

Ron Brandt's Perm Mag Motor – Schematic Motor Controller 1
version of 4.

b. Apr. 4, 1920 d. Nov. 27, 2010 Forsyth, Rosebud County,
Montana, USA

BestEnergy.ws/thankyou - A very special thank you to Ron
Brandt for agreeing to allow me to open source this for a very
reasonable amount!

With due deference to Joseph Newman's 700% dynamometer
tested motor, this is about 500x more cost effective per net watt
out.

BestEnergy.ws/thank you – A very special thank you to Joseph
who turned down any amount because "they" would not agree to
manufacture it for the benefit of the world.

BestEnergy.ws/challenge – My challenge to you is what are you
going to do now with this information?

www.bestEnergy.ws Buster Anderson

cosmic common law copy write and patent protection

Buster Anderson June 1/2016

www.witts.ws Spokesman Timothy Thrapp

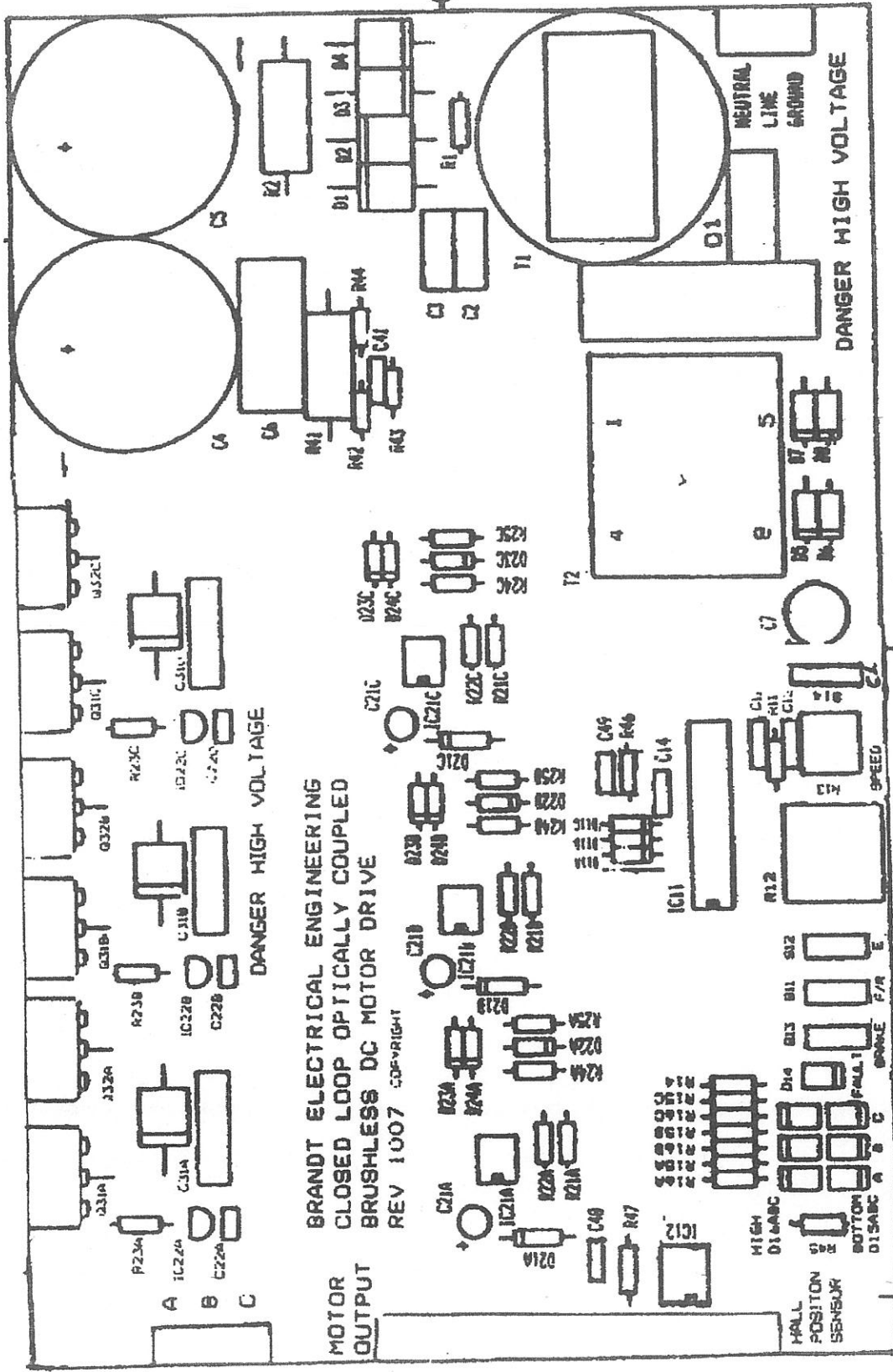


Figure 7. S11 ksc reen Layer

Table 1. Parts List By Component Values and Part Numbers

10

Designators	Quantity	Description	Rating	Tolerance	Manufact.	Part Number	Comp.
C21A,C21B,C21C	3 ✓	22 µF Electrolytic Cap	25 VDC				AL
C7	1 ✓	220 µF Electrolytic Cap	50 V				AL
C4,C5	2 ✓	330 µF Electrolytic Cap	250 V		Sprague	80D	AL
C2,C3	2	4.7 nF AC Cap	250 VAC		Rifa	PME 289 MA 4	970 M
C1	1	100 nF AC Cap	250 VAC		Rifa	PME 285 MB	100 M
C31A,C31B,C31C	3	0.1 µF Capacitor	250 V	5%	Wima	MKP 10 N	MPP-PPR12:
C6	1	1 µF Capacitor	250 V	10%	Wima	MKP 4	MPP
C11,C41	✓ 2, 01	10 nF Capacitor	50 V	10%			Ceramic
C12,C14	✓ 2, 01	100 nF Capacitor	50 V	10%			Ceramic
C22A,C22B,C22C	✓ 3	100 pF Capacitor	50 V	10%			Ceramic
Power Line Connector	1	3 pin Connector	0.200"		Phoenix	1729131	
Motor Output	1	4 pin Connector	0.200"		Phoenix	1729144	
Hall Switch Connector	1	5 pin Connector	0.150"		Phoenix	1727049	
D5,D6,D7,D8	4	50 V Diode	1 A		Motorola	1N4001	
D1,D2,D3,D4	4	600 V Diode	6 A		Motorola	MR758 ✓	
D21A,D21B,D21C	3	600 V Diode			Motorola	MR816 ✓ R _e	1N4937
D31A,D31B,D31C	3	Diode				Not Used	
D11A,D11B,D11C,D22A,D22B,D22C	6	30 V Schottky	1/2 A		Motorola	MSR030 ✓ R _e	1N5818
F1	1	10 A Fuse					
D15A,D15B,D15C,D16A,D16B,D16C	5	Green LED			GI	MV54124A	
D14	1	Red LED			GI	MV57124A	
IC11	1	Control IC			Motorola	MC33035	
IC22A,IC22B,IC22C	3	MTO			Motorola	MDC1000A	
Q31A,Q31B,Q31C,Q32A,Q32B,Q32C	6	N-ch Power MOSFET	70247 AC		Motorola	MTW23N25E	
IC21A,IC21B,IC21C	3	Optocoupler			Motorola	MOC8102	
R12	1	10 kΩ Potentiometer			Bourns	81A1AB28A15	
R13	1	10 kΩ Potentiometer	trimpot		Bourns	3388P1 103	
R41	1	0.01 Ω Resistor	2.25 W	5%	Mills	MRP-2-NI	NLWW
R14,R15A,R15B,R15C,R16A,R16B,R16C	7	1 kΩ Resistor	1/4 W	5%			
R43	1	3 kΩ Resistor	1/4 W	5%			
R11	1	4.7 kΩ Resistor	1/4 W	5%			
R21A,R21B,R21C	3	4.7 Ω Resistor	1/4 W	5%			
R2	1	22 kΩ Resistor	2 W	10%			
R23A,R23B,R23C,R25A,R25B,R25C	6	22 Ω Resistor	1/4 W	5%			
R24A,R24B,R24C	3	100 Ω Resistor	1/4 W	5%			
R42,R44	2	750 Ω Resistor	1/4 W	5%			
R22A,R22B,R22C	3	820 Ω Resistor	1/4 W	5%			
S11,S12,S13,S14	3	SPDT Switch	submin	✓	NKK	#SS 12SDP2	
R1	1	5 Ω cold Thermistor		✓	Keystone	CL10	
T1	1	1.8 mH Transformer	10 A		Pulse Eng.	PE-96188	
T2	1	18 V Transformer	130 mA	✓	Stancor	SW336	
D23A,D23B,D23C,D24A,D24B,D24C	6	10 V Zener	1/4 W		Motorola	1N4897	

