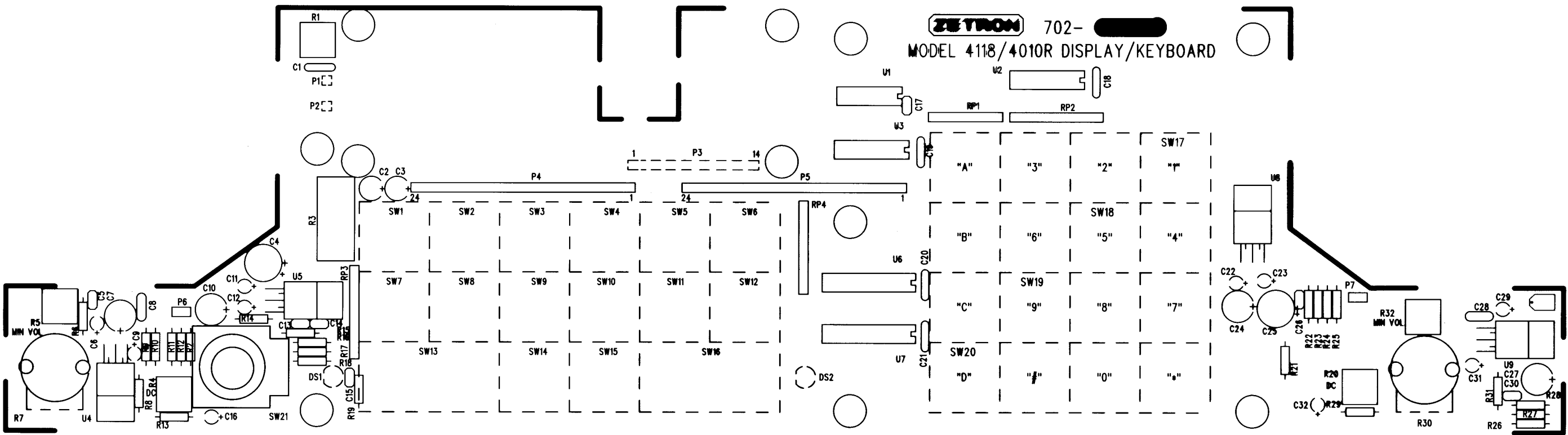
LEGEND:
+ = OPTION, INSTALL PER CUSTOMER ORDER
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
= = SUBSTITUTE PART

ZETRON M4010R DISPLAY/KEYBOARD BOARD PARTS LIST:

Item	Qty	Reference	Part No.	Description	Part Value
1	4	R6,R15,R22,R28	101-0010	RESISTOR,1.0 OHM,1/4W,5%,CARBON FILM	1.0
2	4	R10,R11,R24,R26	101-0013	RESISTOR,2.2 OHM,1/4W,5%,CARBON FILM	2.2
3	6	R9,R12,R14,R23,R25,R27	101-0057	RESISTOR,220 OHM,1/4W,5%,CARBON FILM	220
4	2	R8,R31	101-0073	RESISTOR,1.0K OHM,1/4W,5%,CARBON FILM	1.0K
5	2	R18,R16	101-0085	RESISTOR,3.3K OHM,1/4W,5%,CARBON FILM	3.3K
6	2	R19,R17	101-0113	RESISTOR,47K OHM,1/4W,5%,CARBON FILM	47K
7	2	R13,R29	101-0115	RESISTOR,56K OHM,1/4W,5%,CARBON FILM	56K
8	2	R2,R21	101-0145	RESISTOR,1.0M OHM,1/4W,5%,CARBON FILM	1.0M
9	1	R3	103-0275	RESISTOR, 75 OHM,5W,5%,WIREWOUND,FLAMEPROOF	75 5W
10	2	R7,R30	107-0002	POT,10K OHM,ROTORY,LINEAR TAPER	10K
11	2	R5,R32	107-0202	POT,2K OHM,1 TURN	2K
12	2	R4,R20	107-0504	POT,200K OHM,1 TURN	200K
13	1	R1	107-3085	POT,10K OHM,1 TURN	10K
14	1	RP1	119-0007	R-NETWORK,100K OHM x 7,BUSSED,SIP-08	100K
15	2	RP3,RP4	119-0011	R-NETWORK,220 OHM x 9,BUSSED,SIP-10	220
16	1	RP2	119-0015	R-NETWORK,100K OHM x 9,BUSSED,SIP-10	100K
17	5	C1,C18,C19,C20,C21	150-0110	CAP,.01uF,50V,80%-20%,CERAMIC DISC	.01
18	3	C14,C15,C17	151-0120	CAP,.01uF,50V,10%,CERAMIC X7R	.01
19	4	C5,C13,C26,C30	151-0181	CAP,.1uF,50V,10%,CERAMIC X7R	.1
20	2	C8,C28	152-0085	CAP,.01uF,50V,5%,POLYESTER	.01
21	2	C29,C9	154-0025	CAP,1uF,35V,10%,TANTALUM	1 TANT
22	8	C6,C11,C12,C16,C22,C23,C31,C32	154-0100	CAP,10uF,16V,10%,TANTALUM	10 TANT
23	1	C3,C2#	155-0077	CAP,100uF,25V,20%,RADIAL,A1-E	100
24	4	C7,C10,C24,C27	155-0083	CAP,470uF,10V,20%,RADIAL,A1-E	470 10V
25	2	C25,C4	155-0084	CAP,470uF,25V,20%,RADIAL,A1-E	470 25V
26	2	DS2,DS1 NOTE 4	311-0022	LED,RED,DIFFUSED,T-1	
27	4	U4,U5,U8,U9	316-2003	AMP,AUDIO,8W,HORIZ MOUNT,TO-200-5	LM383
28	1	U2	323-4051	MUX/DEMUX,ANALOG,1-TO-8,DIP-16	4051
29	1	U3	323-4052	MUX,ANALOG,4 CHANNEL,DUAL,DIP-16	4052
30	2	U6,U7	324-4374	FLIP-FLOP,D,HC,3-STATE,NON-INVERTING,OCTAL	74HC374
31	1	U1	324-7414	INVERTER,SCHMITT,MOTOROLA THRESHOLDS,HEX	74HC14
32	1	SW21	371-0015	ENCODER,ROTARY,1/4" SHAFT	
33	2	P4,P5	401-2421	CONN,HDR,LOCKING,24POS	
34	0	P1#,P2# NOTE 1	403-0001	01 OF 401-0052	
35	1	P3	403-0014	14 OF 401-0052	
36	2	P7,P6	404-1002	02 OF 401-1364	
37	4	LCD DISPLAY	210-0001	NUT,KEP,4-40,S-Zn	
38	48	XSW1-16 (2 EA)	220-0075	SCREW,SELF TAP,#3x5/16,TYPE 25,PAN,PHL,S-Zn	
		XSW17-20 (4 EA)			
39	4	LCD DISPLAY	220-0102	SCREW,4-40 x 3/8, PAN PHL,S-Zn	
40	4	LCD DISPLAY	251-1250	SPACER,RND,#4 x .125",3/16"OD,NYLON	
41	2	XDS1,2	251-3125	SPACER,RND,#4 x 5/16",.250"OD,FIBRE	
42	1	XP3 NOTES 1-3	311-1623	LCD,16 x 2,LARGE-STN	
43	14	SW1-12,14,15 NOTE 4	311-4222	LED,RED,TRANSPARENT,T-1	
44	16	SW1-16 NOTE 4	373-1100	CT 1 X 1 LED/KEY HOUSING	
45	4	SW17-20 NOTE 4	373-1101	CT 1 X 4 LED/KEY HOUSING	
46	32	SW1-16 (1 EA) NOTE 4	373-1102	CT KEY PLUNGER	
		SW17-20 (4 EA) NOTE 4			
47	32	SW1-16 (1 EA) NOTE 4	373-1103	CT 1 X 1 KEYPAD ELASTOMER	
		SW 17-20 (4 EA) NOTE 4			
48	1	XP1,2 NOTE 1	408-2401	WIRE,24AWG(19/36),600V,105C,PVC,BLACK	
49	1	PCB	410-9354C	M4118/4010R DISPLAY/KEYBOARD	

NOTES: (Notes are for production use only.)

Display/Keyboard Silkscreen



Display/Keyboard Schematic (008-9570D)

SHEET 2 OF 3

00895702.SCH

DISPLAY

SHEET 3 OF 3

00895703.SCH

KEYPAD

REV	DESCRIPTION	DRN	CHK	APVD	DATE
A	RELEASE	KM			
B	HCN 2382	DW			
C	HCN 2468	TC		AM	3-9-94
D	ECN 3241	DD		AMSP	11-8-95

NOTES: UNLESS OTHERWISE SPECIFIED:

- ALL RESISTOR VALUES ARE IN OHMS, 1/4 WATT, 5%.
- ALL CAPACITOR VALUES ARE IN MICROFARADS.
- ALL POTENTIOMETERS ARE 1 TURN.

UNUSED PARTS:

VCC

10

220

RP3I

4

220

RP4C

10

100K

RP2I

LEGEND:

⏏

ANALOG GROUND.

⏏

CHASSIS GROUND.

⏏

DIGITAL GROUND.

+

OPTION. INSTALL PER CUSTOMER ORDER.

^

INSTALLED ON HIGHER ASSEMBLY.

#

NOT INSTALLED.

X

CUT TRACE.

JUMPER WIRE.

