CHAPTER III

SPECIFICATIONS

3.1 PREAMPLIFIER

Input Signal Polarity	:	Positive or Negative
Rise Time	:	$<$ 60 ns.
Preamplifier Fall Time	:	Fall time constant is designed for 50 μs., assuming a signal source impedance of 1×10^6 Ohms
Signal Connectors	:	BNC
Input Connector Isolation	:	1000 V.

3.2 AMPLIFIER

Gain : Maximum gain 500, adjustable from 12 to 640 by means of front-panel rotary switch, to select coarse gain factor for amplifier, factors are 4, 8, 16, 32 and 64; fine gain continuous control of 3 to 10.

Shaping : Selectable unipolar or bipolar time constants of 0.5 or 2 microseconds; near-Gaussian pulse shape. The peak amplitude of 0.5 μs. time constant Gaussian pulse position :

-- for unipolar at 0.8 μs.

-- for bipolar at 0.7 μs. and crossover at 1.3 μs.

The peak amplitude of 2 μs. time constant Gaussian

pulse position :

-- for unipolar at 2 μs.

-- for bipolar at 1.5 μs. and crossover at 3.6 μs.

Input : Positive or negative (rear panel toggle switch selects polarity), 12 V. abolute maximum, 1000 Ohms input impedance, pole-zero cancellation to match preamplifier.

Output : Positive unipolar or bipolar, with positive phase leading, 0-10 V. linear range. Less than 1 Ohm driving source impedance on front panel output; BNC connector on front panel.

3.3 SINGLE-CHANNEL ANALYZER

Output Timing : Timed ~ 200 ns. from peak output pulse from amplifier

Lower Level : Front panel adjustable from 0.05 to 10 V. with 10-turn potentiometer; slide switch selects external input on rear panel.

External Lower Level : Input from 0 to -10 V., 1000 Ohms input impedance. Rear panel connector.

Window : 0 to 10 V. or 0 to 1 V. with front panel 10-turn potentiometer, range selectable by slide switch.

Input : Internally connected to amplifier output, input uses Baseline Restorer circuit to stabilize the baseline.

Output : Nominally 5V., 0.5 μs. wide; BNC connector rear panel.

3.4 REPLACEABLE PARTS

Reference No.		Description	
R_1	100 Ω	1/4 W.	1 % Metal Film
R_2	1 kΩ	1/4 W.	1 % MF.
R_3	680 kΩ	1/4 W.	1 % MF.
R_4	100Ω	1/4 W.	5 % Carbon
R_5	22Ω	1/4 W.	5 % C.
R_6	22 Ω	1/4 W.	5 % C.
R_7	1 kΩ	1/4 W.	1 % MF.
R_8	1 kΩ	1/4 W.	1 % MF.
R_9	499 Ω	1/4 W.	1 % MF.
R_{10}	402 Ω	1/4 W.	1 % MF.
R_{11}	27.4 kΩ	1/4 W.	1 % MF.
R_{12}	27.4 kΩ	1/4 W.	1 % MF.
R_{13}	5 kΩ		TRIM POT
R_{14}	49 Ω	1/4 W.	5 % C.
R_{15}	49 Ω	1/4 W.	5 % C.
R_{16}	1 kΩ	1/4 W.	1 % MF.
R_{17}	4020 Ω	1/4 W.	1 % MF.
R_{18}	806 Ω	1/4 W.	1 % MF.
R_{19}	2 kΩ	1/4 W.	1 % MF.
R_{20}	27.4 kΩ	1/4 W.	1 % MF.
R_{21}	27.4 kΩ	1/4 W.	1 % MF.
R_{22}	49 Ω	1/4 W.	5 % C.
R_{23}	49 Ω	1/4 W.	5 % C.
R_{24}	5 kΩ		TRIM POT