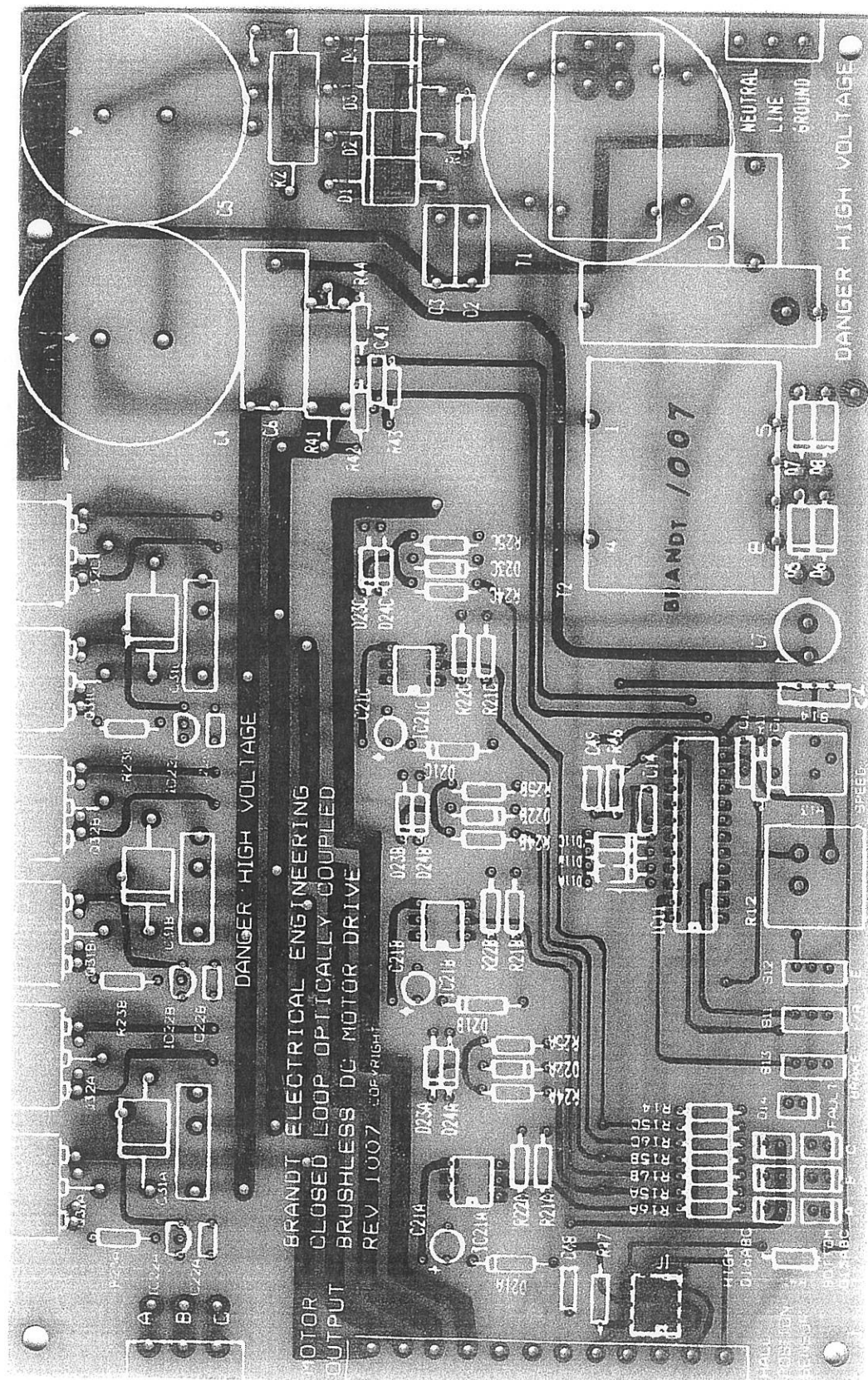
R45 100K
 R46 1 Meg
 200 Ω
 750 PF
 0.1 MFD
 15V 25 MFD
 2 33039
 1N5352 Zener
 15355B

Q31 Q32 = FUJI 2MB1300L-060
 L401 300A 600V
 1N5338A 5.1V 3W Z
 1N5821
 WIMA MKP 10 .22 1000V
 UC3710T UNITROD
 SPRAGUE 36D252F400D52B 2500 400V
 ASC 400V 2.0-2.4 MF
 94F5370

tu.



