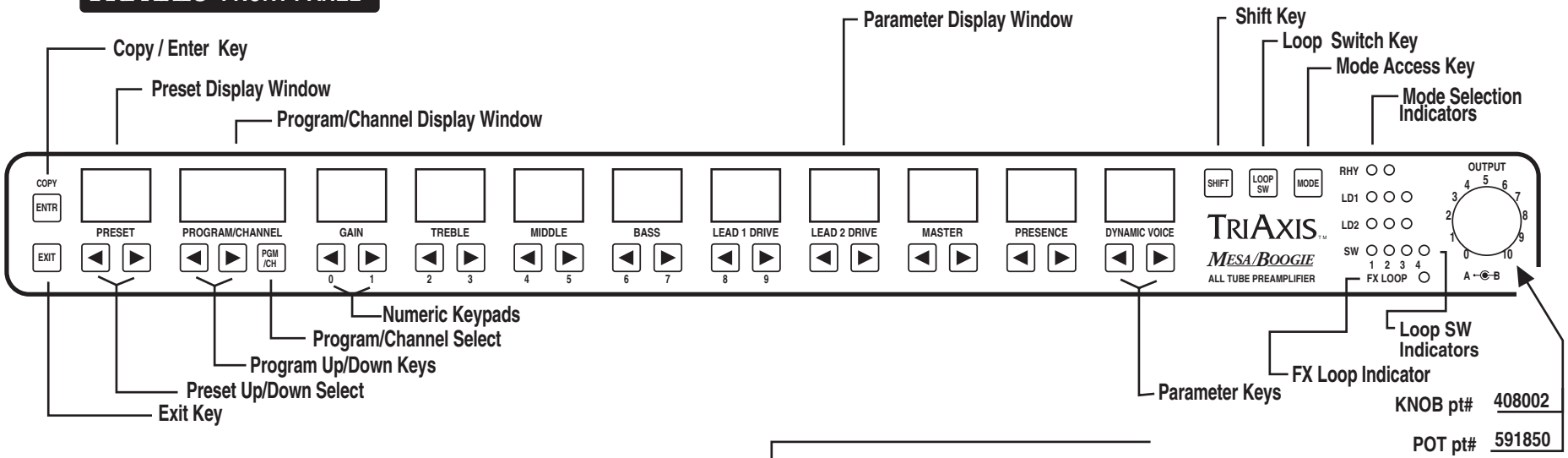
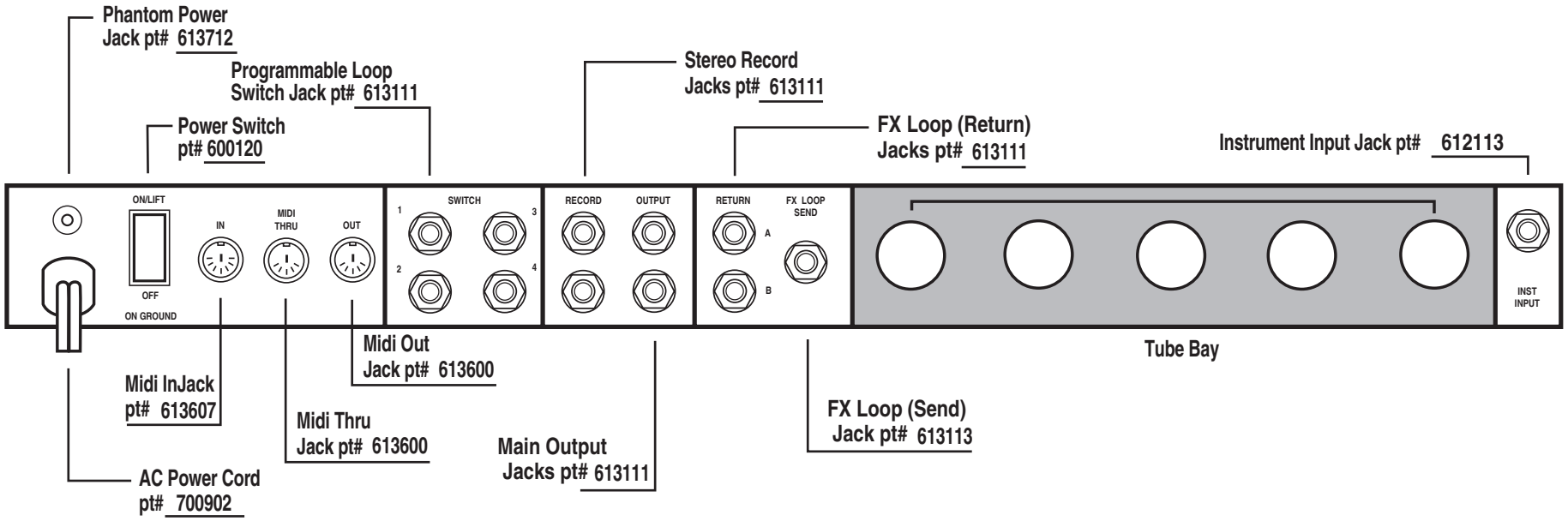
MESA/BOOGIE®

TRIAXIS

TRI AXIS FRONT PANEL



TRI AXIS REAR PANEL

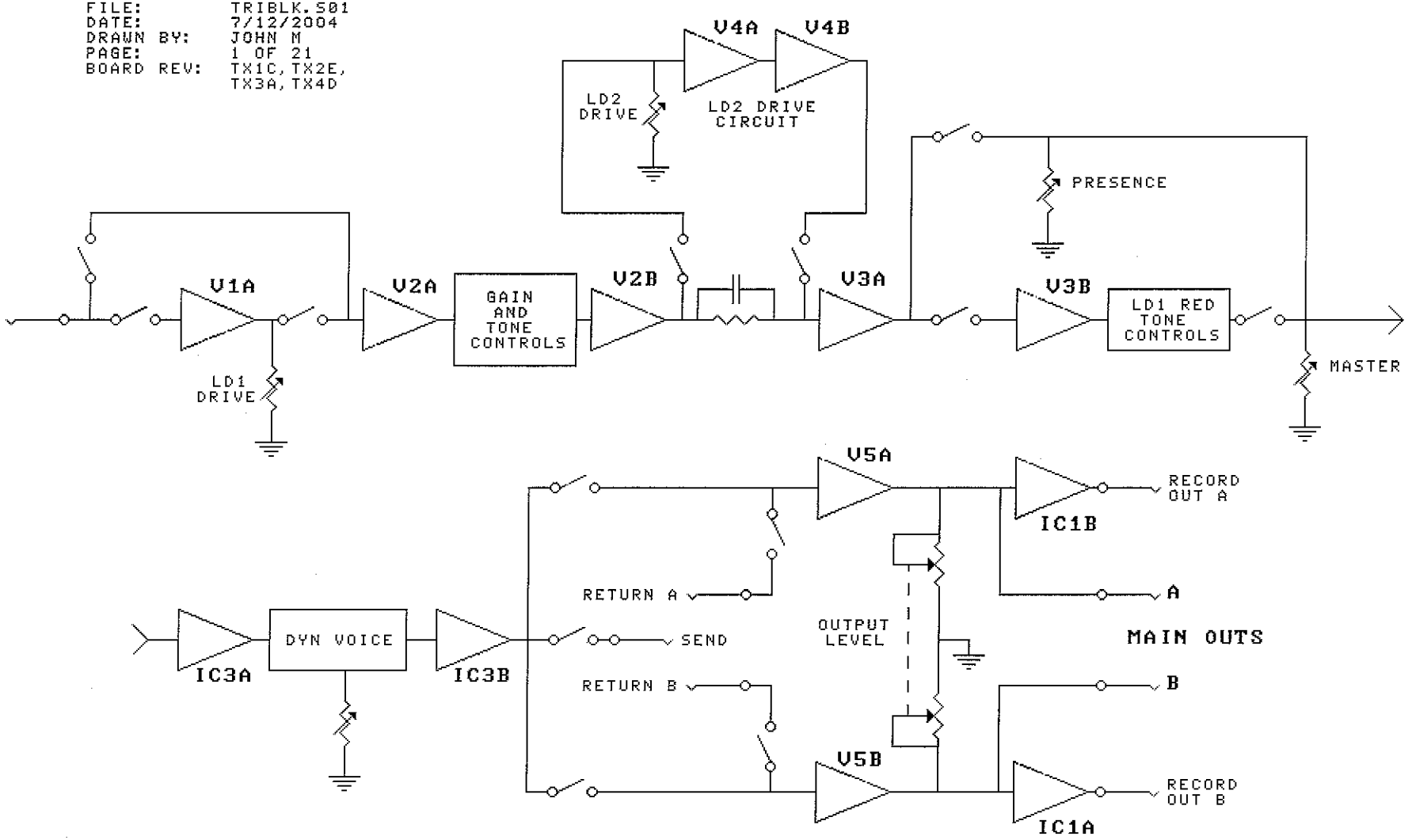


MESA/BOOGIE

TRIAXIS

BLOCK DIAGRAM

FILE: TRIBLK.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 1 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D



MESA/BOOGIE

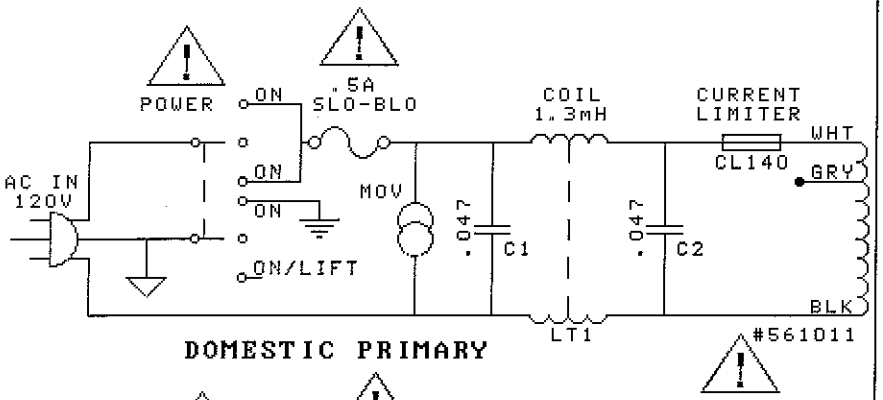
TRIAXIS

POWER SUPPLIES

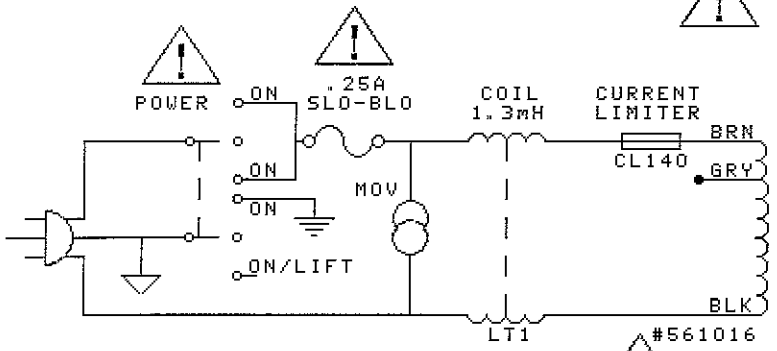
FILE:	TRISUP.S01
DATE:	7/12/2004
DRAWN BY:	JOHN M
PAGE:	2 OF 21
BOARD REV:	TX1C, TX2E, TX3A, TX4D

