September 1984
Final Report

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US Department
of Transportation
National Highway
Traffic Safety
Administration

AIRBAG DEMONSTRATION PROGRAM
PHASE III

Robert C. Esser

Vehicle Research and Test Center
P. O. Box 37
East Liberty, Ohio 43319

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16. Abstract

Abstract Driving and Barrier Tests were performed to determine acceleration levels required to cause an accidental deployment of a Romeo-Kojyo airbag system and a Breed Corporation Mechanical Airbag System sensor.

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Introduction

After an accidental airbag deployment during a police pursuit by the California Highway Patrol (CHP), the National Highway Traffic Safety Administration (NHTSA) decided to attempt to cause an airbag deployment by driving across various rough surfaces with a similarly equipped vehicle.

Discussion

Vehicles from two different manufacturers are currently being used by state police departments involved in the retrofitting of airbags. These are the Plymouth Gran Fury/Dodge Diplomat and the Ford LTD. The vehicle in California in which the accidental deployment occurred was a Dodge Diplomat. California, along with some other states mounts a pusher bar to the front of their vehicles. This allows the patrolman to push other vehicles when necessary while not causing damage to either vehicle. Two methods of mounting are currently being used. The first is to mount the pusher bar to the bumper only. This allows any shock load to be attenuated through the energy absorbers before being transmitted to the vehicle frame and the airbag sensors. This method is used by most police departments. The second method of mounting mounts the pusher bar on the bumper but also braces it longitudinally to the frame which renders the energy absorbers ineffective. Since the airbag sensors are mounted within two inches of the pusher bar / frame interface, any shock load encountered by the pusher bar is transmitted directly to the airbag sensor. This is the method of mounting used by CHP. It has been suggested that CHP's method of mounting the pusher bar is the reason for their accidental deployment. Tests were run at the Vehicle Research and Test Center (VRTC) to verify this hypothesis.

Test Description

Driving tests were performed in increasing severity using a Ford LTD with a pusher bar mounted to the bumper only. All police departments which use LTDs mount them to the bumper only. For this reason it was not deemed necessary to test an LTD with a frame mounted pusher bar.

The vehicle was equipped with a Romeo Kojyo airbag system standard except that if the system triggered, a standard M2B photographic flashbulb mounted on top of the dashboard was fired instead of the airbag.

Since the airbag system sensors are of the on/off variety and are sensative to loading only in the X axis, accelerometers were mounted in the X axis immediatly adjacent to each airbag system sensor in order to determine at what level each particular sensor triggered. The positions monitored were the right front firing sensor, the left front firing sensor, and the safing sensor located under the dashboard. In addition, accelerometers were

mounted at the top of the steering column immediatly ahead of the steering wheel and on the left B-pillar at the seat belt retractor location.

Upon completion of the driving tests, the Ford LTD was towed into a fixed barrier at five, nine, and seven MPH in that order to determine whether the airbag would fire below the design speed of 12 MPH. New front bumper energy absorbers were installed prior to each barrier tests.

Upon completion of the fixed rigid barrier tests, the LTD was rolled into a loading dock. These tests consisted of rolling the vehicle into a concrete wall using gravity as the propulsion method and a hand held stopwatch to measure a ten foot distance marked on the vehicle to determine test speed. Impact speed was double checked by counting video tape frames for each impact. Test configurations consisted of (1) all sensors in their standard positions in its standard configuration and (2) the right front firing sensor remounted to the left inner fender. Throughout both of these conditions, the pusher bar remained mounted to the front bumper.

Similar testing was then performed on a similarly equipped Dodge Diplomat with a frame mounted pusher bar. This configuration duplicated the CHP vehicle involved in the accidental deployment. Driving tests were again performed prior to barrier testing. Barrier testing however consisted only of loading dock tests with the following configurations:

1. Pusher bar attached, sensors in standard positions.
2. Pusher bar removed, sensors in standard positions.
3. Pusher bar removed, prototype high level sensor in place of standard right front sensor.
4. Pusher bar removed, standard right front sensor relocated to inner fender near hood.

Starting with test 13, a sensor manufactured by the Breed Corporation for their all mechanical airbag system was mounted to the steering wheel of the vehicle undergoing testing as part of the evaluation of the Breed system.

Description of Test Surfaces

Single Bump (Figs. 1 & 2) An oblong shaped concrete block, six inches tall with a ramp at both ends. The entrance ramp starts at ground level and is 48 inches wide. It rises to six inches over a distance of seven feet and widens out to 120 inches at the same point. The exit ramp tapers from 120 inches to 102 inches in width and comes back to ground level over a distance of 66 inches. The bump is flat on top over a length and width of ten feet.

Stagger Bumps (Fig. 3) A series of smaller ramped bumps, each being sixteen feet long start to finish, rising to a height of six inches in the center and having a driving surface 36 inches wide. They are located so that the first, third, and fifth bumps are encountered by the left tires of a vehicle and the second, fourth, and sixth are encountered by the right tires. The track center between left and right side bumps is six feet. The spacing from center to center of the bumps is as follows:

1 - 2 = 18 feet 2 - 3 = 17 feet 3 - 4 = 15 feet
4 - 5 = 30 feet 5 - 6 = 25 feet

Ditch (Figs. 4 & 5) A man-made pit ten feet wide, twelve feet long, and twelve inches deep. The entrance wall is very nearly vertical having a slightly rounded top edge. The exit side is tapered to create a ramp six feet long. The flat distance along the bottom of the pit from the entrance wall to the start of the exit ramp is four feet.

Potholed Road A hard packed dirt road with naturally occurring, randonly spaced and sized potholes.

Large Pothole (Figs. 6 & 7) A pothole measuring 30 in. by 30 in. by 10 inches deep.

Barrier Standard fixed rigid barrier into which the vehicle is towed.

Dock (Figs. 8 & 9) Used as a fixed rigid barrier, this was actually a loading dock which is built such that its upper surface is at ground level threrby creating a ramp to the lower level down which the vehicle could roll without a driver. The striking surface is concrete backed by earth.

Hammer A ten pound sledge hammer used to strike the right side of the pusher bar in an attempt to transmit the shock directly to the right front sensor.

Results

Both vehicles were driven over the single bump at speeds building from 25 MPH to 50 MPH. Each was driven over the stagger bumps at speeds building from 25 MPH to 45 MPH. The LTD was driven through the ditch at 20 MPH and the Dodge at 10, 20, and 25 MPH in the less severe direction and 10 and 15 MPH in the more severe direction. The LTD was driven over the potholed road at speeds up to 40 MPH and the single pothole at speeds up to 30 MPH. None of these tests caused the Romeo-Kojyo airbag system to fire on either vehicle. The Breed Corporation sensor tripped on several occasions as documented in Appendices I & II. Each vehicle sustained damage to the front suspension and frame. In addition, the LTD showed visable damage to the bodywork upon completion of the driving tests. (Figs. 10, 11, & 12)

When impacted into the barrier, the LTD's Romeo-Kojyo system fired at nine and then again at seven MPH. After the nine MPH impact, the front bumper energy absorber bolts were examined and determined to have elongated the holes in the vehicle frame through which they are mounted. These holes were repaired by welding new material around them. Following the subsequent seven MPH impact, the mounting holes were again examined and found to be elongated, having torn through the intended fix. These barrier tests were performed with the pusher bar attached. A report for these three tests follows under separate cover.

The Ford LTD's Romeo-Kojyo airbag system fired when triggered from the right front standard sensor when the vehicle was rolled into the loading dock at 4.7 MPH with the pusher bar attached. (Appendix I, Runs A-E) When the left front standard sensor was connected to the system and the vehicle was rolled into the loading dock, the trigger speed was 5.6 MPH (Appendix I, Runs F-K) When the standard sensor was relocated to the left inner fender, the speed required to trigger the system rose to 7.5 MPH. (Appendix I, Runs L-P) The Breed Corporation sensor was not attached to the vehicle during the loading dock testing. Due to the severe damage to the front of the vehicle caused by repeated loading dock impacts, these trigger speeds must be regarded as indicators of a trend and not valid data.

The Dodge Diplomat's Romeo-Kojyo airbag system fired when the vehicle was rolled into the loading dock at 4.8 MPH with the pusher bar installed (Appendix II, Runs 43-45) but not until 6.3 MPH when the pusher bar was removed. (Appendix II, Runs 46-51) When the high level sensor was connected into the firing system in place of the standard sensor, the system fired at 6.7 MPH without the pusher bar. (Appendix II, Runs 52-53) When the standard sensor was reconnected but moved onto the inner fender near the hood opening, the system fired at 6.2 and 8.6 MPH, again without the pusher bar. (Appendix II, Runs Q-U) The Breed Corporation sensor triggered above 6.4 MPH regardless of vehicle configuration.

Again, due to the severe damage to the front of the vehicle from repeated impacts, these speeds must be regarded as an indicator of a trend and not valid data.

The loading dock speeds were measured using a hand held stopwatch to measure a ten foot distance marked off on the vehicle as it went past a fixed off board marker. The vehicle was still accelerating at the time. In addition, frames were counted on video tape to determine the length of time the vehicle took to travel a marked ten feet on the ground. Video tape runs at 30 frames per second so the best resolution on this method is 1/30 sec. Since the accuracy of both of these methods is questionable, speeds derived from the two methods have been averaged for all speed readings into the loading dock and should be assumed to have an accuracy of no more than plus or minus 0.4 MPH.

During the course of the loading dock testing, the front end of both vehicles became progressivly more damaged. Both vehicles' front bumpers were hanging down at angles approaching 45 degrees before testing was halted. For this reason, results from the loading dock tests should be used only as indicators of trends and not valid data. (Figs. 13 thru 18)

Strip chart data is presented in appendix 3 for the most severe traverse of each driving surface for each car. Note that the most severe traverse is not always the fastest.

Appendix 1

Test Data Summaries

Test Data Results for Ford LTD Tests

Test Num.	Test Speed	Vehicle	Condition	Sensors Closed LF	RF	SAF	HL	GAS	BREED
1	30	LTD	Stag & Sing			(1)			N/A
2	35	LTD	"			(1)			N/A
3	45	LTD	"			(1)			N/A
4	50	LTD	"			(1)			N/A
5	30	LTD	Single Bump			(1)			N/A
6	35	LTD	"			X			N/A
7	40	LTD	"			X			N/A
8	45	LTD	"			NONE			N/A
9	50	LTD	"			X			N/A
10	30	LTD	Stag & Sing			X			N/A
11	45	LTD	"			X			N/A
12	30	LTD	Single Bump			X			N/A
13	30	LTD	"			NONE			
14	45	LTD	"			(2)			
15	20	LTD	Ditch			X			X
16	30	LTD	Pothole Rd.			(1)			
17	40	LTD	"			(1)			
18	30	LTD	"			(1)			
19	40	LTD	"			(1)			
20	10	LTD	Large Pothole			(1)			
21	20	LTD	"			(1)			
22	15	LTD	"			(1)			
23	30	LTD	"			(1)			
A	5.5	LTD	Loading Dock	System Fired					
B	5.7	LTD	"	System Fired					
C	4.7	LTD	"	System Fired					
D	4.9	LTD	"	System did not fire					
E	4.7	LTD	"	System did not fire					
F	5.7	LTD	"	System Fired					
G	4.8	LTD	"	System did not fire					
H	4.8	LTD	"	System did not fire					
I	4.9	LTD	"	System did not fire					
J	5.6	LTD	"	System fired					
K	5.7	LTD	"	System fired					
L	6.4	LTD	"	System did not fire					
M	6.5	LTD	"	System did not fire					
N	7.2	LTD	"	System did not fire					
O	7.5	LTD	"	System fired					
P	7.1	LTD	"	System did not fire					

(1) Video tape documentation available only. System did not fire.
(2) Data incomplete due to recorder malfunction.

Test Data Results for Dodge Diplomat Testing

Test Num.	Test Speed	Vehicle	Condition	Sensors Closed LF	RF	SAF	HL	GAS	BREED
24	20	Dodge	Single Bump			NONE			
25	25	Dodge	"			X			
26	30	Dodge	"			NONE			
27	35	Dodge	"			(2)			
28	40	Dodge	"			(2)			
29	45	Dodge	"			(2)			
30	50	Dodge	"			X			
31	25	Dodge	Stagger Bumps			NONE			
32	30	Dodge	"			NONE			
33	35	Dodge	"			NONE			
34	40	Dodge	"			NONE			
35	45	Dodge	"			X			X*
36	0	Dodge	Hammer	X					
37	0	Dodge	"	X					
38	10	Dodge	Ditch			X			X*
39	20	Dodge	"			X			X*
40	10	Dodge	"			NONE			
41	15	Dodge	"			X			X*
42	25	Dodge	"			X			X
43	4.2	Dodge	Dock	System did not fire					
44	4.8	Dodge	"	System fired					
45	4.9	Dodge	"	System fired					
46	4.9	Dodge	"	System did not fire					
47	4.9	Dodge	"	System did not fire					
48	5.7	Dodge	"	System did not fire					
49	5.7	Dodge	"	System did not fire					
50	6.3	Dodge	"	System fired					X
51	6.4	Dodge	"	System fired					X
52	6.6	Dodge	"	X		X	X		X
53	6.9	Dodge	"	X	X	X	X		X
Q	6.2	Dodge	Dock	System Fired					X
R	6.7	Dodge	"	Did not Fire					X
S	7.1	Dodge	"	Did not Fire					X
T	7.1	Dodge	"	Did not Fire					X
U	8.6	Dodge	"	System Fired					X

(1) Video tape documentation available only. System did not fire.
(2) Data incomplete due to recorder malfunction.

* Driver's examination of the breed switch after test run verifies closure even though the data recording system did not capture it.

Appendix 2

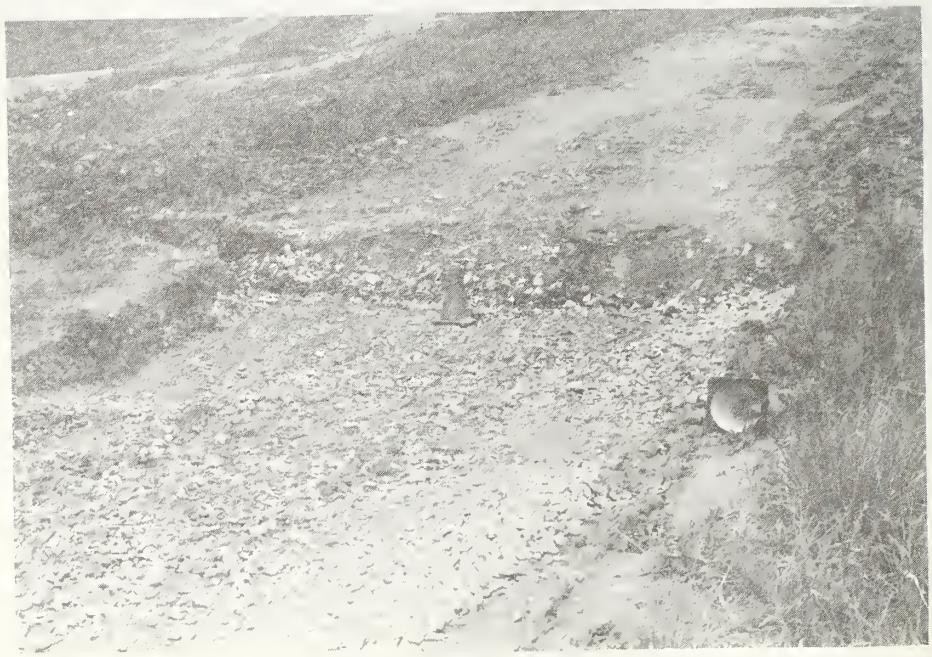
Photographs

Single Bump, side view

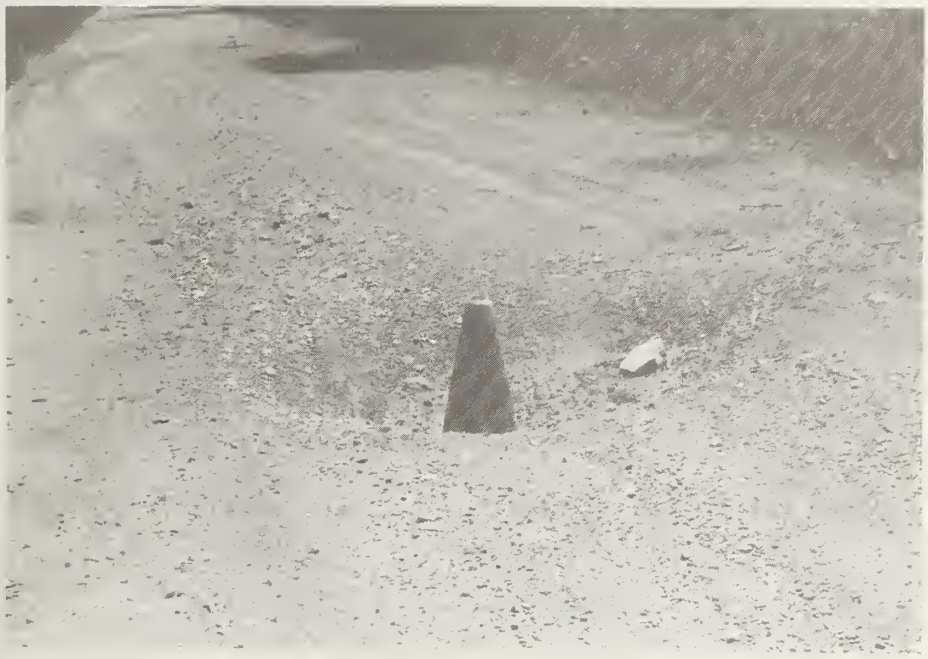
Single Bump,
Entering View

Stagger Bumps

Ditch, Side View



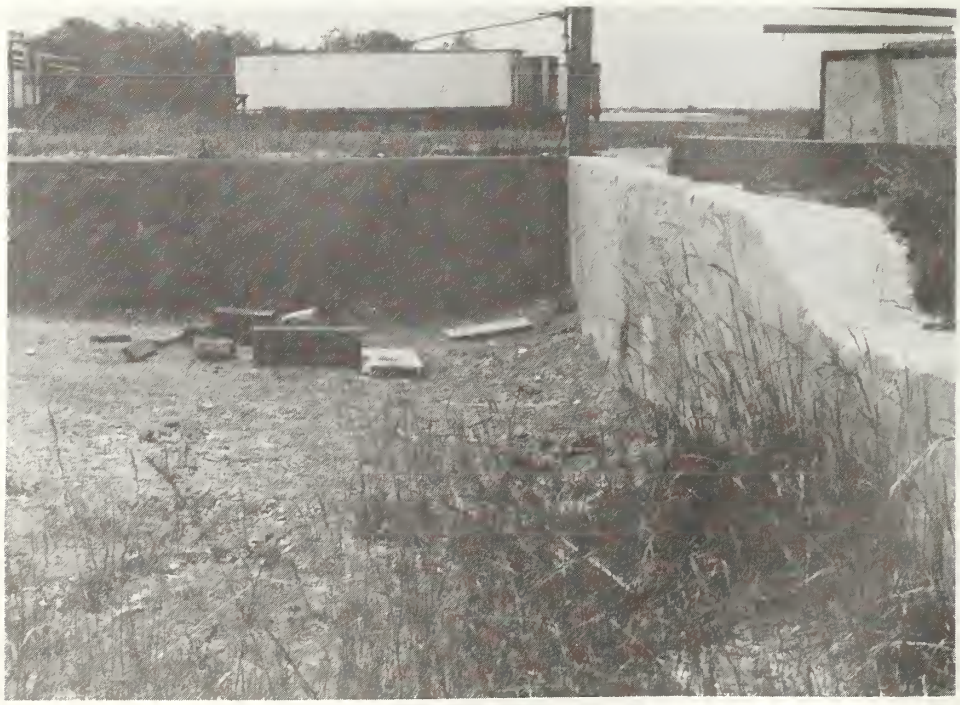
Ditch, End View



Large Pothole
With 12" Cone

Large Pothole
With Vehicle

Loading Dock
Overall View



Loading Dock
Impact Surface

Ford LTD
Post Driving Tests

Ford LTD
Damage to Left Rear

Ford LTD
Pre Loading Dock Testing

Ford LTD
Post Loading Dock Testing

Ford LTD
Post Loading Dock Testing

Ford LTD
Post Loading Dock Testing

Dodge Diplomat
Post Loading Dock Testing

Dodge Diplomat
Post Loading D k Testing

Appendix 3

Digitized Data

Description of Terms

FFCXGR - Acceleration in G's in the X axis at the front frame member on the right side. This is the location of the Right Front Romeo-Kojyo firing sensor.

FFCXGL - Same as above except on the left side.

SCAPG1 - Acceleration in G's in the axis of the steering column at the lower end of the steering column.

SCAPG2 - Same as above except at the top end of the steering column.

LPBXG - Acceleration in the X axis at the left B-pillar.

V1LF - Switch closure monitor for the left front firing sensor.

V2RF - Switch closure monitor for the right front firing sensor.

V3SAF - Switch closure monitor for the safing sensor.

V4HL - Switch closure monitor for the high-level sensor.
V5GAS - Switch closure monitor for the gas-damped sensor.

BREED - Switch closure monitor for the Breed mechanical sensor.

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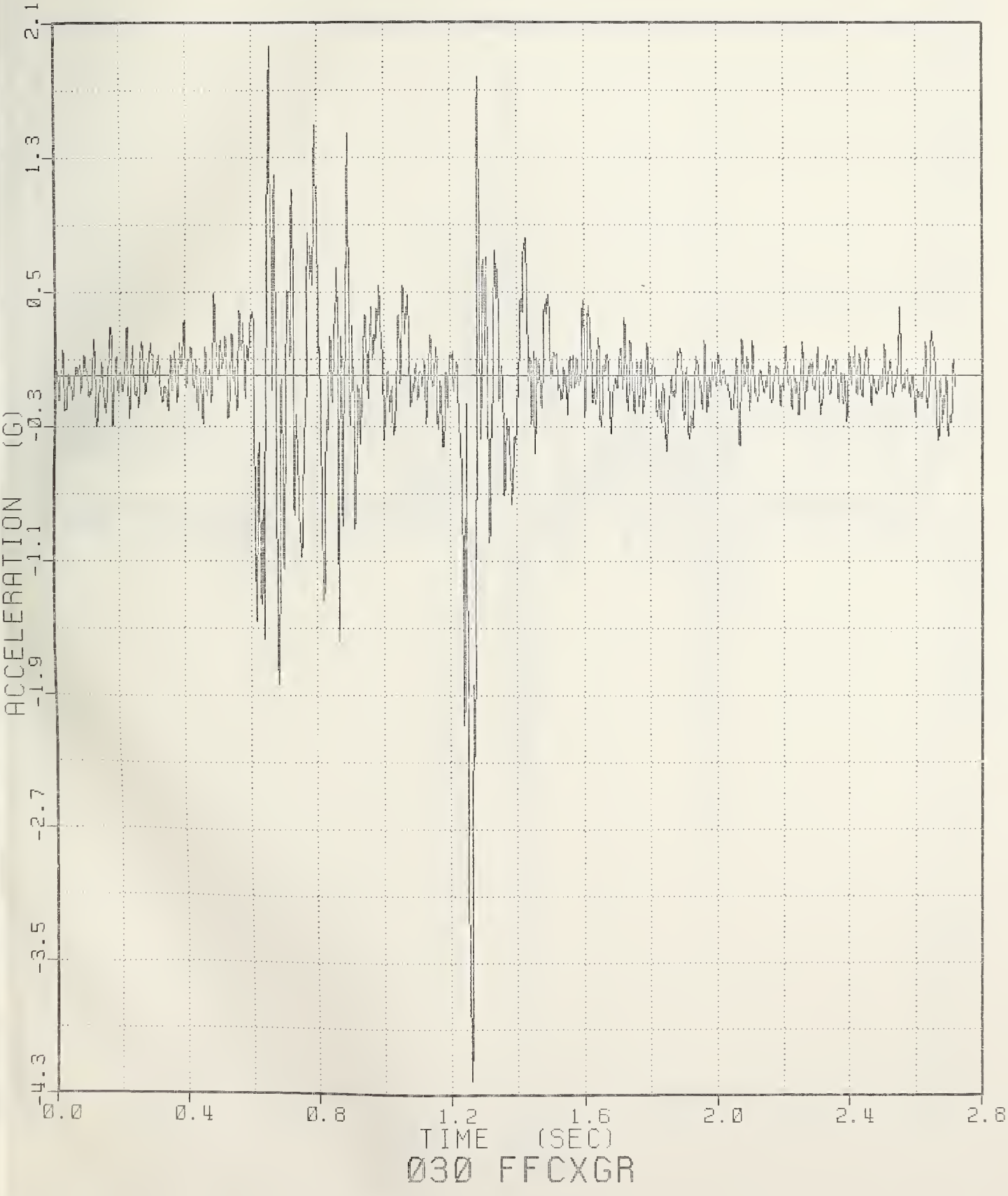

Ø3Ø FFCXGR

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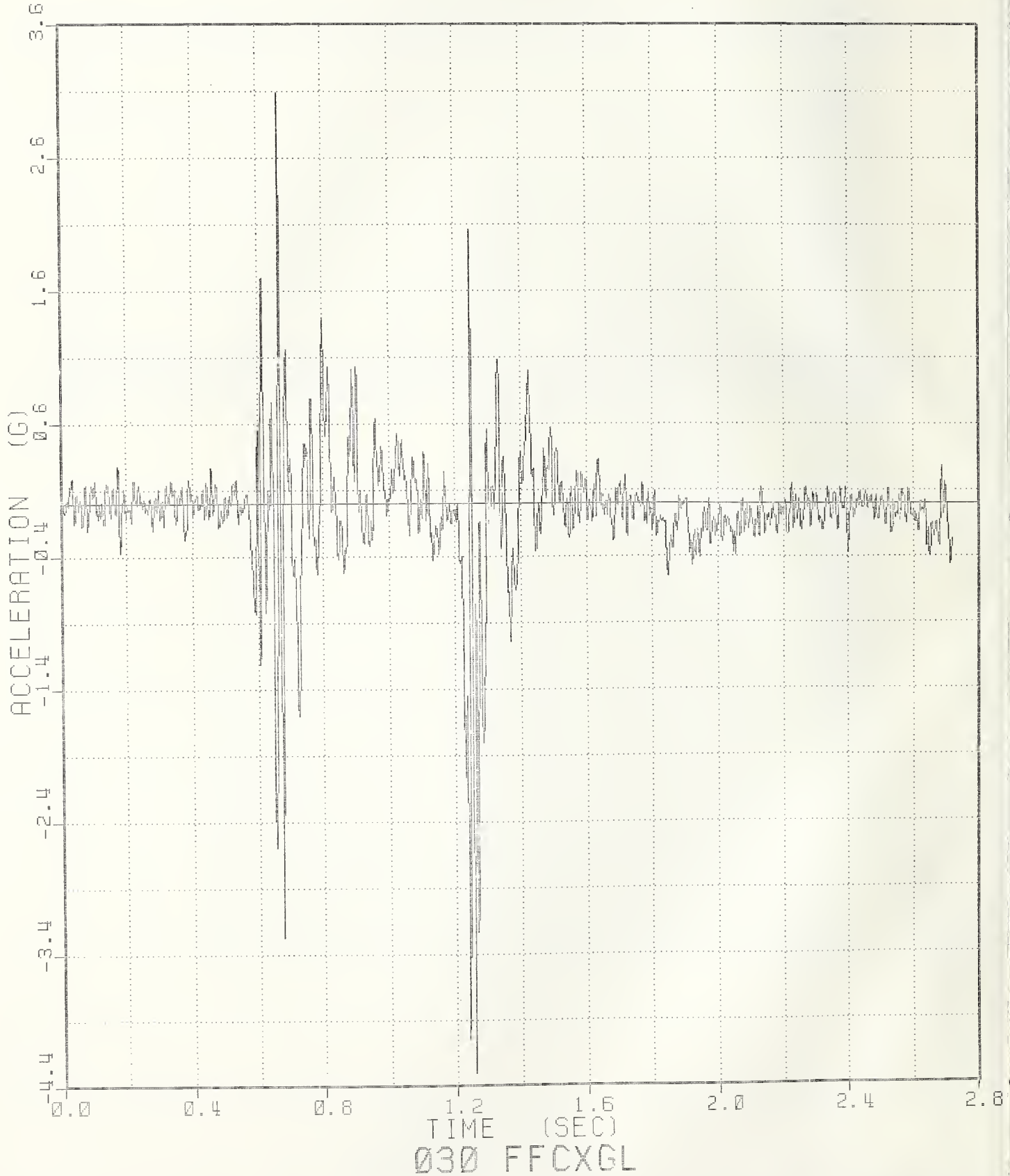

