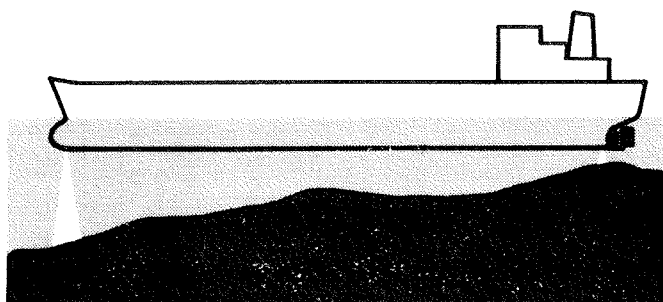
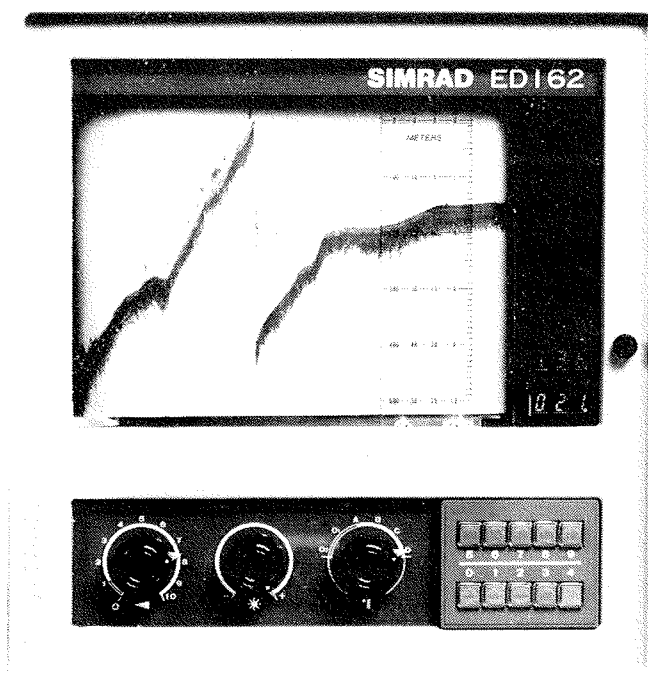


# SIMRAD ED162

## Echo Sounder

### OPERATOR'S MANUAL

March 1980



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# SIMRAD



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## TECHNICAL SPECIFICATIONS

### Scale range

Range setting	Range
0 <sub>1</sub>	Digital depth indicator 0-99.9 meters Recorder off
0 <sub>2</sub>	Digital depth indicator 0-500 meters Recorder off
A	0-10 meters
B	0-25 meters
C	0-50 meters
D	0-500 meters
	Feet, Fathom scales are available

### Transmitter

Frequency	200 kHz
Output power	350 Watts
Pulse duration	
Range 0 <sub>1</sub>	0.6 milliseconds
0 <sub>2</sub>	3 milliseconds
A	0.2 milliseconds
B	0.4 milliseconds
C	0.6 milliseconds
D	3 milliseconds

### Receiver

Frequency	200 kHz
Bandwidth	2 kHz
Bottom recording	Normal
TVG function	20 LogR Adjustable
TVG range	5-500 meters
Gain control	Continuous 30dB

### Recorder

Type	6 inch (150 mm) Belt recorder
Paper speed	Continuously variable 1.2 - 12 mm/minute
Paper type	Dry TP 6 - T16
Pulses per minute	
Range 0 <sub>1</sub>	440 per minute
0 <sub>2</sub>	44 per minute
A-B-C	272 per minute
D	54.4 per minute

### Voltage supply

Mains voltage	220 V AC or 11 - 40 V DC
Power Consumption	50 Watts

### Transducer

Model	NGM-100-200-15L
Frequency	200 kHz
Type	Ceramic
Active face	123 mm circular
Beam width	6°
Housing	Steel tank, supplied by SIMRAD
Length of cable	25 meters

### Miscellaneous

Digital Depth Indicator	
Range	1-99.9 meters 1-500 meters
Depth warning	
Range	1-500 meters
Mode	Decreasing depth
Warning	Audio-Visual
Dimensions of Cabinet	Height 350 mm Width 330 mm Depth 150 mm
Weight of Cabinet	Net 12 kg Gross 14 kg

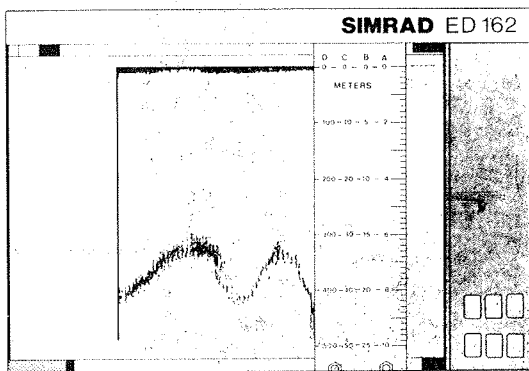
Total gross weight of cabinet and transducer with steel tank 34 kg

### Supplementary equipment

SIMRAD IR 201 Digital Depth Indicator with analog trend. This is a digital depth repeater for depths down to 500 meters (or equivalent depths in feet or fathoms).

OPERATION

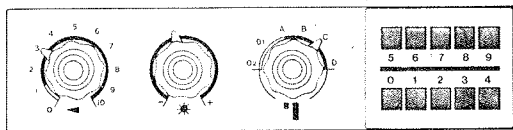
External controls



Push to open cabinet

Digital depth indicator

Depth warning indicator



Depth warning selector.

This push-button selector provides setting of any warning depth down to 999 meters. The selected depth is shown on the depth warning indicator (Green figures). When the depth becomes less than the pre-set value a buzzer will start and the digital depth warning indicator will blink. The warning signals will stop when recorded depth is deeper than the pre-set warning depth, or when zero-setting the depth warning selector.

Illumination control.

The illumination control provides continuous regulation of the illumination of the echogram and the front panel controls. The illumination lamps will extinguish when the recorder is switched off.

