

NASA CR-144945-2

Part 2 of 4

A COMPILATION OF SPACECRAFT LOADS DATA
FROM
FOUR TITAN-CENTAUR LAUNCH VEHICLE FLIGHTS
VOLUME II

VIBRATION POWER SPECTRAL DENSITY ANALYSIS
OF LAUNCH AND MAX Q FLIGHT

Compiled by George Kachadourian

(NASA-CR-144945-Pt-2) A COMPILATION OF
SPACECRAFT LOADS DATA FROM FOUR TITAN
CENTAUR LAUNCH VEHICLE FLIGHTS. VOLUME 2, HC A58/ME A51
PART 2: VIBRATION POWER SPECTRAL DENSITY
ANALYSIS OF LAUNCH AND MAX Q FLIGHT (General G3/15 42477
N77-28183
Unclas

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INPUT BRANCH

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January 1977

VIBRATION PSD OF LAUNCH AND MAX Q FLIGHT DATA

SECTION 2

TC-1 LAUNCH WITH VIKING DYNAMIC SIMULATOR (VDS)

Launch Date February 12, 1974

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Description of Contents - Section 2 - TC-1 Data

This appendix presents PSD analyses of the parameters listed below. The objective of the analysis was to have data directly comparable to Viking flight data from TC-4 and TC-3. For this reason the data is presented in Viking nomenclature. The TC-1 FM/FM telemetry list is shown in Table 2.2. The corresponding measurement nomenclature between TC-1 and TC-4 & # is shown in Table 2.3. There will be frequency content differences in the comparison, first because the type of vibration sensors used were different and second because the IRIG VCO assignments were different. The Viking vibration sensors were all Endevco crystal sensors. The TC-1 used servo accelerometers with the exception of CY2010 which was a crystal vibration sensor.

As in all Viking data analyses two digitization rates were used: for TC-1 1024 & 8192 SPS were used; for TC-4 and 3,1024 and 4096 SPS were used. The higher rates were used to extract as much high frequency data as possible. Double standard IRIG filters (constant displacement) were used for the same reason. The change from 8192 to 4096 SPS was made in the interest of simplifying the data processing.

A special set of matched filters were used in all cases with the 1024 SPS data (see Table 2.2). This filter set limited the phase error to less than one degree for frequencies below 40 Hz between IRIG channels 9 through 18. The objective was to be able to read phase relationship between the measurements in this frequency range when the major structural loads would occur.

Parameters for Which Analyses were performed

Parameter	Description
CY1820 CY1830 CY1840 CY1850	Vibration measurements on the Viking Orbiter Bus; CY1830 is transverse, all others are longitudinal.
CY186S CY187S CY188S CY189S CY190S CY191S	Strain gage measurements, one on each of the six members of the Viking Lander Capsule Adapter (VLCA)
XDDL YDDL ZDDL	Acceleration of the Viking Lander Capsule (VLC) c.g. obtained through transformation of VLCA strain data assuming rigid VLC (Strain data is phase correlated to 40 Hz)
ZDDB	Average of phase correlated longitudinal vibration measurements.

Table 2.1 Data Analysis Matrix: TC-1 PSD Analyses

Event & Time	IRIG No. Sensor No.	18 CY- 1820	17 CY- 1830	16 CY- 1840	15 CY- 1850	14 CY- 186S	13 CY- 187S	12 CY- 188S	11 CY- 189S	10 CY- 190S	9 CY- 191S	$\ddot{x}_L$	$\ddot{y}_L$	$\ddot{z}_L$	$\ddot{z}_B$
Pre Ign. 49679.5-49681.5		X&Z	X&Z	X&Z	X&Z							X	X	X	X
Stg 0 Ign. -1 (T+0-T+2) 49681.7-49683.7		Z	Z	Z	Z							X	X	X	X
Stg 0 Ign. -2 (T+2-T+4) 49683.7-49685.7		Z	Z	Z	Z							X	X	X	X
Stg 0 Ign. -3 (T+4-T+6) 49685.7-49687.7		Z	Z	Z	Z							X	X	X	X
Stg 0 Ign. (5 sec. samp.) 49681.7-49686.7		X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁				
Max Q -1 (T+40.3 - 49722-49724 T+42.3)		Z	Z	Z	Z							X	X	X	X
Max Q -2 (T+44.3 - 49726-49728 T+46.3)		Z	Z	Z	Z							X	X	X	X
Max Q -3 (T+48.3 - 49730-49732 T+50.3)		Z	Z	Z	Z							X	X	X	X
Max Q (6 Sec. Samp.) 49724-49730 (T+42.3 - T+48.3)		X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁	X ₁

X = Power Spectral Density (PSD) analyses, 1024 sps, frequency resolution (Δf) = .50 HzX₁ = PSD, 1024 SPS, Δf = .50 & .25 HzZ = PSD, 8192 SPS, Δf = .50 Hz

Table 2.2 . VDS MEASUREMENT LIST CENTAUR FM/FM #2 2215.5 MHz

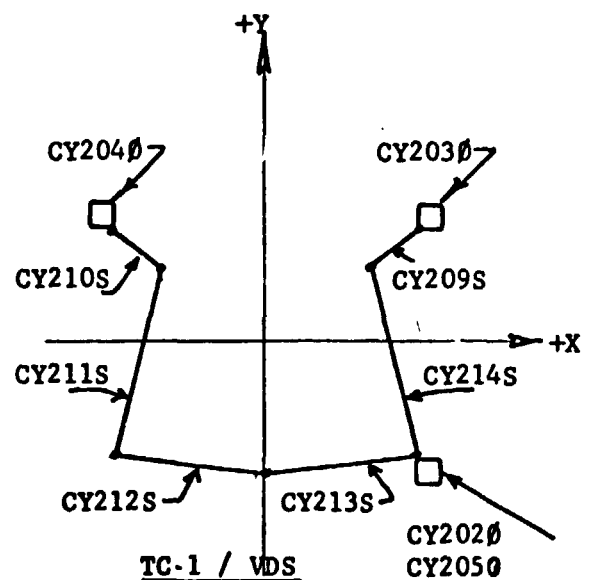
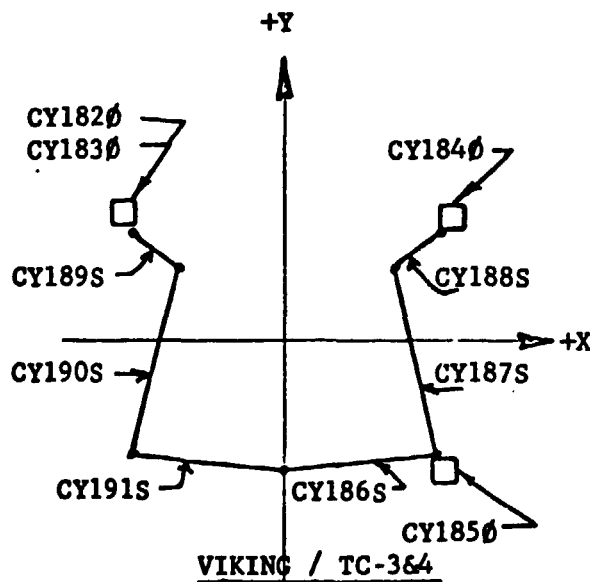
VCO Number	Measure-ment Number	Description	Zero Load Bias	Full Scale Range	Filter Cutoff Frequency (Hz)	
					A	B
3	CY216-S	V-S/C-A Axial Load Transducer	59%	25342 lbs	—	—
4	CY215-S	V-S/C-A Axial Load Transducer	59%	25331 lbs	—	—
5	CY208-φ	VODS Sprung Mass Z-Axis Accelerometer	20%	10.01 g's	—	—
6	CY207-φ	VODS Bus X-Axis Accelerometer	50%	10.00 g's	—	—
7	CY206-φ	VODS Bus Y-Axis Accelerometer	50%	9.99 g's	—	—
8	CY205-φ	VODS Bus Y-Axis Accelerometer	50%	10.01 g's	45	90
9	CY204-φ	VODS Bus Z-Axis Accelerometer	50%	20.00 g's	200	118
10	CY203-φ	VODS Bus Z-Axis Accelerometer	50%	19.98 g's	180	162
11	CY202-φ	VODS Bus Z-Axis Accelerometer	50%	20.00 g's	160	—
12	CY214-S	PFLA Truss Axial Load, Member 202	59.6%	27177 lbs	153	—
13	CY213-S	PFLA Truss Axial Load, Member 203	61.0%	27192 lbs	145	—
14	CY212-S	PFLA Truss Axial Load, Member 204	61.1%	27157 lbs	140	—
15	CY211-S	PFLA Truss Axial Load, Member 205	59.2%	26636 lbs	137	—
16	CY210-S	PFLA Truss Axial Load, Member 206	60.1%	27175 lbs	135	—
17	CY209-S	PFLA Truss Axial Load, Member 201	61.6%	27319 lbs	134	—
18	CY201-φ	Piezoelectric Accelerometer, Z-Axis	50%	40.0 g's	133	2100
19	CY217-Y	Acoustic Microphone	50%	150.0 dB	—	2800
CENTAUR FM/FM #1 2208.5 MHz						
19	CA886Y	Acoustic Microphone Fwd Equip Comp	50%	150.0 db	—	—

A. Filter set used with 1024 sps digitization rate. Design for minimum phase error (below 40 Hz) between channels 9 through 18.

B. Filter set used with 8192 sps digitization = double standard IRIG

**TABLE 2.3 MEASUREMENTS CORRESPONDENCE
VIKING SPACECRAFT TO VDS**

VIKING (TC-4 & 3)		VDS (TC-1)	
IRIG NO.	SENSOR	SENSOR	IRIG NO.
9	CY191S	CY212S	14
10	CY190S	CY211S	15
11	CY189S	CY210S	16
12	CY188S	CY209S	17
13	CY187S	CY214S	12
14	CY186S	CY213S	13
15	CY185Ø	CY201Ø	18
16	CY184Ø	CY203Ø	10
17	CY183Ø	CY205Ø	8
18	CY182Ø	CY204Ø	9



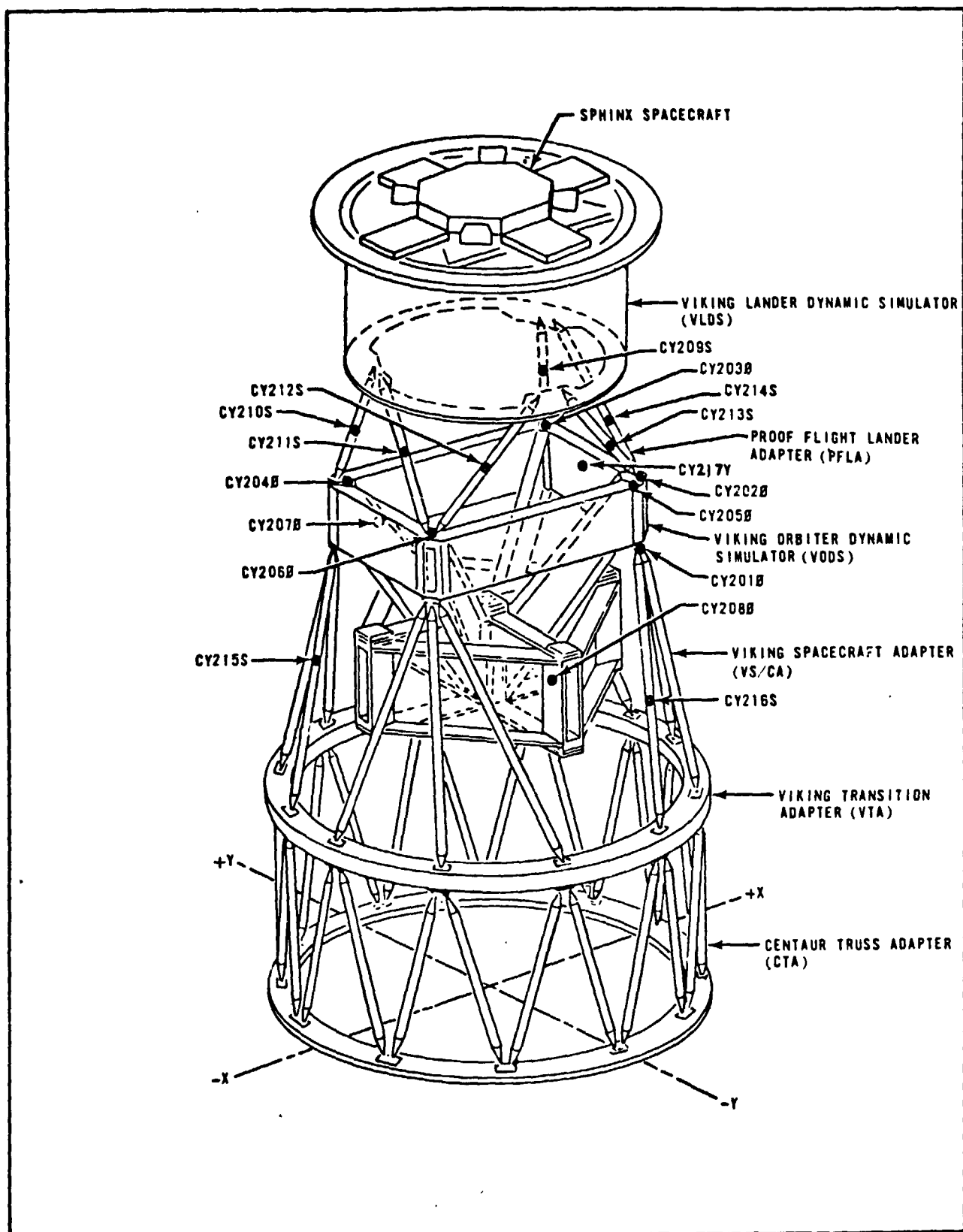
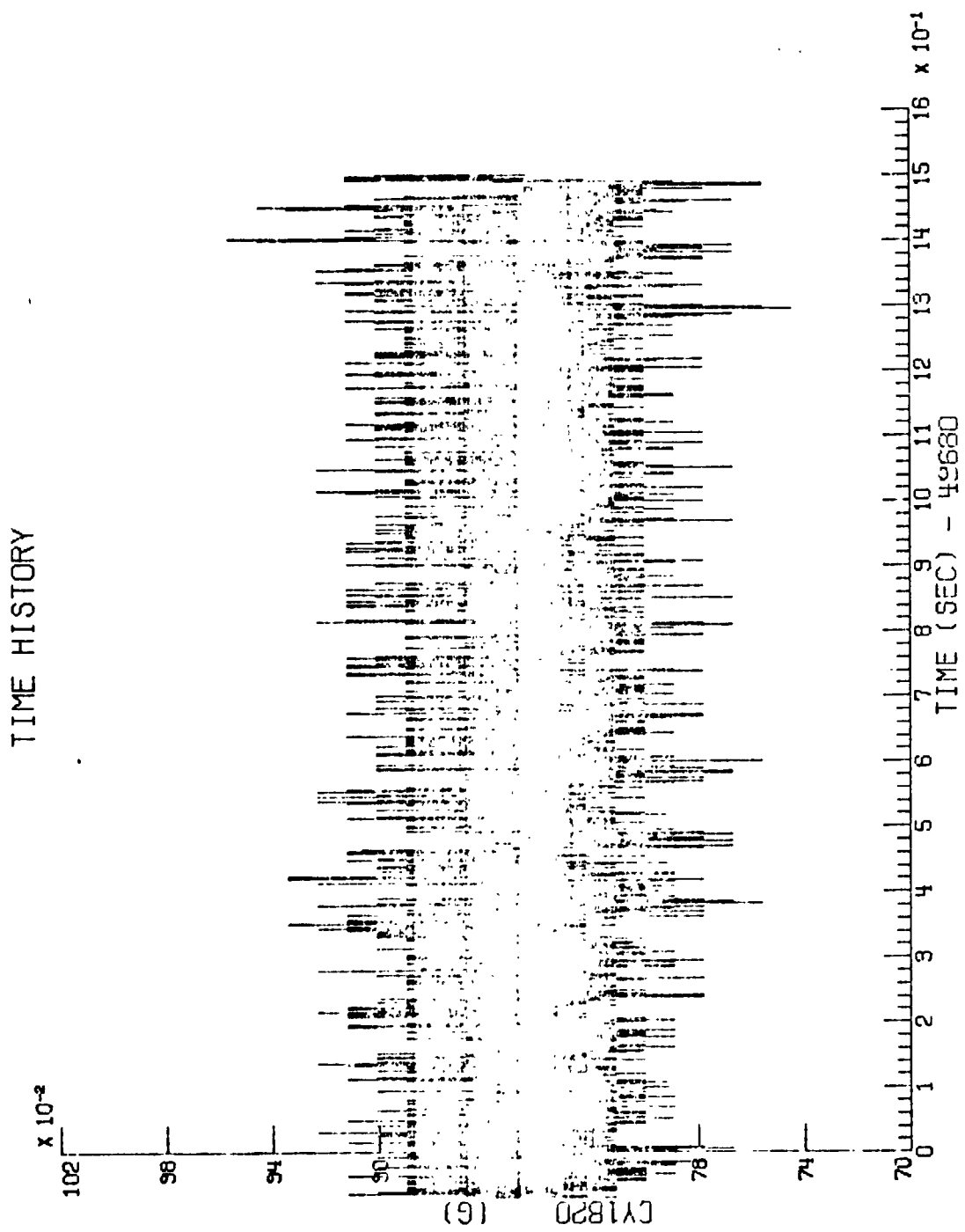


Figure 2.1 Viking Dynamic Simulator Instrumentation

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MAX = .956

MIN = .744

CV1820

PRE-IGNITION

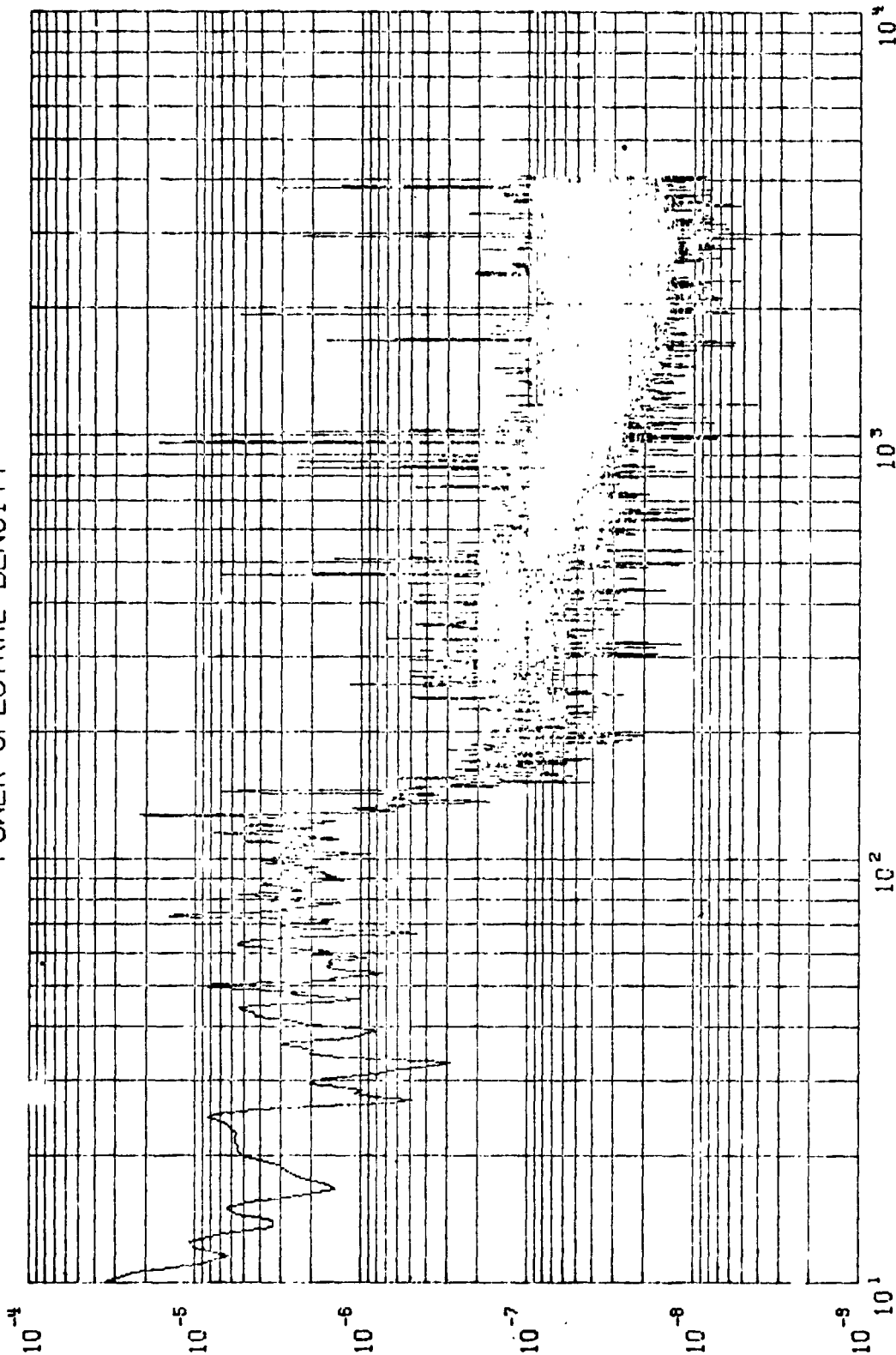
(8192 SPS)

TC-1 VDS DATA (LRC-3A)

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Figure 2.2a

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$

START = 49679.931 SEC

STOP = 49681.500 SEC

MEAN = 83972×10^{-5}

$\sigma^2 = 76095 \times 10^{-8}$

$\sigma = 27585 \times 10^{-6}$

$3\sigma = 82756 \times 10^{-6}$

TC-1/VDS DATA (LRC-3A)

PRE-IGNITION

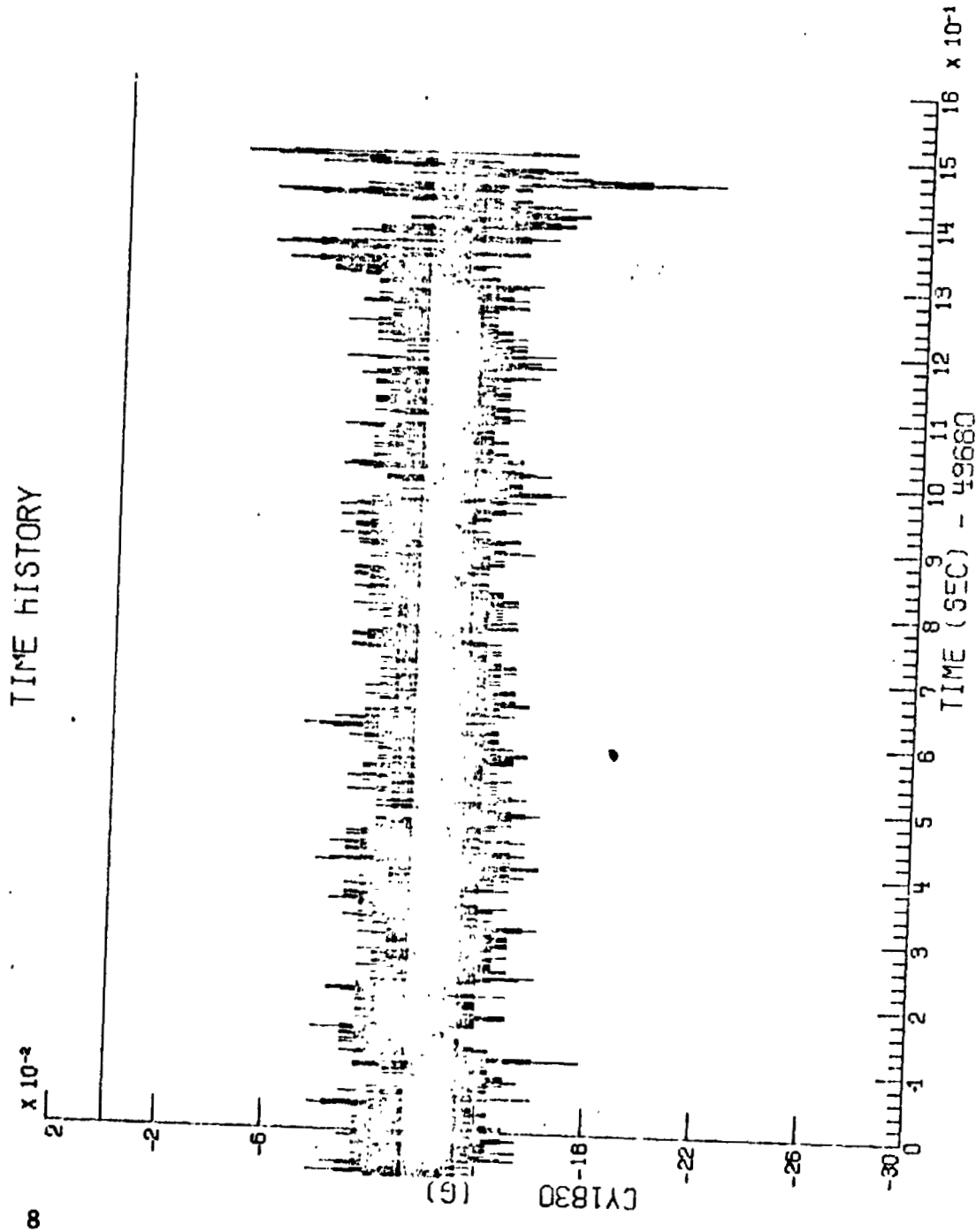
CY1820

(8192 SPS)

Figure 2.2b

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MAX = -.044

MIN = -.222

TC-1 / VDS DATA (LRC-3A)

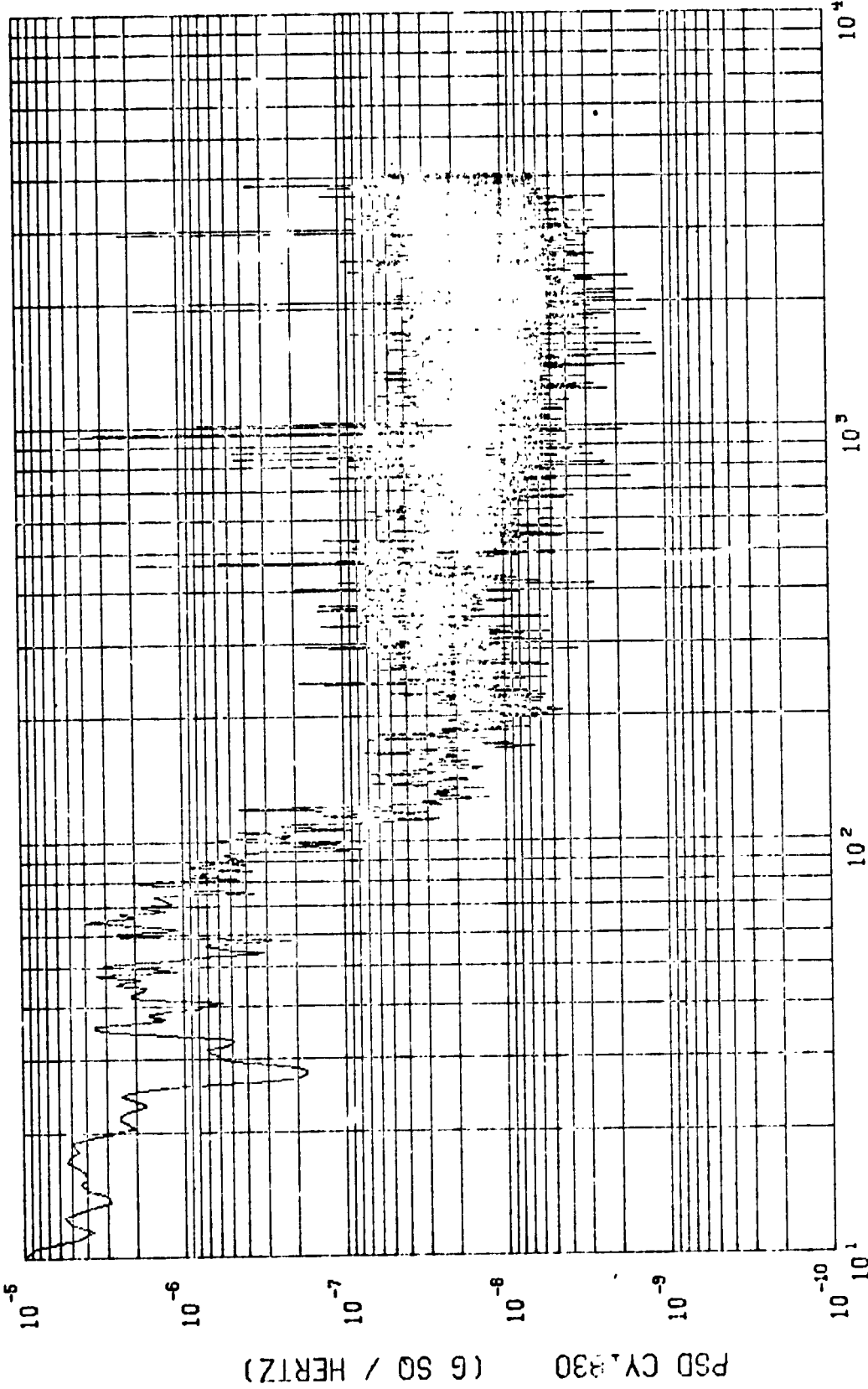
PRE-IGNITION

CY1830

NASA-JSC/STV SIGNAL ANALYSIS PROGRAM 07/29/75

(8192 SPS) Figure 2.3a

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49679.931 SEC

STOP = 49681.500 SEC

MEAN = -12322×10^{-5}

$\sigma^2 = 2^{+107} \times 10^{-5}$

$\sigma = 1705 \times 10^{-5}$

$3\sigma = 51182 \times 10^{-6}$

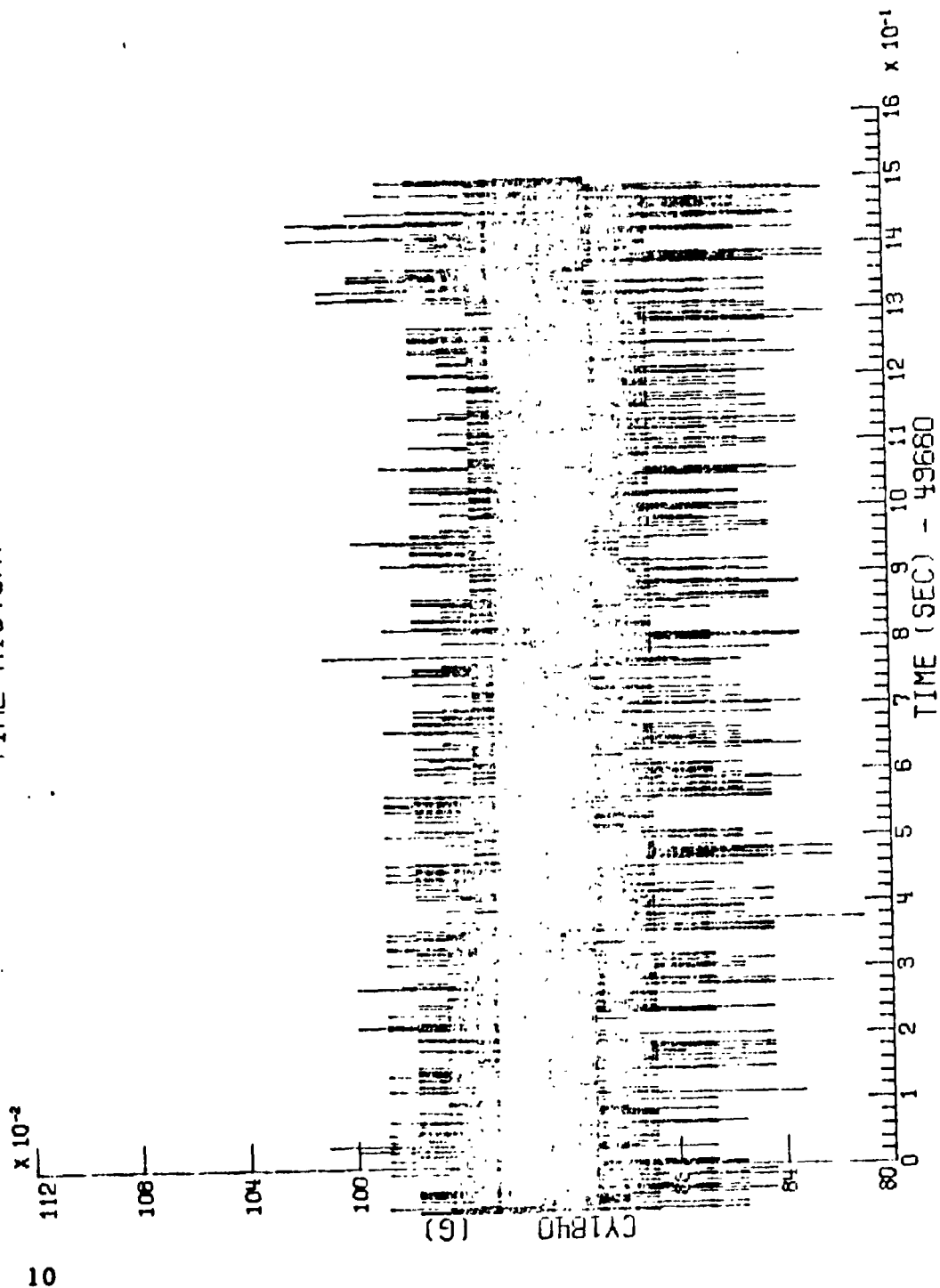
TC-1 / VDS DATA (LRC-3A)

PRE-IGNITION

CV1830

(8192 SPS) Figure 2.3b

TIME HISTORY



MIN = .810

MAX = 1.021

CY1840

PRE-IGNITION

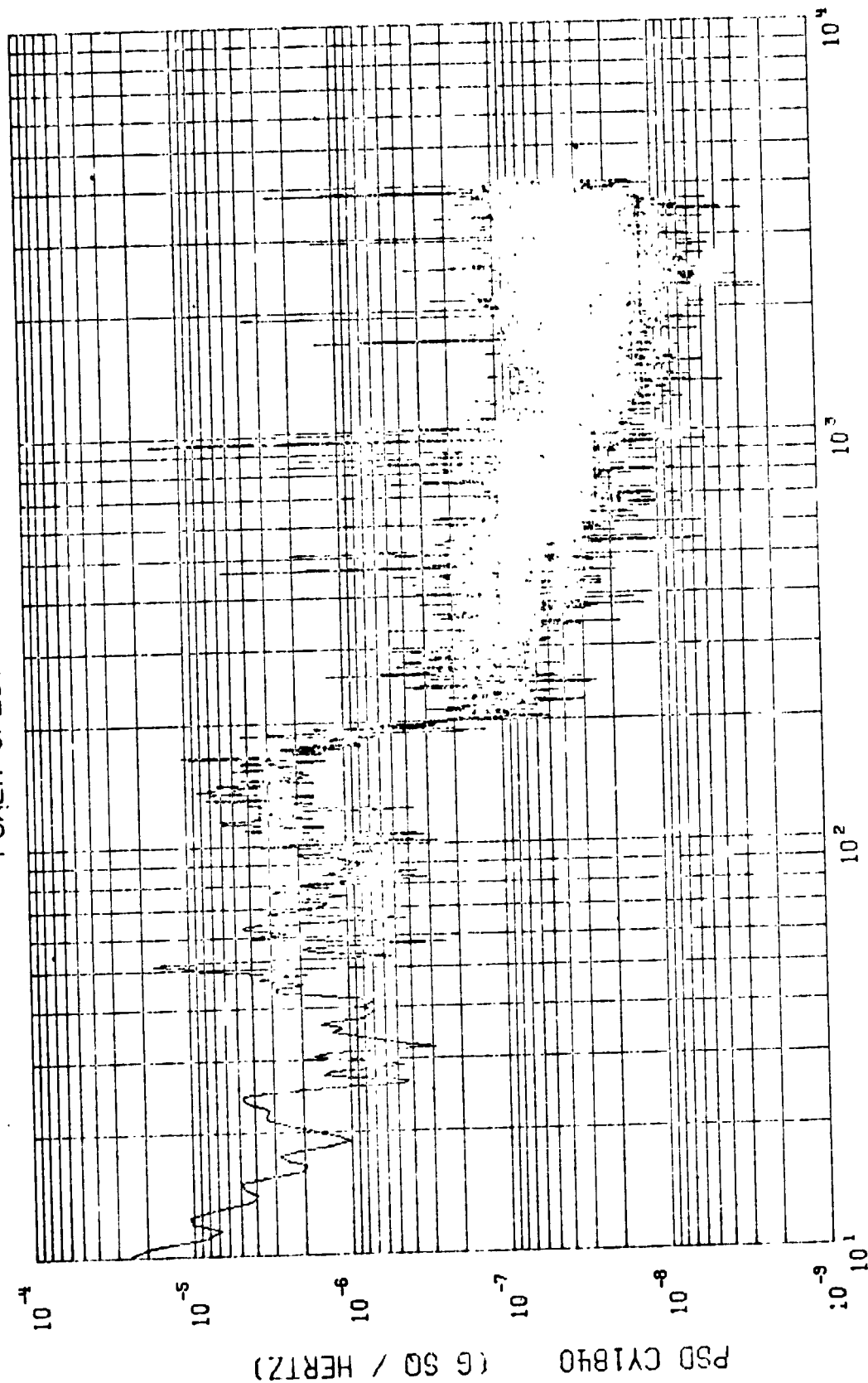
(8192 SPS)

TC-1/VDS DATA (LRC-3A)

Figure 2.4a

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

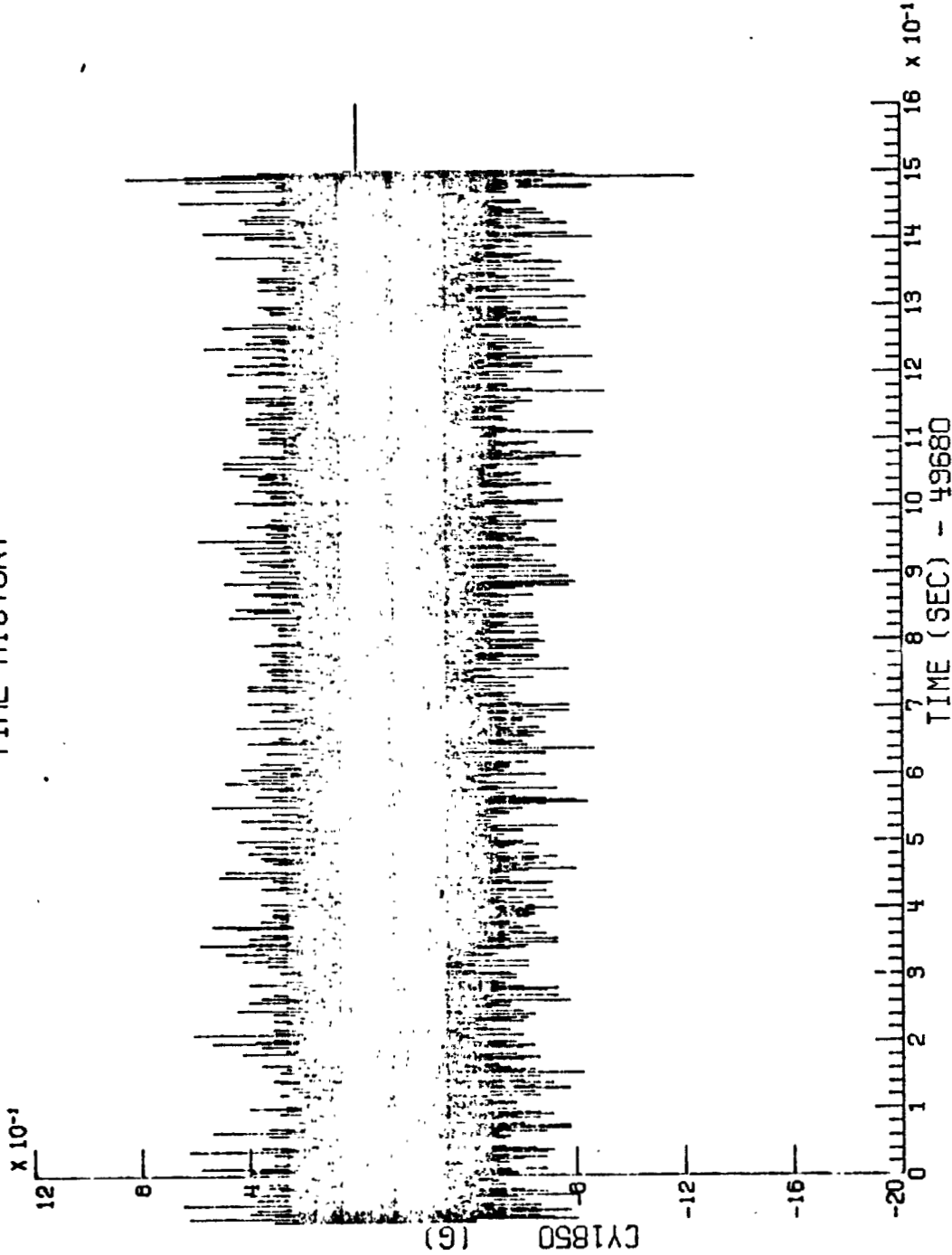
POWER SPECTRAL DENSITY



$\Delta F = .500$
 $MEAN = 92292 \times 10^{-5}$ $\sigma^2 = 77399 \times 10^{-6}$ $\sigma = 2782 \times 10^{-5}$ $3\sigma = 83462 \times 10^{-5}$
 $START = 43679.931 \text{ SEC}$ $STOP = 49681.500 \text{ SEC}$
 TC-1/VDS DATA (LRC-3A) PRE-IGNITION CV1840
 (9192 SPS) Figure 2.4b

ORIGINAL PAGE IS
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TIME HISTORY



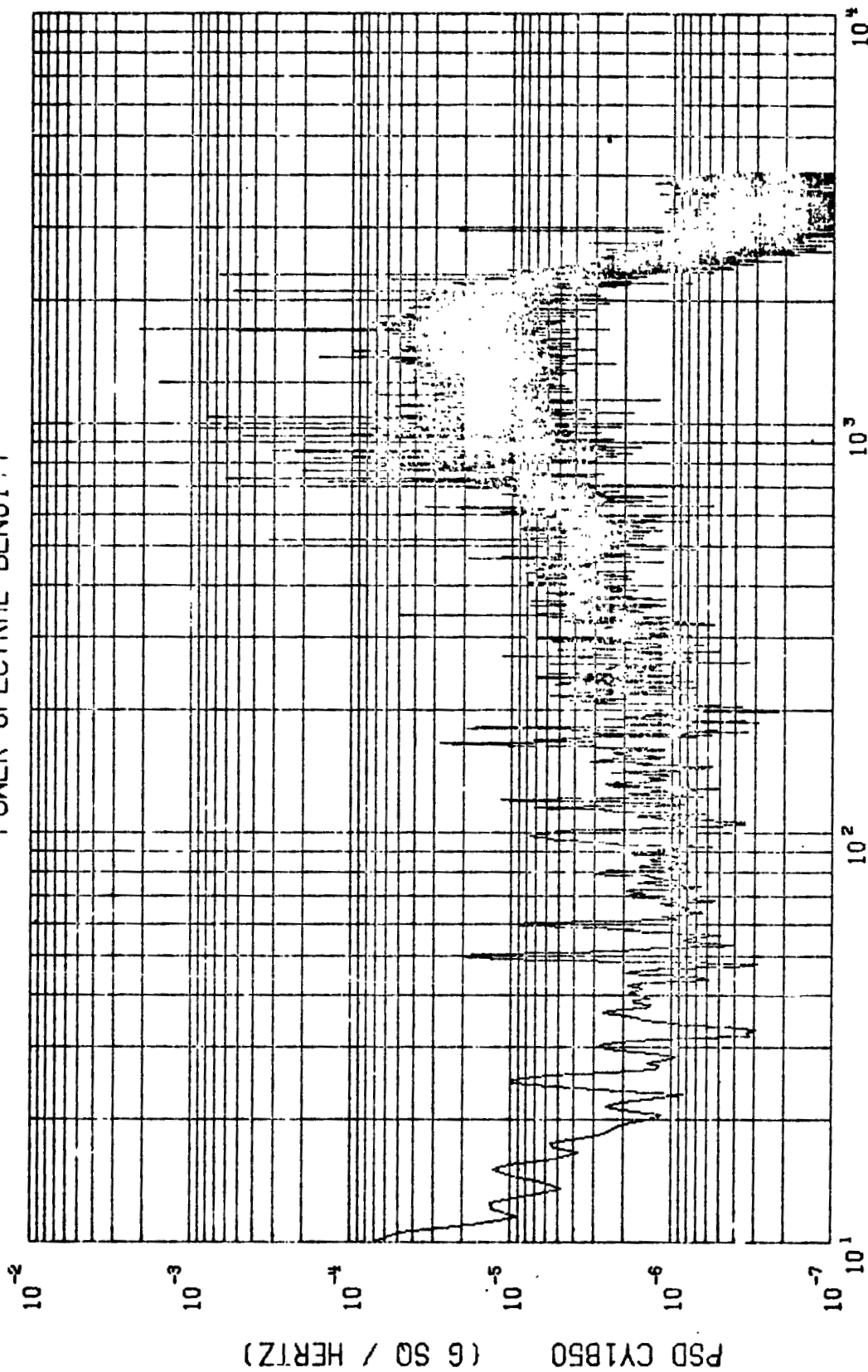
MIN = -1.244

MAX = .844

TC-1 / VDS DATA (LRC-3A)
PRE-IGNITION
(8192 SPS)
CY1850
Figure 2.5a

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POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$

START = 49679.931 SEC

STOP = 49681.500 SEC

MEAN = -12726×10^{-5}

$\sigma^2 = 43044 \times 10^{-5}$

$\sigma = 20747 \times 10^{-5}$

$3\sigma = 62241 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

PRE-IGNITION

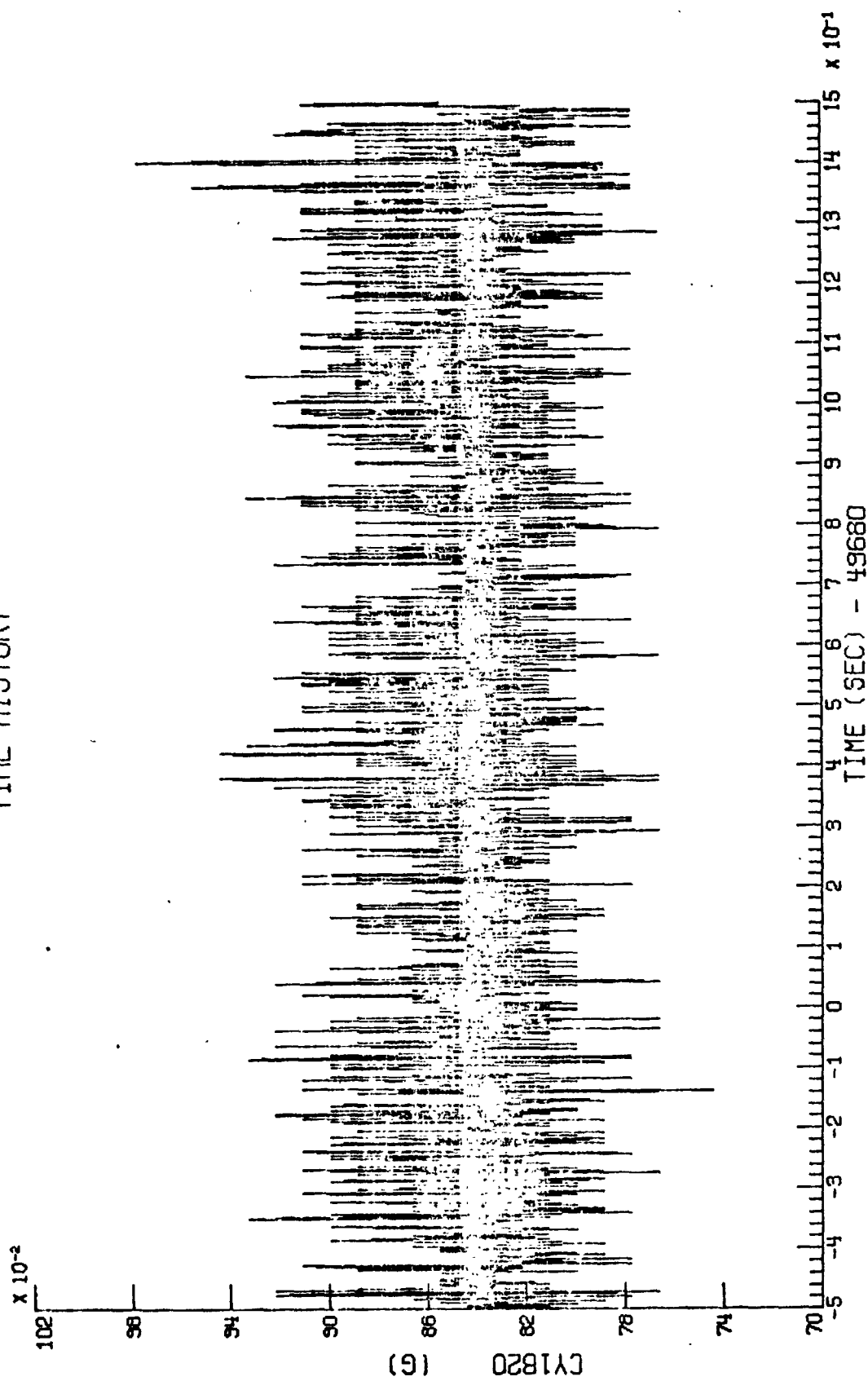
CY1850

(0192 SPS)

Figure 2.5b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

TIME HISTORY



MAX = .977

MIN = .744

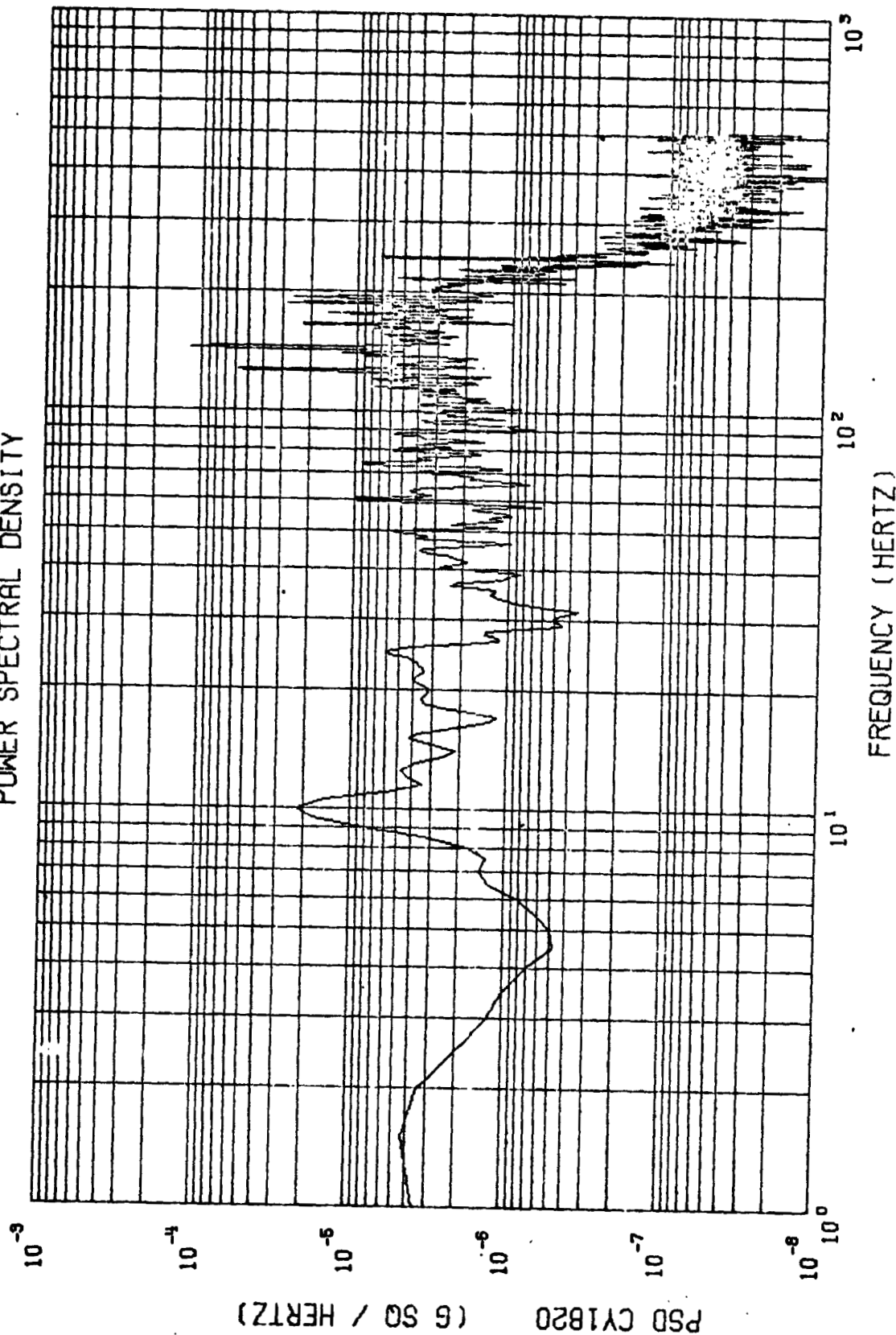
TC-1/VDS DATA (LRC-3A)

PRE-IGNITION

CY1820

(1024 SPS) Figure 2.6a

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49679.500 SEC

STOP = 49681.500 SEC

MEAN = 84134×10^{-5}

$\sigma^2 = 11391 \times 10^{-7}$

$\sigma = 3375 \times 10^{-5}$

$3\sigma = 10125 \times 10^{-5}$

TC-1/ VDS DATA (LRC-3A)

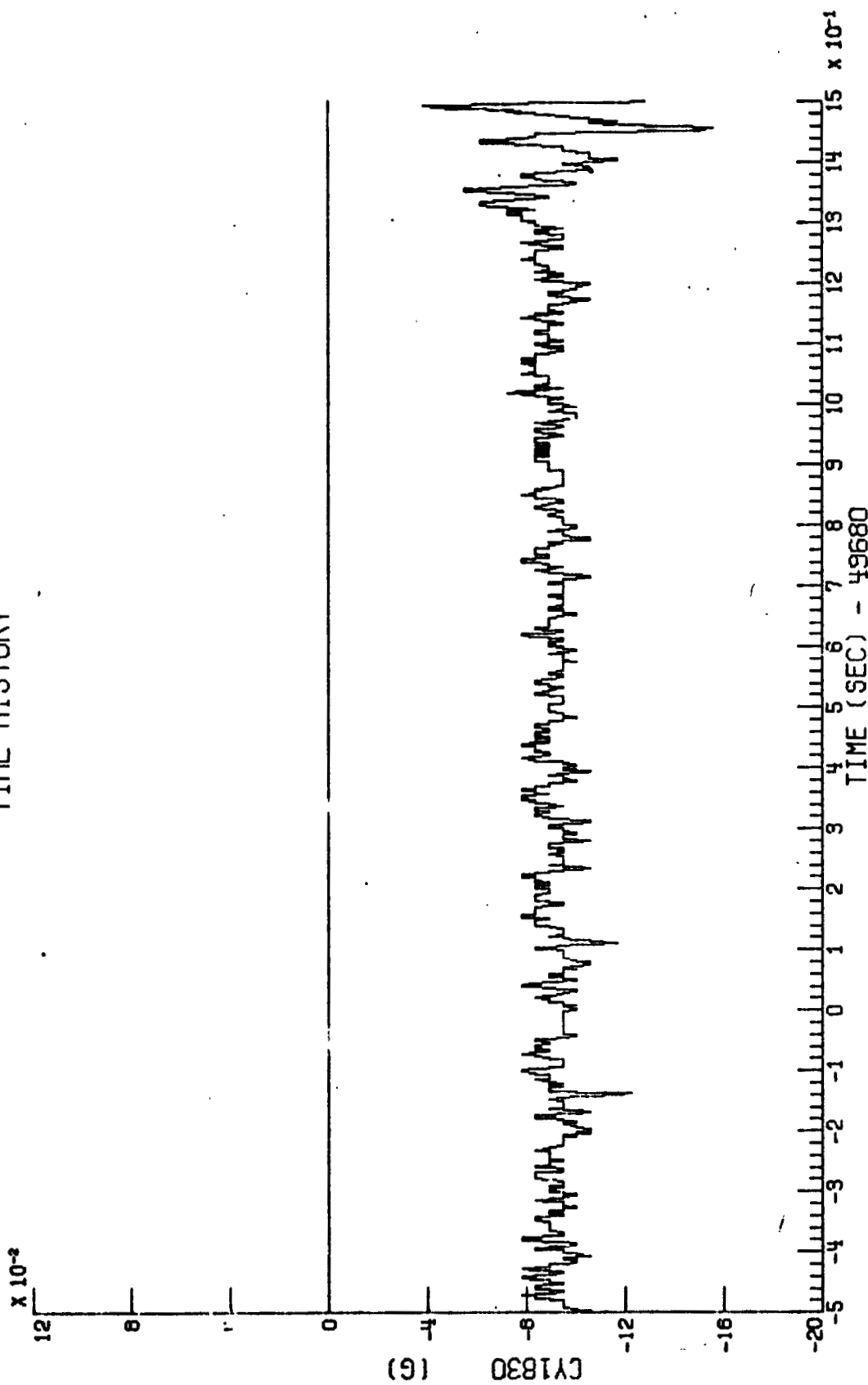
PRE-IGNITION

CY1820

(1024 SPS) Figure 2.6b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY



MAX = --.038

MIN = --.155

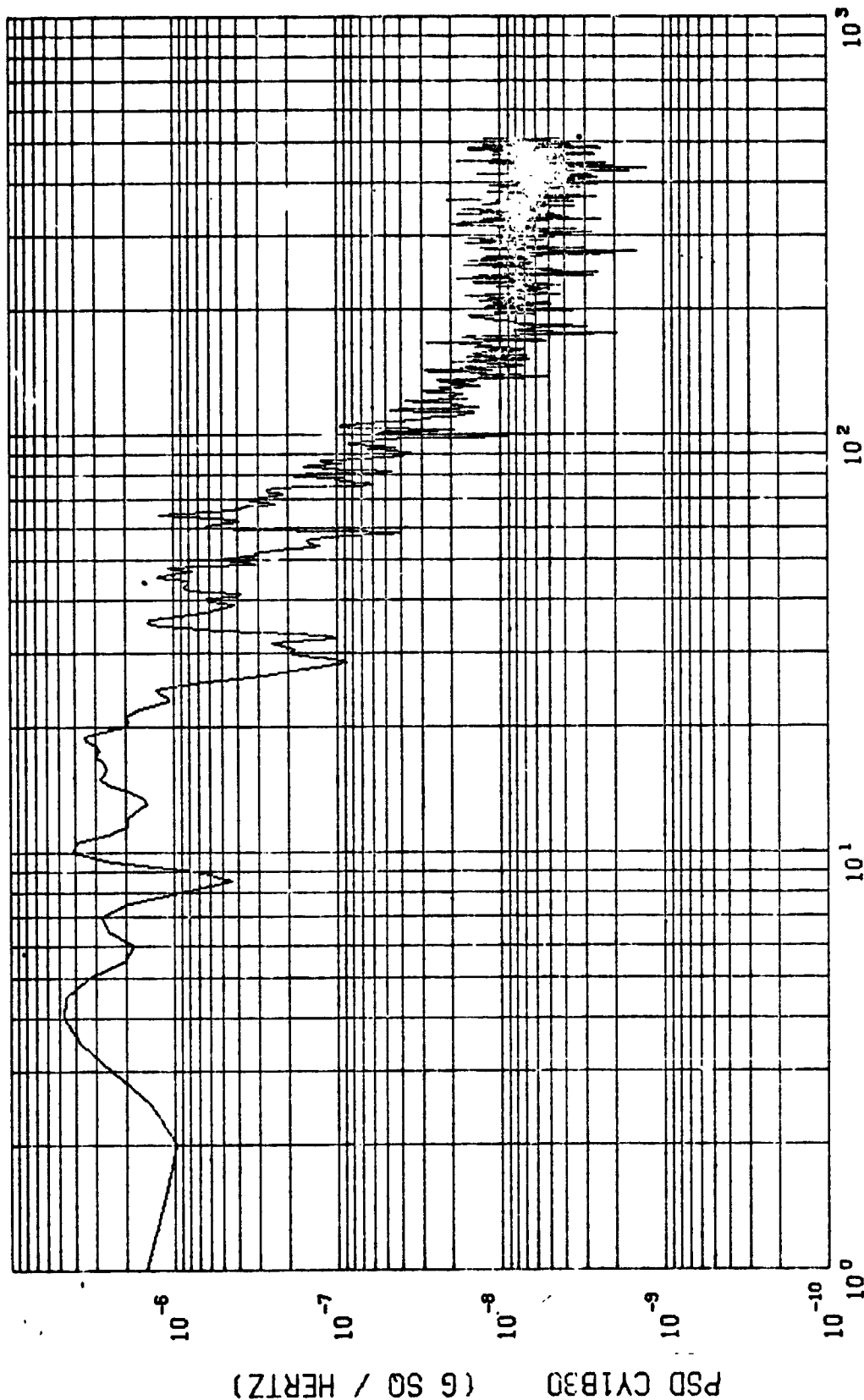
TC-1/VDS DATA (LRC-3A)

PRE-IGNITION

(1024 SPS)

CY1830

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49679.500 SEC

STOP = 49681.500 SEC

MEAN = -90546×10^{-6}

$\sigma^2 = 84793 \times 10^{-3}$

$\sigma = 92083 \times 10^{-7}$

$3\sigma = 27625 \times 10^{-6}$

TC-1 / VDS DATA (LRC-3A)

PRE-IGNITION

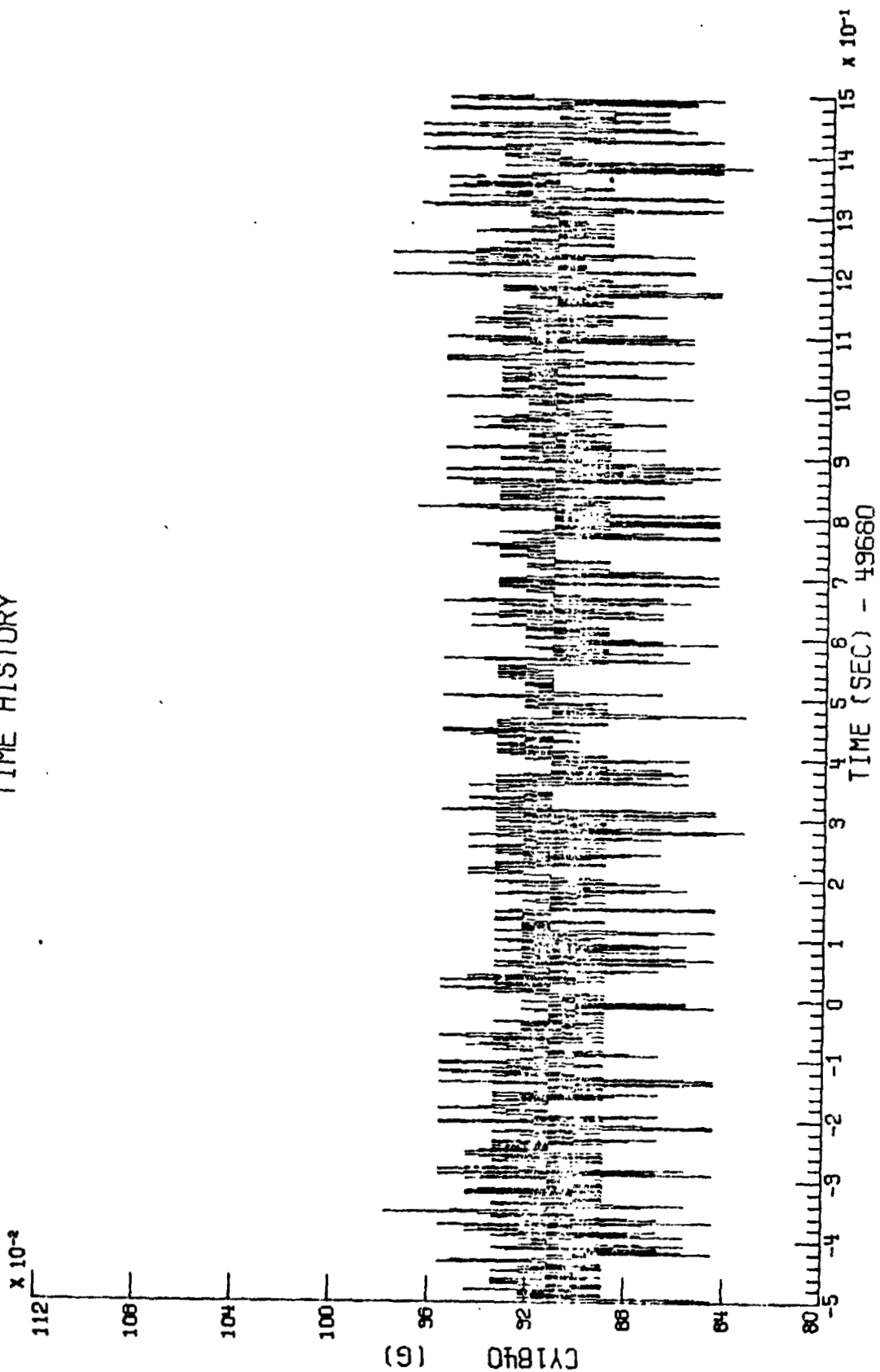
CY1830

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

(1024 SPS)

Figure 2.7b

TIME HISTORY



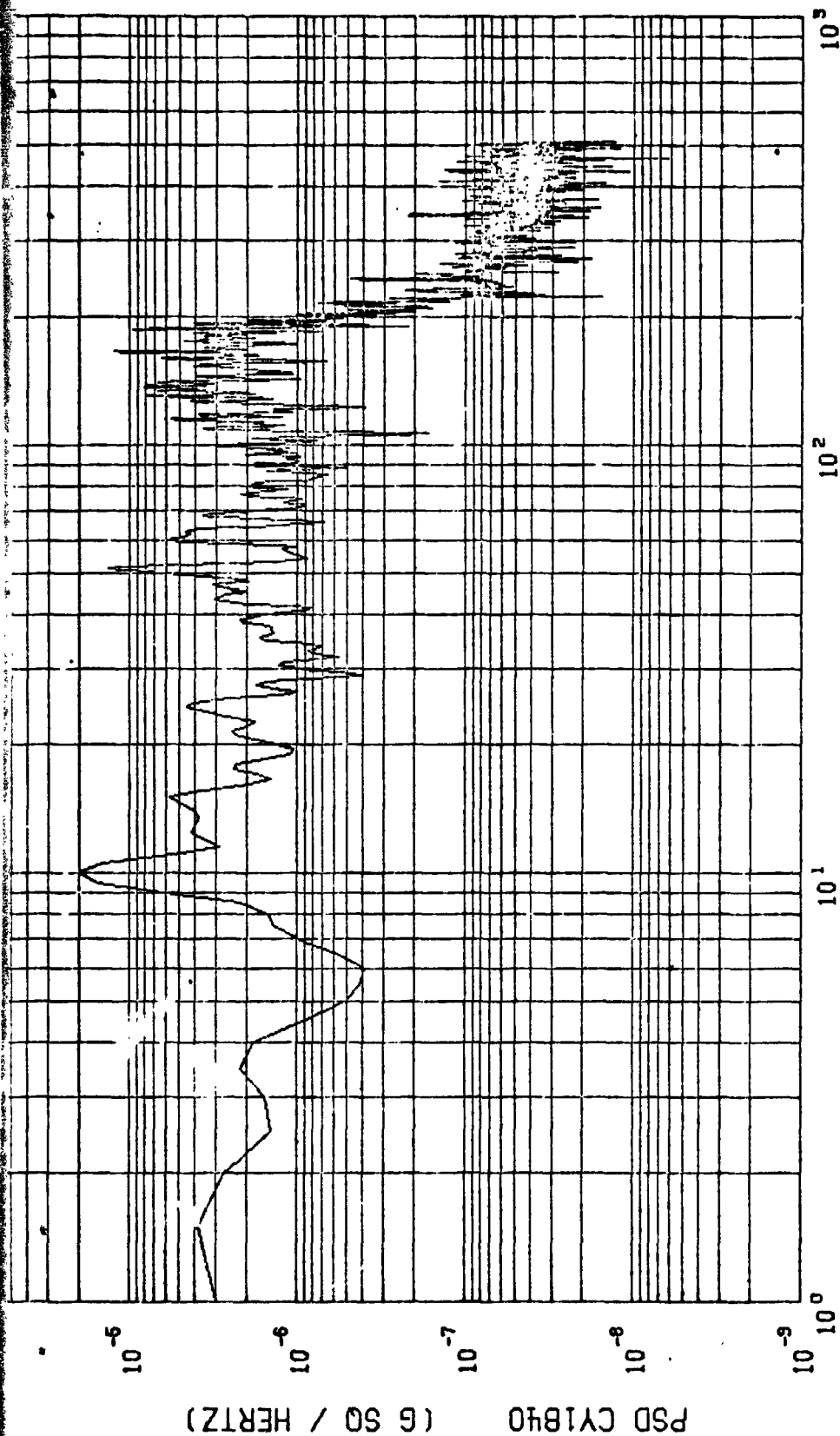
MAX = .977

MIN = .833

TC-1 / VDS DATA (LRC-3A)

PRE-IGNITION

CY1840



FREQUENCY (HERTZ)

$\Delta F = .500$ START = 49679.500 SEC STOP = 49681.500 SEC
 MEAN = 9092×10^{-4} $\sigma^2 = 52964 \times 10^{-6}$ $\sigma = 23013 \times 10^{-5}$ $3\sigma = 69041 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

PRE-IGNITION CY1840

(1024 SPS) Figure 2.8b

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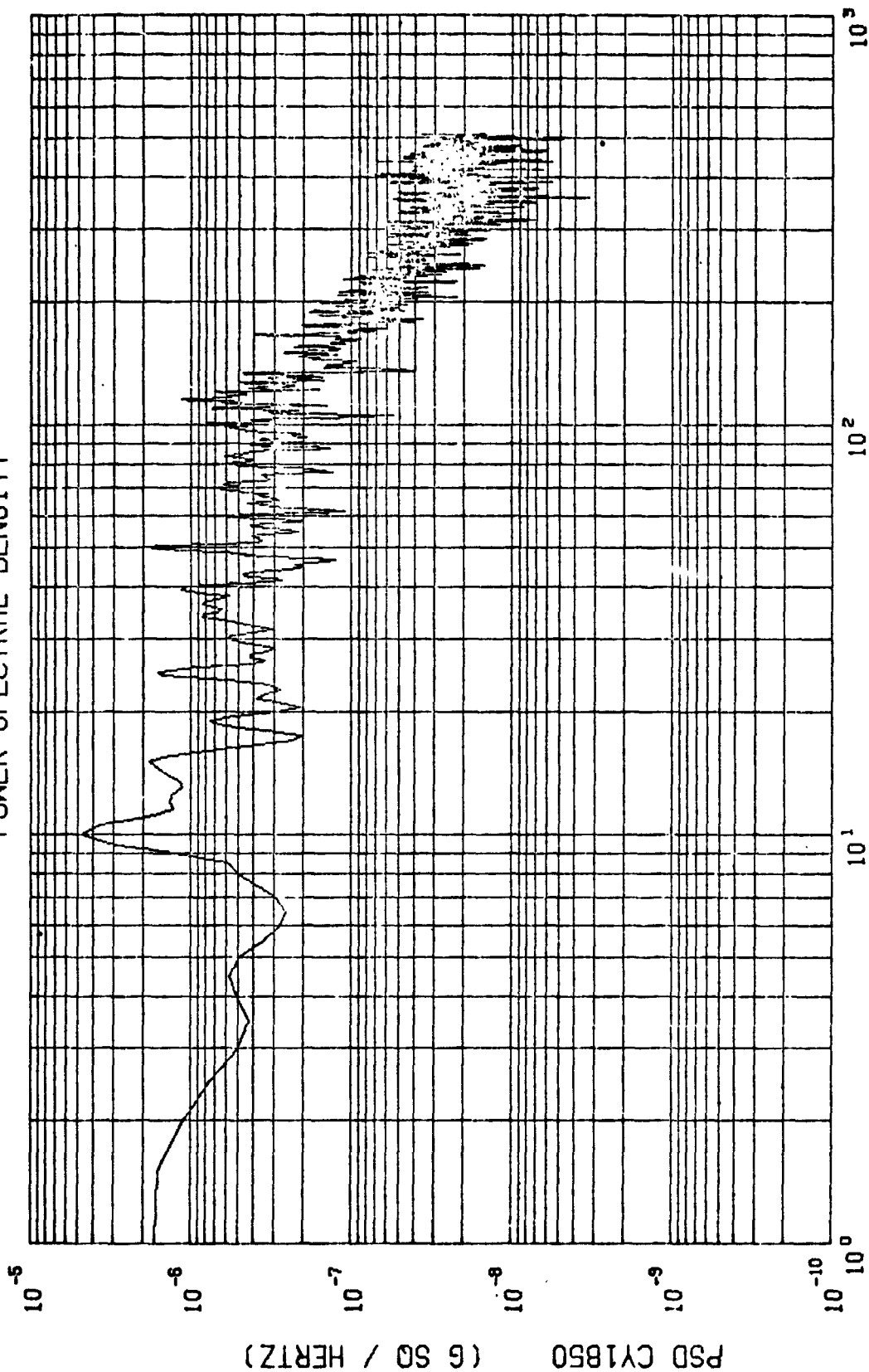
TC-1 / VDS DATA (LRC-3A)

PRE-IGNITION CY1850

(1024 SPS) Figure 2.9a

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POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$
 $MEAN = -19098 \times 10^{-7}$
 $\sigma^2 = 89002 \times 10^{-7}$
 $\sigma = 94341 \times 10^{-4}$
 $3\sigma = 28302 \times 10^{-6}$

START = 49679.500 SEC

STOP = 49681.500 SEC

TC-1 / VDS DATA (LRC-3A)

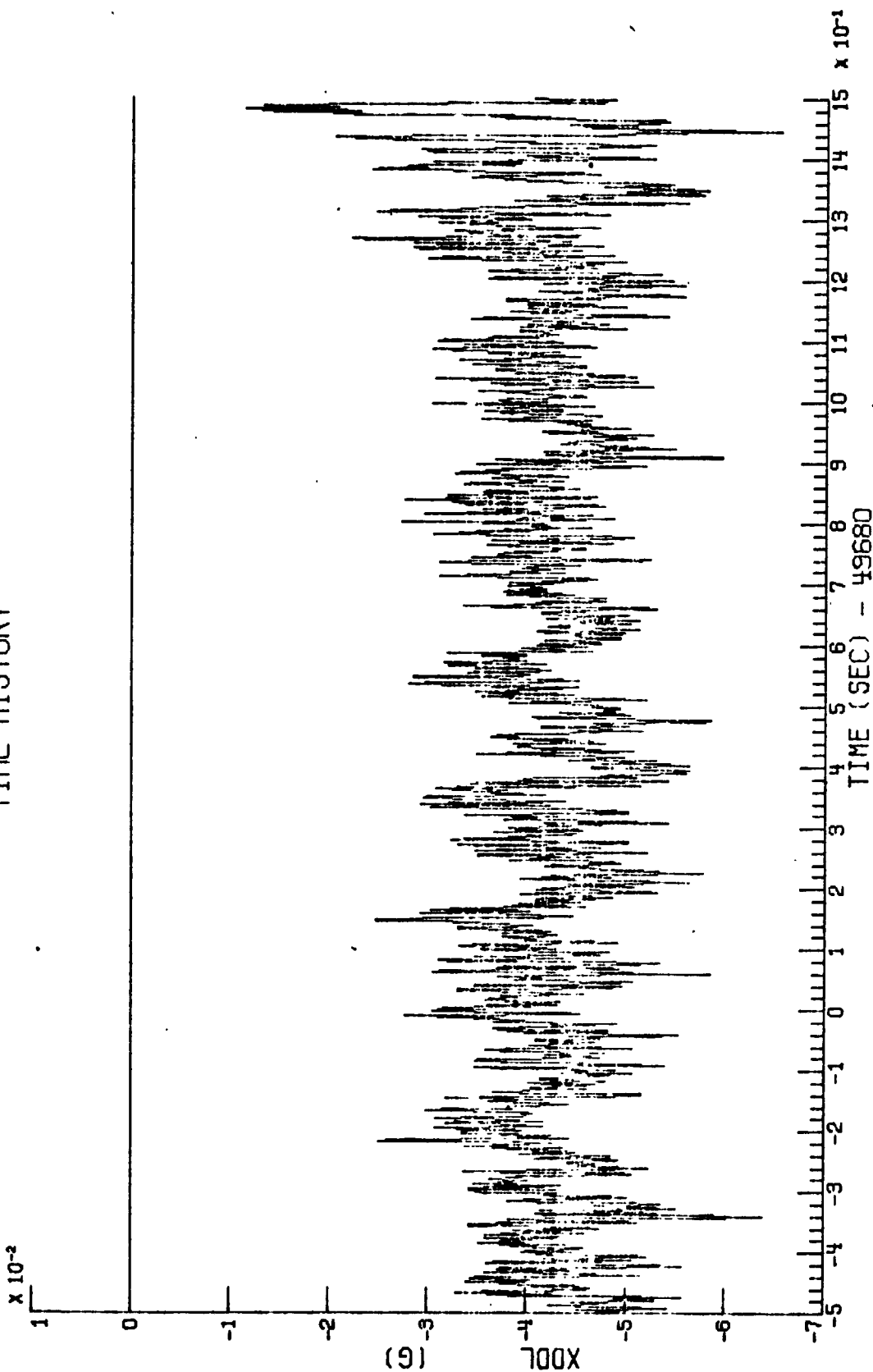
PRE-IGNITION

CY1850

(1024 SPS) Figure 2.9b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY



MAX = -.011

MIN = -.065

TC-1 / VDS DATA (LFC-3A)

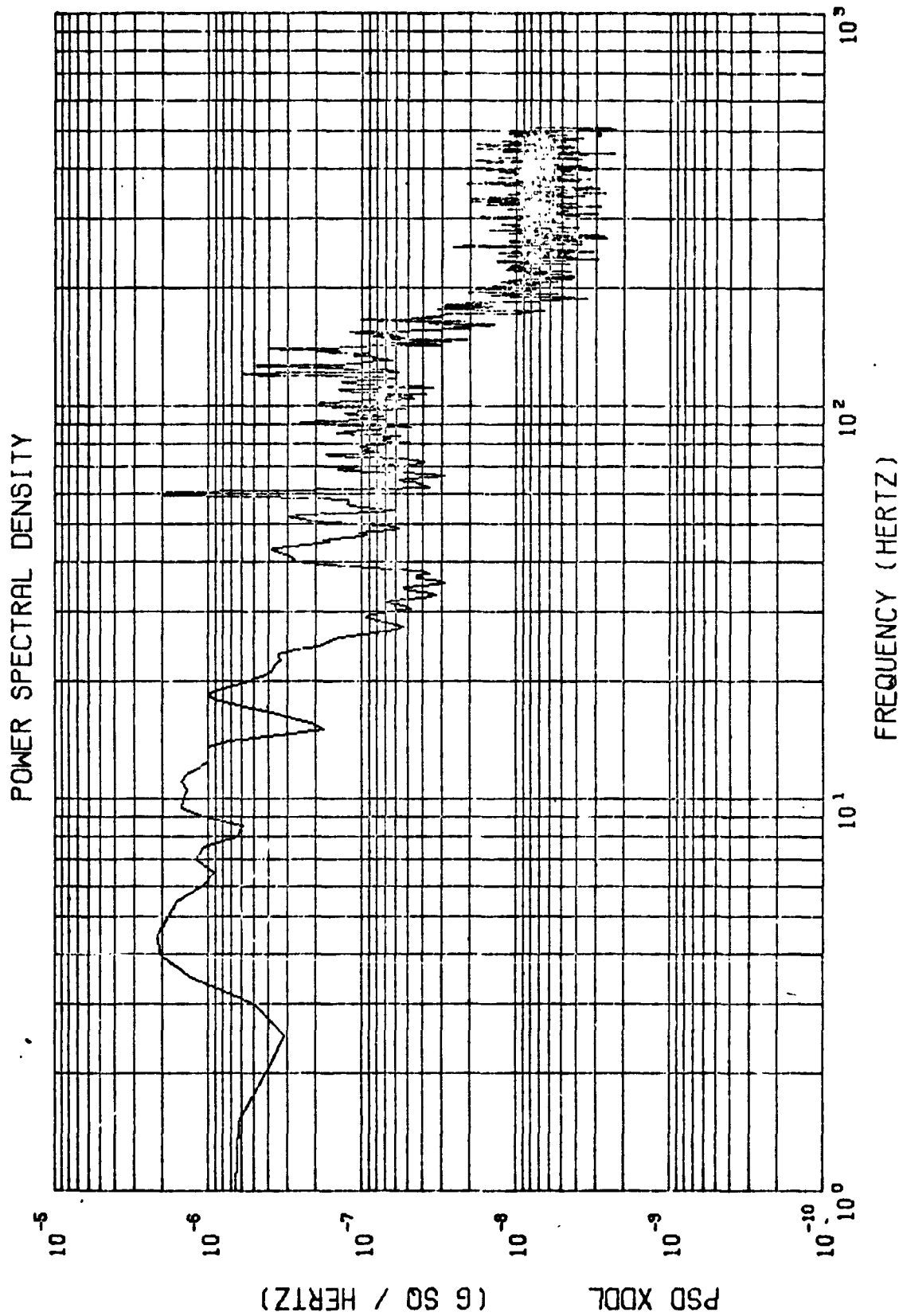
PRE-IGNITION

XDDL

(1024 SPS)

NGSA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

Figure 2.10a



$\Delta F = .500$
 $\text{MEAN} = -41885 \times 10^{-6}$
 $\sigma^2 = 41562 \times 10^{-9}$
 $\sigma = 64469 \times 10^{-7}$
 $3\sigma = 1934 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A) PRE-IGNITION XDDL
 (1024 SPS)

07/23/75

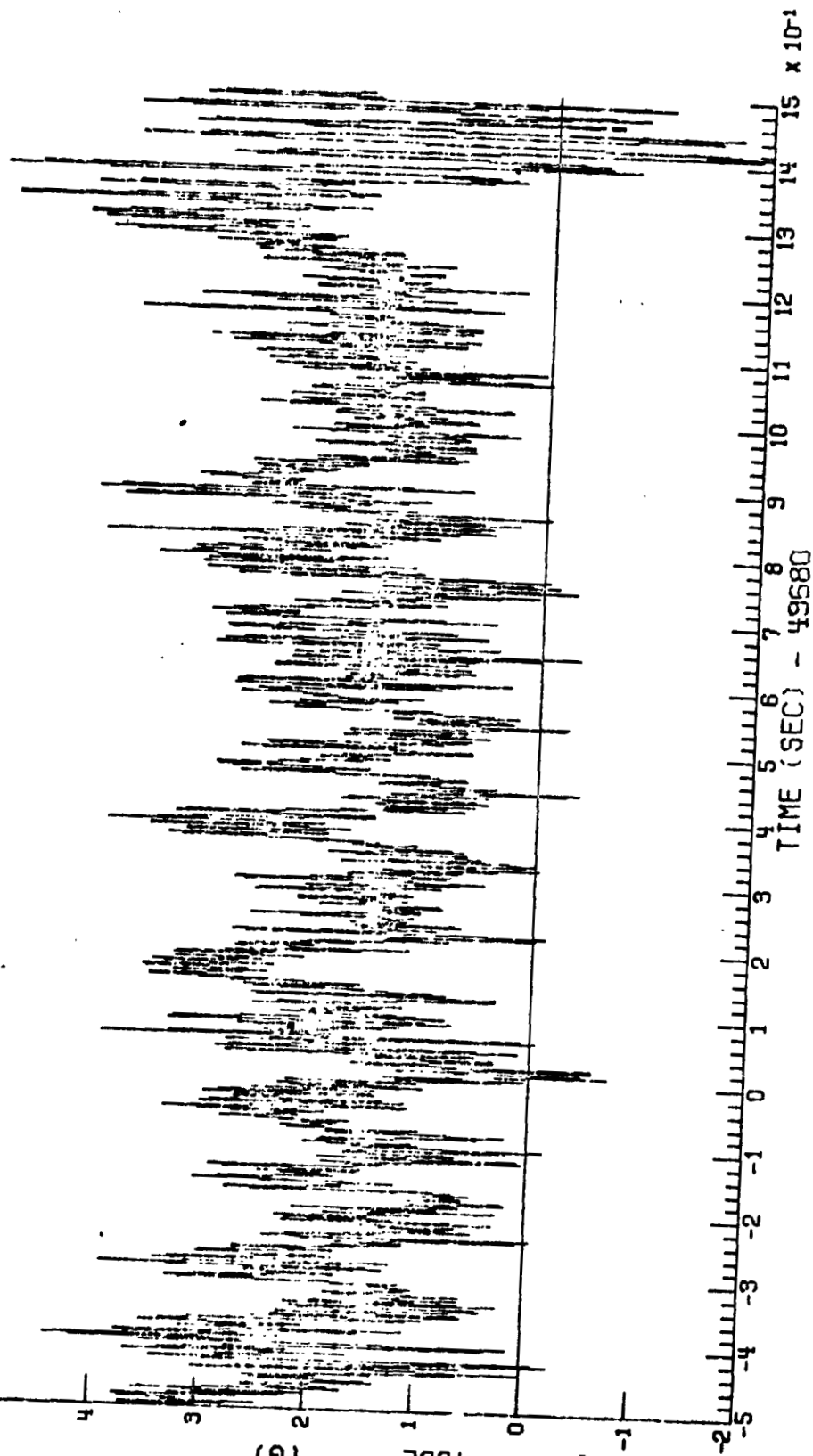
Figure 2.10b

TIME HISTORY

$\times 10^{-2}$

24

(G) YDDL



MAX = .050

MIN = -.020

TC-1 / VDS DATA (LRC-3A)

