AMSU-A VERIFICATION TEST REPORT

TEST ITEM:	AMSU- A1 ANTENNA DRIVE SUBSYSTEM PART OF P/N: 1331720-2 SERIAL NUMBER : 105
LEVEL OF ASSEMBLY:	SUBASSEMBLY AND COMPLETE INSTRUMENT ASSEMBLY
TYPE HARDWARE:	FLIGHT
VERIFICATION: PROCEDURE NO.	AE-26002/1D
TEST DATE:	
SUBSYSTEM:	START DATE: 06 June 1998 FINISH DATE: 15 June 1998

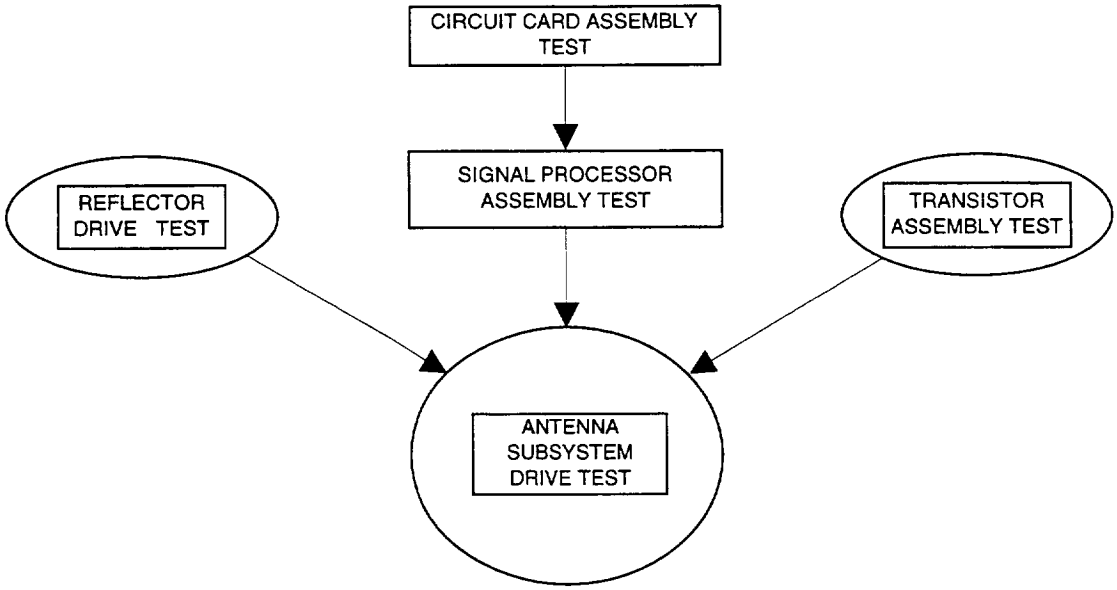
1.0 INTRODUCTION

An antenna drive subsystem test was performed on the METSAT AMSU-A1, S/N 105 instrument. The objective of the test was to demonstrate compliance with applicable paragraphs of AMSU-A specifications S-480-80. Tests were conducted at both the subassembly and instrument level.

2.0 SUMMARY

The antenna drive subsystem of the METSAT AMSU-A1, S/N105, P/N 1331720-2 completed acceptance testing per AES Test Procedure AE-26002/1D. The test included: Scan Motion and Jitter, Pulse Load Bus Peak Current and Rise Time, Resolver Reading and Position Error, Gain/ Phase Margin, and Operational Gain Margin.

The drive motors and electronic circuitry were also tested at the component level. The drive motor test includes: Starting Torque Test, Motor Commutation Test, Resolver Operation/ No-Load Speed Test, and Random Vibration. The electronic circuitry was tested at the Circuit Card Assembly (CCA) level of production; each test exercised all circuit functions. The transistor assembly was tested during the W3 cable assembly (1356424-1) test. Refer to Figure 1 for test flow.



Antenna Subsystem and Subsystem Component Test Flow
Figure 1.

The antenna drive subsystem satisfactorily passed all of the performance requirements. There were no failures in any of the antenna drive components during subsystem testing.

The results of the subsystem and component level testing are discussed in more detail in the following sections:

Reflector Drive Assembly 5.1
Circuit Card Assemblies..... 5.2
Signal Processor 5.3
Transistor Assembly..... 5.4
Antenna Drive Subsystem..... 5.5

3.0 TEST CONFIGURATION

The ***Reflector Drive Assembly Tests*** confirm the operability of the motor under test. The test configuration includes, the motor, motor shaft, bearings, and a supporting housing.

The ***Circuit Card Assembly (CCA) Tests*** confirm the operability of each CCA. Each test includes the CCA under test, electronic test fixtures, and the necessary loads.

A segment of the ***Signal Processor Tests*** ensures the scan drive electronics are functioning properly prior to it's assembly into the instrument. The test configuration includes:

- Timing and Control CCA
- Scan Control Interface CCA
- Mux/ Relay Control CCA
- Interface Converter CCA
- Resolver Data Isolator CCA
- R/D Converter CCA
- Motor Driver CCA
- Test fixture and cabling to interrogate and analyze positional data
- Test motor and inertia wheel

The ***Transistor Assembly Test*** verifies the correct wiring of the transistor assembly and associated cabling. Test configuration includes the CKT 1000 (continuity and Hi-Pot tester), and test fixtures.

The Antenna Drive Subsystem Tests:

- Are configured with the same motor control CCA's used in the signal processor test, interconnecting wiring, the power transistor assembly, and the drive assembly with reflector.
- The antenna drive subsystem components were all installed in the instrument when the subsystem test was performed.
- DC power for the motor control circuit cards was provided by a DC/DC converter simulator P/N: 1359322-1. The simulator operates on 120VAC facility supplied

- ***Reflector Drive Motors (A1-1)*** and (A1-2)- were both observed to have the thermisters wired in reverse order causing the resistance and voltage readings to be 14.6 Kohms and 19.6 Vdc respectively instead of the required 2.66 to 3.24 Kohms and 3.9 to 4.77 Vdc. The terminal boards were repaired and re-tested satisfactorily. The process planning was altered to reduce the risks of recurrence.

All other components designated for use in the METSAT AMSU-A1 instrument (pertaining to the scan drive circuitry) passed on the first time through component testing.

5.1 REFLECTOR DRIVE ASSEMBLIES

The tests performed on this unit are: Starting Torque Test, Motor Commutation Test, Resolver Operation/ No-Load Speed Test, and Random Vibration. The Motor Commutation and Resolver Operation tests are performed both pre and post-vibration.

Starting Torque
The starting torque test is performed on the rotating segment of the drive assembly to verify the torque associated with bearing friction. Reflector drive assemblies (F06 & F07) passed the starting torque test at ambient temperature as well as at the colder plateaus first time through testing.

Motor Commutation Test
This test is performed to determine the commutation characteristics of the motor under test. Both reflector drive assemblies (F06 & F07) passed the motor commutation test both pre- and post-vibration tests without incident.

Resolver Operation/ No-Load Speed Test
This test is performed to verify resolver operation as well as speed characteristics and back electromotive force of the motor. Both reflector drive assemblies (F06 & F07) passed the resolver operation/ no-load speed test both pre- and post-vibration tests without incident.

Random Vibration
Reflector drive assemblies (F06 & F07) passed vibration testing first time through. The motor assembly also passed the pre- and post-vibration electronic tests as well as the post-vibration visual inspection without incident.

5.2 CIRCUIT CARD ASSEMBLIES

Test procedures were prepared for each motor control circuit card; document revision status is controlled by reference in the shop order. The cards were individually tested to the procedures and results were recorded on data sheets found in Appendix A. The following list indexes the CCA Test Data Sheets:

- *Appendix A1 ..... Resolver Data Isolator Assembly (A1-1)*
- *Appendix A2 ..... Resolver Data Isolator Assembly (A1-2)*
- *Appendix A3 ..... Interface Converter Assembly (A1-1)*
- *Appendix A4 ..... Interface Converter Assembly (A1-2)*
- *Appendix A5 ..... Motor Driver Assembly (A1-1)*
- *Appendix A6 ..... Motor Driver Assembly (A1-2)*
- *Appendix A7 .....R/D Converter/ Oscillator Assembly (A1-1)*
- *Appendix A8 .....R/D Converter/ Oscillator Assembly (A1-2)*

All circuit card assemblies passed testing the first time through. The assembly build shop orders contain the part number and accept tag record the of test and select resistors.

5.3 SIGNAL PROCESSOR

For the first time, the entire antenna drive motor electronics is mated together. The test instrumentation commands and interrogates the electronics during this segment of testing. The instrumentation sends position commands to the Interface Converter CCA. The Interface Converter D/A's the command and provides inputs to the Motor Driver CCA. The test motor (instrumentation) responds to the drive signal and feeds back positional data via resolver outputs. The instrumentation then interrogates the Resolver Data Isolator CCA for position data. A comparison is made in the instrumentation between the position command sent and the actual position received. The pass/ fail indication is presented to the operator for test data sheet recording.

The signal processor assembly (F01) failed one segment of the test procedure relating to the A1-2 scan drive. The failure (-15V to +10V power supply short) was attributed to a loose, bare wire found in the backplane. The bare wire was removed and another power distribution check was conducted; no further failures were found. The test procedure for the A1-2 scan drive was re-performed without incident.

5.4 TRANSISTOR ASSEMBLY

All transistor assemblies are tested along with their respective W3 cable. The cable is continuity, then hi-pot tested prior to attaching the transistor circuitry. Each transistor pair is exercised validating the turn on voltage, current drawn, and cable wiring as well. The W3 cable and transistor assembly underwent component testing and passed without incident.

5.5 ANTENNA SUBSYSTEM DRIVE TESTS

The antenna drive motor electronics mates with the instrument microprocessor for the first time during this segment of testing. The microprocessor sends position commands from the memory CCA to the Interface Converter CCA. The Interface Converter D/A's the command and provides inputs to the Motor Driver CCA. The Reflector Drive Motor responds to the drive signals and feeds back positional data via the resolver outputs. The microprocessor then interrogates the Resolver Data Isolator CCA for position data.. The microprocessor in turn communicates with the spacecraft interface.

During other segments of the test, positional data is monitored via a potentiometer attached to the shaft of each reflector drive assembly. This provides scan characteristic information in regard to overshoot, jitter, and beam position transition timing for each motor assembly.

The remaining paragraphs in this section discuss tests that ensures the instrument complies with specific operating parameters. Prior to conducting these tests there is a series of preliminary checks that are run to select component values that customize the operating parameters of each motor. These checks perform the following functions:

- Program "on board" memory with Beam Position Pointing Angles for each reflector drive assembly
- Adjust for peak Motor Current Limits on both A1-1 and A1-2 motor drive circuits
- Observe Preliminary Scan Dynamics on both A1-1 and A1-2 motor drive circuits
- Identify Mechanical Resonant Frequencies of each reflector drive assembly

Beam Position Pointing Angles are calculated from Nadir pointing direction which is determined on the antenna range. The instrument's EPROMs (EPROMs for testing; PROMs for final configuration) are programmed to reflect the position commands. The initial programming may require fine tuning; fine tuning is determined during the remaining segments of the test procedure.

Motor Current Limits were adjusted, via selecting "test and select" resistors, to comply with the specification requirement; less than 1 amp peak current.

Preliminary Scan Dynamics looked good; transition times, overshoot and jitter were all acceptable at the sampled pointing directions (5).

The ***Mechanical Resonant Frequencies*** were identified; notch filters were calculated and installed to compensate for these resonant frequencies.

5.5.1 SCAN MOTION AND JITTER

In this test, the antenna position was measured in a series of five 8-sec full scans. The measurement was made with a 1-turn test potentiometer temporarily affixed to the rear end of the motor shaft. A Dynamic Signal Analyzer (DSA) was connected to the pot wiper to record the antenna position data. Five scans of each A1-1 and A1-2 were captured and stored on the AMSU-A1 Test Data File disc. One representative waveform from each subassembly is presented in Appendix B1 (A1-1) and Appendix B34 (A1-2).

Each 3.33 degrees scene step was expanded and checked for both a 35 msec max step time, and a 165 msec integration period. Expanded waveforms were plotted and are presented in Appendix B2 thru B31 for the A1-1 subassembly and Appendix B35 thru B64 for the A1-2 subassembly. All of the scene steps meet the step response requirement for transition time, overshoot, and jitter.

Slew periods to the cold and warm calibration stations were measured and met requirements. A time of 0.21 sec is allocated for the 35.0 degree slew to cold cal, and 0.40 sec for the 96.67 degree slew to warm cal. Calibration station jitter was less than the $\pm$ 5 % maximum permitted. Expanded waveforms for each subassembly were plotted and are presented in Appendix B32 and B33 (A1-1) and Appendix B65 and B66 (A1-2). The waveforms are also stored on the AMSU-A1 Test Data File disc. The test data sheets are presented in Appendix B67 (A1-1) and B68 (A1-2); as an extension of these data sheets, more detailed data (concerning rise time, overshoot and jitter) is presented on Appendix page B67-E and B68-E.

5.5.2 PULSE LOAD BUS PEAK CURRENT AND RISE TIME

The Pulse Load pulse load bus peak current and the rate of change of current were measured. The peak current must be less than 1A at any beam position along the scan. Peak current along the scan is .996A. The current rate of change while transitioning from one beam position to the next (including the transition to the cold calibration and warm calibration targets) should be greater than 35 microseconds. A random 3.33° step was selected; the transition to the next step was 1.2 ms. The transition to the warm cal position start and stop was significantly longer than the required 35 ms; 1.2 and 5.5 ms respectively.

The peak bus current was measured across the entire scan and met the requirement. The full scan waveform was plotted and is presented in Appendix C1. The waveform is also stored on the AMSU-A1 Test Data File disc. The test data sheet is presented in Appendix C2.

5.5.3 RESOLVER READING AND POSITION ERROR

The 14-bit command position word is stored in the "on-board" memory and is read to the motor drive circuitry under microprocessor program control. The microprocessor also reads the resolver output at each of the thirty scene stations, and at the cold and warm calibration positions. The readings are made at the start of integration (LOOK 1), and halfway into the integration period (LOOK 2). The resolver data is sent to the spacecraft interface for subsequent transmission to the STE.

The purpose of this portion of the test is to demonstrate that the antenna is meeting beam pointing requirements.

If the antenna is out of the pointing tolerance of > ± 10 counts at LOOK 1 or > ± 5 counts at LOOK 2 , the EPROM is reprogrammed to bring the pointing direction to within the prescribe tolerances. A copy of the STE computer print out showing the pointing direction is shown in Figure 2 for the A1-1 subassembly and Figure 3 for the A1-2 subassembly.

		Actual		Difference*	
BP	Command	Look 1	Look2	Look 1	Look2
1	26	27	27	-1	-1
2	178	182	177	-4	1
3	330	337	329	-7	1
4	481	485	481	-4	0
5	633	639	633	-6	0
6	785	792	785	-7	0
7	936	942	936	-6	0
8	1088	1094	1088	-6	0
9	1240	1249	1240	-9	0
10	1391	1398	1391	-7	0
11	1543	1547	1543	-4	0
12	1695	1701	1695	-6	0
13	1846	1851	1845	-5	1
14	1998	2005	1998	-7	0
15	2150	2156	2149	-6	1
16	2301	2306	2300	-5	1

		Actual		Difference*	
BP	Command	Look 1	Look2	Look 1	Look2
17	2453	2459	2452	-6	1
18	2605	2612	2604	-7	1
19	2756	2762	2756	-6	0
20	2908	2913	2908	-5	0
21	3060	3068	3060	-8	0
22	3211	3212	3210	-1	1
23	3363	3369	3362	-6	1
24	3515	3523	3514	-8	1
25	3666	3672	3666	-6	0
26	3818	3824	3817	-6	1
27	3970	3977	3969	-7	1
28	4121	4129	4120	-8	1
29	4273	4277	4273	-4	0
30	4425	4432	4425	-7	0
CC 1	6019	6021	6021	-2	-2
WC	10418	10420	10420	-2	-2

* Difference between Command and Actual

Figure 2. Beam Position Pointing Directions and Error Calculation for A1-1

		Actual		Difference*	
BP	Command	Look 1	Look2	Look 1	Look2
1	16211	16212	16212	-1	-1
2	16363	16368	16362	-5	1
3	131	134	128	-3	3
4	282	288	281	-6	1
5	434	439	433	-5	1
6	586	593	585	-7	1
7	737	743	736	-6	1
8	889	895	888	-6	1
9	1041	1048	1040	-7	1
10	1192	1197	1192	-5	0
11	1344	1350	1343	-6	1
12	1496	1502	1496	-6	0
13	1647	1653	1646	-6	1
14	1799	1804	1799	-5	0
15	1951	1959	1950	-8	1
16	2102	2107	2101	-5	1

		Actual		Difference*	
BP	Command	Look 1	Look2	Look 1	Look2
17	2254	2260	2253	-6	1
18	2406	2412	2405	-6	1
19	2557	2562	2556	-5	1
20	2709	2715	2708	-6	1
21	2861	2867	2860	-6	1
22	3012	3018	3011	-6	1
23	3164	3170	3163	-6	1
24	3316	3324	3315	-8	1
25	3467	3473	3466	-6	1
26	3619	3626	3618	-7	1
27	3771	3778	3771	-7	0
28	3922	3928	3921	-6	1
29	4074	4079	4073	-5	1
30	4226	4229	4222	-3	4
CC 1	5820	5820	5820	0	0
WC	10219	10220	10220	-1	-1

* Difference between Command and Actual

Figure 3. Beam Position Pointing Directions and Error Calculation for A1-2

5.5.4 GAIN/PHASE MARGIN

A gain/phase margin test was performed on the antenna drive subsystem. The test was performed by obtaining a Bode plot of the control loop and measuring the gain at 180° phase differential and the phase margin at the 0db crossover point.

The Dynamic Signal Analyzer (DSA) was used to make the measurement operating in the swept sine mode. Three separate Bode plots were made on the antenna and the gain and phase margins were determined from each plot. The gain margin measured was 13.08 db (average of three) for the A1-1 subsystem and 12.78 db (average of three) for the A1-2 subsystem. The phase margin measured was 64.7° (average of three) for the A1-1 subsystem and 64.1° (average of three) for the A1-2 subsystem. These margins exceed the specification requirements of 9.2 db and 25 degrees and therefore are acceptable. The three Bode waveforms were plotted and are presented in Appendix D1 thru D3 for the A1-1 subsystem and Appendix D4 thru D6 for the A1-2 subsystem. The waveforms are also stored on the AMSU-A1 Test Data File disc. The test data sheets are presented in Appendix D7and D8 for A1-1 and A1-2 respectively.

