

Section 6

Technical Data

<u>page</u>	<u>contents</u>
6-2	Specifications
6-6	Circuit Description
6-6	Motherboard
6-7	Analog I/O Card
6-11	DSP Cards
6-13	Control Card
6-15	Display Board
6-16	Power Supply
6-17	Input Filter Board
6-17	D-Connector Board
6-18	Parts List
6-19	Obtaining Spare Parts
6-20	Vendor Codes
6-33	Schematics, Assembly Drawings
6-63	Abbreviations
6-67	Warranty

Specifications

It is impossible to characterize the listening quality of even the simplest limiter or compressor on the basis of the usual specifications, because such specifications cannot adequately describe the crucial dynamic processes that occur under program conditions. Therefore, the only way to meaningfully evaluate the sound of an audio processor is by subjective listening tests.

Certain specifications are presented here to assure the engineer that they are reasonable, to help plan the installation and to help make certain comparisons with other processing equipment.

Performance

Specifications for measurements from analog left/right input to analog left/right output are as follows:

Frequency Response (all structures, measured below gain reduction and clipping thresholds, high-pass filter off): Follows standard 50 μ s or 75 μ s pre-emphasis curve ± 0.20 dB, 5Hz-15kHz. Analog left/right outputs and digital output can be independently user-configured for flat or pre-emphasized output.

Noise: Output noise floor will depend upon how much gain the processor is set for (LIMIT DRIVE LEVEL, AGC DRIVE, 2B NORMAL DRIVE, and/or MULTI-BAND DRIVE), ratio of user-set analog input clipping level to analog input reference level, gating level, equalization, noise reduction, etc. It is primarily governed by the dynamic range of the A/D Converter, which has an overload-to-noise ratio of 97dB. The dynamic range of the digital signal processing is 144dB.

Total System Distortion (de-emphasized, 100% modulation): <0.01% THD, 20Hz-1kHz rising to <.05% at 15kHz. <0.02% SMPTE IM Distortion.

Total System Separation: >80dB, 20Hz-15kHz; 90dB typical.

Polarity (PROTECTION or BYPASS structure): Absolute polarity maintained. Positive-going signal on input will result in positive-going signal on output.

Installation

Analog Audio Input

Configuration: Left and right.

Impedance: 600 Ω or 10k Ω load impedance, electronically balanced, jumper selectable.

Common Mode Rejection: >45dB at 60Hz-15kHz.

Sensitivity: -40dBu to +20dBu to produce 10dB gain reduction at 1kHz.

Maximum Input Level: +27dBu.

Connector: XLR-type, female, EMI-suppressed. Pin 1 Chassis, Pins 2 and 3 electronically balanced, floating and symmetrical.

Analog Audio Output

Configuration: Left and right. Flat or pre-emphasized.

Source Impedance: 30 Ω , \pm 5%, electronically balanced and floating.

Load Impedance: 600 Ω or greater, balanced or unbalanced. Termination not required.

Maximum Output Level: +23.7dBu into 600 Ω or greater balanced load.

Connector: XLR-type, male, EMI-suppressed. Pin 1 Chassis, Pins 2 and 3 electronically balanced, floating and symmetrical.

Digital Input and Output

Configuration: Two-channel AES/EBU-standard.

Sampling Rate: 32kHz (8200D/32) or 32kHz, 44.1kHz, and 48kHz (8200D/SRC).

Connector: XLR-type, female input, male output, EMI-suppressed. Pin 1 Chassis, Pins 2 and 3 transformer balanced and floating.

Remote Computer Interface

Configuration: RS-232 and RS-422 interfaces to connect to IBM PC-compatible computers, directly or via modem, for remote control and metering.

Minimum Hardware: IBM PC/XT-compatible with hard disk drive and Hayes AT-compatible 1200 baud modem.

Optimum Hardware: IBM 386 or higher compatible with hard drive, VGA monitor and Hayes AT-compatible 9600 baud modem.

Connector, RS-232: DB-9, EMI-suppressed.

Connector, RS-422: DB-9, EMI-suppressed.

Remote Control Interface

Configuration: Eight (8) analog or digital inputs. User programmable to select any eight of: user presets, factory presets, EBS tone, stereo, dual channel, exit test, SC1 modulation reduction, SC2 modulation reduction, overshoot TX1 modulation reduction, overshoot TX2 reduction modulation, clock reset, input analog, input digital.

Voltage: 6-24VAC or DC, momentary or continuous, optically isolated. Current-Limited 12VDC provided to facilitate use with contact closure.

Connector: DB-25, EMI-suppressed.

Power

Requirements: Switch selectable on the rear panel, 90-130VAC or 180-260VAC, 50-60Hz; 55VA.

Connector: IEC; detachable 3-wire power cord supplied. AC is EMI-suppressed.

Ground: Circuit ground is independent of chassis ground; can be isolated or connected with a rear panel switch.

Safety standards: IEC65, UL.

Dimensions

Dimensions: 19in/48.3cm wide, 7in/17.8cm high, 15in/38.1cm deep. 4 rack units.

Environmental

Operating temperature range: 32-122°F/0-50°C

Humidity: 0-95% RH, non-condensing.

Setup and Operation

HELP Button: Available at all times. Push HELP, and a message will tell you what you are looking at on the screen, what can be done and how to do it.

System Setup (I/O CALIB)

Function: Initial setup.

Controls: Studio chassis yes/no (defeats AGC), Pre-emphasis 50 μ s or 75 μ s, meter select VU or PPM, analog input clip level, analog input reference level, analog input balance, analog outputs flat or pre-emphasized, analog output level, input meters indicate ref/clip, reduction of modulation for TX1 ON, reduction of modulation for TX2 ON, reduction of modulation for SC1 ON, reduction of modulation for SC2 ON, modulation type, clock sync to AC line/crystal; if digital i/o is present: input A or D, digital left/right input and output levels, digital input ref level, digital output sampling rate (/SRC Card), digital output sync (/SRC Card).

Quick Setup

Function: Guided screen-by-screen setup for all required setup adjustments.

On-Screen Metering

Metering can be switched to indicate gain reduction (G/R) or input/output levels (I/O).

Gain Reduction (G/R): Shows gain reduction of AGC, compressors, high-frequency limiters, and gate on/off, as appropriate to the Programmable Processing Structure selected.

Input/Output (I/O): Left input (dB), right input (dB), left output (dB), right output (dB).

Preset Programming

Function: Save processing settings for recall from the front panel, by remote control, by remote computer or by Automatic Preset Switching.

Number of User Presets: 32.

Test Presets

BYPASS Preset: No processing; audio is digitized, pre-emphasized and low-pass filtered only. Adjustable gain (-18dB to +15dB).

TONE Preset: Frequency programmable 16Hz-16kHz. Level programmable 0-130% total modulation. Modulation type (LEFT,RIGHT, L+R, L-R). Bessel Null tone frequency of 10,395.8Hz at 100% modulation produces 25kHz deviation on the first Bessel null. Bessel null tone frequency of 9,057.8Hz at 100% produces 50kHz deviation on the second Bessel null.

Automatic Preset Switching

Function: Changes presets on a programmed event schedule.

Programming: Date (daily, specific day or days of the week, specific date), time, preset number.

Events: Up to 64 events.

Pascode Security

Function: To prevent unauthorized adjustment of controls by persons without pascodes.

Number of Pascodes: 10.

Access: Each Pascode can be programmed to permit or deny access via front panel or computer to RECALL PRESET, MODIFY TEST PRESETS, MODIFY PROCESSING, OBSERVE METERS AND PRESET NAMES, PROGRAM AUTOMATION (Automatic Preset Switching), PROGRAM SYSTEM SETUP and PROGRAM SET PASCODE, TIMEOUT TO AUTO LOCK, HRS:MIN.

Remote Control with Orban 8282/PC Remote Control Software (Optional)

Metering: Simultaneous dynamic metering of input levels, output levels, and all gain reduction (in color on color monitors).

Control: Full control of all user-adjustable processing parameters and System Setup.

Presets: Recall all factory and user presets. Store a virtually unlimited number of preset configurations on your hard disk for archiving, backup, or transferring to other units. Preset backup feature copies all presets from the 8282 to your hard disk.

Password Protection: Programmable on the 8282 unit.

Circuit Characteristics

Analog-To-Digital Converter

(A/D Converter subject to change as technology improves.)

Device: Analog devices, AD1879 A/D Converter.

Performance: 97dB dynamic range (overload-to-noise ratio).

Digital Signal Processing

Device: Motorola DSP56001.

Performance: 24-bit processing. 144dB internal dynamic range.

Digital Input Conditioning

Subsonic Filter: Switchable in/out third-order Chebychev with 30Hz cutoff and 0.5dB pass-band ripple; -0.5dB @ 30Hz, -10.5dB @ 20Hz, -31.5dB @ 10Hz.

Time Dispersion Network: All-pass network to make speech more symmetrical to reduce processing distortion. (Two-Band and Multi-Band Structures only.)

Digital Output Conditioning

Passband Response: Typically +0, -0.26dB to 15kHz.

Stopband Rejection (referenced to 100% modulation): To reduce spectrum to <-75dB at 18kHz and above.

Digital-To-Analog Converter

Device: Analog Devices AD1865.

Performance: 18-bit. 4X over-sampled output. Linear-phase reconstruction filters.

Specifications subject to change without notice.

Circuit Description

This section provides a detailed description of each circuit used in the 8282. It starts with an overview of the 8282 system, identifying all the circuit boards and describing their purpose. Then each board is treated in detail by first giving an overview of the circuits followed by a component-by-component description.

1. Overview

The 8282 has eight types of circuit boards: Mother, Analog I/O, DSP (digital signal processing), Control, Display, Power Supply, Input Filter and D-Connector.

The block diagram on page 6-34 illustrates the following overview of 8282 circuit boards.

The Motherboard contains no active circuitry and serves only to connect all the other boards together properly.

The Analog I/O Card provides the circuitry to interface the analog audio inputs and outputs to the digital processing.

The DSP Cards implement the audio processing using digital signal processing. The 8282 has four DSP Cards.

The Control Card administrates control of the 8282 system.

The Display Board provides circuitry for the LCD display, push buttons, front panel knobs.

The Power Supply Board provides power for all 8282 boards.

The Input Filter Board provides the connectors and RF filtering for the left and right audio inputs and outputs, and the digital audio input and output.

The D-Connector Board provides the connectors, RF filtering, and circuitry for the remote control inputs, RS-232 interface, and RS-422 interface.

Motherboard

The Motherboard is used to connect all parts of the 8282 system together. Only connectors are mounted to it. It is a four layer board with nearly all signal traces on the outer two layers. The inner layers contain ground and power connections.

Under no circumstances should you try to replace any components on this board. Soldering or desoldering can permanently damage the inner layers and ruin the board.

Analog I/O Card

1. Overview

The Analog I/O Card provides the circuitry to interface analog audio to and from the DSP Cards. The input buffer scales the input audio level to match it to the audio processor. The analog-to-digital (A/D) converter converts the analog input audio to digital audio. The digital audio is transmitted to the DSP Cards. The DSP Cards transmit the processed digital audio output back to the Analog I/O Card. The digital output audio is converted to an analog signal by the digital-to-analog (D/A) converter. The low-pass reconstruction filters remove high frequency images from the D/A converter output and feed the output buffer. The output buffer is made up of a programmable gain amplifier, a programmable time constant de-emphasis filter, and a balanced output buffer. The board also provides logic circuitry to generate the system sample rate clocks and interface the board to the Control Card and DSP Cards.

2. Input Buffer

The signal enters the input buffer in balanced form. It comes from the Input Filter Board via the Motherboard. The signal is applied to a resistor load and a resistor pad. The pad and the load are enabled or disabled by jumpers that are positioned by hand. The loaded and padded signal is applied to a balanced amplifier that has an adjustable gain. The gain is set by FET transistors and analog switches. The state of the FETs and switches is set by the outputs of a latch. The Control Card controls the gain according to what the user specifies from the front panel controls by writing data to the latch. The balanced amplifier output feeds a servoed buffer which feeds an RC low-pass filter applying the signal to the analog-to-digital converter.

Component-level description:

The balanced audio input signal is applied to the pad and load network made up of R200, R203, R204 and R205-7. JA is a jumper that removes or inserts a 600Ω termination load on the input signal. JB is a jumper that removes or inserts a resistive divider that pads the input signal before being applied to IC15, a balanced amplifier. R215-222, FETs Q202-203, and IC14, a quad analog switch, make up the circuit that sets gain of IC15. The FETs are used as switches along with IC14 to change the resistive paths in the circuit. The state of the FET switches is set by the outputs of IC19, a digital latch. The latch outputs feed IC7, a quad comparator, which outputs 0V to turn on a FET and -15V to turn off a FET. The Control Card writes data directly to IC14 to control the state of the switches on IC14. IC15's output is divided down by R211 and R212 to scale the signal to the proper level for the analog-to-digital converter. IC8 and IC9 buffer and servo the signal. R209 and C215 make a simple RC filter necessary to filter high frequency energy that would otherwise cause aliasing distortion in the analog-to-digital converter.

3. Analog-to-Digital Converter (A/D)

The A/D is a single chip, stereo, 18-bit sigma-delta type converter. The A/D oversamples the audio at 2.048MHz. It applies noise shaping, then it filters and decimates to a 32kHz sample rate. The samples are output in twos complement format and transmitted to the DSP Cards.

Component-level description:

The right analog input is applied to pin 13. Pin 26 is a 8.192MHz clock input used by the chip to oversample the input. Pins 3 and 25 place the A/D in its slave mode allowing it to run from an external bit and L/R clock. Pin 27 is the serial data output. Both the left and right samples are multiplexed on to it and synchronized to the 2.048MHz clock. The left sample starts on the rising edge of the L/R clock.

4. Digital-to-Analog Converter

The D/A is a single chip, stereo, 18-bit resistor ladder type. It has two synchronous serial inputs that receive the left and right audio samples from the DSP Cards. A NAND gate outputs a signal to clock the data in. A 128kHz clock signal controls the timing of when the output switches between analog sample output voltages.

Component-level description:

IC39 is the digital-to-analog converter. Pins 15 and 10 are the left and right serial data inputs from the DSP Cards. Pin 12 is a gated 6.75MHz clock input from the DSP Cards that clocks in the serial data. Pins 12 and 14 receive a 128kHz clock input. Pins 17 and 8 are the left and right voltage outputs. The voltages change to the current sample value on the falling edge of the 128kHz clock. A full scale output is approximately 3.0 Volts peak. IC40 is a NAND gate that processes the bit clock and word clock supplied by the DSP Cards.

5. Reconstruction filter

The reconstruction filter is a 5th order elliptic filter with 90dB stopband attenuation at 113kHz. It filters the ultrasonic energy “images” present at the D/A output. There are two filters, one each for the left and right signals.

Component-level description:

The reconstruction filter is an active RC analog of a passive LC ladder filter, realized by resistors, capacitors, and frequency-dependent negative resistors (FDNRs). An FDNR is realized with a dual opamp, three resistors, and two capacitors. When the passive LC filter is transformed into an active RC filter,

inductors become resistors, resistors become capacitors, and capacitors become FDNRs.

Each FDNR resonates with a series resistor to create a notch in the frequency response of the filter. This is analogous to a series LC circuit to ground. The notches are located in the “stopband” (beyond 15kHz).

The frequency response of the filter CANNOT be measured by applying a swept sine wave at the 8282 analog inputs. This is because the filter has bandwidth much larger than the analog-to-digital converter. The analog-to-digital converter band limits the input to 16kHz. To test the filter response, see step 3, page 4-17.

6. Output Buffer

The output buffer buffers the output of the reconstruction filters in three stages. The first stage of the output buffer is an inverting amplifier with gain programmable by the Control Card. The second stage is a programmable de-emphasis filter. The de-emphasis response is controlled by JFET switches. The third stage is a balanced floating line amplifier. It has a $30\Omega, \pm 5\%$ output impedance.

Component-level description:

The first stage is a programmable gain inverting amplifier formed by R170, R171, C132, IC12 and IC5a. IC12 is an 8-bit MDAC, which is a resistor ladder with a programmable resistance. The Control Card writes an eight-bit word to the chip which has a latch on board to store the value and set the resistance. The resistance determines the gain. The output at pin 1, IC5a feeds the second stage, a programmable de-emphasis filter. It is formed by IC5b, Q102, Q103, Q104, and the associated resistors and capacitors. Q103, Q102, and Q104 are JFET transistors used to switch C127, C126, or R179 and C136 in or out of the circuit. If none of the JFETs are on, the circuit is a unity-gain inverting amplifier. With capacitor C127 in circuit, it becomes a first-order low-pass filter with a $75\mu\text{s}$ time constant. With capacitor C126 in circuit, it becomes a first-order low-pass filter with a $50\mu\text{s}$ time constant. With R179 and C136 in circuit, it becomes a first-order low-pass shelf that provides J.17 de-emphasis. The fourth stage is a balanced floating line amplifier formed by IC6 and IC13. The 412 opamp used in the balanced output module is a low-offset servo amplifier which centers the average DC level at the (+) and (-) outputs of the module around ground. The floating characteristic is achieved by complex cross-coupled positive and negative feedback between two 5532 opamps, and its operation is not readily explainable except by a detailed mathematical analysis. Opamps may be replaced; resistors are specially matched and should not be replaced.

7. Logic Circuitry

The Control Card reads and writes data from and to the Analog I/O Card. The control logic section decodes the address lines and enables the proper latch to be read from or written to.

Component-level description:

IC37 compares the slot address hard-wired into the Motherboard with the address lines A8-11. If the address lines match the slot address, IC37, pin 6 is asserted and partially enables the address decoder IC28. The address bits A3-5 feed IC28 to select one of eight output signals to assert low. The eight outputs are used to select various devices that the Control Card reads from and writes to. The output buffer MDACs and the input buffer's analog switches and latch require further decoding to be selected. This is accomplished by IC27, a three-to-eight decoder.

8. Clock logic

A crystal oscillator provides the timing reference for all signals related to the system sample rate. Divider circuitry produces the various signals used by the system. Logic is used to gate the sample rate clocks and serial input data. A latch provides for the control of a variety of functions.

A crystal oscillator circuit generates an 8.192MHz clock that provides the reference for all signals related to the sample rate of the system. The 8.192MHz clock is divided down to generate the 2.048MHz and 32kHz clocks for the A/D converter, along with the 32kHz, 64kHz and 128kHz clocks, for the DSP. The signals 32kHz, 64kHz, and 128kHz are gated and buffered to make the signals 1 x frameclock, 2 x frameclock, and 4 x frameclock. These signals are gated "on" at the rising edge of the 128kHz signal just prior to the falling edge of the 32kHz signal. This is necessary because any one of these signals can be used by the DSP Cards to generate interrupts on a falling edge and the first interrupt must occur simultaneously with all DSP chips. The 64kHz signal is also gated to make the signal IFRAME. IFRAME marks the start of sample words transmitted from the A/D to the DSP Cards. It is gated "on" so that two words of data are transmitted to the DSP Cards before they start processing.

Component-level description:

Y1, IC33a, and IC33b make up an 8.192MHz square wave oscillator. IC35, IC34, IC32, and IC31 are set up as dividers and produce clock signals down to the sample rate, 32kHz. IC41 and IC42a are used to create two control signals that drive IC43, a quad "AND" gate. The "AND" gates act as switches for signals that drive the DSP Cards. IC36 is a 74HC244 buffer that connects the sample rate clocks and the serial input data to the DSP Cards. The buffer is enabled by bit 2 of latch IC30. The Control Card writes to this latch and clears the bit if it selects the Analog I/O Card as the source of sample rate clocks and input data. IC30 also provides control of other circuits. Bit 1 is set high to start a DSP algorithm. Bit 3 is set high to select a 50 μ s de-emphasis. Bit 4 is set high to select a 75 μ s de-emphasis. Bit 7 is set high to select J.17 de-emphasis. Bit 8 is set high to calibrate the A/D chip.

DSP Cards

1. Overview

The DSP Cards use general purpose DSP chips that use software programs to implement digital signal processing algorithms. The algorithms filter, compress, and limit the audio signal. Each board has three DSP chips on it. Each DSP chip has two FIFO buffer circuits associated with it: one for transmitting data to another DSP chip, the other for receiving data from another DSP chip. The DSP chips are cascaded with the FIFO circuits between them to interface the DSP chips. The DSP chips are cascaded so that the first generates output to the second which generates output to the third. The first receives input from the third DSP chip on a separate DSP Card. The third DSP chip generates output to the first DSP chip on a separate DSP Card. The DSP chip communication is through a FIFO interface. The FIFO is 24 bits wide and 16 words deep. The FIFO is dual ported so that reads and writes can occur simultaneously. The control logic interfaces the DSP chips and the interrupt logic with the Control Card. The Control Card reads from and writes to the DSP chips through the DSP chip host ports. The board has two latches on it that the Control Card writes to. The latch output bits are used to reset the DSP chips and to control how the DSP chips are synchronized to the sample rate clocks.

Component-level description:

IC19, IC43, and IC55 are the DSP chips. Do not attempt to remove these chips from the card. These chips should be removed only by the Orban service department. The chips can be ruined by static discharge or by damage to their delicate pins.

2. FIFO Buffers

A FIFO buffer is used by a DSP chip to write data to another DSP chip. There are three FIFO buffers on a DSP Card. Each FIFO buffer is paired with a DSP chip. The FIFO/DSP pairs are cascaded in a line. The first FIFO is written to by a DSP chip on a previous DSP Card, if there is one. The first DSP chip reads from the first FIFO and writes to the second FIFO. The second DSP chip reads from the second FIFO and writes to the third FIFO. The third DSP chip reads from the third FIFO and writes to the first FIFO on the next DSP Card, if there is one. A FIFO buffer is made up of three 74HC373 latches and six 74HC40105 4X16 FIFOs. The 74HC373s latch the data from the DSP chip writing to the FIFO buffer. The 74HC373 outputs are shifted into the 74HC40105 FIFO chips. The DSP chip that reads from the buffer reads the data from the 74HC40105 FIFO chips and shifts it out.

3. Control Logic

The control logic decodes the address lines and selects the proper device for the Control Card to read from or write to.

Component-level description:

IC1 is an address magnitude comparator used to decode the board address. It compares the address bits A8-11 with the slot address from the Motherboard. If they match, the comparator output, pin 6, partially enables IC3, a 74HC138 3-to-8 line address decoder. It decodes the address bits A3-5 to select one of three DSP chips or one of two latches. IC3 is fully enabled when the Control Card asserts the E signal high at pin 6. When that happens, one of its eight outputs goes low and provides a control signal to the device being addressed.

4. DSP Reset and Interrupt Logic

The Control Card writes to two latches on the DSP Card that reset the DSP chips and control four multiplexers. The multiplexers select which of three signals is connected to the IRQB pin on each DSP chip. The IRQB pin is an interrupt request pin that is negative edge-triggered. When the DSP chip detects an interrupt, it runs its algorithm on the current audio sample. The multiplexers are necessary because the algorithms are designed to run at one of three rates: 32kHz, 64kHz, or 128kHz.

Component-level description:

IC4 is the reset control latch. It is a 74HC373 transparent latch. It is written to by the Control Card to initiate hardware resets on the DSP chips. Only the four least significant bits are used. When IC4 is not being written to, its outputs are tri-stated and pulled high by the pull-up resistors R2-5. Three of the outputs are connected to the reset pin on each DSP chip which is active low.

When the Control Card writes to the reset latch, IC4, the outputs are briefly enabled and the DSP chips will be reset if the Control Card has written a low logic level. The outputs of IC4 also connect to inverters on IC2. The inverted signals connect to pin 1 on IC6-9. If the Control Card resets the DSP chips, pin 1 on IC6-9 goes high and tri-states pin 7 on IC6-9. This is necessary to make the DSP chips boot properly. The purpose of IC6-9 is described below. The three signals 1 x frameclock, 2 x frameclock, and 4 x frameclock are 32kHz, 64kHz, and 128kHz clock signals respectively. ICs 6, 7, 8, and 9 are 74HC253B multiplexers that select which of the three frameclock signals interrupt each DSP chip. IC5 is a 74HC373 latch that supplies four pairs of logic signals to address the multiplexers. The address signals are applied to pins 14 and 2 of the 74HC253B. The selected input is output at pin 7. IC7's output is not connected to anything; IC7 is a spare IC.

Control Card

1. Overview

The Control Card processes and executes all user initiated requests to the system. This includes changes to the DSP processing such as program change and modifications through the front panel keyboard, the serial port, and the eight remote contact closures. The Control Card also provides the housekeeping functions like the real time clock, gain reduction and input/output metering, analog signal path setup levels, and security password functions.

2. Power Monitoring Circuit

The +5 volt supply voltage is monitored to ensure it is within the correct operating range.