AN1101



MOTOR OUTPUT
 BRANDT ELECTRICAL ENGINEERING
 CLOSED LOOP OPTICALLY COUPLED
 BRUSHLESS DC MOTOR DRIVE
 REV 1007 TOP VIEW

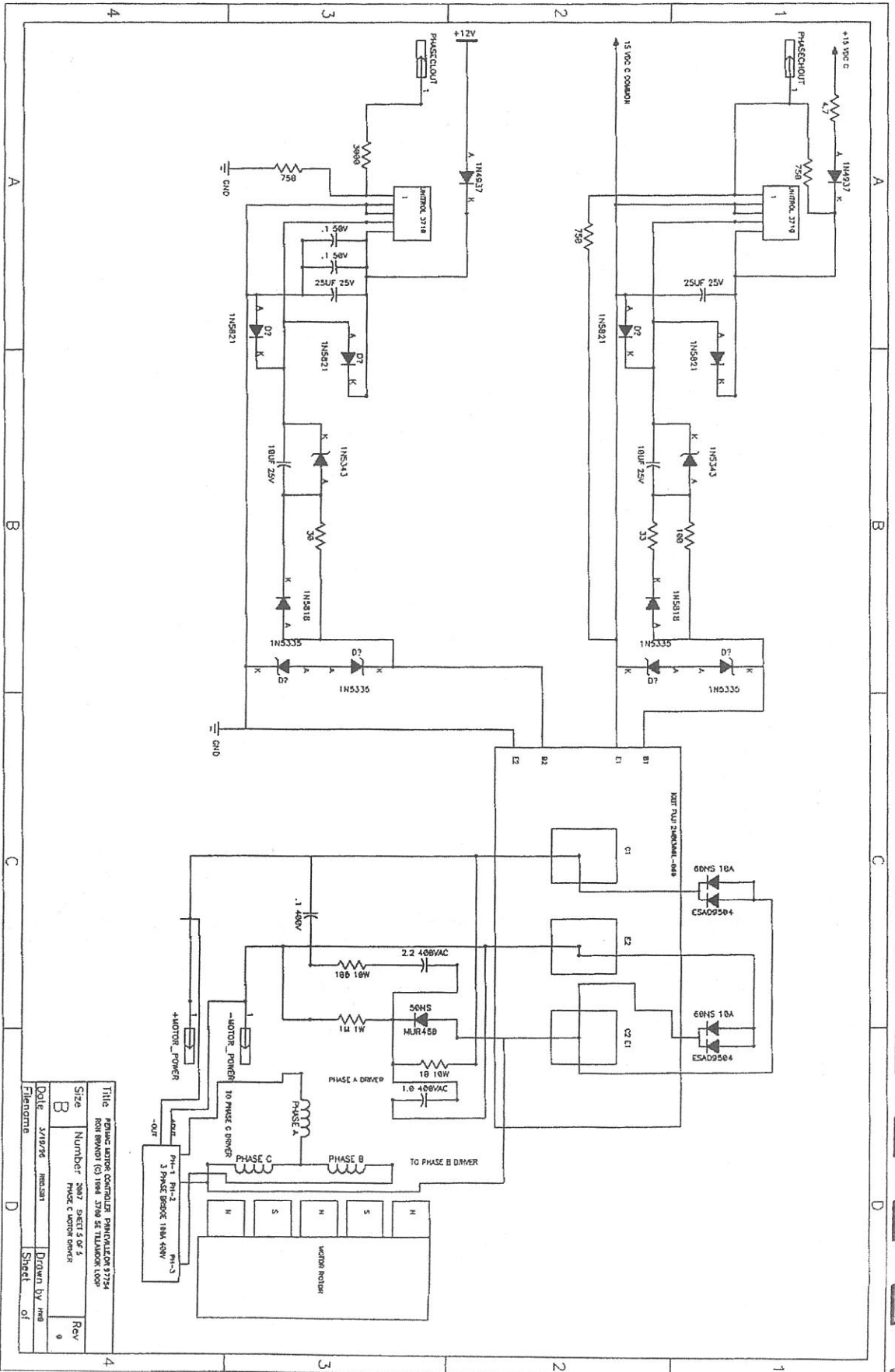
DANGER HIGH VOLTAGE

DANGER HIGH VOLTAGE

BRANDT 1007

A
 B
 C

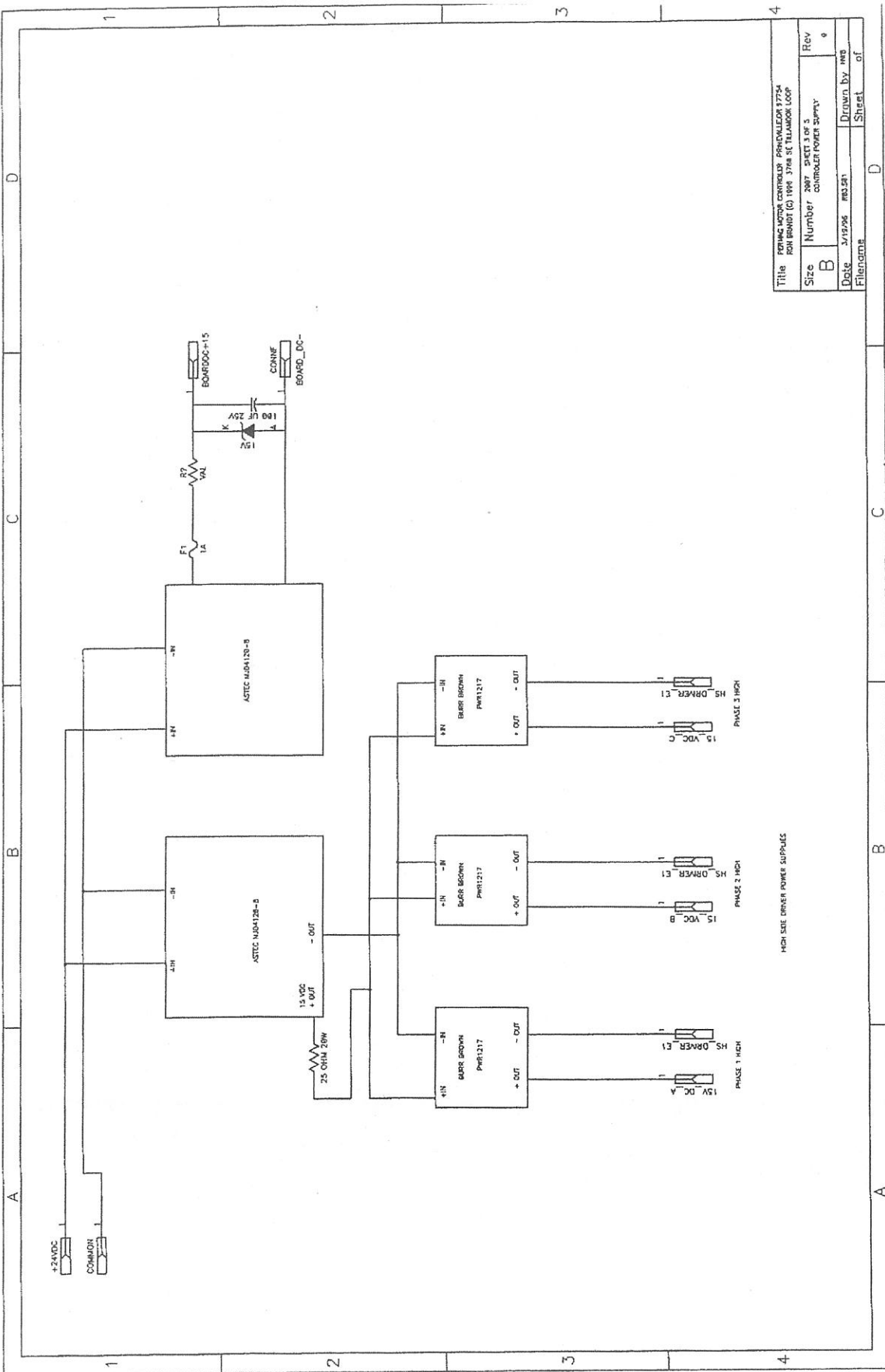
HIGH
 D1-D3
 NEUTRAL LINE
 GROUND



Size	Number	2087	Sheet	3 OF 3
Date	3/19/76	revision	Drawn by	HWB
File name			Sheet	of

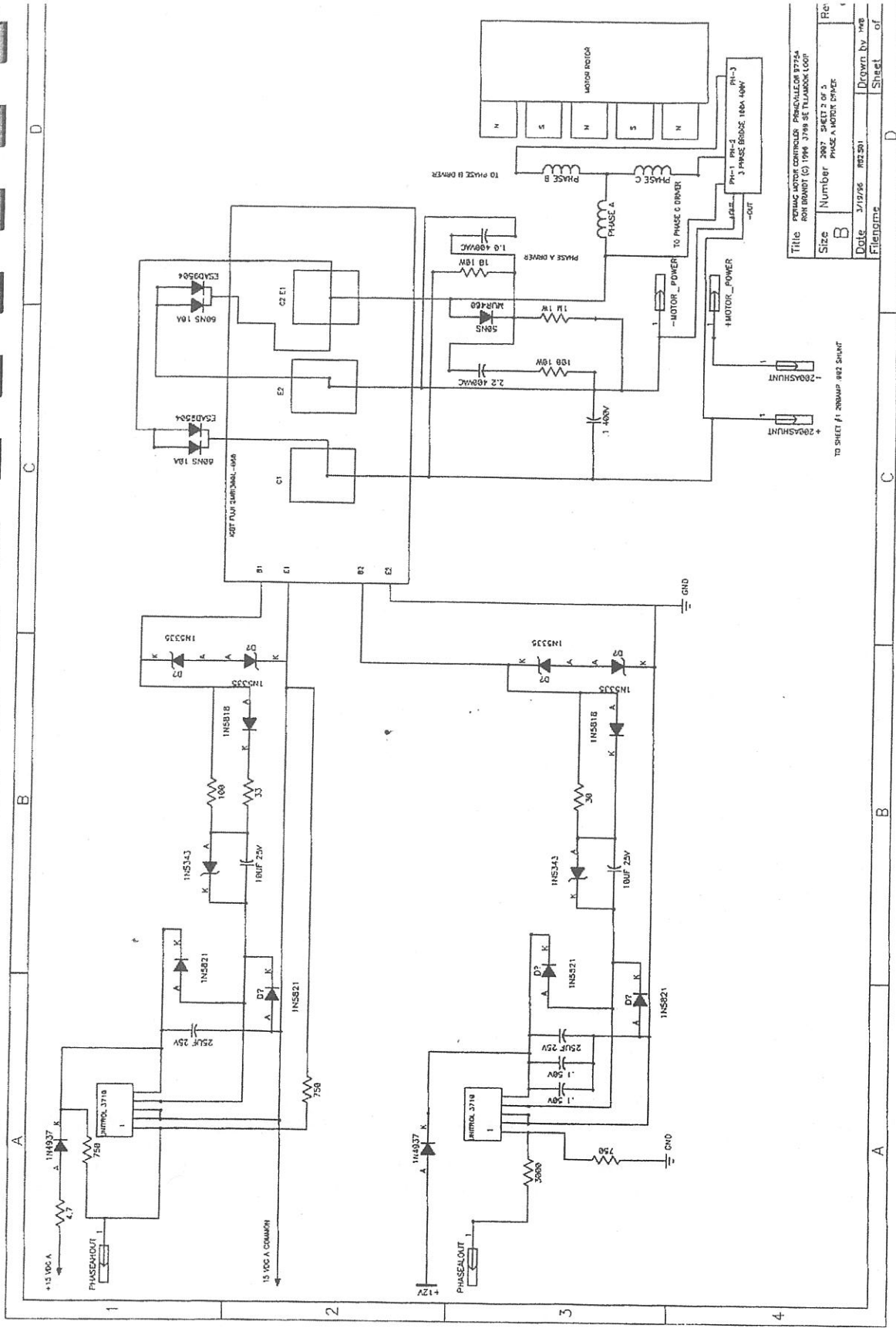
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 FROM REVISED (C) 1968, 3746 S.E. TILLAMOOK 100'

Rev 9



HIGH SITE DRIVER POWER SUPPLIES

Title: POWER SUPPLY SYSTEMS FOR CALCULATOR 1774			
Part Number: (C) 1001 3748 SE TILAMOOK LOOP			
Size	Number	Rev	
B	2887	Sheet 3 of 3	
Date: 3/13/2006			Drawn by: mps
Filename: mps2887			Sheet of