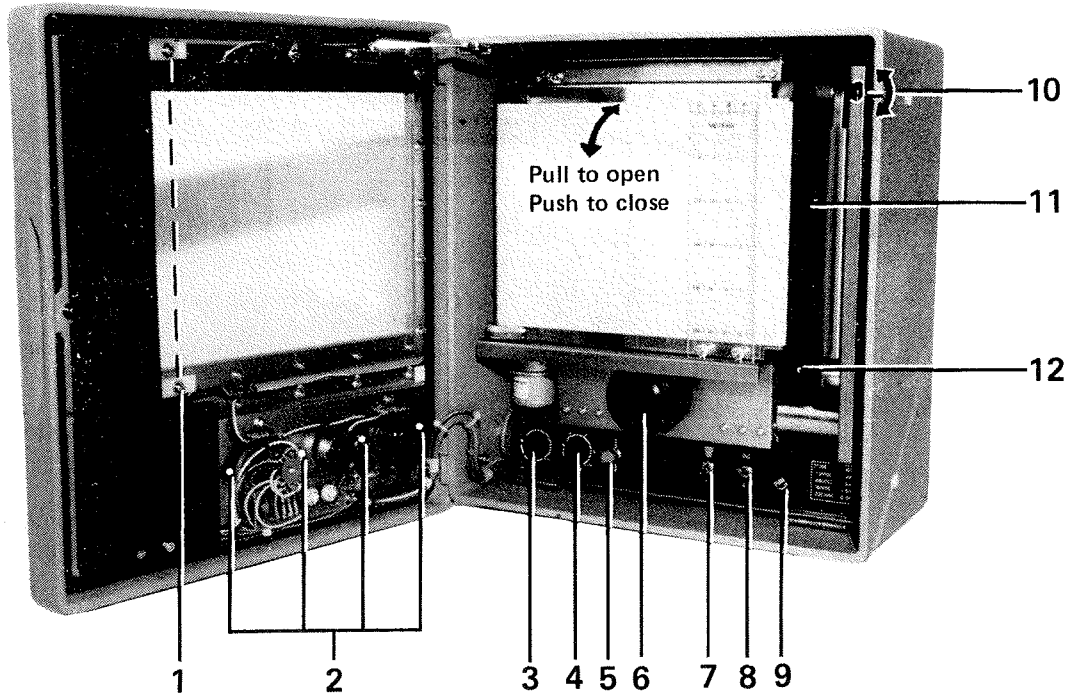
Range Selector  
Recorder On/Off.

This control selects the basic ranges according to the table given under technical specifications. In position 0 the recorder is switched off and the depth will be shown only on the digital depth indicator. The depth warning and any remote depth indicators will be operational.

On/Off.  
Receiver Gain Control


This control regulates the amplification of the received signals.  
Correct setting: Turn the knob clockwise until a stable depth indication is obtained on the digital depth indicator. If the setting is too low the depth-indicator will start blinking. Too high setting may result in false depth indication from air bubbles, plancton layers, side lobes etc. By turning the control fully anti clockwise the echosounder is switched off.


INTERNAL CONTROLS




**1** Scale illumination lamps

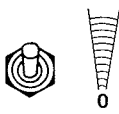
**2** Control illumination lamps


 **3** Paper Speed Control  
All ranges: 1.2 - 12 mm per minute continuously variable.


 **4** Time Varied Gain/TVG Control  
Regulates the receiver amplification in the shallow water range.

 **5** Marker Control  
A black line is drawn across the echogram when the knob is depressed.

**6** Audio Alarm

 **7** Depth Warning Audio - On/Off

 **8** Mains selector

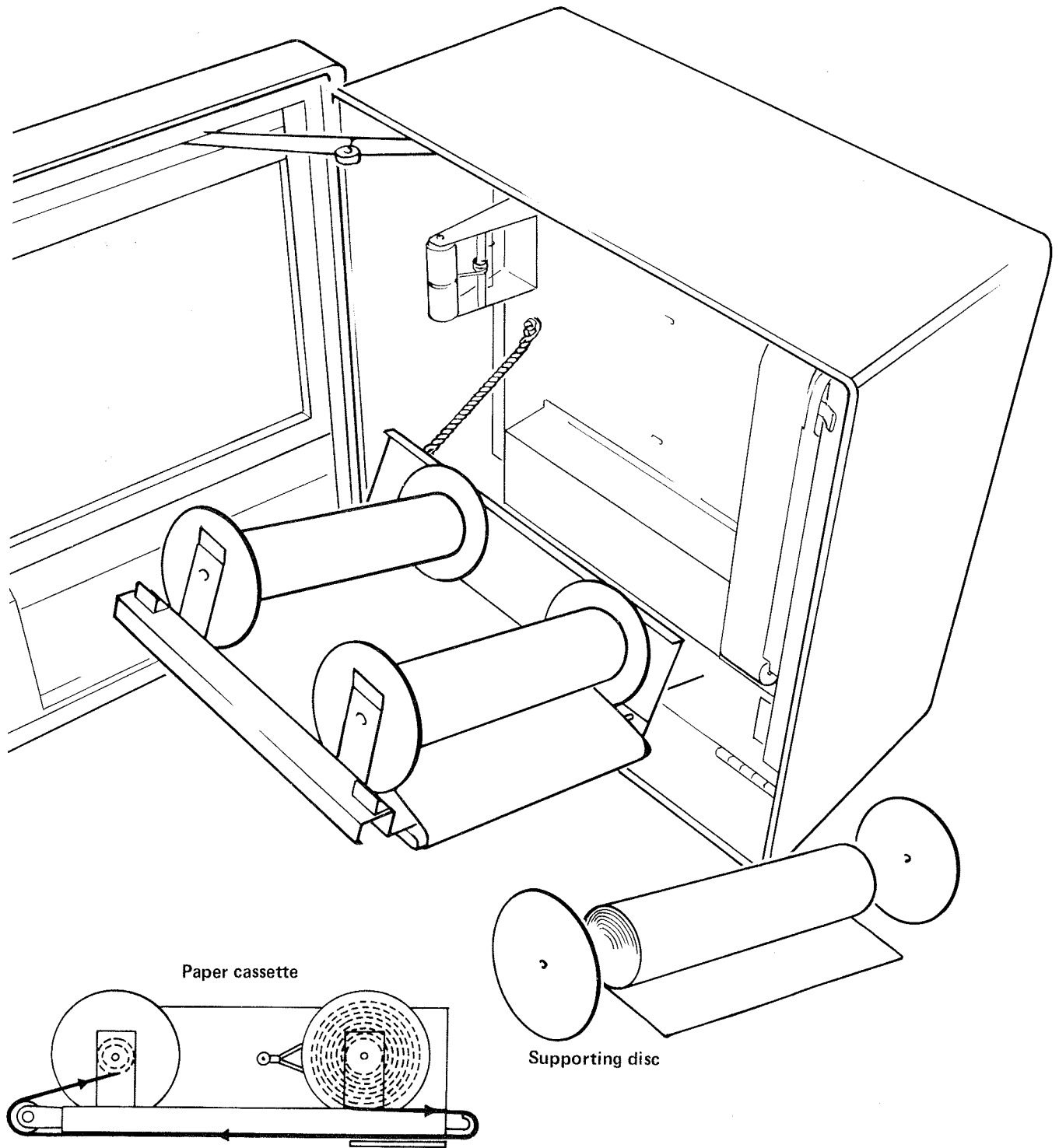
 **9** Fuse holder  
Fuses:  
12 V - 4 A      32 V - 1.5 A  
24 V - 2 A      220 V - 0.3 A

**10** Zero-Line adjuster  
For adjustment of the zero-line to correspond with the scale.  
By moving the zero-line downwards corresponding to the ship's (transducer's) draft true water depth is read on the echogram.