PRE-IGNITION

YDDL

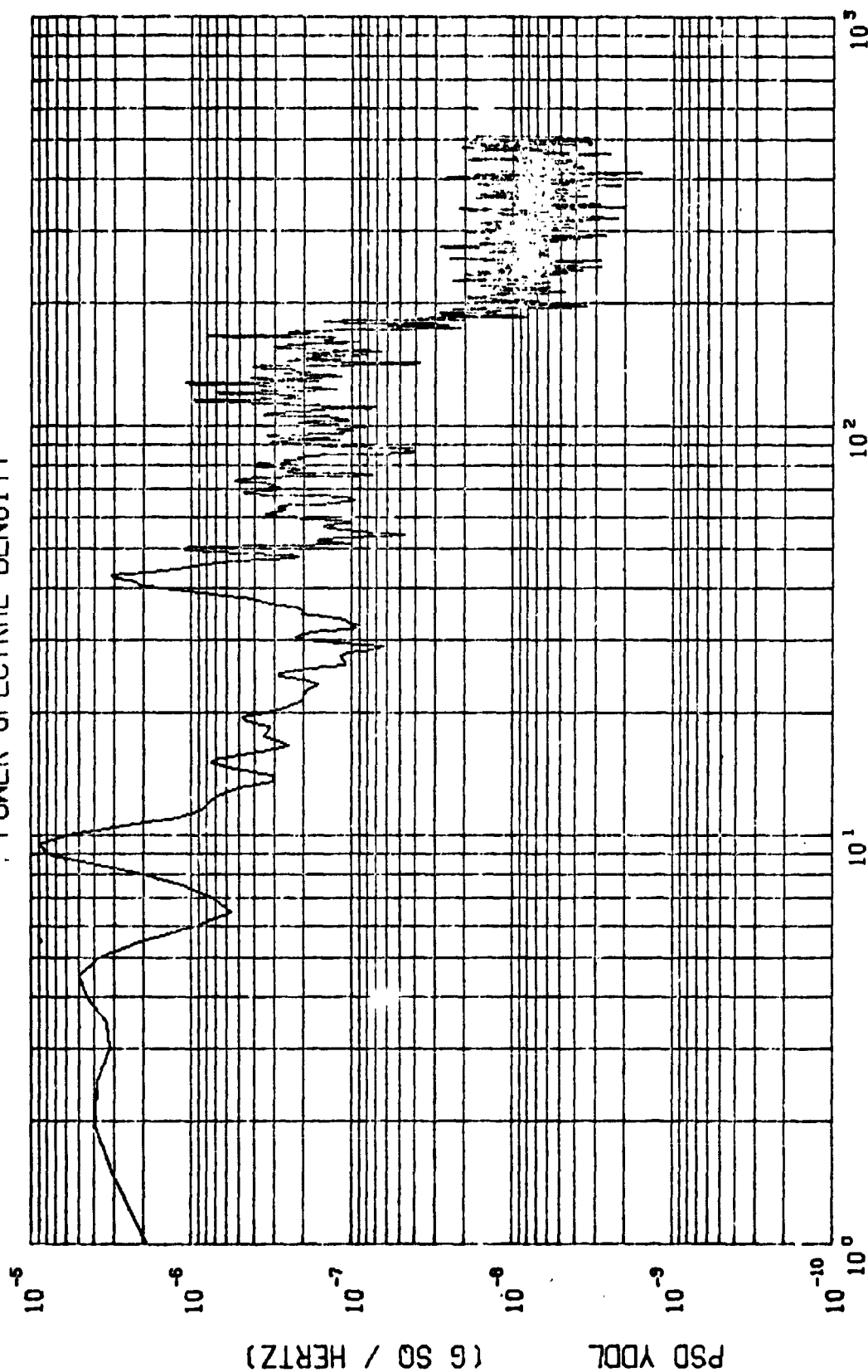
NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

(1024 sps)

Figure 2.11a

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POWER SPECTRAL DENSITY



$\Delta F = .500$ START = 49679.500 SEC STOP = 49681.500 SEC
 MEAN = 1796×10^{-5} $\sigma^2 = 91753 \times 10^{-3}$ $\sigma = 95788 \times 10^{-7}$ $3\sigma = 28736 \times 10^{-5}$

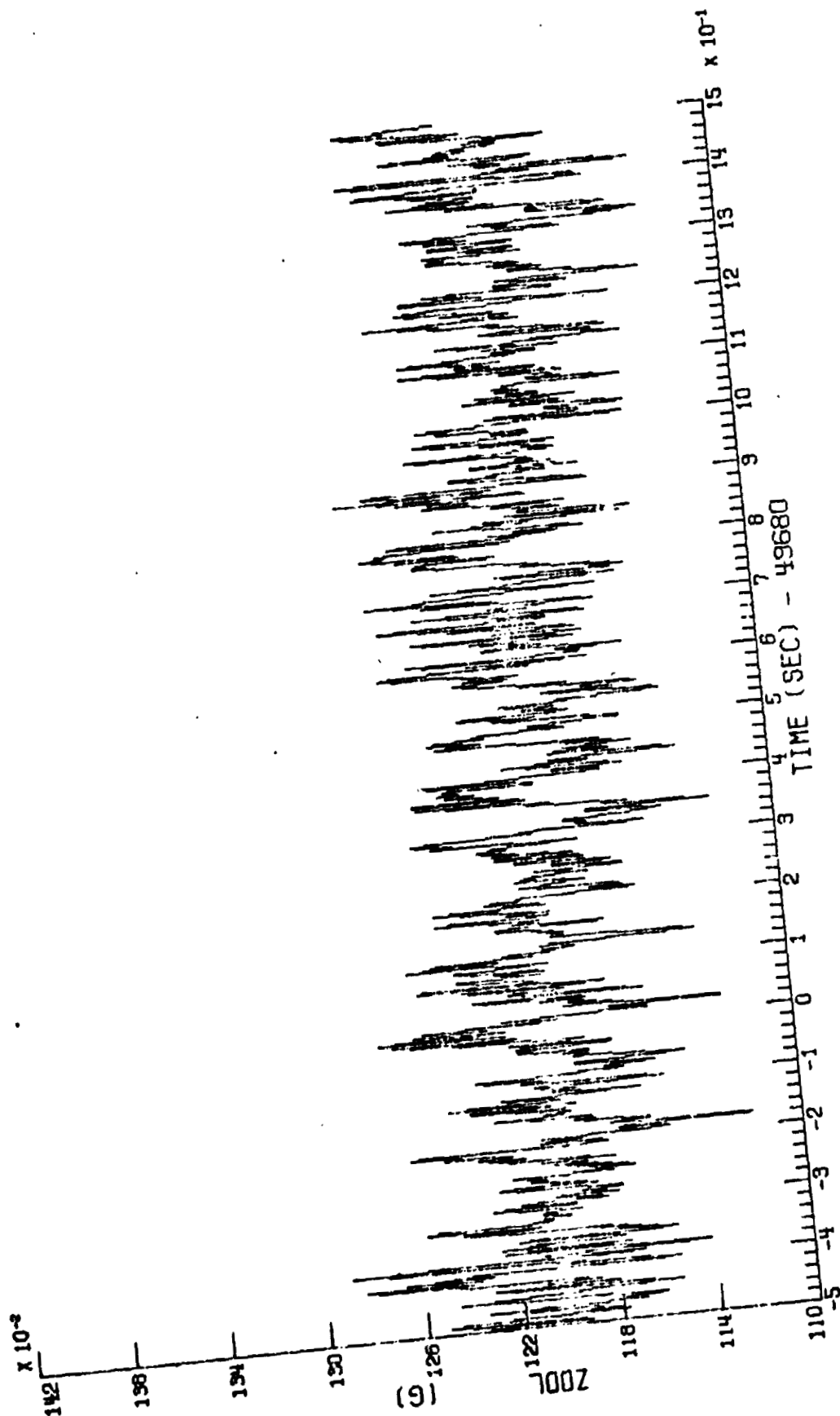
TC-1 / VDS DATA (LRC-3A)

PRE-IGNITION

YDDL

(1024 SPS) Figure 2.11b

TIME HISTORY



MIN = 1-120

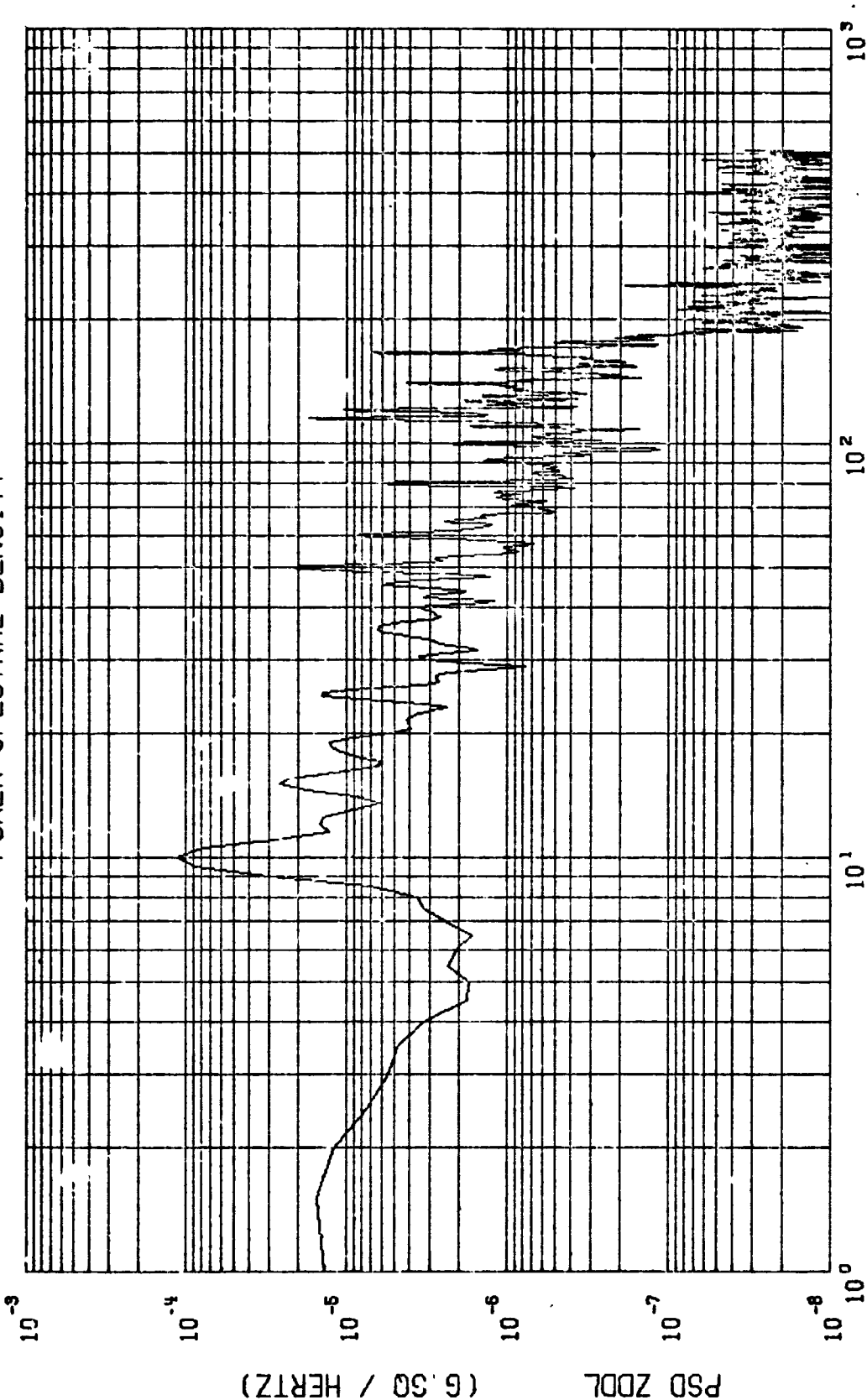
MAX = 1-208

Z00L
PRE-IGNITION
(1024 SPS)
Figure 2.12a

TC-1 / VDS DATA (LRC-3A)
07/23/75

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$ START = 49679.500 SEC STOP = 49681.500 SEC
 MEAN = 11975×10^{-4} $\sigma^2 = 64957 \times 10^{-5}$ $\sigma = 25486 \times 10^{-5}$ $3\sigma = 7646 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

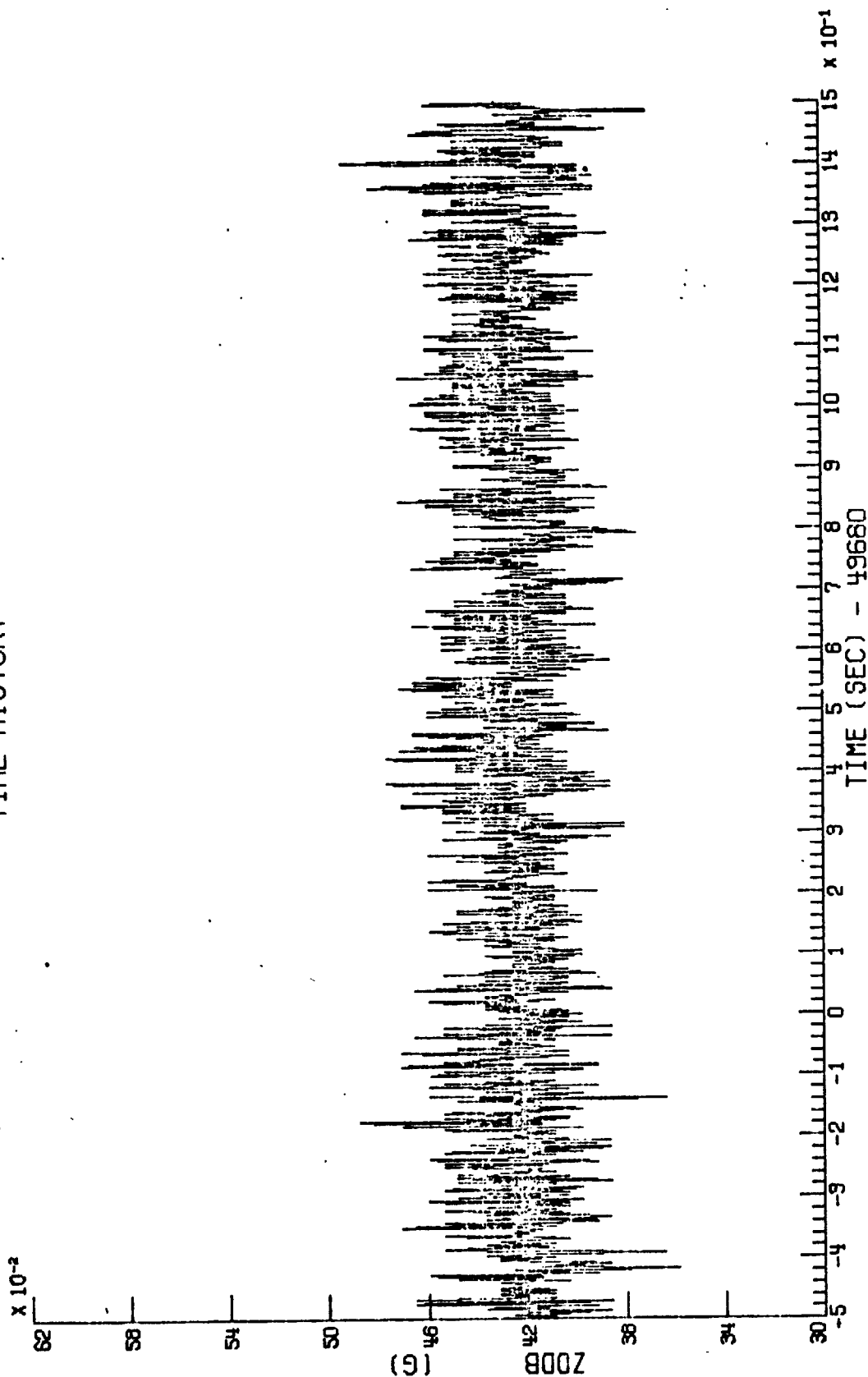
PRE-IGNITION

ZDL

(1024 SPS) Figure 2.12b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY



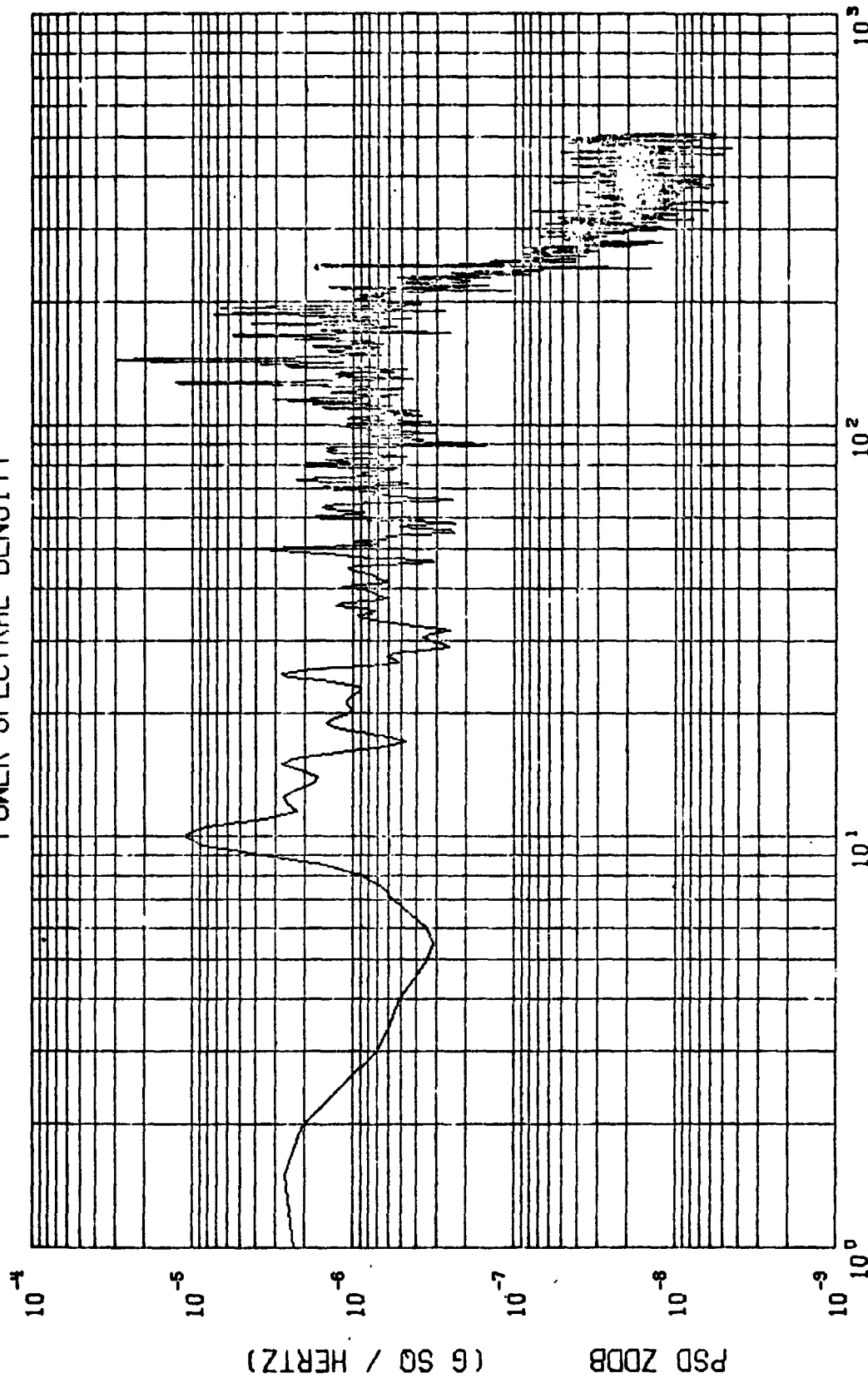
MAX = .492

MIN = .358

TC-1 / VDS DATA (LRC-3A) PRE-IGNITION Z00B

(1024 sps) Figure 2.13a

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49679.500 SEC

STOP = 49681.500 SEC

MEAN = 42326×10^{-5}

$\sigma^2 = 33948 \times 10^{-5}$

$\sigma = 18425 \times 10^{-5}$

$3\sigma = 55275 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

PRE-IGNITION

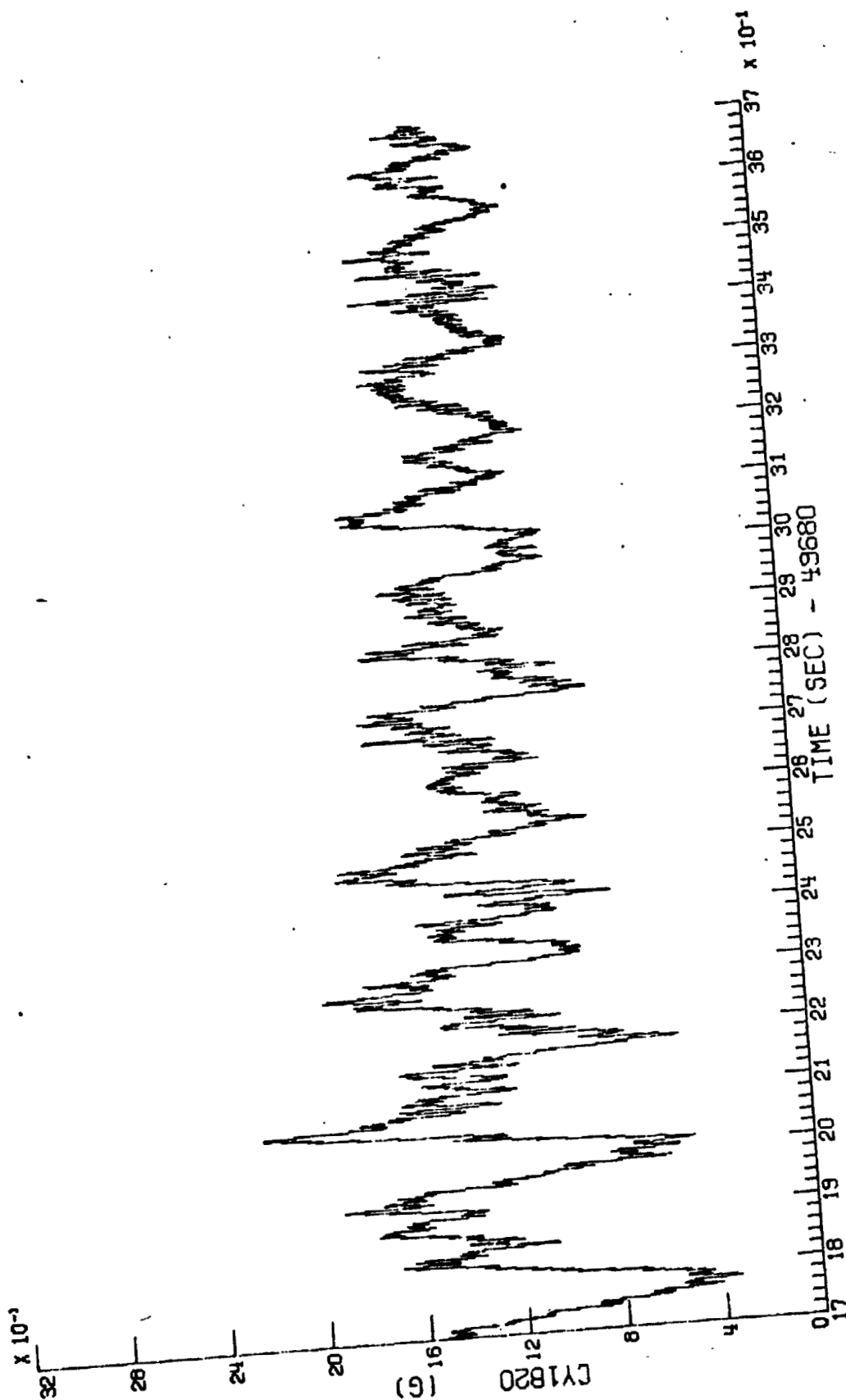
Z008

(1024 SPS)

Figure 2.13b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY



MIN = .333

MAX = 2.223

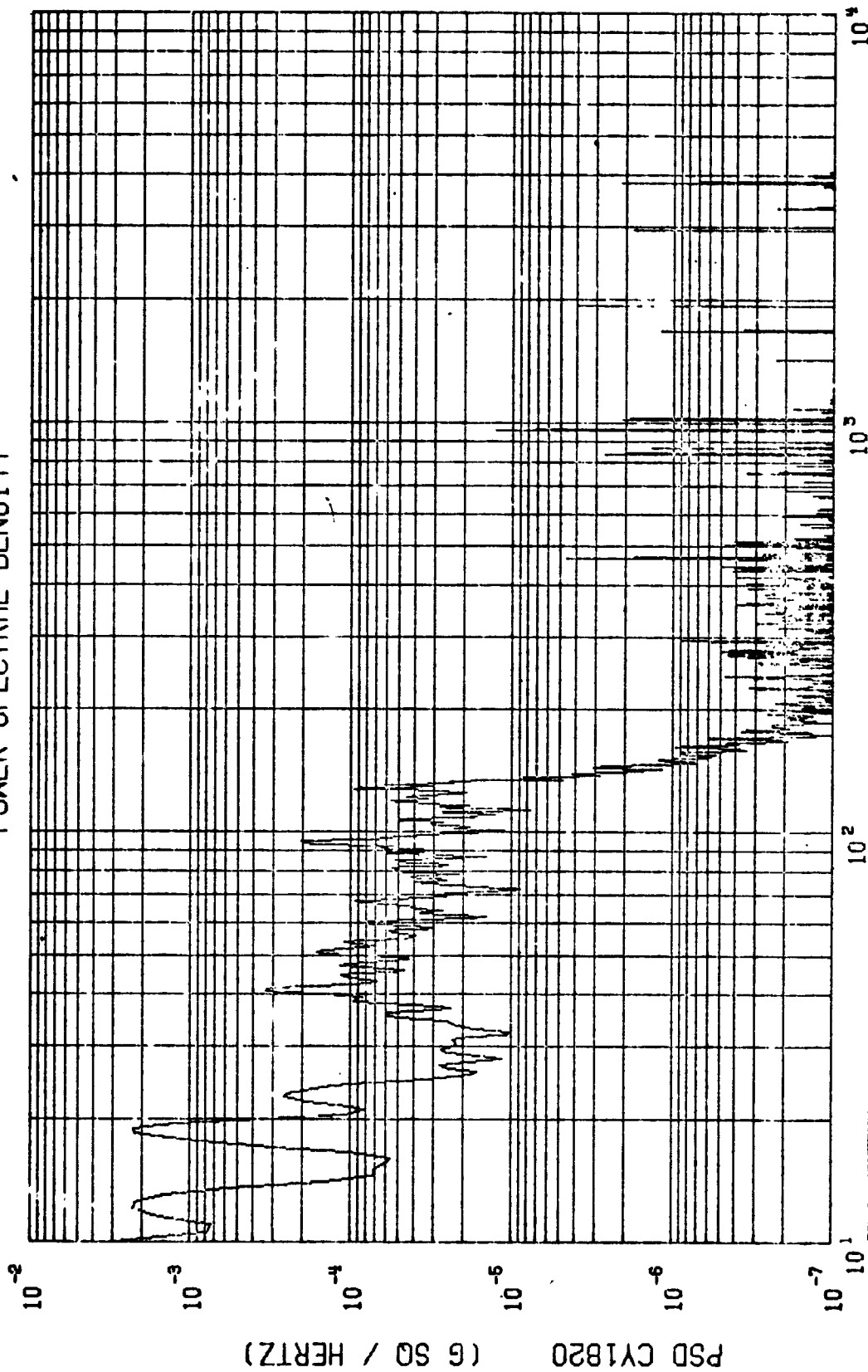
STAGE 0 IGN
CY1820
(0192 SPs) Figure 2.14a

TC-1 / VDS DATA (LRC-3A)

07/30/75

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49681.701 SEC

STOP = 49683.699 SEC

MEAN = 12848×10^{-4}

$\sigma^2 = 71129 \times 10^{-8}$

$\sigma = 2667 \times 10^{-4}$

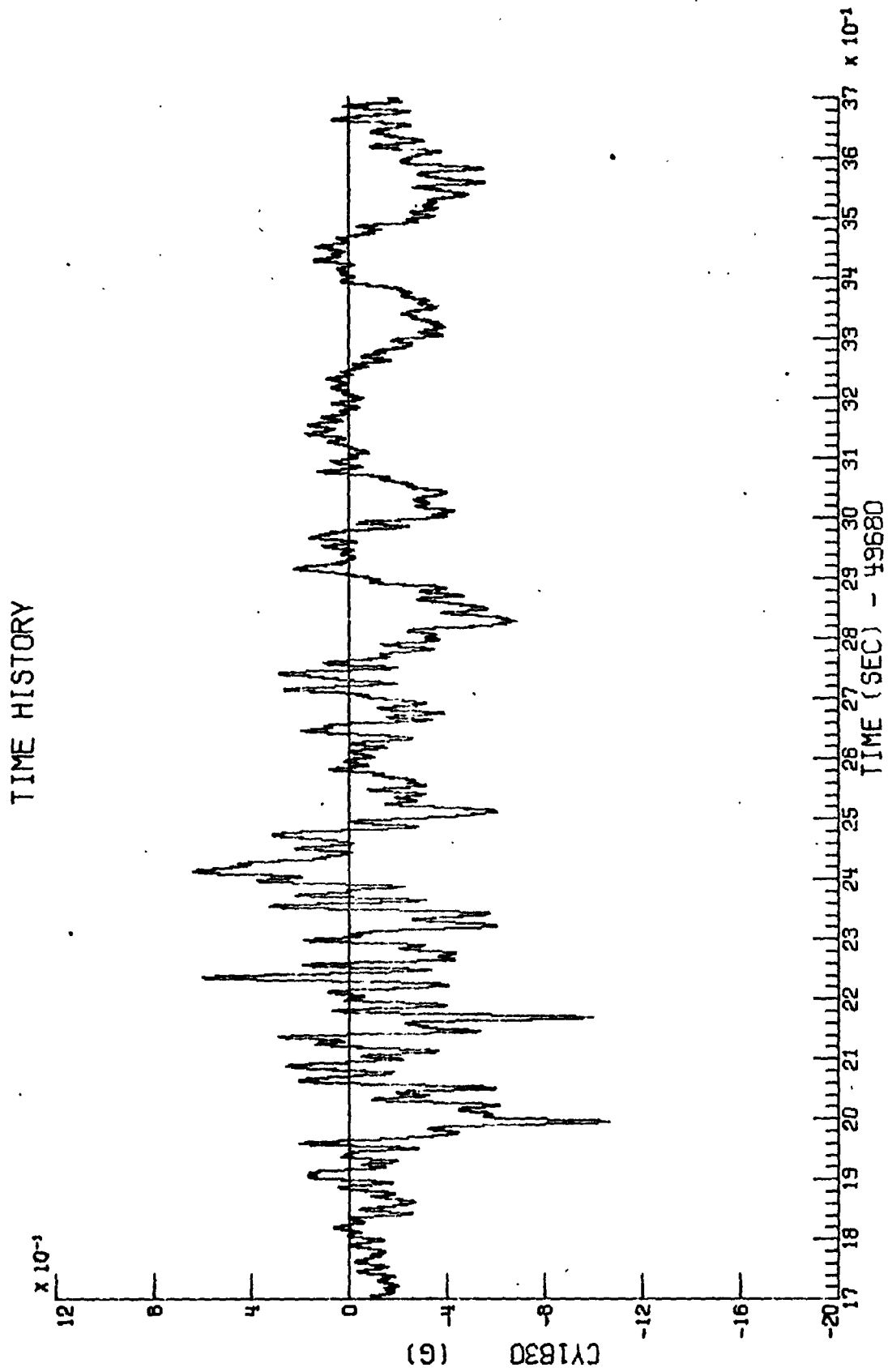
$3\sigma = 8001 \times 10^{-4}$

TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

CY1820

(8192 SPS) Figure 2.14b



MAX = .639

MIN = -1.061

TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

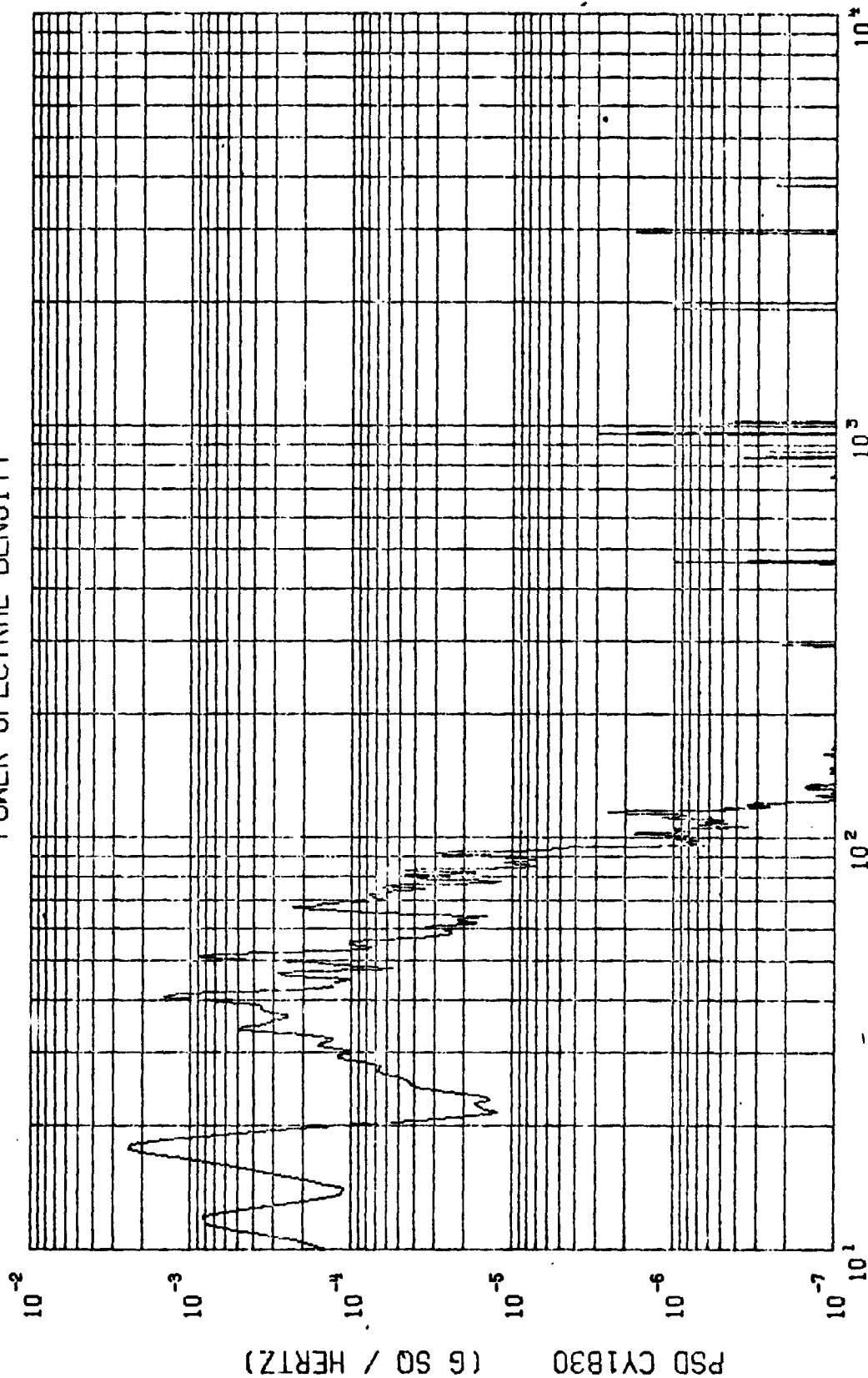
CY1830

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

(8192 SPS)

Figure 2.15a

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49681.701 SEC

STOP = 49683.699 SEC

MEAN = -13384×10^{-5}

$\sigma^2 = 4884 \times 10^{-5}$

$\sigma = 22099 \times 10^{-5}$

$3\sigma = 66299 \times 10^{-5}$

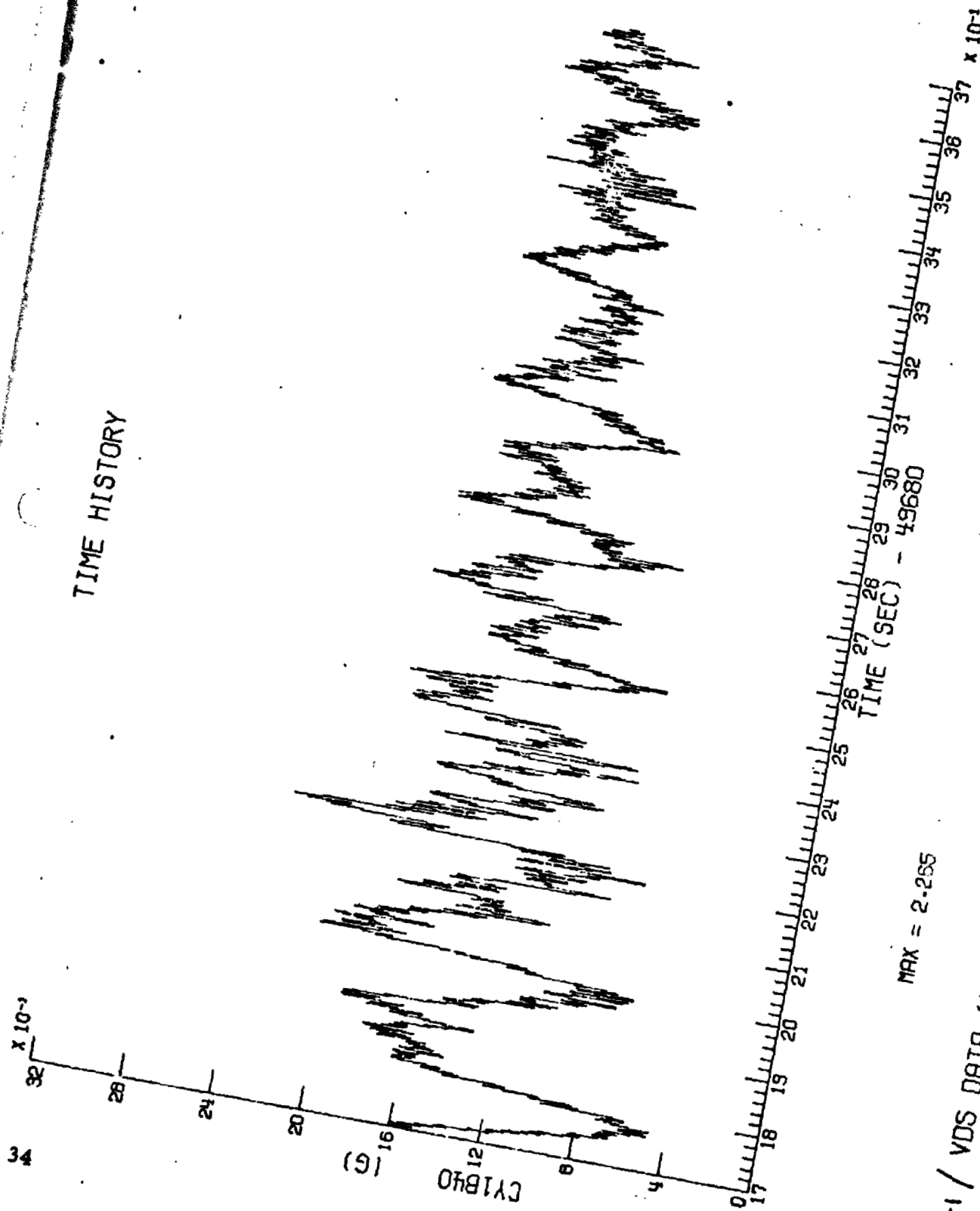
TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

CY1830

(8192 sps) Figure 2.15b

NA32-210LEY SIGNAL ANALYSIS PROGRAM 07/30/75



TIME HISTORY

MAX = 2.255

MIN = .477

TC-1 / VDS DATA (LRC-3A)

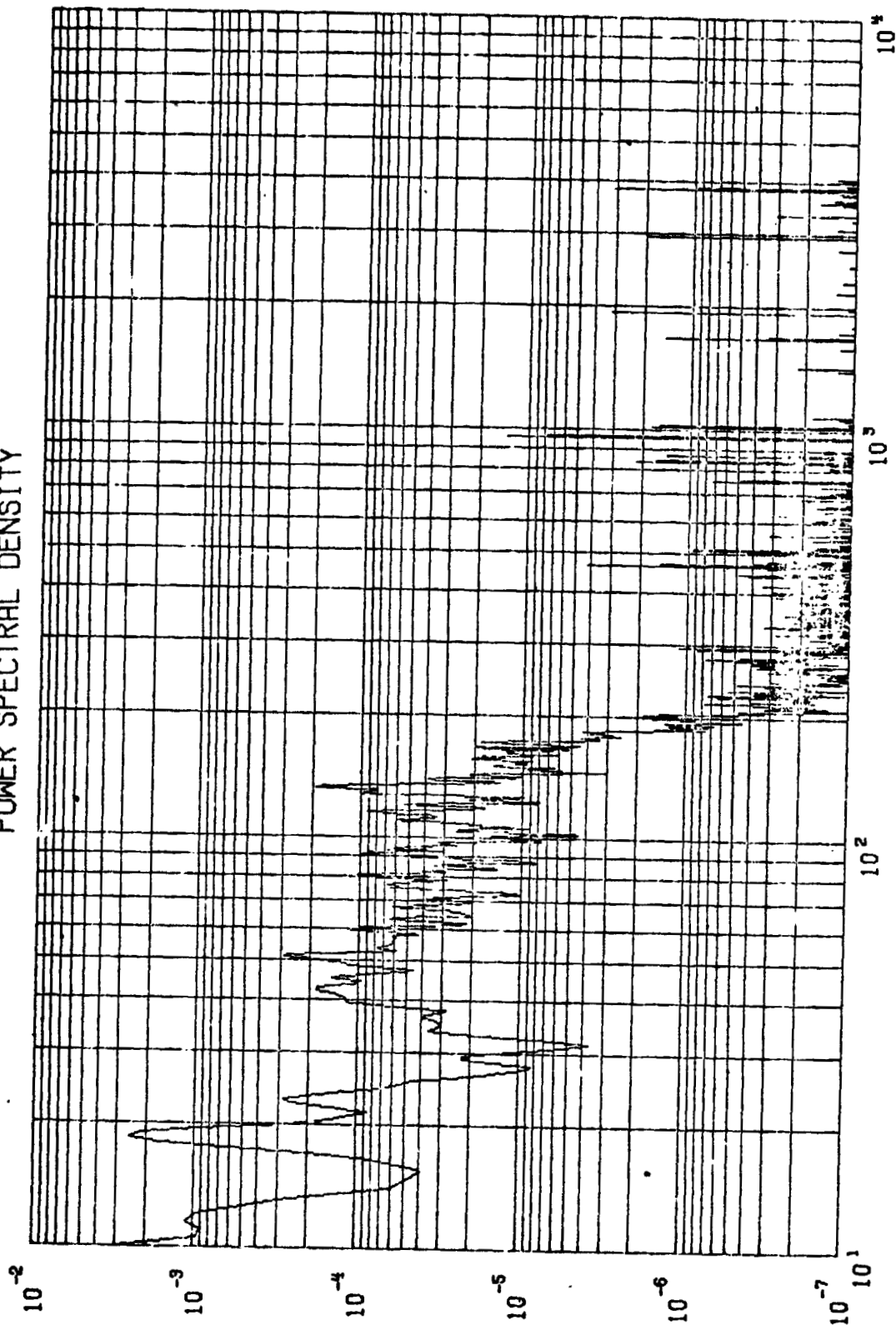
STAGE 0 IGN

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

CY1840
(8192 sps)

Figure 2.16a

POWER SPECTRAL DENSITY



PSD CY1840 (G SQ / HERTZ)

FREQUENCY (HERTZ)

$\Delta F = .500$

START = 49681.701 SEC

STOP = 49683.699 SEC

MEAN = 1349×10^{-3}

$\sigma^2 = 6873 \times 10^{-5}$

$\sigma = 26216 \times 10^{-5}$

$3\sigma = 78649 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

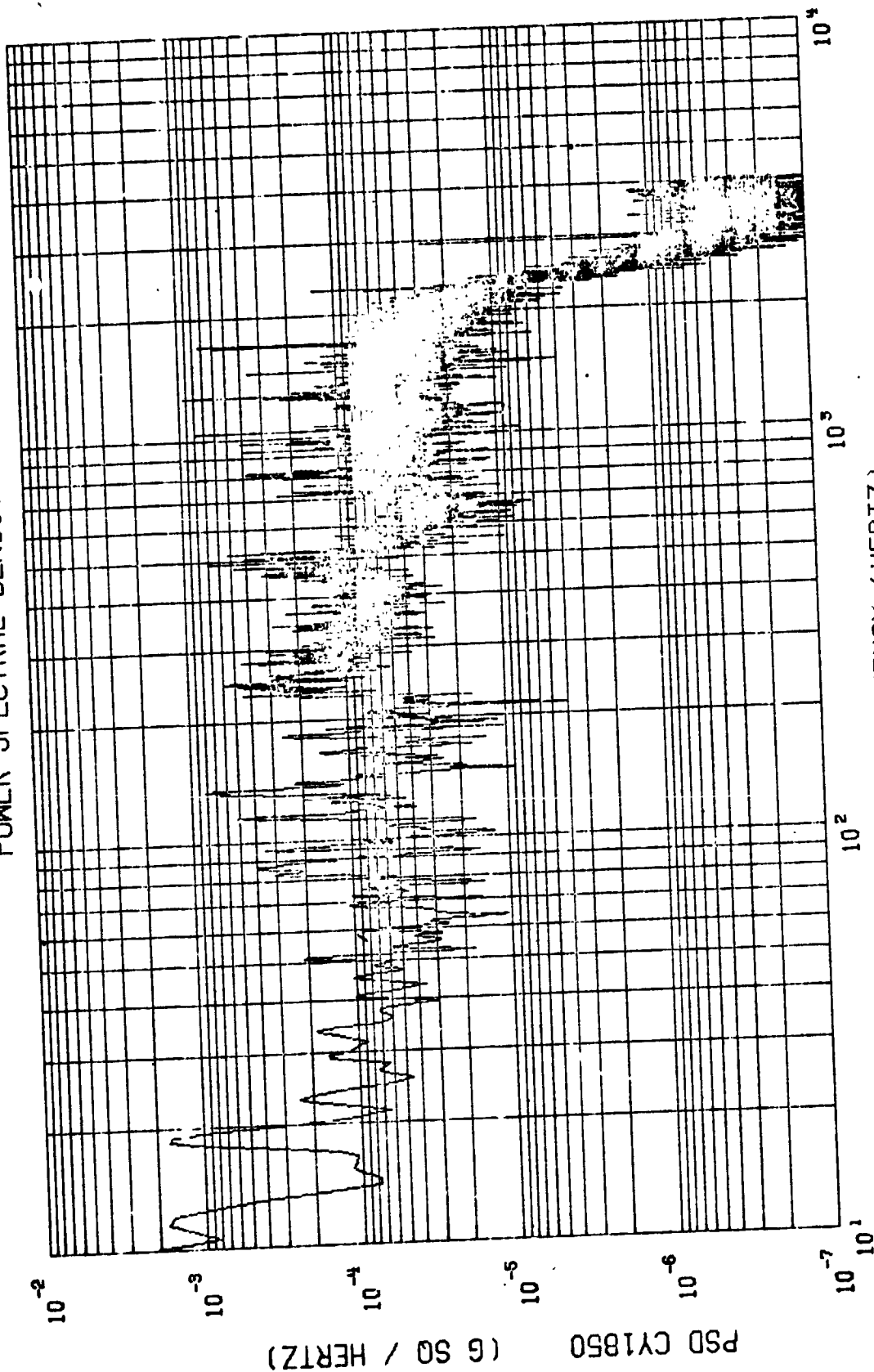
STAGE 0 IGN

CY1840

NSA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

(8192 sps) Figure 2.16b

POWER SPECTRAL DENSITY



STOP = 49683.699 SEC
 $3\sigma = 13486 \times 10^{-4}$

START = 49681.701 SEC
 $\sigma = 44955 \times 10^{-3}$

$\Delta F = .500$

MEAN = -12601×10^{-5} $f = 2021 \times 10^{-4}$

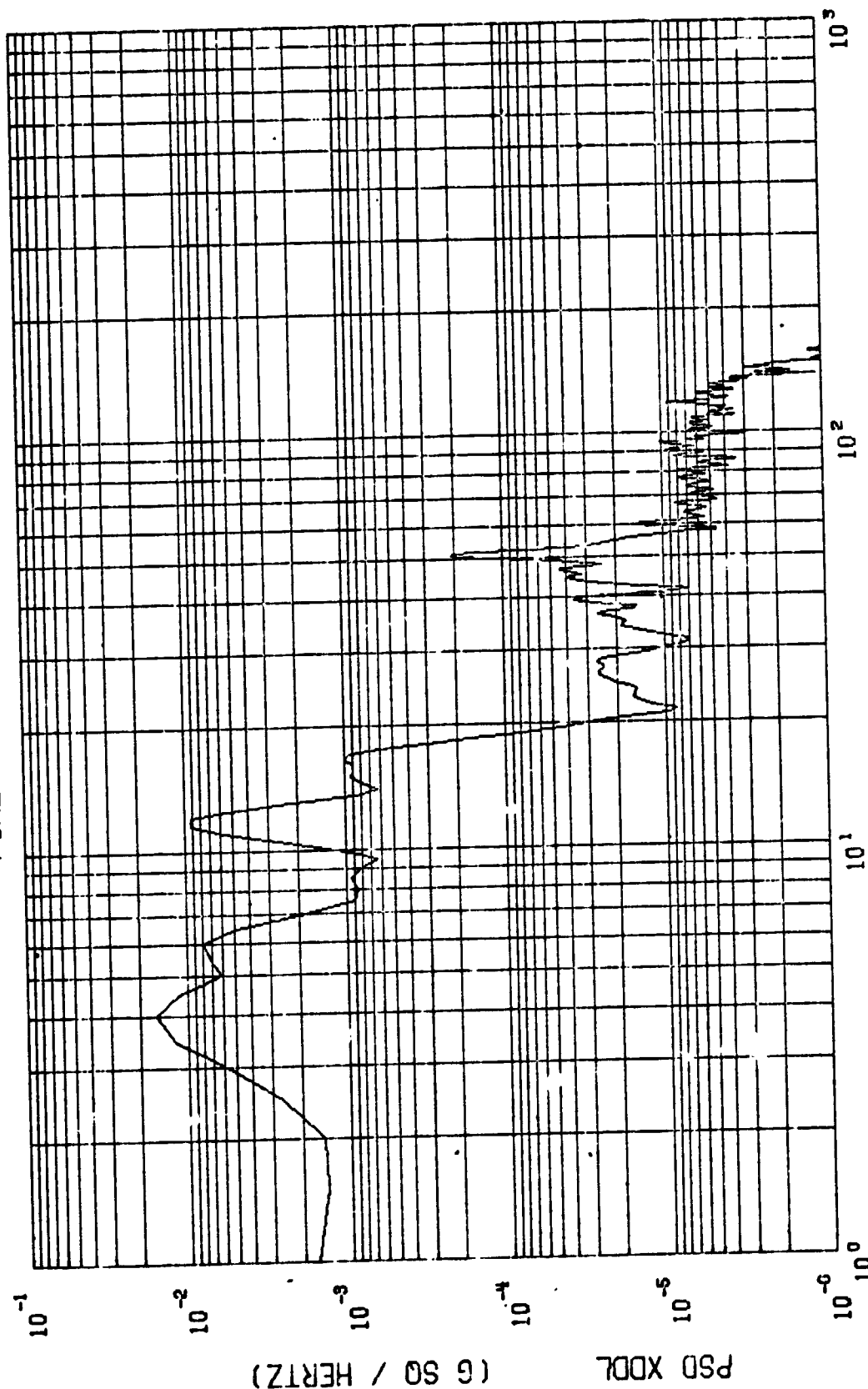
CY1850

STAGE 0 IGN

TC-1 / VDS DATA (LRC-3A)

(8192 sps) Figure 2.17b

POWER SPECTRAL DENSITY



$\Delta F = .500$

MEAN = -50985×10^{-6}

$\sigma^2 = 6647 \times 10^{-5}$

$\sigma = 25781 \times 10^{-5}$

$3\sigma = 77345 \times 10^{-5}$

START = 49681.700 SEC

STOP = 49683.700 SEC

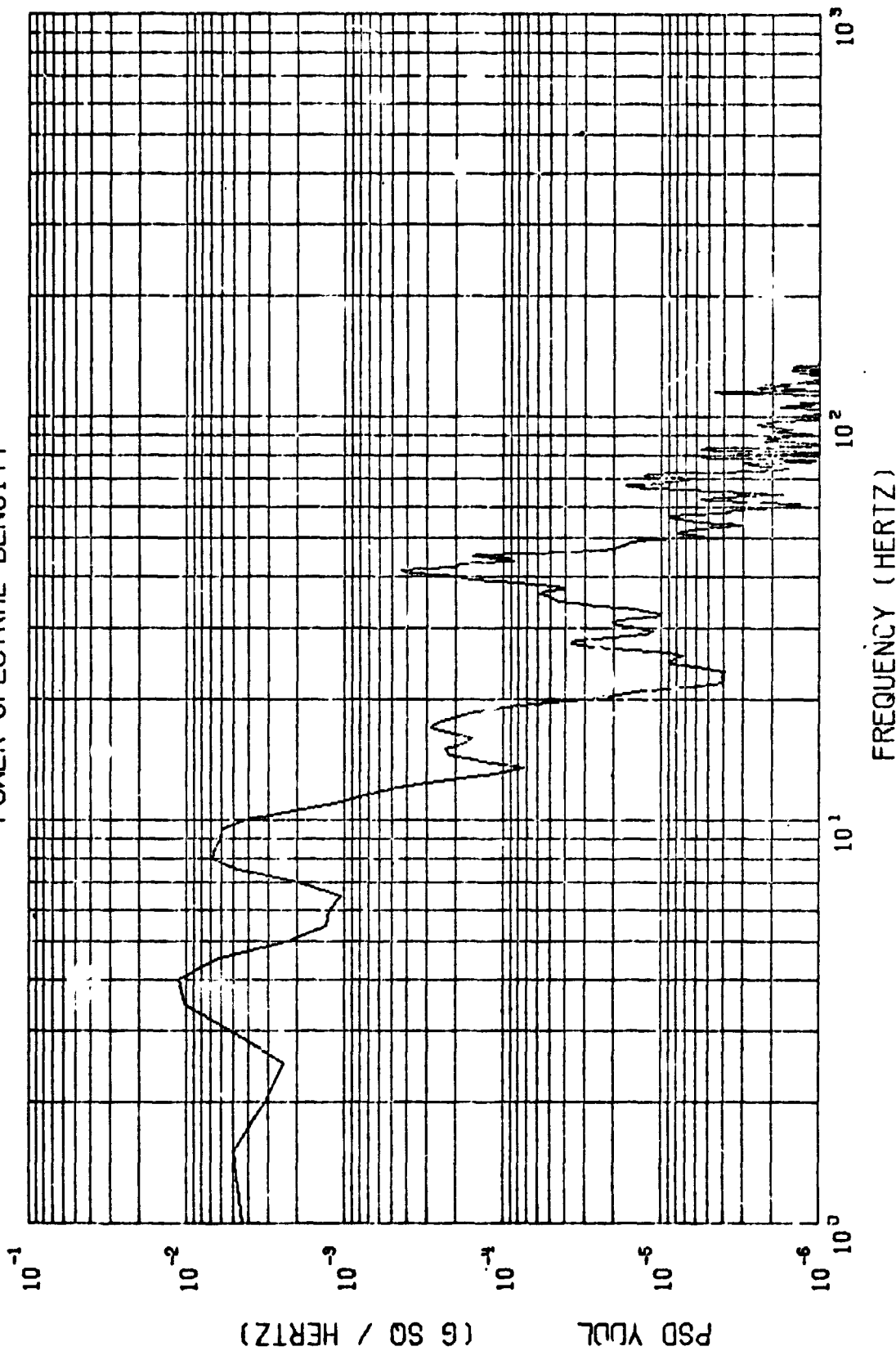
TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

XDDL

(1024 SPS) Figure 2.18

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49681.700 SEC

STOP = 49683.700 SEC

MEAN = 1.121×10^{-3}

$\sigma^2 = 52446 \times 10^{-5}$

$\sigma = 2290.1 \times 10^{-5}$

$3\sigma = 68703 \times 10^{-5}$

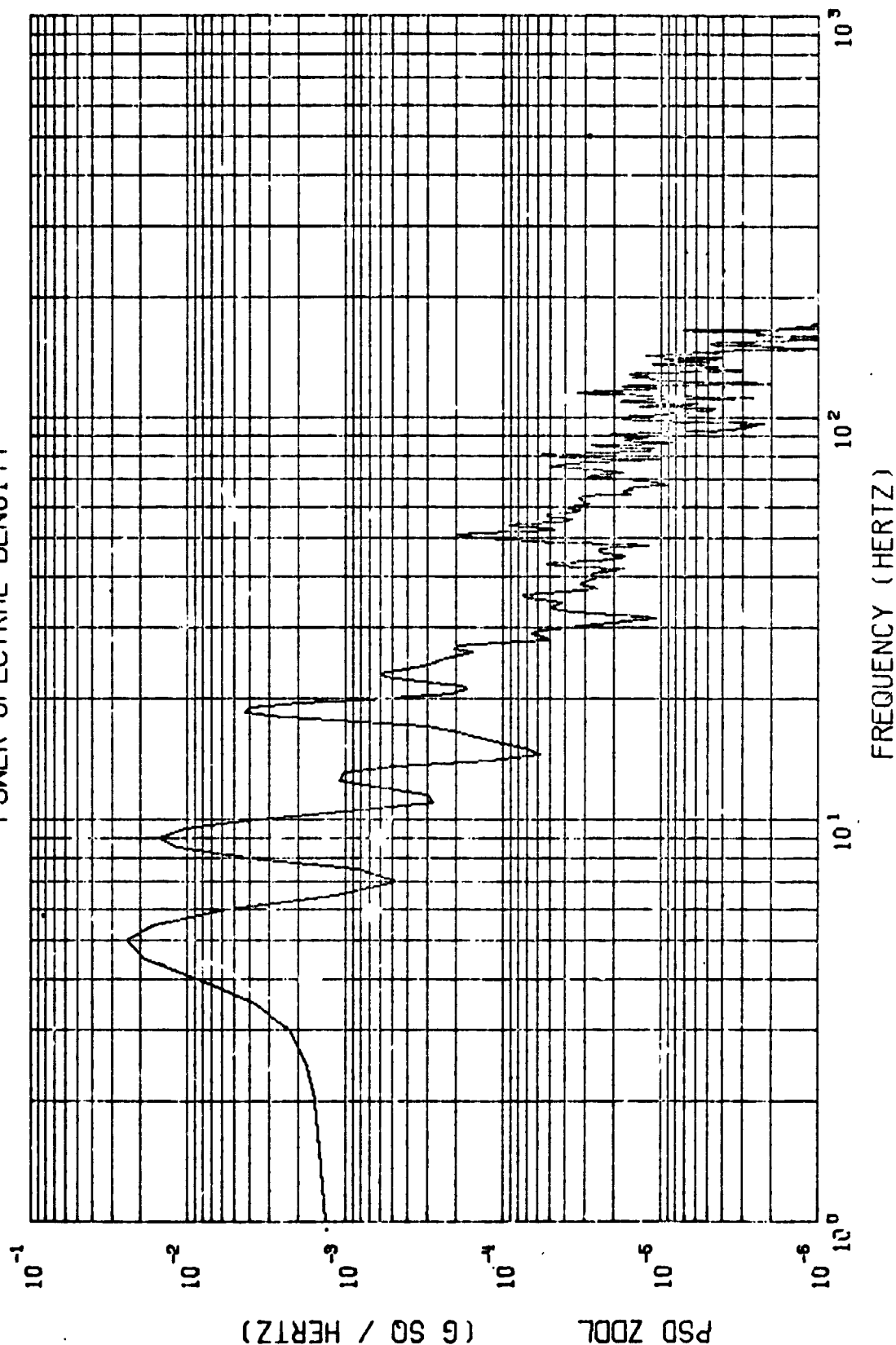
TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

YDOL

(1024 SPS) Figure 2.19

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49681.700 SEC

STOP = 49683.700 SEC

MEAN = 16909×10^{-4}

$\sigma^2 = 81539 \times 10^{-8}$

$\sigma = 28555 \times 10^{-5}$

$3\sigma = 85665 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

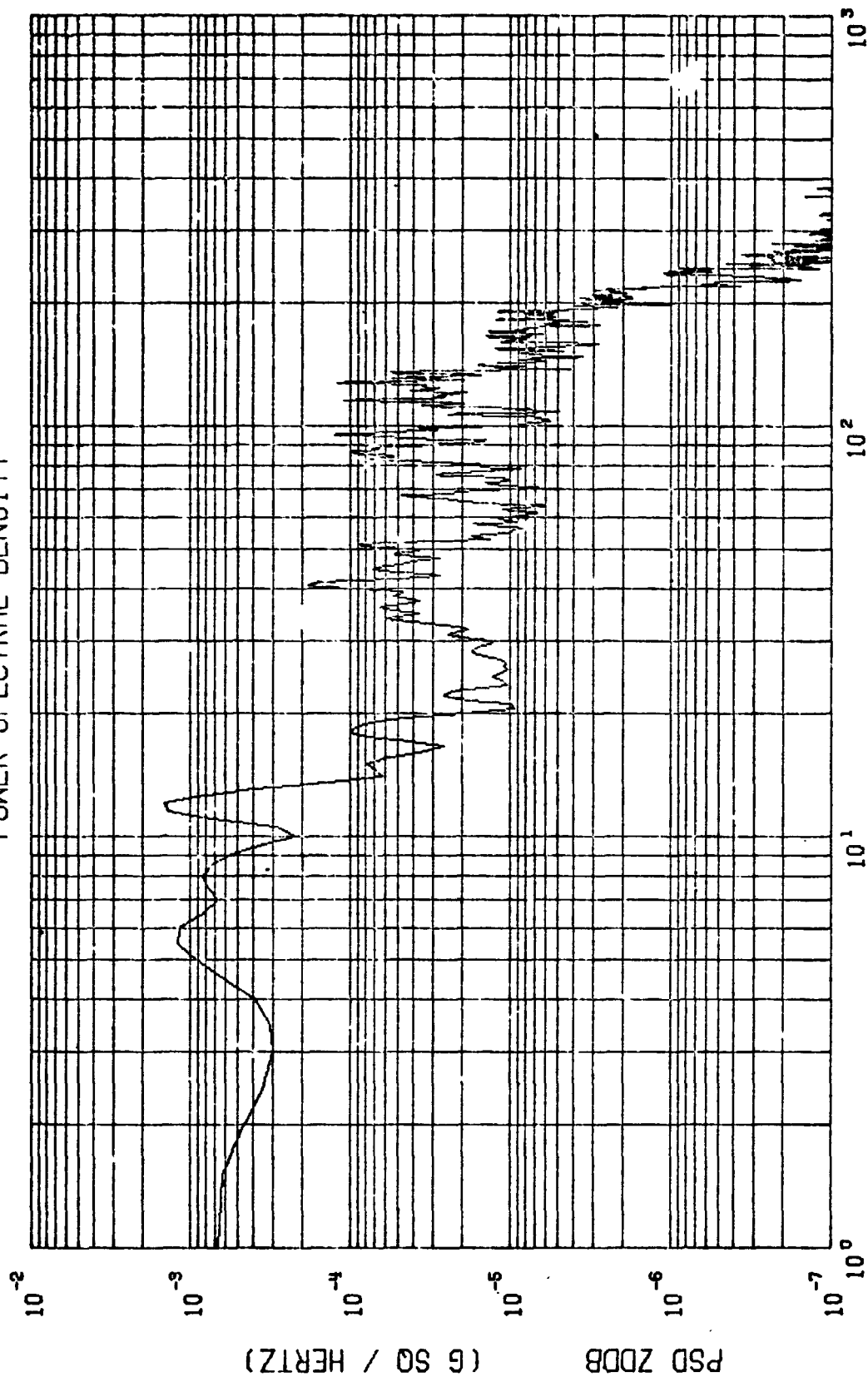
ZDOL

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

(1024 SPS)

Figure 2.20

POWER SPECTRAL DENSITY



$\Delta F = .500$ START = 49681.700 SEC STOP = 49683.700 SEC
 MEAN = 64639×10^{-5} $\sigma^2 = 13924 \times 10^{-5}$ $\sigma = 118 \times 10^{-3}$ $3\sigma = 354 \times 10^{-3}$

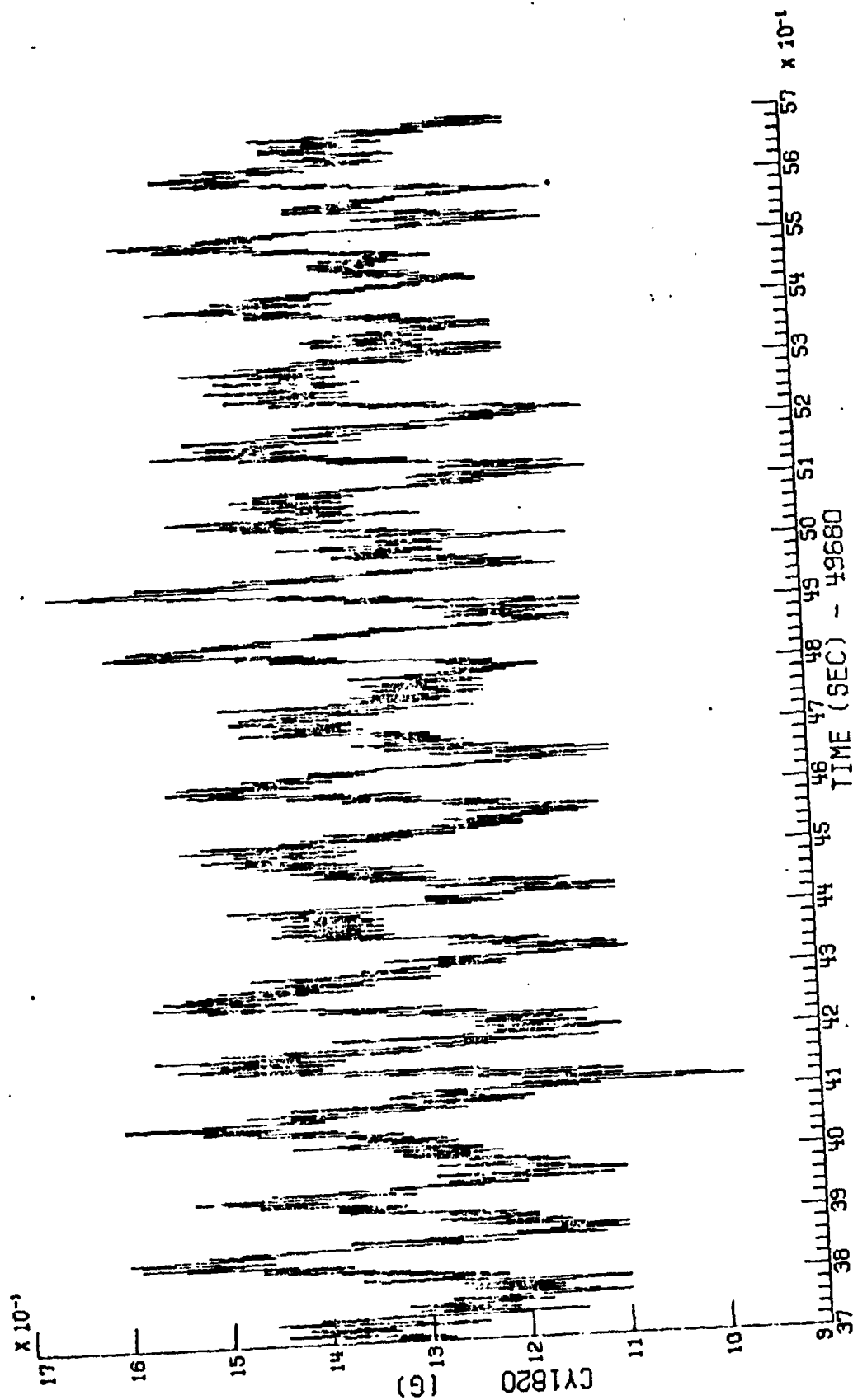
TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

ZODB

(1024 SPS) Figure 2.21

TIME HISTORY



MIN = .978

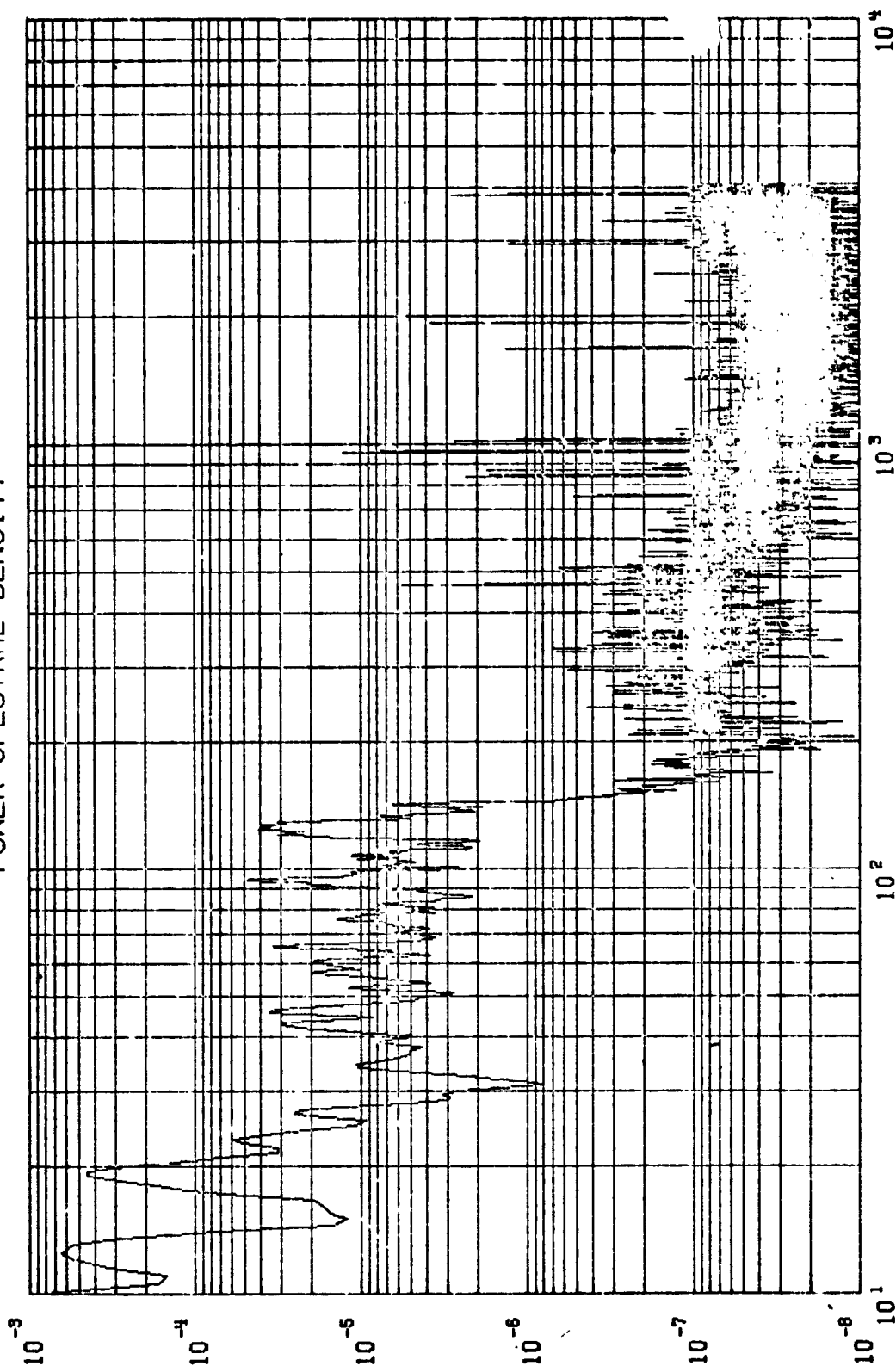
MAX = 1.656

STAGE 0 IGN
(8192 SPS) Figure 2.22a

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$

START = 49683.701 SEC

STOP = 49685.699 SEC

MEAN = 13261×10^{-4}

$\sigma^2 = 11057 \times 10^{-6}$

$\sigma = 10515 \times 10^{-3}$

$3\sigma = 31546 \times 10^{-3}$

TC-1 / VDS DATA (LRC-3A)

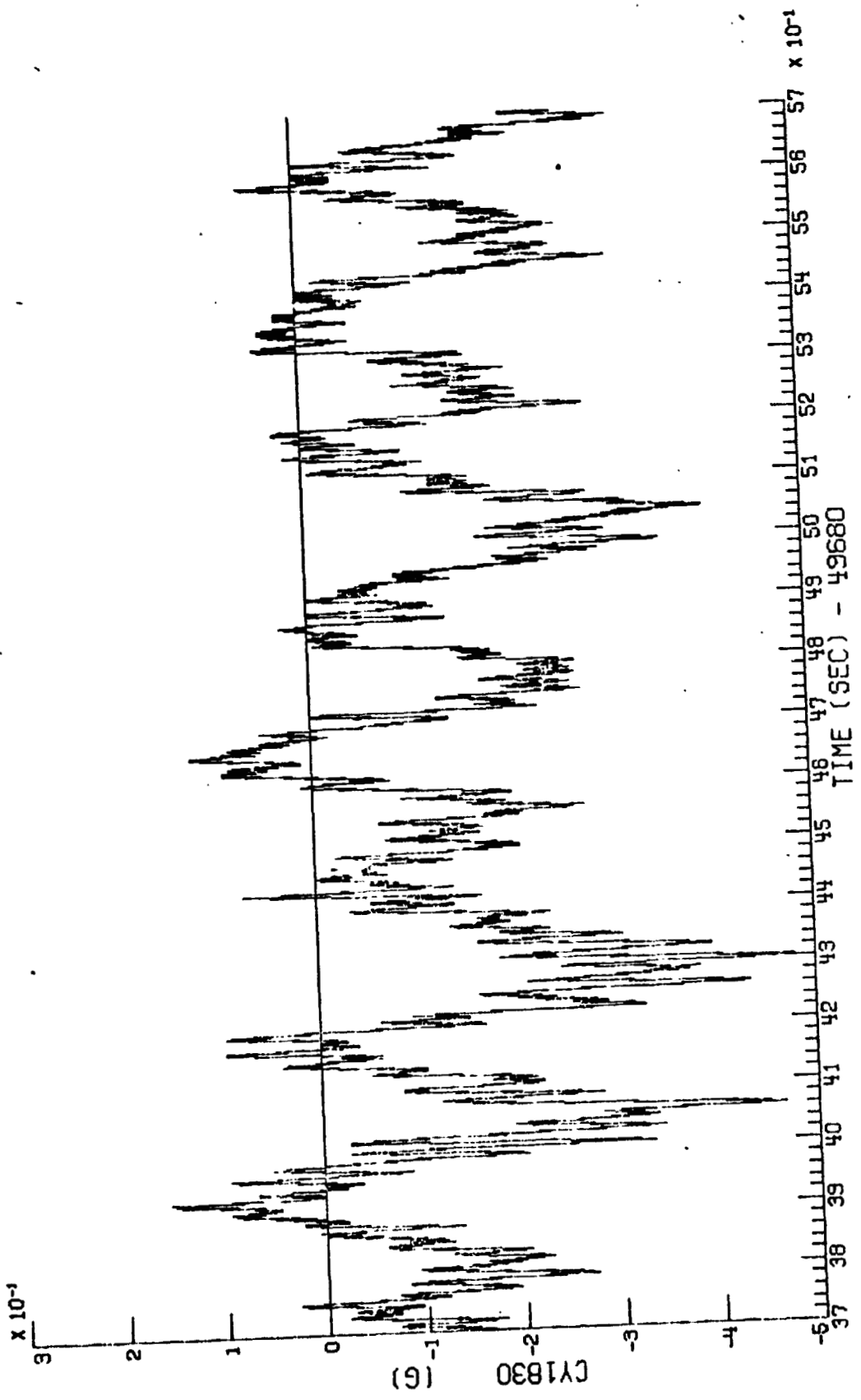
STAGE 0 IGN

CY1820

(8192 SPS) Figure 2.22b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

TIME HISTORY



MIN = -.489

MAX = .155

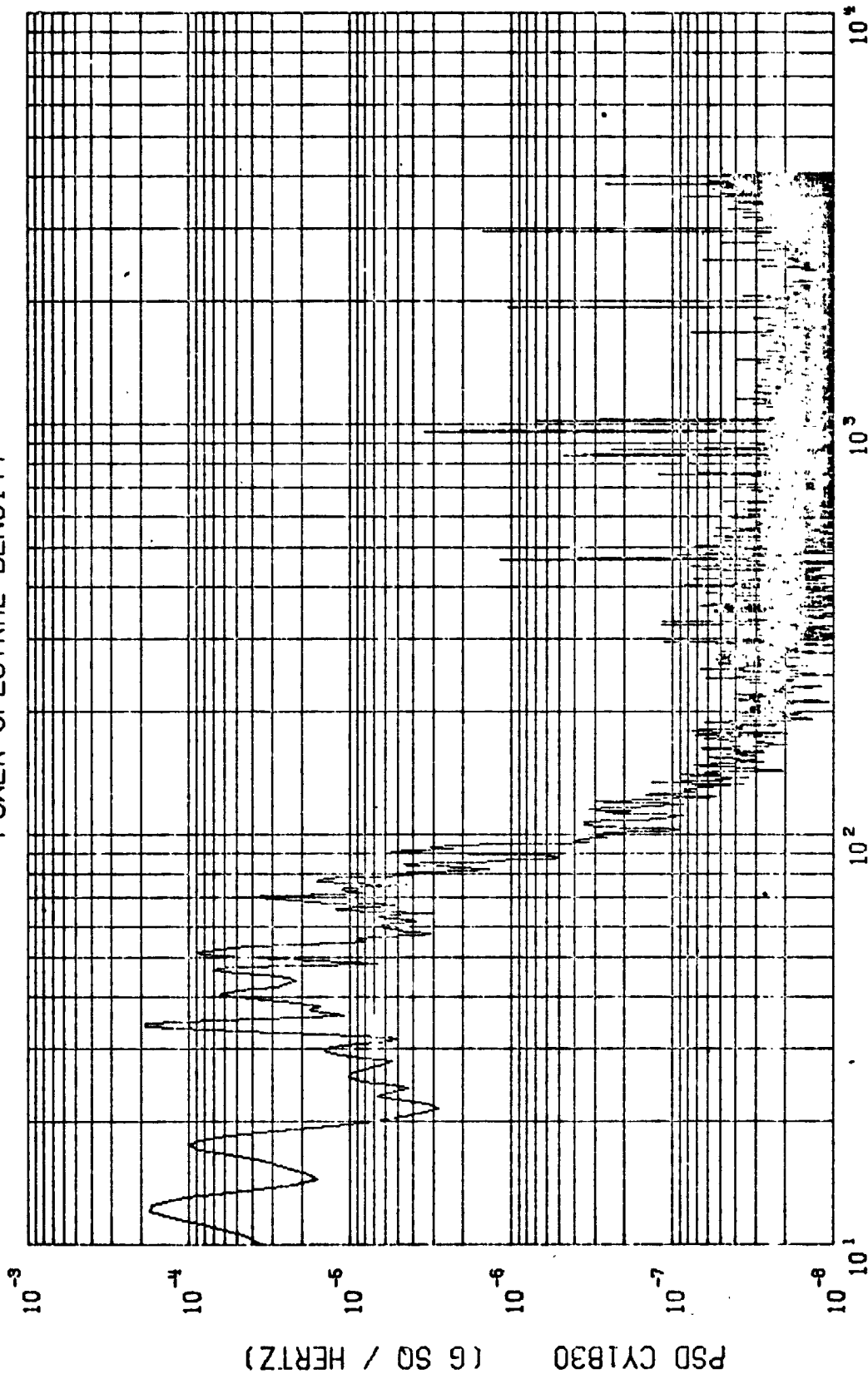
Figure 2.23a

CY1830
STAGE 0 IGN
(8192 SPS)

TC-1 / VDS DATA (LRC-3A)

NAACP-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $\text{MEAN} = -12249 \times 10^{-5}$ $\sigma^2 = 11885 \times 10^{-5}$ $\sigma = 10902 \times 10^{-5}$ $3\sigma = 32706 \times 10^{-5}$
 $\text{START} = 49683.701 \text{ SEC}$ $\text{STOP} = 49685.699 \text{ SEC}$

CY1830

STAGE 0 IGN

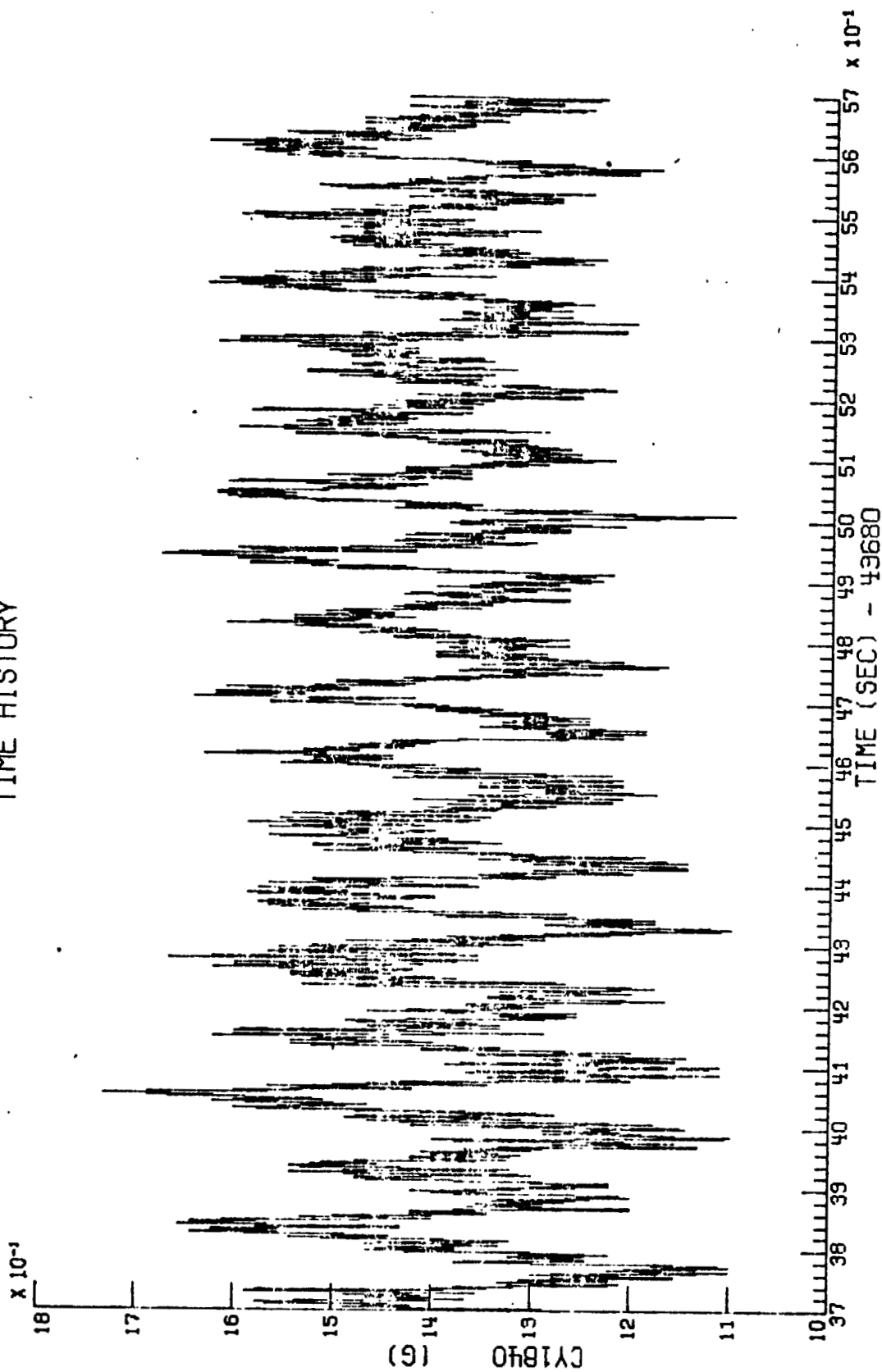
TC-1 / VDS DATA (LRC-3A)

(8192 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

Figure 2.23b

TIME HISTORY



MAX = 1.732

MIN = 1.099

TC-1 / VDS DATA (LRC-3A)