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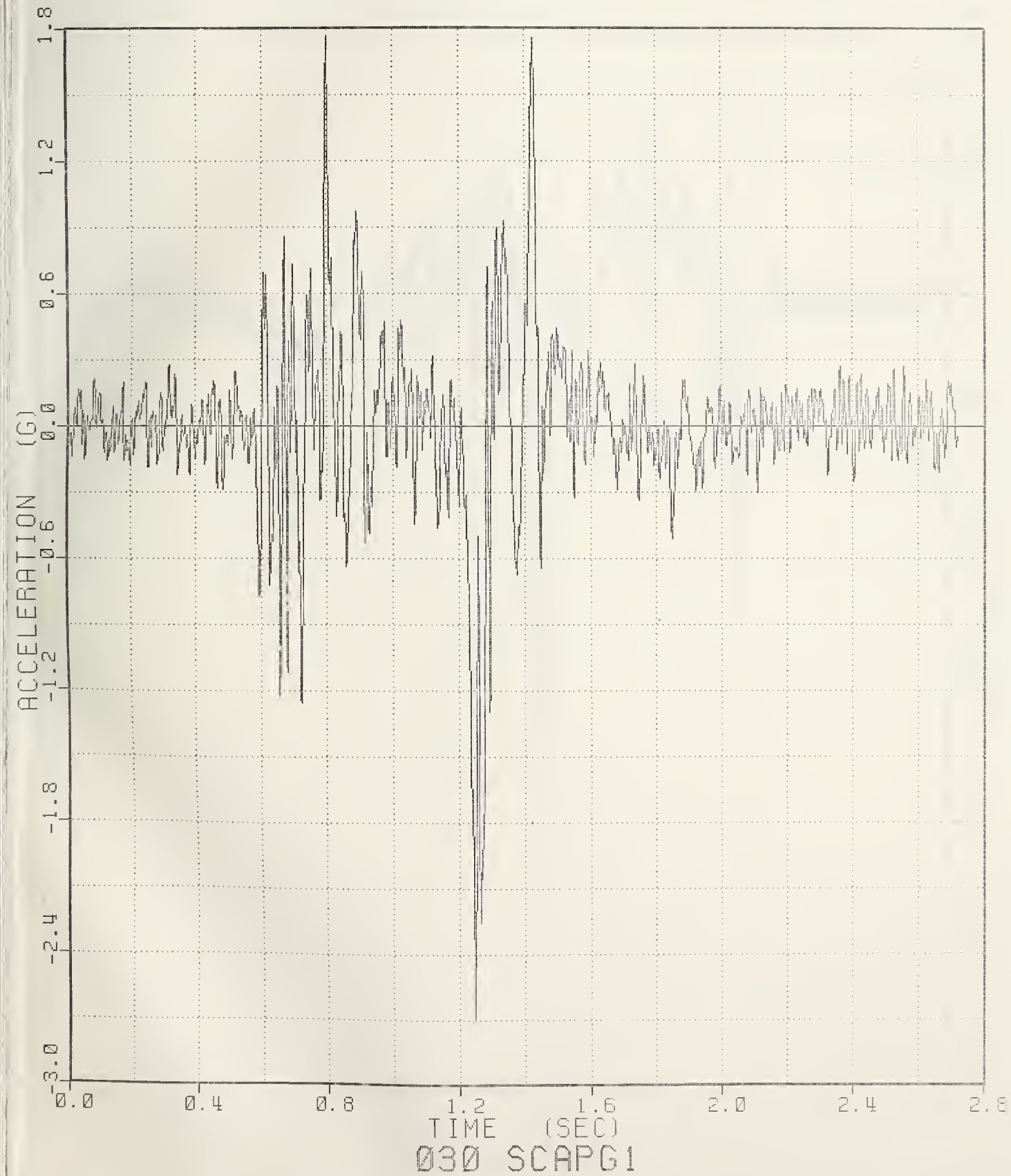

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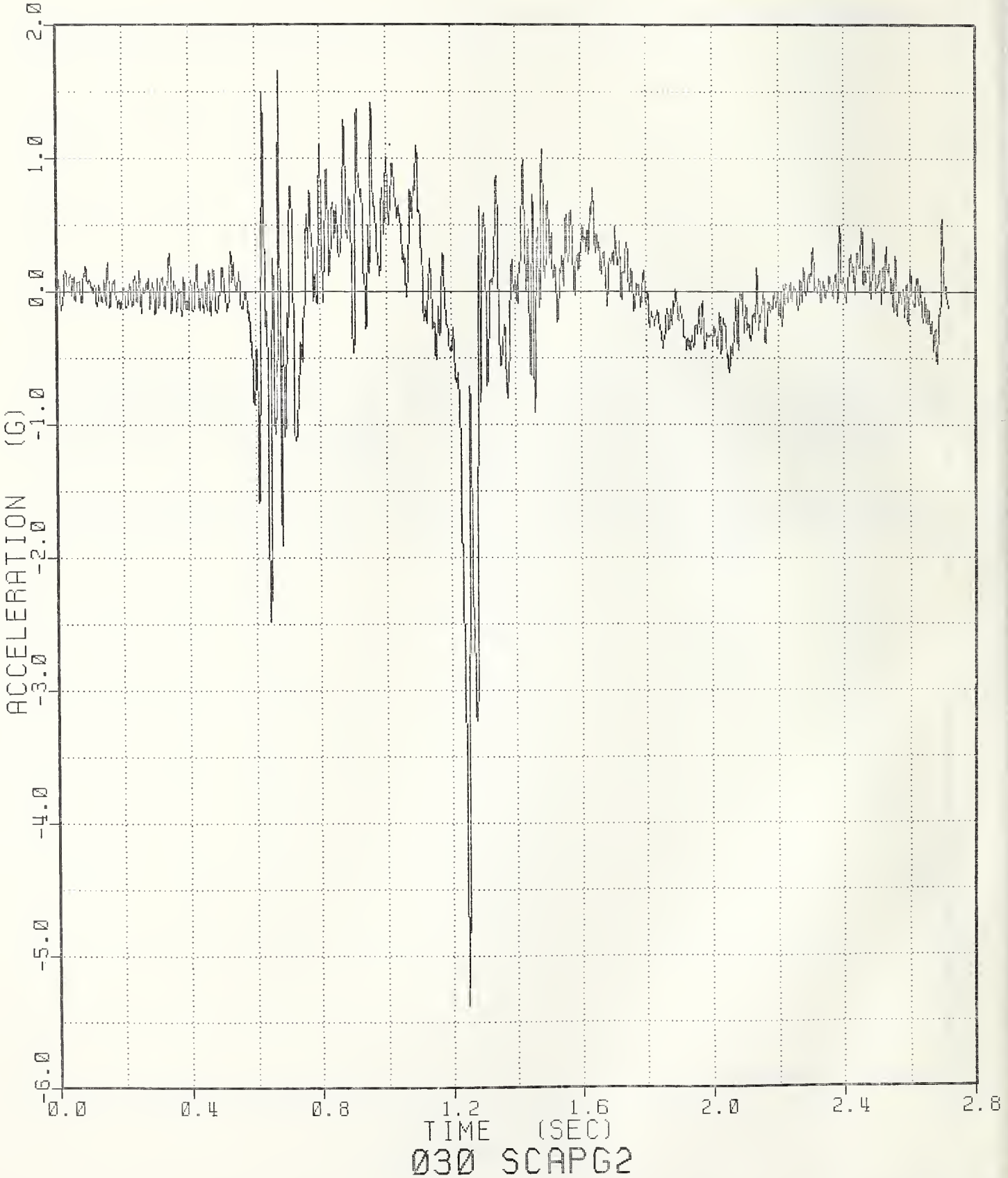

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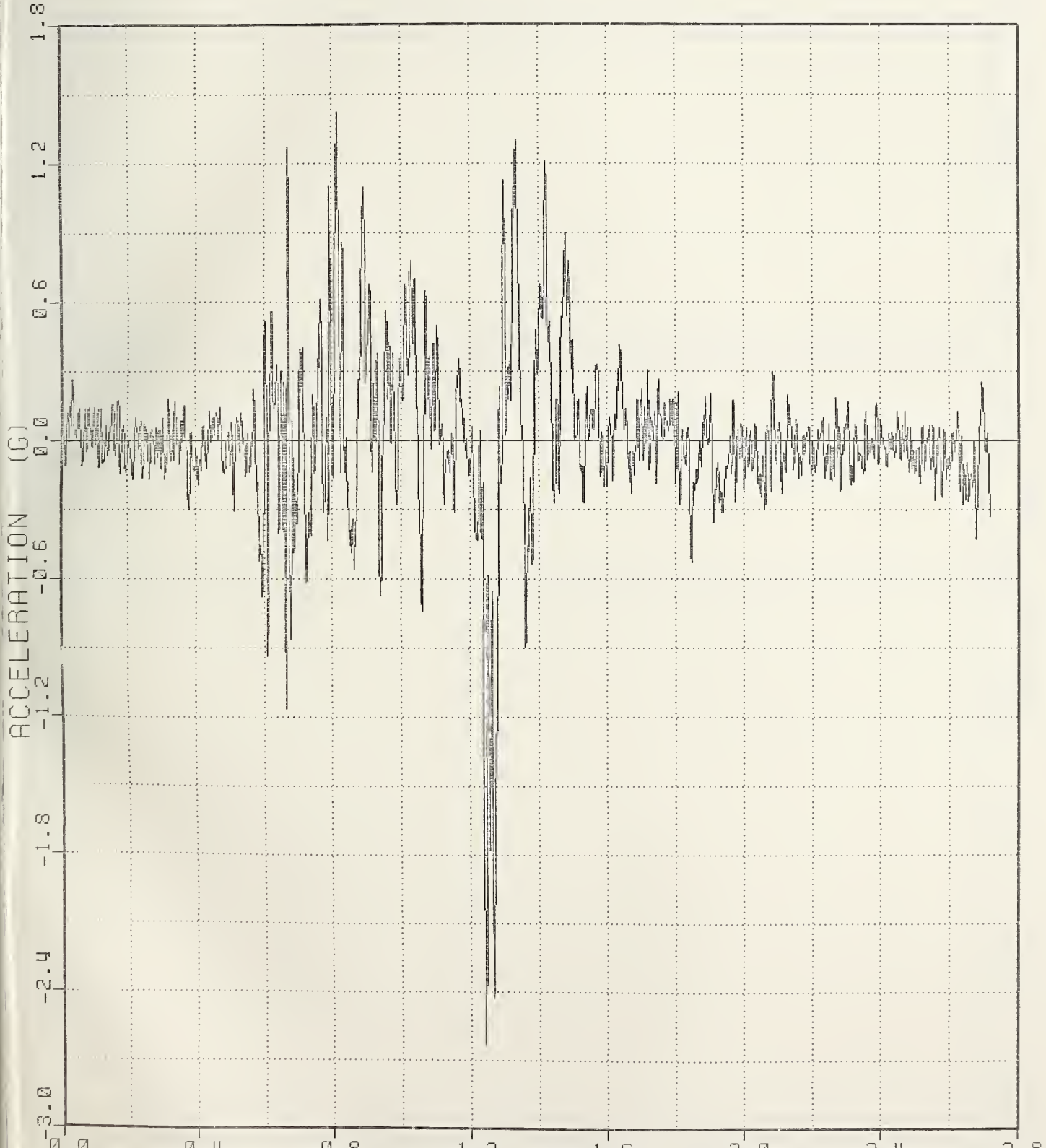

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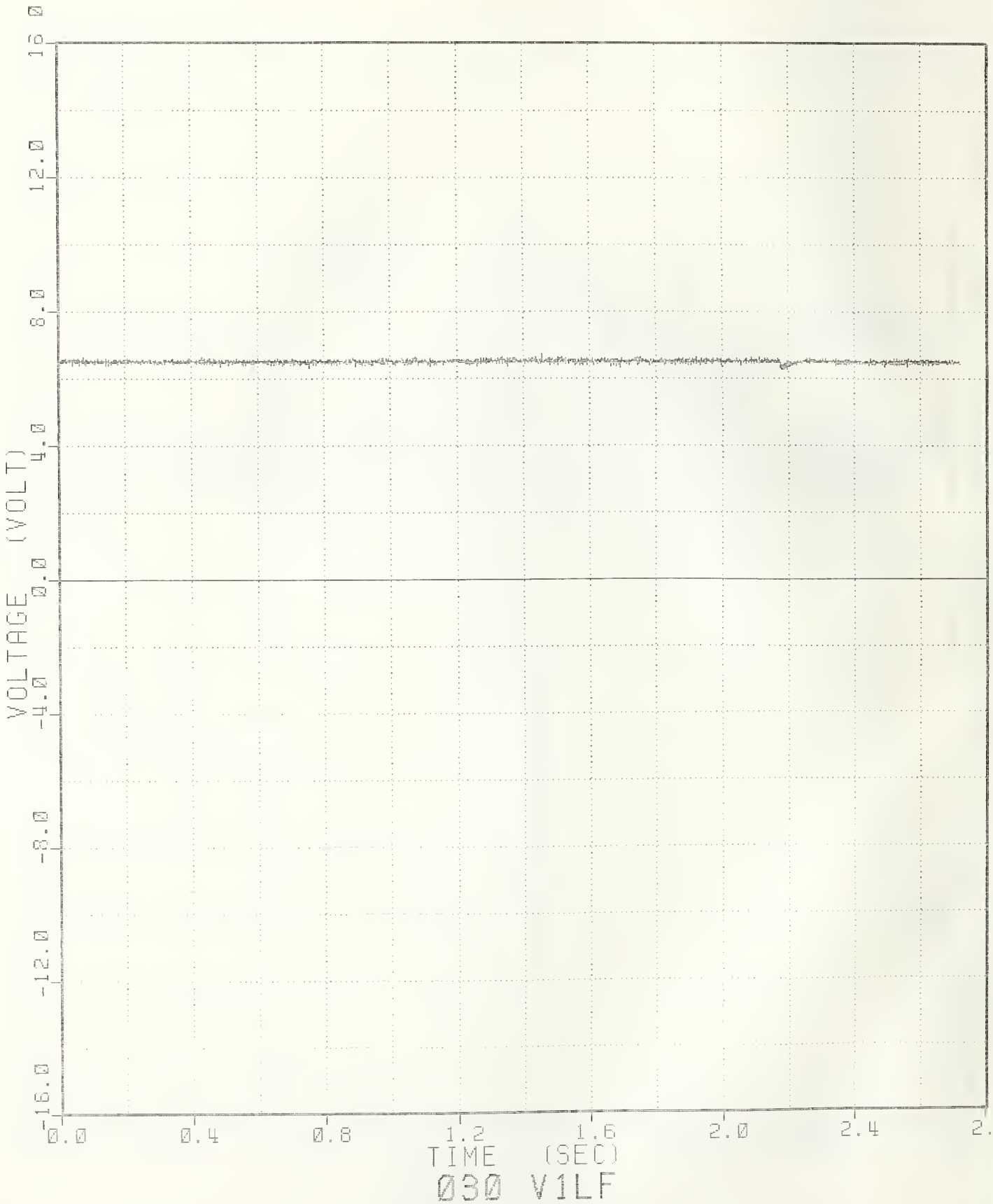

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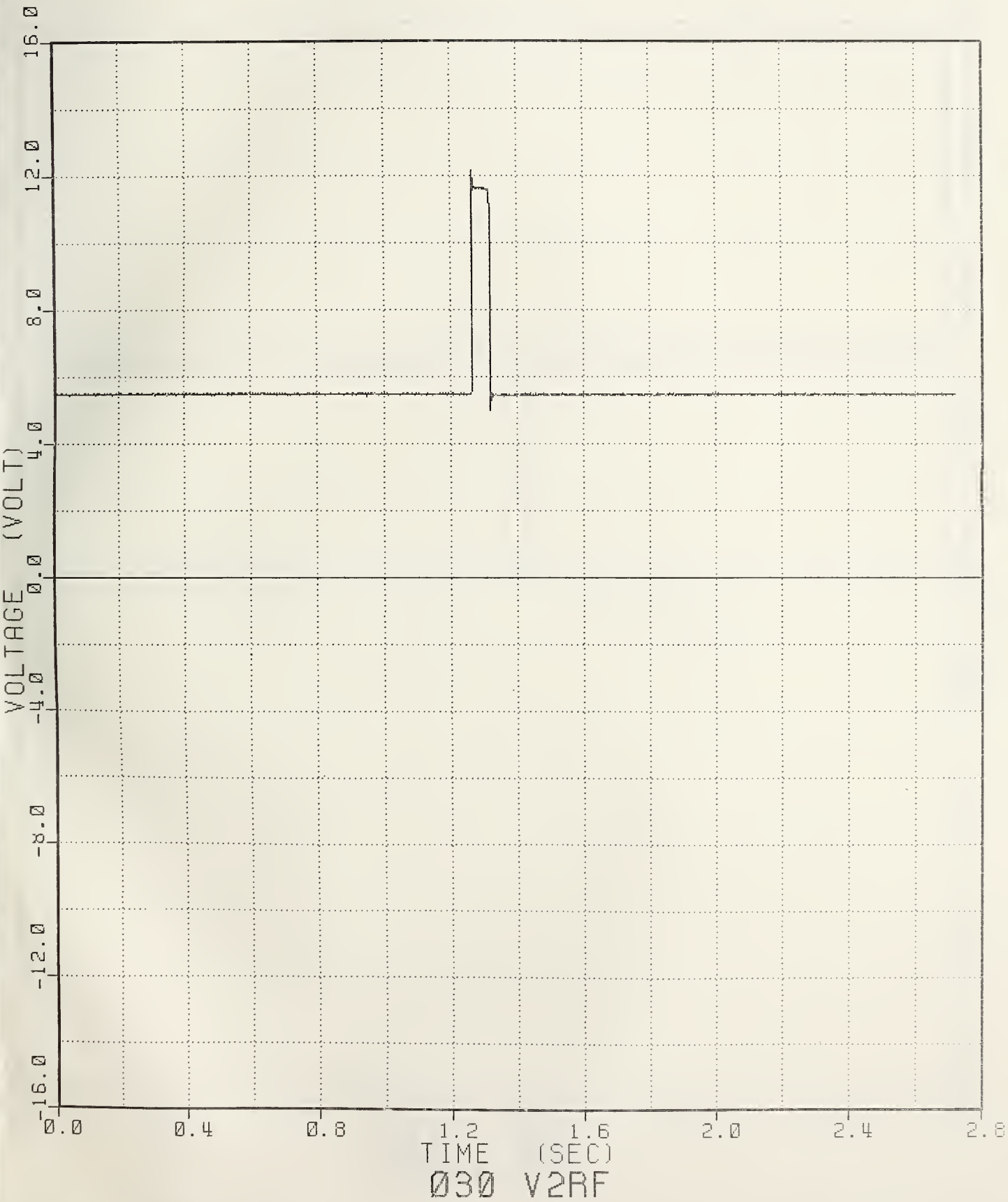

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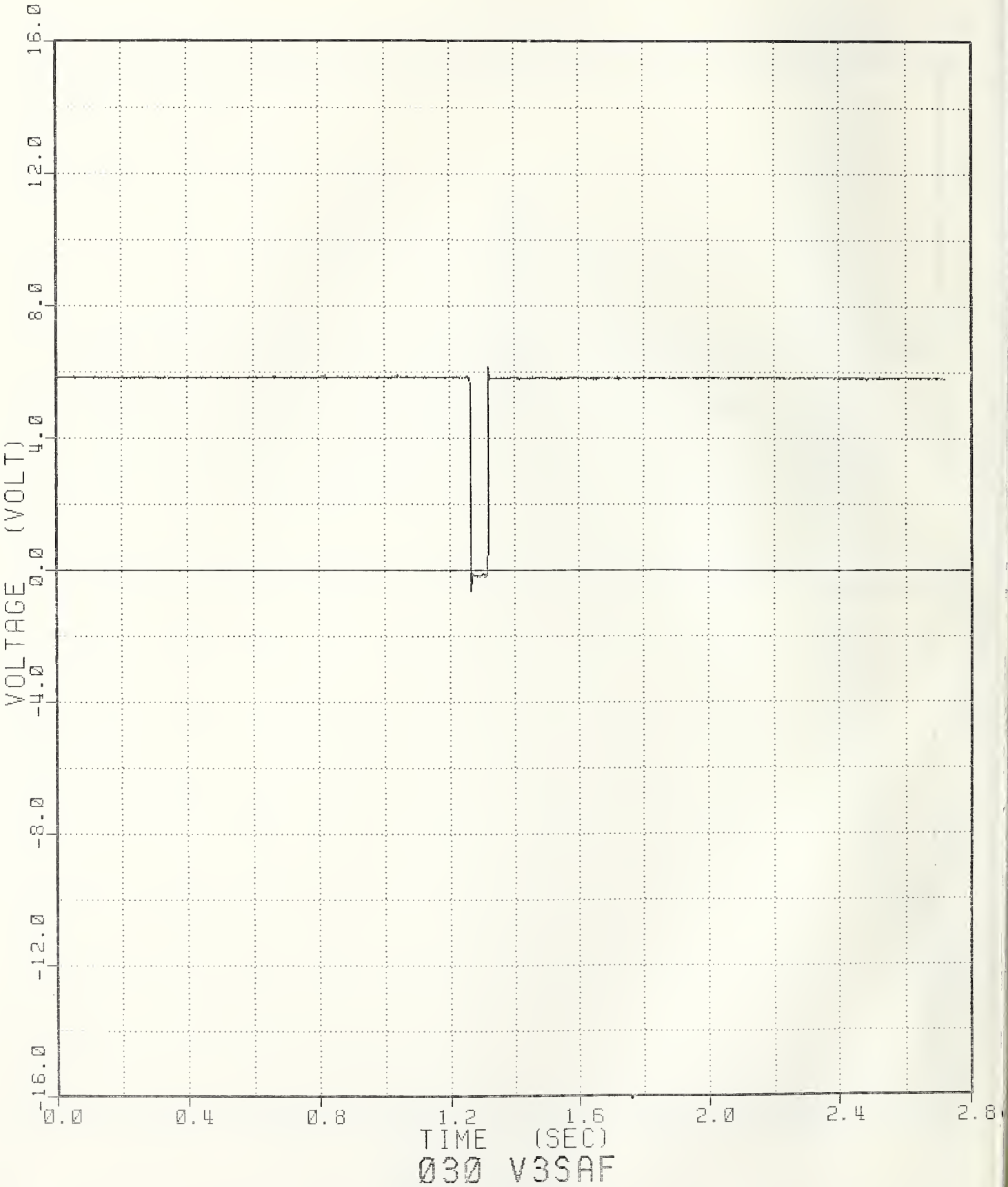

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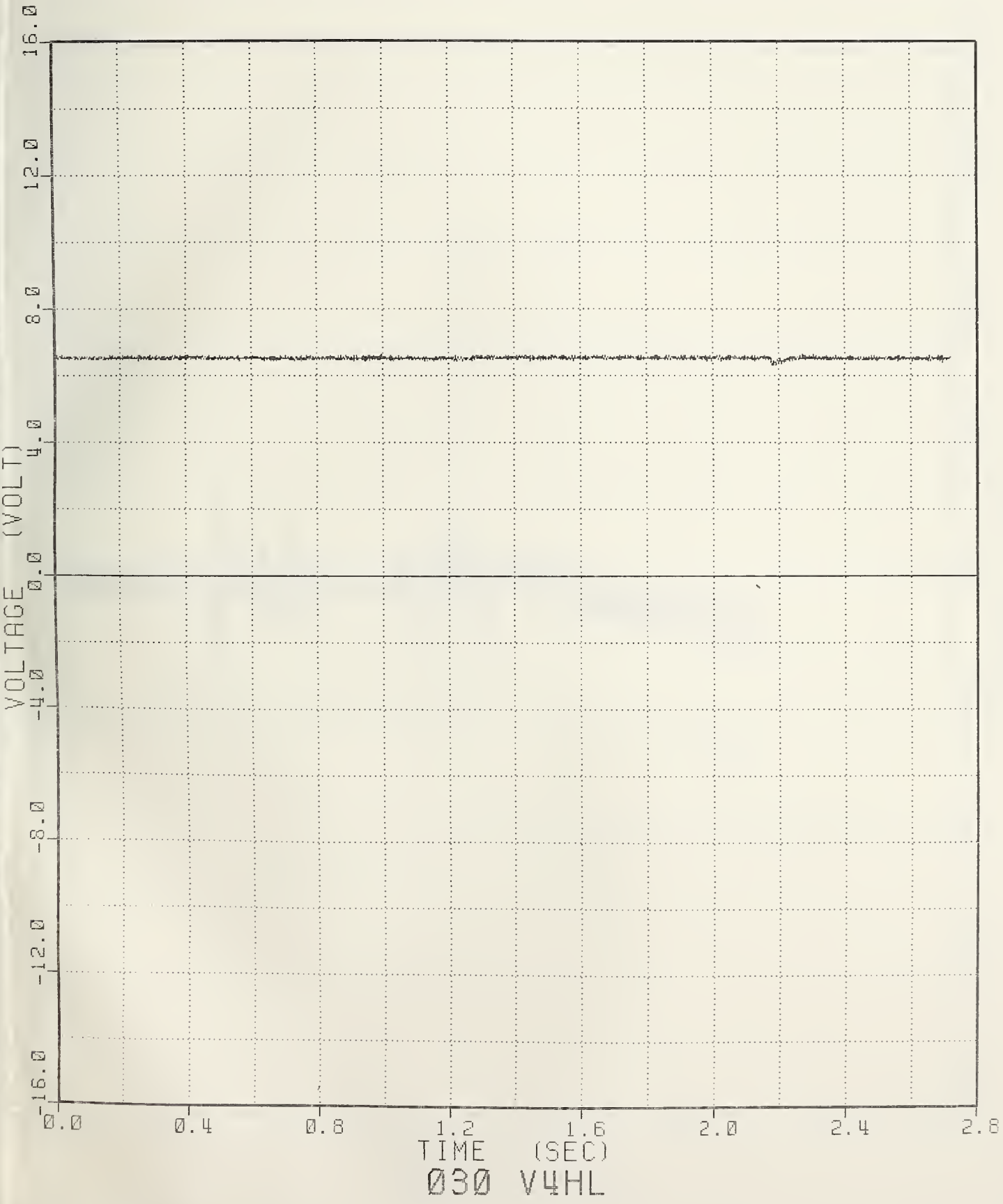

