

APPENDIX A: Guide For The Master Control Operator

THE ORBAN MODEL 275A AUTOMATIC STEREO SYNTHESIZER

1. BUTTONS AND INDICATORS

Red ACTIVE lamps indicate the current status of the synthesizer, and that a function is being performed. Yellow STANDBY lamps indicate the next event when the unit is released from an automation system by cessation of automation activity, or by operating the AUTOMATION LOCKOUT button. The yellow lamps won't light unless external automation is controlling the 275A.

Buttons may be freely operated without danger of clicks, pops, or discontinuities, except for the NARROW/WIDE and NOISE REDUCTION ON/OFF buttons. (See comments below on how to operate these buttons without causing disturbances to the audio.)

Buttons are flush with the panel to prevent inadvertent operation. They can be more easily pressed with a pencil eraser.

2. BASIC MODE SWITCHING

The Orban 275A Stereo Synthesizer monitors the audio feed, comparing the two channels. In Auto mode, when it thinks that the audio is mono, it automatically synthesizes a convincing stereo effect from its left or right input. When it thinks that the audio is stereo, it passes the audio through without processing (Bypass mode). Transitions between the modes are smooth cross-fades. The red ACTIVE lamps indicate the current basic mode: SYNTH FROM L, SYNTH FROM R, BYPASS, or AUTO.

When the unit is in Auto mode, it won't guess right all the time. But its errors will always be "polite". To avoid the possibility of the unit's guessing wrong, it is best if the unit is manually controlled when possible, particularly during stereo programs. A program known to be in stereo should be run in Bypass mode (without synthesis).

A mono program can be synthesized to stereo from either the left or right input channel. To cause the 275A to choose between Bypass (true stereo) and Synthesize modes according to its own analysis of the program material, activate its Auto mode by pressing the front-panel AUTO button.

To go to manual mode, press SYNTH FROM L, SYNTH FROM R, or BYPASS.

If a stereo program is known to contain mono spots, switching to AUTO shortly before a spot will assure that the 275A's mode is changed at the proper time without further attention.

3. WIDE/NARROW

When the unit is synthesizing stereo from mono, you can choose a WIDE dramatic stereo effect, which is best on music, or a NARROW effect, which keeps dialog centered while still providing an impressive effect on music. These functions are not switched automatically. If manual switching is not practical, NARROW is the best "all-purpose" choice.

To avoid audible effects, it is best to switch between WIDE and NARROW during silence, or when the unit is in Bypass mode.

4. AUTO POLARITY

The channels of a true stereo feed must remain in-phase with each other at all times to avoid cancellations which would otherwise severely damage the quality of mono reception. It is not uncommon to experience occasional polarity reversals in program sources or from patching errors.

The AUTO POLARITY circuit monitors the polarity and corrects it (by reversing the polarity of the right channel) if necessary. The INVERTED lamp indicates when incorrect input polarity is being corrected.

AUTO-POLARITY is typically left ON. However, some program material (particularly material with "surround" information, like Dolby^R stereo movies) may have short sections containing out-of-phase information. It may be wise to manually defeat the circuit when such material is broadcast, or if errors in the Auto Polarity function are observed.

5. NOISE REDUCTION

The NOISE REDUCTION feature applies single-ended dynamic noise reduction to the synthesized signal only (it does nothing in Bypass mode). The Noise Reduction is particularly useful for films with optical soundtracks and other noisy mono feeds.

The EXPANSION lamp indicates when the circuit is decreasing gain to reduce noise.

Noise Reduction is normally left in OPERATE. Sometimes, when the unit is operating in Auto mode, transitions between true and synthesized stereo can be made less noticeable by DEFEATING the Noise Reduction.

Switching the Noise Reduction to OPERATE or DEFEAT while in Synth mode will be least noticeable if done during program material which is loud and which has substantial high frequency content. Switching will be most audible if done during silence.

6. AUTOMATION LOCKOUT

When the Synthesizer is normally controlled from a sequencer or automation system and errors occur, you can override the SYNTH FROM L, SYNTH FROM R, BYPASS, and AUTO external commands by pressing the AUTOMATION LOCKOUT button. Then press the button corresponding to the mode you wish to use (AUTO may be a good choice).

If you do not press a button after pressing AUTOMATION LOCKOUT, the 275A will immediately enter the Standby mode as indicated by a yellow lamp (if one is lit; if none are lit, the mode will not change).

To cancel AUTOMATION LOCKOUT, press the button again.

NOTE: Auto mode has nothing to do with "AUTOMATION LOCKOUT", which refers only to external control inputs.

APPENDIX B:

Internal

User-Adjustable Trims

There are two internal trimpots which a) set the mono/stereo switching threshold of the Recognition circuit, and b) set the relative level balance between Synthesize and Bypass modes. These are pre-adjusted at the factory to be optimum for most plants and applications. However, your needs may be different.

CAUTION! The factory-adjusted settings have been determined by a long and painstaking process of design and experimentation. Be advised that finding settings that will work better for your application may take considerable time and effort.

To access these trimmers, remove the top cover of 275A. Both trimmers are on the top side of the main circuit board. To locate them, refer to the **Assembly Drawing in Appendix E.**

a. Mono/Stereo Switching Threshold Trim: If the 275A is failing to automatically recognize two-channel mono material when the channels are nearly identical, it is possible that your plant uses equipment which produces enough interchannel phase error and/or channel imbalance to confuse the circuit into thinking that such mono material is true stereo. If this problem arises, turn R263 (Mono Threshold, marked "MT" on the board) counterclockwise until satisfactory recognition is achieved. (Unfortunately, such an adjustment will increase the number of cases in which the circuit mistakes true stereo for mono and incorrectly activates the synthesizer -- an inevitable tradeoff.) If satisfactory recognition cannot be achieved even with R263 end-stopped, then your equipment probably has sufficient interchannel phase error to audibly degrade the mono sum due to phase cancellations. If careful alignment of the equipment does not solve the problem, we suggest use of an "audio timebase corrector" such as those currently (1986) manufactured by Harris Corp. or Howe Audio.

Conversely, if your plant has outstandingly good interchannel phase performance, it may be possible to turn R263 clockwise to reduce the incidence of false triggering of the stereo synthesizer circuit on true stereo material. Be careful: material which originates outside your plant may not meet the necessary standards of accuracy.

b. Bypass/Synthesize Gain Balance Trim: Adjustment of the front-panel SEPARATION control affects the relative loudness between true and synthesized stereo in a complex way which is fully discussed in **Section 3.** If you find that the loudness balance when switching between true and synthesized stereo is unsatisfactory for your typical program material and/or SEPARATION control setting, this balance can be readjusted by means of R134 (Gain Trim). R134 affects the gain of the synthesized signal only, which is increased by turning R134 clockwise.

To avoid being fooled by atypical listening environments, be sure to listen on typical home receivers in both stereo and mono before deciding to change this adjustment.

APPENDIX C: Installation Of Model 275A/RC Remote-Control Panel

1. INTRODUCTION The 275A/RC Remote Control Panel duplicates all front-panel features of the host unit (except the SEPARATION control) at a remote location within any reasonable distance. This unit should be convenient if duplicate controls are desired.

The Remote Control Panel is housed in a 1 3/4" (1 rack unit) panel nearly identical to the host, but requires only 2 1/4" behind the panel if you use the connector supplied. It connects to the host via a user-supplied 19-pair unshielded cable terminated at both ends with DC-37 connectors. (Connectors and backshells are supplied with the Remote Control Panel.)

2. THE CONNECTOR The two backshells each have a right-angle cable exit. This prevents use of jackscrews on the chassis to hold the connector in place. However, the extraction force of a 37-pin connector is ample to prevent accidental disconnection in most cases.

Other backshells may be chosen which can use 4-40 x 5/16" hex jackscrews. The Remote Control Panel has captive nuts behind the mounting screws, making disassembly unnecessary to install jackscrews. Jackscrews and alternate backshells are widely available from connector manufacturers.

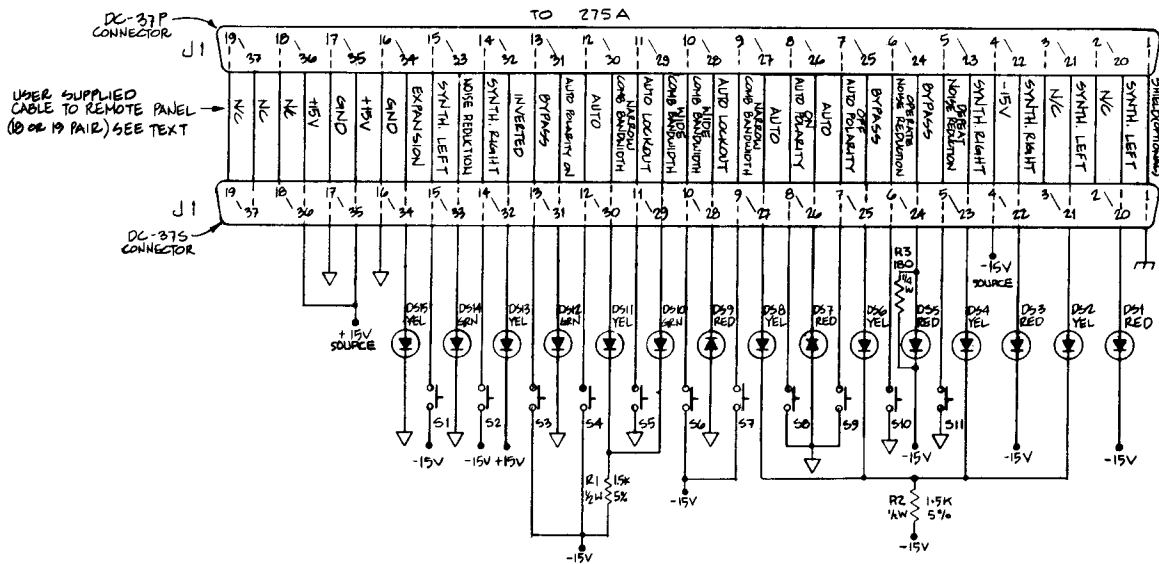


Fig. C-1: Connector Wiring Diagram, Remote Control Panel 275A/RC

3. CABLE

The cable used may be unshielded except in the presence of exceptionally high RF fields. While the control and indicator lines carry only DC, the cable could pass EMI into the audio circuits in the host chassis. It is especially important that no sync leaks into the audio, since it could affect subsequent audio processing.