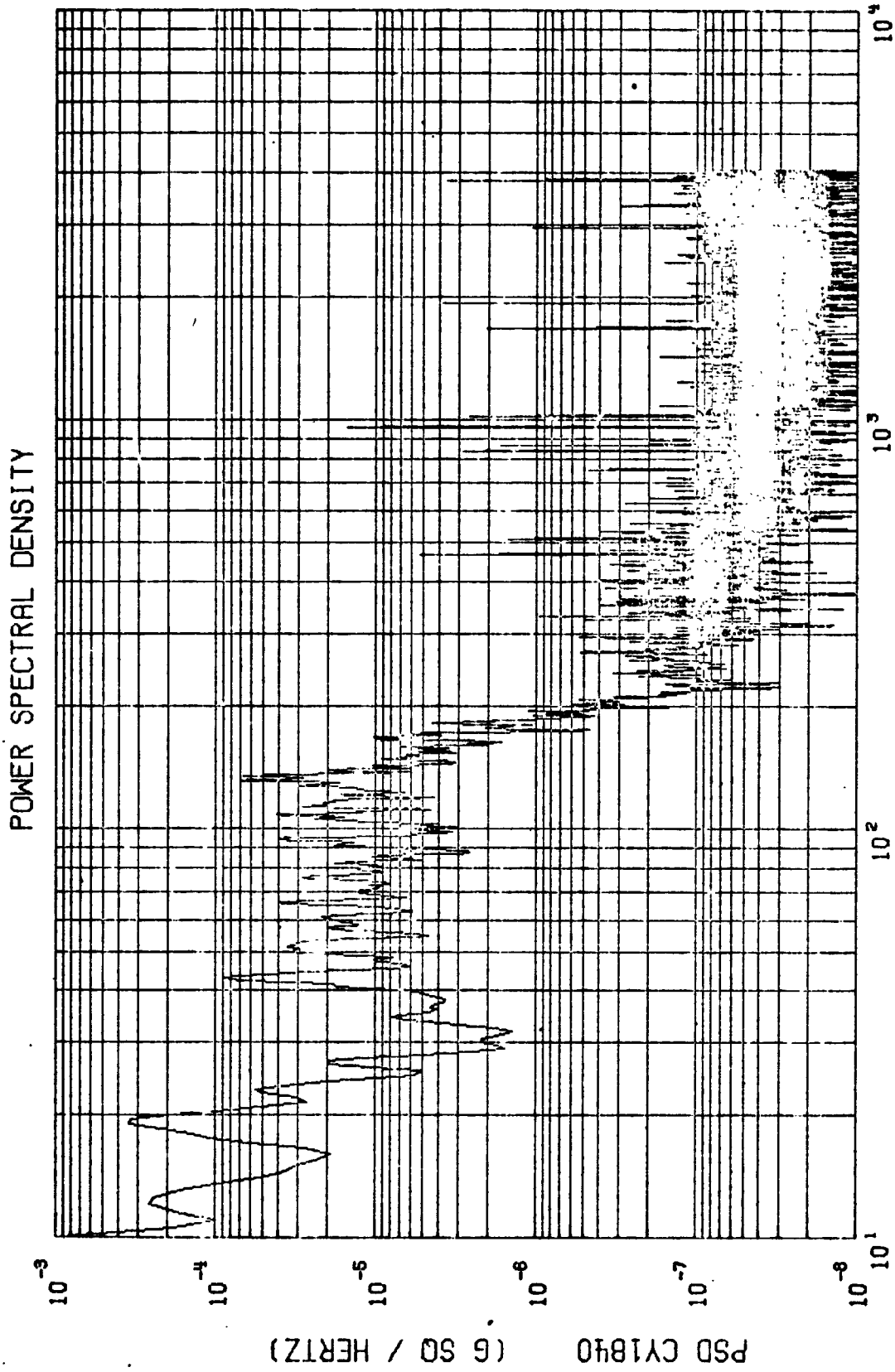
STAGE 0 IGN

CY1840

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

(8192 SPS) Figure 2.24a

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OF POOR QUALITY



POWER SPECTRAL DENSITY

$\Delta F = .500$
 $MEAN = 13903 \times 10^{-4}$
 $\sigma^2 = 11664 \times 10^{-6}$
 $\sigma = 108 \times 10^{-3}$
 $3\sigma = 324 \times 10^{-3}$

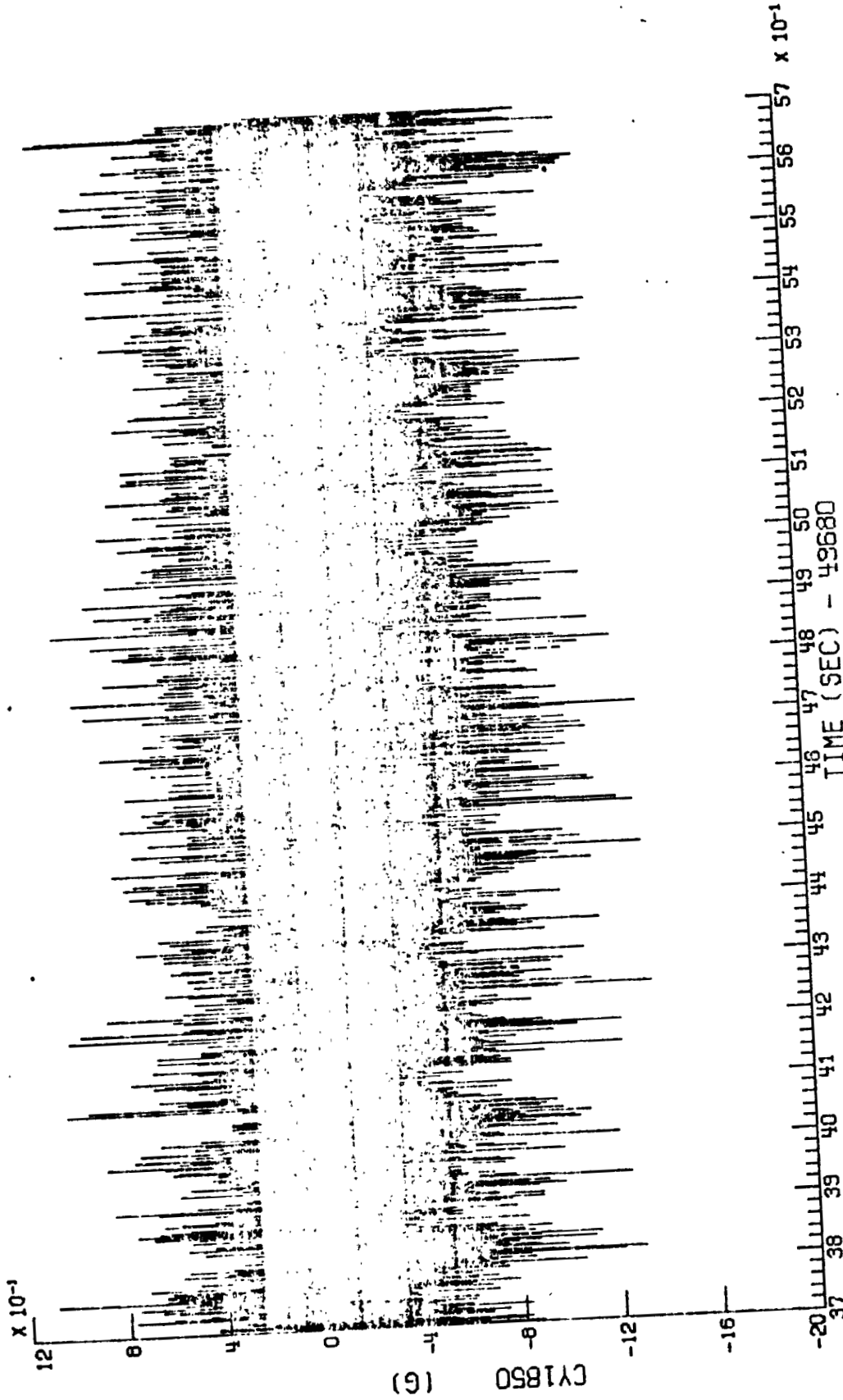
$START = 49683.701 \text{ SEC}$
 $STOP = 49685.699 \text{ SEC}$

TC-1/VDS DATA (LRC-3A)
 STAGE 0 IGN
 CY1840

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75
 (8192 SPS) Figure 2.24b

ORIGINAL PAGE IS
OF POOR QUALITY

TIME HISTORY



MIN = -1.356

MAX = 1.069

CY1850

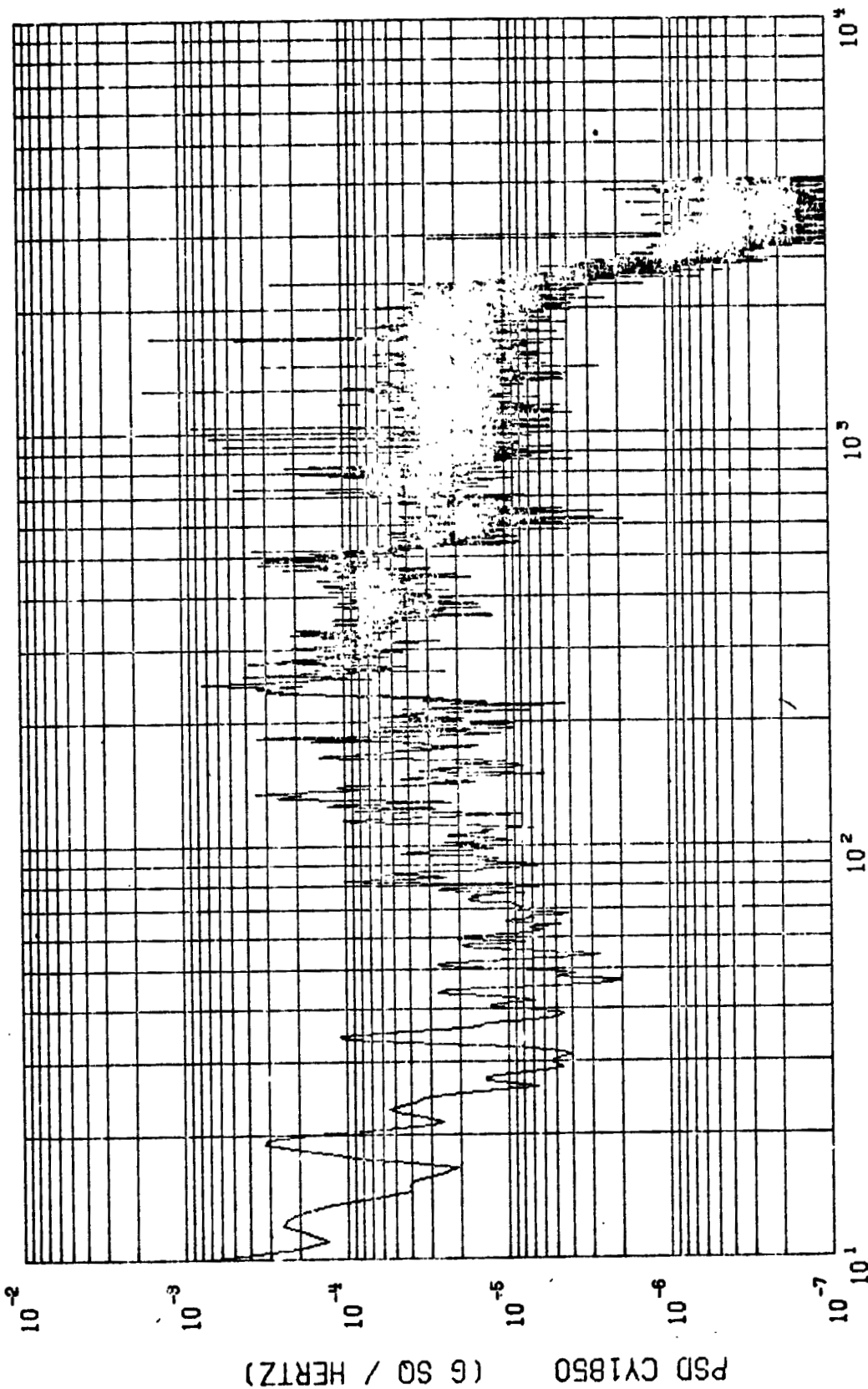
STAGE 0 IGN

(8192 SPS) Figure 2.25a

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49683.701 SEC

STOP = 49685.699 SEC

MEAN = -13338×10^{-3}

$\sigma^2 = 99109 \times 10^{-5}$

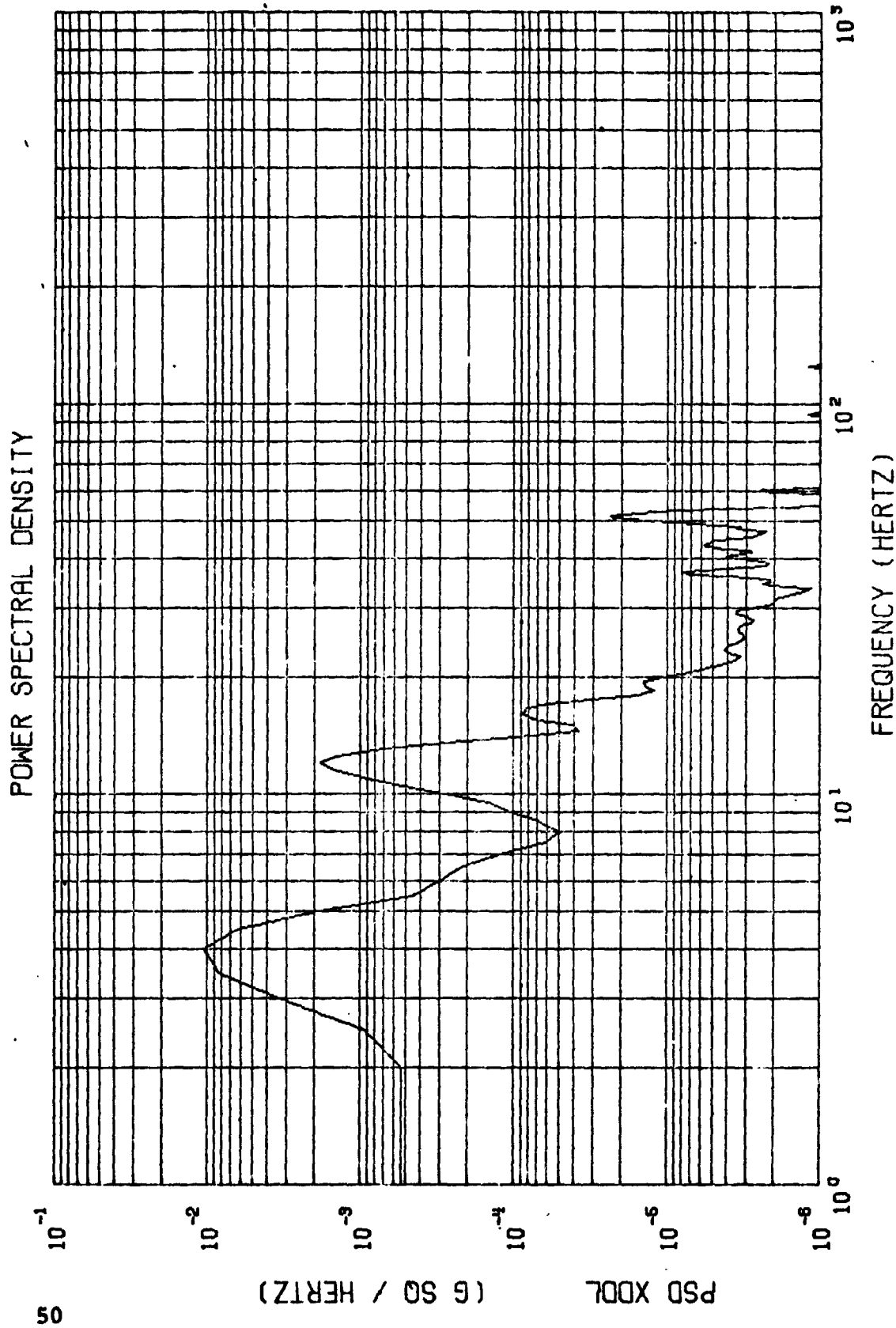
$\sigma = 31481 \times 10^{-5}$

$3\sigma = 94445 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

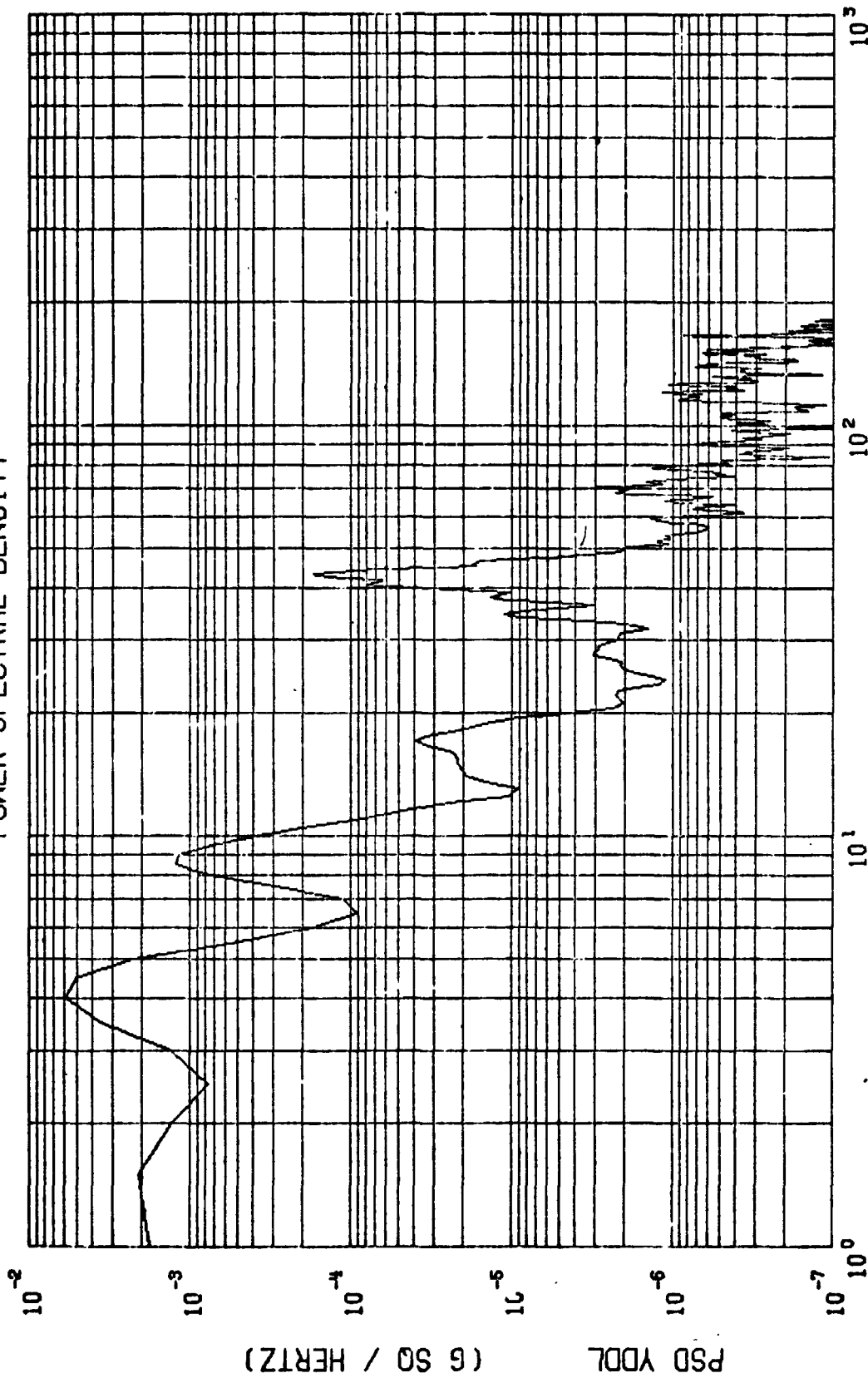
CY1850



$\Delta F = .500$ START = 49683.700 SEC STOP = 49685.699 SEC
 MEAN = -30734×10^{-5} $\sigma^2 = 21737 \times 10^{-6}$ $\sigma = 14743 \times 10^{-3}$ $3\sigma = 4423 \times 10^{-4}$

TC-1 / VDS DATA (LRC-3A) STAGE 0 IGN XDDL

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$
 $MEAN = 22155 \times 10^{-5}$ $\sigma^2 = 16206 \times 10^{-6}$ $\sigma = 1273 \times 10^{-4}$ $3\sigma = 38191 \times 10^{-5}$
 $START = 49683.700 \text{ SEC}$ $STOP = 49685.699 \text{ SEC}$

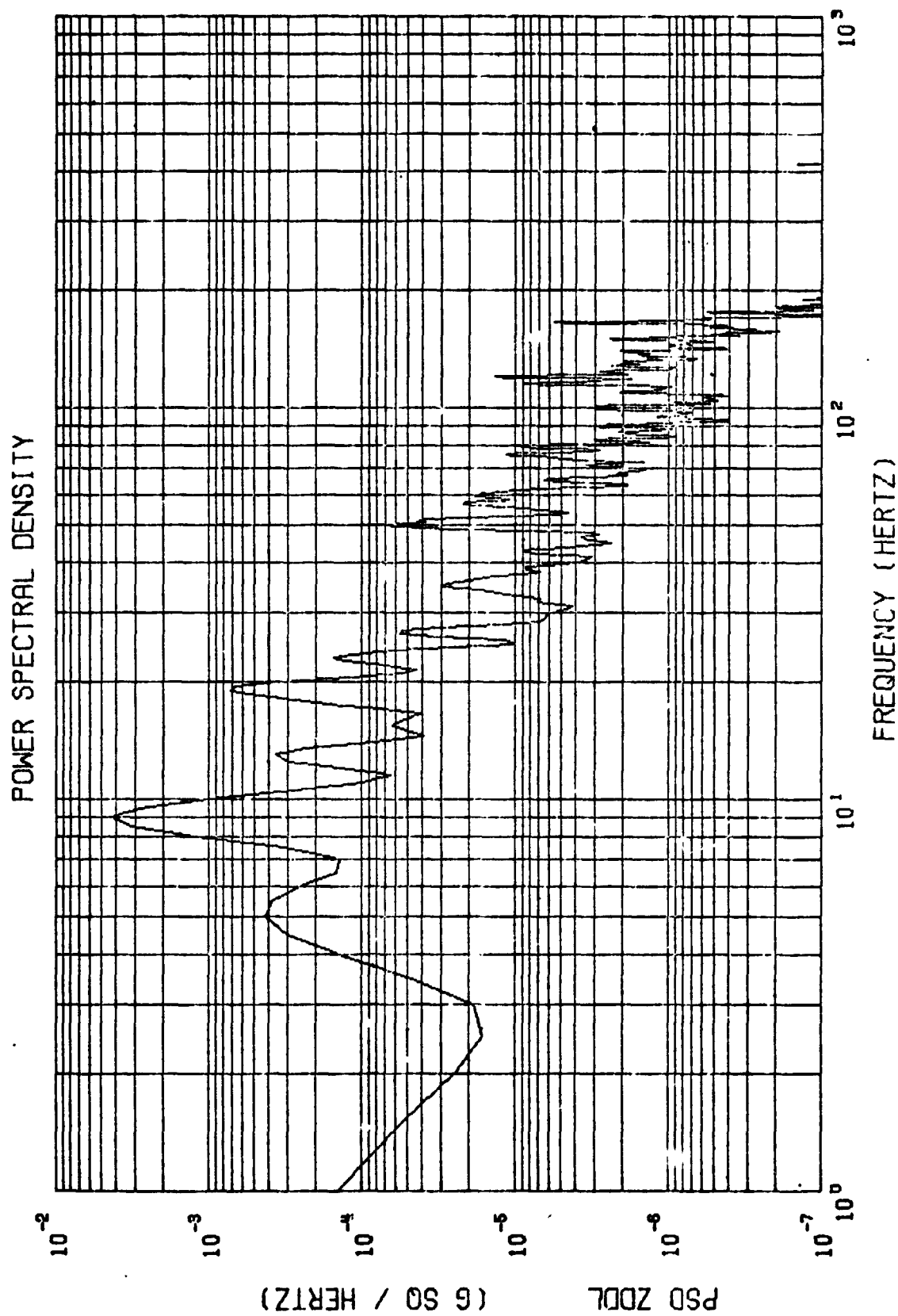
TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

YDDL

(1024 SPS) Figure 2.27

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75


 $\Delta F = .500$
 $\text{START} = 49683.700 \text{ SEC}$
 $\text{STUP} = 49685.699 \text{ SEC}$
 $\text{MEAN} = 17578 \times 10^{-4}$
 $\sigma^2 = 11133 \times 10^{-6}$
 $\sigma = 10551 \times 10^{-3}$
 $3\sigma = 31655 \times 10^{-3}$

TC-1 / VDS DATA (LRC-3A)

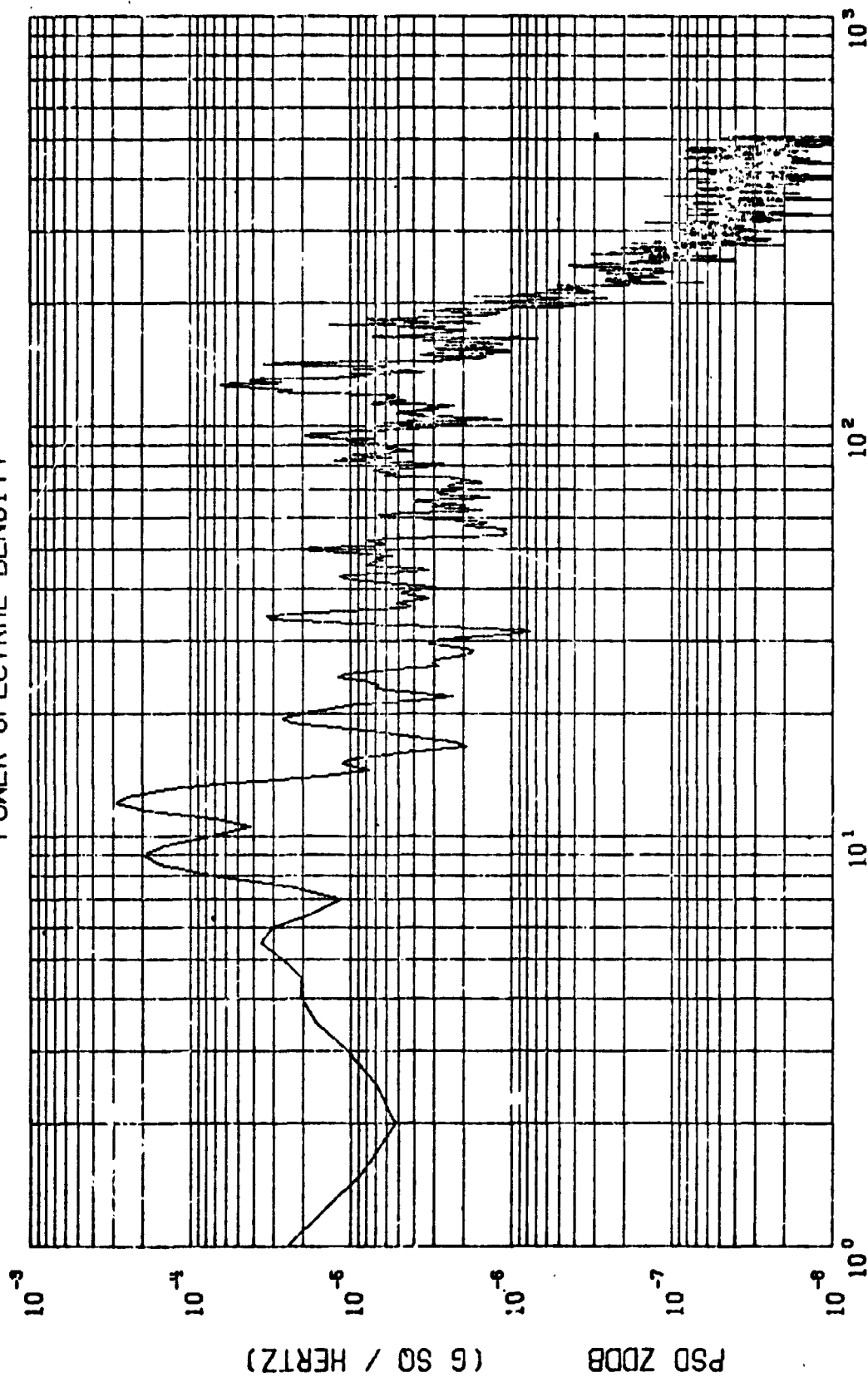
STAGE 0 IGN

ZDDL

(1024 SPS)

Figure 2.28

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$

START = 49683.700 SEC

STOP = 49685.699 SEC

MEAN = 65602×10^{-5}

$\sigma^2 = 23681 \times 10^{-7}$

$\sigma = 48663 \times 10^{-6}$

$3\sigma = 14599 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

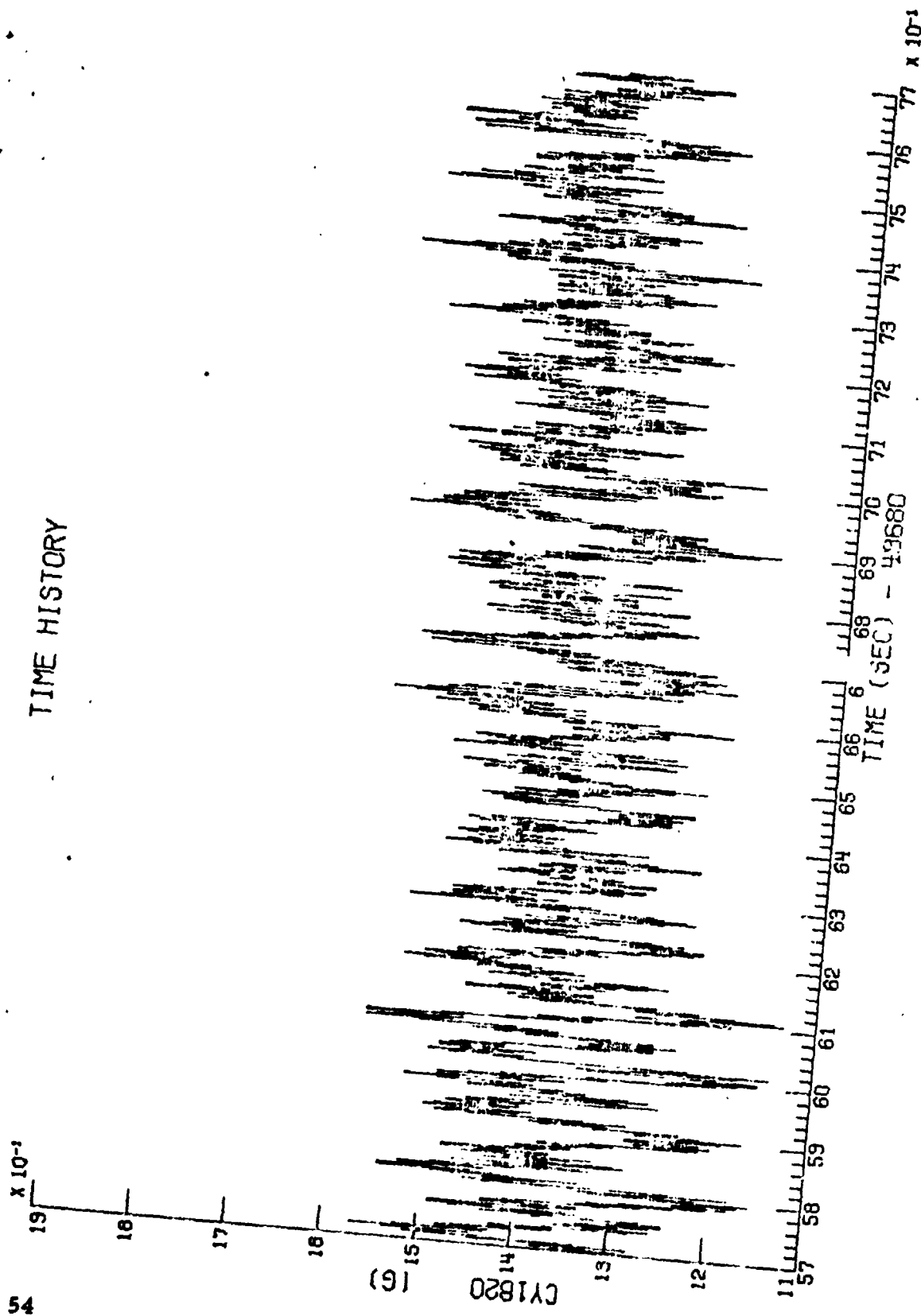
STAGE 0 IGN

Z008

(1024 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

Figure 2.29



MAX = 1.578

MIN = 1.133

TC-1 / VDS DATA (LRC-3A)

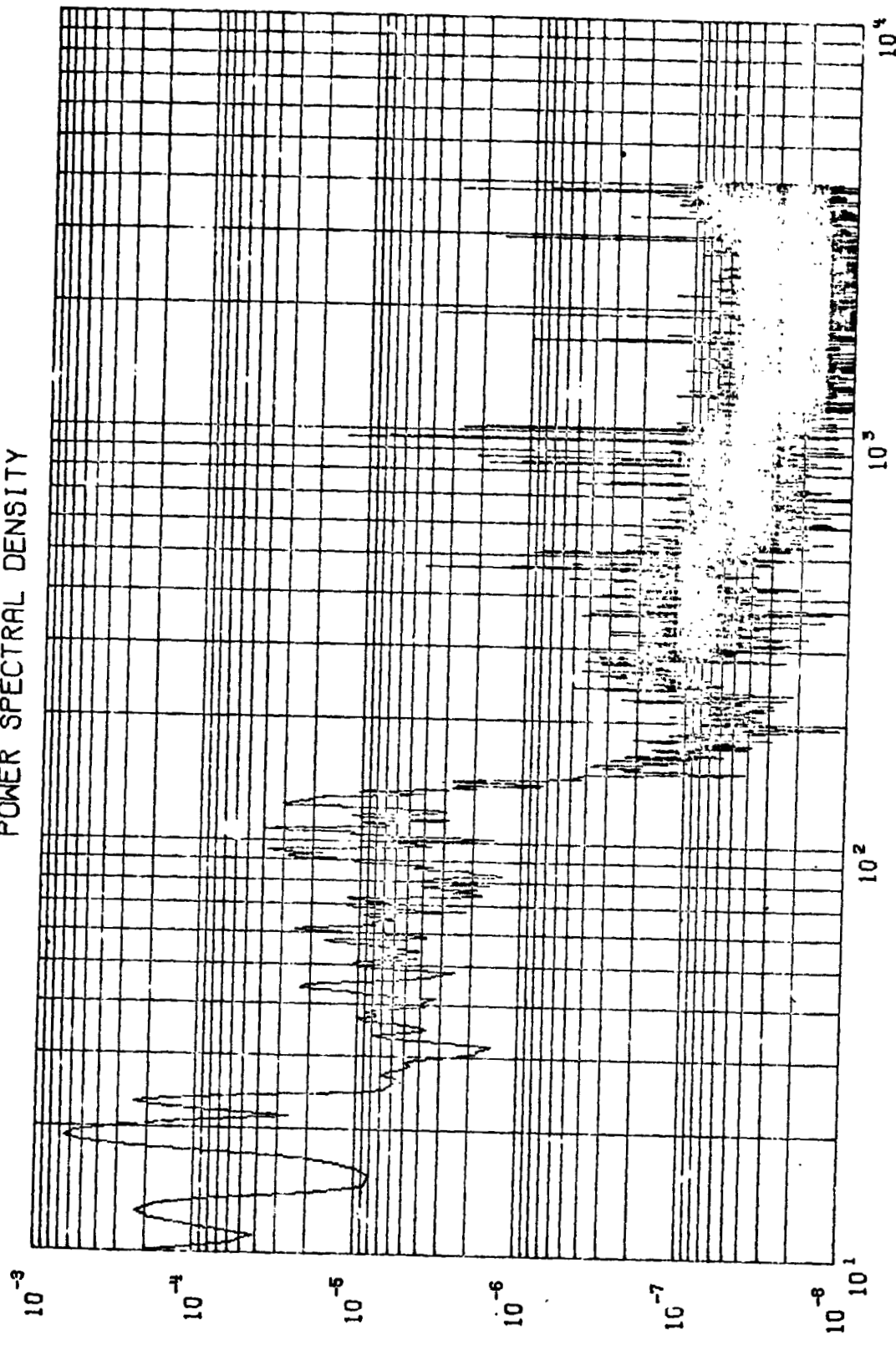
NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

STAGE 0 IGN

CY1820

(0192 SPS) Figure 2.30a

POWER SPECTRAL DENSITY

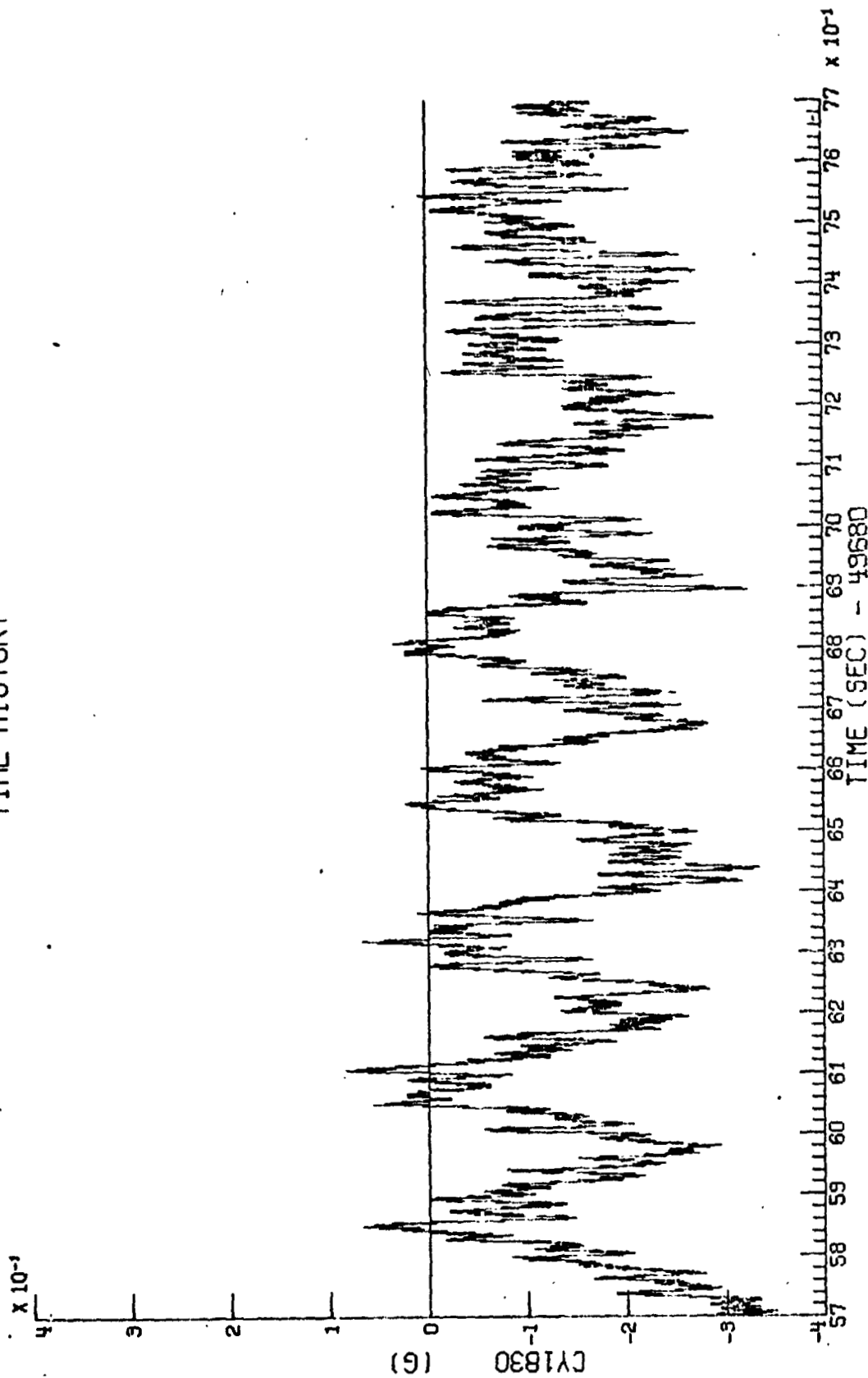


$\Delta F = .500$
 $MEAN = 13788 \times 10^{-4}$ $\sigma^2 = 49965 \times 10^{-7}$ $\sigma = 70686 \times 10^{-6}$ $3\sigma = 21205 \times 10^{-5}$
 $START = 49685.701 \text{ SEC}$ $STOP = 49687.699 \text{ SEC}$

TC-1 / VDS DATA (LRC-3A) STAGE 0 IGN CY1820

(8192 SPS) Figure 2.30b

TIME HISTORY



MAX = .083

MIN = -.350

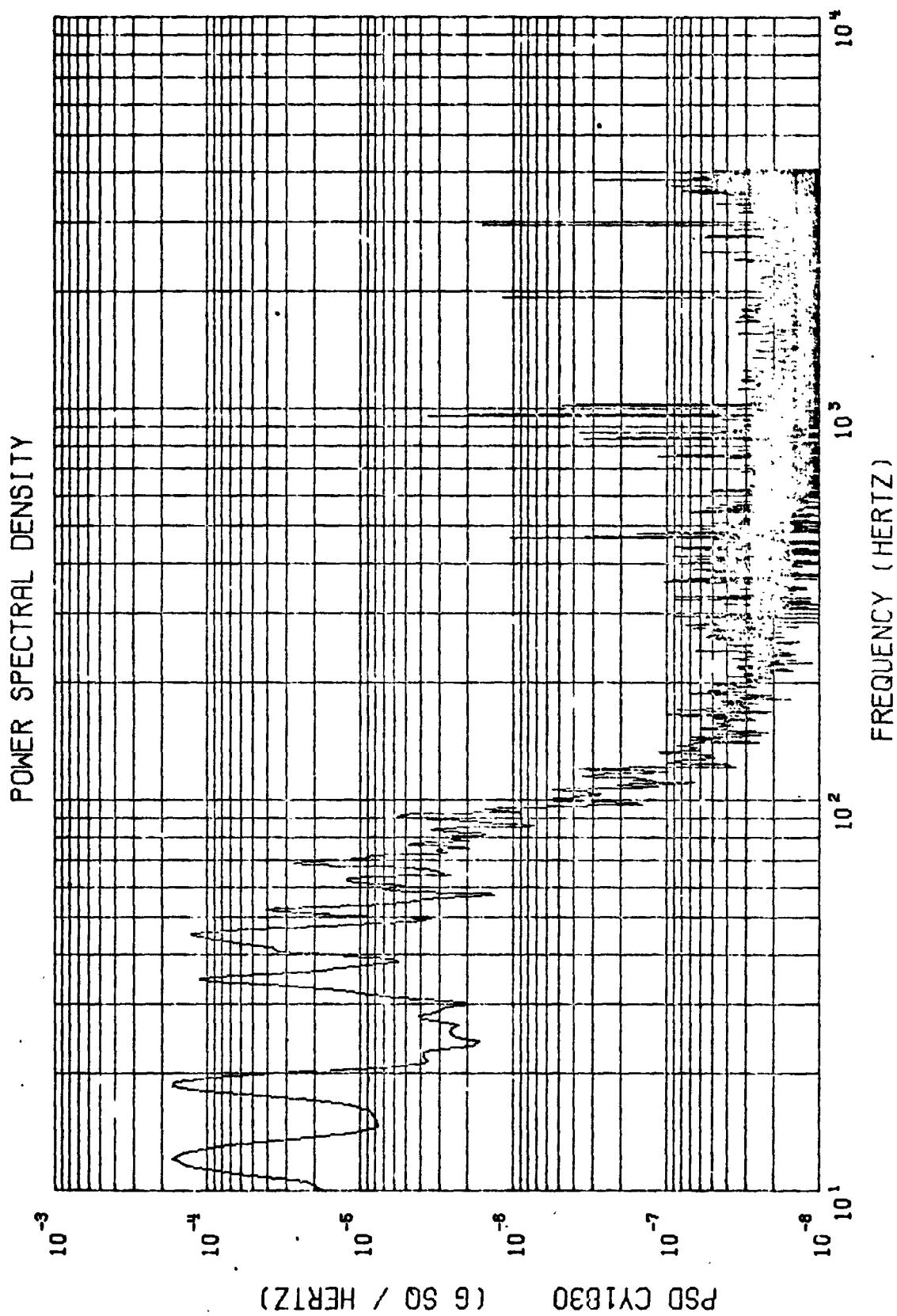
TC-1 / VDS DATA (LRC-39)

STAGE 0 IGN

CY1830

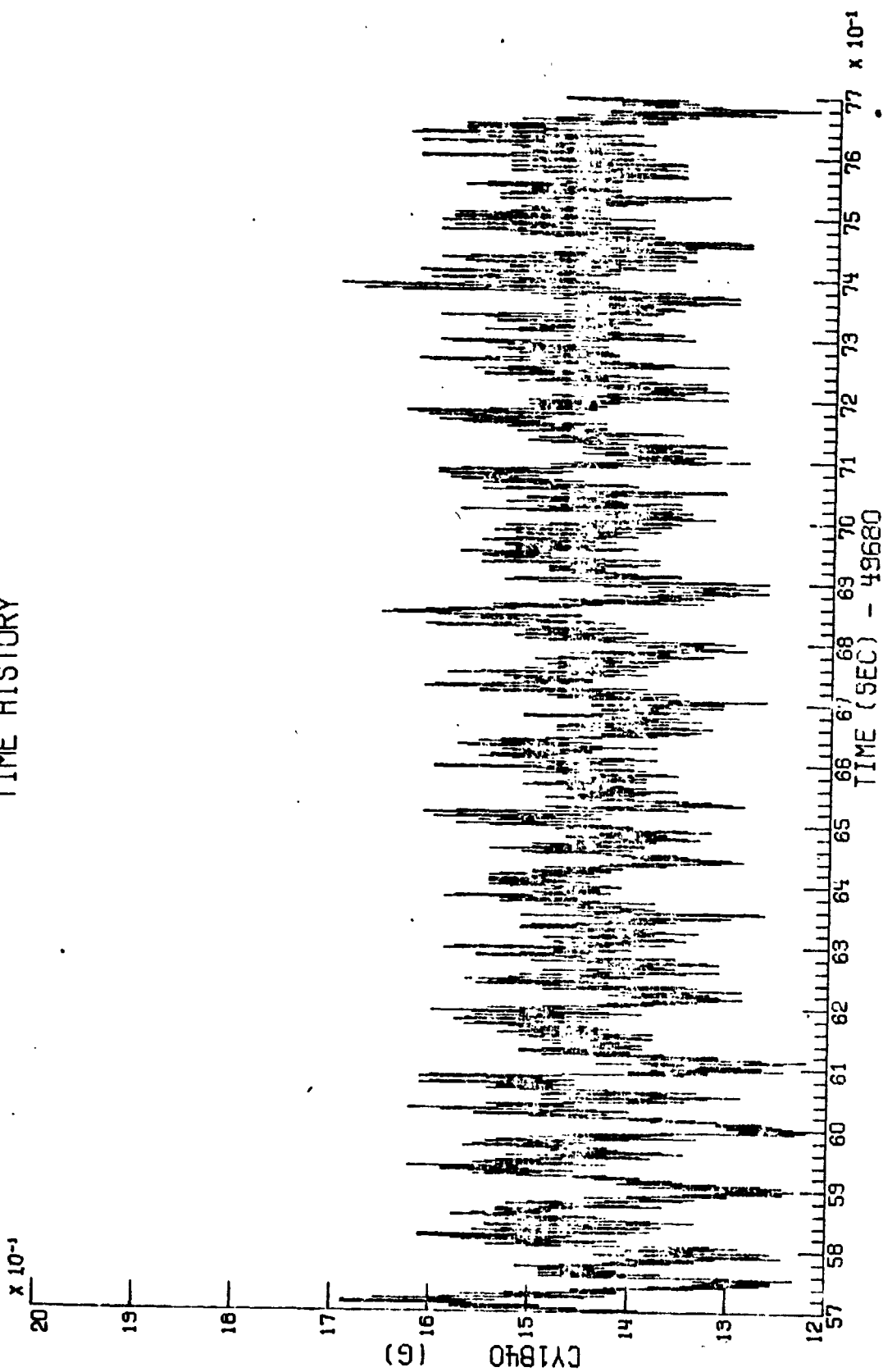
(8192 SPS) Figure 2.31a

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75



$\Delta F = .500$
 $\text{MEAN} = -13079 \times 10^{-8}$ $\sigma^2 = 63179 \times 10^{-7}$ $\sigma = 79485 \times 10^{-8}$ $3\sigma = 23845 \times 10^{-8}$
 $\text{START} = 49685.701 \text{ SEC}$ $\text{STOP} = 49687.699 \text{ SEC}$

TIME HISTORY



MAX = 1.699

MIN = 1.210

TC-1 / VDS DATA (LRC-3A)

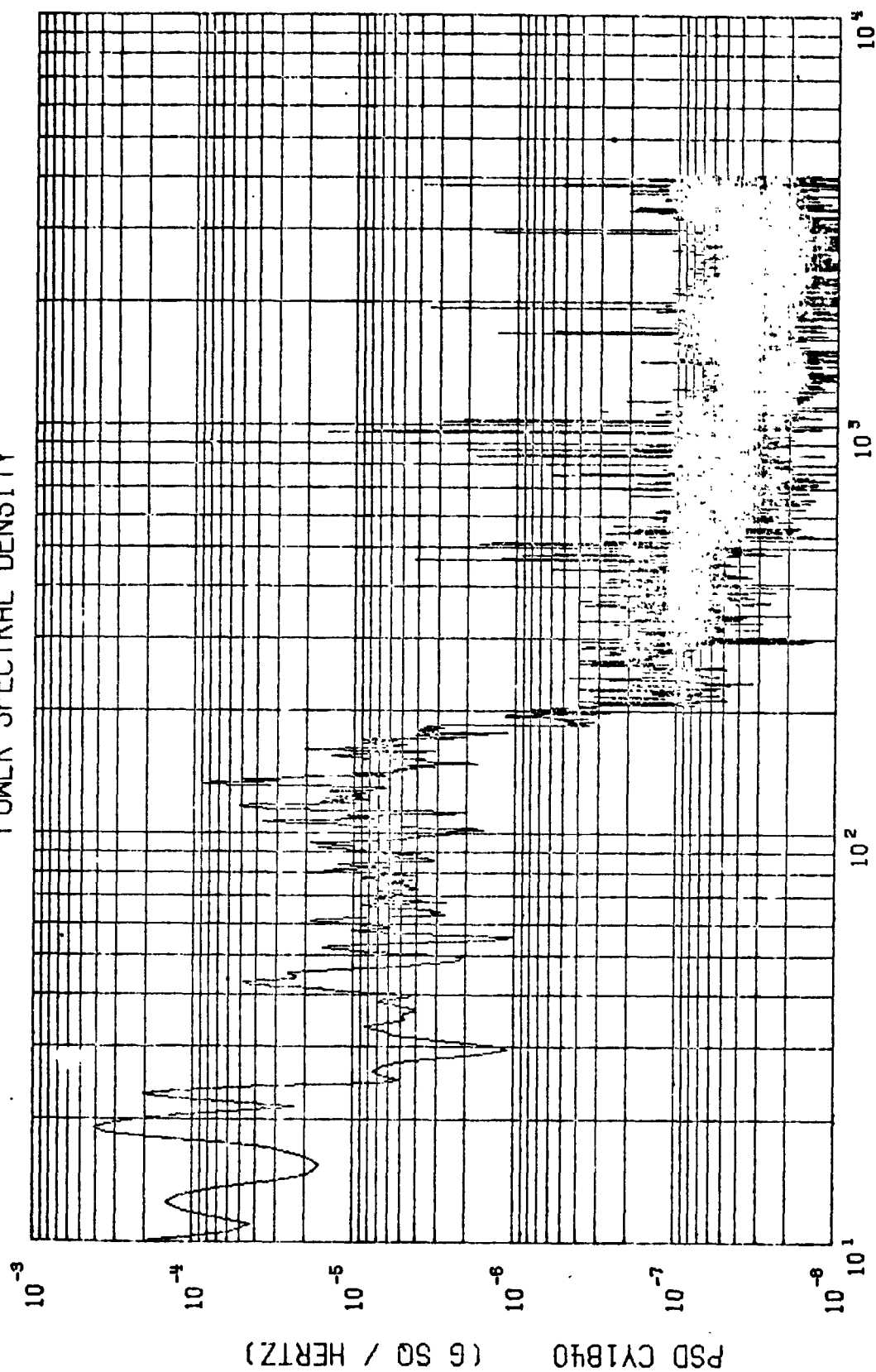
STAGE 0 IGN

CY1840

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

(8192 SPS) Figure 2.32a

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49685.701 SEC

STOP = 49687.699 SEC

MEAN = 1.4143×10^{-4}

$\sigma^2 = 5178 \times 10^{-6}$

$\sigma = 71958 \times 10^{-5}$

$3\sigma = 21587 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

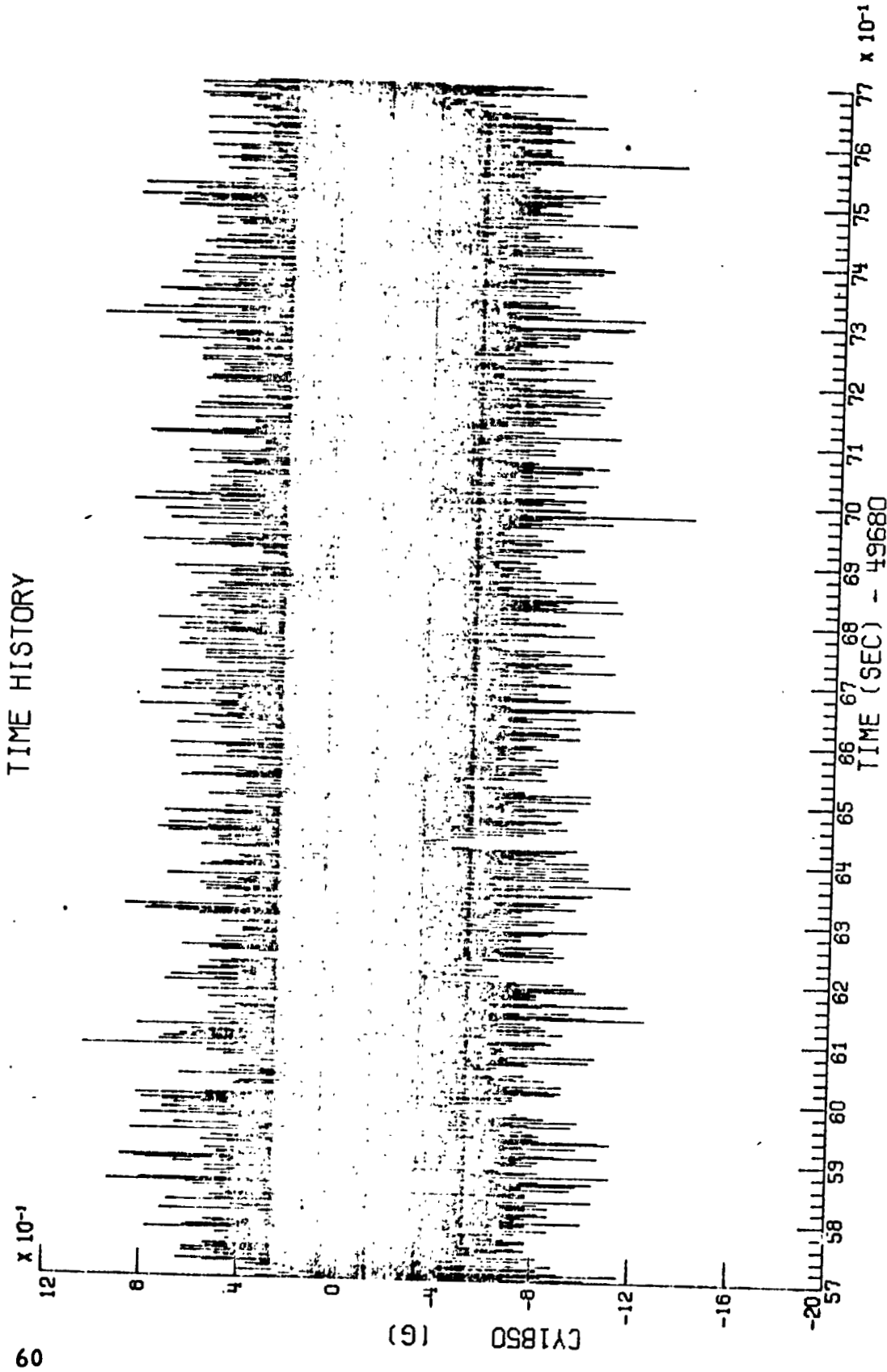
CY1840

(8192 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

Figure 2.32b

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MAX = 1.044

MIN = -1.400

TC-1/VDS DATA (LRC-3A)

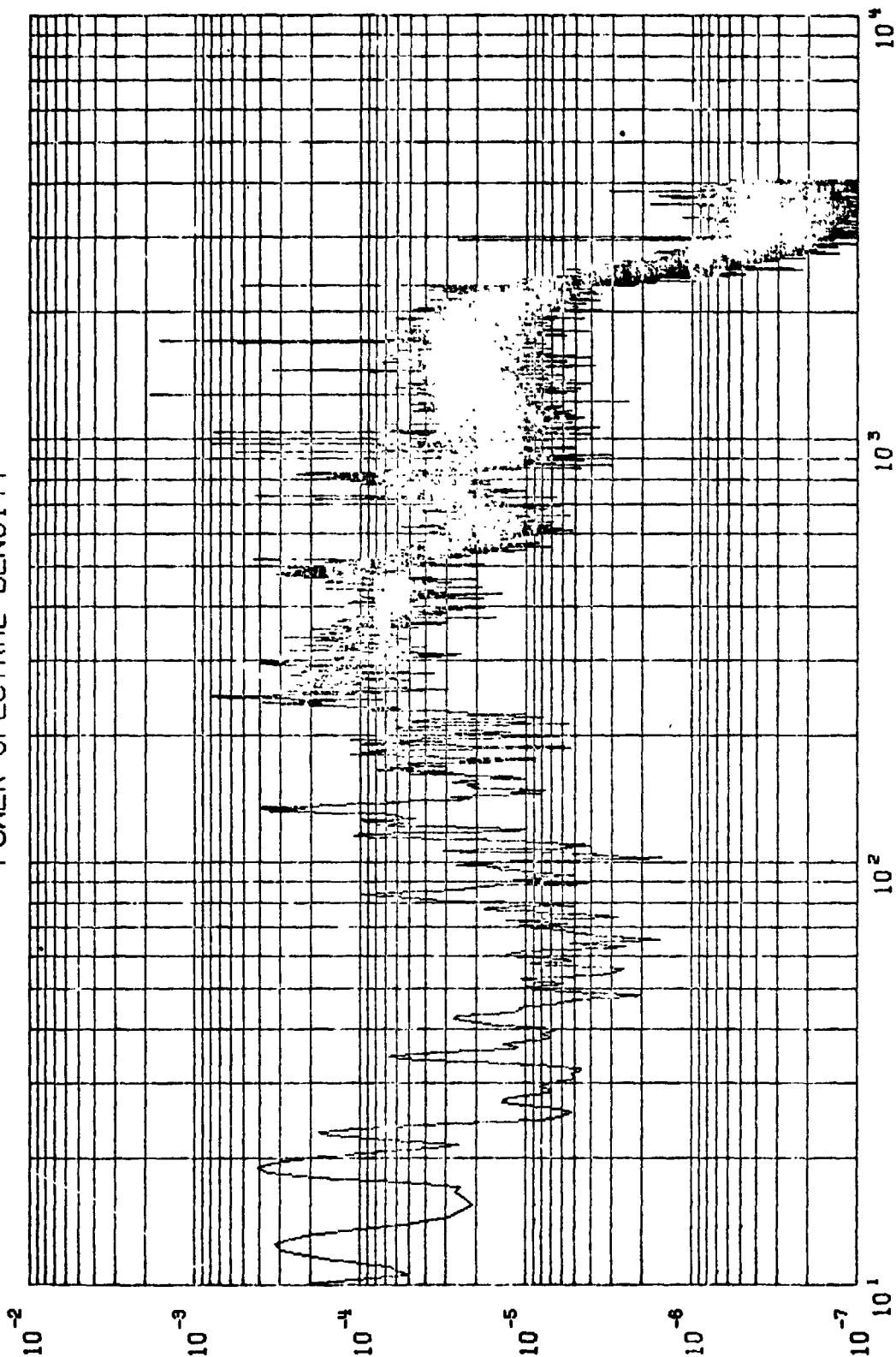
STAGE 0 IGN

CY1850

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

(8192 SPS) Figure 2.33a

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$

START = 49685.701 SEC

STOP = 49687.699 SEC

MEAN = -13134×10^{-5}

$\sigma^2 = 98044 \times 10^{-5}$

$\sigma = 31311 \times 10^{-3}$

$3\sigma = 93935 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

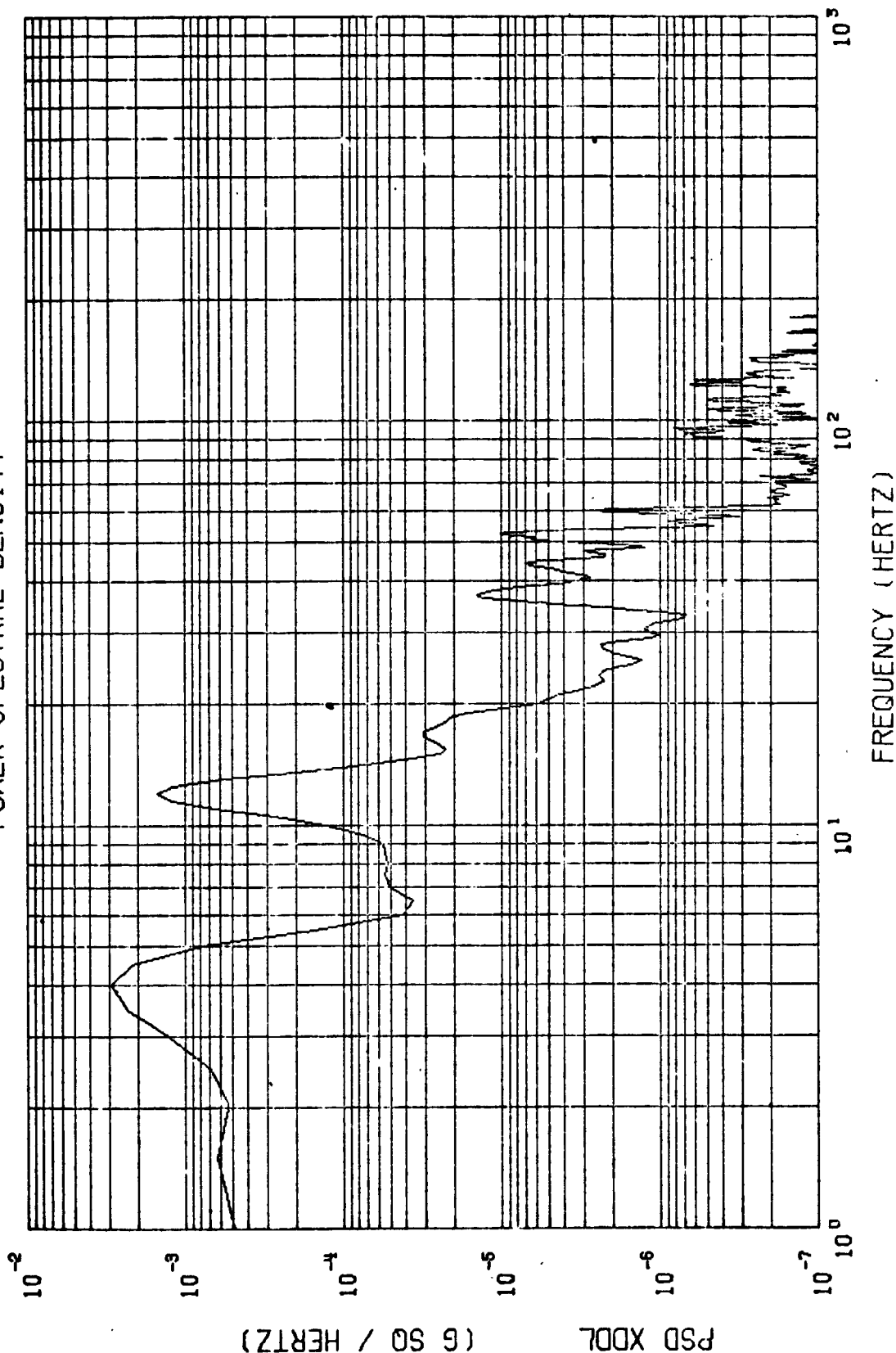
CY1850

(8192 SPS)

Figure 2.33b

NE3A-1 ANALYSIS PROGRAM 07/30/75

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49685.700 SEC

STOP = 49687.699 SEC

MEAN = -39391×10^{-5}

$\sigma^2 = 9501 \times 10^{-5}$

$\sigma = 97473 \times 10^{-5}$

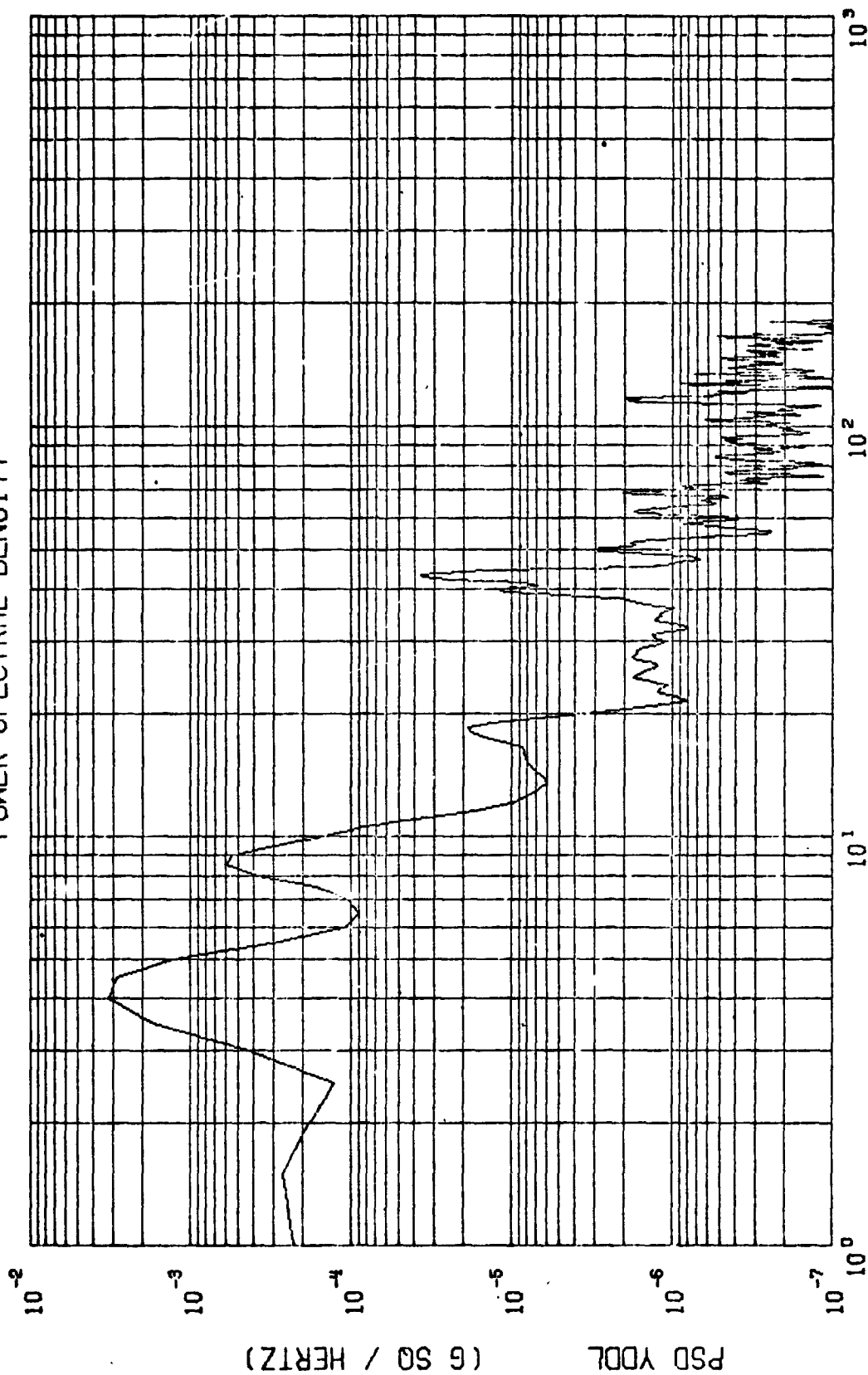
$3\sigma = 29242 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

XDDL

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $MEAN = 97596 \times 10^{-7}$ $\sigma^2 = 69612 \times 10^{-7}$ $\sigma = 83434 \times 10^{-6}$ $3\sigma = 2503 \times 10^{-4}$
 $START = 49685.700 \text{ SEC}$ $STOP = 49687.699 \text{ SEC}$

TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

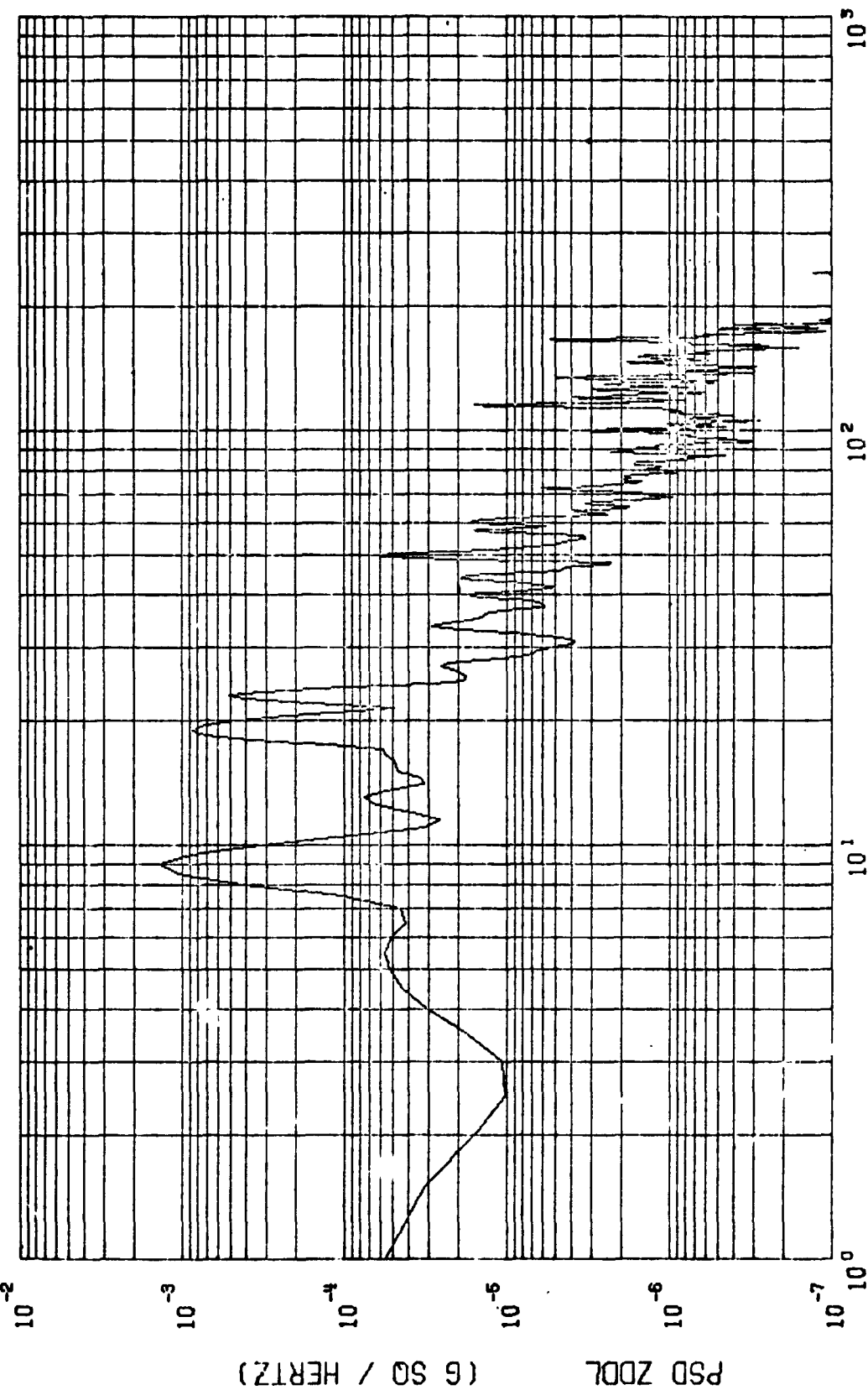
YDDL

(1024 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

Figure 2.35

POWER SPECTRAL DENSITY

 $\Delta F = .500$ START = 49685.700 SEC STOP = 49687.699 SEC MEAN = 1814×10^{-3} $\sigma^2 = 59719 \times 10^{-7}$ $\sigma = 77278 \times 10^{-5}$ $3\sigma = 23183 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

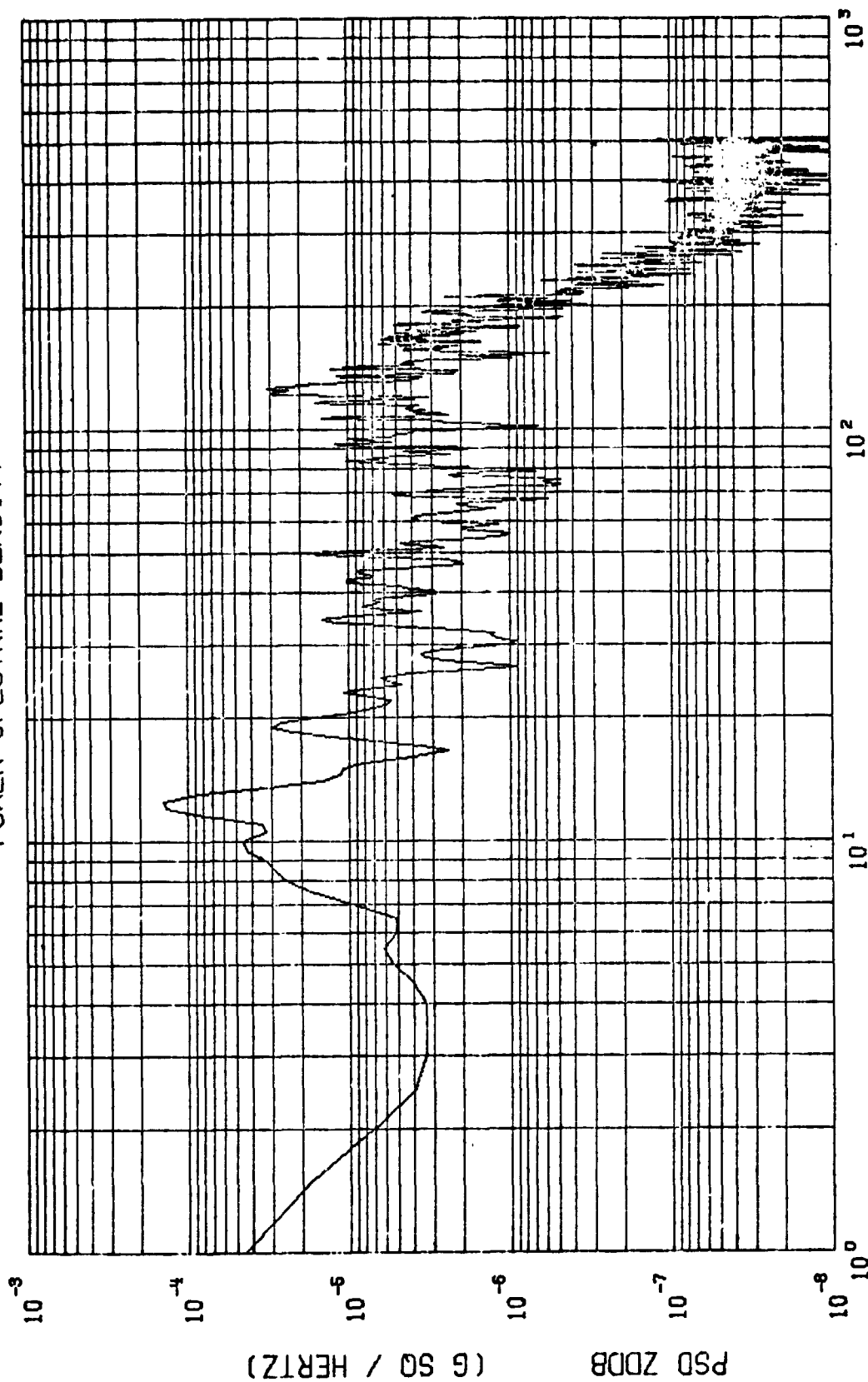
STAGE 0 IGN

ZDOL

(1024 SPS)

Figure 2.36

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $MEAN = 68233 \times 10^{-5}$
 $\sigma^2 = 15169 \times 10^{-7}$

START = 49685.700 SEC

STOP = 49687.599 SEC

$\sigma = 38947 \times 10^{-6}$

$3\sigma = 11684 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

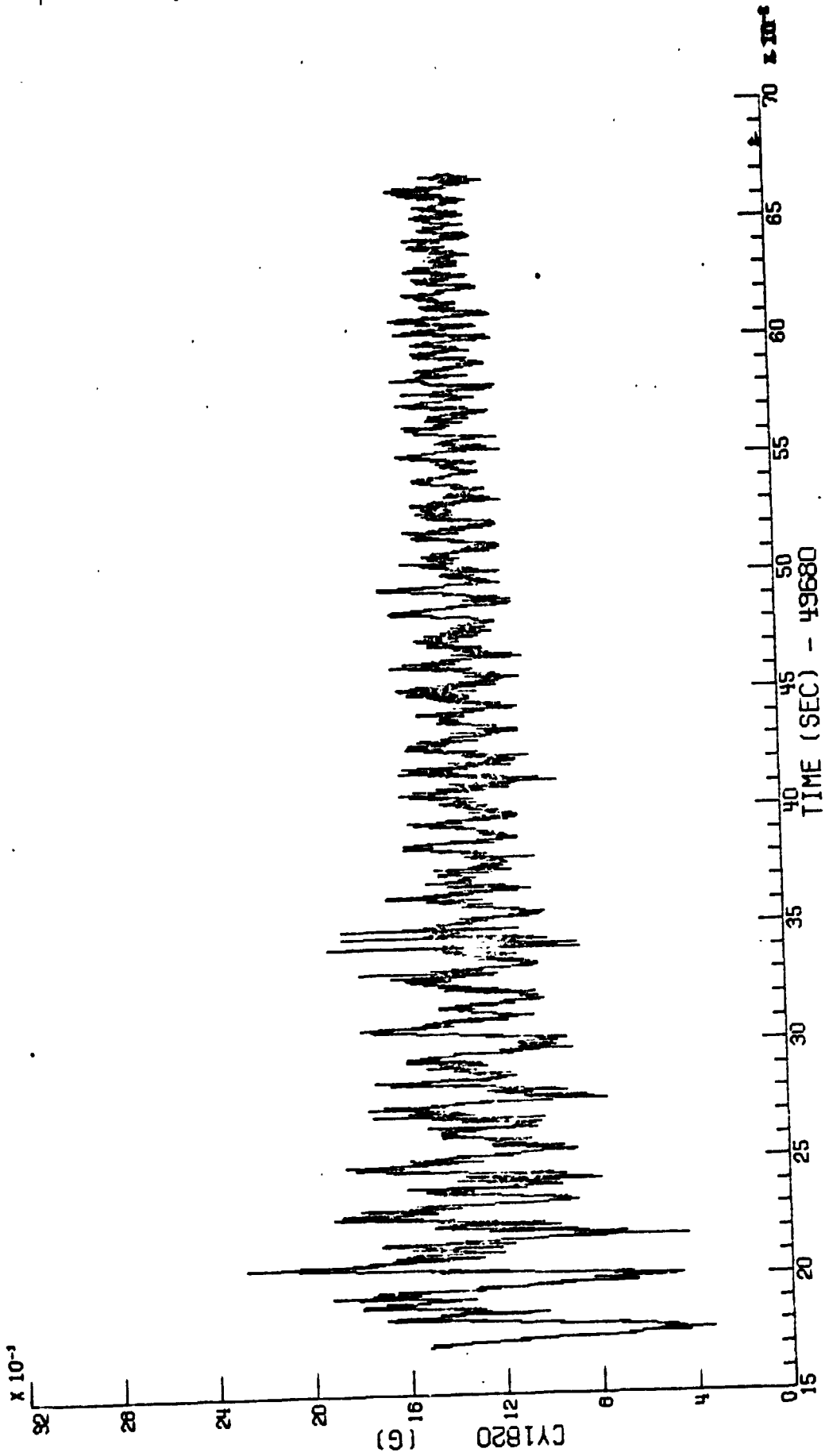
ZDOB

(1024 SPS)

Figure 2.37

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY

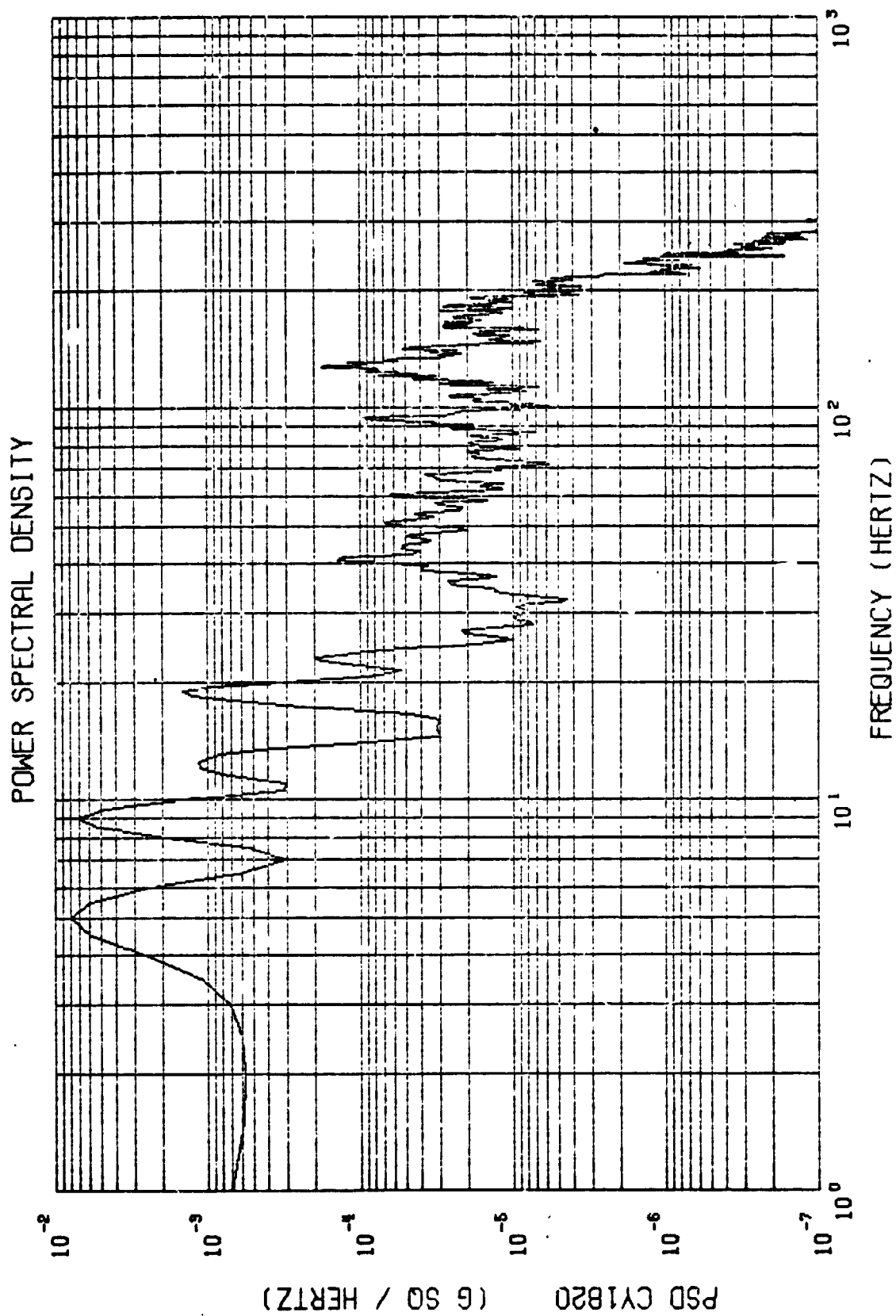


TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

CY1820

(1024 SPS) Figure 2.38a

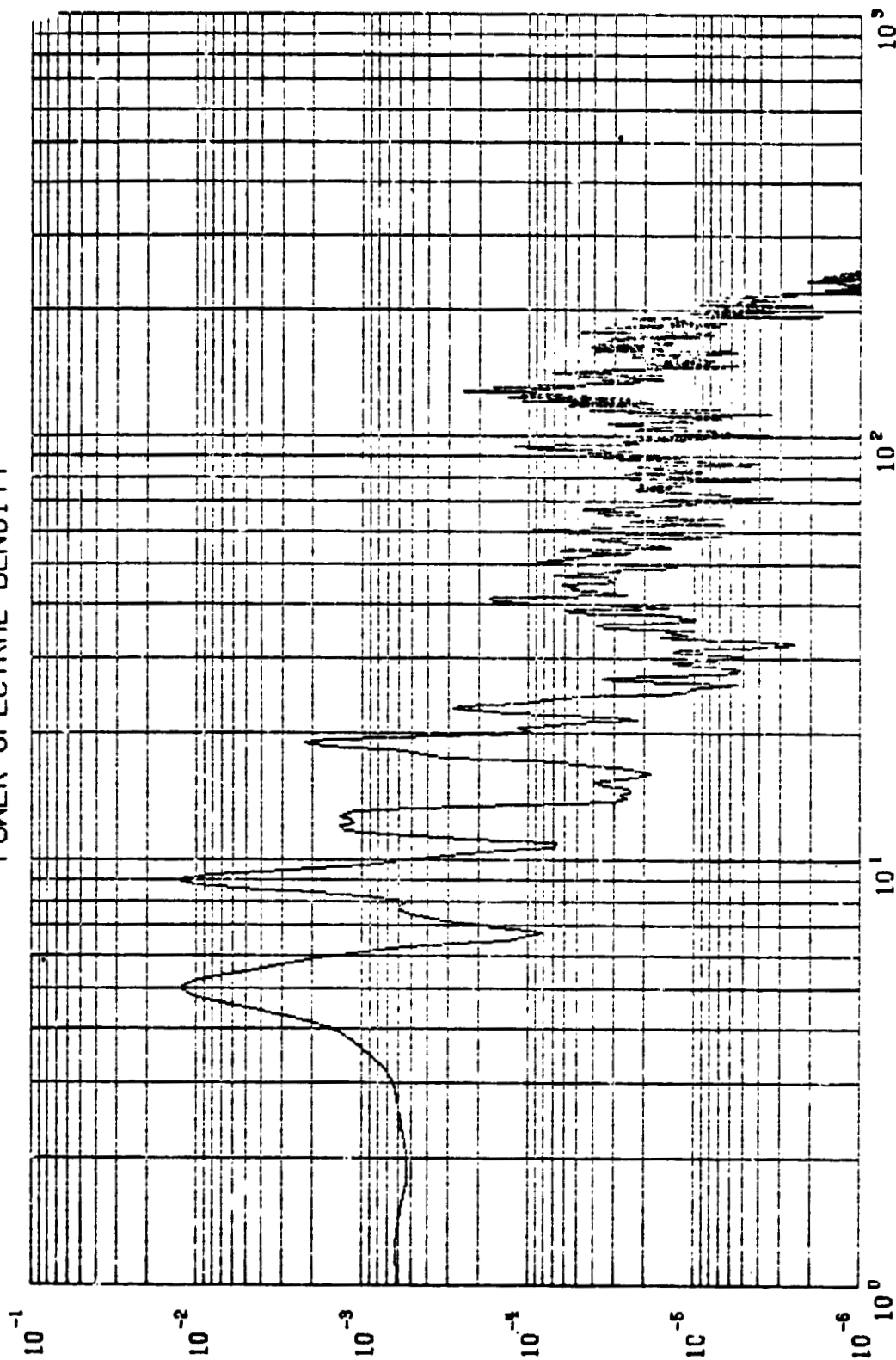


$\Delta F = .500$ START = 49681.700 SEC STOP = 49686.700 SEC
 MEAN = 13171×10^{-3} $\sigma^2 = 36774 \times 10^{-6}$ $\sigma = 19176 \times 10^{-3}$ $3\sigma = 5753 \times 10^{-3}$