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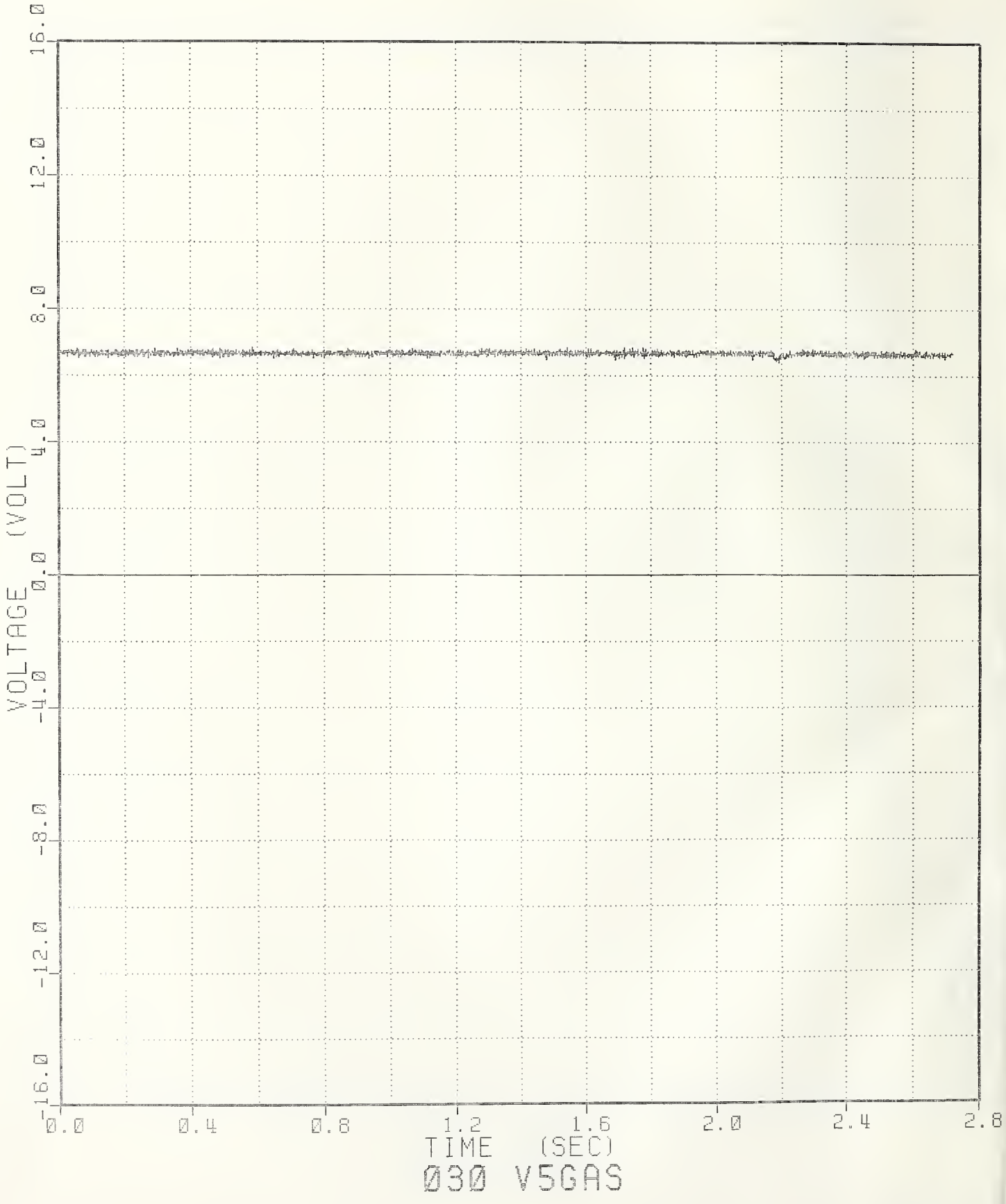

030 V5GAS

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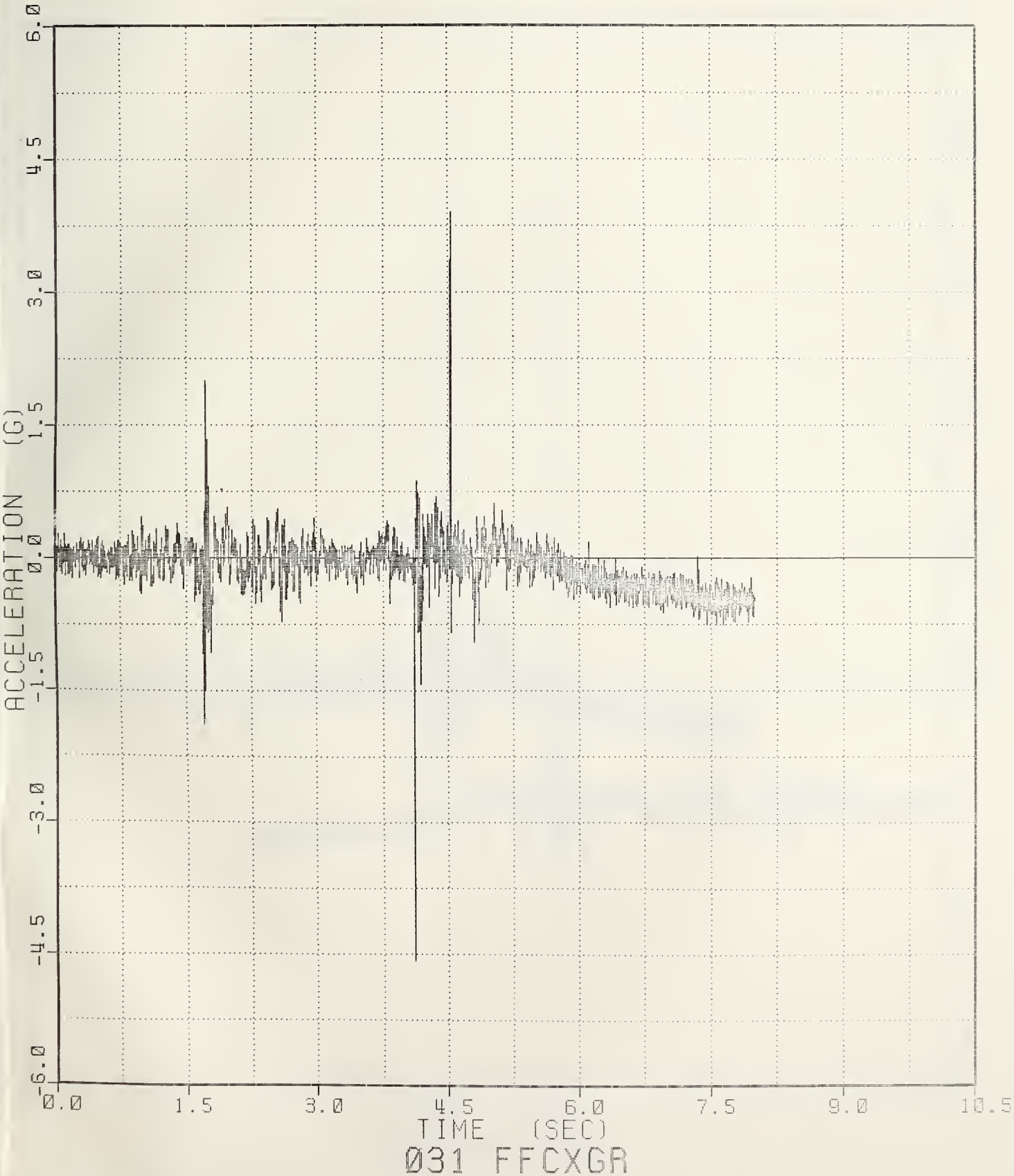

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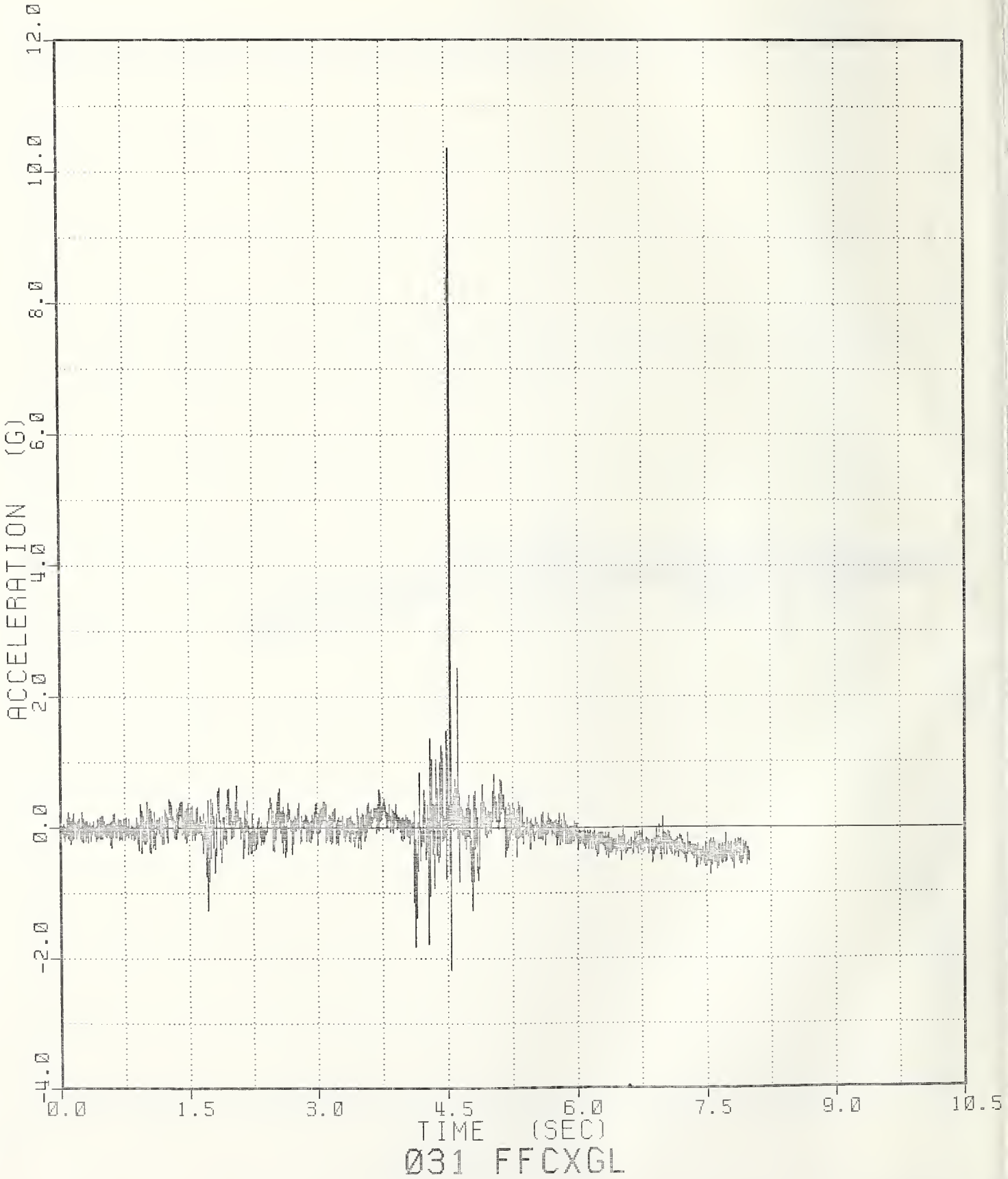

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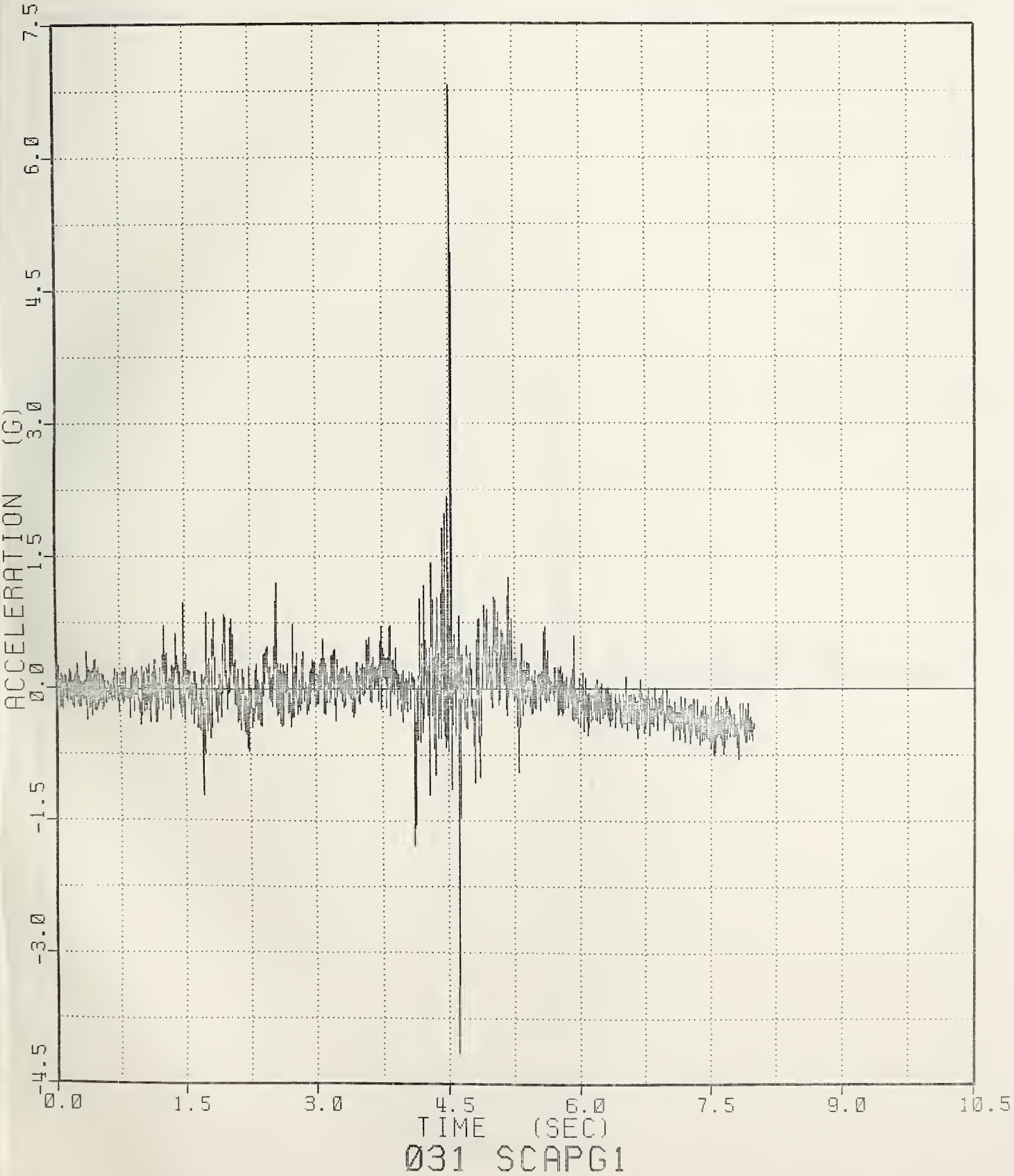

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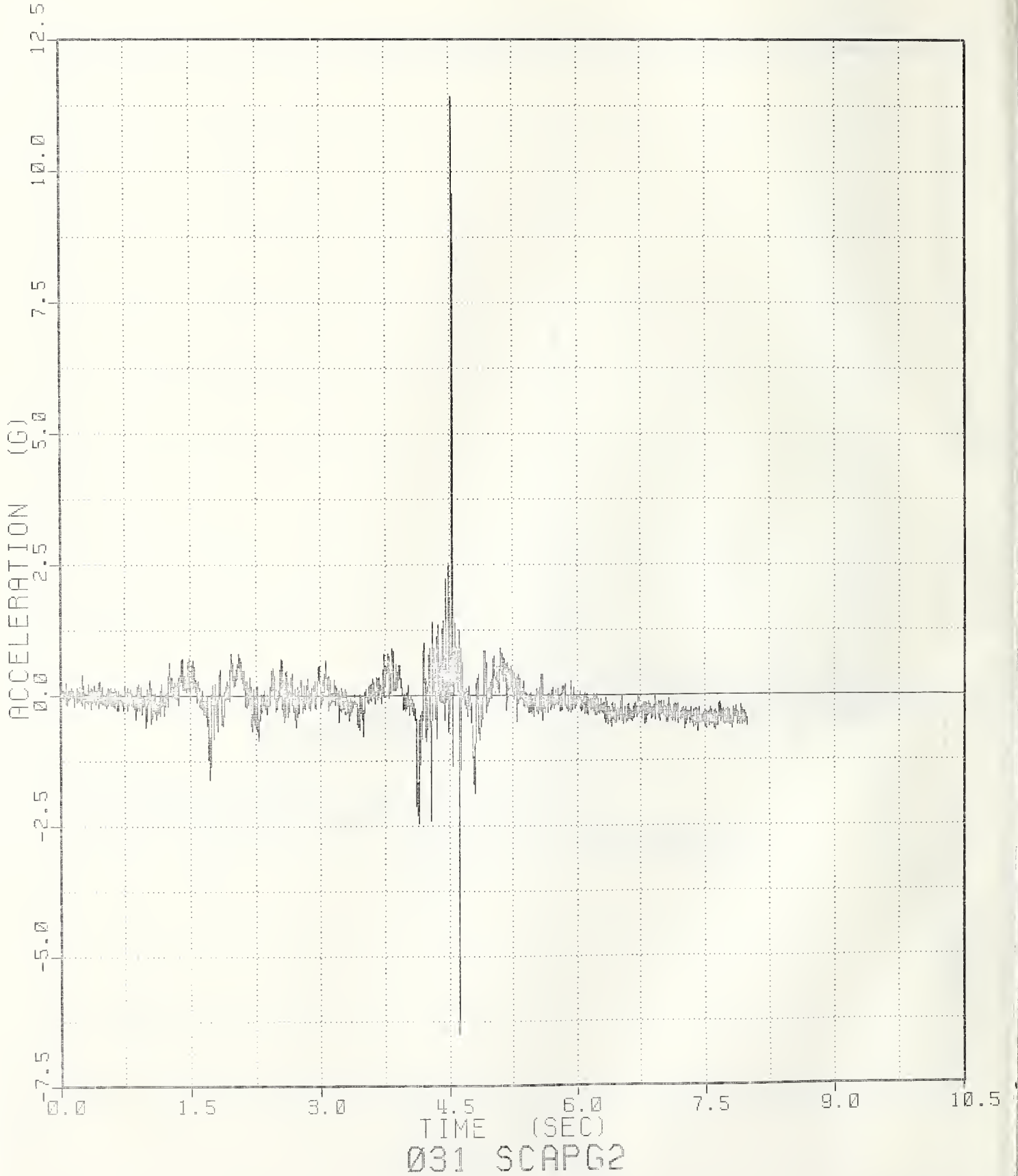
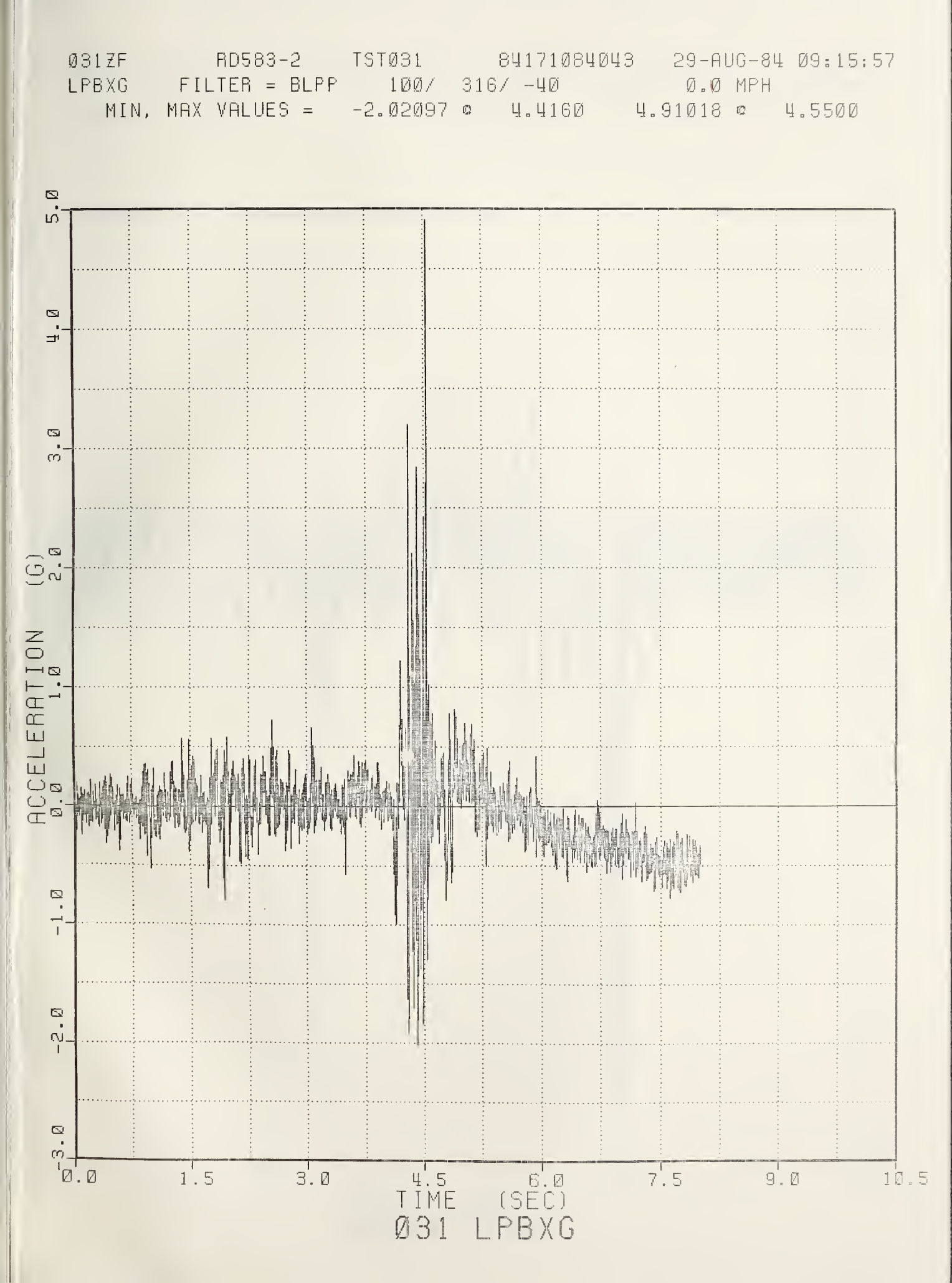
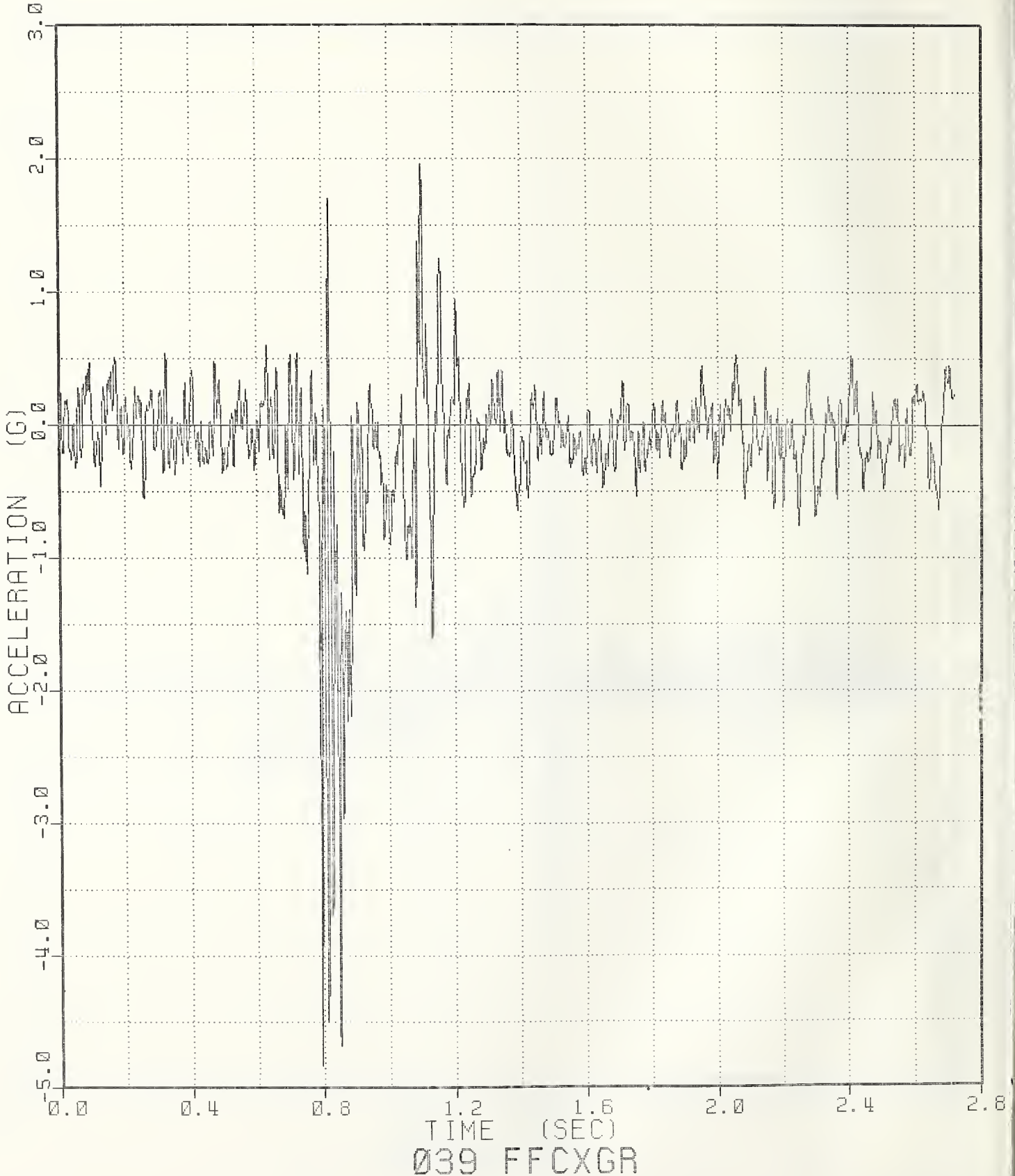