End-to-end DC resistance of each line should not exceed 100 ohms.

Specifications for several potentially appropriate cables are shown in Table C-1. In some localities, building authorities require that PVC-insulated cable that is run through air plenums be in conduit or, alternately, require that an approved insulation (such as Teflon^R) be used.

No voltage in the cable exceeds 15 volts DC with reference to ground. No current exceeds 0.10 amps. The current and voltage sources driving the cable are insulated from AC mains by means of a power transformer having a primary-to-secondary breakdown voltage of at least 1500VDC. NEC Class 2 wiring rules are applicable.

<u>Belden Number</u>	<u>Pairs</u>	<u>Wires</u>	<u>DC Res. (ohms/1000')</u>	<u>O.D.</u>	<u>Insul.</u>	<u>Comment</u>
9519	19	24 Str.	24	.460"	PVC	
9526	19	22 Str.	15	.631"	PVC	Shielded, low R/1000'
9837	18	24 Str.	24	.570"	PVC	Shielded
9585	25	24 Sol.	24	.480"	PVC	"Inside Wiring Cable"

Table C-1: Potentially Useful Cables

The last item in Table C-1 is 25-pair telephone cable widely available from telephone suppliers by its REA number CW-2524. Fireproof versions of this cable for plenum use are available. This cable is especially convenient for long runs because there are many convenient intermediate connectors and connecting blocks available, and because its use is familiar to building authorities.

If the wiring is run with 19-pair (or greater) cable, five unused lines (on pins 2, 3, 18, 19, and 37) exist between the units. These can be employed for additional functions if desired.

If shielded cable is used, the shield should be connected only at the host chassis if both units are grounded through racks. Otherwise large circulating AC ground currents may flow through the shield.

4. ADDITIONAL REMOTE CONTROL PANELS

While no special provisions have been made for more than one Remote Control Panel, such an installation is feasible with a small amount of local engineering. Switches may be paralleled; LED's must be placed in series. Since LED's are current-operated devices, several can be placed in series with only minor brightness loss. (LED circuits were designed this way to minimize power supply current drain.)

5. TEMPORARY REMOVAL OF REMOTE CONTROL PANEL

If a Remote Control Panel is not connected, an internal plug (see **Installation of Remote Controls** in Section 2) must be placed in J5 (on the main circuit board in the host chassis) to bypass the Remote Control Panel connector.

If the internal plug is in J4 (as is normal for Remote Control operation), but neither the Remote Control Panel nor an external jumper connector is present, then no LED's will light on the host unit, and it will not pass audio if it is logically in the Bypass mode.

It may be convenient to build an external jumper connector to avoid the necessity of opening the chassis to move the internal plug. A diagram for such an external jumper connector is shown in Fig. C-2.

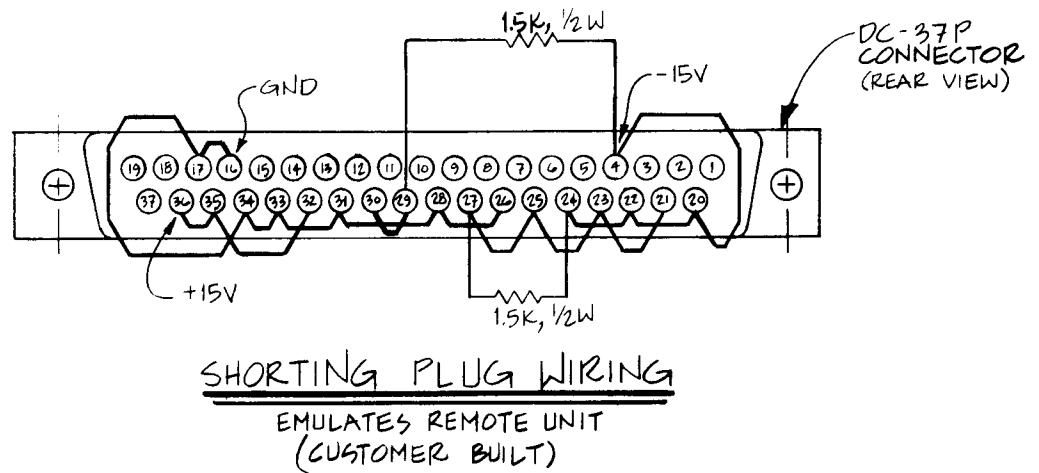


Fig. C-2: External Jumper Cable, Remote Control Bypass

APPENDIX D:

Constructing A Phase-Difference Network

This Manual has discussed in some detail the problems of recognizing stereophonic material containing hard-center mono dialog and/or effects. Such effects are inevitably recognized as "mono" and force the 275A into Synth From L mode. This appendix presents a circuit which can pre-process such stereophonic material so that it is unambiguously recognized as "stereo" by the Center-Channel Recognition circuitry. This provides an alternative to encoding all material to be synthesized on one channel only, because the program material processed by the technique described below can be used in the "M/S+1CH" Recognition mode without problems. This may increase operational convenience.

1. THEORY The Center-Channel Recognition circuitry recognizes mono by detecting both amplitude and phase differences between the left and right channels. If the amplitude and phase are sufficiently similar, the circuit recognizes the program material as "mono". The circuit has been designed to be more sensitive to phase differences than to amplitude differences.

If all "true stereo" program material is pre-processed through a pair of phase shifters which produce substantial phase difference between the channels in the 100Hz-1kHz frequency range (the range sensed by the Recognition circuitry), "hard-center" material will be recognized as stereo instead of mono. Such pre-processing can occur before recording, or even at a network distribution node. We recommend that such phase difference be between 20° and 30° .

Because the relative phase shift between the channels never exceeds a relatively small amount, no significant comb filtering effects occur in the mono sum (L+R). However, because the phase shift changes as a function of frequency (see Fig. D-1), the mono sum exhibits a very slight frequency response deviation (see Fig. D-2). The deviation produced by the 30° network is larger (-0.33dB) than the deviation produced by the 20° network (-0.14dB), although both are too small to be audible.

Psychoacoustic research has shown that 20° of phase shift between the channels is undetectable by most people, while 30° can result in a very slight widening of a hard-center image.

Operationally, when R263 (MONO THRESHOLD TRIM) is adjusted to its "factory-shipped" position (approximately 1:00), the 20° network will hold the 275A in Bypass mode indefinitely, but the 275A may not switch from Synthesize into Bypass mode until triggered by material with substantial real stereo content. Conversely, the 30° network will force the 275A from Synthesize into Bypass mode even with hard-center material.

Because of the slight tradeoffs involved, we present component values to build either the 20° or 30° phase-difference networks. We recommend the 30° network because it

produces more reliable detection (particularly if the MONO THRESHOLD trimmer is readjusted) and because, in our opinion, the hard-center image widening produced by this circuit is negligible and is unlikely to be noticed by your audience.

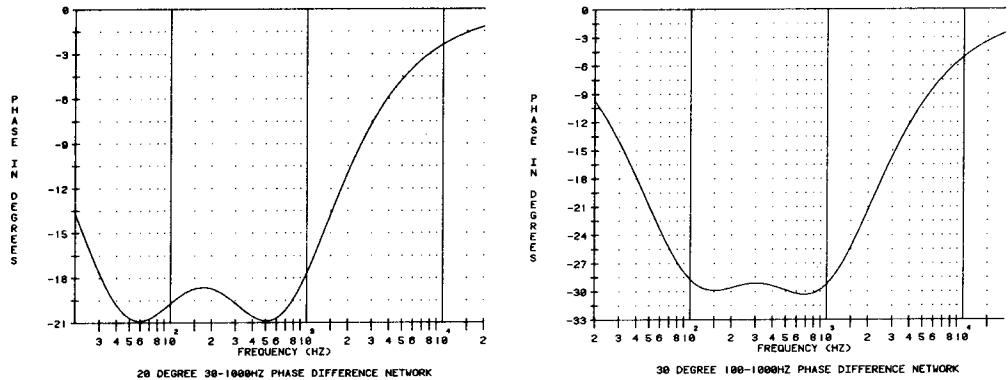


Fig. D-1: Phase Difference Between Left And Right Channels Introduced By 20° (left) and 30° (right) Phase Shift Networks

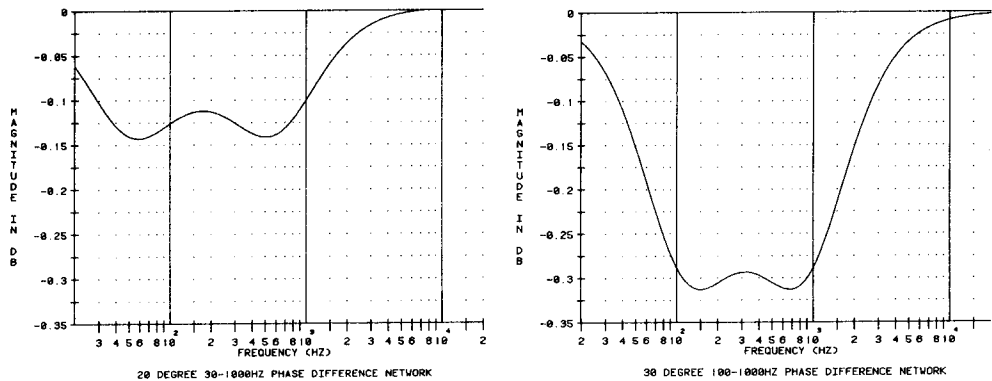


Fig. D-2: Mono Sum Error Introduced By 20° (left) and 30° (right) Phase Shift Networks

2. IMPLEMENTATION

The Schematic Diagram at the end of this appendix (Fig. D-3) shows a complete implementation of the phase-difference circuit. It includes remote-control logic to switch the phase-difference network on- or off-line (to accommodate true mono material, which should not be processed by the phase-difference circuit). Soft-switching is provided, along with appropriate balanced input and output stages to accommodate +26dBm/600-ohm systems.