CIRCUIT GROUND

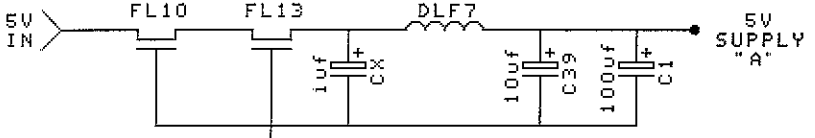
CHASSIS GROUND



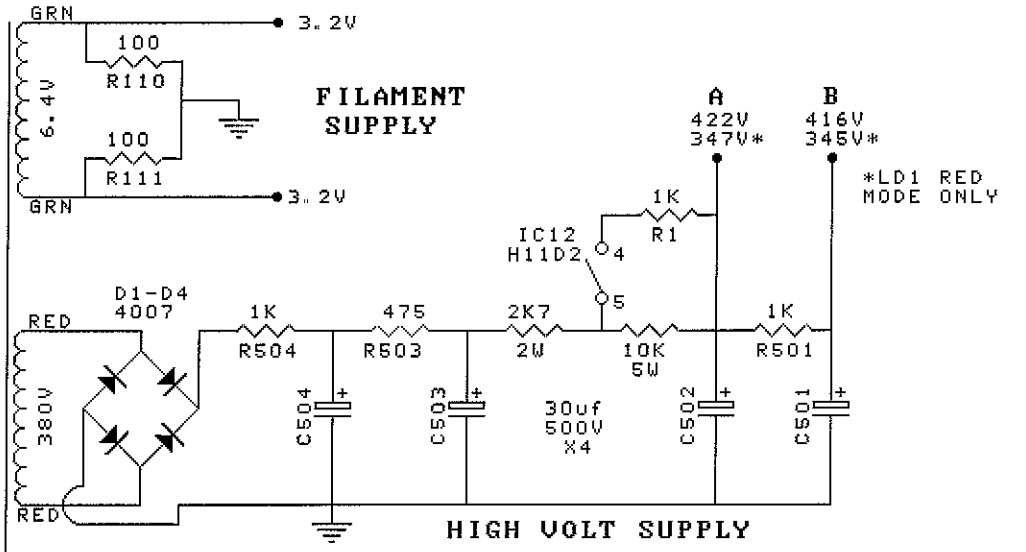
DOMESTIC PRIMARY

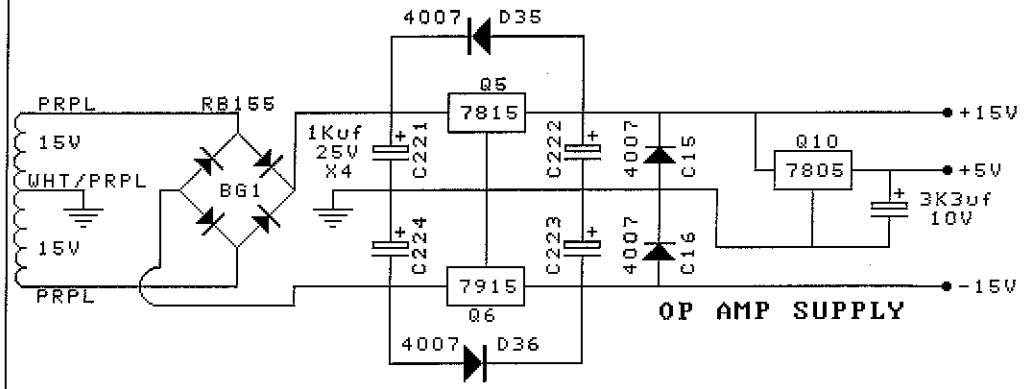


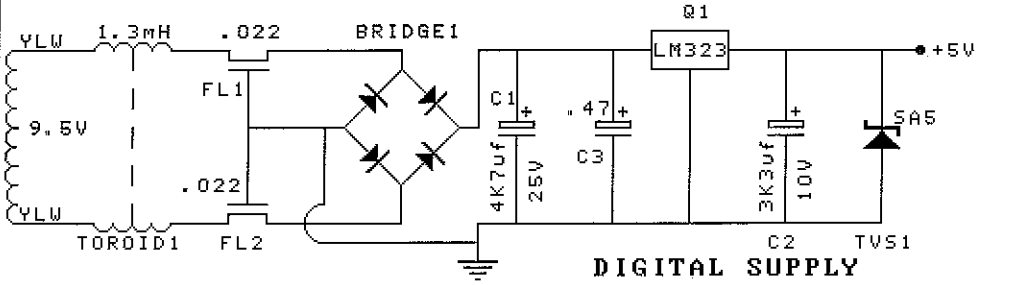
EXPORT PRIMARY



TX3 5V SUPPLY



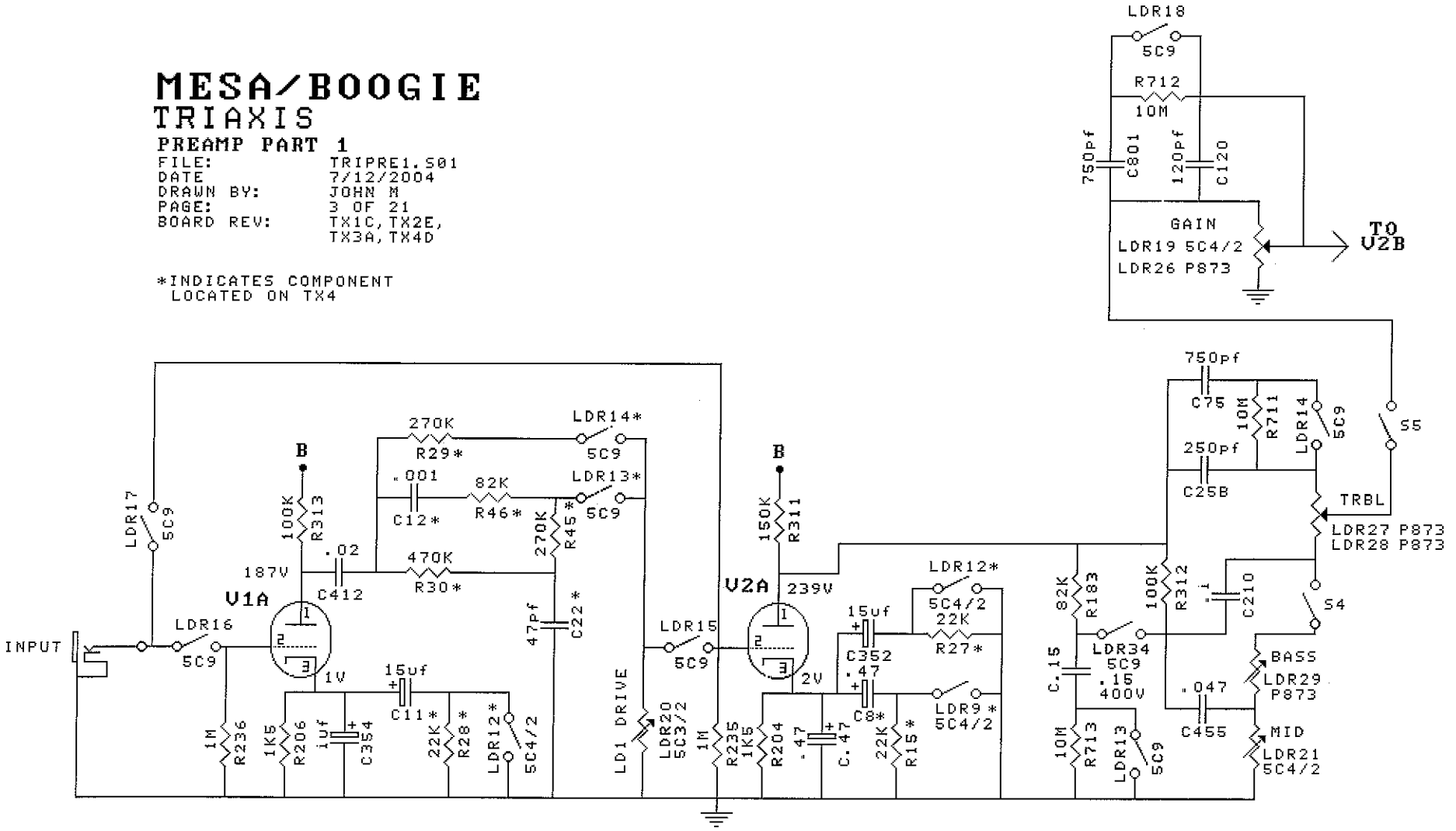




MESA/BOOGIE
TRIAXIS
PREAMP PART 1

FILE:	TRIPRE1.S01
DATE	7/12/2004
DRAWN BY:	JOHN M
PAGE:	3 OF 21
BOARD REV:	TX1C, TX2E, TX3A, TX4D

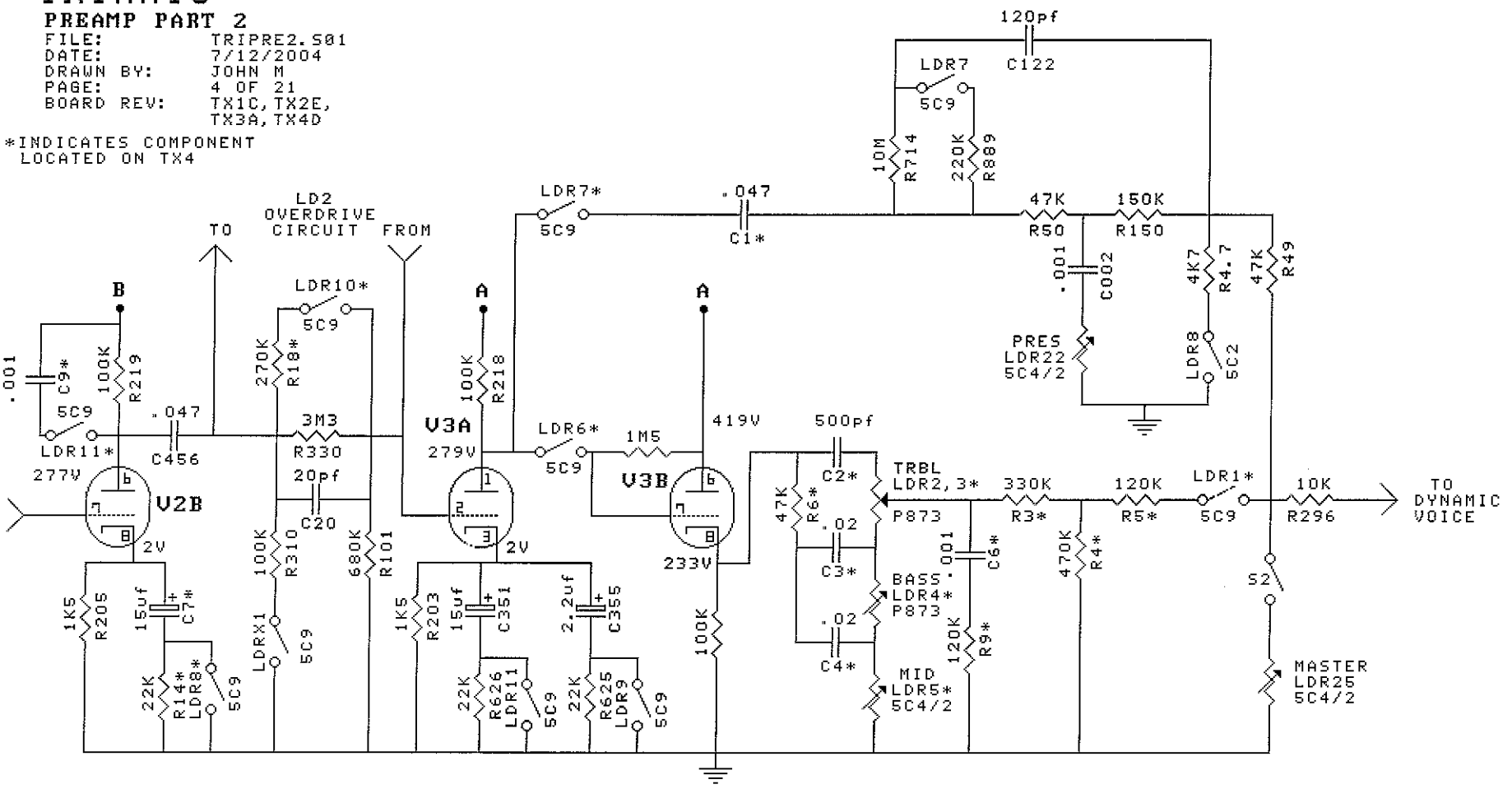
*INDICATES COMPONENT LOCATED ON TX4



MESA/BOOGIE
TRIAXIS
PREAMP PART 2

FILE: TRIPRE2.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 4 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D

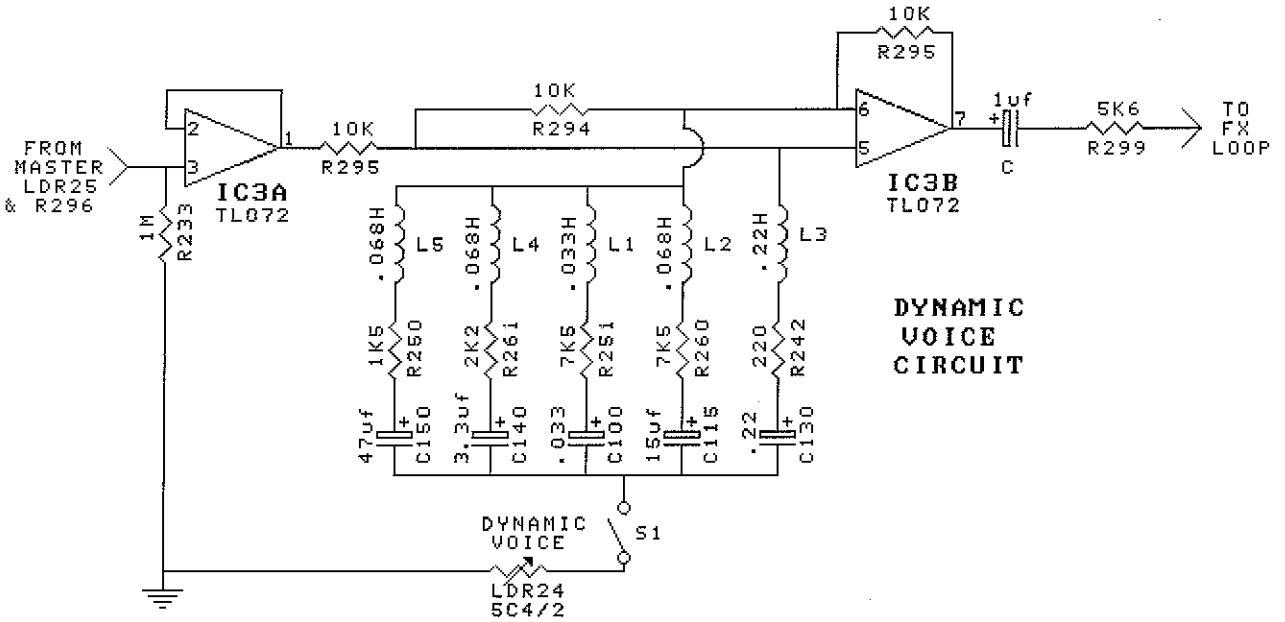
*INDICATES COMPONENT LOCATED ON TX4

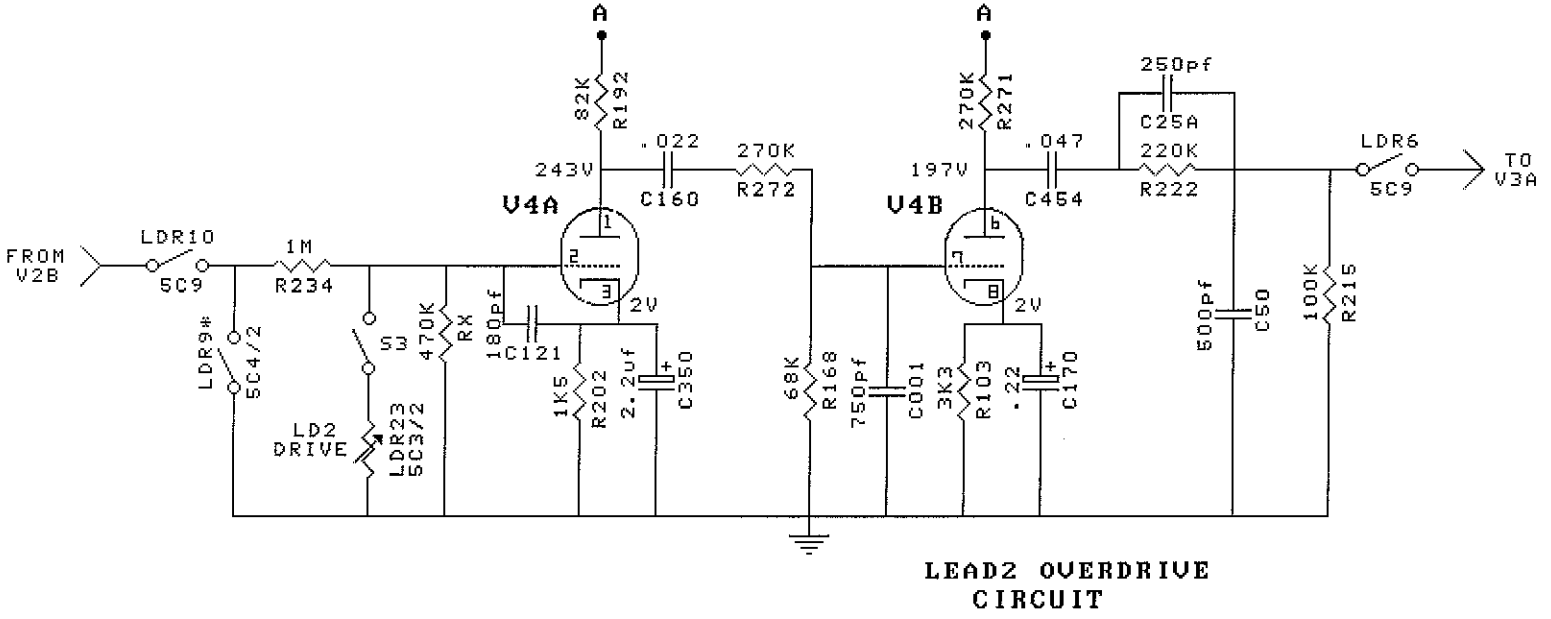


MESA/BOOGIE
TRIAXIS
PREAMP PART 3

FILE:	TRIPRE3.S01
DATE:	7/12/2004
DRAWN BY:	JOHN M
PAGE:	5 OF 21
BOARD REV:	TX1C, TX2E, TX3A, TX4D

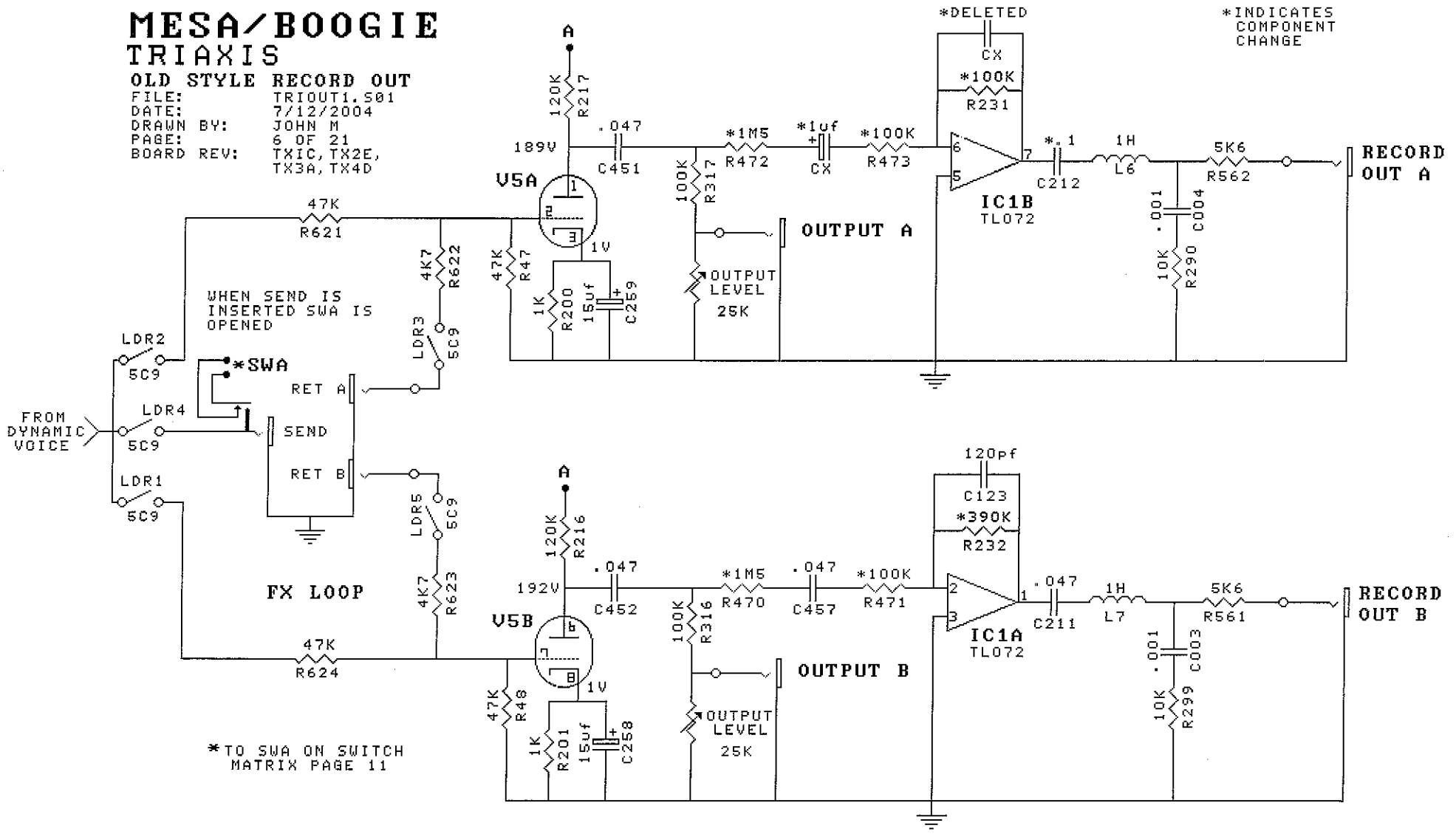
*INDICATES COMPONENT LOCATED ON TX4





MESA/BOOGIE
TRIAXIS
OLD STYLE RECORD OUT

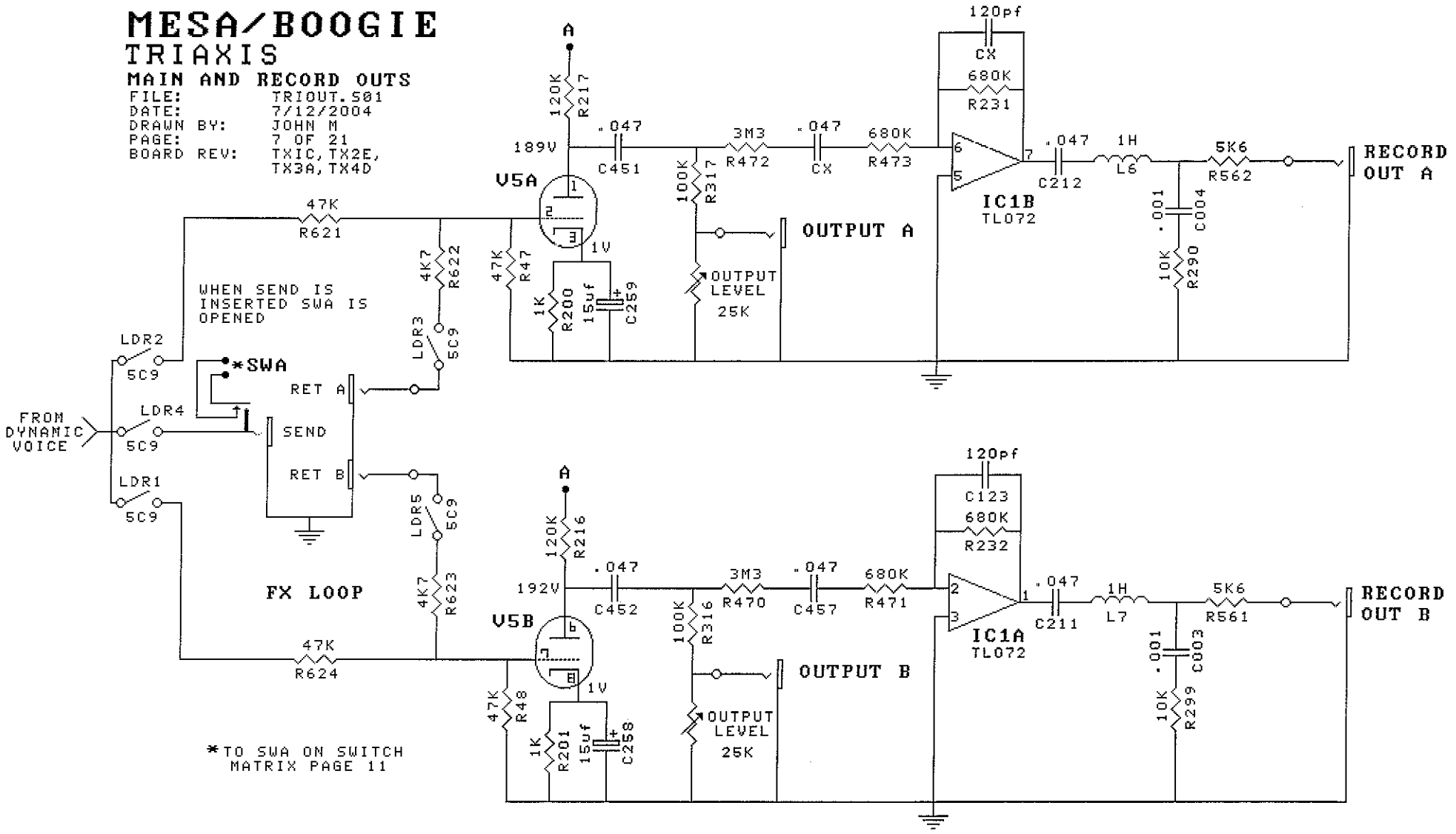
FILE: TRIOUT1.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 6 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D



OLD STYLE RECORD OUT CIRCUIT UP TO SER# T1631

MESA/BOOGIE
TRIAXIS
MAIN AND RECORD OUTS

FILE: TRIOUT.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 7 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D