**11** Recording stylus  
Contact spring

**12** Trigger magnet

## REPLACEMENT OF RECORDING PAPER



1. Switch off the echosounder.
2. Rotate the pen belt so that the recording pen is located at the back.
3. Take hold of the top front of the paper cassette, pull it out and let it swing down carefully.
4. Pull out the end disc knob for the magazine and remove the used paper roll.

5. Transfer the empty spool from right to left side and make sure that the end supporting discs enter the spool.
6. Insert a new roll of recording paper and thread the paper as shown on the figure.
7. Thread the end of the paper into the slot in the paper spool and turn the spool to tighten the roll.
8. Lift and lock the paper cassette in the recorder.

## MAINTENANCE

### General

This chapter deals with the maintenance work that may be done by the user. Major repairs and overhauls should be left to an authorized SIMRAD service engineer.

### Cleaning

Keep the cabinet clean and dry. If desired, the cabinet may be polished with a good car wax. Take care not to wax the acryl window and front plate. This should be cleaned with ordinary soap and a wet cloth.

The transducer normally needs little attention. However, the radiating face should be cleaned when docking. Use syntetic soap. Marine growth may be removed with a piece of wood, whereupon the radiating face is carefully cleaned with fine-grade sand paper or emery paper.

### The radiating face must not be painted

The recorder should be cleaned at regular intervals. A brush is fine for this purpose.

### Oiling

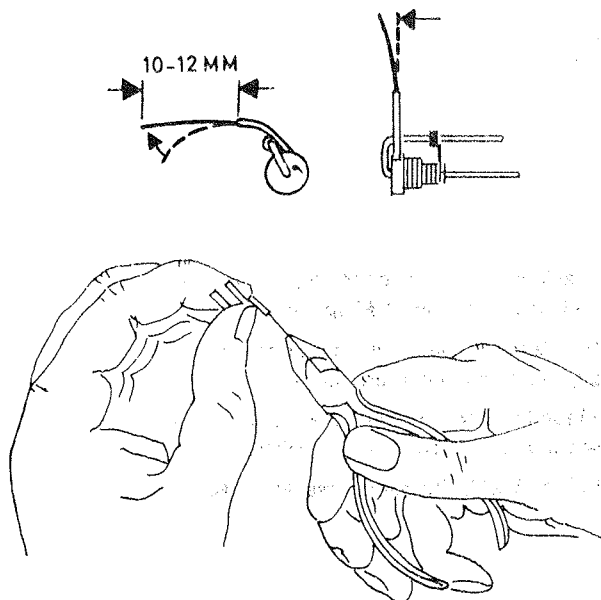
Normally no oiling and greasing is required. If necessary apply only one drop of oil on moving parts.

### Adjusting the recording pen

The recording pen has a magazine of thin steel wire which must be pulled out when the tip is worn down. This is usually done every time a new roll of paper is inserted.

1. Switch off the echosounder, open the cabinet door and rotate the penbelt till the pen is in front.
2. Remove the pen from its beltholder.
3. Hold the pen as shown with a pair of pliers. Pull the wire slowly out from the thin guiding tube. Be careful not to damage the tube. Total length of wire outside the tube should be 10 - 12 mm ( $3/8$  -  $1/2$  in). If the wire has been pulled out too far, cut to correct length.
4. Straighten the wire as an extension of the guiding tube.

The pen should be bent slightly to the left.



### Spare Parts

With the echosounder a spare part kit is supplied:

- 8 ea fuses
- 5 ea scale lamps
- 2 ea recording pens
- 2 ea trailing contacts

Spare part Reg. No. 160-1

Replacing fuses.

SIMRAD ED 161 has one fuse which is located inside the cabinet. Switch off the echosounder before carrying out any replacement

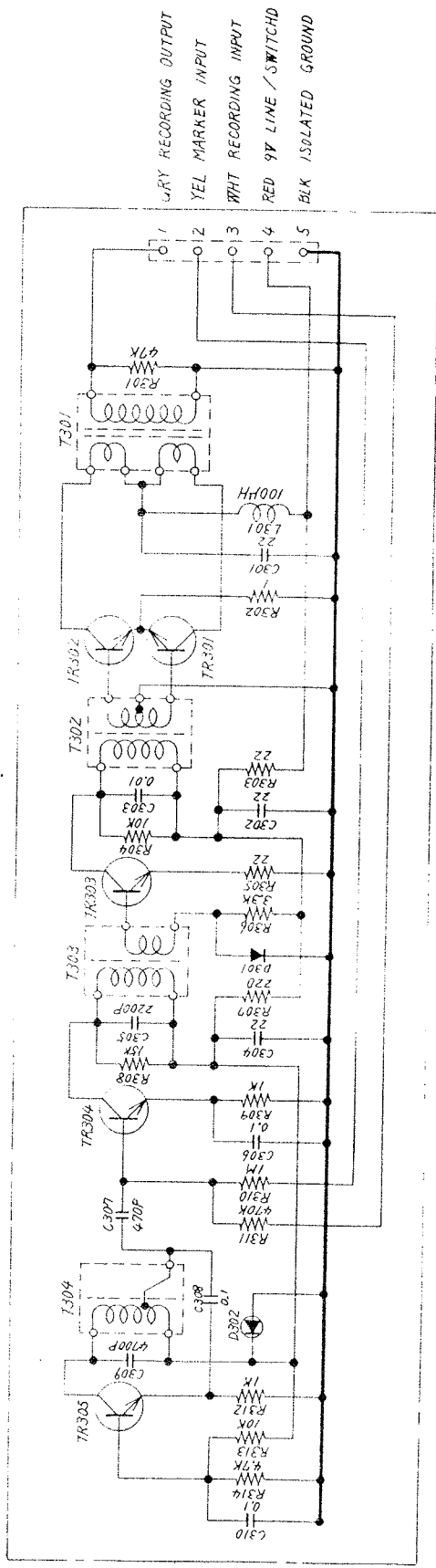
- |            |               |
|------------|---------------|
| 12 V - 4 A | 32 V - 1.5 A  |
| 24 V - 2 A | 220 V - 0.3 A |

### Replacing illumination lamps

SIMRAD ED 161 is furnished with 6 illumination lamps located inside the front door.