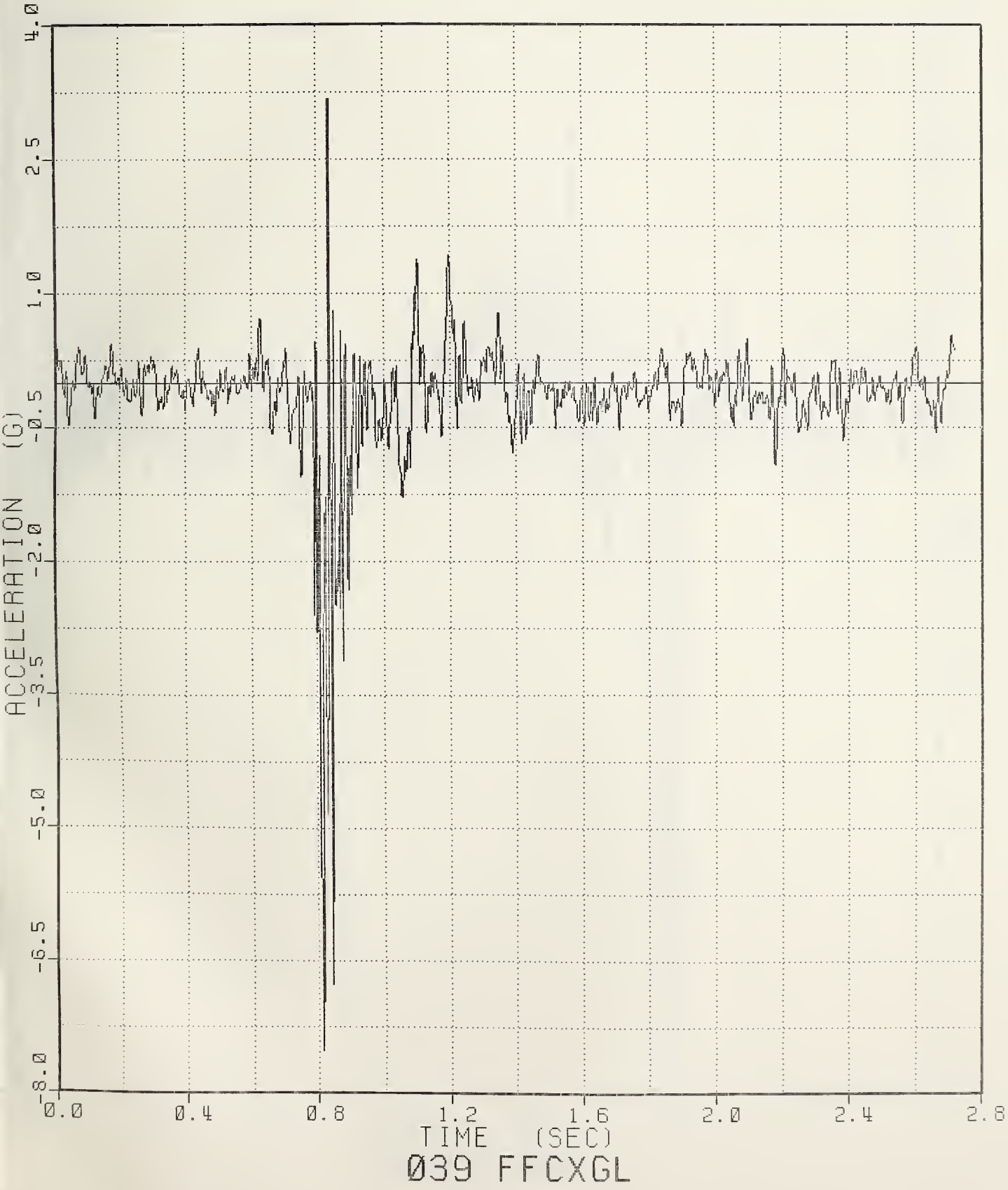

031ZF RD583-2 TST031 84171084043 29-AUG-84 09:15:57
LPBXG FILTER = BLPP 100/ 316/ -40 0.0 MPH
MIN, MAX VALUES = -2.02097 @ 4.4160 4.91018 @ 4.5500
ACCELERATION (G)
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
-2.0
-3.0
0.0
1.5
3.0
4.5
6.0
7.5
9.0
10.5
TIME (SEC)
031 LPBXG

Ø39ZF RD583-2 TSTØ39 84171084520 29-AUG-84 Ø8:Ø9:15
FFCXGR FILTER = BLPP 1ØØ/ 316/ -4Ø Ø.Ø MPH
MIN, MAX VALUES = -4.82567 @ Ø.7920 1.95725 @ 1.1ØØ8



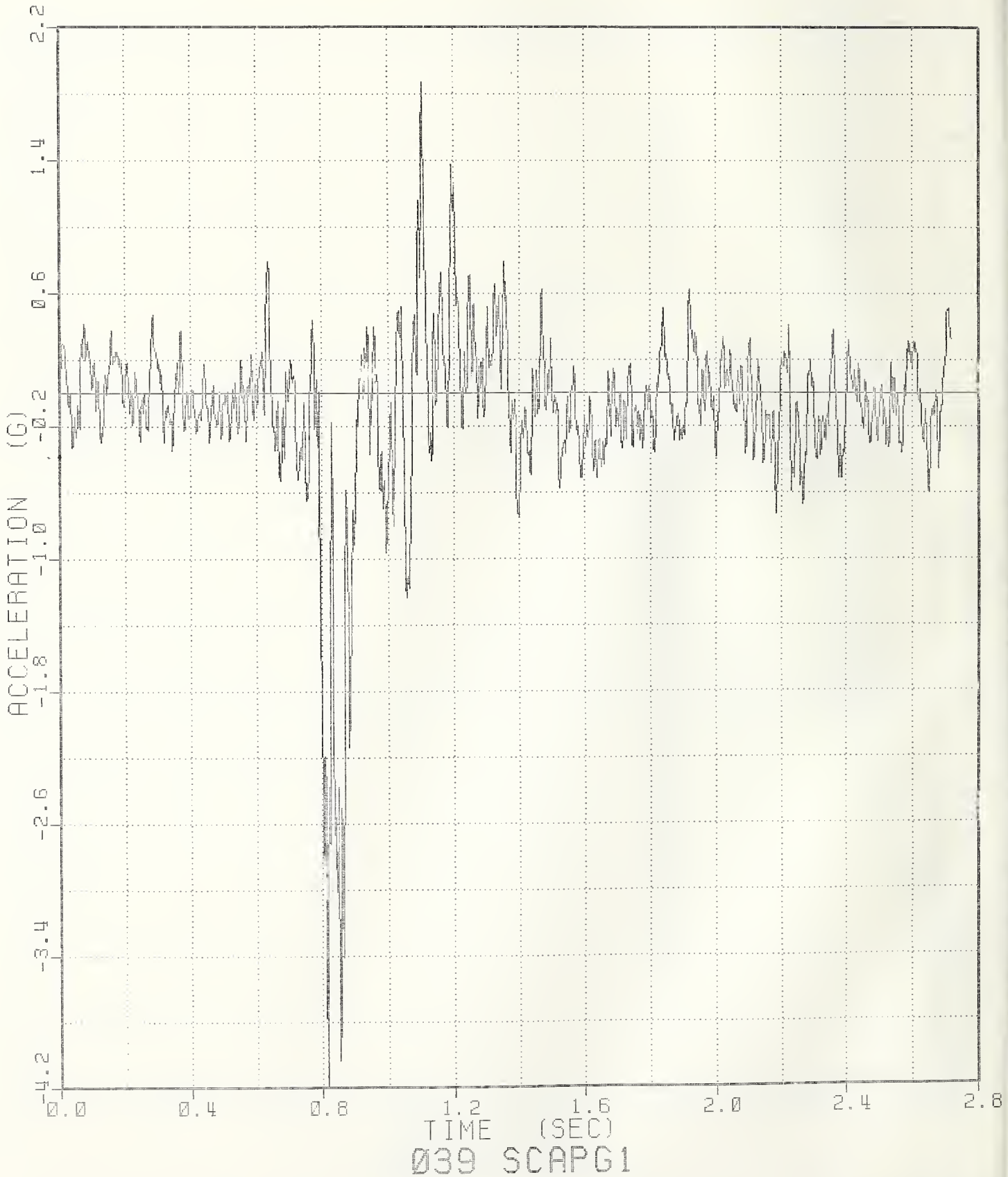
Ø39 FFCXGR

039ZF RD583-2 TST039 84171084520 29-AUG-84 08:09:15
FFCXGL FILTER = BLPP 100/ 316/ -40 0.0 MPH
MIN, MAX VALUES = -7.51574 @ 0.8128 3.18071 @ 0.8336

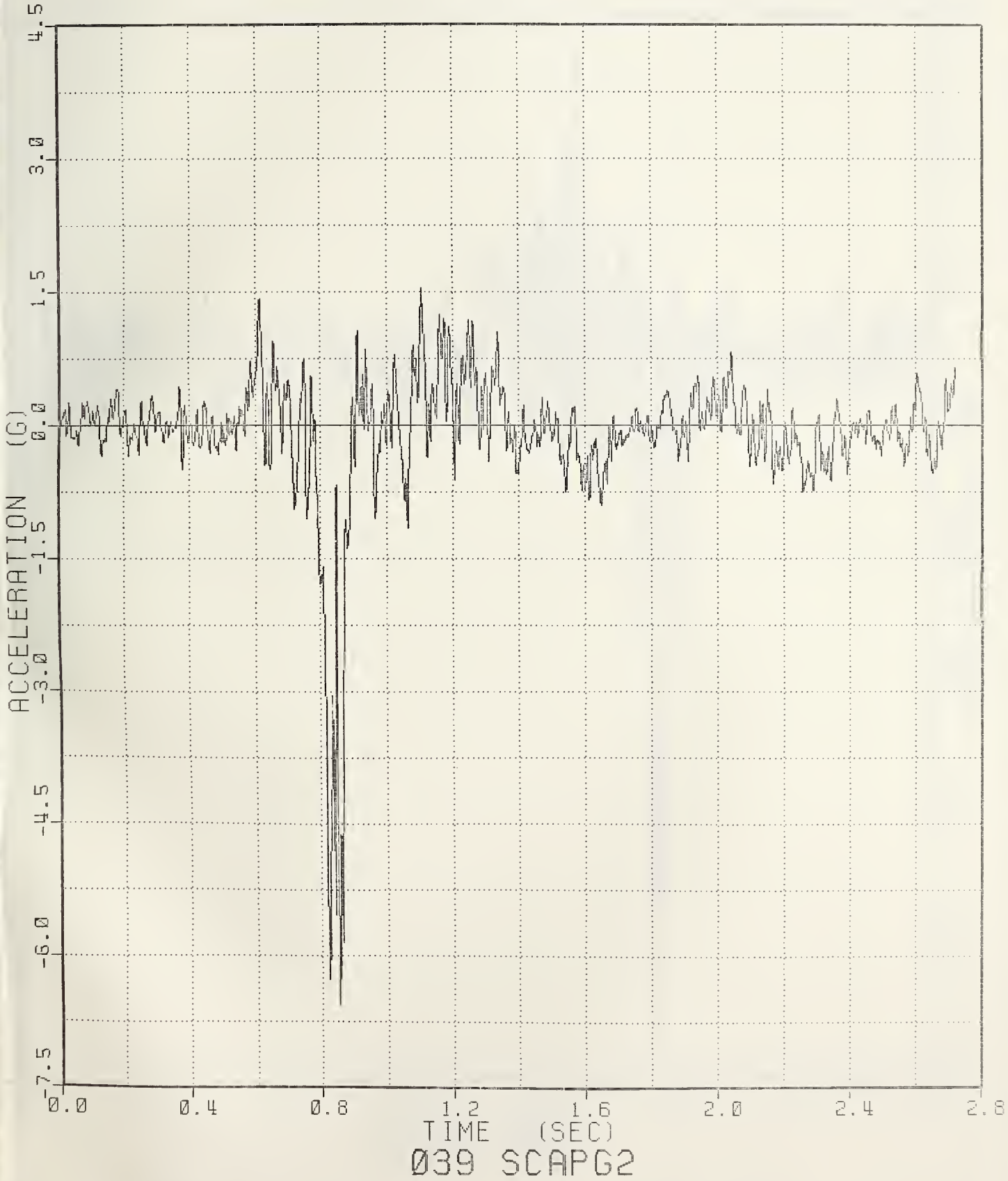


039 FFCXGL

039ZF RD583-2 TST039 84171084520 29-AUG-84 08:09:15
SCAPG1 FILTER = BLPP 100/ 316/ -40 0.0 MPH
MIN, MAX VALUES = -4.19925 @ 0.8144 1.87209 @ 1.1040

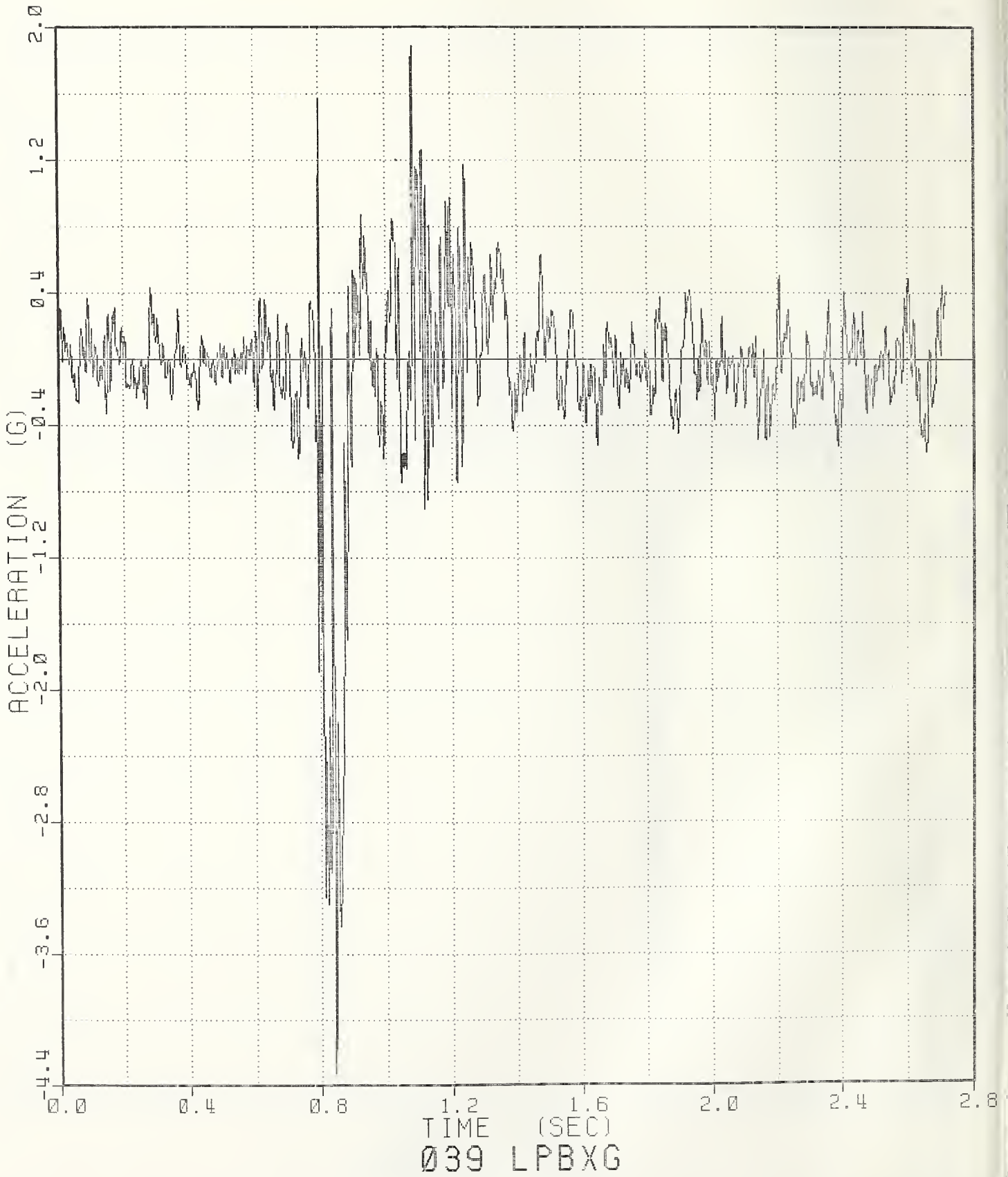


Ø39ZF RD583-2 TSTØ39 84171084520 29-AUG-84 Ø8:Ø9:15
SCAPG2 FILTER = BLPP 100/ 316/ -40 Ø.Ø MPH
MIN, MAX VALUES = -6.56964 @ Ø.8528 1.55027 @ 1.1040



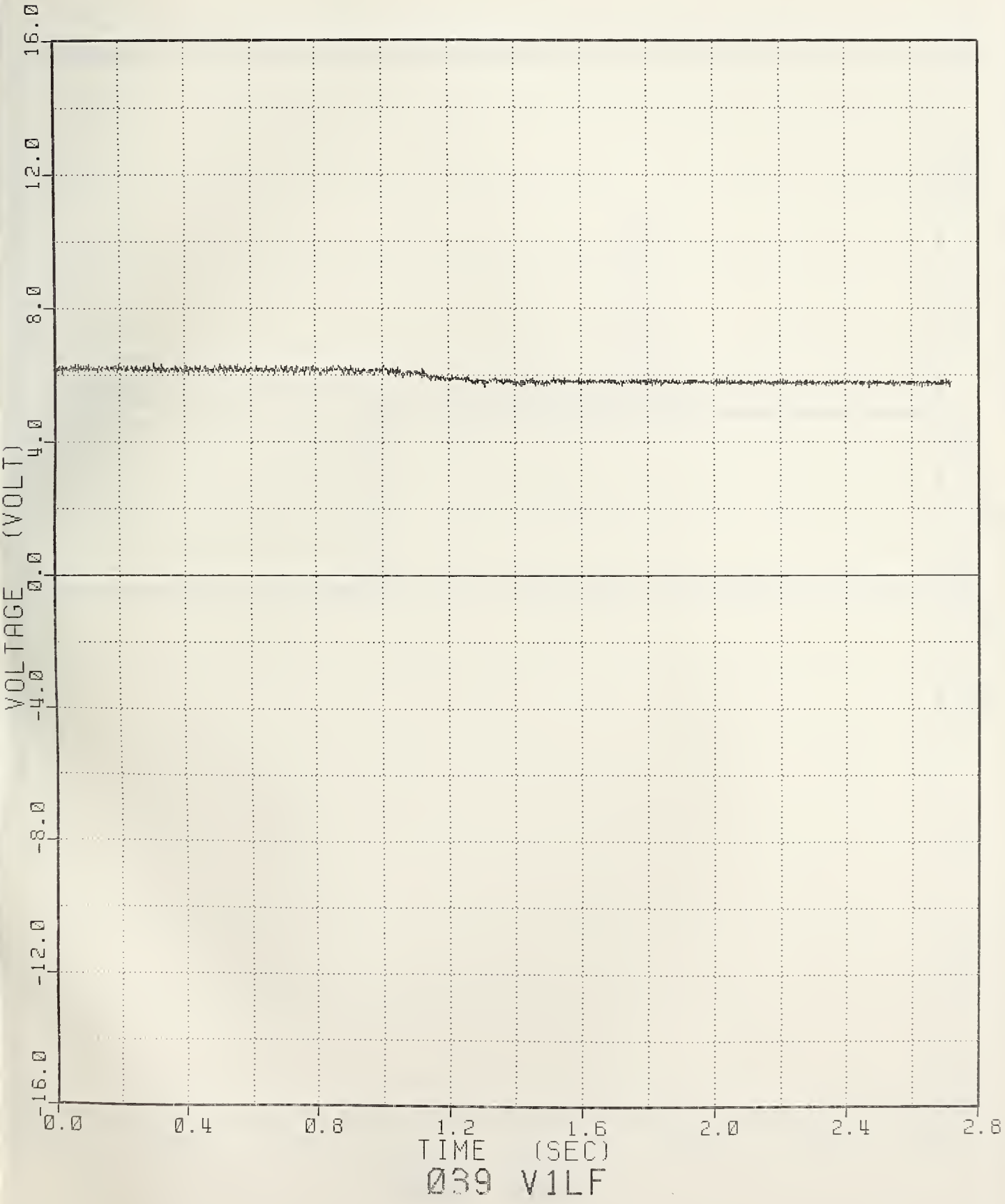
Ø39 SCAPG2

039ZF RD583-2 TST039 84171084520 29-AUG-84 08:09:15
LPBXG FILTER = BLPP 100/ 316/ -40 0.0 MPH
MIN, MAX VALUES = -4.32462 @ 0.8416 1.88510 @ 1.0832



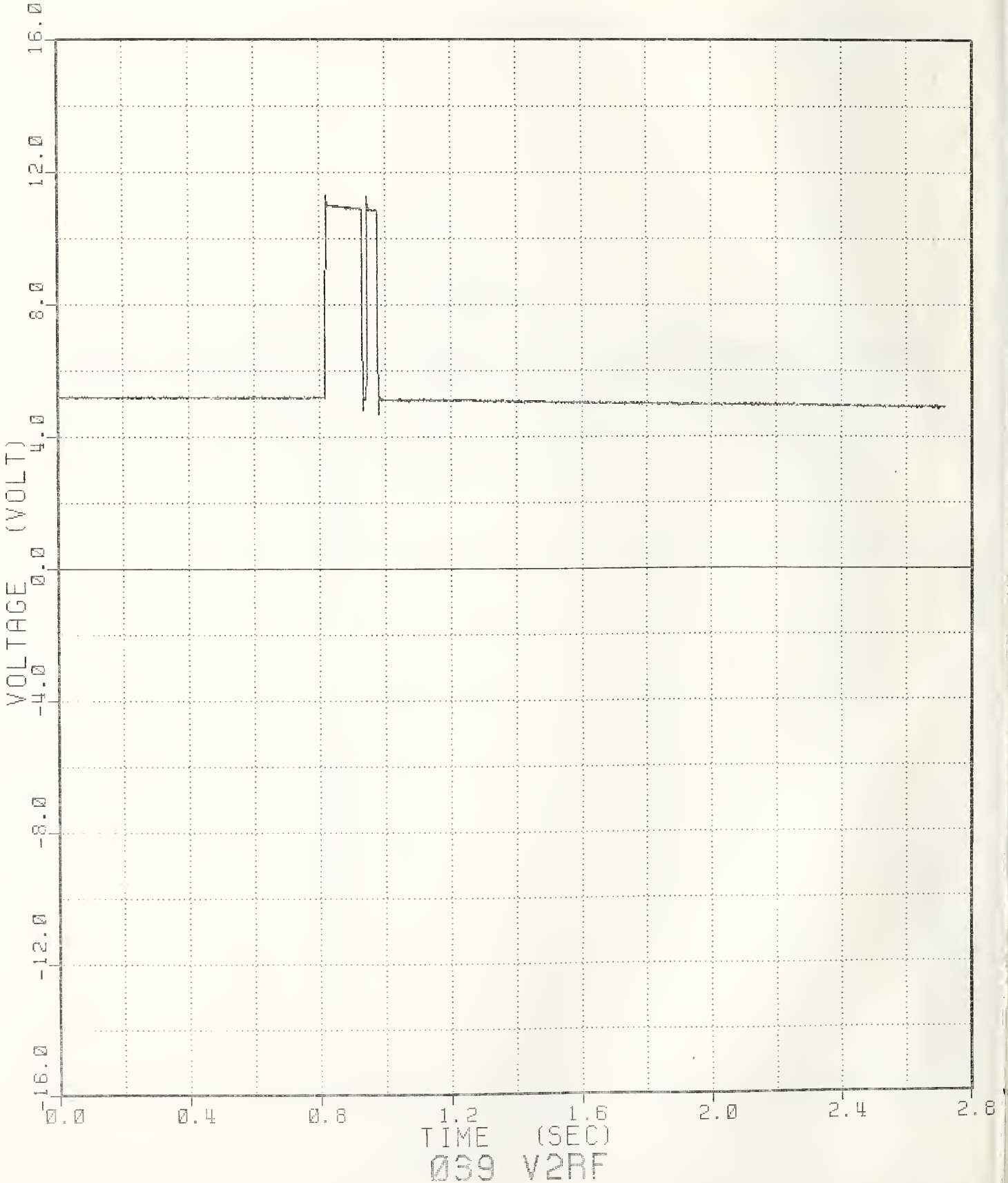
039 LPBXG

039ZF RD583-2 TST039 84171084520 29-AUG-84 08:09:15
V1LF FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = 5.63281 @ 2.7152 6.34375 @ 0.3056

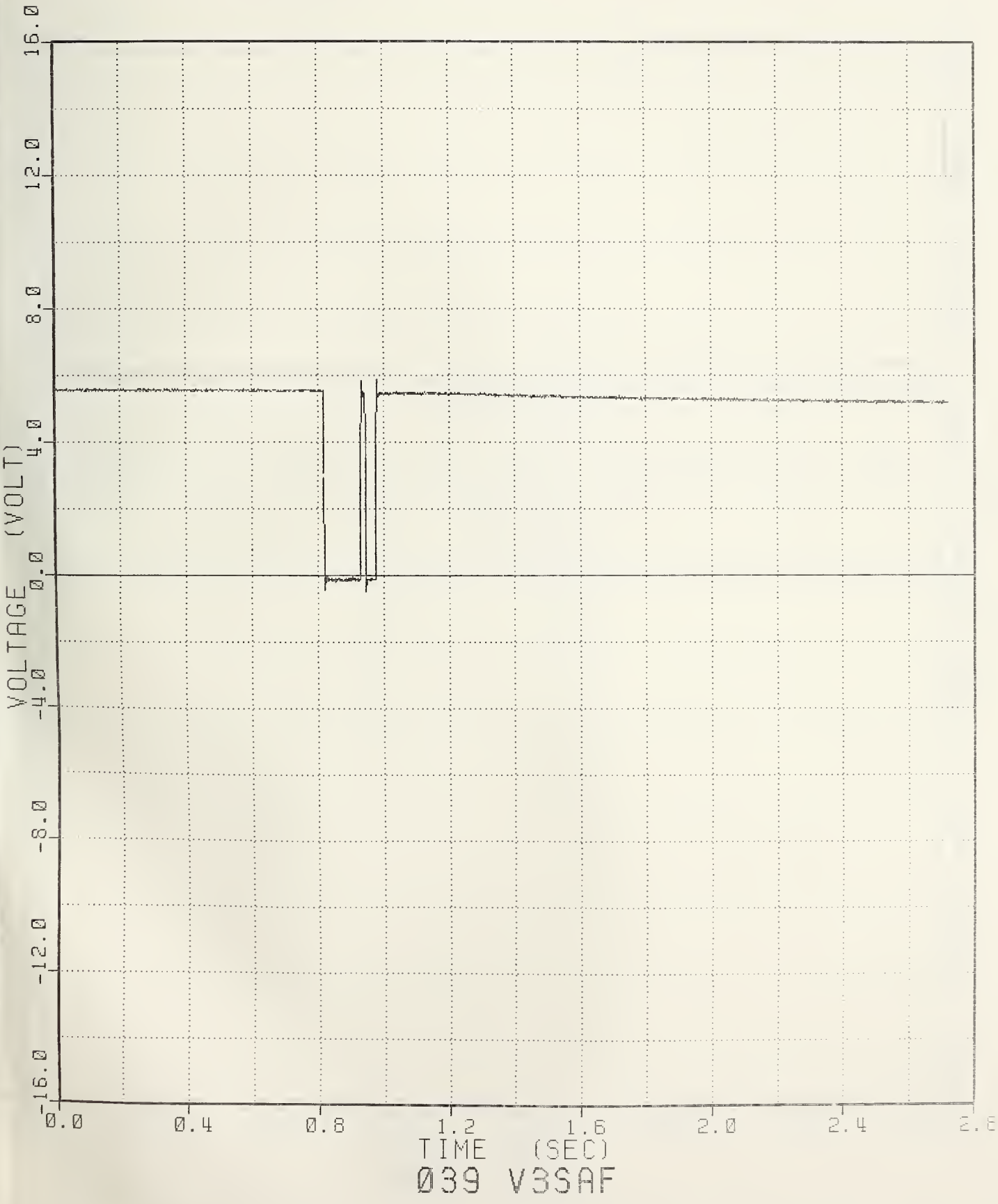


039 V1LF

039ZF RD583-2 TST039 84171084520 29-AUG-84 08:09:15
V2RF FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = 4.680 @ 0.9792 11.328 @ 0.8208