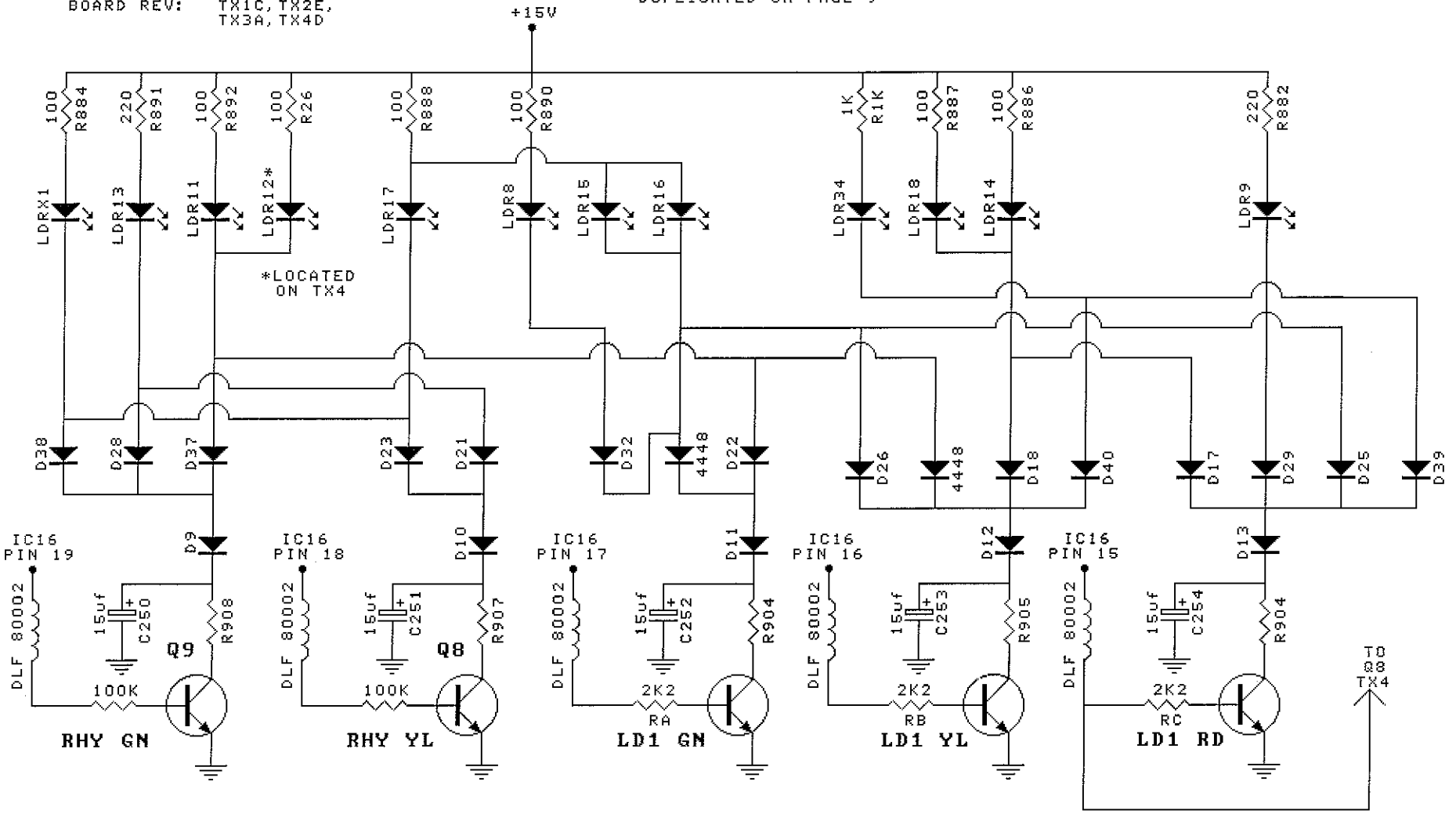
RECORD AND MAIN OUT CIRCUIT AFTER SER# T1631

MESA/BOOGIE
TRIAXIS
SWITCH MATRIX PART 1

FILE: TRISWI.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 8 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D

ALL DIODES 4007
UNLESS MARKED

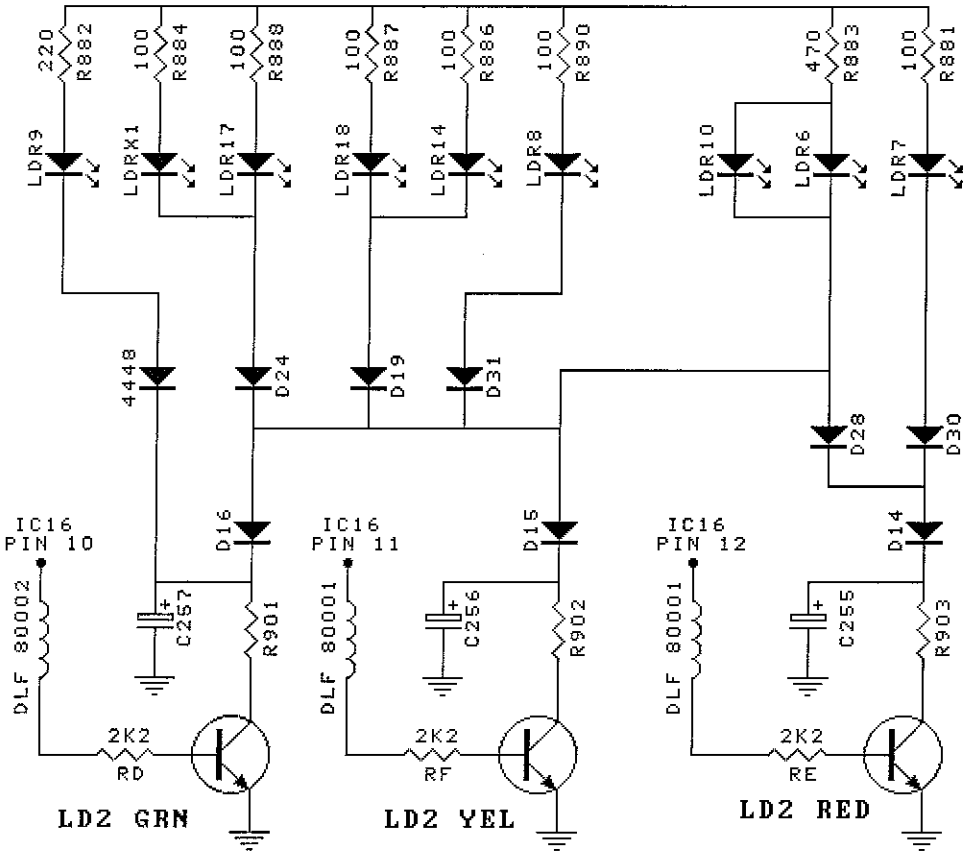
LDRS 8,9,14,17,18,X1
DUPLICATED ON PAGE 9



MESA/BOOGIE
TRIAXIS
SWITCH MATRIX PART 2

FILE: TRISW1.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 9 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D

LDRS 8,9,14,17,18,X1
DUPLICATED ON PAGE 8



LDR#	MODE	FUNCTION
LDRX1	RHY GN, YL LD2 ALL	PAD
LDR6	LD2 ALL	OVERDRIVE OUTPUT
LDR7	LD2 RD	VOICING
LDR8	LD1 GN, LD2 ALL	PAD
LDR9	LD1 RD, LD2GN	VOICING/MID BOOST
LDR10	LD2 ALL	OVERDRIVE INPUT
LDR11	RHY GN	BASS BOOST
LDR13	RHY GN, YL	PAD
LDR14	LD1 YL, RD LD2 ALL	VOICING
LDR15	LD1 ALL	OVERDRIVE OUTPUT
LDR16	LD1 ALL	OVERDRIVE INPUT
LDR17	RHY GN, YL LD2 ALL	INPUT
LDR18	LD1 YL, RD LD2 ALL	VOICING
LDR34	LD1 YL, RD	BASS SHIFT
*LDR12	RHY GN	BASS BOOST

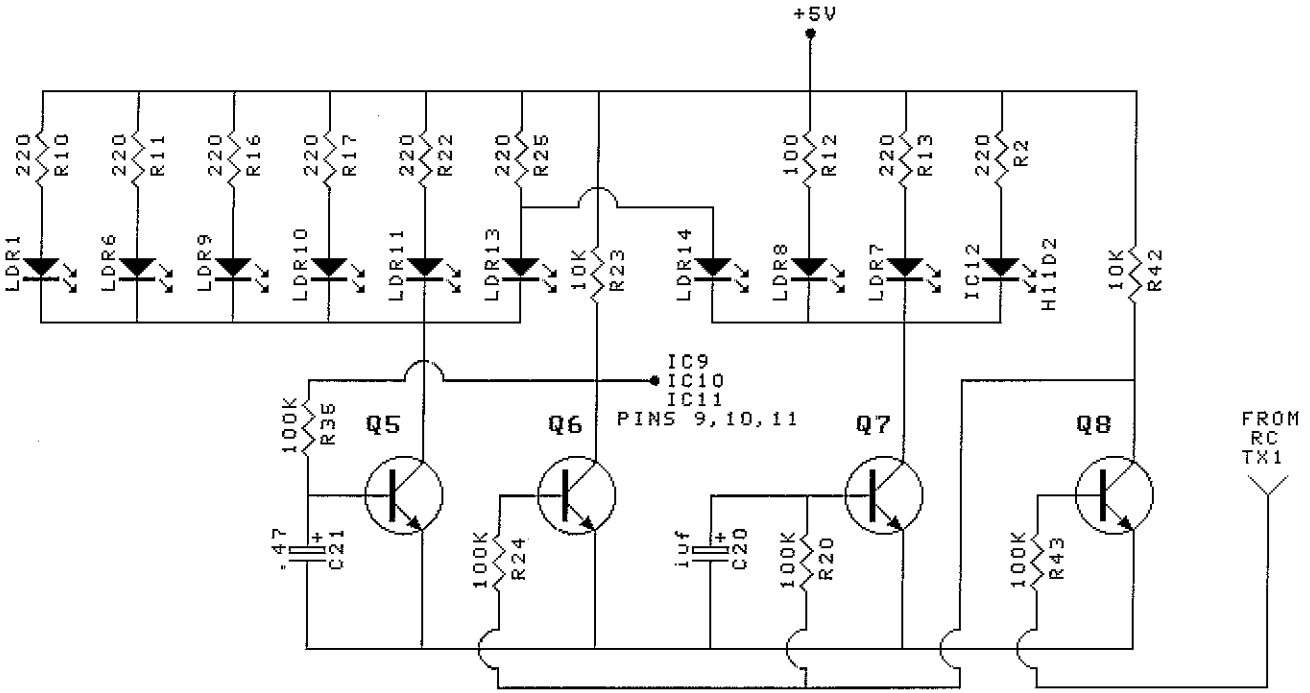
*LOCATED ON TX4

MESA/BOOGIE
TRIAXIS
SWITCH MATRIX PART 3
TX4/LD1 RD MODE

FILE: TRISW2.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 10 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D

ALL COMPONENTS ON THIS PAGE LOCATED ON TX4 CIRCUIT BOARD

LDR#	MODE	FUNCTION
LDR1	LD1 RD	OD/TONE OUTPUT
LDR6	LD1 RD	OD/TONE INPUT
LDR7	ALL MODE EXCEPT LD1 RD	VOICING/PRESENCE
LDR8	ALL MODE EXCEPT LD1 RD	BASS SHIFT
LDR9	LD1 RD	LD2 OD MUTE
LDR10	LD1 RD	VOICING
LDR11	LD1 RD	HIGH FREQ ROLLOFF
LDR13	LD1 RD	VOICING
LDR14	ALL MODE EXCEPT LD1 RD	VOICING



Q5-Q8 2N6426

MESA/BOOGIE

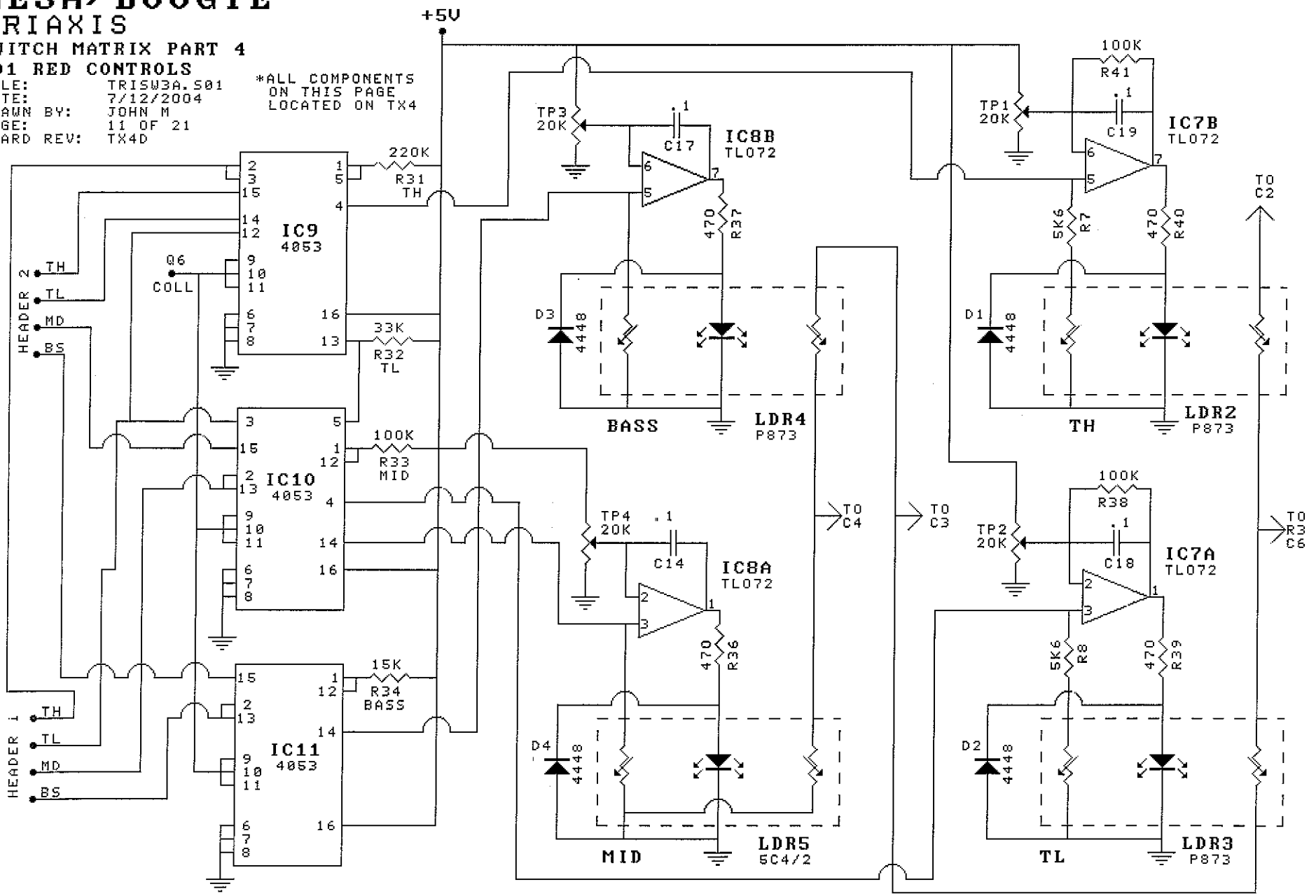
TRIAXIS

SWITCH MATRIX PART 4

LD1 RED CONTROLS

FILE: TRISW3A.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 11 OF 21
BOARD REV: TX4D

*ALL COMPONENTS ON THIS PAGE LOCATED ON TX4

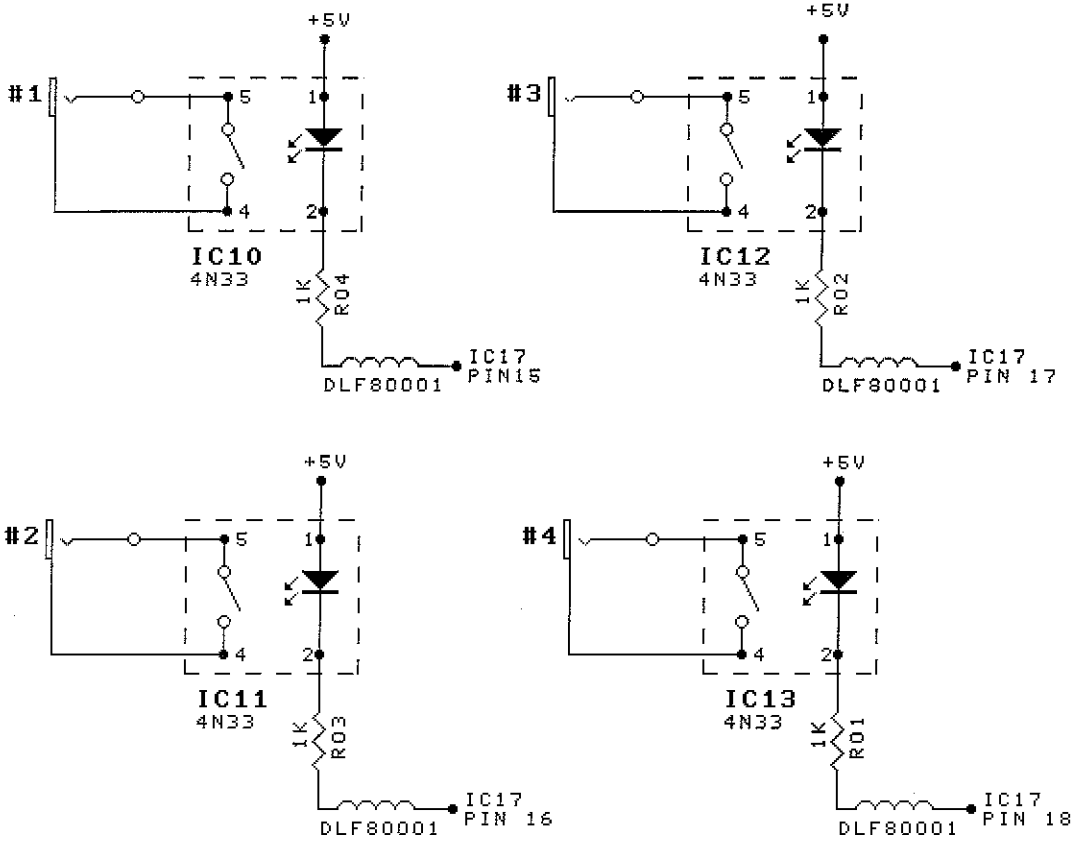


MESA/BOOGIE

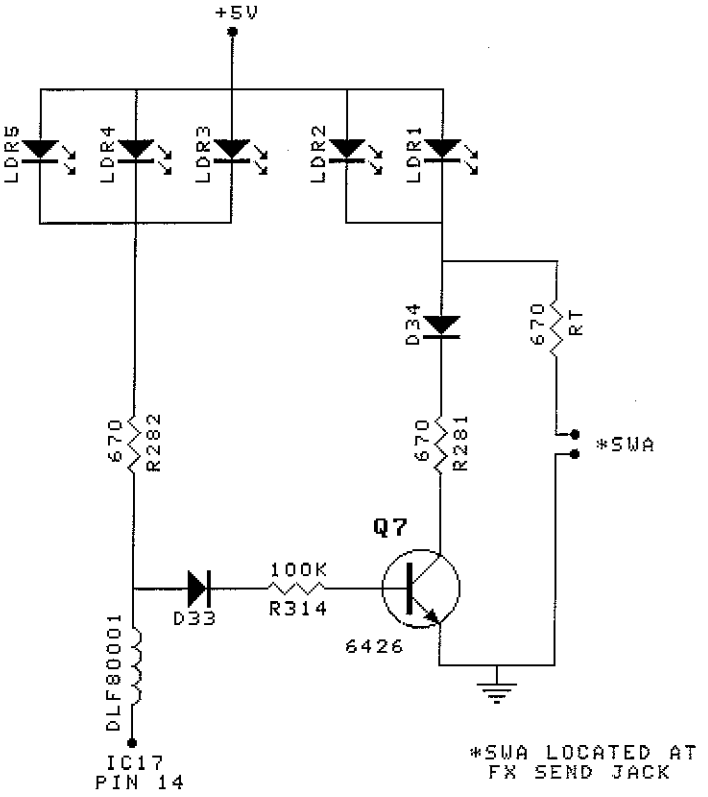
TRIAXIS

LOOP AND EXT SWITCHING

FILE: TRISW4.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 12 OF 21
BOARD REV: TX1C, TX2E
TX3A, TX4D