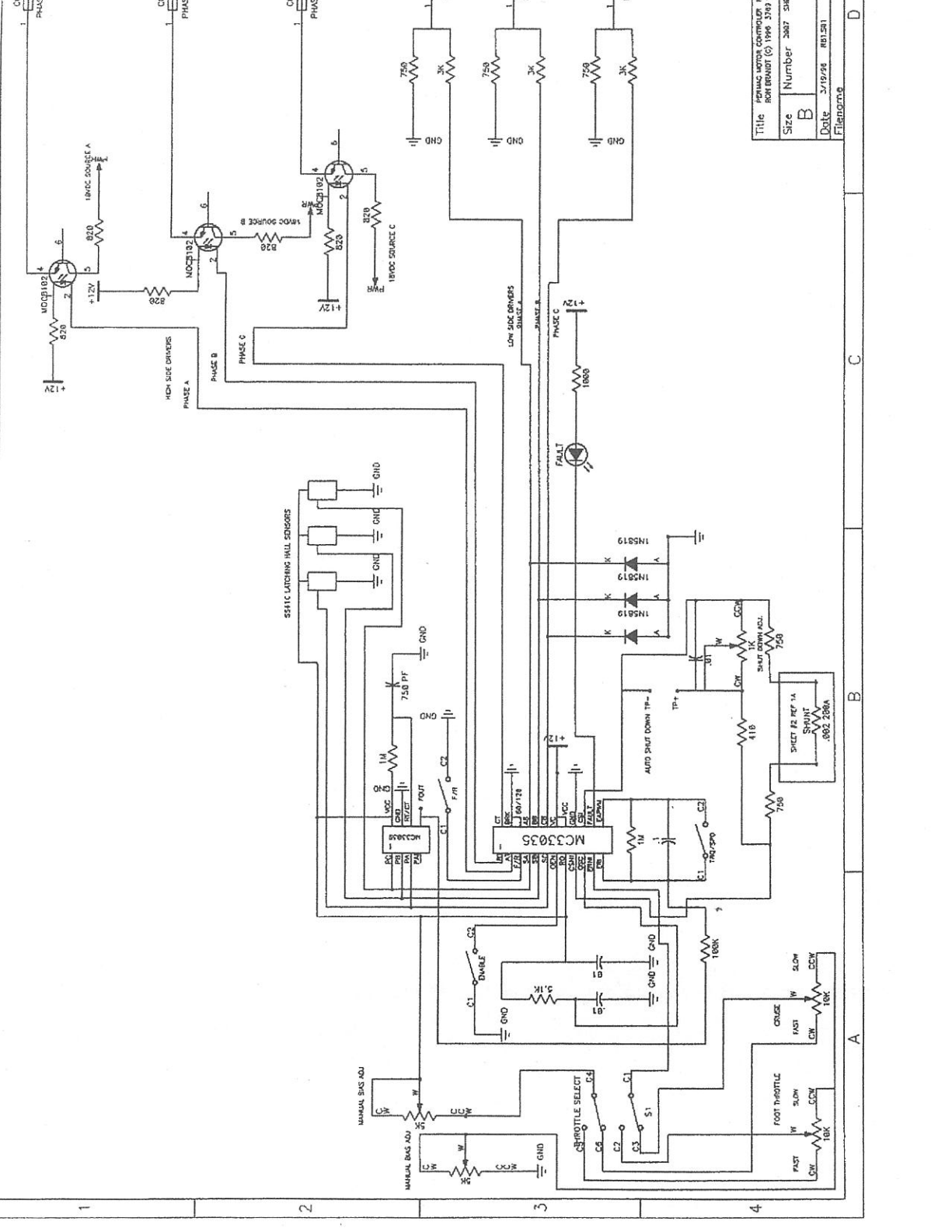
Title: RETINA MOTOR CONTROLS - PHASE A DRIVER
 R01 REV01 (3) 1994 3748 SE TLUAS006 LOOP

Size	Number	387	SHEET 2 of 3
Date	2/12/96	mz381	Drawn by mzb
File name			Sheet of