Reference No.		Description	
R_{25}	61.9 kΩ	1/4 W.	1 % MF.
R_{26}	14.7 kΩ	1/4 W.	1 % MF.
R_{27}	1.5 kΩ	1/4 W.	1 % MF.
R_{28}	1.5 kΩ	1/4 W.	1 % MF.
R_{29}	1.5 kΩ	1/4 W.	1 % MF.
R_{30}	8060 Ω	1/4 W.	1 % MF.
R_{31}	887 Ω	1/4 W.	1 % MF.
R_{32}	27.4 kΩ	1/4 W.	1 % MF.
R_{33}	27.4 kΩ	1/4 W.	1 % MF.
R_{34}	12.4 kΩ	1/4 W.	1 % MF.
R_{35}	5 kΩ		TRIM POT
R_{36}	22 Ω	1/4 W.	5 % C.
R_{37}	22 Ω	1/4 W.	5 % C.
R_{38}	499 Ω	1/4 W.	1 % MF.
R_{39}	1 kΩ	3 W.	1-T POT
R_{40}	500 Ω	1/4 W.	1 % MF.
R_{41}	500 Ω	1/4 W.	1 % MF.
R_{42}	1 kΩ	1/4 W.	1 % MF.
R_{43}	500 Ω	1/4 W.	1 % MF.
R_{44}	1 kΩ	1/4 W.	1 % MF.
R_{45}	500 Ω	1/4 W.	1 % MF.
R_{46}	500 Ω	1/4 W.	1 % MF.
R_{47}	1 kΩ	1/4 W.	1 % MF.
R_{48}	5.62 kΩ	1/4 W.	1 % MF.
R_{49}	1 kΩ	1/4 W.	1 % MF.

Reference No.		Description	
R_{50}	6.04 kΩ	1/4 W.	1 % MF.
R_{51}	3.01 kΩ	1/4 W.	1 % MF.
R_{52}	100 Ω	1/4 W.	5 % C.
R_{53}	100 Ω	1/4 W.	5 % C.
R_{54}	715 Ω	1/4 W.	1 % MF.
R_{55}	3 kΩ	1/4 W.	1 % MF.
R_{56}	10 kΩ	1/4 W.	1 % MF.
R_{57}	1 kΩ	1/4 W.	1 % MF.
R_{58}	27.4 kΩ	1/4 W.	1 % MF.
R_{59}	27.4 kΩ	1/4 W.	1 % MF.
R_{60}	5 kΩ		TRIM POT
R_{61}	22 Ω	1/4 W.	5 % C.
R_{62}	22 Ω	1/4 W.	5 % C.
R_{63}	10 Ω	1/4 W.	5 % C.
R_{64}	4.7 kΩ	1/4 W.	5 % C.
R_{65}	4.7 kΩ	1/4 W.	5 % C.
R_{66}	10 Ω	1/4 W.	5 % C.
R_{67}	10 Ω	1/4 W.	5 % C.
R_{68}	10 Ω	1/4 W.	5 % C.
R_{69}	10 Ω	1/4 W.	5 % C.
R_{70}	10 Ω	1/4 W.	5 % C.
R_{71}	2.5 kΩ	1/4 W.	1 % MF.
R_{72}	1 kΩ	1/4 W.	1 % MF.
R_{73}	27.4 kΩ	1/4 W.	1 % MF.
R_{74}	27.4 kΩ	1/4 W.	1 % MF.