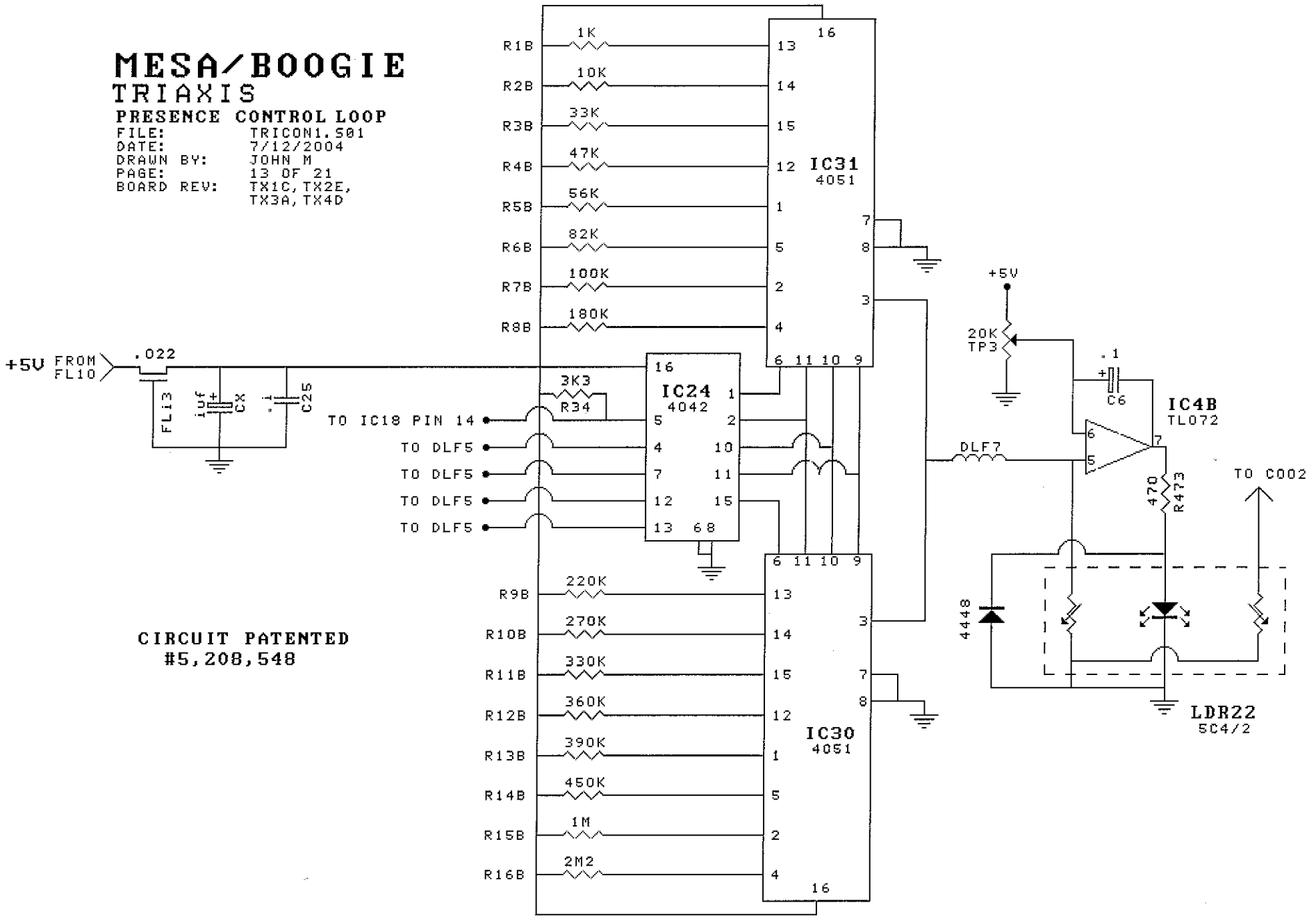
EXT SWITCHES



LOOP SWITCHING

MESA/BOOGIE
TRIAXIS
PRESENCE CONTROL LOOP

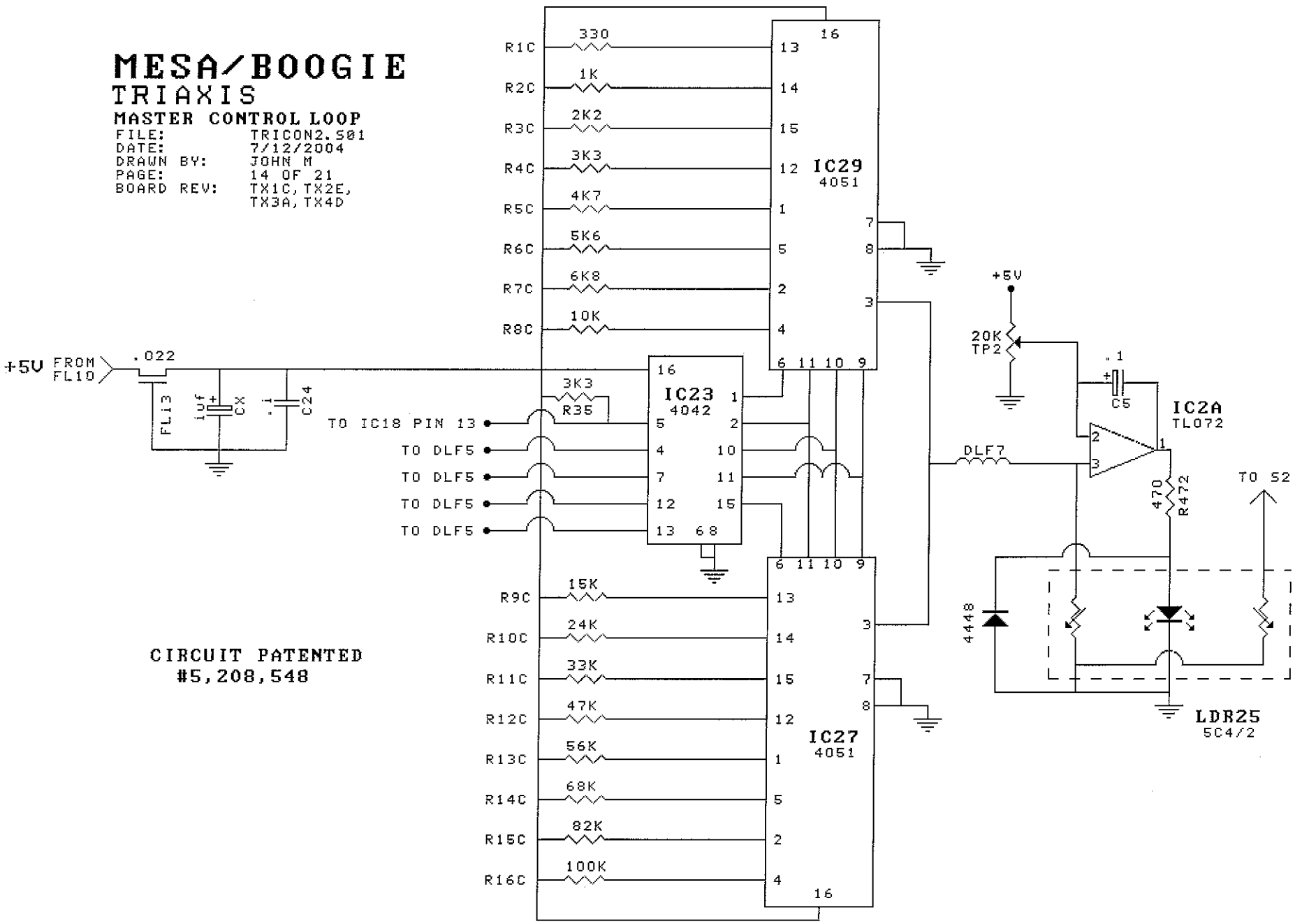
FILE: TRICON1.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 13 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D



CIRCUIT PATENTED
#5,208,548

MESA/BOOGIE
TRIAXIS
MASTER CONTROL LOOP

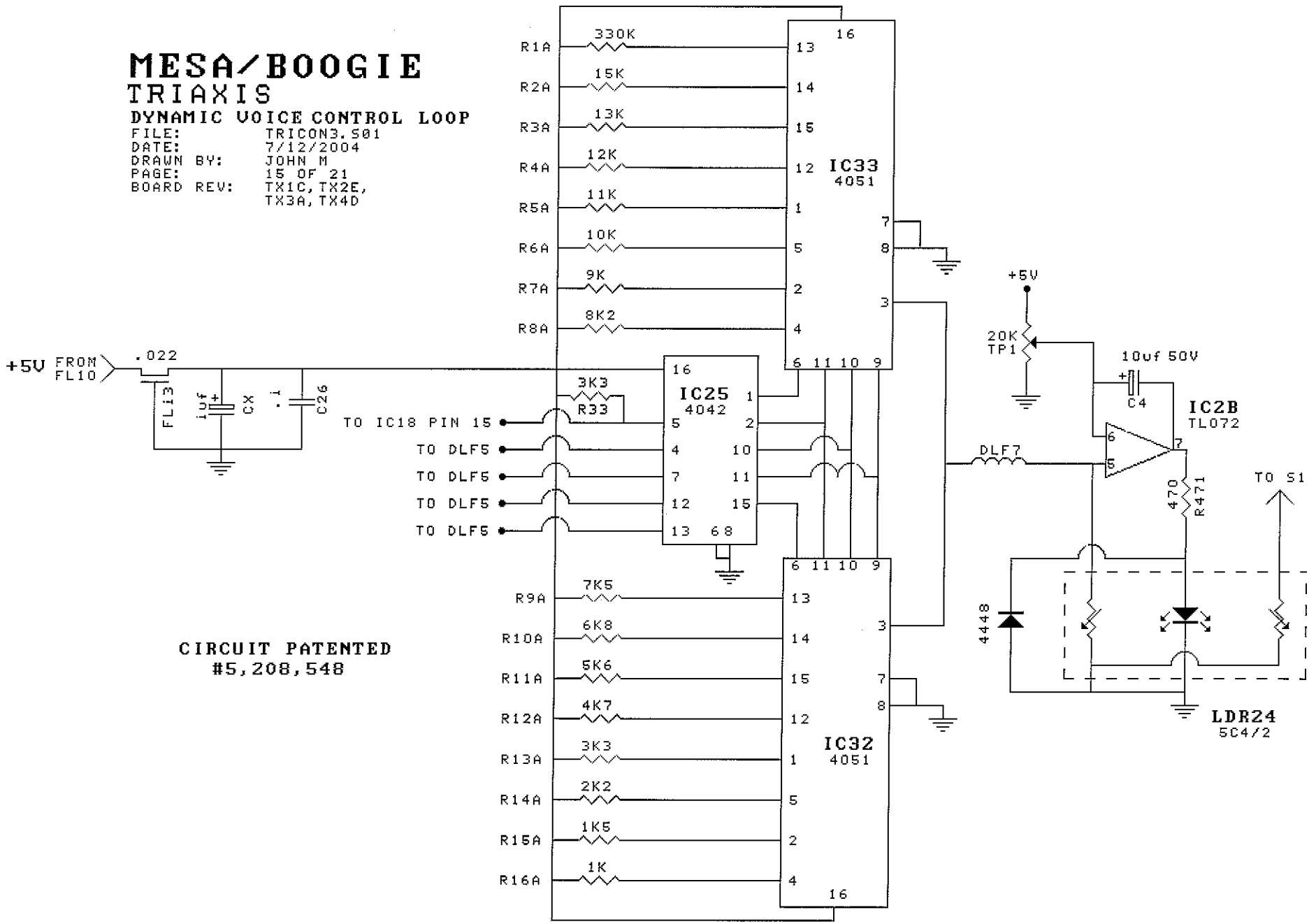
FILE:	TRICON2.S01
DATE:	7/12/2004
DRAWN BY:	JOHN M
PAGE:	14 OF 21
BOARD REV:	TX1C, TX2E, TX3A, TX4D



CIRCUIT PATENTED
#5,208,548

MESA/BOOGIE
TRIAXIS
DYNAMIC VOICE CONTROL LOOP

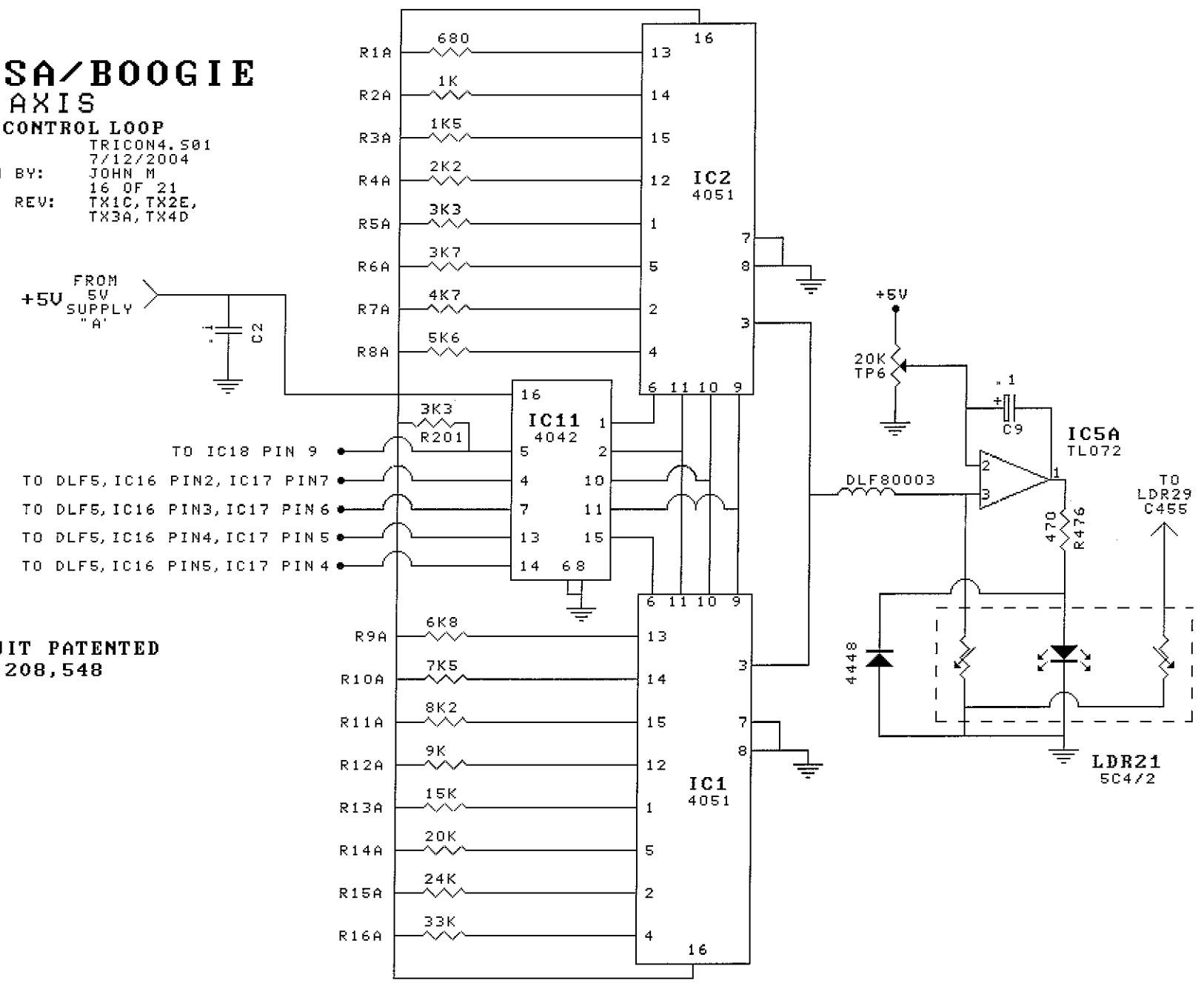
FILE: TRICON3.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 15 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D



CIRCUIT PATENTED
#5,208,548

MESA/BOOGIE
TRIAXIS
MID CONTROL LOOP

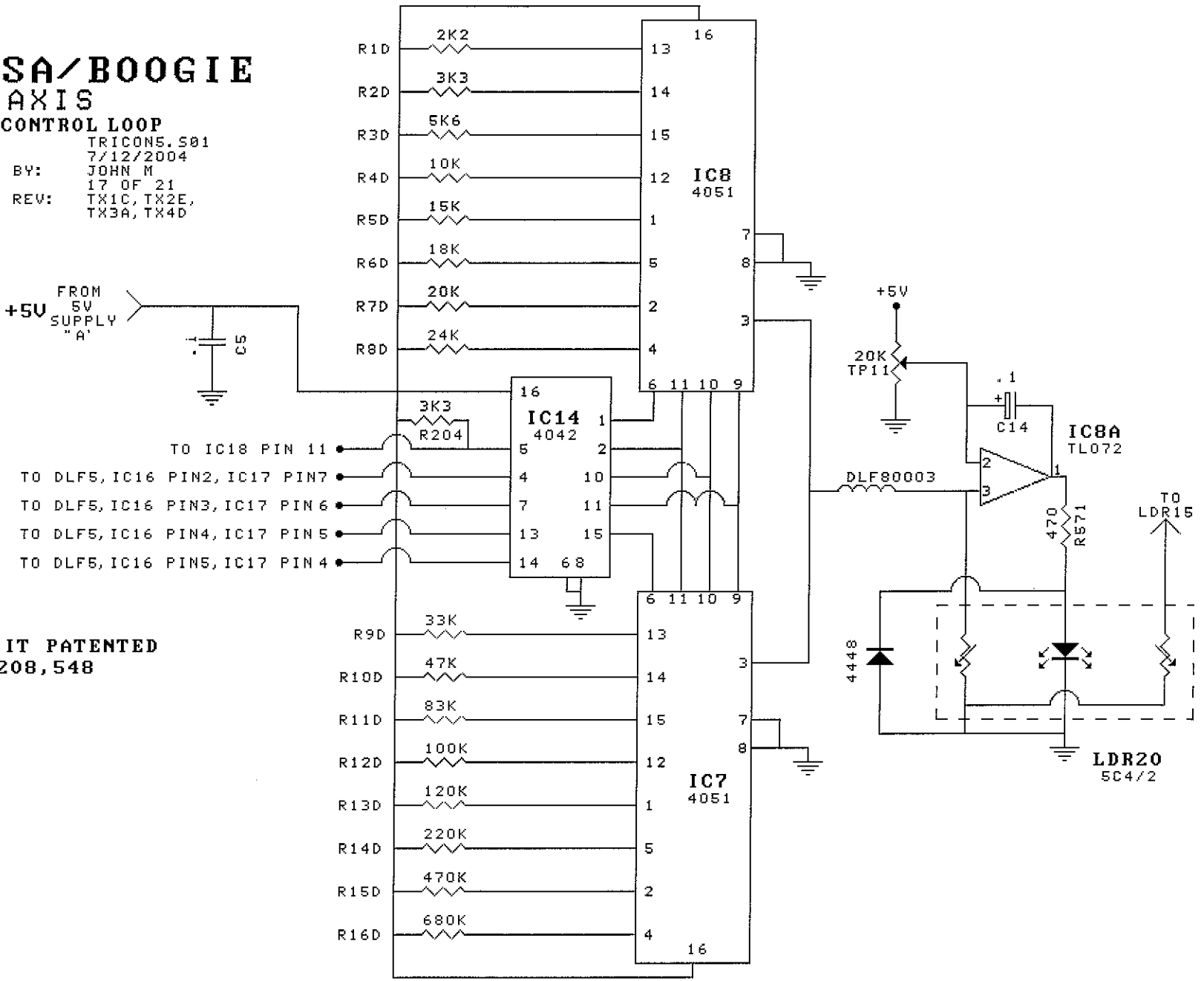
FILE: TRICON4.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 16 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D