TC-1 / VDS DATA (LRC-3A) STAGE 0 IGN CY1820

(1024 SPS) Figure 2.38b

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .250$ START = 45681.700 SEC STOP = 45686.700 SEC
 MEAN = 13171×10^{-4} $\sigma^2 = 36774 \times 10^{-6}$ $\sigma = 19176 \times 10^{-5}$ $3\sigma = 5753 \times 10^{-4}$

TC-1 / VDS DATA (LRC-3A)

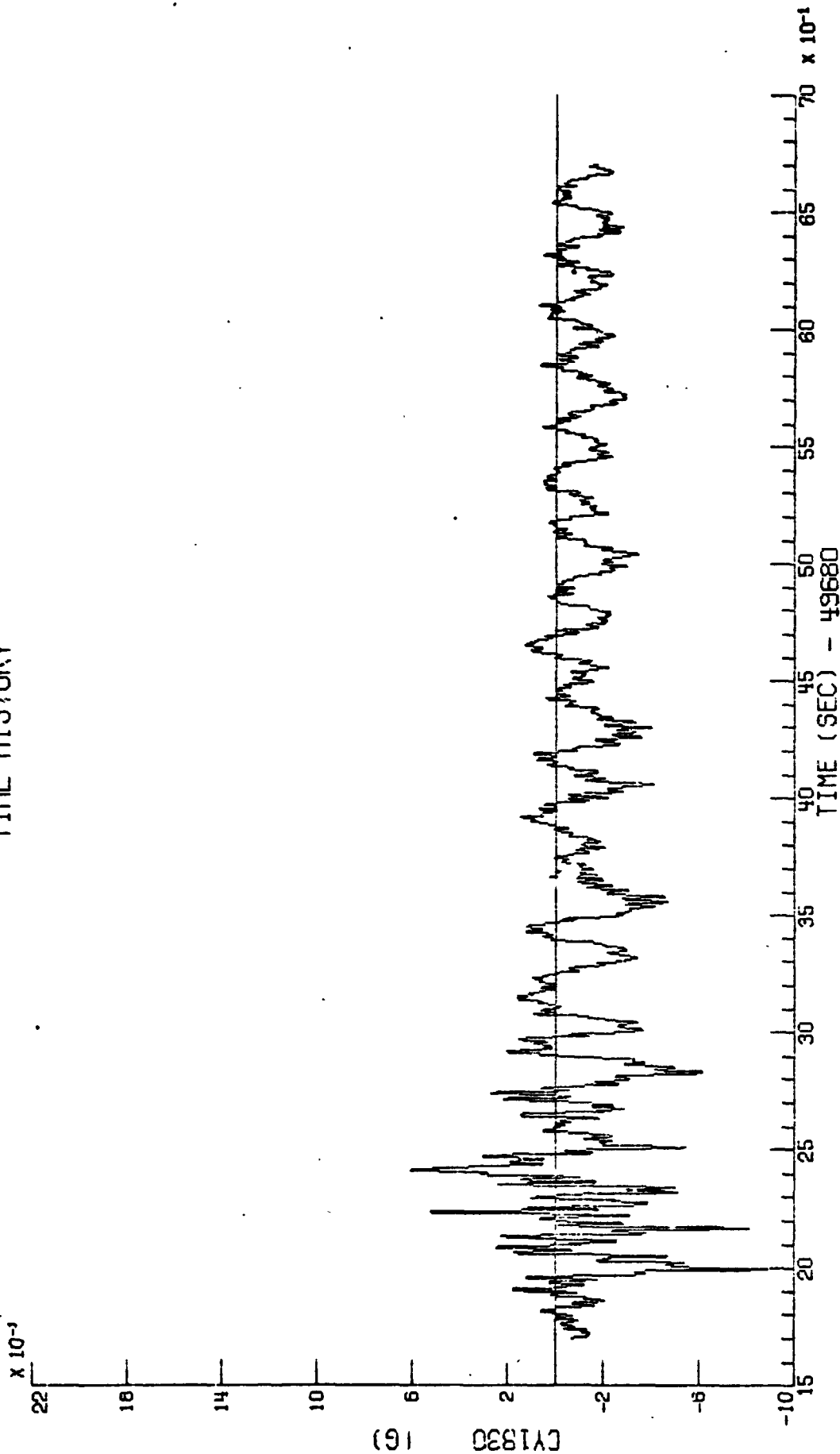
STAGE 0 IGN

CY1820

(1024 SPS) Figure 2.38c

NON-CLASSIFY SIGNAL ANALYSIS PROGRAM 07/21/75

TIME HISTORY



MAX = .606

MIN = -.890

TC-1 / VDS DATA (LRC-3A)

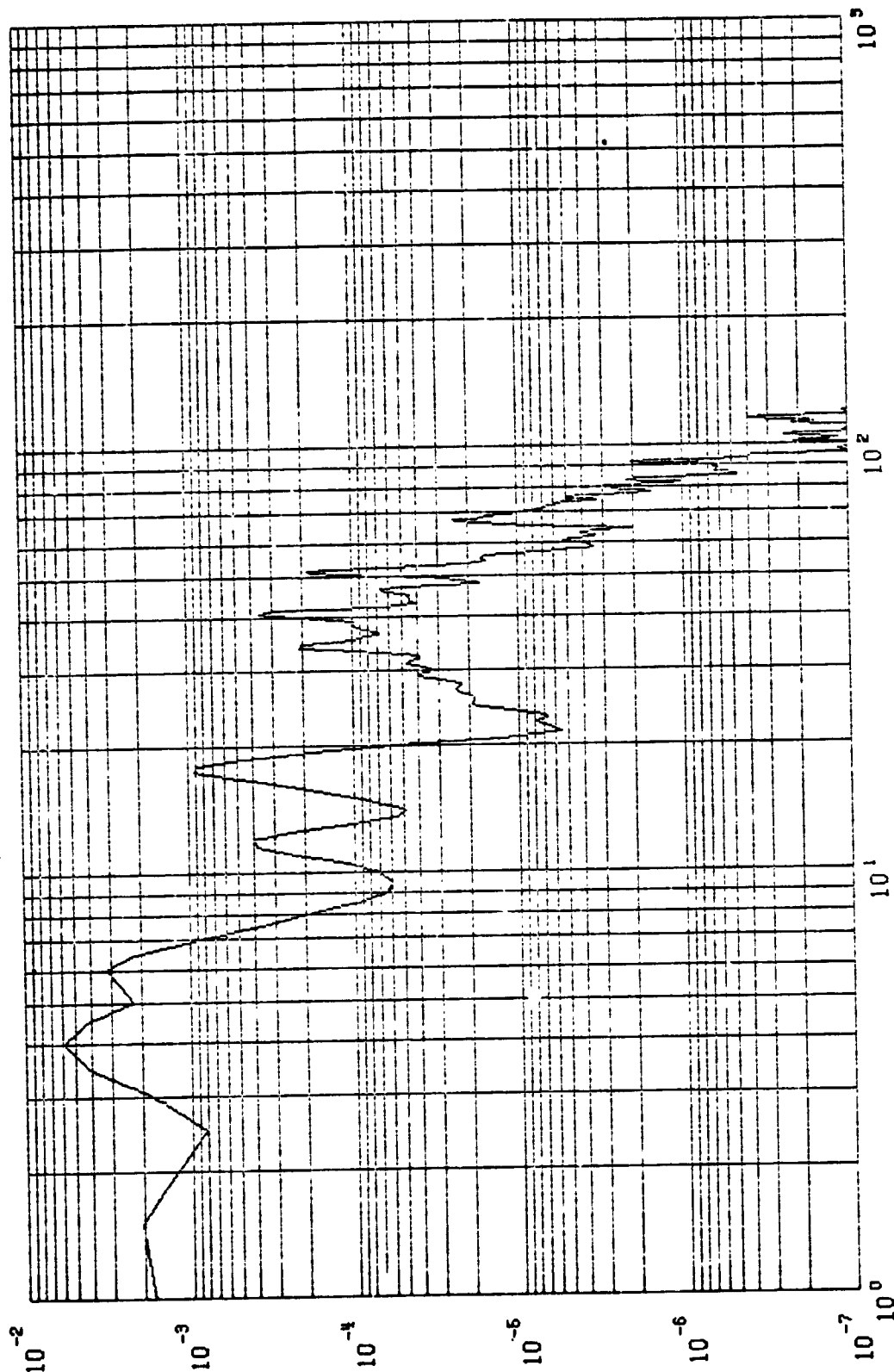
STAGE 0 IGN

CY1830

(1024 SPS) Figure 2.39a

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$
 $MEAN = -10429 \times 10^{-5}$
 $\sigma^2 = 22984 \times 10^{-5}$
 $\sigma = 1516 \times 10^{-1}$
 $3\sigma = 45481 \times 10^{-5}$

START = 49681.700 SEC

STOP = 49686.700 SEC

TC-1 / VDS DATA (LKC-3A)

STAGE 0 IGN

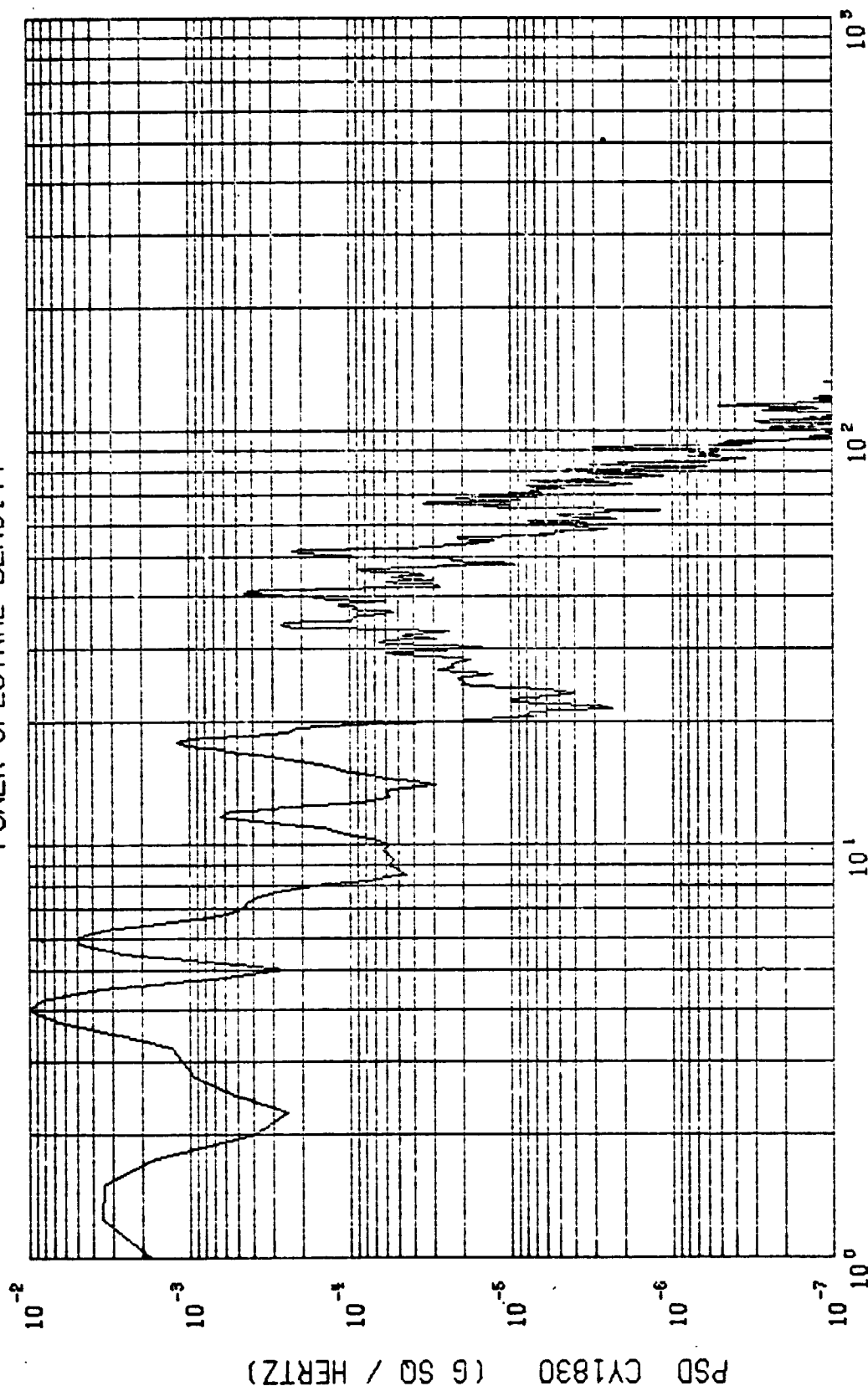
CY1830

Figure 2.39b

(1024 SPS)

NASH-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



$\Delta F = .250$

START = 49681.700 SEC

STOP = 49686.700 SEC

MEAN = -10429×10^{-5} $\sigma^2 = 22984 \times 10^{-6}$

$\sigma = 1516 \times 10^{-3}$

$3\sigma = 45481 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

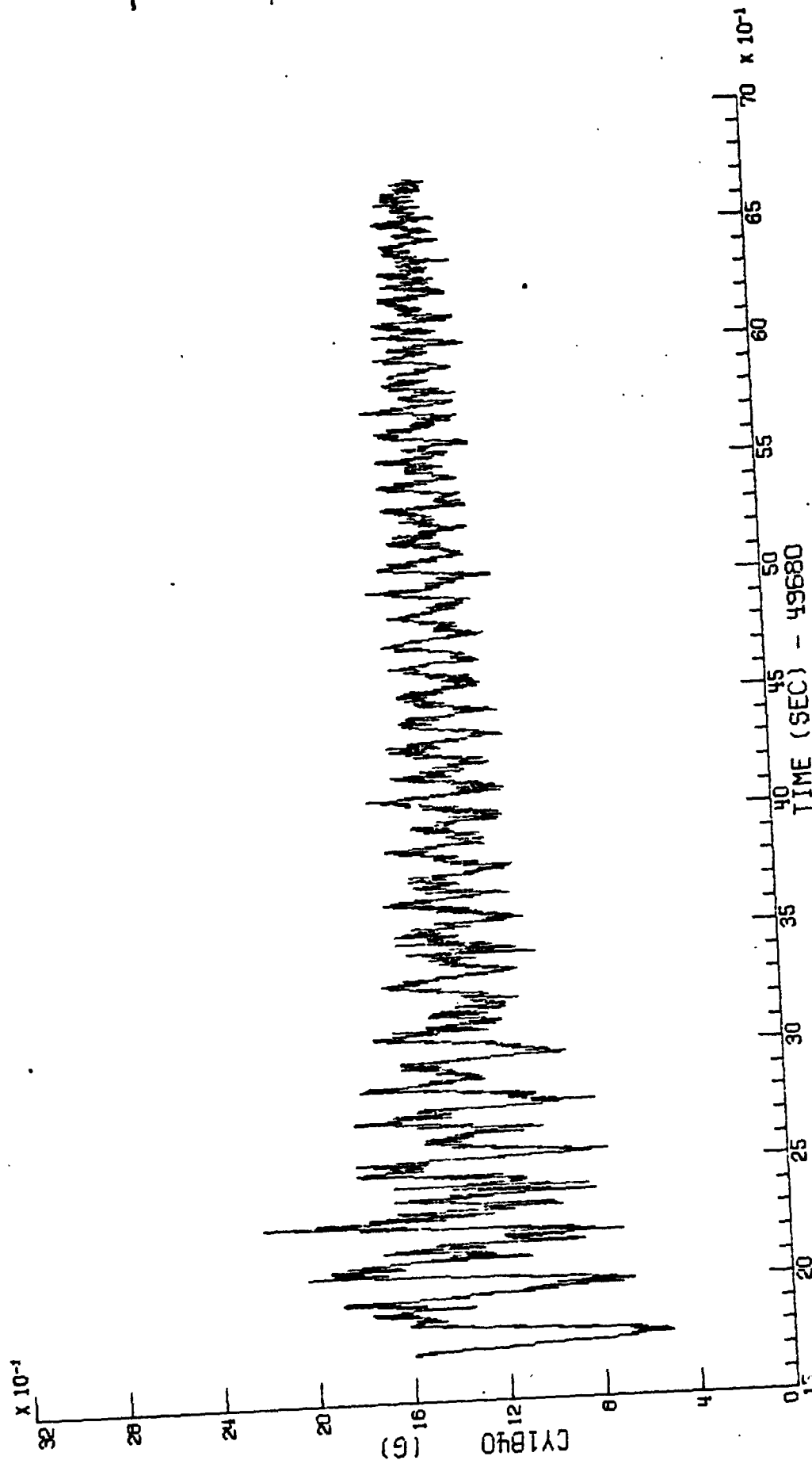
STAGE 0 IGN

CY1830

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

(1024 SPS) Figure 2.39c

TIME HISTORY



MAX = 2.211

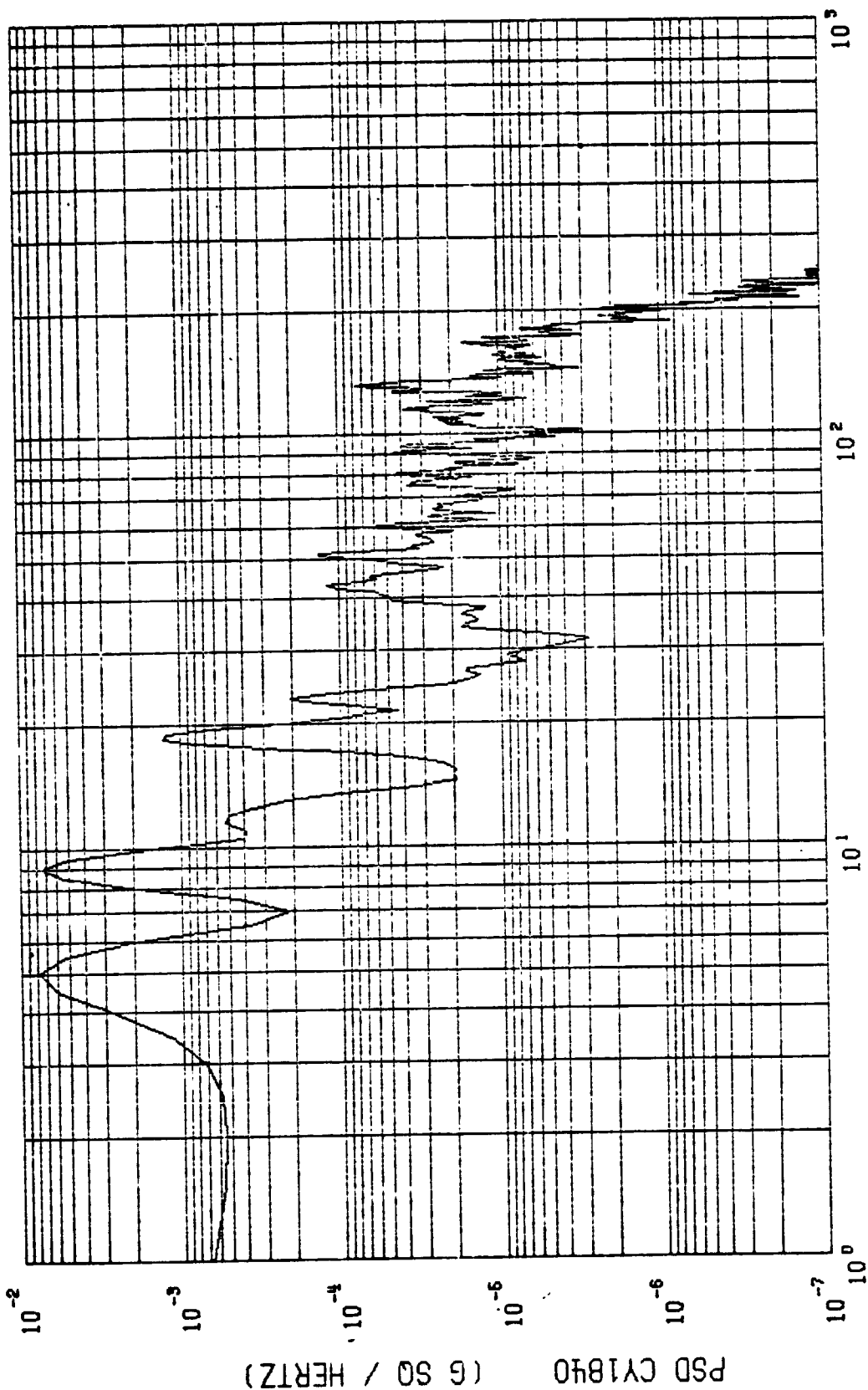
MIN = .511

STAGE 0 IGN
CY1840
(1024 SPS) Figure 2.40a

TC-1 / VDS DATA (LRC-3H)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 496.1700 SEC

STOP = 496.66700 SEC

MEAN = 13722×10^{-4}

$\sigma^2 = 33578 \times 10^{-6}$

$\sigma = 18324 \times 10^{-5}$

$3\sigma = 54973 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

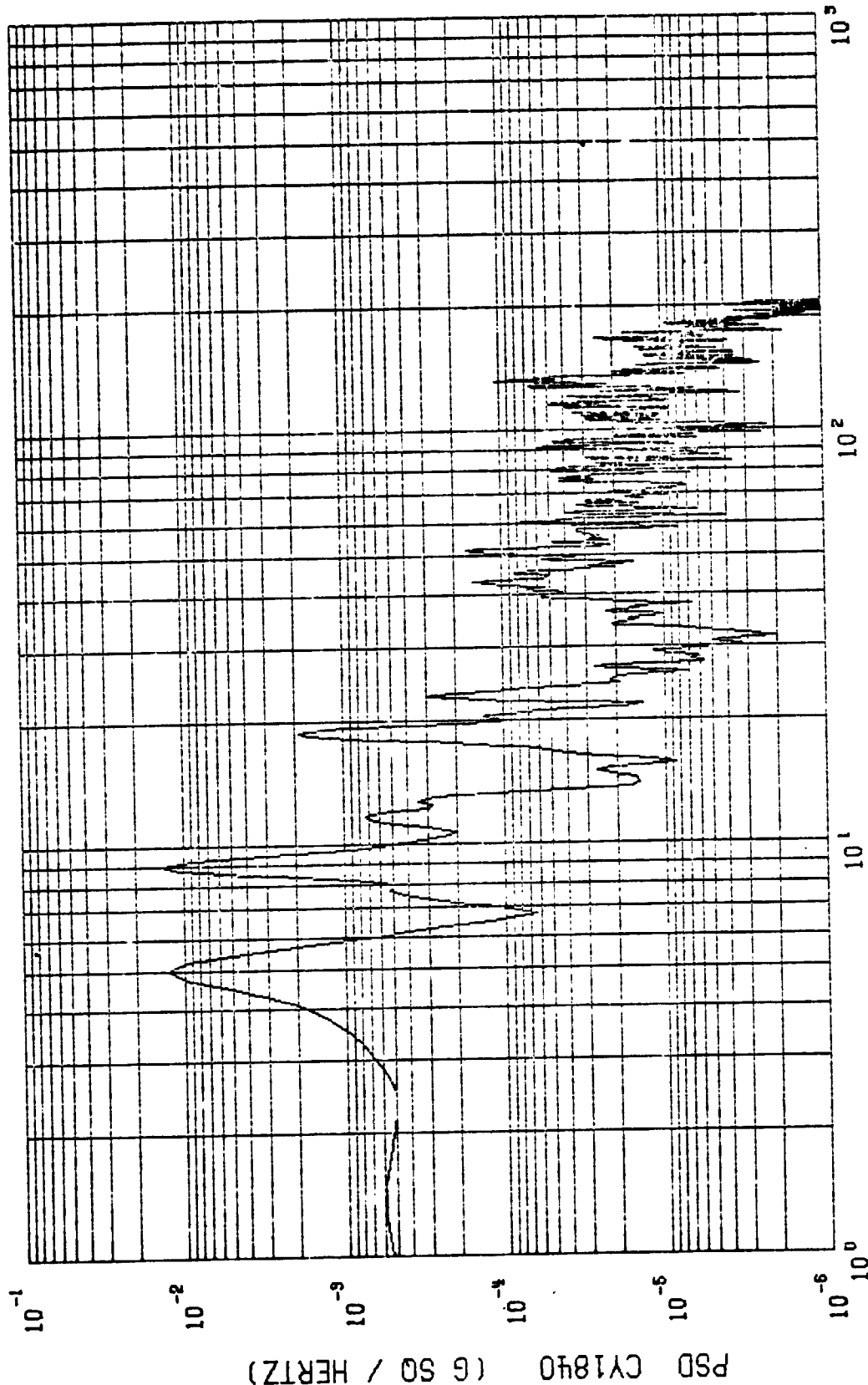
STAGE 0 IGN

CY1840

(1024 SPS) Figure 2.40b

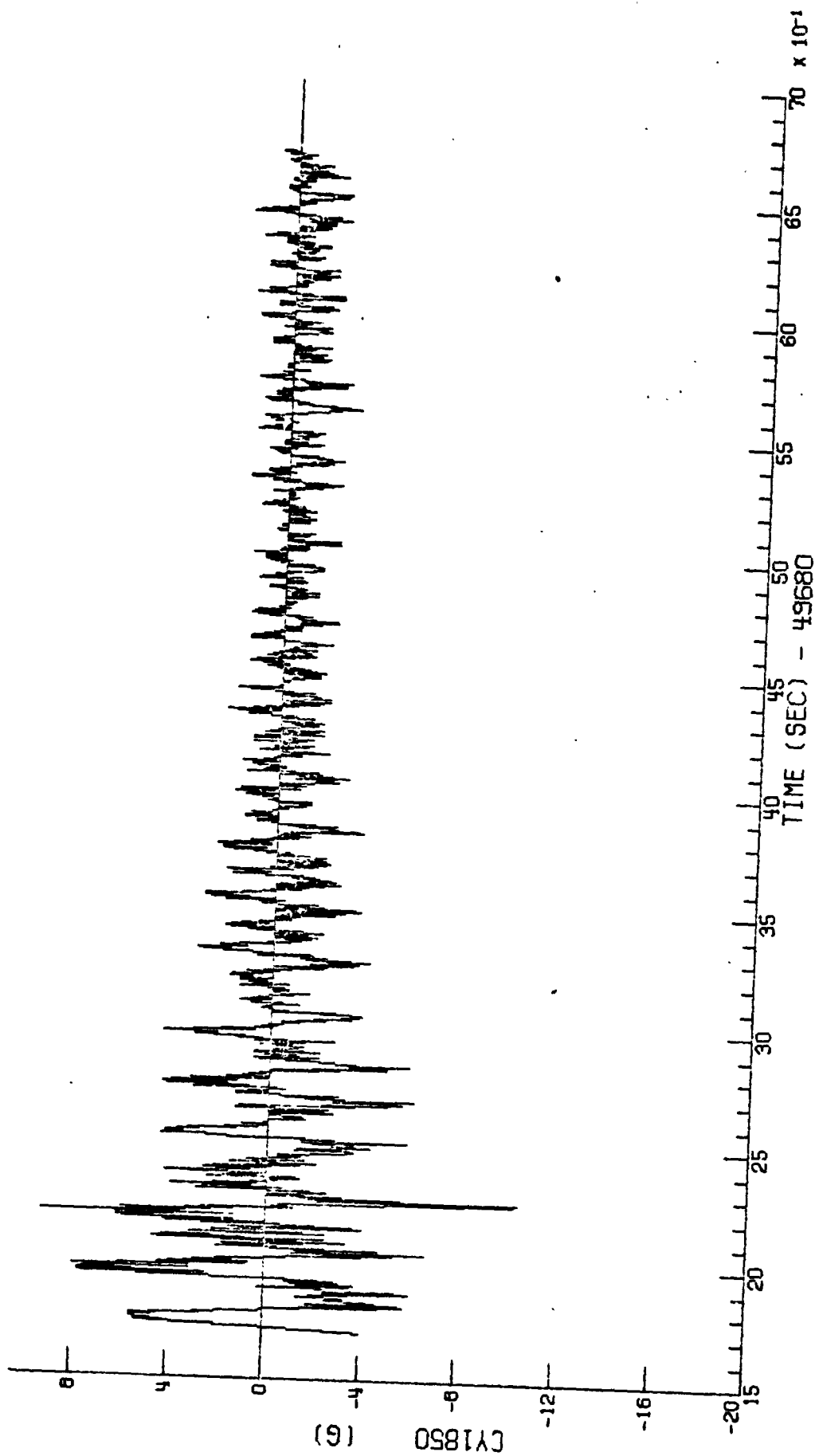
NAER-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



$\Delta F = .250$ $\text{START} = 49681.700 \text{ SEC}$ $\text{STOP} = 49686.700 \text{ SEC}$
 $\text{MEAN} = 13722 \times 10^{-4}$ $\sigma^2 = 33578 \times 10^{-6}$ $\sigma = 18324 \times 10^{-5}$ $3\sigma = 54973 \times 10^{-5}$
 TC-1 / VDS DATA (LRC-3A) STAGE 0 IGN CY1840
 NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75 (1024 SPS) Figure 2.40c

TIME HISTORY



MAX = .933

MIN = -1.045

TC-1 / VDS DATA (LRC-3A1)

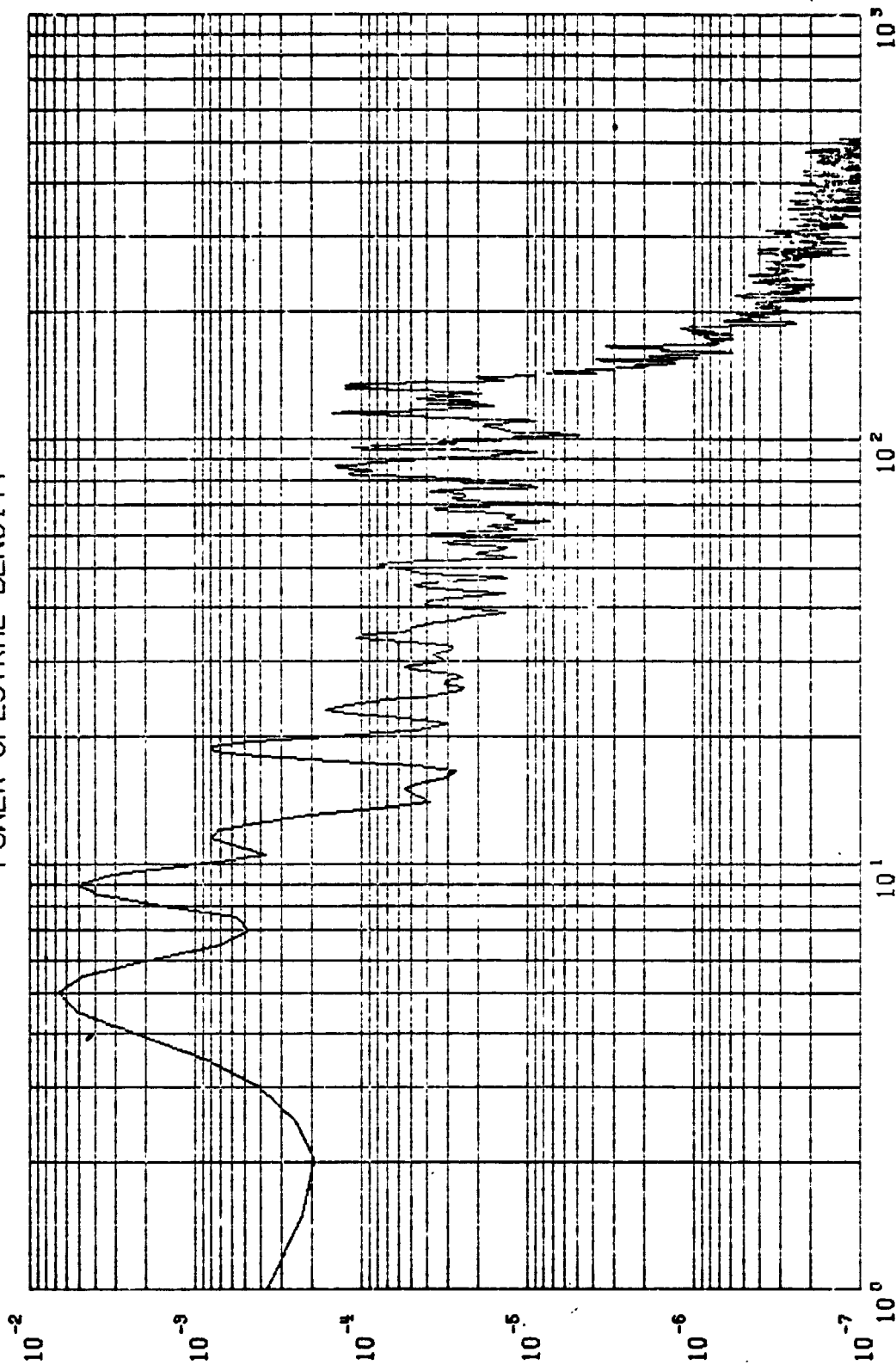
STAGE 0 IGN

CY1850

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

(1024 SPS) Figure 2.41a

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $MEAN = -17601 \times 10^{-6}$ $\sigma^2 = 28202 \times 10^{-6}$ $\sigma = 16793 \times 10^{-5}$ $3\sigma = 5038 \times 10^{-4}$

$START = 49681.700 \text{ SEC}$ $STOP = 49686.700 \text{ SEC}$

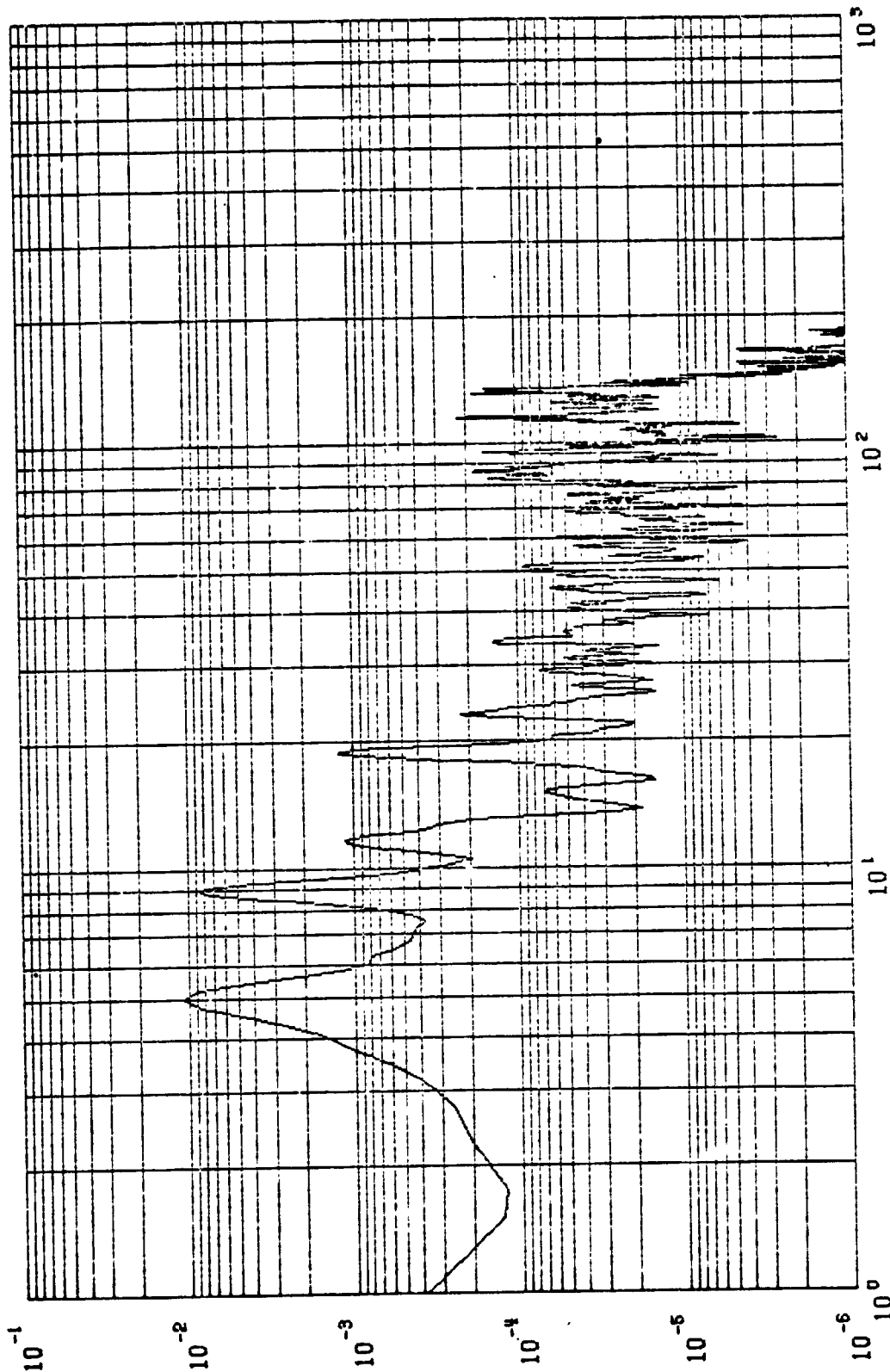
TC-1 / VDS DATA (LRC-3A) STAGE U IGN CY1850

(1024 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

Figure 2.41b

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .250$ START = 49681.700 SEC STOP = 49686.700 SEC
 MEAN = -17601×10^{-6} $\sigma^2 = 28202 \times 10^{-6}$ $\sigma = 16793 \times 10^{-3}$ $3\sigma = 5038 \times 10^{-4}$

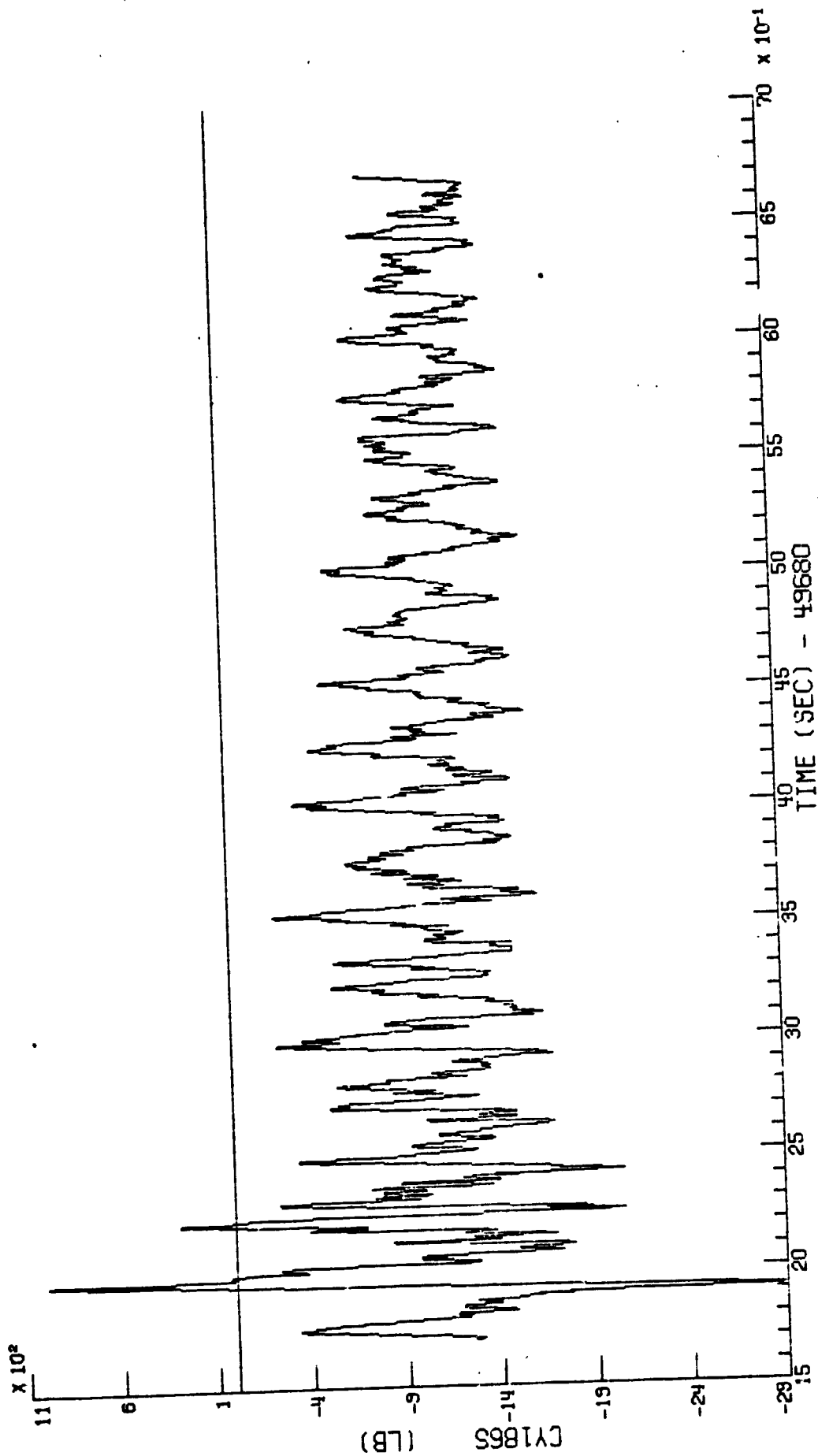
TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

CY1850

(1024 SPS) Figure 2.41c

TIME HISTORY



MIN = -2385.182

MPX = 999.820

CY1865

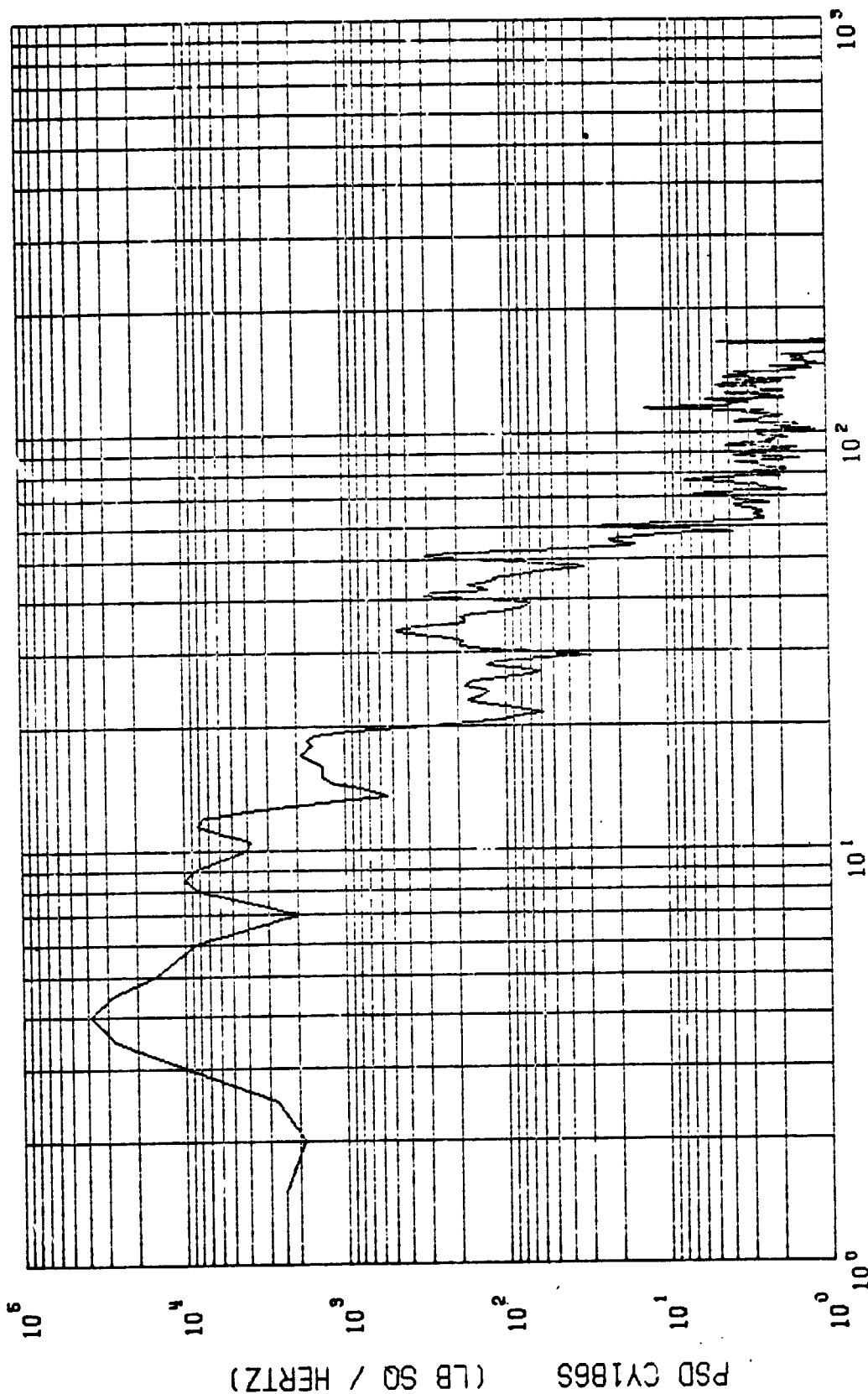
STAGE 0 IGN

(1024 SPS) Figure 2.42a

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNATURE ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY

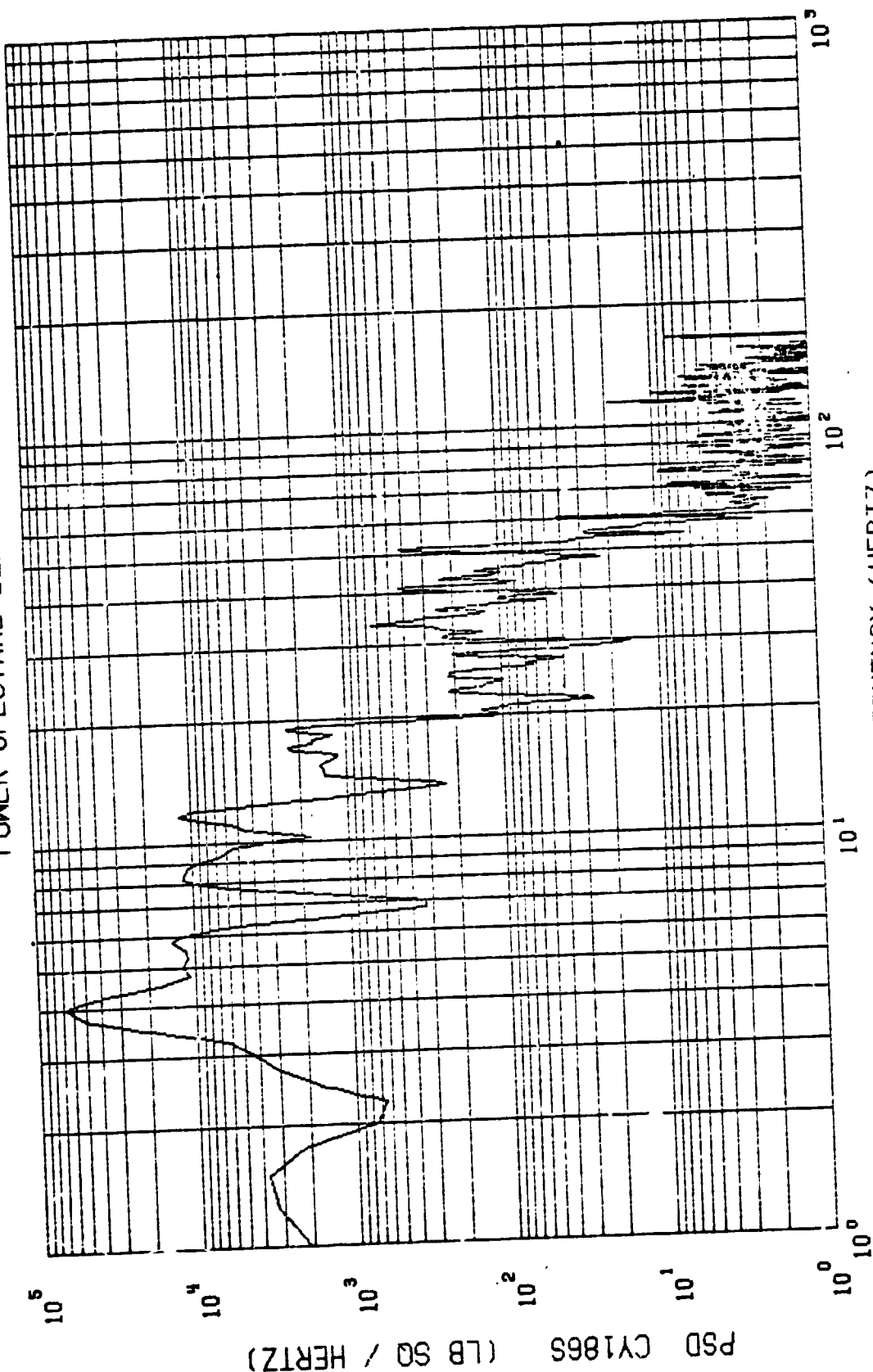


FREQUENCY (HERTZ)

$\Delta F = .500$ START = 49681.700 SEC STOP = 49686.700 SEC
 MEAN = -10727×10^{-1} $\sigma^2 = 12831 \times 10^1$ $\sigma = 35904 \times 10^{-2}$ $3\sigma = 10771 \times 10^{-1}$

TC-1 / VDS DATA (LRC-3A) STAGE 0 IGN CY186S Figure 2.42b
 (1024 SPS)

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

STOP = 49686.700 SEC

START = 49681.700 SEC

$3\sigma = 10771 \times 10^{-1}$

$\sigma = 35904 \times 10^{-2}$

$\Delta F = .250$

MEAN = -10727×10^{-1} $\sigma^2 = 12831 \times 10^{-1}$

CY186S

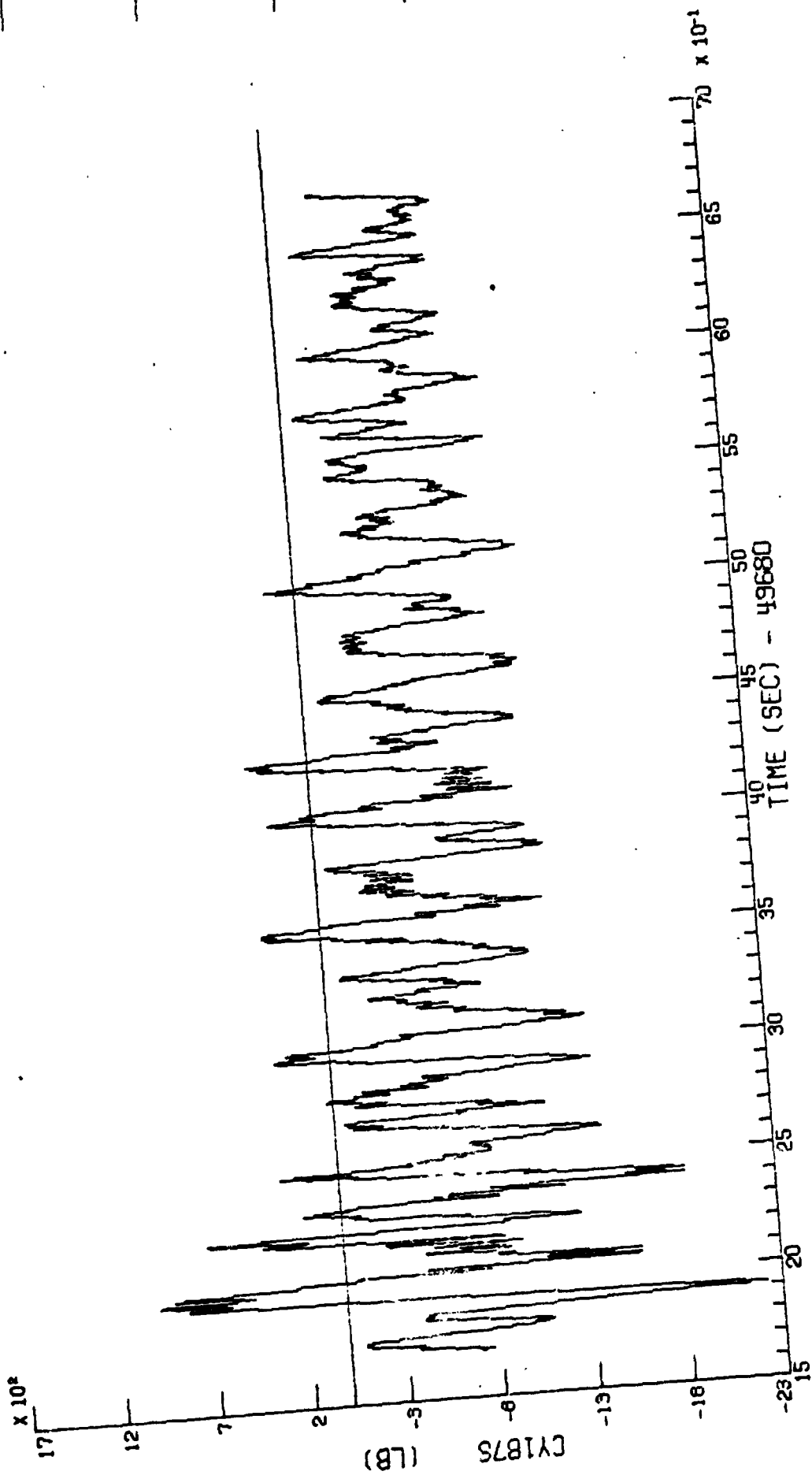
STAGE 0 IGN

(1024 SPS) Figure 2.42c

TC-1 / VDS DATA (LRC-3A)

NASA LANGLEY STORING ANALYSIS PROGRAM 07/21/75

TIME HISTORY

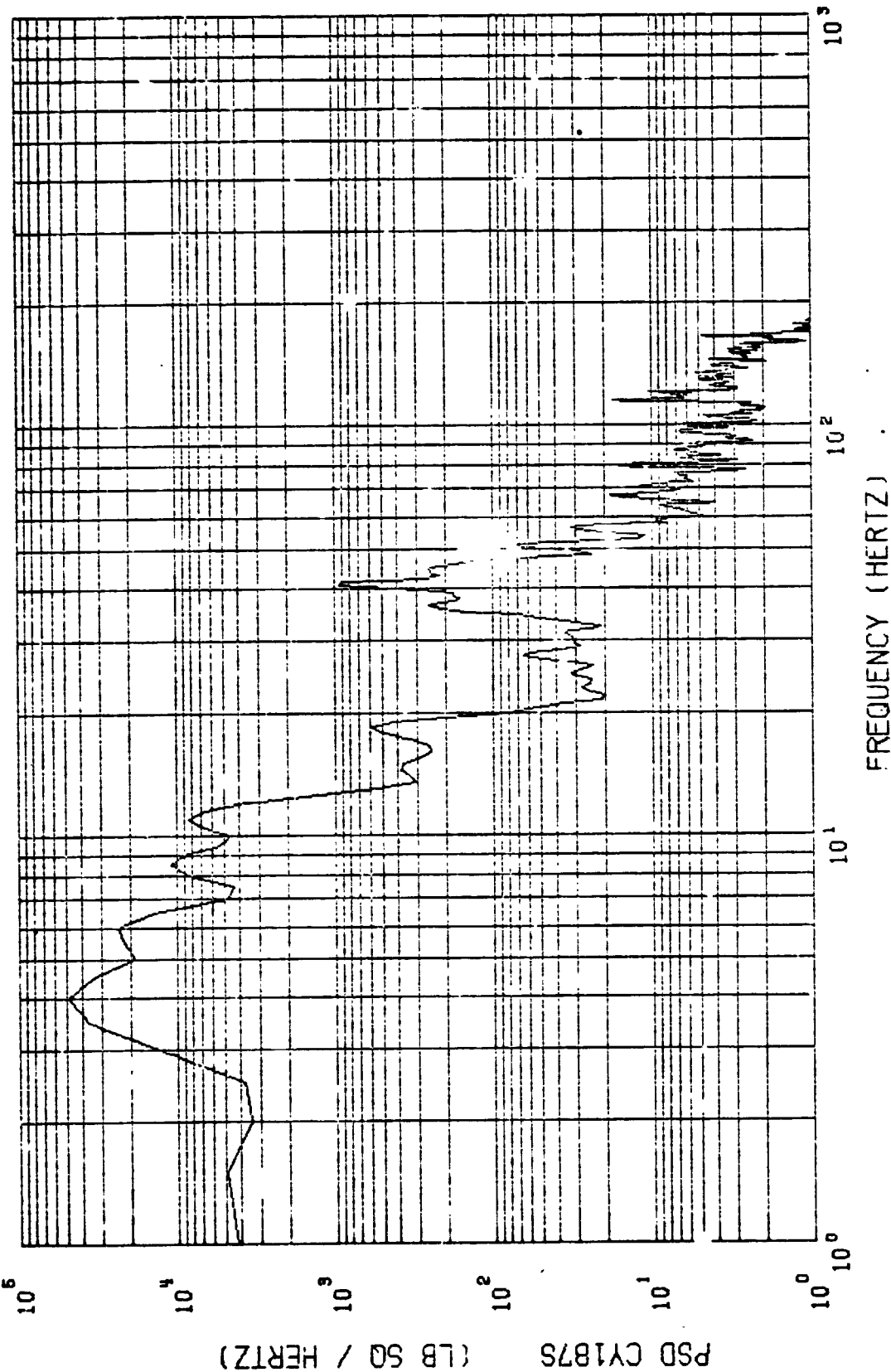


MIN = -2215.943

MAX = 984.903

CY1875
STAGE 0 IGN
(1024 SPS) Figure 2.43a

POWER SPECTRAL DENSITY

 $\Delta F = .500$

START = 49681.700 SEC

STOP = 49686.700 SEC

MEAN = -55604×10^{-2} $\sigma^2 = 16019 \times 10^1$ $\sigma = 40023 \times 10^{-2}$ $3\sigma = 12007 \times 10^{-1}$

TC-1 / VDS DATA (LRC-3A)

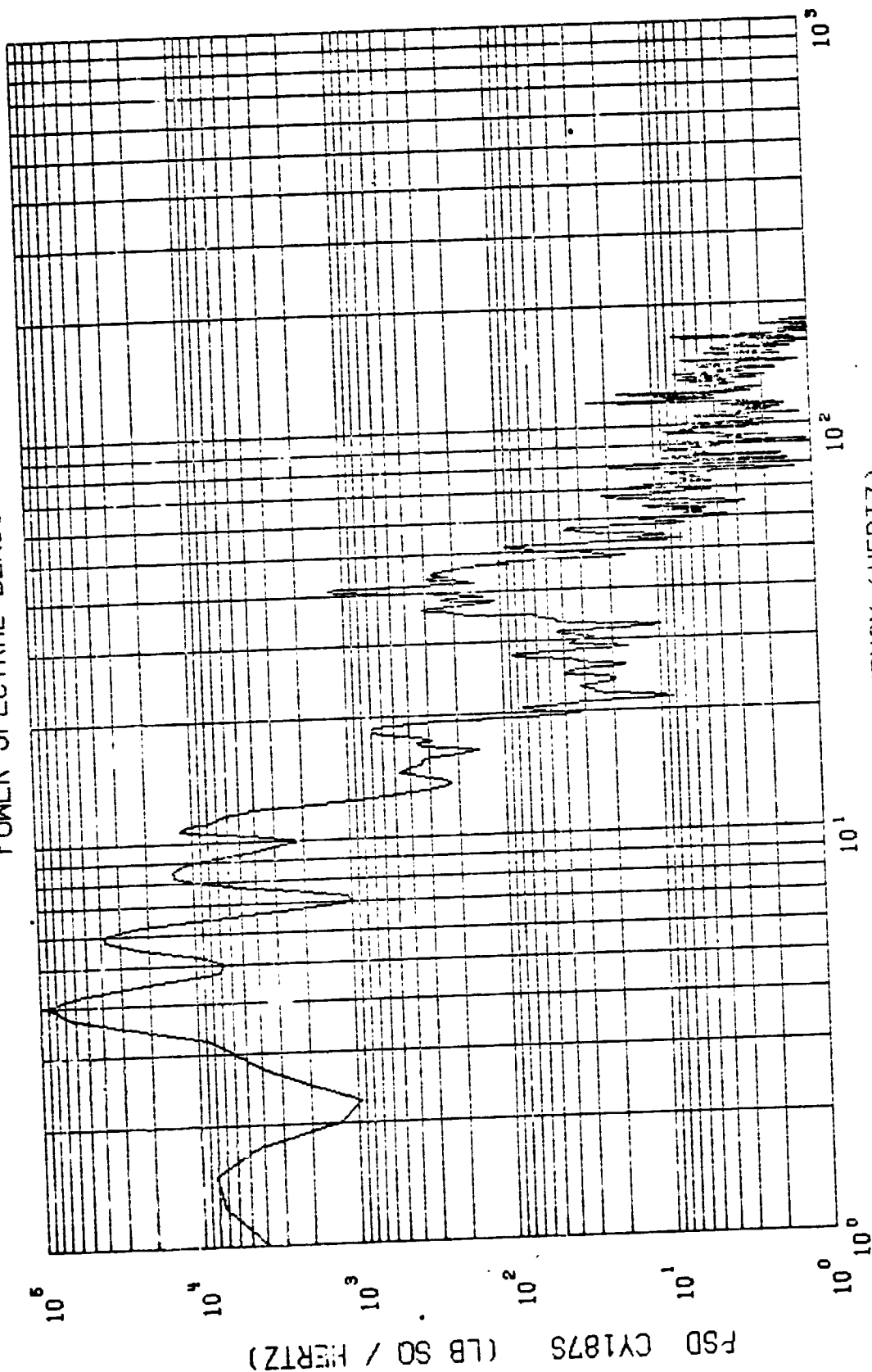
STAGE 0 IGN

CY187S

(1024 SPS)

Figure 2.43b

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

STOP = 49686.700 SEC

START = 49681.700 SEC

$3\sigma = 12007 \times 10^{-1}$

$\sigma = 40023 \times 10^{-2}$

$\Delta F = .250$

MEAN = -55604×10^{-2}

$\sigma^2 = 16019 \times 10^1$

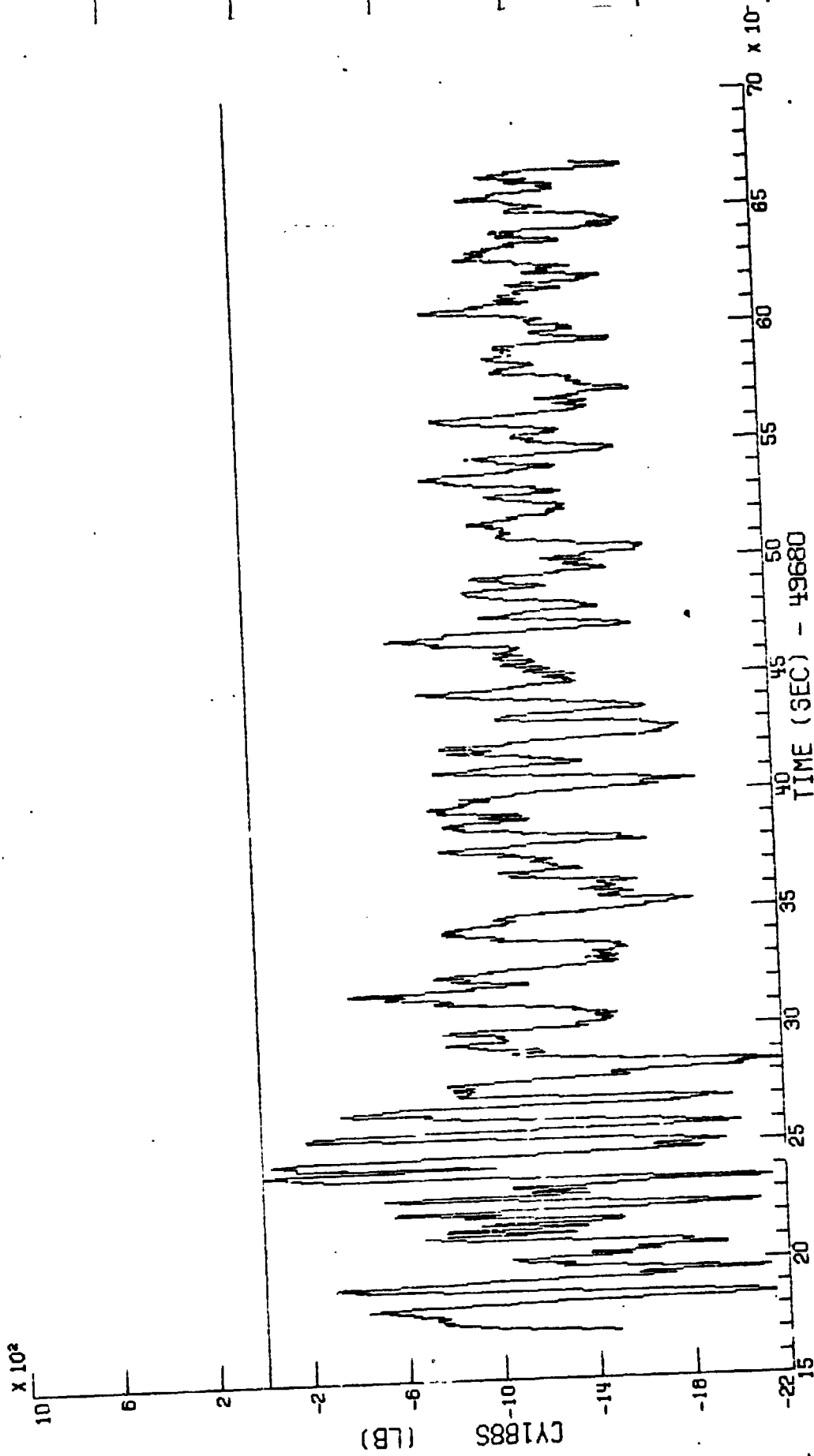
CY187S

STAGE 0 IGN

(1024 sps) Figure 2.43c

TC-1 / VDS DATA (LRC-3A)

STORY



MIN = -2137.969

MAX = -9.774

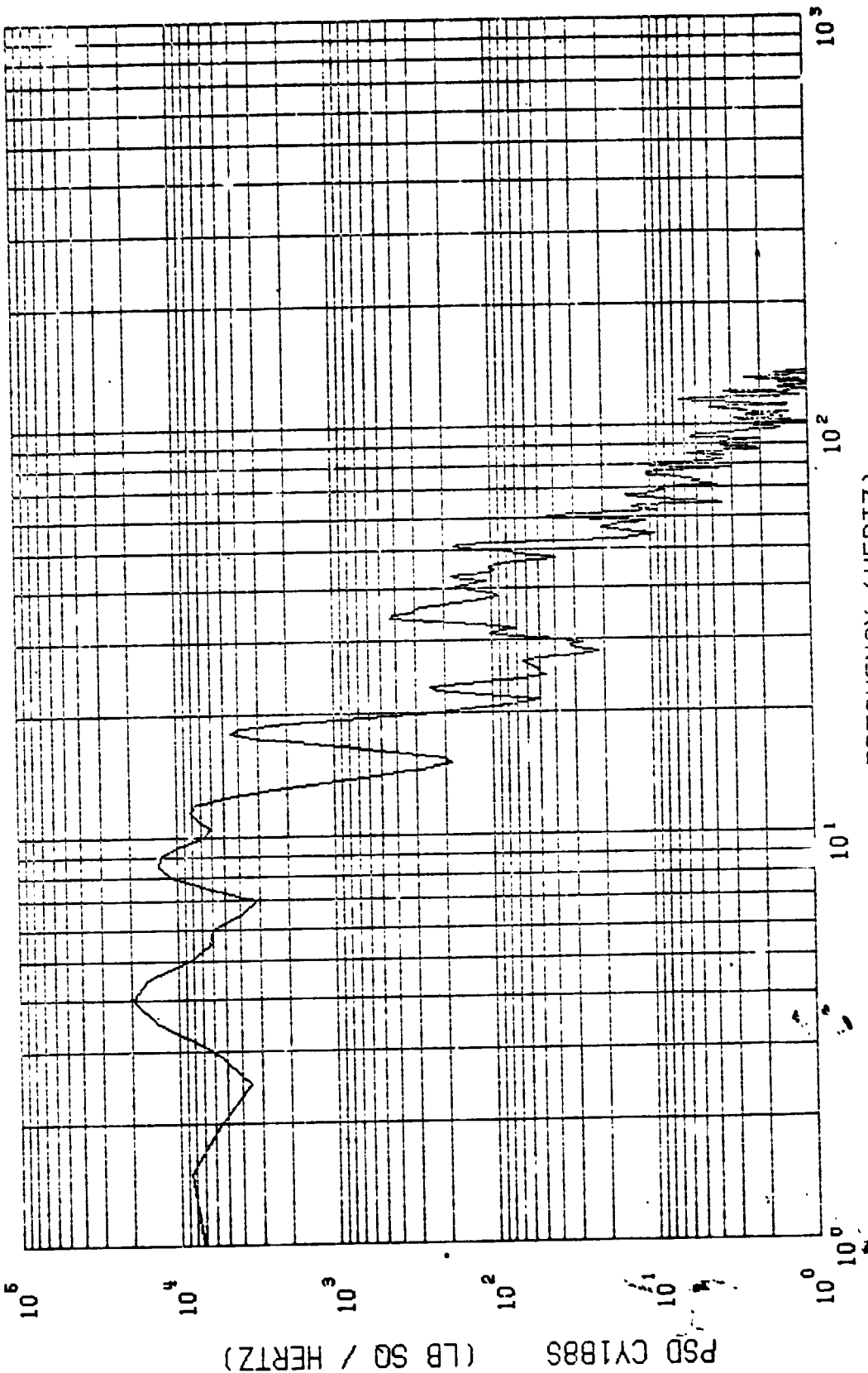
CY1885
(1024 SPS) Figure 2.44a

STAGE 0 IGN

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



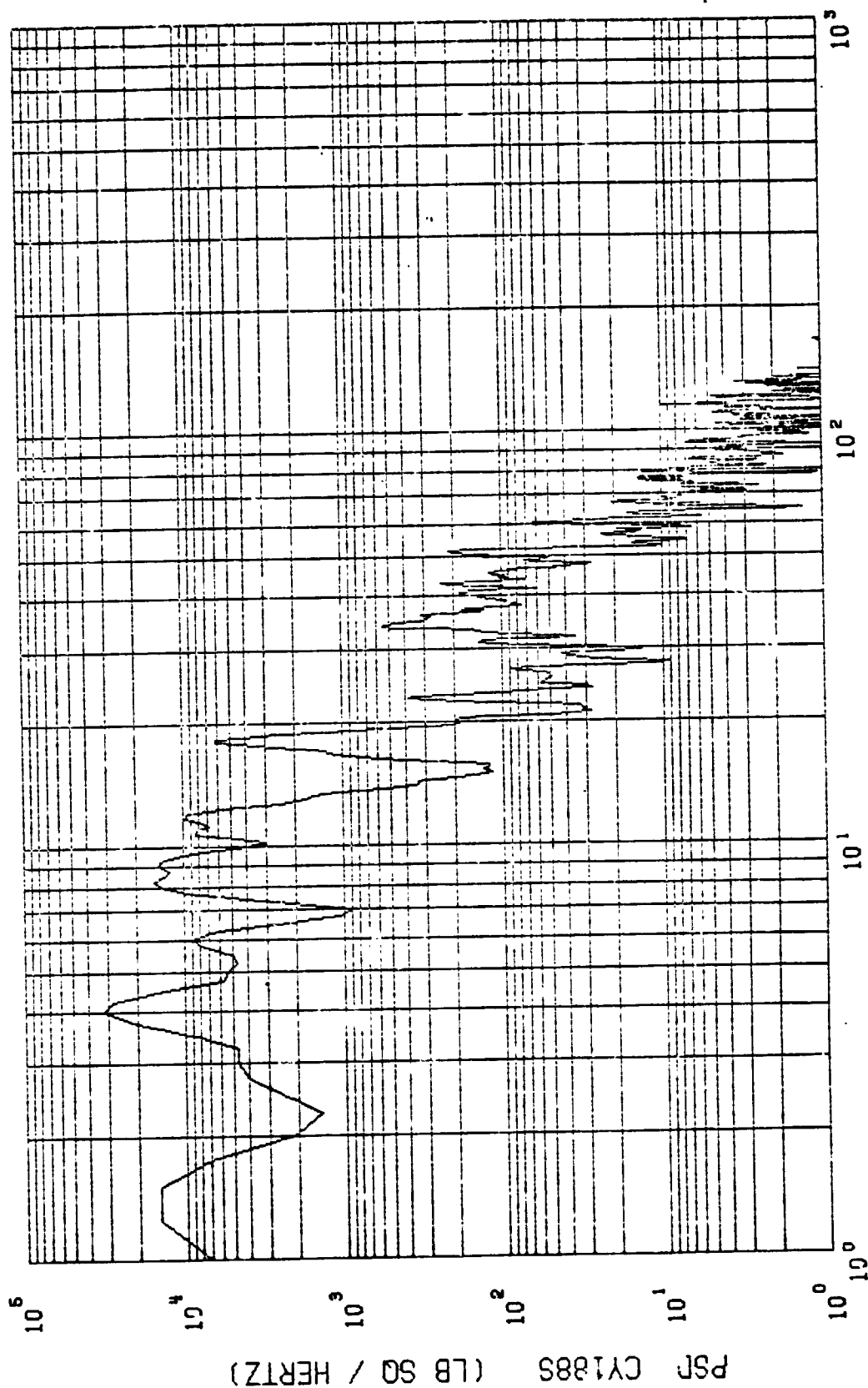
FREQUENCY (HERTZ)

$\Delta F = .500$
 $\text{MEAN} = 12151 \times 10^{-4}$
 $\sigma^2 = 11836 \times 10^1$
 $\sigma = 34404 \times 10^{-2}$
 $\sigma = 10321 \times 10^{-1}$
 $\text{START} = 49681.700 \text{ SEC}$
 $\text{STOP} = 19686.700 \text{ SEC}$
 STAGE 0 IGN
 CY188S
 $\text{TC-1 / VDS DATA (1024 SPS.)}$
 Figure 2.44b

NASA-LANGLEY SIGNI

07/21/75

POWER SPECTRAL DENSITY

 $\Delta F = .250$ MEAN = -12151×10^1 $\sigma^2 = 11836 \times 10^1$ $\sigma = 34404 \times 10^{-2}$

START = 49681.700 SEC

STOP = 49686.700 SEC

 $3\sigma = 10321 \times 10^{-1}$

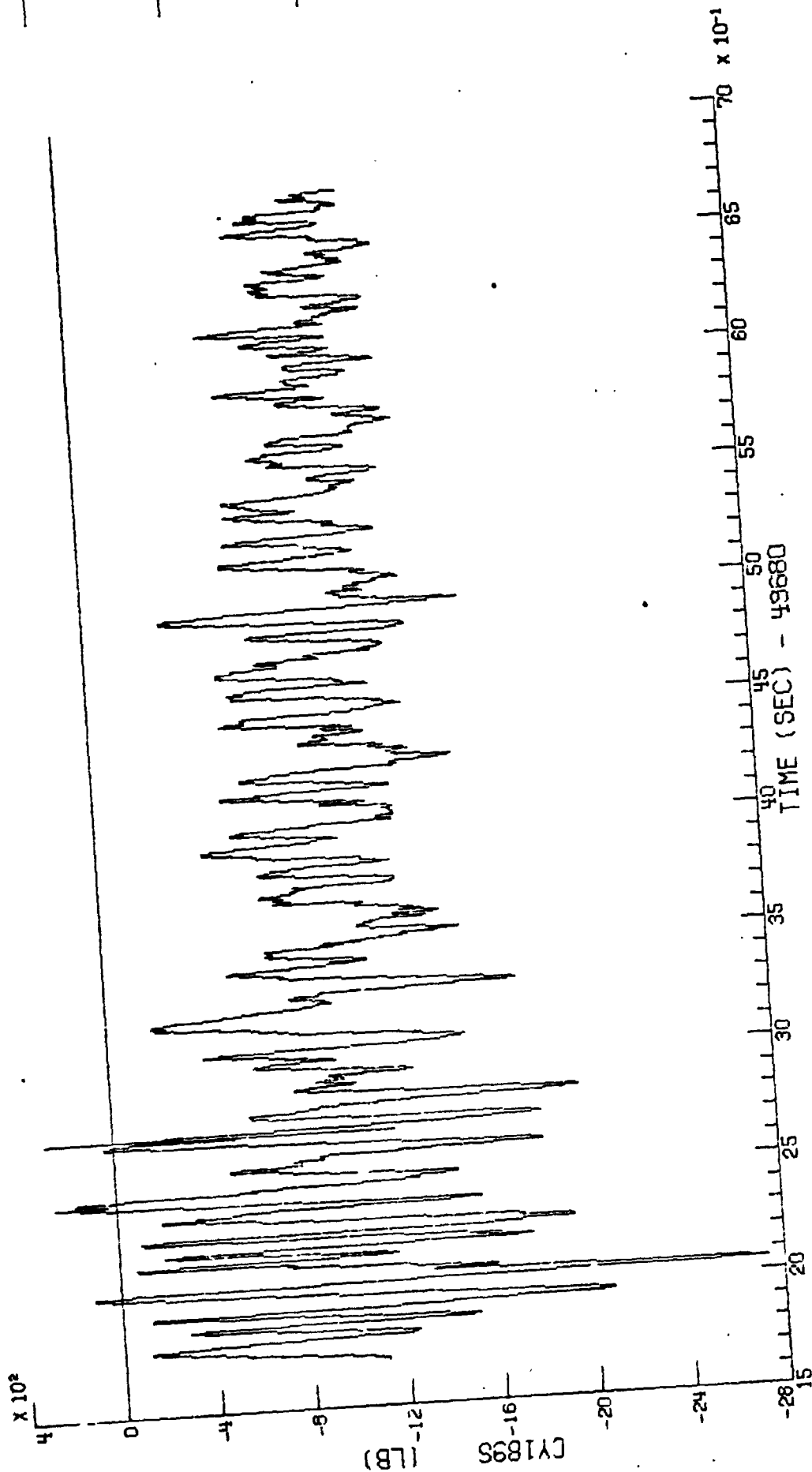
TC-1/VDS DATA { 0 -381

STAGE 0 IGN

CY1885

(1024 SPS) Figure 2.44c

TIME HISTORY



MIN = -2729.394

MAX = 291.728

CY1835
STAGE 0 IGN
(1024 SPS) Figure 2.45a

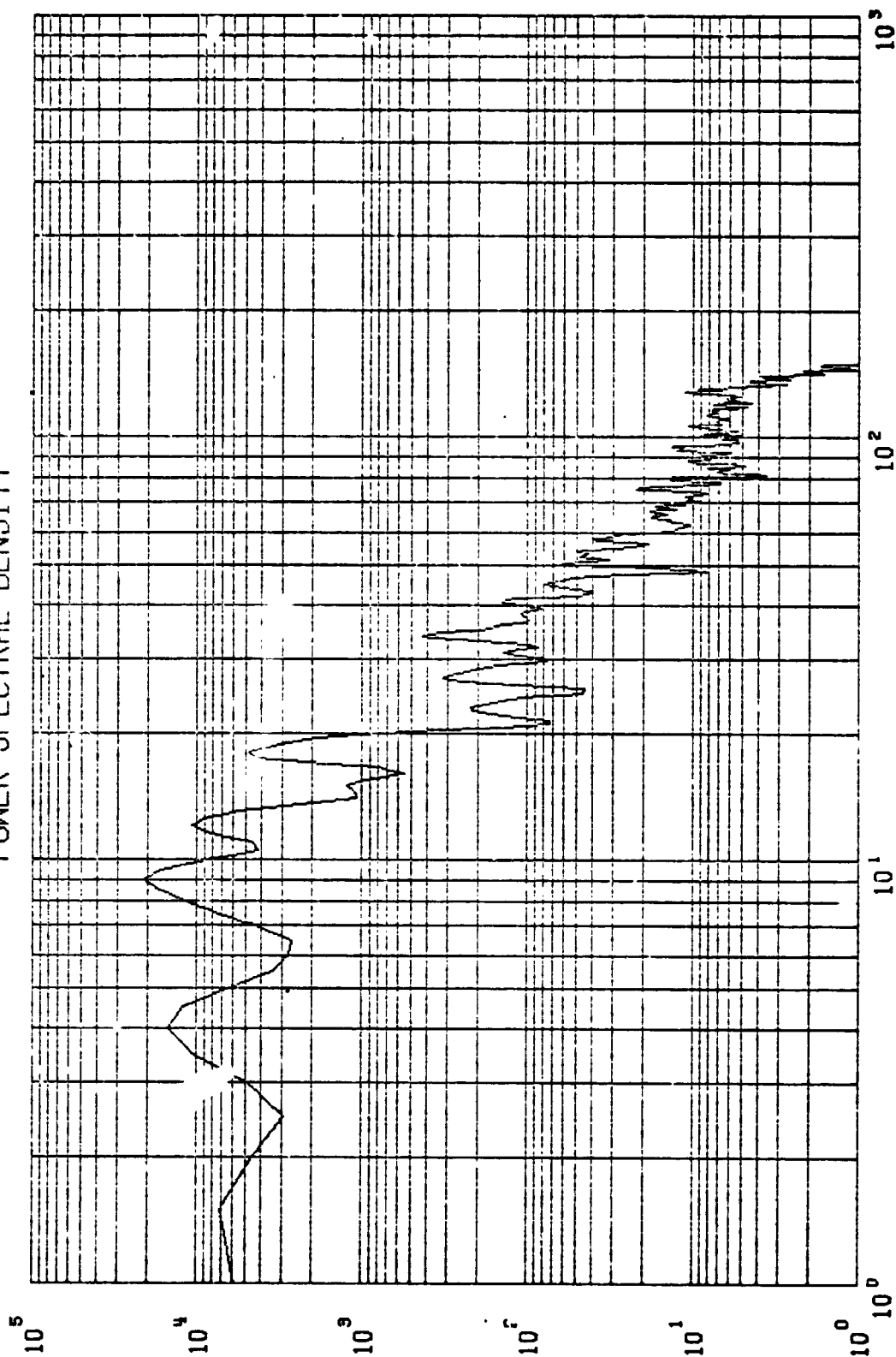
87

TC-1 / VDS DATA (LRC-3A)