The system $\overline{\text{RESET}}$ is activated if the +5V supply drops below the minimum acceptable voltage. Battery voltage is also monitored to ensure it is above its minimum operating voltage.

Component-level description:

Voltage comparator IC11 provides the system reset function. The 5-volt source is divided by resistors R202 and 203 and compared to the 1.2V voltage reference created by R204 and CR200. When the 5V line is above the 4.8V minimum operating voltage, timing network R210 and C207 will begin to charge to 5V. Inverters IC13c and IC13d buffer the signal and $\overline{\text{RESET}}$ goes high, enabling the Z180 $\overline{\text{RESET}}$ input.

Battery voltage is buffered by IC11a with stabilizing network R208 and C206, divided by R209 and R211, and compared to the 1.2V reference by IC11b. The output of IC11b goes low when the battery voltage falls below 2.4V. This signal is read periodically by the Z180 though buffer IC12 to detect acceptable battery voltage.

CR201 and CR202 switch the Vbat line between 5V and battery 3V to retain real time clock and RAM data retention during mains voltage outages.

Security Reset Switch is debounced by R216 and C208 and buffered by IC13e.

This signal is read periodically by the Z180 though buffer IC12 to detect if security should be disabled.

Display Board

1. Overview

The Display Board supports the front panel keys, LCD display, and rotary encoder. The keys are configured in a switch matrix circuit controlled by the Control Card. The LCD display has its own special purpose driver IC, RAM, and address and data buffers and support circuitry. The rotary encoder circuit includes filtering components, a pulse counter and buffers.

2. Switch Matrix

The switch matrix is configured as two columns and six rows. Decoder IC15 selects latch IC16 to drive one of the two columns low. Decoder IC15 then selects buffer IC17 which reads the six rows to determine if one or more of the switches in that column are closed. If no switches are closed, pull-up resistors R204D-R204I drive the buffer inputs to +5 volts. The HELP key has a dedicated row so that it can be read in combination with any other key.

3. Rotary Encoder

The rotary encoder provides two pulsed outputs when it is rotated. The outputs are out of phase so that direction can be determined. The Z180 on the Control Card reads the switch circuitry approximately every 4 milliseconds to check if any switches or the rotary encoder have been turned.

Component-level description:

IC9a and IC9b buffer and invert the rotary encoder outputs. Flip-flop IC8a is clocked and the output goes low to indicate the encoder has been turned. IC9c, IC9d, IC9e, and IC9f with associated resistors and capacitors provide filtering so that the directional phase information can be determined. The output of IC8b will go high if the encoder is turned to clockwise and will go low if turned counter-clockwise. The output is read by buffer IC17. Pulse counter IC19 counts how far the encoder was turned. IC19s output is buffered by IC18.

4. Display circuit

The LCD display uses a special purpose display driver to interface to the LCD and to refresh the display data. The Z180 microprocessor on the Control Card writes display data to a static RAM on the Display Board. The display driver IC uses this data to refresh and update the

LCD. Data and address latches allow the Z180 and the display driver to access the current display data.

Component-level description:

Display driver IC4 uses crystal Y100 to generate its clock frequency. IC4 is selected by the Control Card with signal DISPLAY. IC4 is initialized on power-up. All updates to the LCD are done through RAM IC3 with data and address latches IC1, IC2, IC13, and IC14. IC11c, IC11d, and IC10a decode the READ, WRITE, and MDISPLAY signals to determine if the Control Card is requesting a read or write operation. Asynchronous RAM access between the Control Card and LCD driver IC4 is accommodated with logic circuitry IC5, IC6, IC7, IC11, and IC12.

5. LCD display

The LCD is a 128-by-256-dot graphics display incorporating a fluorescent backlight. Screen saver circuitry for the backlight helps extend its lifetime. The backlight's voltage source is a 300V 30kHz AC signal and requires caution to avoid user injury. All components described below other than the LCD unit reside on the Display Board.

Component-level description:

The LCD's power and control signals connect to the Display Board with a 14-pin connector. The LCD unit consists of the display and an integral control circuit board containing the driver circuitry for each screen element. The output of the front panel CONTRAST control provides the LCD operating voltage of approximately -8 volts. Adjusting this voltage will change the optimum viewing angle of the LCD. The backlight's power is generated by power inverter A100. The inverter's +12 volt power source is switched on or off with Q100, R100, and R101 by bit 7Q of latch IC16. Diode CR100 protects transistor Q100 against reverse bias voltages.

Power Supply

The power supply converts an AC line voltage input to various power sources used by the 8282. It consists of three main parts: the Regulator Board, the Finger Board, and the Switching Power Supply. The Regulator Board circuitry supplies power to the 8282 analog circuits. The Finger Board is used to connect the power signals to the Motherboard. The switching power supply supplies power to the 8282 digital circuits. Other than a full replacement, the switching power supply is not intended to be serviced.

Component-level description:

L1 is a power line filter that filters out RFI. T1 is a conventional power transformer used to step down the input voltage for the ± 15 VDC supply. S2 is a switch used to select between a 115V or 230V power source. CR1 is a full wave rectifier. C1, C2, C5, and C6 smooth and condition the rectified voltage signal for input to

the voltage regulators, IC1 and IC2. The regulators output the +15V and -15V sources used to power the analog circuits in the 8282.

The Finger Board holds the test points and bypass capacitors before connecting the power signals to the Motherboard.

Input Filter Board

The Input Filter Board serves as a mount for the audio input and output connectors, the AES/EBU connectors, the composite outputs and the SCA input. It provides RFI filtering for all the above inputs and outputs.

D-Connector Board

The D-Connector Board holds the connectors and circuitry for the RS-232, RS-422, and remote control interfaces.

Component-level description:

The RS-232 interface is comprised of J1, IC1, and IC2. J1 is a 9-pin D-connector. IC1 and IC2 provide logic circuitry to interface the RS-232 signals with the microprocessor on the Control Card.

The RS-422 interface consists of J2, IC3, IC4 and associated resistors. J2 is a 9-pin D-connector. IC3 and IC4 provide logic circuitry to interface the RS-422 signals with the microprocessor on the Control Card.

J3 is a 25-pin D-connector that connects the remote control input signals. The associated resistors and capacitors filter out RFI from the input signals. The associated opto-isolators (e.g. IC12) isolate the inputs from the detector circuitry on the Control Card. The associated diodes prevent the opto-isolators from breaking down under a reverse bias.

S1 is the ground lift switch used to connect or lift circuit ground from chassis ground.

Parts List

Parts are listed by ASSEMBLY, then by TYPE, then by REFERENCE DESIGNATOR. Widely used common parts are not listed; such parts are described generally below (examine the part to determine exact value). See the following assembly drawings for locations of components.

SIGNAL DIODES, if not listed by reference designator in the following parts list, are:

Orban part number 22101-000, Fairchild (FSC) part number 1N4148, also available from many other vendors. This is a silicon, small-signal diode with ultra-fast recovery and high conductance. It may be replaced with 1N914 (BAY-61 in Europe).

(BV: 75V min. @ $I_r = 5\mu\text{A}$; I_r : 25nA max. @ $V_r = 20\text{V}$; V_f : 1.0V max. @ $I_f = 100\text{mA}$; t_{rr} : 4ns max.) See Miscellaneous list for ZENER DIODES (reference designator VRxx).

RESISTORS should only be replaced with the same style and with the exact value marked on the resistor body. If the value marking is not legible, consult the schematic or the factory. Performance and stability will be compromised if you do not use exact replacements.

Unless listed by reference designator in the following parts list, you can verify resistors by their physical appearance:

Metal film resistors have conformally-coated bodies, and are identified by five color bands or a printed value. They are rated at $\frac{1}{8}$ watt @ 70°C , $\pm 1\%$, with a temperature coefficient of 100 PPM/ $^\circ\text{C}$. Orban part numbers 20038-xxx through 20045-xxx, USA Military Specification MIL-R-10509 Style RN55D. Manufactured by R-Ohm (CRB-1/4FX), TRW/IRC, Beyschlag, Dale, Corning, and Matsushita.

Carbon film resistors have conformally-coated bodies, and are identified by four color bands. They are rated at $\frac{1}{4}$ watt @ 70°C , $\pm 5\%$. Orban part numbers 20001-xxx, Manufactured by R-Ohm (R-25), Piher, Beyschlag, Dale, Phillips, Spectrol, and Matsushita.

Carbon composition resistors have molded phenolic bodies, and are identified by four color bands. The 0.090 x 0.250 inch (2.3 x 6.4 mm) size is rated at $\frac{1}{4}$ watt, and the 0.140 x 0.375 inch (3.6 x 9.5 mm) size is rated at $\frac{1}{2}$ watt, both $\pm 5\%$ tolerance numbers 2001x-xxx, USA Military Specification MIL-R-11 Style RC-07 ($\frac{1}{4}$ watt) or RC-20 ($\frac{1}{2}$ watt). Manufactured by Allen-Bradley, TRW/IRC, and Matsushita.

Cermet trimmer resistors have $\frac{3}{8}$ -inch (9 mm) square bodies, and are identified by printing on their sides. They are rated at $\frac{1}{2}$ watt @ 70°C , $\pm 10\%$, with a temperature coefficient of 100 PPM/ $^\circ\text{C}$. Orban part numbers 20510-xxx and 20511-xxx. Manufactured by Beckman (72P, 68W- series), Spectrol, and Matsushita.

Obtaining Spare Parts

Special or subtle characteristics of certain components are exploited to produce an elegant design at a reasonable cost. It is therefore unwise to make substitutions for listed parts. Consult the factory if the listing of a part includes the note "selected" or "realignment required."

Orban normally maintains an inventory of tested, exact replacement parts that can be supplied quickly at nominal cost. Standardized spare parts kits are also available. When ordering parts from the factory, please have available the following information about the parts you want:

- Orban part number
- Reference designator (e.g., C3, R78, IC14)
- Brief description of part
- Model, serial, and "M" (if any) number of unit — see rear-panel label

To facilitate future maintenance, parts for this unit have been chosen from the catalogs of well-known manufacturers whenever possible. Most of these manufacturers have extensive worldwide distribution and may be contacted through their local offices. Addresses for each manufacturer's USA headquarters are given on page 6-20.

Vendor Codes

AB	Allen-Bradley Co., Inc. 1201-T South Second Street Milwaukee, WI 53204	DUR	Duracell, Inc. Berkshire Industrial Park Bethel, CT 06801	LT	Linear Technology Corp. 1630 McCarthy Blvd. Milpitas, CA 95035	ORB	Orban A division of AKG Acoustics, Inc. 1525 Alvarado Street San Leandro, CA 94577	TAI	Taiyo America, Inc. 700 Frontier Way Bensenville, IL 60106
AD	Analog Devices, Inc. One Technology Way PO Box 9106 Norwood, MA 02062-9106	ELSW	Electro Switch 77 King Avenue Weymouth, MA 02188	LUMX	Lumex Opto/Components Inc. 292 E. Hellen Road Palatine, IL 60067	PAN	Panasonic Industrial Company Two Panasonic Way 7E-2T Secaucus, NJ 07094	TDK	TDK Electronics Corporation 12 Harbor Park Port Washington, NY 11050
AKG	AKG Acoustics, Inc. 1525 Alvarado Street San Leandro, CA 94577	EMI	Emico Inc. 123 Main Street Dublin, PA 18917	MAL	Mallory Capacitor Co. Emhart Electrical/Electronic Gr. 4760 Kentucky Ave Indianapolis, IN 46241	QT	Quality Technologies, Inc. 610 North Mary Ave. Sunnyvale, CA 94086	TI	Texas Instruments, Inc. PO Box 225012 Dallas, TX 75265
AM	Amphenol Corporation 358 Hall Avenue Wallingford, CT 06492	EXR	Exar Corporation 2222 Qume Dr. PO Box 49007 San Jose, CA 95161-9007	MAR	Marquardt Switches, Inc. 2711-TR Route 20 East Cazenovia, NY 13035	RAL	Raltron Electronics Corp. 9550 Warner Ave. Fountain Valley, CA 92708	TOS	Toshiba America, Inc. 9740 Irvine Blvd. Irvine, CA 92718
BEK	Beckman Industrial Corporation 4141 Palm Street Fullerton, CA 92635-1025	FR	Fair-Rite Products Corp. PO Box J Wallkill, NY 12589	MAT	Matsushita Electric Corp of America One Panasonic Way Secaucus, NJ 07094	RAY	Raytheon Company Semiconductor Division 350 Ellis Street Mountain View, CA 94039	TRW	TRW Electronics Components Connector Division 1501 Morse Avenue Elk Grove Village, IL 60007
BEL	Belden Electronic Wire & Cable PO Box 1980 Richmond, IN 47374	FSC	Fairchild Camera & Instr. Corp. See National Semiconductor	ME	Mepcopal/Centralab A North American Phillips Corp. 11468 Sorrento Valley Road San Diego, CA 92121	RCA	RCA Solid State See Harris Semiconductor	VARO	Varo Semiconductor, Inc. PO Box 469013 Garland, TX 75046-9013
BRN	Bourns, Inc Resistive Components Group 1200 Columbia Avenue Riverside, CA 92507	GI	General Instruments Optoelectronics Division See Quality Technologies	MID	Hollingsworth/Wearnes Hollingsworth Solderless Terminal Div. 357 Beloit Street Burlington, WI 53105	ROHM	Rohm Corporation 8 Whatney Irvine, CA 92718	WES	Westlake See Mallory Capacitor Co.
BUS	Bussmann Division Cooper Industries PO Box 14460 St. Louis, MO 63178	HA	Harris Semiconductor 2460 N 1st Street Suite 200 San Jose, CA 95131-0124	MIL	J.W. Miller Division Bell Industries 306 E. Alondra Gardena, CA 90247	SAE	Stanford Applied Engineering, Inc 340 Martin Avenue Santa Clara, CA 95050	WIM	The Inter-Technical Group Inc. Wima Division PO Box 23 Irvington, NY 10533
CD	Cornell-Dubilier Elec. 1700 Rte. 23 North Wayne, NJ 07470	HO	Hoyt Elect. Inst. Works 19 Linden St. Penacook, NH 03303	MOT	Motorola Semiconductor PO Box 20912 Phoenix, AZ 85036	SAN	Sangamo Weston Inc. Capacitor Division See Cornell-Dubilier	ZI	ZILOG Inc. 210 Hacienda Ave. Campbell, CA 95008
CRL	Mepcopal/Centralab See Mepcopal	HP	Hewlett-Packard Co. Components Group 640 Page Mill Road Palo Alto, CA 94304	MUR	Murata Erie North America 2200 Lake Park Drive Smyrna, GA 30080	SCH	ITT Schadow, Inc. 8081 Wallace Road Eden Prairie, MN 55344		
CSC	Crystal Semiconductor Corporation 4210-T. South Industrial Dr. Austin, TX 78744	INS	Intersil, Inc. See Harris Semiconductor	NAT	National Semiconductor Corp. 2900 Semiconductor Drive PO Box 58090 Santa Clara, CA 95051	SIE	Siemens Components Inc. Heimann Systems Div. 186 Wood Avenue South Iselin, NJ 08830		
CTS	CTS Corporation 907 North West Blvd. Elkhart, IN 46514	ITW	ITW Switches An Illinois Tool Works Co. 6615 W. Irving Park Rd. Dept. T Chicago, IL 60634	NEL	NEL Frequency Controls, Inc. 357 Beloit Street Burlington, WI 53105	SIG	Philips Components - Signetics North American Phillips Corp. 811 E. Arques Sunnyvale, CA 94088		
CW	CW Industries 130 James Way Southampton, PA 18966	KEM	KEMET Electronics Corporation Post Office Box 5928 Greenville, South Carolina 29606	NOB	Noble U.S.A., Incorporated 5450 Meadowbrook Industrial Ct. Rolling Meadows, IL 60008	SPR	Sprague Electric Co. 41 Hampden Road PO Box 9102 Mansfield, MA 02048-9102		
DBX	dbx A division of AKG Acoustics, Inc. 1525 Alvarado Street San Leandro, CA 94577	KEY	Keystone Electronics Corp. 31-07 20th Rd. Astoria, NY 11105	OKI	OKI Semiconductor 785 N. Mary Ave. Sunnyvale, CA 94086-2909	SW	Switchcraft A Raytheon Company 5555 N. Elston Avenue Chicago, IL 60630		
DEL	Delta Products Corp 361 Fairview Way Milpitas, CA 95035	LFE	Littlefuse A Subsidiary of Tracor, Inc. 800 E. Northwest Hwy Des Plaines, IL 60016	OHM	Ohmite Manufacturing Company 3601 Howard Street Skokie, IL 60076				

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

ANALOG BOARD ASSEMBLYCapacitors

C98,99	Ceramic,Disc, 1kV, 10%; 12pF	21112-012	MEP	120K20S2L		
C100-102	Polypropylene, 50V, 1%; 4700pF	21701-247	NOB	CQ15P1H472FPP	WES	
C103	Met. Polyester, 50V, 5%; 0.1uF	21445-410	PAN	ECQ-V1H104JZ		
C104-107	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C108,109	Polypropylene, 50V, 1%; 4700pF	21701-247	NOB	CQ15P1H472FPP	WES	
C110	Met. Polyester, 50V, 5%; 0.1uF	21445-410	PAN	ECQ-V1H104JZ		
C111-113	Polypropylene, 50V, 1%; 4700pF	21701-247	NOB	CQ15P1H472FPP	WES	
C114	Mica, 500V, 1%; 2400pF	21022-224	CD	CD19-FD242F03	SAN	
C115-118	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C119,120	Polypropylene, 50V, 1%; 4700pF	21701-247	NOB	CQ15P1H472FPP	WES	
C121	Mica, 500V, 1%; 2400pF	21022-224	CD	CD19-FD242F03	SAN	
C122	Mica, 500V, 1%; 1500pF	21022-215	CD	CD19-FD152F03	SAN	
C123	Mica, 500V, 1%; 1000pF	21022-210	CD	CD19-FD102F03	SAN	
C124,125	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C126	Mica, 500V, 1%; 1000pF	21022-210	CD	CD19-FD102F03	SAN	
C127	Mica, 500V, 1%; 1500pF	21022-215	CD	CD19-FD152F03	SAN	
C128,129	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C130,131	Met. Polyester, 50V, 5%; 0.1uF	21445-410	PAN	ECQ-V1H104JZ		
C132,133	Mica, 500V, +1/2pF -1/2pF; 33pF	21017-033	CD	CD15-CD330D03	SAN	
C134,135	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C136,137	Met. Polyester, 100V, 10%; 0.0056uF	21445-256	WES	160C 562K630	SIE,WIM	
C200,201	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C202,203	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C213	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C216	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C217,218	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C220	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C224-227	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C300-303	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C304	Met. Polyester, 50V, 5%; 0.01uF	21445-310	PAN	ECQ-V1H103JZ		
C305,306	Mica, 500V +1/2pF -1/2pF; 39pF	21017-039	CD	CD15-CD390D03	SAN	
C307,308	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
(2) No Alternate Vendors known at publication
(3) Actual part is specially selected from part listed, consult Factory
(4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

SPECIFICATIONS AND SOURCES FOR REPLACEMENT PARTS

Orban Model 8282
Analog Board Assembly - Capacitors.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

Capacitors (continued)

C400	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C401	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C402	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C403-408	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C410-412	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C413	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C414	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C415,416	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C596-601	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C617	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C801	Polypropylene, 50V, 2.5%; 100pF	21702-110	NOB	CQ15P1H101GPP	WES,WIM	
C804-806	Polypropylene, 50V, 2.5%; 100pF	21702-110	NOB	CQ15P1H101GPP	WES,WIM	
C807-810	Ceramic, 100V, 5%; .01uF	21125-310	MUR	RPE113C0G103J110V	KEM	
C811,812	Tantalum, 20V, 10%; 10uF	21305-610	SPR	196D 106X9020JA1	MANY	
C813,814	Ceramic, 50V, 5%; 4700pF	21124-247	CRL	CN30C472J245	KEM	
C815	Tantalum, 20V, 10%; 10uF	21305-610	SPR	196D 106X9020JA1	MANY	
C817-820	Tantalum, 20V, 10%; 10uF	21305-610	SPR	196D 106X9020JA1	MANY	
C821,822	Ceramic Disc, 25V, 20%; 0.01uF	21106-310	CRL	UK25-103	MUR, SPR	

Diodes

CR400,401	Diode, Rectifier, 400V, 1A	22201-400	MOT	1N4004	MANY	
-----------	----------------------------	-----------	-----	--------	------	--

Integrated Circuits

IC1	Linear, Dual Opamp	24207-202	SIG	NE5532N	TI,EXR	
IC2	Quad SPST Switches	24728-302	AD	ADG222		
IC3	Audio Preamp	24727-302	AD	SSM-2017		
IC4-6	Linear, Dual Opamp	24209-202	NAT	LF412CN		
IC7	Quad Comparator	24710-302	NAT	LM339		
IC8,9	Linear, Dual Opamp	24207-202	SIG	NE5532N	TI,EXR	
IC10	Linear, Dual Opamp	24206-202	TI	TL072CP	MOT	
IC11,12	Digital, Multiplying DAC	24714-302	AD	AD7524JN		
IC13	Linear, Dual Opamp	24207-202	SIG	NE5532N	TI,EXR	
IC14	Quad SPST Switches	24728-302	AD	ADG222		
IC15	Audio Preamp	24727-302	AD	SSM-2017		

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
(2) No Alternate Vendors known at publication
(3) Actual part is specially selected from part listed, consult Factory
(4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

SPECIFICATIONS AND SOURCES FOR REPLACEMENT PARTS

OPTIMOD-TV 8282
Analog Board Assembly - Capacitors,
Diodes, Integrated Circuits.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
<u>Integrated Circuits (continued)</u>						
IC16,17	Linear, Dual Opamp	24206-202	TI	TL072CP	MOT	
IC18	Quad Comparator	24710-302	NAT	LM339		
IC19	Digital, Octal Flip-Flop	24553-302	NAT	MM74HC374		
IC20	Digital, A/D Converter	24730-000	AD	AD1879		
IC21	D.C. Regulator, 5V Negative	24308-901	NAT	LM79M05C	TI,MOT	
IC22	D.C. Regulator, 5V Positive	24307-901	NAT	LM78M05C	TI,MOT	
IC23	Linear, Dual Opamp	24209-202	NAT	LF412CN		
IC24-26	Linear, Dual Opamp	24206-202	TI	TL072CP	MOT	
IC27,28	Digital, Line Decoder	24569-302	NAT	MM74HC138N	TI	
IC29	Digital, Buffer	24568-302	NAT	MM74HC244N	TI	
IC30	Digital, Octal Flip-Flop	24553-302	NAT	MM74HC374		
IC31,32	Digital, Dual Flip-Flop	24567-302	RCA	CD74HC74N	SIG	
IC33	Digital, Hex Inverter	24572-302	NAT	74HC04N	TI	
IC34,35	Digital, Dual Flip-Flop	24567-302	RCA	CD74HC74N	SIG	
IC36	Digital, Buffer	24568-302	NAT	MM74HC244N	TI	
IC37	Digital, Magnitude Comparator	24574-302	SIG	74HC85N	TI	
IC38	Linear, Dual Opamp	24206-202	TI	TL072CP	MOT	
IC39	Digital, Audio DAC	24825-000	AD	AD1865		
IC40	Digital, NAND Gate	24585-000	RCA	CD74HC132E	TI	
IC41,42	Digital, Dual Flip-Flop	24567-302	RCA	CD74HC74N	SIG	
IC43	Digital, AND Gate	24576-302	RCA	CD74HC08		
IC44	Linear, Dual Opamp	24207-202	SIG	NE5532N	TI,EXR	
<u>Miscellaneous</u>						
Y1	Crystal; 8.192 MHz	28052-001	NEL	NE-18-8.192MHz		
<u>Transistors</u>						
Q100-105	Transistor, JFET/N	23406-101	NAT	J113	SIL	
Q200-203	Transistor, JFET/N	23402-101	NAT	J108		
Q400-402	Transistor, Signal, PNP	23002-101	MOT	2N4402	FSC	

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
(2) No Alternate Vendors known at publication
(3) Actual part is specially selected from part listed, consult Factory

- (4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

SPECIFICATIONS AND SOURCES FOR REPLACEMENT PARTS

OPTIMOD-TV 8282
Analog Board Assembly - Integrated Circuits,
Miscellaneous, Transistors.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

CONTROL BOARD ASSEMBLYMiscellaneous

NONE	Battery Holder, Coin Cell	28031-000	KEY	106		
B200	Coin Cell, Lithium; 3V	28041-000	DUR	DL2032	GE	
Y100	Crystal; 12.288 MHz	28055-000	RAL	A-12.288-5		
Y101	Oscillator; 32.768 MHz	28056-000	NEL	HS426-32.768MHz		