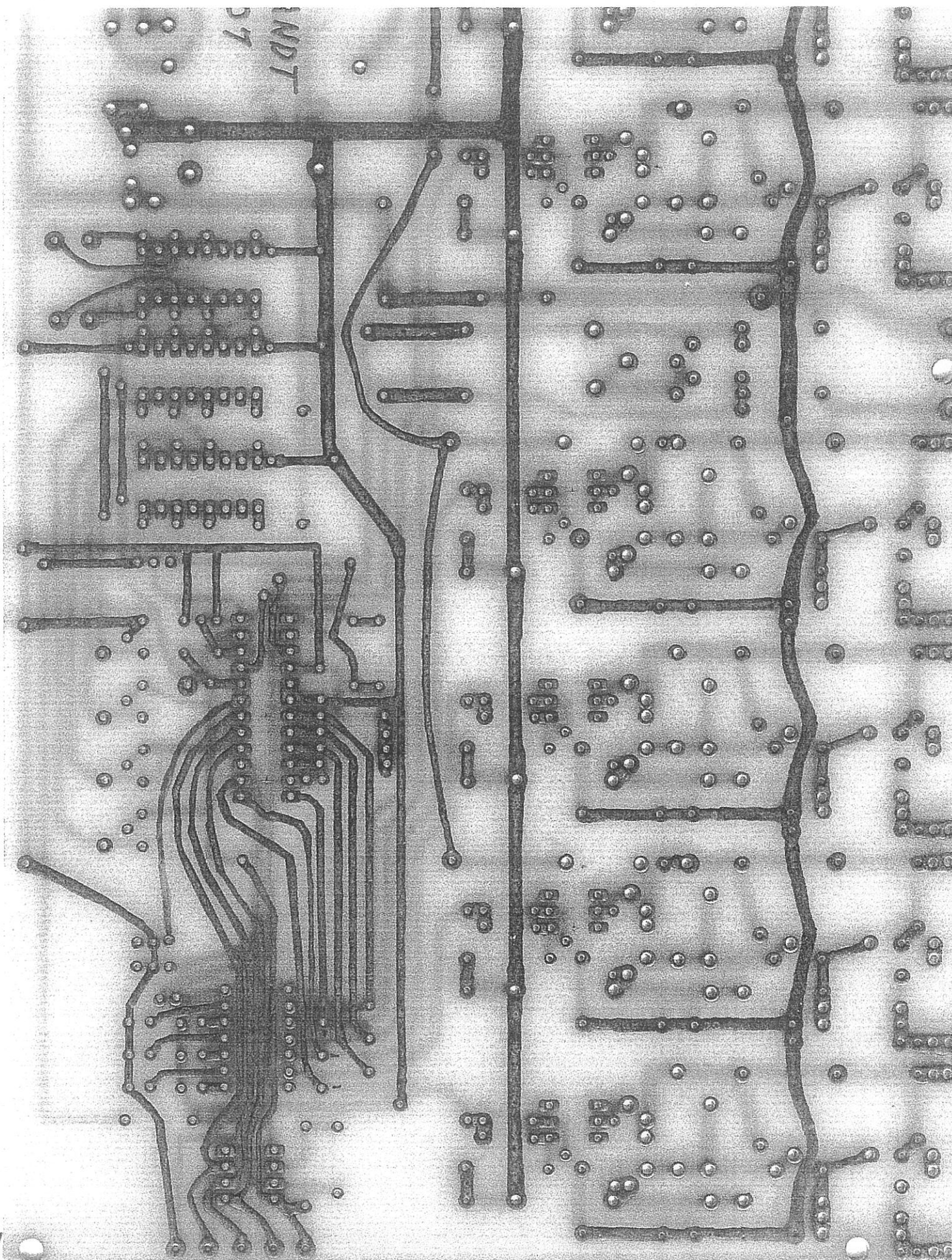
A B C D

A B C D

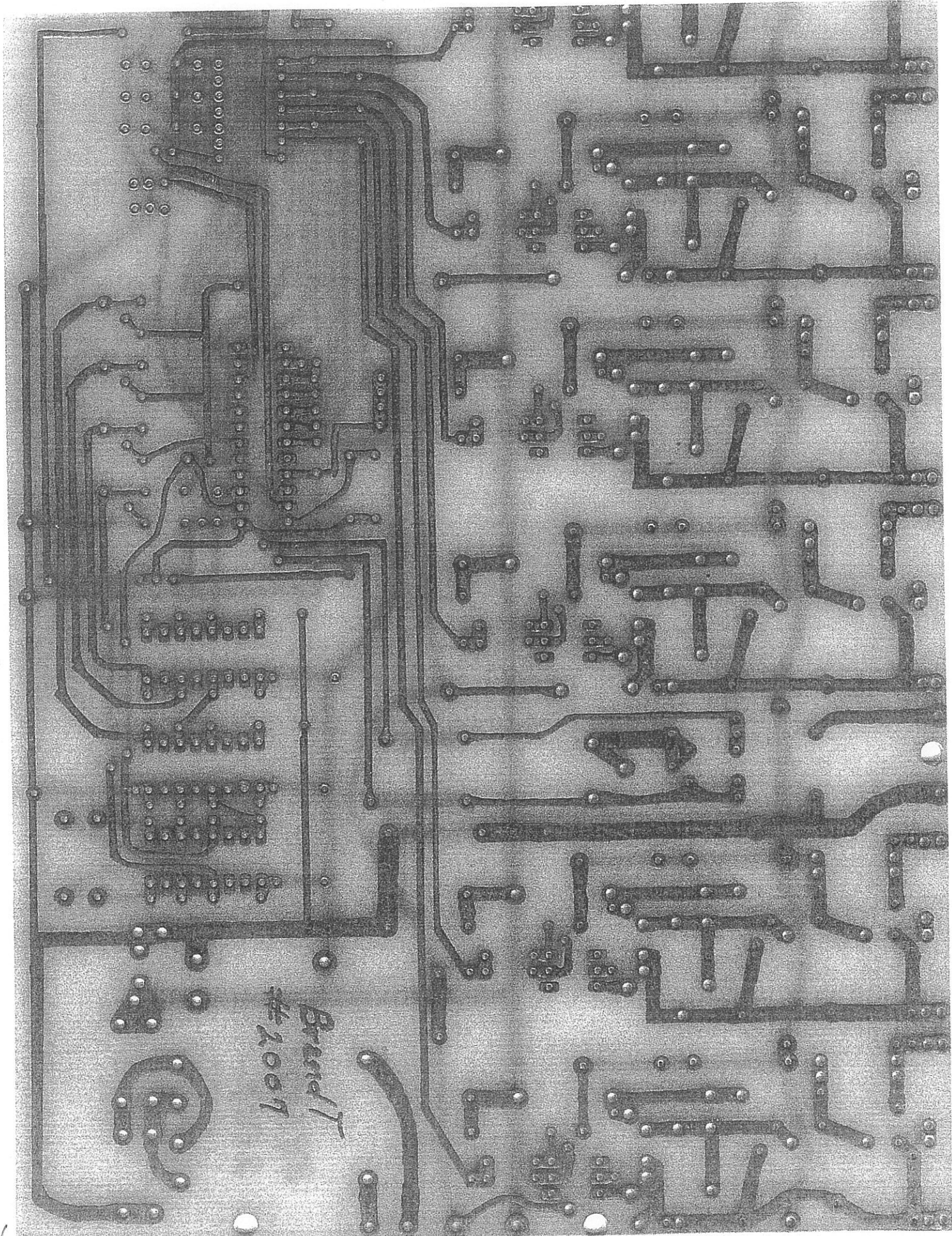
A B C D



Title	MOTOR DRIVE CIRCUIT FOR MOTOR CONTROL WITH		
Size	B	Number	3007 SHEET 1 OF 3
Date	3/19/98	Drawn by	HEB
File name	Sheet		