CIRCUIT PATENTED
#5,208,548

MESA/BOOGIE
TRIAXIS
LD1 CONTROL LOOP

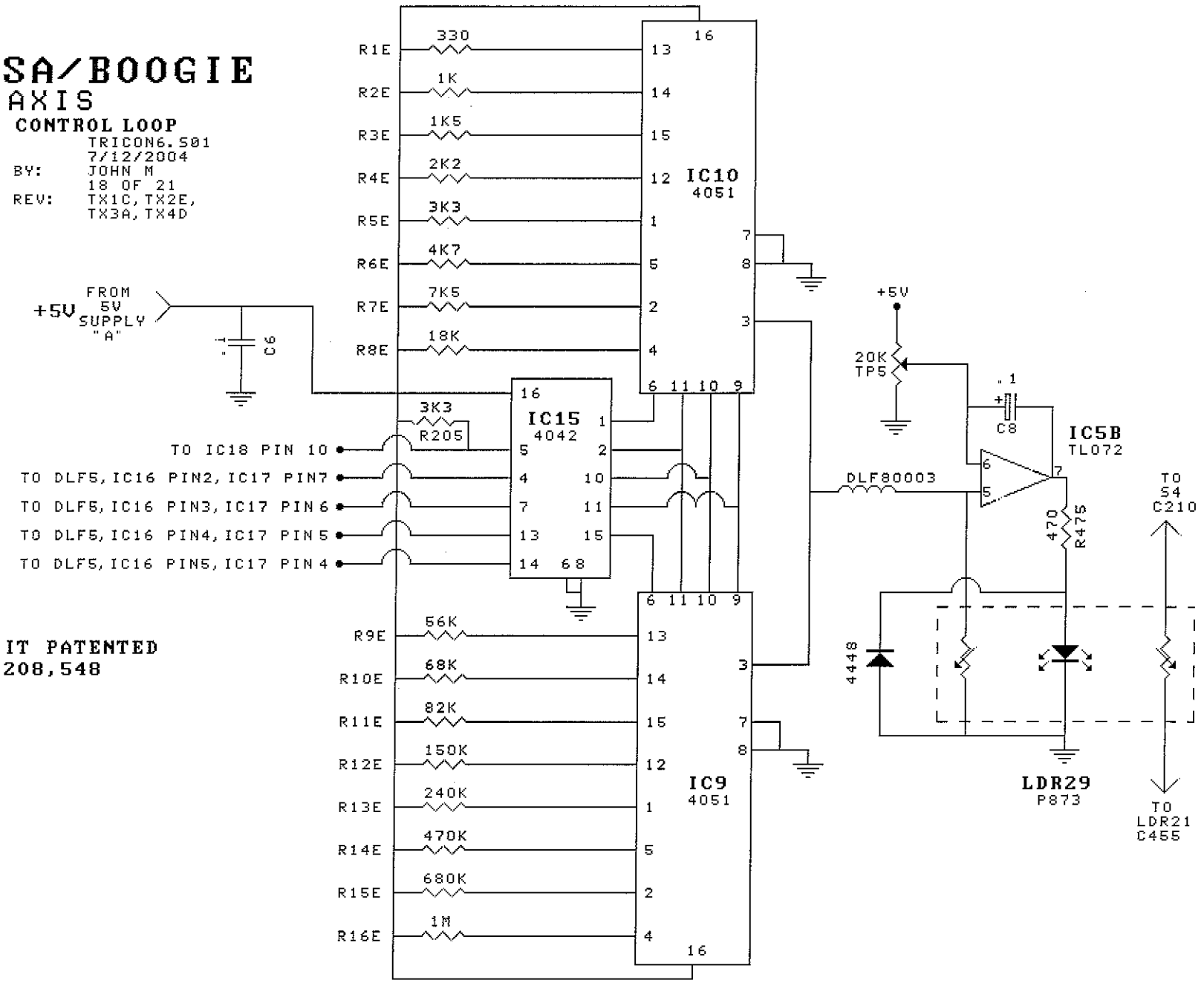
FILE: TRICON5.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 17 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D



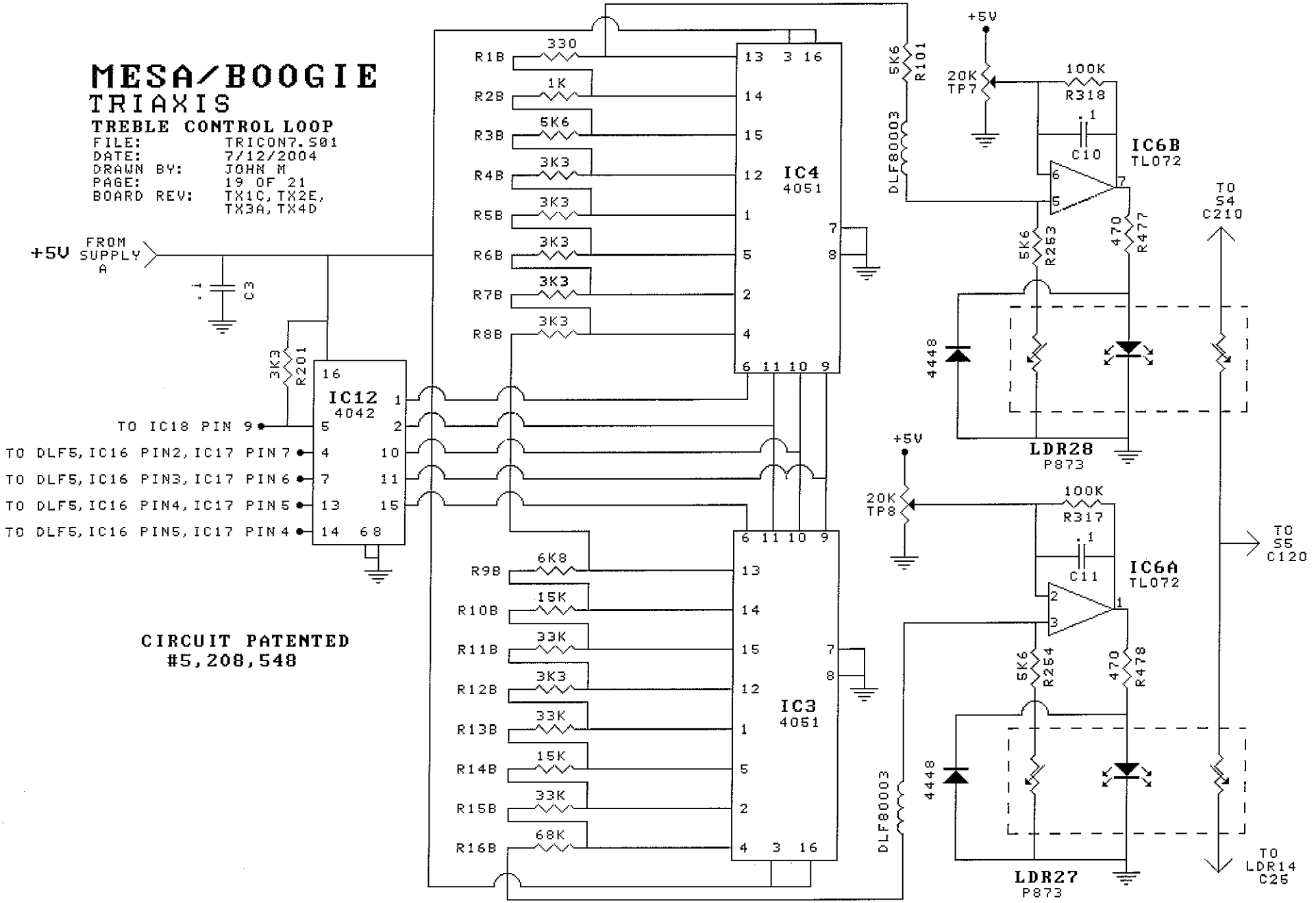
CIRCUIT PATENTED #5,208,548

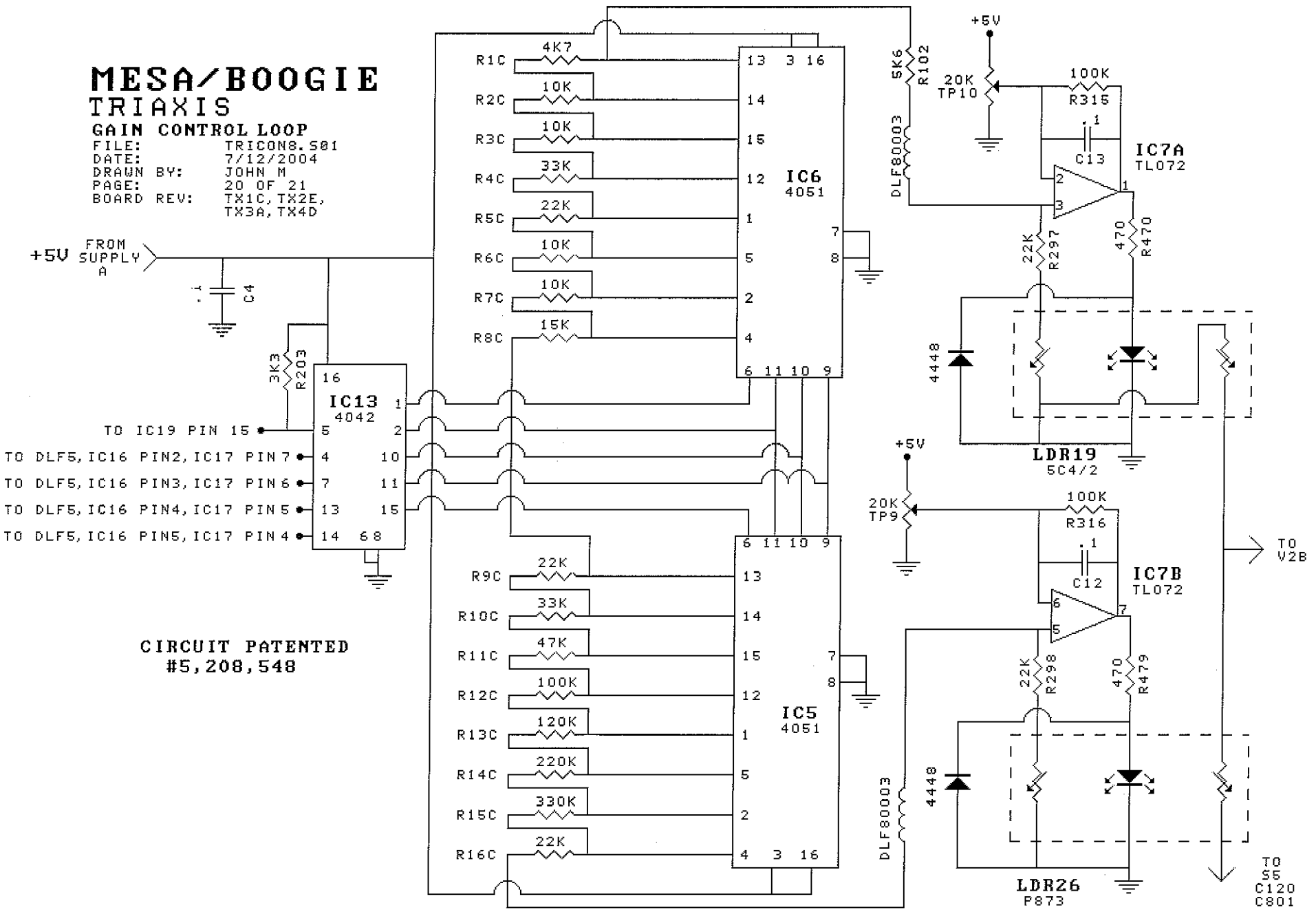
MESA/BOOGIE
TRIAXIS
BASS CONTROL LOOP

FILE: TRICON6.501
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 18 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D



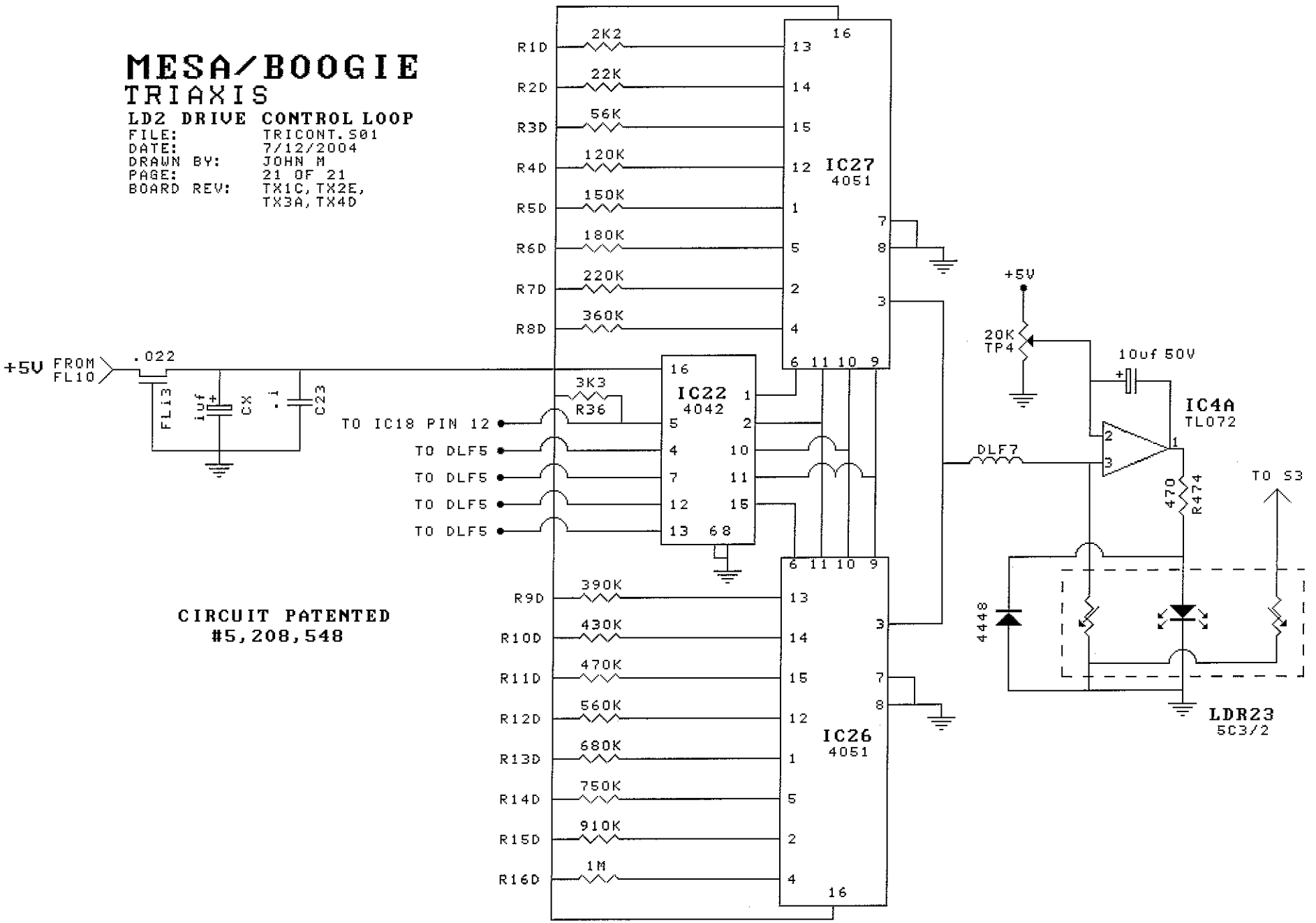
CIRCUIT PATENTED
#5,208,548


MESA/BOOGIE
TRIAXIS
TREBLE CONTROL LOOP
FILE: TRICON7.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 19 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D
+5V FROM SUPPLY A
.1 C3
3K3 R201
IC12 4042
TO IC18 PIN 9
TO DLF5, IC16 PIN2, IC17 PIN 7
TO DLF5, IC16 PIN3, IC17 PIN 6
TO DLF5, IC16 PIN4, IC17 PIN 5
TO DLF5, IC16 PIN5, IC17 PIN 4
CIRCUIT PATENTED #5,208,548
R1B 330
R2B 1K
R3B 5K6
R4B 3K3
R5B 3K3
R6B 3K3
R7B 3K3
R8B 3K3
IC4 4051
R9B 6K8
R10B 15K
R11B 33K
R12B 3K3
R13B 33K
R14B 15K
R15B 33K
R16B 68K
IC3 4051
5K6 R101
DLF80003
+5V
20K TP7
100K R318
.1 C10
IC6B TL072
5K6 R253
470 R477
4448
LDR28 P873
TO S4 C210
+5V
20K TP8
100K R317
.1 C11
IC6A TL072
5K6 R254
470 R478
4448
LDR27 P873
DLF80003
TO S5 C120
TO LDR14 C25