Capacitors

C100,101	Mica, 500V, +1/2pF -1/2pF; 22pF	21017-022	CD	CD15-CD220D03	SAN	
C102,103	Mica, 500V, 1%; 100pF	21018-110	CD	CD15-FD101F03	SAN	
C200-202	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C203-205	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C206	Alum., Radial, 50V, -20% +100%; 47uF	21208-647	SPR	502D 476G050CD1C	PAN	
C207	Alum., Radial, 63V, -20% +100%; 2.2uF	21209-522	SPR	502D 225G063BB1C	PAN	
C208	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C209	Alum., Radial, 63V, -20% +100%; 2.2uF	21209-522	SPR	502D 225G063BB1C	PAN	
C210	Ceramic Disc, 25V, 20%; 0.1uF	21106-410	CRL	UK25-104	MUR	
C211-214	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C300-311	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C313	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C316,317	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	

Diodes

CR200	Diode, Voltage Reference	22081-112	NAT	LM385	MOT	
CR201,202	Diode, Signal, Hot Carrier	22102-001	HP	HP5082-2800	MANY	

Integrated Circuits

IC1	Digital, RAM, RTA	24809-302	MOT	MC146818A		
IC2	Digital, Transceiver	24570-302	NAT	MM74HC245N	TI	
IC3	Digital, Quad OR Gate	24571-302	NAT	MM74HC32N	TI	
IC4	Digital, Dual Flip-Flop	24567-302	RCA	CD74HC74N	SIG	
IC5	Digital, Binary Counter	24583-302	RCA	CD74HC393		
IC6	Digital, Hex Inverter	24572-302	NAT	74HC04N	TI	
IC7	Digital, AND Gate	24576-302	RCA	CD74HC08		

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
 (2) No Alternate Vendors known at publication
 (3) Actual part is specially selected from part listed, consult Factory
 (4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

SPECIFICATIONS AND SOURCES FOR
REPLACEMENT PARTS

OPTIMOD-TV 8282
 Control Board Assembly - Miscellaneous, Capacitors, Diodes,
 Integrated Circuits.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
<u>Integrated Circuits (continued)</u>						
IC8	Digital, Quad OR Gate	24571-302	NAT	MM74HC32N	TI	
IC9,10	Digital, Line Decoder	24569-302	NAT	MM74HC138N	TI	
IC11	Quad Comparator	24710-302	NAT	LM339		
IC12	Digital, Buffer	24568-302	NAT	MM74HC244N	TI	
IC13	Digital, Schmitt Trigger Inverter	24582-302	MOT	74HC14A		
IC14	Digital, Buffer	24568-302	NAT	MM74HC244N	TI	
IC15	Digital, Line Decoder	24569-302	NAT	MM74HC138N	TI	
IC16	Digital, Hex Inverter	24572-302	NAT	74HC04N	TI	
IC17	Digital, Schmitt Trigger Inverter	24582-302	MOT	74HC14A		
IC18	Digital, MPU	24813-302	ZI	Z8018006PSC		
IC19	Digital, Buffer	24568-302	NAT	MM74HC244N	TI	
IC20	Digital, Tranceiver	24570-302	NAT	MM74HC245N	TI	
IC22	Digital, RAM	24811-302	TOS	TC5565APL15L		
IC25,26	Digital, Buffer	24568-302	NAT	MM74HC244N	TI	
<u>Resistors</u>						
R100,101	Resistor Network, SIP; 100K	20221-101	BEK	L10-1C104		
R105-107	Resistor Network, SIP; 100K	20221-101	BEK	L10-1C104		
R200	Resistor Network, SIP; 100K	20221-101	BEK	L10-1C104		
R215	Resistor Network, SIP; 100K	20221-101	BEK	L10-1C104		
<u>Switches</u>						
S1	Switch, MOM.; SPST	26302-001	SCH	D6-01-01		

<p>FOOTNOTES:</p> <p>(1) See page 6-20 for Vendor abbreviations</p> <p>(2) No Alternate Vendors known at publication</p> <p>(3) Actual part is specially selected from part listed, consult Factory</p> <p>(4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions</p>	<p>SPECIFICATIONS AND SOURCES FOR REPLACEMENT PARTS</p> <p>OPTIMOD-TV 8282</p> <hr/> <p>Control Board Assembly - Integrated Circuits, Resistors, Switches.</p>
--	---

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

D-CONNECTOR BOARD ASSEMBLY

Capacitors

C1-16	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C17	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C18,19	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C20	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C21,22	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C23	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C24,25	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	

Diodes

CR1-8	Diode, Rectifier, 400V, 1A	22201-400	MOT	1N4004	MANY	
-------	----------------------------	-----------	-----	--------	------	--

Inductors

L1	Inductor, RF Choke; 7uH	29501-004	OHM	Z-50	(2)	
----	-------------------------	-----------	-----	------	-----	--

Integrated Circuits

IC1	Digital, Quad Line Driver	24661-302	NAT	DS14C88N		
IC2	Digital, Quad Line Receiver	24662-302	NAT	DS14C89A		
IC3	Digital, Quad Line Drivers	24717-302	MOT	SN75174N		
IC4	Digital, Quad Line Receivers	24718-302	MOT	SN75175N		
IC5-12	Optoisolator, NPN	25003-000	SIE	SFH-601-1		

Miscellaneous

FB1-18	Ferrite Bead, with wire	29506-001	FR	2743001111		
--------	-------------------------	-----------	----	------------	--	--

Switches

S1	Switch, Slide; SPDT	26142-000	ITW	124-230-020		
----	---------------------	-----------	-----	-------------	--	--

FOOTNOTES:

- | | |
|---|--|
| (1) See page 6-20 for Vendor abbreviations | (4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions |
| (2) No Alternate Vendors known at publication | |
| (3) Actual part is specially selected from part listed, consult Factory | |

SPECIFICATIONS AND SOURCES FOR REPLACEMENT PARTS

OPTIMOD-TV 8282
D-Connector Board Assembly - Capacitors, Diodes, Inductors, Integrated Circuits, Miscellaneous, Switches.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

DSP BOARD ASSEMBLYCapacitors

C1,2	Alum., Radial, 63V, -20% +100%; 22uF	21209-622	SPR	502D 226G063CC1C	PAN	
C3-40	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	

Integrated Circuits

IC1	Digital, NOR Gate	24581-302	SIG	74HC02N	TI	
IC2	Digital, Quad OR Gate	24571-302	NAT	MM74HC32N	TI	
IC3	Digital, Latch	24577-302	SIG	74HC373N	TI	
IC4-6	Digital, Register	24578-302	SIG	74HC40105N		
IC7	Digital, NOR Gate	24581-302	SIG	74HC02N	TI	
IC8	Digital, Quad OR Gate	24571-302	NAT	MM74HC32N	TI	
IC9	Digital, DSP	24835-000	MOT	DSP56001FC27		
IC10,11	Digital, Latch	24577-302	SIG	74HC373N	TI	
IC12-14	Digital, Register	24578-302	SIG	74HC40105N		
IC15	Digital, DSP	24835-000	MOT	DSP56001FC27		
IC16	Digital, NOR Gate	24581-302	SIG	74HC02N	TI	
IC17	Digital, Quad OR Gate	24571-302	NAT	MM74HC32N	TI	
IC18-20	Digital, Register	24578-302	SIG	74HC40105N		
IC21	Digital, Latch	24577-302	SIG	74HC373N	TI	
IC22-24	Digital, Register	24578-302	SIG	74HC40105N		
IC25	Digital, Latch	24577-302	SIG	74HC373N	TI	
IC26-28	Digital, Register	24578-302	SIG	74HC40105N		
IC29	Digital, Latch	24577-302	SIG	74HC373N	TI	
IC30	Digital, DSP	24835-000	MOT	DSP56001FC27		
IC31-33	Digital, Register	24578-302	SIG	74HC40105N		
IC34,35	Digital, Latch	24577-302	SIG	74HC373N	TI	
IC36-38	Digital, Multiplexer	24579-302	SIG	74HC253BN	TI	
IC39	Digital, Latch	24577-302	SIG	74HC373N	TI	
IC40	Digital, Multiplexer	24579-302	SIG	74HC253BN	TI	
IC41	Digital, Hex Inverter	24572-302	NAT	74HC04N	TI	
IC42	Digital, Line Decoder	24569-302	NAT	MM74HC138N	TI	
IC43,44	Digital, Latch	24577-302	SIG	74HC373N	TI	
IC45	Digital, Magnitude Comparator	24574-302	SIG	74HC85N	TI	

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
(2) No Alternate Vendors known at publication
(3) Actual part is specially selected from part listed, consult Factory
(4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

SPECIFICATIONS AND SOURCES FOR REPLACEMENT PARTS

OPTIMOD-TV 8282
DSP Board Assembly - Capacitors,
Integrated Circuits.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

Miscellaneous

Y1	Oscillator; 27 MHz	28054-000	NEL	HS-350-27.000		
----	--------------------	-----------	-----	---------------	--	--

FINGER BOARD ASSEMBLY

Capacitors

C12	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C13	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C14	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C15	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C16	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C17	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C18	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C19	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C20	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C21	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C22	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C23	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C26	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C27	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C28	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C29	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C30	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C31	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
C32	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C33	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	

FRONT PANEL ASSEMBLY

Miscellaneous

LCD Display	42025-000	ORB			
-------------	-----------	-----	--	--	--

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
- (2) No Alternate Vendors known at publication
- (3) Actual part is specially selected from part listed, consult Factory
- (4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

SPECIFICATIONS AND SOURCES FOR REPLACEMENT PARTS

OPTIMOD-TV 8282
 DSP Board Assembly - Miscellaneous.
 Finger Board Assembly - Capacitors.
 Front Panel Assembly - Miscellaneous.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

INPUT FILTER BOARD ASSEMBLYCapacitors

C2-5	Ceramic Disc, 1kV, 10%; 0.001uF	21112-210	CRL	DD-102	MUR	
------	---------------------------------	-----------	-----	--------	-----	--

Inductors

L1-4	Inductor, RF Choke; 1.2mH	29503-000	MIL	73F123AF		
L5-8	Inductor, RF Choke; 7uH	29501-004	OHM	Z-50	(2)	
L14-21	Filter, EMI, W/BEAD, 50V,1000PF	29508-210	TAI	STB102KB		
L22-25	Filter, EMI, W/INDUCT, 50V,470PF	29509-147	TAI	LC471M1RO		

Miscellaneous

FB1	Ferrite Bead, with wire	29506-001	FR	2743001111		
-----	-------------------------	-----------	----	------------	--	--

MAIN DISPLAY BOARD ASSEMBLYCapacitors

C100,101	Mica, 500V, +1/2pF -1/2pF; 22pF	21017-022	CD	CD15-CD220D03	SAN	
C200,201	Mica, 500V, 1%; 270pF	21018-127	CD	CD15-FD271F03	SAN	
C300-302	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C303-327	Monolithic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	

Diodes

CR100	Diode, Rectifier, 400V, 1A	22201-400	MOT	1N4004	MANY	
-------	----------------------------	-----------	-----	--------	------	--

Integrated Circuits

IC1,2	Digital, Octal Flip-Flop	24553-302	NAT	MM74HC374		
IC3	Digital, Ram	497-1137	HIT	HM6264ALP-10		
IC4	Digital, LCD Controller	24723-000	OKI	MSM62556GS		
IC5	Digital, Schmitt Trigger Inverter	24582-302	MOT	74HC14A		
IC6-8	Digital, Dual Flip-Flop	24567-302	RCA	CD74HC74N	SIG	
IC9	Digital, Schmitt Trigger Inverter	24582-302	MOT	74HC14A		
IC10	Digital, AND Gate	24576-302	RCA	CD74HC08		
IC11	Digital, Quad OR Gate	24571-302	NAT	MM74HC32N	TI	
IC12	Digital, Dual Flip-Flop	24567-302	RCA	CD74HC74N	SIG	

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
(2) No Alternate Vendors known at publication
(3) Actual part is specially selected from part listed, consult Factory
(4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

SPECIFICATIONS AND SOURCES FOR
REPLACEMENT PARTS

OPTIMOD-TV 8282
Input Filter Board Assembly - Capacitors, Inductors
Miscellaneous.
Main Display Board Assembly - Capacitors, Diodes,
Integrated Circuits.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

Integrated Circuits (continued)

IC13,14	Digital, Octal Flip-Flop	24553-302	NAT	MM74HC374		
IC15	Digital, Line Decoder	24569-302	NAT	MM74HC138N	TI	
IC16	Digital, Octal Flip-Flop	24553-302	NAT	MM74HC374		
IC17,18	Digital, Buffer	24568-302	NAT	MM74HC244N	TI	
IC19	Digital, Binary Counter	24583-302	RCA	CD74HC393		
IC20	Digital, Quad 2-Input NAND	24559-302	RCA	74HCT132E	TI	

Miscellaneous

Y100	Crystal; 4.9152 MHz	28051-003	MID	C1700		
------	---------------------	-----------	-----	-------	--	--

Modules

A100	Digital, Inverter, DC to AC	24722-000	TDK	CXAM10L		
------	-----------------------------	-----------	-----	---------	--	--

Resistors

R104	Pot, Single; 500 OHM (5050)	20747-000	ORB	Linear		
R204	Resistor Network, SIP; 100K	20221-101	BEK	L10-1C104		

Transistors

Q100	Transistor, Power, NPN; TO-220	23604-201	TI	TIP122	RCA	
------	--------------------------------	-----------	----	--------	-----	--

MISCELLANEOUS

Miscellaneous

	Extender Card 48/48	31510-002	ORB			
	Line Cord, CEE	28102-002	BEL	17500	MANY	

POWER SUPPLY CHASSIS

Integrated Circuits

IC1	D.C. Regulator, 15V Positive	24304-901	NAT	LM78M15UC	TI,MOT	
IC2	D.C. Regulator, 15V Negative	24303-901	NAT	LM79M15AUC	TI,MOT	

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
- (2) No Alternate Vendors known at publication
- (3) Actual part is specially selected from part listed, consult Factory

- (4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

SPECIFICATIONS AND SOURCES FOR REPLACEMENT PARTS

OPTIMOD-TV 8282
 Main Display Board Assembly - Integrated Circuits,
 Miscellaneous, Modules, Transistors.
 Miscellaneous - Miscellaneous.
 Power Supply Chassis - Integrated Circuits.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

REGULATOR BOARD ASSEMBLYCapacitors

C1	Alum., Axial, 40V, -10% +100%; 1000uF	21224-810	SIE	B41010-1000-40	PAN	
C2	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C3	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C4	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C5	Alum., Axial, 40V, -10% +100%; 1000uF	21224-810	SIE	B41010-1000-40	PAN	
C6	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	
C7	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-A1EV101S		
C8	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25 Z5U104M050B	KEM	

Diodes

CR1	Diode, Bridge, 200V, 1A	22301-000	VARO	VE-27	GI	
CR2,3	Diode, Rectifier, 400V, 1A	22201-400	MOT	1N4004	MANY	

Inductors

L1	Filter, Line	28012-000	DEL	03ME1		
----	--------------	-----------	-----	-------	--	--

Miscellaneous

F1	Fuse, 3AG, Slo-Blo, 1/2A	28004-150	LFE	313.500	BUS	Domestic unit only
F1	Fuse, Type T, 1/4A	28025-125	LFE	218.250	European unit only	
F2	Fuse, 3AG, Slo-Blo, 4A	28004-240	LFE	313.004	Domestic unit only	
F2	Fuse, Type T, 2A	28025-220	LFE	218.002	European unit only	
PS1	Switcher, Power Supply	42026-000	ORB			
T1	Transformer, Power; 51VCT	55015-000	ORB			
V1	Varistor; 430V	22500-431	PAN	ERZ-C10DK431		

Switches

S1	Switch, Push-Push; DPST	26118-000	SCH	NE18-2AEESP		
S2	Switch, Slide, Mains voltage selector	26143-000	SW	EPS2-PC3		

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
 (2) No Alternate Vendors known at publication
 (3) Actual part is specially selected from part listed, consult Factory
 (4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

SPECIFICATIONS AND SOURCES FOR
REPLACEMENT PARTS

OPTIMOD-TV 8282
 Regular Board Assembly - Capacitors, Diodes,
 Inductors, Miscellaneous, Switches.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
------------	-------------	-----------	------------	------------	--------------------------	-------

SWITCH BOARD ASSEMBLY

LED

None	LED, Green	25107-002	MAT	LN322GP		
------	------------	-----------	-----	---------	--	--

Switches

S5	Switch, Rotary, Encoder	26080-000	CLA	600EN-128-CBL		
----	-------------------------	-----------	-----	---------------	--	--

FOOTNOTES:

- (1) See page 6-20 for Vendor abbreviations
- (2) No Alternate Vendors known at publication
- (3) Actual part is specially selected from part listed, consult Factory

- (4) Realignment may be required if replaced, see Circuit Description and/or Alignment Instructions

**SPECIFICATIONS AND SOURCES FOR
REPLACEMENT PARTS**

OPTIMOD-TV 8282
Switch Board Assembly - LED, Switches.

Schematics, Assembly Drawings

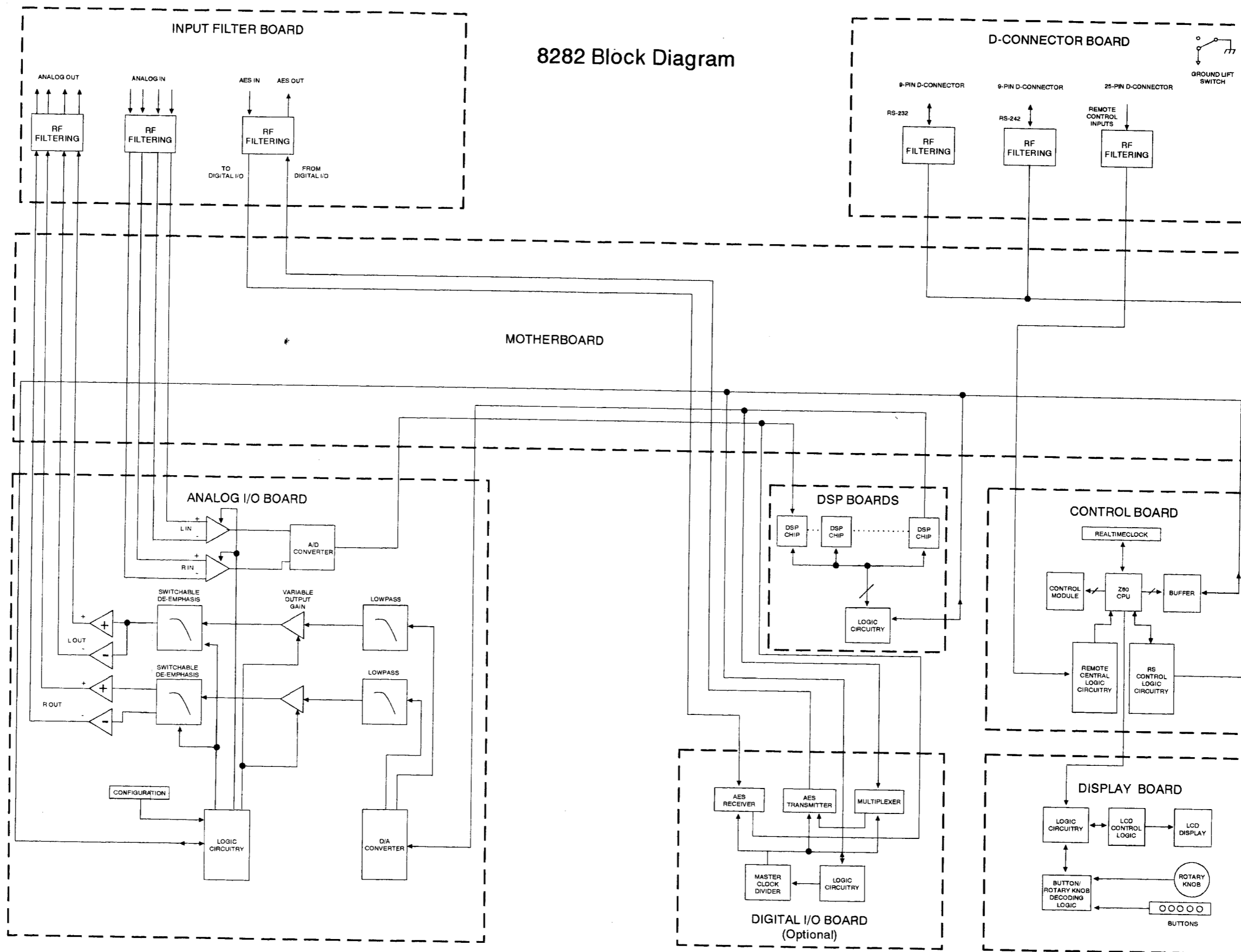
The following drawings are included in this manual:

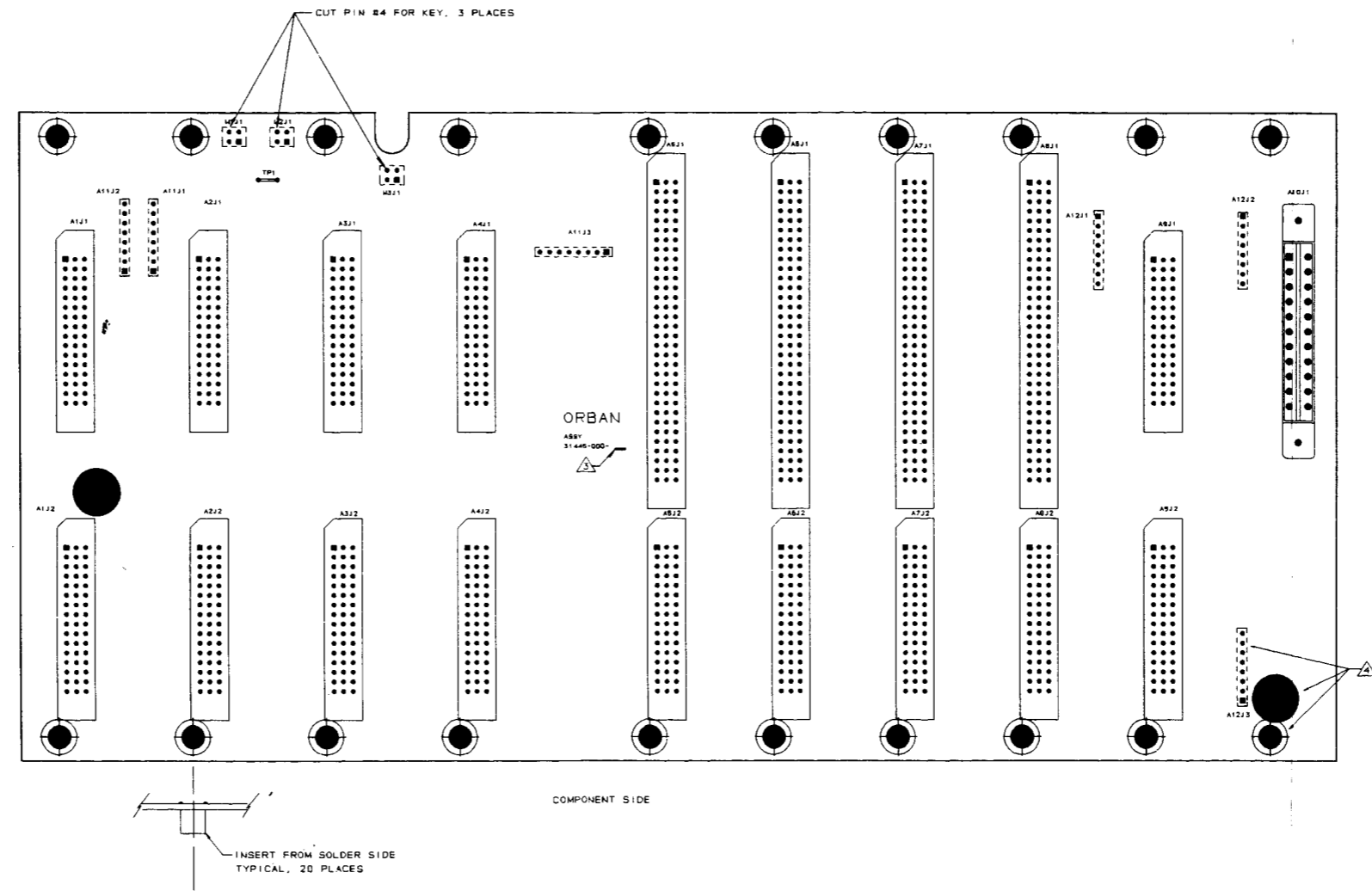
Page	Circuit Board/Card	Drawing
6-34	Block Diagram	Assembly Drawing
6-35	Mother	Assembly Drawing
6-36	Mother	Schematic 1 of 5
6-37		2 of 5
6-38		3 of 5
6-39		4 of 5
6-40		5 of 5
6-41	Control	Assembly Drawing
6-42	Control	Schematic 1 of 2
6-43		2 of 2
6-44	DSP	Assembly Drawing
6-45	DSP	Schematic 1 of 4
6-46		2 of 4
6-47		3 of 4
6-48		4 of 4
6-49	Analog I/O	Assembly Drawing
6-50	Analog I/O	Schematic 1 of 4
6-51		2 of 4
6-52		3 of 4
6-53		4 of 4
6-54	Display	Assembly Drawing
6-55	Display	Schematic 1 of 2
6-56		2 of 2
6-57	Regulator	Assembly Drawing
6-58	Regulator	Schematic
6-59	Input Filter	Assembly Drawing
6-60	Input Filter	Schematic
6-61	D-Connector	Assembly Drawing
6-62	D-Connector	Schematic

These drawings reflect the actual construction of your unit as accurately as possible. Any differences between the drawings and your unit are almost undoubtedly due to product improvements or production changes since the publication of this manual.