Reference No.	Description		
R_{75}	5 kΩ		TRIM POT
R_{76}	22 Ω	1/4 W.	5 % C.
R_{77}	22 Ω	1/4 W.	5 % C.
R_{78}	100 Ω	1/4 W.	1 % MF.
R_{79}	100 Ω	1/4 W.	5 % C.
R_{80}	1.3 kΩ	1/4 W.	5 % C.
R_{81}	2.4 kΩ	1/4 W.	5 % C.
R_{82}	3.48 kΩ	1/4 W.	1 % C.
R_{83}	1 kΩ	1/4 W.	1 % MF.
R_{84}	121 kΩ	1/4 W.	1 % MF.
R_{85}	511 Ω	1/4 W.	1 % MF.
R_{86}	1 kΩ	1/4 W.	1 % MF.
R_{87}	500 Ω		10-T POT
R_{88}	1.33 kΩ	1/4 W.	1 % MF.
R_{89}	51.1 Ω	1/4 W.	1 % MF.
R_{90}	22 Ω	1/4 W.	5 % C.
R_{91}	22 Ω	1/4 W.	5 % C.
R_{92}	1 kΩ	1/4 W.	1 % MF.
R_{93}	1 kΩ	1/4 W.	1 % MF.
R_{94}	22 Ω	1/4 W.	5 % C.
R_{95}	22 Ω	1/4 W.	5 % C.
R_{96}	1 kΩ	1/4 W.	1 % MF.
R_{97}	1 kΩ	1/4 W.	1 % MF.
R_{98}	22 Ω	1/4 W.	5 % C.
R_{99}	22 Ω	1/4 W.	5 % C.

Reference No.	Description		
R_{100}	1 kΩ	1/4 W.	1 % MF.
R_{101}	500 Ω		10-T POT
R_{102}	806 Ω	1/4 W.	1 % MF.
R_{103}	402 Ω	1/4 W.	1 % MF.
R_{104}	100 Ω	1/4 W.	5 % C.
R_{105}	1.3 kΩ	1/4 W.	5 % C.
R_{106}	100 Ω	1/4 W.	5 % C.
R_{107}	1.3 kΩ	1/4 W.	5 % C.
R_{108}	360 Ω	1/4 W.	5 % C.
R_{109}	360 Ω	1/4 W.	5 % C.
R_{110}	5 kΩ	1/4 W.	5 % C.
R_{111}	1.1 kΩ	1/4 W.	1 % MF.
R_{112}	1 kΩ	1/4 W.	1 % MF.
R_{113}	100 Ω	1/4 W.	5 % C.
R_{114}	6.8 kΩ	1/4 W.	5 % C.
R_{115}	2.2 kΩ	1/4 W.	5 % C.
R_{116}	100 Ω	1/4 W.	5 % C.
R_{117}	100 Ω	1/4 W.	5 % C.
R_{118}	2.2 kΩ	1/4 W.	5 % C.
R_{119}	23.7 kΩ	1/4 W.	5 % C.
R_{120}	100 Ω	1/4 W.	5 % C.
R_{121}	100 Ω	1/4 W.	5 % C.
R_{122}	23.7 kΩ	1/4 W.	5 % C.
R_{123}	1 kΩ	1/4 W.	1 % MF.
R_{124}	10 Ω	1/4 W.	5 % C.

Reference No.		Description	
R_{125}	10 kΩ	1/4 W.	5 % C.
R_{126}	100 Ω	1/4 W.	5 % C.
R_{127}	100 Ω	1/4 W.	5 % C.
R_{128}	1.3 kΩ	1/4 W.	5 % C.
VR_1	1 kΩ	POT	
C_1	0.01 µF	3 KV.	Disc. Ceramic
C_2	22 pF	500 V.	Dipped Mica.
C_3	100 pF	500 V.	DM.
C_4	5 pF	500 V.	DM.
C_5	6.8 µF	35 V.	Tantalum
C_6	6.8 µF	35 V.	Tan.
C_7	22 µF	35 V.	Tan.
C_8	0.01 µF	50 V.	Disc.
C_9	6.8 µF	35 V.	Tan.
C_{10}	6.8 µF	35 V.	Tan.
C_{11}	0.01 µF	50 V.	Disc.
C_{12}	6.8 µF	35 V.	Tan.
C_{13}	6.8 µF	35 V.	Tan.
C_{14}	500 pF	500 V.	DM.
C_{15}	2000 pF	500 V.	DM.
C_{16}	0.01 µF	50 V.	Disc.
C_{17}	6.8 µF	35 V.	Tan.
C_{18}	6.8 µF	35 V.	Tan.
C_{19}	27 pF	500 V.	DM.