ZETRON INCORPORATED

12335 134TH COURT NORTHEAST

REDMOND, WASHINGTON 98052-2433

Title

M4010R DISPLAY/KEYBOARD

Size

Document Number

REV

B

008-9570

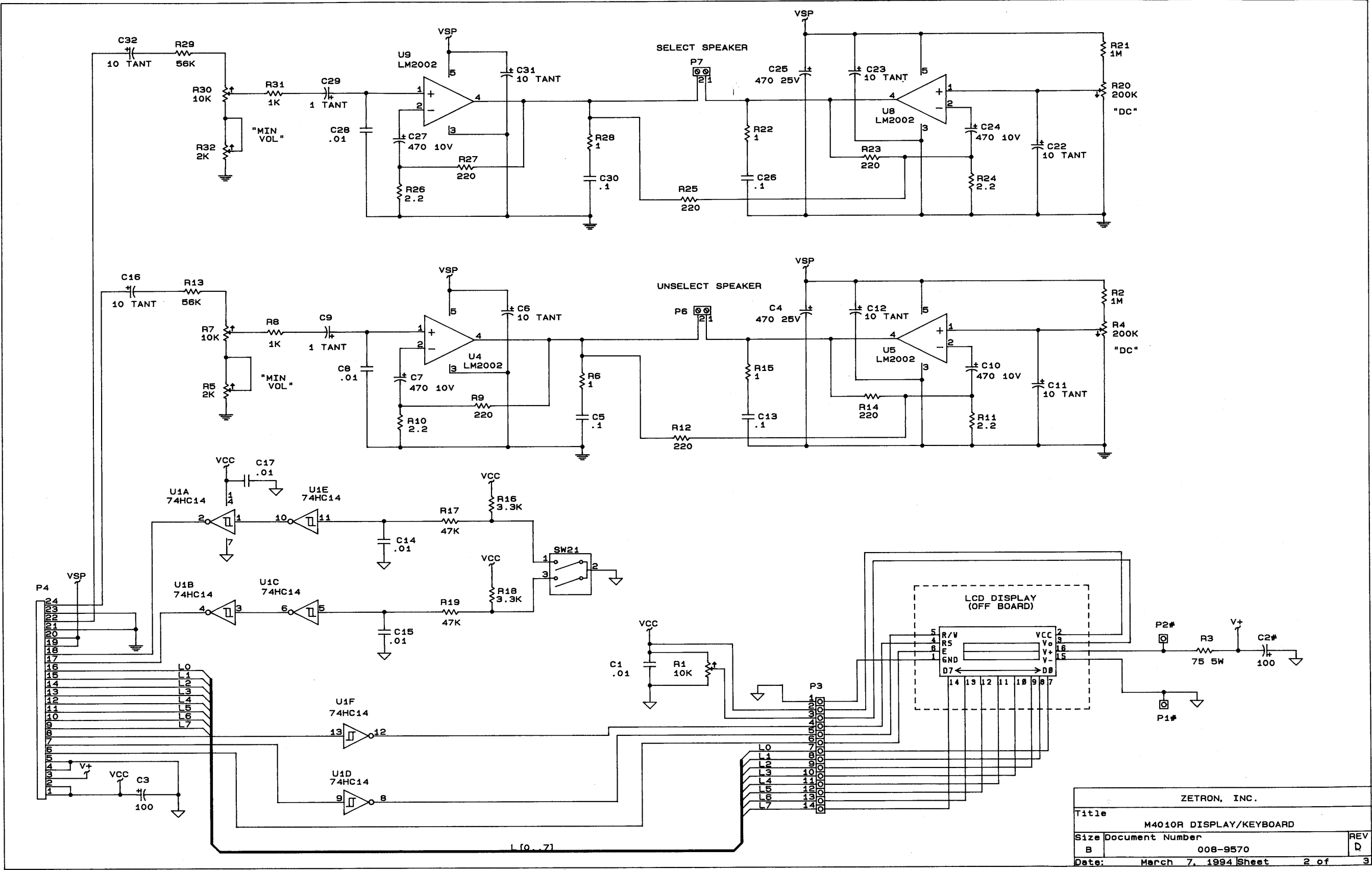
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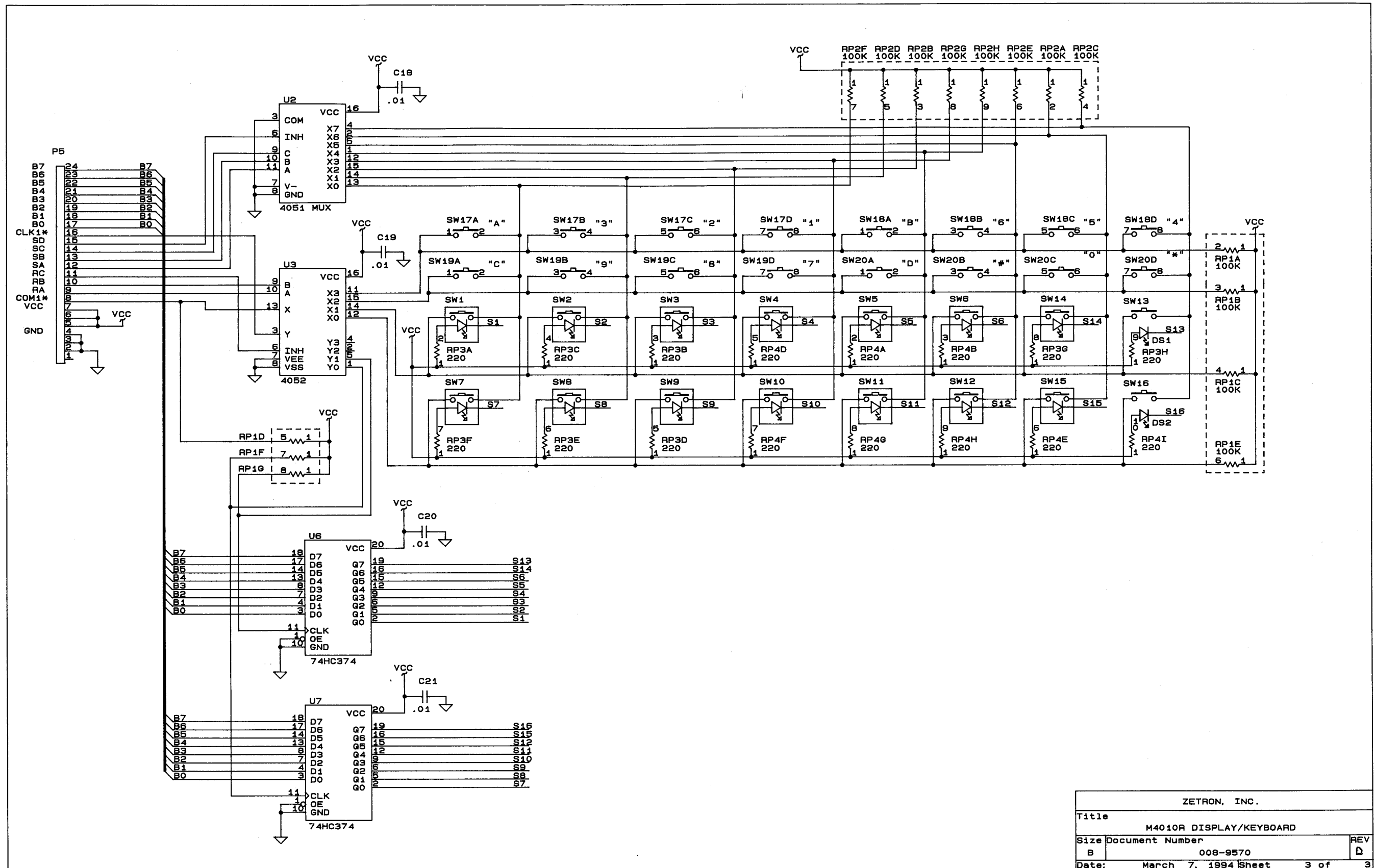
March 8, 1994

Sheet

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ZETRON, INC.		
Title M4010R DISPLAY/KEYBOARD		
Size Document Number		
B	008-9570	REV D
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ZETRON, INC.		
Title		
M4010R DISPLAY/KEYBOARD		
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60-Button Interface Parts List (702-9572D)

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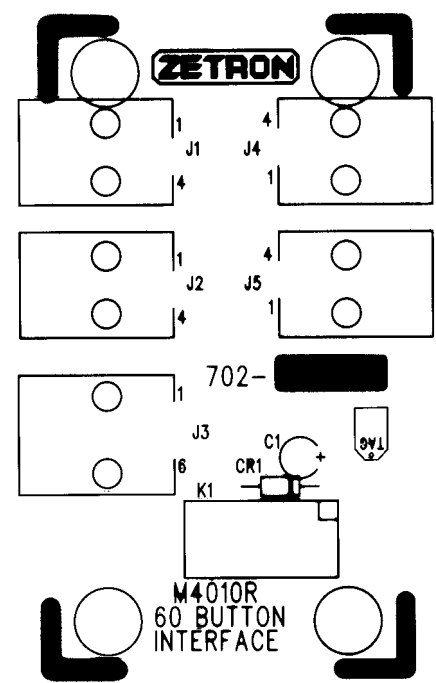
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^ = INSTALLED ON HIGHER ASSY
+ = OPTION (INSTALLED PER CUSTOMER ORDER)

ZETRON MODEL 4010R 60 BUTTON INTERFACE PARTS LIST (702-9572D)