If you intend to replace parts, please read page 6-18

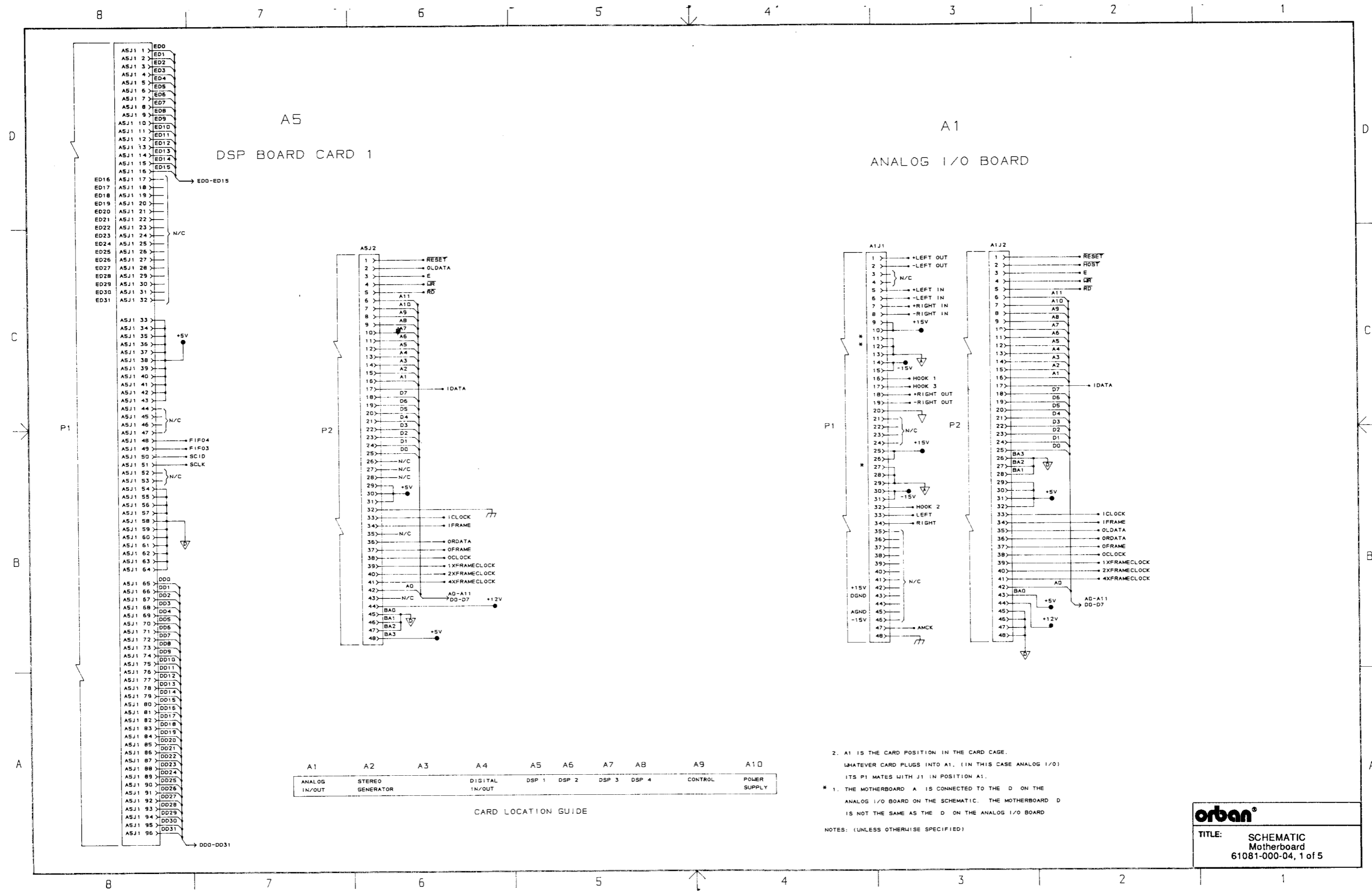
8282 Block Diagram





- 5. CONNECTORS SHOWN AS DASHED LINES TO BE MOUNTED ON SOLDER SIDE OF PCB AFTER HAVE SOLDER OF COMPONENT SIDE CONNECTIONS.
 - △ MARK ALL MOUNTING HOLES AND HOLES FOR SOLDER SIDE CONNECTORS BEFORE HAVE SOLDERING.
 - △ MARK ASSEMBLY REVISION LEVEL IN SPACE PROVIDED
 - 2. REFERENCE SCHEMATIC DRAWING NO. 61081
 - 1. SQUARE PADS INDICATE PIN 1 OF CONNECTORS, CATHODE OF DIODES, POS. SIDE OF CAPS., PIN 1 OF ICs
- NOTES: (UNLESS OTHERWISE SPECIFIED)

orban [®]	
TITLE: PCB ASSEMBLY Motherboard 31445-000-02	

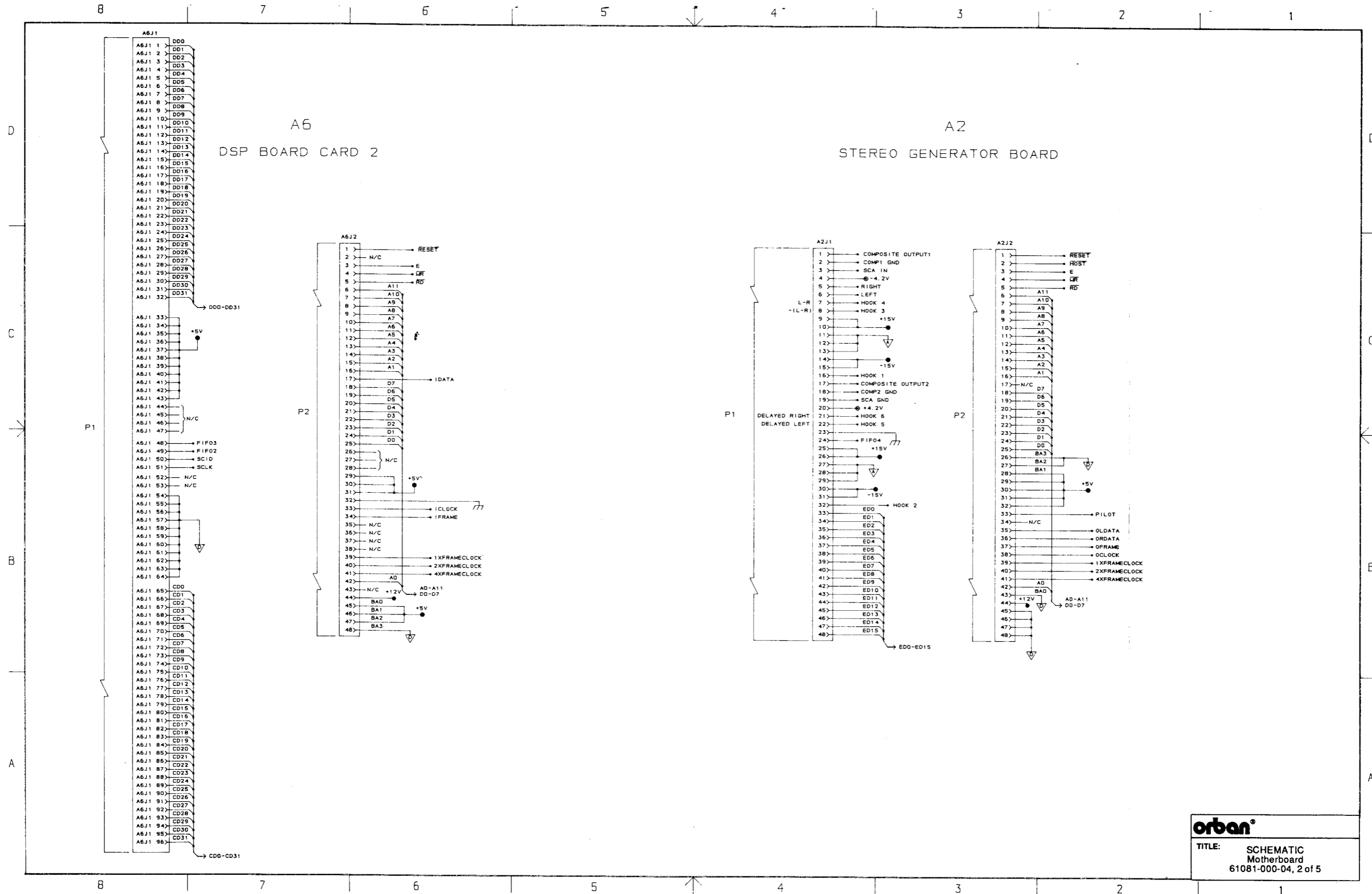


2. A1 IS THE CARD POSITION IN THE CARD CAGE.
 (WHATEVER CARD PLUGS INTO A1. (IN THIS CASE ANALOG I/O)
 ITS P1 MATES WITH J1 IN POSITION A1.

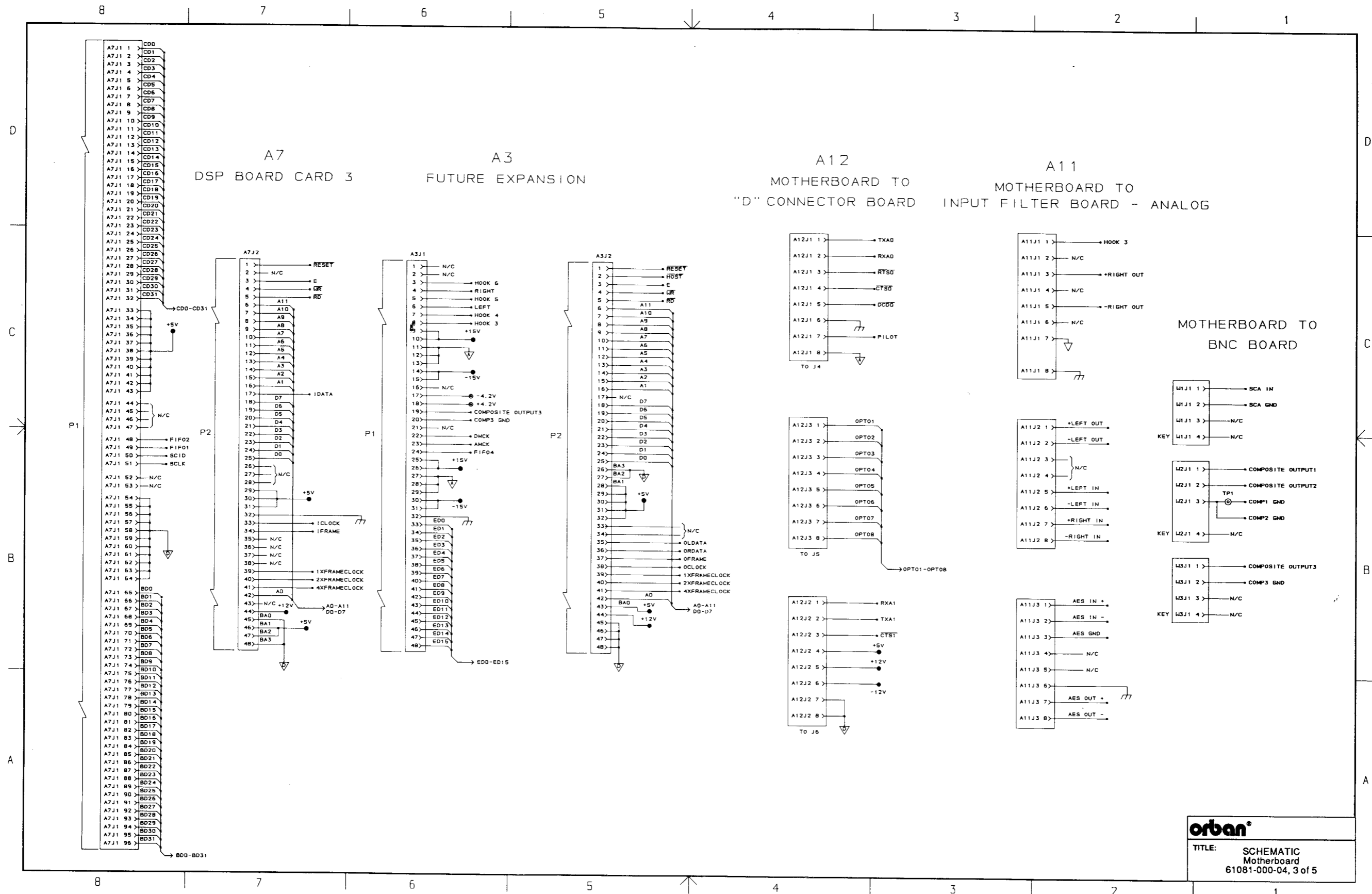
* 1. THE MOTHERBOARD A IS CONNECTED TO THE D ON THE ANALOG I/O BOARD ON THE SCHEMATIC. THE MOTHERBOARD D IS NOT THE SAME AS THE D ON THE ANALOG I/O BOARD

NOTES: (UNLESS OTHERWISE SPECIFIED)

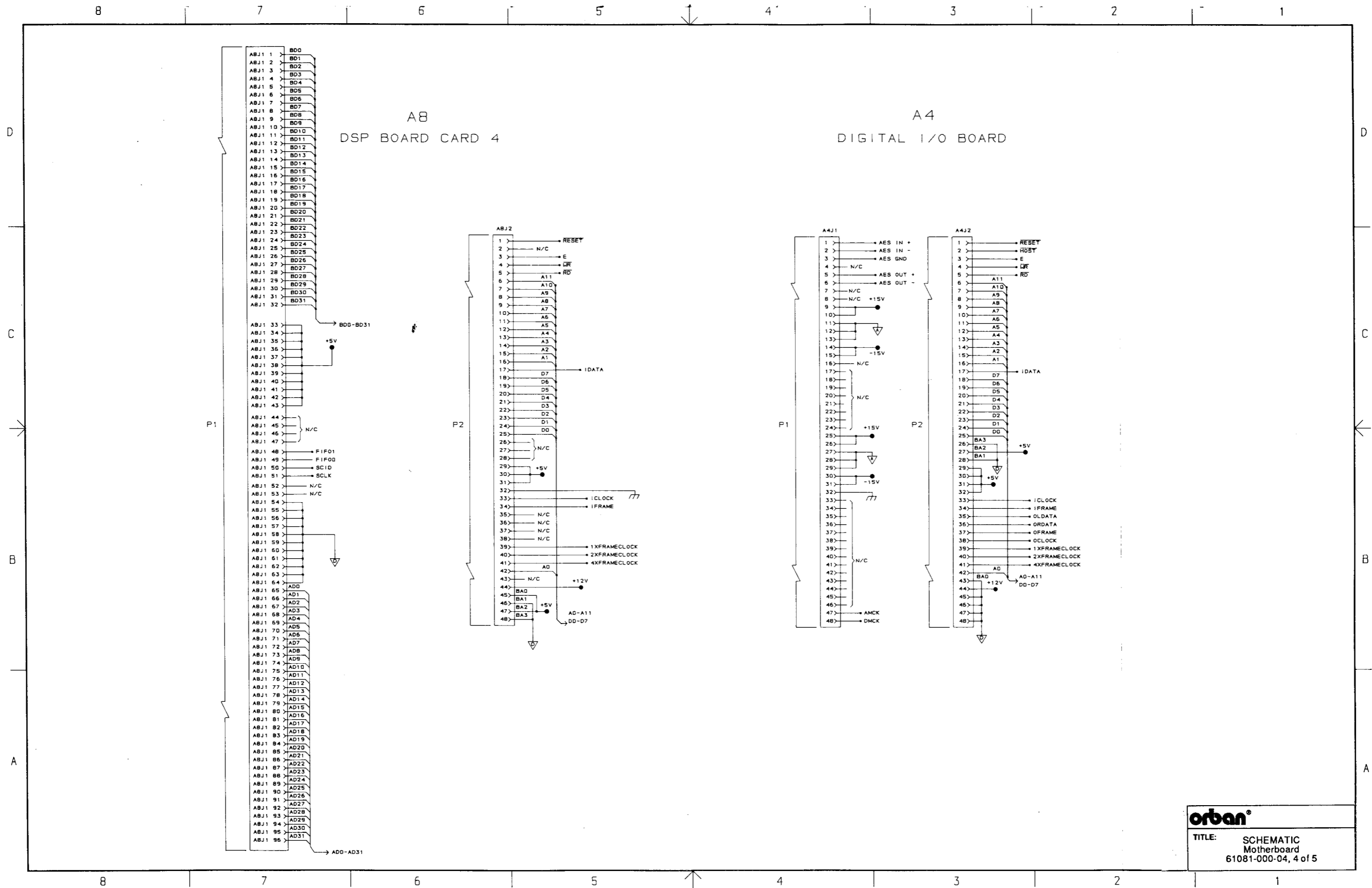
orban
 TITLE: SCHEMATIC
 Motherboard
 61081-000-04, 1 of 5



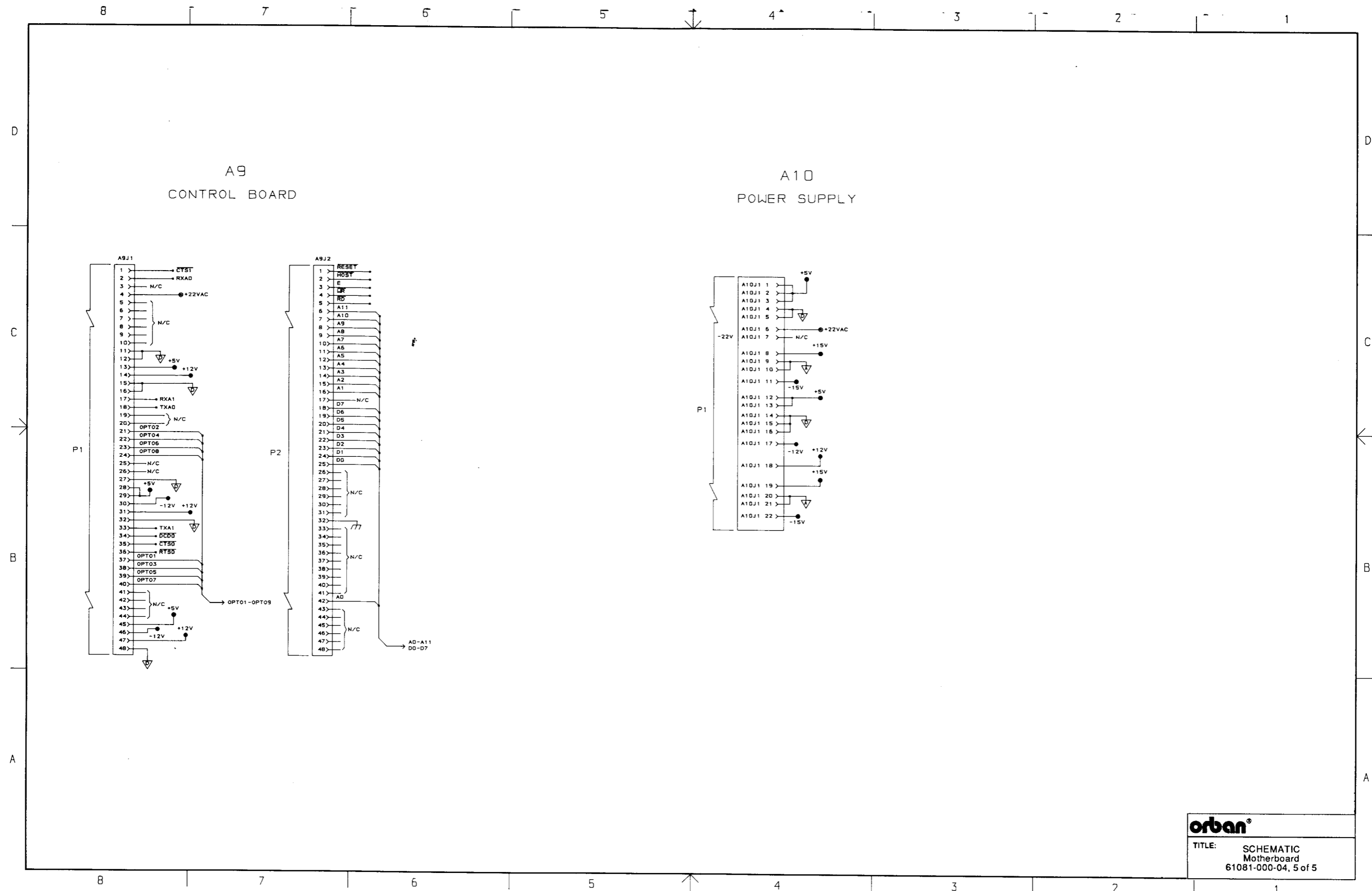
orban
 TITLE: SCHEMATIC
 Motherboard
 61081-000-04, 2 of 5