5.5.5 OPERATIONAL GAIN MARGIN

An operational gain margin test was performed on the instrument three times. This test consists of increasing the gain of the control loop until oscillation occurs. The gain increase and frequency of oscillation are measured. An increase in gain greater than 8 db is required; the frequency of oscillation is an observation.

A 50K pot was connected in series with the R58 feedback resistor on amplifier AR8. The resistance of the test pot was slowly added to the feedback resistor while observing the reflector for oscillations.

The reflector begins to produce an audible sound as gain is increased. The following added resistance values are calculated to have the following gain margins for the A1-1 and A1-2 subsystems:

Resistance (ohms)	Gain
35.93 K	9.0 db
37.34 K	9.2 db
37.39 K	9.2 db

A1-1

Resistance (ohms)	Gain
38.90 K	9.4 db
37.56 K	9.2 db
37.61 K	9.2 db

A1-2

The first mode mechanical resonance of the shaft and reflector is about 161 Hz for the A1-1 subsystem. The power spectrum waveform was plotted and is presented in Appendix E1. The first mode mechanical resonance of the shaft and reflector is about 172 Hz for the A1-2 subsystem. The power spectrum waveform was plotted and is presented in Appendix E2. These waveforms are also stored on the AMSU-A1 Test Data File disc. The test data sheets are presented in Appendix E3 and E4 for the A1-1 and A1-2 subsystems respectively.

6.0 CONCLUSION

Based on the test results, it can be concluded that the METSAT AMSU-A1 S/N 105 antenna drive subsystem meets the AMSU-A specification requirements.

7.0 TEST DATA

Test data for the METSAT AMSU-A1 S/N 105 obtained in the antenna drive subsystem test is attached. Data sheet number and type of test is shown in the following Appendix Index.

APPENDIX INDEX

Appendix A1 .....*Resolver Data Isolator CCA TDS (A1-1)*

Appendix A2 .....*Resolver Data Isolator CCA TDS (A1-2)*

Appendix A3 ..... *Interface Converter CCA TDS (A1-1)*

Appendix A4 ..... *Interface Converter CCA TDS (A1-2)*

Appendix A5 ..... *Motor Driver CCA TDS (A1-1)*

Appendix A6 ..... *Motor Driver CCA TDS (A1-2)*

Appendix A7 .....*R/D Converter/ Oscillator CCA TDS (A1-1)*

Appendix A8 .....*R/D Converter/ Oscillator CCA TDS (A1-2)*

Appendix B1 .....*Full Scan Step Response (A1-1)*

Appendix B2 thru B31 .....*Single Step Responses (A1-1)*

Appendix B32 .....*Cold Calibration Step Response (A1-1)*

Appendix B33 .....*Warm Calibration Step Response (A1-1)*

Appendix B34 .....*Full Scan Step Response (A1-2)*

Appendix B35 thru B64 .....*Single Step Responses (A1-2)*

Appendix B65 .....*Cold Calibration Step Response (A1-2)*

Appendix B66 .....*Warm Calibration Step Response (A1-2)*

Appendix B67 .....*Scan Motion Jitter Test TDS (A1-1)*

Appendix B68 .....*Scan Motion Jitter Test TDS (A1-2)*

Appendix C1 ..... Peak Pulse Load Bus Current Waveform

Appendix C2 ..... Pulse Load Bus Current TDS

Appendix D1 thru D3 ..... Gain/ Phase Margin Bode Plots (A1-1)

Appendix D4 thru D6 ..... Gain/ Phase Margin Bode Plots (A1-2)

Appendix D7 ..... Gain/ Phase Margin TDS (A1-1)

Appendix D8 ..... Gain/ Phase Margin TDS (A1-2)

Appendix E1 ..... Operational Gain Margin Power Spectrum (A1-1)

Appendix E2 ..... Operational Gain Margin Power Spectrum (A1-2)

Appendix E3 ..... Operational Gain Margin TDS (A1-1)

Appendix E4 ..... Operational Gain Margin TDS (A1-2)

APPENDIX A

TEST DATA SHEETS FOR SCAN DRIVE CIRCUIT CARD ASSEMBLIES

TEST DATA SHEET B-6 (Sheet 1 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Date: 4/14/97
S/N: F-20
1334972-1

6.6.7.1 Supply Voltages

Supply*	Measured Value (V)	Limits (Vdc)	Pass/Fail
+5 V (I)	5.00	± 0.25	P
+5 V (U)	5.03	± 0.25	P

6.6.7.2 Supply Currents

Steps 1 and 2:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	53.13	100 max	P
+5 V (U)	329.00	400 max	P

Steps 3 and 4:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	83.03	150 max	P
+5 V (U)	11.99	30 max	P

* I = Isolated, U = Unisolated

6.6.7.3 Resolver Data

Bit No.	Pass/Fail
API 0 - AP Bit 0	P
API 1 - AP Bit 1	P
API 2 - AP Bit 2	P
API 3 - AP Bit 3	P
API 4 - AP Bit 4	P
API 5 - AP Bit 5	P
API 6 - AP Bit 6	P
API 7 - AP Bit 7	P
API 8 - AP Bit 8	P
API 9 - AP Bit 9	P
API 10 - AP Bit 10	P
API 11 - AP Bit 11	P
API 12 - AP Bit 12	P
API 13 - AP Bit 13	P

6.6.7.4 Converter Busy Pulse

Converter Busy Pulse	Measured Value (µsec)	Limits (µsec)	Pass/Fail
15.0	~~14.9~~ 14.75 PLW 4/16/97	± 3.0	P

A1-a

TEST DATA SHEET B-6 (Sheet 2 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Comments: NONE

Conducted by: Test Engineer — Date 4/14/97

Verified by: Quality Control Inspector (ZA 269) — Date 4/16/97

Approved by: DCMC — Date 4/16/97

A1-b

TEST DATA SHEET B-6 (Sheet 1 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Date: 4/15/97
S/N: F36

6.6.7.1 Supply Voltages

Supply*	Measured Value (V)	Limits (Vdc)	Pass/Fail
+5 V (I)	5.00	± 0.25	P
+5 V (U)	5.01	± 0.25	P

6.6.7.2 Supply Currents

Steps 1 and 2:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	53.54	100 max	P
+5 V (U)	326.00	400 max	P

Steps 3 and 4:

Supply*	Measured Value (mA)	Limits (mA)	Pass/Fail
+5 V (I)	83.39	150 max	P
+5 V (U)	11.06	30 max	P

* I = Isolated, U = Unisolated

6.6.7.3 Resolver Data

Bit No.	Pass/Fail
API 0 - AP Bit 0	P
API 1 - AP Bit 1	P
API 2 - AP Bit 2	P
API 3 - AP Bit 3	P
API 4 - AP Bit 4	P
API 5 - AP Bit 5	P
API 6 - AP Bit 6	P
API 7 - AP Bit 7	P
API 8 - AP Bit 8	P
API 9 - AP Bit 9	P
API 10 - AP Bit 10	P
API 11 - AP Bit 11	P
API 12 - AP Bit 12	P
API 13 - AP Bit 13	P

6.6.7.4 Converter Busy Pulse

Converter Busy Pulse	Measured Value (µsec)	Limits (µsec)	Pass/Fail
15.0	14.15	± 3.0	P

A2-a

TEST DATA SHEET B-6 (Sheet 2 of 2)

RESOLVER DATA ISOLATOR CCA (P/N 1334972) (Paragraph 6.6.7)

Comments: NONE

Conducted by: Dennis Lien — Test Engineer — Date 4/14/97

Verified by: Judy Hervey — Quality Control Inspector — Date 4-14-97

Approved by: [signature] — DCMC — Date 4/14/97

A2-b

TEST DATA SHEET B-13 (Sheet 1 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

Date: 8/12/97
CCA S/N: F28
1331697-1

6.13.7.1 Supply Voltages

Supply	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
+5V (U)	5.02	+5V± 0.05	P
+15V (I)	15.01	+15V± 0.15	P
-15V (I)	-14.97	-15V± 0.15	P
+5V (I)	5.02	+5V± 0.05	P

6.13.7.2 Supply Currents

Step 1 (CP and API Low):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	86.61	70 - 110	P
+5V (I)	3.41	1.5 - 5.5	P
+15V (I)	18.33	15 - 23	P
-15V (I)	21.10	18 - 26	P

Step 2 (CP and API High):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	56.67	40 - 70	P
+5V (I)	23.98	18 - 30	P
+15V (I)	18.34	15 - 23	P
-15V (I)	21.09	18 - 26	P

6.13.7.3 Amplifier Offsets

Amplifier	Measured Value (mV)	Limits (mV)	Pass/Fail
AR1	+0.13	0.0 ±0.15	P
AR2	+0.50	0.0 ±2.0	P

A3-a

TEST DATA SHEET B-13 (Sheet 2 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.4 Subtraction and D-A Conversion

wmHummel 9-10-97

± 0.00015
± 0.00060
± 0.00030

Step 1:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	0.00013	P
00000000000001	00000000000000	-0.00061	-0.000373	P
00000000000010	00000000000000	-0.00122	-0.001005	P
00000000000011	00000000000000	-0.00184	-0.001650	P
00000000000100	00000000000000	-0.00245	-0.002286	P
00000000001000	00000000000000	-0.00490 *	-0.004830	P
00000000010000	00000000000000	-0.00979 *	-0.009916	P
00000000100000	00000000000000	-0.01958 *	-0.020083	P
00000001000000	00000000000000	-0.03917 *	-0.040416	P
00000010000000	00000000000000	-0.07834 *	-0.081095	P
00000100000000	00000000000000	-0.15667 *	-0.16244	P
00001000000000	00000000000000	-0.31334 *	-0.32512	P
00010000000000	00000000000000	-0.62669 *	-0.65057	P
00100000000000	00000000000000	-1.25338 *	-1.3015	P
01000000000000	00000000000000	-2.50675 *	-2.6032	P
10000000000000	00000000000000	-5.01350 *	-5.2065	P

* Tolerance on output voltage is ± 10%

wmHummel 9-10-97

± 0.00015
± 0.00060
± 0.00030

Step 2:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	0.000122	P
00000000000000	00000000000001	0.00061	0.000746	P
00000000000000	00000000000010	0.00122	0.001388	P
00000000000000	00000000000011	0.00184	0.002012	P
00000000000000	00000000000100	0.00245	0.002656	P
00000000000000	00000000001000	0.00490 *	0.005200	P
00000000000000	00000000010000	0.00979 *	0.010319	P
00000000000000	00000000100000	0.01958 *	0.020482	P
00000000000000	00000001000000	0.03917 *	0.040823	P
00000000000000	00000010000000	0.07834 *	0.081504	P
00000000000000	00000100000000	0.15667 *	0.16287	P
00000000000000	00001000000000	0.31334 *	0.32563	P
00000000000000	00010000000000	0.62669 *	0.65115	P
00000000000000	00100000000000	1.25338 *	1.3017	P
00000000000000	01000000000000	2.50675 *	2.6033	P
00000000000000	10000000000000	-5.01350 *	-5.2065	P

* Tolerance on output voltage is ± 10%

A3-b

TEST DATA SHEET B-13 (Sheet 3 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.5 Strobe Function

Step 1: Strobe Low

	Pass/Fail
No E11 Change with Input CP Changes	P

Step 2: Strobe High

	Pass/Fail
E11 Change with Input CP Changes	P

6.13.7.6 Amplifier Gain

	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
E11	0.32563	-	P
E10	3.5768	-	P
E10 Voltage / E11 Voltage	11.0	10.7 - 11.3	P

6.13.7.7 Ground Isolation

	Measured Value (MΩ)	Limits (MΩ)	Pass/Fail
Pin 91 to Pin 7 DC Resistance	larger than 200 MΩ	>20	P

Comments: NONE

Conducted by: Dennis Lewis — Test Engineer — 8/12/97 Date

Verified by: [signature] 7A 190 — Quality Control Inspector — OCT 10 '97 Date

Approved by: [signature] — DCMC — 10/14/97 Date

A3-c

TEST DATA SHEET B-13 (Sheet 1 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

Date: 8/13/97
CCA S/N: F29
1331697-1

6.13.7.1 Supply Voltages

Supply	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
+5V (U)	5.01	+5V± 0.05	P
+15V (I)	15.01	+15V± 0.15	P
-15V (I)	-14.97	-15V± 0.15	P
+5V (I)	5.02	+5V± 0.05	P

6.13.7.2 Supply Currents

Step 1 (CP and API Low):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	86.52	70 - 110	P
+5V (I)	3.40	1.5 - 5.5	P
+15V (I)	17.63	15 - 23	P
-15V (I)	20.29	18 - 26	P

Step 2 (CP and API High):

Supply	Measured Value (mA)	Limits (mA)	Pass/Fail
+5V (U)	56.54	40 - 70	P
+5V (I)	23.97	18 - 30	P
+15V (I)	17.63	15 - 23	P
-15V (I)	20.29	18 - 26	P

6.13.7.3 Amplifier Offsets

Amplifier	Measured Value (mV)	Limits (mV)	Pass/Fail
AR1	0.147	0.0 ±0.15	P
AR2	0.800	0.0 ±2.0	P

TEST DATA SHEET B-13 (Sheet 2 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.4 Subtraction and D-A Conversion

wmHummel 9-10-97

± 0.00015
± 0.00060
± 0.00030

Step 1:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	0.00014	P
00000000000001	00000000000000	-0.00061	-0.000500	P
00000000000010	00000000000000	-0.00122	-0.001134	P
00000000000011	00000000000000	-0.00184	-0.001766	P
00000000000100	00000000000000	-0.00245	-0.002390	P
00000000001000	00000000000000	-0.00490 *	-0.004893	P
00000000010000	00000000000000	-0.00979 *	-0.009890	P
00000000100000	00000000000000	-0.01958 *	-0.019892	P
00000001000000	00000000000000	-0.03917 *	-0.039891	P
00000010000000	00000000000000	-0.07834 *	-0.079881	P
00000100000000	00000000000000	-0.15667 *	-0.15986	P
00001000000000	00000000000000	-0.31334 *	-0.31985	P
00010000000000	00000000000000	-0.62669 *	-0.63990	P
00100000000000	00000000000000	-1.25338 *	-1.2800	P
01000000000000	00000000000000	-2.50675 *	-2.5602	P
10000000000000	00000000000000	-5.01350 *	-5.1208	P

* Tolerance on output voltage is ± 10%

wmHummel 9-10-97

± 0.00015
± 0.00060
± 0.00030

Step 2:

Actual Position (API) MSB LSB	Command Position (CP) MSB LSB	AR1 Output* Voltage Required (Vdc)	Test Result (Vdc)	Pass/Fail
00000000000000	00000000000000	0.00000	0.000146	P
00000000000000	00000000000001	0.00061	0.000755	P
00000000000000	00000000000010	0.00122	0.001386	P
00000000000000	00000000000011	0.00184	0.001998	P
00000000000000	00000000000100	0.00245	0.002632	P
00000000000000	00000000001000	0.00490 *	0.005133	P
00000000000000	00000000010000	0.00979 *	0.010160	P
00000000000000	00000000100000	0.01958 *	0.020162	P
00000000000000	00000001000000	0.03917 *	0.040150	P
00000000000000	00000010000000	0.07834 *	0.080151	P
00000000000000	00000100000000	0.15667 *	0.16020	P
00000000000000	00001000000000	0.31334 *	0.32024	P
00000000000000	00010000000000	0.62669 *	0.64038	P
00000000000000	00100000000000	1.25338 *	1.2803	P
00000000000000	01000000000000	2.50675 *	2.5604	P
00000000000000	10000000000000	-5.01350 *	-5.1208	P

* Tolerance on output voltage is ± 10%

A4-b

TEST DATA SHEET B-13 (Sheet 3 of 3)

INTERFACE/CONVERTER CCA (P/N 1331697) (Paragraph 6.13.7)

6.13.7.5 Strobe Function

Step 1: Strobe Low

	Pass/Fail
No E11 Change with Input CP Changes	P

Step 2: Strobe High

	Pass/Fail
E11 Change with Input CP Changes	P

6.13.7.6 Amplifier Gain

	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
E11	0.32024	-	P
E10	3.5173	-	P
E10 Voltage / E11 Voltage	11.0	10.7 - 11.3	P

6.13.7.7 Ground Isolation

	Measured Value (MΩ)	Limits (MΩ)	Pass/Fail
Pin 91 to Pin 7 DC Resistance	larger than 20M>20		P

Comments: NONE

Conducted by: Daniel Lee — Test Engineer — Date 8/13/97

Verified by: [signature] — Quality Control Inspector — Date OCT 10 '97

7A 190

Approved by: [signature] — DCMC — Date 10/14/97

A4-c

TEST DATA SHEET B-4 (Sheet 1 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

S/N: F08
Date: 8/21/97
1331694-3

6.4.3.2 Input Signal Offset

Step No.	Test Results	Limits
4	1.45mV	0.0 ±1 mVdc
6	1.59mV	0.0 ±1 mVdc
8	1.46mV	0.0 ±1 mVdc

Step No.	Test Resistor	Resistance Measured
13	E7-E8 (R25)	3.4K
	E9-E10 (R52)	5.62K
	E11-E12 (R33)	3.16K
	E13-E14 (R53)	5.62K
	E15-E16 (R42)	3.16K
	E17-E18 (R54)	5.23K

Step No.	Resistors	Selected Trim Resistors
14	R25	RNC55J3401FS
	R52	RNC55J5621FS
	R33	RNC55J3161FS
	R53	RNC55J5621FS
	R42	RNC55J3161FS
	R54	RNC55J5231FS

Step No.	E Point	Test Results	Limits	Pass/Fail
19	E19	0.059mV	0.0 ±1 mVdc	PASS
	E20	-0.042mV	0.0 ±1 mVdc	PASS
	E21	+0.040mV	0.0 ±1 mVdc	PASS

6.4.3.3 Motor Driver Operation

Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
2	5.01V	+5V±0.05Vdc	PASS
	52.78mA	70mAdc max	PASS
	15.01V	+15V±0.15Vdc	PASS
	1.57mA	3.0mAdc max	PASS
	-14.98V	-15V±0.15Vdc	PASS
	18.54mA	25mAdc max	PASS
	28.00V	+28V±0.5Vdc	PASS
	5.66mA	8mAdc max	PASS
3	240mV	400mVdc max	PASS
4	40mA	50mAdc max	PASS
5	48mA	50mAdc max	PASS

AS-a

TEST DATA SHEET B-4 (Sheet 2 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

Counter Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
3	297 mV	400mVdc max	PASS
4	37 mA	50mAdc max	PASS
5	40 mA	50mAdc max	PASS