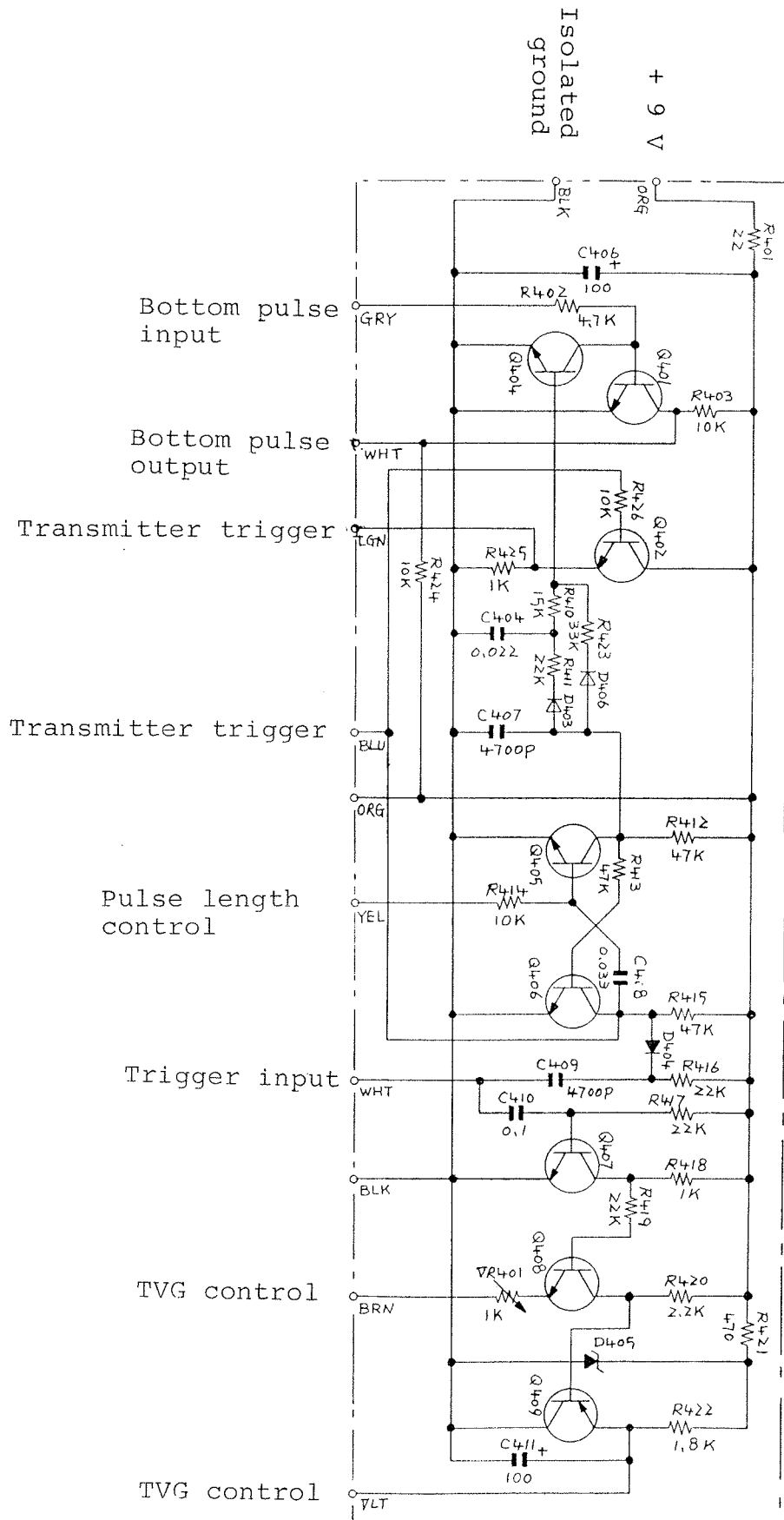
Switch off the echosounder before carrying out any replacement.





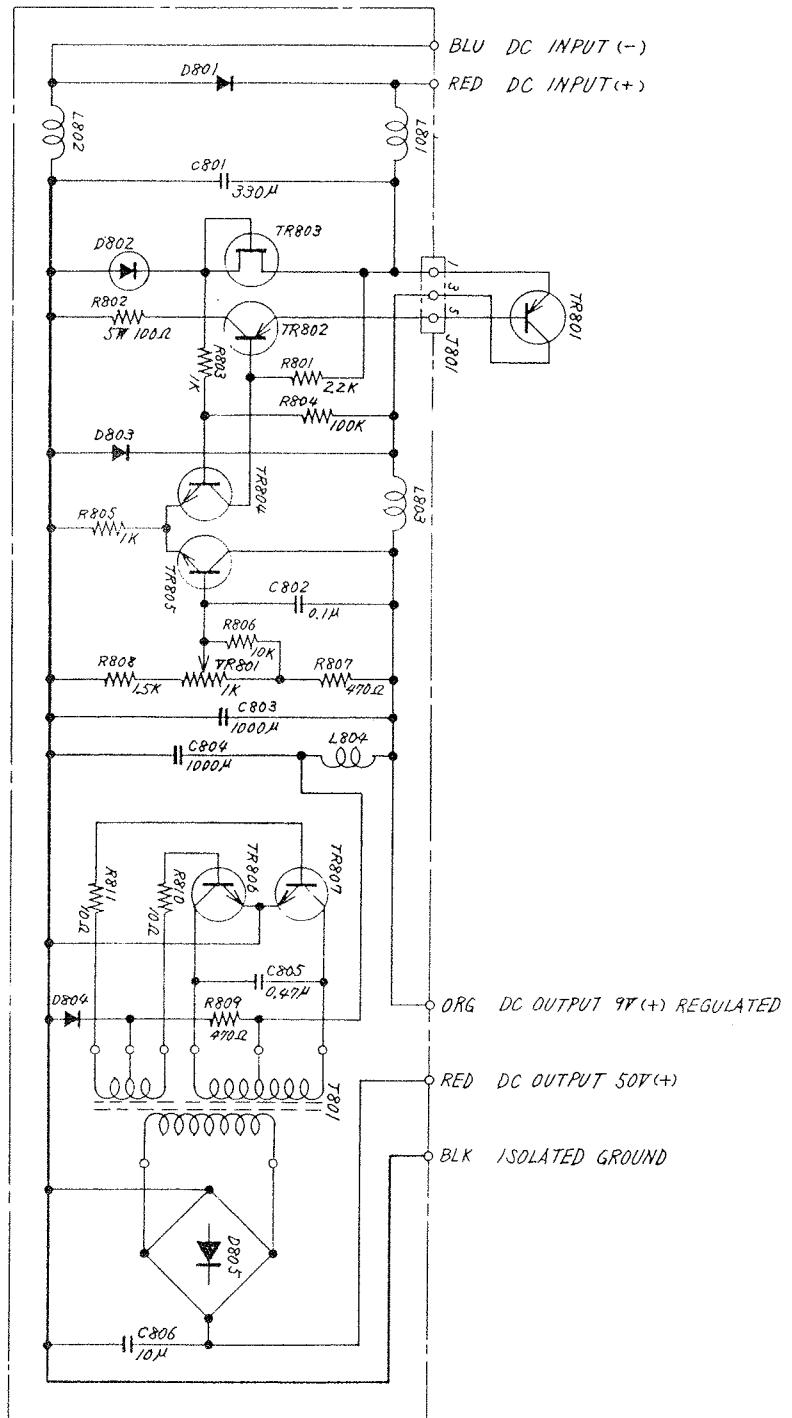
PB 161/162-109  
 SIMRAD ED 161/162  
 Recording Amplifier