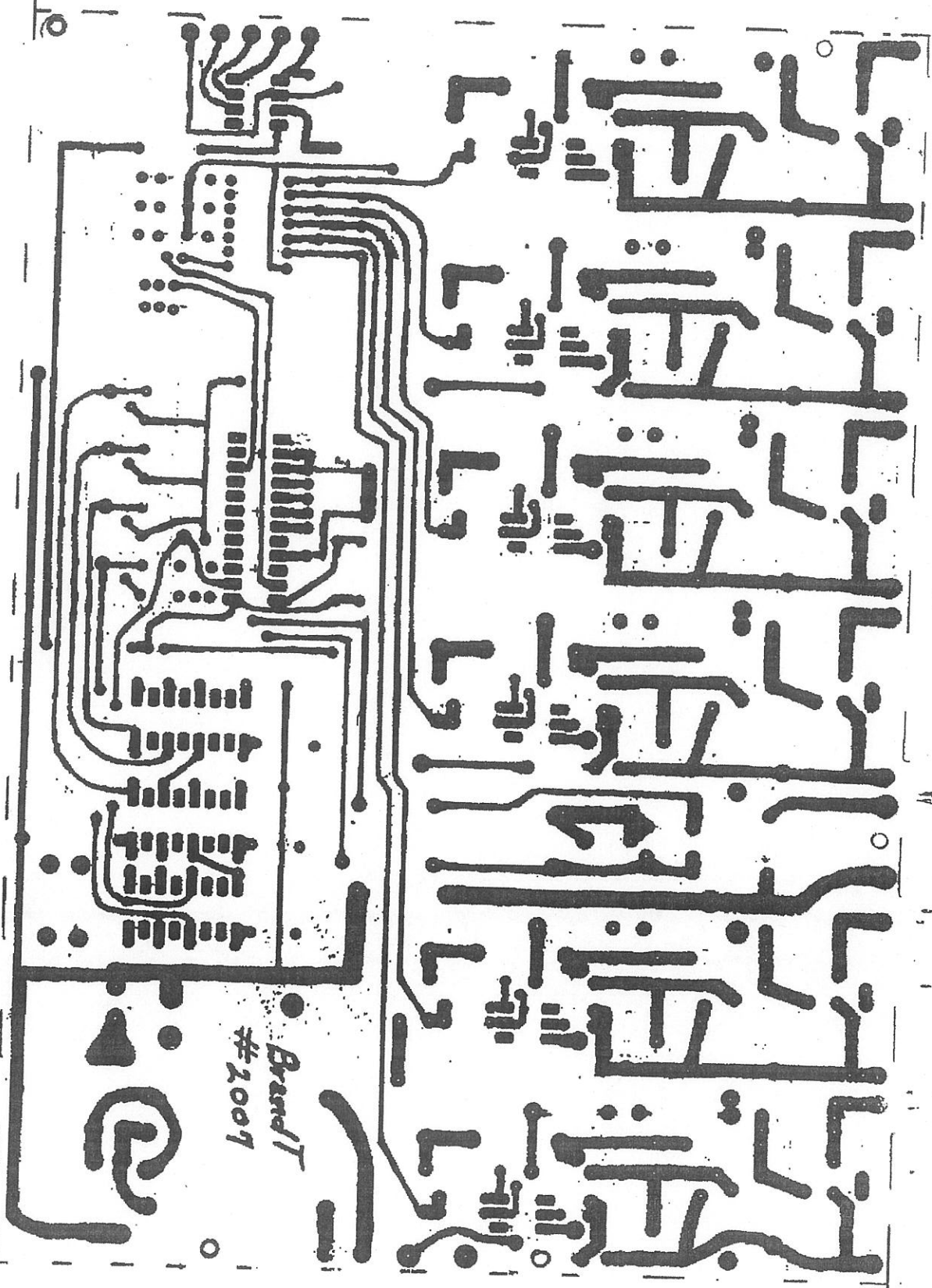
INDT
07



Brand T
#2007

BRANDT-ELECTRONIC ENGINEERING
AUTUMN ST
ARTTO - MORGAN - GREGSON 92754
9271-155 928

Component Side

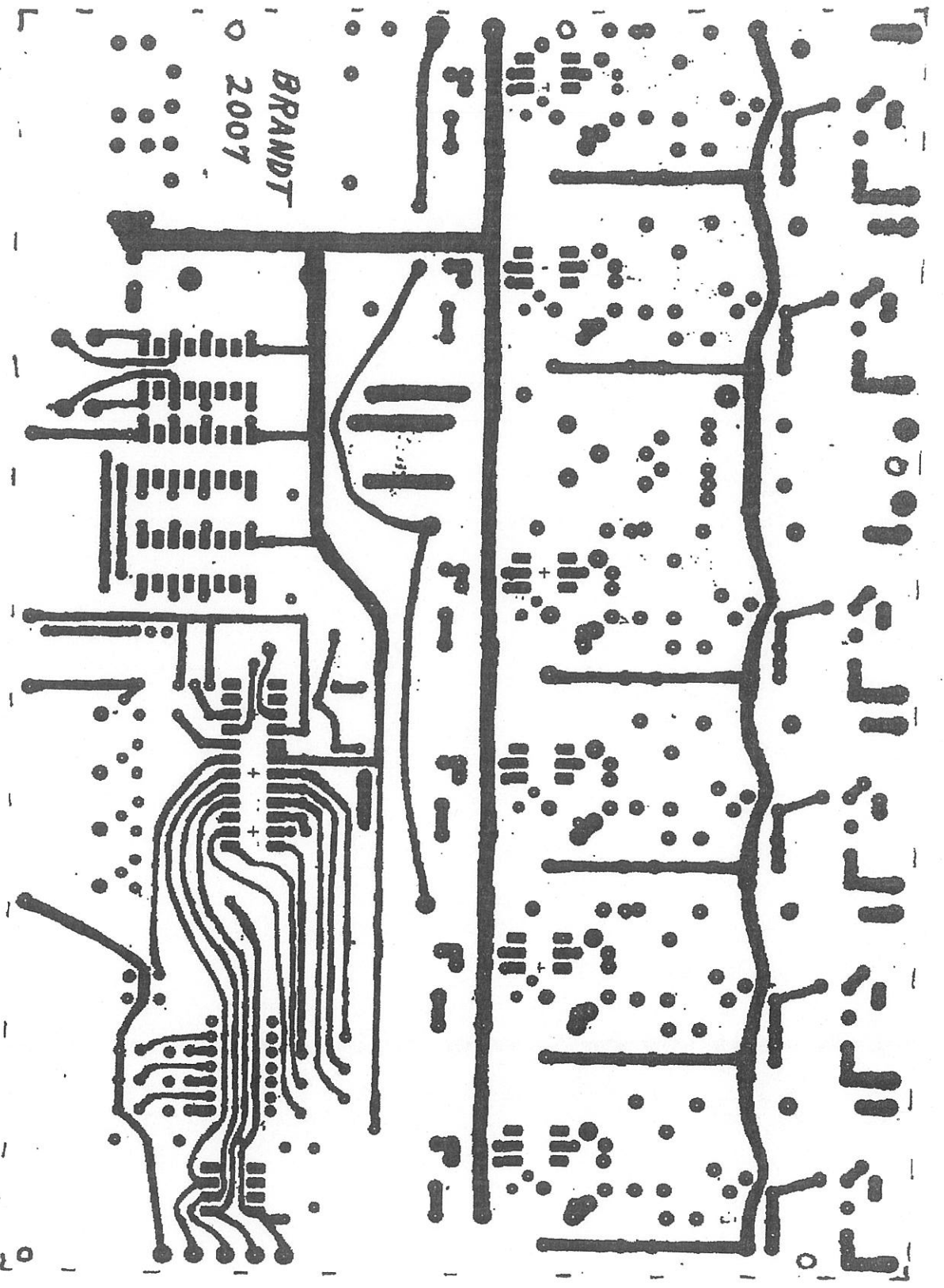


Brandt
#2007

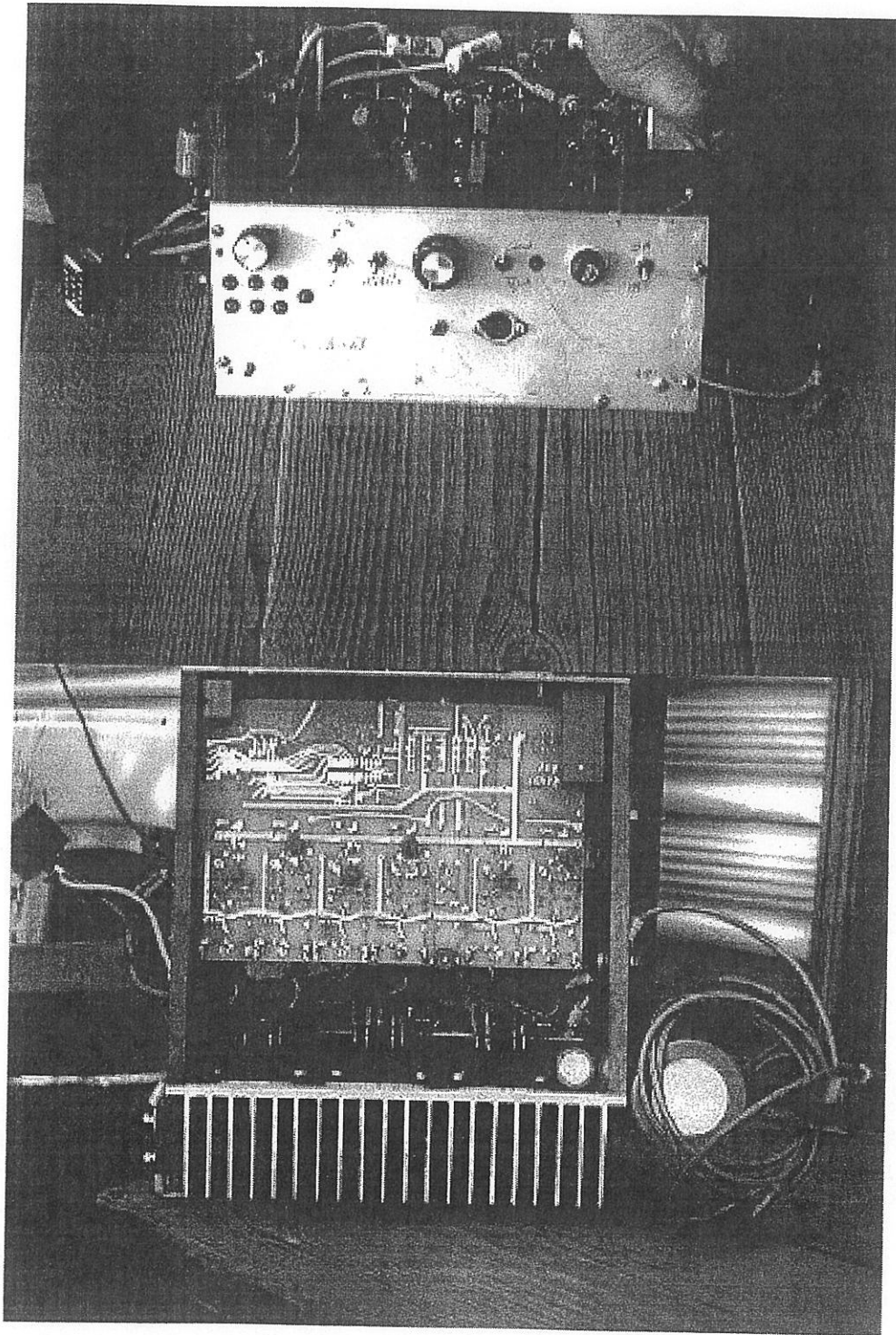
BRANDT ELECTRICAL ENGINEERING
112 UMATILLA
PRINCEVILLE OREGON 97754
928-48-1782

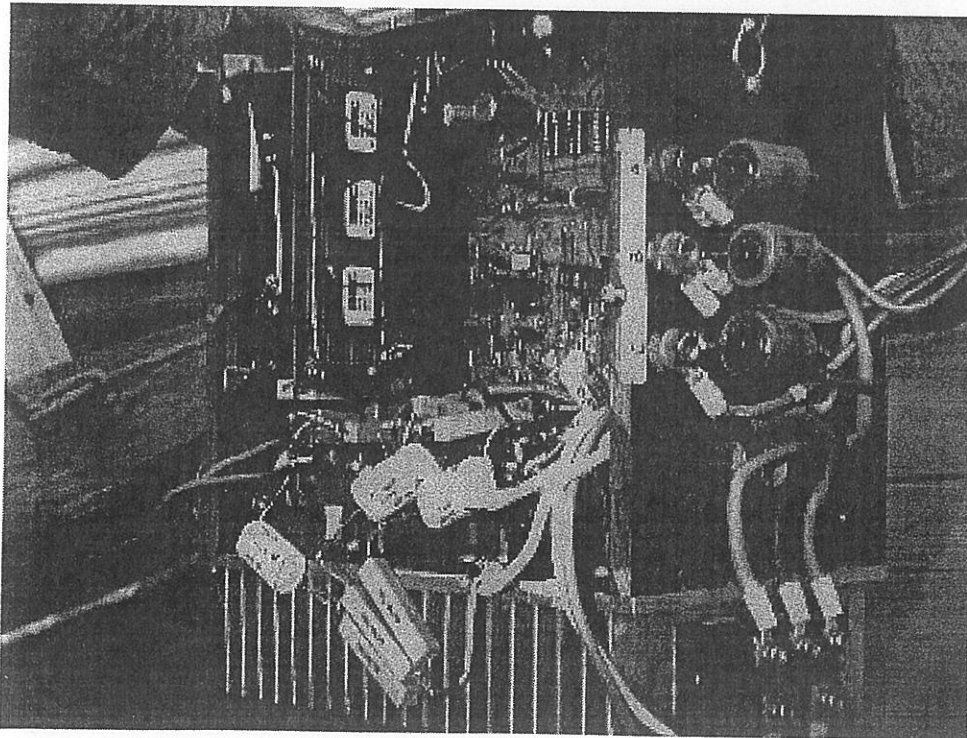
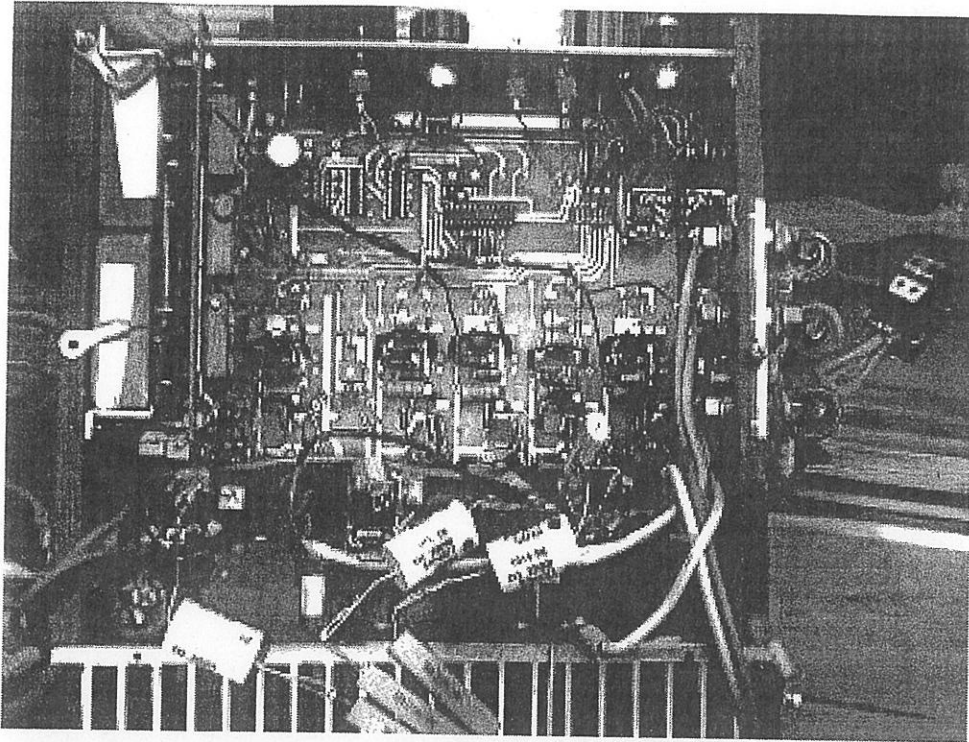
BRANDT ELECTRICAL ENGINEERING
ALHAMBRA ST
MOUNTAIN VIEW, CALIF. 92036

Solder Side



BRANDT ELECTRICAL ENGINEERING
112 UNATILLA
PRINEVILLE OREGON 97544
503 437-1779





MC33039

CLOSED-LOOP BRUSHLESS MOTOR ADAPTER

The MC33039 is a high performance closed-loop speed control adapter specifically designed for use in brushless dc motor control systems. Implementation will allow precise speed regulation without the need for a magnetic or optical tachometer. This device contains three input buffers each with hysteresis for noise immunity, three digital edge detectors, a programmable monostable, and an internal shunt regulator. Also included is an inverter output for use in systems that require conversion of sensor phasing. Although this device is primarily intended for use with the MC33034 brushless motor controller, it can be used cost effectively in many other closed-loop speed control applications.

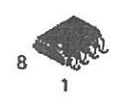
- Digital Detection of Each Input Transition for Improved Low Speed Motor Operation
- TTL Compatible Inputs With Hysteresis
- Operation Down to 5.5 V for Direct Powering from MC33034 Reference
- Internal Shunt Regulator Allows Operation from a Non-Regulated Voltage Source
- Inverter Output for Easy Conversion Between 60°/300° and 120°/240° Sensor Phasing Conventions

CLOSED-LOOP BRUSHLESS MOTOR ADAPTER

SILICON MONOLITHIC INTEGRATED CIRCUIT

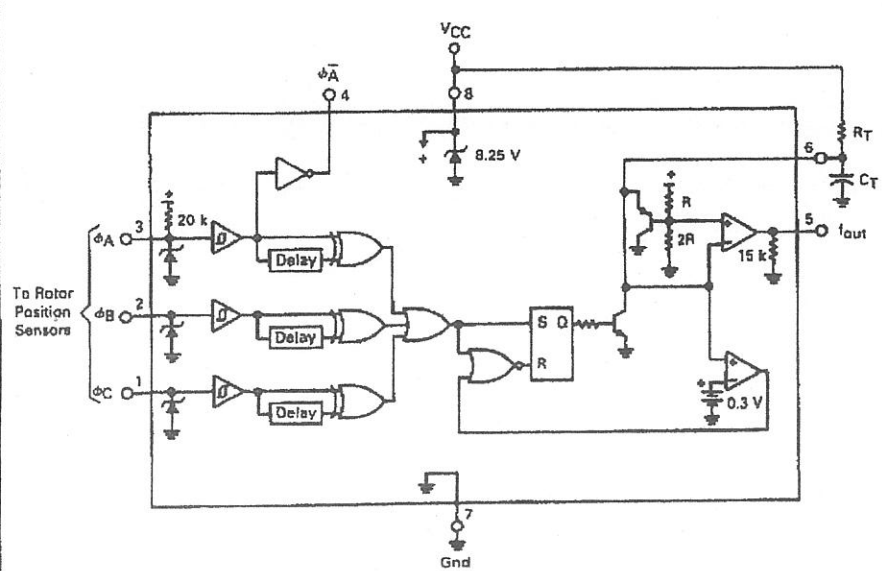


P SUFFIX
PLASTIC PACKAGE
CASE 626

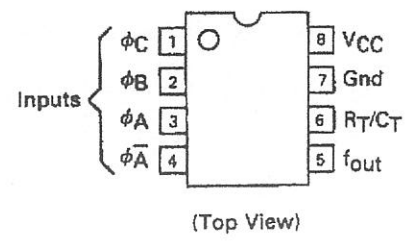


D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO-8)

REPRESENTATIVE BLOCK DIAGRAM



PIN CONNECTIONS





ORDERING INFORMATION

Device	Temperature Range	Package
MC33039D	-40°C to +85°C	SO-8
MC33039P		Plastic DIP

6-Pin DIP Optoisolators For Power Supply Applications

These devices consist of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon phototransistor detector. They have been designed and specified to meet the requirements of switchmode power supplies and other applications requiring very closely matched current transfer ratios (CTR), linearity and stable performance over the temperature range. The internal base-to-Pin 6 connection has been eliminated for improved noise immunity.