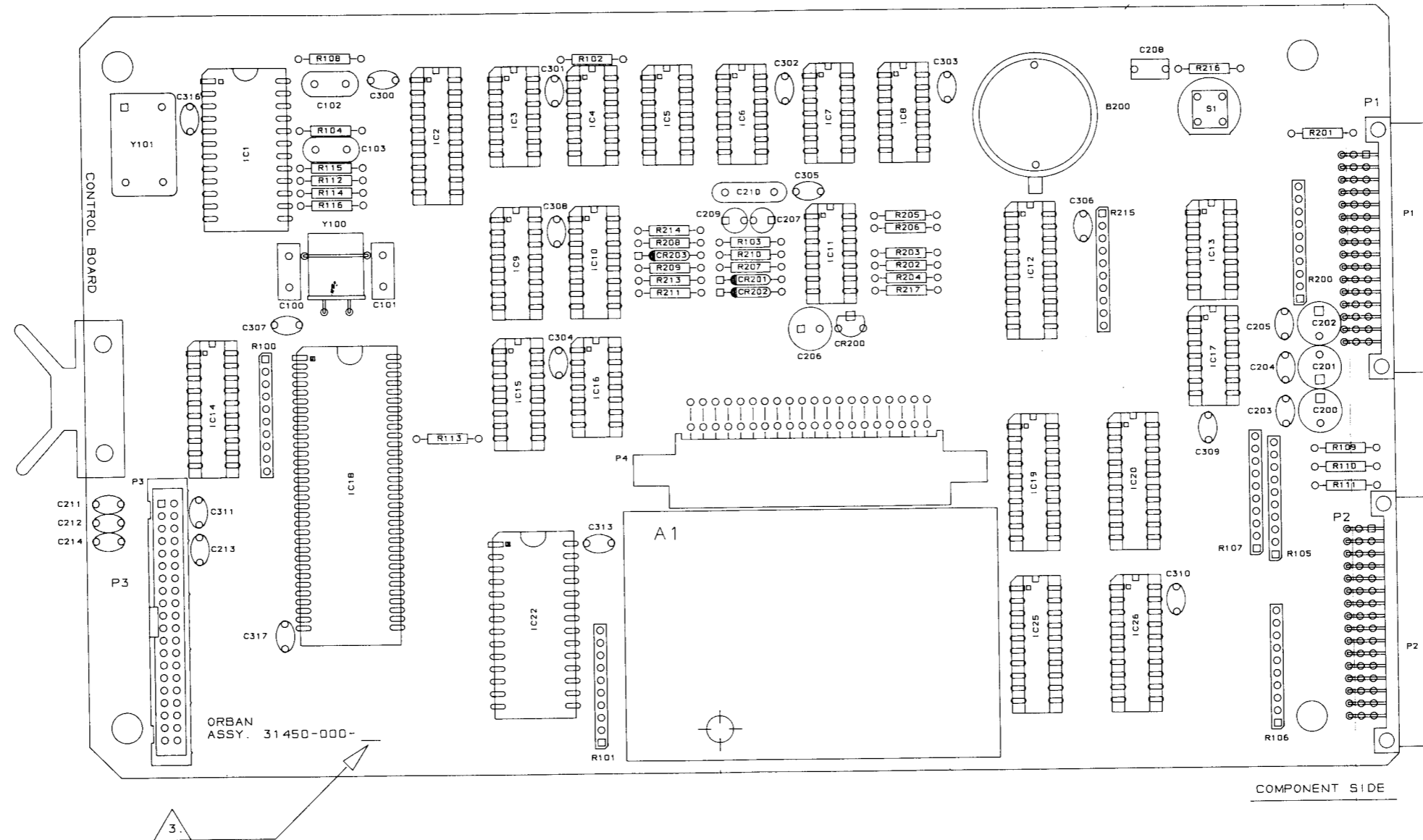
orban
 TITLE: SCHEMATIC
 Motherboard
 61081-000-04, 3 of 5



orban
TITLE: SCHEMATIC
Motherboard
61081-000-04, 4 of 5

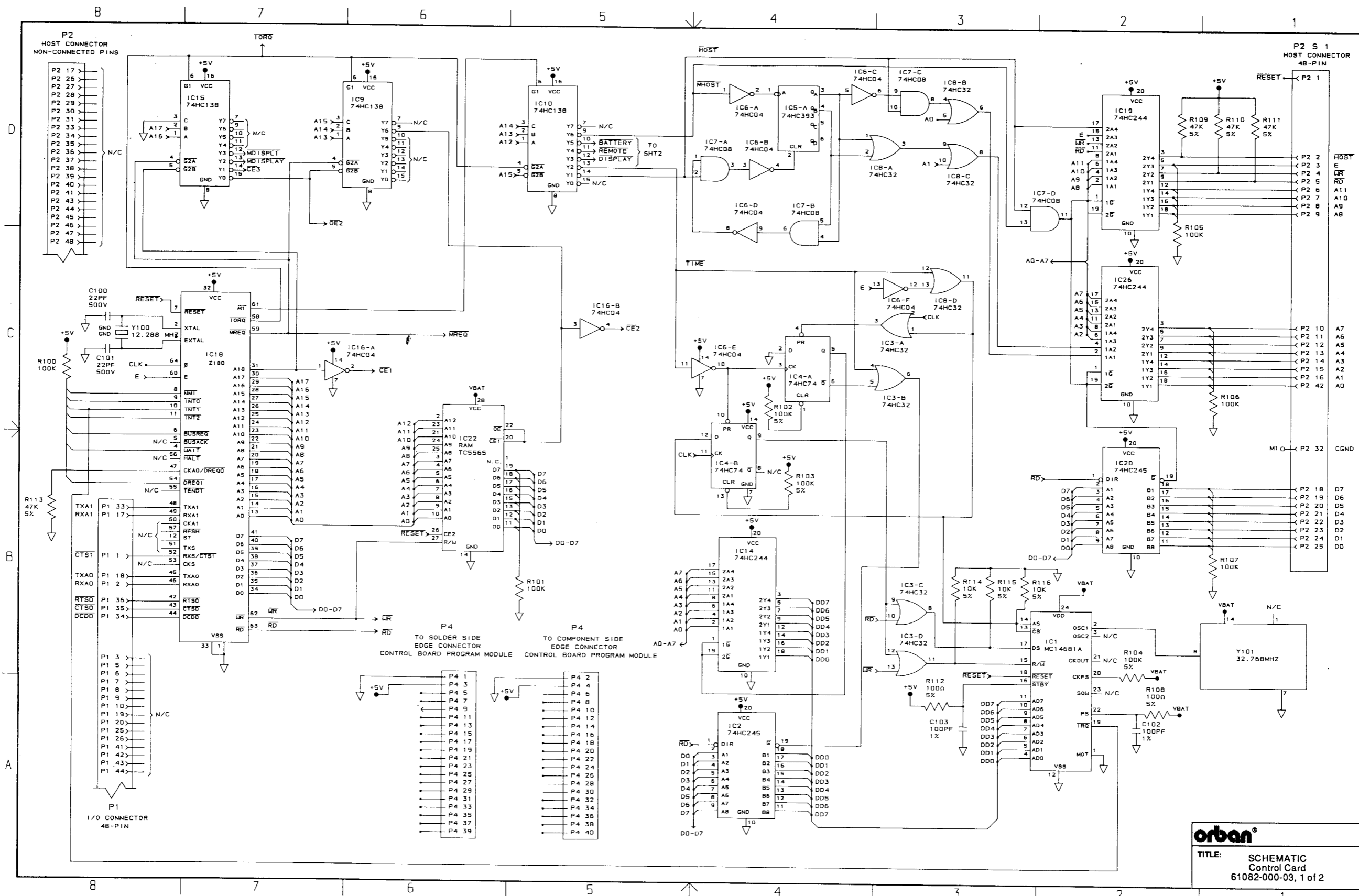


orban
TITLE: SCHEMATIC
Motherboard
61081-000-04, 5 of 5

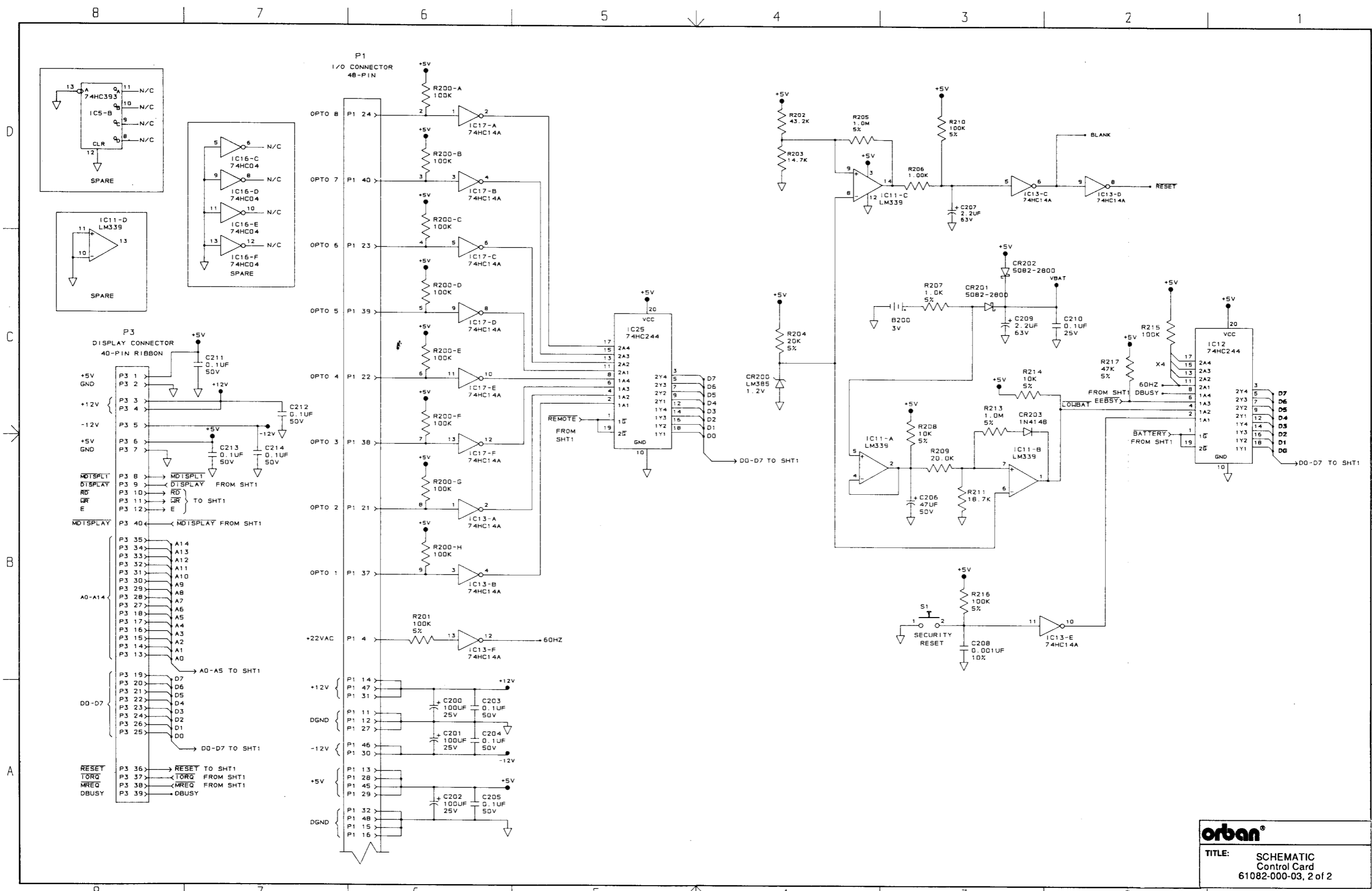


- 3. MARK ASSEMBLY REVISION LEVEL IN SPACE PROVIDED
 - 2. REFERENCE SCHEMATIC DRAWING NO. 610B2-000
 - 1. SQUARE PADS INDICATE PIN 1 OF CONNECTORS, CATHODE OF DIODES.
POS. SIDE OF CAPS., PIN 1 OF IC'S
- NOTES: (UNLESS OTHERWISE SPECIFIED)

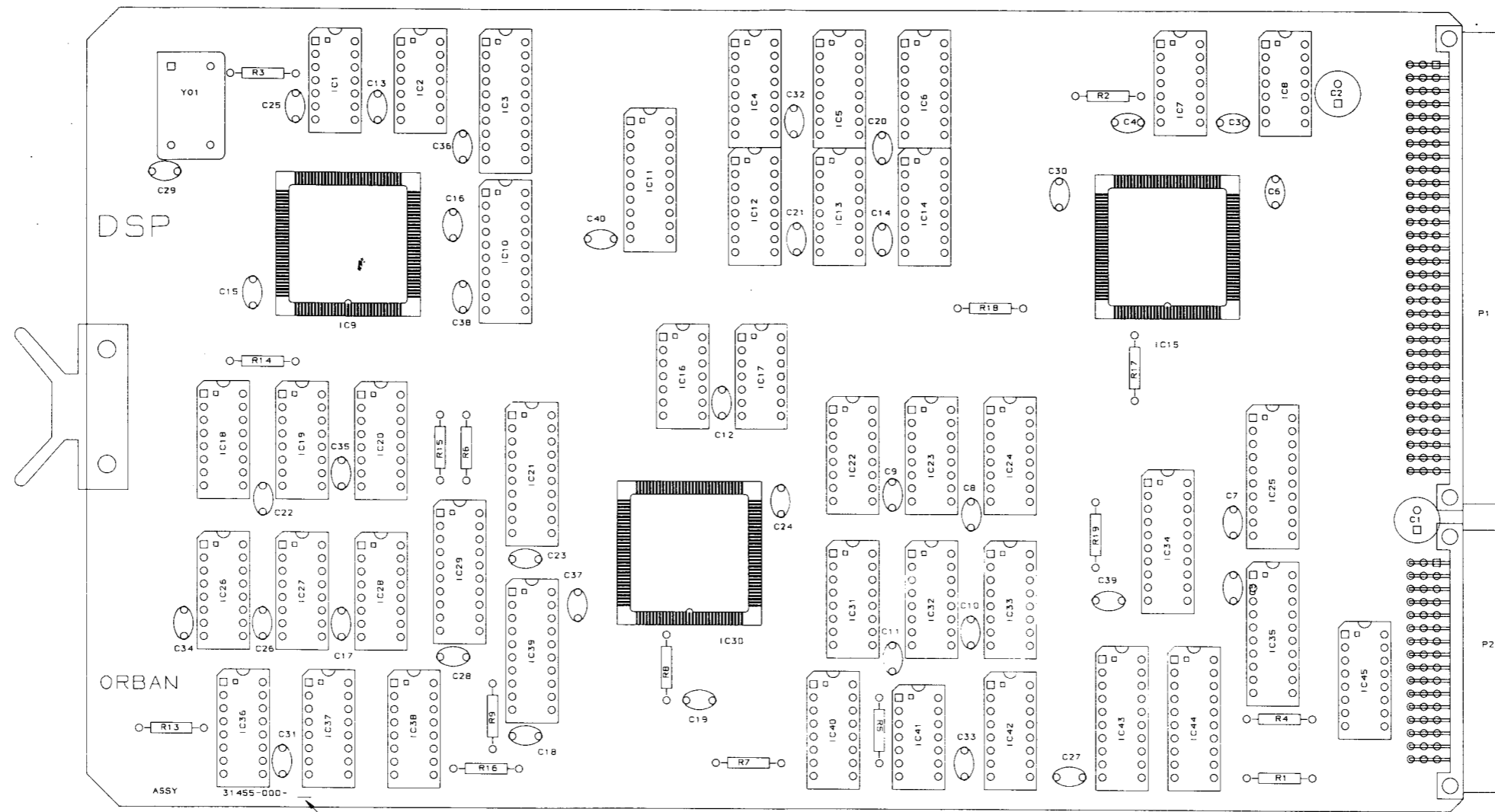
orban [®]	
TITLE: PCB ASSEMBLY Control Card 31450-000-04	



urban
 TITLE: SCHEMATIC
 Control Card
 61082-000-03, 1 of 2



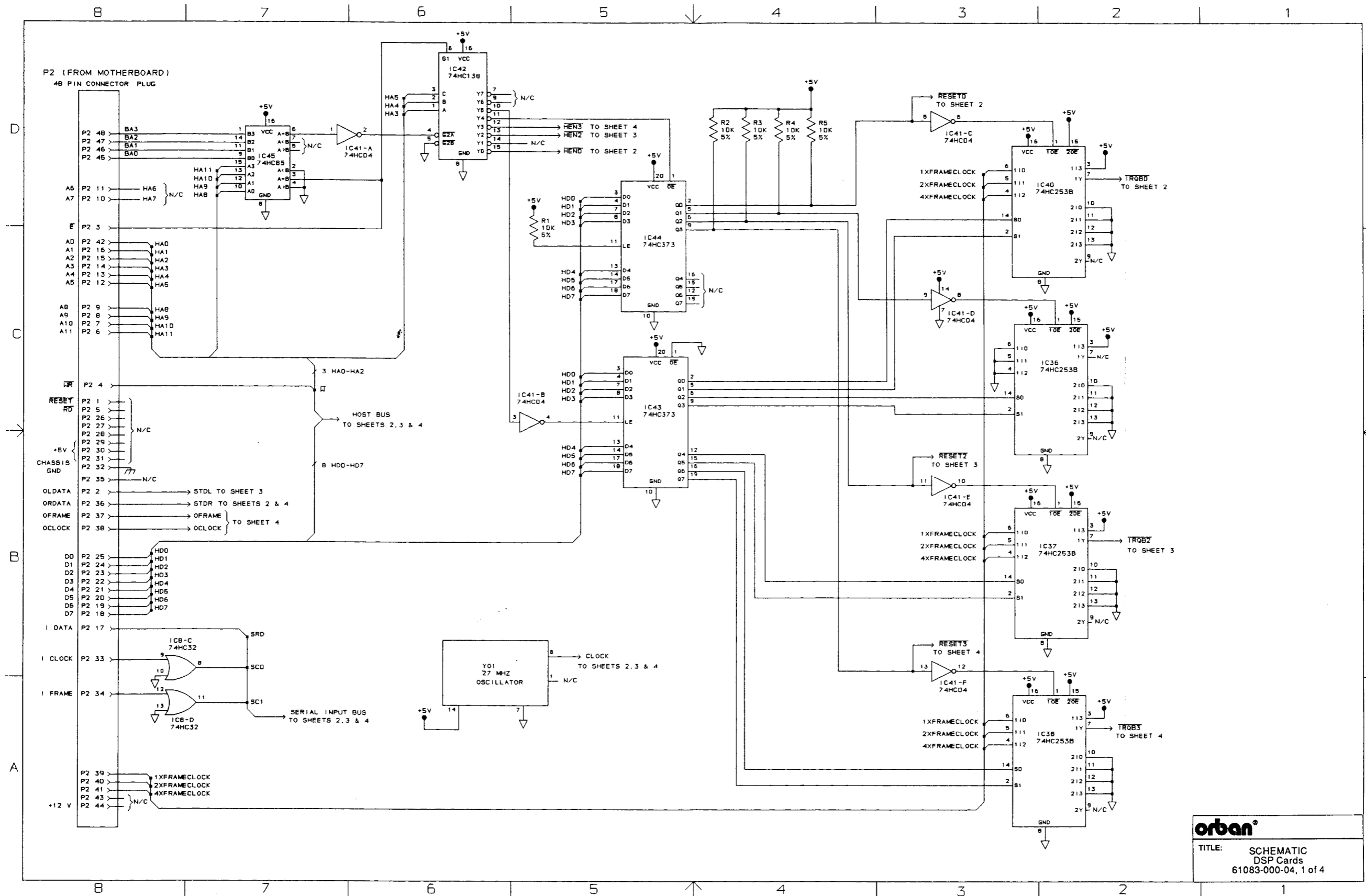
orban
 TITLE: SCHEMATIC
 Control Card
 61082-000-03, 2 of 2



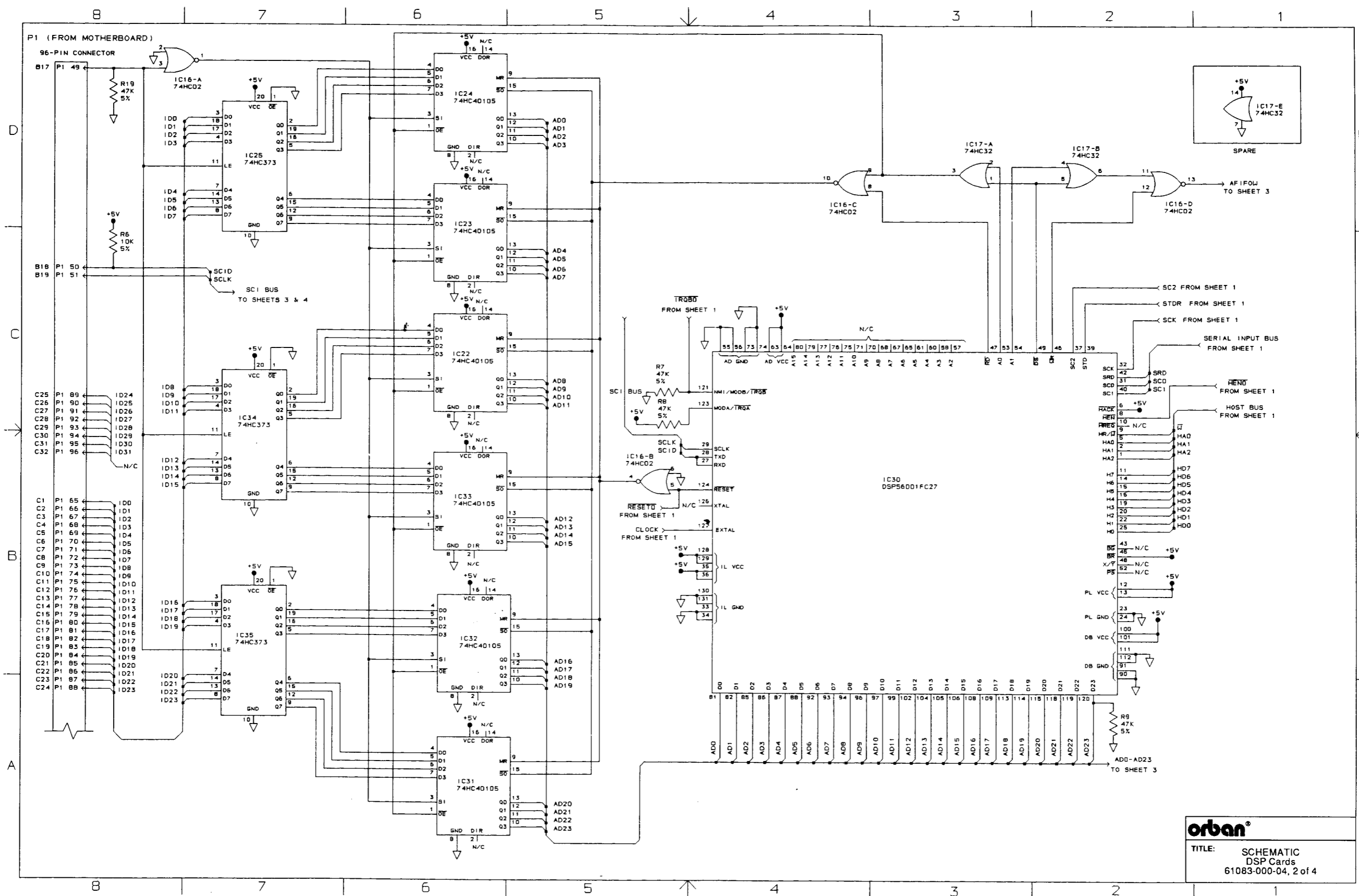
COMPONENT SIDE

3. MARK ASSEMBLY REVISION LEVEL IN SPACE PROVIDED
2. REFERENCE SCHEMATIC DRAWING NO. 610B3-000
1. SQUARE PADS INDICATE PIN 1 OF CONNECTORS, CATHODE OF DIODES POS. SIDE OF CAPS., PIN 1 OF IC'S
- NOTES: (UNLESS OTHERWISE SPECIFIED)

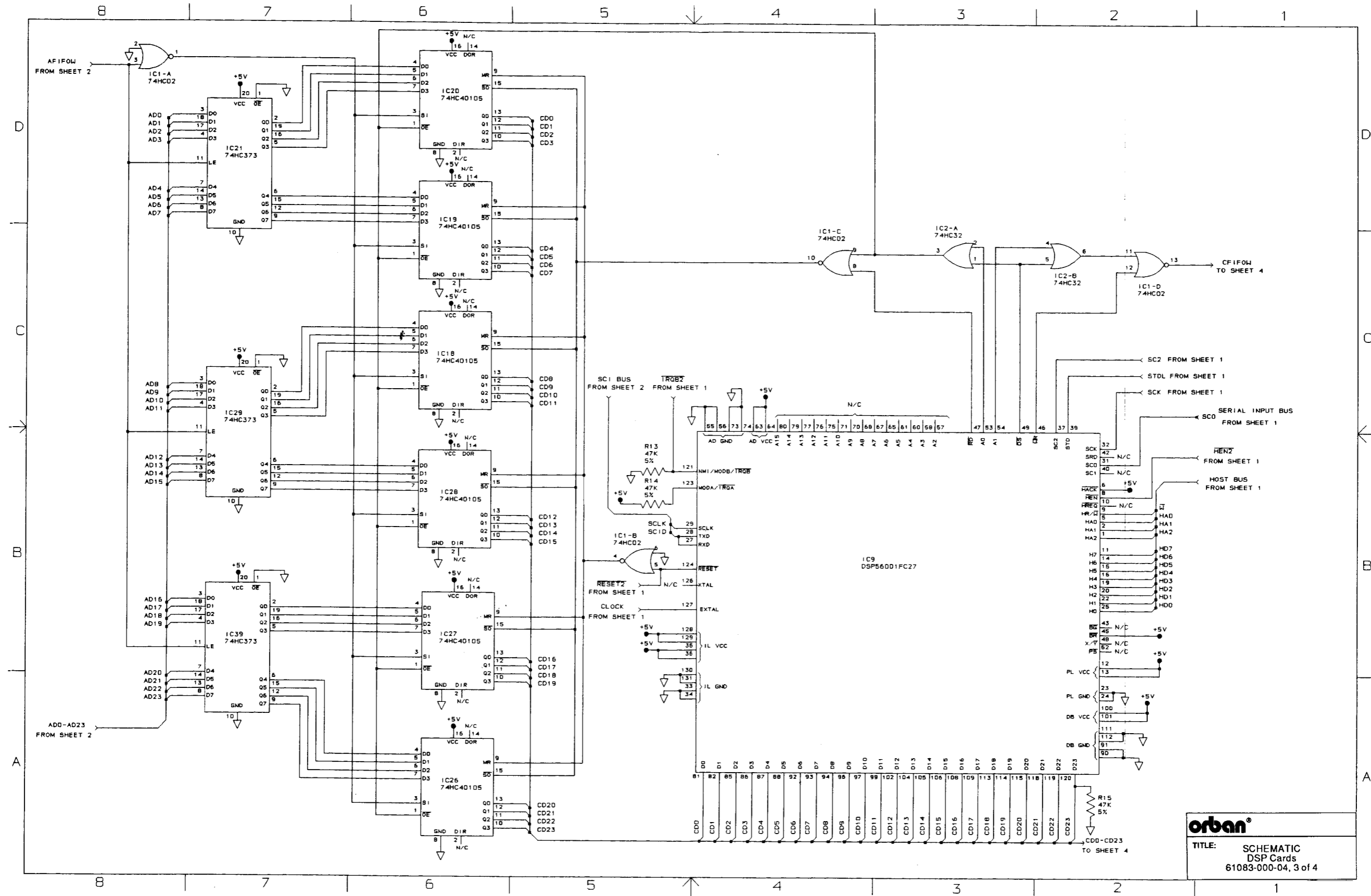
orban	
TITLE: PCB ASSEMBLY DSP Cards 31455-000-03	