6.4.3.4 Current Limit Test

Step No.	Test Results	Limits	Pass/Fail
3	450 mA	350-500mAdc	PASS

Comments: NONE

Conducted by: Dennis Lum — Test Engineer — Date 8/21/97

Verified by: Judy Hervey (ZA 269) — Quality Control Inspector — Date 09/03/97

Approved by: David Stone — DCMC — Date 9/3/97

A5-b

TEST DATA SHEET B-4 (Sheet 1 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

S/N: F09
Date: 8/20/97
1331694-3

6.4.3.2 Input Signal Offset

Step No.	Test Results	Limits
4	1.29 mV	0.0 ±1 mVdc
6	1.58 mV	0.0 ±1 mVdc
8	0.89 mV	0.0 ±1 mVdc

Step No.	Test Resistor	Resistance Measured
13	E7-E8 (R25)	3.4k
	E9-E10 (R52)	5.23K
	E11-E12 (R33)	3.16K
	E13-E14 (R53)	5.62K
	E15-E16 (R42)	N/A
	E17-E18 (R54)	N/A

Step No.	Resistors	Selected Trim Resistors
14	R25	RNC55J3401FS
	R52	RNC55J5231FS
	R33	RNC55J3161FS
	R53	RNC55J5621FS
	R42	N/A
	R54	N/A

Step No.	E Point	Test Results	Limits	Pass/Fail
19	E19	+0.093 mV	0.0 ±1 mVdc	PASS
	E20	-0.095 mV	0.0 ±1 mVdc	PASS
	E21	+0.858	0.0 ±1 mVdc	PASS

6.4.3.3 Motor Driver Operation

Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
2	5.01 V	+5V±0.05Vdc	PASS
	52.43 mA	70mAdc max	PASS
	15.01 V	+15V±0.15Vdc	PASS
	1.60 mA	3.0mAdc max	PASS
	-14.97 V	-15V±0.15Vdc	PASS
	18.72 mA	25mAdc max	PASS
	28.00 V	+28V±0.5Vdc	PASS
	5.61 mA	8mAdc max	PASS
3	280 mV	400mVdc max	PASS
4	42 mA	50mAdc max	PASS
5	47 mA	50mAdc max	PASS

A6-a

TEST DATA SHEET B-4 (Sheet 2 of 2)

MOTOR DRIVER 3-HALL SENSOR CCA (P/N 1331694) (Paragraph 6.4.3)

Counter Clockwise Rotation:

Step No.	Test Results	Limits	Pass/Fail
3	281 mV	400mVdc max	PASS
4	37 mA	50mAdc max	PASS
5	40 mA	50mAdc max	PASS

6.4.3.4 Current Limit Test

Step No.	Test Results	Limits	Pass/Fail
3	450 mA	350-500mAdc	PASS

Comments: NONE

Conducted by: Test Engineer — Date 8/20/97

Verified by: Quality Control Inspector (QA 269) — Date 09/03/97

Approved by: DCMC — Date 9/3/97

A6-b

TEST DATA SHEET B-5 (Sheet 1 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

Date 5/14/97
CCA S/N F18
1337739-1

6.5.7.1 UUT Pre-Test

Step 2:

Supply Currents (Without UUT)

Supply (Vdc)	(Baseline) Measured Value (mA) (Without UUT)	Limits (mA)	Pass/Fail
+15	0.06 mA	0-1	P
-15	-0.28 mA	-1 - 0	P
+5	0.06 mA	0-1	P

Supply Voltages (Without UUT)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.02V	± 0.50	P
-15V (I)	-15.01V	± 0.50	P
+5V (I)	5.03V	±0.25	P

Step 6:

Supply Currents (UUT Installed)

Supply (Vdc)	Measured Value (mA) (UUT Installed)	Difference (mA) (Measured - Baseline)	Limits (mA)	Pass/Fail
+15	31.85mA	31.79mA	20-40	P
-15	-41.21mA	-40.93mA	-30 - -50	P
+5	56.45mA	56.39mA	30-70	P

6.5.7.2 Supply Voltages (UUT Installed)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.01V	± 0.50	P
-15V (I)	-14.96V	± 0.50	P
+5V (I)	5.02V	±0.25	P

6.5.7.3 Oscillator Frequency, Duty Cycle, and Output Voltage

Parameter	Measured Value	Limits	Pass/Fail
Frequency	1596 Hz	1550-1650 Hz	P
Duty Cycle	52 %	45-55 %	P
Output Voltage	8.08 V	7.6-8.4 Vrms	P

TEST DATA SHEET B-5 (Sheet 2 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.4 R-D Converter Operation

Step 1:

Bit Number/ Test Fixture Label	CW Pass/Fail	CCW Pass/Fail
API 0/1	P	P
API 1/2	P	P
API 2/3	P	P
API 3/4	P	P
API 4/5	P	P
API 5/6	P	P
API 6/7	P	P
API 7/8	P	P
API 8/9	P	P
API 9/10	P	P
API 10/11	P	P
API 11/12	P	P
API 12/13	P	P
API 13/14	P	P
Converter Busy	P	P

Step 2: WSHummel 3-4-97 QC 16

~~PES-RS~~ RS (E10)	Measured Value (Vdc)	Calculated Value (Vdc) * CCA -1 Assy	Calculated Value (Vdc) * CCA -2 Assy	Pass/Fail
CW Rotation**	1.62V	+1.79V	N/A	P
CCW Rotation**	-1.86V	-1.79V	N/A	P

* Signal level function of test and calibration gain resistors. Record calculated value and measured value. Measured value shall be within ±10 percent of calculated value. The equation is as follows:

$$V = 0.155\left(\frac{R20}{R17}\right) \pm \frac{23\%}{10}$$

R20 = 59K
R17 = 5.11K
DLMM 5/14/97

6.5.7.5 Amplifier Gain

WSHummel 5-15-97 QC 29

PES-RS	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
PES = +0.300 Vdc	1.12V	1.00 to1.30	P
PES = -0.300 Vdc	1.10V	1.00 to 1.30	P

6.5.7.6 Direction Control Signal

DIR CNTRL	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
CCW Rotation	5.00V	4.5 to 5.5	P
CCW Rotation	0.13V	0.0 to 0.4	P

WSHummel 5-15-97 QC 229

A7-b

TEST DATA SHEET B-5 (Sheet 3 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.7 Notch Filter Frequency Response

Frequency	Measured Value (Hz)	Calculated Value (Hz) * CCA -1 Assy	Calculated Value (Hz) * CCA -2 Assy	Pass/Fail
AR3 Notch	N/A	N/A	N/A	N/A
AR4 Notch	|	|	|	|
AR5 Notch	|	|	|	|

* Notch frequencies shall be within ±3 percent of values determined by test and calibration resistors. Record calculated and measured values.

Comments: NONE

Note

This test shall be performed at the system level during antenna drive subsystem ~~level~~ testing.

QC 16

WM Hummel
3-4-97

Conducted by: Dennis Lum — Test Engineer — 5/14/97 Date

Verified by: Judie Hervey — Quality Control Inspector — 5-15-97 Date

Approved by: Tonya L. Ignowski Clark — DCMC — 5-15-97 Date

A7-c

TEST DATA SHEET B-5 (Sheet 1 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

Date 8/27/97
CCA S/N F19
1337739-1

6.5.7.1 UUT Pre-Test

Step 2:

Supply Currents (Without UUT)

Supply (Vdc)	(Baseline) Measured Value (mA) (Without UUT)	Limits (mA)	Pass/Fail
+15	0.06	0-1	P
-15	-0.28	-1 - 0	P
+5	0.06	0-1	P

Supply Voltages (Without UUT)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.02	± 0.50	P
-15V (I)	-15.01	± 0.50	P
+5V (I)	5.03	±0.25	P

Step 6:

Supply Currents (UUT Installed)

Supply (Vdc)	Measured Value (mA) (UUT Installed)	Difference (mA) (Measured - Baseline)	Limits (mA)	Pass/Fail
+15	27.08	27.02	20-40	P
-15	-36.14	- 35.86	-30 - -50	P
+5	52.12	52.06	30-70	P

6.5.7.2 Supply Voltages (UUT Installed)

Supply	Measured Value (V)	Limits (V)	Pass/Fail
+15V (I)	15.01	± 0.50	P
-15V (I)	-14.97	± 0.50	P
+5V (I)	5.02	±0.25	P

6.5.7.3 Oscillator Frequency, Duty Cycle, and Output Voltage

Parameter	Measured Value	Limits	Pass/Fail
Frequency	1603 Hz	1550-1650 Hz	P
Duty Cycle	51.5%	45-55 %	P
Output Voltage	7.94 V	7.6-8.4 Vrms	P

A8-a

TEST DATA SHEET B-5 (Sheet 2 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.4 R-D Converter Operation

Step 1:

Bit Number/ Test Fixture Label	CW Pass/Fail	CCW Pass/Fail
API 0/1	P	P
API 1/2	P	P
API 2/3	P	P
API 3/4	P	P
API 4/5	P	P
API 5/6	P	P
API 6/7	P	P
API 7/8	P	P
API 8/9	P	P
API 9/10	P	P
API 10/11	P	P
API 11/12	P	P
API 12/13	P	P
API 13/14	P	P
Converter Busy	P	P

Step 2:

RS (E10)	Measured Value (Vdc)	Calculated Value (Vdc) * CCA -1 Assy	Calculated Value (Vdc) * CCA -2 Assy	Pass/Fail
CW Rotation**	1.554	(+) 1.790	(+) N/A	P
CCW Rotation**	-1.649	(-) 1.790	(-) N/A	P

* Signal level function of test and calibration gain resistors. Record calculated value and measured value. Measured value shall be within ±~~10~~ 20 percent of calculated value. The equation is as follows:

$$V = \pm 0.155\left(\frac{R20}{R17}\right) \pm \cancel{10}\,20\% = 0.155\left(\frac{59k}{5.11k}\right) = 1.79V$$

8-26-97

8-26-97

6.5.7.5 Amplifier Gain

PES-RS	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
PES = +0.300 Vdc	1.066	1.00 to1.30	P
PES = -0.300 Vdc	1.133	1.00 to 1.30	P

6.5.7.6 Direction Control Signal

DIR CNTRL	Measured Value (Vdc)	Limits (Vdc)	Pass/Fail
CW Rotation	5.000	4.5 to 5.5	P
CCW Rotation	0.116	0.0 to 0.4	P

A8-b

TEST DATA SHEET B-5 (Sheet 3 of 3)

R-D CONVERTER/OSCILLATOR CCA (P/N 1337739) (Paragraph 6.5.7)

6.5.7.7 Notch Filter Frequency Response

Frequency	Measured Value (Hz)	Calculated Value (Hz) * CCA -1 Assy	Calculated Value (Hz) * CCA -2 Assy	Pass/Fail
AR3 Notch	N/A	N/A	N/A	N/A
AR4 Notch				
AR5 Notch				

* Notch frequencies shall be within ±3 percent of values determined by test and calibration resistors. Record calculated and measured values.

Comments: NONG

Conducted by: Dennis Lum — Test Engineer — Date 8/27/97

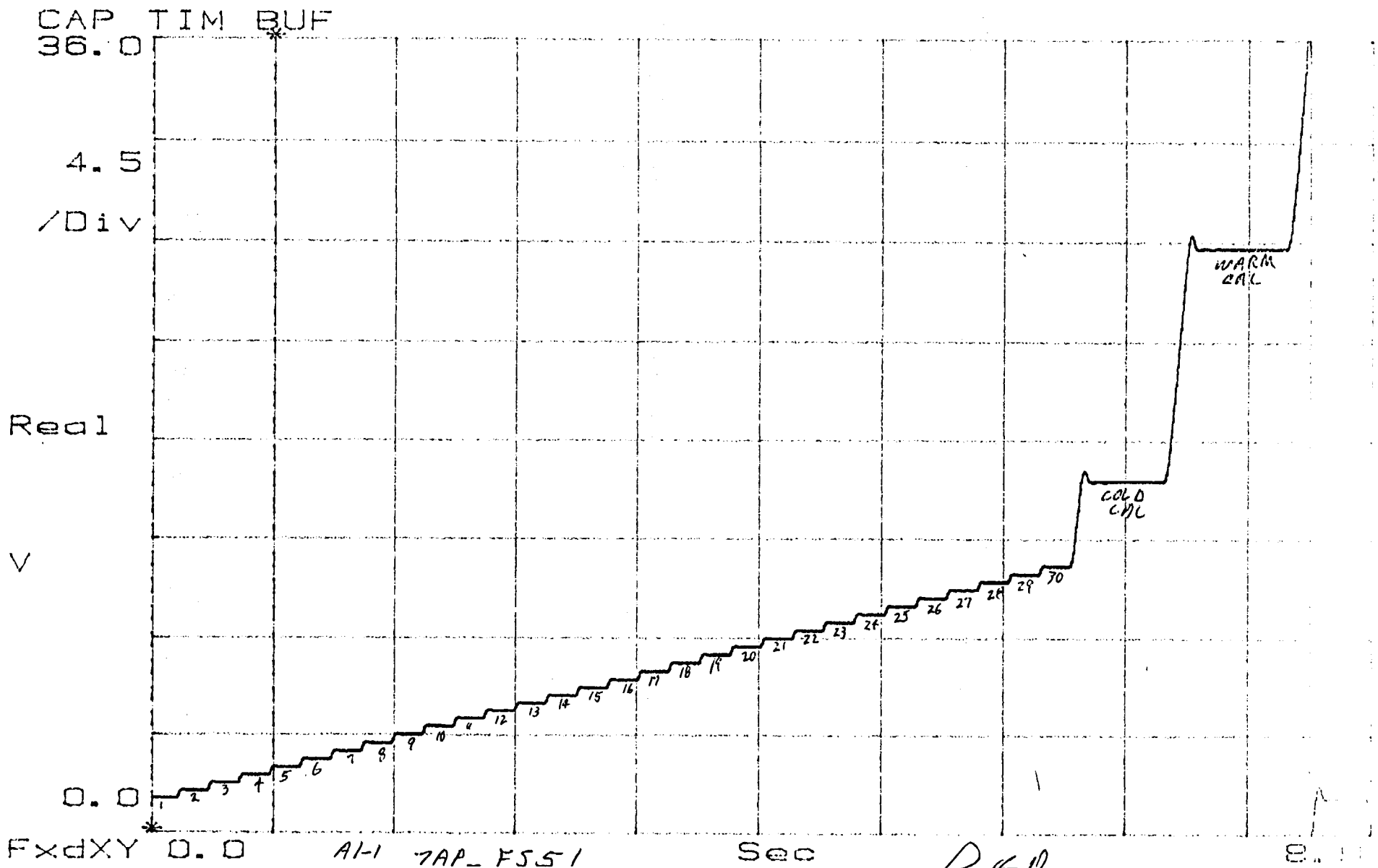
Verified by: Judie Herrera (7A 269) — Quality Control Inspector — Date 09/02/97