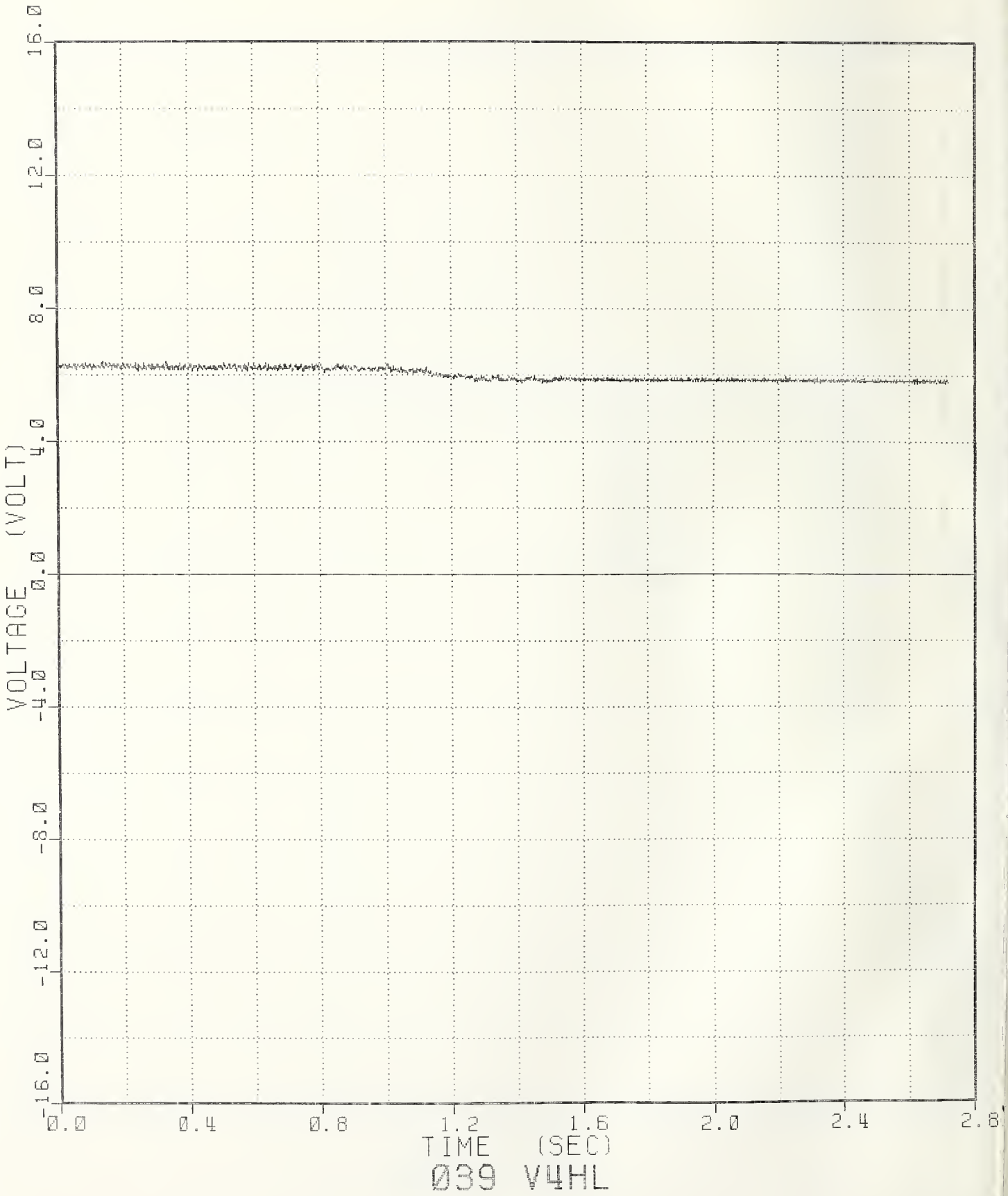


039ZF RD583-2 TST039 84171084520 29-AUG-84 08:09:15
V3SAF FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -0.47656 @ 0.945S 5.89063 @ 0.9792

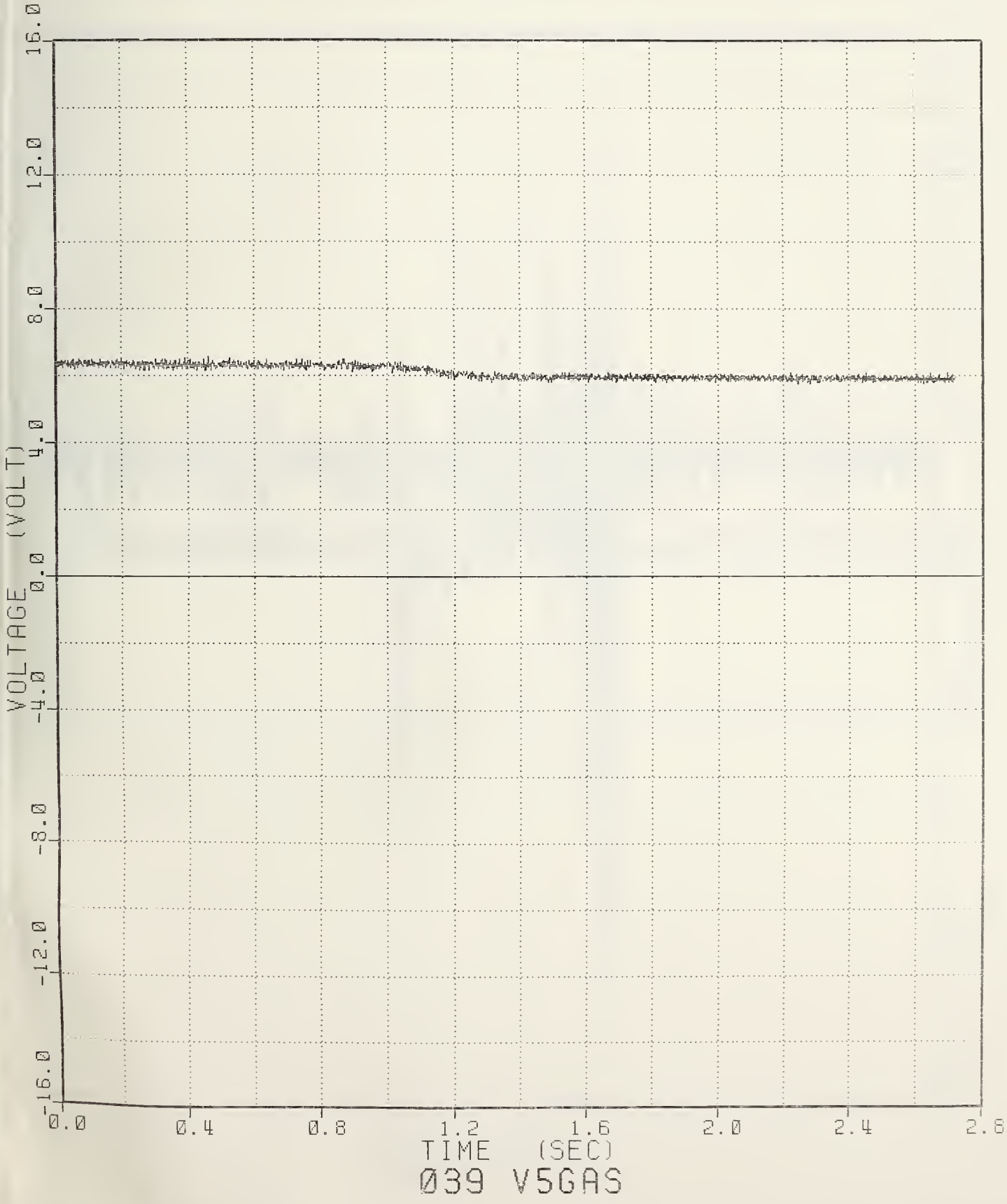


039 V3SAF

039ZF RD583-2 TST039 84171084520 29-AUG-84 08:09:15
V4HL FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = 5.75000 @ 2.7104 6.38281 @ 0.1392

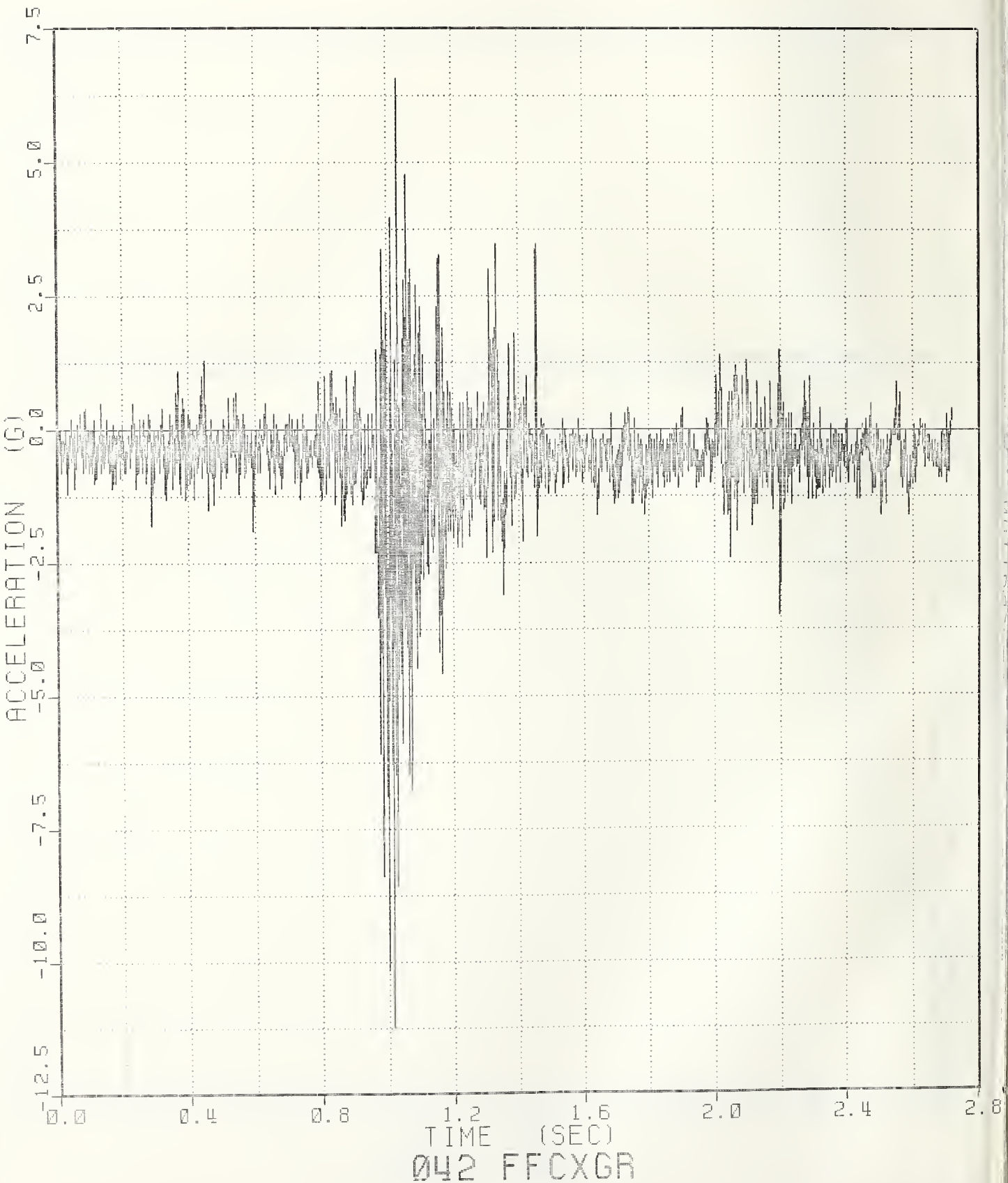


039ZF RD583-2 TST039 84171084520 29-AUG-84 08:09:15
V5GAS FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = 5.77344 @ 2.2448 6.54688 @ 0.4640

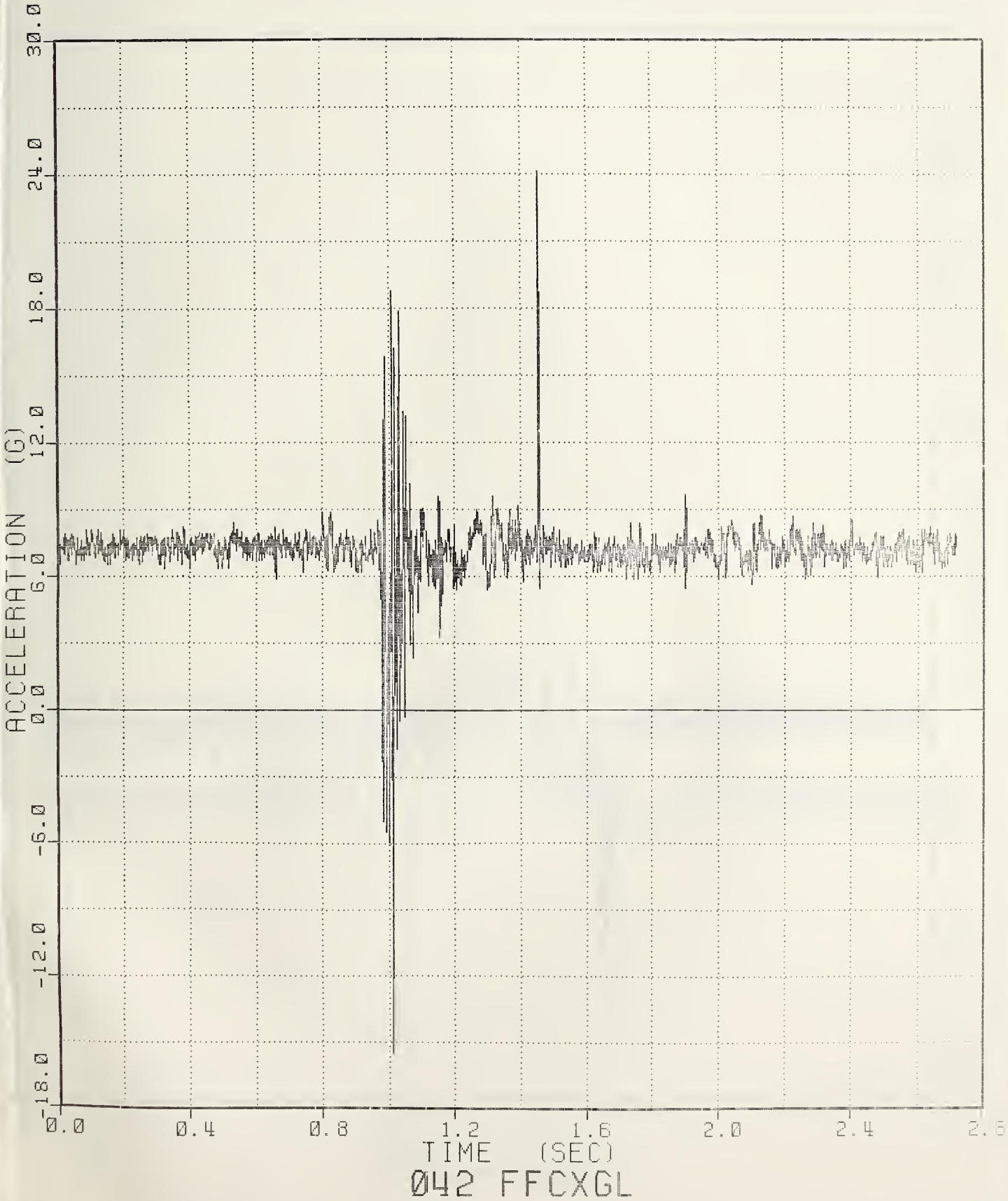


039 V5GAS

042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
FFCXGR FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -11.256 @ 1.0144 6.574 @ 1.0304

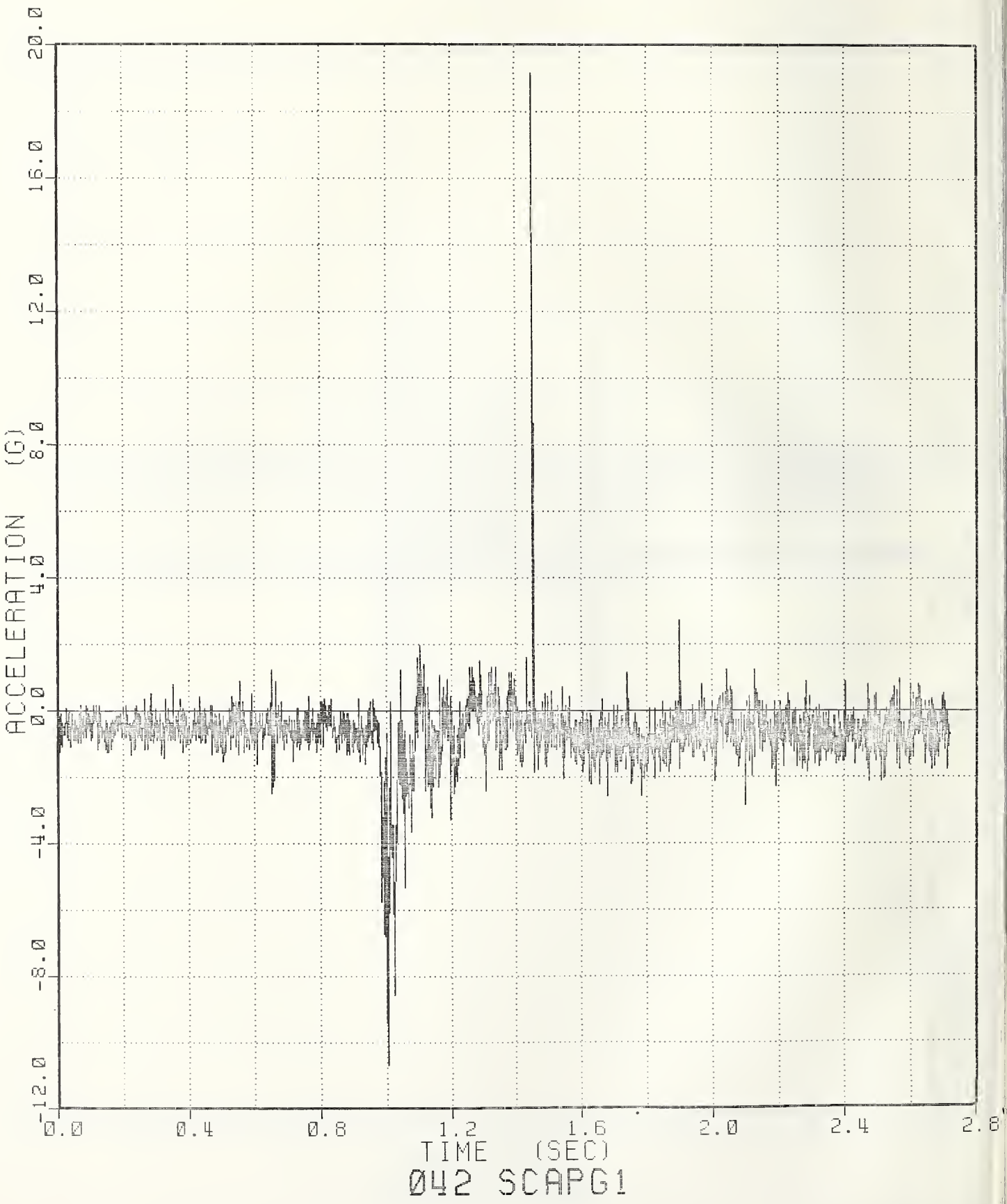


042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
FFCXGL FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -15.527 @ 1.0112 24.121 @ 1.4528

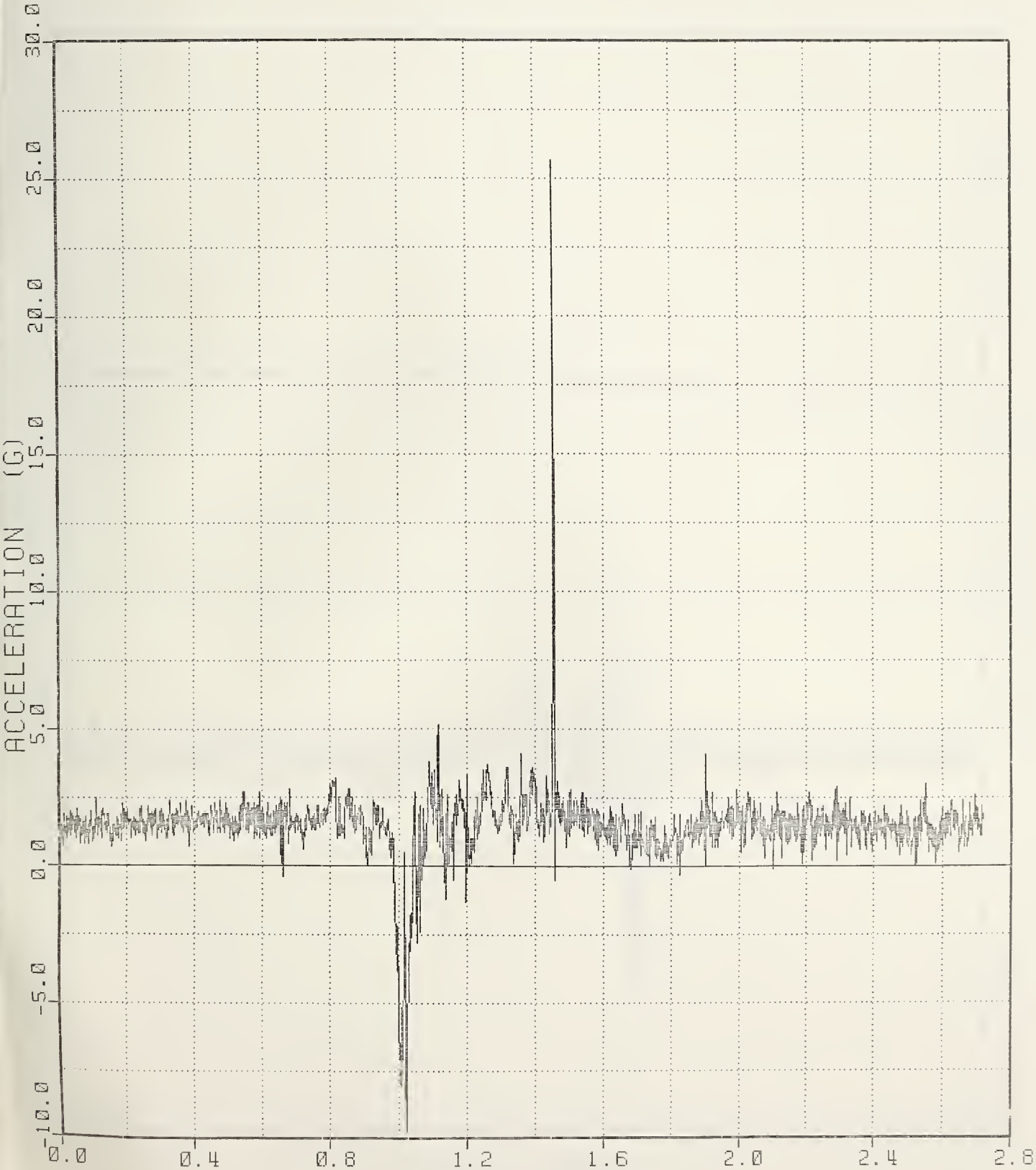


042 FFCXGL

042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
SCAPG1 FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -10.694 @ 1.0032 19.178 @ 1.4528

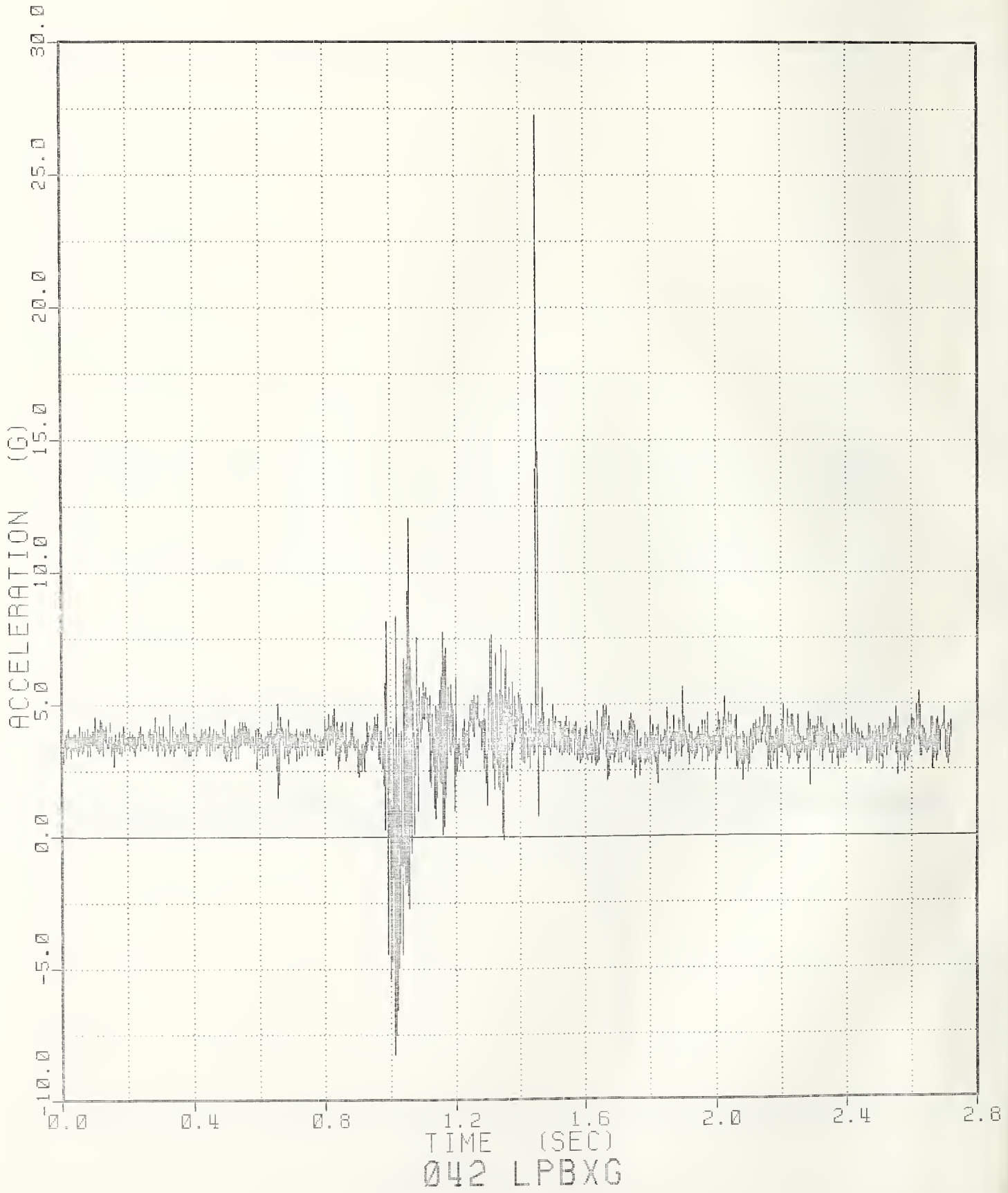


042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
SCAPG2 FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -9.757 @ 1.0240 25.649 @ 1.4528