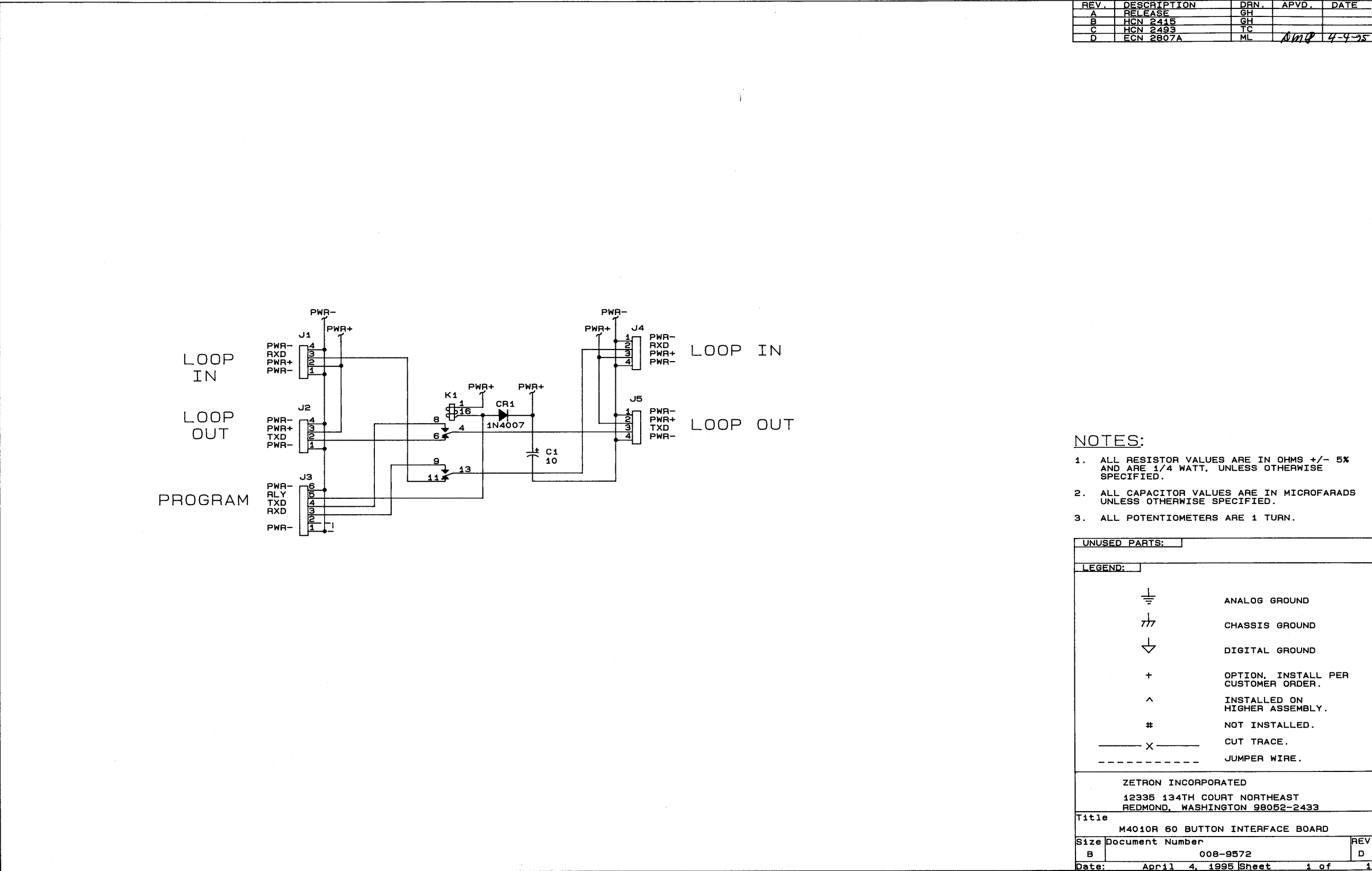
Item	Qty	Reference	Part No.	Description	Part Value
1	1	C1	155-0052	10 UF 35V +-20% RADIAL ALUM. ELEC.	ECE-B2AV100S
2	1	CR1	342-3011	SILICON 1A 1000V .50 SP	1N4007
3	1	K1	380-0030	DPDT 12V COIL MINI RELAY	G5V-2
4	1	J3	401-0080	6-PIN LO PRO R/A TELCO	520250-3
5	4	J1,J2,J4,J5	401-5202	4 PIN TELCO, RT ANGLE	520249-2
6	1	PCB	410-9572B	PCB, M4010R 60 BUTTON INTERFACE	

NOTES: (Notes are for production use only.)

60-Button Interface Silkscreen



60-Button Interface Schematic (008-9572D)



MODEL 4011 BOARDS

30-Button Board Parts List (702-9711A)

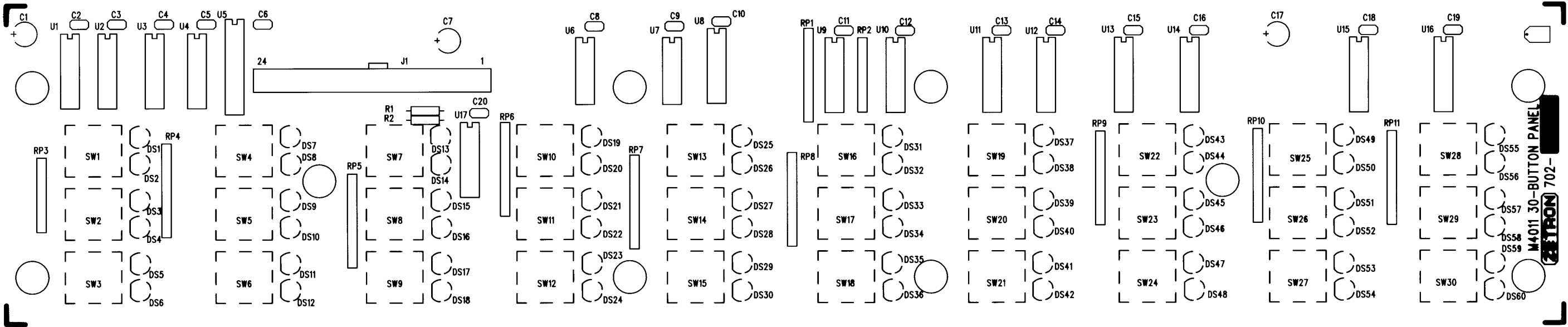
LEGEND:
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
+ = OPTION (INSTALLED PER CUSTOMER ORDER)

ZETRON MODEL 4011 30-BUTTON PANEL PARTS LIST (702-9711A)

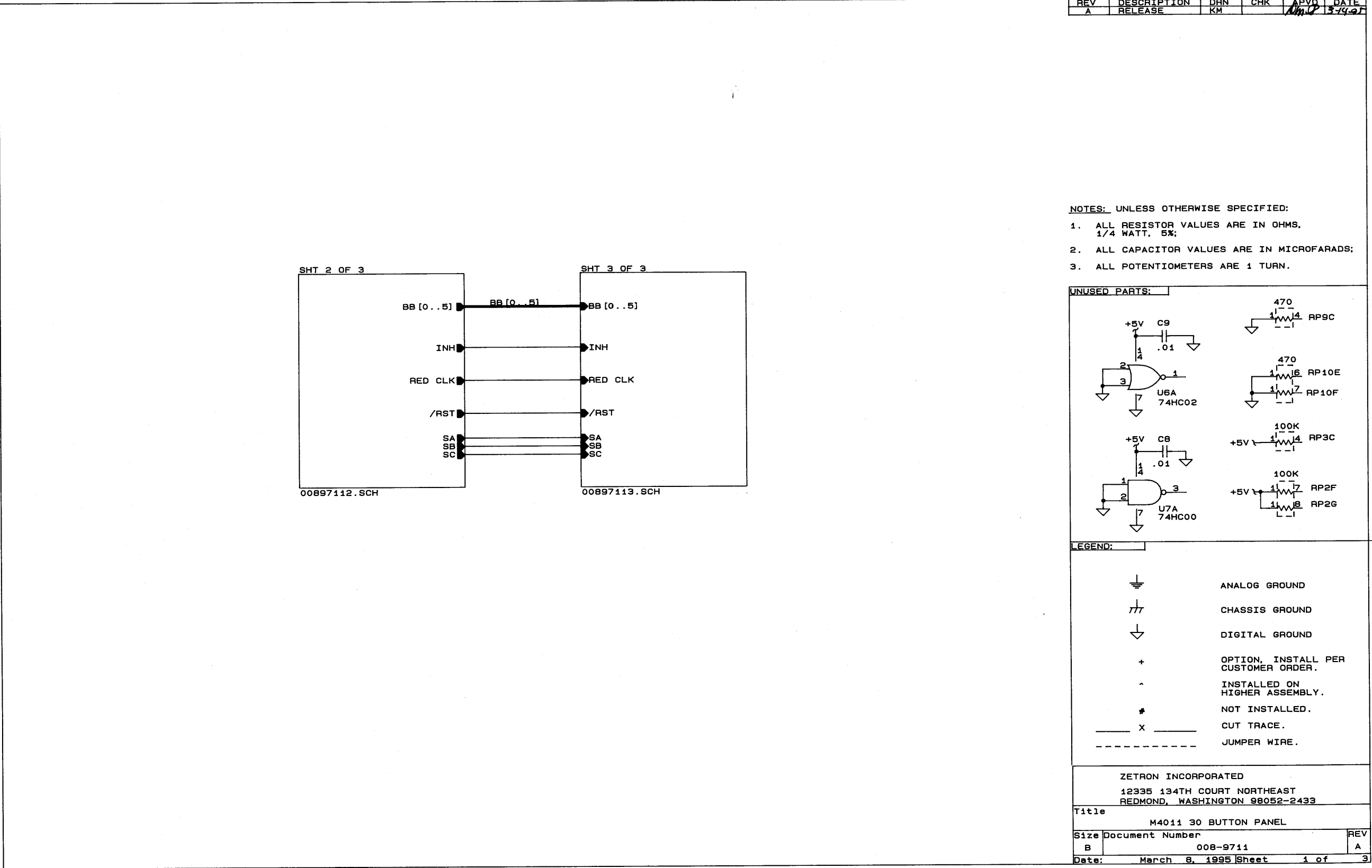
Item	Qty	Reference	Part No.	Description	Part Value
1	1	R1	101-0097	10K 1/4W 5% CARBON FILM	
2	1	R2	101-0121	100K 1/4W 5% CARBON FILM	
3	2	RP1,RP6	119-0006	10K x 9 BUSSED 10-PIN SIP	
4	2	RP2,RP3	119-0007	100K x7 BUSSED 8-PIN SIP	
5	7	RP4,RP5,RP7,RP8,RP9,RP10,RP11	119-0027	470 x 9 BUSSED 10-PIN SIP	
6	17	C2,C3,C4,C5,C6,C8,C9,C10,C11,C12,C13,C14,C15,C16,C18,C19,C20	151-0120	.01UF 50V/100V +-10% CERAMIC X7R	
7	3	C1,C7,C17	155-0077	100UF 25V +-20% RADIAL ALUMINUM ELECTROLYTIC	
8	30	DS1,DS3,DS5,DS7,DS9,DS11,DS13,DS15,DS17,DS19,DS21,DS23,DS25,DS27,DS29,DS31,DS33,DS35,DS37,DS39,DS41,DS43,DS45,DS47,DS49,DS51,DS53,DS55,DS57,DS59	311-0021	LED GREEN, T-1	
9	30	NOTE 3 DS2,DS4,DS6,DS8,DS10,DS12,DS14,DS16,DS18,DS20,DS22,DS24,DS26,DS28,DS30,DS32,DS34,DS36,DS38,DS40,DS42,DS44,DS46,DS48,DS50,DS52,DS54,DS56,DS58,DS60,	311-0022	LED RED, T-1	
10	4	U8,U9,U10,U17	323-4051	1-TO-8 ANALOG MUX/DEMUX	4051
11	1	U6	324-4002	QUAD 2 INPUT NOR	74HC02
12	1	U5	324-4240	OCTAL BUFFER (INVERTING)	74HC240
13	1	U7	324-7400	QUAD NAND	74HC00
14	10	U1,U2,U3,U4,U11,U12,U13,U14,U15,U16	325-4174	HEX D. F/F	74HCT174
15	30	SW1,SW2,SW3,SW4,SW5,SW6,SW7,SW8,SW9,SW10,SW11,SW12,SW13,SW14,SW15,SW16,SW17,SW18,SW19,SW20,SW21,SW22,SW23,SW24,SW25,SW26,SW27,SW28,SW29,SW30	371-0003	SINGLE KEY - NO LIGHT	
16	1	J1	404-2024	24 OF 401-0180	
17	2	XU6,7	407-0014	SKT, 14 PIN DIP	
18	14	XU1-4,8-18	407-0016	SKT, 16 PIN DIP	
19	1	XU5	407-0020	SKT, 20 PIN DIP	
20	1	PCB	410-9711A	M4011 30-BUTTON PANEL	
21	5	XDS1-60	415-9536	LED SPACER	