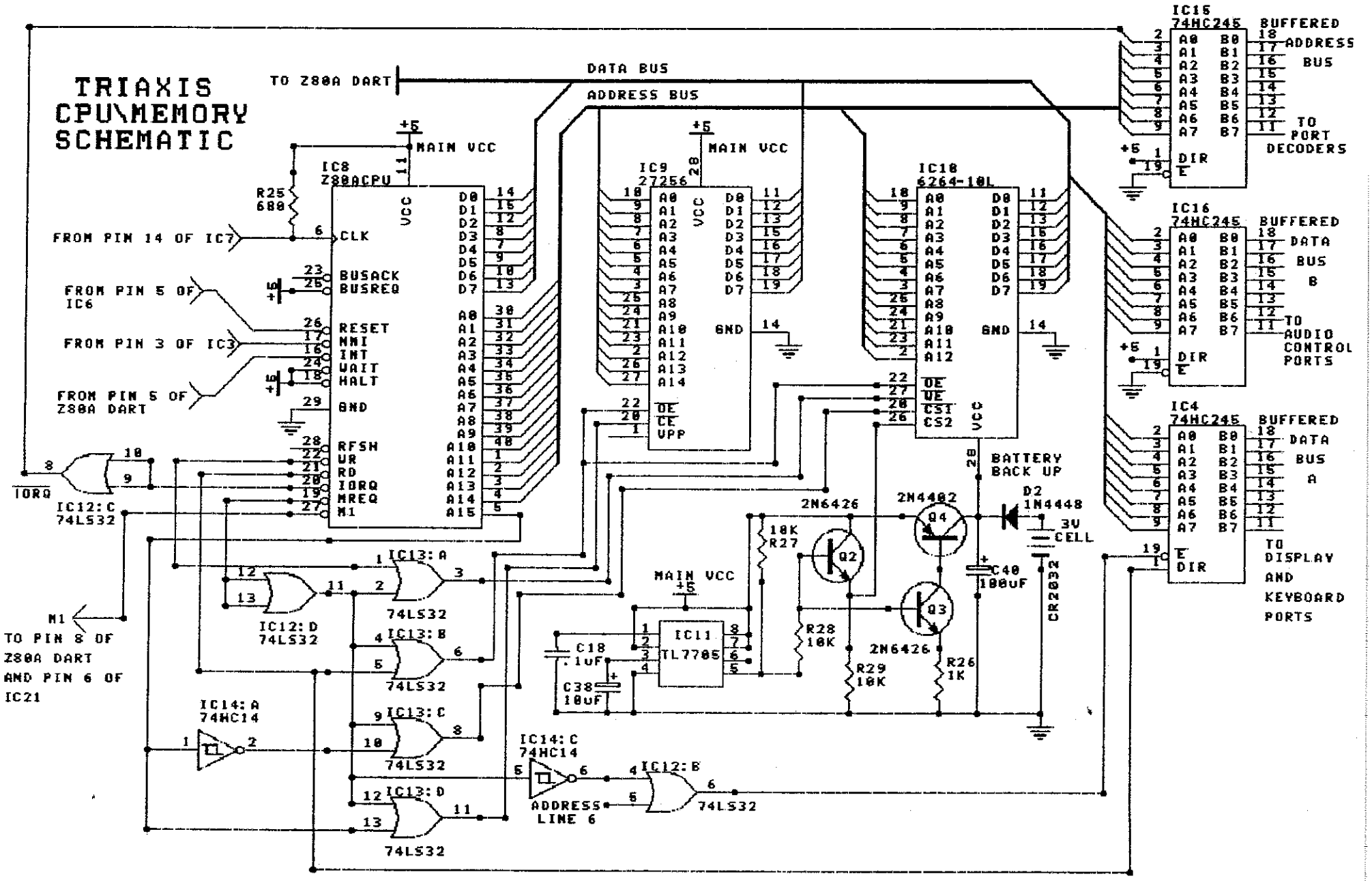

MESA/BOOGIE
TRIAXIS
GAIN CONTROL LOOP
FILE: TRICON8.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 20 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D
+5V FROM SUPPLY A
C4 .1
IC13 4042
3K3 R203
TO IC19 PIN 15
TO DLF5, IC16 PIN2, IC17 PIN 7
TO DLF5, IC16 PIN3, IC17 PIN 6
TO DLF5, IC16 PIN4, IC17 PIN 5
TO DLF5, IC16 PIN5, IC17 PIN 4
IC6 4051
R1C 4K7
R2C 10K
R3C 10K
R4C 33K
R5C 22K
R6C 10K
R7C 10K
R8C 15K
IC5 4051
R9C 22K
R10C 33K
R11C 47K
R12C 100K
R13C 120K
R14C 220K
R15C 330K
R16C 22K
CIRCUIT PATENTED #5,208,548
+5V
20K TP10
5K6 R102
DLF80003
100K R315
C13 .1
IC7A TL072
22K R297
470 R470
4448
LDR19 5C4/2
+5V
20K TP9
100K R316
C12 .1
IC7B TL072
22K R298
470 R479
4448
LDR26 P873
DLF80003
TO V2B
TO S5 C120 C801

MESA/BOOGIE
TRIAXIS
LD2 DRIVE CONTROL LOOP

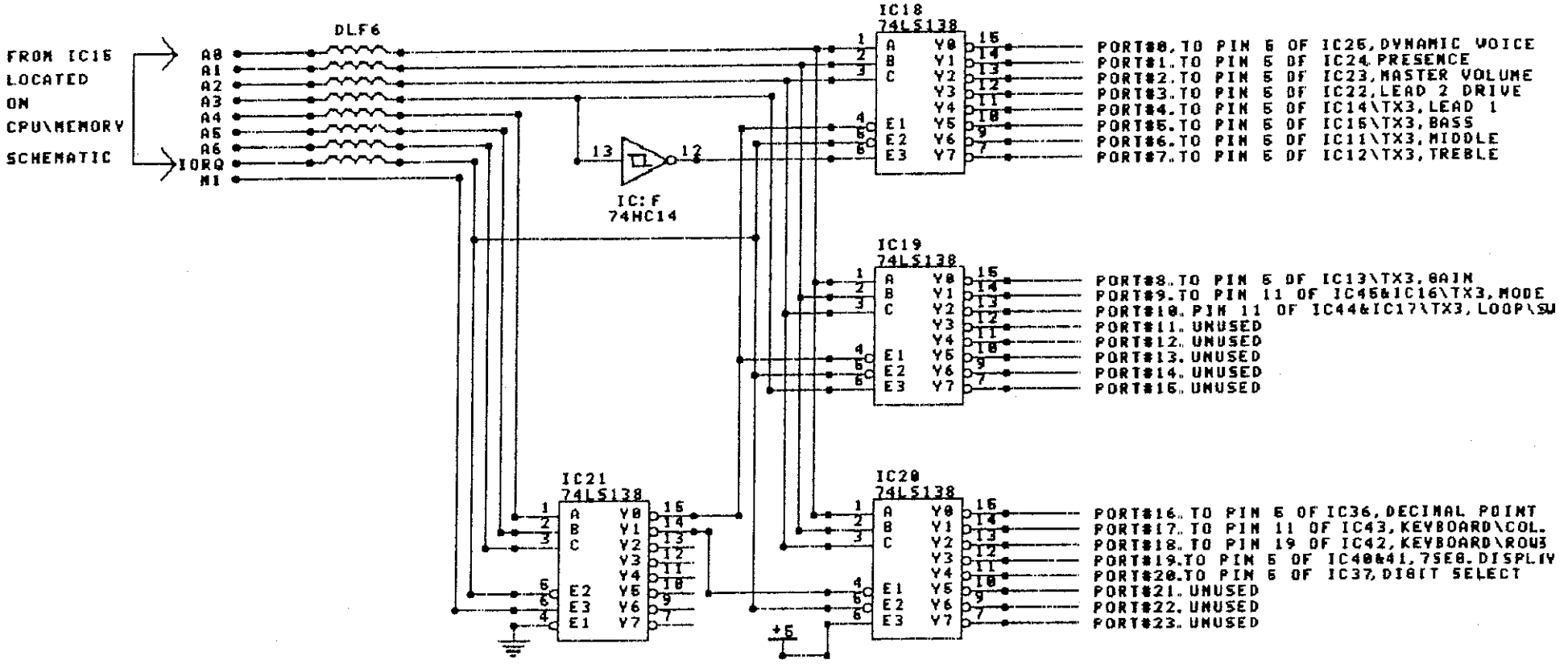
FILE: TRICONT.S01
DATE: 7/12/2004
DRAWN BY: JOHN M
PAGE: 21 OF 21
BOARD REV: TX1C, TX2E, TX3A, TX4D

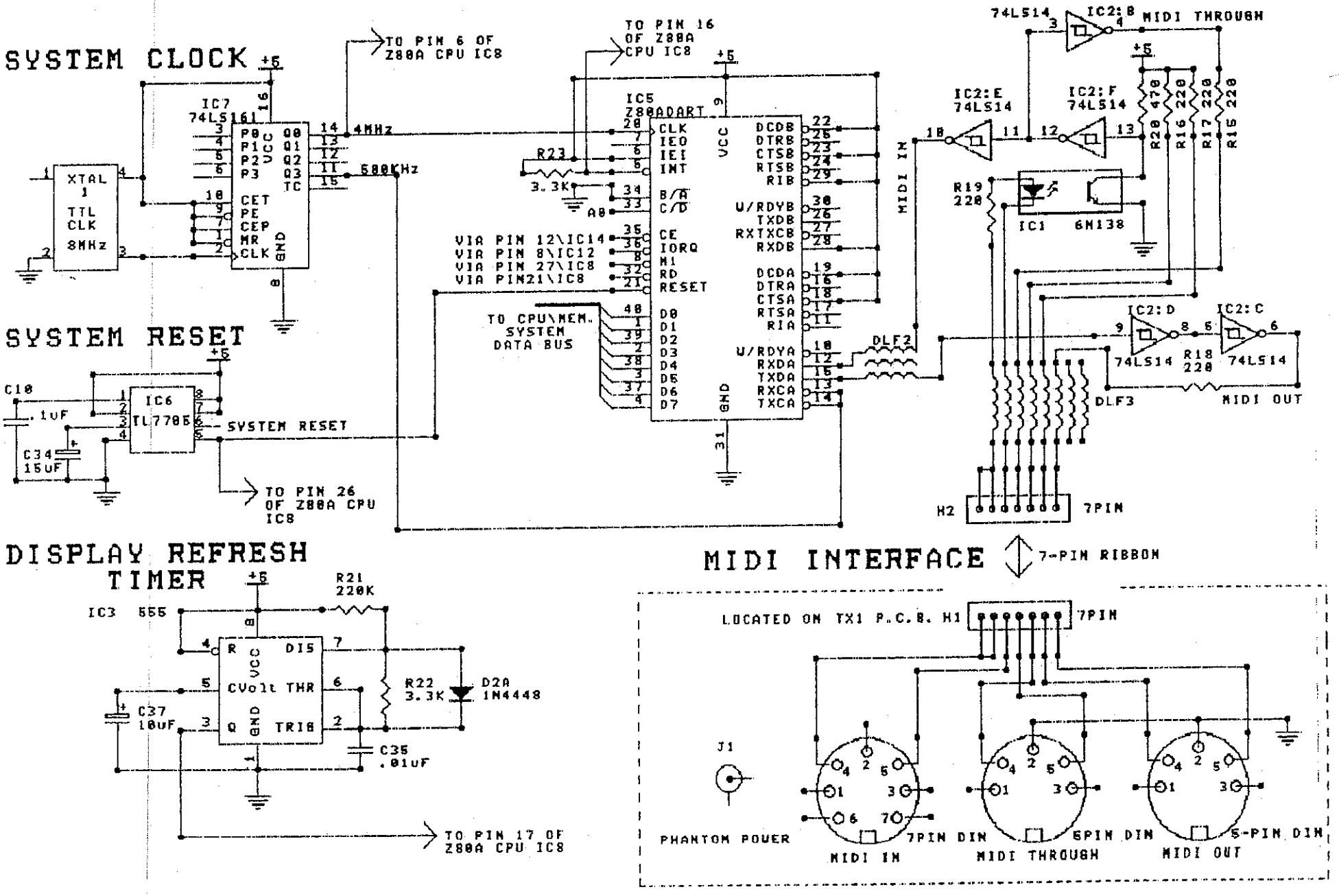


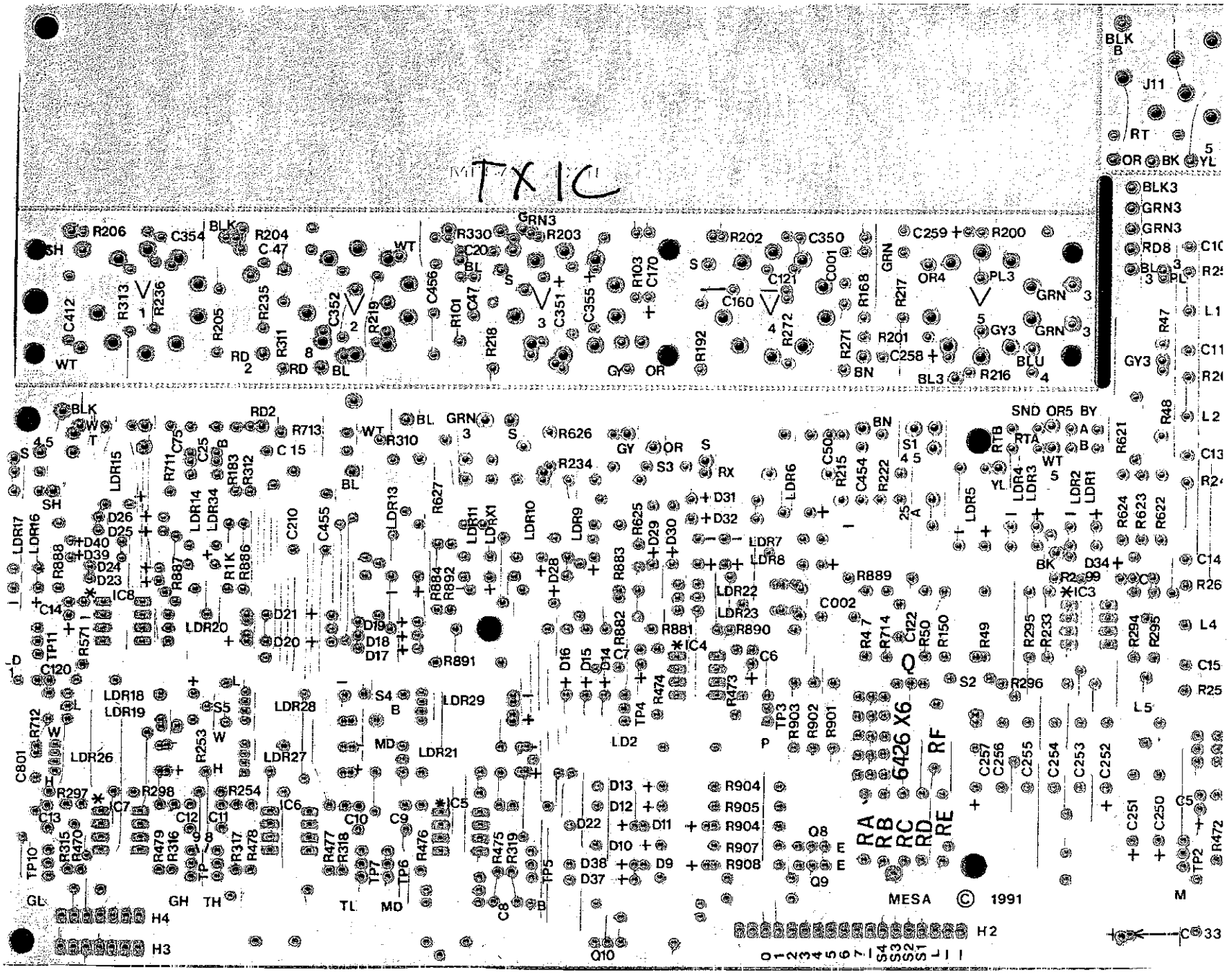
CIRCUIT PATENTED
#5,208,548

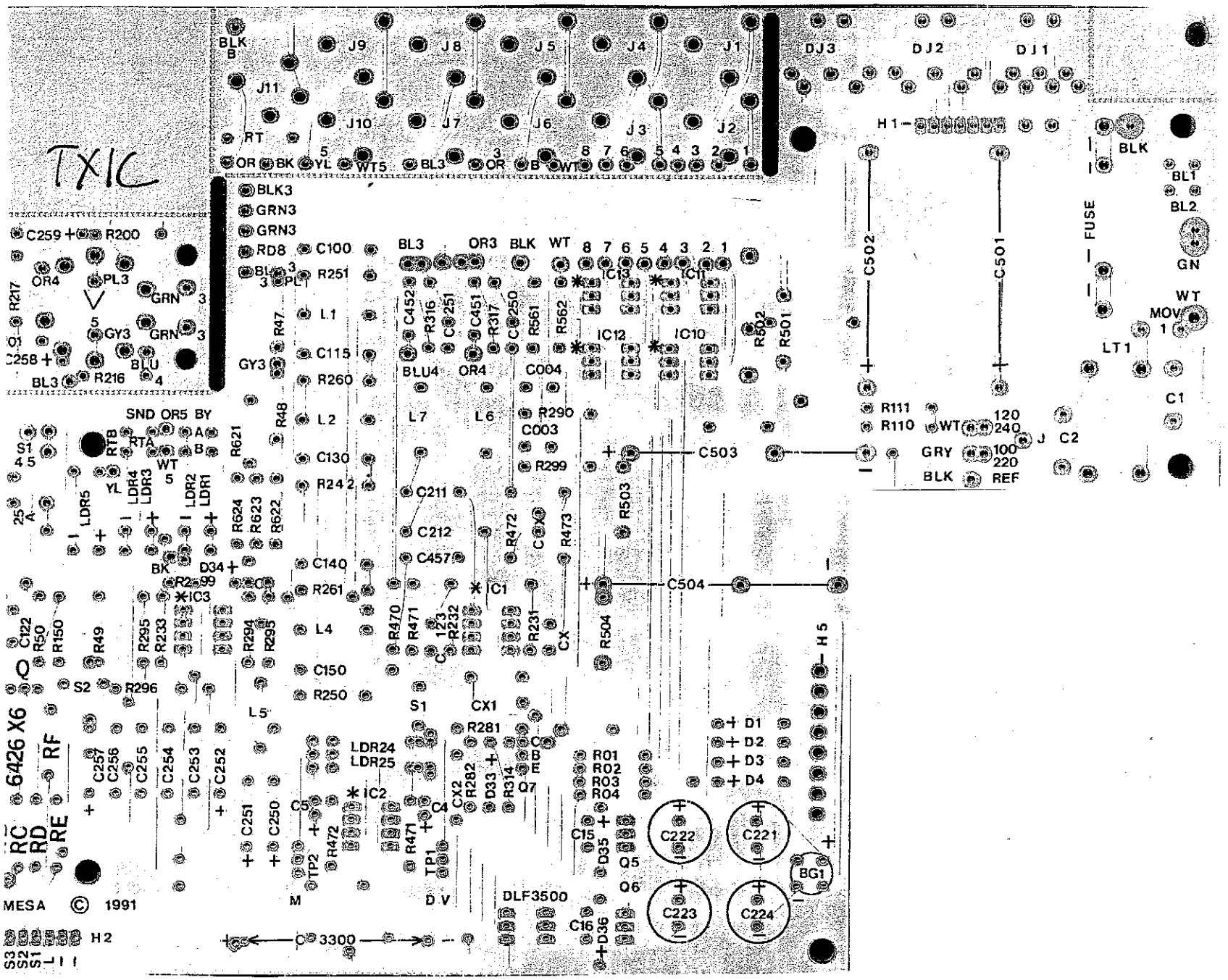

TRIAXIS
CPU\MEMORY
SCHEMATIC
TO Z80A DART
DATA BUS
ADDRESS BUS
MAIN VCC
IC8
Z80ACPU
R25
680
FROM PIN 14 OF IC7
FROM PIN 5 OF
IC6
FROM PIN 3 OF IC3
FROM PIN 5 OF
Z80A DART
CLK
BUSACK
BUSREQ
RESET
NMI
INT
WAIT
HALT
GND
RFSH
WR
RD
IORQ
MREQ
M1
IORQ
IC12:C
74LS532
M1
TO PIN 8 OF
Z80A DART
AND PIN 6 OF
IC21
IC12:D
74LS532
IC13:A
74LS532
IC13:B
74LS532
IC13:C
74LS532
IC13:D
74LS532
IC14:A
74HC14
IC14:C
74HC14
ADDRESS
LINE 6
IC12:B
74LS532
IC9
27256
VPP
OE
CE
IC18
6264-10L
CS1
CS2
BATTERY
BACK UP
D2
1N4448
3V
CELL
CR2032
C40
100uF
2N6426
2N4402
Q2
Q3
Q4
R27
10K
R28
10K
R29
10K
R26
1K
IC11
TL7705
C18
.1uF
C38
10uF
IC15
74HC245
BUFFERED
ADDRESS
BUS
TO
PORT
DECODERS
IC16
74HC245
BUFFERED
DATA
BUS
B
TO
AUDIO
CONTROL
PORTS
IC4
74HC245
BUFFERED
DATA
BUS
A
TO
DISPLAY
AND
KEYBOARD
PORTS
DIR
E