07/21/75

NESEA-LANGLEY SIGNAL ANALYSIS PROGRAM

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$

START = 49681.700 SEC

STOP = 49686.700 SEC

MEAN = -96734×10^{-2}

$\sigma^2 = 12461 \times 10^1$

$\sigma = 35301 \times 10^{-2}$

$3\sigma = 1059 \times 10^0$

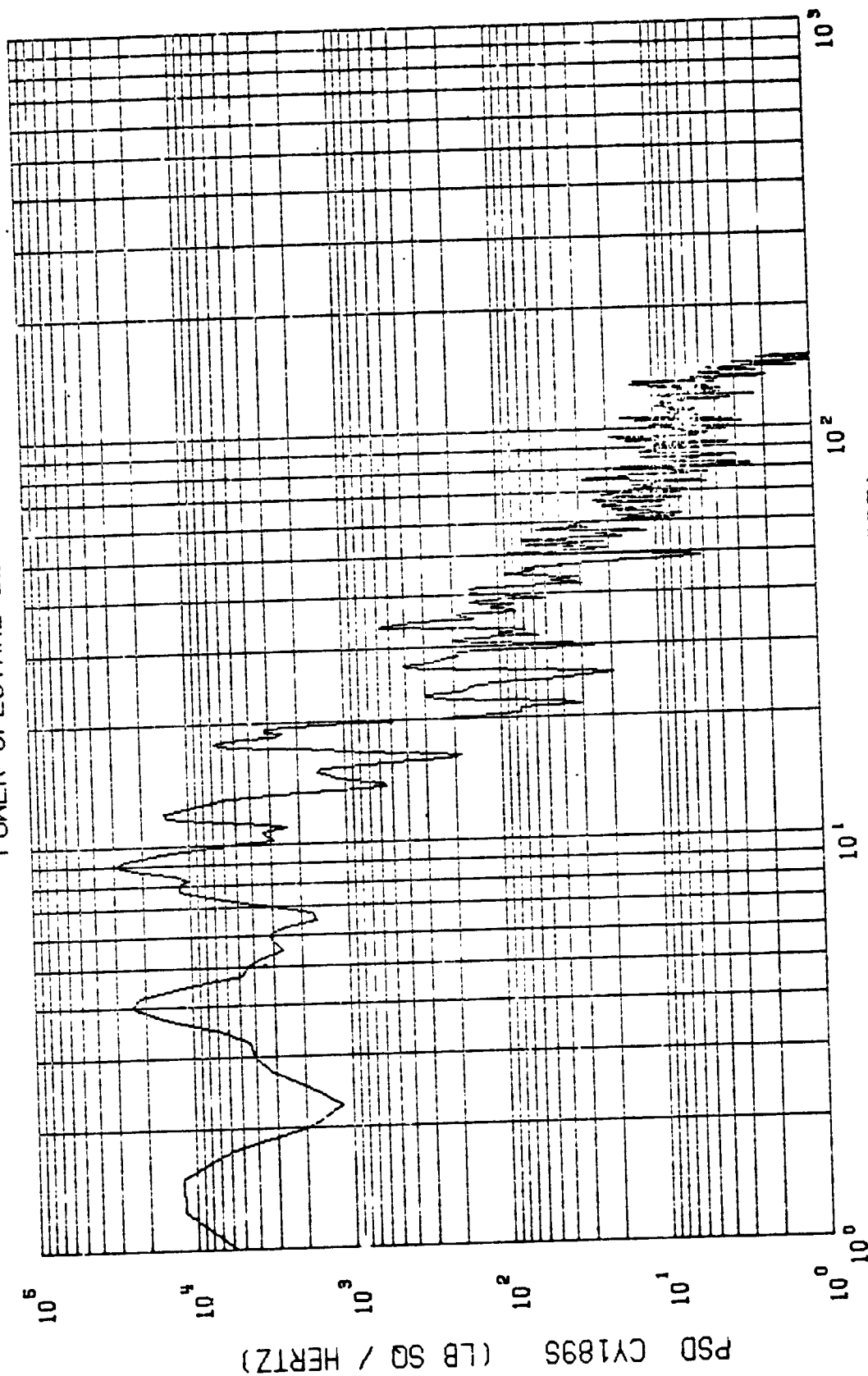
TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

CY189S

(1024 SPS) Figure 2.45b

POWER SPECTRAL DENSITY



START = 49681.700 SEC

STOP = 49686.700 SEC

$\Delta F = .250$

MEAN = -96734×10^{-2}

$\sigma = 35301 \times 10^{-2}$

$3\sigma = 1059 \times 10^0$

68

TC-1 / VDS DATA (LRC-3A)

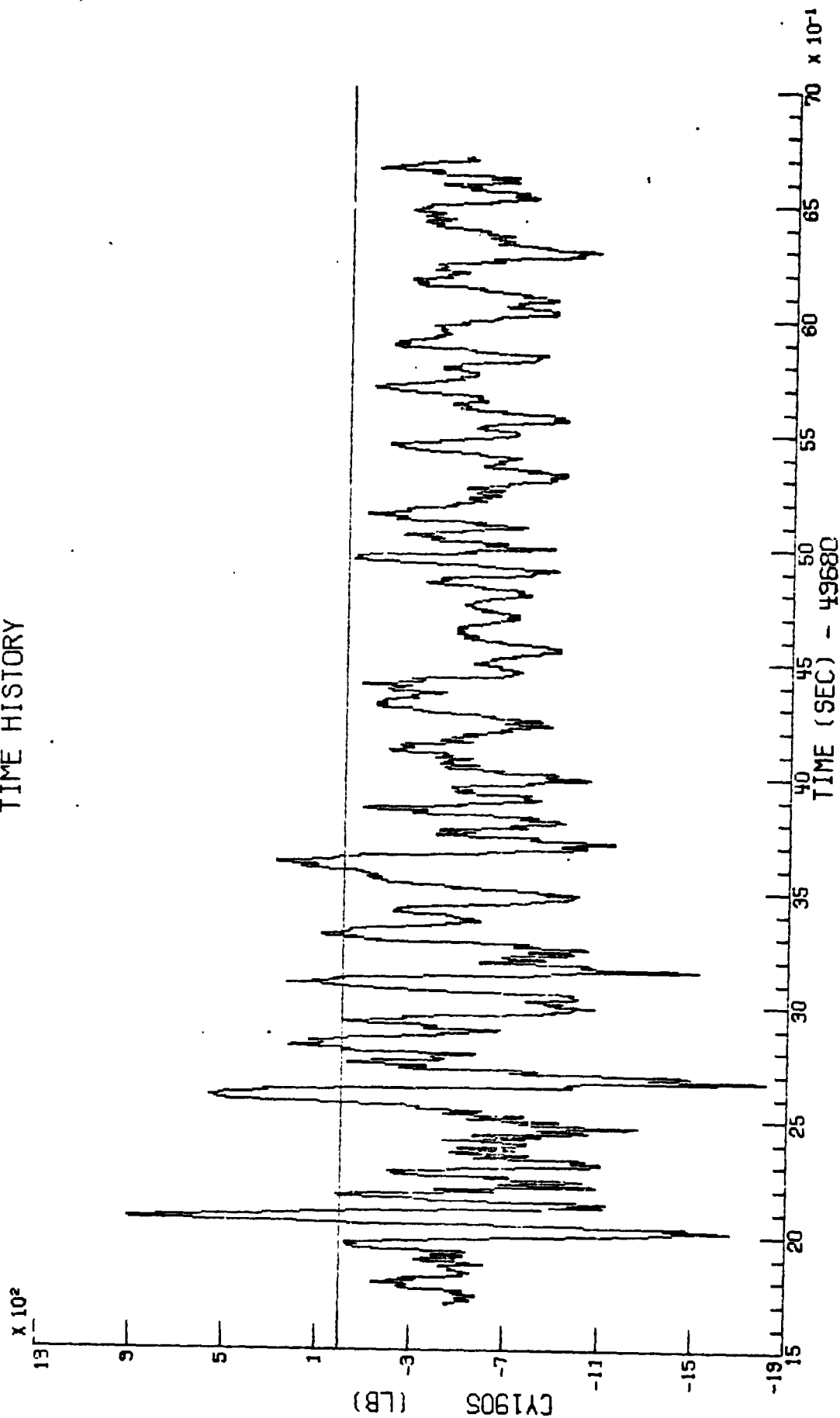
STAGE 0 IGN

CY1895

(1024 SPS) Figure 2.45c

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

TIME HISTORY



MAX = 910.710

MIN = -1814.200

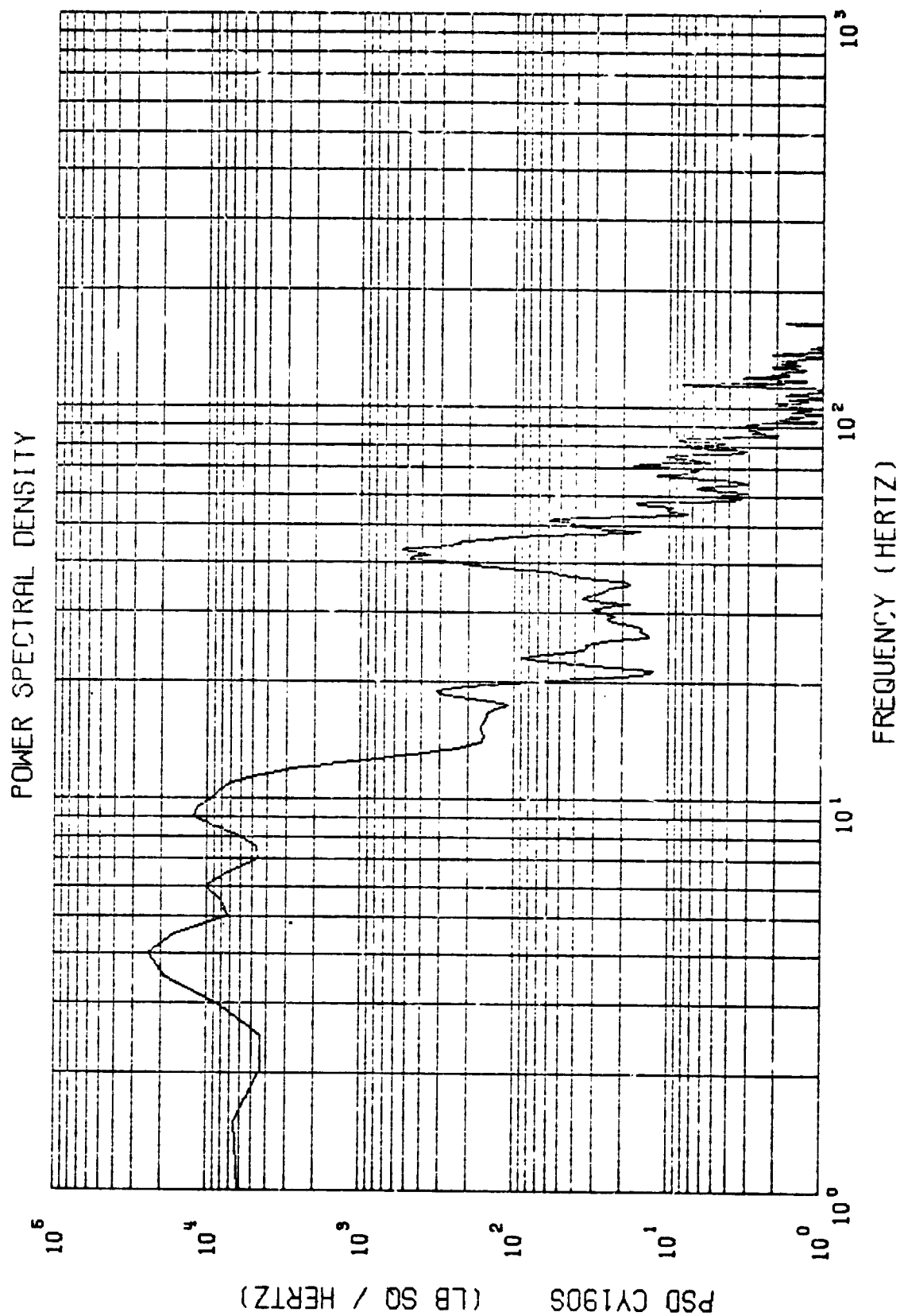
TC-1 / VDS DATA (U'RC-3A)

STAGE 0 IGN

CY1905

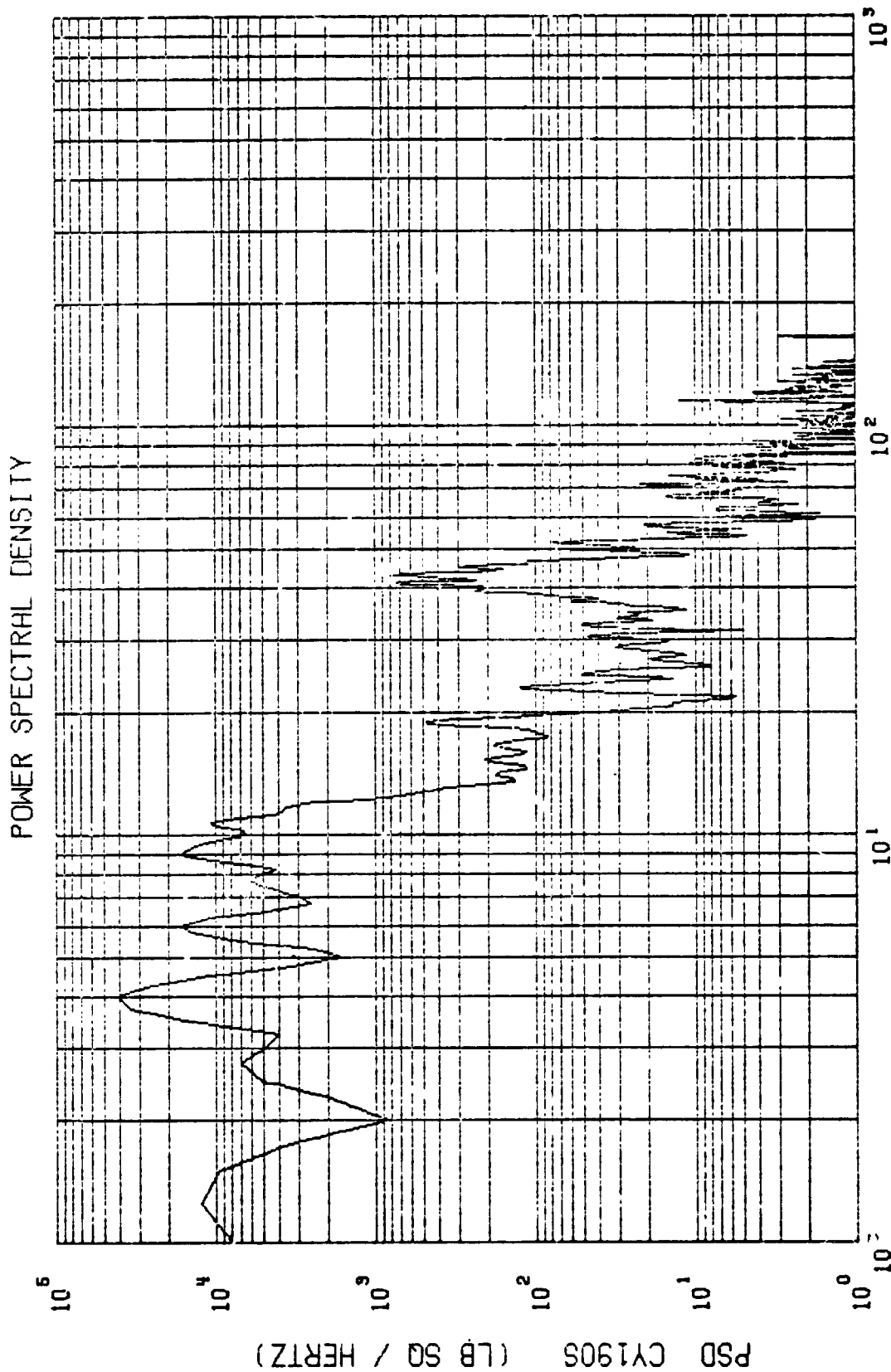
(1024 SPS) Figure 2.46a

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75



$\Delta F = .500$
 $\text{MEAN} = -52008 \times 10^{-2}$ $\sigma^2 = 10781 \times 10^1$ $\sigma = 32834 \times 10^{-2}$ $3\sigma = 98504 \times 10^{-2}$
 $\text{START} = 49681.700 \text{ SEC}$ $\text{STOP} = 49686.700 \text{ SEC}$

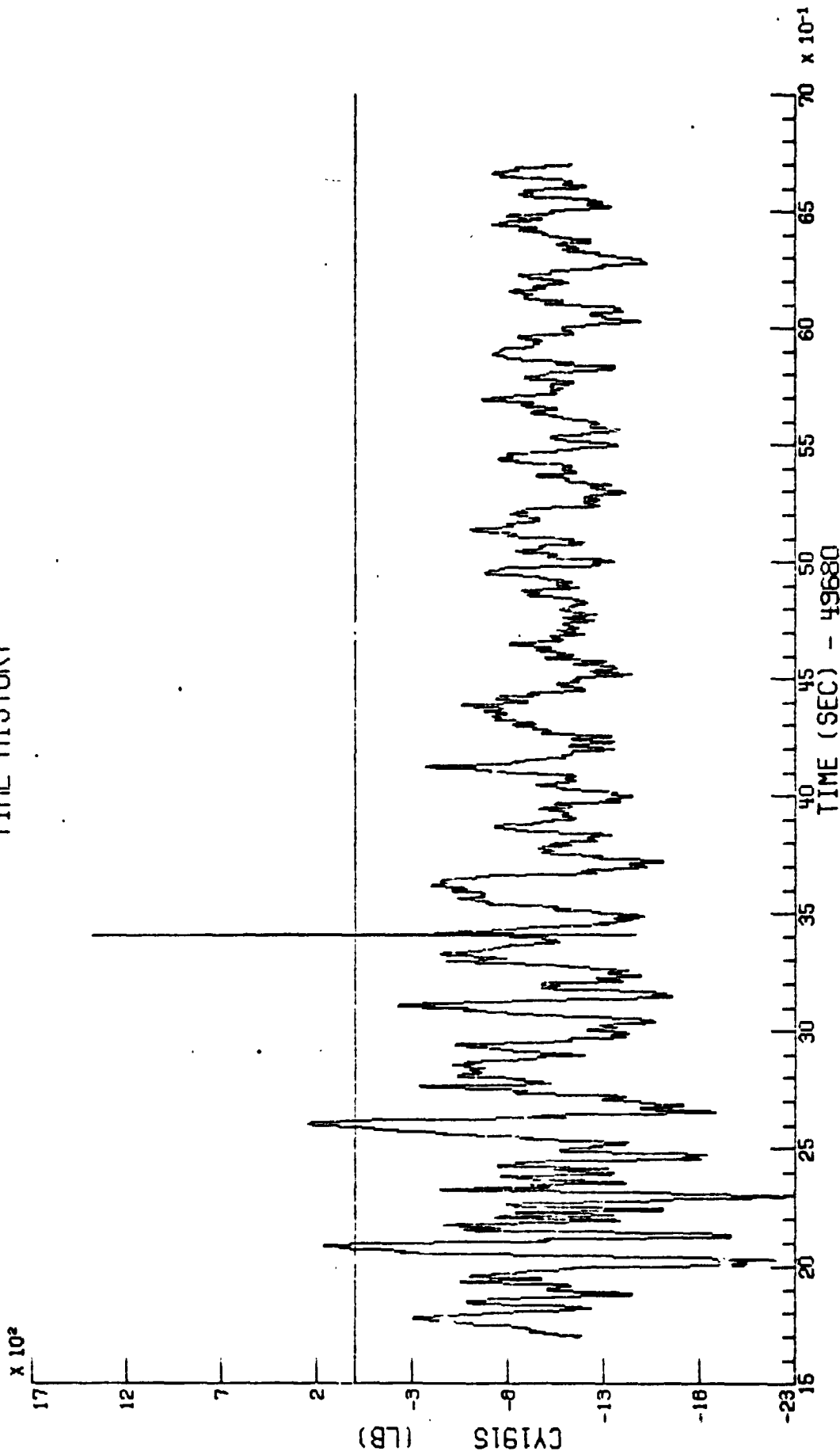
TC-1 / VDS DATA (LRC-3A) STAGE 0 IGN CY190S Figure 2.46b
 NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75 (1024 SPS)



$\Delta F = .250$ START = 49681.700 SEC STOP = 49686.700 SEC
 MEAN = -52008×10^{-2} $\sigma^2 = 10781 \times 10^1$ $\sigma = 32834 \times 10^{-2}$ $3\sigma = 98504 \times 10^{-2}$

TC-1 / VDS DATA (LRC-3A) STAGE 0 ION CY190S
 (1024 sps) Figure 2.46c

TIME HISTORY



MAX = 1383.805

MIN = -2246.344

TC-1 / VDS DATA (LRC-3A)

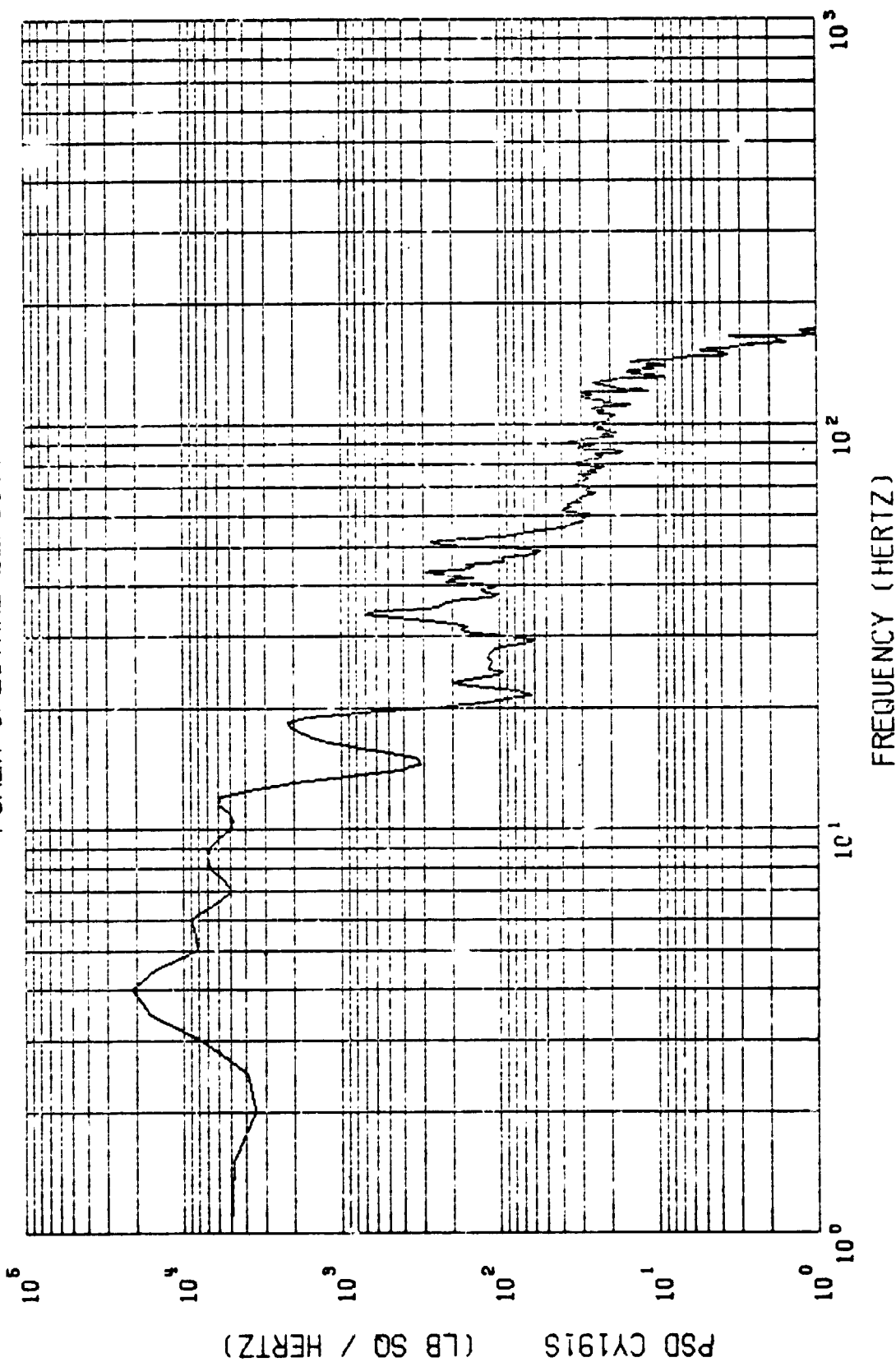
STAGE 0 IGN

CY191S

(1024 SPS)

Figure 2.47a

POWER SPECTRAL DENSITY

 $\Delta F = .500$

START = 49681.700 SEC

STOP = 49686.700 SEC

MEAN = -10254×10^{-1} $\sigma^2 = 19677 \times 10^{-1}$ $\sigma = 32675 \times 10^{-2}$ $3\sigma = 98027 \times 10^{-2}$

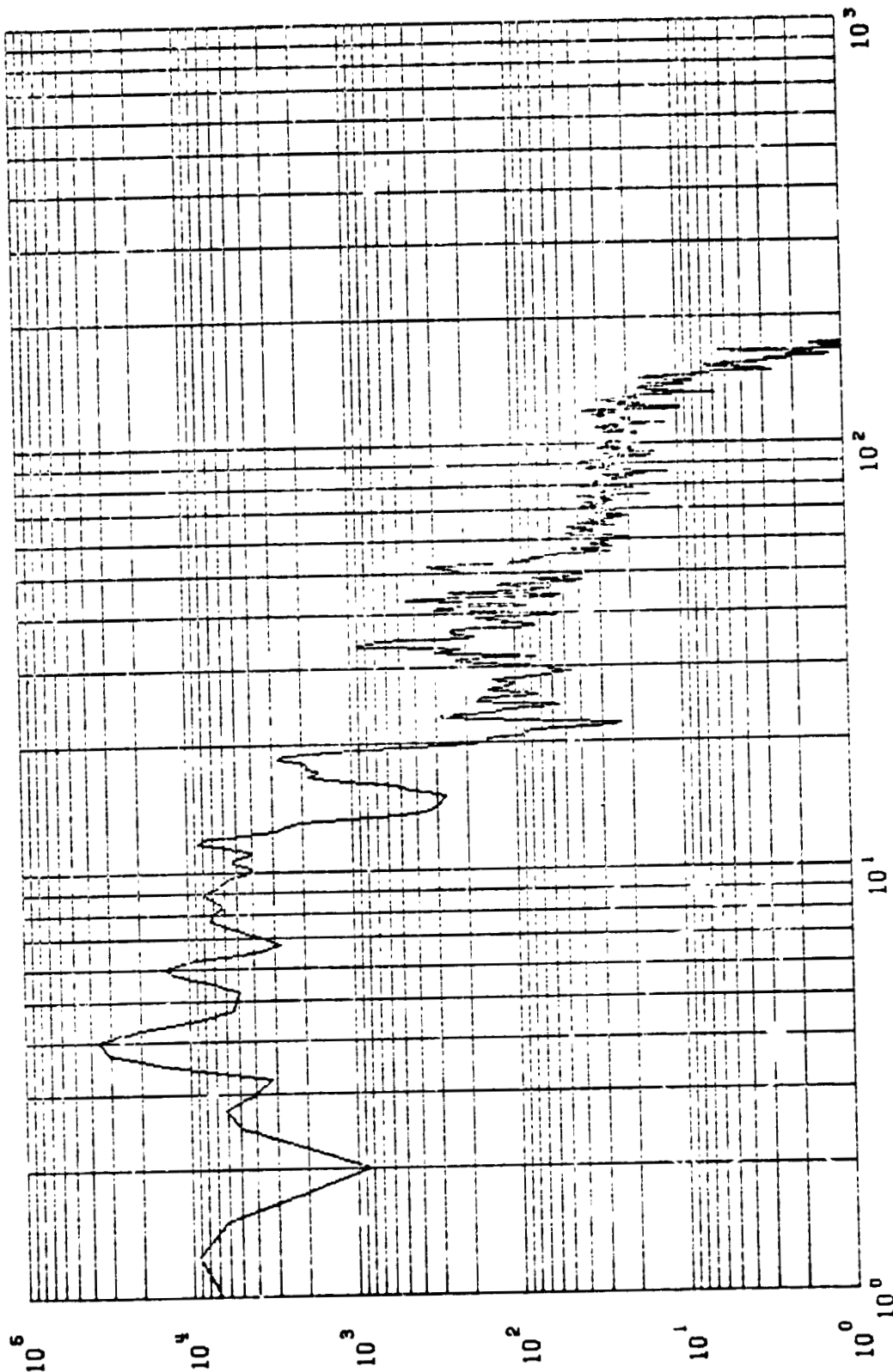
TC-1 / VDS DATA (LRC-3A)

STAGE 0 IGN

CY191S

(1024 SPS) Figure 2.47b

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

STOP = 49666.700 SEC

START = 49681.700 SEC

$\Delta F = .250$

$3\sigma = 98027 \times 10^{-2}$

$\sigma = 32675 \times 10^{-2}$

$\sigma^2 = 10677 \times 10^{-1}$

$\text{MEAN} = -10254 \times 10^{-1}$

CY1915

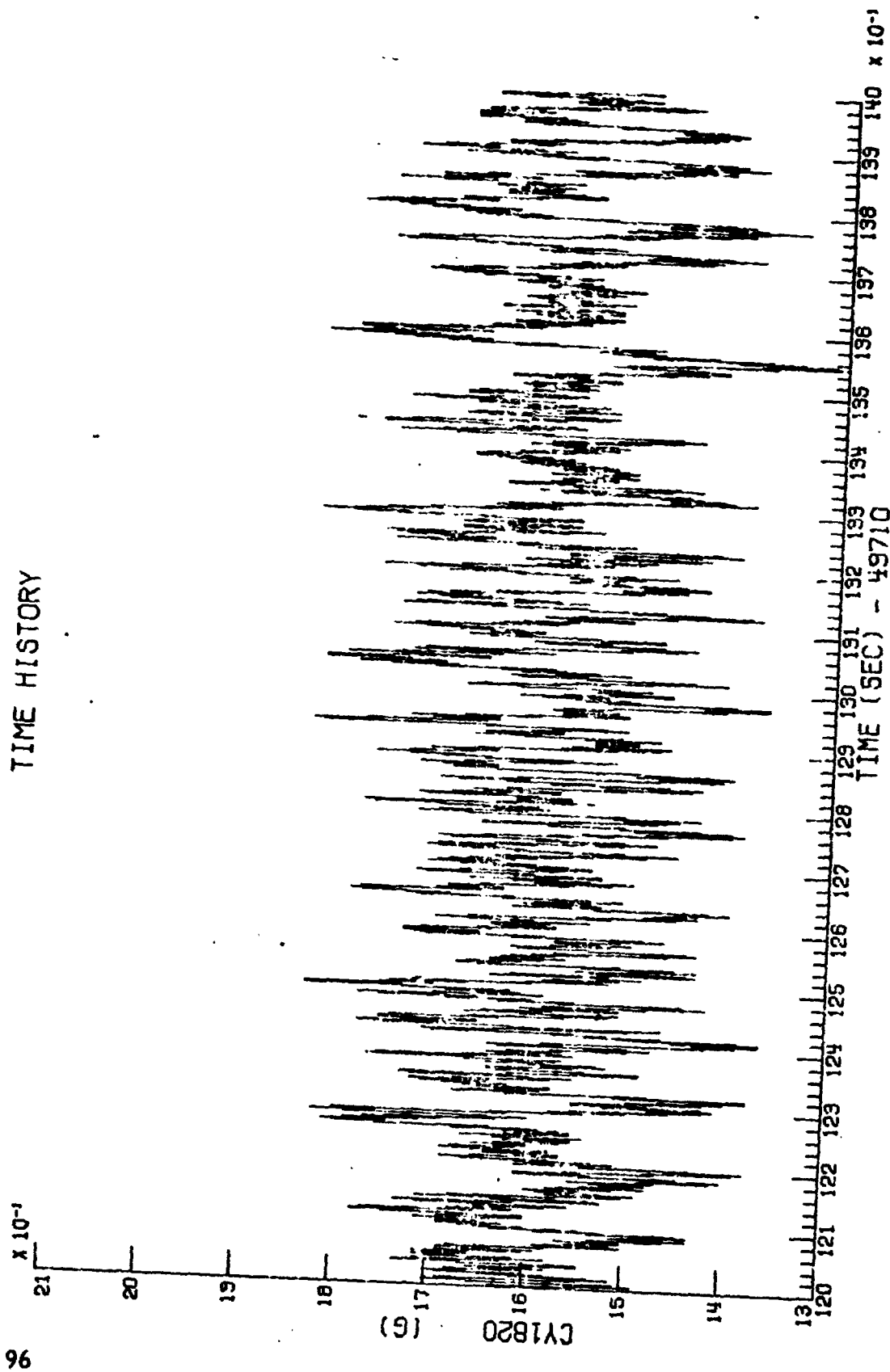
STAGE 0 IGN

TC-1 / VDS DATA (LRC-3A)

(1024 SPS) Figure 2.47c

NE568-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

C-2



MAX = 1.834

MIN = 1.300

TC-1 / VDS DATA (LRC-3A)

MAX Q

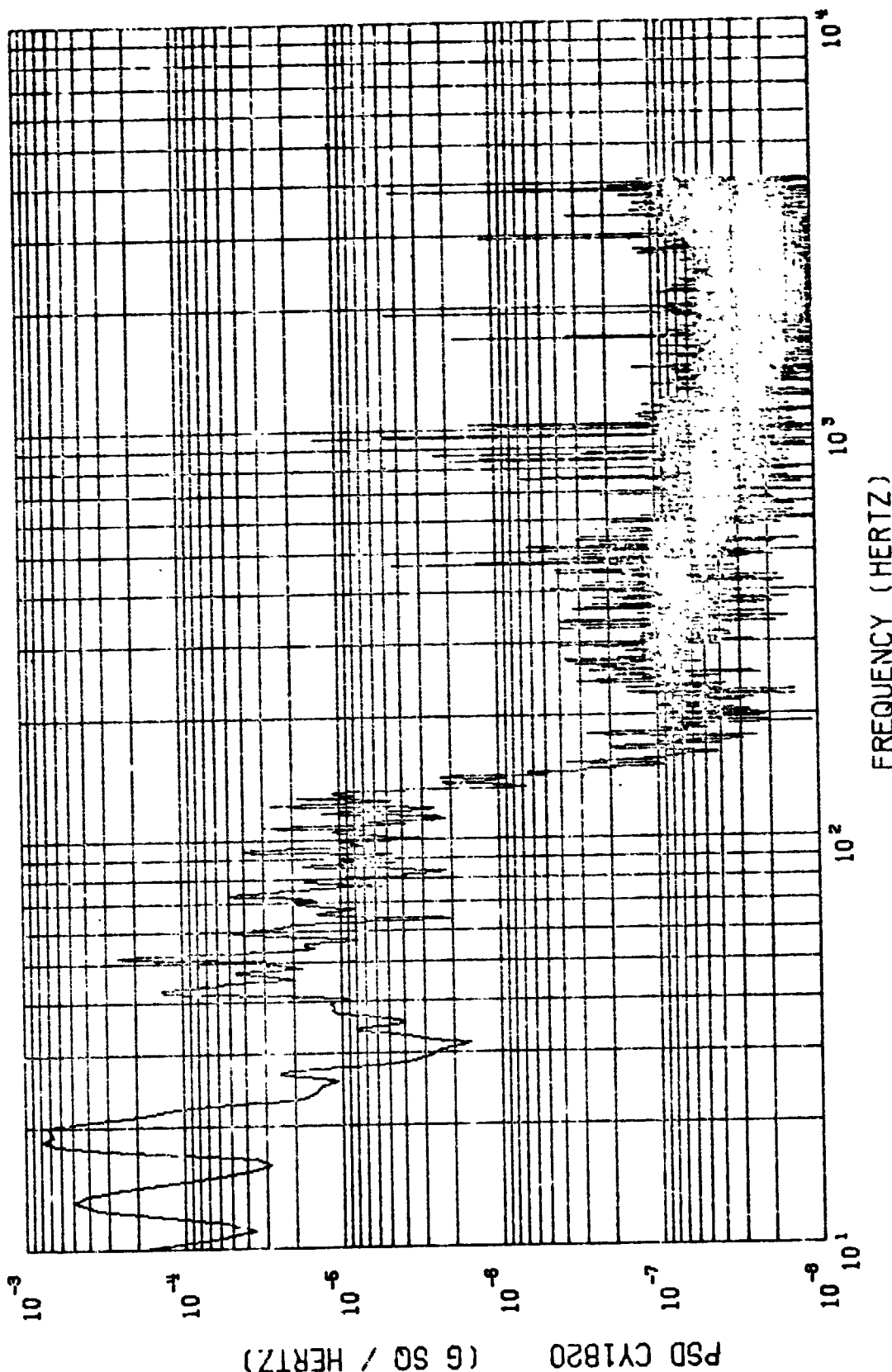
CY1820

(@92 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

Figure 2.48a

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49722.001 SEC

STOP = 49723.998 SEC

MEAN = 15928×10^{-4}

$\sigma^2 = 74801 \times 10^{-7}$

$\sigma = 86487 \times 10^{-4}$

$3\sigma = 25946 \times 10^{-4}$

TC-1 / VDS DATA (LRC-3A)

MAX 0

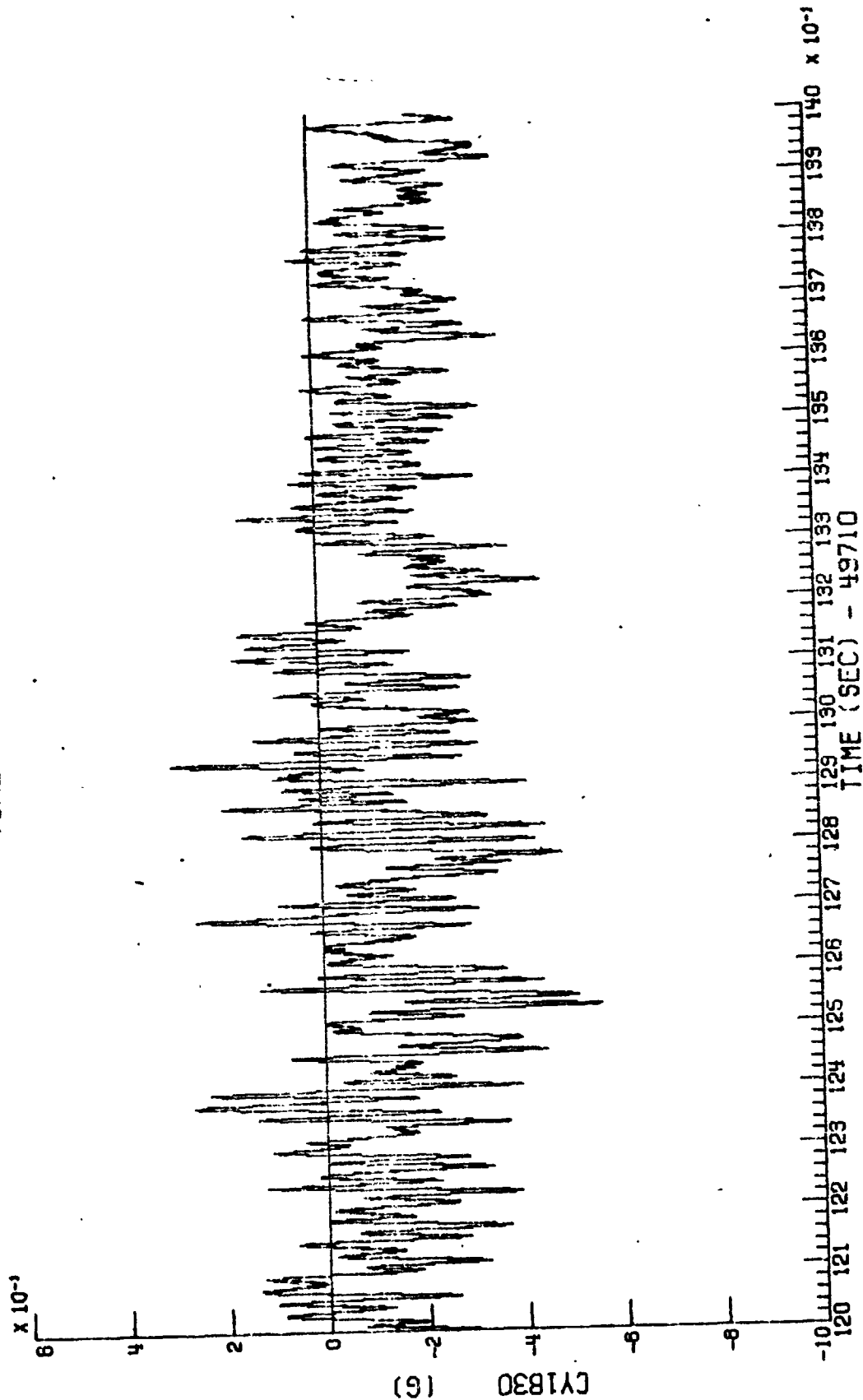
CY1820

(0192-S2S)

Figure 2.48b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

TIME HISTORY



MIN : -.555

MAX = .300

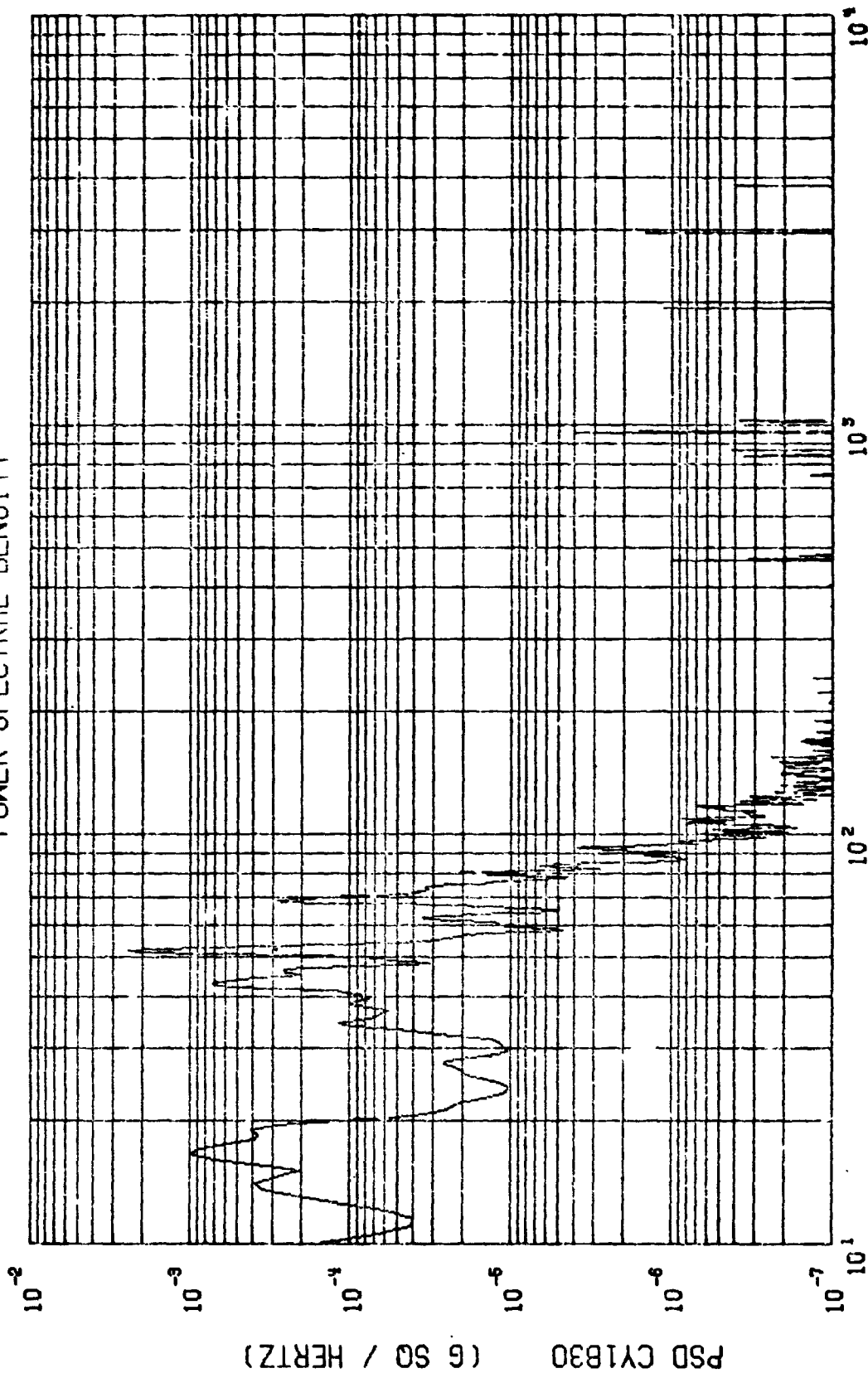
CY1830
(8142 SPS)
Figure 2.49a

MAX 0

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$

START = 49722.001 SEC

STOP = 49723.998 SEC

MEAN = -12718×10^{-5}

$\sigma^2 = 16983 \times 10^{-6}$

$\sigma = 13031 \times 10^{-3}$

$3\sigma = 39095 \times 10^{-3}$

TC-1 / VDS DATA (LRC-3A)

MAX 0

CY1830

(8192 SPS)

Figure 2.49b

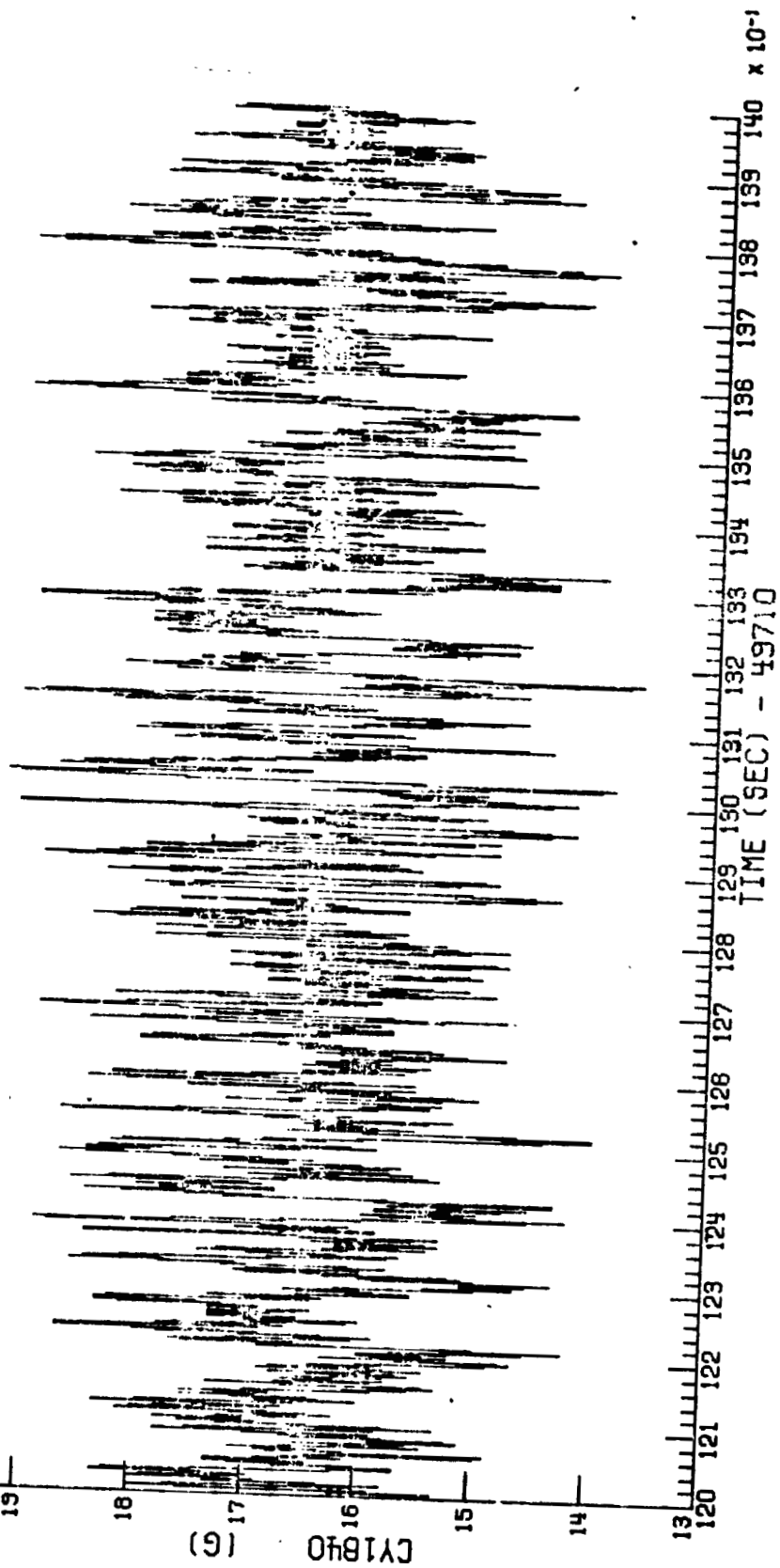
NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

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ORIGINAL PAGE IS
OF POOR QUALITY

TIME HISTORY

100
x 10⁻¹



MAX = 1.921

MIN = 1.366

TC-1 / VDS DATA (LRC-3A)

MAX 0

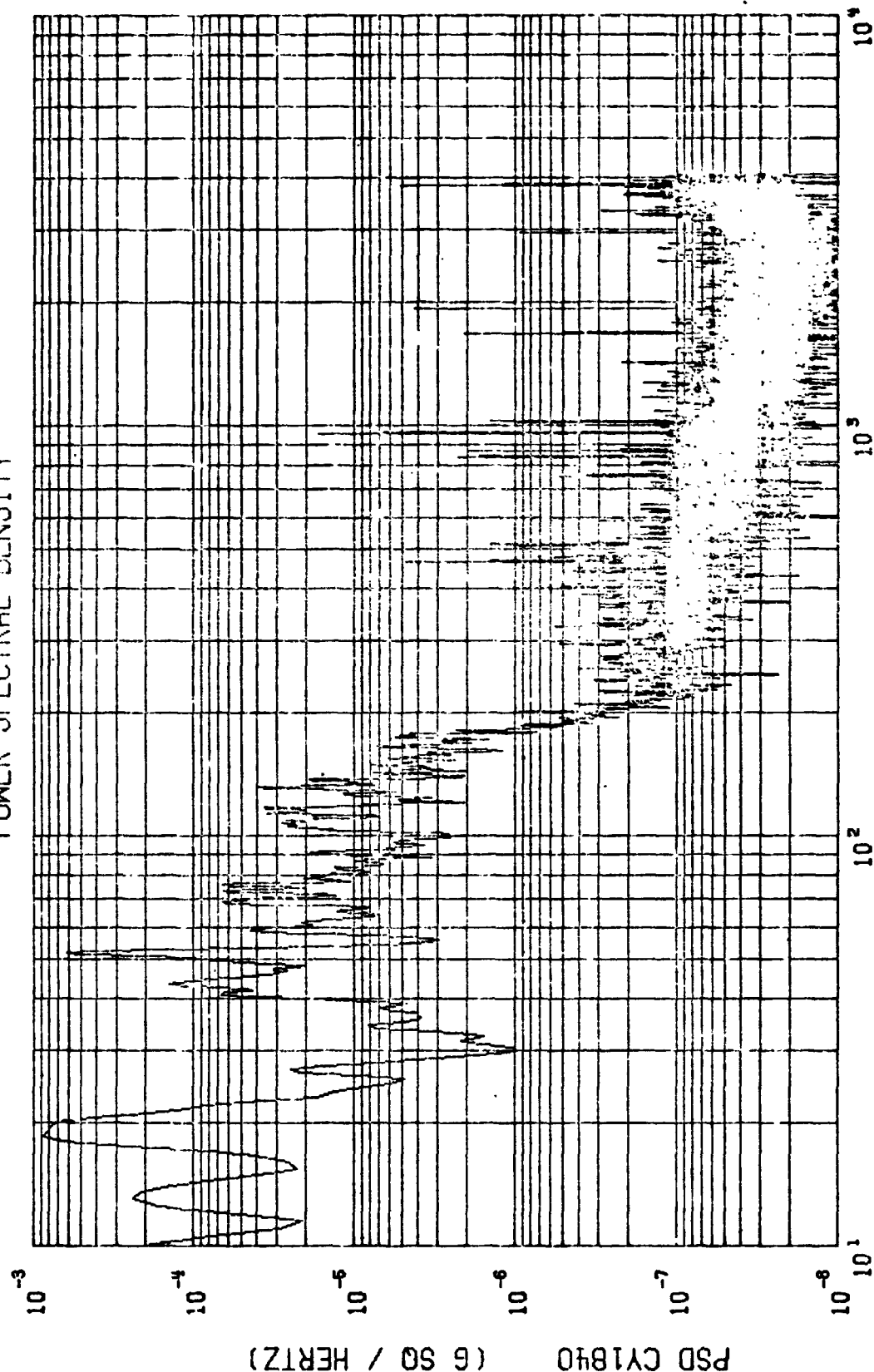
CY1840

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

(8192 SPS)

Figure 2.50a

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$ START = 49722.001 SEC STOP = 49729.998 SEC
 $MEAN = 16475 \times 10^{-4}$ $\sigma^2 = 84579 \times 10^{-7}$ $\sigma = 91967 \times 10^{-6}$ $3\sigma = 2759 \times 10^{-4}$

TC-1 / VDS DATA (LRC-3A)

MAX Q

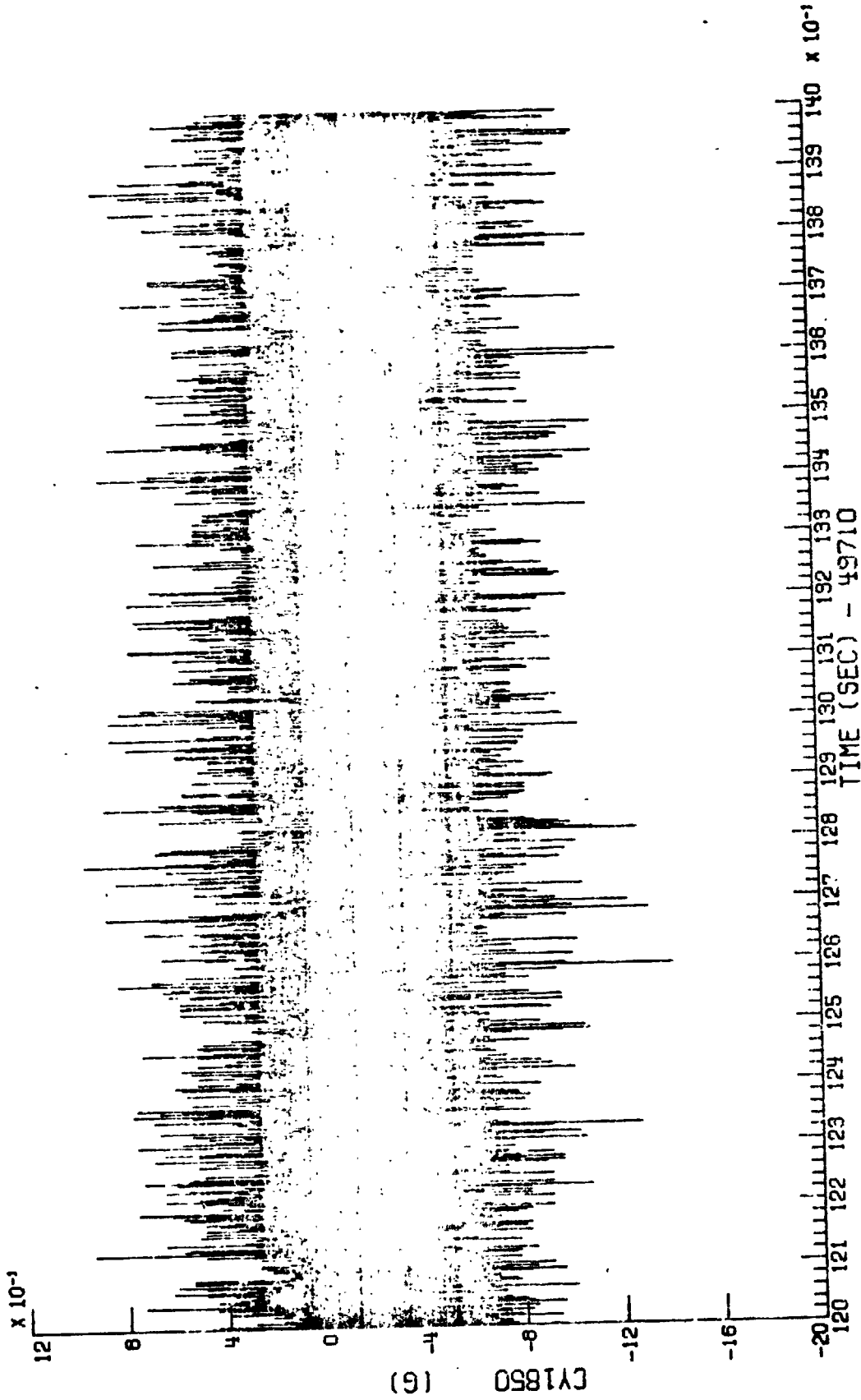
CY1840

(8192 SPS) Figure 2.50b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

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OF POOR QUALITY

TIME HISTORY



MIN = -1.400

MAX = .955

CY1850

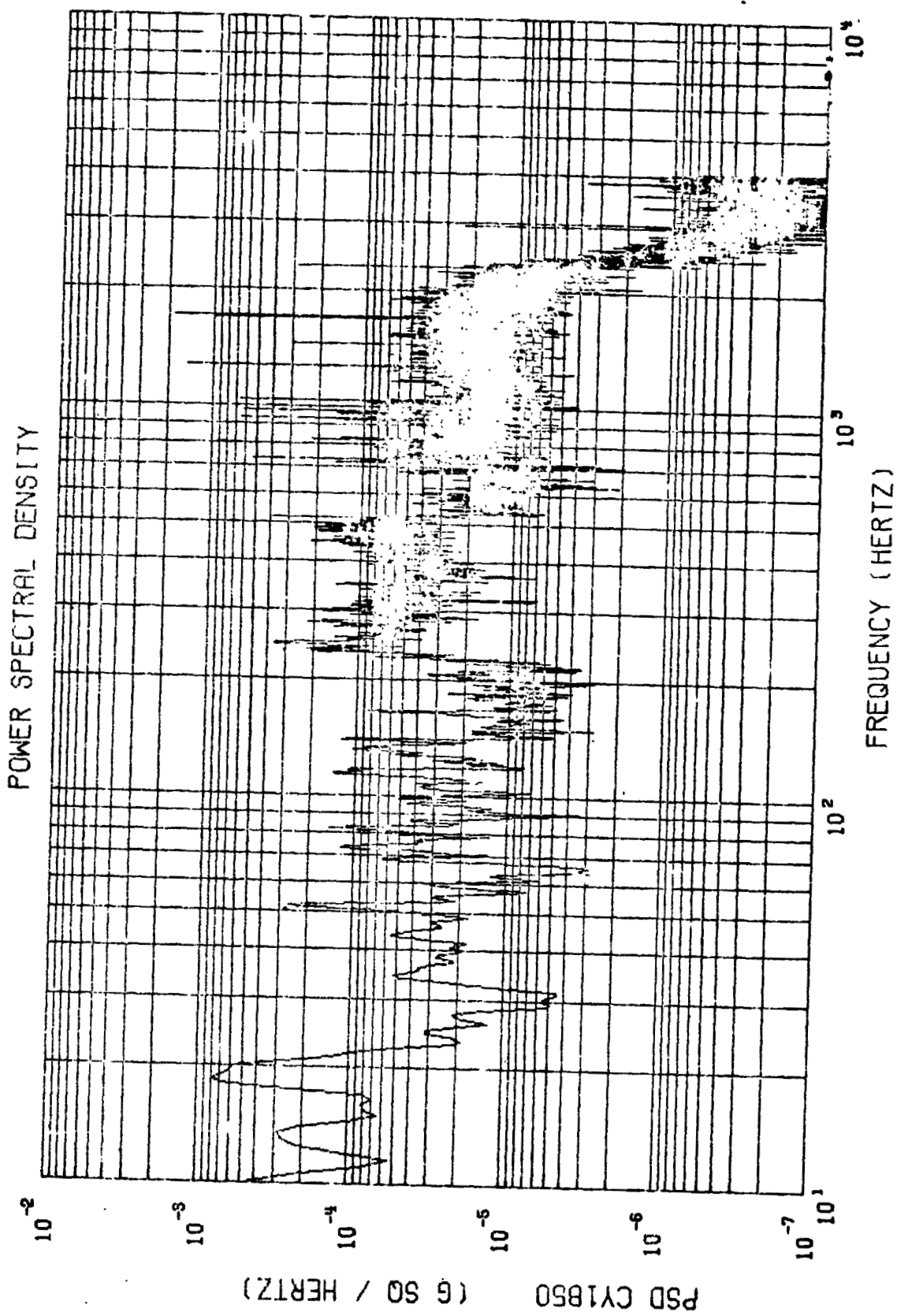
MAX 0

(8192 SPS)

Figure 2.51a

TC-1 / VDS DATA (LRC-3A)

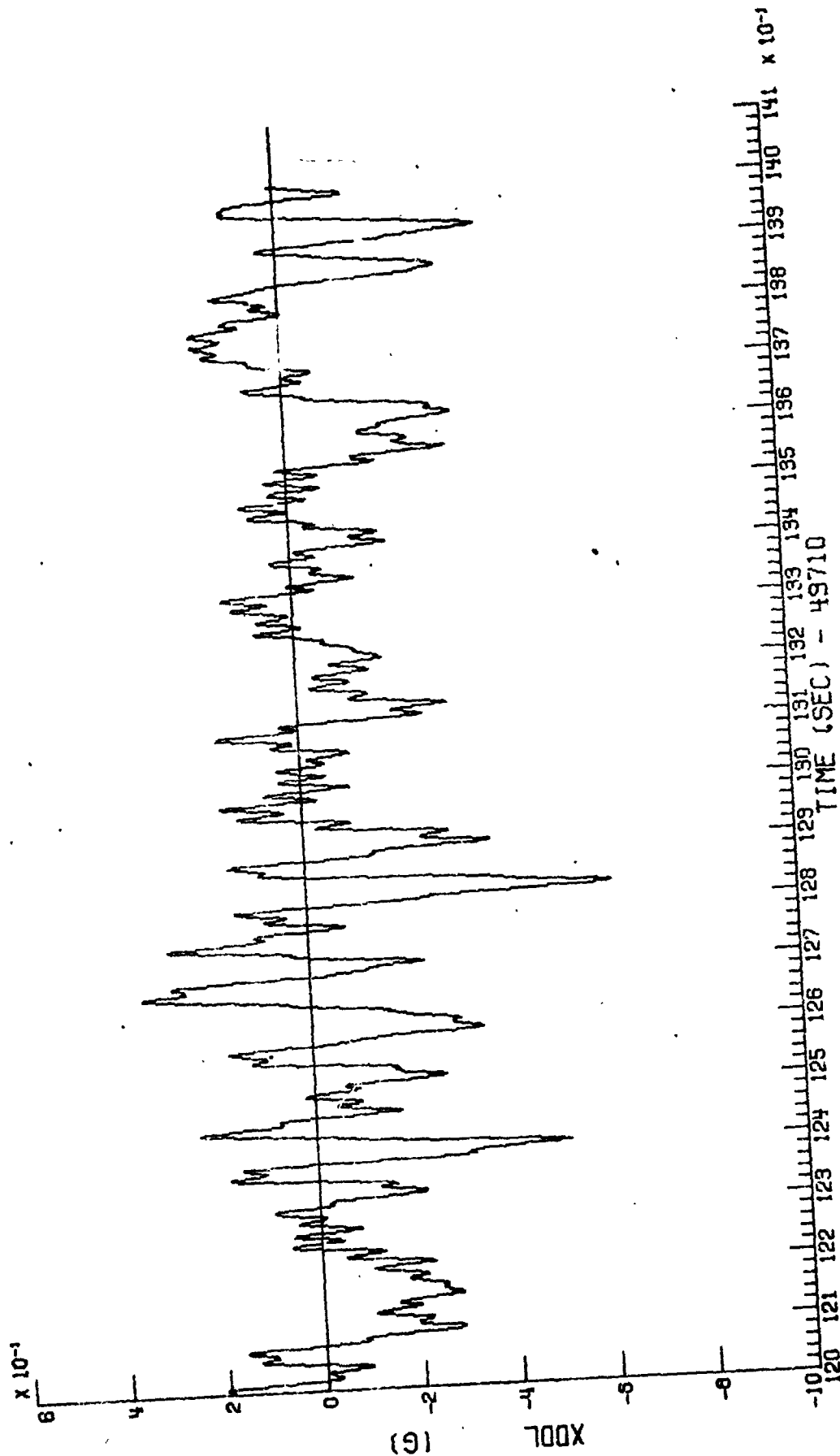
ANALYSIS PROGRAM 07/30/75



$\Delta F = .500$
 MEAN = -13737×10^{-5} $\sigma^2 = 827 \times 10^{-4}$ START = 49722.001 SEC STOP = 49723.998 SEC
 $\sigma = 28757 \times 10^{-5}$ $3\sigma = 86273 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A) MAX 0 CY1850 Figure 2.51b
 NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75 (8192 sps)

TIME HISTORY



MIN = -.621

MAX = .343

XDDL

(1024 SPS)

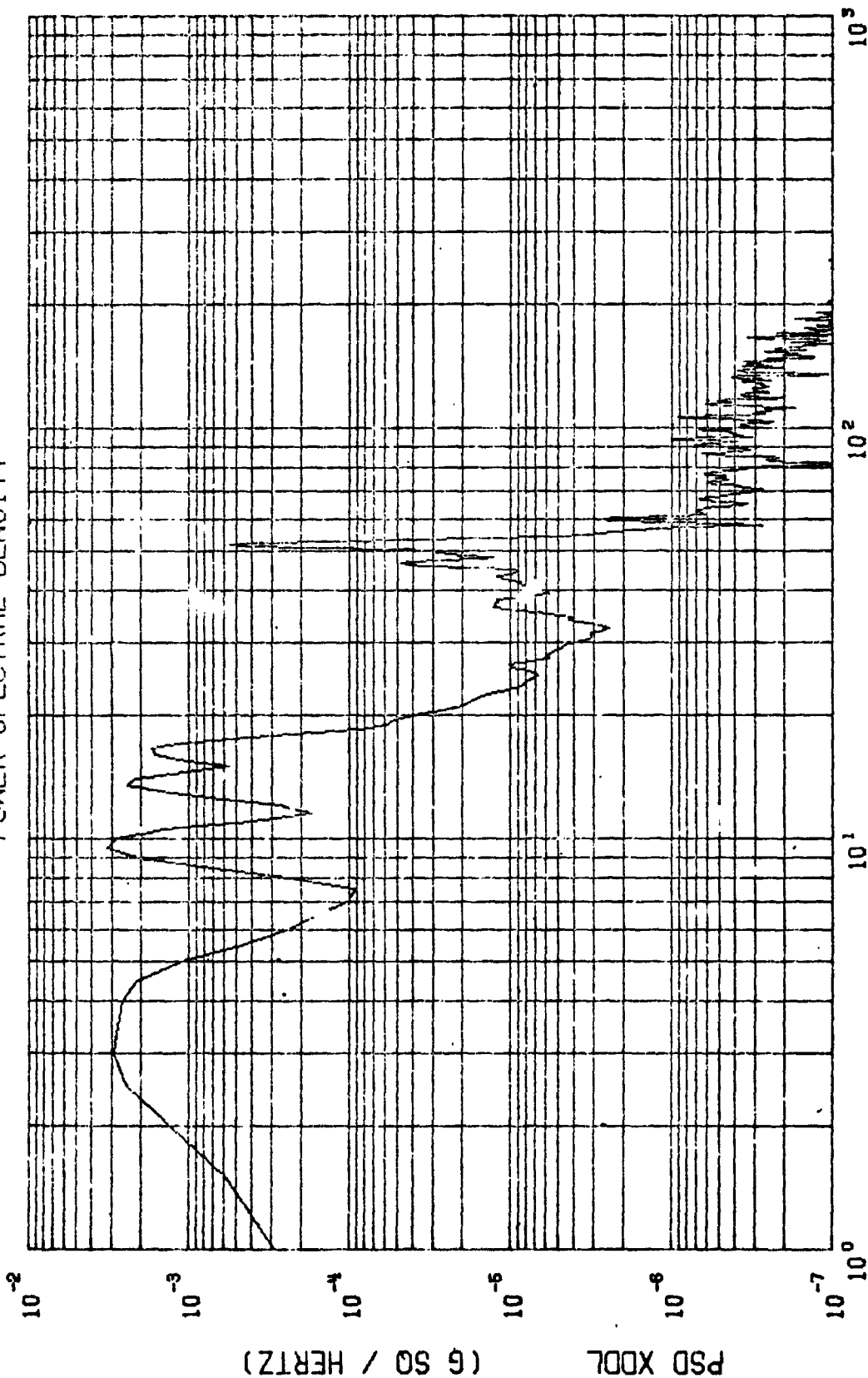
MAX 0

TC-1 / VDS DATA (LRC-3A)

Figure 2.52a

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

POWER SPECTRAL DENSITY

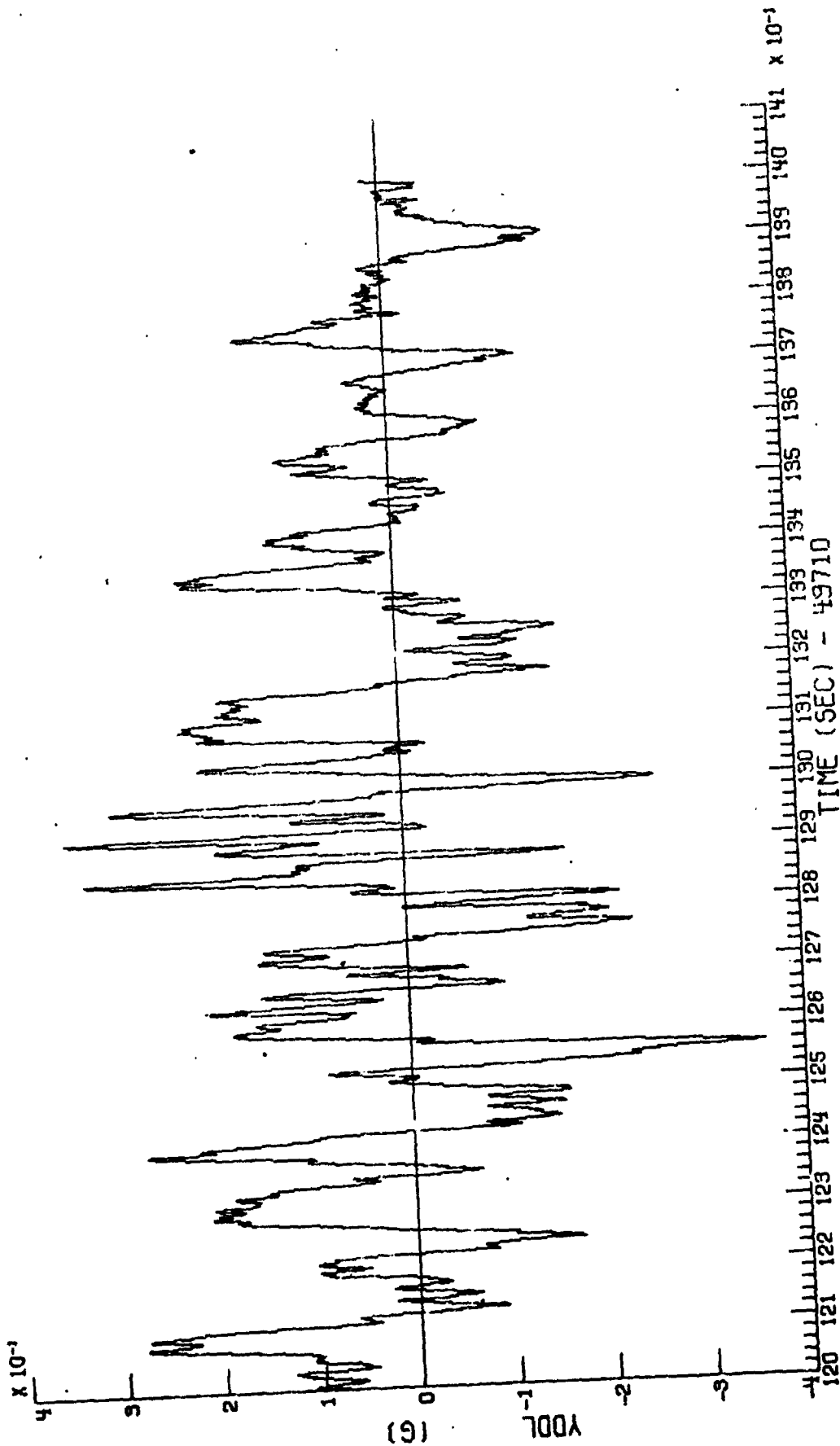


$\Delta F = .500$ START = 49722.000 SEC STOP = 49724.000 SEC
 MEAN = -58172×10^{-4} $\sigma^2 = 23135 \times 10^{-6}$ $\sigma = 1521 \times 10^{-4}$ $3\sigma = 45631 \times 10^{-4}$

TC-1 / VDS DATA (LRC-3A) XDDL (1024 SPS) Figure 2.52b
 NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY

106



MIN = -.360

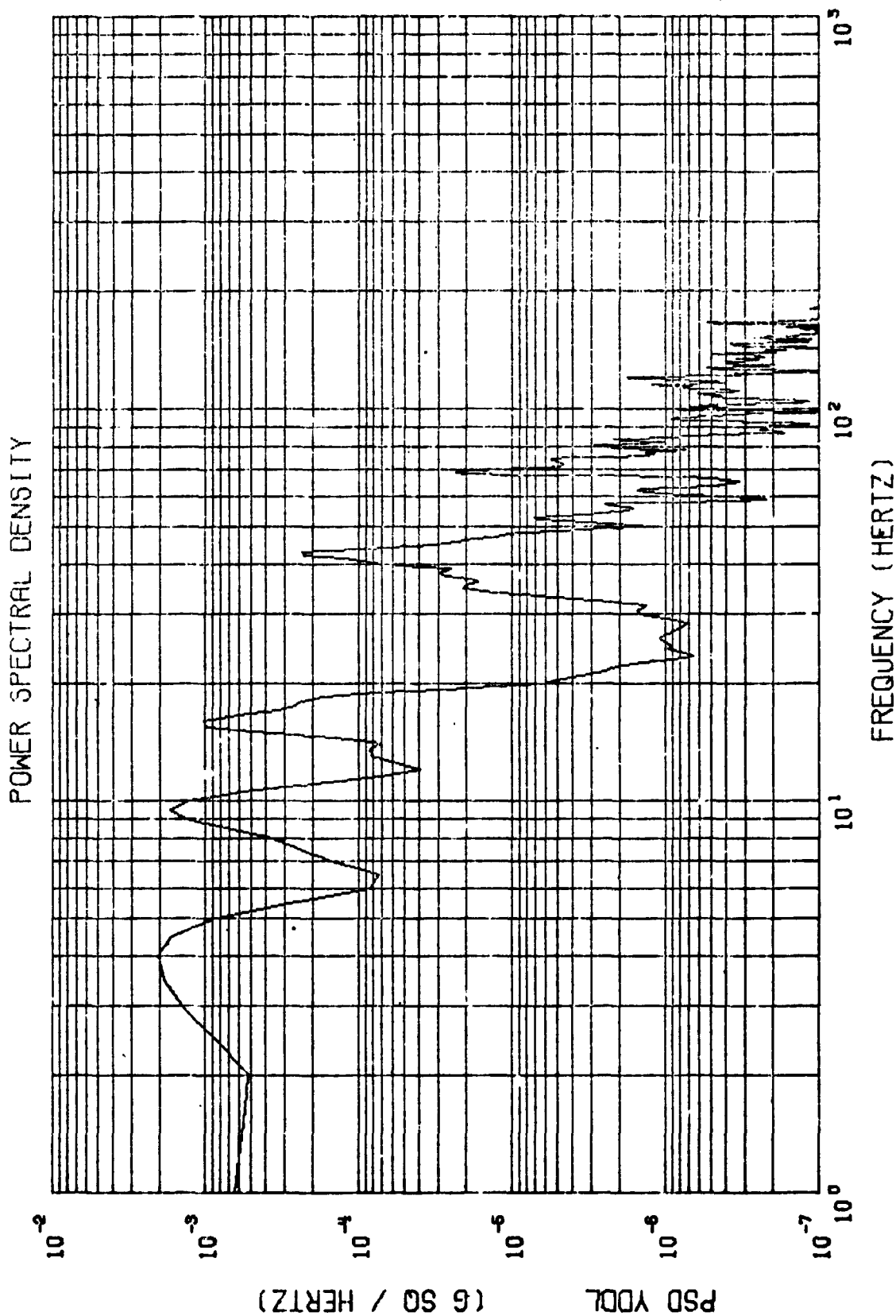
MAX = .345

YDDL
Figure 2.53a

MAX 0
(1024 SPS)

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

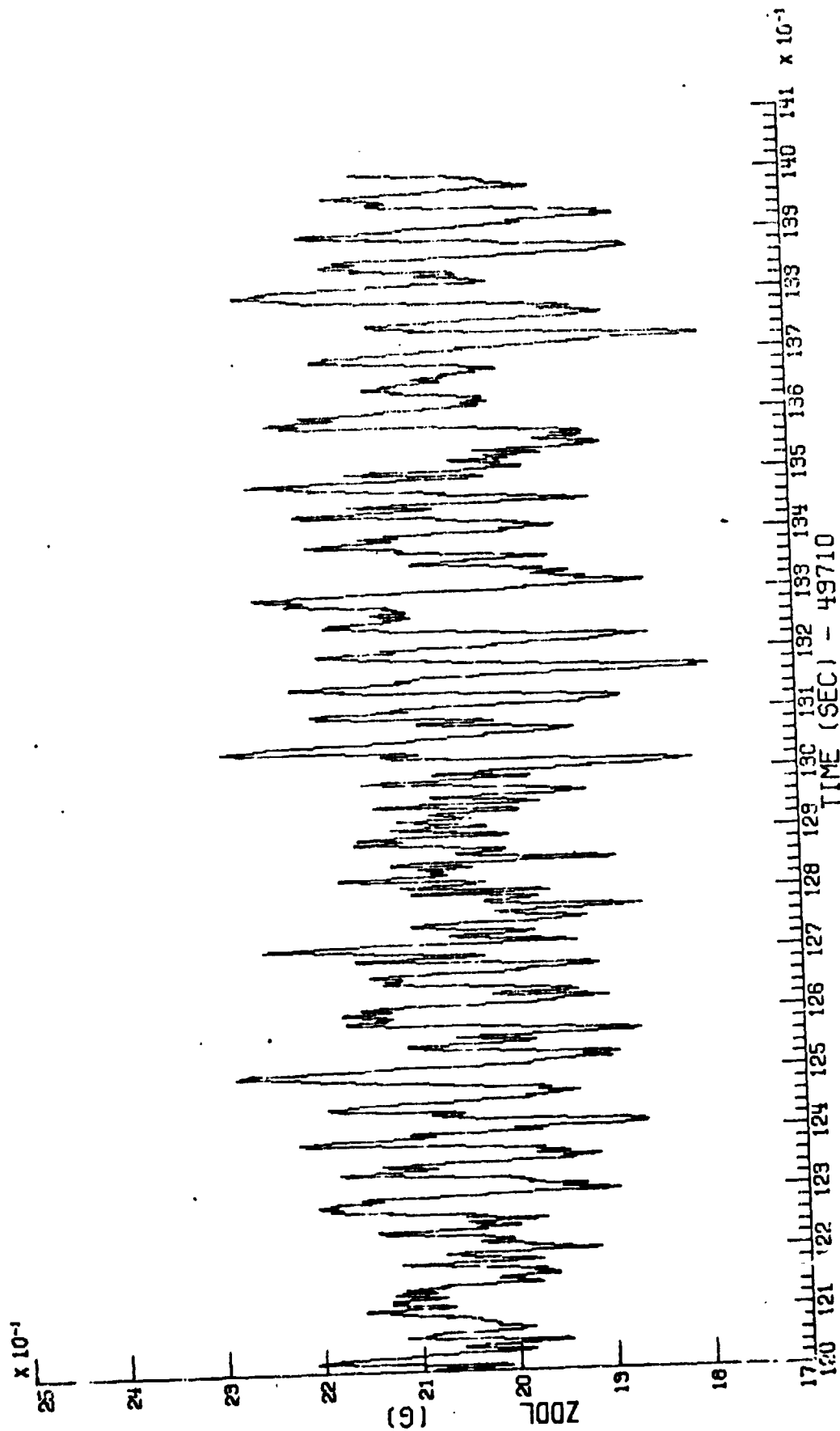


$\Delta F = .500$ START = 49722.000 SEC STOP = 49724.000 SEC
 $MEAN = 24452 \times 10^{-6}$ $\sigma^2 = 12541 \times 10^{-6}$ $\sigma = 11198 \times 10^{-6}$ $3\sigma = 33596 \times 10^{-6}$

TC-1 / VDS DATA (1 RC-3A) MAX Q YDDL Figure 2.53b
 (1024 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY



MIN = 1.788

MAX = 2.290

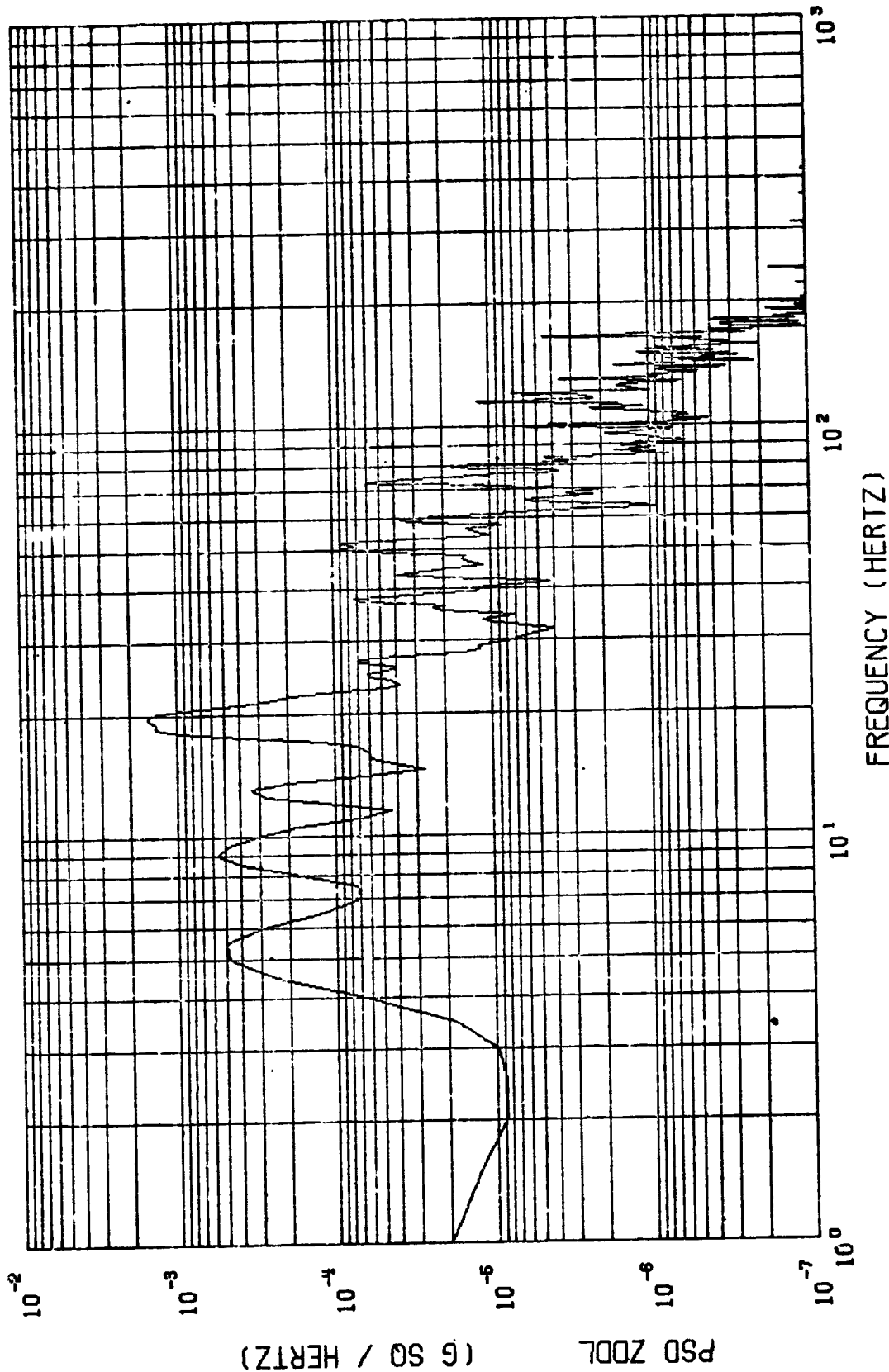
ZDDL
Figure 2.54a

(1024 SPS)