NOTES: (Notes are for production use only)

30-Button Board Silkscreen



30-Button Board Schematic (008-9711A)



NOTES: UNLESS OTHERWISE SPECIFIED:

1. ALL RESISTOR VALUES ARE IN OHMS,
1/4 WATT, 5%;

2. ALL CAPACITOR VALUES ARE IN MICROFARADS;

3. ALL POTENTIOMETERS ARE 1 TURN.

UNUSED PARTS:

+5V

C9

.01

U6A

74HC02

470

RP9C

470

RP10E

470

RP10F

+5V

C8

.01

U7A

74HC00

100K

RP3C

100K

RP2F

100K

RP2G

LEGEND:

ANALOG GROUND

CHASSIS GROUND

DIGITAL GROUND

OPTION, INSTALL PER
CUSTOMER ORDER.

INSTALLED ON
HIGHER ASSEMBLY.

NOT INSTALLED.

CUT TRACE.

JUMPER WIRE.

ZETRON INCORPORATED

12335 134TH COURT NORTHEAST

REDMOND, WASHINGTON 98052-2433

Title

M4011 30 BUTTON PANEL

Size

Document Number

008-9711

REV

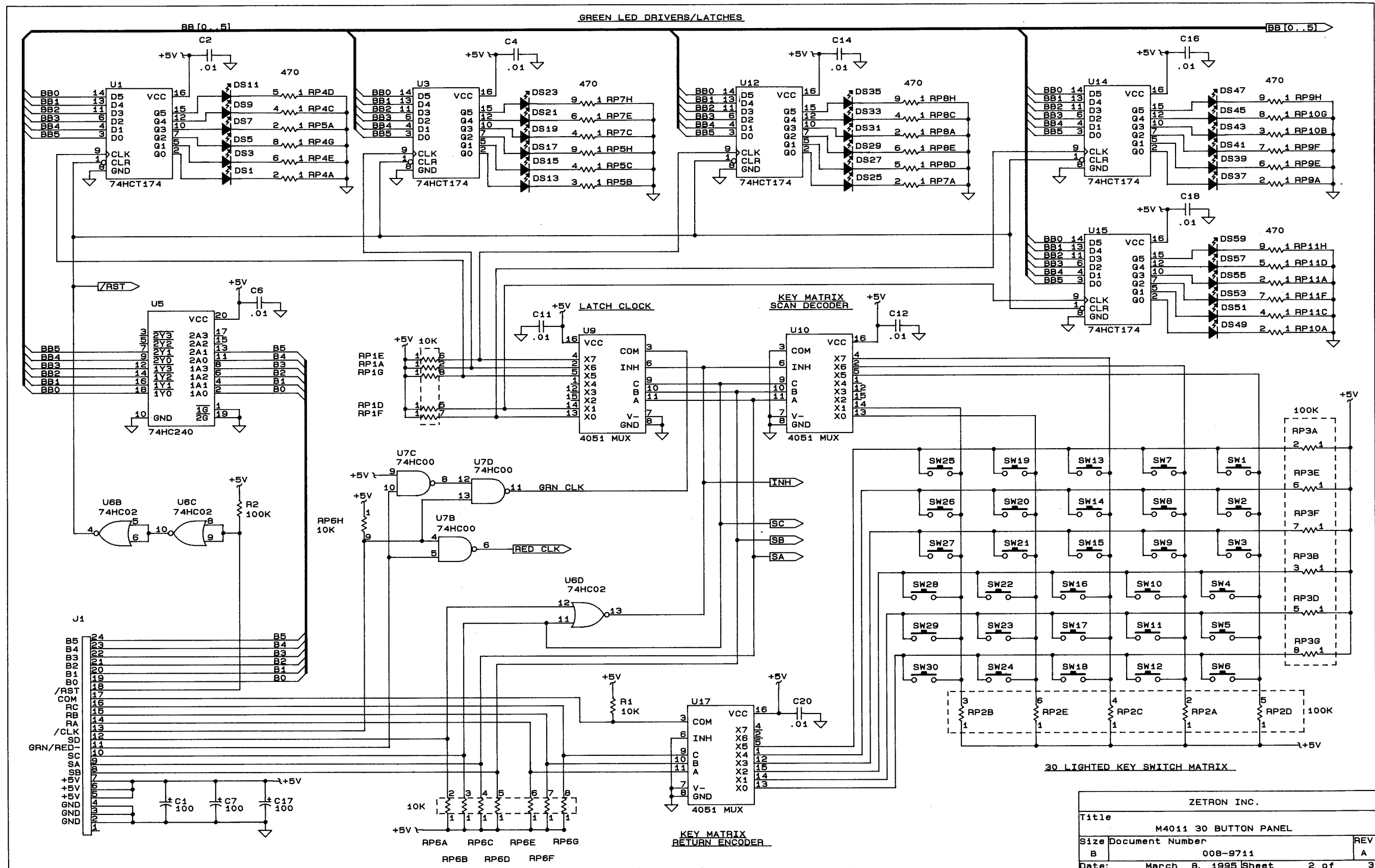
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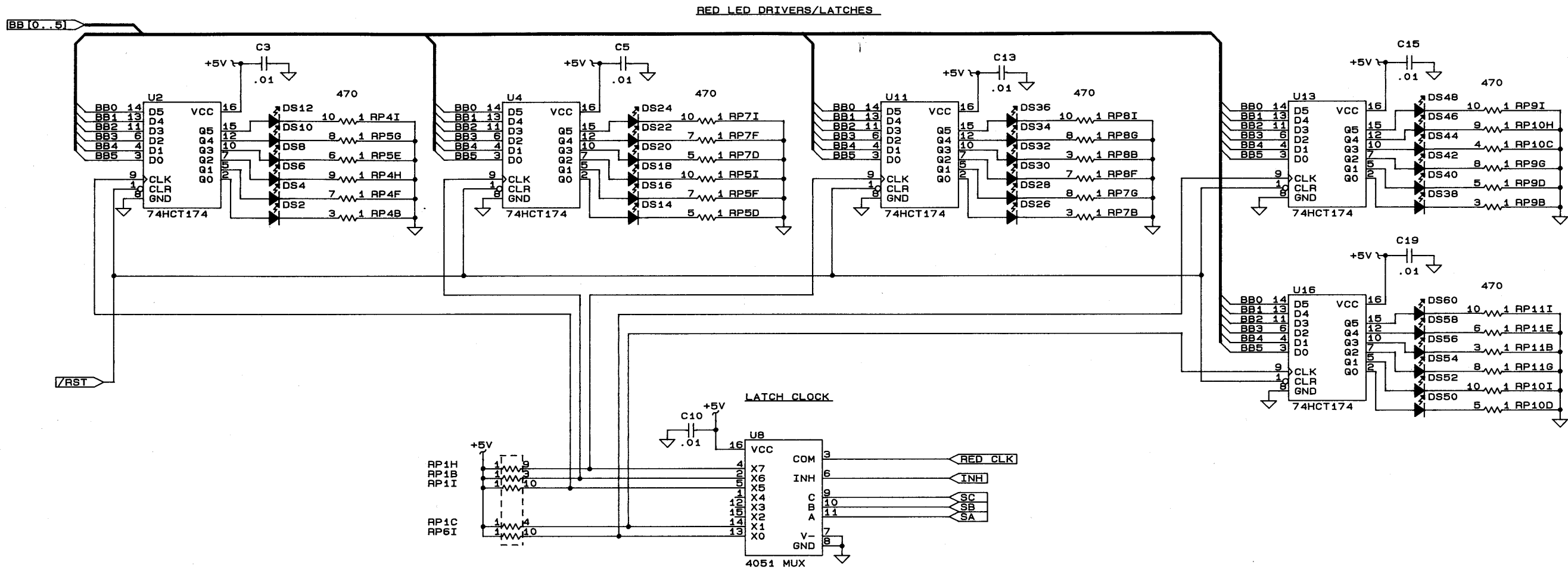
March 8, 1995

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ZETRON INC.		
Title	M4011 30 BUTTON PANEL	
Size	Document Number	REV
B	008-9711	A
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ZETRON INC.		
Title		
M4011 30 BUTTON PANEL		
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Controller Board Parts List (702-9712A)