If you do not wish to build the entire system, the most basic implementation is simply insertion of the IC2a circuit in series with the left channel and insertion of the IC2b

circuit in series with the right channel. In this case external switching must be provided.

A table in the schematic provides component values for both the 20⁰ and 30⁰ versions. Six resistors are affected.

The circuit is designed to be run from well-regulated $\pm 15\text{VDC}$ power supplies. The power supplies should be generously bypassed to ground locally, using 0.1 μF 25VDC monolithic ceramic capacitors. In addition, global bypassing should be implemented by means of 47 μF 25VDC low-inductance aluminum electrolytic capacitors. The circuit shown draws <50mA (V-) and <50mA (V+).

All uncommon parts (such as IC's and opto-couplers) are also used in the 275A circuitry. Thus, parts descriptions and sources can be obtained from the **Parts List** in **Appendix F**.

3. APPLICATION AND OPERATION

The schematic shows remote control terminals. These are used like the User Control Interface connector on the 275A, and the same caveat applies: keep the LED current below 10mA continuous to assure long opto-isolator life.

The switching between input and phase-shifted signals occurs in about 200ms. During this short time, the phase-shifted signal is crossfaded with the input signal and comb filtering can occur. Depending on the nature of the program material, such comb filtering may be perceived as a momentary "thinness" or loss of program bass content, and is relatively subtle. Nevertheless, smoothest results are obtained by switching during silence.

At a network origination point, particularly smooth results can be obtained by dedicating one mixing bus on the console or switcher to true stereo material and another bus to true mono material (to be synthesized by an affiliate-installed 275A at the affiliate's option). The output of the true stereo bus is applied to the phase shift circuit before the two buses are mixed together to produce the final program audio. If the 30⁰ circuit is used, this will result in foolproof operation of any downstream 275A that has been set to Auto and M/S+1CH modes.

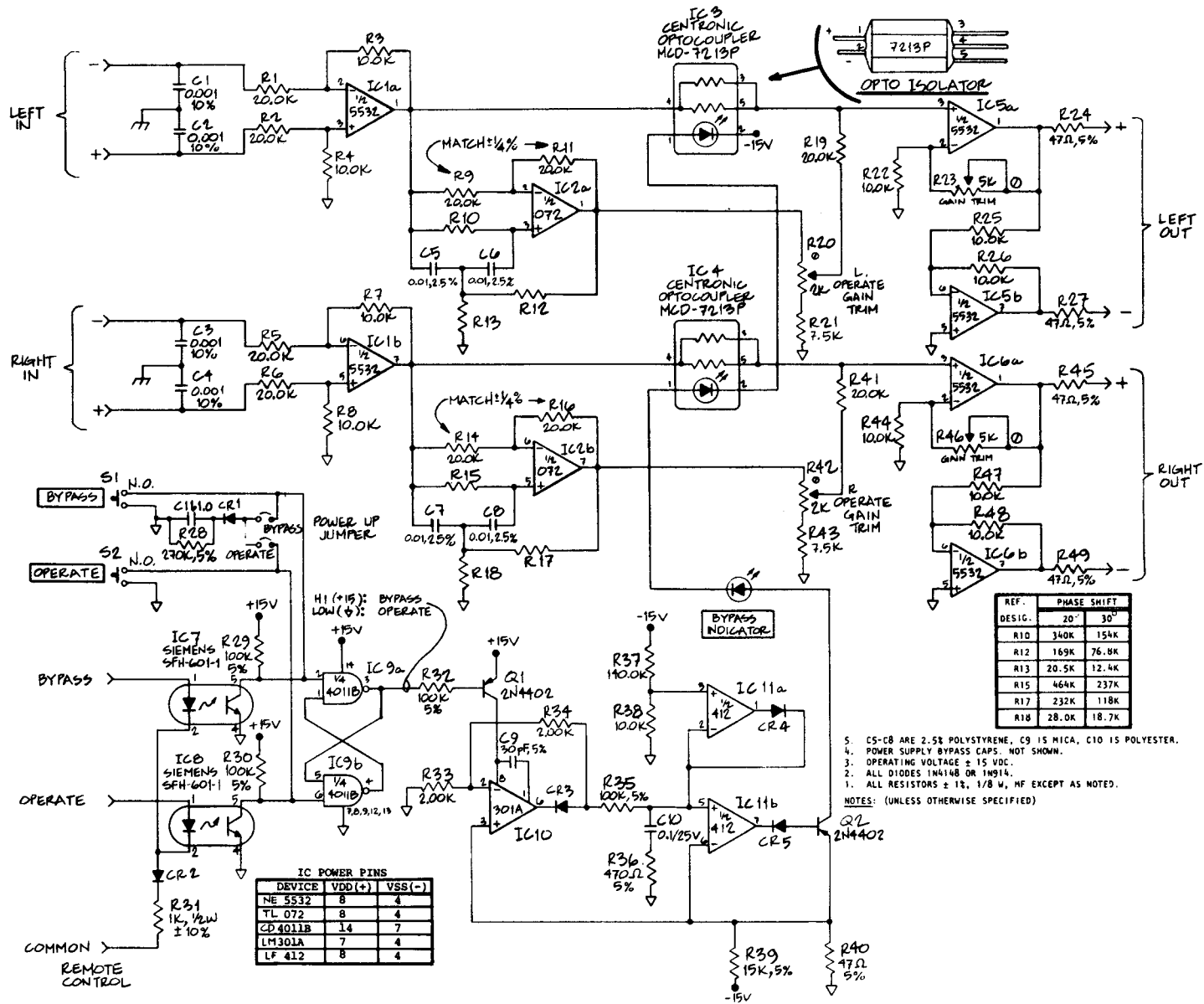


Fig. D-3: Schematic, Phase-Difference Network

APPENDIX E: Parts List

Parts for this unit have been chosen from the catalogs of well-known manufacturers for ease in future maintenance. The U.S. headquarter addresses are listed at the end of the Parts List. Most manufacturers have extensive distribution facilities throughout the world and may often be contacted through local offices.

Parts are listed by assembly, by part class, in Reference Designator order except for certain widely used common parts such as:

Signal Diodes, Fixed Resistors, 3/8" Square Trimmer Resistors

which are described generally below and which must be examined to determine the exact value.

SIGNAL DIODES

ALL DIODES NOT LISTED BY REFERENCE DESIGNATOR ARE:

<u>DESCRIPTION</u>	<u>ORBAN P/N</u>	<u>VEN</u>	<u>VENDOR P/N</u>	<u>ALTERNATE VENDORS</u>
Diode, Signal	22101-000	FSC	1N4148	MANY

NOTE: This is a silicon small-signal diode, ultra fast recovery, high conductance. It may be replaced with 1N914 or, in Europe, with BAY-61.

(BV: 75V min. @ $I_R = 5V$ $I_R : 25nA$ max. @ $V_R = 20V$ $V_f : 1.0V$ max. @ $I_f = 100mA$ $t_{rr} : 4ns$ max.)

NOTE: For Zener Diodes (VR...) see Miscellaneous Section.

RESISTORS

ALL COMMON RESISTORS NOT SPECIFICALLY LISTED ARE GENERALLY SPECIFIED BELOW:

Replace resistors only with the same style and with the exact value as marked on the resistor body, lest performance or stability be compromised. If the resistor is damaged, consult the factory or refer to the Schematic to obtain the value.

Metal Film Resistors

Body: conformally-coated
I.D.: five color band or printed value
Orban P/N: 20038-XXX - 20045-XXX
Power Rating: 1/8 Watt @ 70°C
Tolerance: 1%
Temperature Coefficient: 100 PPM/°C
U.S. Military Spec.: MIL-R-10509, Style RN55D
Manufacturers: R-Ohm (CRB-1/4FX), TRW/IRC, Beyschlag, Dale, Corning, Matsushita

Carbon Composition Resistors

Body: molded phenolic
I.D.: four color bands
Orban P/N: 2001X-XXX
Power Rating: (70°C) 1/4 Watt (Body 0.090" x 0.250")
1/2 Watt (Body 0.140" x 0.375")
Tolerance: 5%
U.S. Military Spec.: MIL-R-11, Style RC-07 (1/4W) or RC-20 (1/2 W)
Manufacturers: Allen-Bradley, TRW/IRC, Stackpole, Matsushita

Carbon Film Resistors

Body: conformally-coated
I.D.: four color bands
Orban P/N: 20001-XXX
Power Rating: 1/4 Watt @ 70°C
Tolerance: 5%
Manufacturers: R-Ohm (R-25), Piher, Beyschlag, Dale, Phillips, Spectrol, Matsushita

Cermet Trimmer Resistors

Body: 3/8" square (9mm)
I.D.: printed marking on side
Orban P/N: 20510-XXX, 20511-XXX
Power Rating: 1/2 Watt @ 70°C
Tolerance: 10%
Temperature Coefficient: 100 PPM/°C
Manufacturers: Beckman (72P, 68W- Series), Spectrol, Matsushita

OBTAINING SPARE PARTS

Because special or subtle characteristics of certain components are exploited in order to produce an elegant design at a reasonable cost, it is unwise to make substitutions for listed parts. It is also unwise to ignore notations in the Parts List indicating "Selected" or "Realignment Required" when replacing components. In such cases, the factory should be consulted if optimum performance is to be maintained.