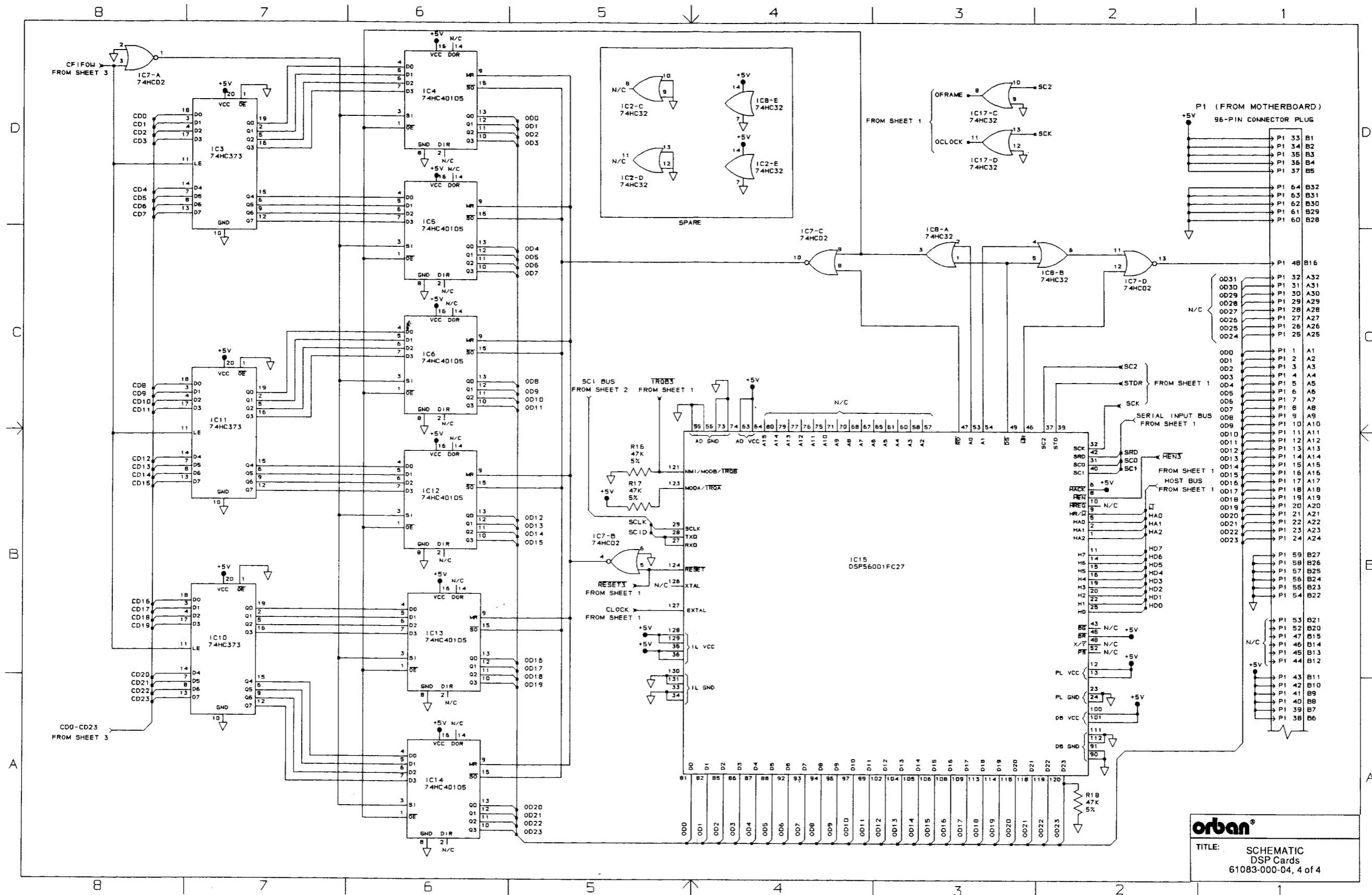
orban
 TITLE: SCHEMATIC
 DSP Cards
 61083-000-04, 1 of 4



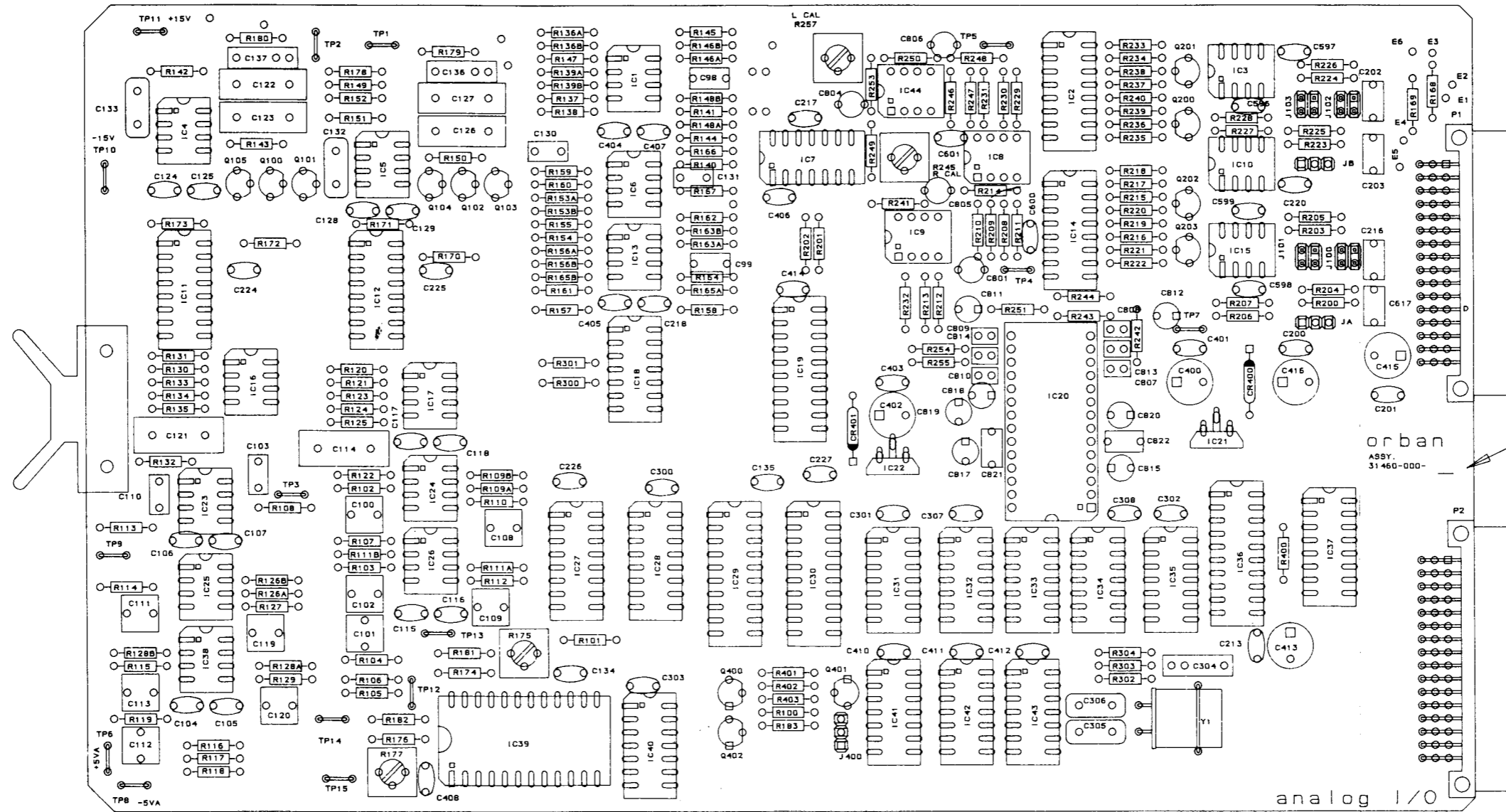
orban
TITLE: SCHEMATIC
DSP Cards
61083-000-04, 2 of 4



orban®
 TITLE: SCHEMATIC
 DSP Cards
 61083-000-04, 3 of 4



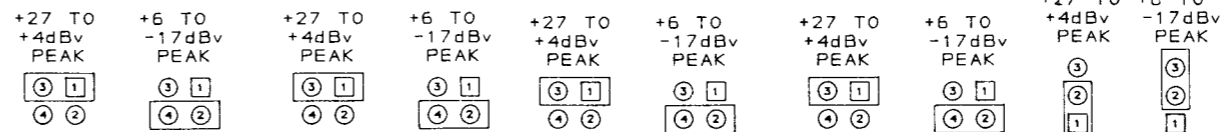
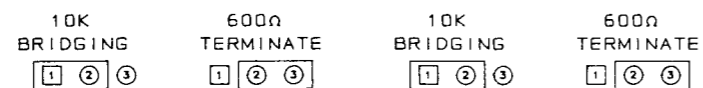
urban
TITLE: SCHEMATIC
DSP Cards
61083-000-04, 4 of 4



COMPONENT SIDE

- 3 MARK ASSEMBLY REVISION LEVEL IN SPACE PROVIDED
2. REFERENCE SCHEMATIC NUMBER 61084-000
1. SQUARE PADS INDICATE PIN 1 OF CONNECTORS, CATHODE OF DIODE, POS SIDE OF CAPACITORS, PIN 1 OF ICs

NOTES: (UNLESS OTHERWISE SPECIFIED)