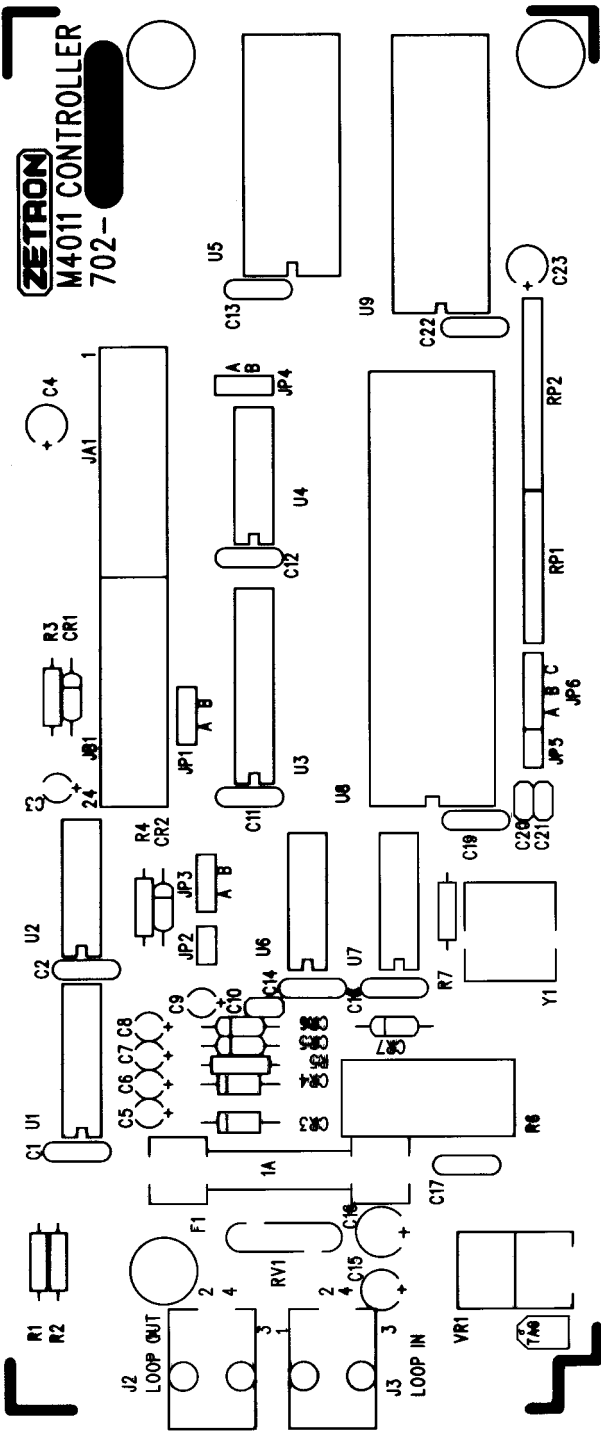
LEGEND:
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
+ = OPTION (INSTALLED PER CUSTOMER ORDER)

ZETRON MODEL 4011 CONTROLLER BOARD PARTS LIST (702-9712A)

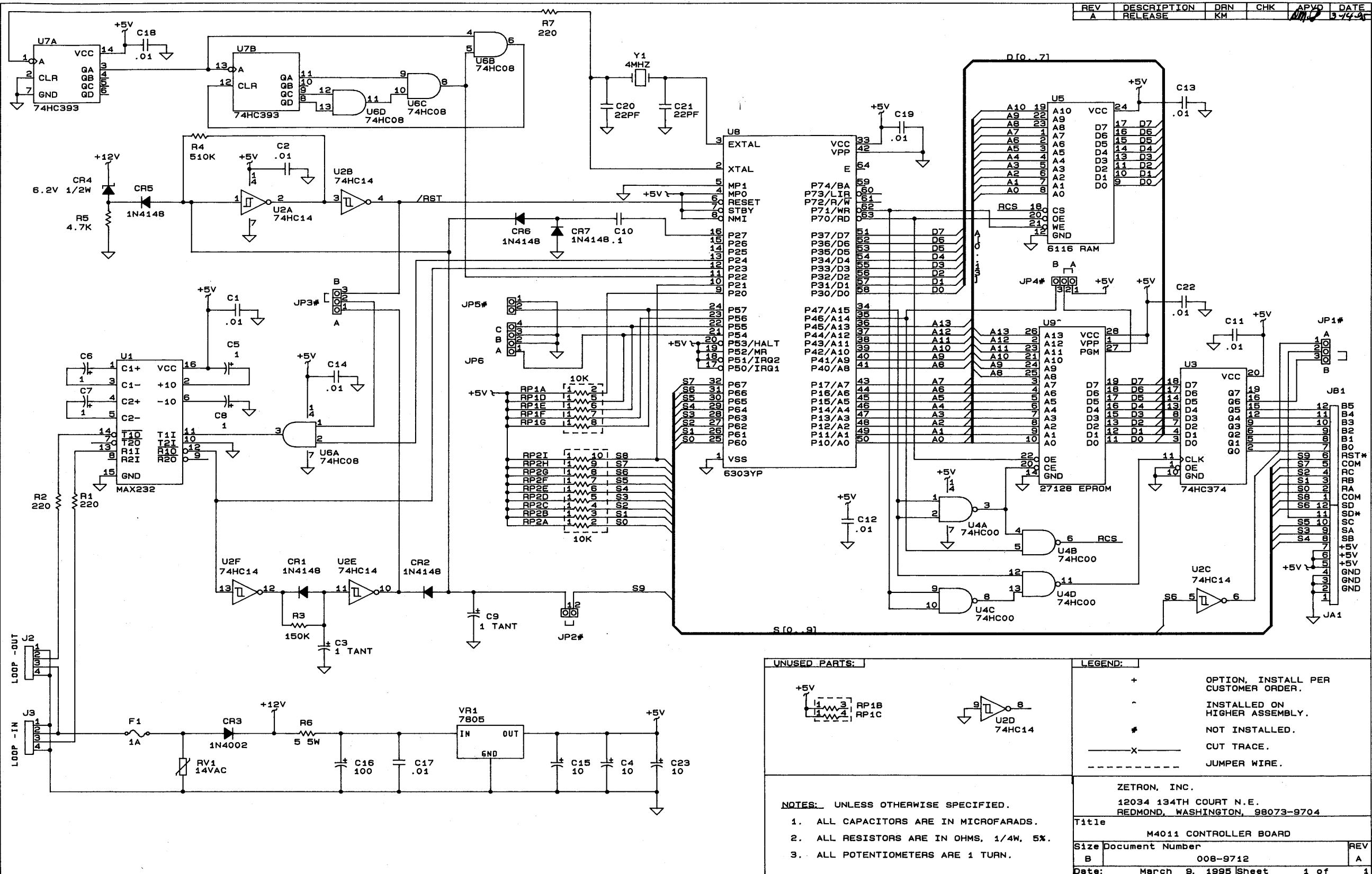
Item	Qty	Reference	Part No.	Description	Part Value
1	3	R1,R2,R7	101-0057	220 OHM 1/4W 5% CARBON FILM	
2	1	R5	101-0089	4.7K 1/4W 5% CARBON FILM	
3	1	R3	101-0125	150K 1/4W 5% CARBON FILM	
4	1	R4	101-0138	510K 1/4W 5% CARBON FILM	
5	1	R6 NOTE 2	103-3050	RES, 5 OHM 5W 5% WIREWOUND	
6	1	RV1	105-0002	VARISTOR 14V AC	
7	1	RP2	119-0006	10K x 9 BUSSED 10-PIN SIP	
8	1	RP1	119-0008	10K x 7 BUSSED 8-PIN SIP	
9	10	C1,C2,C11,C12,C13,C14,C17,C18,C19,C22	150-0110	.01 UF 50V 80%-20% CERAMIC DISC	
10	2	C20,C21	151-0022	22PF 100V/200V +/-10%/5% CERAMIC NPO	
11	1	C10	151-0180	.1UF 50V +/-20% CERAMIC Z5U	
12	6	C3,C5,C6,C7,C8,C9	154-0025	1 UF 35V TANTALUM +/- 10%	
13	3	C4,C15,C23	155-0052	10 UF 35V +/-20% RADIAL ALUMINUM ELECTROLYTIC	
14	1	C16	155-0077	100UF 25V +/-20% RADIAL ALUMINUM ELECTROLYTIC	
15	1	U1	316-0232	RS232 DRIVER CMOS +5V POWER	232
16	1	VR1	316-7805	REGULATOR, +5V 1.5A	7805
17	1	U5	321-6116	RAM 2Kx8 (450NS)	6116 RAM
18	1	U8	321-6303	MICROPROCESSOR CMOS	6303YP
19	0	U9^	322-7128	16K X 8 CMOS PROM, 250NS	27128 EPROM
20	1	U3	324-4374	OCTAL DFF REG	74HC374
21	1	U7	324-4393	DUAL 4 BIT COUNTER	74HC393
22	1	U4	324-7400	QUAD NAND	74HC00
23	1	U6	324-7408	QUAD 2 IN AND	74HC08
24	1	U2	324-7414	HEX SCHMIDT	74HC14
25	1	CR3	342-0001	SILICON 1A 100V .50 SP	1N4002
26	5	CR1,CR2,CR5,CR6,CR7	342-3009	SILICON .50 SP	1N4148
27	1	CR4	343-3017	1/2W 6.2V 5%	1N5234B
28	1	Y1 NOTE 1	376-0004	4.000 MHz HC 18 CASE	4MHz
29	2	JA1,JB1	401-0009	12-POS THRU PCB	
30	2	J2,J3	401-0078	4 PIN TELCO MNT	
31	0	JP2#,JP5#	403-0002	2 OF 401-0052	
32	0	JP1#,JP3#,JP4#	403-0003	3 OF 401-0052	
33	1	JP6	403-0004	4 OF 401-0052	
34	1	F1	416-1576	FUSE AGC 1 A FAST-BLOW	1A
35	1	XJP6 (POS B)	402-3040	MINI JUMPER	
36	4	XU2,4,6,7	407-0014	SKT, 14 PIN DIP	
37	1	XU1	407-0016	SKT, 16 PIN DIP	
38	1	XU3	407-0020	SKT, 20 PIN DIP	
39	1	XU5	407-0024	SKT, 24 PIN DIP	
40	1	XU9	407-0028	SKT, 28 PIN DIP	
41	1	XU8	407-0064	SKT, 64 PIN DIP	
42	4	XJP1,3 (POS B) XJP2,4 (POS A)	408-0001	WIRE JUMPER	
43	1	PCB	410-9712A	M4011 CONTROLLER BOARD	
44	2	XF1	416-3040	FUSE CLIPS	