Orban normally maintains an inventory of tested, exact replacement spare parts to supply any present or reasonable future demand quickly at nominal cost.

When ordering parts from the factory, we will need all of the following information:

- The Orban Part Number, if ascertainable
- The Reference Designator
- A brief description of the part
- From the Serial Label on the rear
- The exact Model Number
- The Serial Number
- The "M" number, if any

Orban can supply standardized Spare Parts Kits for this product during its production life. Consult the factory for the contents of such kits and their prices.

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
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PCB MAIN ASSEMBLY

Capacitors

C105	Metallized, Polyester, 10%; 0.22uF	21441-422	PAN	ECQ-E-1224-K2		
C106	Mica, 500V, 1%; 1000pF	21022-210	CD	CD19-FD102F03	SAN	
C107	Polypropylene, 50V, 1%; 4700pF	21701-247	NOB	CQ15P1H472FPP	WES	
C108	Mica, 500V, 5%; 470pF	21024-147	CD	CD19-FD471J03	SAN	
C109	Tantalum, 35V, 10%; 0.47uF	21307-447	SPR	196D474X9035HAL	MANY	
C110	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25Z5U104M050B	KEM	
C111	Mica, 500V, +1/2pF -1/2pF; 10pF	21017-010	CD	CD15-CD100D03	SAN	
C112	Alum., Radial, 50V, -20% +100%; 47uF	21208-647	SPR	502D476G050CD1C	PAN	
C113-116	Not Used					
C117,118	Polypropylene, 50V, 2.5%; 1000pF	21702-210	NOB	CQ15P1H102GPP	WIM	
C119-133	Polypropylene, 50V, 2.5%; 0.01uF	21702-310	NOB	CQ15P1H103GPP	WES	
C201-204	Polypropylene, 50V, 2.5%; 0.01uF	21702-310	NOB	CQ15P1H103GPP	WES	
C205,206	Mica, 500V, 1%; 1000pF	21022-210	CD	CD19-FD102F03	SAN	
C207-215	Polypropylene, 50V, 2.5%; 0.01uF	21702-310	NOB	CQ15P1H103GPP	WES	
C216,217	Tantalum, 35V, 10%; 4.7uF	21307-547	SPR	196D475X9035JAL	MANY	
C218	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25Z5U104M050B	KEM	
C219-221	Tantalum, 35V, 10%; 1uF	21307-510	SPR	196D105X9035HAL	MANY	
C222,223	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25Z5U104M050B	KEM	
C301-304	Ceramic Disc, 1kV, 20%; 0.005uF	21113-250	CRL	DD-5022	MUR,SPR	
C305	Monolythic Ceramic, 50V, 20%; 1.0uF	21123-510	SPR	2C25Z5U105M050B		
C306	Tantalum, 35V, 10%; 1uF	21307-510	SPR	196D105X9035HAL	MANY	
C307	Mica, 500V, 5%; 30pF	21020-030	CD	CD15-ED300J03		
C308	Met. Polyester, 100V, 10%; 0.1uF	21441-410	WES	60C104K100	WIM,SIE	
C309	Ceramic Disc, 1kV, 20%; 0.005uF	21113-250	CRL	DD-5022	MUR,SPR	
C310,311	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25Z5U104M050B	KEM	
C401-406	Ceramic Disc, 1kV, 20%; 0.005uF	21113-250	CRL	DD-5022	MUR,SPR	
C407-409	Monolythic Ceramic, 50V, 20%; 1.0uF	21123-510	SPR	2C25Z5U105M050B		
C501,502	Alum., Axial, 40V, -10% +100%; 470uF	21224-747	SPR	TVA-1315-1000-40	SIE,PAN	
C503,504	Alum., Radial, 25V, -20% +100%; 100uF	21206-710	PAN	ECE-ALEV101S		
C505,506	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25Z5U104M050B	KEM	
C601-616	Monolythic Ceramic, 50V, 20%; 0.1uF	21123-410	SPR	1C25Z5U104M050B	KEM	

Diodes

CR101	Diode, Rect. Bridge, 1A, 200V	22301-000	VARO	VE-27		
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Integrated Circuits

IC1-3	Linear, Dual Opamp	24207-202	SIG	NE5532N	TI,EXR	
IC4-8	Linear, Dual Opamp	24206-202	TI	TL072CP	NAT(LF353H)	
IC9	Linear, Dual Opamp	24207-202	SIG	NE5532N	TI,EXR	
IC10,11	Linear, Dual Opamp	24206-202	TI	TL072CP	NAT(LF353H)	

FOOTNOTES:

- | | |
|---|--|
| (1) See last page for 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

AUTO STEREO SYNTHESIZER MODEL 275A

PCB MAIN ASSY: Caps, Diodes, ICs

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
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Integrated Circuits, Cont'd

IC12	Special Function, N/R	24709-302	ORB			See Footnote 4
IC13	Linear, Dual Opamp	24206-202	TI	TL072CP	NAT(LF353H)	
IC14	Digital, Dual Flip-Flop	24502-302	RCA	CD4013BE		
IC15	Linear, Single Opamp	24003-202	RCA	CA301AE	NAT, TI	
IC16,17	Linear, Dual Opamp	24209-202	NAT	LF412CN		
IC18,19	Linear, Single Opamp	24003-202	RCA	CA301AE	NAT, TI	
IC20,21	Linear, Dual Opamp	24206-202	TI	TL072CP	NAT(LF353H)	
IC22	Linear, Dual Opamp	24209-202	NAT	LF412CN		
IC23	Linear, Dual Opamp	24202-202	RAY	4558NE	MOT, FSC	
IC24	Linear, Dual Opamp	24203-202	MOT	MC1458CPI	TI, RCA	
IC25	Digital, XOR Gate	24504-302	RCA	CD4030BE	SIG	
IC26,27	Digital, Nand Gate	24501-302	RCA	CD4011BE	MOT	
IC28	Special Function, 4-Comparator	24710-302	NAT	LM339		
IC29	Digital, Nand Gate	24501-302	RCA	CD4011BE	MOT	
IC30,31	Linear, Single Opamp	24003-202	RCA	CA301AE	NAT, TI	
IC32	Linear, Dual Opamp	24203-202	MOT	MC1458CPI	TI, RCA	
IC33,34	Digital, Nand Gate	24501-302	RCA	CD4011BE	MOT	
IC35	Digital, Dual Flip-Flop	24502-302	RCA	CD4013BE		
IC36	Linear, Dual Opamp	24209-202	NAT	LF412CN		
IC37,38	Linear, Single Opamp	24003-202	RCA	CA301AE	NAT, TI	
IC39	Digital, Nand Gate	24501-302	RCA	CD4011BE	MOT	
IC40,41	Digital, 2 x 8 Buffer	24631-302	NAT	MM74C244		
IC42	Digital, Nand Gate	24501-302	RCA	CD4011BE	MOT	
IC51,52	LED Photocoupler	25004-000	CEN	MCD-7213P		See Footnote 4
IC53-62	Optoisolator, NPN	25003-000	SIE	SFH-601-1		
IC71	D.C. Regulator, 15V Positive	24304-901	FSC	uA78M15UC		
IC72	D.C. Regulator, 15V Negative	24303-901	FSC	F79M15AUC	TI	

Miscellaneous

NONE	Connector, PC Mounting, 2 x 13	27010-007		6092653		Vendor: Ansley
NONE	Connector, PC Mounting, 2 x 20	27010-010		6094053		Vendor: Ansley
NONE	Connector, 25-F, D Type	27009-001		609255MI		Vendor: Ansley
NONE	Connector, 37-F, D Type	27009-002		609375MI		Vendor: Ansley

Resistors

R155 & 156	Resistor Set, MF, .25% 20.0K	28521-001	ORB			
R160 & 161	Resistor Set, MF, .25% 20.0K	28521-001	ORB			
R165 & 166	Resistor Set, MF, .25% 20.0K	28521-001	ORB			
R170 & 171	Resistor Set, MF, .25% 20.0K	28521-001	ORB			
R175 & 176	Resistor Set, MF, .25% 20.0K	28521-001	ORB			
R180 & 181	Resistor Set, MF, .25% 20.0K	28521-001	ORB			
R185 & 186	Resistor Set, MF, .25% 20.0K	28521-001	ORB			
R213,214	Resistor, MF, 1/8W, .5% 154.0K	20053-154				

FOOTNOTES:

- (1) See last page for 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

AUTO STEREO SYNTHESIZER MODEL 275A

PCB MAIN ASSY: ICs, Misc, Resistors

REF DES	DESCRIPTION	ORBAN P/N	VEN (1)	VENDOR P/N	ALTERNATE VENDORS (1)	NOTES
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14/16 PIN CABLE ASSEMBLY

Miscellaneous

NONE	Connector, Plug, Dip, 16 Pin	27409-016		CAL6IDPM-146-G		Vendor: Circuit Assembly
NONE	Connector, Plug, Dip, 14 Pin	27409-014		CAL4IDPM-146-G		Vendor: Circuit Assembly

FINAL ASSEMBLY

Capacitors

CL101-104	Ceramic Disc, 1KV, 10%; 0.001uF	21112-210	CRL	DD-102		
CL113-116	Ceramic Disc, 1KV, 10%; 0.001uF	21112-210	CRL	DD-102		

Inductors

L1,2	Inductor, RF Choke, mH, 160 mA	29502-000	MIL	4662		
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Miscellaneous