Approved by: Richard Hoonks — DCMC — Date 9/2/97

A8-c

APPENDIX B

SCAN MOTION AND JITTER RESPONSE PLOTS



A1-1 7AP_FS51
3.4.4.5

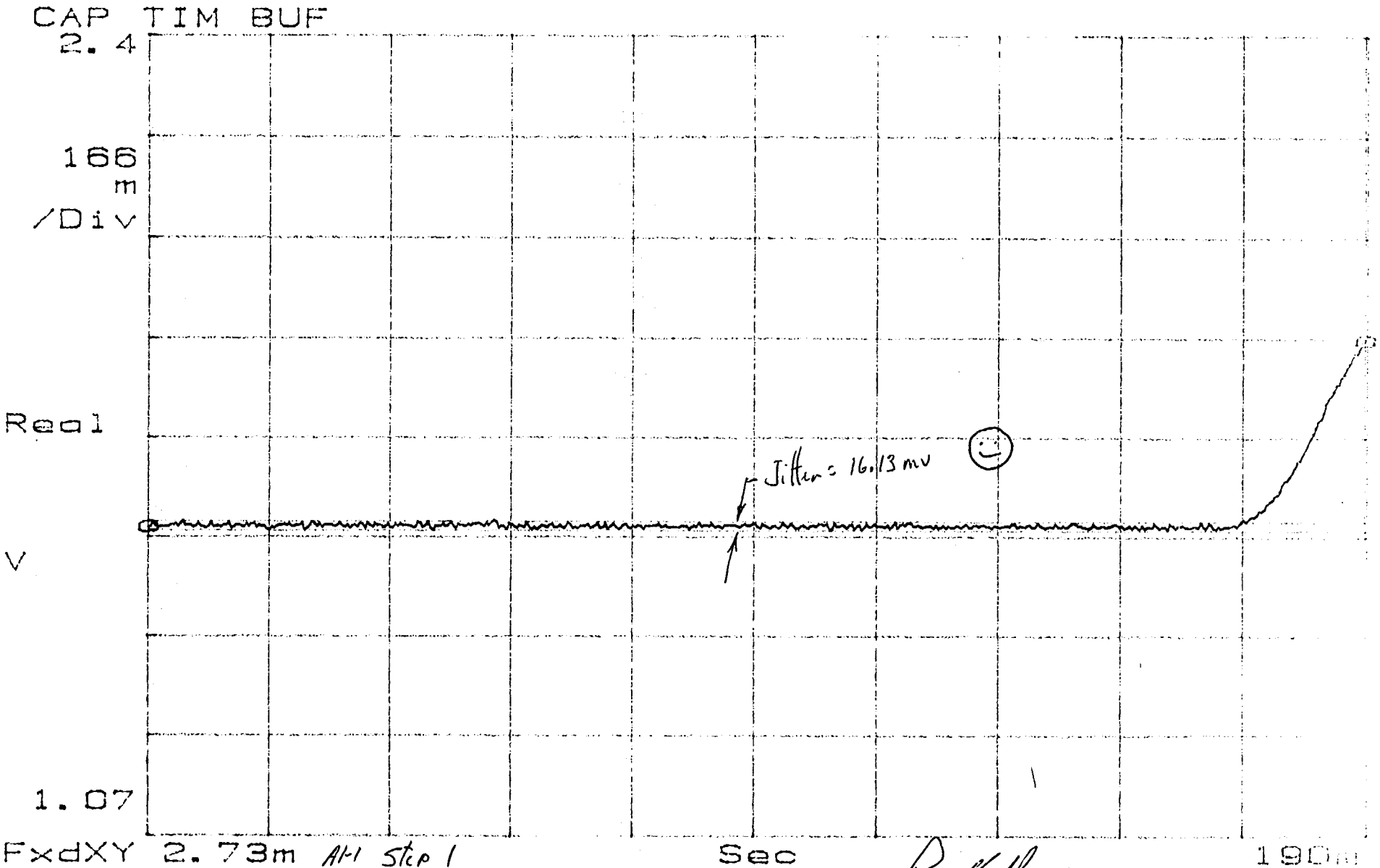
S/O: 436613

P/N: 1331720-2-1T SN: 105

Test Eng: Ray Huffing Date: 6-17-98

Quality: 7A 190 JUN 16 1998

B1



Al-1 Step 1

3445

S/O: 436613

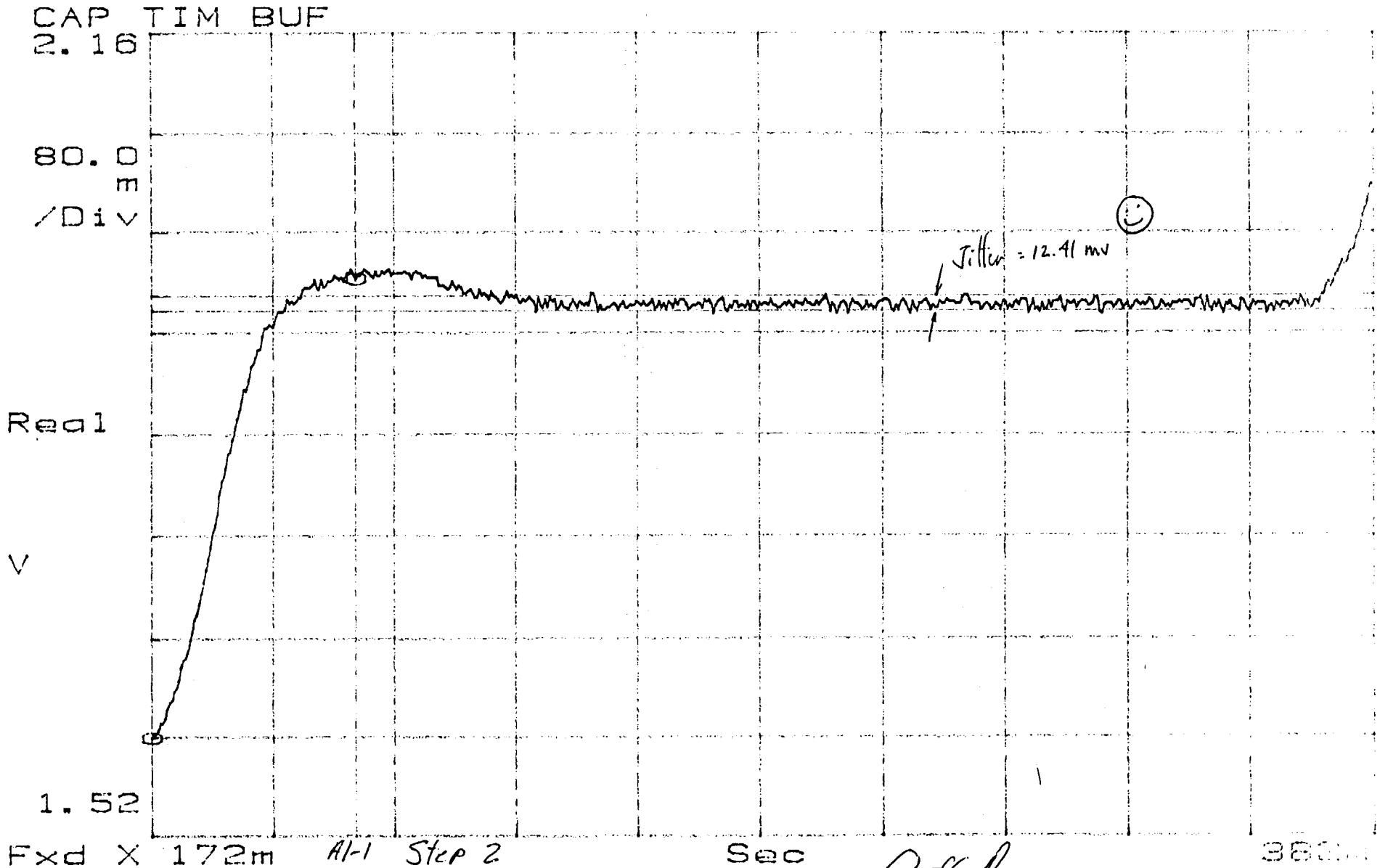
P/N: 1331720-2-1T SN: 105

Test Eng: Ray [signature] Date: 6-12-[illegible]

Quality: JUN 16 1998 (7A 190)

B2

X=172.3mS ΔX=35.16mS Y=1.94938 ΔY=12.41mV
Ya=1.59912 ΔYa=363.3mV



A1-1 Step 2

3.4.4.5

S/O: 436613

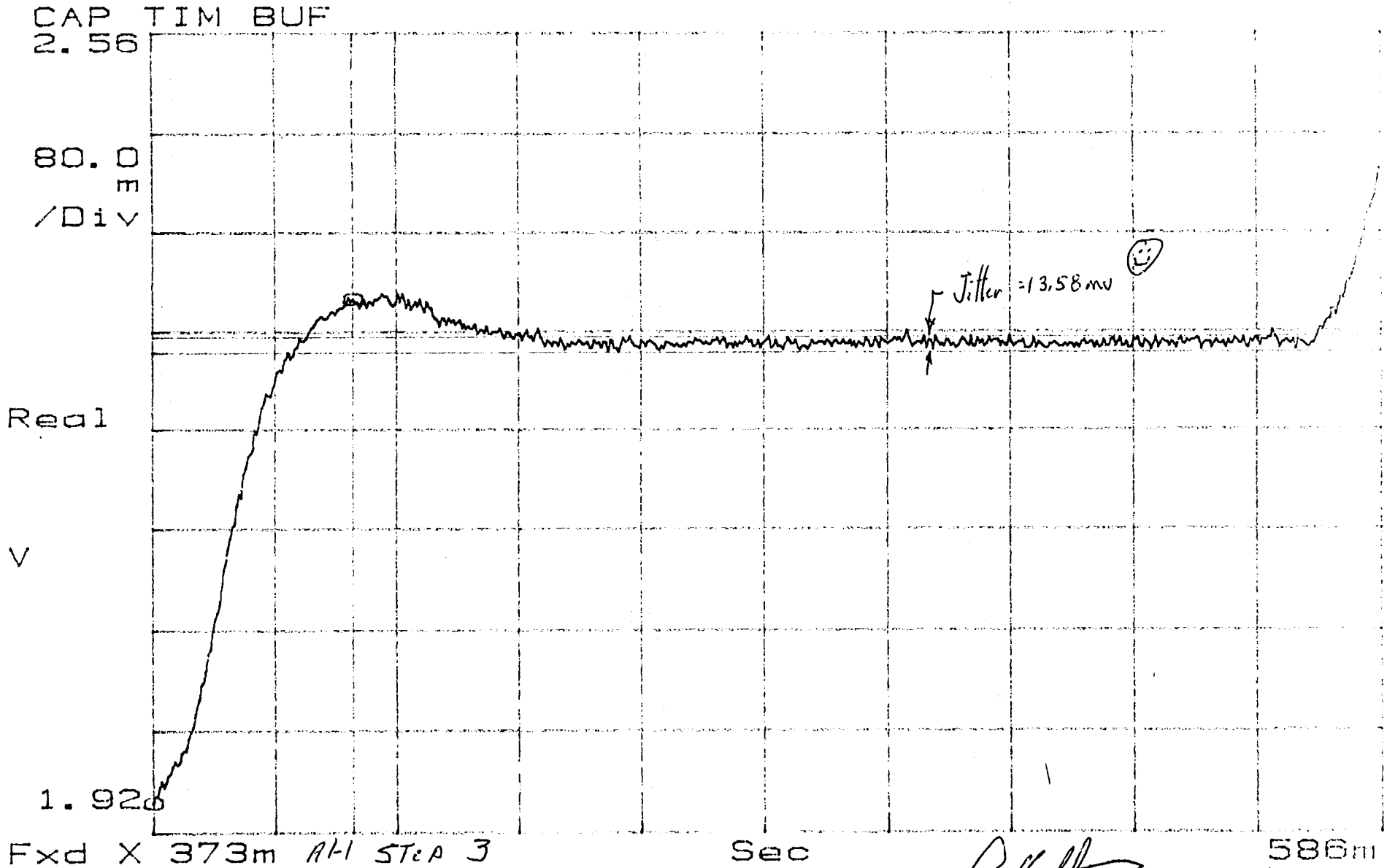
P/N: 1331720-2-1C SN: 105

Test Eng: Ray Hughes Date: 6-12-98

Quality: 7A 190 JUN 16 1998

R3

X=372.7mS ΔX=35.16mS Y=2.31564 ΔY=13.58mV
Ya=1.94295 ΔYa=402.2mV



AH STEP 3

S/O: 436613 3.4.4.5

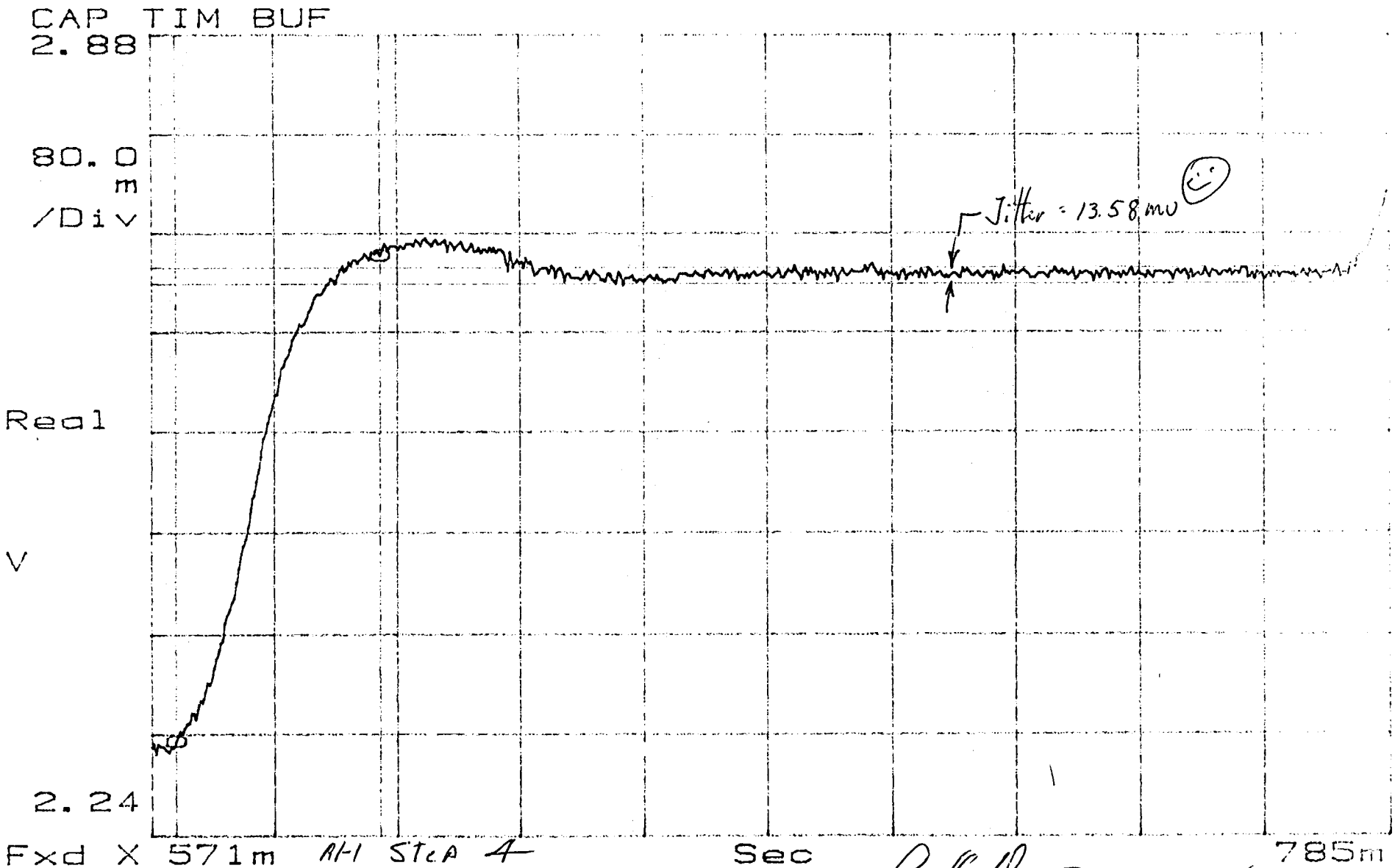
P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hertzberg Date: 6-12-98

Quality: JUN 16 1998 7A 190

R4

X=575.4mS ΔX=35.55mS Y=2.69227 ΔY=13.58mV
Ya=2.31434 ΔYa=387.6mV



AH Step 4
3.4.4.5.

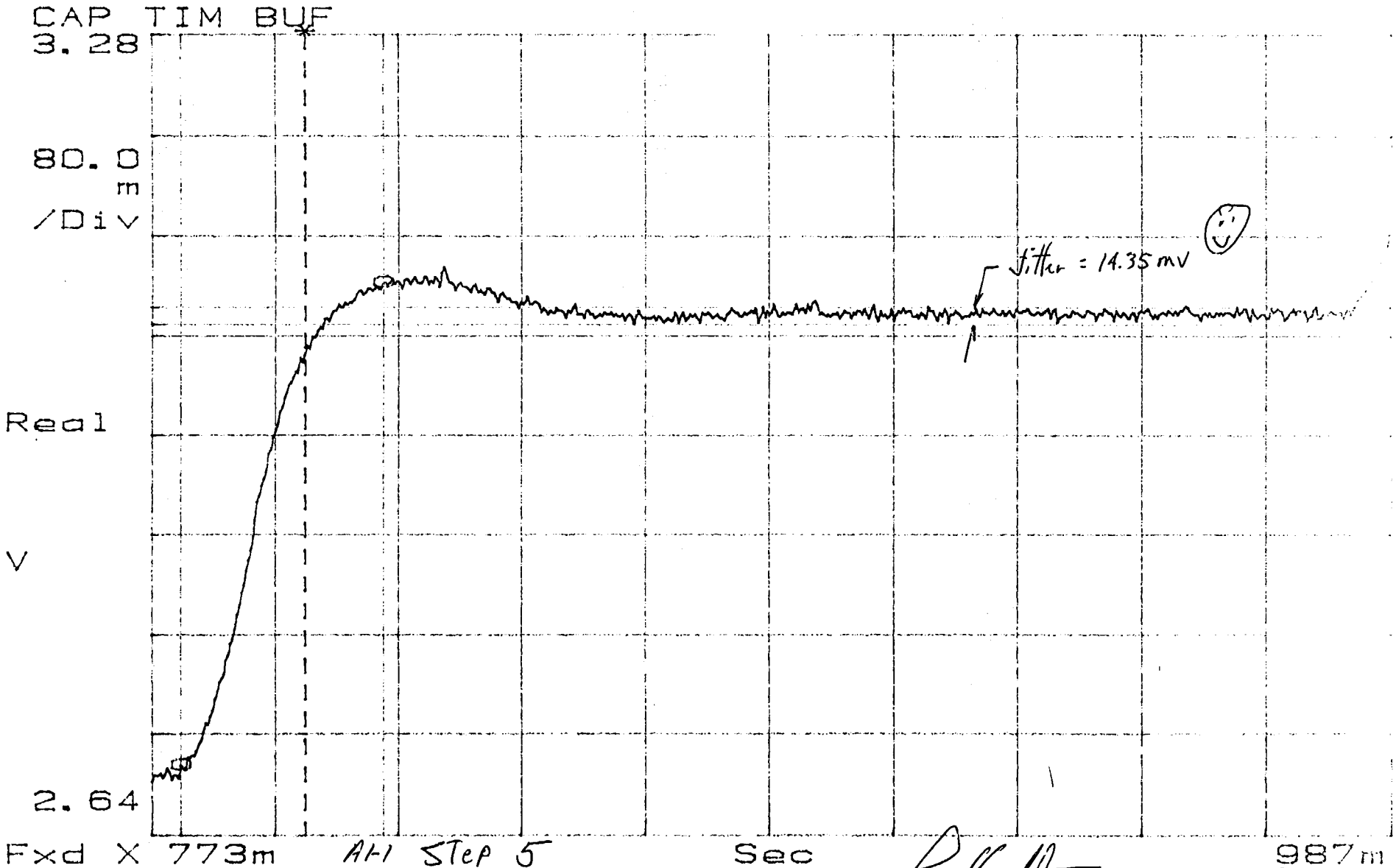
S/O: 436613

P/N: 1331720-2-17 S/N: 105

Test Eng: Ray Burghey Date: 6-12-98

Quality: QA 190 JUN 16 1998

B5



A1-1 Step 5
3.4.4.5.