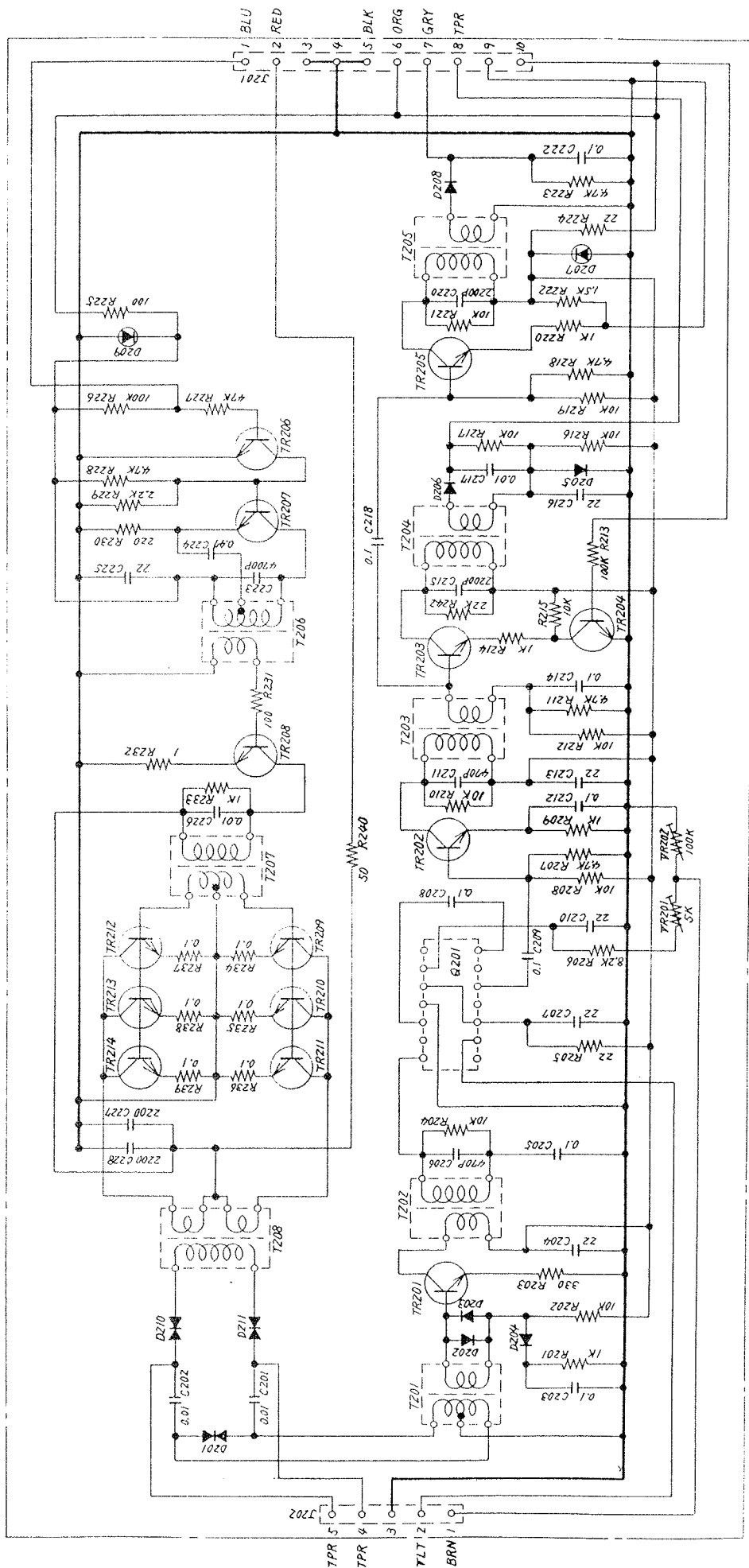
PB 161-103  
 SIMRAD ED 161/162  
 Main Control Board