F1	Fuse, 3AG, Slo-Blo, 1/8A	28004-113	LFE	313.125	BUS	
NONE	Line Cord, AC, 3 Wire	28101-000	BEL	17534		
T1	Transformer, Power, 38VCT, 10VA	55005-000				

Switches

SL2-14	Switch, Slide, DPDT, Gold	26106-000	CW	GF326-0149		
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PCB FRONT PANEL ASSEMBLY

LEDs

DS1	LED, Red	25106-003	HP	HLMP-1300		
DS2	LED, Yellow	25106-001	HP	HLMP-1400		
DS3	LED, Red	25106-003	HP	HLMP-1300		
DS4	LED, Yellow	25106-001	HP	HLMP-1400		
DS5	LED, Red	25106-003	HP	HLMP-1300		
DS6	LED, Yellow	25106-001	HP	HLMP-1400		
DS7	LED, Red	25106-003	HP	HLMP-1300		
DS8	LED, Yellow	25106-001	HP	HLMP-1400		
DS9	LED, Red	25106-003	HP	HLMP-1300		
DS10	LED, Green	25106-002	HP	HLMP-1503		
DS11	LED, Yellow	25106-001	HP	HLMP-1400		
DS12	LED, Green	25106-002	HP	HLMP-1503		
DS13	LED, Yellow	25106-001	HP	HLMP-1400		
DS14	LED, Green	25106-002	HP	HLMP-1503		
DS15	LED, Yellow	25106-001	HP	HLMP-1400		

Switches

S1-11	Switch, SPST, MOM., Gray	26115-005	SCH	D6-02-05		
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FOOTNOTES:

- | | |
|---|--|
| (1) See last page for 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

AUTO STEREO SYNTHESIZER MODEL 275A

14/16 PIN CABLE ASSY: Misc
FINAL ASSY: Caps, Inductors, Misc, Switches
PCB FRONT PANEL ASSY: LEDs, Switches

<u>REF</u> <u>DES</u>	<u>DESCRIPTION</u>	<u>ORBAN P/N</u>	<u>VEN</u> <u>(1)</u>	<u>VENDOR P/N</u>	<u>ALTERNATE</u> <u>VENDORS (1)</u>	<u>NOTES</u>
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Transistors

Q101	Transistor, JFET/P	23407-101	NAT	J174		
Q102,103	Transistor, JFET/N	23406-101	NAT	J113		
Q104	Transistor, Signal, PNP	23002-101	MOT	2N4402	FSC	
Q105	Transistor, JFET/N	23406-101	NAT	J113		
Q106	Transistor, JFET/N	23402-101	NAT	J108		
Q201	Transistor, JFET/N	23403-101	NAT	J111	INS	
Q202	Transistor, Signal, NPN	23202-101	MOT	2N4400	FSC	
Q203	Transistor, Signal, PNP	23002-101	MOT	2N4402	FSC	
Q301-306	Transistor, Signal, PNP	23002-101	MOT	2N4402	FSC	
Q307	Transistor, Signal, NPN	23202-101	MOT	2N4400	FSC	
Q308	Transistor, JFET/N	23406-101	NAT	J113		
Q309	Transistor, Signal, NPN	23202-101	MOT	2N4400	FSC	
Q310,311	Transistor, Signal, PNP	23002-101	MOT	2N4402	FSC	
Q312	Transistor, Signal, NPN	23202-101	MOT	2N4400	FSC	
Q401	Transistor, Signal, NPN	23201-101	MOT	2N4123	FSC	
Q402-405	Transistor, Signal, PNP	23002-101	MOT	2N4402	FSC	

275A P/L REVISIONS

06041-000-01	CHASSIS ASSEMBLY
30980-000-01	MAIN PCB ASSEMBLY
30985-000-01	FRONT PANEL PCB ASSEMBLY
40056-000-01	16 PIN CABLE ASSEMBLY
40057-000-01	14 PIN CABLE ASSEMBLY

E-5

FOOTNOTES:

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

SPECIFICATIONS AND SOURCES FOR
REPLACEMENT PARTS

AUTO STEREO SYNTHESIZER MODEL 275A

PCB MAIN ASSEMBLY: Transistors

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

MODEL 275A/RC (Remote)

PCB FRONT PANEL ASSEMBLY

LEDs

DS1	LED, Red	25106-003	HP	HLMP-1300		
DS2	LED, Yellow	25106-001	HP	HLMP-1400		
DS3	LED, Red	25106-003	HP	HLMP-1300		
DS4	LED, Yellow	25106-001	HP	HLMP-1400		
DS5	LED, Red	25106-003	HP	HLMP-1300		
DS6	LED, Yellow	25106-001	HP	HLMP-1400		
DS7	LED, Red	25106-003	HP	HLMP-1300		
DS8	LED, Yellow	25106-001	HP	HLMP-1400		
DS9	LED, Red	25106-003	HP	HLMP-1300		
DS10	LED, Green	25106-002	HP	HLMP-1503		
DS11	LED, Yellow	25106-001	HP	HLMP-1400		
DS12	LED, Green	25106-002	HP	HLMP-1503		
DS13	LED, Yellow	25106-001	HP	HLMP-1400		
DS14	LED, Green	25106-002	HP	HLMP-1503		
DS15	LED, Yellow	25106-001	HP	HLMP-1400		

Miscellaneous

NONE	Connector, 37 Pos.	27011-004		H4M375T28C		Vendor: Holmberg
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Switches

S1-11	Switch, SPST, MOM., Gray	26301-005	SCH	D6-02-05		
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275A/RC P/L REVISIONS

06042-000-01	FINAL ASSEMBLY
30990-000-01	FRONT PANEL PCB ASSEMBLY

FOOTNOTES:

- | | |
|---|--|
| (1) See last page for 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

AUTO STEREO SYNTHESIZER (Remote) MODEL 275A/RC
FRONT PANEL ASSEMBLY: LEDs, Misc, Switches

Vendor Codes

AB	Rockwell Allen-Bradley 625 Liberty Ave Pittsburgh, Pa 15222-3123	DEL	Delta Products Corp 3225 Laurel View Ct. Fremont, CA 94538	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	SW	Switchcraft A Raytheon Company 5555 N. Elston Avenue Chicago, IL 60630
AD	Analog Devices, Inc. One Technology Way PO Box 9106 Norwood, MA 02062-9106	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
AKG	AKG Acoustics, Inc. 1525 Alvarado Street San Leandro, CA 94577	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
AM	Amphenol Corporation 358 Hall Avenue Wallingford, CT 06492	EMI	Crompton Modutec 920 Candia Rd. Manchester, NH 03109	MAL	Mallory Capacitor Co. 7545 Rockville Rd. PO Box 1284 Indianapolis, IN 46241	QTY	Quality Technologies, Inc. 610 North Mary Ave. Sunnyvale, CA 94086	TI	Texas Instruments, Inc. PO Box 655012 Dallas, TX 75265
BEK	Beckman Industrial Corporation 4141 Palm Street Fullerton, CA 92635-1025	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. 2315 NW 107th Ave. Miami, FL 33172	TOS	Toshiba America, Inc. 9740 Irvine Blvd. Irvine, CA 92718
BEL	Belden Electronic Wire & Cable PO Box 1980 Richmond, IN 47374	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
BRN	Bourns, Inc Resistive Components Group 1200 Columbia Avenue Riverside, CA 92507	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	Micro Quality Semiconductor, Inc. PO Box 469013 Garland, TX 75046-9013
BUS	Bussmann Division Cooper Industries PO Box 14460 St. Louis, MO 63178	GI	General Instruments Optoelectronics Division See Quality Technologies	MID	Hollingsworth/Wearnes 1601 N. Powerline Rd. Pampano, FL 33069	ROHM	Rohm Electronics 3034 Owens Dr. Antioch, TENN 37013	WES	Westlake See Mallory Capacitor Co.
CD	Cornell-Dubilier Elec. 1700 Rte. 23 North Wayne, NJ 07470	HA	Harris Semiconductor 1301 Woody Burke Rd. Melbourne, FL 32901	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	Wima Division 2269 Saw Mill Rd. Building 4C PO Box 217 Elmsford, NY 10533
CRL	Mepcopal/Centralab See Mepcopal	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
CSC	Crystal Semiconductor Corporation 4210-T. South Industrial Dr. Austin, TX 78744	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		
CTS	CTS Corporation 907 North West Blvd. Elkhart, IN 46514	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		
CW	CW Industries 130 James Way Southampton, PA 18966	ITW	ITW Switches An Illinois Tool Works Co. 6615 W. Irving Park Rd. Dept. T Chicago, IL 60634	NEL	Crystal Biotech 75 South Street Hopkinton, MA 01748	SIG	Philips Components - Signetics North American Phillips Corp. 811 E. Arques Sunnyvale, CA 94088		
DBX	dbx A division of AKG Acoustics, Inc. 1525 Alvarado Street San Leandro, CA 94577	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		
		KEY	Keystone Electronics Corp. 31-07 20th Rd. Astoria, NY 11105	OKI	OKI Semiconductor 785 N. Mary Ave. Sunnyvale, CA 94086-2909				

APPENDIX F:

Specifications

Frequency Response

(re mono sum):

+1/2dB, 30-15,000 Hz (Bypass mode)

±1dB, 30-15,000 Hz (Synthesize mode)

Total Harmonic Distortion

(+18dBm/600 ohms):

<0.02%, 30-15,000 Hz (Bypass mode)

<0.3%, 30-15,000 Hz (Synthesize mode)

Noise

(30-15,000 Hz):

<-80dBm (Bypass mode)

<-67dBm (Synthesize mode)

Input

Impedance >10K ohms, balanced bridging.

Absolute overload occurs at +26dBm.