MAX Q

TC-1 / VDS DATA (LRC-3A)

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $MEAN = 20472 \times 10^{-4}$
 $\sigma^2 = 87113 \times 10^{-7}$
 $\sigma = 93334 \times 10^{-4}$
 $3\sigma = 28 \times 10^{-2}$

STOP = 49724.000 SEC

START = 49722.000 SEC

ZDDL

MAX 0

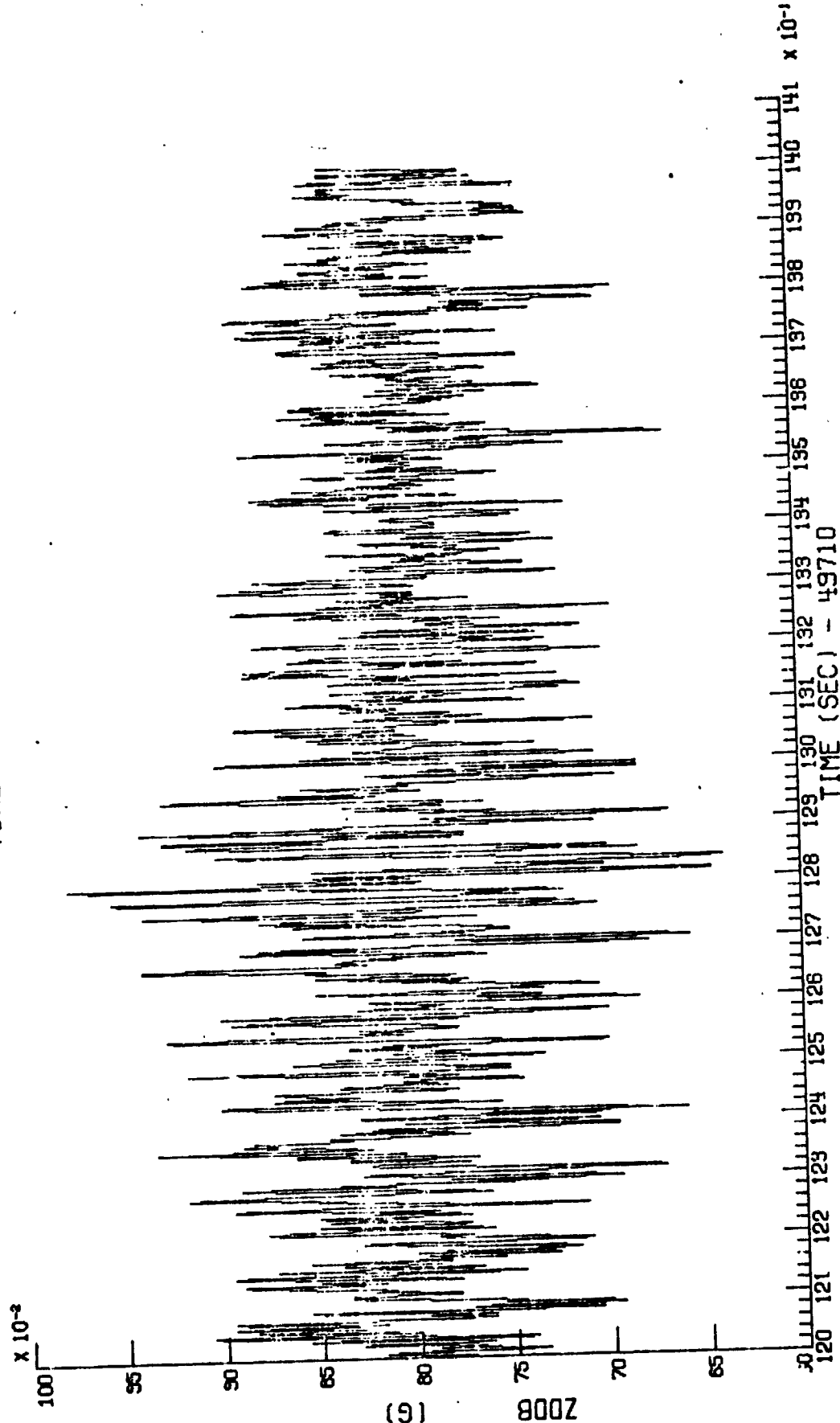
TC-1 / VDS DATA (LRC-3A)

(1024 SPS)

Figure 2.54b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY



MIN = .639

MAX = .977

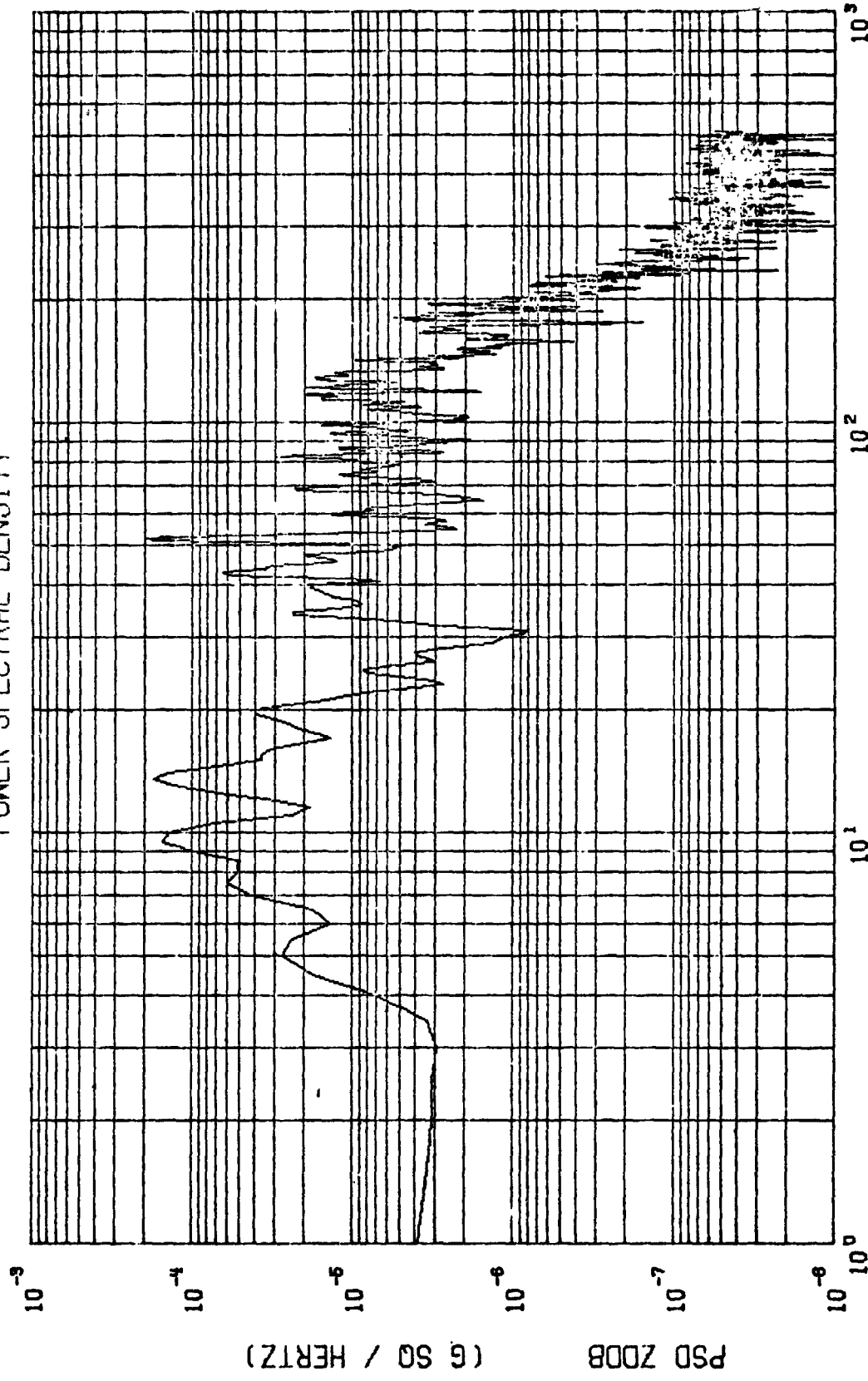
Z008
(1024 SPS)
Figure 2.55a

MAX Q

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

POWER SPECTRAL DENSITY



$\Delta f = .500$

START = 49722.000 SEC

STOP = 49724.000 SEC

MEAN = 80141×10^{-5}

$\sigma^2 = 24093 \times 10^{-7}$

$\sigma = 49085 \times 10^{-8}$

$3\sigma = 14725 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

MAX Q

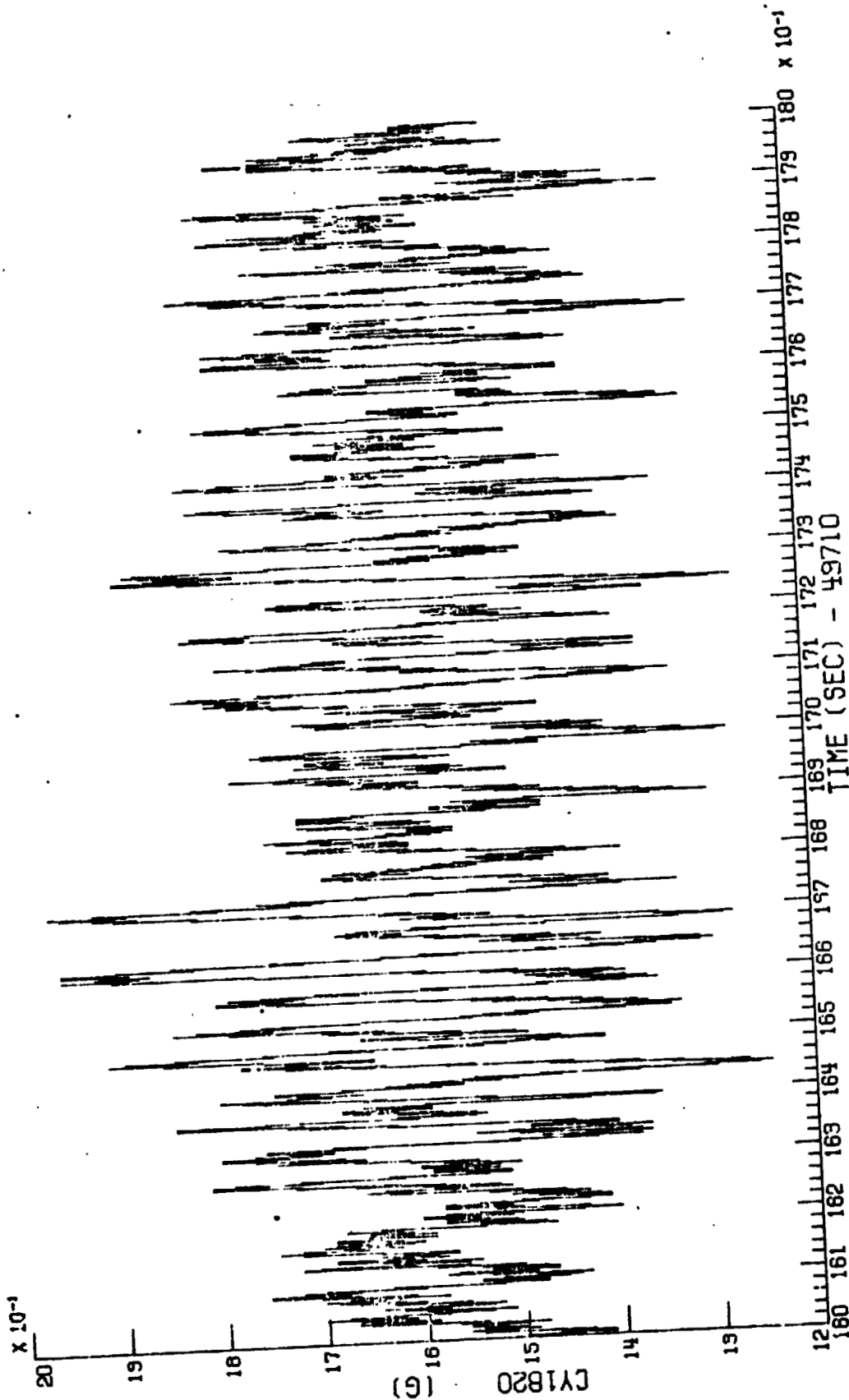
Z008

(1024 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

Figure 2.55b

TIME HISTORY



MIN = 1.245

MAX = 1.967

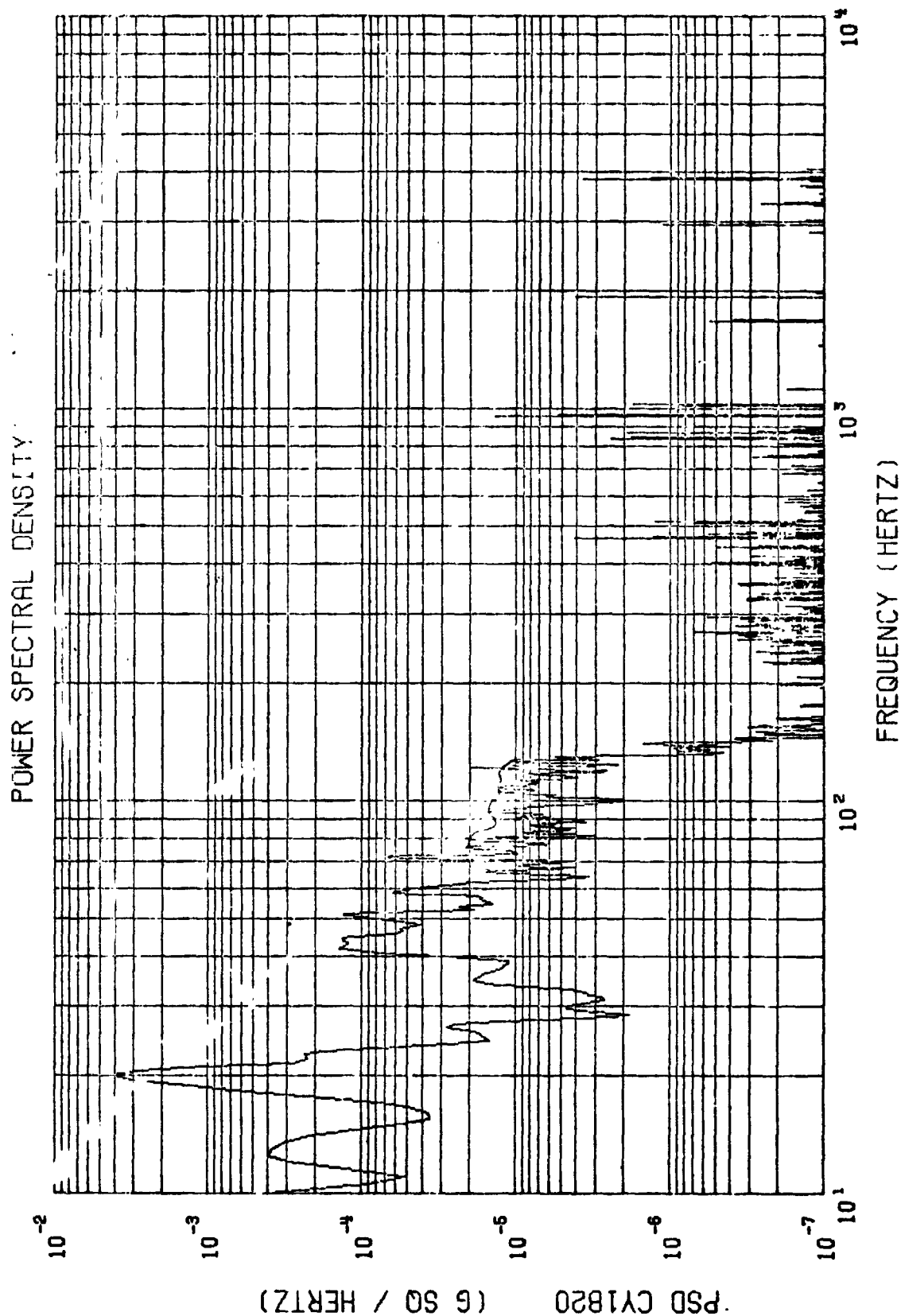
CY1820
Figure 2.56a

(0.192 sps)

MAX 0

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75



$\Delta F = .500$ START = 49726.001 SEC STOP = 49727.998 SEC
 MEAN = 15851×10^{-4} $\sigma^2 = 14278 \times 10^{-5}$ $\sigma = 11949 \times 10^{-3}$ $3\sigma = 35848 \times 10^{-3}$

TC-1 / VDS DATA (LRC-3A)

MAX Q

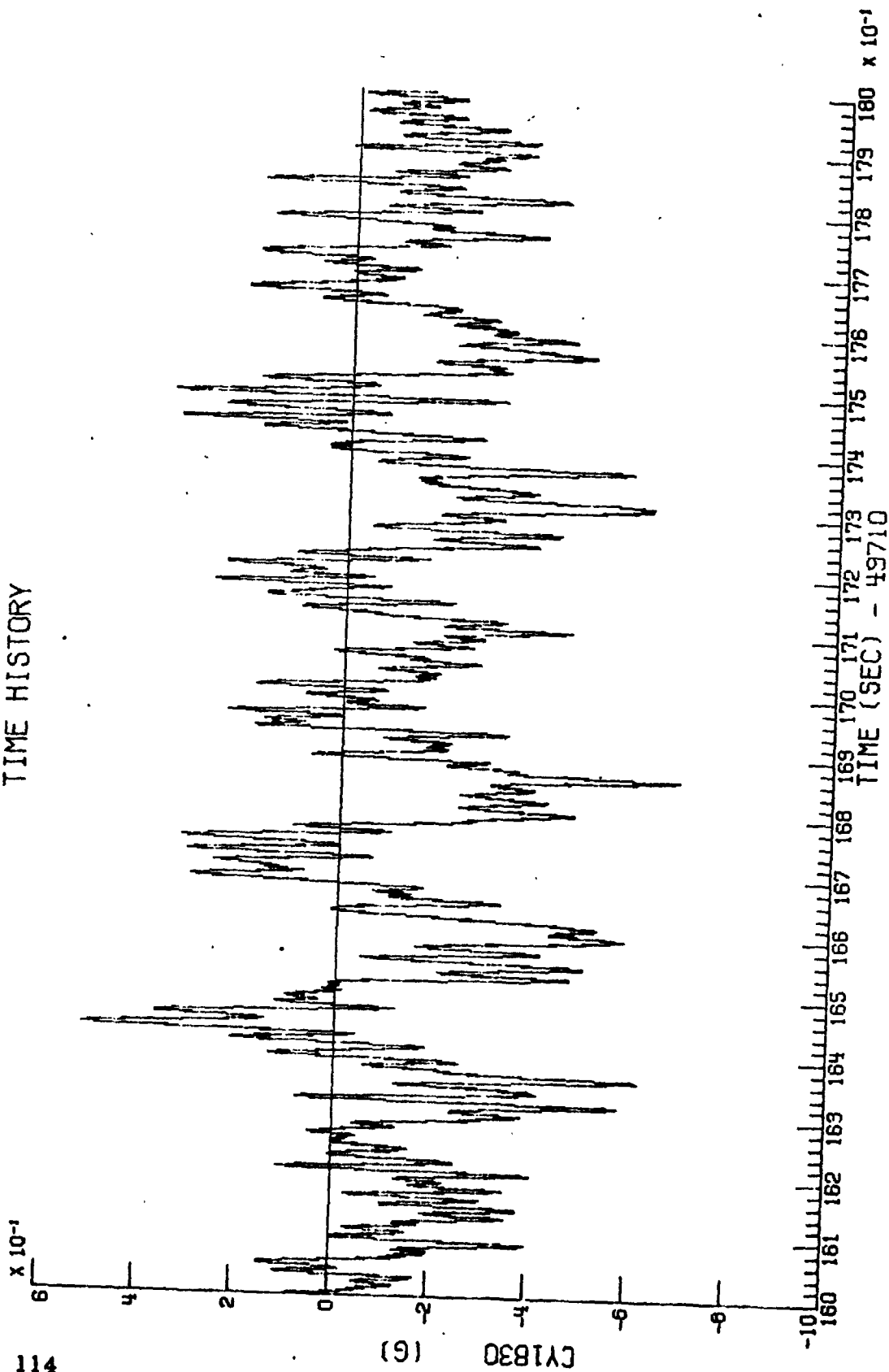
CY1820

(2192 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

Figure 2.56b

TIME HISTORY



MAX = .516

MIN = -.689

TC-1 / VDS DATA (LRC-3A)

MAX 0

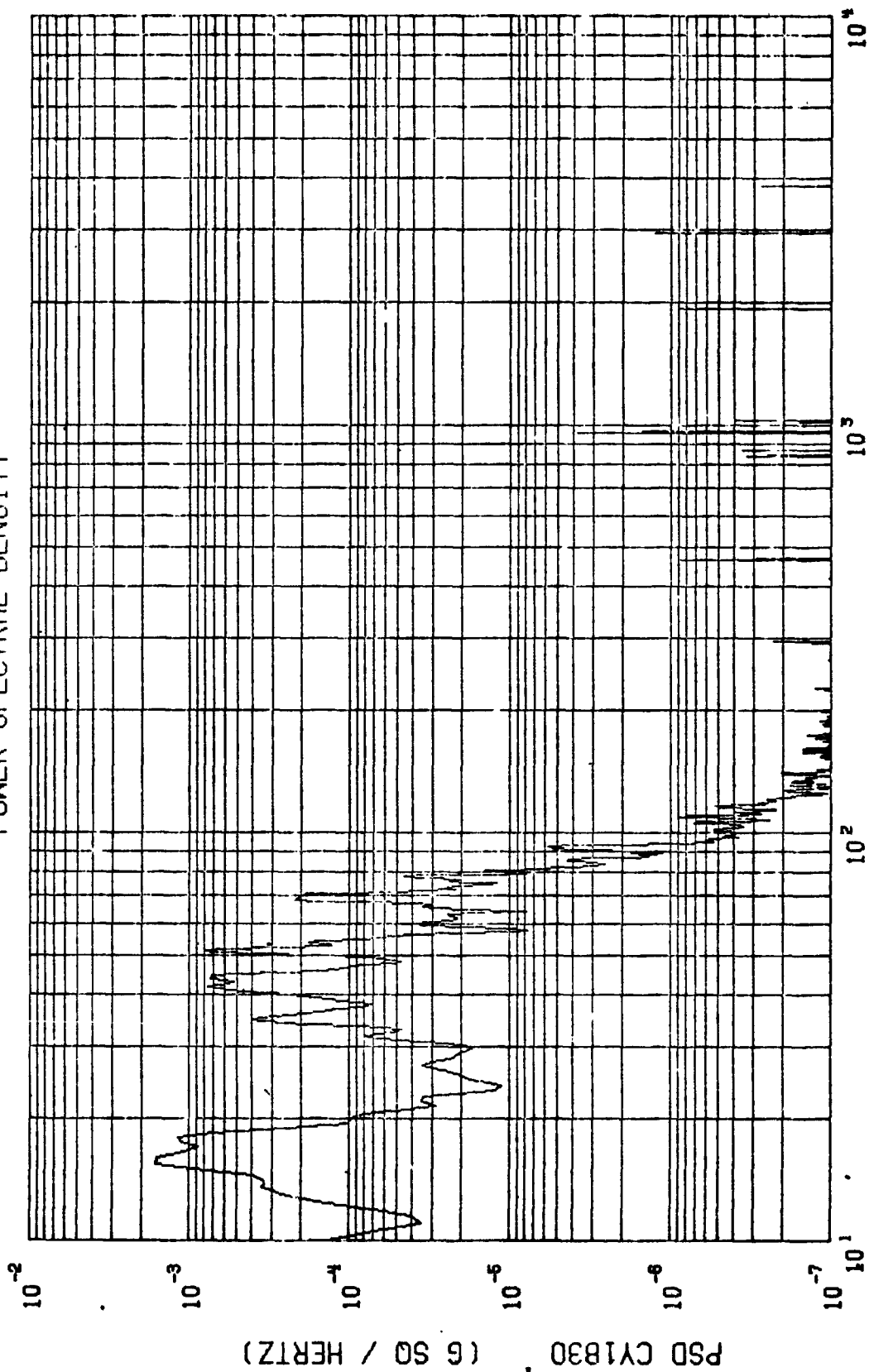
CY1830

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

(0192 sps)

Figure 2. 57a

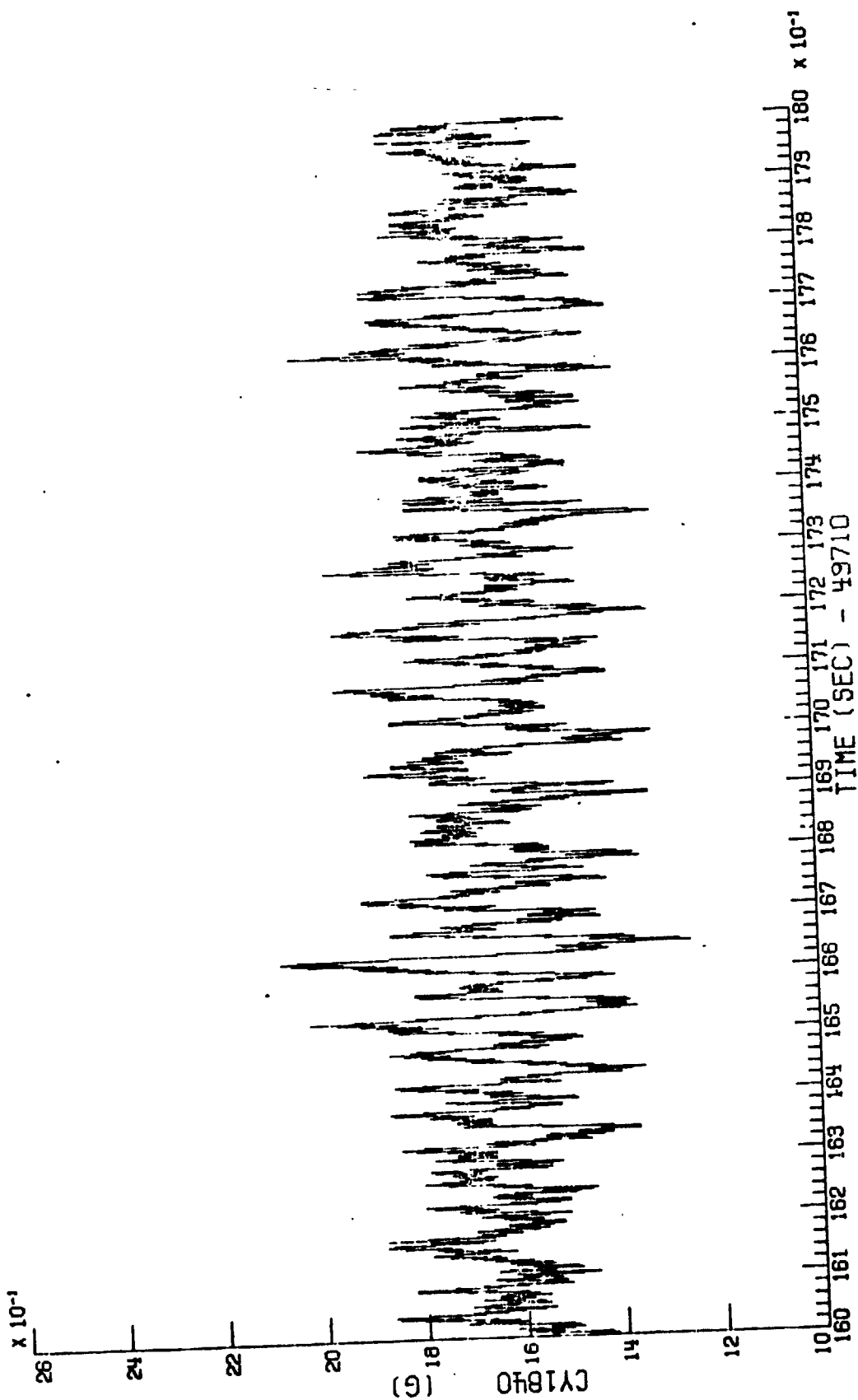
POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$ $\text{START} = 49726.001 \text{ SEC}$ $\text{STOP} = 49727.998 \text{ SEC}$
 $\text{MEAN} = -12894 \times 10^{-5}$ $\sigma^2 = 36976 \times 10^{-5}$ $\sigma = 19229 \times 10^{-5}$ $3\sigma = 57687 \times 10^{-5}$
 TC-1 / VDS DATA (LRC-3A) MAX Q CY1830 Figure 2.57b
 NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75 (0192 sps)

TIME HISTORY



MIN = 1.254

MAX = 2.076

CY1840
Figure 2.58a

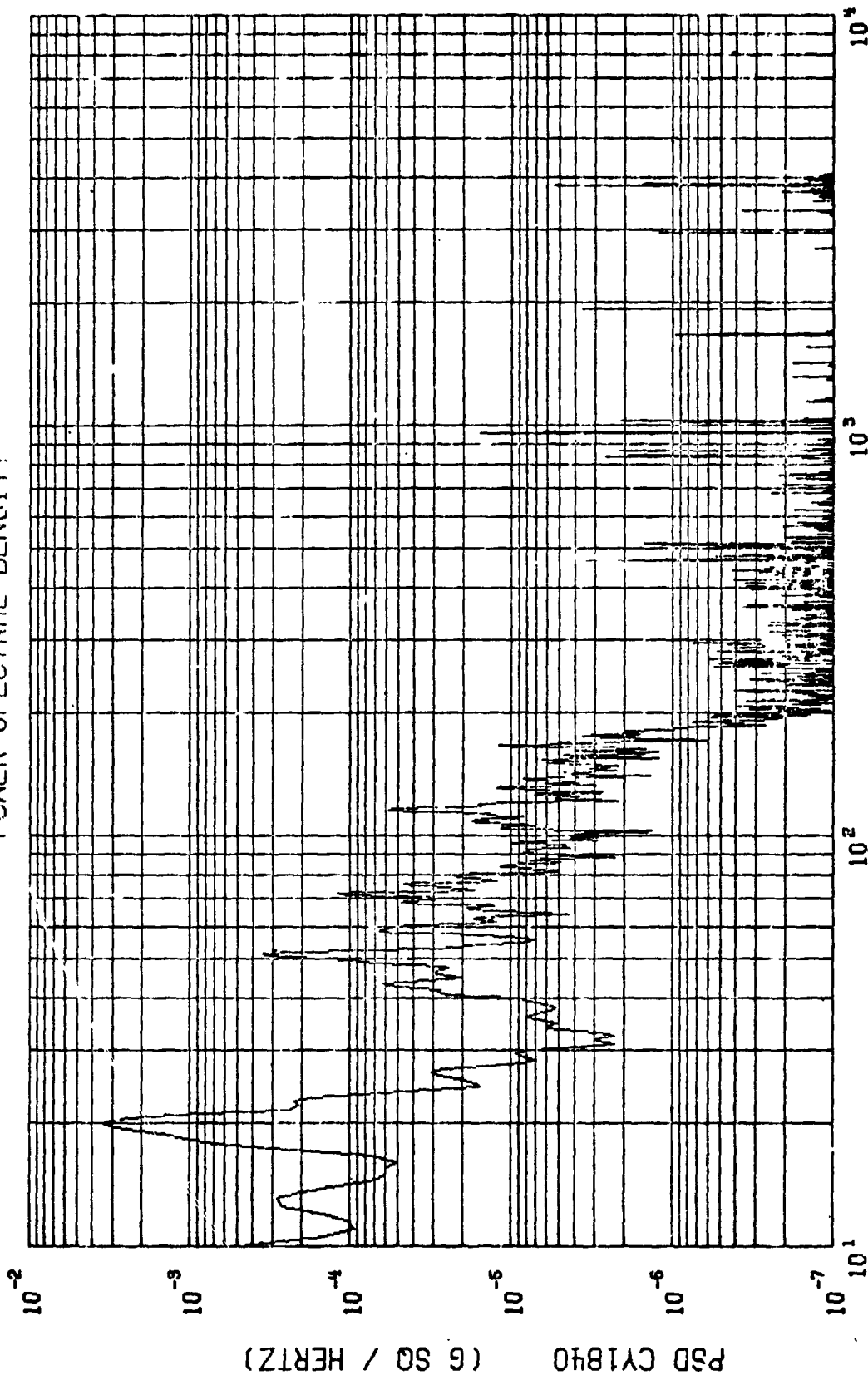
(0192 SPS)

MAX Q

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$
 $MEAN = 16411 \times 10^{-4}$
 $\sigma^2 = 14492 \times 10^{-6}$
 $\sigma = 12038 \times 10^{-3}$
 $3\sigma = 36115 \times 10^{-5}$

START = 49726.001 SEC

STOP = 49727.998 SEC

TC-1 / VDS DATA (LRC-3A)

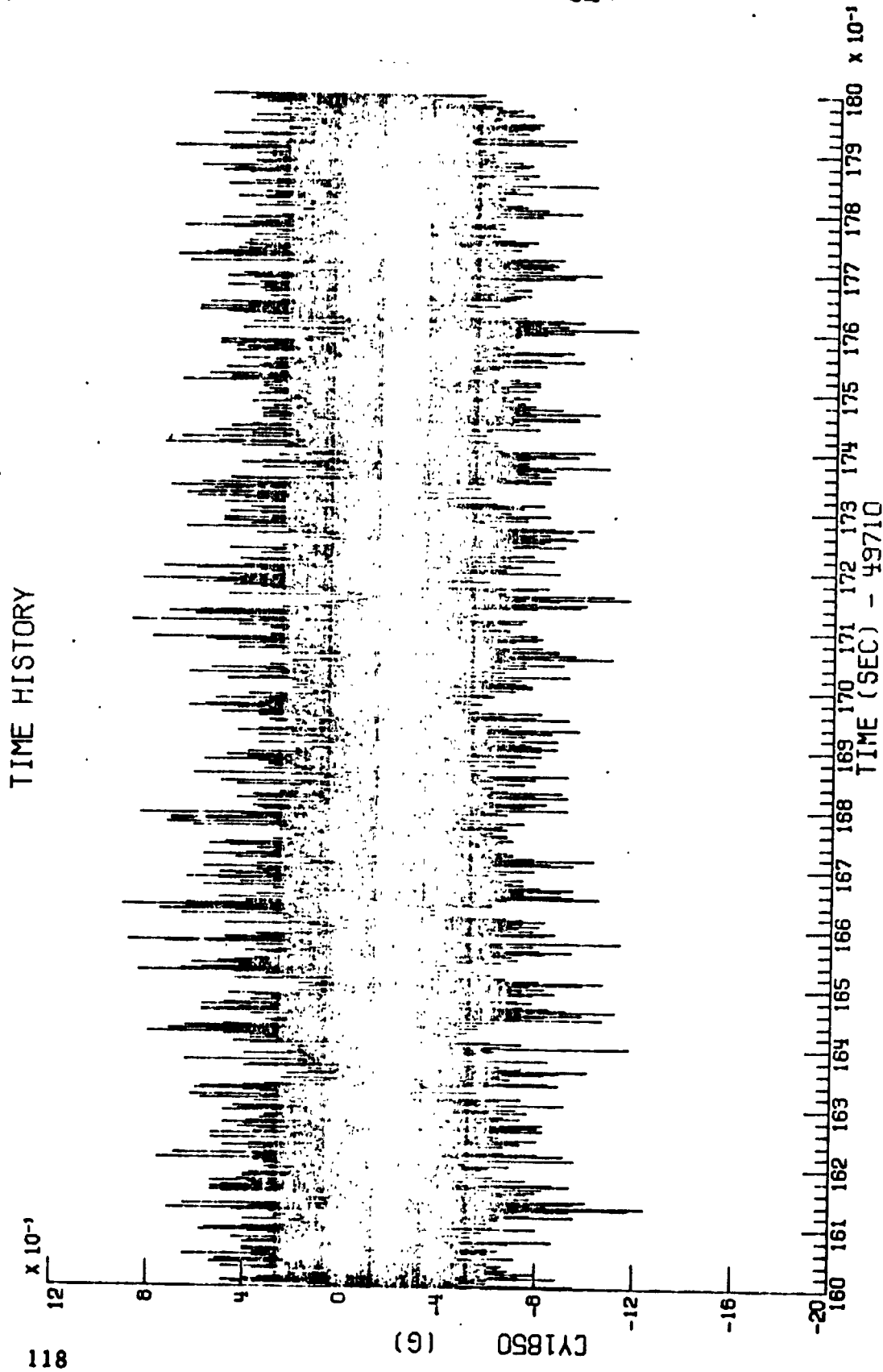
MAX 0

CY1840

(8192 - SPS) Figure 2.58b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

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OF POOR QUALITY



MAX = .911

MIN = -1.244

TC-1 / VDS DATA (LRC-3A)

MAX 0

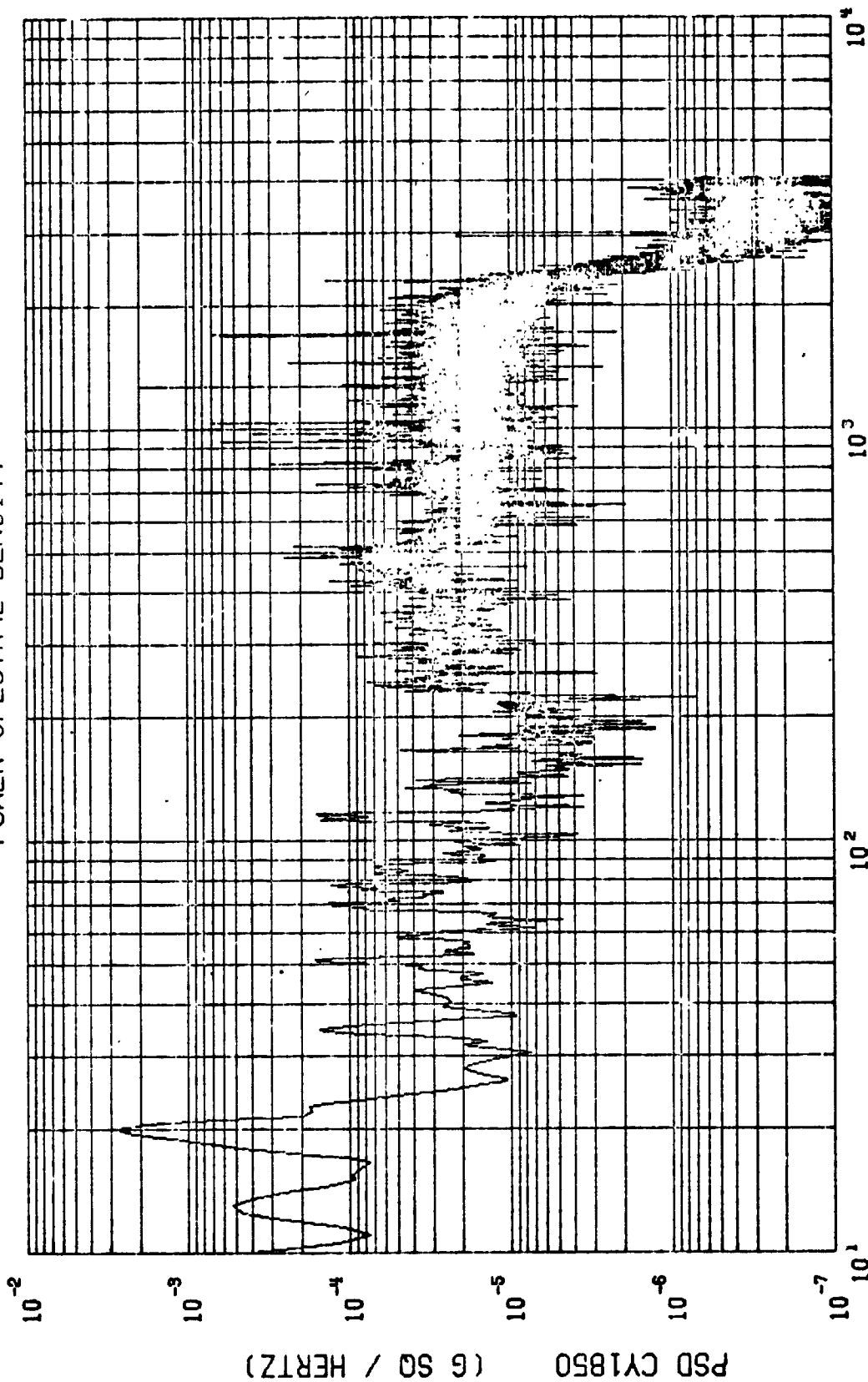
CY1850

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

(8192 SPs)

Figure 2.59a

POWER SPECTRAL DENSITY



$\Delta F = .500$

START = 49726.001 SEC

STOP = 49727.998 SEC

MEAN = -13866×10^{-5}

$\sigma^2 = 76667 \times 10^{-5}$

$\sigma = 27688 \times 10^{-5}$

$3\sigma = 83066 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

MAX Q

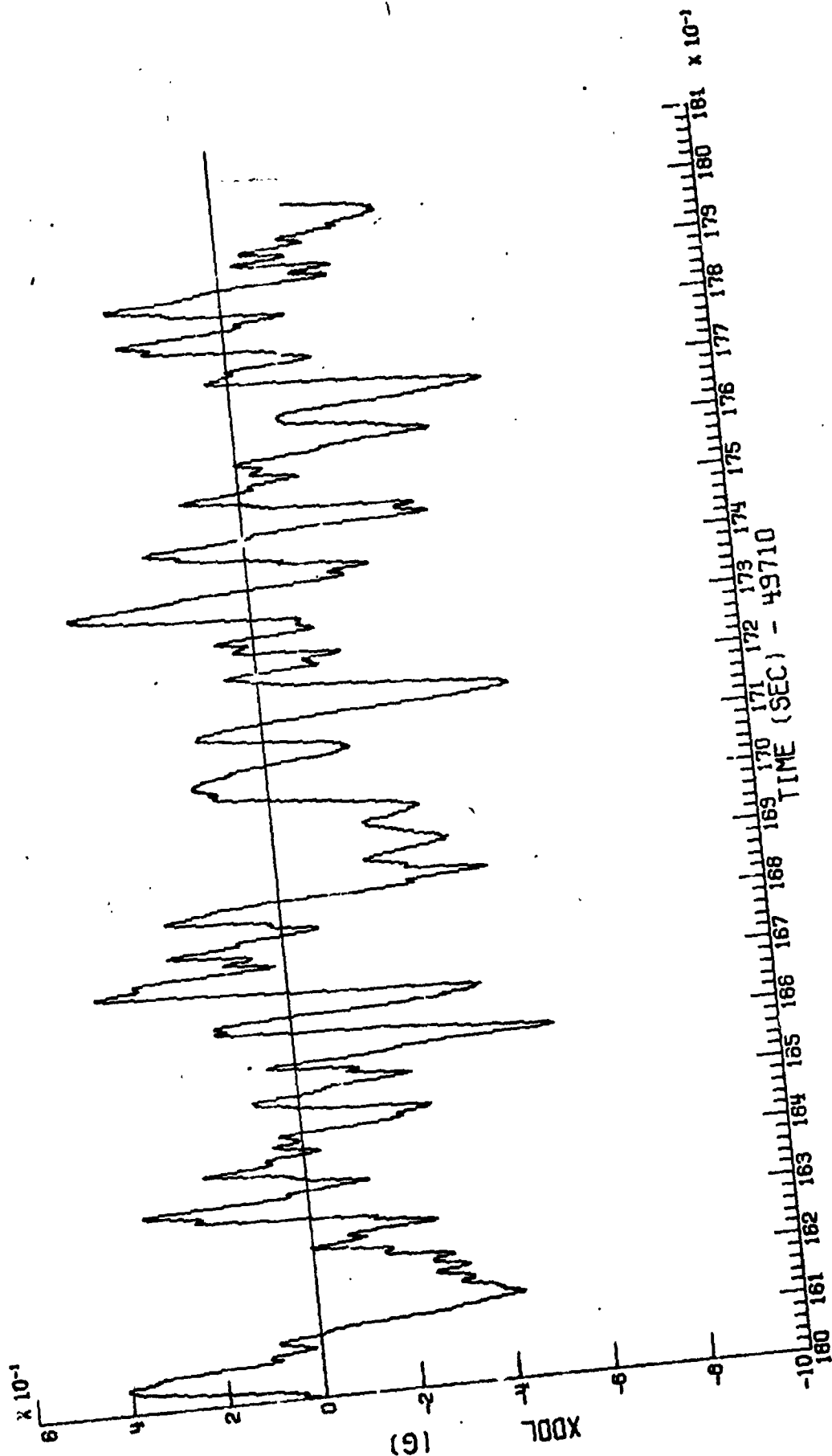
CY1850

(6192 SPS)

Figure 2.59b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

TIME HISTORY



MIN = -.537

MAX = .407

XDDL

(1024 sps)

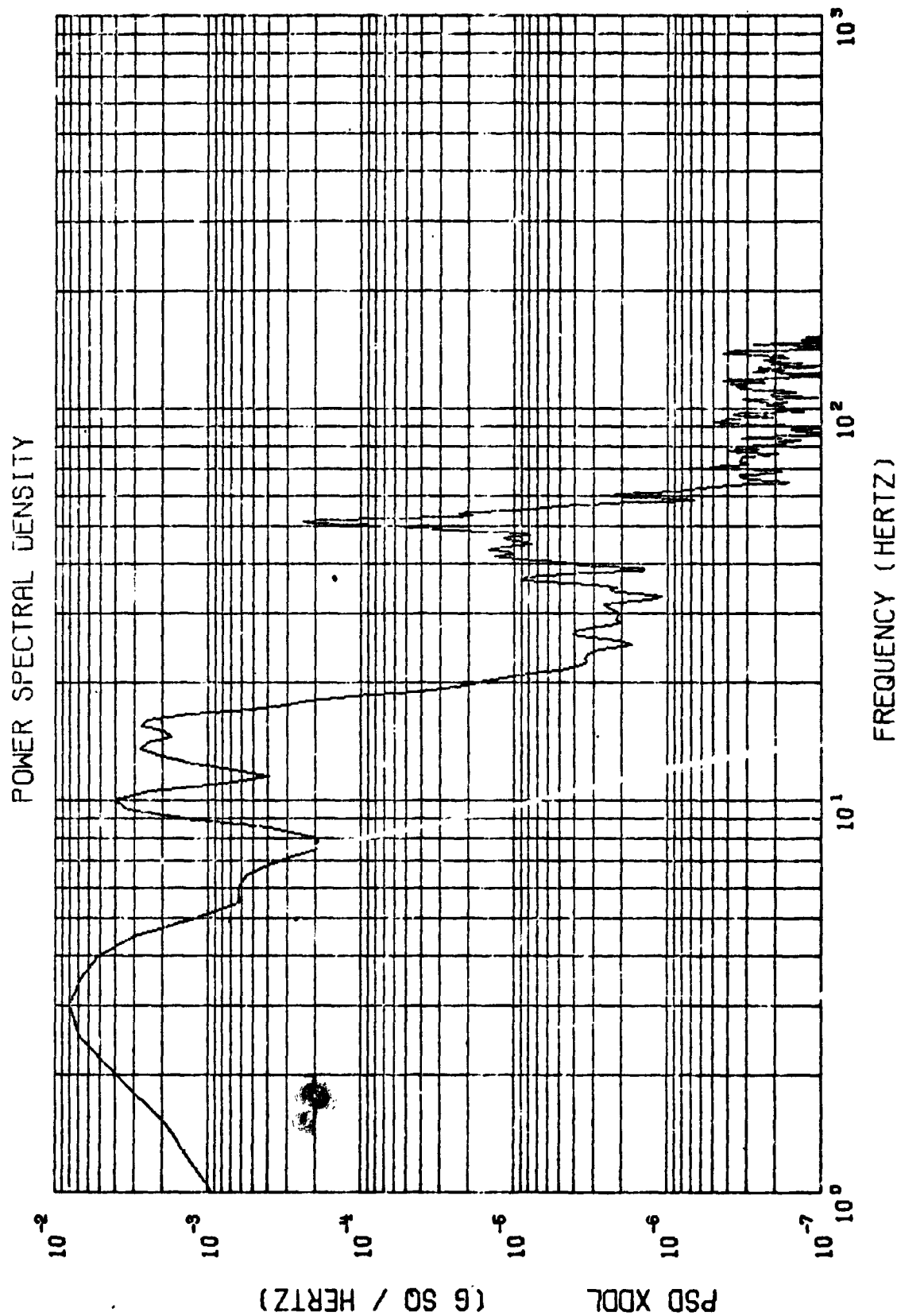
MAX 0

Figure 2.60a

TC-1 / VDS DATA (LRC-3A)

07/23/75

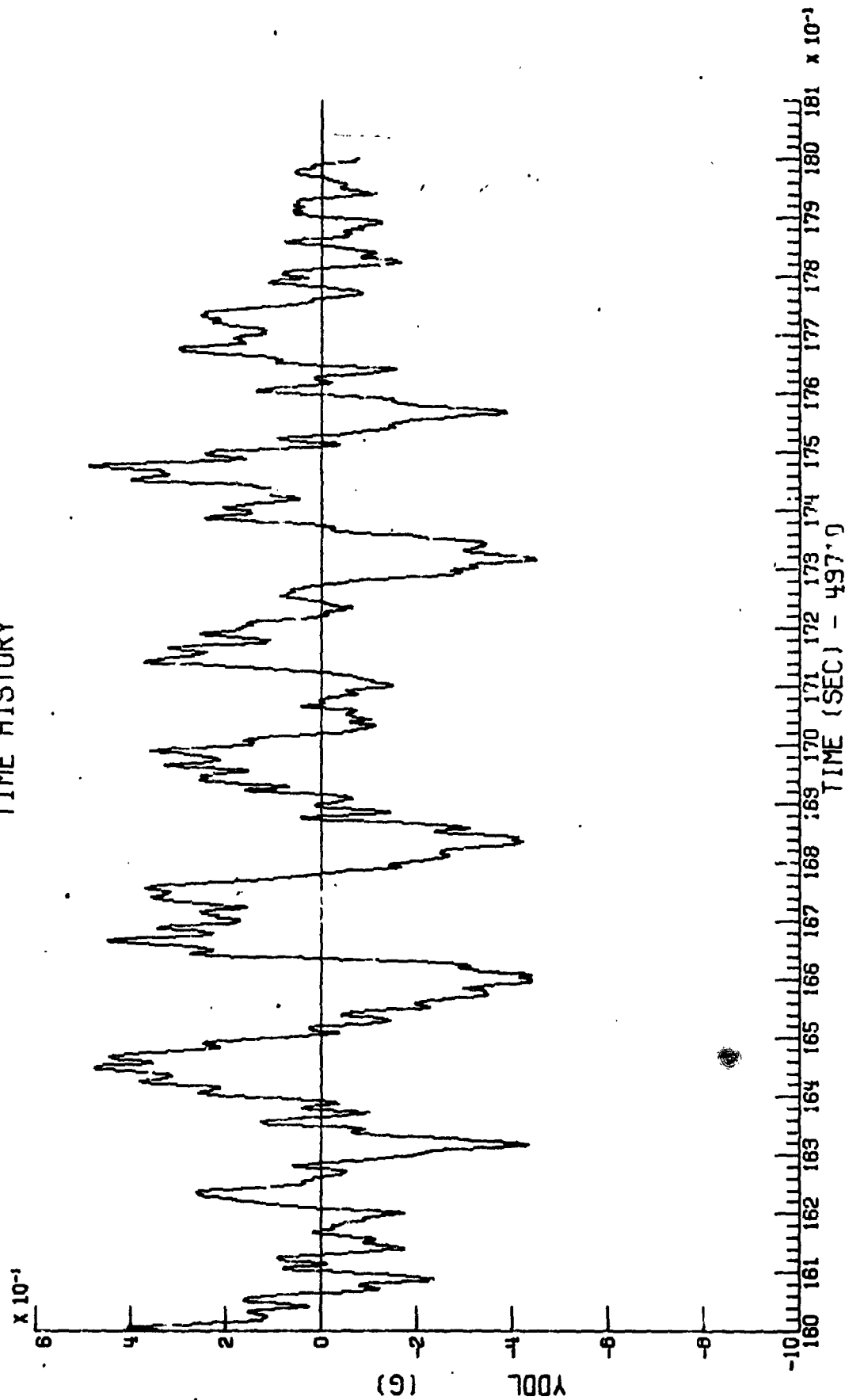
NASA-LANGLEY SIGNAL ANALYSIS PROGRAM



$\Delta F = .500$ START = 49726.000 SEC $\sigma = 19543 \times 10^{-4}$ $3\sigma = 5863 \times 10^{-4}$
 MEAN = -73102×10^{-8} $\sigma^2 = 38194 \times 10^{-8}$

TC-1 / VDS DATA (LRC-3A) MAX Q' XDDL
 (1024 sps) Figure 2.60b

TIME HISTORY



MAX = .407

MIN = -.448

TC-1 / VDS DATA (LRC-3A)

MAX Q

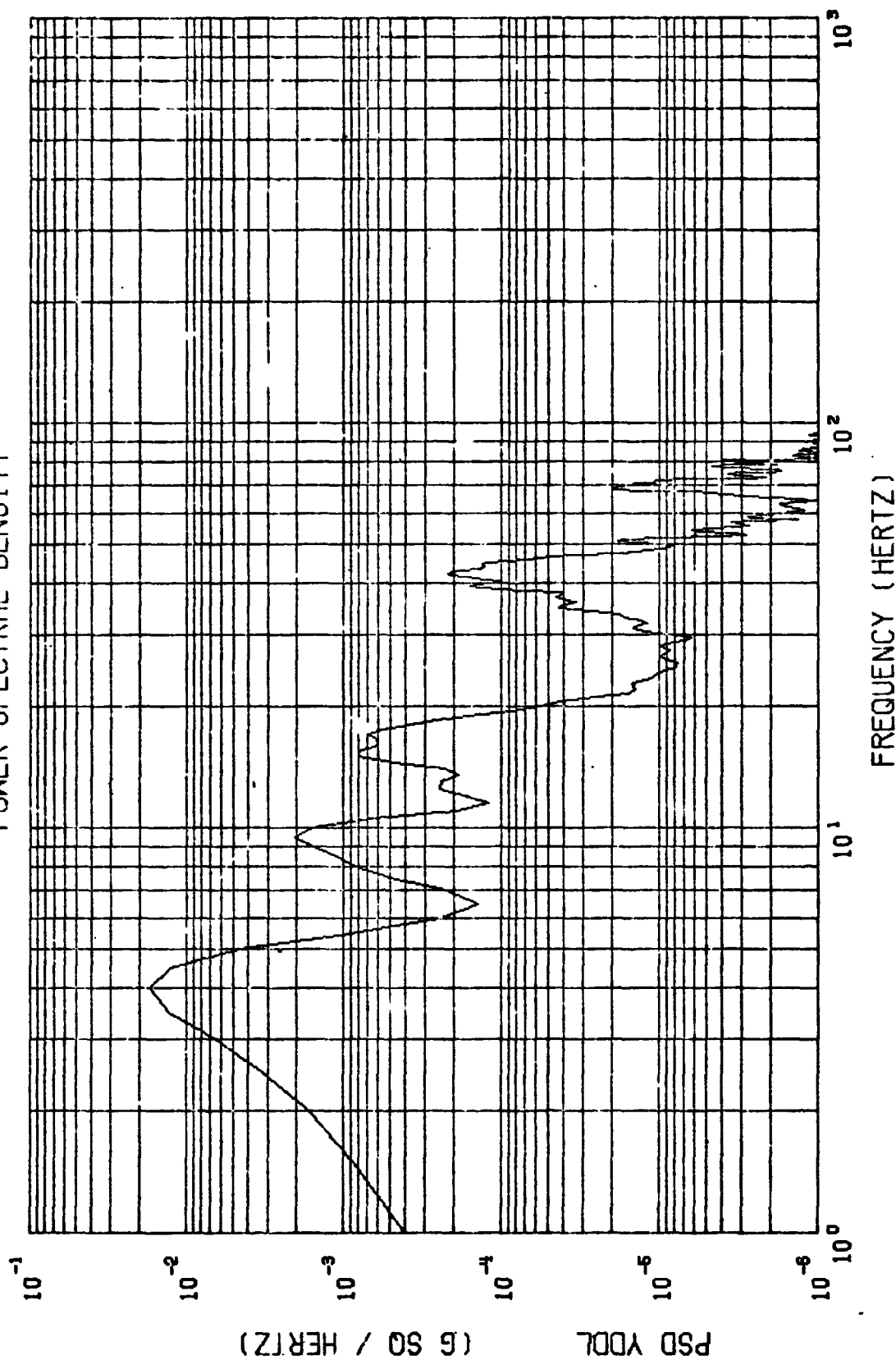
YDDL

(1024 SPS)

Figure 2.61a

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $MEAN = 24514 \times 10^{-6}$ $\sigma^2 = 39865 \times 10^{-6}$ $\sigma = 19966 \times 10^{-6}$ $3\sigma = 59898 \times 10^{-6}$

START = 49726.000 SEC

STOP = 49728.000 SEC

TC-1 / VDS DATA (LRC-3A)

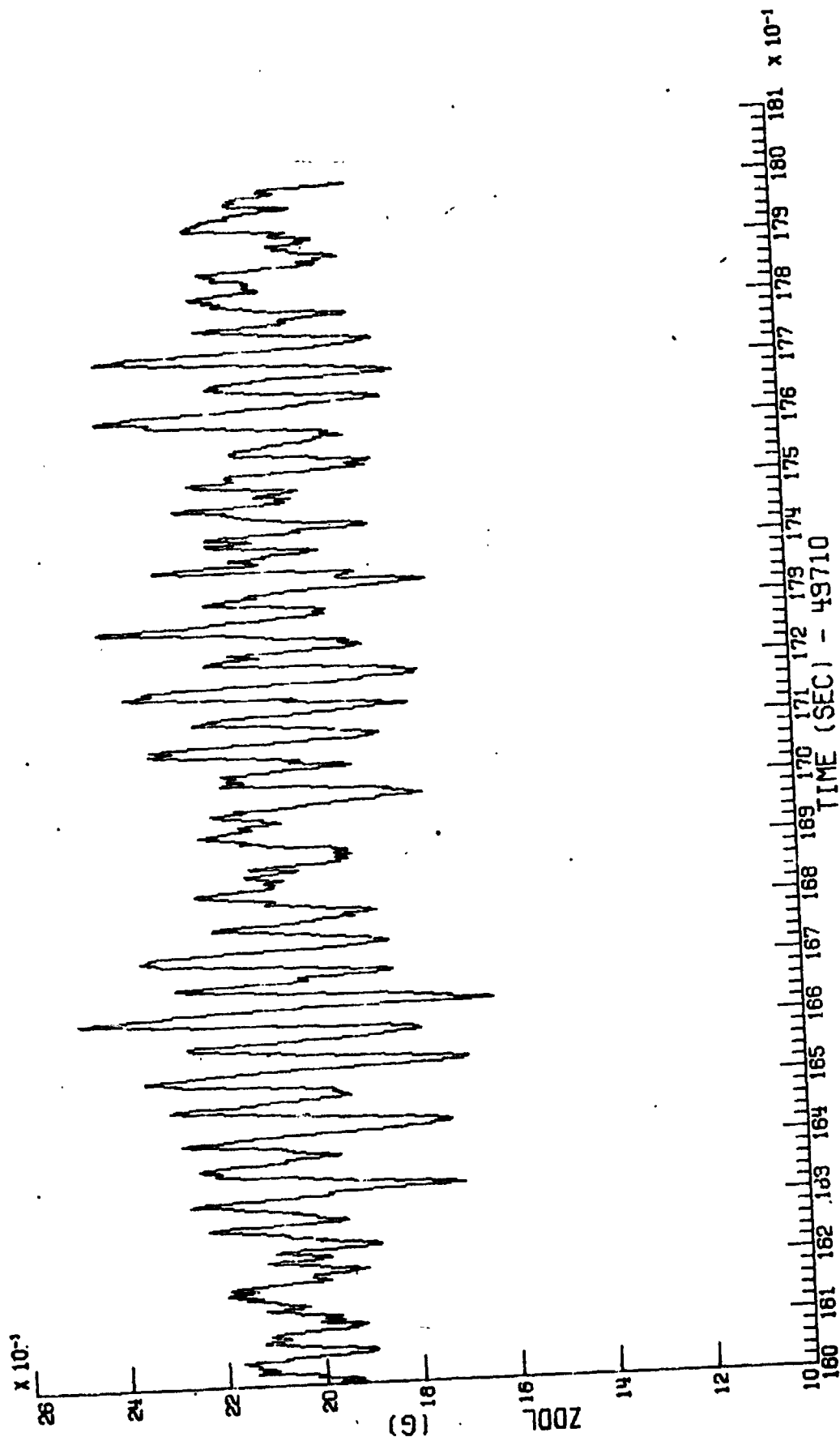
MAX 0

YDDL

(1024 SPS) Figure 2.61b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY



MIN = 1.630

MAX = 2.483

ZDDL

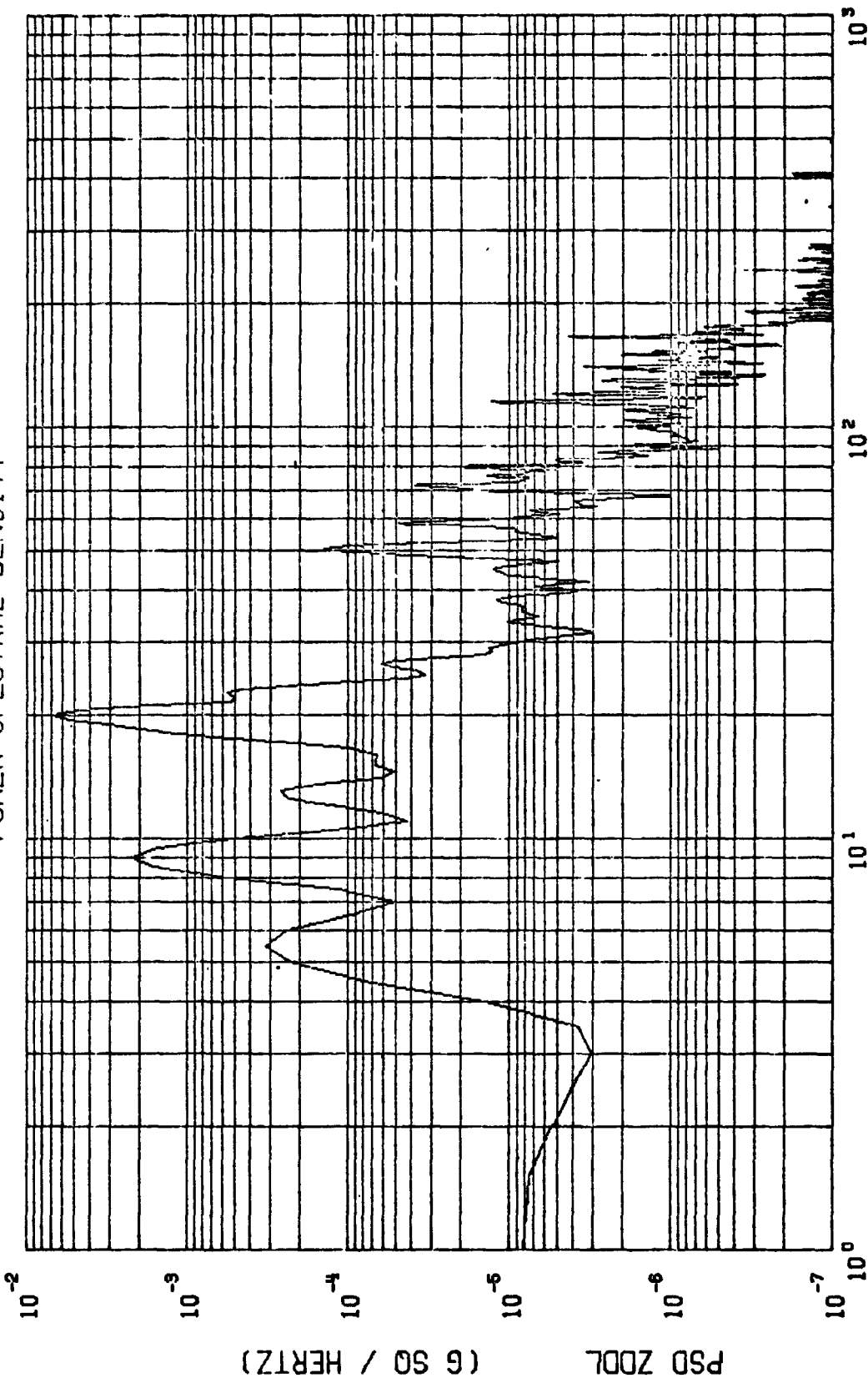
(1024 SPS)

MAX 0

TC-1 / VDS DATA (LRC-3A)

Figure 2.62a

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$ START = 49726.000 SEC STOP = 49728.000 SEC
 MEAN = 20472×10^{-4} $\sigma^2 = 19712 \times 10^{-5}$ $\sigma = 1404 \times 10^{-3}$ $3\sigma = 4212 \times 10^{-4}$

TC-1 / VDS DATA (LRC-3A)

MAX Q

ZDDL

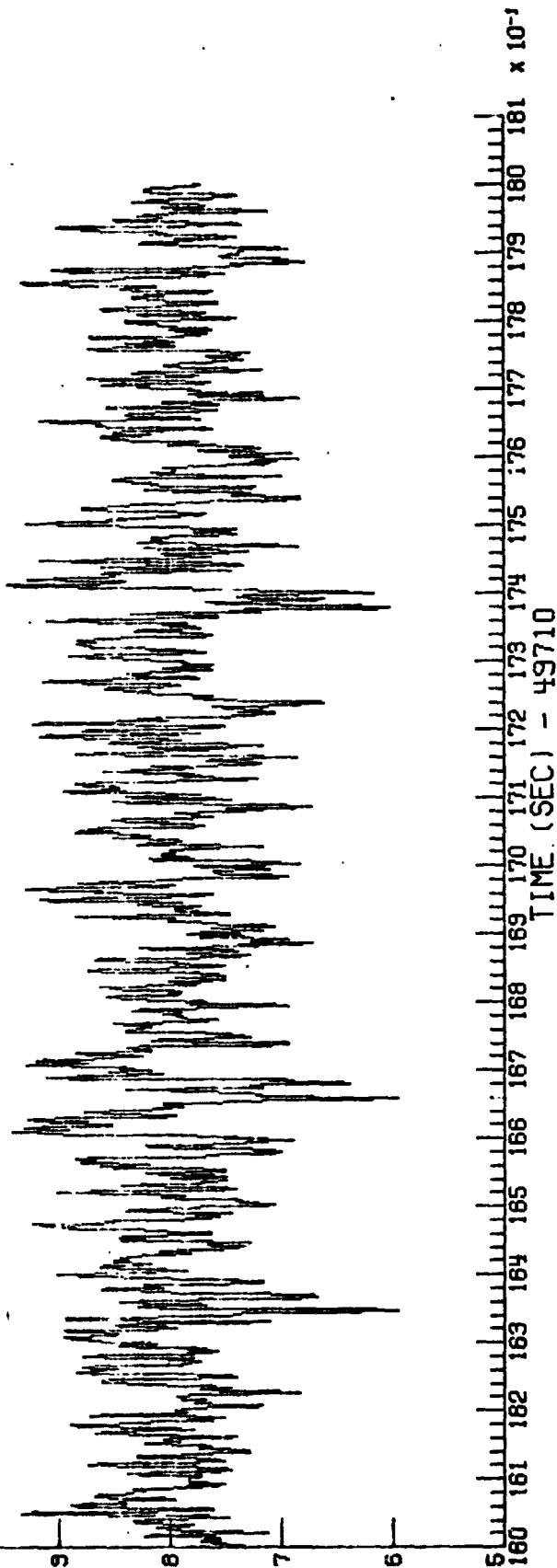
(1024 SPS) Figure 2.62b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY

126 $\times 10^{-3}$

(G) Z008



MAX = .945

MIN = .595

TC-1 / VDS DATA (LRC-3A)

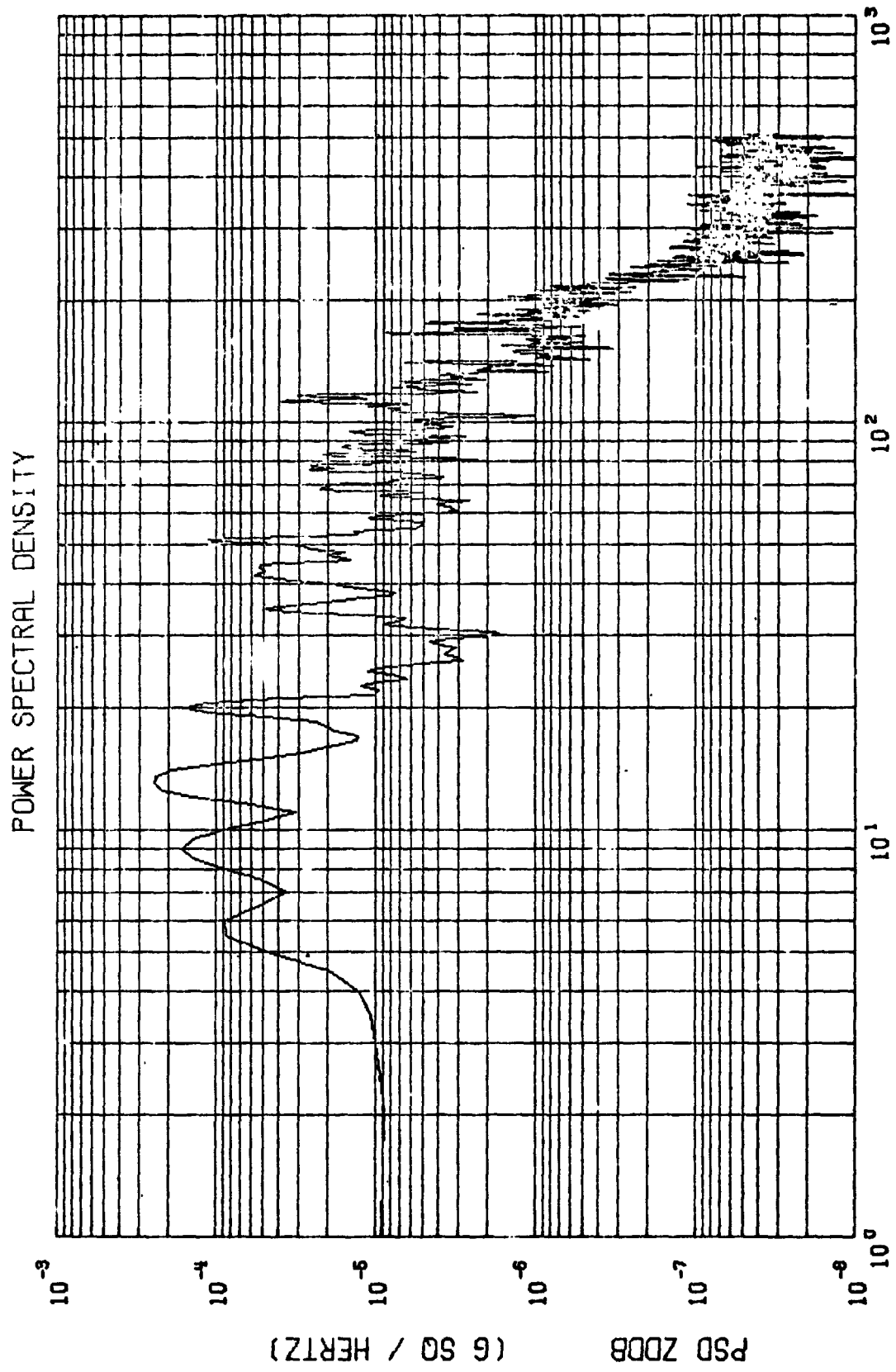
MAX Q

(1024 SPS)

Z008

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

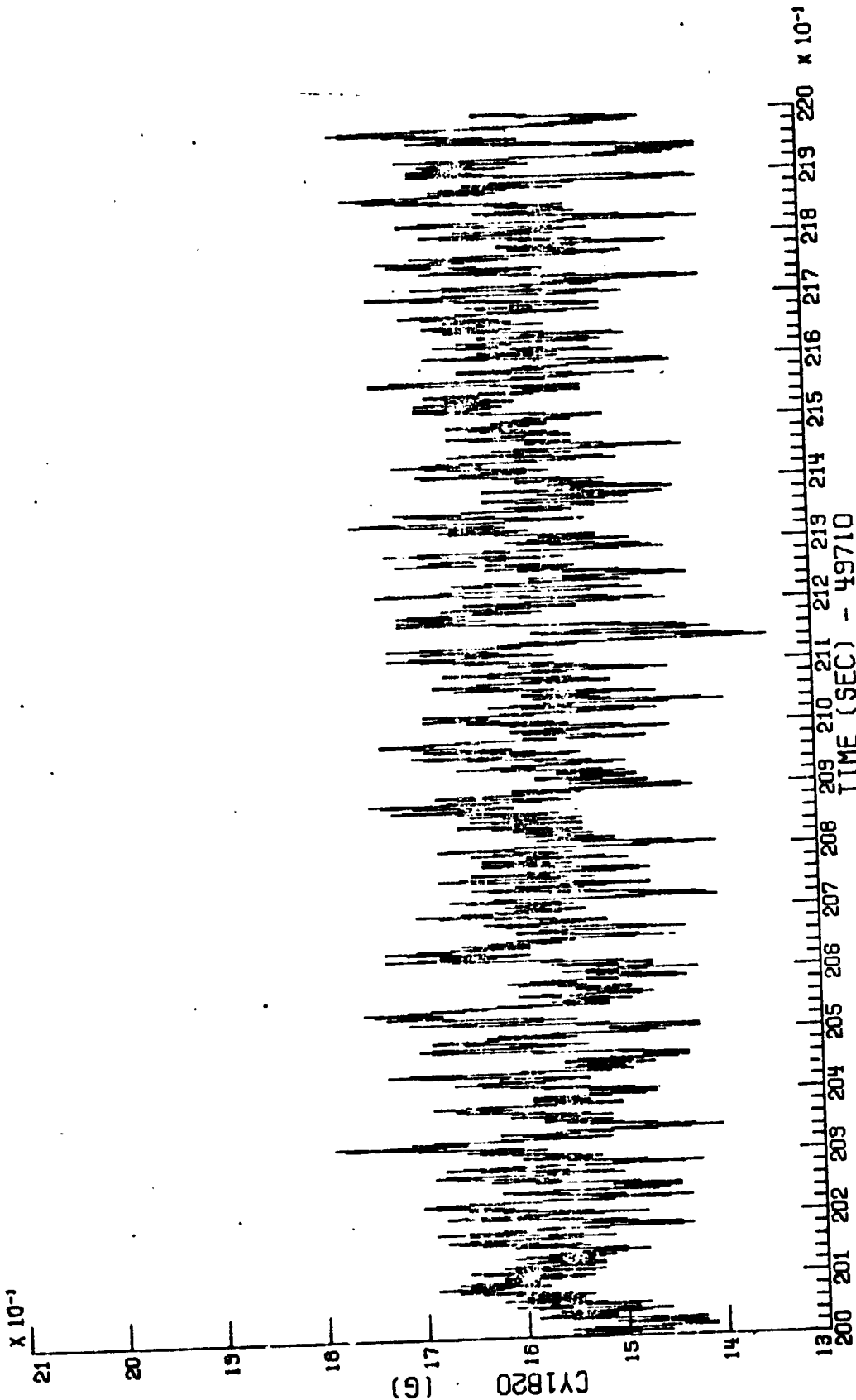
Figure 2.63a



$\Delta F = .500$
 $MEAN = 79643 \times 10^{-5}$ $\sigma^2 = 30795 \times 10^{-7}$ $\sigma = 55493 \times 10^{-6}$ $3\sigma = 16648 \times 10^{-5}$
 $START = 43726.000 \text{ SEC}$ $STOP = 49728.000 \text{ SEC}$

TC-1 / VDS DATA (LRC-3A) MAX 0 ZDOB (1024 SPS) Figure 2.63b
 NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY



MIN = 1.345

MAX = 1.783

CY1820
Figure 2.64a

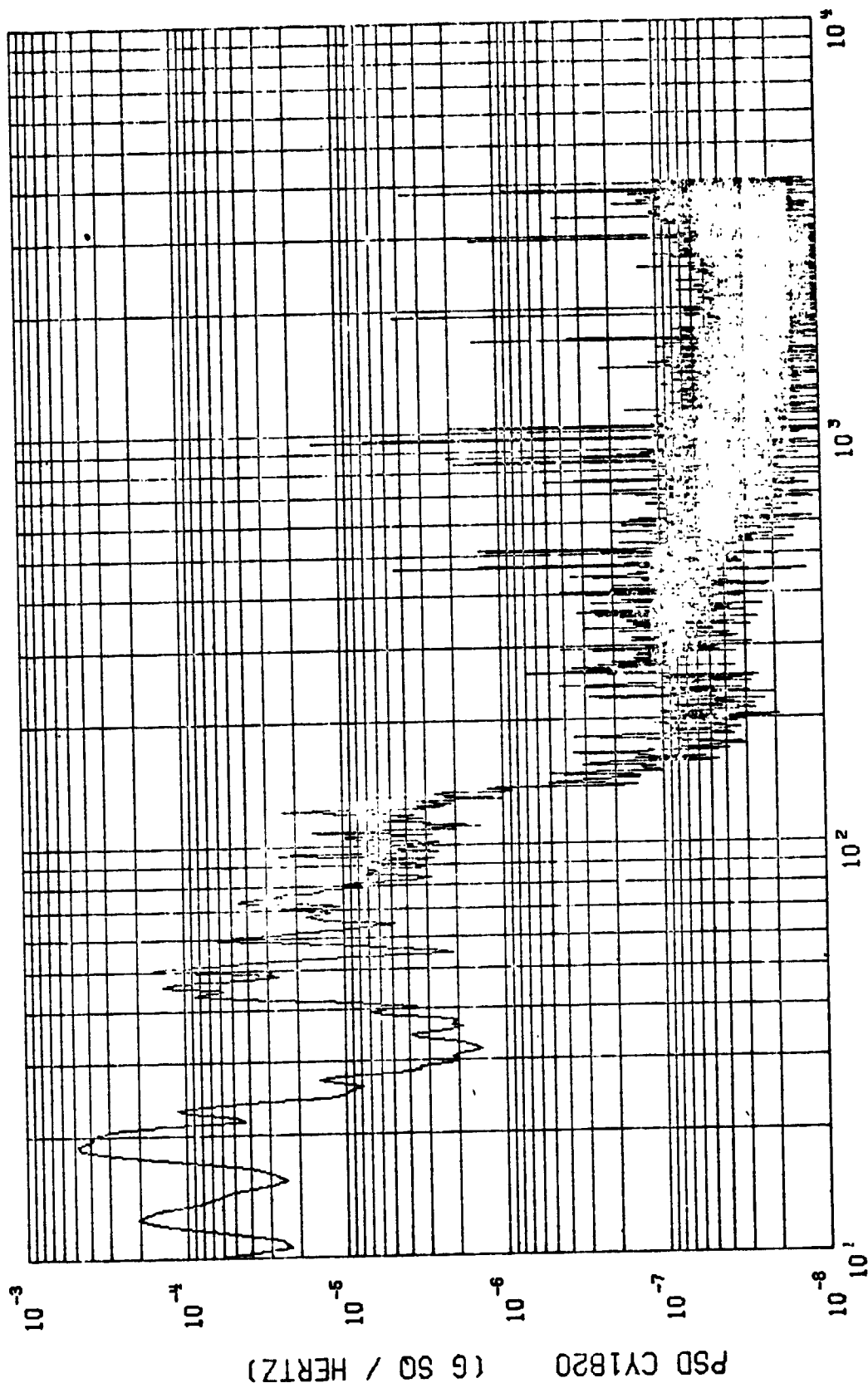
(0192 SPS)

MAX Q

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

POWER SPECTRAL DENSITY



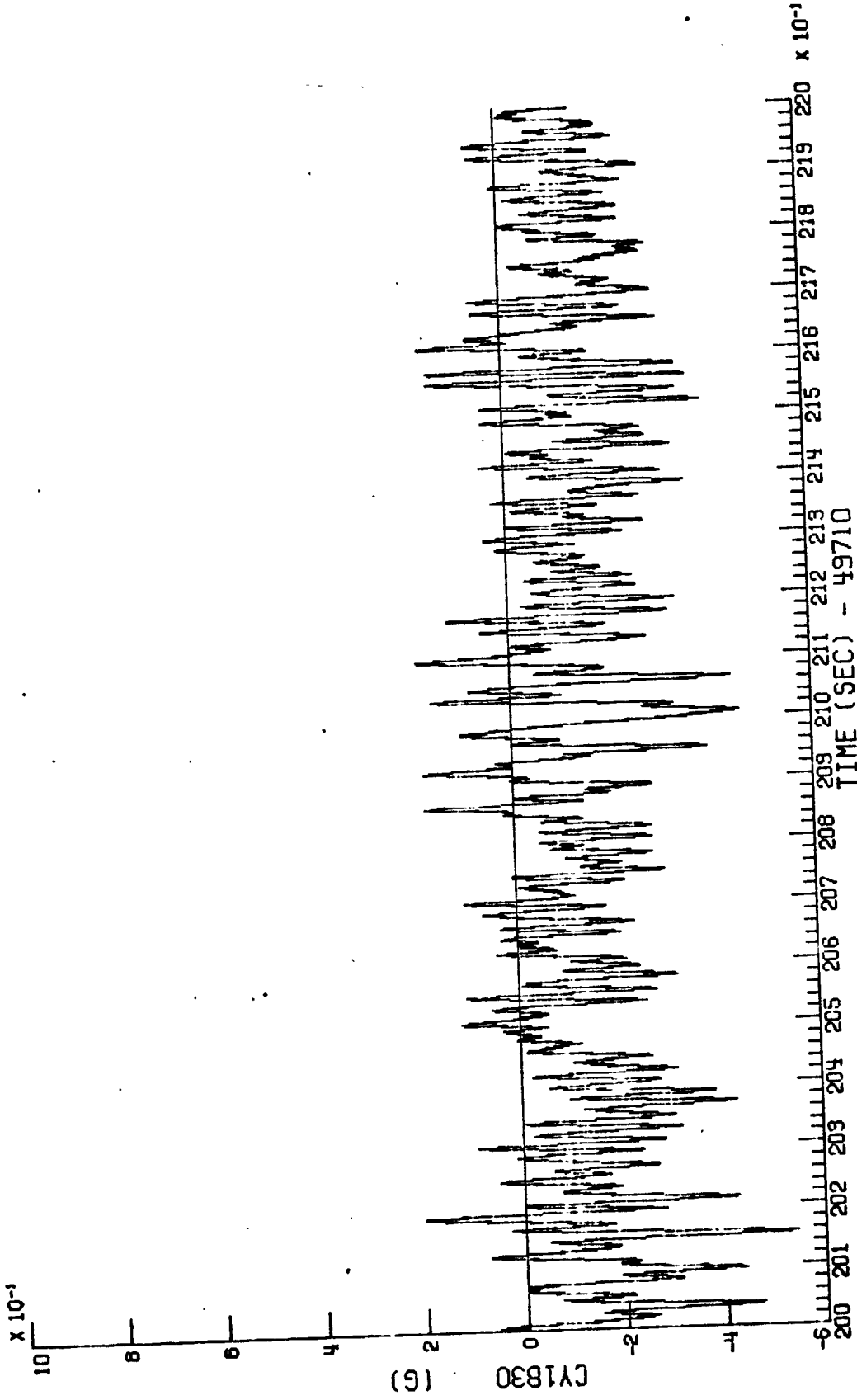
$\Delta F = .500$
 $MEAN = 15753 \times 10^{-4}$ $\sigma^2 = 4602 \times 10^{-6}$ $\sigma = 67838 \times 10^{-6}$ $3\sigma = 20351 \times 10^{-6}$
 $START = 49730.001 \text{ SEC}$ $STOP = 49731.998 \text{ SEC}$

TC-1 / VDS DATA (LRC-3A)
 CY1820
 (0192 sps)