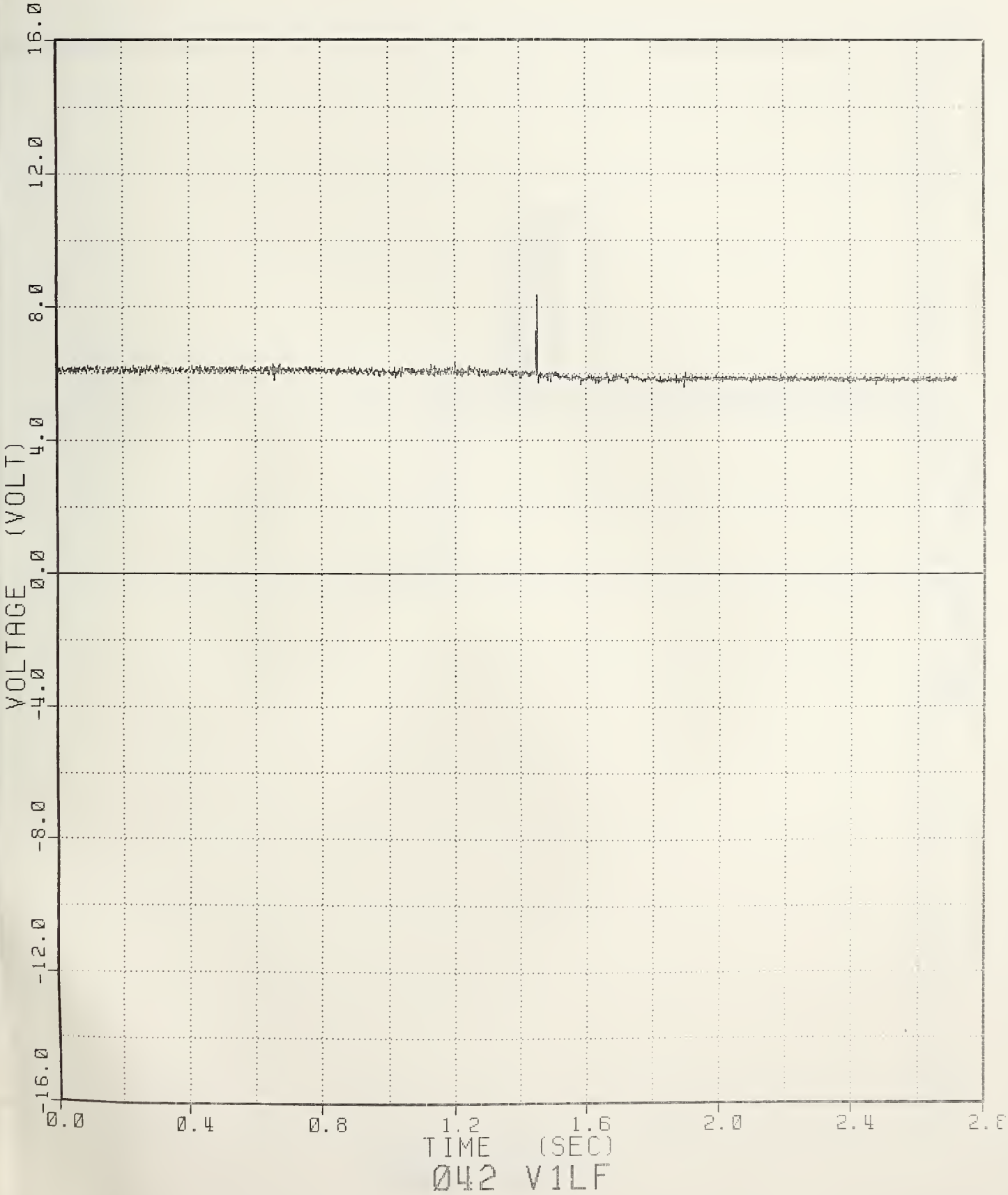


042 SCAPG2

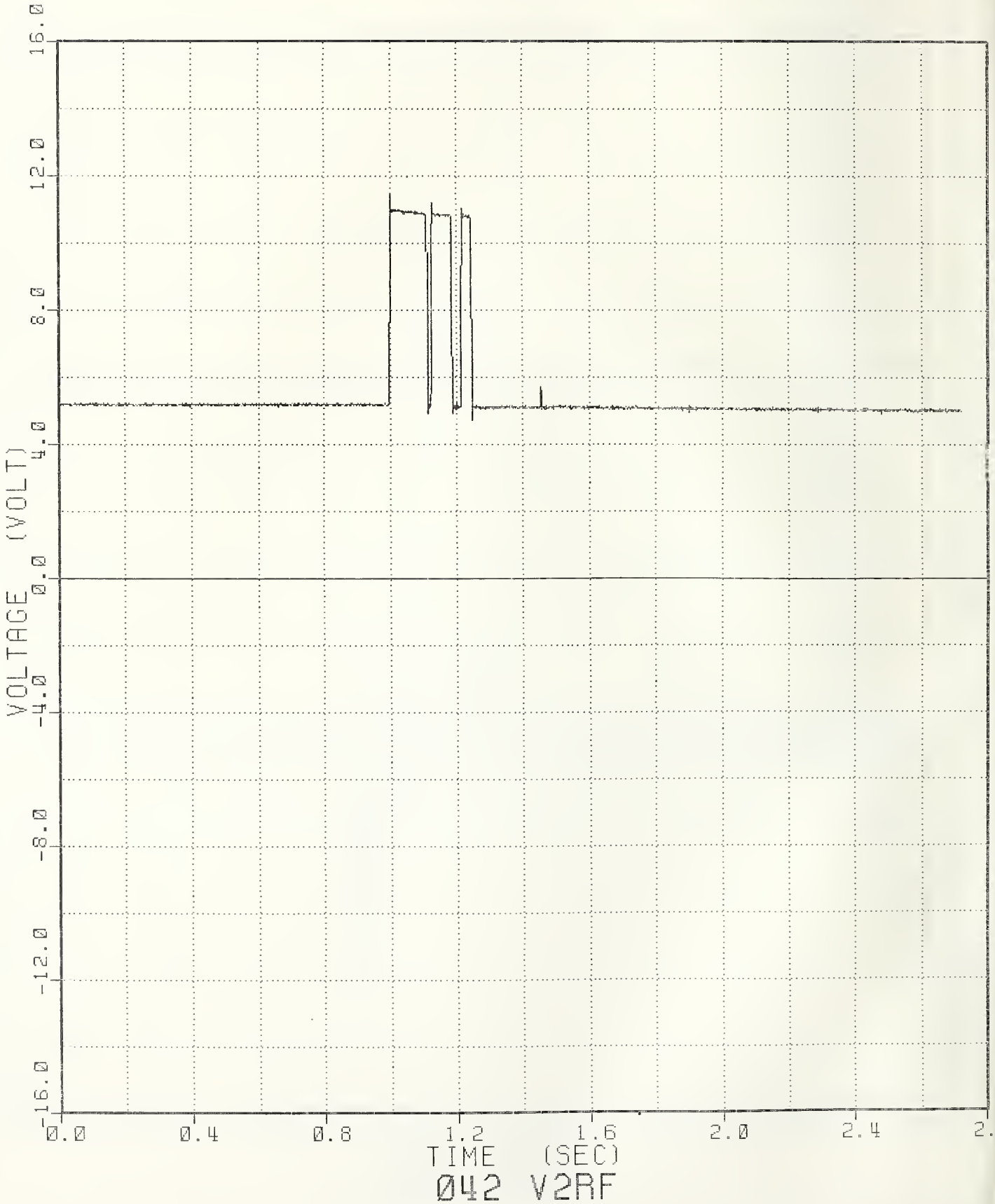
042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
LPBXG FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -8.248 @ 1.0128 27.259 @ 1.4528



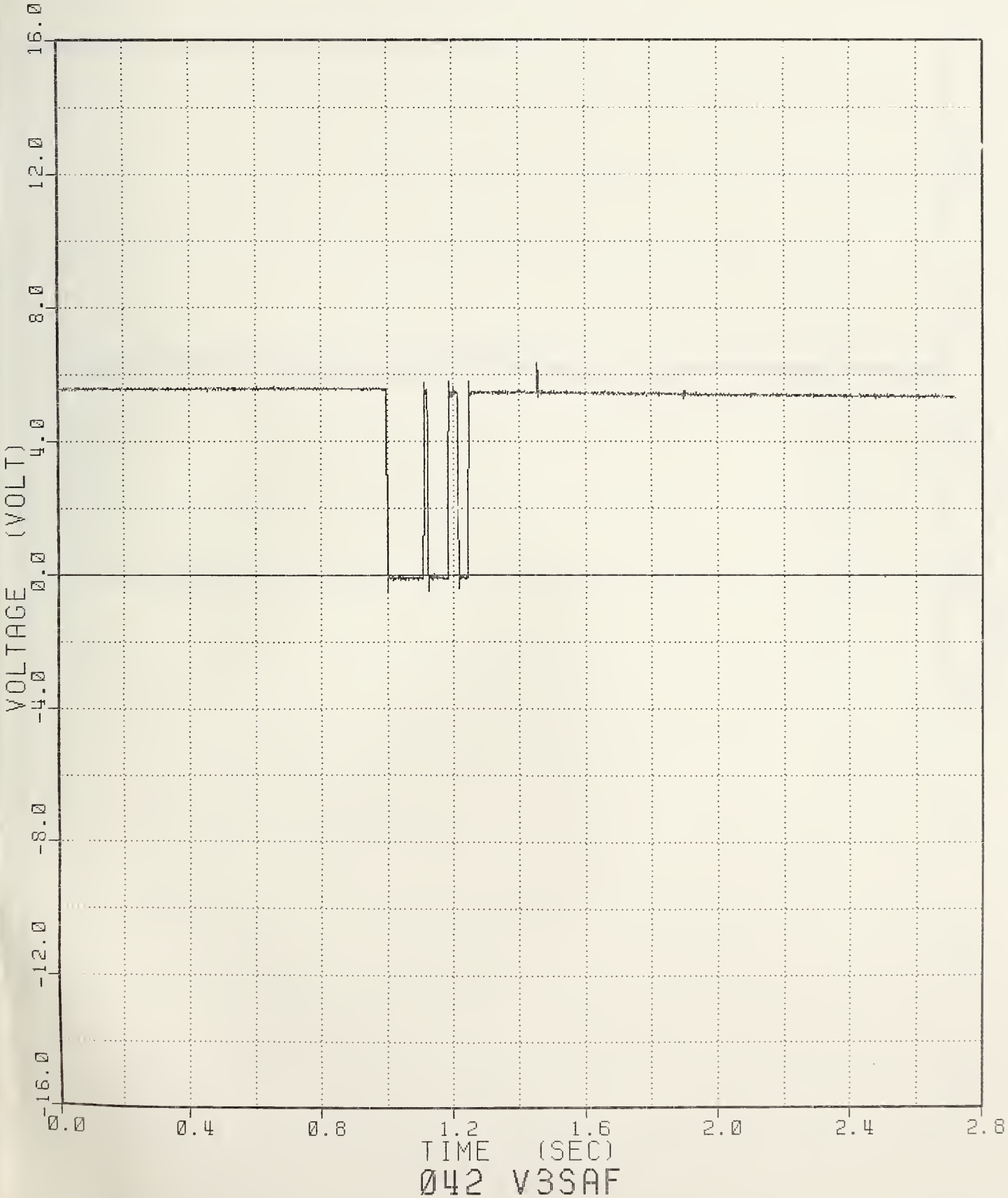
042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
V1LF FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = 5.59375 @ 1.8976 8.35156 @ 1.4512



042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
V2RF FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = 4.734 @ 1.2480 11.469 @ 1.0000

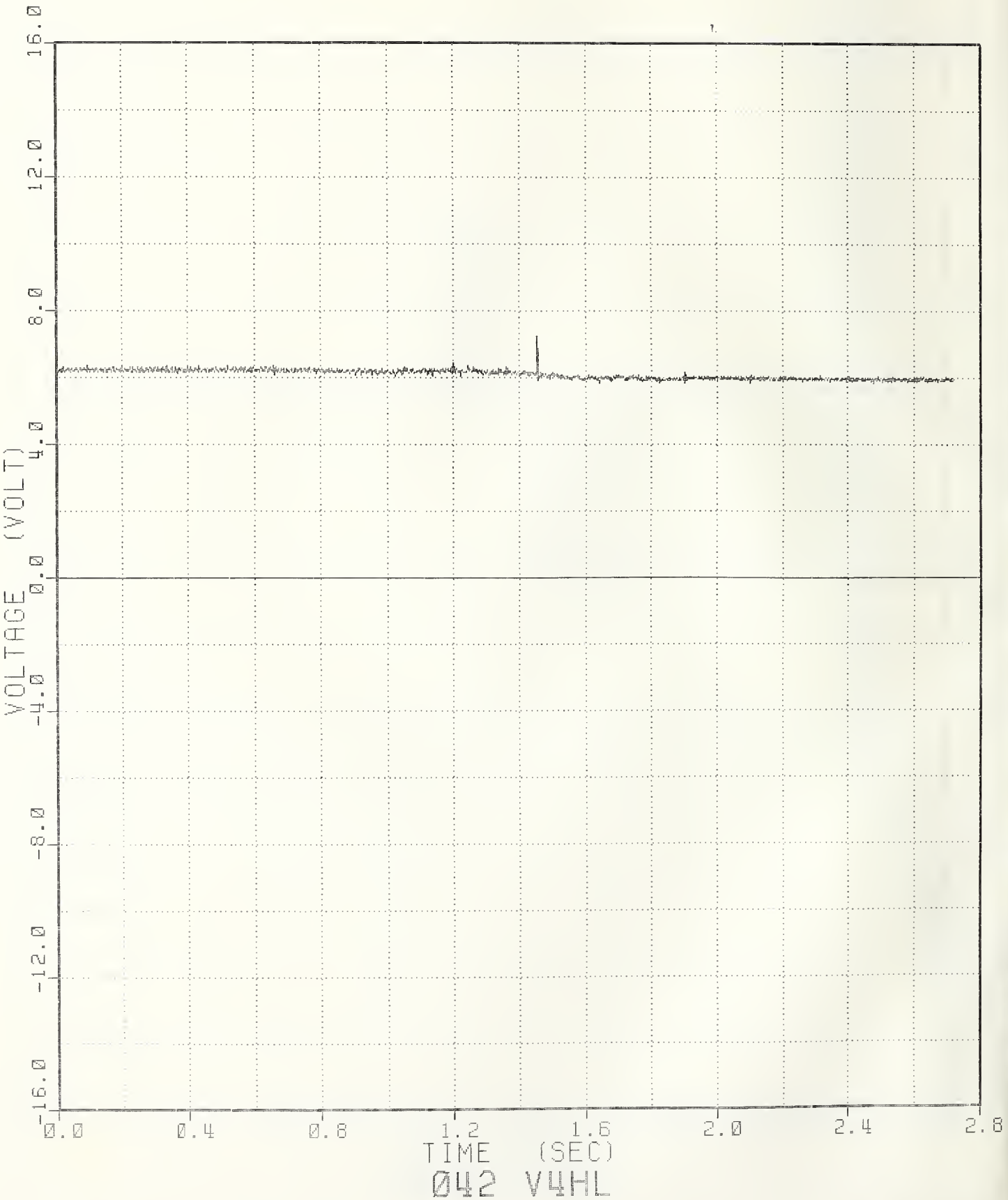


042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
V3SAF FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -0.50000 @ 1.0000 6.34375 @ 1.4528

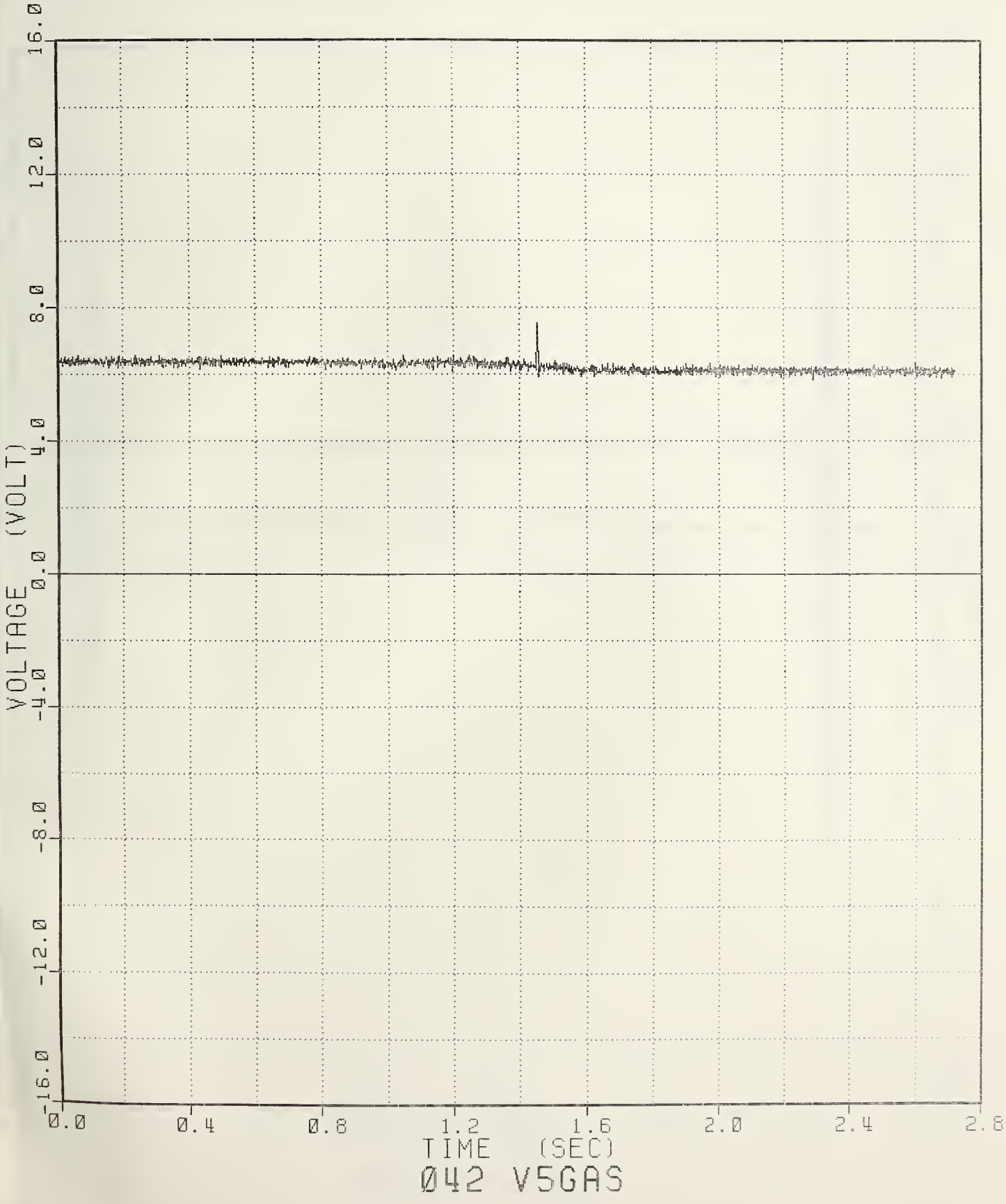


042 V3SAF

042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
V4HL FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = 5.82813 @ 1.8992 7.25781 @ 1.4528



042 RD583-2 TST042 84171084752 29-AUG-84 08:09:15
V5GAS FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = 5.85156 @ 2.2864 7.52344 @ 1.4528

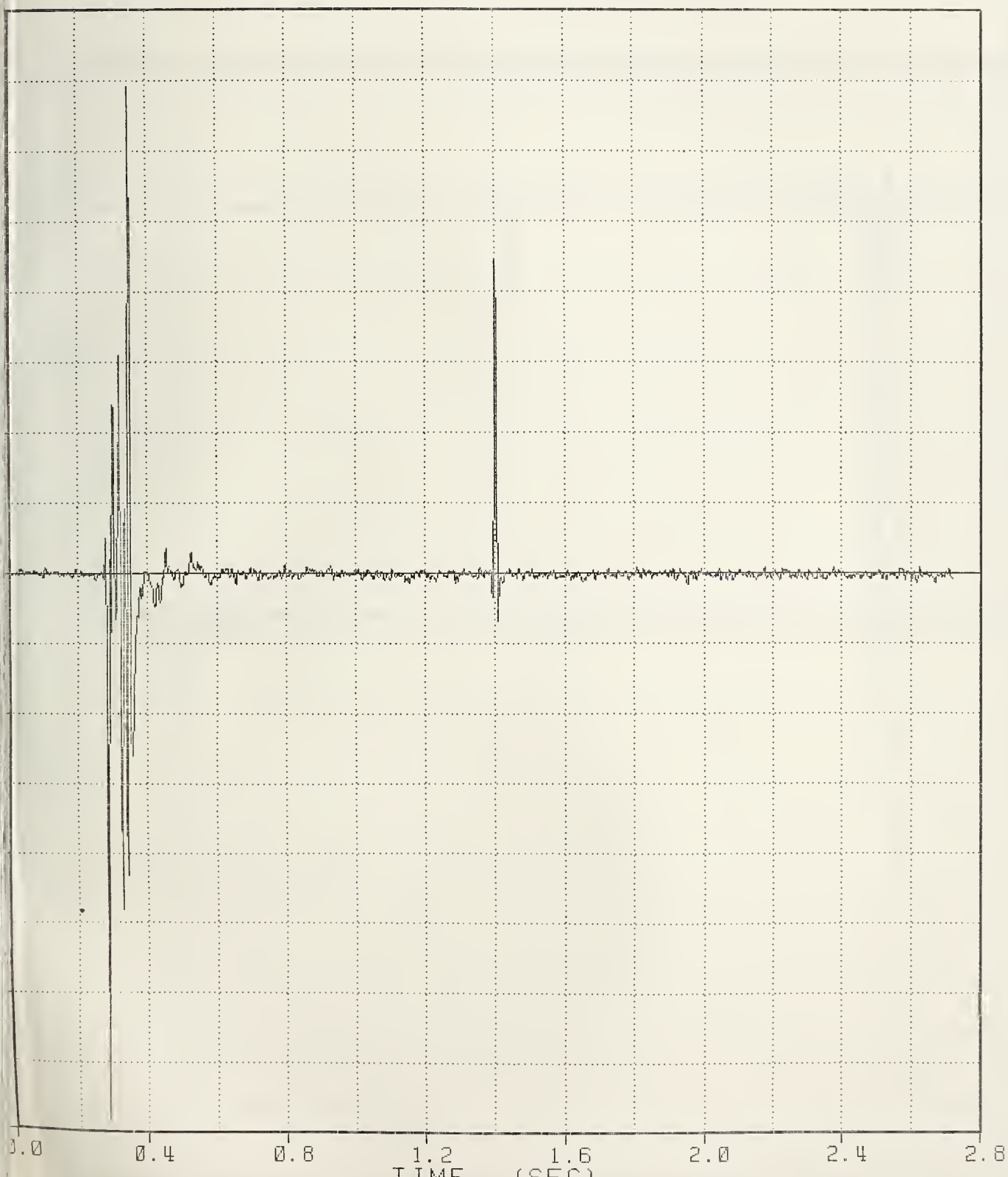


042 V5GAS

Ø53ZF RD583-2 TSTØ53 84171085950 29-AUG-84 Ø8:Ø9:15
FFCXGR FILTER = BLPP 1ØØ/ 316/ -4Ø Ø.Ø MPH
MIN, MAX VALUES = -18.466 @ Ø.2880 11.779 @ Ø.3168

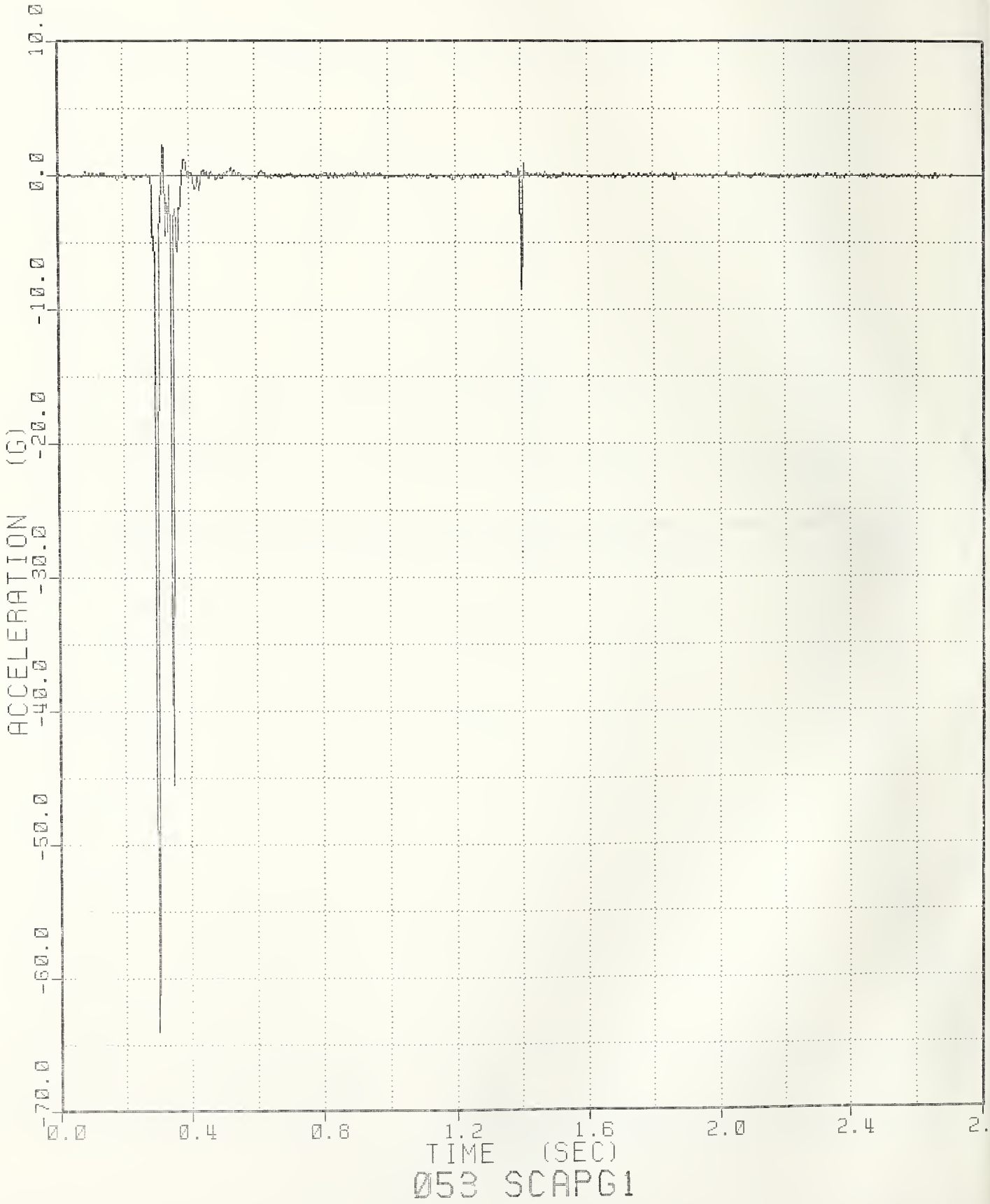
Ø53 FFCXGR

053ZF RD583-2 TST053 84171085950 29-AUG-84 08:09:15
FFCXGL FILTER = BLPP 100/ 316/ -40 0.0 MPH
MIN, MAX VALUES = -19.543 @ 0.2880 17.291 @ 0.3488