— J A —

— J B —

— J 101 —

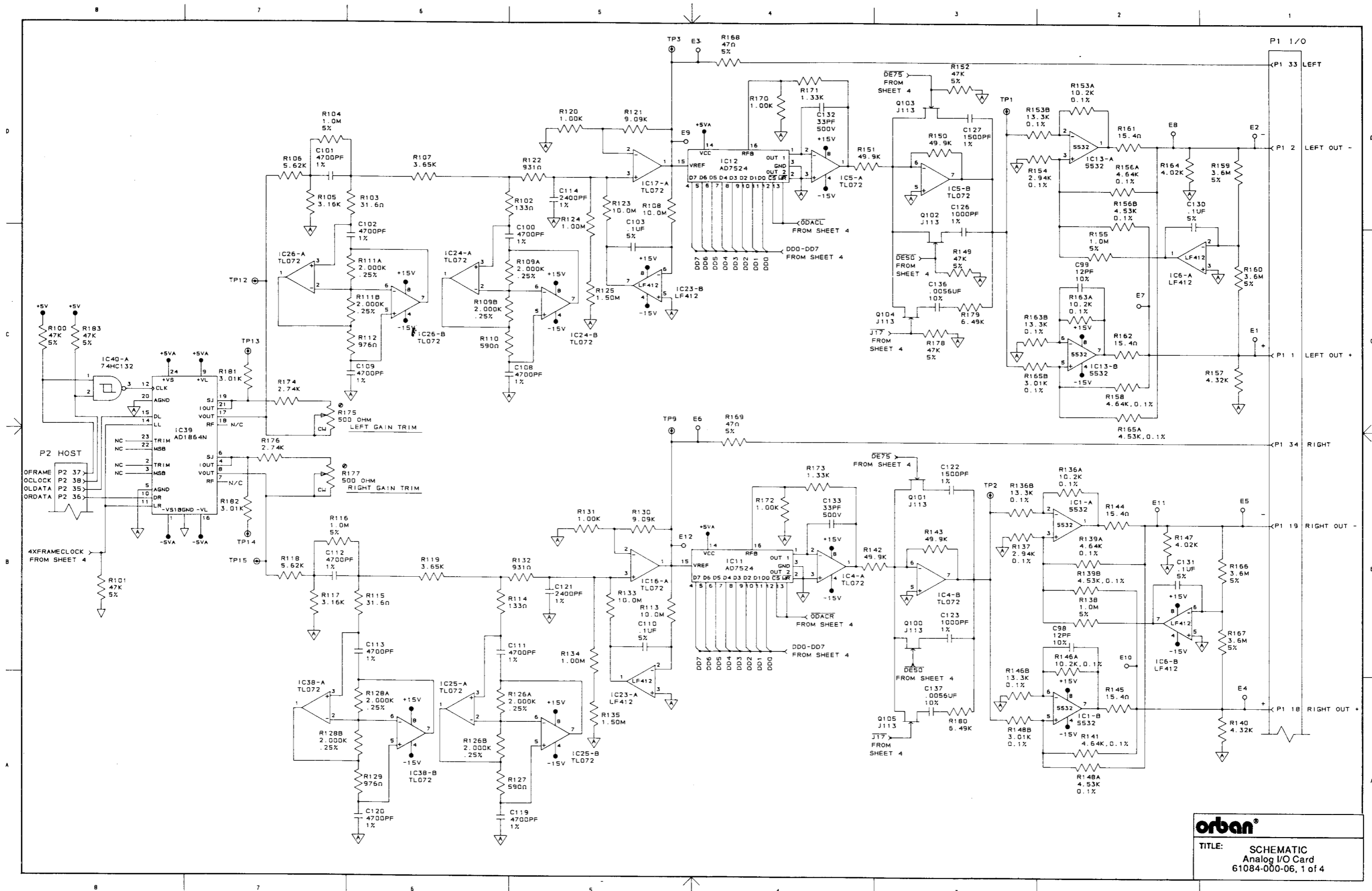
— J 100 —

— J 103 —

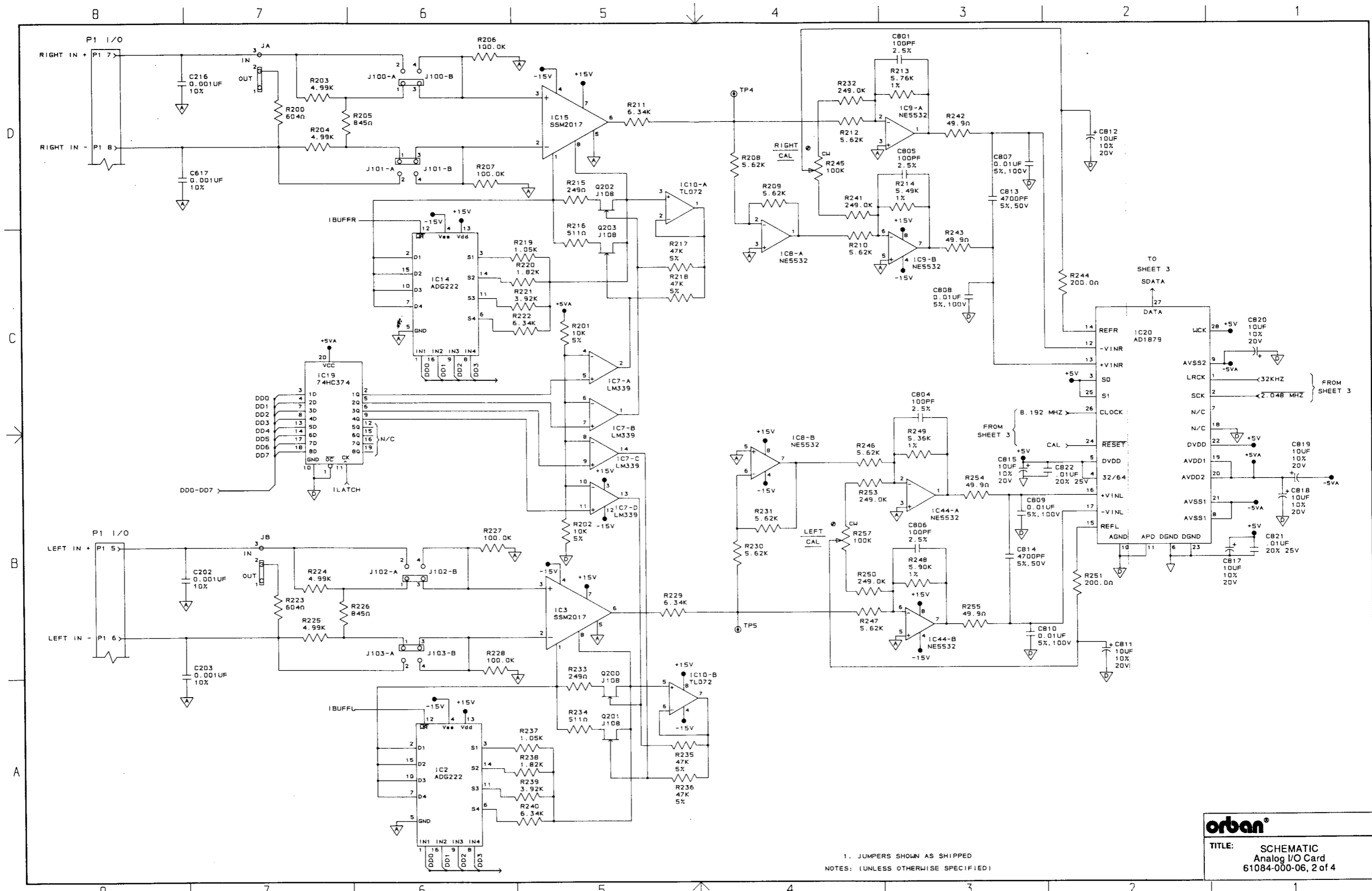
— J 102 —

— J 400 —

orban
 TITLE: PCB ASSEMBLY
 Analog I/O Card
 31460-000-07

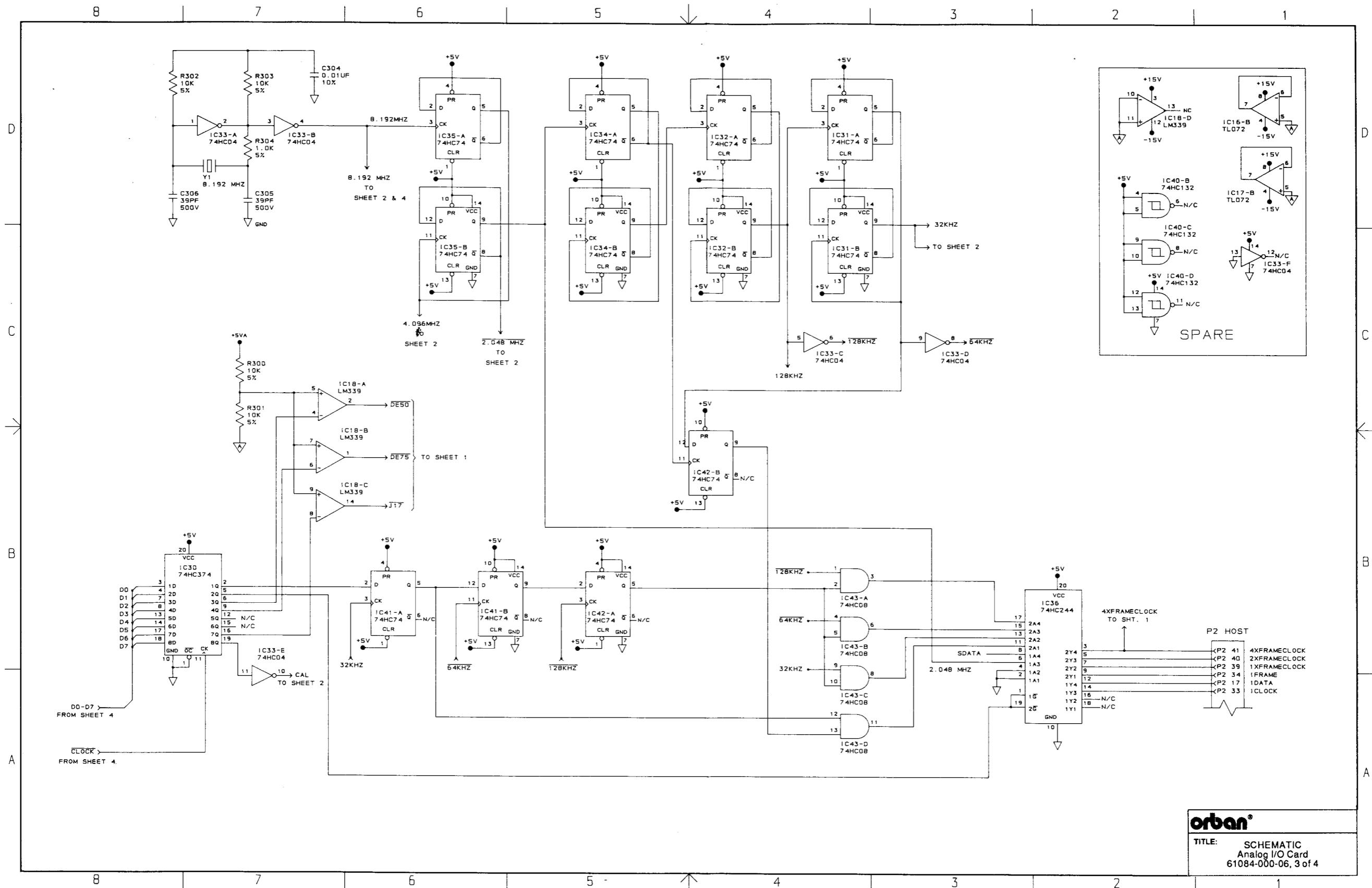


orban
TITLE: SCHEMATIC
Analog I/O Card
61084-000-06, 1 of 4

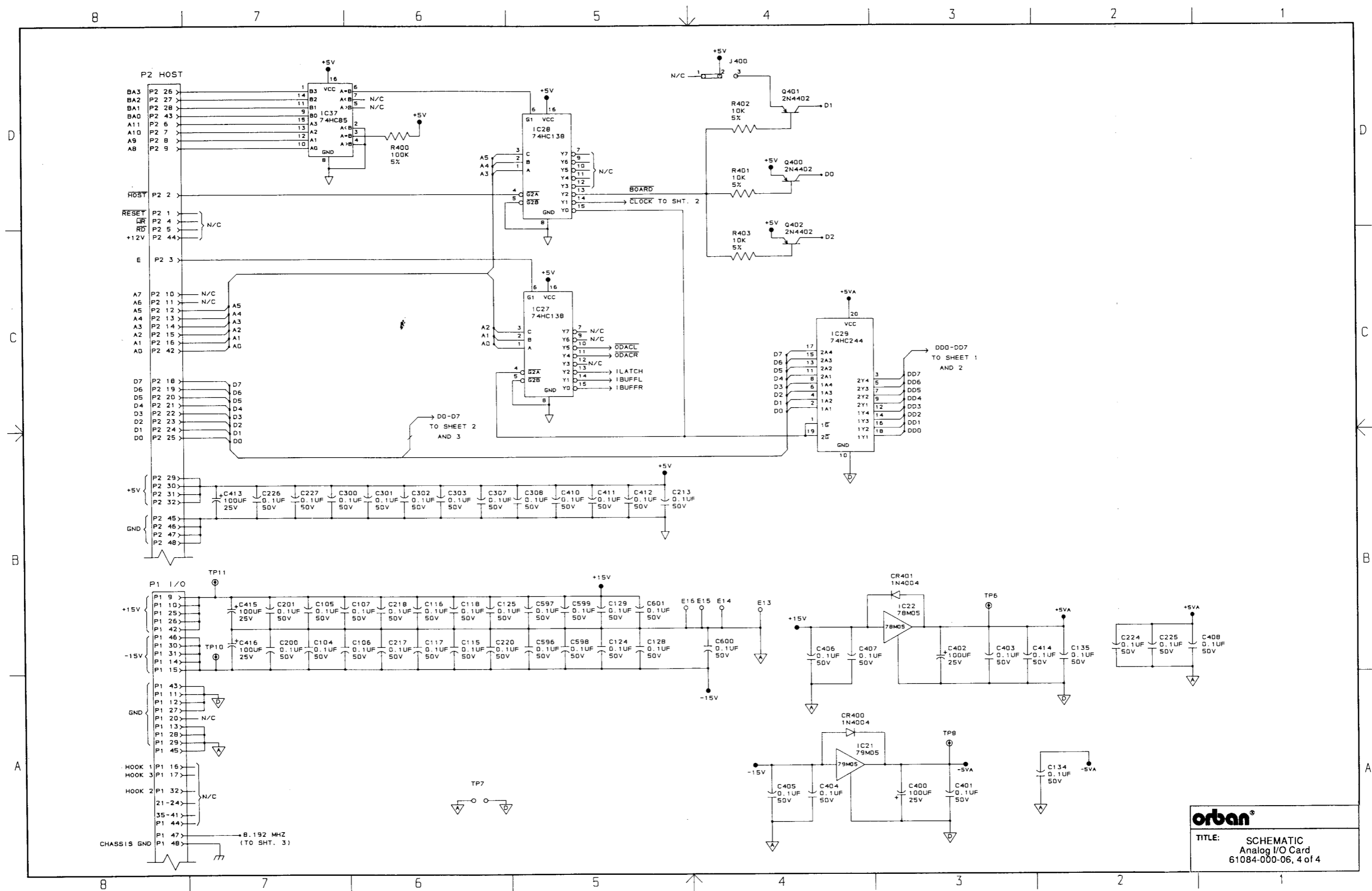


1. JUMPERS SHOWN AS SHIPPED
 NOTES: (UNLESS OTHERWISE SPECIFIED)

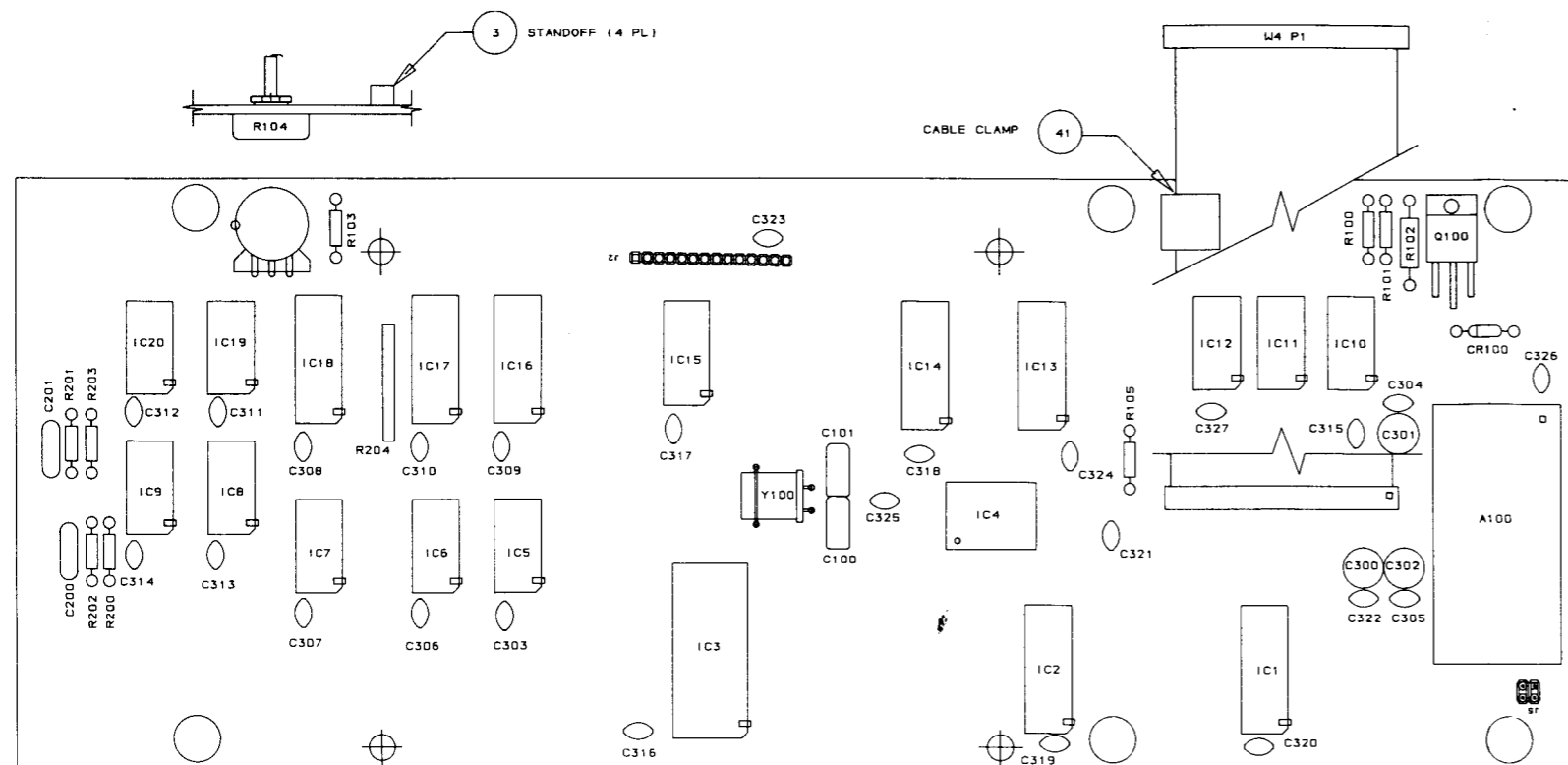
orban
 TITLE: SCHEMATIC
 Analog I/O Card
 61084-000-06, 2 of 4



orban
 TITLE: SCHEMATIC
 Analog I/O Card
 61084-000-06, 3 of 4



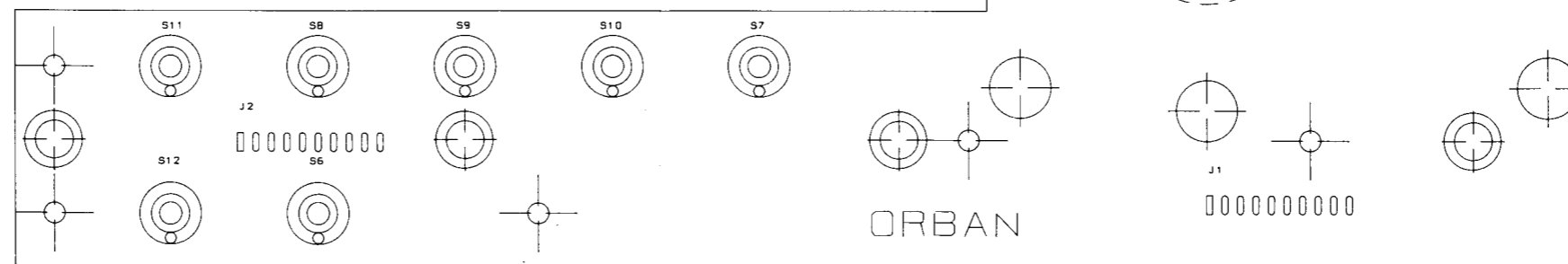
orban
 TITLE: SCHEMATIC
 Analog I/O Card
 61084-000-06, 4 of 4



6. DO NOT INSTALL IC SOCKETS
5. IC4 IS A SURFACE MOUNTED COMPONENT
4. J2 AND J5 TO BE MOUNTED ON THE BACKSIDE OF BOARD
3. MARK ASSEMBLY REVISION LEVEL IN SPACE PROVIDED
2. REFERENCE SCHEMATIC DRAWING NO. 6108B
1. SQUARE PADS INDICATE PIN NO. 1 OF CONNECTORS, CATHODE OF DIODES, POS. SIDE OF CAPS. AND PIN NO. 1 OF IC'S

NOTES: (UNLESS OTHERWISE SPECIFIED)

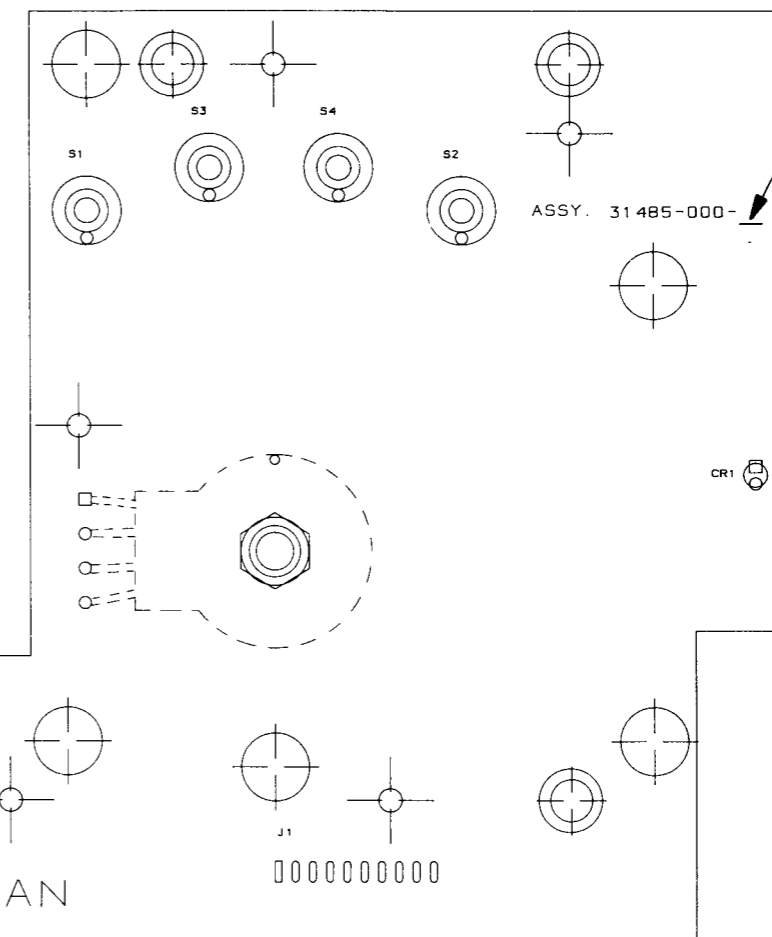
orban
 TITLE: PCB ASSEMBLY
 Display Board
 31480-000-04



4. INSTALL ANG #N 15061-024-01 BEFORE SOLDER FLOWING.
3. MARK ASSEMBLY REVISION LEVEL IN SPACE PROVIDED
2. REFERENCE SCHEMATIC DRAWING NO. 61089-000
1. SQUARE PADS INDICATE PIN 1 OF CONNECTORS, CATHODE OF DIODES, POS. SIDE OF CAPS., PIN 1 OF IC'S

NOTES: (UNLESS OTHERWISE SPECIFIED)

COMPONENT SIDE



KEYPAD

PCB

ASSY. 31485-000-

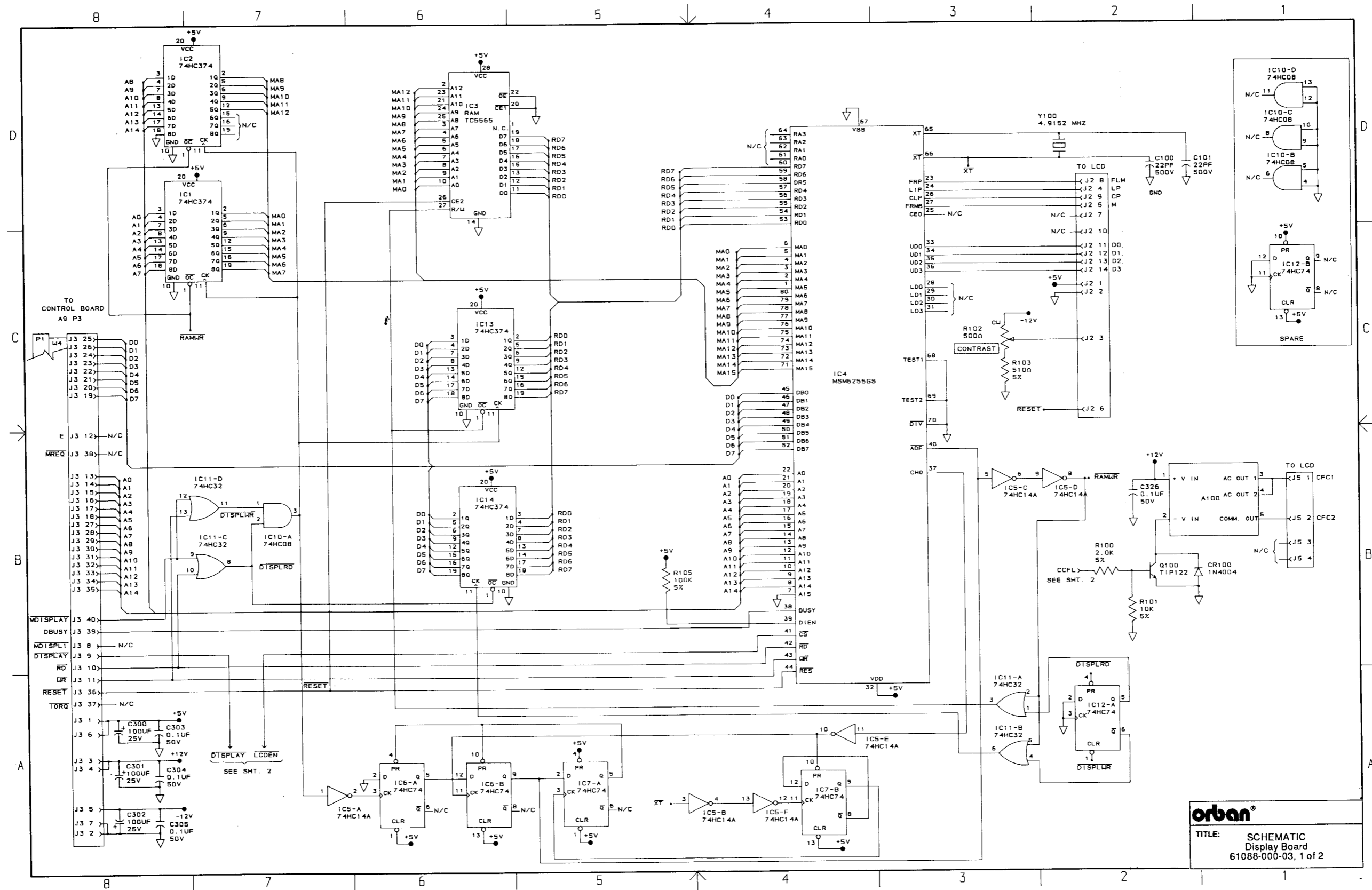
DOME SWITCH

SPACER

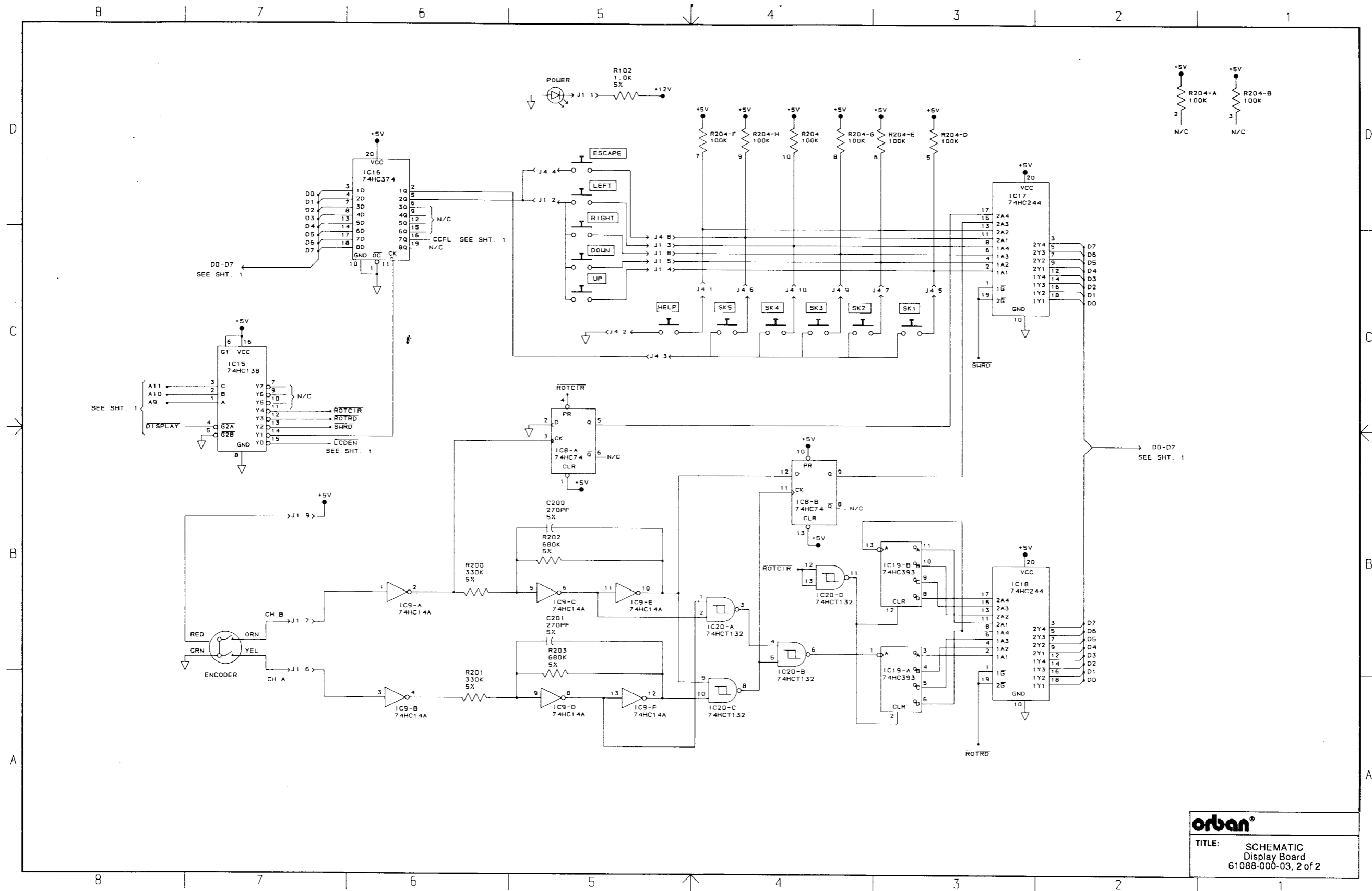
FLEX CABLE

SOLDER ON THIS SIDE OF BOARD

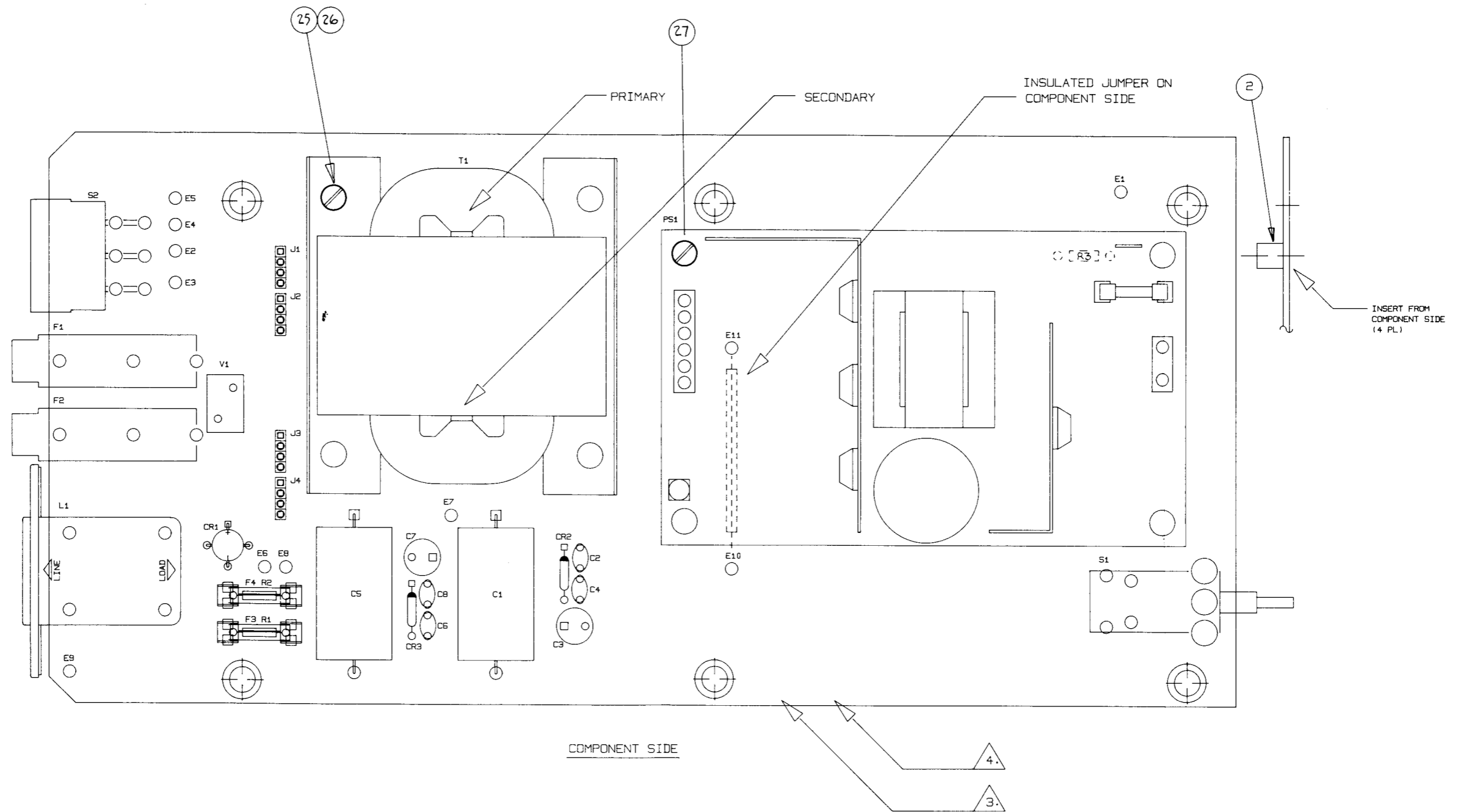
orban
 TITLE: PCB ASSEMBLY
 Switch Display Board
 31485-000-04



orban
TITLE: SCHEMATIC
Display Board
61088-000-03, 1 of 2



orban
 TITLE: SCHEMATIC
 Display Board
 61088-000-03, 2 of 2

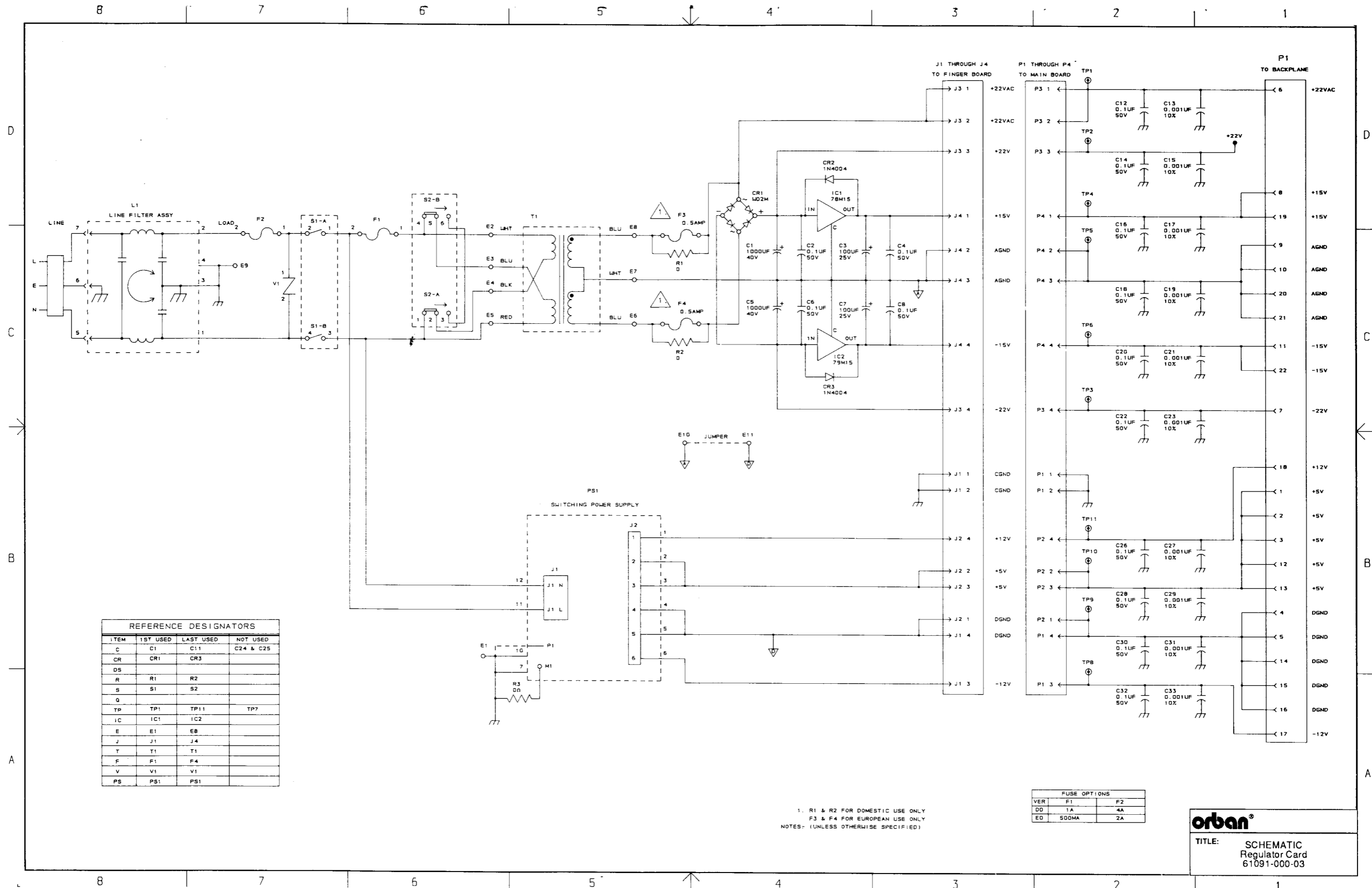


- 4. MARK VERSION NUMBER IN SPACE PROVIDED
 - 3. MARK ASSEMBLY REVISION LEVEL IN SPACE PROVIDED
 - 2. REFERENCE SCHEMATIC DRAWING NO. 61091
 - 1. SQUARE PADS INDICATE PIN 1 OF CONNECTORS, CATHODE OF DIODES.
 - POS. SIDE OF CAPS., PIN 1 OF ICS
- NOTES: (UNLESS OTHERWISE SPECIFIED)