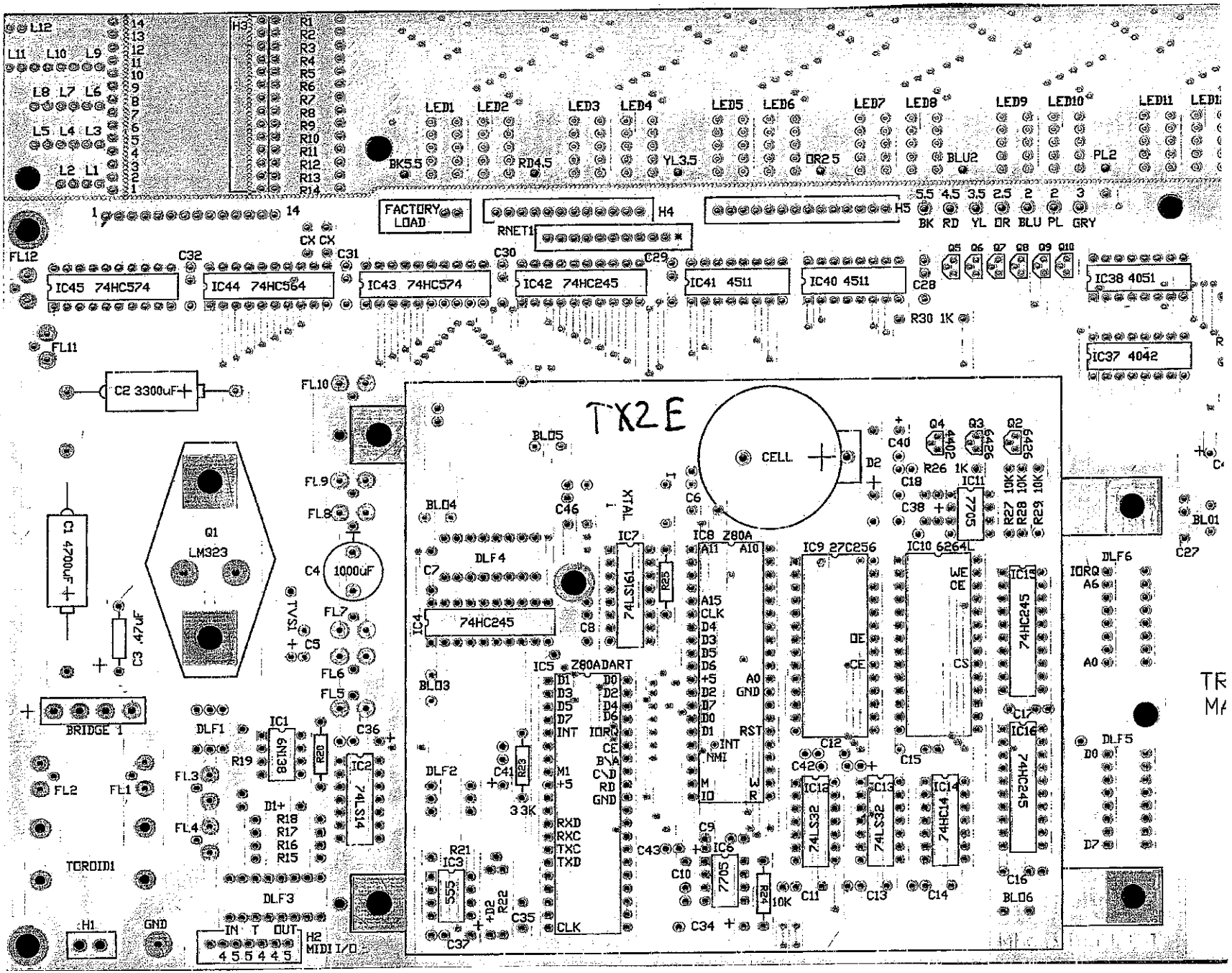
TRIAXIS PORT DECODER SCHEMATIC

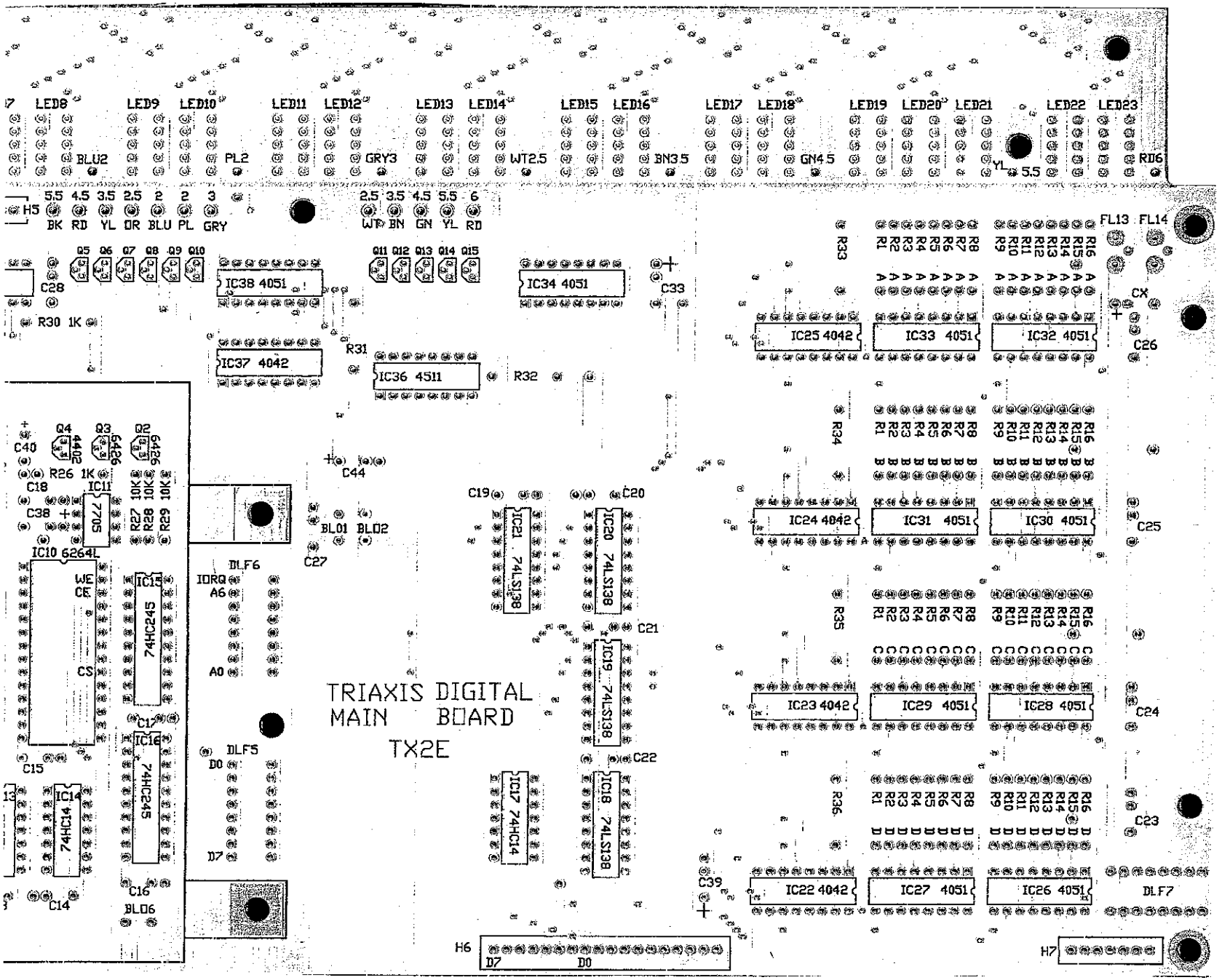


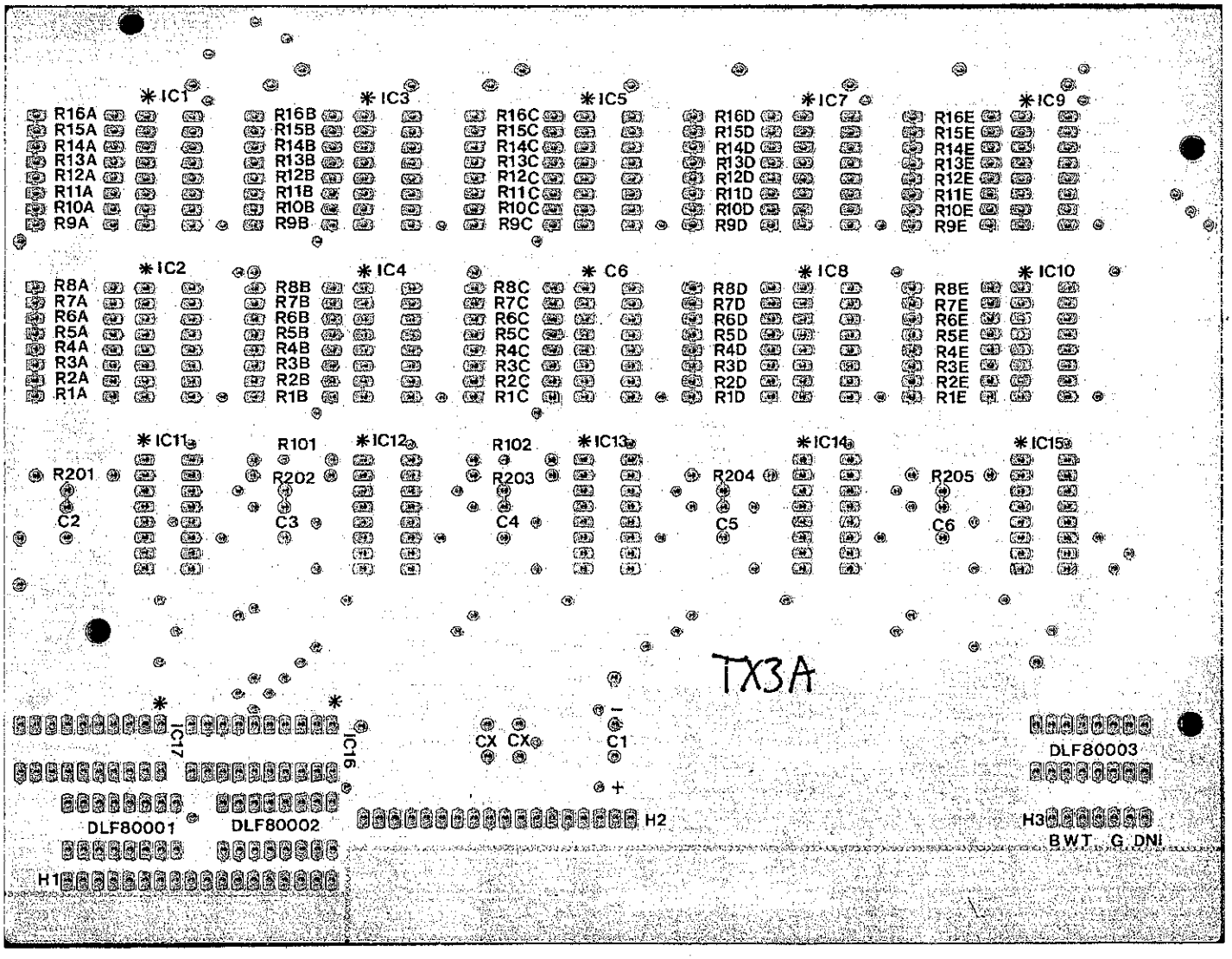

SYSTEM CLOCK
+5
IC7
74LS161
XTAL
1
TTL
CLK
8MHz
4MHz
580KHz
TO PIN 6 OF
Z80A CPU IC8
TO PIN 16
OF Z80A
CPU IC8
IC5
Z80ADART
R23
3.3K
VIA PIN 12\IC14
VIA PIN 8\IC12
VIA PIN 27\IC8
VIA PIN21\IC8
TO CPU\MEM.
SYSTEM
DATA BUS
SYSTEM RESET
C10
.1uF
C34
15uF
IC6
TL7705
SYSTEM RESET
TO PIN 26
OF Z80A CPU
IC8
74LS14
IC2:B
MIDI THROUGH
IC2:E
74LS14
IC2:F
74LS14
R20 470
R16 220
R17 220
R15 220
MIDI IN
R19
220
IC1
6N138
DLF2
DLF3
IC2:D
IC2:C
74LS14
R18
220
74LS14
MIDI OUT
H2
7PIN
DISPLAY REFRESH
TIMER
IC3 555
R21
220K
R22
3.3K
D2A
1N4448
C37
10uF
C35
.01uF
TO PIN 17 OF
Z80A CPU IC8
MIDI INTERFACE
7-PIN RIBBON
LOCATED ON TX1 P.C.B. H1
7PIN
J1
PHANTOM POWER
7PIN DIN
MIDI IN
6PIN DIN
MIDI THROUGH
5-PIN DIN
MIDI OUT

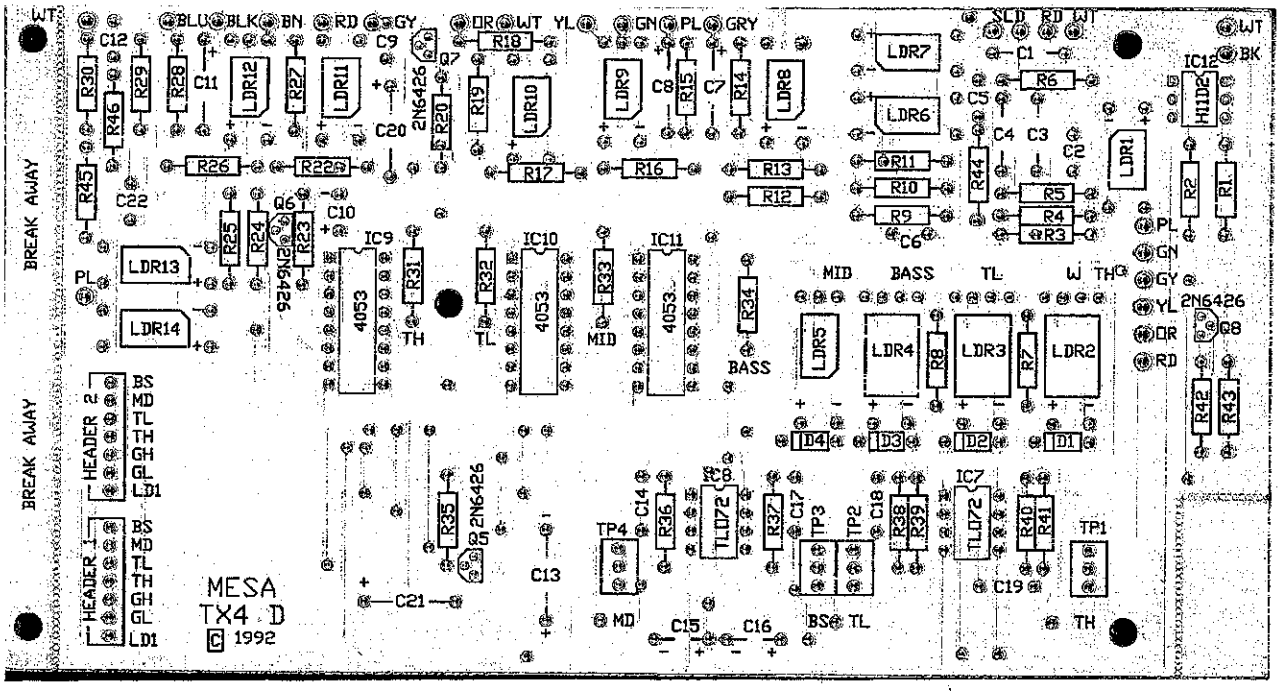

TX IC
MESA © 1991
6426 X6
RA
RB
RC
RD
RE
RF


TXIC
6426 X6
RF
RC
RD
RE
MESA © 1991
DLF3500
J9
J8
J5
J4
J1
DJ3
DJ2
DJ1
J11
J10
J7
J6
J3
J2
H1
H2
H5
BLK
BL1
BL2
GN
WT
MOV
1
LT1
FUSE
C502
C501
C503
C504
C1
C2
R111
R110
120
240
100
220
GRY
BLK
REF
C259
R200
R217
C258
R216
PL3
PL1
BLK3
GRN3
RD8
C100
R251
L1
C115
R260
L2
C130
R242
C140
R261
L4
C150
R250
L5
R47
R48
R621
R624
R623
R622
SND OR5 BY
RTB
RTA
WT
YL
LDR5
LDR4
LDR3
LDR2
LDR1
D34
IC3
S1
S2
R296
C122
R50
R150
R49
R295
R233
R294
R298
C257
C256
C255
C254
C253
C252
C251
C250
LDR24
LDR25
IC2
C5
C4
TP2
TP1
R472
R471
M
D V
C 3300
BL3
OR3
BLK
WT
IC13
IC11
IC12
IC10
C452
R316
C251
C451
R317
C250
R561
R562
R502
R501
BLU4
OR4
C004
R290
C003
R299
L7
L6
C211
C212
C457
IC1
R472
C
R473
R503
R470
R471
123
R232
R231
CX
R504
S1
CX1
R281
CX2
R282
D33
R314
Q7
R01
R02
R03
R04
C15
D35
Q5
Q6
C16
D36
C222
C221
C223
C224
BG1
D1
D2
D3
D4
C3
C2
C1
B
E