S/O: 436613

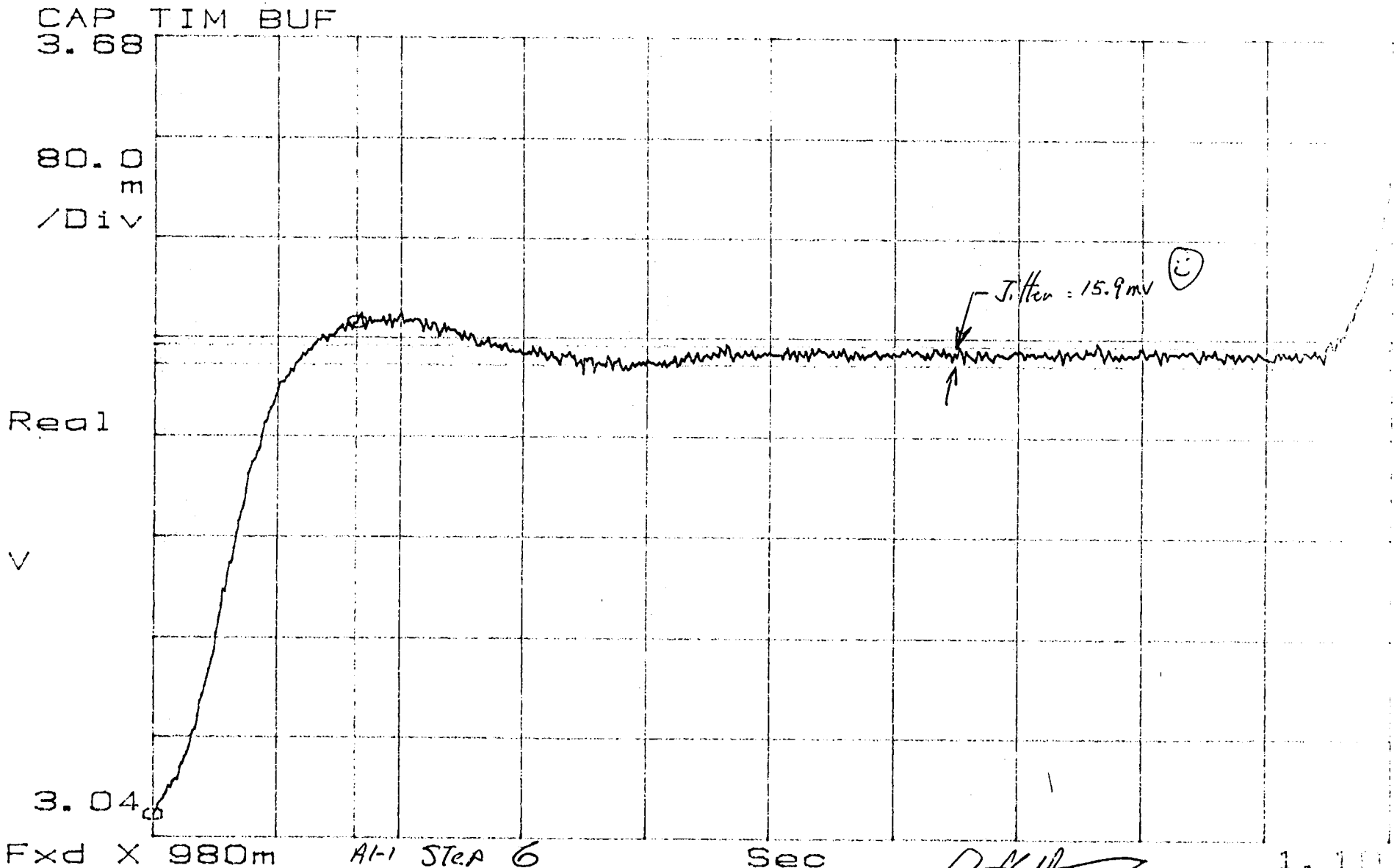
P/N: 1331720-2-1T SN: 105

Test Eng: Ray Kerkberg Date: 6-12-98

Quality: 74 190 JUN 15 1998

B6

X=980.5mS ΔX=35.16mS Y=3.43331 ΔY=15.9mV
Ya=3.05714 ΔYa=394.1mV



Al-1 Step 6
3.4.4.5

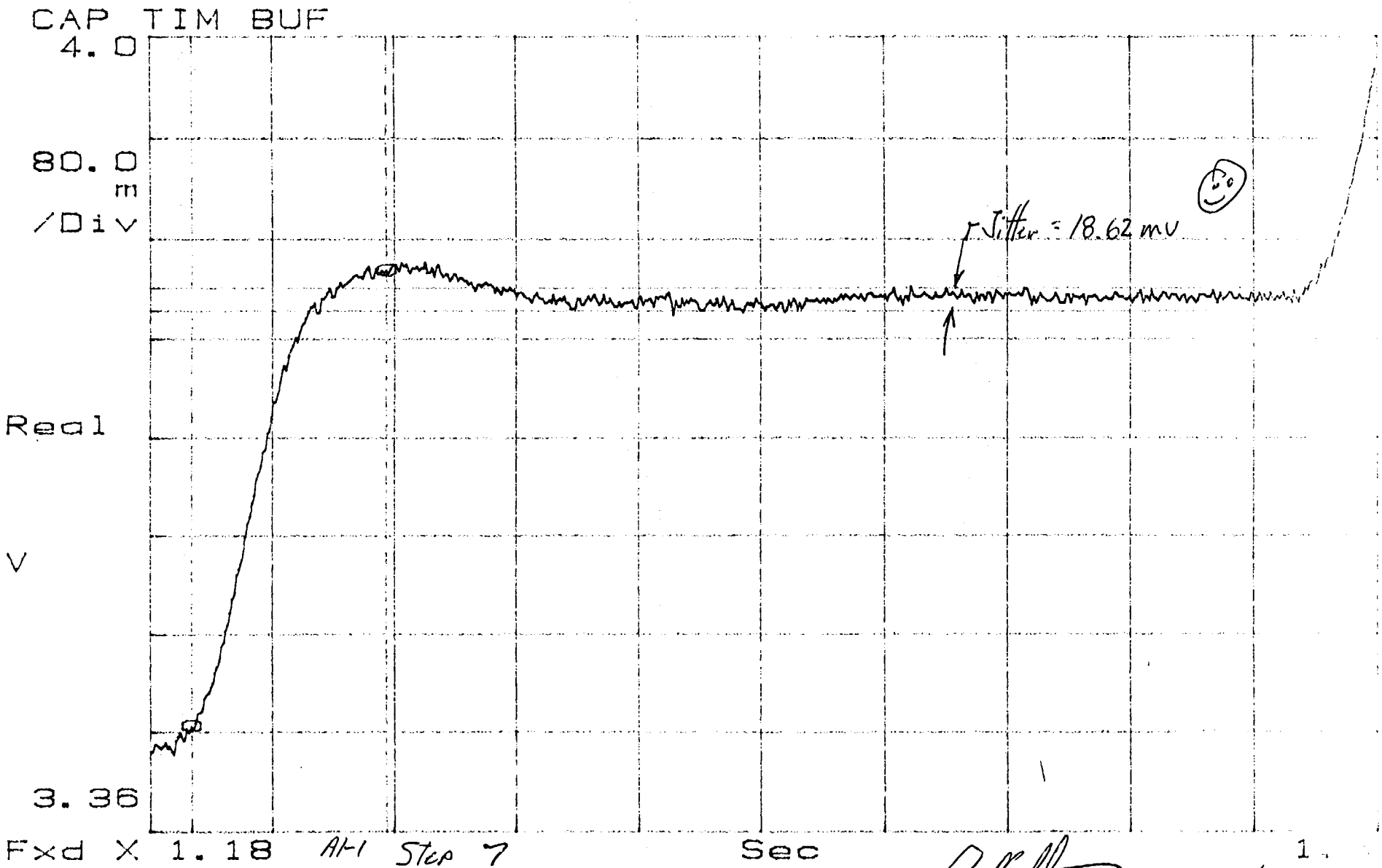
S/O: 436613

P/N: 133172.0-2-LT SN: 105

Test Eng: Date: 6-12-98

Quality: JUN 15 1998

B7

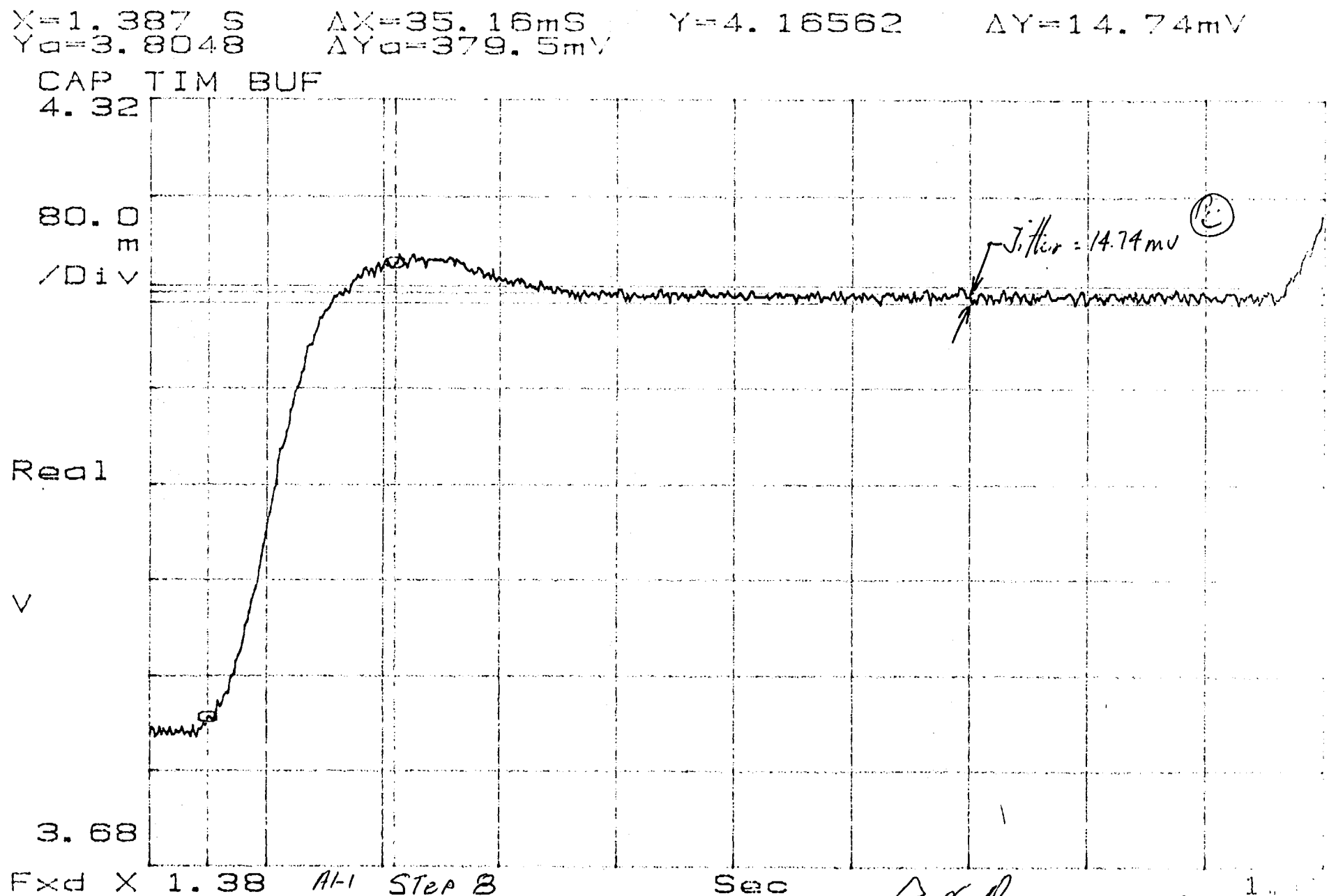


A1-1 Step 7
3.4.4.5

S/O: 436613
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-1[illegible] 98
Quality: 7A 190 JUN 15 1998

B8



A1-1 Step 8
3.4.4.5

S/O: 436613

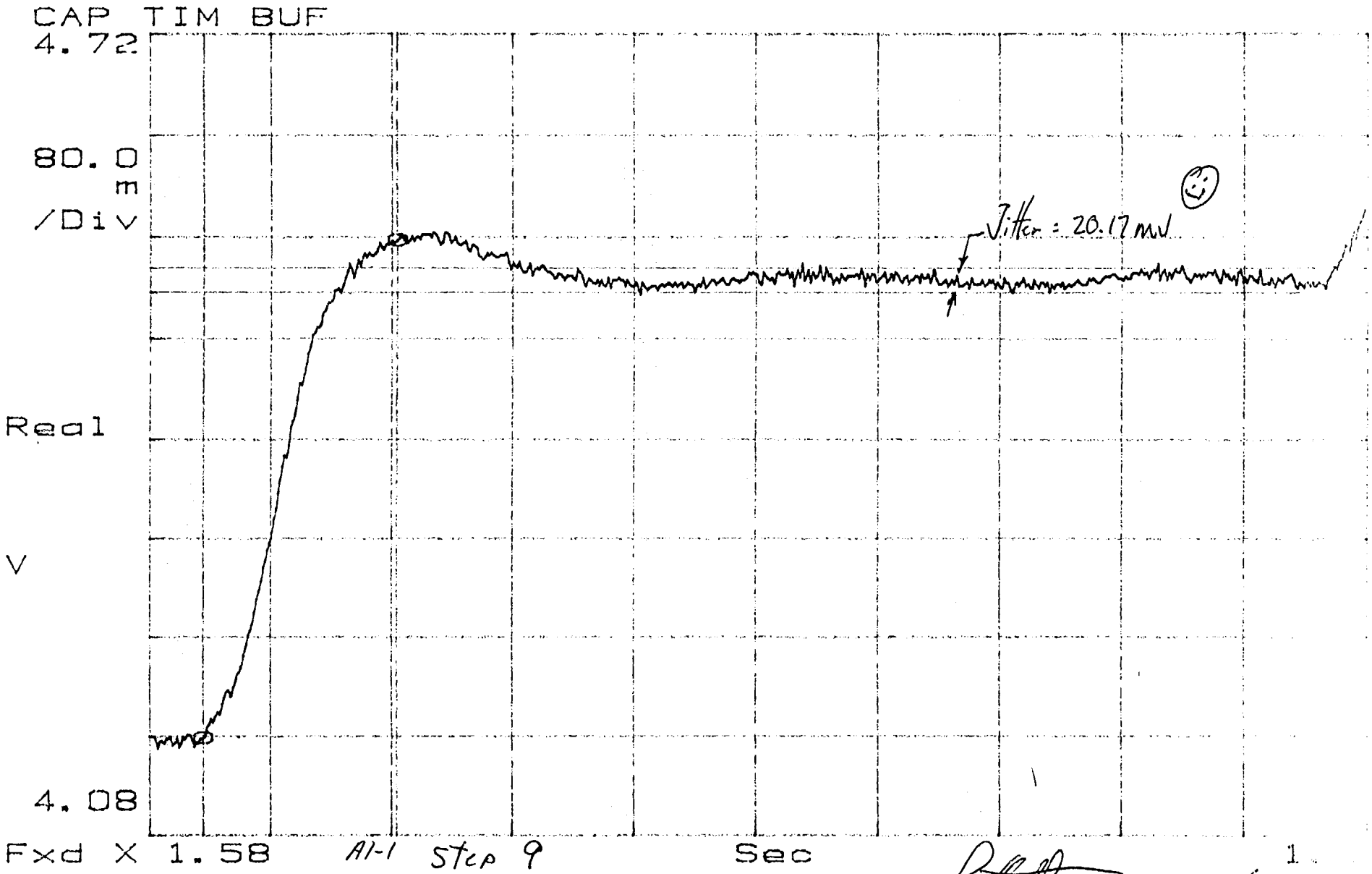
P/N: 1331720-2-1T SN: 105

Test Eng: Raytheon Date: 6-12-

Quality: 7A 190 JUN 15 1998

B9

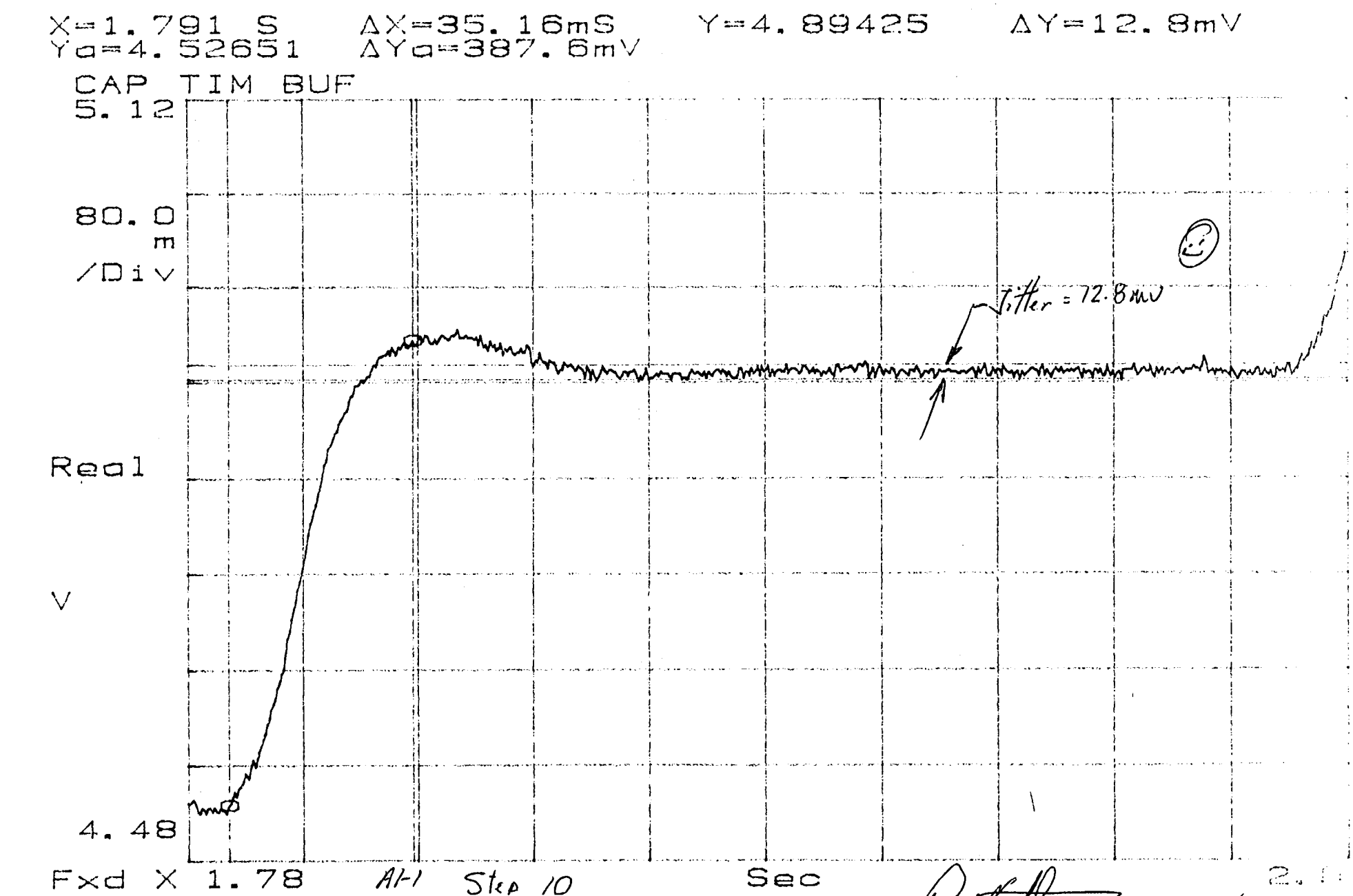
X=1.588 S ΔX=35.16mS Y=4.53614 ΔY=20.17mV
Ya=4.15836 ΔYa=399.0mV