- Convenient Plastic Dual-in-Line Package
- High Input-Output Isolation Guaranteed 3750 Vac(rms)
- UL recognized, File Number E54915 
- VDE approved per standard 0883/6.80 (Certificate number 41853), with additional approval to DIN IEC380/VDE0806, IEC435/VDE0805, IEC65/VDE0860, VDE0110b, covering all other standards with equal or less stringent requirements, including IEC204/VDE0113, VDE0160, VDE0832, VDE0833, etc. 
- Special lead form available (add suffix "T" to part number) which satisfies VDE0883/6.80 requirement for 8 mm minimum creepage distance between input and output solder pads.
- Other lead forms available. Consult "Optoisolator Lead Form Options" data sheet for details.

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
INPUT LED			
Forward Current — Continuous	I_F	60	mA
Forward Current-Peak (PW = 100 μs , 120 pps)	$I_F(\text{pk})$	1.0	A
Reverse Voltage	V_R	6.0	V
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	120 1.41	mW mW/ $^\circ\text{C}$

OUTPUT TRANSISTOR

Collector-Emitter Voltage	V_{CE0}	30	V
Emitter-Collector Voltage	V_{ECO}	7.0	V
Collector Current — Continuous	I_C	150	mA
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	150 1.76	mW mW/ $^\circ\text{C}$

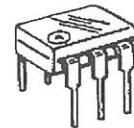
TOTAL DEVICE

Input-Output Isolation Voltage (1) (f = 60 Hz, t = 1 sec.)	V_{ISO}	3750	Vac(rms)
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	150 2.94	mW mW/ $^\circ\text{C}$
Ambient Operating Temperature Range	T_A	-55 to +100	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$
Lead Soldering Temperature (1/16" from case, 10 sec. duration)	—	260	$^\circ\text{C}$

(1) Input-Output Isolation Voltage, V_{ISO} , is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

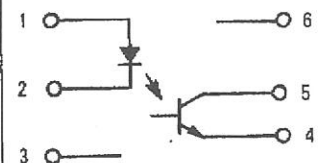
MOC8101
MOC8102
MOC8103
MOC8104

**6-PIN DIP
OPTOISOLATORS
TRANSISTOR OUTPUT**



**CASE 730A-02
PLASTIC**

SCHEMATIC



1. LED ANODE
2. LED CATHODE
3. NO CONNECTION
4. EMITTER
5. COLLECTOR
6. NO CONNECTION



MOTOROLA

DS5978

Advance Information

BRUSHLESS DC MOTOR CONTROLLER

The MC33035 is a high performance second generation monolithic brushless DC motor controller containing all of the active functions required to implement a full featured open-loop, three or four phase motor control system. This device consists of a rotor position decoder for proper commutation sequencing, temperature compensated reference capable of supplying sensor power, frequency programmable sawtooth oscillator, fully accessible error amplifier, pulse width modulator comparator, three open collector top drivers, and three high current totem pole bottom drivers ideally suited for driving power MOSFETs.