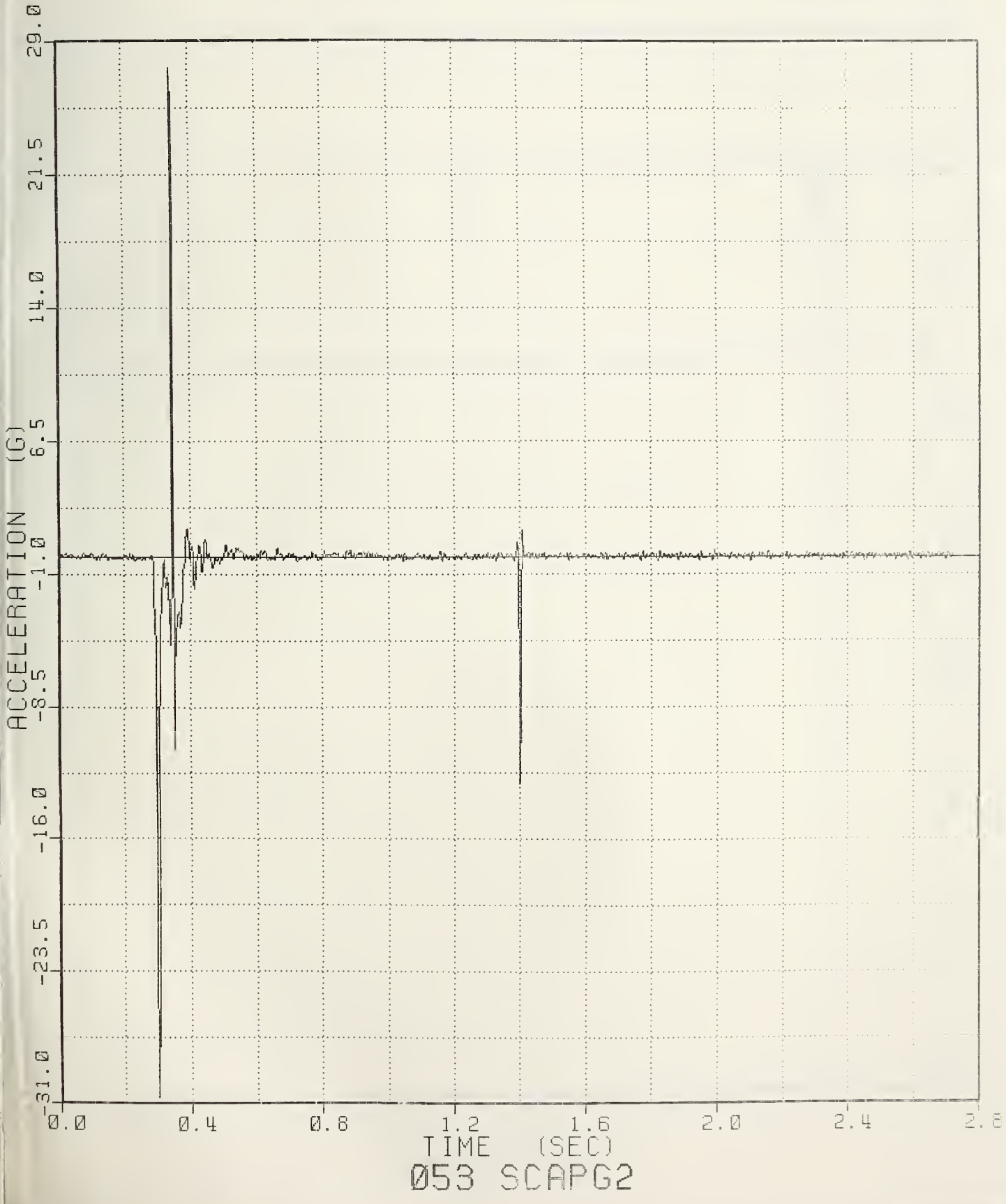
053 FFCXGL

053ZF RD583-2 TST053 84171085950 29-AUG-84 08:09:15
SCAPG1 FILTER = BLPP 100/ 316/ -40 0.0 MPH
MIN, MAX VALUES = -63.993 @ 0.3008 2.316 @ 0.3216



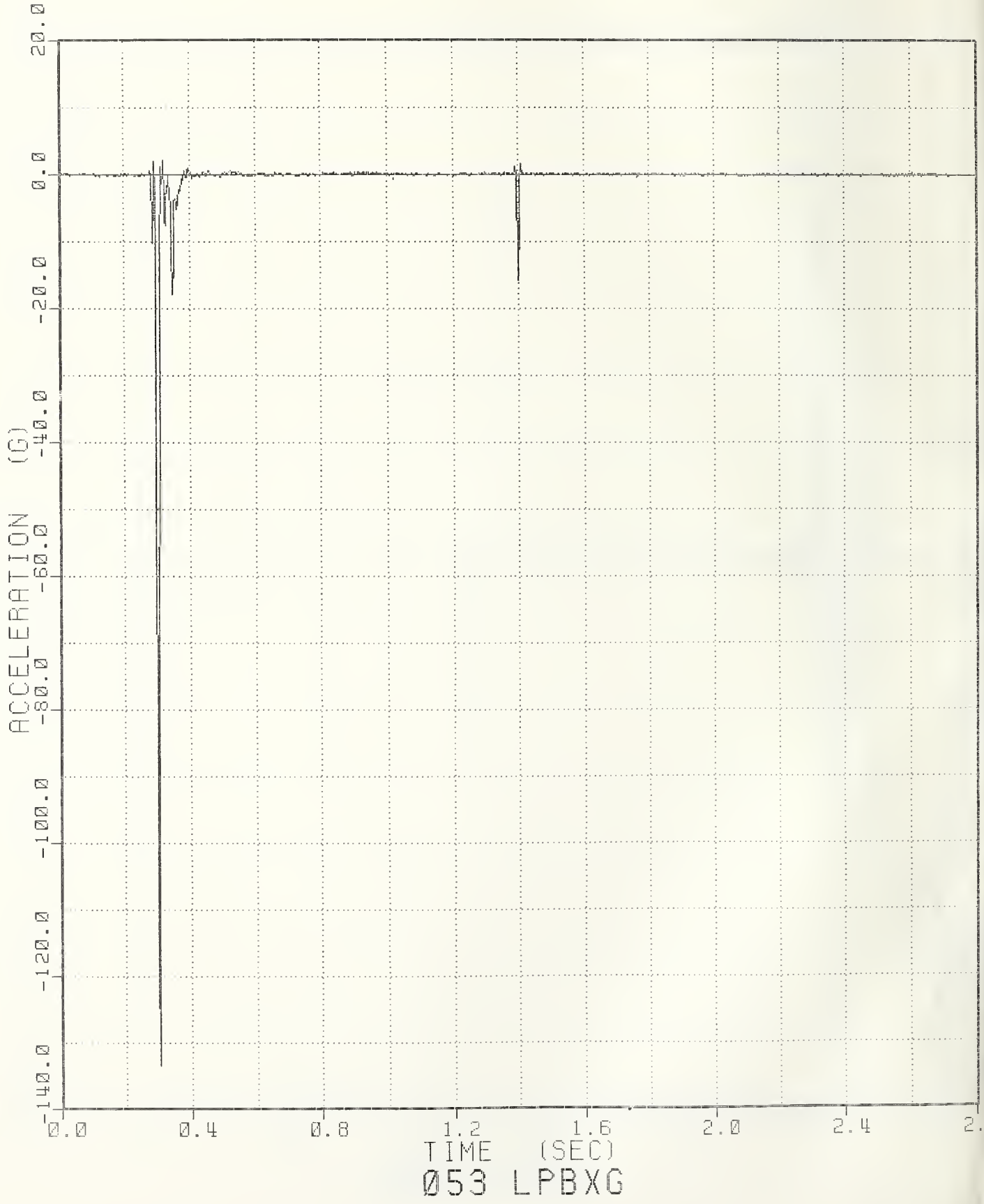
053 SCAPG1

Ø53ZF RD583-2 TSTØ53 84171085950 29-AUG-84 Ø8:Ø9:15
SCAPG2 FILTER = BLPP 1ØØ/ 316/ -4Ø Ø.Ø MPH
MIN, MAX VALUES = -3Ø.589 @ Ø.3ØØ8 27.498 @ Ø.3456

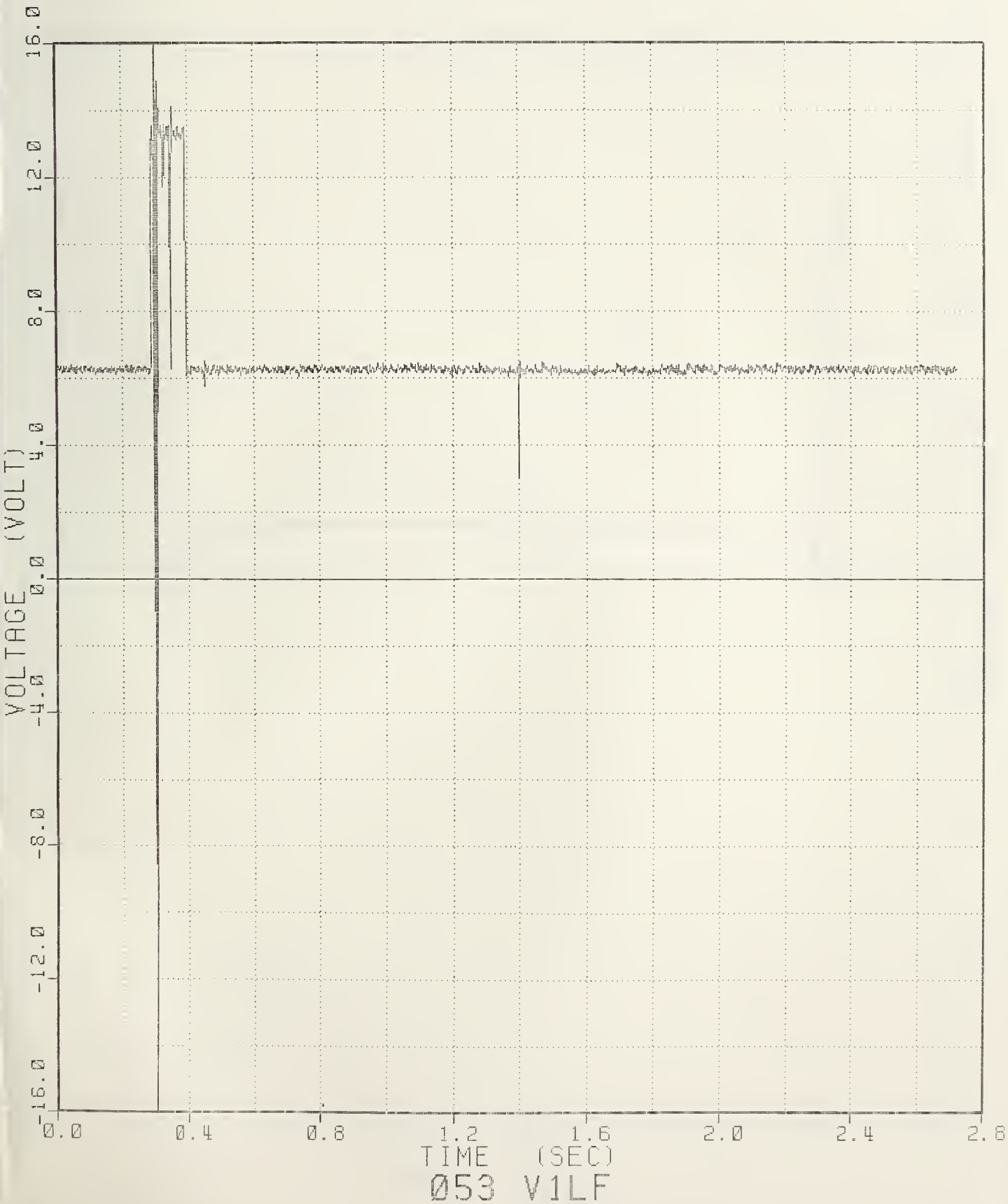


Ø53 SCAPG2

053ZF RD583-2 TST053 84171085950 29-AUG-84 08:09:15
LPBXG FILTER = BLPP 100/ 316/ -40 0.0 MPH
MIN, MAX VALUES = -133.455 @ 0.3024 2.299 @ 0.3200

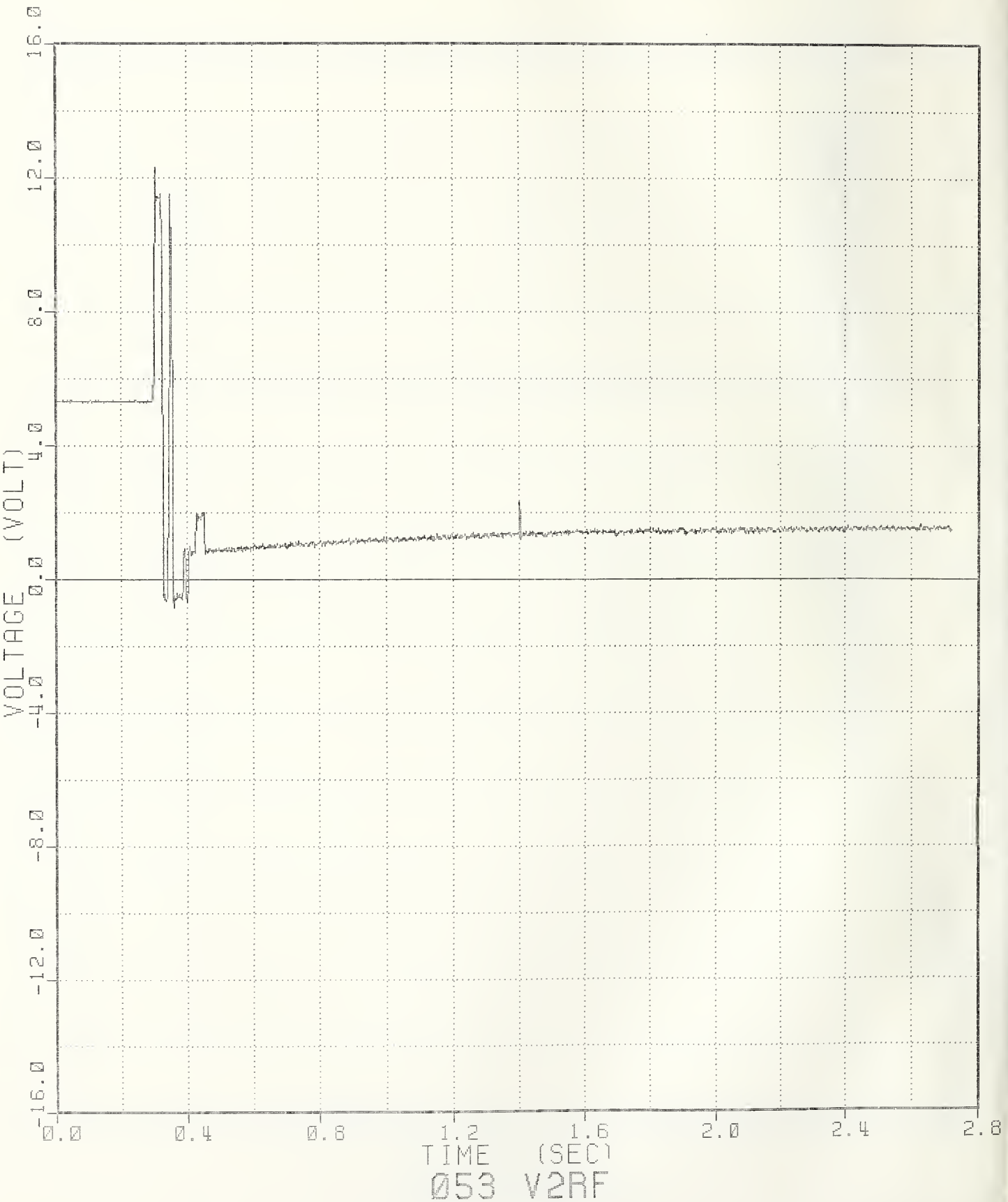


053ZF RD583-2 TST053 84171085950 29-AUG-84 08:09:15
V1LF FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -16.000 @ 0.3024 15.961 @ 0.3008

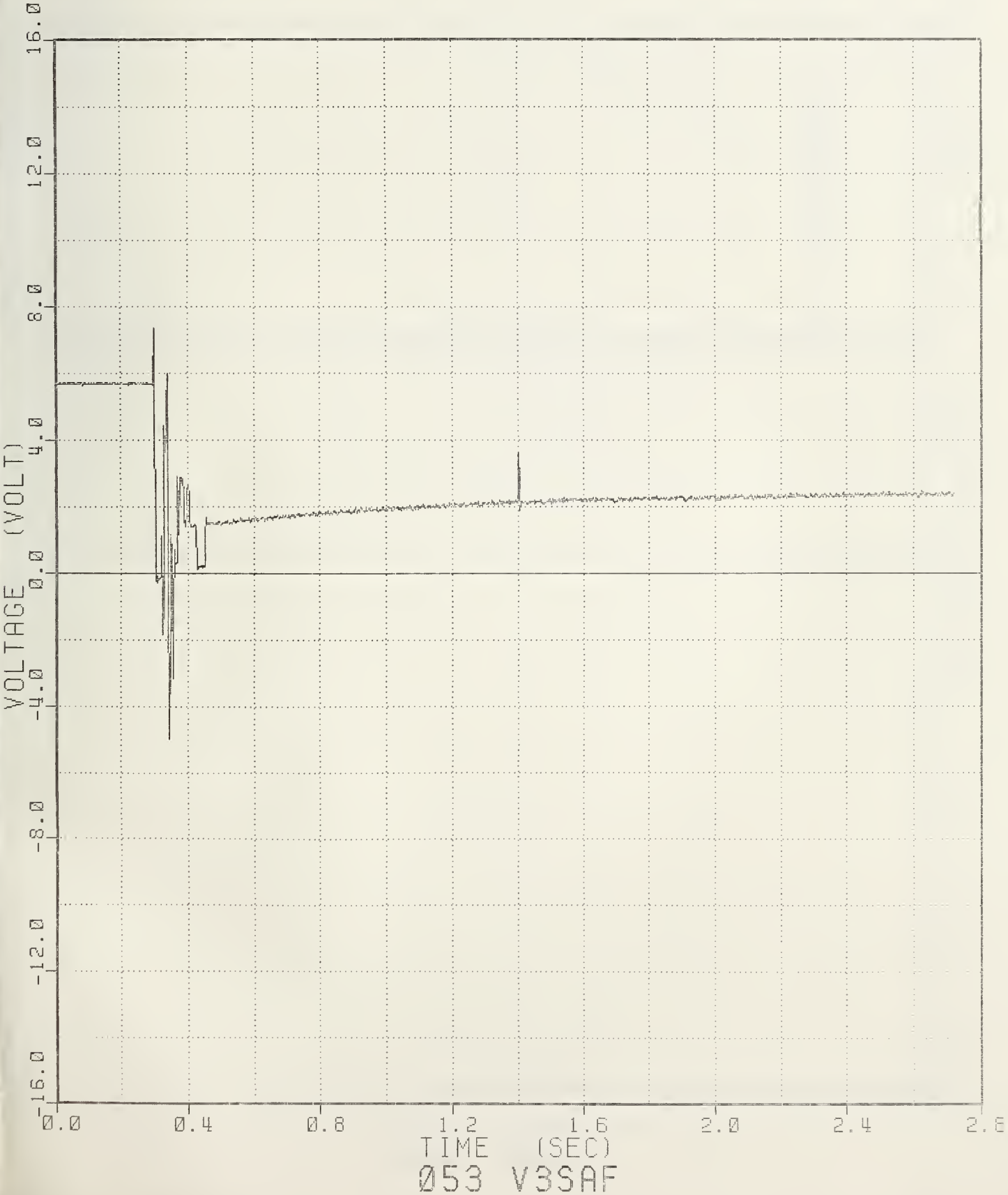


053 V1LF

053ZF RD583-2 TST053 84171085950 29-AUG-84 08:09:15
V2RF FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -0.852 @ 0.3584 12.305 @ 0.3040

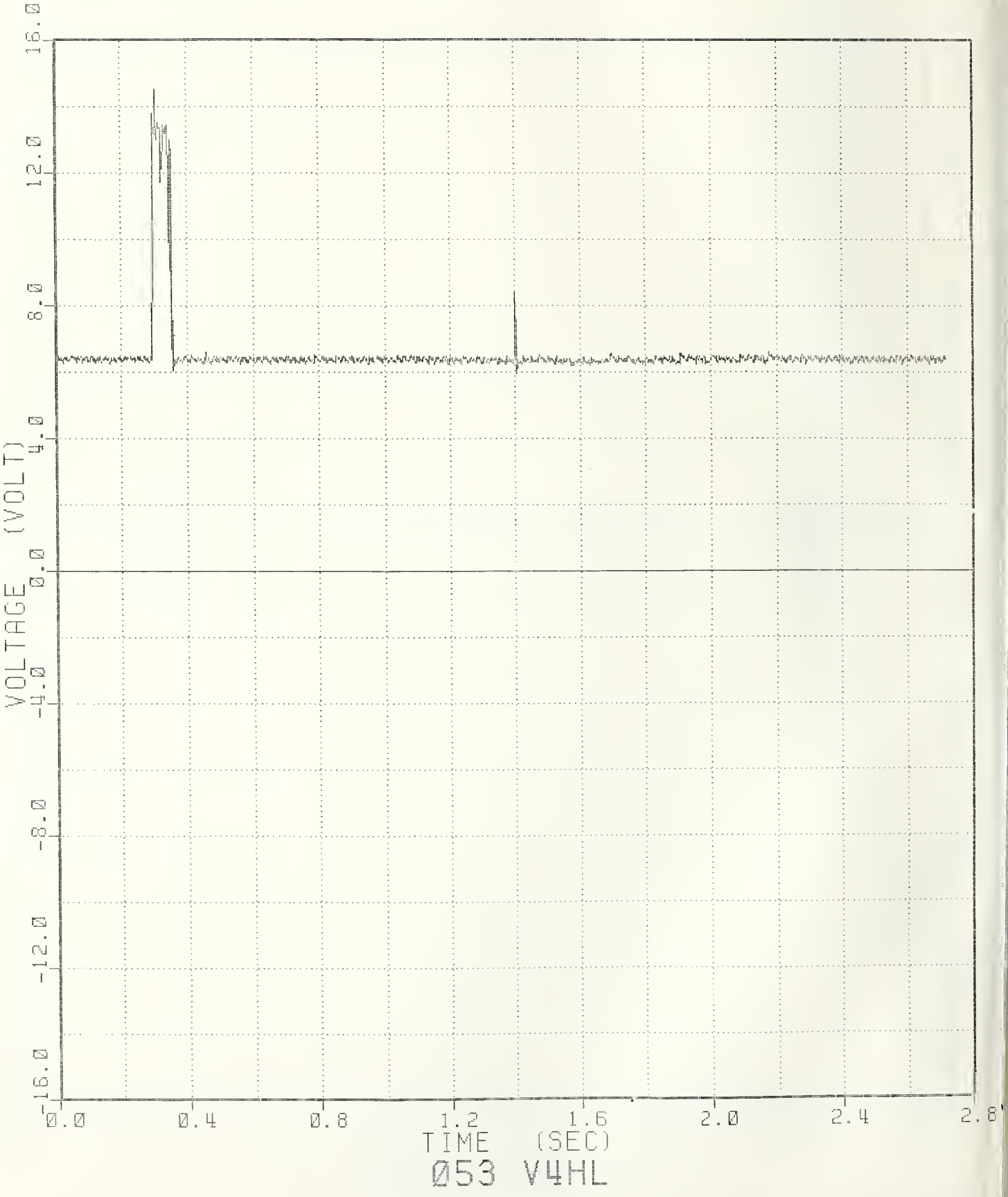


Ø53ZF RD583-2 TSTØ53 84171085950 29-AUG-84 Ø8:Ø9:15
V3SAF FILTER = ALPF 15Ø/ 474/ -4Ø Ø.Ø MPH
MIN, MAX VALUES = -4.99219 @ Ø.3424 7.37500 @ Ø.2992



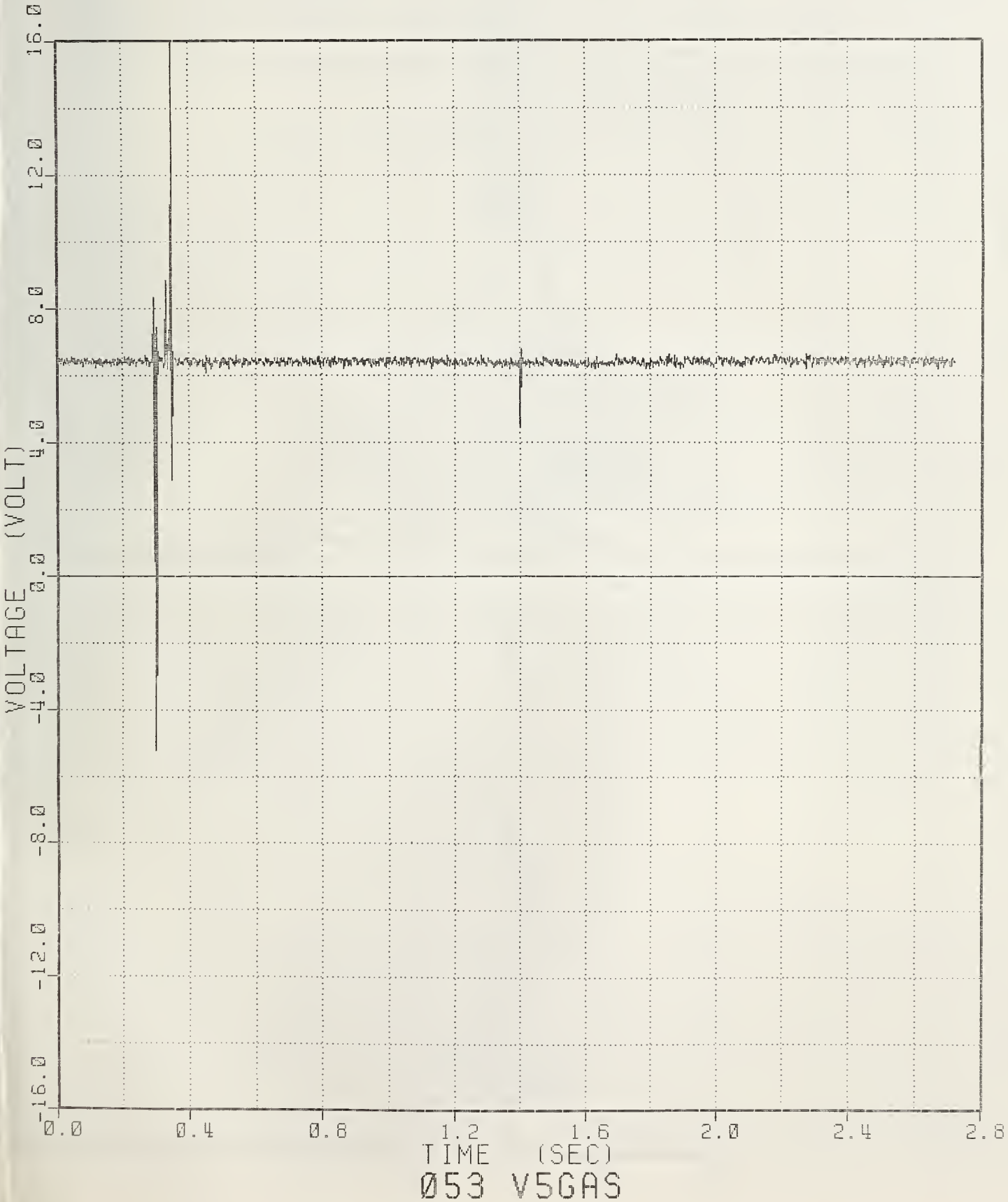
Ø53 V3SAF

053ZF RD583-2 TST053 84171085950 29-AUG-84 08:09:15
V4HL FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = 5.953 @ 1.4048 14.523 @ 0.3040