Output

Impedance <100 ohms, balanced to ground.

Clipping occurs at +26dBm into 600 ohms.

Connectors

Audio: Type 140-Y barrier strip (#5 screw).

User Control Interface: Type DC-25S jack (accepts DC-25P plug).

275A/RC Remote Control: Type DC-37S jack (accepts DC-37P plug).

Power Requirements

115-230V AC 50/60Hz, 9VA.

Supplied with "U-ground" grounding-type plug to USA standards.

Mounting

Requires 1 unit (1 3/4", 4.5cm) of vertical space in an EIA 19" (48.3cm) rack.

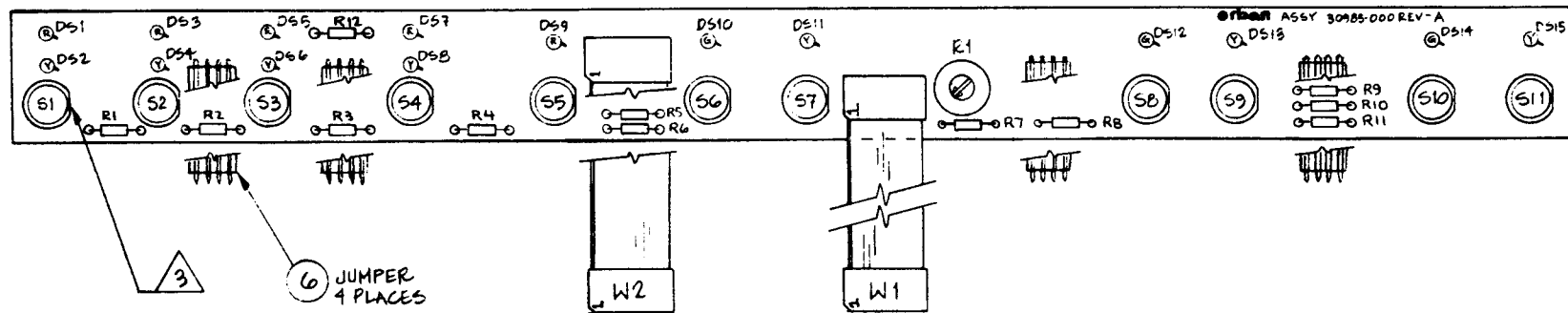
Depth is 9 5/8" (24.5 cm).

Optional 275A/RC remote control unit requires the same space, except depth of unit is only 2 1/4" (5.7cm).

Shipping Weight

12 lbs. (5.4 kg)

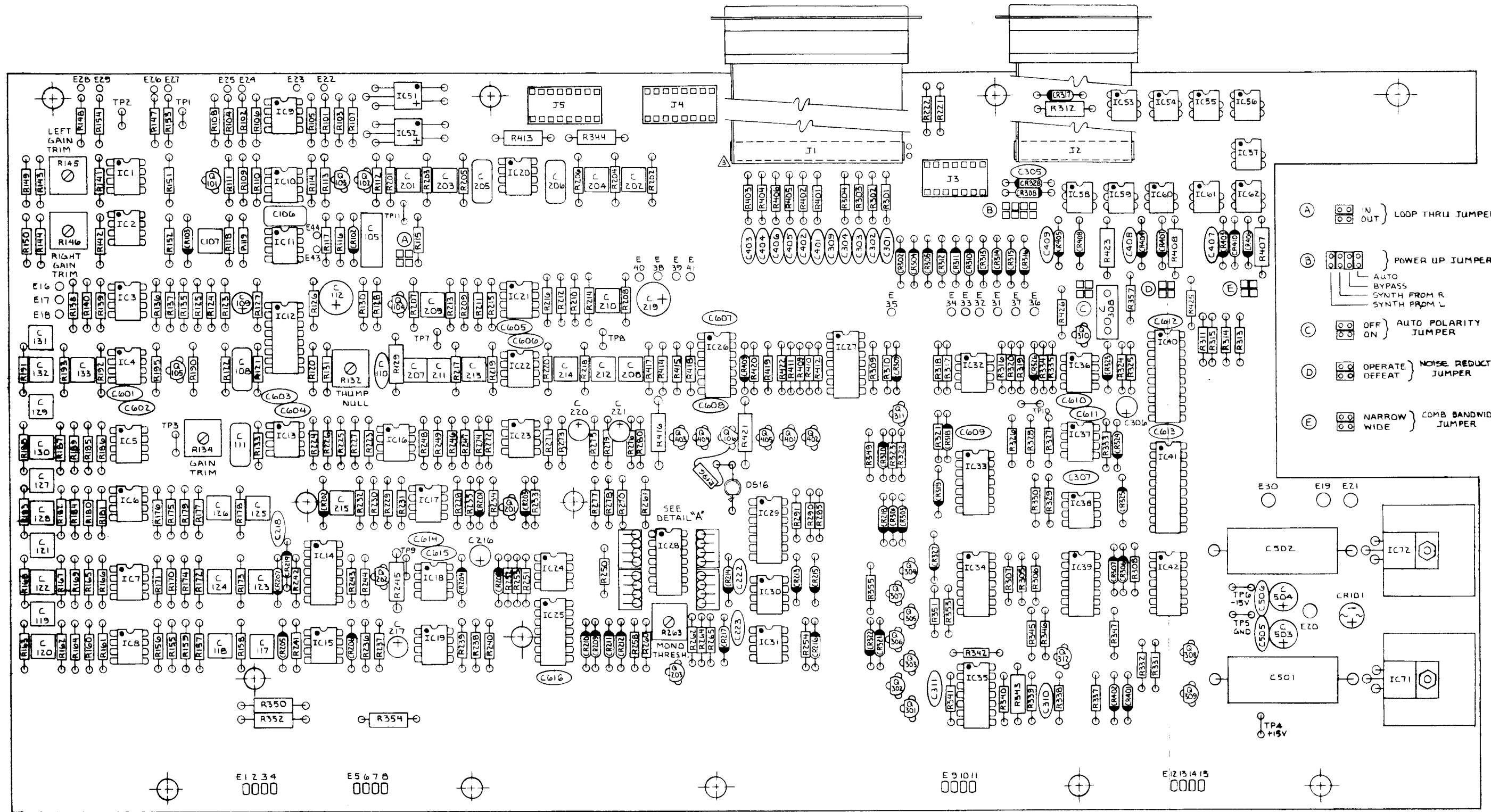
APPENDIX G:
**Schematics and
Parts Locator Drawings**



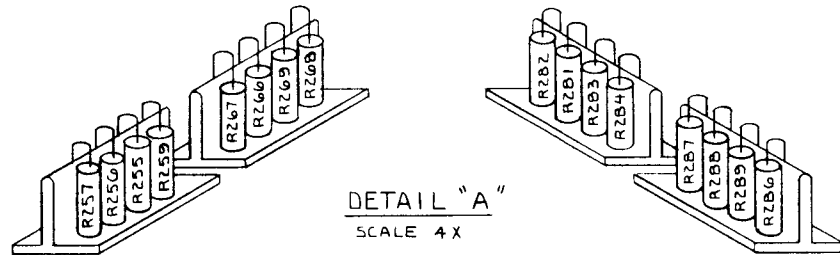
COMPLEMENT SIDE

3. NOTE ORIENTATION (FLAT SIDE) OF SWITCHES.
 2. TIC MARKS INDICATE CATHODE OF LED'S (FLAT SIDE).
 1. REFERENCE SCHEMATIC P/N 61006-000.
NOTES: UNLESS OTHERWISE SPECIFIED

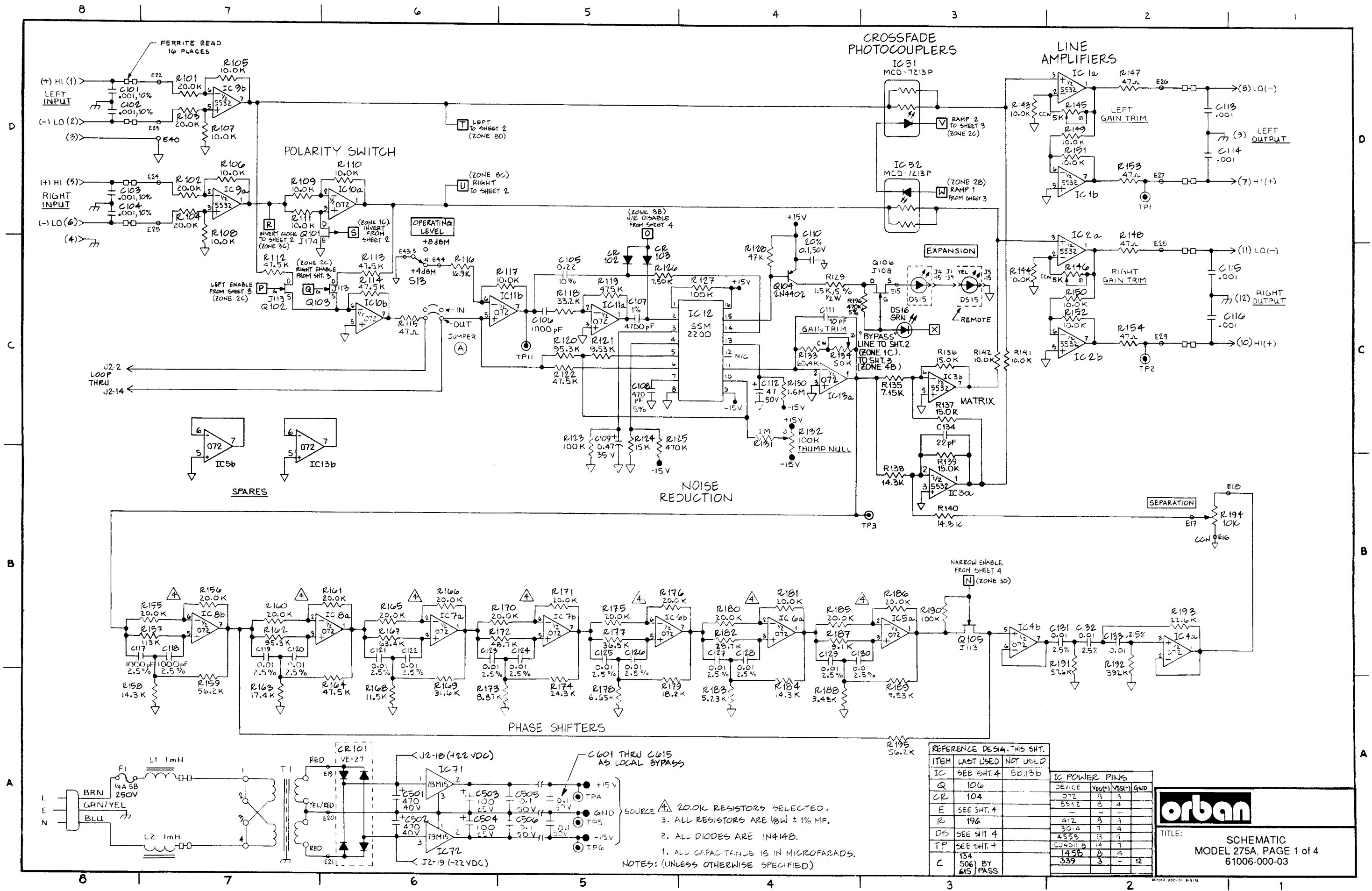
orban
TITLE: ASSEMBLY DRAWING FRONT PANEL, MAIN UNIT 30985-000-02