MAX Q

Figure 2.64b

TIME HISTORY



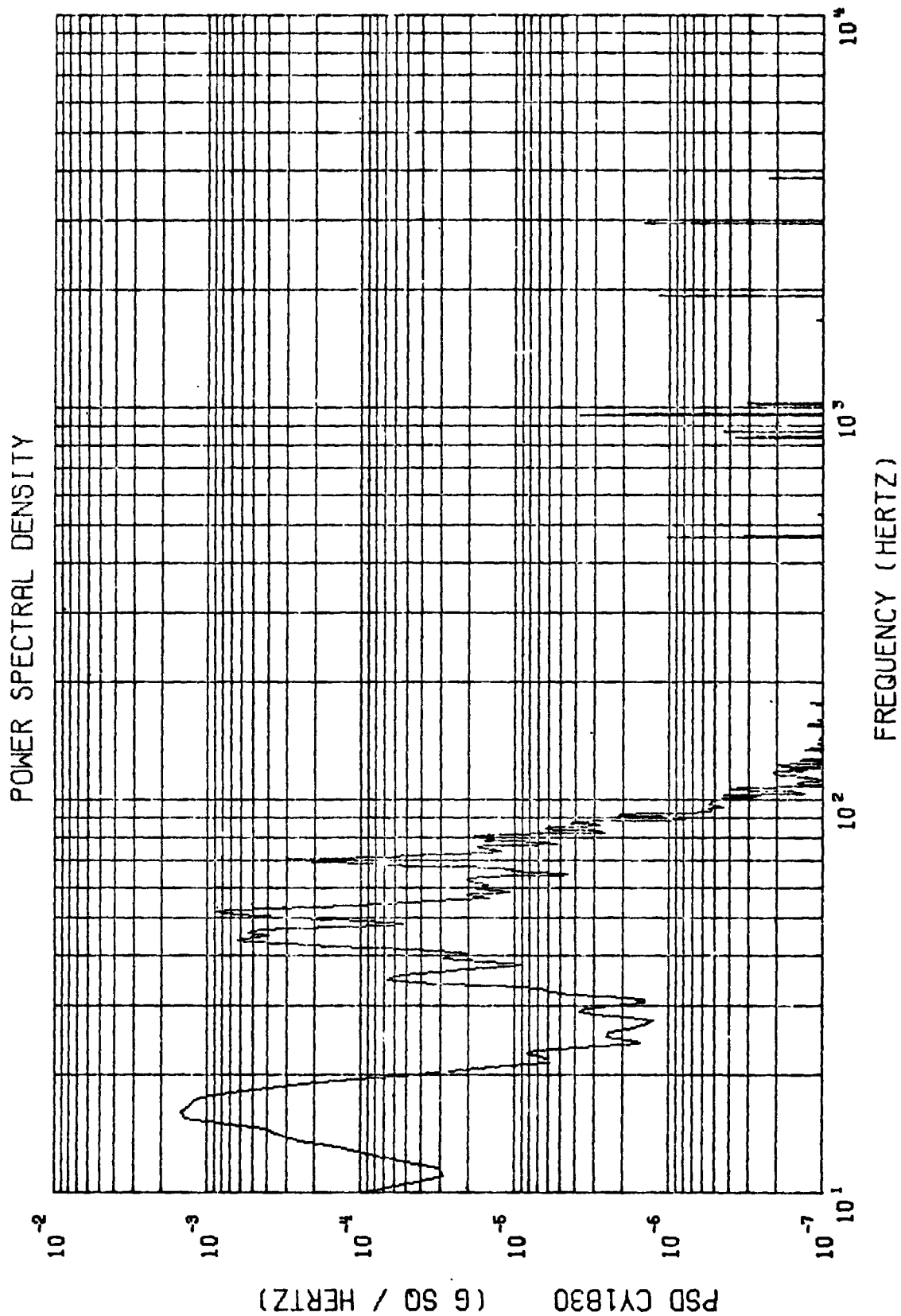
MIN = -.544

MAX = .200

CY1830
(8192 SPS) Figure 2.65a

MAX Q

TC-1 / VDS DATA (LRC-3A)



$\Delta F = .500$ START = 49730.001 SEC STOP = 49731.998 SEC
 MEAN = -12095×10^{-5} $\sigma^2 = 13649 \times 10^{-5}$ $\sigma = 11683 \times 10^{-5}$ $3\sigma = 35049 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

MAX 0

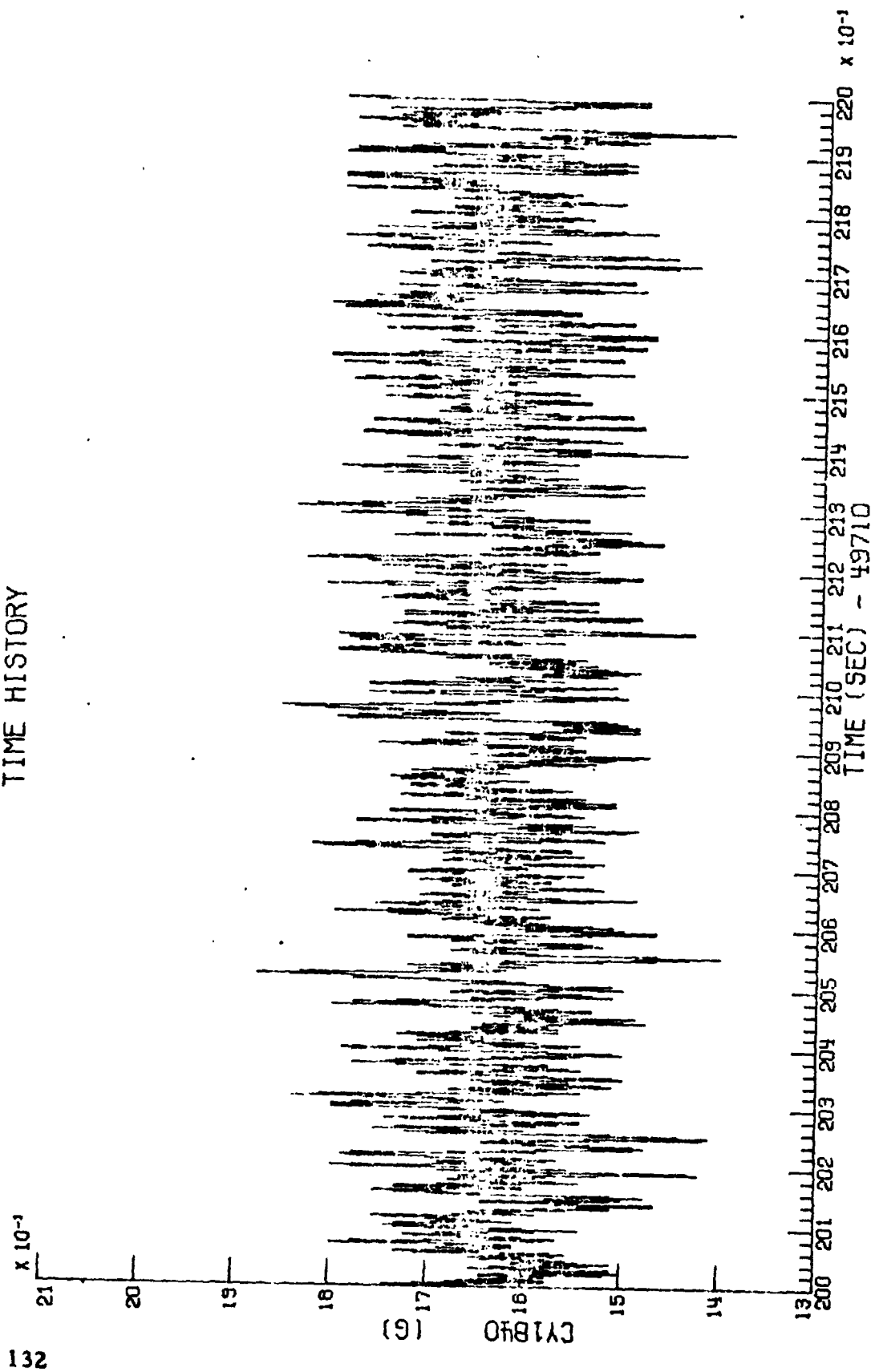
CY1830

(8192 SPS)

Figure 2.65b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

TIME HISTORY



MAX = 1.876

MIN = 1.399

TC-1 / VDS DATA (LRC-3A)

MAX 0

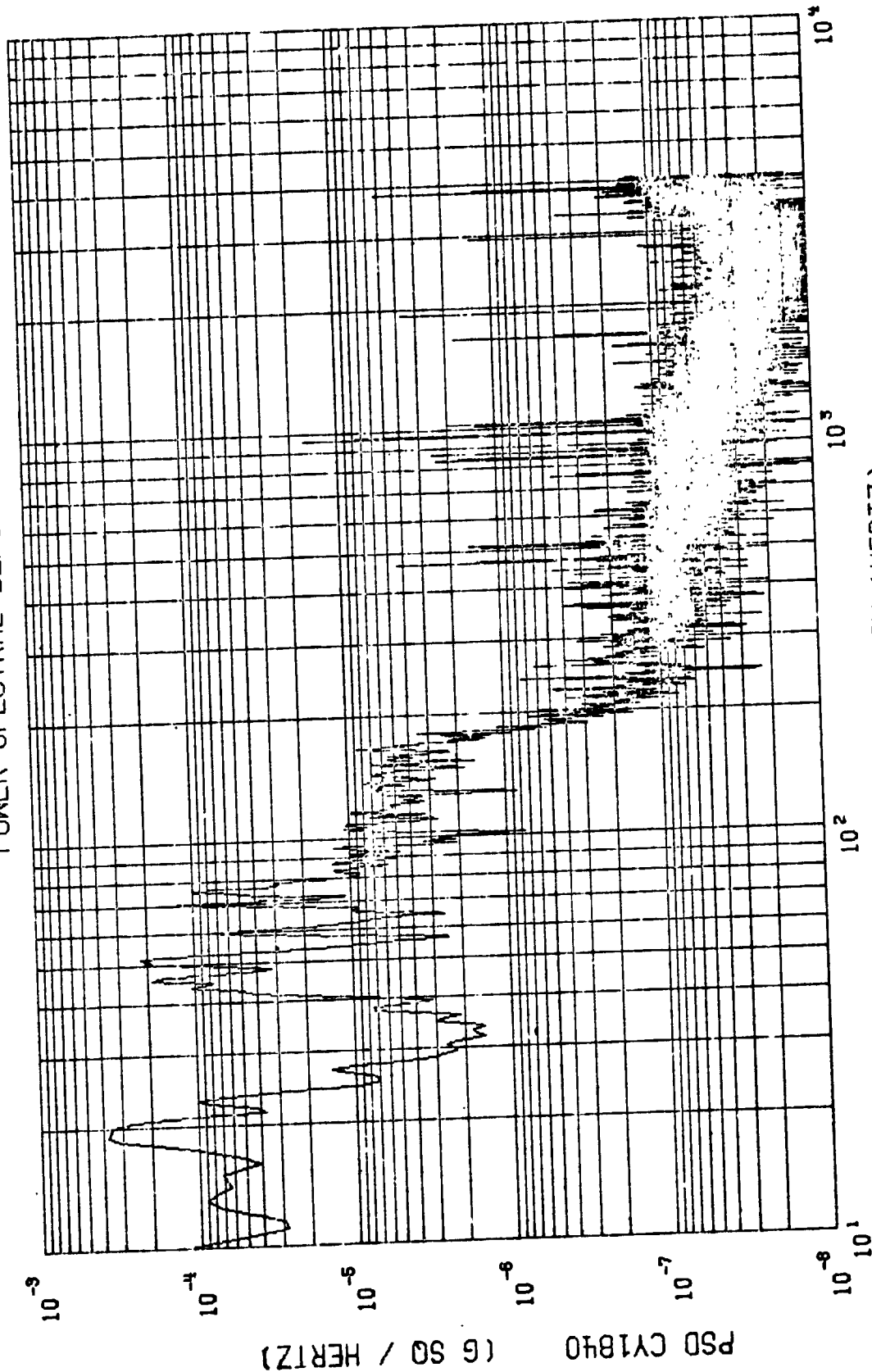
CY1840

(8192 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

Figure 2.66a

POWER SPECTRAL DENSITY

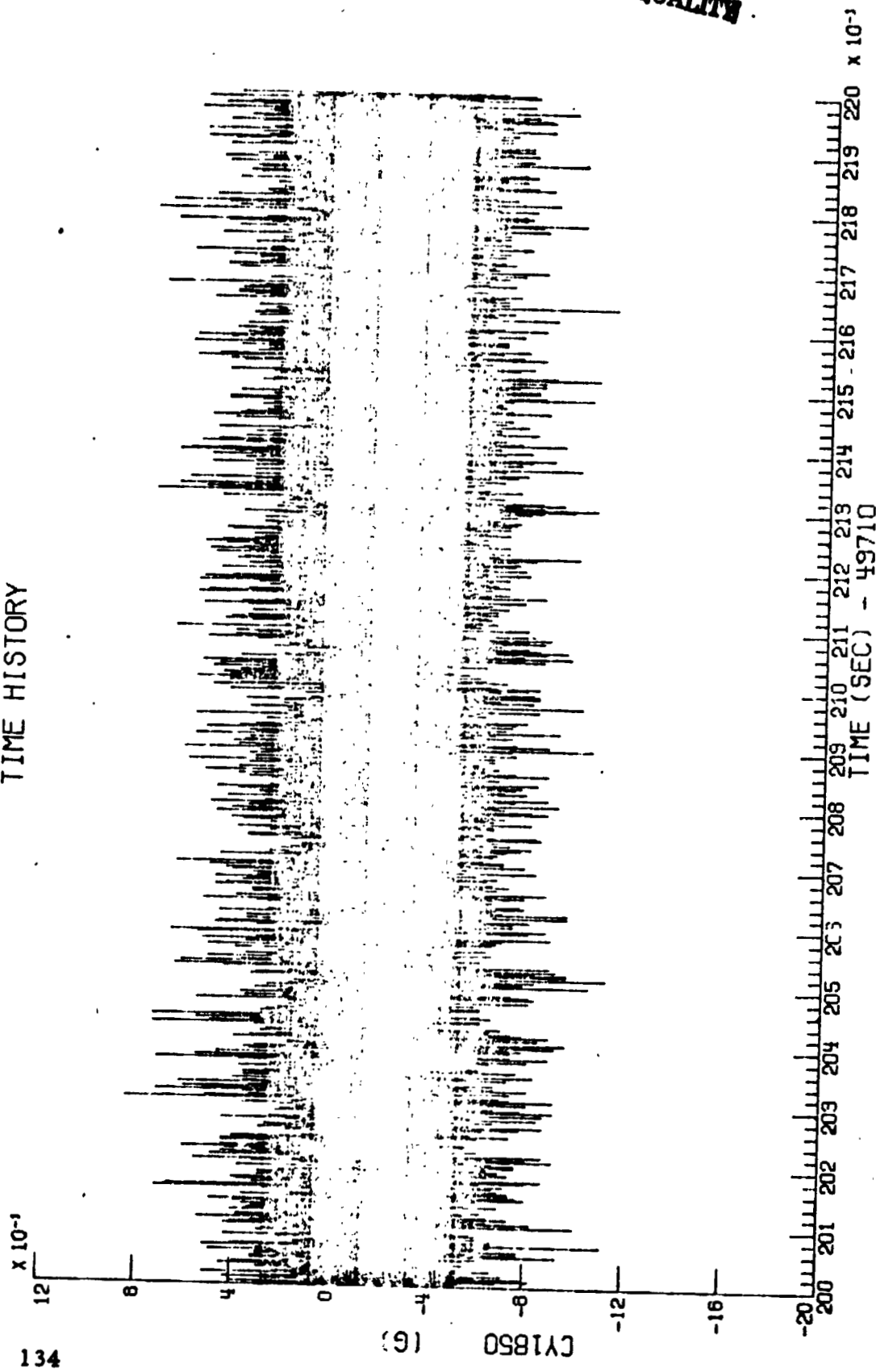


$\Delta F = .500$
 $MEAN = 16335 \times 10^{-4}$ $\sigma^2 = 52769 \times 10^{-7}$ $\sigma = 72642 \times 10^{-5}$ $3\sigma = 21792 \times 10^{-5}$
 $START = 49730.001 \text{ SEC}$ $STOP = 49731.998 \text{ SEC}$

TC-1 / VDS DATA (LRC-3A) MAX Q CY1840 (0192 SPS) Figure 2.66b

ORIGINAL PAGE IS
OF POOR QUALITY

TIME HISTORY



MAX = .844

MIN = -1.111

TC-1 / VDS DATA (LRC-3A)

MAX 0

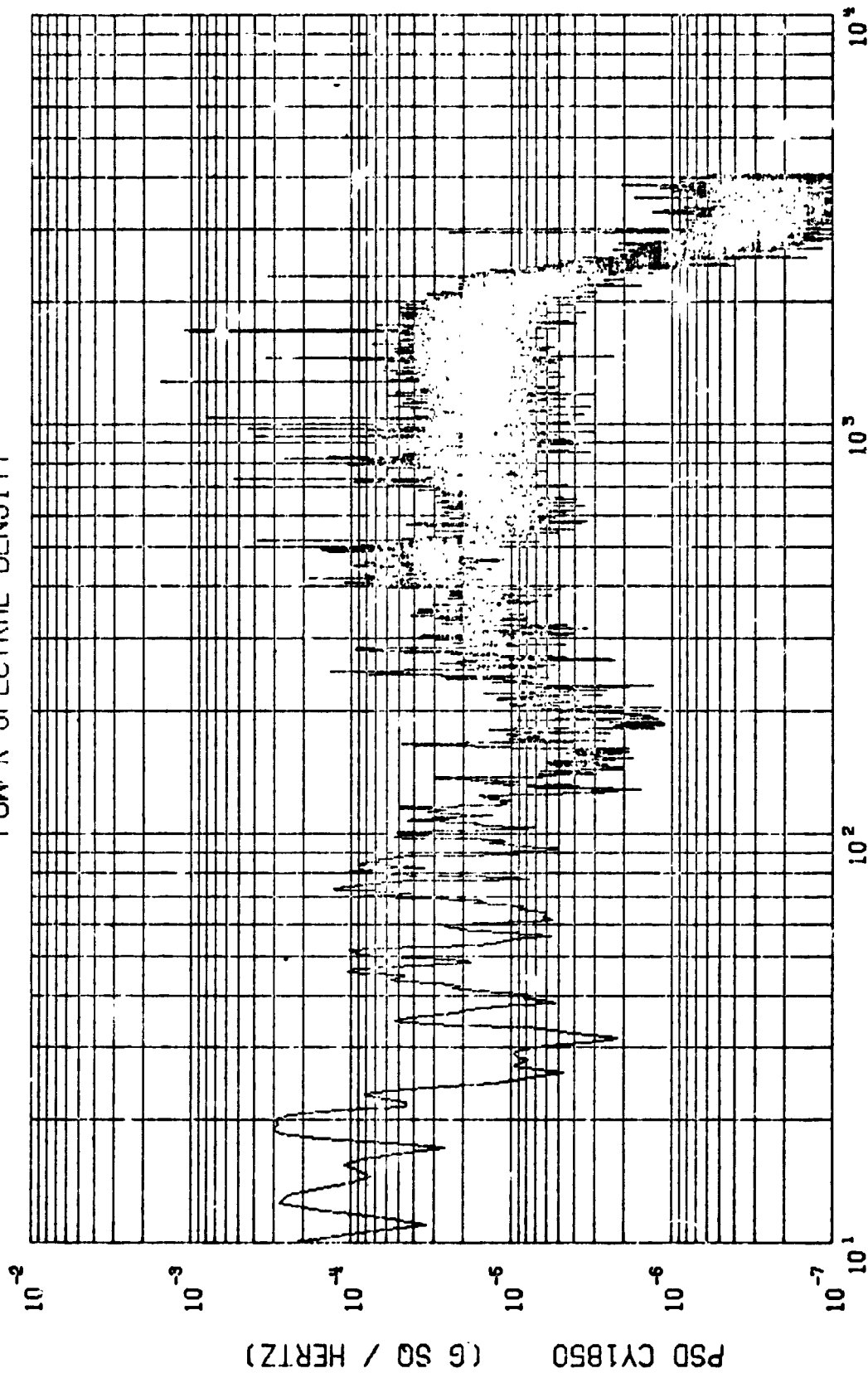
CY1850

(8192 sps)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

Figure 2.67a

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $\text{MEAN} = -13773 \times 10^{-3}$ $\sigma^2 = 6353 \times 10^{-5}$ $\sigma = 25205 \times 10^{-3}$ $\sigma_1 = 75615 \times 10^{-5}$
 $\text{START} = 49730.001 \text{ SEC}$ $\text{STOP} = 49731.998 \text{ SEC}$

TC-1 / VDS DATA (LRC-3A) MAX Q CY1850
 (0192 SPS)

Figure 2.67b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/30/75

TIME HISTORY

136

136

$\times 10^{-1}$

11

9

7

5

(9)

100X

-1

-3

-5

200

201

202

203

204

205

206

207

208

209

210

211

212

213

214

215

216

217

218

219

220

221

TIME (SEC) - 49710

TIME (SEC) - 49710

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TIME (SEC) - 49710

TIME (SEC) - 49710

MAX = .309

MIN = -.455

TC-1 / VDS DATA (LRC-3A)

MAX 0

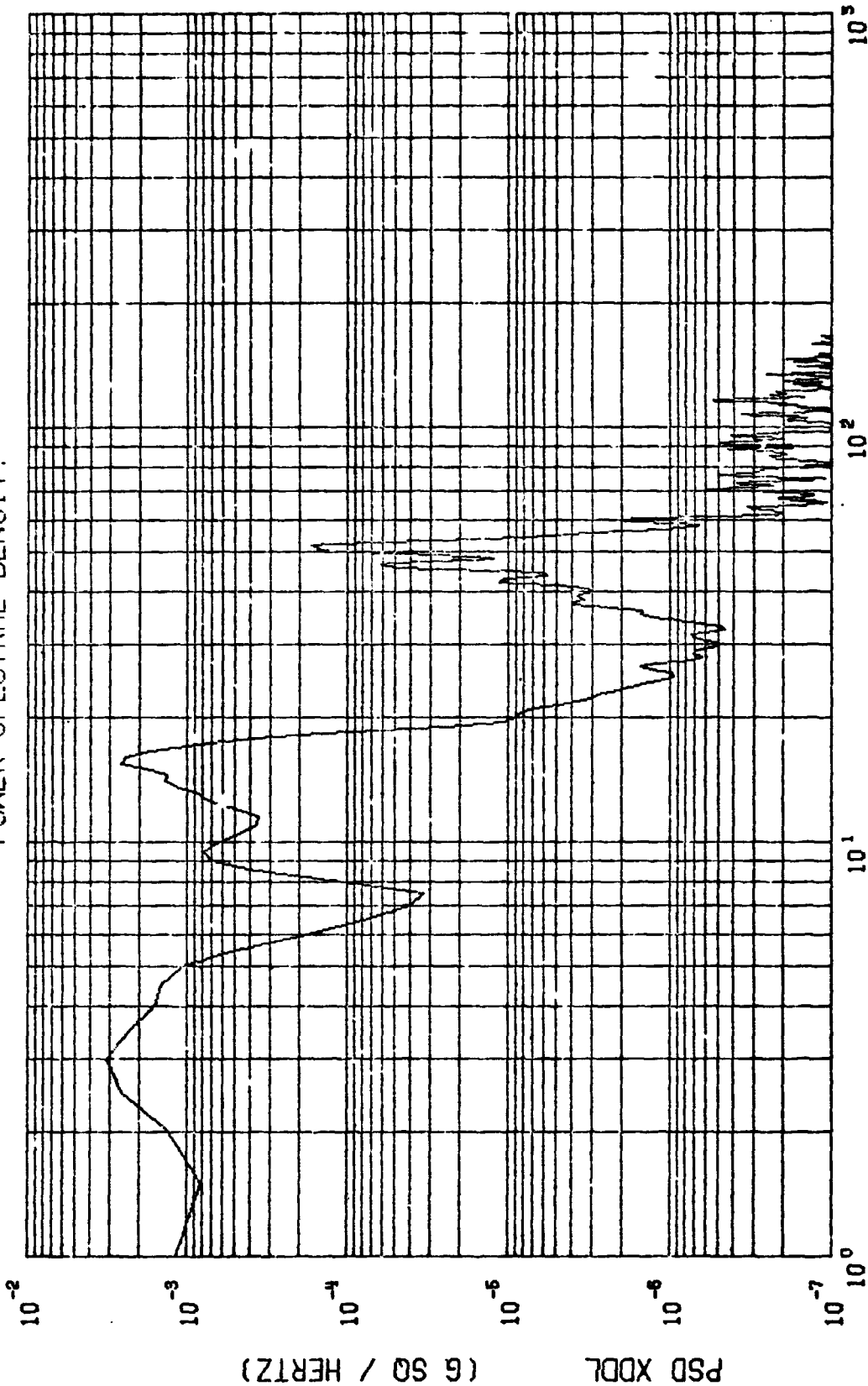
(1024 SPS)

XDDL

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

Figure 2.63a

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$ START = 49730.000 SEC STOP = 49732.000 SEC
 MEAN = -49198×10^{-8} $\sigma^2 = 20509 \times 10^{-8}$ $\sigma = 14321 \times 10^{-3}$ $3\sigma = 42963 \times 10^{-3}$

TC-1 / VDS DATA (LRC-3A)

MAX Q

XDDL

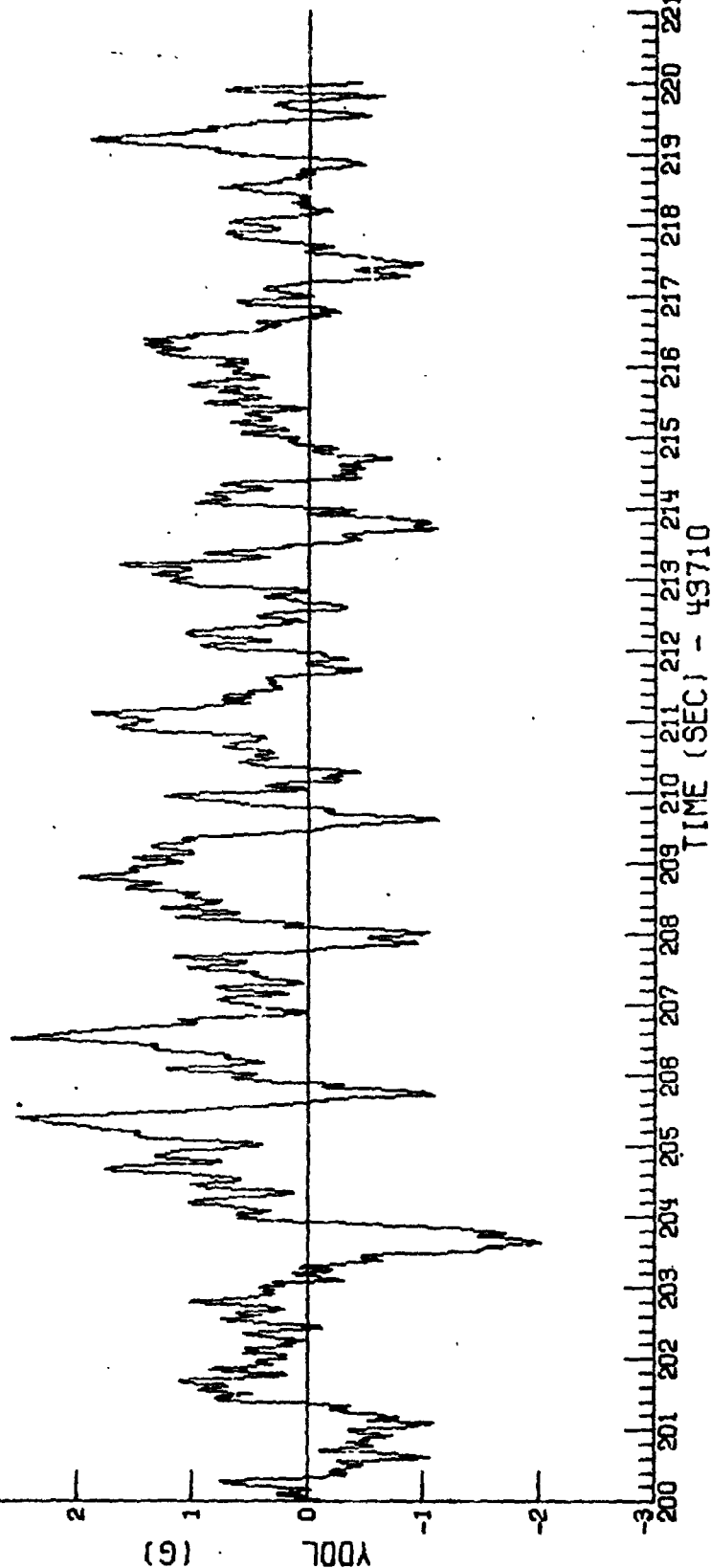
(1024 SPS) Figure 2.68b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY

5
4
3
2
1
0
-1
-2
-3

138



MAX = .257

MIN = -.201

TC-1 / VDS DATA (LRC-3A)

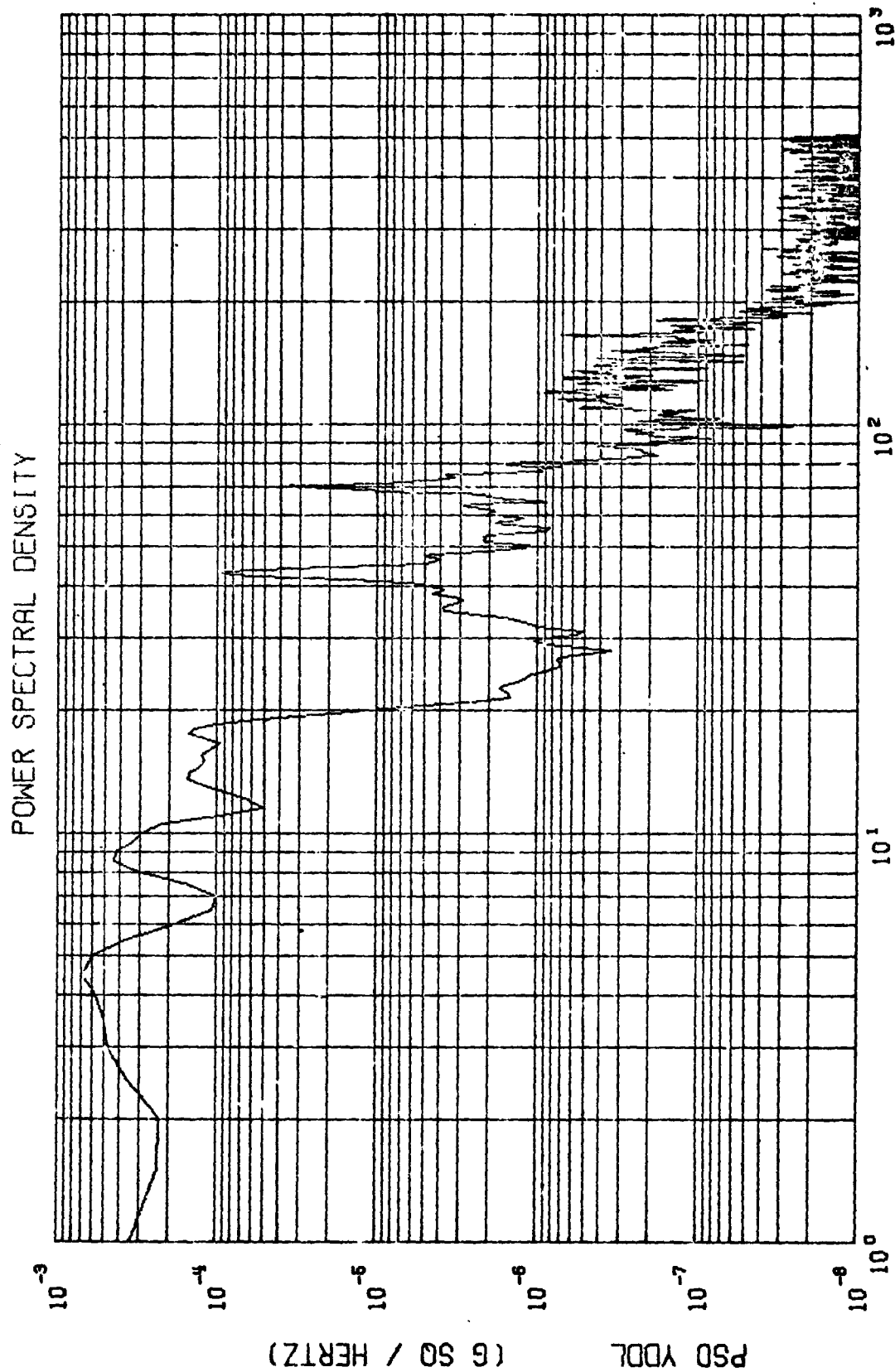
MAX Q

YDDL

(1024 SPS)

Figure 2.69a

NSA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75



FREQUENCY (HERTZ)

$\Delta F = .500$
 $MEAN = 36859 \times 10^{-5}$
 $\sigma^2 = 51148 \times 10^{-7}$
 $\sigma = 71518 \times 10^{-5}$
 $3\sigma = 21455 \times 10^{-5}$

START = 49730.000 SEC

STOP = 49732.000 SEC

TC-1 / VDS DATA (LRC-3A)

MAX 0

YDDL

(1024 SPS)

Figure 2.69b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

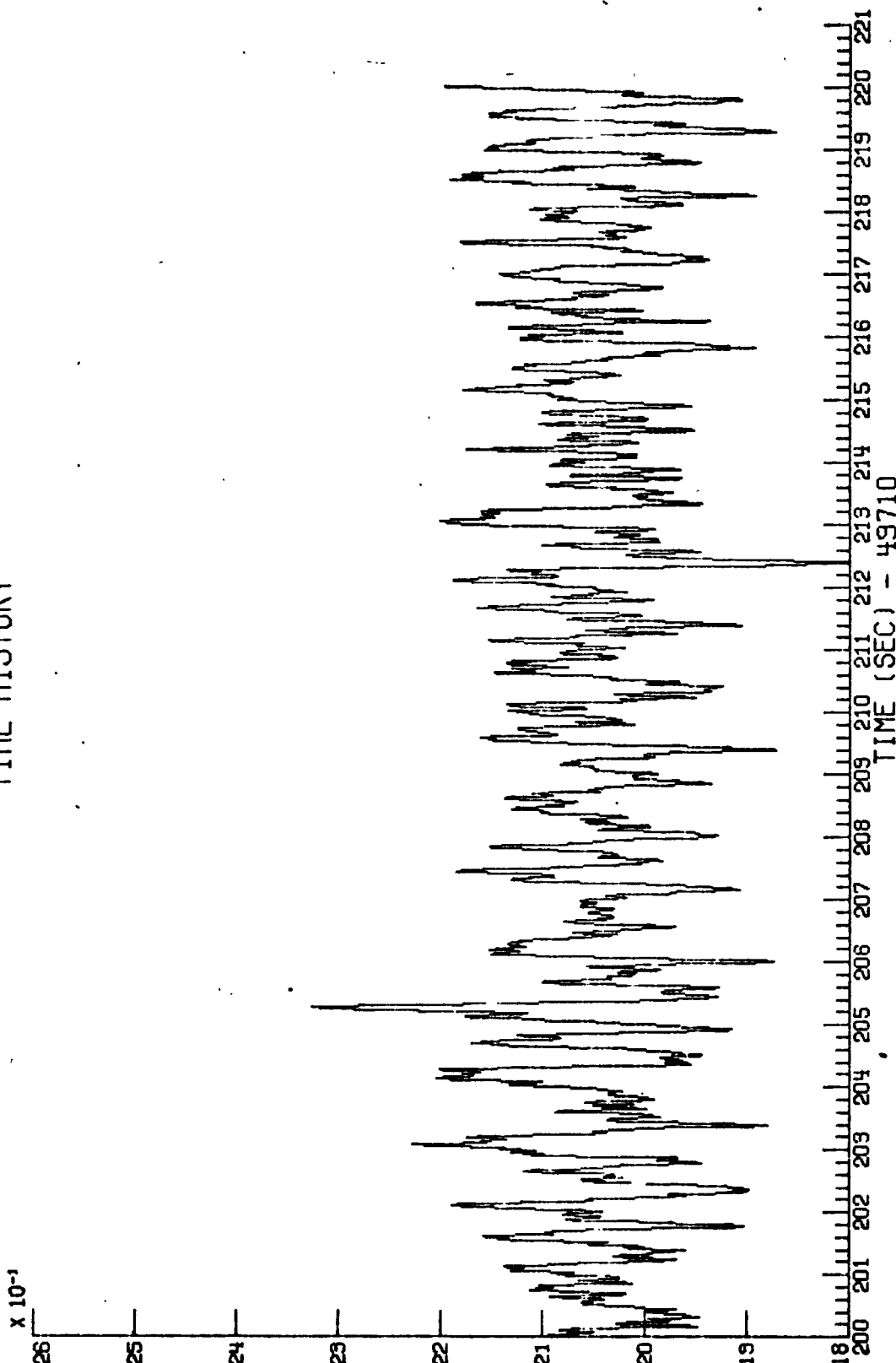
TIME HISTORY

$\times 10^{-1}$

140

(9)

700Z



MAX = 2.325

MIN = 1.803

TC-1 / VDS DATA (LRC-3A)

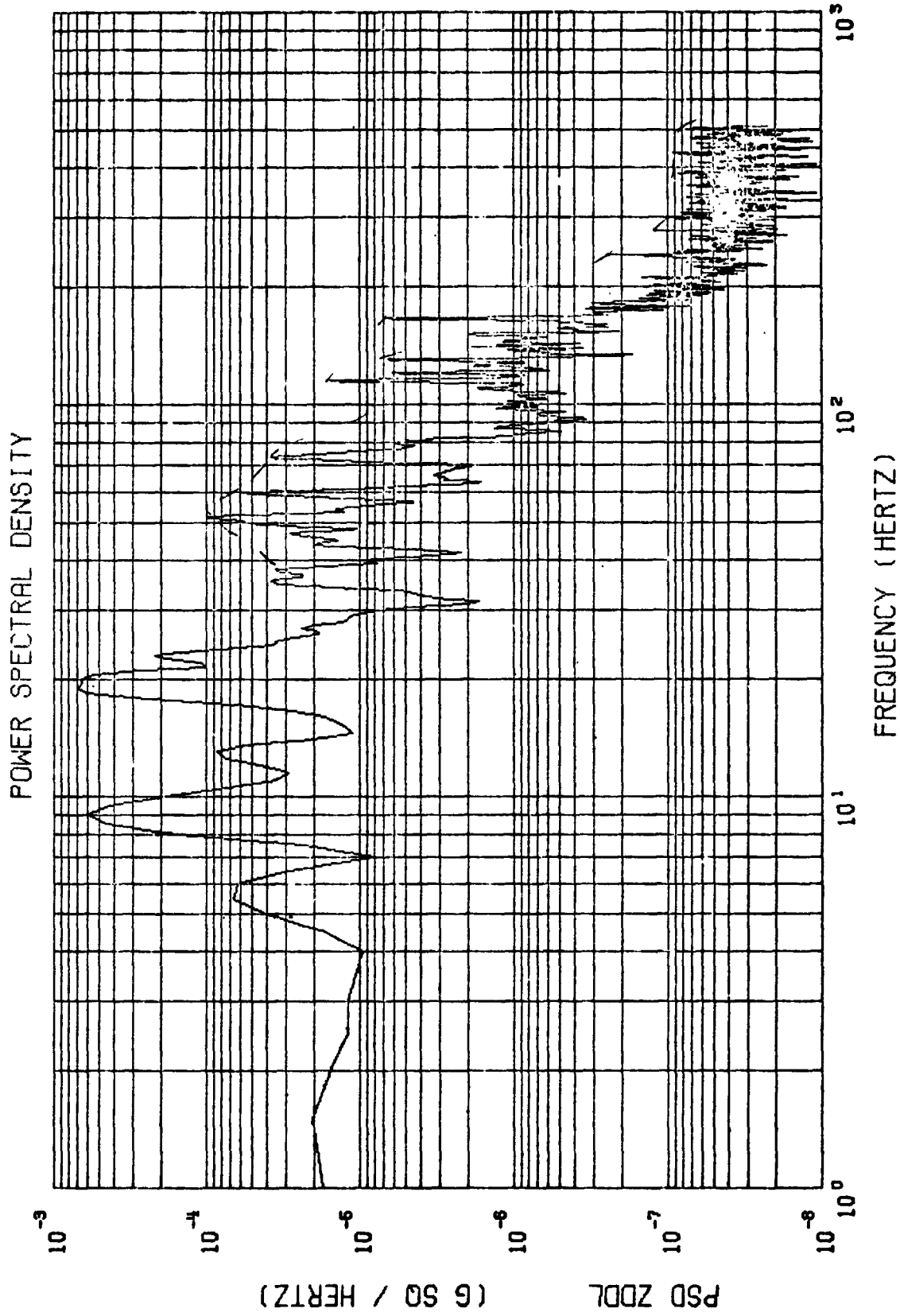
MAX Q

(1024 SPS)

ZDDL

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

Figure 2.70a



$\Delta F = .500$ START = 49730.000 SEC STOP = 49732.000 SEC
 MEAN = 20488×10^{-4} $\sigma^2 = 48044 \times 10^{-7}$ $\sigma = 69313 \times 10^{-4}$ $3\sigma = 20734 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

MAX Q

(1024 SPS)

ZDDL

Figure 2.70b

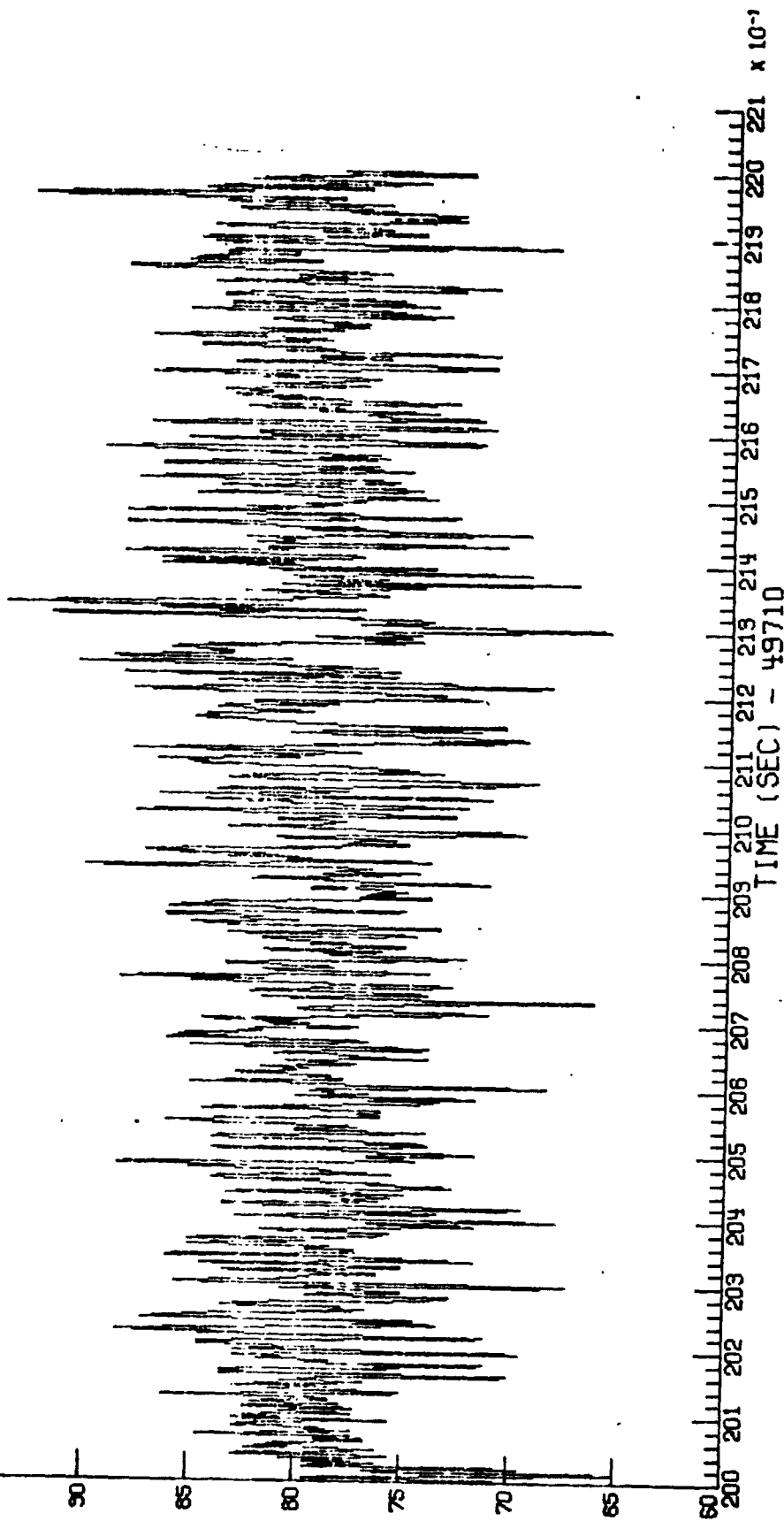
TIME HISTORY

$\times 10^{-2}$

142

(9)

8002



MAX = .939

MIN = .650

TC-1 / VDS DATA (LRC-3A)

MAX Q

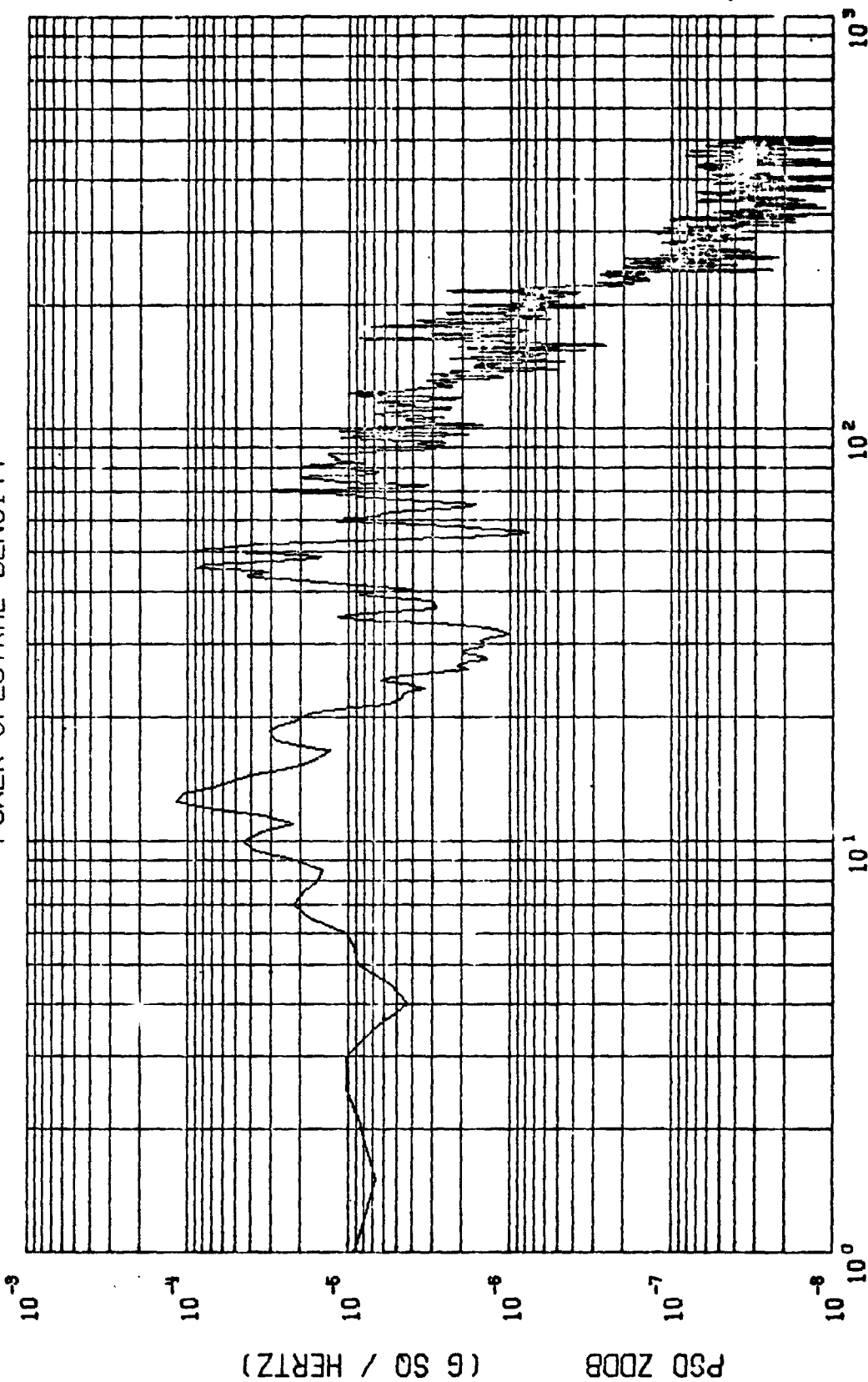
(1024 SPS)

ZDOB

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

Figure 2.71a

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$
 $\text{START} = 49730.000 \text{ SEC}$
 $\text{STOP} = 49732.000 \text{ SEC}$
 $\text{MEAN} = 79135 \times 10^{-5}$
 $\sigma^2 = 17639 \times 10^{-7}$
 $\sigma = 41999 \times 10^{-4}$
 $3\sigma = 12599 \times 10^{-4}$

TC-1 / VDS DATA (LRC-3A)

MAX Q

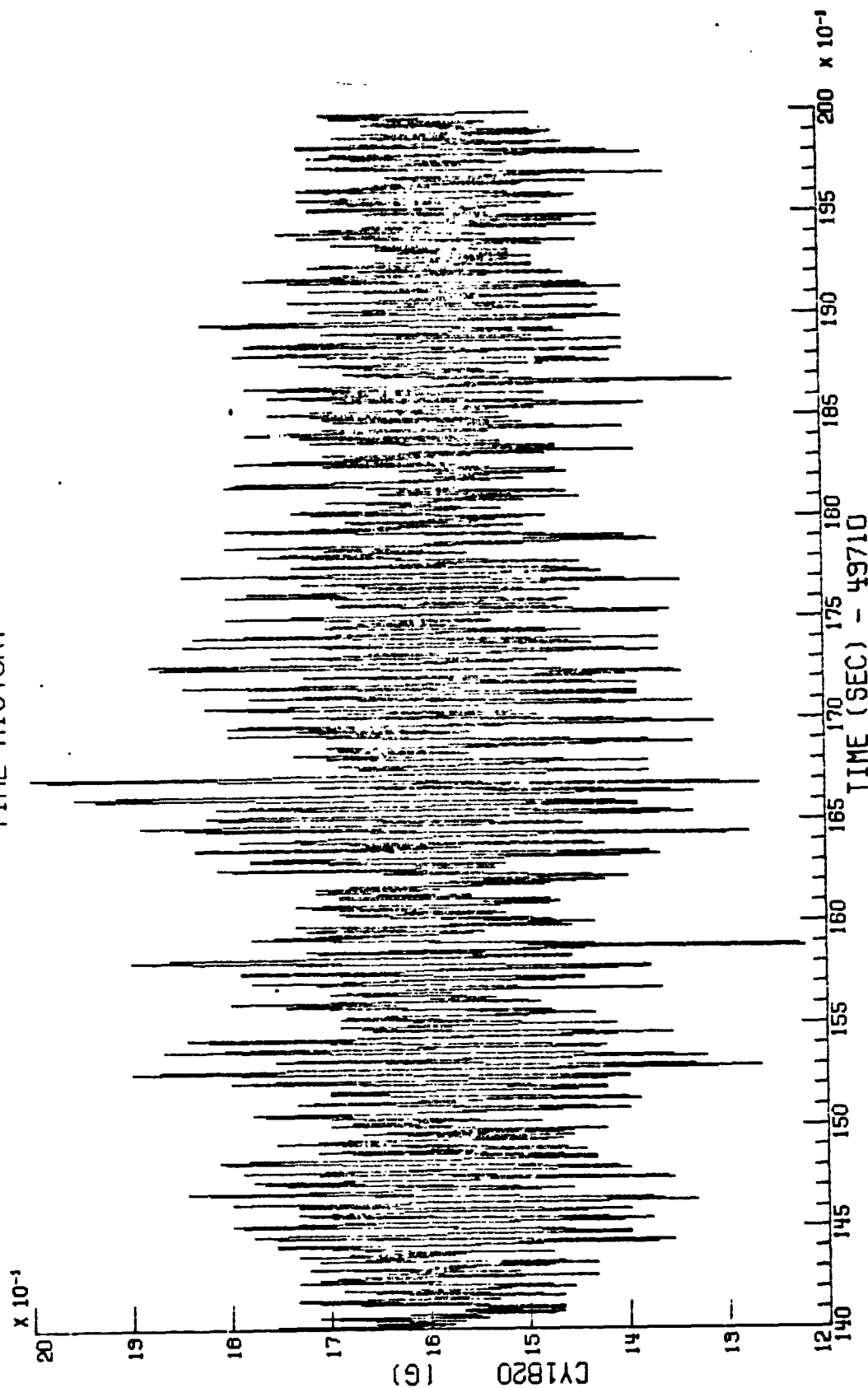
Z008

(1024 SPS)

Figure 2.71b

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/23/75

TIME HISTORY



MAX = 1.998

MIN = 1.221

TC-1 / VDS DATA (LRC-3A)

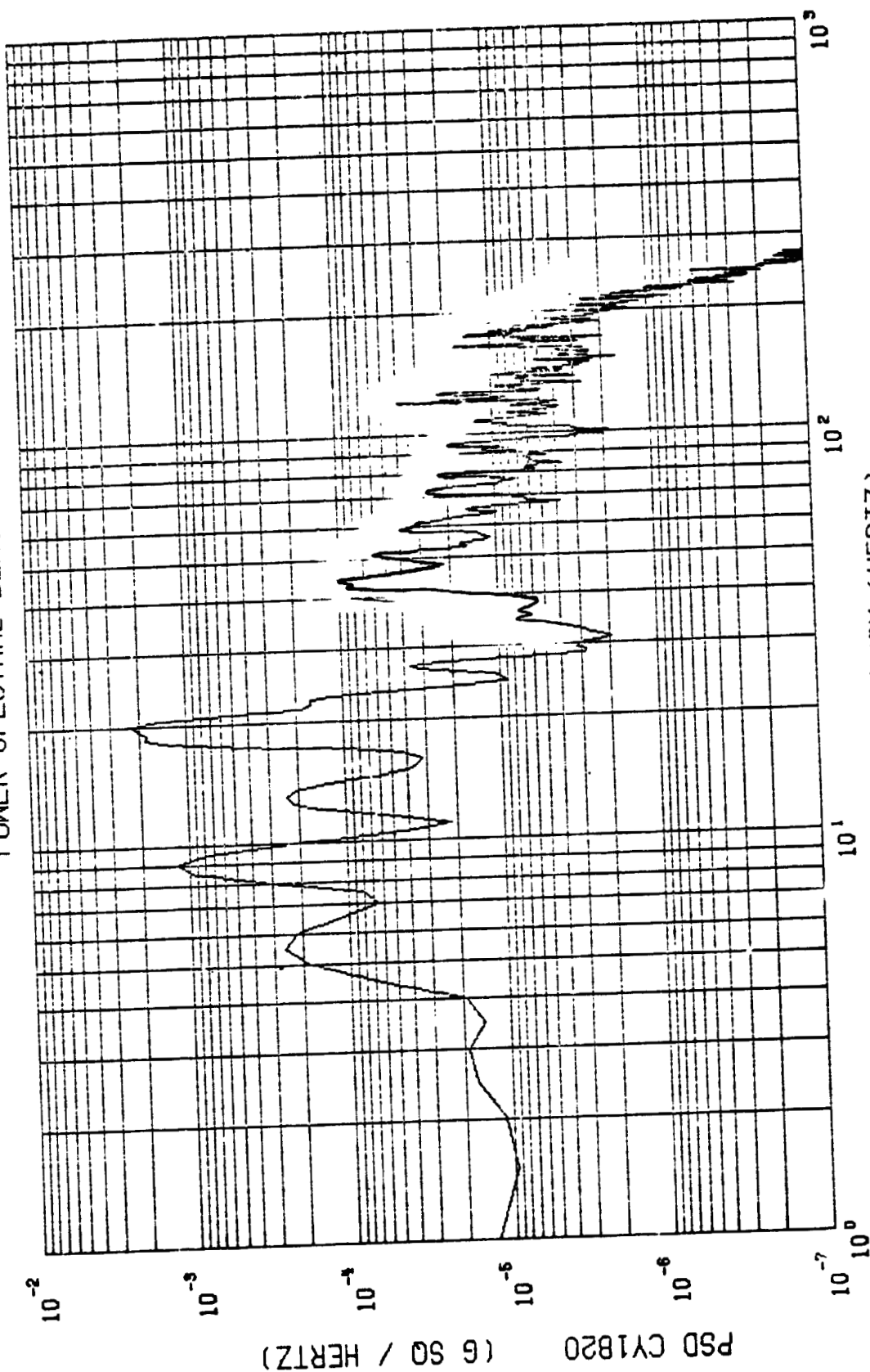
MAX Q

CY1820

(1024 SPS)

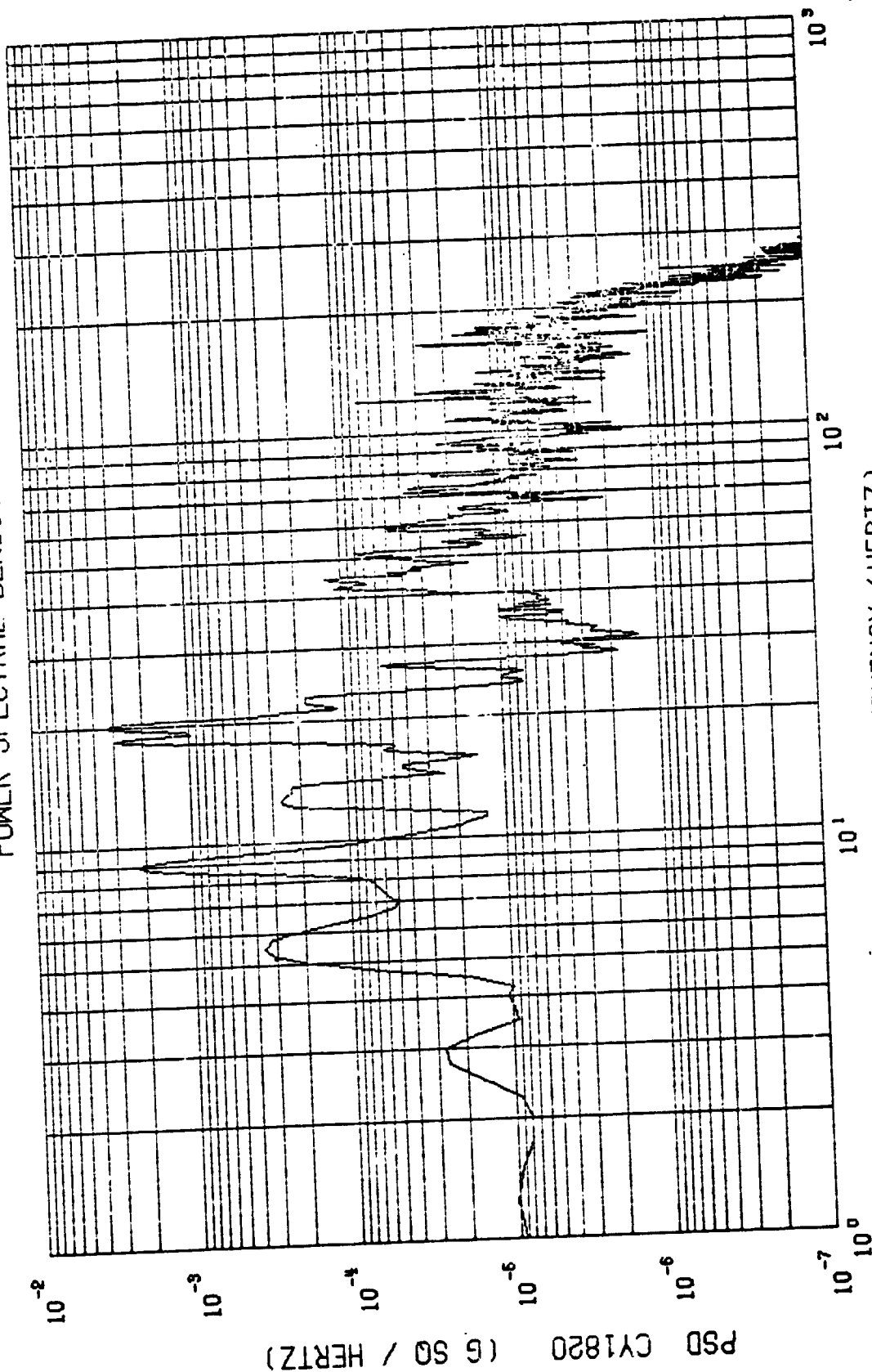
Figure 2.72a

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $MEAN = 1588 \times 10^{-3}$ $\sigma^2 = 111 \times 10^{-4}$ $\sigma = 10535 \times 10^{-5}$ $3\sigma = 31607 \times 10^{-5}$
 $START = 49724.000 \text{ SEC}$ $STOP = 49729.996 \text{ SEC}$
 TC-1 / VDS DATA (LRC-3A) MAX Q (1024 SPS) CY1820 Figure 2.72b

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .250$
 $MEAN = 1588 \times 10^{-3}$
 $\sigma^2 = 111 \times 10^{-4}$
 $\sigma = 10535 \times 10^{-5}$
 $3\sigma = 31607 \times 10^{-5}$
 $START = 49724.000 \text{ SEC}$
 $STOP = 49729.996 \text{ SEC}$

CY1820

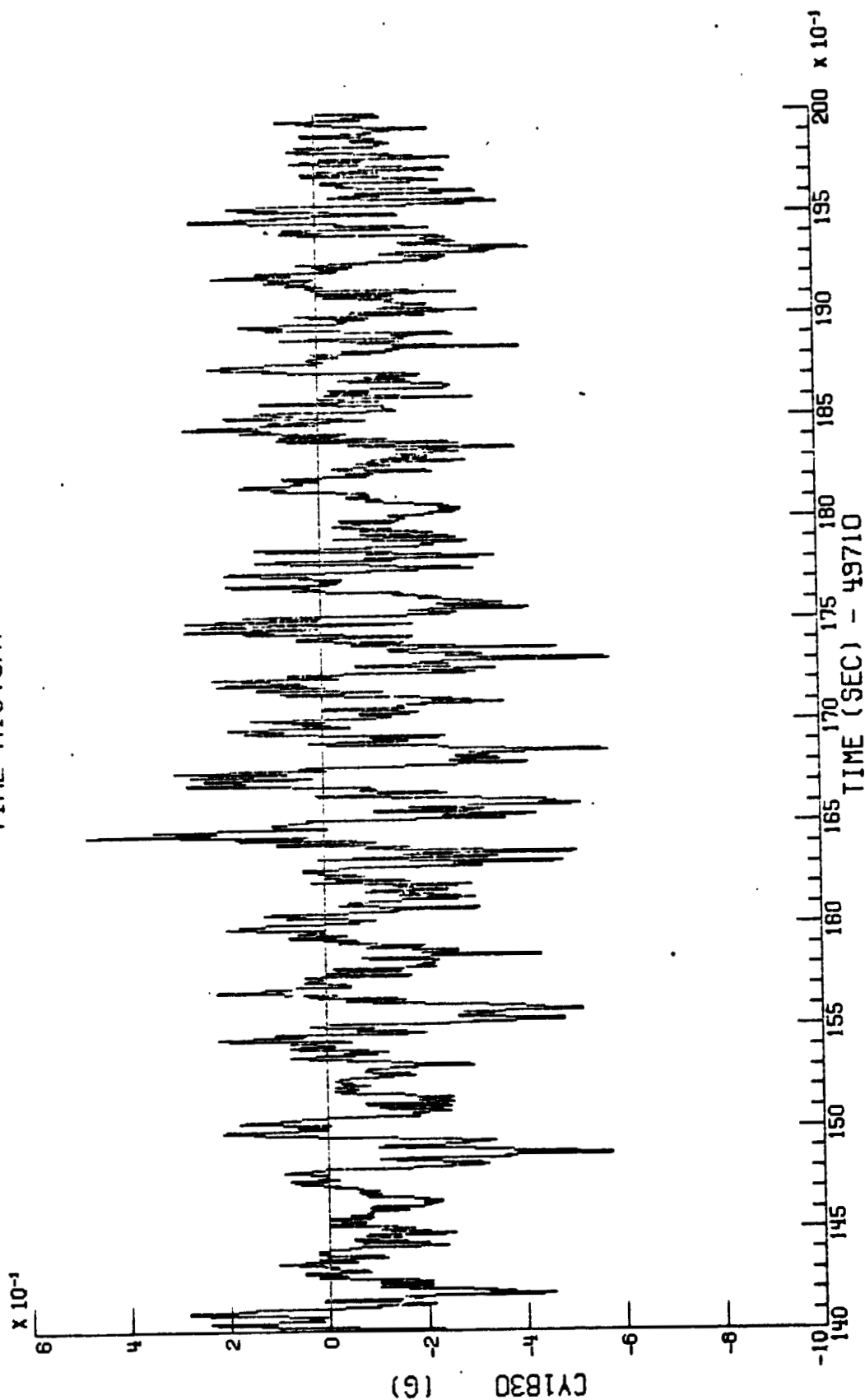
MAX Q

TC-1 / VDS DATA (LRC-3A)

(1024 SPS)

Figure 2.72c

TIME HISTORY



MIN = -.579

MAX = .478

CY1830
Figure 2.73a

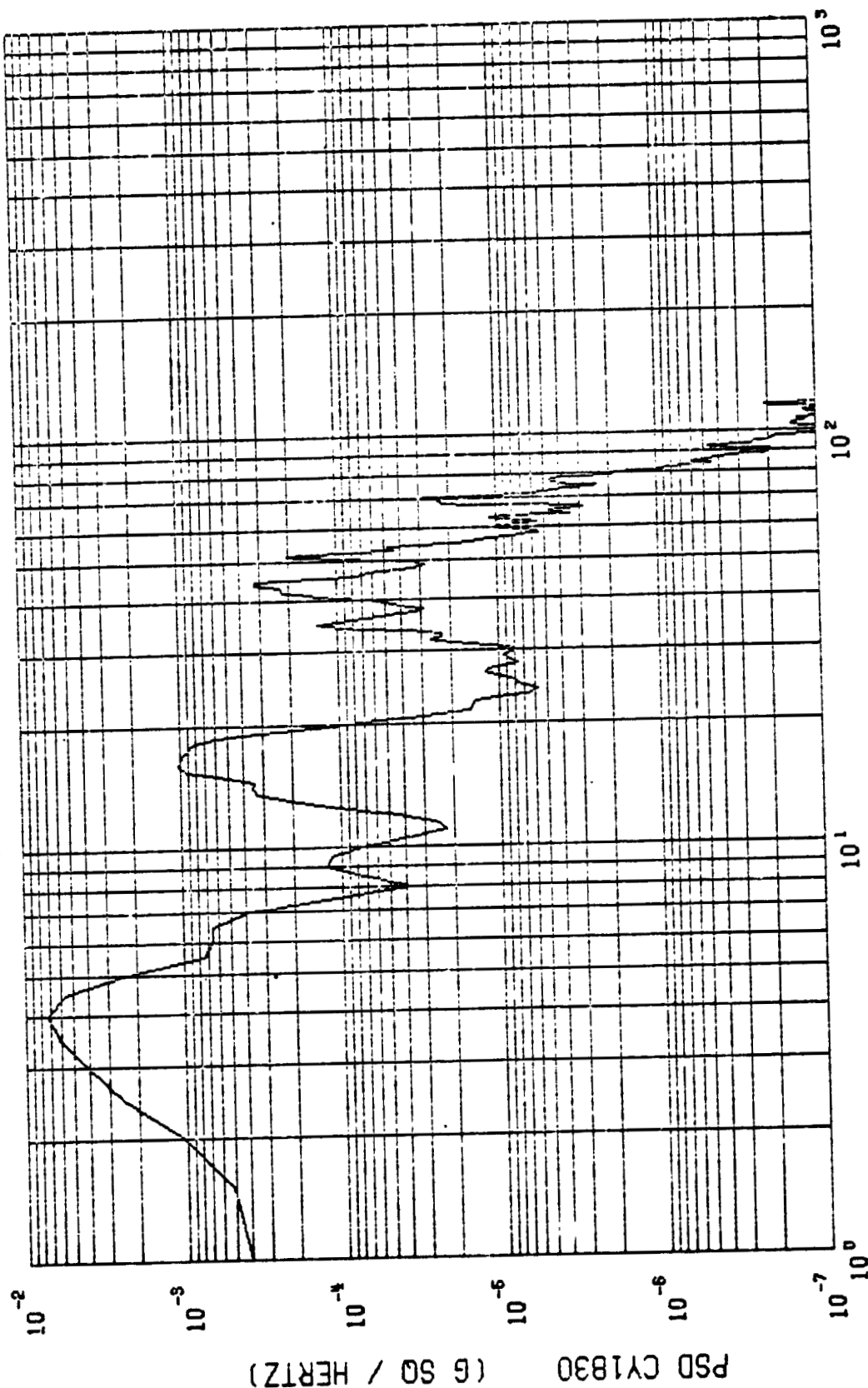
(1024 sps)

MAX 0

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$
 $MEAN = -91514 \times 10^{-6}$ $\sigma^2 = 23794 \times 10^{-6}$ $\sigma = 15425 \times 10^{-5}$ $3\sigma = 46276 \times 10^{-5}$
 $START = 49724.000 \text{ SEC}$ $STOP = 49729.936 \text{ SEC}$

CY1830
 Figure 2.73b

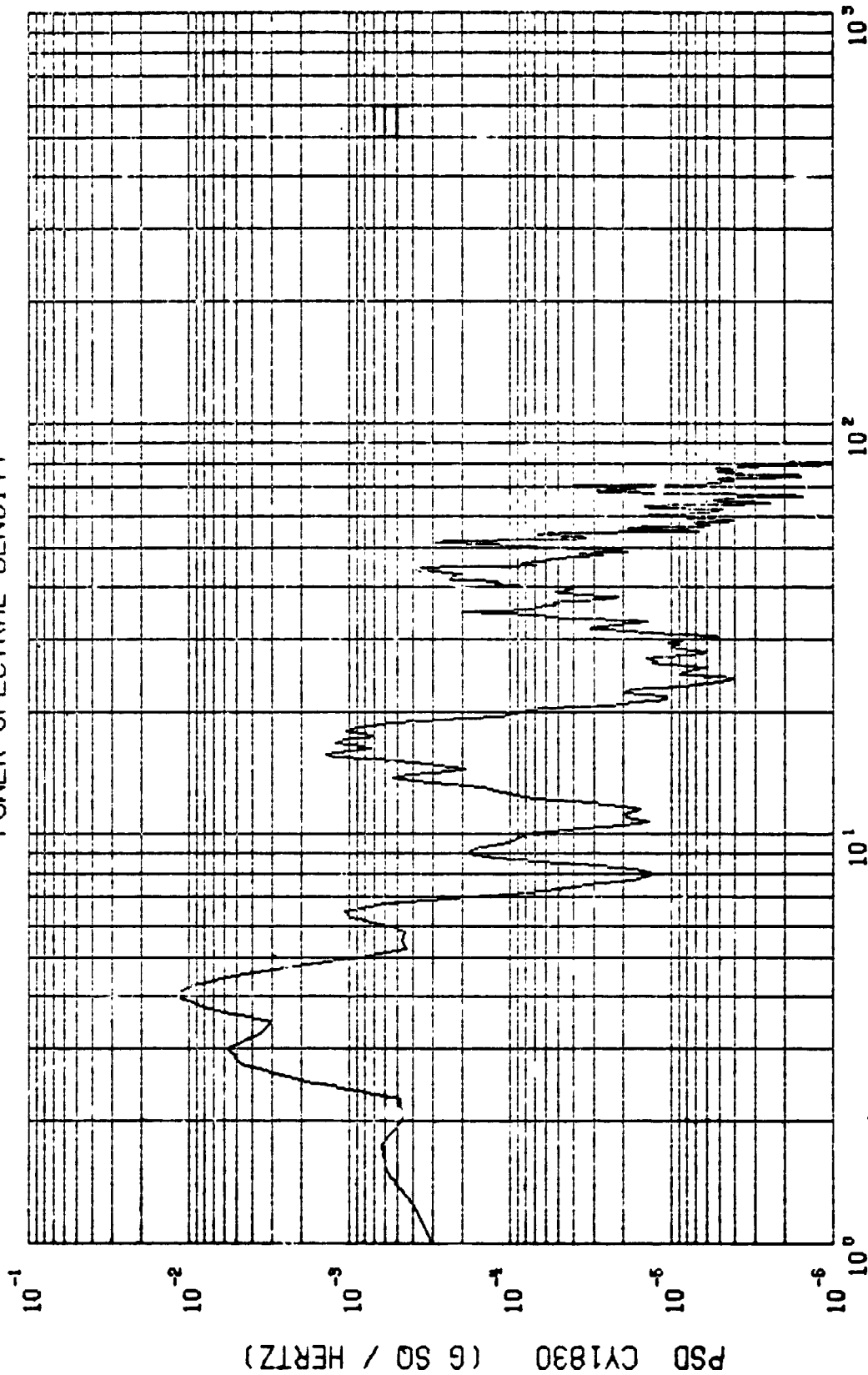
(1024 sps)

MAX 0

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



$\Delta F = .250$

START = 49724.000 SEC

STOP = 49729.996 SEC

MEAN = -91614×10^{-6}

$\sigma^2 = 23734 \times 10^{-6}$

$\sigma = 15425 \times 10^{-5}$

$3\sigma = 46276 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

MAX 0

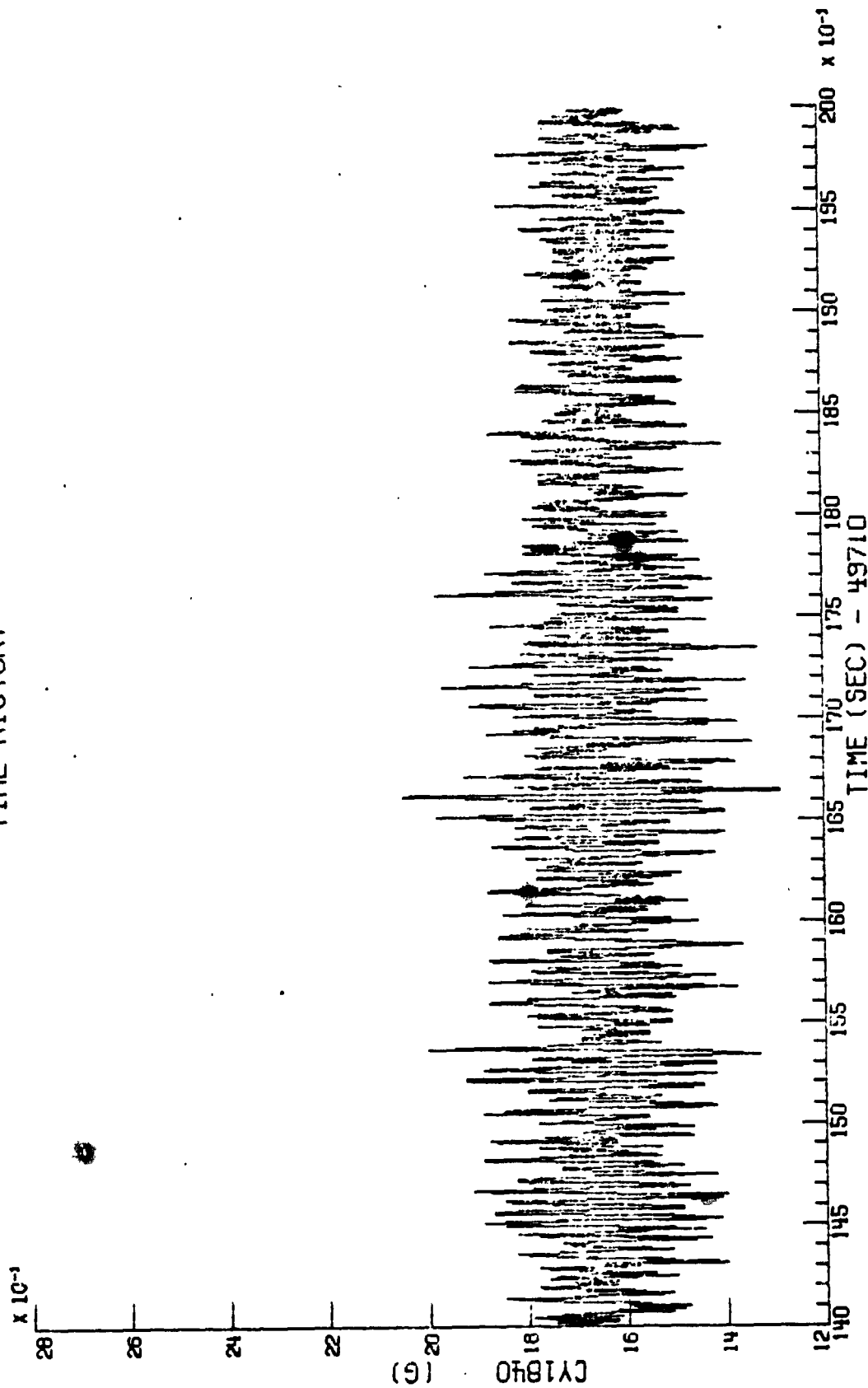
CY1830

(1024 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

Figure 2.73c

TIME HISTORY



MIN = 1.289

MAX = 2.044

CY1840

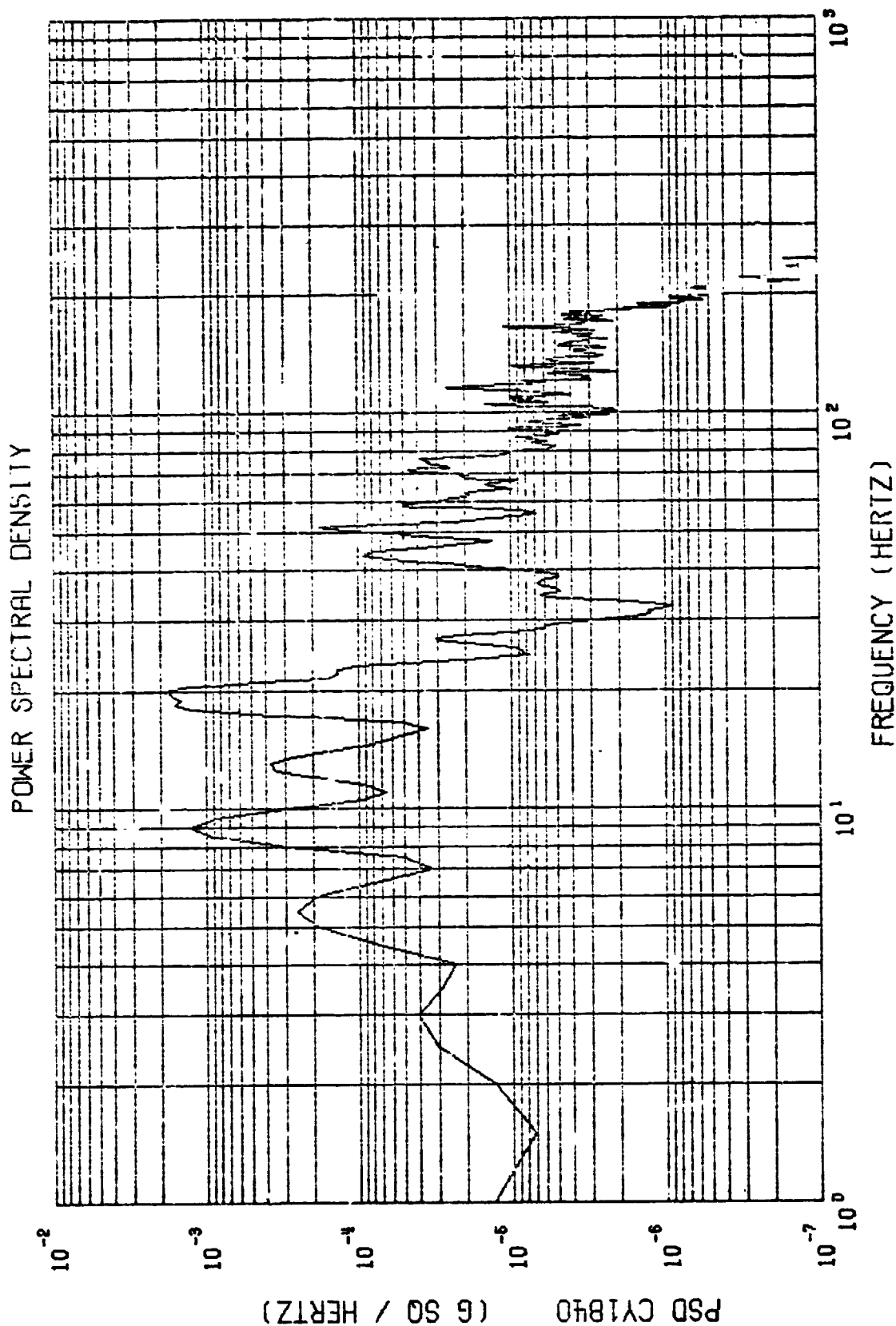
MAX Q

(1024 sps.)