VERSION	DESCRIPTION	USED	NOT USED
001	DOMESTIC	R1 & R2	F3 & F4
002	EUROPEAN	F3 & F4	R1 & R2

WIRE LIST	
FROM	TO
T1 RED	E5
T1 BLK	E4
T1 WHT	E2
T1 BLU	E3
T1 BLU (SEC)	E8
T1 WHT (SEC)	E7
T1 BLU (SEC)	E6

orban
 TITLE: PCB ASSEMBLY
 Regulator Card
 31495-000-03



REFERENCE DESIGNATORS

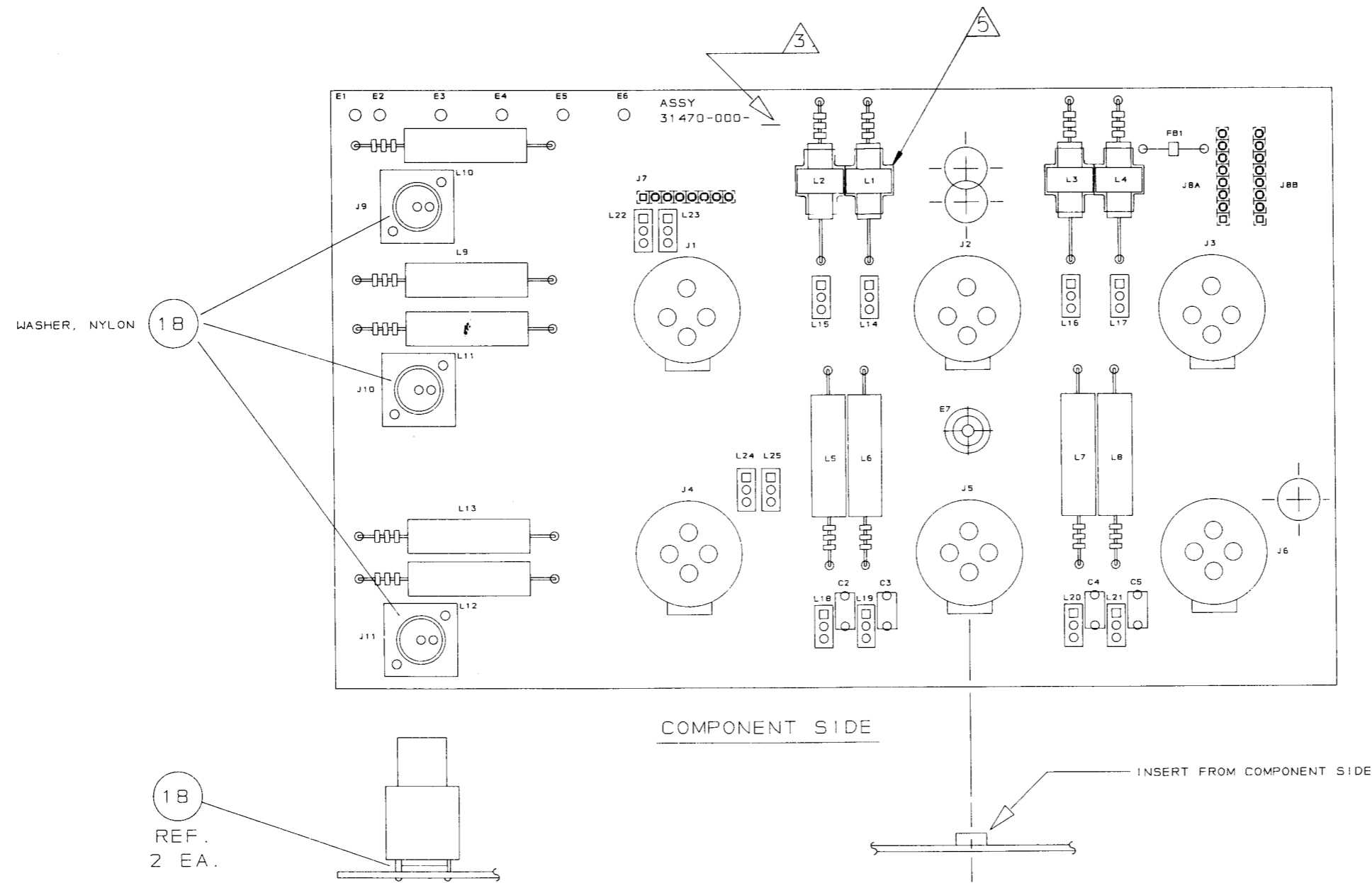
ITEM	1ST USED	LAST USED	NOT USED
C	C1	C11	C24 & C25
CR	CR1	CR3	
DS			
R	R1	R2	
S	S1	S2	
Q			
TP	TP1	TP11	TP7
IC	IC1	IC2	
E	E1	E8	
J	J1	J4	
T	T1	T1	
F	F1	F4	
V	V1	V1	
PS	PS1	PS1	

1. R1 & R2 FOR DOMESTIC USE ONLY
 F3 & F4 FOR EUROPEAN USE ONLY
 NOTES: (UNLESS OTHERWISE SPECIFIED)

FUSE OPTIONS

VER	F1	F2
DD	1A	4A
ED	500MA	2A

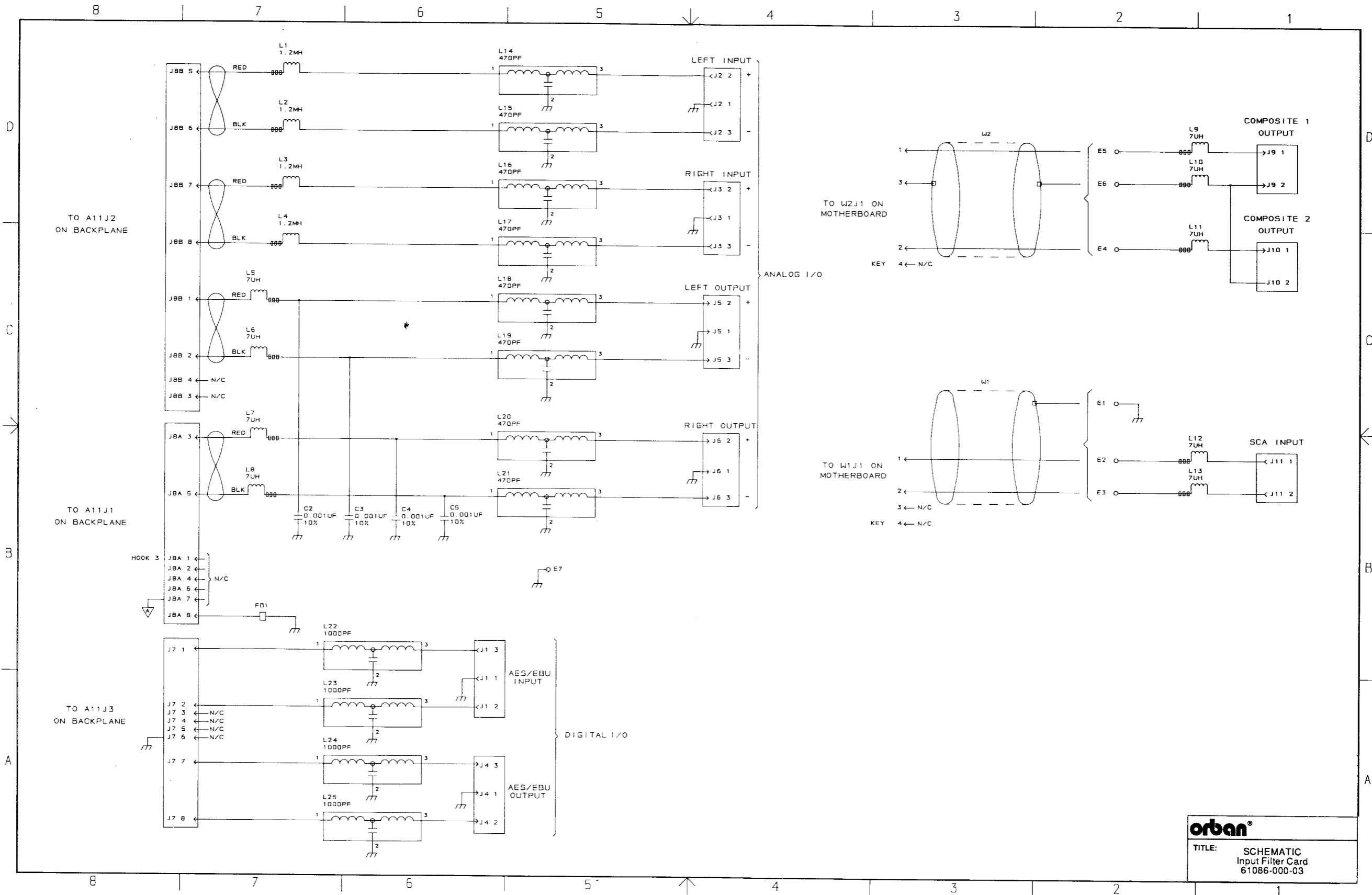
orban
 TITLE: SCHEMATIC
 Regulator Card
 61091-000-03



- 5. INSTALL 1/2" DIA. X 1" SHRINKTUBE TO L1, L2, L3, L4 BEFORE SOLDER FLOWING.
 - 4. J7, J8A & J8B TO BE MOUNTED FROM SOLDER SIDE OF BOARD
 - 3. MARK ASSEMBLY REVISION LEVEL IN SPACE PROVIDED
 - 2. REFERENCE SCHEMATIC DRAWING NO. 81086-000-03
 - 1. SQUARE PADS INDICATE PIN 1 OF CONNECTORS, CATHODE OF DIODES, POS. SIDE OF CAPS., PIN 1 OF ICs
- NOTES: (UNLESS OTHERWISE SPECIFIED)

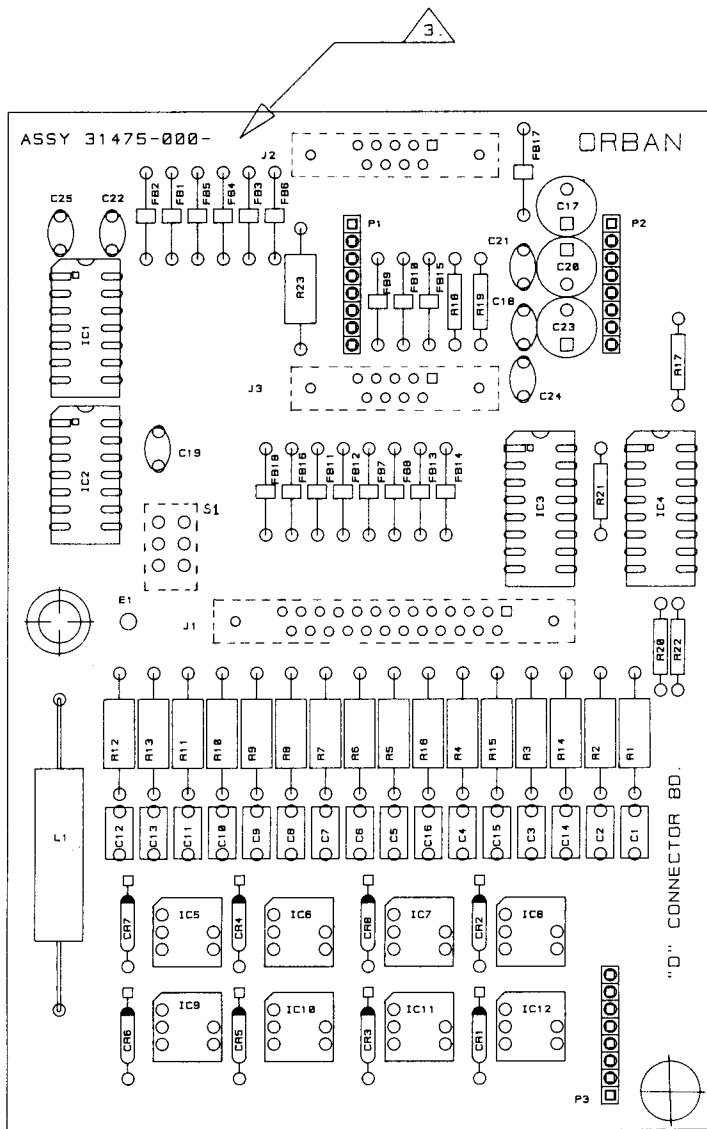
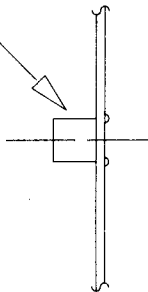
orban[®]

TITLE: PCB ASSEMBLY
Input Filter Card
31470-000-03



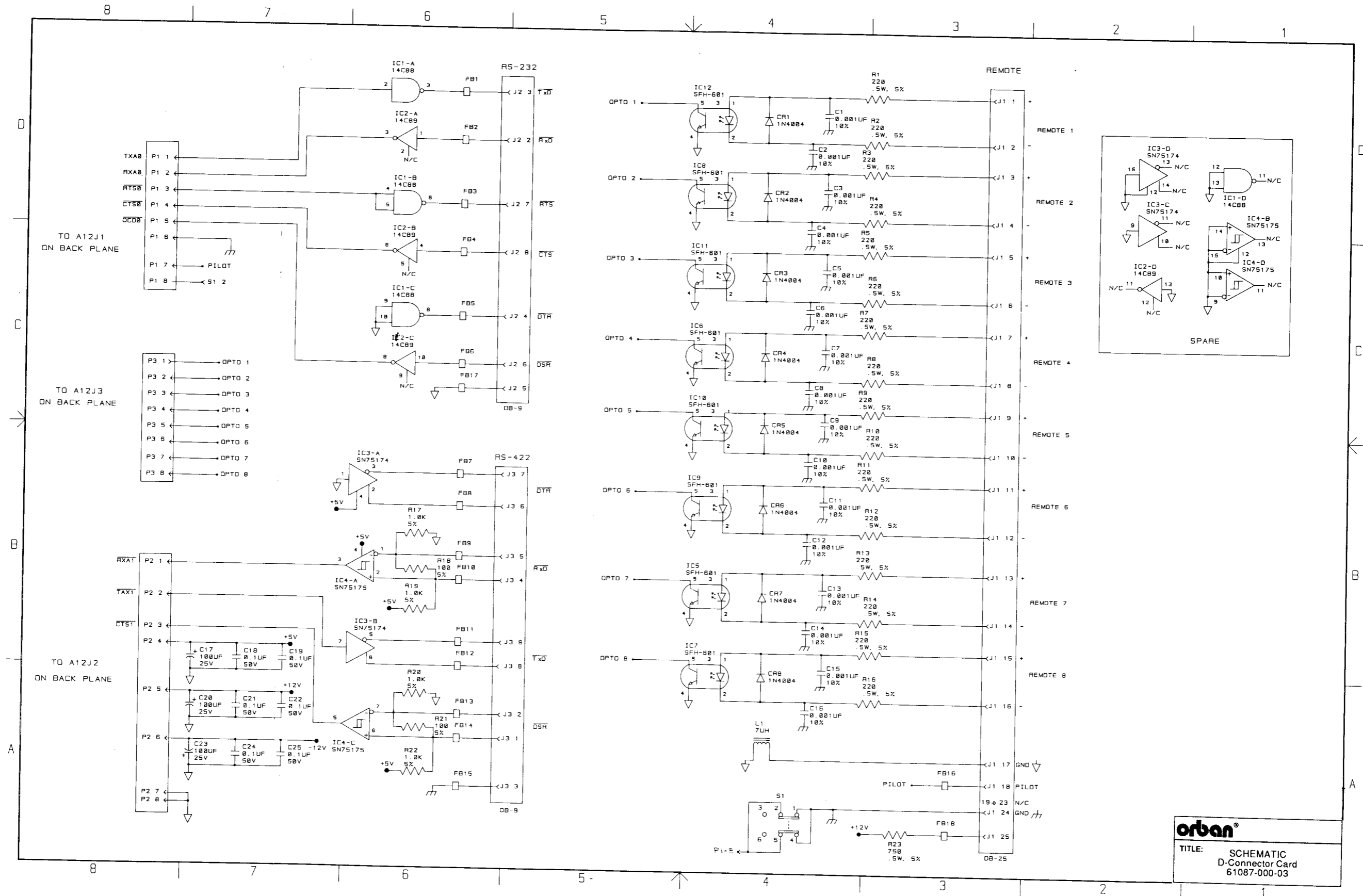
orban
 TITLE: SCHEMATIC
 Input Filter Card
 61086-000-03

INSERT FROM SOLDER SIDE



COMPONENT SIDE

orban®	
TITLE: PCB ASSEMBLY D-Connector Card 31475-000-02	



orban
 TITLE: SCHEMATIC
 D-Connector Card
 61087-000-03

Abbreviations

Some of the abbreviations used in this manual may not be familiar to all readers:

A/D (or A to D)	analog-to-digital converter
AES	Audio Engineering Society
AGC	automatic gain control
A-I	analog input
A-O	analog output
AT	"advanced technology" — IBM PC with 80286 or higher processor
BAL	balance
BBC	British Broadcasting Corporation
BNC	a type of RF connector
CALIB	calibrate
CIT	composite isolation transformer
CMOS	complementary metal-oxide semiconductor
COM	serial data communications port
DA (or D to A)	digital-to-analog converter
dBm	decibel power measurement. 0dBm = 1mW applied to a specified load. In audio, the load is usually 600Ω.
dBu	decibel voltage measurement. 0dBu = 0.775V RMS. For this application, the dBm-into-600Ω scale on voltmeters can be read as if it were calibrated in dBu.
DI	digital input
DJ	disk jockey, an announcer who plays records in a club or on the air
DO	digital output
DOS	Microsoft disk operating system for IBM PC
DSP	digital signal processor
EBU	European Broadcasting Union
EBS	Emergency Broadcasting System (U.S.A.)
EMI	electromagnetic interference
ESC	escape
FCC	Federal Communications Commission (USA regulatory agency)
FDNR	frequency-dependent negative resistor — an element used in rc-active filters
FET	field effect transistor
FFT	fast Fourier transform
FIFO	first-in, first-out
G/R	gain reduction
HF	high-frequency

HP	high-pass
IC	integrated circuit
IM	intermodulation (or "intermodulation distortion")
I/O	input/output
JFET	junction field effect transistor
LC	inductor/capacitor
LCD	liquid crystal display
LED	light-emitting diode
LF	low-frequency
LP	low-pass
LVL	level
MHF	midrange/high-frequency
MLF	midrange/low-frequency
MOD	modulation
N&D	noise and distortion
N/C	no connection
OSHOOT	overshoot
PC	IBM-compatible personal computer
PCM	pulse code modulation
PPM	peak program meter
RAM	random-access memory
RC	resistor/capacitor
REF	reference
RF	radio frequency
RFI	radio-frequency interference
RMS	root-mean-square
ROM	read-only memory
SC	subcarrier
SCA	subsidiary communications authorization — a non program-related subcarrier in the aural baseband above 20kHz (monophonic) or 53kHz (stereophonic)
S/P-DIF	Sony/Philips digital interface
TRS	tip-ring-sleeve (2-circuit phone jack)
THD	total harmonic distortion
TX	transmitter
μ s	microseconds
VCA	voltage-controlled amplifier
VU	volume unit (meter)
XLR	a common style of 3-conductor audio connector
XTAL	crystal

Warranty

United States Warranty

Limited Warranty

Valid only in the United States. We warrant Orban products against defects in material or workmanship for a period of one year from the date of original purchase for use, and agree to repair or, at our option, replace any defective item without charge for either parts or labor.

IMPORTANT: This warranty does not cover damage resulting from accident, misuse or abuse, lack of reasonable care, the affixing of any attachment not provided with the product, loss of parts, or connecting the product to any but the specified receptacles. This warranty is void unless service or repairs are performed by an authorized service center. No responsibility is assumed for any special, incidental or consequential damages. However, the limitation of any right or remedy shall not be effective where such is prohibited or restricted by law.

Simply take or ship your Orban product prepaid to our service department. Be sure to include your sales slip as proof of purchase date. (We will not repair transit damage under the no-charge terms of this warranty). Orban will pay return shipping.

NOTE: No other warranty, written or oral is authorized for Orban products.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. Some states do not allow the exclusion of limitations of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above exclusion and limitations may not apply to you.

International Warranty

Bedingungen

Orban gewährt 1 Jahr Garantie ab Verkaufsdatum auf nachweisbare Material- und Fabrikationsfehler. Der Garantieanspruch erlischt bei unsachgemäßer Handhabung, elektrischer oder mechanischer Beschädigung durch mißbräuchliche Anwendung sowie bei unsachgemäßer Reparatur durch nichtautorisierte Werkstätten. Voraussetzung für die Garantieleistung ist die Vorlage der ordnungsgemäß durch den Fachhändler ausgefüllten Garantiekarte sowie der Kaufrechnung. Transport- und Portospesen, welche aus der Einsendung des Gerätes zur Garantiereparatur erwachsen, können von Orban nicht übernommen werden, das Risiko der Zusendung trägt der Kunde. Die Garantie wird ausschließlich für den ursprünglichen Käufer geleistet.

Warranty Conditions

Orban warrants Orban products against evident defects in material and workmanship for a period of one year from the date of original purchase for use. This warranty does not cover damage resulting from misuse or abuse, or lack of reasonable care, and inadequate repairs performed by unauthorized service centers. Performance of repairs or replacements under this warranty is subject to submission of this Warranty/Registration Card, completed and signed by the dealer on the day of purchase, and the sales slip. Shipment of the defective item for repair under this warranty will be at the customer's own risk and expense. This warranty is valid for the original purchaser only.

Conditions de garantie

Pour toute mise en œuvre de garantie ou de service après-vente, vous devez vous adresser à votre revendeur. Notre société assure au revendeur le remplacement gratuit des pièces détachées nécessaires à la réparation pendant un an, à partir de la date de votre facture, sauf en cas de non respect des prescriptions d'utilisation ou lorsqu' une cause étrangère à l'appareil est responsable de la défaillance. Les dispositions stipulées ci-dessus ne sont pas exclusives du bénéfice au profit de l'acheteur de la garantie légale pour défaut et vice cachés qui s'applique, en tout état de cause, dans les conditions des articles 1641 et suivants du Code Civil.

Condizioni di garanzia

L'Orban presta garanzia per un anno dalla data della vendita per difetti di materiale e fabbricazione che possono essere provati. Il diritto di garanzia cessa in caso di manipolazione impropria, danneggiamento elettrico o meccanico attraverso l'uso non appropriato e riparazione inesperta eseguita da officine non autorizzate. E' indispensabile, per la prestazione della garanzia, presentare la carta di garanzia debitamente riempita dal rivenditore autorizzato e la fattura di vendita. Spese di trasporto che risultano dall'invio dell'impianto per la riparazione in garanzia, non possono essere assunte dall'Orban l'invio è a rischio e pericolo del cliente. La garanzia verrà data solo al primo acquirente.

Condiciones de garantía

Orban concede 1 año de garantía por defectos comprobables de material o de fabricación a partir de la fecha de venta. El derecho de garantía caduca en caso de procederse a una manipulación inadecuada en caso de producirse daño eléctrico o mecánico por uso indebido, así como también en caso de reparaciones inadecuadas por parte de talleres no autorizados. La prestación de la garantía está sujeta a la presentación de la Tarjeta de Garantía rellena correctamente por el vendedor autorizado, y de la factura de compra. Orban no asume ningún gasto de transporte o correo incurrido por el envío del aparato defectuoso para la reparación bajo garantía; el riesgo del envío ha de ser asumido por el cliente. La garantía se concede única y exclusivamente al comprador original.