- NOTES:
1. CUT OFF PIN #6 OF IC 53-62 BEFORE INSERTING.
 2. RIBBON CABLE SHOULD BE BUTTED TO LEFT AS SHOWN.
 3. TICK MARKS INDICATE PIN 1 OF ICs, CATHODE OF DIODES, POS. SIDE OF CAPACITORS, EMITTER OF TRANSISTORS.



orban
 TITLE: ASSEMBLY DRAWING
 MODEL 275A
 30980-000-03



REFERENCE DESIG. THIS SHT.

ITEM	LAST USED	NOT USED
IC	SEE SHT. 4	5B, 13B
Q	106	
CR	104	
R	SEE SHT. 4	
E	196	
DS	SEE SHT. 4	
TP	SEE SHT. 4	
C	134, 506 BY 615 PASS	

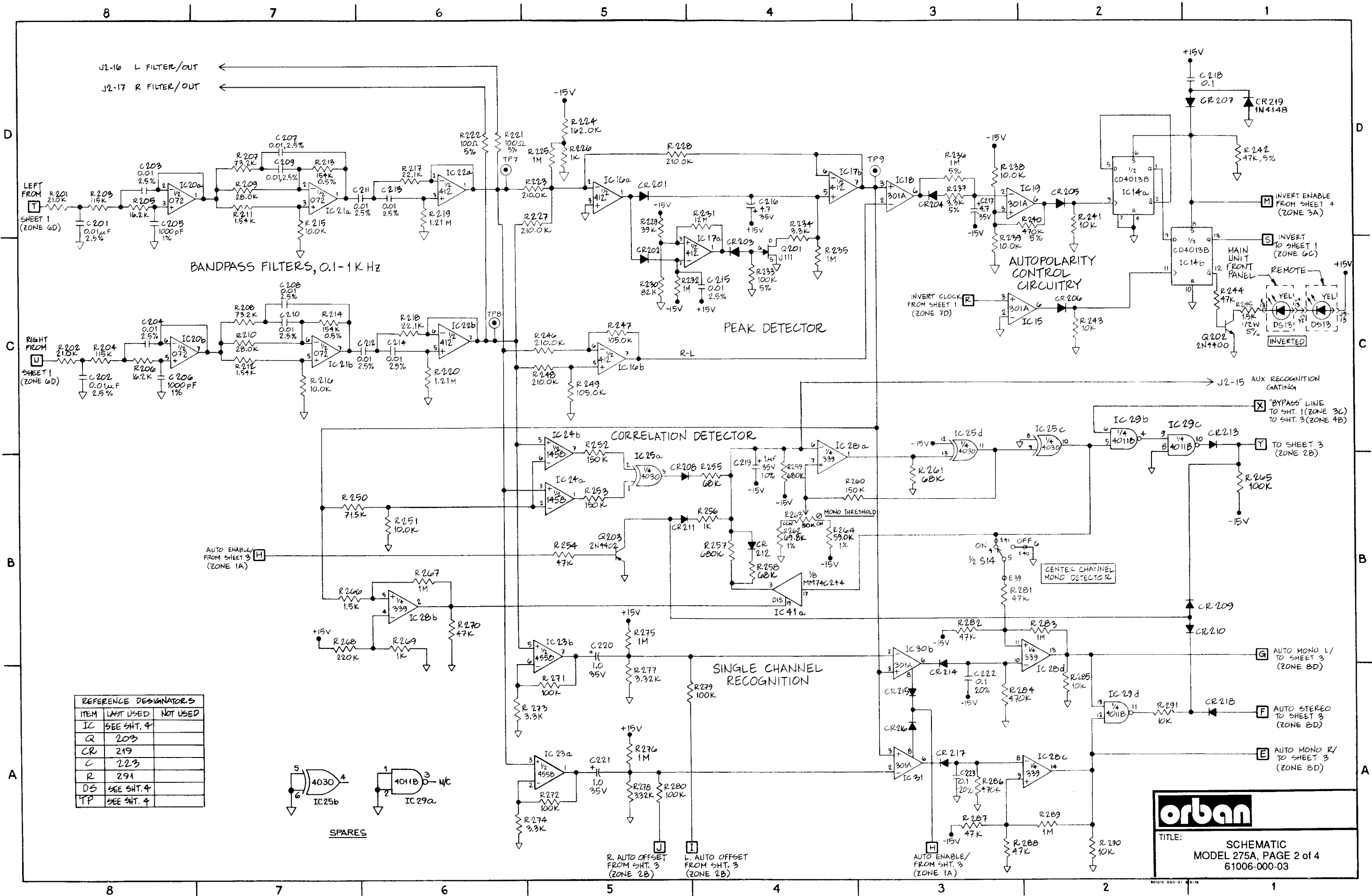
IC POWER PINS

DEVICE	V _{DD} (B)	V _{SS} (-)	GND
072	8	4	
5532	8	4	
	412	8	4
301A	7	4	
4558	13	4	
C2401B	14	7	
1458	8	4	
339	3	-	12

orban

TITLE: SCHEMATIC MODEL 275A, PAGE 1 of 4 61006-000-03

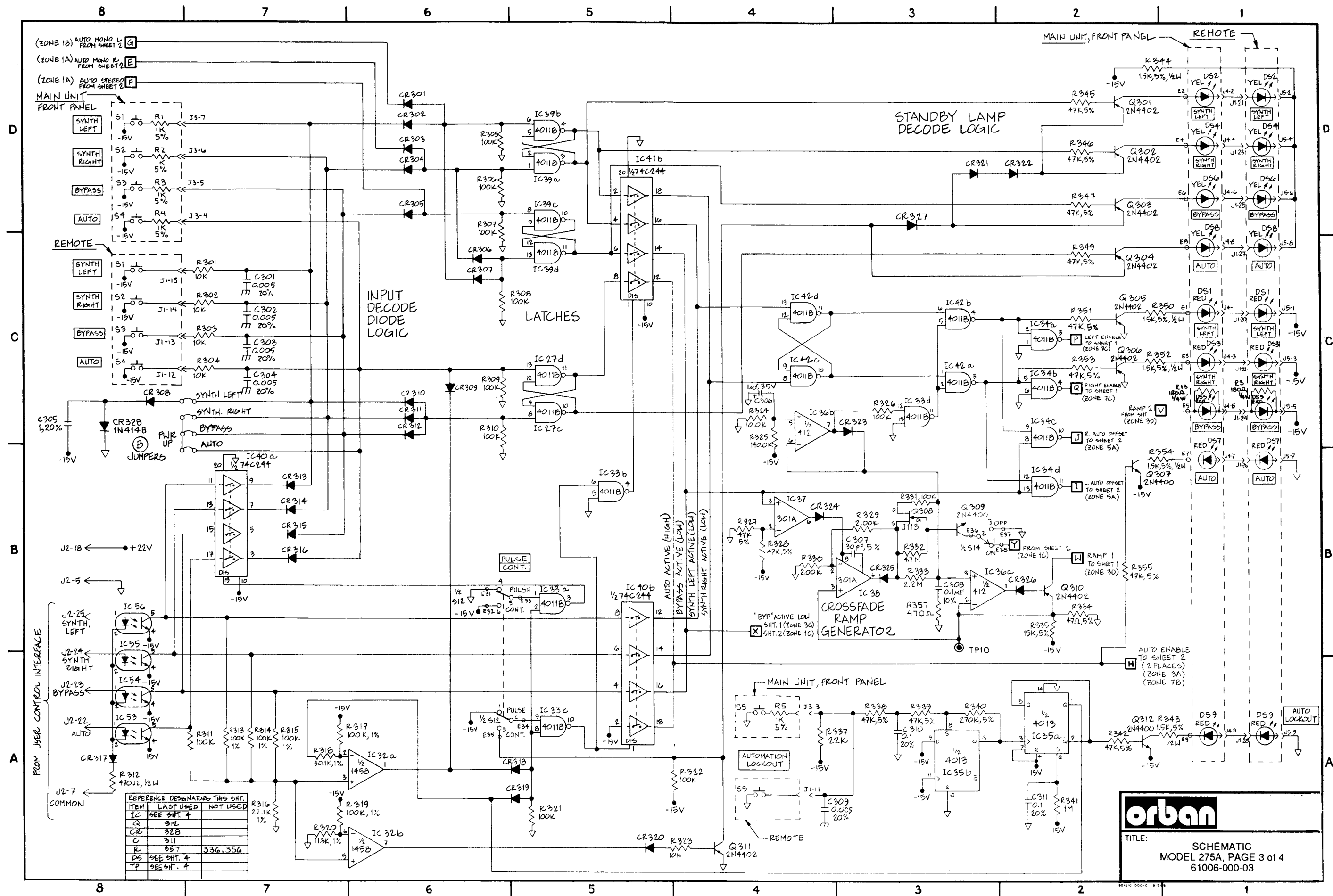
- SOURCE: Δ 200K RESISTORS SELECTED.
 3. ALL RESISTORS ARE 1/8W \pm 1% MF.
 2. ALL DIODES ARE 1N4148.
 1. ALL CAPACITANCE IS IN MICROFARADS.
 NOTES: (UNLESS OTHERWISE SPECIFIED)