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

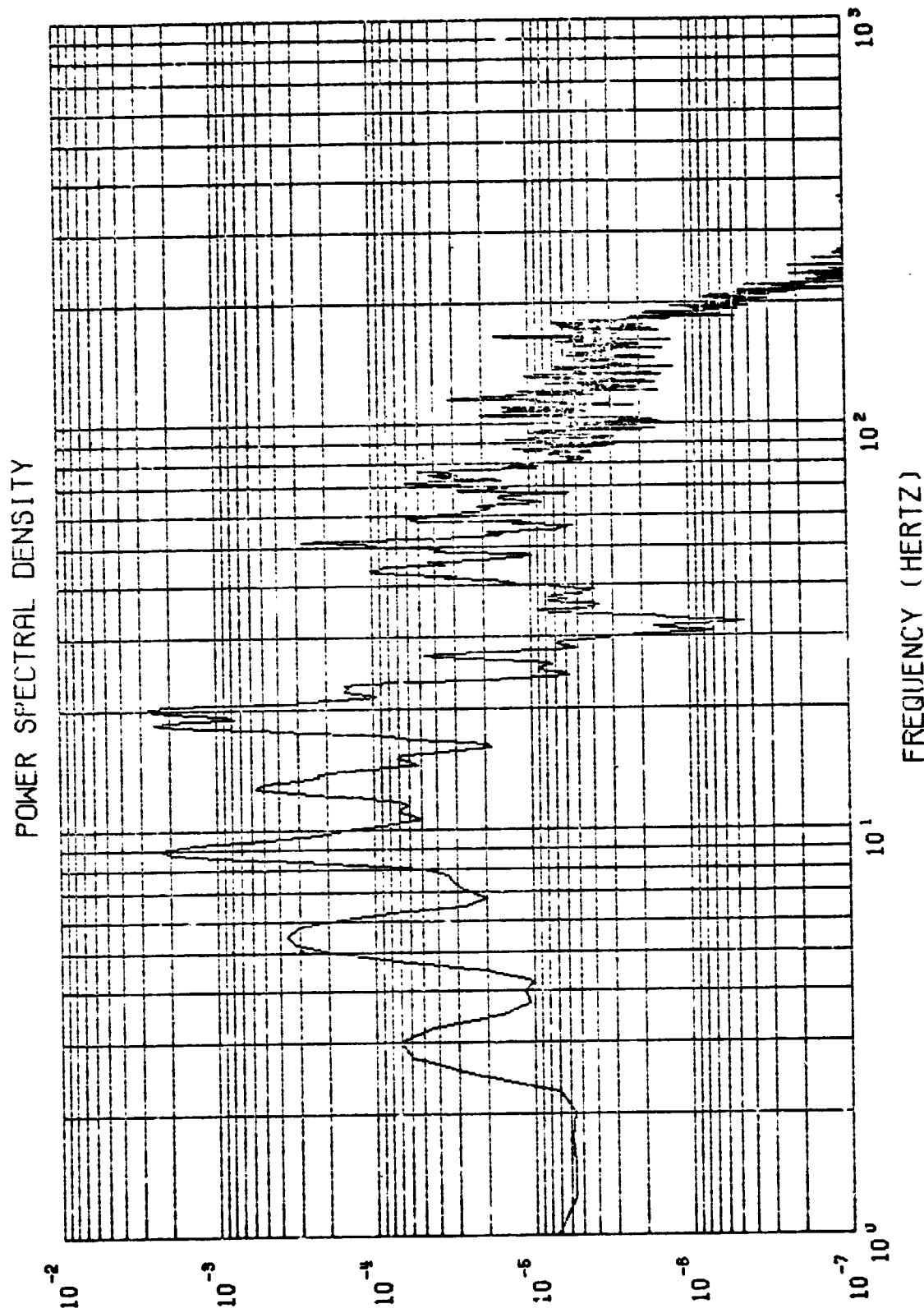
Figure 2.74a



$\Delta F = .500$ START = 43724.000 SEC STOP = 49729.996 SEC
 MEAN = 16447×10^{-4} $\sigma^2 = 10778 \times 10^{-6}$ $\sigma = 10381 \times 10^{-3}$ $3\sigma = 31145 \times 10^{-3}$

TC-1 / VDS DATA (LRC-3A) MAX Q (1024 SPS) CY1840
 NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75 Figure 2.74b

PSD CY1840 (G SQ / HERTZ)

 $\Delta F = .250$

START = 49724.000 SEC

STOP = 49729.996 SEC

MEAN = 16447×10^{-4} $f = 10778 \times 10^{-5}$ $\sigma = 10381 \times 10^{-5}$ $3\sigma = 31145 \times 10^{-5}$

TC-1 / VDS DATA (LRC-3A)

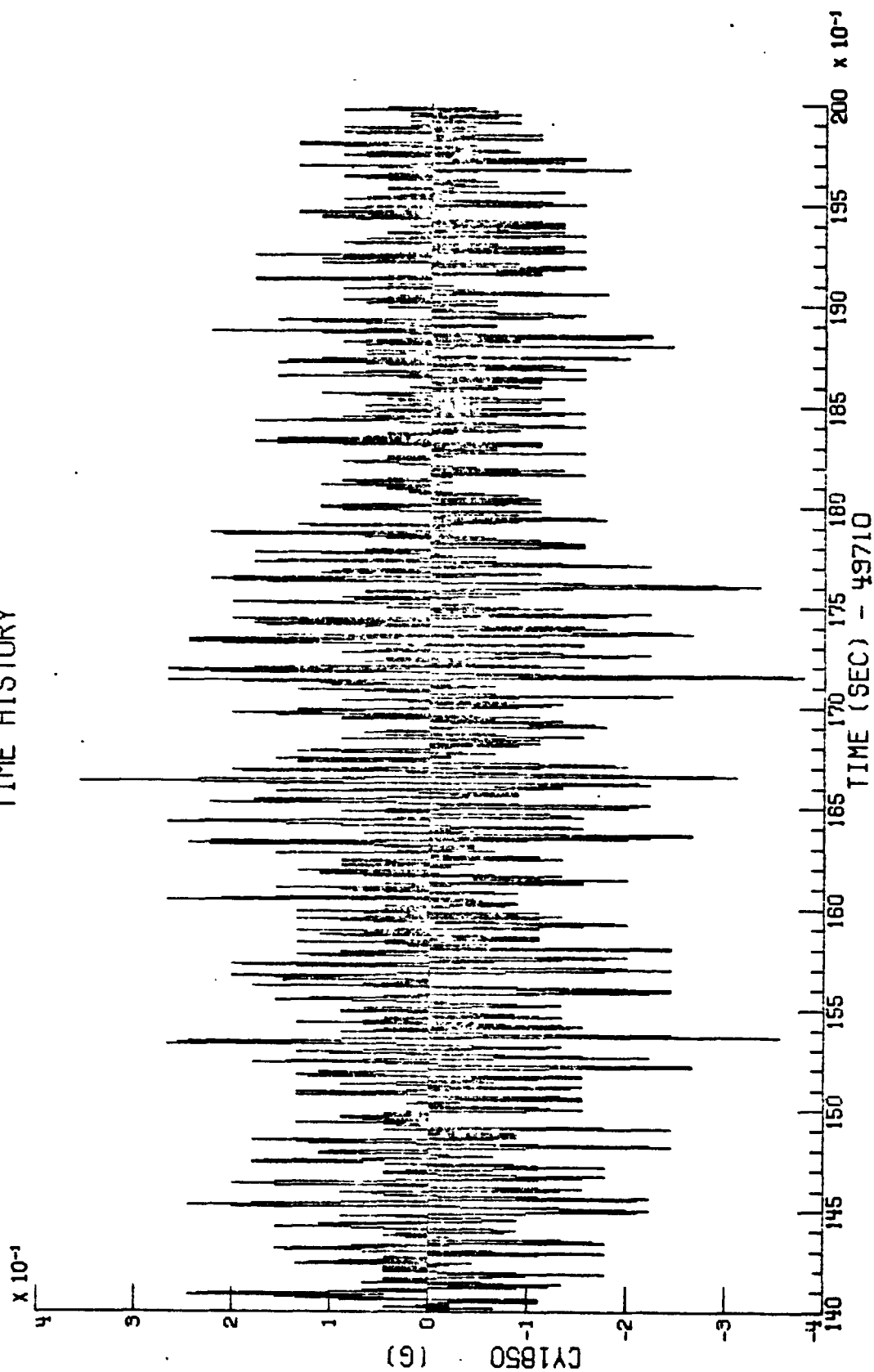
MAX 0

CY1840

(1024 SPS)

Figure 2.74c

TIME HISTORY



MAX = .355

MIN = -.377

TC-1 / VDS DATA (LRC-3A)

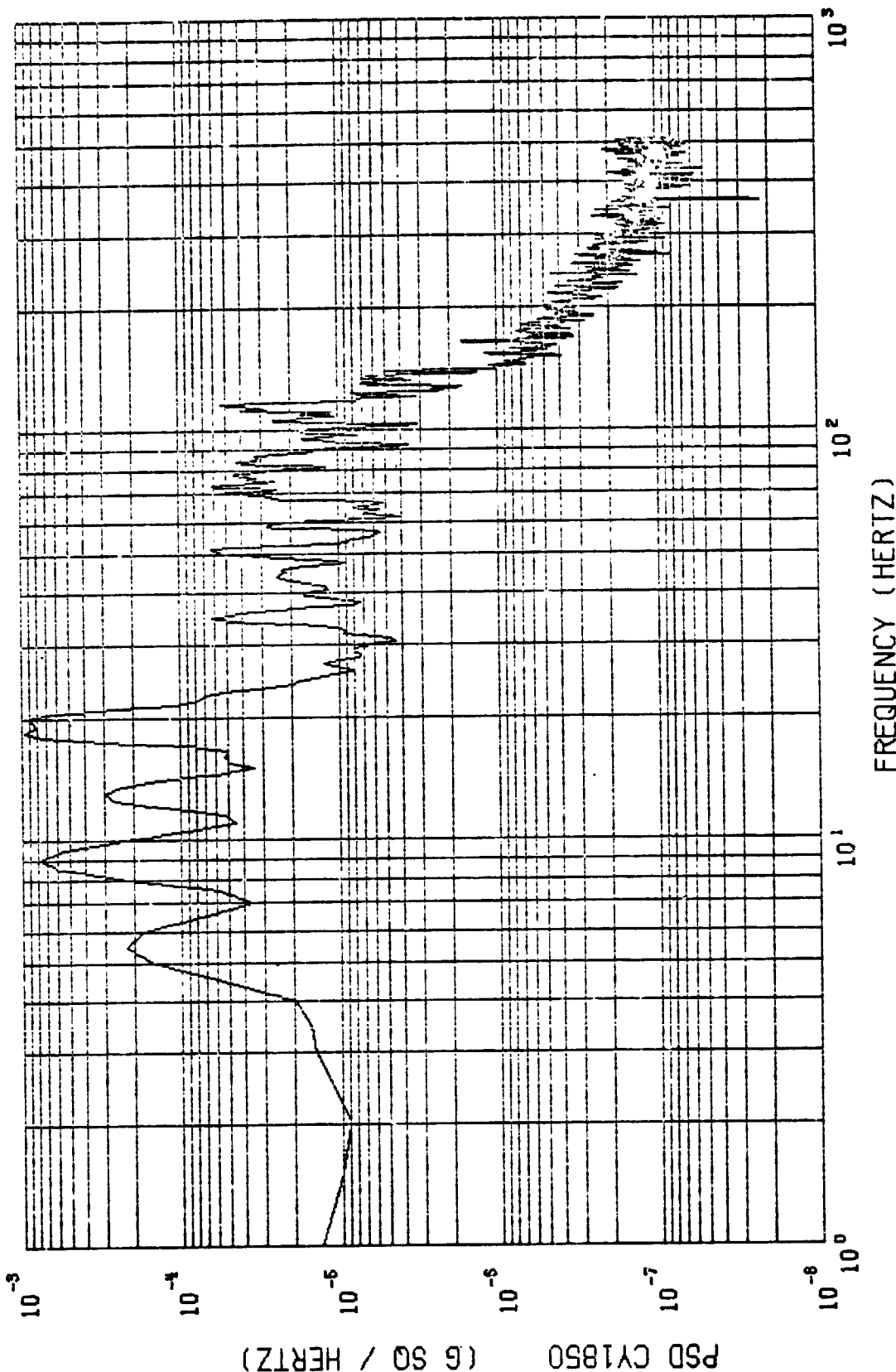
MAX Q

CY1850

(1024 sps)

Figure 2.75a

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $MEAN = -103 \times 10^{-4}$
 $\sigma^2 = 74394 \times 10^{-7}$
 $\sigma = 86252 \times 10^{-6}$
 $3\sigma = 25875 \times 10^{-5}$

START = 49724.000 SEC

STOP = 49729.996 SEC

CY1850

(1024 sps)

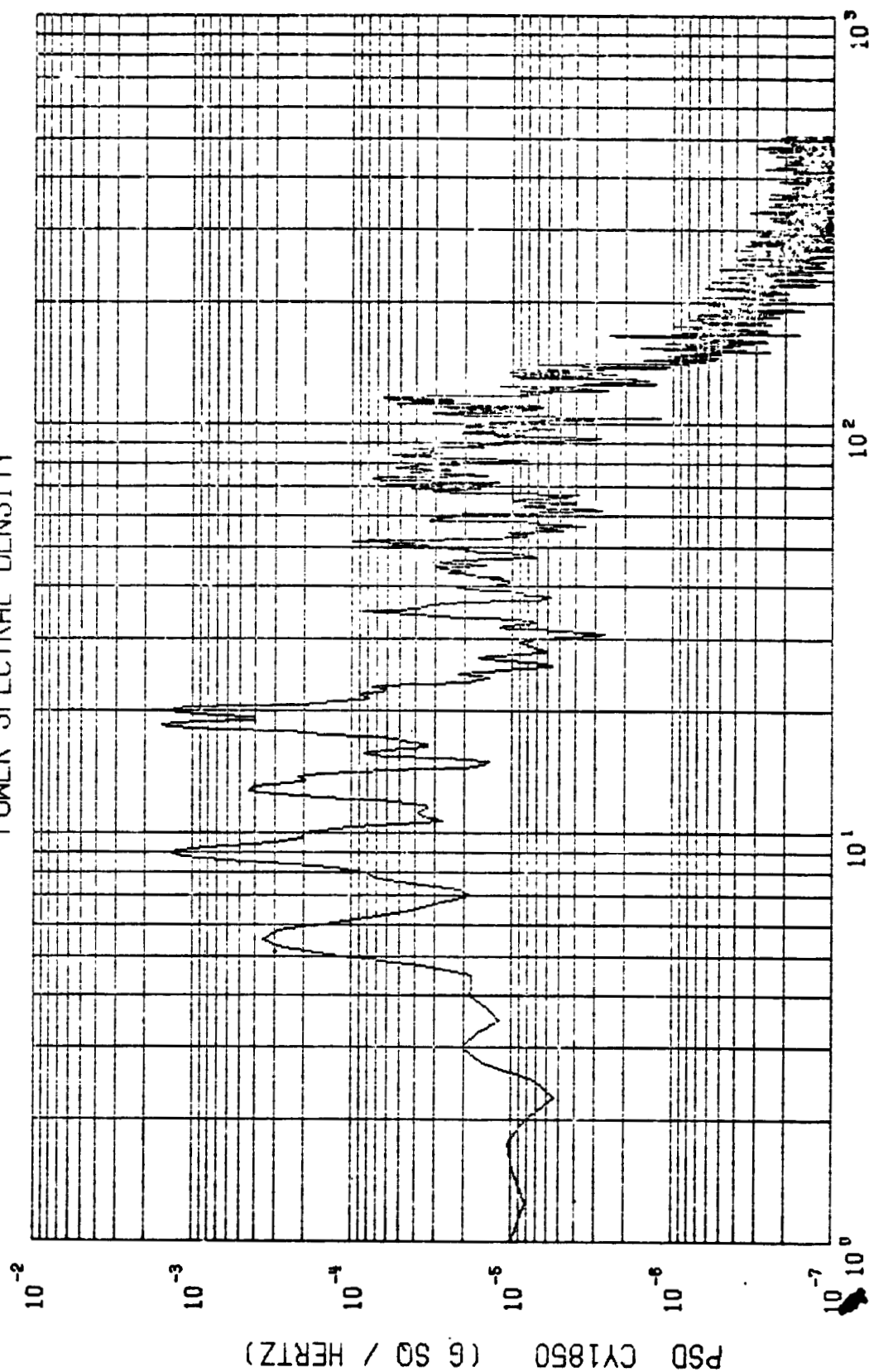
MAX 0

TC-1 / VDS DATA (LRC-3A)

Figure 2.75b

NFSA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

START = 49724.000 SEC STOP = 49729.996 SEC
 MEAN = -103×10^{-4} $\sigma^2 = 74394 \times 10^{-7}$ $\sigma = 86252 \times 10^{-8}$ $3\sigma = 25875 \times 10^{-5}$

CY1850
 Figure 2.75c

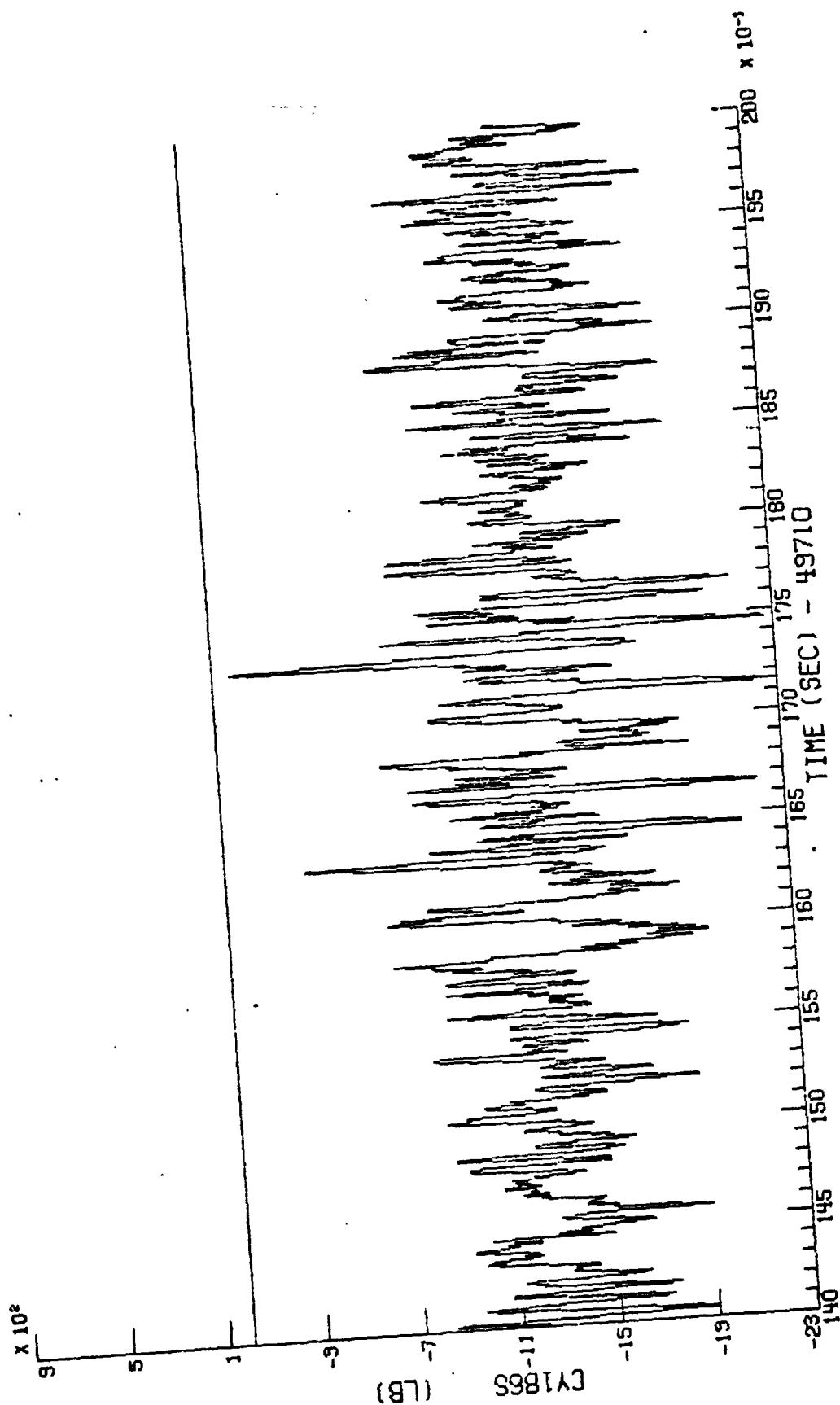
(1024 sps)

MAX 0

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

TIME HISTORY



MIN = -2235.629

MAX = -73.468

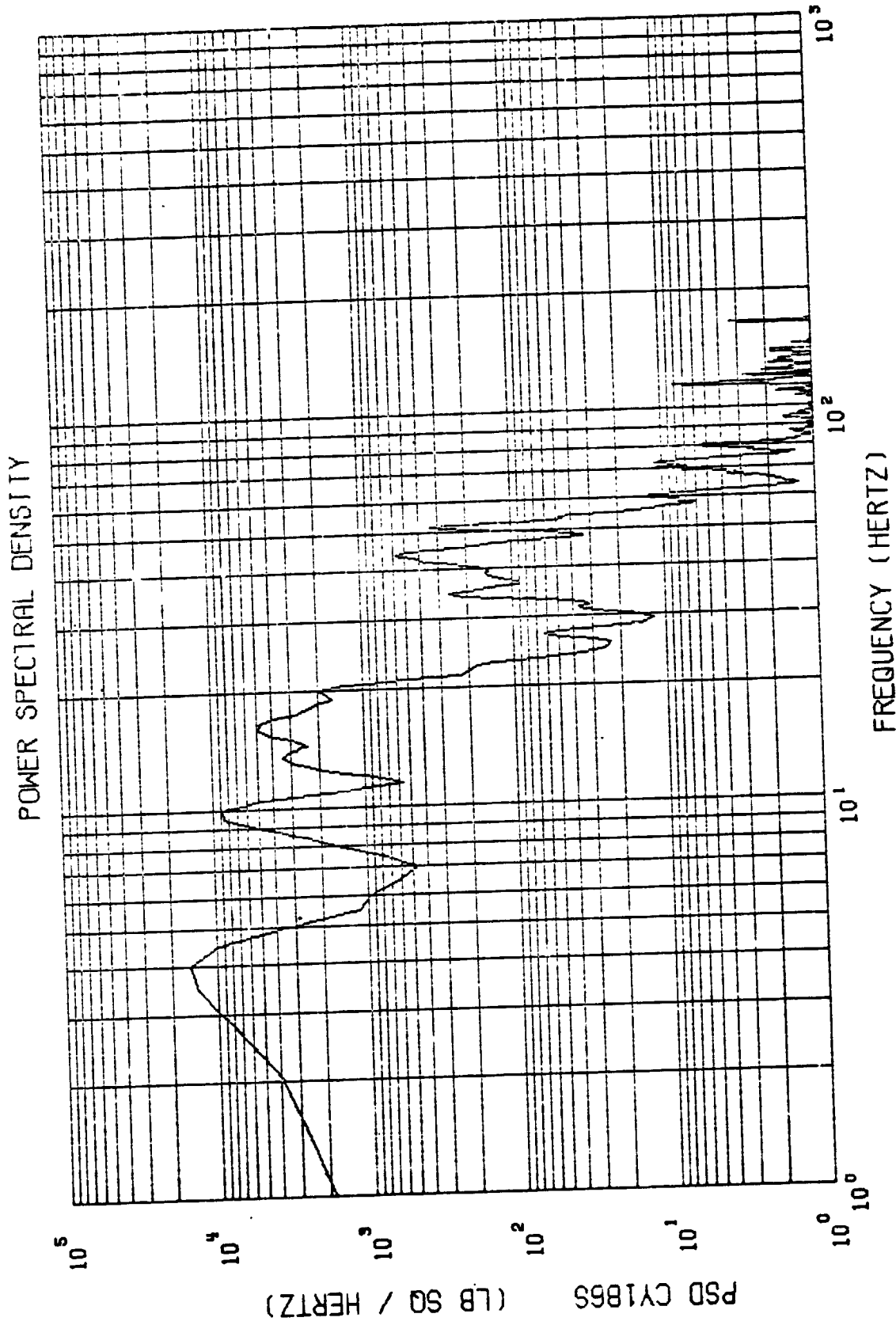
CY186S
Figure 2.76a

(1024 SPS)

MAX Q

TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 6/21/75

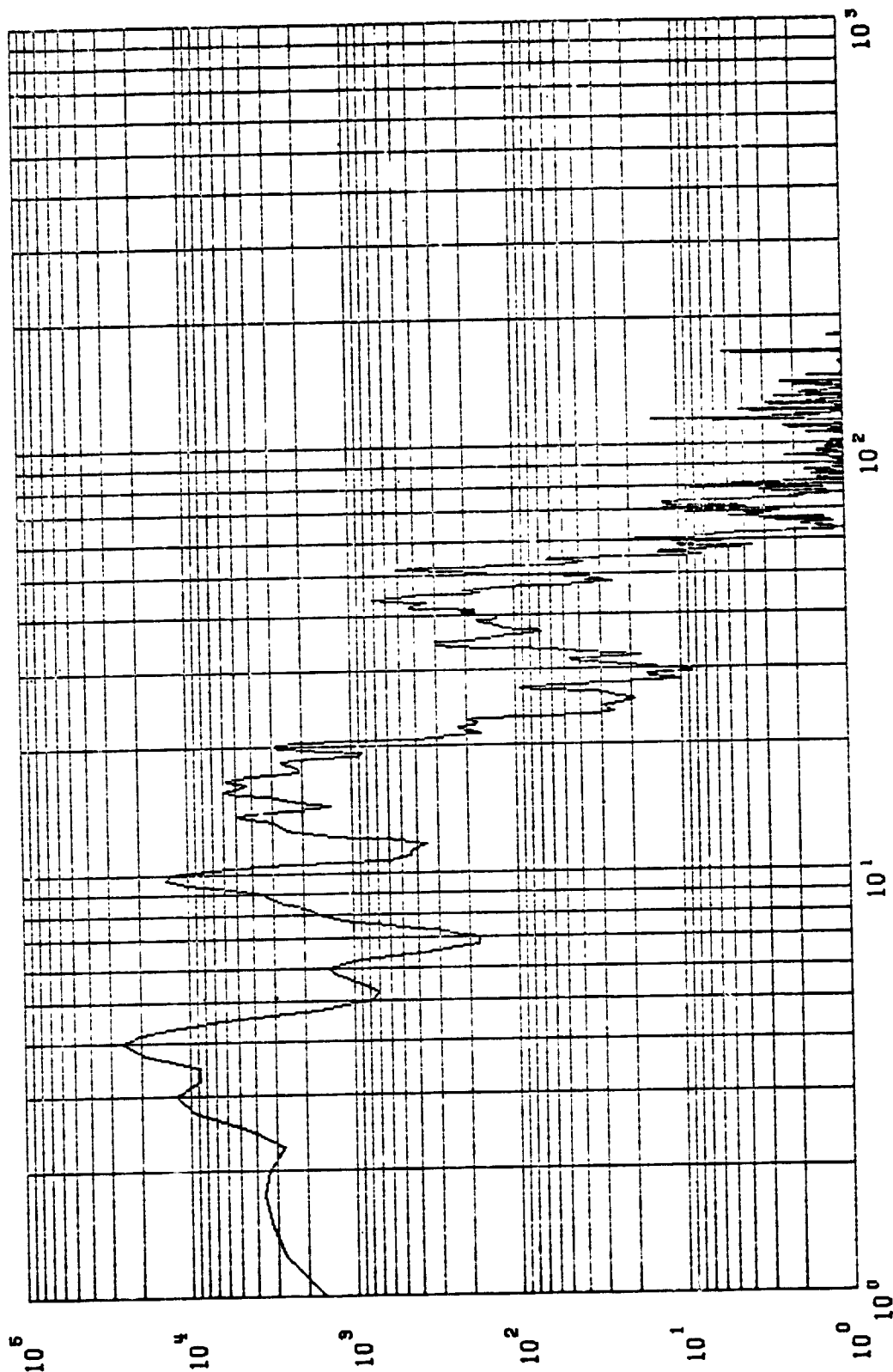


$\Delta F = .500$
 MEAN = -1311×10^0 $\sigma^2 = 82027 \times 10^0$ $\sigma = 2864 \times 10^{-1}$ $3\sigma = 85921 \times 10^{-2}$
 START = 49724.000 SEC STOP = 49729.996 SEC
 TC-1 / VDS DATA (LRC-3A) MAX Q CY186S Figure 2.76b
 (1024 SPS)

851

PSD CY186S (LB SQ / HERTZ)

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .250$
 $MEAN = -1311 \times 10^0$
 $START = 49724.000 \text{ SEC}$
 $STOP = 49729.996 \text{ SEC}$
 $\sigma^2 = 82027 \times 10^0$
 $\sigma = 2864 \times 10^{-1}$
 $3\sigma = 85921 \times 10^{-2}$

TC-1 / VDS DATA (LRC-3A1)

MAX Q

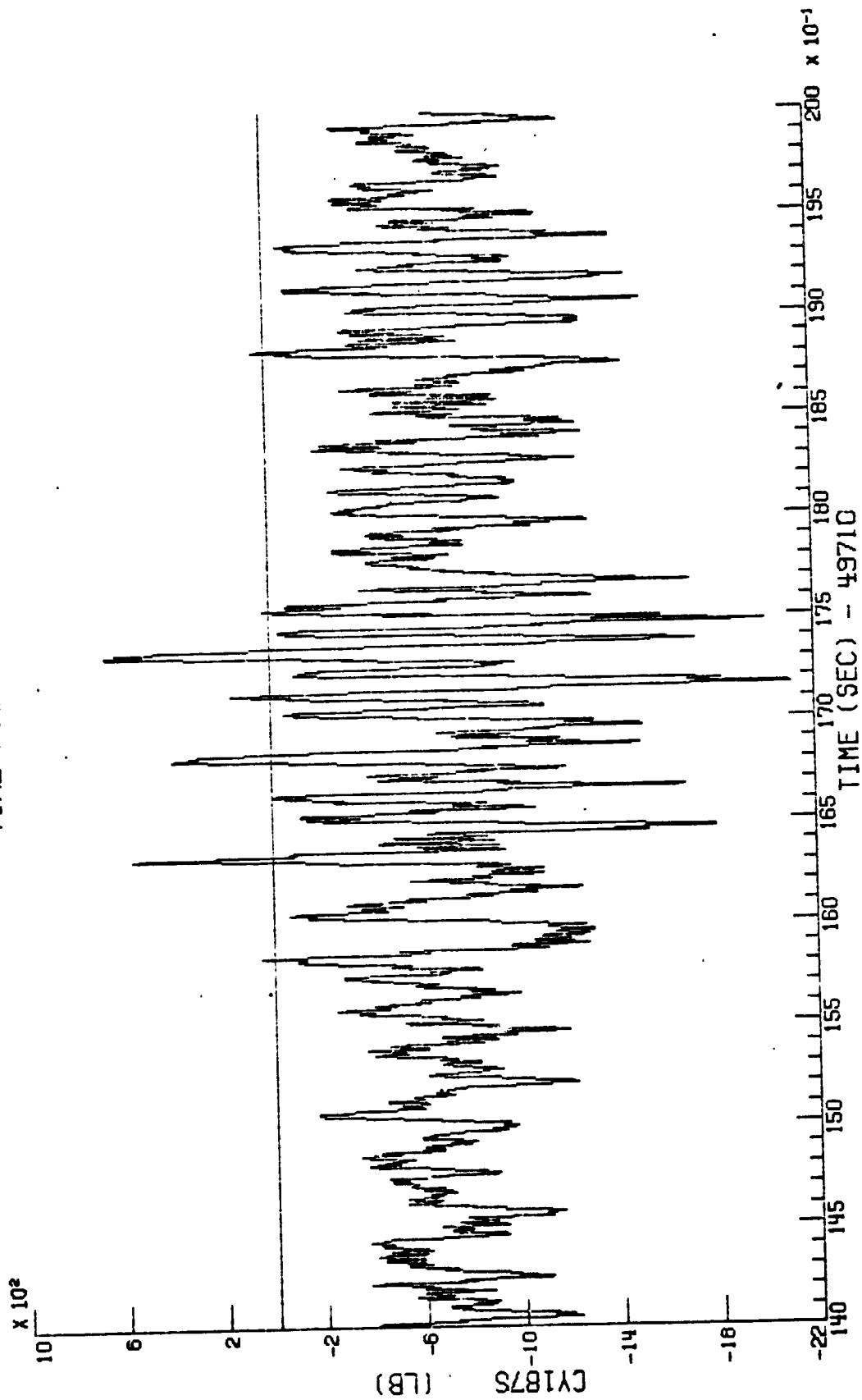
(1024 SPS)

CY186S

Figure 2.76c

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

TIME HISTORY



MAX = 667.838

MIN = -2110.255

159

TC-1 / VDS DATA (LRC-3A)

MAX 0

(1024 STS)

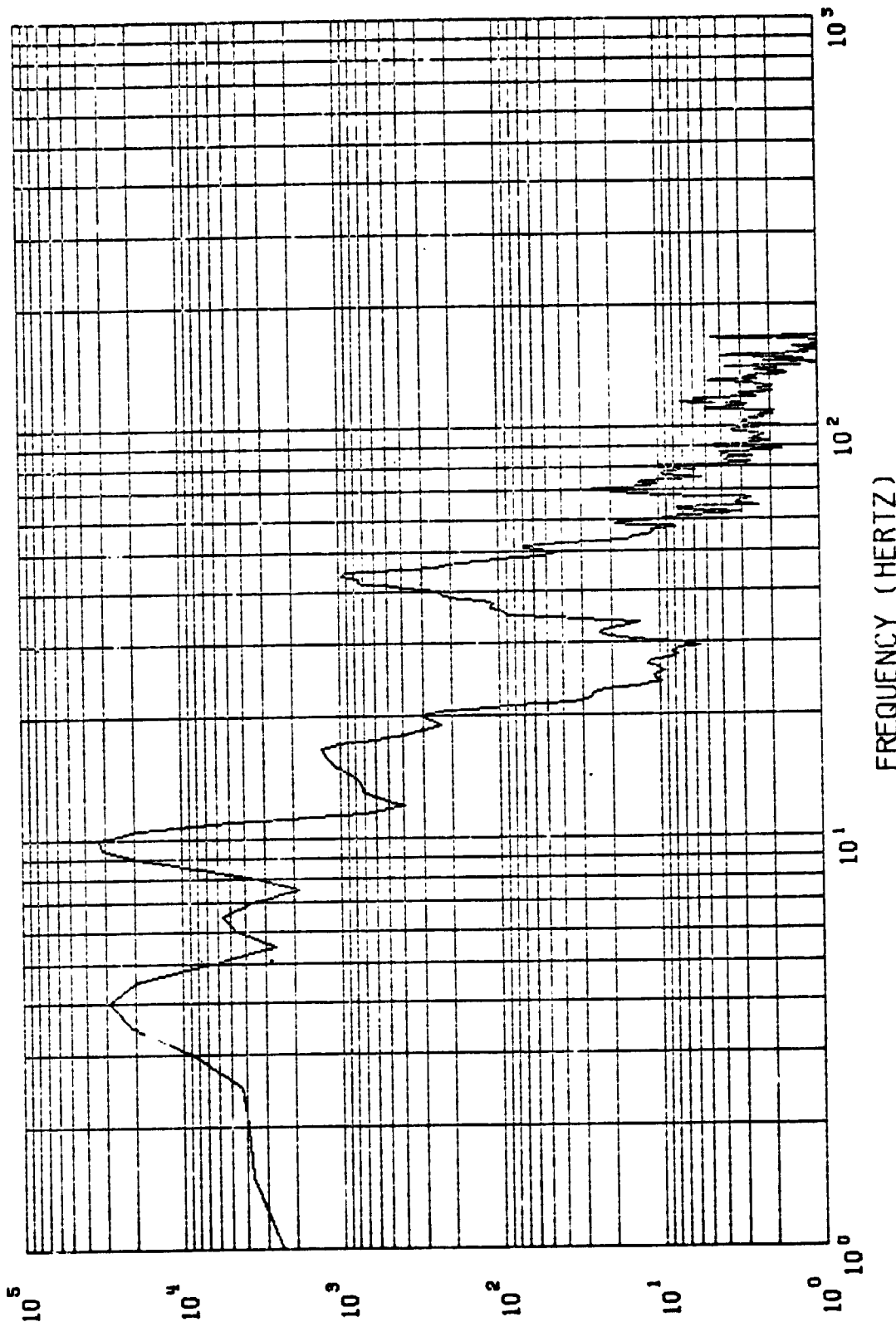
CY187S

Figure 2.77a

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

PSD CY187S (LB SQ / HERTZ)

POWER SPECTRAL DENSITY



$\Delta F = .500$
 $MEAN = -69861 \times 10^{-2}$
 $\sigma^2 = 13093 \times 10^1$
 $\sigma = 36184 \times 10^{-2}$
 $3\sigma = 10855 \times 10^{-1}$

START = 49724.000 SEC

STOP = 49723.996 SEC

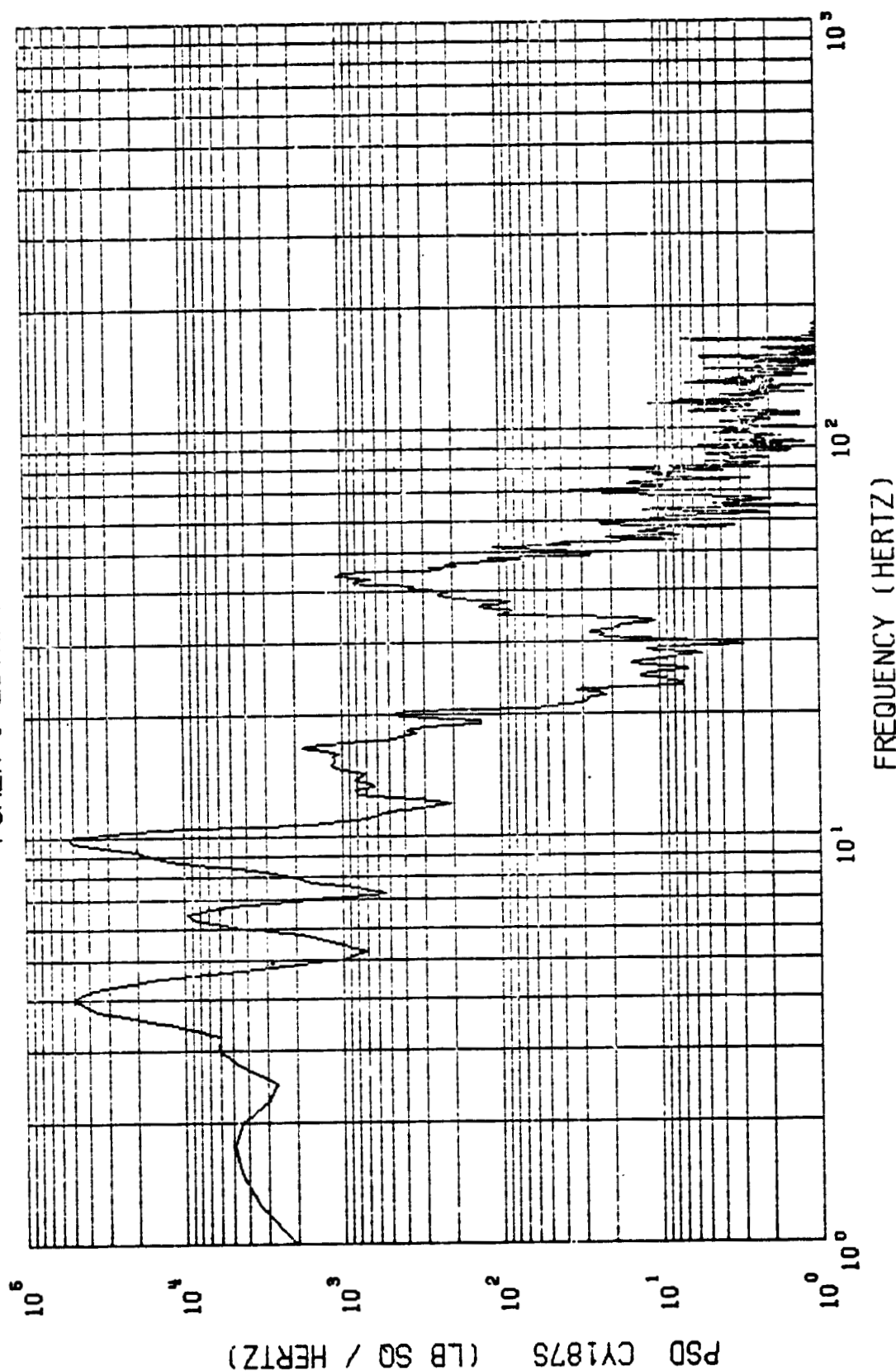
TC-1 / VDS DATA (LRC-3A)

MAX Q

(1024 SPS)

CY187S

POWER SPECTRAL DENSITY



$\Delta F = .250$
 $MEAN = -69861 \times 10^{-2}$
 $\sigma^2 = 13093 \times 10^1$
 $\sigma = 36184 \times 10^{-2}$
 $3\sigma = 10855 \times 10^{-1}$

$START = 49724.000 \text{ SEC}$
 $STOP = 49729.996 \text{ SEC}$

TC-1 / VDS DATA (LRC-3A)
 NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

MAX Q
 (1024 SPS)

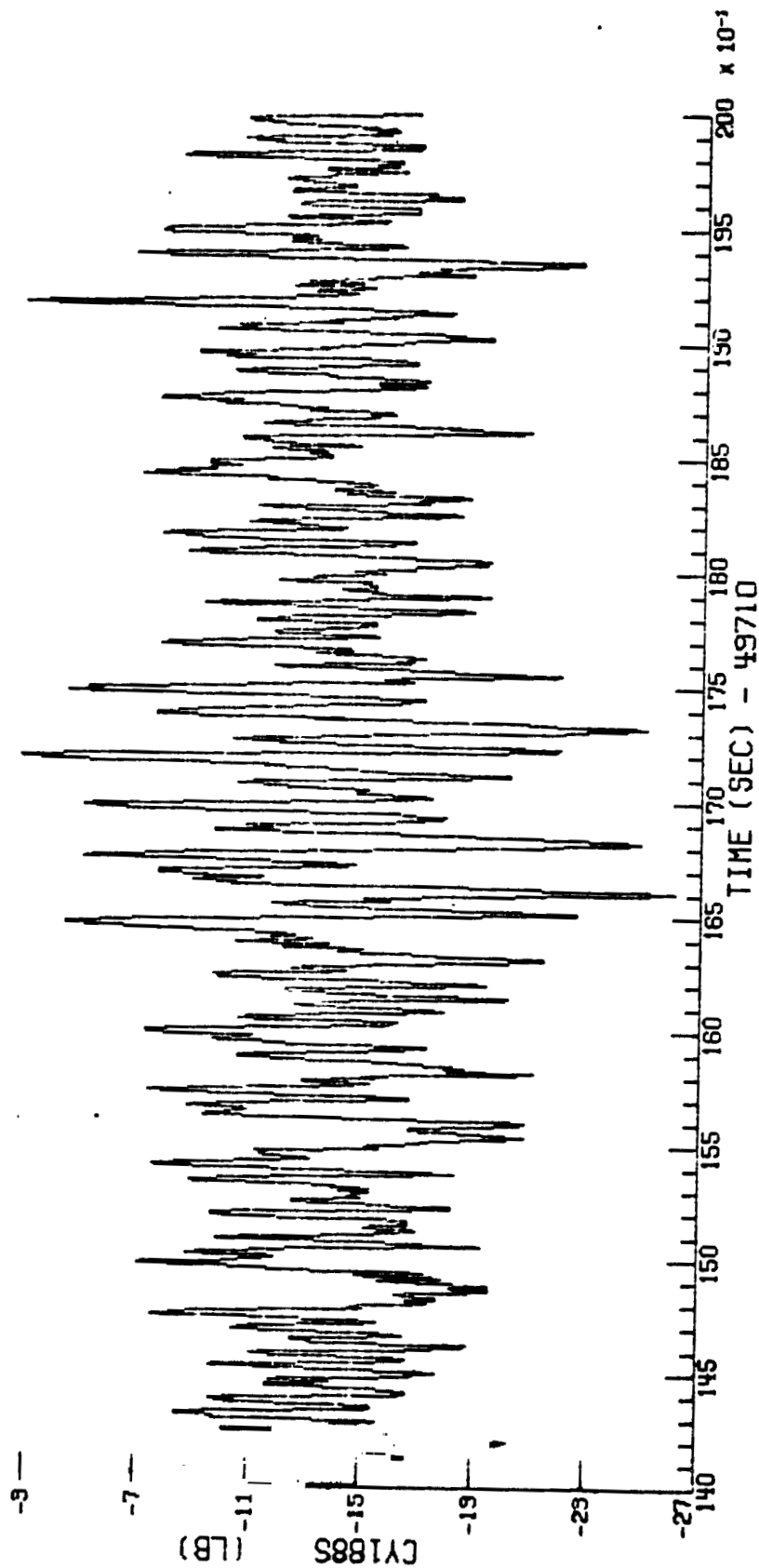
CY187S

Figure 2.77c

TIME HISTORY

$\times 10^2$

162



MAX = -268.103

MIN = -2608.255

TC-1 / VDS DATA (LRC-3A)

MAX Q

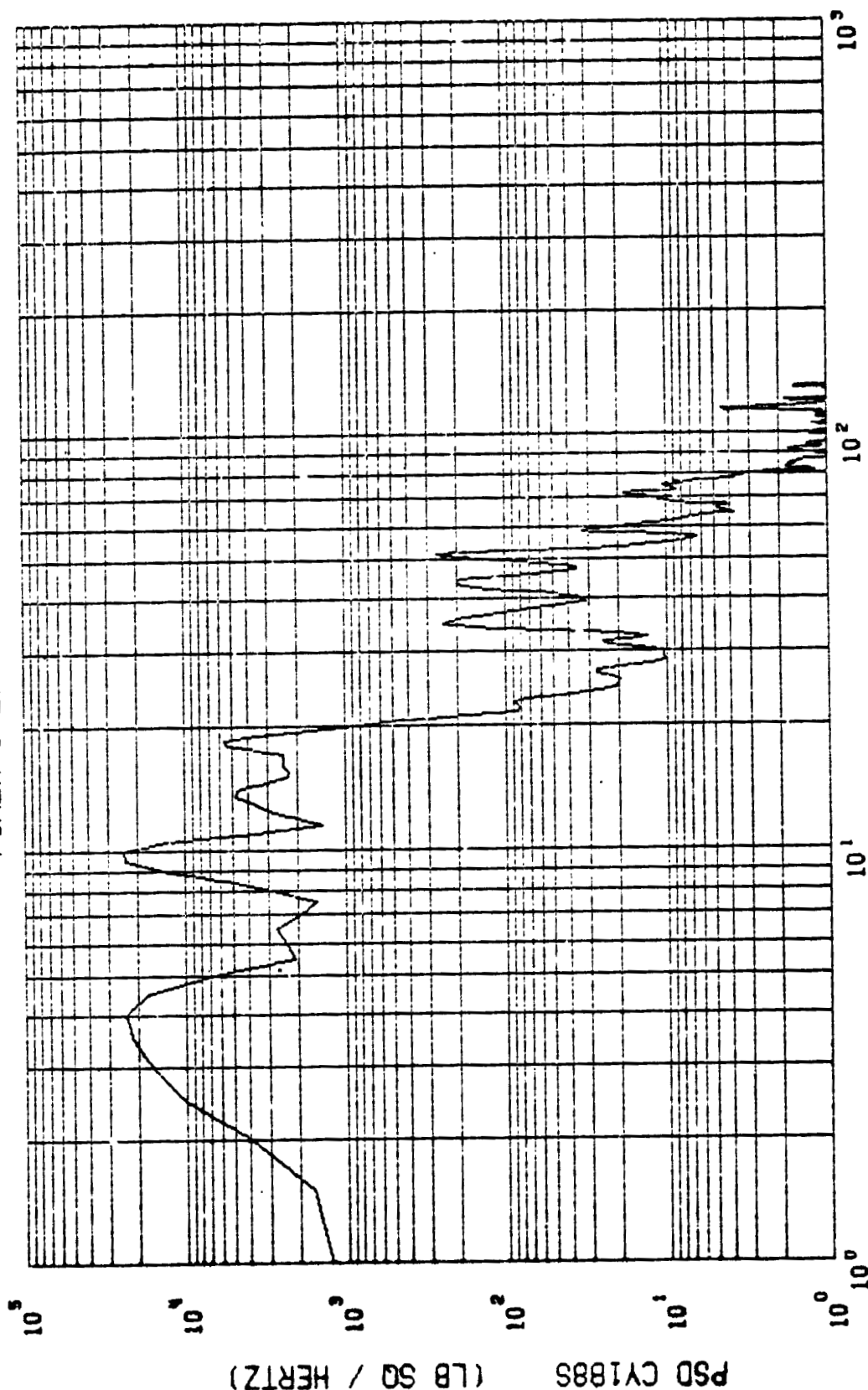
(1024 sps)

CY188S

Figure 2.78a

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .500$ START = 49724.000 SEC STOP = 49729.996 SEC
 MEAN = -13803×10^{-1} $\sigma^2 = 13133 \times 10^1$ $\sigma = 3624 \times 10^{-1}$ $3\sigma = 10872 \times 10^{-1}$

TC-1 / VDS DATA (LRC-3A)

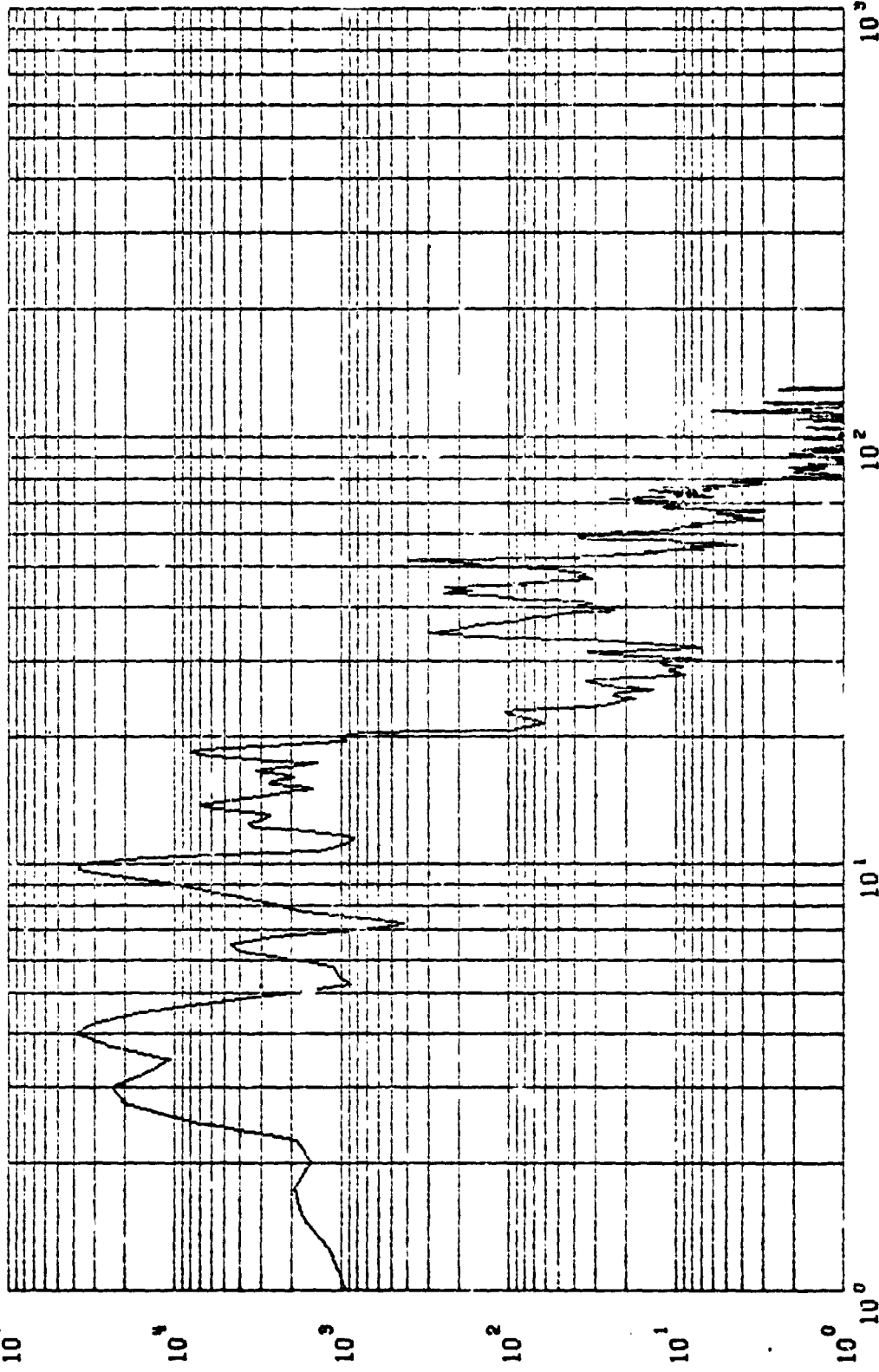
MAX 0

(1024 SPS)

CY188S

Figure 2.78b

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

$\Delta F = .250$

START = 49724.000 SEC

STOP = 49729.996 SEC

MEAN = -13893×10^{-1}

$\sigma^2 = 13133 \times 10^1$

$\sigma = 3624 \times 10^{-1}$

$3\sigma = 10872 \times 10^{-1}$

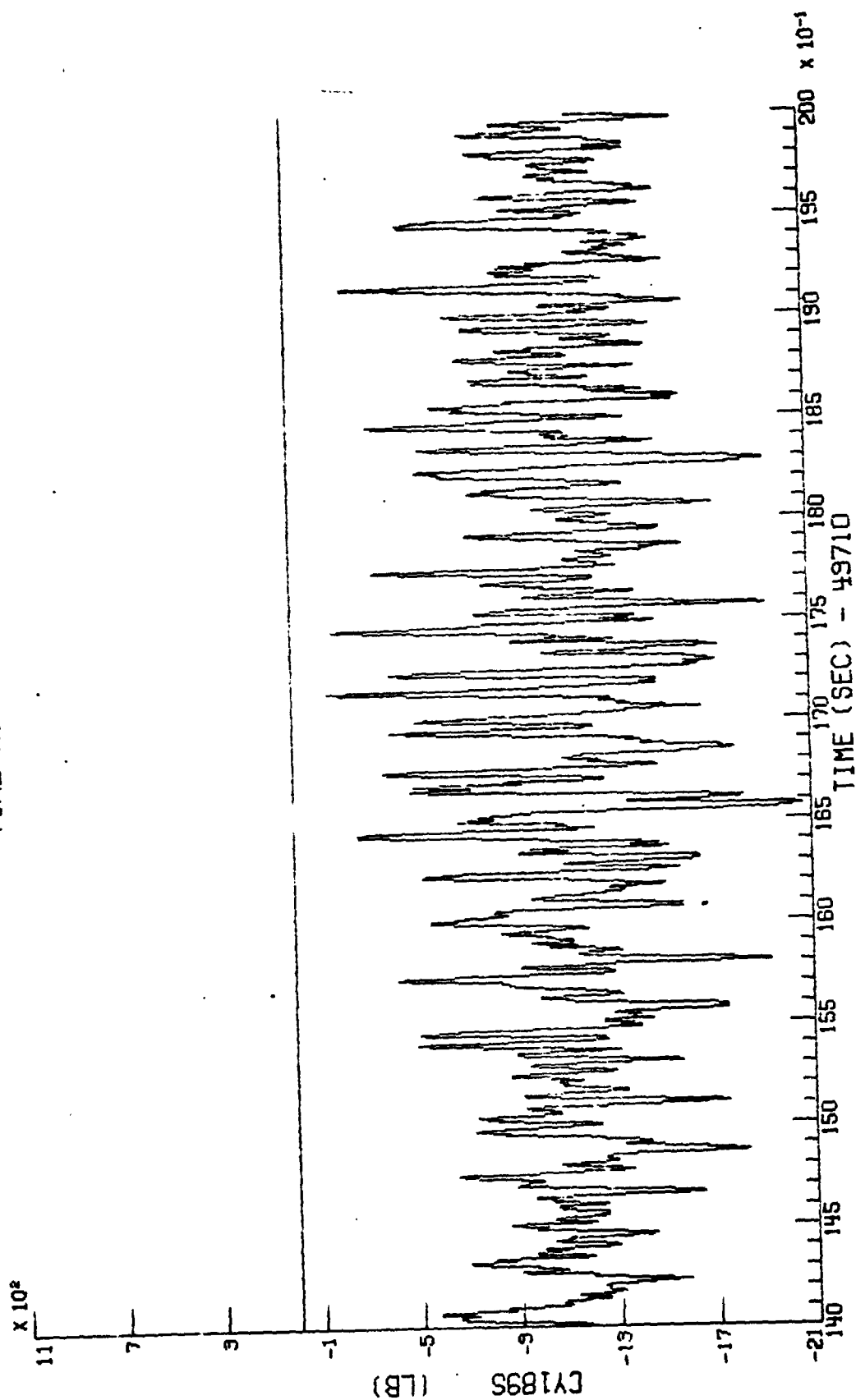
TC-1 / VDS DATA (LRC-3A)

MAX 0

(1024 SPS)

CY1885

TIME HISTORY



MIN = -2064.747

MAX = -146.334

CY189S
Figure 2.79a

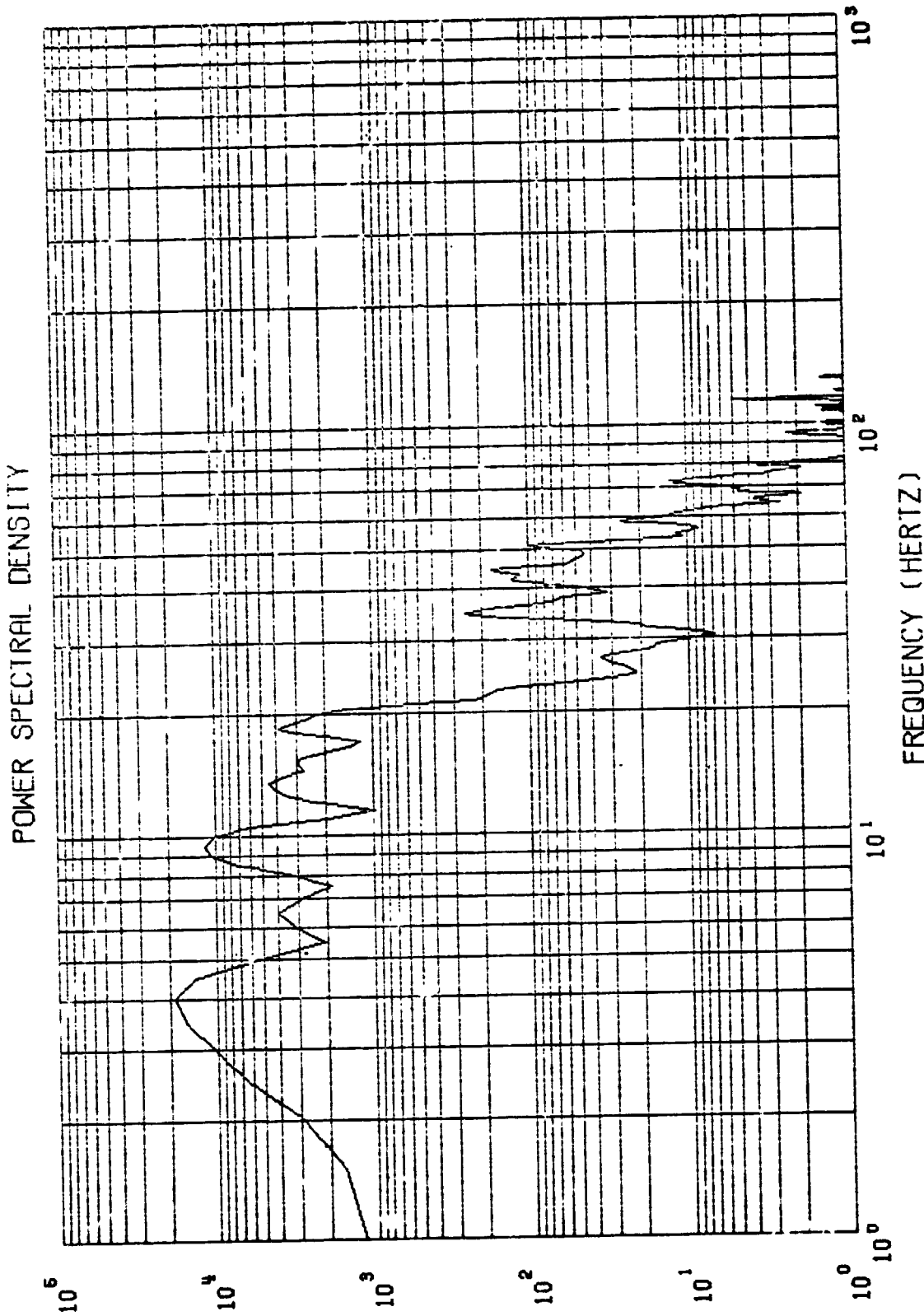
(1024 SPS)

MAX 0

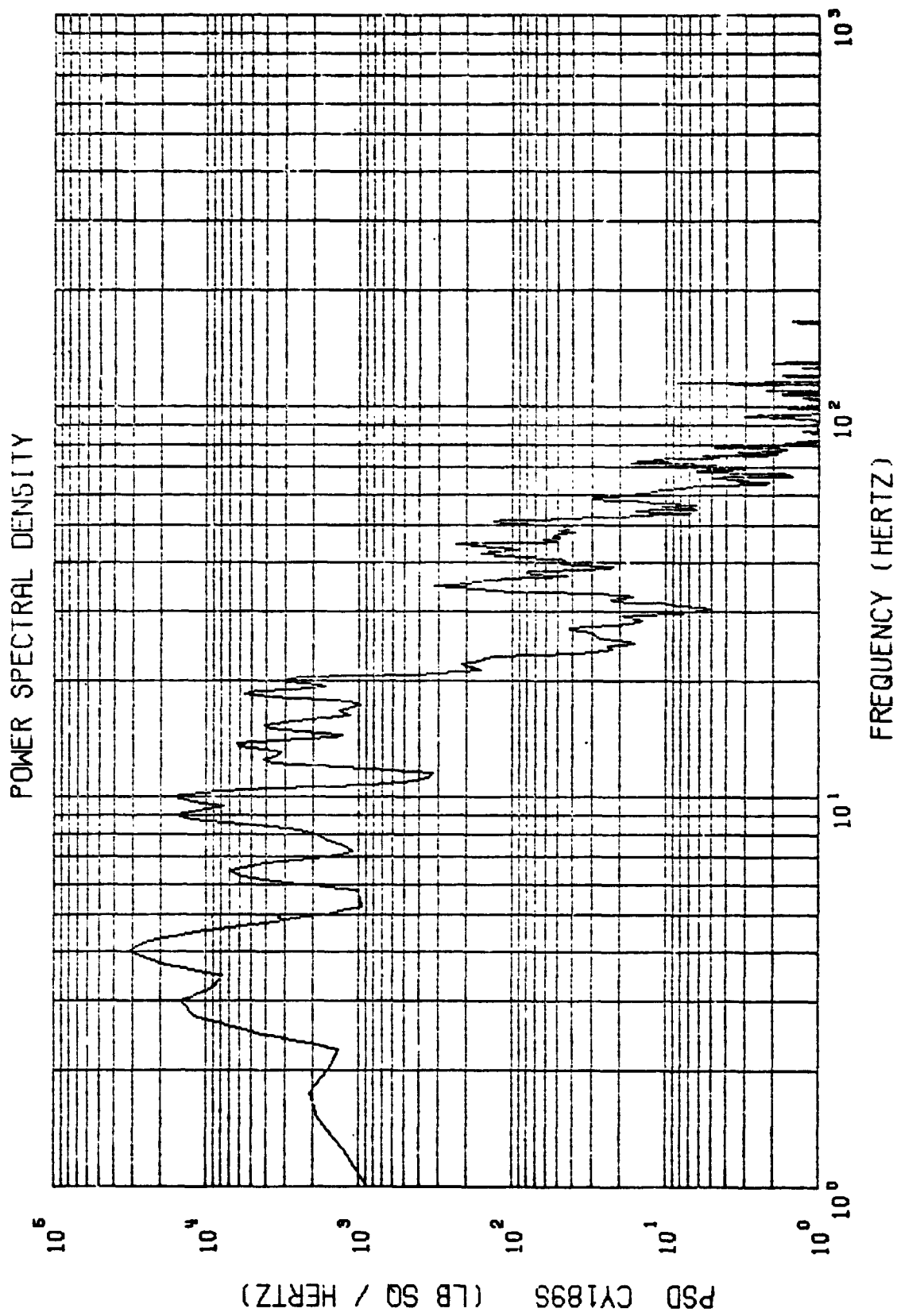
TC-1 / VDS DATA (LRC-3A)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

PSD CY189S (LB SQ / HERTZ)



$\Delta F = .500$ START = 49724.000 SEC STOP = 49729.996 SEC
 MEAN = -11193×10^{-1} $\sigma^2 = 98882 \times 10^0$ $\sigma = 31446 \times 10^{-2}$ $3\sigma = 9434 \times 10^{-1}$
 TC-1 / VDS DATA (LRC-3A) MAX 0 (1024 SPS) CY189S
 NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75 Figure 2.79U



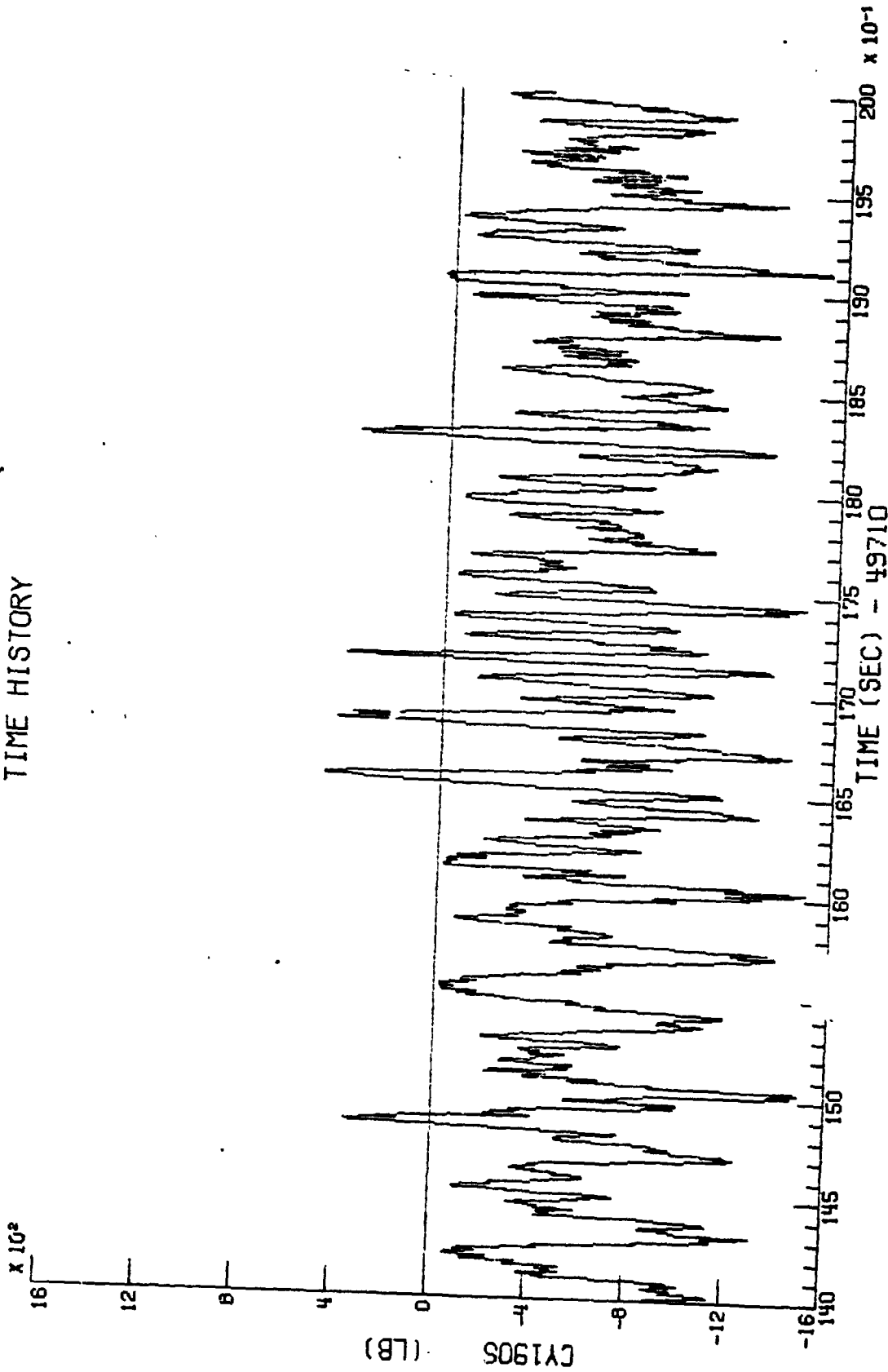
$\Delta F = .250$
 $\text{MEAN} = -11193 \times 10^{-1}$ $f = 98889 \times 10^0$ $\sigma = 31446 \times 10^{-2}$ $3\sigma = 9434 \times 10^{-1}$
 $\text{START} = 49724.000 \text{ SEC}$ $\text{STOP} = 49729.996 \text{ SEC}$

167

TC-1 / VDS DATA (LRC-3A) MAX Q CY1895 Figure 2.79c
 (1024 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

TIME HISTORY



MAX = 466.431

MIN = -1532.823

TC-1 / VDS DATA (LRC-3A)

MAX 0

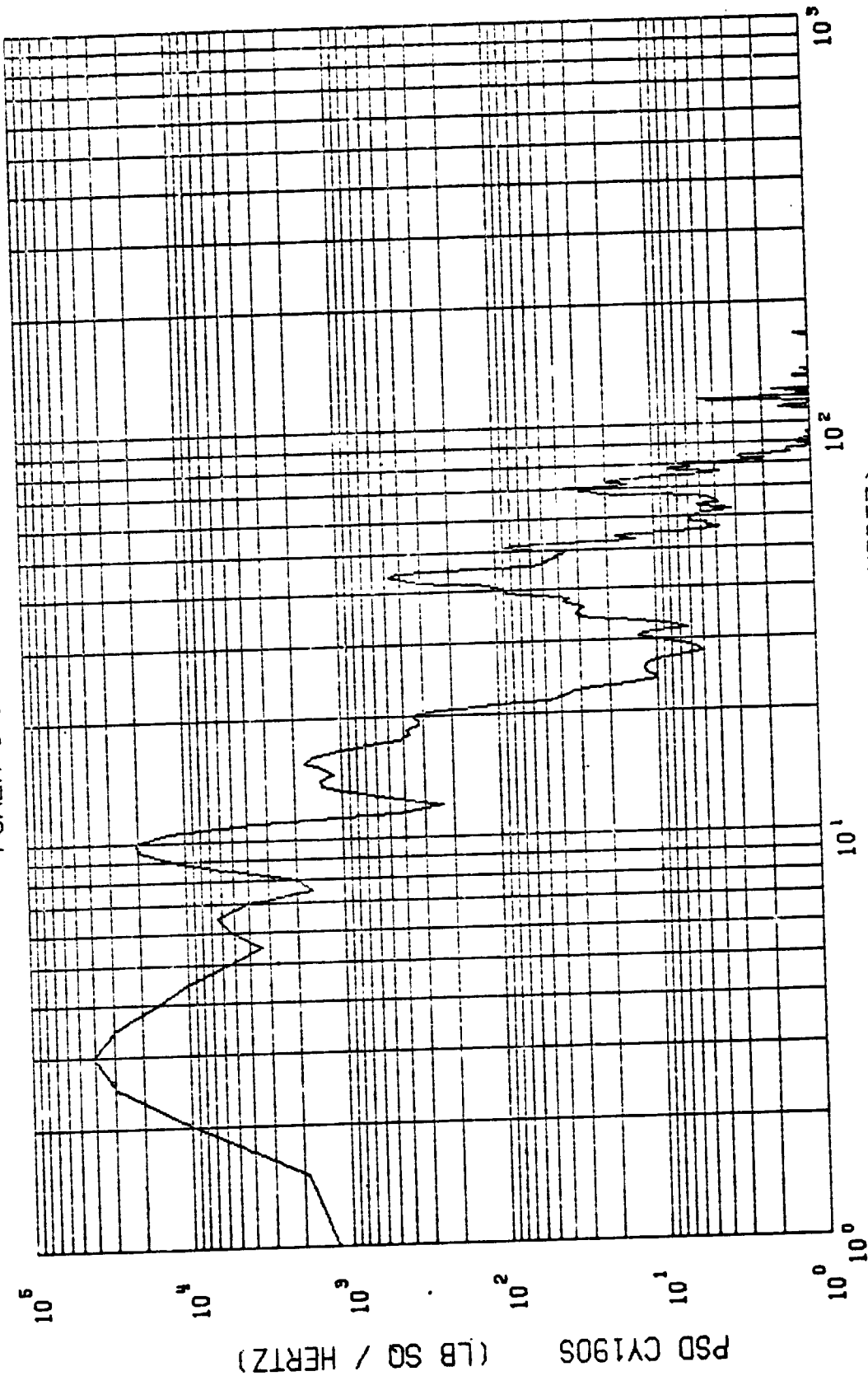
CY1905

(1024 sps)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

Figure 2.80a

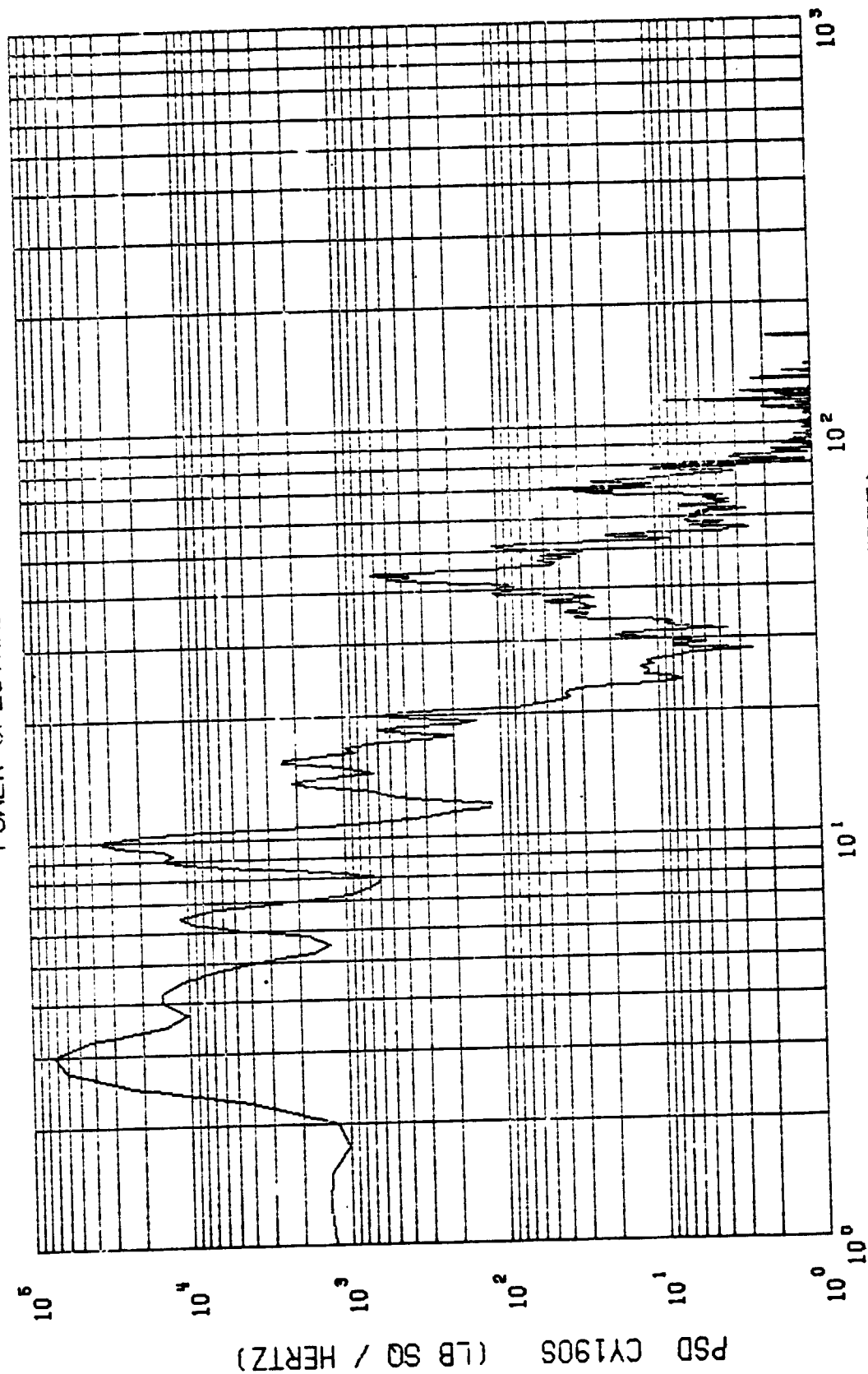
POWER SPECTRAL DENSITY



$\Delta F = .500$
 $START = 49724.000 \text{ SEC}$
 $STOP = 49729.996 \text{ SEC}$
 $MEAN = -60877 \times 10^{-2}$
 $\sigma^2 = 13088 \times 10^1$
 $\sigma = 36178 \times 10^{-2}$
 $3\sigma = 10853 \times 10^{-1}$

TC-1 / VDS DATA (LRC-3A) MAX 0 (1024 SPS) CY190S Figure 2.80b

POWER SPECTRAL DENSITY

 $\Delta F = .250$ $\text{MEAN} = -60877 \times 10^{-2}$ $\sigma^2 = 13088 \times 10^1$ $\text{START} = 49724.000 \text{ SEC}$ $\sigma = 36178 \times 10^{-2}$ $\text{STOP} = 49729.996 \text{ SEC}$ $3\sigma = 10853 \times 10^{-1}$

TC-1 / VDS DATA (LRC-3A)

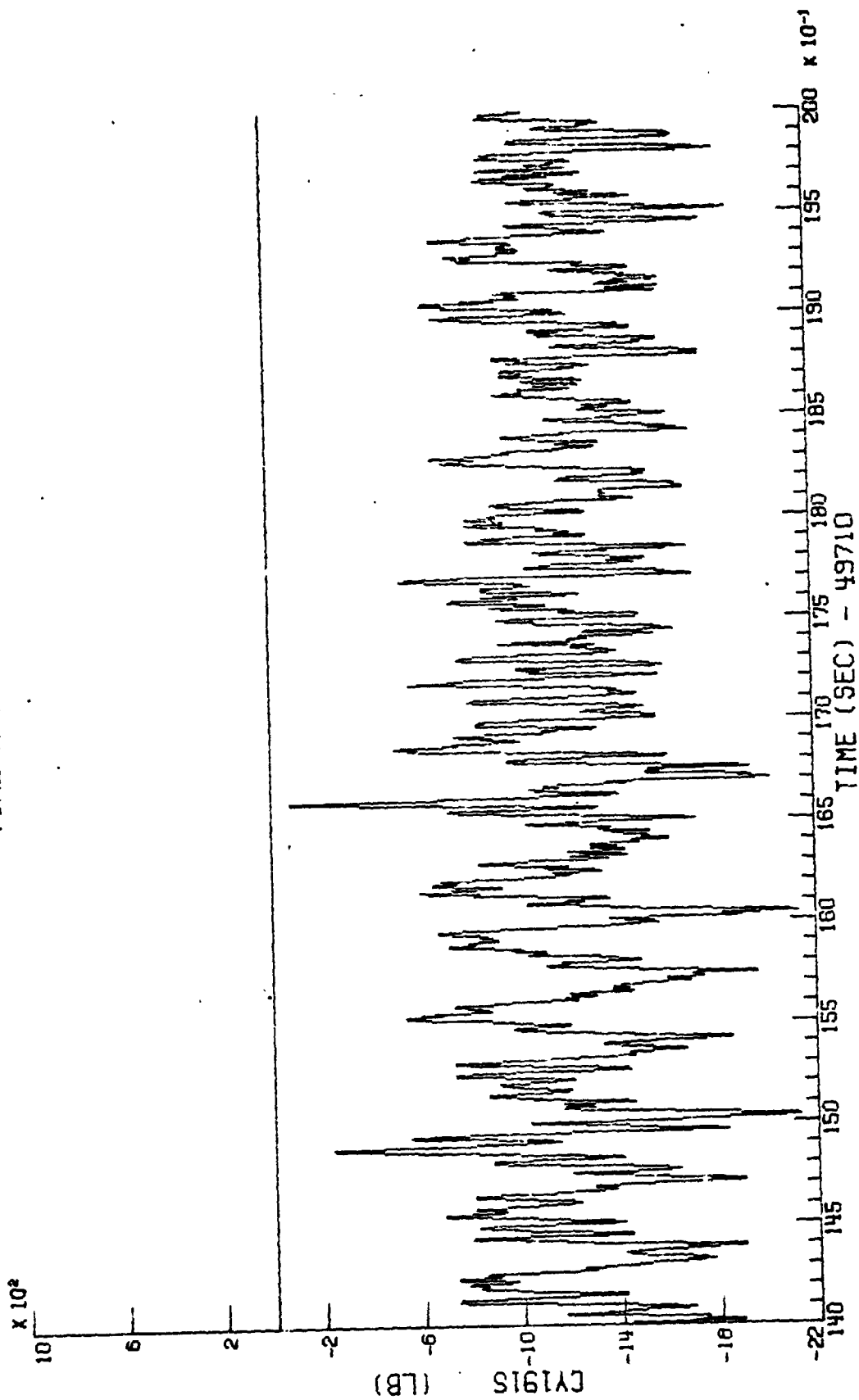
MAX Q

CY190S

(1024 sps)

Figure 2.80c

TIME HISTORY



MAX = -83.379

MIN = -2125.339

171

CC-1 / VDS DATA (LRC-3A)

MAX Q

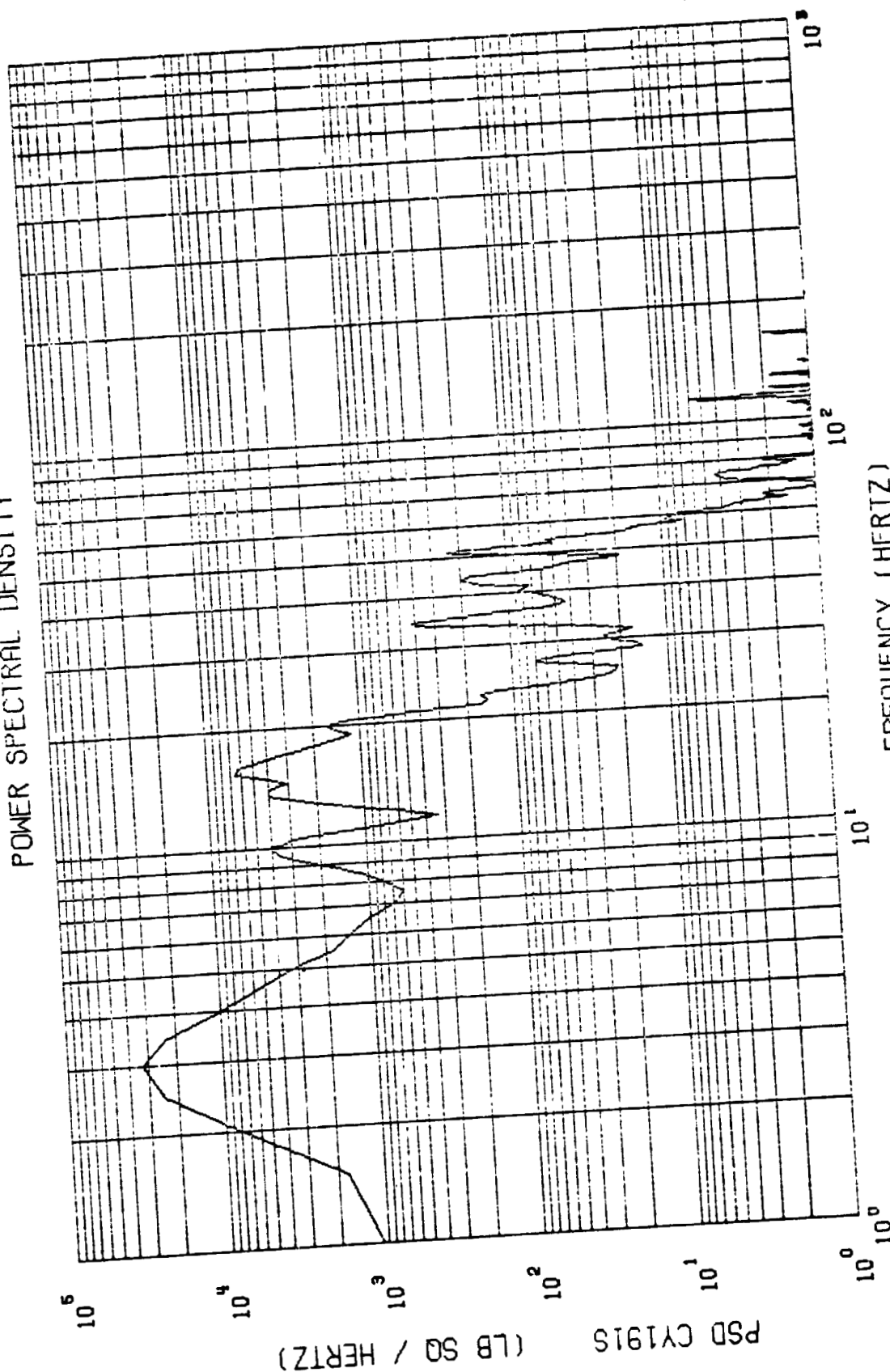
CY191S

(1024 SPS)

Figure 2.81a

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75

POWER SPECTRAL DENSITY



FREQUENCY (HERTZ)

STOP = 49729.996 SEC

$\sigma = 30863 \times 10^{-2}$

START = 49724.000 SEC

$\sigma = 95255 \times 10^0$

$\Delta F = .500$

MEAN = -12036×10^{-1}

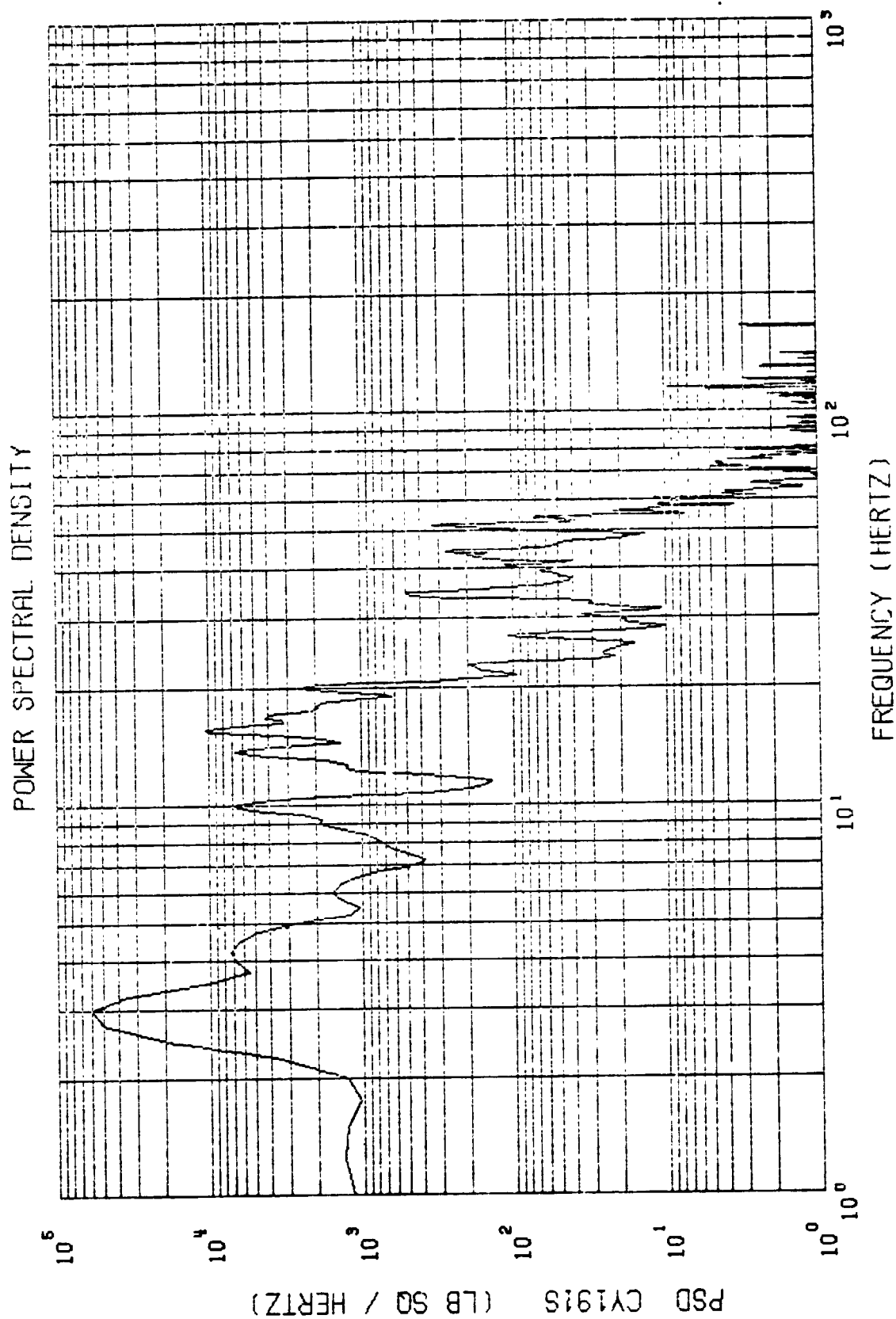
CY191S

MAX 0

(1024 SPS)

Figure 2.81b

TC-1 / VDS DATA (LRC-3A)



$\Delta F = .250$ START = 49724.000 SEC STOP = 49729.906 SEC
 MEAN = -12038×10^{-1} $\sigma^2 = 95255 \times 10^0$ $\sigma = 30863 \times 10^{-2}$ $3\sigma = 92559 \times 10^{-1}$

TC-1 / VDS DATA (LRC-3R) MAX Q CY191S Figure 2.81c
 (1024 SPS)

NASA-LANGLEY SIGNAL ANALYSIS PROGRAM 07/21/75