S/O: 436613 3.4.4.5 Test Eng: [signature] Date: 6-12-98

P/N: 1331720-2-IT S/N: 105 Quality: [signature] 7A 190 JUN 15 1998

B10



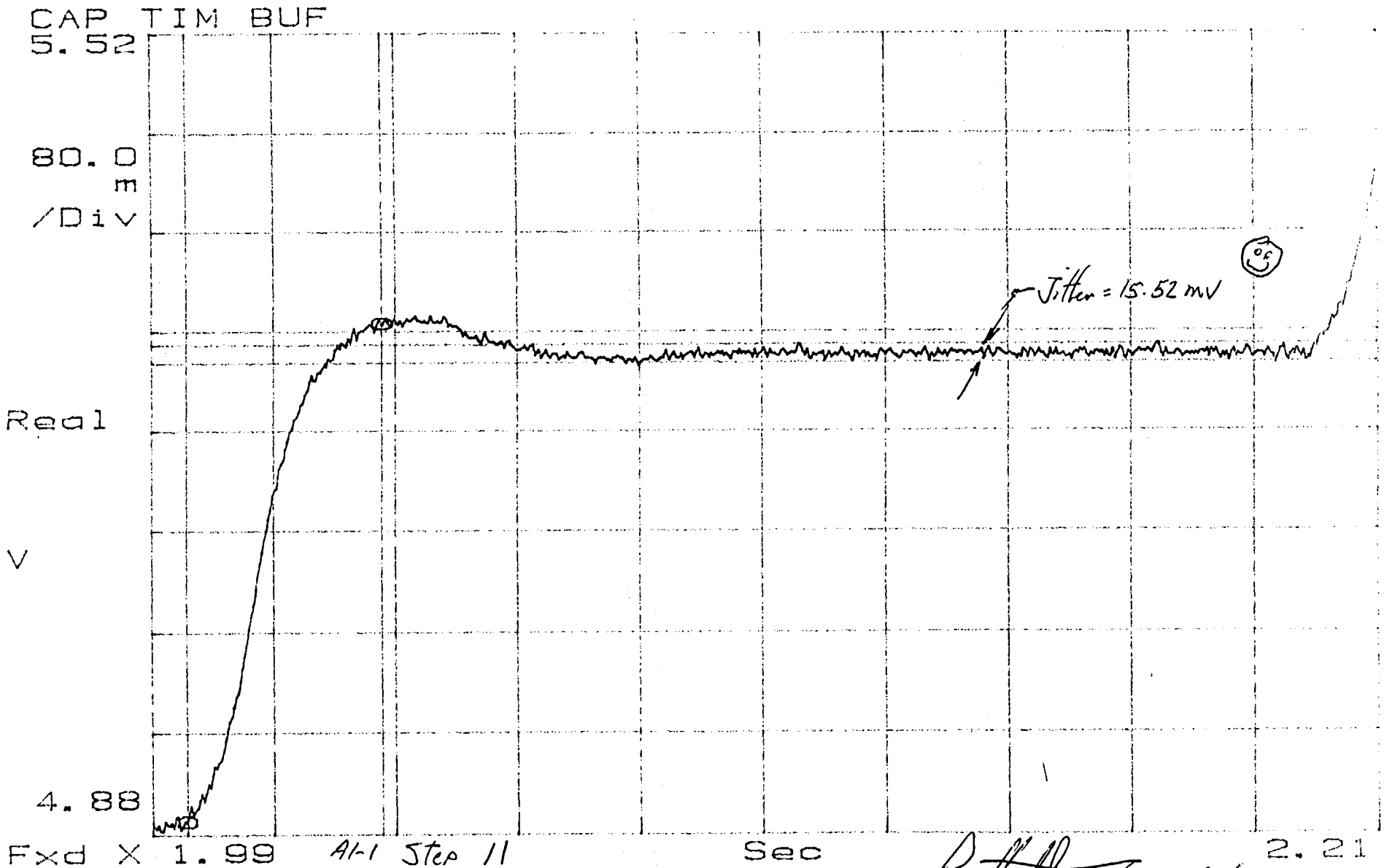
A1-1 Step 10
3.4.4.5

S/O: 436613
P/N: 1331720-2-IT SN: 105

Test Eng: Ray [signature] Date: 6-[illegible]
Quality: 7A 190 JUN 15 1998

B11

X=1.994 S ΔX=35.16mS Y=5.26904 ΔY=15.52mV
Ya=4.8898 ΔYa=395.7mV



A1-1 Step 11

3-4.4.5

S/O: 436613

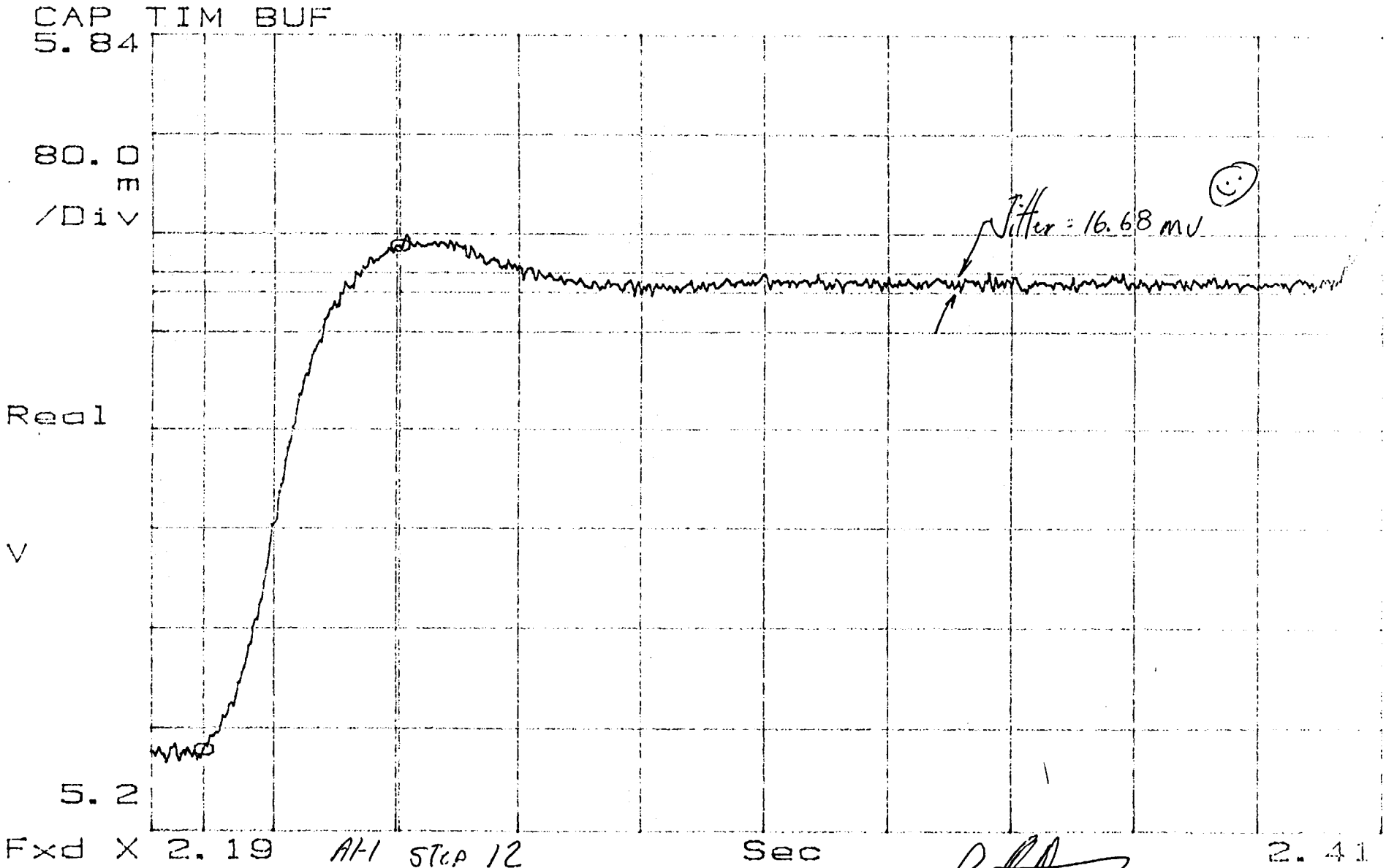
P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hughes Date: 6-12-98