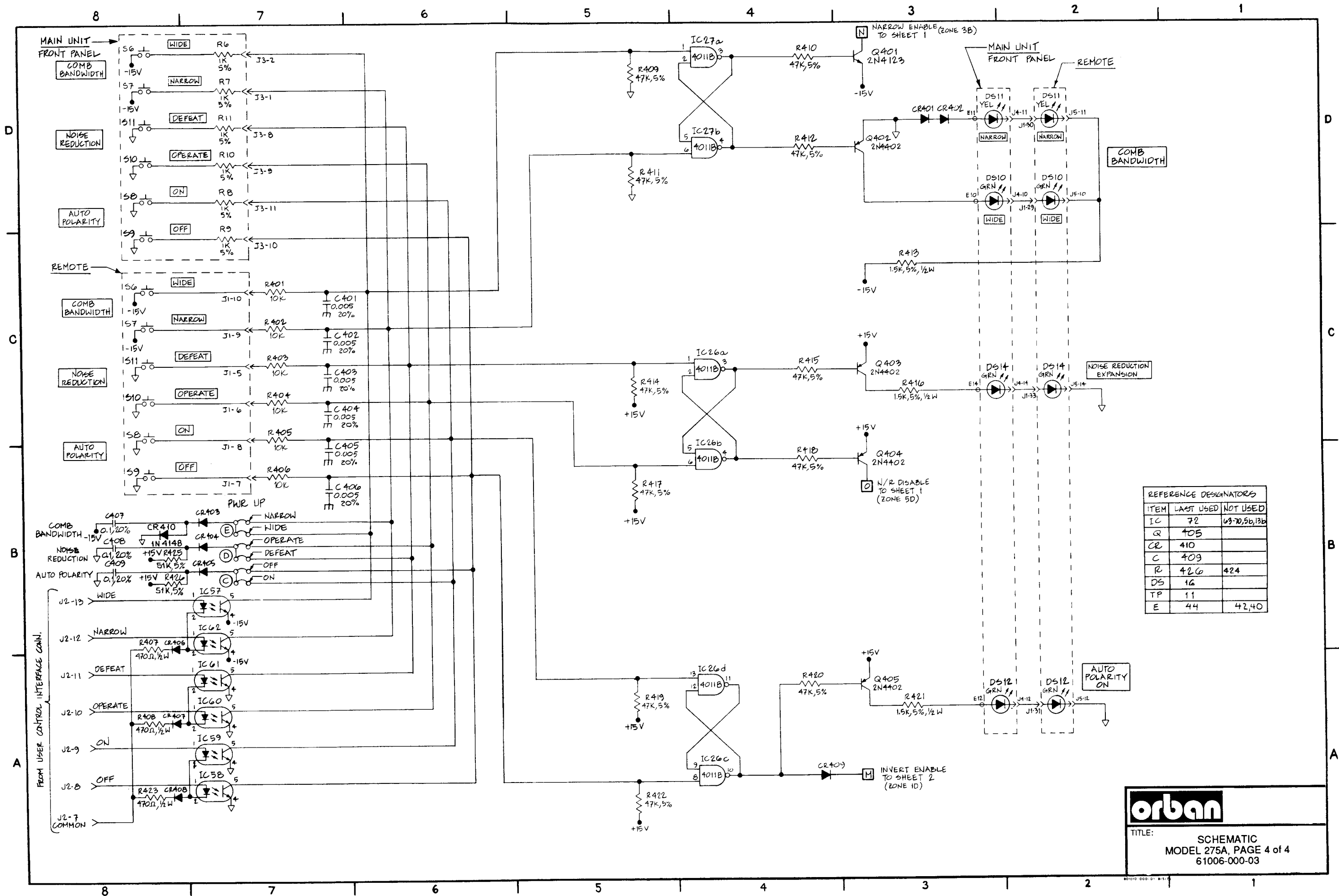
REFERENCE DESIGNATORS		
ITEM	LAST USED	NOT USED
IC	SEE SHT. 4	
R	203	
CR	219	
C	223	
R	291	
DS	SEE SHT. 4	
TP	SEE SHT. 4	

orban

TITLE: SCHEMATIC
MODEL 275A, PAGE 2 of 4
61006-000-03

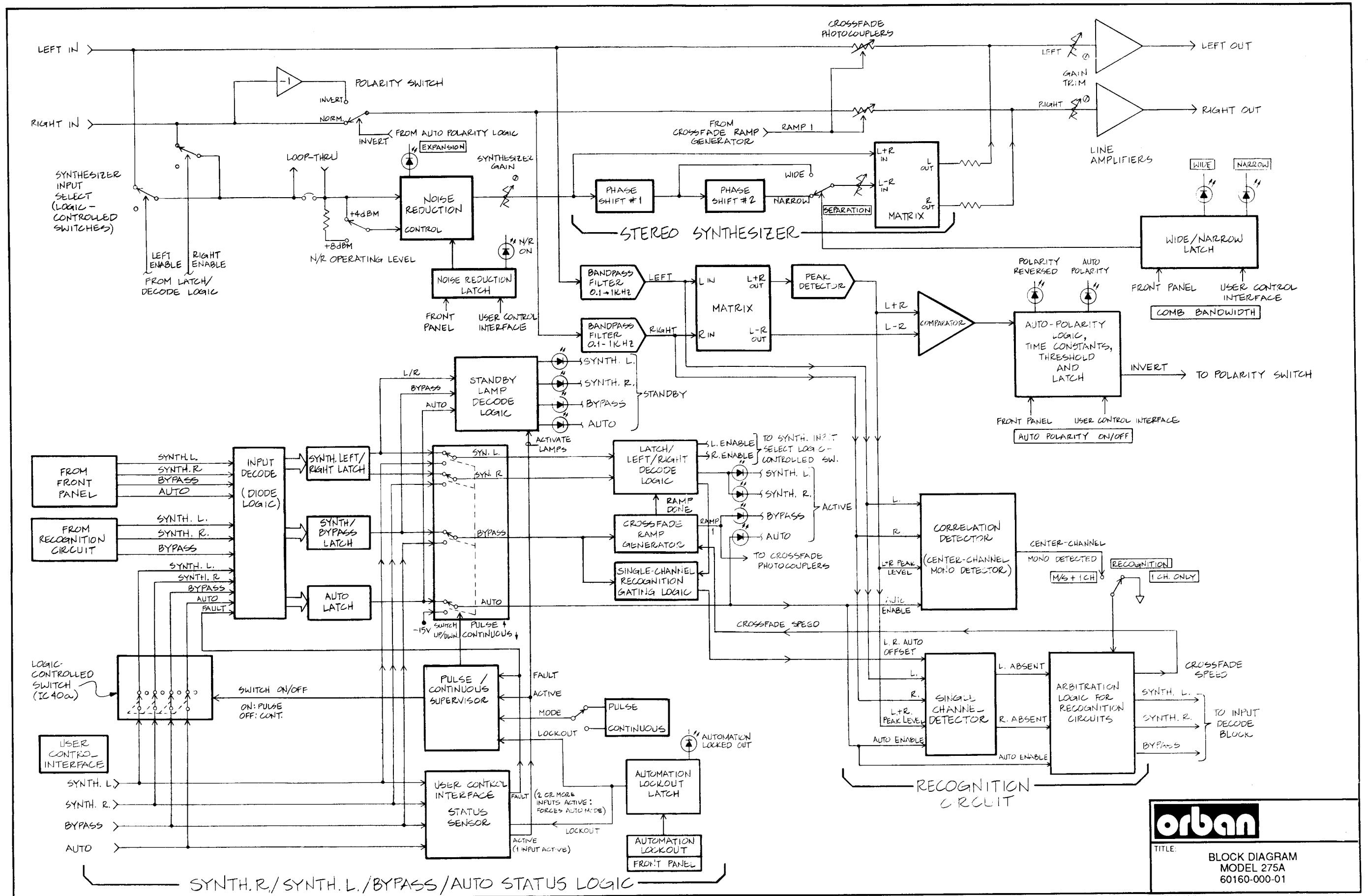


urban
 TITLE: SCHEMATIC
 MODEL 275A, PAGE 3 of 4
 61006-000-03



REFERENCE DESIGNATORS		
ITEM	LAST USED	NOT USED
IC	72	69,70,5b,13b
Q	405	
CR	410	
C	409	424
DS	16	
TP	11	
E	44	42,40

urban
 TITLE: SCHEMATIC
 MODEL 275A, PAGE 4 of 4
 61006-000-03



orban

TITLE: BLOCK DIAGRAM
MODEL 275A
60160-000-01

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.