Also included are protective features consisting of undervoltage lockout, cycle-by-cycle current limiting with a selectable time delayed latched shutdown mode, internal thermal shutdown, and a unique fault output that can be interfaced into microprocessor controlled systems.

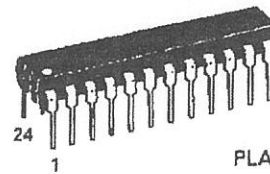
Typical motor control functions include open-loop speed, forward or reverse direction, run enable, and dynamic braking. The MC33035 is designed to operate with electrical sensor phasings of 60°/300° or 120°/240°, and can also efficiently control brush DC motors.

- 10 V to 30 V Operation
- Undervoltage Lockout
- 6.25 V Reference Capable of Supplying Sensor Power
- Fully Accessible Error Amplifier for Closed-Loop Servo Applications
- High Current Drivers can Control MPM3003 MOSFET 3-Phase Bridge
- Cycle-By-Cycle Current Limiting
- Pinned-Out Current Sense Reference
- Internal Thermal Shutdown
- Selectable 60°/300° or 120°/240° Sensor Phasings
- Can Efficiently Control Brush DC Motors with MPM3002 MOSFET H-Bridge

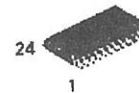
MC33035

**BRUSHLESS DC
 MOTOR CONTROLLER**

**SILICON MONOLITHIC
 INTEGRATED CIRCUIT**

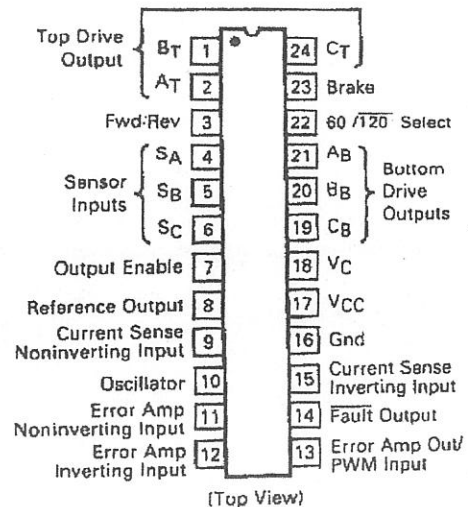


**P SUFFIX
 PLASTIC PACKAGE
 CASE 724**



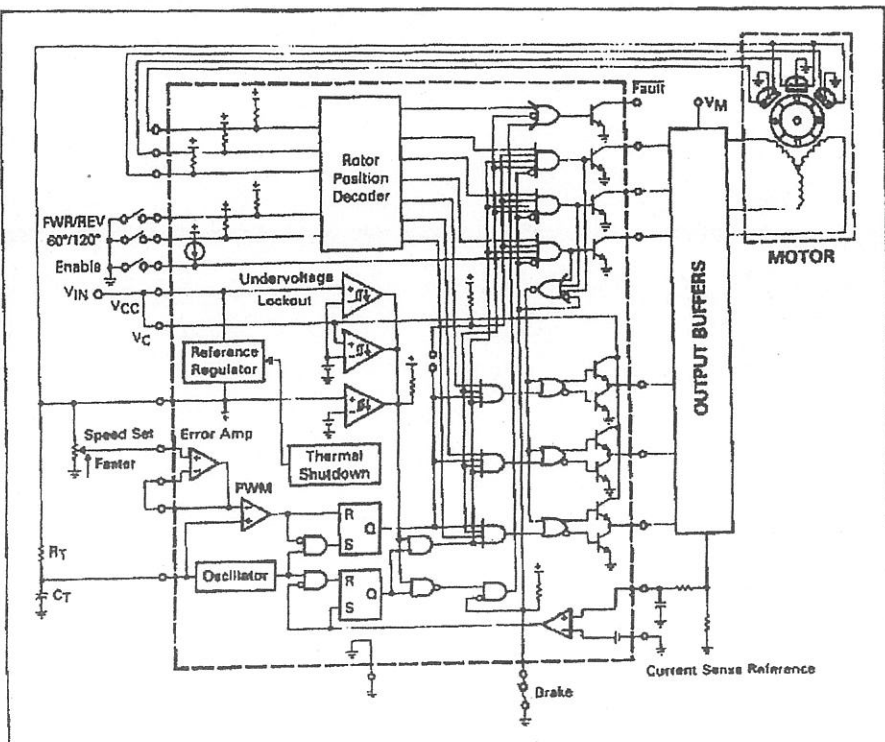
**DW SUFFIX
 PLASTIC PACKAGE
 CASE 751E
 (SO-24L)**

PIN CONNECTIONS



ORDERING INFORMATION



Device	Operating Ambient Temperature Range	Package
MC33035P	-40°C to +85°C	Plastic DIP
MC33035DW	-40°C to +85°C	SO-24L



6-Pin DIP Optoisolators

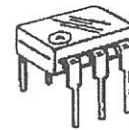
For Power Supply Applications

These devices consist of a gallium arsenide infrared emitting diode optically coupled to a monolithic silicon phototransistor detector. They have been designed and specified to meet the requirements of switchmode power supplies and other applications requiring very closely matched current transfer ratios (CTR), linearity and stable performance over the temperature range. The internal base-to-Pin 6 connection has been eliminated for improved noise immunity.

- Convenient Plastic Dual-in-Line Package
- High Input-Output Isolation Guaranteed 3750 Vac(rms)
- UL recognized. File Number E54915 
- VDE approved per standard 0883/6.80 (Certificate number 41853), with additional approval to DIN IEC380/VDE0806, IEC435/VDE0805, IEC65/VDE0860, VDE0110b, covering all other standards with equal or less stringent requirements, including IEC204/VDE0113, VDE0160, VDE0832, VDE0833, etc. 
- Special lead form available (add suffix "T" to part number) which satisfies VDE0883/6.80 requirement for 8 mm minimum creepage distance between input and output solder pads.
- Other lead forms available. Consult "Optoisolator Lead Form Options" data sheet for details.

MOC8101
MOC8102
MOC8103
MOC8104

6-PIN DIP
OPTOISOLATORS
TRANSISTOR OUTPUT



CASE 730A-02
PLASTIC

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Unit
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INPUT LED

Forward Current — Continuous	I_F	60	mA
Forward Current-Peak (PW = 100 μs , 120 pps)	$I_F(\text{pk})$	1.0	A
Reverse Voltage	V_R	6.0	V
LED Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	120 1.41	mW mW/ $^\circ\text{C}$

OUTPUT TRANSISTOR

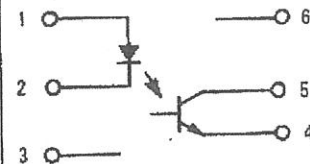
Collector-Emitter Voltage	V_{CE0}	30	V
Emitter-Collector Voltage	V_{ECO}	7.0	V
Collector Current — Continuous	I_C	150	mA
Detector Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	150 1.76	mW mW/ $^\circ\text{C}$

TOTAL DEVICE

Input-Output Isolation Voltage (1) (f = 60 Hz, t = 1 sec.)	V_{ISO}	3750	Vac(rms)
Total Device Power Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	150 2.94	mW mW/ $^\circ\text{C}$
Ambient Operating Temperature Range	T_A	-55 to +100	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	-55 to +150	$^\circ\text{C}$
Lead Soldering Temperature (1/16" from case, 10 sec. duration)	—	260	$^\circ\text{C}$

(1) Input-Output Isolation Voltage, V_{ISO} , is an internal device dielectric breakdown rating. For this test, Pins 1 and 2 are common, and Pins 4, 5 and 6 are common.

SCHEMATIC



1. LED ANODE
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4. EMITTER
5. COLLECTOR
6. NO CONNECTION