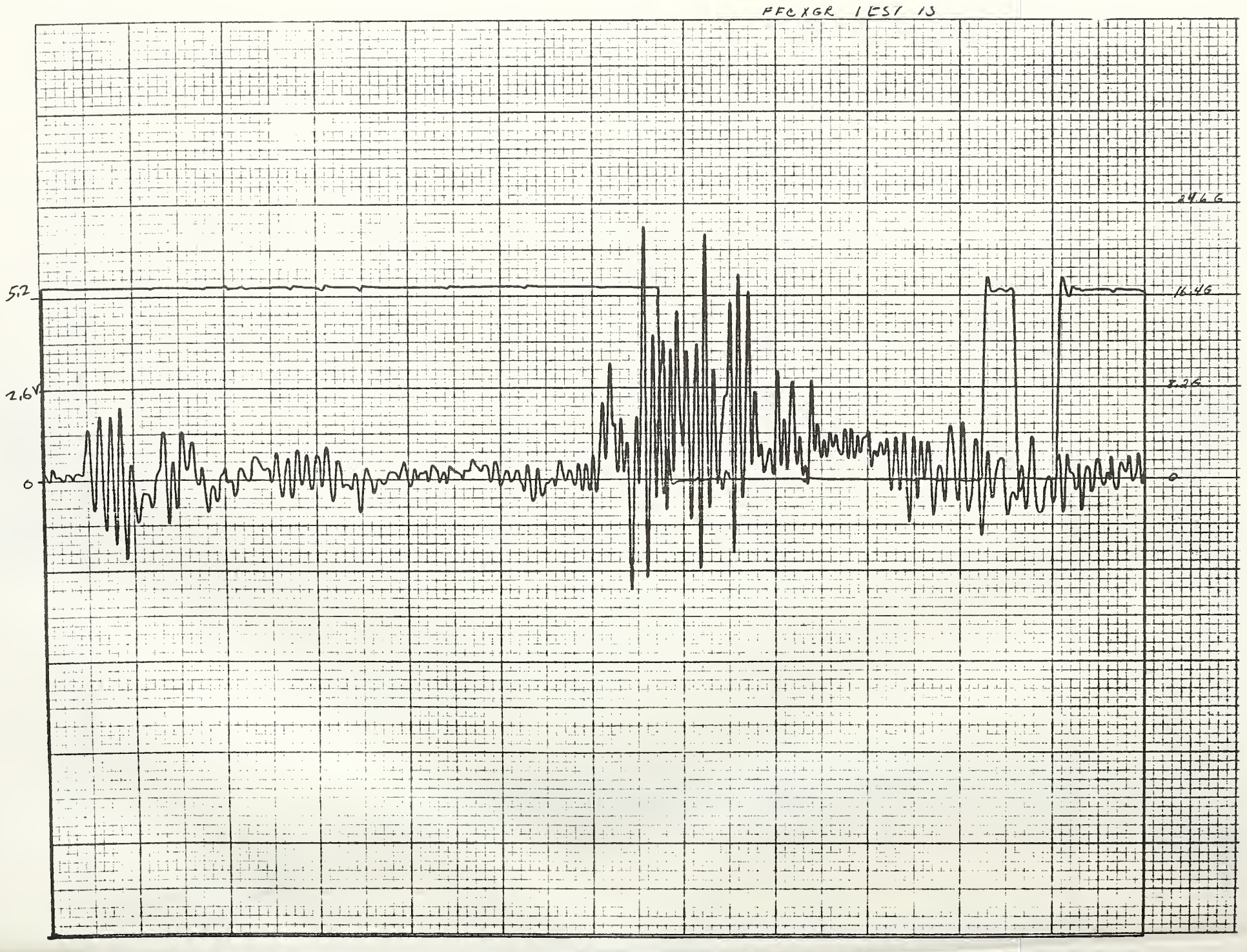


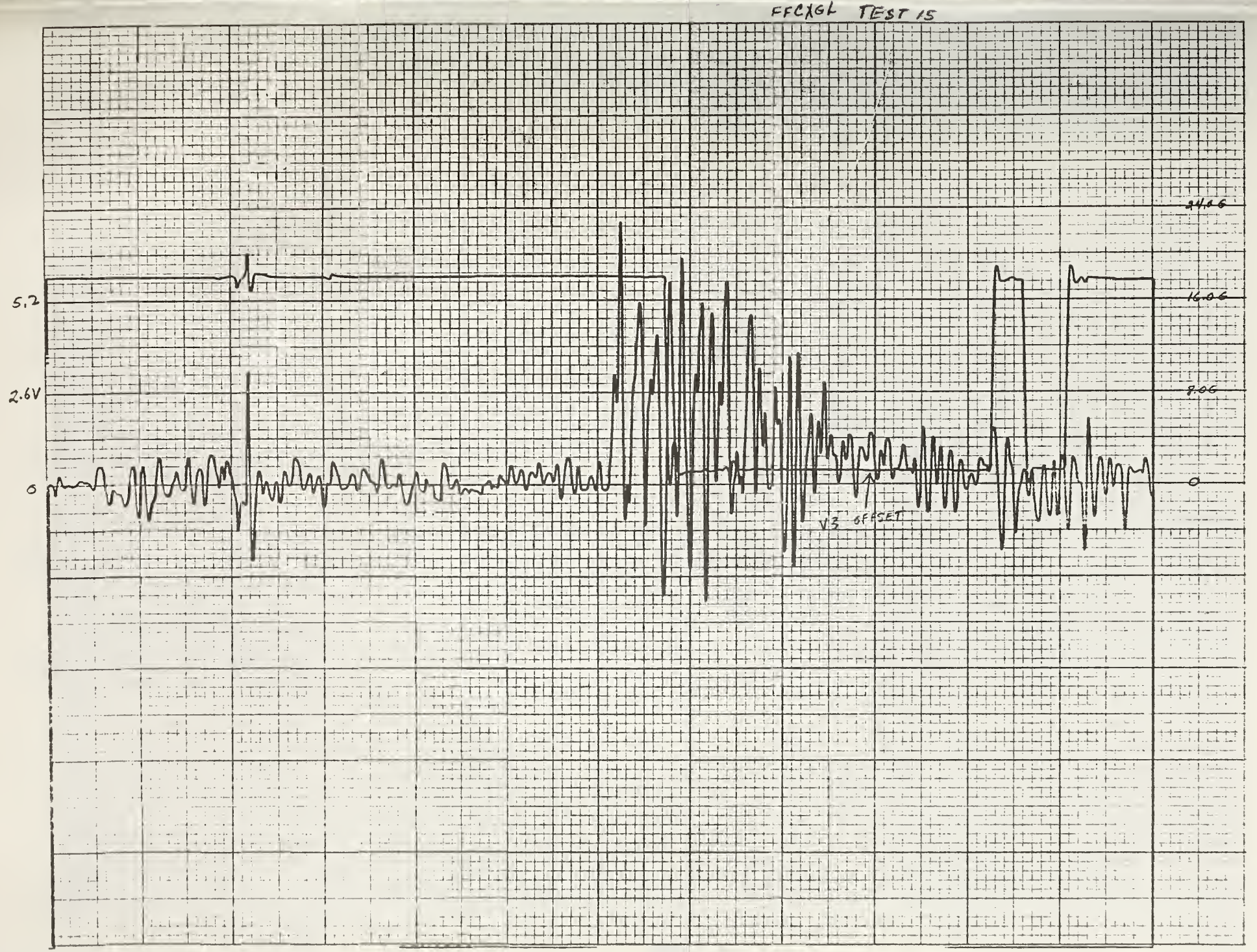
053 V4HL

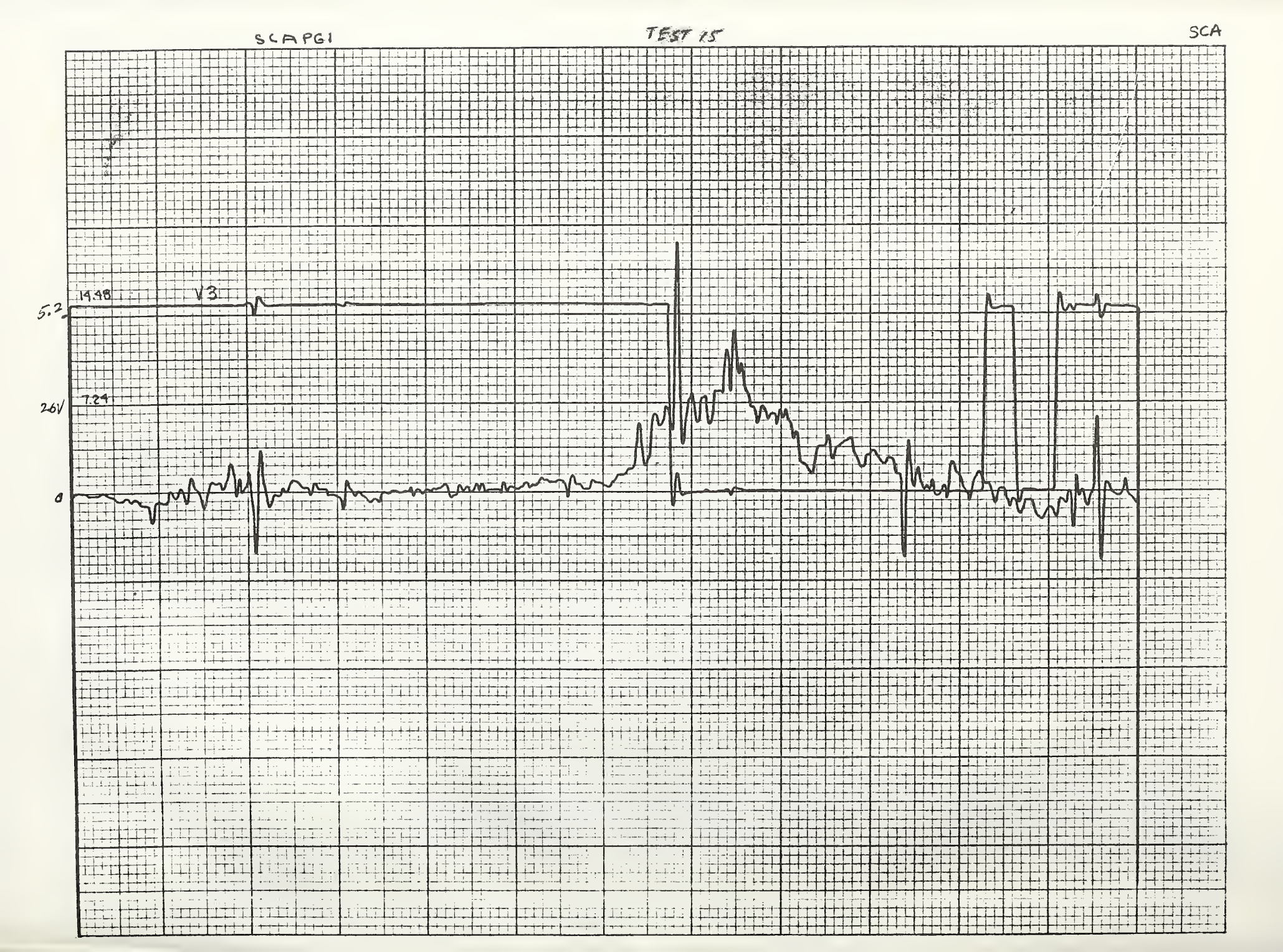
053ZF RD583-2 TST053 84171085950 29-AUG-84 08:09:15
V5GAS FILTER = ALPF 150/ 474/ -40 0.0 MPH
MIN, MAX VALUES = -5.219 @ 0.2992 15.992 @ 0.3472

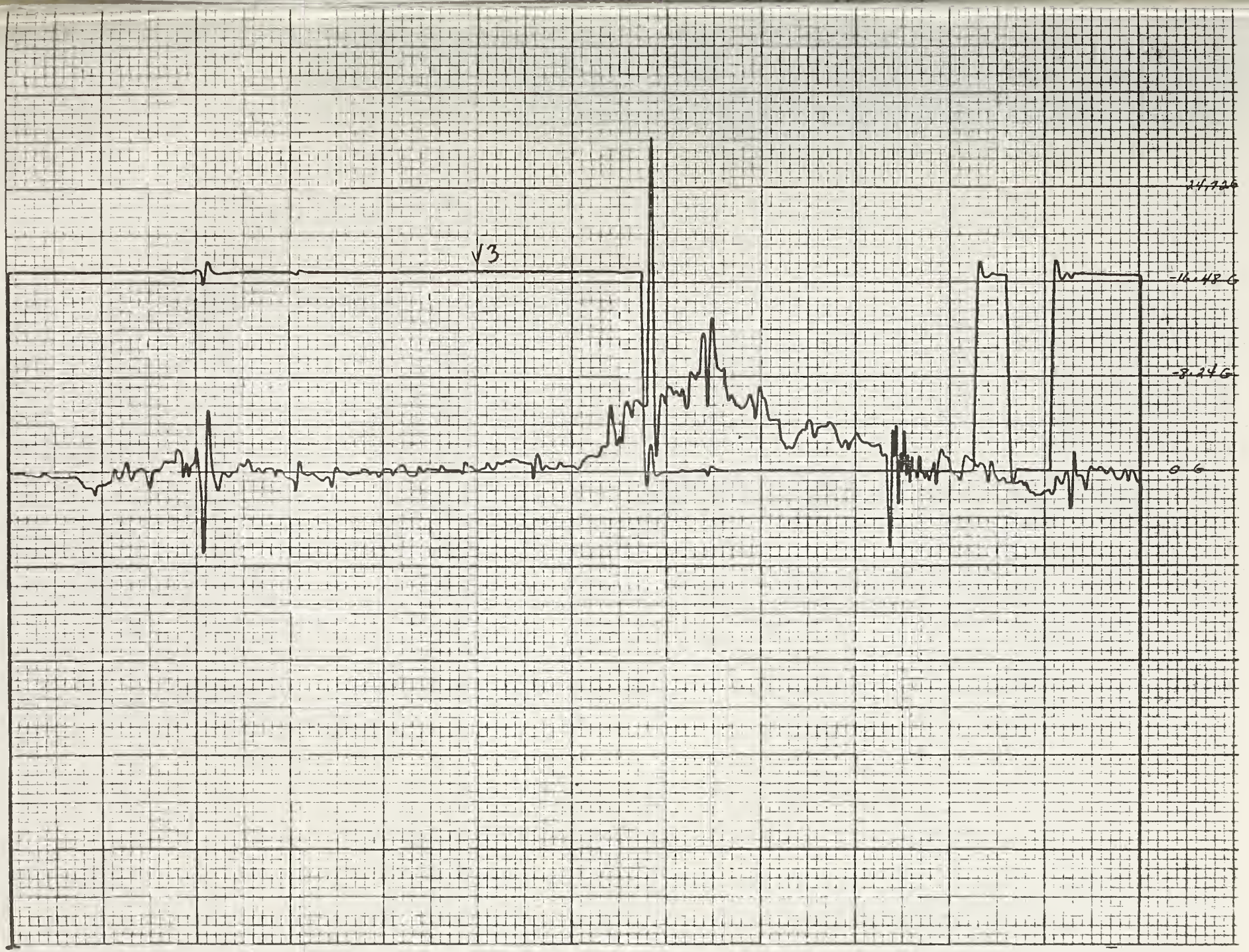


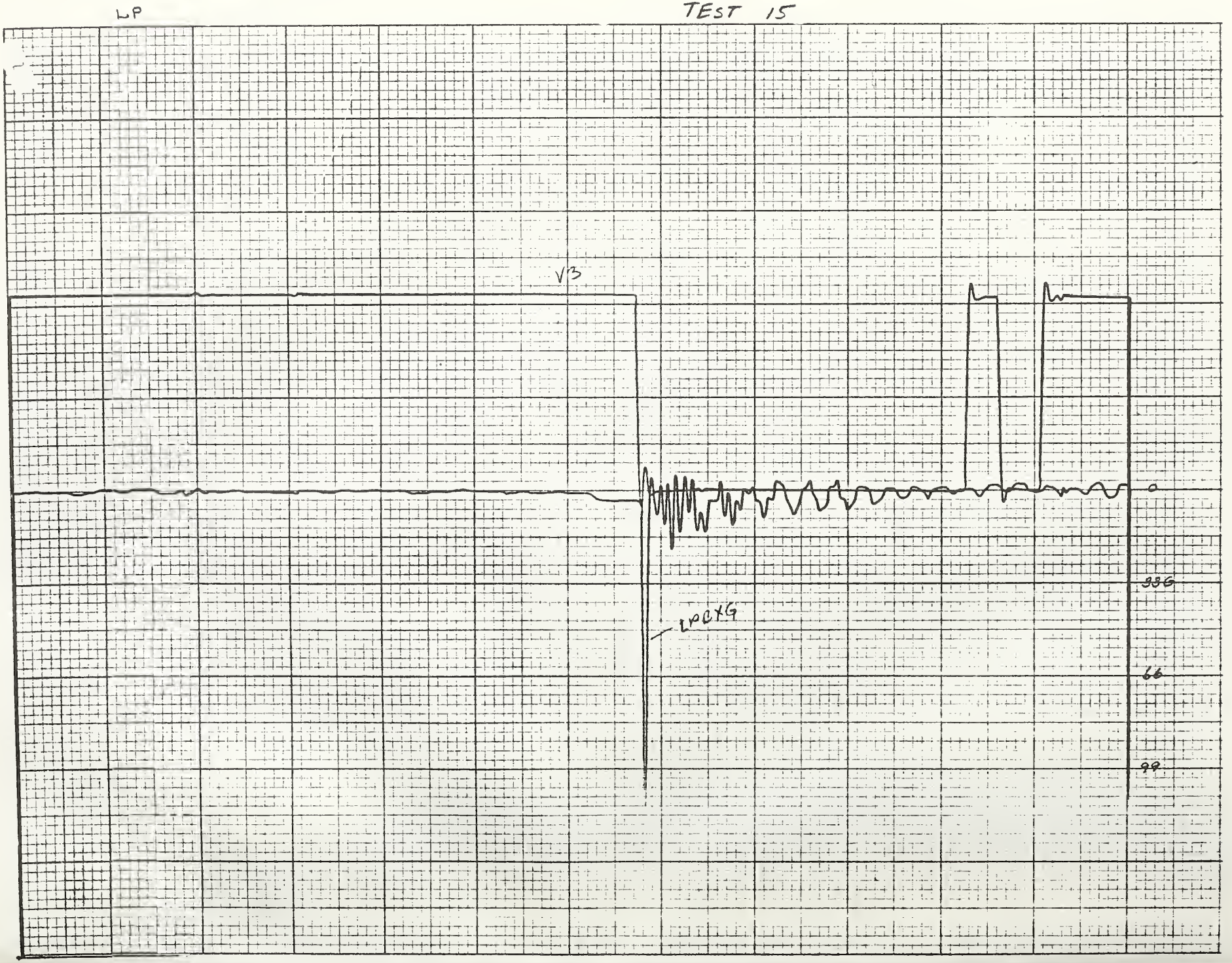
053 V5GAS

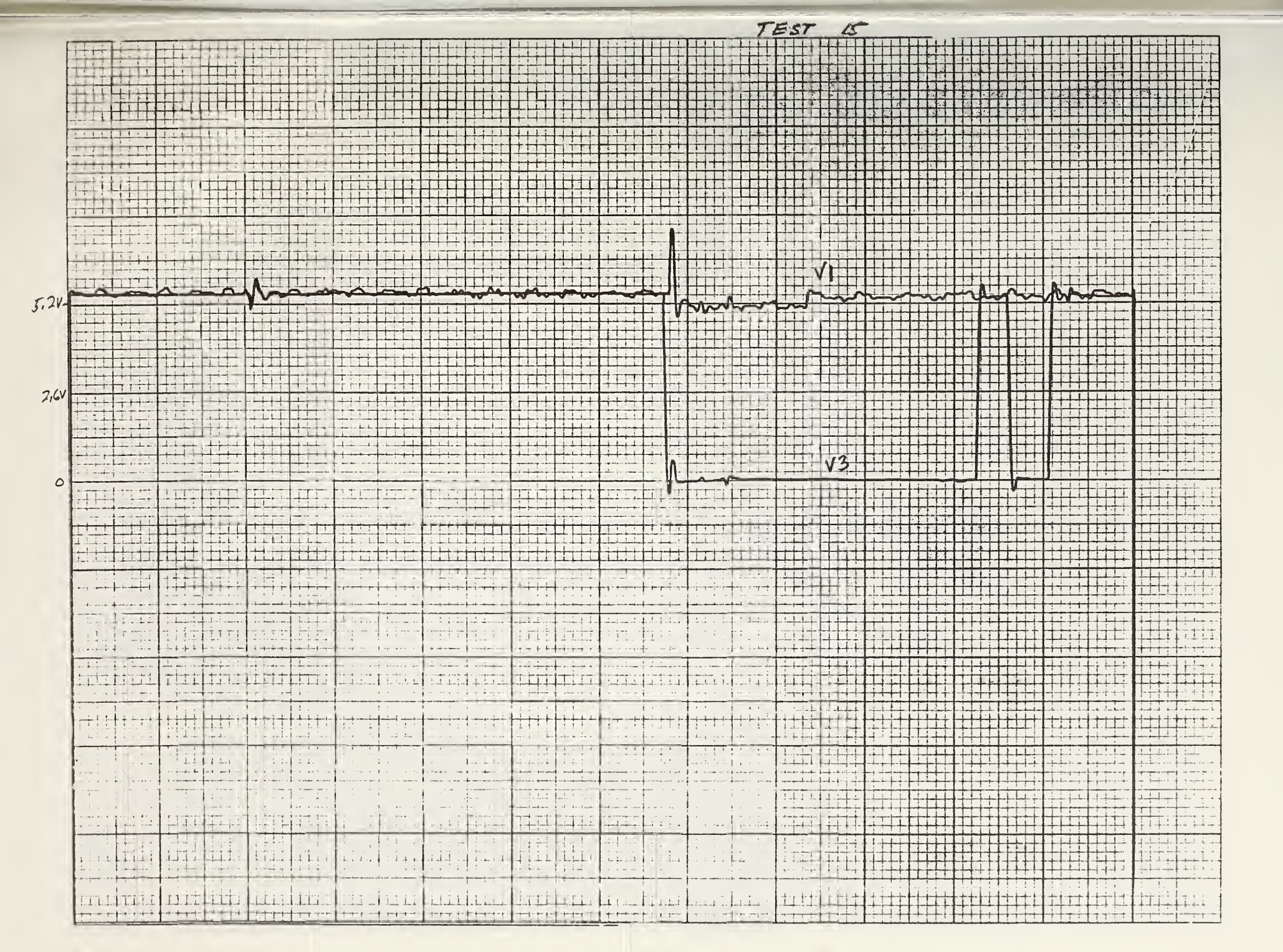

EFCXGR TEST 13
24.6 G
16.4G
8.2G
0
5.2
2.6V
0

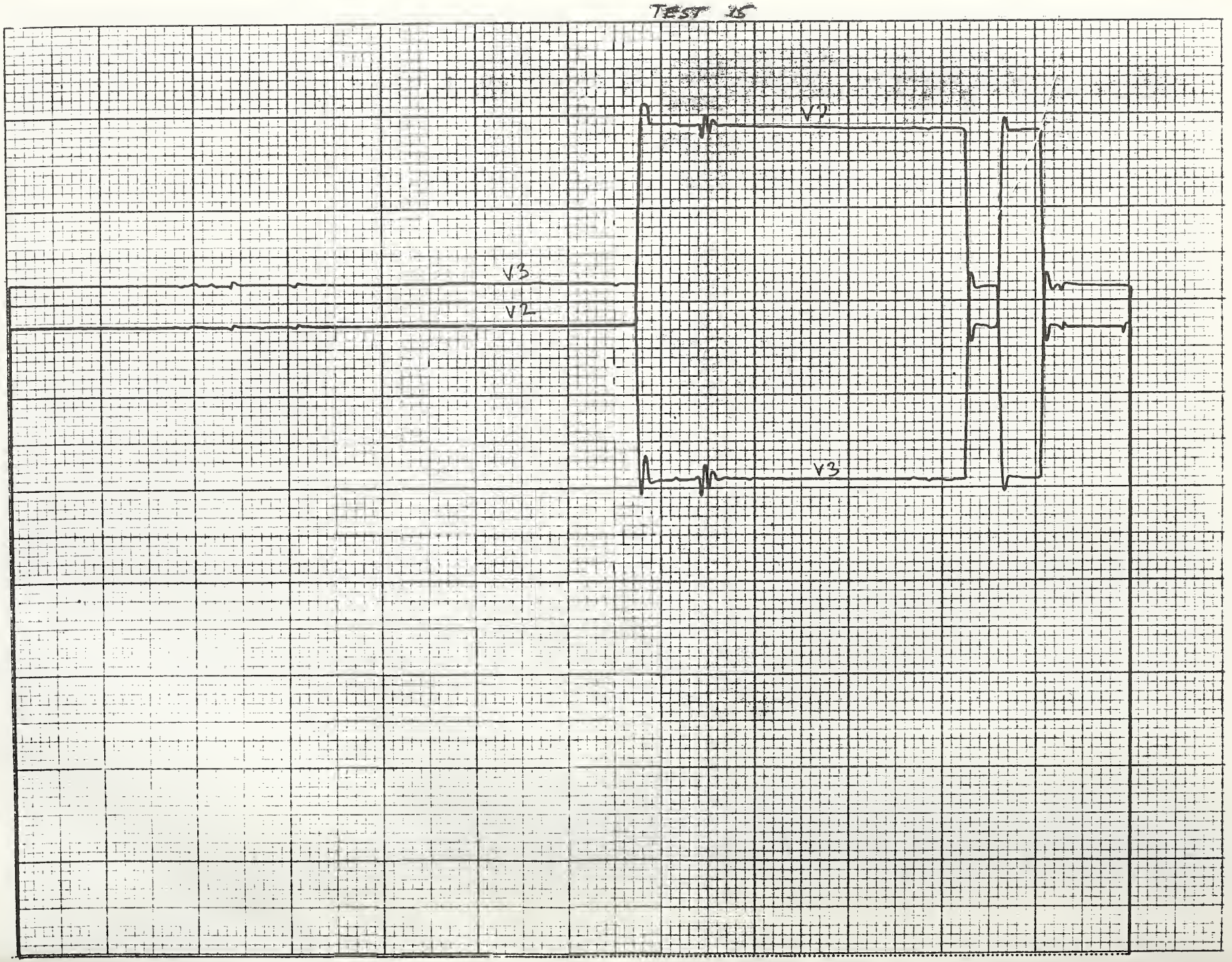

FFCXGL TEST 15
24.0G
16.0G
8.0G
0
5.2
2.6V
0
V3 OFFSET


SCAPG1
TEST 15
SCA
19.48
V3
5.2
7.24
26V
0


√3
24,726
-16,48 G
-8,24 G
0 G


LP
TEST 15
V3
LPCXG
33G
66
99


TEST 15
5.2V
2.6V
0
V1
V3


TEST 15
V3
V2
V2
V3

TEST 15