Reference No.		Description	
C_{20}	150 pF	500 V.	DM.
C_{21}	68 pF	500 V.	DM.
C_{22}	270 pF	500 V.	DM.
C_{23}	39 pF	500 V.	DM.
C_{24}	110 pF	500 V.	DM.
C_{25}	500 pF	500 V.	DM.
C_{26}	2000 pF	500 V.	DM.
C_{27}	6.8 µF	35 V.	Tan.
C_{28}	6.8 µF	35 V.	Tan.
C_{29}	6.8 µF	35 V.	Tan.
C_{30}	6.8 µF	35 V.	Tan.
C_{31}	5 pF	500 V.	DM.
C_{32}	15 µF	35 V.	Tan.
C_{33}	15 µF	35 V.	Tan.
C_{34}	6.8 µF	35 V.	Tan.
C_{35}	6.8 µF	35 V.	Tan.
C_{36}	5.8 µF	35 V.	Tan.
C_{37}	6.8 µF	35 V.	Tan.
C_{38}	0.01 µF	50 V.	Disc.
C_{39}	0.01 µF	50 V.	Disc.
C_{40}	0.1 µF	50 V.	Disc.
C_{41}	1 µF	50 V.	Disc.
C_{42}	0.001 µF	50 V.	Disc.
C_{43}	6.8 µF	35 V.	Tan.
C_{44}	6.8 µF	35 V.	Tan.

Reference No.			Description
C_{45}	6.8 µF	35 V.	Tan.
C_{46}	6.8 µF	35 V.	Tan.
C_{47}	6.8 µF	35 V.	Tan.
C_{48}	6.8 µF	35 V.	Tan.
C_{49}	0.001 µF	50 V.	Disc.
C_{50}	0.01 µF	50 V.	Disc.
C_{51}	0.01 µF	50 V.	Disc.
C_{52}	0.01 µF	50 V.	Disc.
C_{53}	0.01 µF	50 V.	Disc.
C_{54}	100 pF	500 V.	DM.
C_{55}	0.1 µF	50 V.	Disc.
C_{56}	6.8 µF	35 V.	Tan.
C_{57}	15 µF	35 V.	Tan.
C_{58}	680 pF	500 V.	DM.
C_{59}	22 µF	35 V.	Tan.
C_{60}	6.8 µF	35 V.	Tan.
C_{61}	6.8 µF	35 V.	Tan.
C_{62}	6.8 µF	35 V.	Tan.
C_{63}	0.1 µF	35 V.	Tan.
C_{64}	0.01 µF	50 V.	Disc.
C_{65}	0.01 µF	50 V.	Disc.

D_1	Diode	1N 914
D_2	Diode	1N 914
D_3	Diode	1N 914

Reference No.	Description	
D_4	Diode	1N 914
D_5	Diode	1N 914
D_6	Diode	1N 914
D_7	Diode	1N 914
D_8	Diode	1N 914
D_9	Diode	1N 914
D_{10}	Diode	1N 914
D_{11}	Diode	1N 914
Q_1	Transistor	2N 3638
Q_2	Transistor	2N 3643
Q_3	Transistor	2N 3643
Q_4	Transistor	2N 3638
Q_5	Transistor	2N 3638
Q_6	Transistor	2N 3643
Q_7	Transistor	2N 3643
Q_8	Transistor	MPS 6520
Q_9	Transistor	MPS 6520
Q_{10}	Transistor	2N 3638 A
Q_{11}	Transistor	2N 3643
IC-1	IC	LM 318
IC-2	IC	LM 318
IC-3	IC	LM 318
IC-4	IC	LM 318

Reference No.	Description	
IC-5	IC	LM 318
IC-6	IC	LM 318
IC-7	IC	LM 318
IC-8	IC	µA 710 C
IC-9	IC	LM 741
IC-10	IC	LM 741
IC-11	IC	LM 741
IC-12	IC	µA 710
IC-13	IC	µA 710
IC-14	IC	N 74121
IC-15	IC	N 74121
IC-16	IC	SN 7408
IC-17	IC	SN 7400
IC-18	IC	µA 710