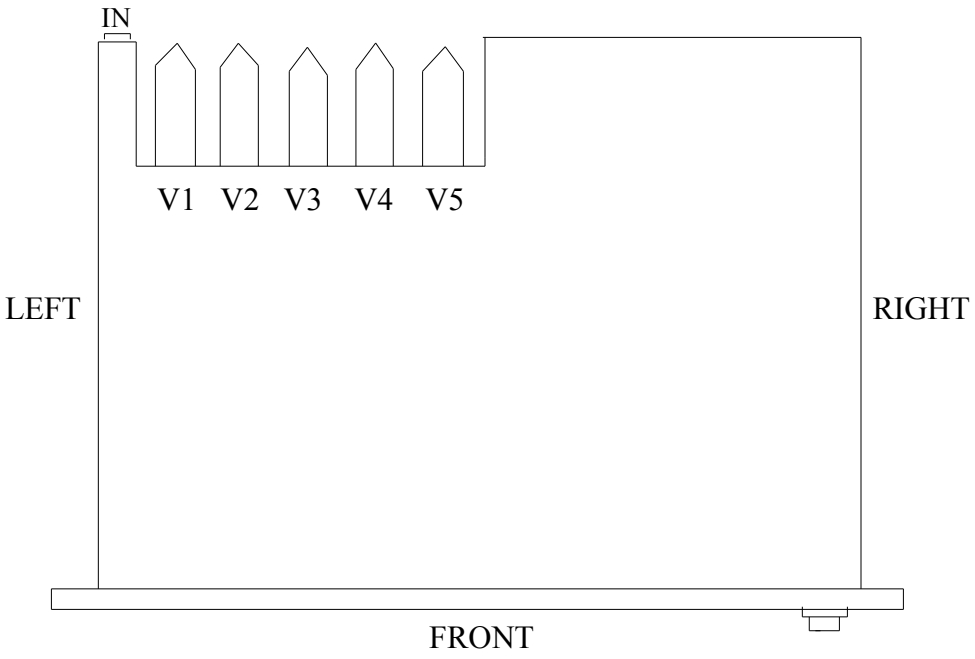

TX2E
L12
L11 L10 L9
L8 L7 L6
L5 L4 L3
L2 L1
H3
LED1 LED2 LED3 LED4 LED5 LED6 LED7 LED8 LED9 LED10 LED11
BK5.5 RD4.5 YL3.5 OR2.5 BLU2 PL2
FACTORY LOAD
RNET1
H4
H5
5.5 4.5 3.5 2.5 2 2 3
BK RD YL OR BLU PL GRY
FL12
FL11
FL10
FL9
FL8
FL7
FL6
FL5
FL4
FL3
FL2
FL1
C32
C31
C30
C29
C28
IC45 74HC574
IC44 74HC564
IC43 74HC574
IC42 74HC245
IC41 4511
IC40 4511
IC38 4051
IC37 4042
R30 1K
C2 3300uF
C1 4700uF
C3 4.7uF
C4 1000uF
C5
C6
C7
C8
C9
C10
C11
C12
C13
C14
C15
C16
C17
C18
C27
C34
C35
C36
C37
C38
C40
C41
C42
C43
C46
Q1
LM323
Q2 4426
Q3 4426
Q4 4402
R26 1K
R27 10K
R28 10K
R29 10K
BRIDGE 1
IC1 6N138
IC2 74LS14
IC3 555
IC4 74HC245
IC5 Z80ADART
IC6 7705
IC7 74LS161
IC8 Z80A
IC9 27C256
IC10 6264L
IC11 7705
IC12 74LS32
IC13 74LS32
IC14 74HC14
IC15 74HC245
IC16 74HC245
R18
R17
R16
R15
R19
R20
R21
R22
R23
R24 10K
R25
33K
D1+
+D2
TVS1
XTAL 1
CELL
D2
BL01
BL03
BL04
BL05
BL06
DLF1
DLF2
DLF3
DLF4
DLF5
DLF6
TOROID1
H1
GND
H2
MIDI I/O
IN T OUT
4 5 5 4 4 5
A15 CLK D4 D3 D5 D6 +5 D2 D7 D0 D1 INT NMI M1 IO
A11 A10 A0 GND RST
D1 D3 D5 D7 INT M1 +5 RXD RXC TXC TXD CLK
D0 D2 D4 D6 IORQ CE B/A C/D RD GND
WE CE OE CE CS
IORQ A6 A0 D0 D7
RD WR MI


TRIAXIS DIGITAL
MAIN BOARD
TX2E
LED8
LED9
LED10
LED11
LED12
LED13
LED14
LED15
LED16
LED17
LED18
LED19
LED20
LED21
LED22
LED23
BLU2
PL2
GRY3
WT2.5
BN3.5
GN4.5
YL 5.5
RD6
H5
BK RD YL OR BLU PL GRY
WT BN GN YL RD
IC38 4051
IC34 4051
IC37 4042
IC36 4511
IC25 4042
IC33 4051
IC32 4051
IC24 4042
IC31 4051
IC30 4051
IC23 4042
IC29 4051
IC28 4051
IC22 4042
IC27 4051
IC26 4051
IC10 6264L
IC11
IC15
IC16
IC14
IC21 74LS138
IC20 74LS138
IC19 74LS138
IC17 74HC14
IC18 74LS138
74HC245
DLF6
DLF5
DLF7
H6
H7
FL13
FL14
CX


IC1
IC3
IC5
IC7
IC9
R16A
R15A
R14A
R13A
R12A
R11A
R10A
R9A
R16B
R15B
R14B
R13B
R12B
R11B
R10B
R9B
R16C
R15C
R14C
R13C
R12C
R11C
R10C
R9C
R16D
R15D
R14D
R13D
R12D
R11D
R10D
R9D
R16E
R15E
R14E
R13E
R12E
R11E
R10E
R9E
IC2
IC4
C6
IC8
IC10
R8A
R7A
R6A
R5A
R4A
R3A
R2A
R1A
R8B
R7B
R6B
R5B
R4B
R3B
R2B
R1B
R8C
R7C
R6C
R5C
R4C
R3C
R2C
R1C
R8D
R7D
R6D
R5D
R4D
R3D
R2D
R1D
R8E
R7E
R6E
R5E
R4E
R3E
R2E
R1E
IC11
IC12
IC13
IC14
IC15
R201
C2
R101
R202
C3
R102
R203
C4
R204
C5
R205
C6
TX3A
IC17
IC16
CX
CX
C1
DLF80003
DLF80001
DLF80002
H2
H3
H1
BWT G DNI


MESA
TX4 .D
© 1992
BREAK AWAY
BREAK AWAY
HEADER 2
HEADER 1
BS
MD
TL
TH
GH
GL
LD1
MID
BASS
TL
TH
IC9
IC10
IC11
4053
2N6426
TLD72
LDR1
LDR2
LDR3
LDR4
LDR5
LDR6
LDR7
LDR8
LDR9
LDR10
LDR11
LDR12
LDR13
LDR14
WT
BLU
BLK
BN
RD
GY
OR
YL
GN
PL
GRY
BK

Triaxis Tube Chart



V1A Input Stage Lead 1 Modes
V1B N/A

V2A Input Stage all other Modes
V2B Gain Stage

V3A Gain Stage/Lead--Rhythm Mixer
V3B On units w/TX4--Lead 1 Red Tone Control Buffer Stage
w/o TX4-- Gain Stage

V4A Lead 2 Drive Stage
V4B Lead 2 Drive Stage

V5A Effects Return/Output Side A
V5B Effects Return/Output Side B

1) Board Layout

The Triaxis has several different circuit boards, and you should be familiar with them before repairing or calibrating the Triaxis. The unit should be on the bench in front of you, with the front panel facing towards you. All directional references (left, right, front, rear) will be from this orientation.

The large board in the front half of the unit is the TX2 board. Under the large silver cover is the Eprom, the CPU, the battery, and most of the digital program ICs. On the right side of the board is the midi circuit and the power supply for the digital section. On the far left side of the board are the control sections for the Dynamic Voice, Presence, Master, and Lead 2 Drive controls. This board, along with the two LED display boards on the front panel, are included in the scan of the TX2 board.

Raised above the TX2 board in the left front half of the unit is the TX3 board. This board holds the control sections for the Mid, Treble, Gain, Lead 1 Drive, and Bass controls.

The large board in the rear half of the unit is the TX1 board. The far right side of this board holds the power supplies for the filaments, the high voltage, and the op amps. To the left of the power supplies are the function switches, the main and record out circuits, and the dynamic voice circuit. In the middle of the board will be the IC (IC9) that controls the mode selection. (This was updated on later models to be six 6462 transistors instead of a single IC). Along the rear edge in the middle of the board are the five LDRs that control the effects loop. The rest of the board is the audio portion, including the all controls for the audio parameters. This board and the two rear panel boards are included in the scan of the TX1 board.

On units that have serial #s T1631 to T8279, there will be a circuit board that is raised above the left side of the TX1 board. This is the TX4 board. This board holds the audio controls for the Lead 1 Red mode. It also holds some of the switching related to the Lead 1 Red mode. Some units before serial# T1631 have been upgraded and will have the TX4 board. After serial# T8279 the TX4 board was removed.

On units after serial # T8279, there will be a small circuit board that is raised above the TX1 board. This is the TX5 board, with four 5C9 LDRs on it. These LDRs, combined with 5C9 LDR #s 26, 27, 28, 29 on TX1, replace the four original Dual Cell (P873) LDR #s 26, 27, 28, 29 that were on TX1. These control the Gain, Treble, and Bass.

Diagnostic Table

There are two 18 pin headers on the TX3 board, labeled H1 and H2. Measuring the voltages on these headers can indicate if there is a problem with the digital controls.

Tip: If there is a discrepancy, lift H1 from the audio board (TX1, the rearmost board) and measure the headers again. If the discrepancy has cleared, this can indicate that the problem is in the audio portion of the circuit, on either the TX1 or TX4 boards.

Header #H2

Pin #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Volts	5	5	gnd	5	5	5	5	5	4.1	4.1	2.6	3.2	1.9	1.5	2.4	1.9	1.9	2.4

Header #H1

Pin #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Volts	5	gnd	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	nc	5	5	5	5	5	5	5
Rhy Gn	5	gnd	5								nc							
Rhy Yl	5	gnd		5							nc							
Ld1 Gn	5	gnd			5						nc							
Ld1 Yl	5	gnd				5					nc							
Ld1 Rd	5	gnd					5				nc							
Ld2 Gn	5	gnd						5			nc							
Ld2 Yl	5	gnd							5		nc							
Ld2 Rd	5	gnd								5	nc							
SW1	5	gnd									nc				0.08			
SW2	5	gnd									nc			0.08				
SW3	5	gnd									nc		0.08					
SW4	5	gnd									nc	0.08						
Loop	5	gnd									nc					0.1	0.1	0.1

Header H1-- Pins 3 through 10, all measurements low (less than .2V) unless otherwise shown.
Pins 12 through 18, all measurements high (5V) unless otherwise shown.
Pin 1, always 5V.
Pin 2, ground.
Pin 11, no connection.

Bench Test and Calibration Procedure

Before performing the bench test, do a full visual check on the unit. It is important that all legs of the LDRs are separated from each other, as a short will cause the unit to not function properly. Look for any other abnormalities as well.

Set the VOM to DC volts. All voltage measurements are referenced to ground.

Connect the meter to C504, the front most 30uf 500V filter cap on the TX1 board. Turn the unit on. The reading should rise to +/- 490V within about 30 seconds or so, then settle at about +/- 465V as the tubes warm up. This reading may vary slightly.

Check the op amp supply by measuring the voltage on IC1, just to the left of C504. Pin 8 should read +15V, and pin 4 should read -15V.

Check the unregulated DC supply for the digital board at the positive end of C1 (4700uf 25V), located on the right edge of the TX2 board. It should read 10.7V. A slight variation in this reading is normal.

Check the regulated DC supply for the digital board at the positive end of C2 (3300uf 10V), just in front of and to the left of C1. It should read +5V.

Check the reference voltage for the controls at the voltage regulator Q10, located on the rear edge of the TX1 board just to the left of the large header H2. It should read +5V.

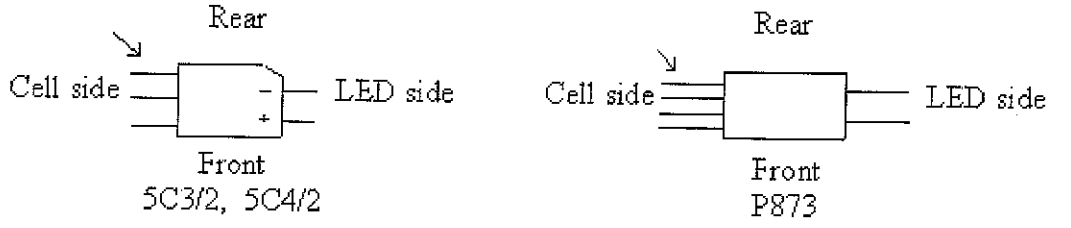
On units with the TX4 board, the high voltage changes when the Lead 1 Red mode is activated. To check this, set the meter on the positive end of C501, the far right hand 30uf 500V filter cap. Using the mode key, change the modes until you get to the Lead 1 Red mode. The voltage should read about 330V. In all other modes the voltage should read about 395V. If this is not functioning correctly, check the operation of IC12 on the right rear corner of the TX4 board. This IC switches R501 in and out to make the voltage change.

Factory Load: In order to perform the calibration correctly, the Factory Load must be performed. The Factory Load resets the unit and loads the factory presets into the memory. However-- if the user presets have been changed and saved, the Factory load will overwrite those presets and they will be lost. If you need to save the presets that are programmed into the unit, then you will need to transfer or "dump" them to an external storage medium. This procedure is outlined in the Triaxis owner's manual on pages 4 and 5. (Note: The stored information can be transferred to another Triaxis for saving if necessary) **To perform the Factory Load:** Turn the unit on and set it to any Program except Program 1. Find the Factory Load pads on the TX2 board, at the front edge directly behind the Dynamic Voice control. Simply short the two pads together with a screwdriver or a pair of pliers. The unit should revert to Program 1. This will indicate that the factory Load has been completed. After the Factory Load, check the controls to see if they respond correctly.

Due to variables in the manufacture of the LDRs, they must be calibrated in order to operate in a predictable manner. This is done by measuring the resistance on the cell side at a specific setting while changing the voltage (and therefore the current) on the LED side. The voltage is set with a trim pot. There are 11 trim pots-- one for each parameter, with Gain and Treble each having two. All of the trim pots are located on the TX1 circuit board. The nomenclature for each trim pot is as follows:

Mid	MD	TP6
Bass	B	TP5
Treble Low	TL	TP7
Treble High	TH	TP8
Gain Low	GL	TP10
Gain High	GH	TP9
Lead 1 Drive	LD1	TP11
Lead 2 Drive	LD2	TP4
Presence	P	TP3
Master	M	TP2
Dyn. Voice	D.V.	TP1

When measuring the resistance of the LDR, you will connect the meter to the outside leg of the cell side of the LDR. In all cases (unless otherwise noted), this will be the rearmost leg of the cell side of the LDR (On the TX4 board, this will be the right leg of the cell side of the LDR) Examples:



To gain access to the trim pots on the TX1 board, you must lift the TX4 board out of the way. To do this, begin by removing the two screws on the right side of the TX4 board. Unplug the two ribbon connectors on the left side of the TX4 board, *noting which way they are connected*. Important: Use one of the ribbon cables to reconnect the header marked H3 on the TX3 board to the header marked H4 on the TX1 board. Using pliers, pinch the standoff that is in the middle and lift the front edge of the TX4 board so that it sits up and out of the way. There is a purple wire that runs from the left edge of the TX4 board to the upper left corner of the TX1 board. Unsolder the end that connects to the TX1 board, noting which pad it is connected to.

Now that you can access the TX1 board, find the five small switches and open them all (a dot next to the switch indicates it is closed). These switches are used to isolate the LDRs so that they can be calibrated properly.

1) Turn the unit on, and set it to Program 1. Push the Shift key once. The Program/Channel display should flash three times. Now perform the Factory Load. This puts the unit into the calibration mode. All the parameters should now read 10, except the Presence which reads 5.0 and the Dynamic Voice which reads 1.0. The mode should be Rhythm Green and the Loop LED should be on. The Preset and Program should read 01. Set the VOM to ohms.

2) Middle: Connect one side of the meter to ground, and the other to the outside leg of LDR 21. Using TP6, adjust until the resistance reads 33K.

3) Bass: Leave the meter connected to the outside leg of LDR 21, and connect the other lead to the outside leg of LDR 29. Using TP5, adjust until the resistance reads 1M.

4) Treble Low: Connect one lead of the VOM to the outside leg of LDR 27, and the other lead to the outside leg of LDR 28. Using TP7, adjust until the resistance reads 215K.

5) Treble High: Move the lead that is connected to LDR 28, and connect it to the leg that is next to the outside leg of LDR 27. This means that the meter will be connected to the two rearmost legs of LDR 27. Push the Treble down arrow on the front panel once-- the Treble should now read 0. Using TP8, adjust until the resistance reads 240K. Push the Treble up arrow on the front panel once-- the Treble should read 10 again.

6) Gain Low: Connect one lead of the VOM to ground, and the other lead to the outside leg of LDR 18. (This is the top LDR of the two). Pull V2 from its socket. Using TP10, adjust until the resistance reads 1M.

7) Gain High: Move the lead that is connected to ground and connect it to the forward leg of C801. This cap is located on the left edge of the TX1 board. Push the Gain down arrow on the front panel once-- the gain should now read 0. Using TP9, adjust until the resistance reads 1M. Reinstall V2, and push the Gain up arrow once-- the Gain should read 10 again.

For the remainder of the calibration procedure, one lead of the VOM will be connected to ground.

8) Lead 1 Drive: Connect the VOM lead to the outside leg of LDR 20. Using TP11, adjust until the resistance reads 680K.

9) Lead 2 Drive: Connect the VOM lead to the outside leg of LDR 23 (the top LDR of the two). Using TP4, adjust until the resistance until it reads 1M.

10) Presence: Connect the VOM lead to the left side of C002. This cap is located in the middle of the TX1 board, just to the right of LDR 22/23. Using TP3, adjust until the resistance reads 80K.

11) Dynamic Voice: Connect the VOM lead to the outside leg of LDR 24 (the bottom LDR of the two). Using TP1, adjust until the resistance reads 15K.

12) Master: Connect the VOM lead to the outside leg of LDR 25, directly above LDR 24. Using TP2, adjust until the resistance reads 100K.

Turn the unit off. Close the five switches on TX1 (the dot indicates the switch is closed). Reattach the purple wire on the left side of the TX4 board to the upper left corner of the TX1 board. Lay the TX4 board back down into position and reattach the two ribbon cables on the left side. Remove V3 from its socket. Locate resistor R3 (330K) near the right rear corner of the TX4 board. Carefully unsolder and lift the right side of this resistor. Turn the unit on again. Push the Shift key once, then perform the Factory Load. Again, make sure that the parameters have changed to the calibration settings. Push the mode key once, and make sure the mode changes to Lead 1 Red. The unit is now set to calibrate the Lead 1 Red mode. Note: This applies only to units between serial#s T1631 and T8279.

All of the remaining portion of the calibration takes place on the TX4 circuit board. All of the outside legs of the LDRs indicated will be the right rearmost legs.

14) Mid: Attach one lead of the VOM to ground, and the other to the outside leg of LDR 5. Using TP4, adjust until the resistance reads 33K.

15) Bass: Take the VOM lead that is connected to ground, and connect it to the outside leg of LDR 4. Using TP3, adjust until the resistance reads 1M.

16) Treble Low: Take the VOM lead that is connected to the outside leg of LDR 5, and connect it to the outside leg of LDR 3. Using TP2, adjust until the resistance reads 240K.

17) Treble High: Take the VOM lead that is connected to the outside leg of LDR 4, and connect it to the outside leg of LDR 2. Push the Treble down arrow on the front panel once-- the Treble control should now read 0. Using TP1, adjust until the resistance reads 240K.

18) The calibration is complete. Turn the unit off, reattach the right side of R3, and reinstall V3.