NOTES: (Notes are for production use only)

Controller Board Silkscreen



Controller Board Schematic (008-9712A)



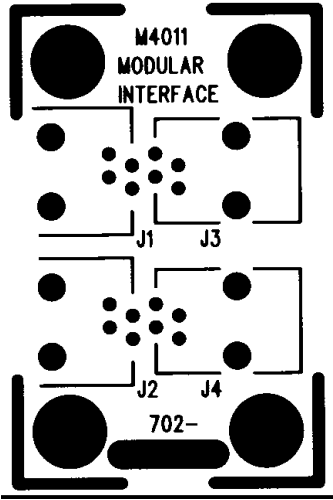
Modular Interface Board Parts List (702-9737A)

LEGEND:
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
+ = OPTION (INSTALLED PER CUSTOMER ORDER)

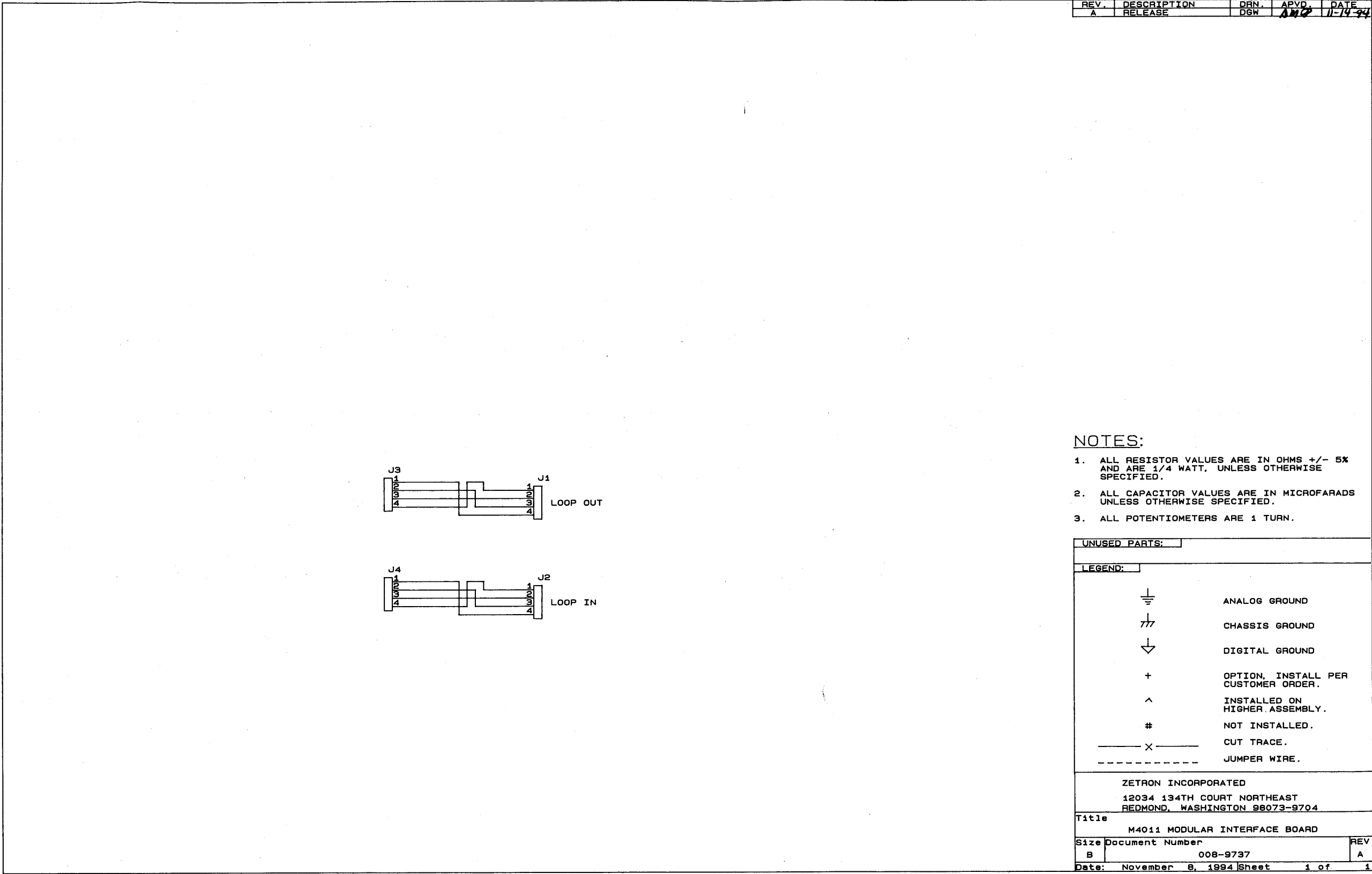
ZETRON M4011 MODULAR ITERFACE BOARD PARTS LIST (702-9737A)

Item	Qty	Reference	Part No.	Description	Part Value
1	2	J4,J3	401-0078	4 PIN TELCO MNT	
2	2	J1,J2	401-5202	4 PIN TELCO, RT ANGLE	
3	1	PCB	410-9737A	PCB, M4011 MODULAR INTERFACE BOARD	

Modular Interface Board Silkscreen



Modular Interface Board Schematic (008-9737A)



MODEL 4115B BOARDS

Keyboard Parts List (702-9323A.2)

LEGEND:

= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY
+ = OPTION (INSTALLED PER CUSTOMER ORDER)

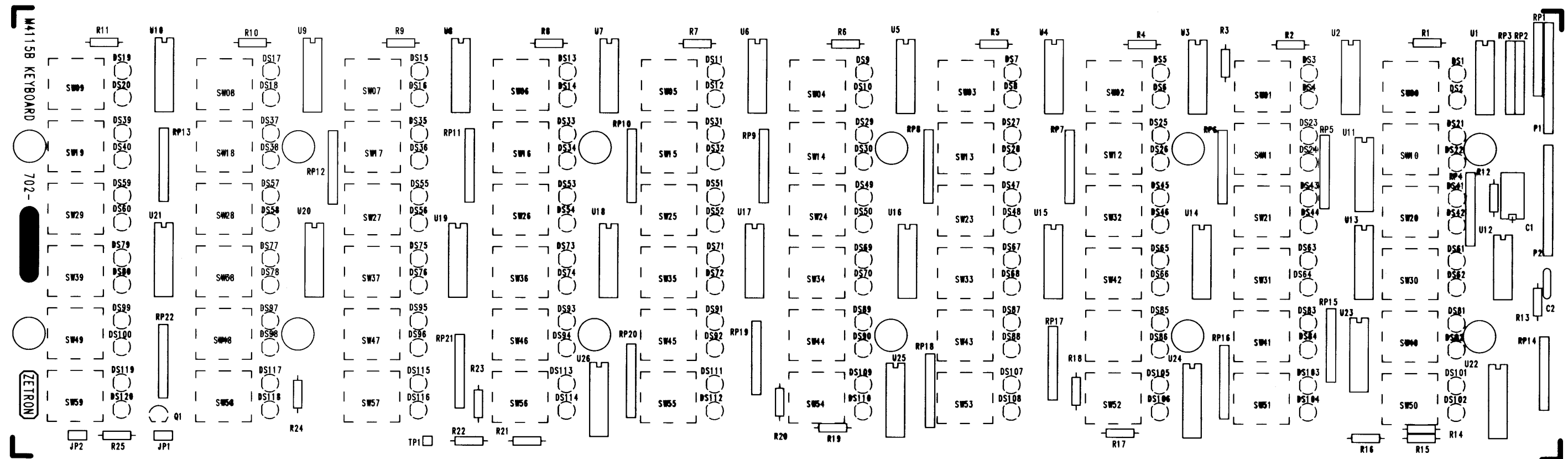
ZETRON MODEL 4115B KEYBOARD PARTS LIST (702-9323A.2)