PB 162-127  
 SIMRAD ED 162/162 Power Supply Board





PB 162-108 SIMRAD ED 162 Transmitter -Receiver Front End

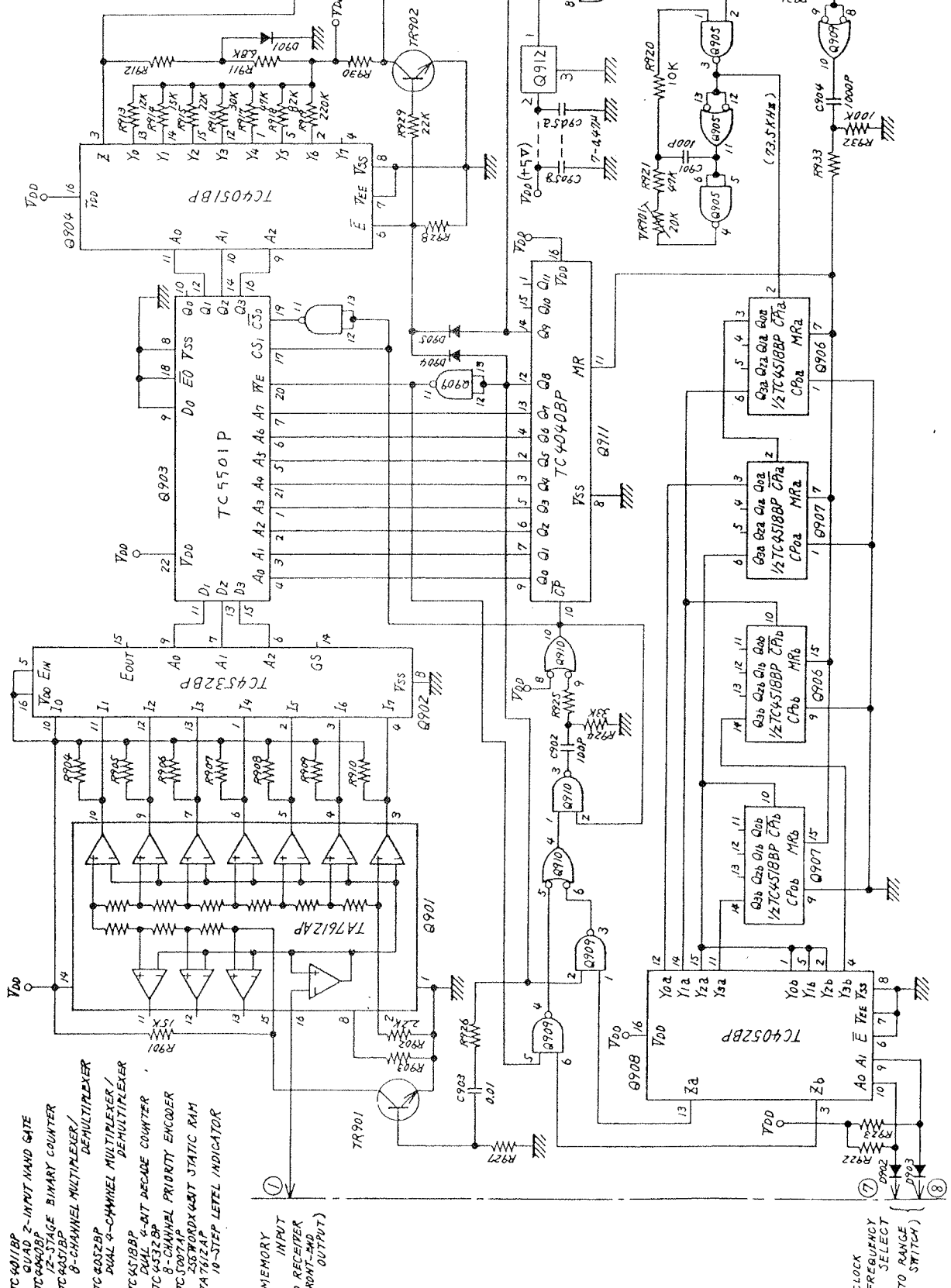




NOTE 1: ALL GATES ARE TC4011BP  
 NOTE 2: ALL RESISTOR VALUES ARE 10KΩ UNLESS OTHERWISE SPECIFIED

TC4052BP PM3.9, 10 & 13  
 RANGE A0 A1 32.00K 83(CHE)  
 A L L 18.375 3.675  
 B H L 7.35 3.675  
 C L H 3.675 3.675  
 D H H 0.3675 0.735

TC4090BP PM 12 & 14  
 Q0=Q4=L READING TIME, USE CLOCK 8B  
 Q0=H WRITING TIME, USE CLOCK 13  
 Q4=H WAITING TIME.



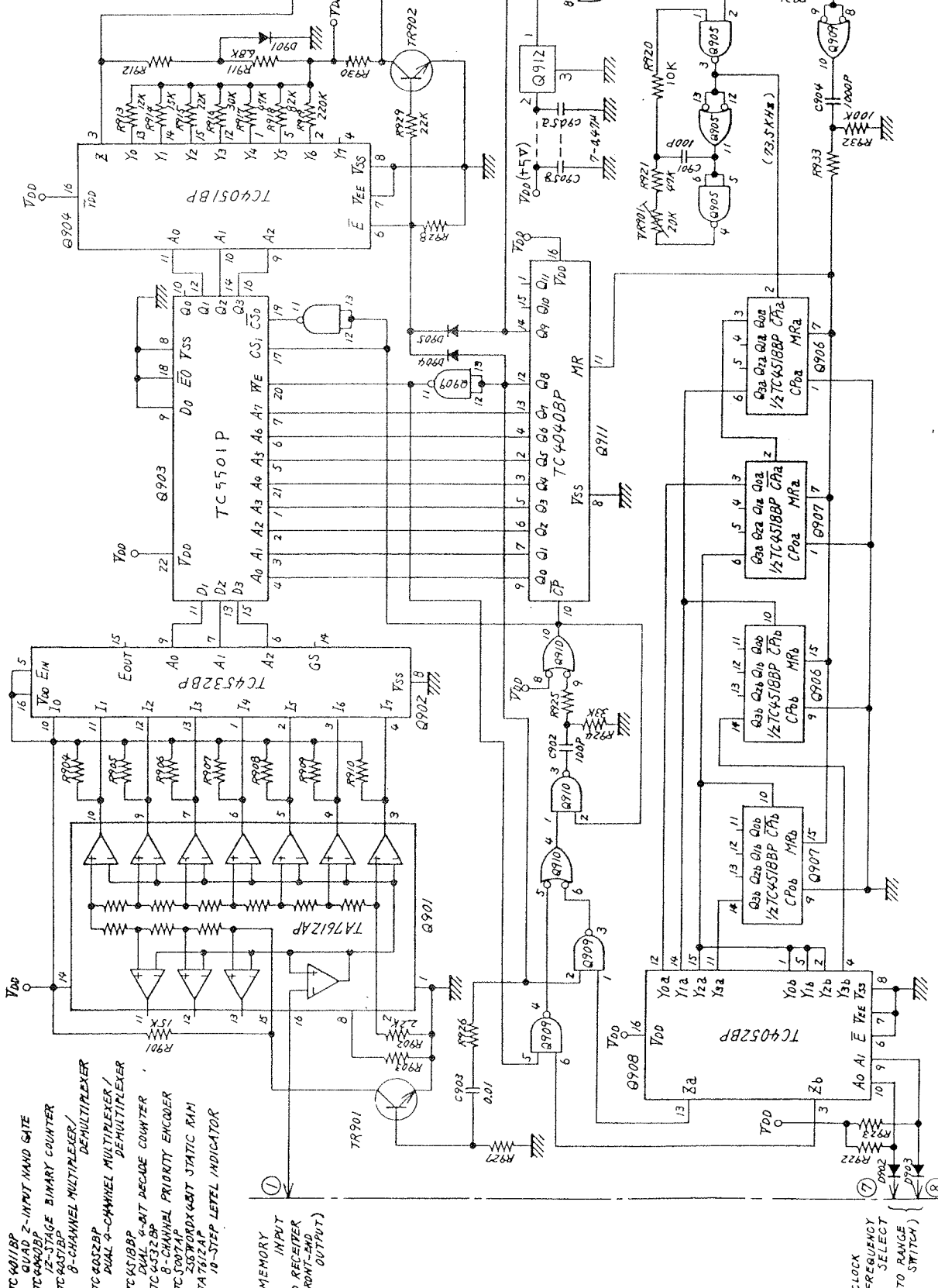
TC 4011BP QUAD 2-INPUT NAND GATE  
 TC 4040BP 12-STAGE BINARY COUNTER  
 TC 4051BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4052BP DUAL 4-BIT DECODE COUNTER  
 TC 4053BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4054BP DUAL 4-BIT DECODE COUNTER  
 TC 4055BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4056BP DUAL 4-BIT DECODE COUNTER  
 TC 4057BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4058BP DUAL 4-BIT DECODE COUNTER  
 TC 4059BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4060BP DUAL 4-BIT DECODE COUNTER  
 TC 4061BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4062BP DUAL 4-BIT DECODE COUNTER  
 TC 4063BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4064BP DUAL 4-BIT DECODE COUNTER  
 TC 4065BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4066BP DUAL 4-BIT DECODE COUNTER  
 TC 4067BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4068BP DUAL 4-BIT DECODE COUNTER  
 TC 4069BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4070BP DUAL 4-BIT DECODE COUNTER  
 TC 4071BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4072BP DUAL 4-BIT DECODE COUNTER  
 TC 4073BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4074BP DUAL 4-BIT DECODE COUNTER  
 TC 4075BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4076BP DUAL 4-BIT DECODE COUNTER  
 TC 4077BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4078BP DUAL 4-BIT DECODE COUNTER  
 TC 4079BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4080BP DUAL 4-BIT DECODE COUNTER  
 TC 4081BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4082BP DUAL 4-BIT DECODE COUNTER  
 TC 4083BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4084BP DUAL 4-BIT DECODE COUNTER  
 TC 4085BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4086BP DUAL 4-BIT DECODE COUNTER  
 TC 4087BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4088BP DUAL 4-BIT DECODE COUNTER  
 TC 4089BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4090BP DUAL 4-BIT DECODE COUNTER  
 TC 4091BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4092BP DUAL 4-BIT DECODE COUNTER  
 TC 4093BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4094BP DUAL 4-BIT DECODE COUNTER  
 TC 4095BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4096BP DUAL 4-BIT DECODE COUNTER  
 TC 4097BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4098BP DUAL 4-BIT DECODE COUNTER  
 TC 4099BP 8-CHANNEL MULTIPLEXER / DEMULTIPLEXER  
 TC 4100BP DUAL 4-BIT DECODE COUNTER