Quality: TA 190 JUN 15 1998

B12

X=2.196 S ΔX=35.16mS Y=5.64839 ΔY=16.68mV
Ya=5.26282 ΔYa=407.1mV



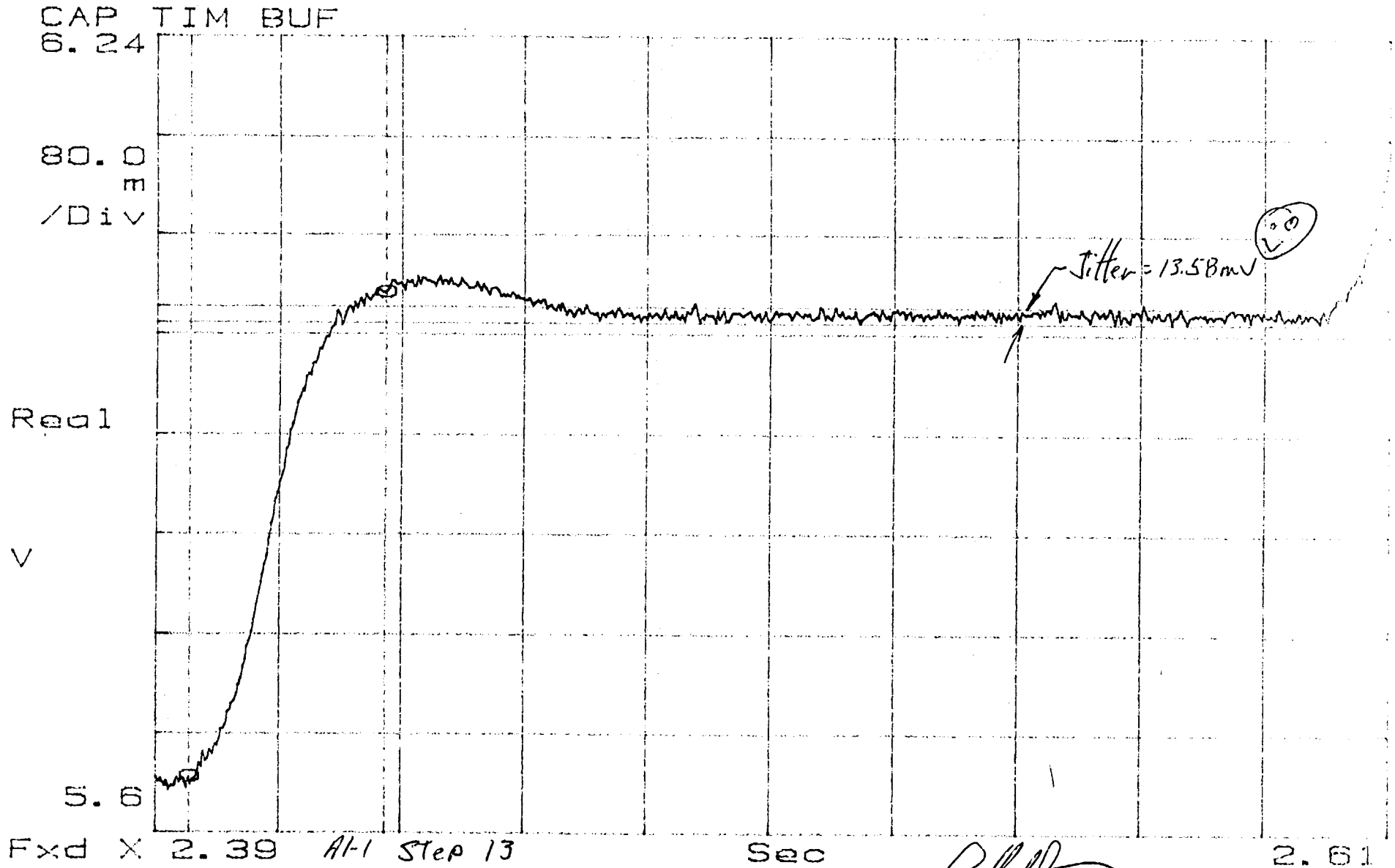
AH-1 Step 12
3.4.1.5

S/O: 436613
P/N: 1331720-2-1T SN: 105

Test Eng: Date: 6-12-98
Quality: 7A 190 JUN 15 1998

B13

X=2.398 S ΔX=35.16mS Y=6.02162 ΔY=13.58mV
Ya=5.64395 ΔYa=389.2mV



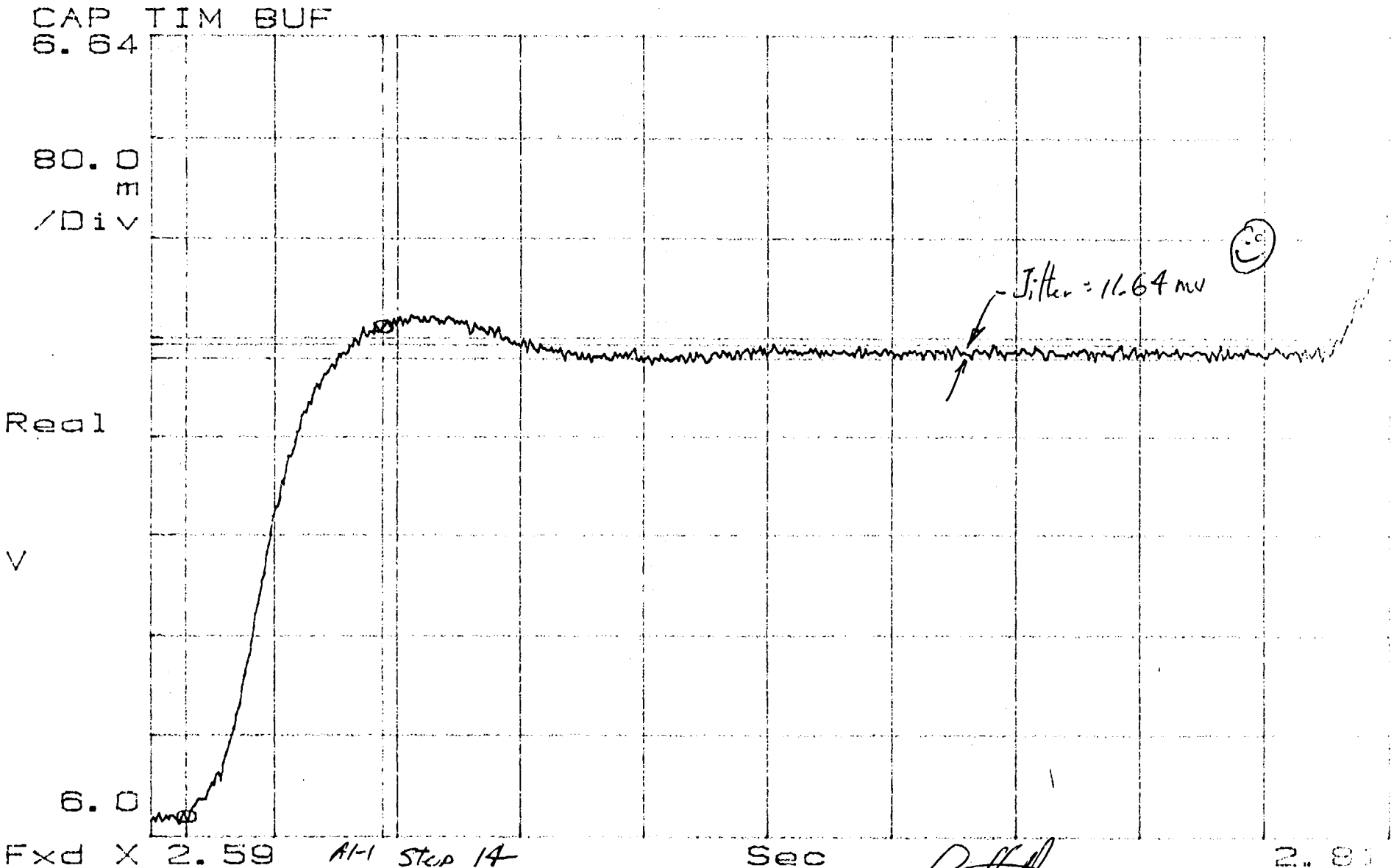
A1-1 Step 13
3.1.4.5

S/O: 436613
P/N: 133720-2-1T SN: 105

Test Eng: [signature] Date: 6-12-98
Quality: [signature] 7A 190 JUN 15 1998

RIL

X=2.6 S ΔX=35.16mS Y=6.39447 ΔY=11.64mV
Ya=6.01535 ΔYa=392.5mV



A1-1 Step 14

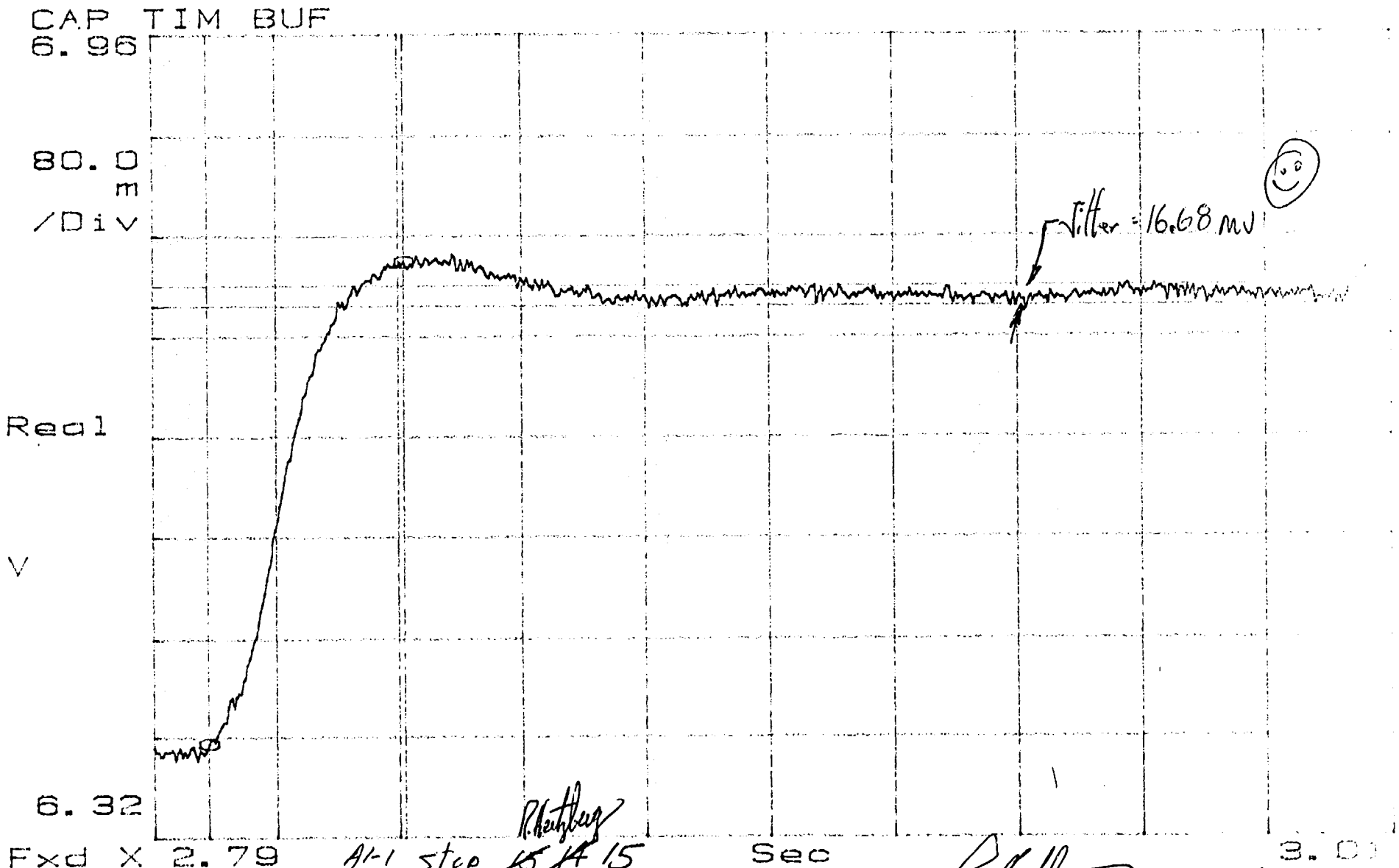
S/O: 436613 3.4.4.5

P/N: 1331720-2-1T SN: 105

Test Eng: Ray Humphrey Date: 6-12-98

Quality: 7A 190 JUN 15 1998

B15



A1-1 step ~~15~~ ~~14~~ 15 R. Heitzberg

3.4.4.5

S/O: 436613

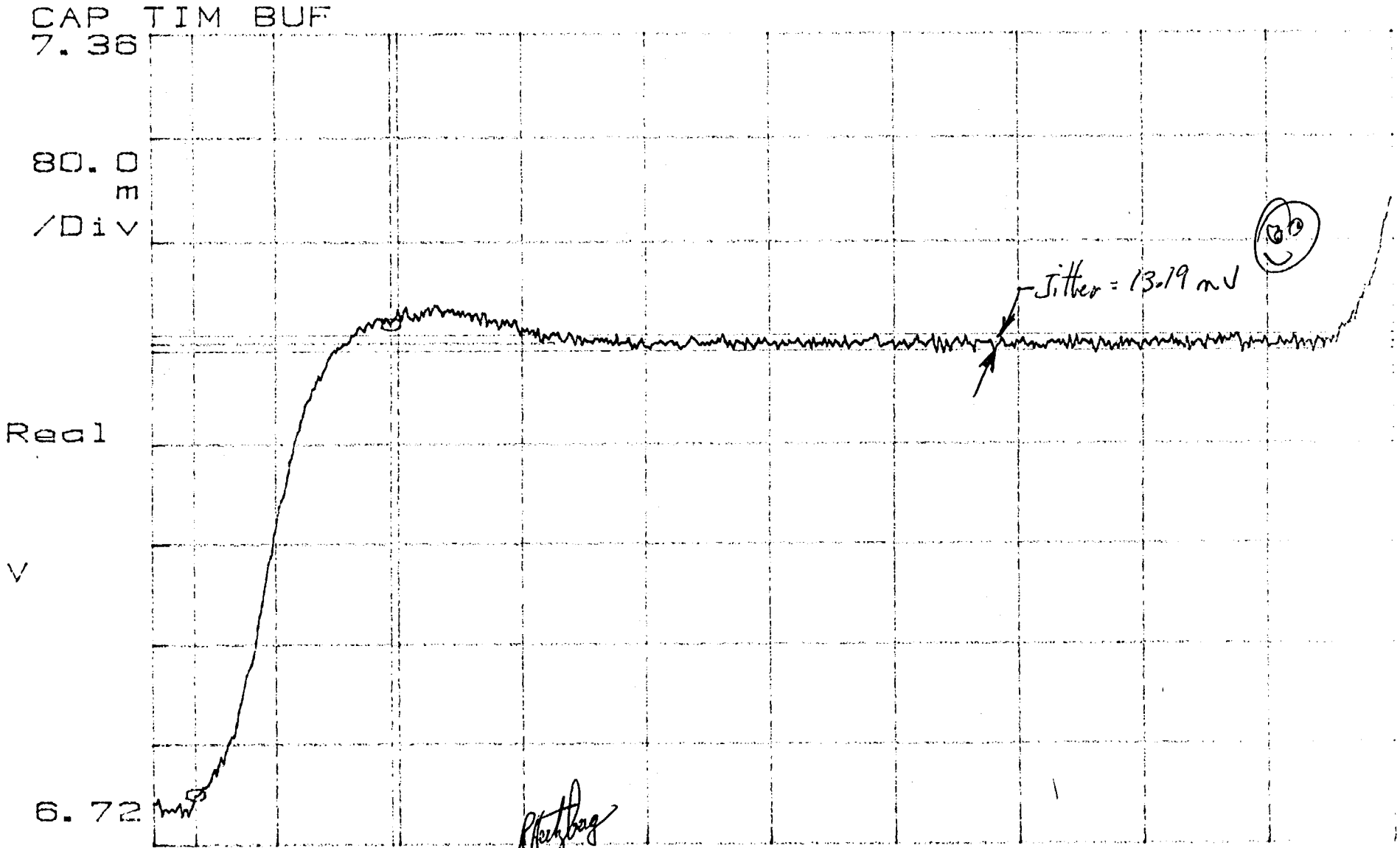
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-12-98

Quality: [signature] 7A 190 JUN 15 1998

B16

X=3.007 S ΔX=35.16mS Y=7.1265 ΔY=13.19mV
Ya=6.75976 ΔYa=374.6mV

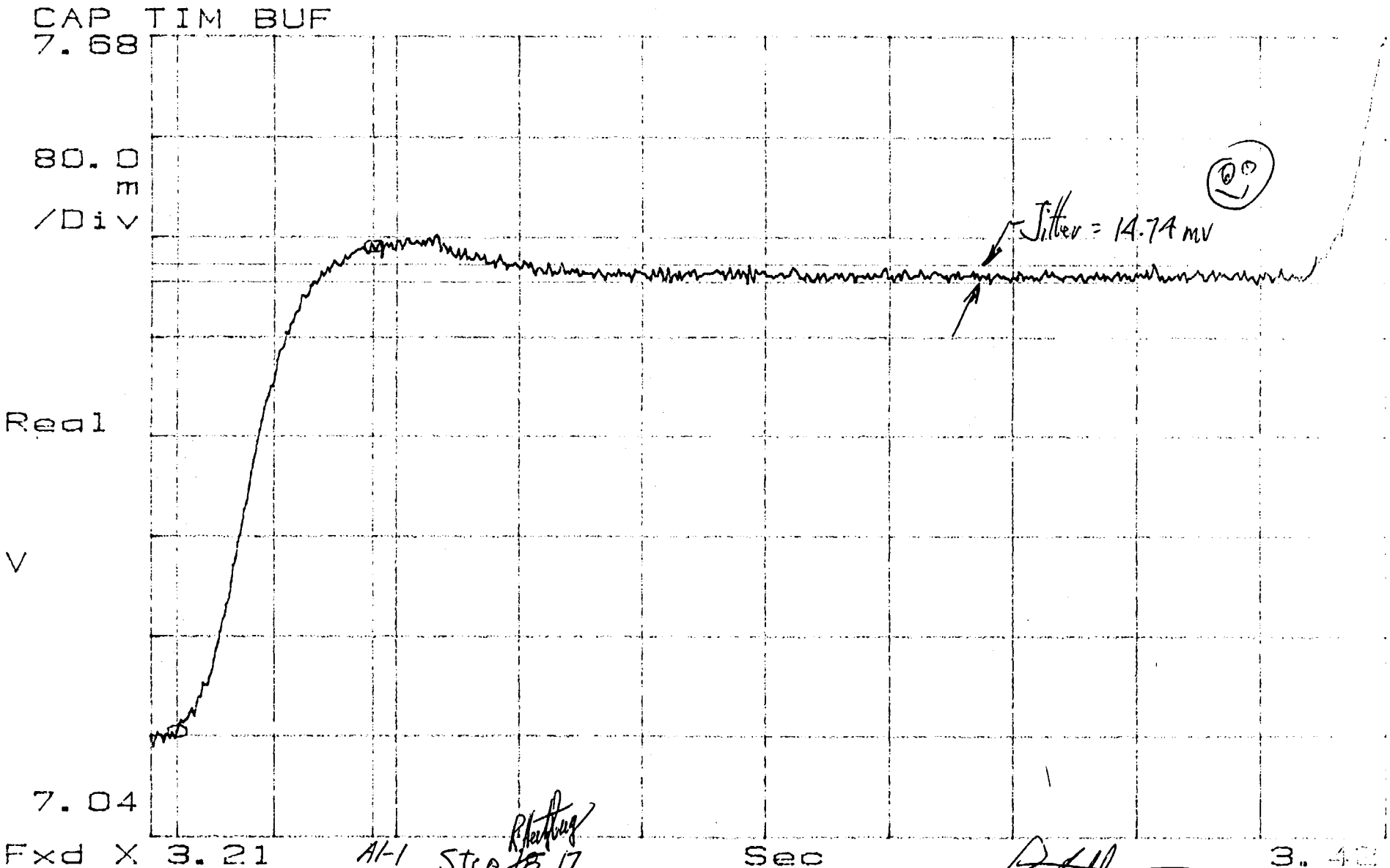


Fxd X 3.0 A1-1 Step: ~~17~~ 16 Sec 3.

S/O: 436613 3.4.4.5 Test Eng: Ray Hartberg Date: 6-

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 (7A 190)

B17



A1-1 Step ~~18~~ 17 3.4.4.5

S/O: 436613

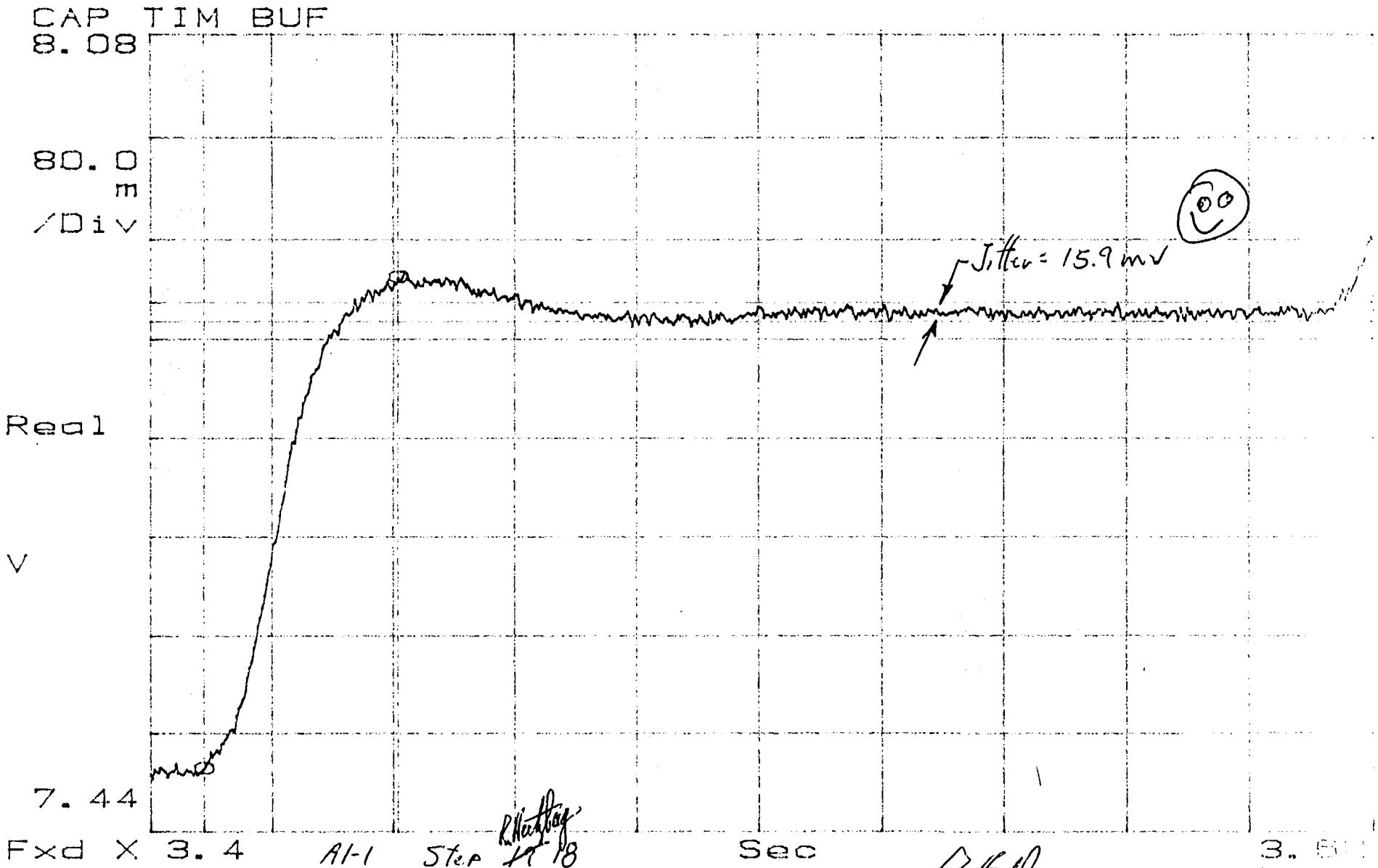
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-12-98

Quality: TA 190 JUN 15 1998

B18

X=3.412 S ΔX=35.16mS Y=7.86938 ΔY=15.9mV
Ya=7.49121 ΔYa=397.3mV



A1-1 Step 3.4.4.5

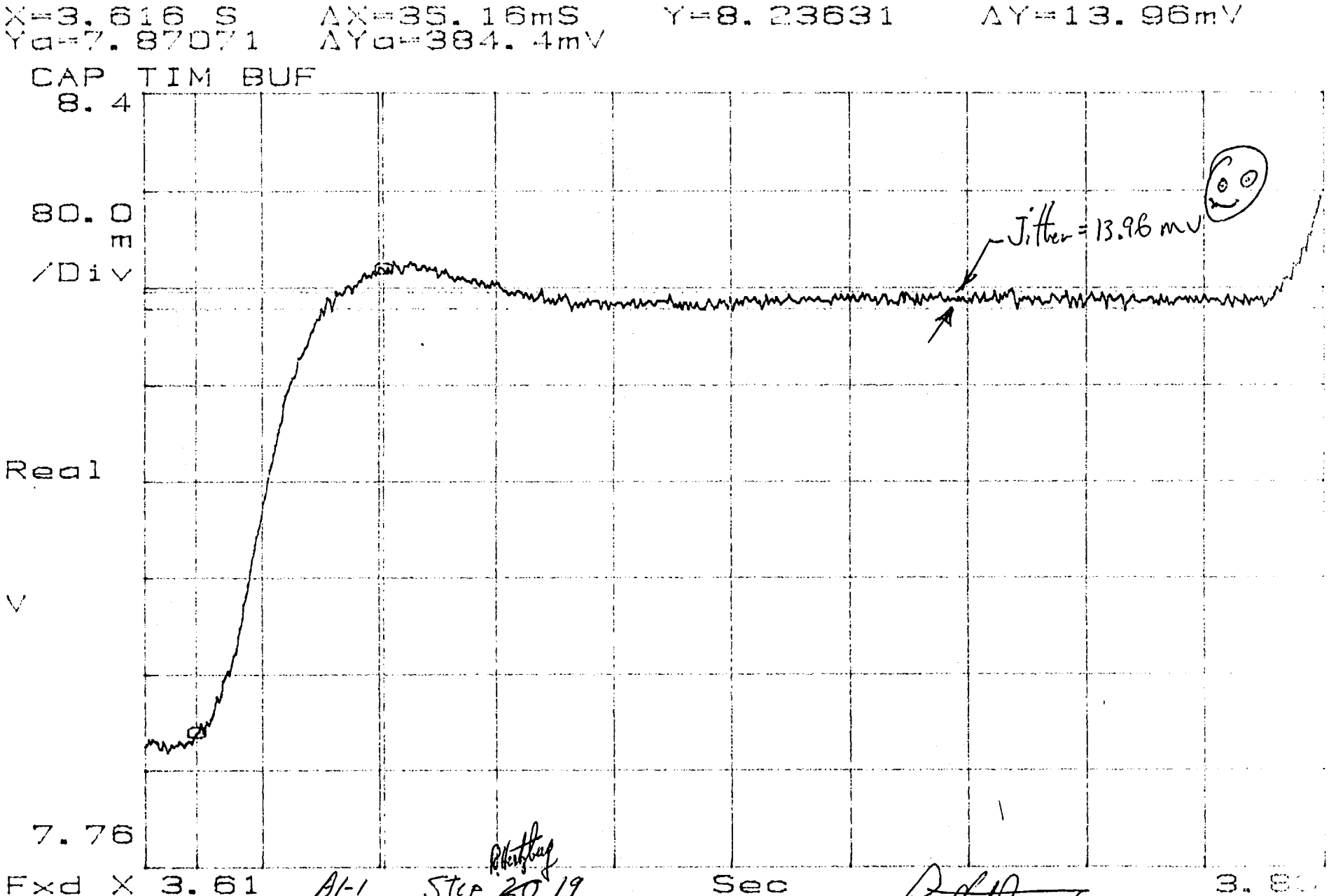
S/O: 436613

P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-1[illegible]-98

Quality: [signature] JUN 15 1998 (7A 190)