Item	Qty	Reference	Part No.	Description	Part Value
1	15	R1,R2,R4,R5,R6,R7, R8,R9,R10,R11,R14,R18, R20,R23,R24	101-0057	220 OHM 1/4W 5% CARBON FILM	
2	1	R22,R25#	101-0085	3.3K 1/4W 5% CARBON FILM	
3	4	R12,R15,R19,R21	101-0097	10K 1/4W 5% CARBON FILM	
4	4	R3,R13,R16,R17	101-0121	100K 1/4W 5% CARBON FILM	
5	2	RP3,RP16	119-0007	100K X 7 R-SIP	4608-101-104
6	5	RP1,RP2,RP14,RP18, RP20	119-0008	10K X 7 R-SIP	
7	15	RP4,RP5,RP6,RP7, RP8,RP9,RP10,RP11,RP12, RP13,RP15,RP17,RP19, RP21,RP22	119-0022	220K X 7 R-SIP	750-81-R220
8	1	C2	150-0110	.01 UF 50V 80%-20% CERAMIC DISC	DF-103Z
9	1	C1	155-0055	22 UF 25V +50%-10% AXIAL ALUM. ELECT.	TLBIE220M
10	60	DS1,DS3,DS5,DS7,DS9, DS11,DS13,DS15,DS17, DS19,DS21,DS23,DS25, DS27,DS29,DS31,DS33, DS35,DS37,DS39,DS41, DS43,DS45,DS47,DS49, DS51,DS53,DS57,DS59, DS61,DS63,DS65,DS67, DS69,DS71,DS73,DS75, DS77,DS79,DS81,DS83, DS85,DS87,DS89,DS91, DS93,DS95,DS97,DS99, DS101,DS103,DS105,DS107, DS109,DS111,DS113,DS115, DS117,DS119 NOTE 1	311-0021	LED GREEN, T-1	LTL-4231
11	60	DS2,DS4,DS6,DS8,DS10, DS12,DS14,DS16,DS18, DS20,DS22,DS24,DS26, DS28,DS30,DS32,DS34, DS36,DS38,DS40,DS42, DS44,DS46,DS48,DS50, DS52,DS54,DS56,DS58, DS60,DS62,DS64,DS66, DS68,DS70,DS72,DS74, DS76,DS78,DS80,DS82, DS84,DS86,DS88,DS90, DS92,DS94,DS96,DS98, DS100,DS102,DS104,DS106, DS108,DS110,DS112,DS114, DS116,DS118,DS120 NOTE 1	311-0022	LED RED, T-1	LTL-4221
12	1	U12	314-7400	QUAD NAND	74LS00
13	4	U1,U24,U25,U26	323-4051	1-TO-8 ANALOG MUX/DEMUX	MC14051B
14	1	U22	323-4053	3PDT SWITCH	MC144053
15	20	U2,U3,U4,U5,U6,U7, U8,U9,U10,U11,U13,U14, U15,U16,U17,U18,U19, U20,U21,U23	325-4174	HEX D. F/F	KS74HCT1174
16	0	Q1#	340-3904	NPN 40V/200MA	2N3904
17	60	SW01,SW02,SW03, SW04,SW05,SW06,SW07, SW08,SW09,SW10,SW11, SW12,SW13,SW14,SW15, SW16,SW17,SW18,SW19, SW20,SW21,SW22,SW23, SW24,SW25,SW26,SW27,	371-0003	SINGLE KEY-NO LIGHT	JM2005#01

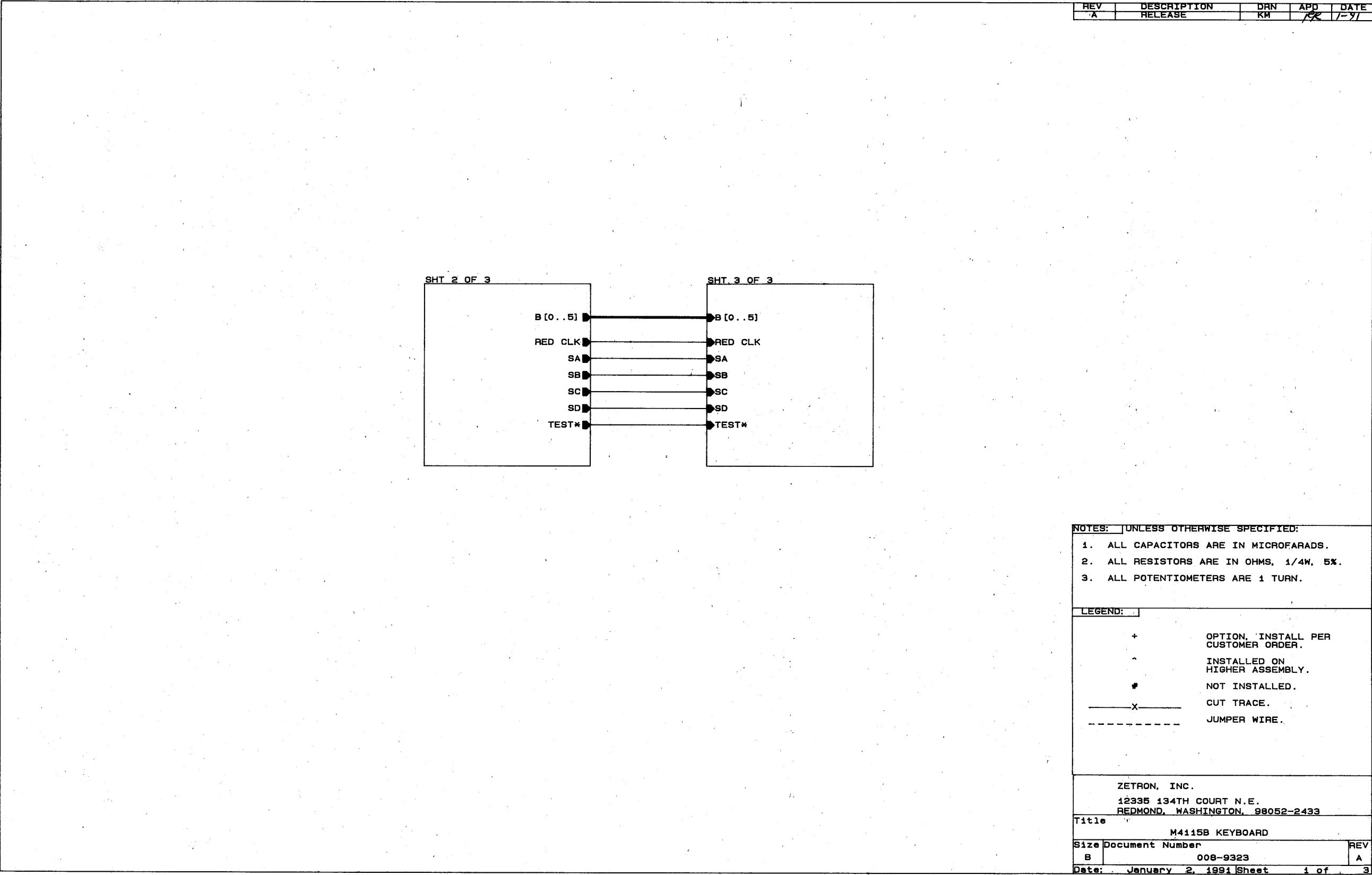
		SW28,SW29,SW30,SW31, SW32,SW33,SW34,SW35, SW36,SW37,SW38,SW39, SW40,SW41,SW42,SW43, SW44,SW45,SW46,SW47, SW48,SW49,SW50,SW51, SW52,SW53,SW54,SW55, SW56,SW57,SW58,SW59, SW00	NOTE 1		
18	1	TP1		403-0001	1 OF 401-0052
19	2	P1,P2	NOTE 2	403-2012	12 OF 401-0178
20	2	JP1,JP2		408-0001	WIRE JUMPER (24GA WIRE .35)
21	4			220-0108	440 X 1/4 SCREW
22	10			250-0104	440 X 1/2 STANDOFF
23	2			251-1240	440 X 1/16 SPACER
24	1	XU2		407-0014	SKT, 14 PIN DIP
25	25	XU1,XU3,XU4,XU5,XU6, XU7XU8,XU9,XU10,XU11, XU12,XU13,XU14,XU15, XU16,XU17,XU18,XU19, XU20,XU21,XU22,XU23, XU24,XU25,XU26		407-0016	SKT, 16 PIN DIP
26	1	PCB		410-9323A	MODEL 4115B PCB
27	1			415-9525-1	M4115B FRONT PANEL
28	10	XDS1-120		415-9536	LED SPACER

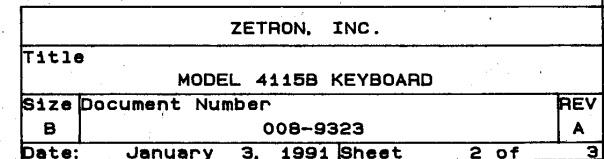
NOTES: (Notes are for production use only.)

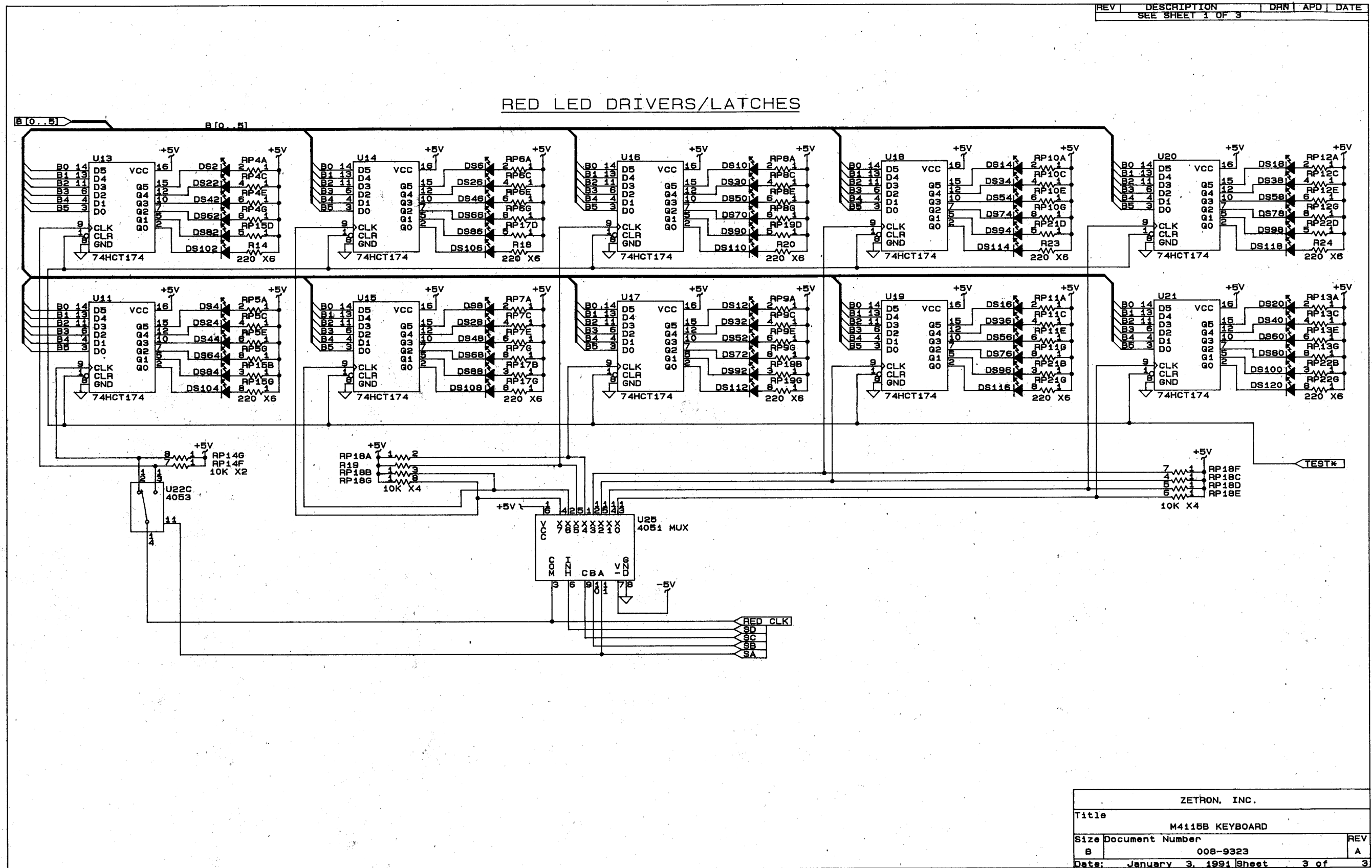
Keyboard Silkscreen



Keyboard Schematic (008-9323A)