Expansion/Compression Board  
 PCB 162-124 SIMRAD ED 162



NOTE 1: ALL GATES ARE TC4011BP  
 NOTE 2: ALL RESISTORS VALUES ARE 10KΩ UNLESS OTHERWISE SPECIFIED

TC4052BP PMJ. 9. 10 B 13  
 RANGE A0 A1 3.675 3.675 (CLK)  
 A L L 18.375 3.675  
 B H L L 7.35 3.675  
 C L H H 3.675 3.675  
 D H H H 0.3675 0.735  
 TC4050BP PMJ. 12 B 14  
 Q0=Q4=L READING TIME, USE CLOCK IN  
 Q5=H WAITING TIME, USE CLOCK IN  
 Q9=H WAITING TIME.



TC4011BP QUAD 2-INPUT NAND GATE  
 TC4012BP QUAD 3-INPUT NAND GATE  
 TC4013BP QUAD 2-INPUT NOR GATE  
 TC4014BP QUAD 2-INPUT OR GATE  
 TC4015BP QUAD 2-INPUT AND GATE  
 TC4016BP QUAD 2-INPUT OR GATE  
 TC4017BP QUAD 2-INPUT AND GATE  
 TC4018BP QUAD 2-INPUT OR GATE  
 TC4019BP QUAD 2-INPUT AND GATE  
 TC4020BP QUAD 2-INPUT OR GATE  
 TC4021BP QUAD 2-INPUT AND GATE  
 TC4022BP QUAD 2-INPUT OR GATE  
 TC4023BP QUAD 2-INPUT AND GATE  
 TC4024BP QUAD 2-INPUT OR GATE  
 TC4025BP QUAD 2-INPUT AND GATE  
 TC4026BP QUAD 2-INPUT OR GATE  
 TC4027BP QUAD 2-INPUT AND GATE  
 TC4028BP QUAD 2-INPUT OR GATE  
 TC4029BP QUAD 2-INPUT AND GATE  
 TC4030BP QUAD 2-INPUT OR GATE  
 TC4031BP QUAD 2-INPUT AND GATE  
 TC4032BP QUAD 2-INPUT OR GATE  
 TC4033BP QUAD 2-INPUT AND GATE  
 TC4034BP QUAD 2-INPUT OR GATE  
 TC4035BP QUAD 2-INPUT AND GATE  
 TC4036BP QUAD 2-INPUT OR GATE  
 TC4037BP QUAD 2-INPUT AND GATE  
 TC4038BP QUAD 2-INPUT OR GATE  
 TC4039BP QUAD 2-INPUT AND GATE  
 TC4040BP QUAD 2-INPUT OR GATE  
 TC4041BP QUAD 2-INPUT AND GATE  
 TC4042BP QUAD 2-INPUT OR GATE  
 TC4043BP QUAD 2-INPUT AND GATE  
 TC4044BP QUAD 2-INPUT OR GATE  
 TC4045BP QUAD 2-INPUT AND GATE  
 TC4046BP QUAD 2-INPUT OR GATE  
 TC4047BP QUAD 2-INPUT AND GATE  
 TC4048BP QUAD 2-INPUT OR GATE  
 TC4049BP QUAD 2-INPUT AND GATE  
 TC4050BP QUAD 2-INPUT OR GATE  
 TC4051BP QUAD 2-INPUT AND GATE  
 TC4052BP QUAD 2-INPUT OR GATE  
 TC4053BP QUAD 2-INPUT AND GATE  
 TC4054BP QUAD 2-INPUT OR GATE  
 TC4055BP QUAD 2-INPUT AND GATE  
 TC4056BP QUAD 2-INPUT OR GATE  
 TC4057BP QUAD 2-INPUT AND GATE  
 TC4058BP QUAD 2-INPUT OR GATE  
 TC4059BP QUAD 2-INPUT AND GATE  
 TC4060BP QUAD 2-INPUT OR GATE  
 TC4061BP QUAD 2-INPUT AND GATE  
 TC4062BP QUAD 2-INPUT OR GATE  
 TC4063BP QUAD 2-INPUT AND GATE  
 TC4064BP QUAD 2-INPUT OR GATE  
 TC4065BP QUAD 2-INPUT AND GATE  
 TC4066BP QUAD 2-INPUT OR GATE  
 TC4067BP QUAD 2-INPUT AND GATE  
 TC4068BP QUAD 2-INPUT OR GATE  
 TC4069BP QUAD 2-INPUT AND GATE  
 TC4070BP QUAD 2-INPUT OR GATE  
 TC4071BP QUAD 2-INPUT AND GATE  
 TC4072BP QUAD 2-INPUT OR GATE  
 TC4073BP QUAD 2-INPUT AND GATE  
 TC4074BP QUAD 2-INPUT OR GATE  
 TC4075BP QUAD 2-INPUT AND GATE  
 TC4076BP QUAD 2-INPUT OR GATE  
 TC4077BP QUAD 2-INPUT AND GATE  
 TC4078BP QUAD 2-INPUT OR GATE  
 TC4079BP QUAD 2-INPUT AND GATE  
 TC4080BP QUAD 2-INPUT OR GATE  
 TC4081BP QUAD 2-INPUT AND GATE  
 TC4082BP QUAD 2-INPUT OR GATE  
 TC4083BP QUAD 2-INPUT AND GATE  
 TC4084BP QUAD 2-INPUT OR GATE  
 TC4085BP QUAD 2-INPUT AND GATE  
 TC4086BP QUAD 2-INPUT OR GATE  
 TC4087BP QUAD 2-INPUT AND GATE  
 TC4088BP QUAD 2-INPUT OR GATE  
 TC4089BP QUAD 2-INPUT AND GATE  
 TC4090BP QUAD 2-INPUT OR GATE  
 TC4091BP QUAD 2-INPUT AND GATE  
 TC4092BP QUAD 2-INPUT OR GATE  
 TC4093BP QUAD 2-INPUT AND GATE  
 TC4094BP QUAD 2-INPUT OR GATE  
 TC4095BP QUAD 2-INPUT AND GATE  
 TC4096BP QUAD 2-INPUT OR GATE  
 TC4097BP QUAD 2-INPUT AND GATE  
 TC4098BP QUAD 2-INPUT OR GATE  
 TC4099BP QUAD 2-INPUT AND GATE