ZETRON, INC.		
Title		
M4115B KEYBOARD		
Size	Document Number	REV
B	008-9323	A
Date: January 3, 1991 Sheet 3 of 3		

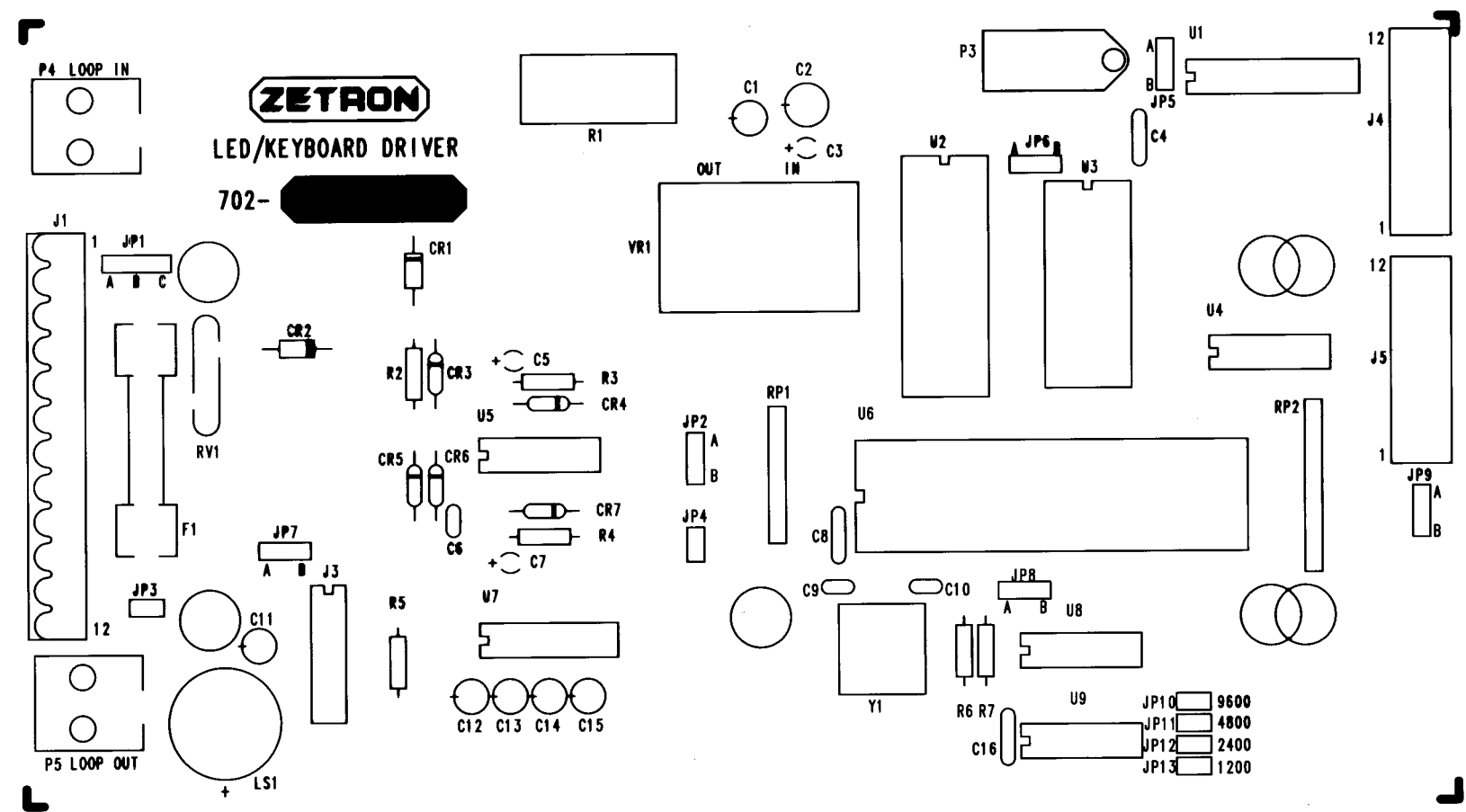
Controller Board Parts List (702-9167E)

LEGEND:
+ = OPTION
= NOT INSTALLED
^ = INSTALLED ON HIGHER ASSY

ZETRON MODEL 4115 CONTROLLER BD PARTS LIST (702-9167E)					
Item	Qty	Reference	Part	Description	Mfg.Part No.
1	3	R5,R6,R7	101-0057	220 OHM 1/4W 5% CARBON FILM	
2	1	R2	101-0089	4.7K 1/4W 5% CARBON FILM	
3	1	R3	101-0125	150K 1/4W 5% CARBON FILM	
4	1	R4	101-0138	510K 1/4W 5% CARBON FILM	
5	1	R1 (NOTE 1)	103-3050	5 OHM 5W 5% CARBON FILM	PW PW5
6	1	RV1	105-0002	VARISTOR 14V AC	V22ZA3
7	1	RP2	119-0006	10K x 9 R-SIP	4610X-101-103
8	1	RP1	119-0008	10K x 7 R-SIP	EXB-F8E103G or J
9	3	C4,C8,C16	150-0110	.01 UF 50V 80%-20% CERAMIC DISC	DF-103Z
10	2	C9,C10	151-0022	22PF 50V +-10%	CN15C220K
11	1	C6	151-0180	.1 UF 50V +-10% CERAMIC, UNSTABLE	AVXSR205E104MAA
12	3	C3,C5,C7	154-0025	1 UF 35V TANTALUM	ECS-F-35E1
13	5	C1,C11#,C12,C13,C14,C15	155-0052	10 UF 35V +-20% RADIAL ALUM. ELEC.	ECEA1VU100
14	1	C2	155-0077	100UF 25V +-20% RADIAL ALUM. ELEC.	ECEA1EU101
15	0	LS1#	305-0002	AUDIO SPEAKER	AT-02
16	1	U7	316-0232	RS232 DRIVER	AD232JN
17	1	VR1	316-7805	REGULATOR, +5V 1.5A	LM340T-5
18	1	U3	321-6116	RAM 2Kx8 (450NS)	CXK5816PN-15L
19	1	U6	321-6303	MICROPROCESSOR CMOS	HD6303YP
20	0	U2^	322-7128	16Kx8 250NS EPROM	27128TMS
21	1	U1	324-4374	OCTAL DFF REG	MC74HC374N
22	1	U9	324-4393	DUAL 4 BIT COUNTER	MC74HC393
23	1	U4	324-7400	QUAD NAND	MC74HC00
24	1	U8	324-7408	QUAD 2 IN AND	74HC08
25	1	U5	324-7414	HEX SCHMIDT	74HC14
26	1	CR2	342-0001	SILICON 1A 100V .50 SP	1N4002
27	5	CR3,CR4,CR5,CR6,CR7	342-3009	SILICON .50 SP	1N4148
28	1	CR1	343-3017	1/2 WATT 6.2V 5% .25 SP	1N5234B
29	1	Y1 (NOTE 2)	376-0004	4.000 MHz HC 18 CASE	SKO-DS400A
30	2	J4,J5	401-0009	12-POS THRU PCB	22-14-2124
31	0	J1#	401-0015	12 POS BLOCK MALE	1103.6
32	0	P3#	401-0029	3 PIN POWER CONN	10-18-1032
33	2	P4,P5	401-0078	4 PIN TELCO MNT	520257-2
34	0	JP3#,JP10#,JP11#,JP12#,JP13#	403-0002	2 OF 401-0052	
35	1	JP2#,JP5#,JP6,JP7#,JP8#,JP9#	403-0003	3 OF 401-0052	
36	1	JP1	403-0004	4 OF 401-0052	
37	0	J3#	407-0016	SKT, 16 PIN DIP	640358-3
38	0	JP4#	408-0001	WIRE JUMPER (24GA WIRE .35)	
39	1	F1	416-1576	FUSE AGC 1 A	AGC 1
40	1	XVR1	210-0001	KEPT NUT	
41	1	XVR1	220-0102	440X3/8 PAN PHILLIPS	
42	1	XVR1	381-0010	HEATSINK TO-220	
43	2	XJP1,XJP6 (POS A)	402-3040	MINI JUMPER	
44	4	XU4,XU5,XU8,XU9	407-0014	SKT, 14 PIN DIP	
45	1	XU7	407-0016	SKT, 16 PIN DIP	
46	1	XU1	407-0020	SKT, 20 PIN DIP	
47	1	XU3	407-0024	SKT, 24 PIN DIP	
48	1	XU2	407-0028	SKT, 28 PIN DIP	
49	1	XU6	407-0064	SKT, 64 PIN DIP	
50	6	XJP10 (IN) XJP9 (POS A) XJP2,XJP5,XJP7,XJP8 (POS B)	408-0001	WIRE JUMPER (24GA WIRE .35)	
51	2	XF1	416-3040	FUSE CLIP	
52	1	PCB	410-9023F	LED/KEYBOARD DRIVER	
53	A/R	XVR1	561-0001	THERMAL COMPOUND	

NOTES: (Notes are for production use only.)

Controller Board Silkscreen



Controller Board Schematic (008-9167E)