Expansion/Compression Board  
 PCB 162-124 SIMRAD ED 162



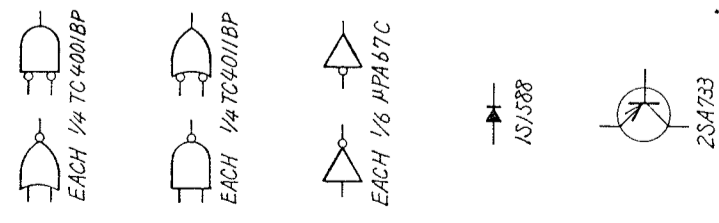
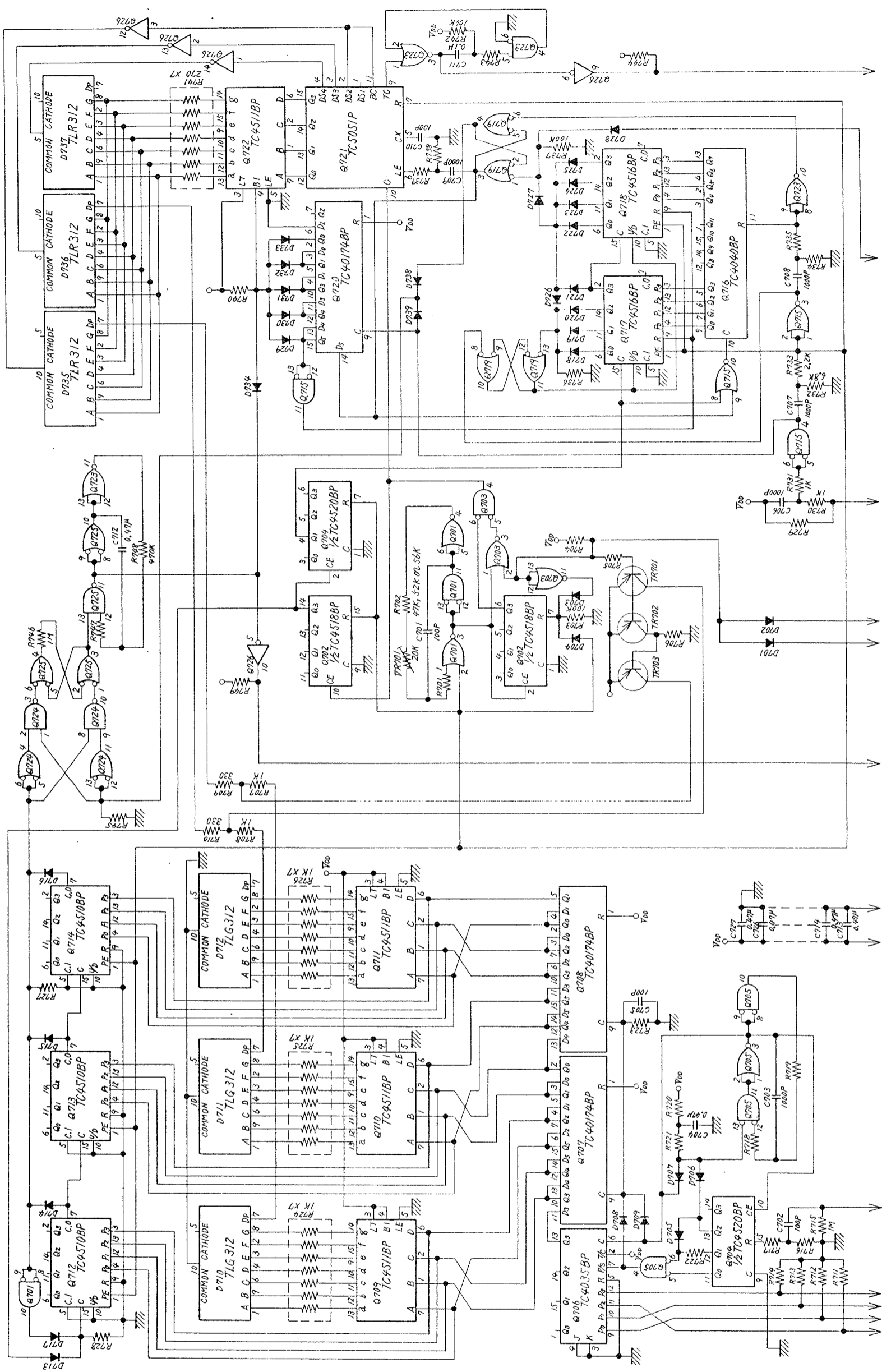
NOTE 1: ALL RESISTORS VALUES ARE 10KΩ UNLESS OTHERWISE SPECIFIED  
 NOTE 2: CLOCK FREQUENCY 7.35MHz AT Q702 (TC4518BP) 6 (6A3)

DUAL BCD UP COUNTER  
 DUAL BINARY UP COUNTER  
 HEX D FLIP-FLOP  
 4-DIGIT BCD COUNTER WITH BLANKING CONTROL  
 GREEN 7-SEGMENT LED  
 RED 7-SEGMENT LED  
 DRIVER TRANSISTOR ARRAY

TC4518BP  
 TC4520BP  
 TC40174BP  
 TC5051P  
 TLG312  
 TLR312  
 MPA67C

GUARD 2-INPUT NOR GATE  
 GUARD 2-INPUT NAND GATE  
 4-BIT PARALLEL IN / PARALLEL OUT SERIAL RIGHT SHIFT REGISTER  
 12-STAGE BINARY COUNTER  
 PRESETTABLE BCD UP/DOWN COUNTER  
 BCD-TO-7-SEGMENT LATCH / DECODER / DRIVER  
 PRESETTABLE BINARY UP/DOWN COUNTER

TC4017BP  
 TC4035BP  
 TC4040BP  
 TC4510BP  
 TC4511BP  
 TC4516BP



- ① ELECTRIC BUZZER (INTERMITTENT TONE ON/HIGH OFF/LOW)
- ② TRIGGER INPUT (TO MAIN CONTROL BOARD)
- ③ BOTTOM PULSE INPUT (TO RANGE SELECTOR)
- ④ TRIGGER OUTPUT (TO RANGE SELECTOR)
- ⑤ ISOLATED GROUND
- ⑥ 9V
- ⑦ PARALLEL INPUT RESET/PARALLEL-TO-SERIAL BCD CODE CONVERSION INITIATE (TO ENCODER BOARD)

PB161-123  
 SIMRAD 161/162 ALARM & DIGITAL DEPTH READOUT BOARD