B19



A1-1 Step ~~20~~ 19 3.4.4.5

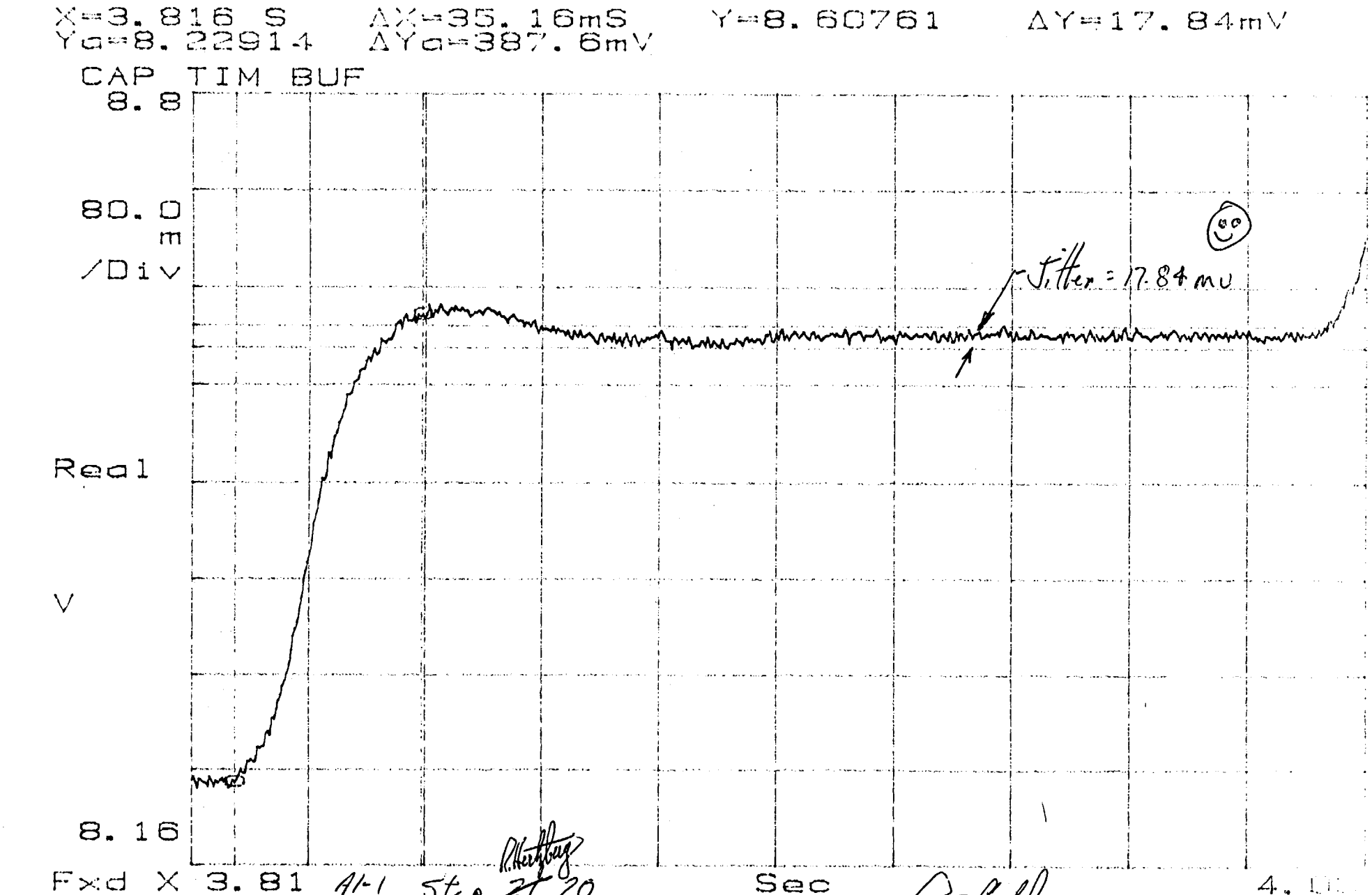
S/O: 436613

P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6 1[illegible] 98

Qualifr: JUN 15 1998 (7A 190)

B20



A1-1 Step ~~21~~ 20 R. Hertzberg

3.4.4.5

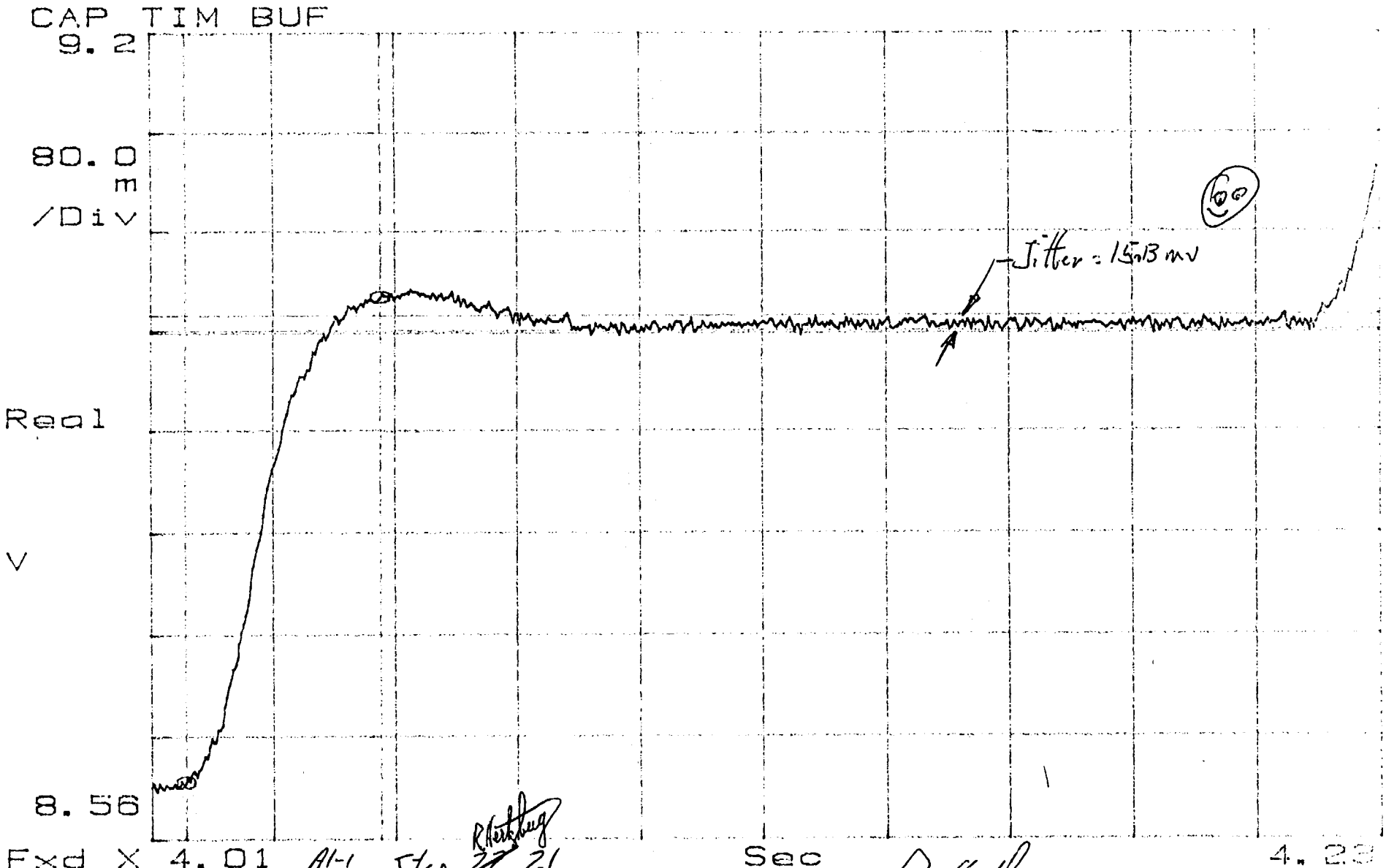
S/O: 436613

P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hertzberg Date: 6-[illegible]

Quality: 7A 190 JUN 15 1998

B21



A1-1 Step ~~22~~ 21 R Hertzberg

3.4.4.5

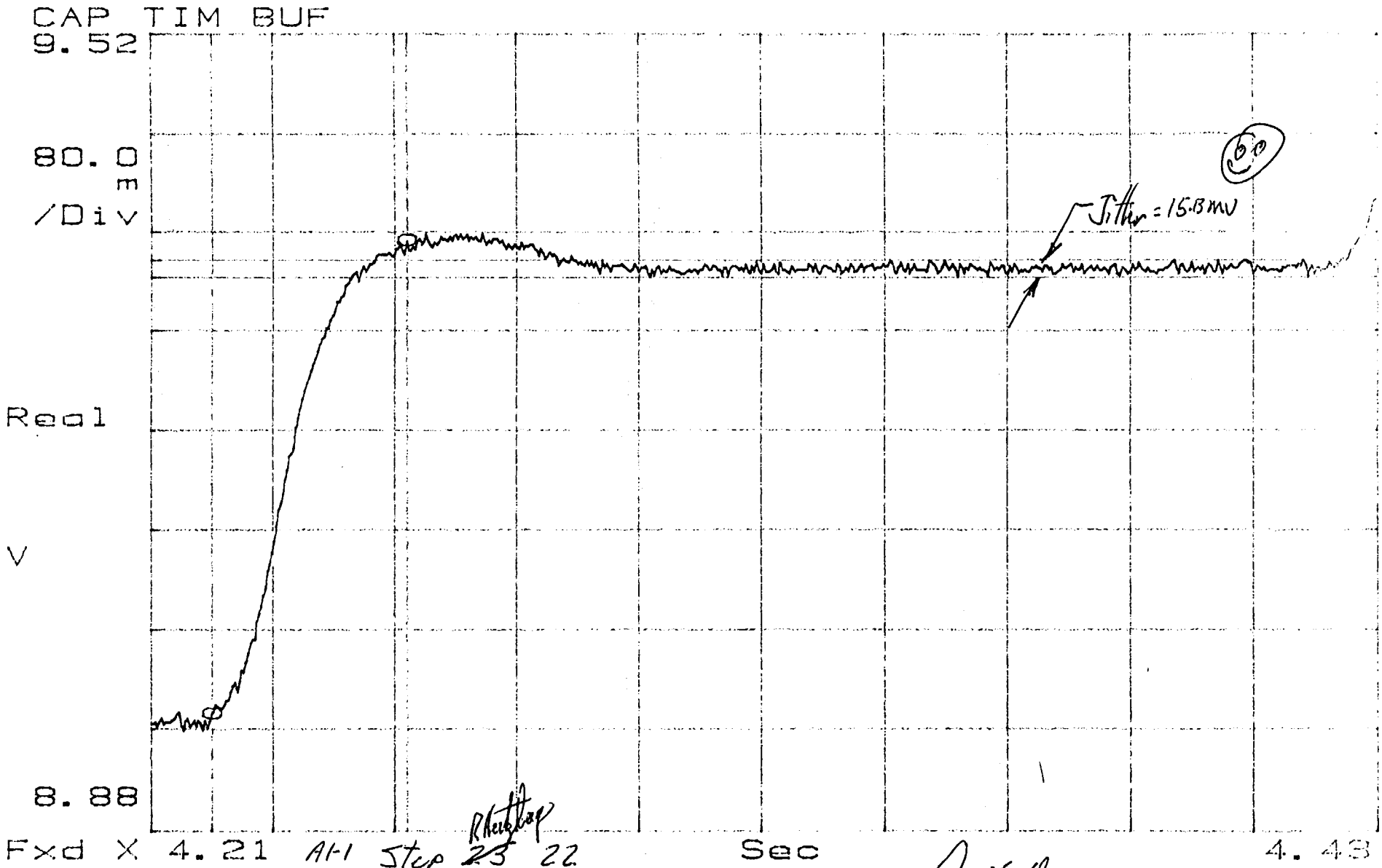
S/O: 436613

P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hertzberg Date: 6-12-98

Quality: JUN 15 1998 (7A 190)

B22



A1-1 Step ~~23~~ 22 R Hertzberg

S/O: 436613 3.4.4.5

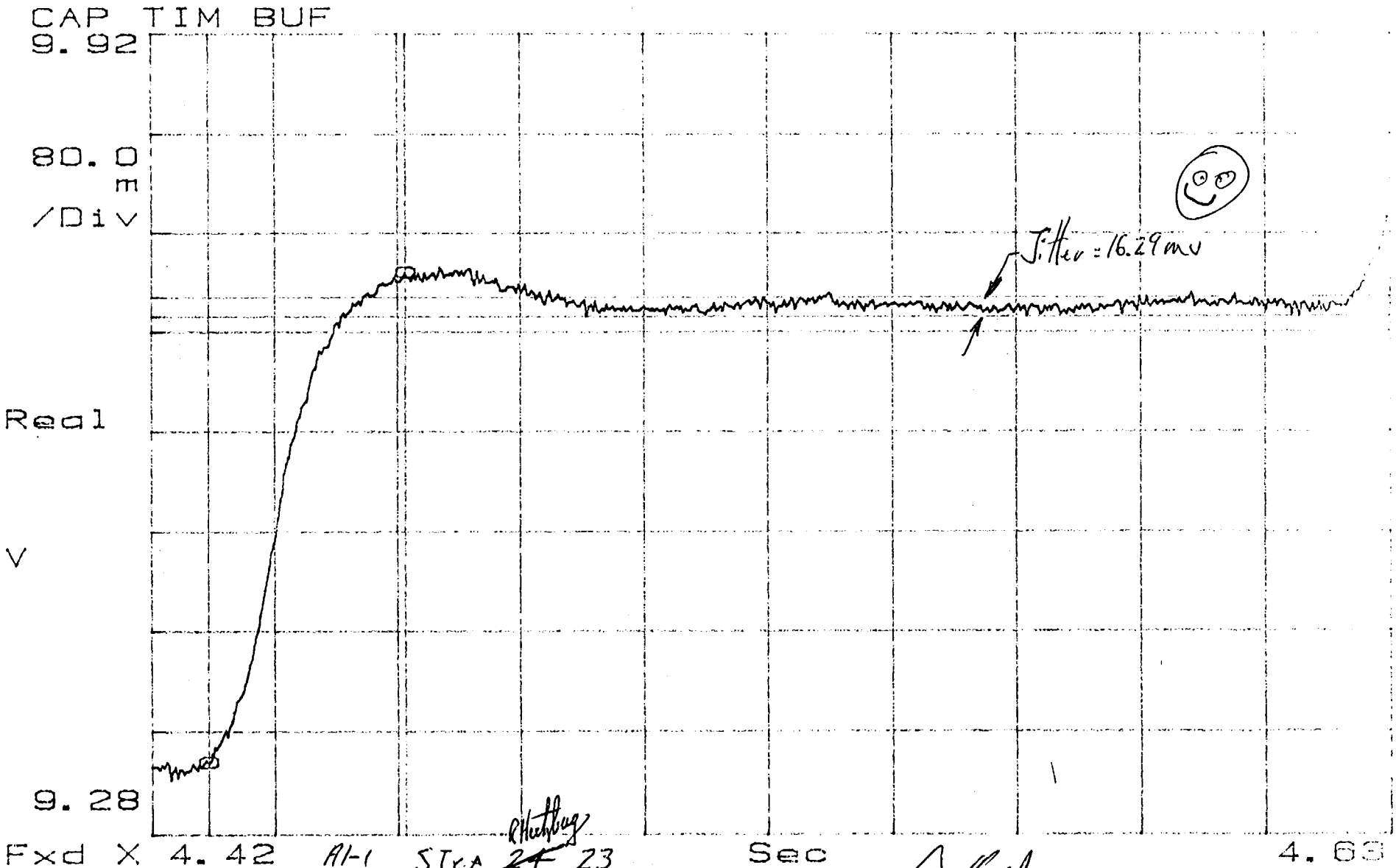
P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hertzberg Date: 6-12-98

Quality: 7A 190 JUN 15 1998

B23

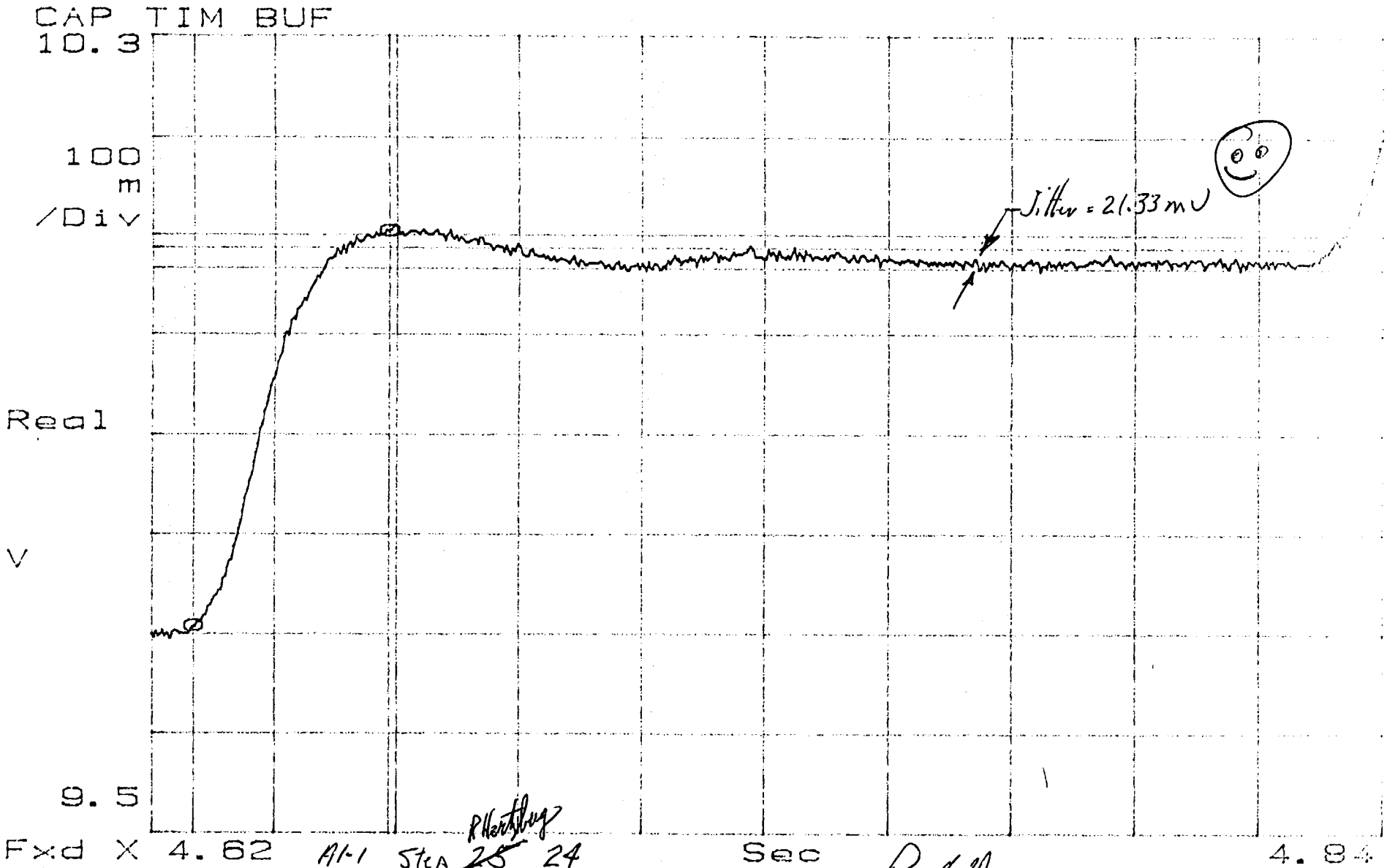
X=4.425 S ΔX=35.16mS Y=9.70783 ΔY=16.29mV
Ya=9.33522 ΔYa=392.5mV



S/O: 436613 3.4.4.5 Test Eng: Raytheon Eng Date: 6-12-98

P/N: 1331720-2-1T SN: 105 Quality: 7A 190 JUN 15 1998

B24



A1-1 Step ~~25~~ 24 R Hertzberg

3.4.4.5

S/O: 436613

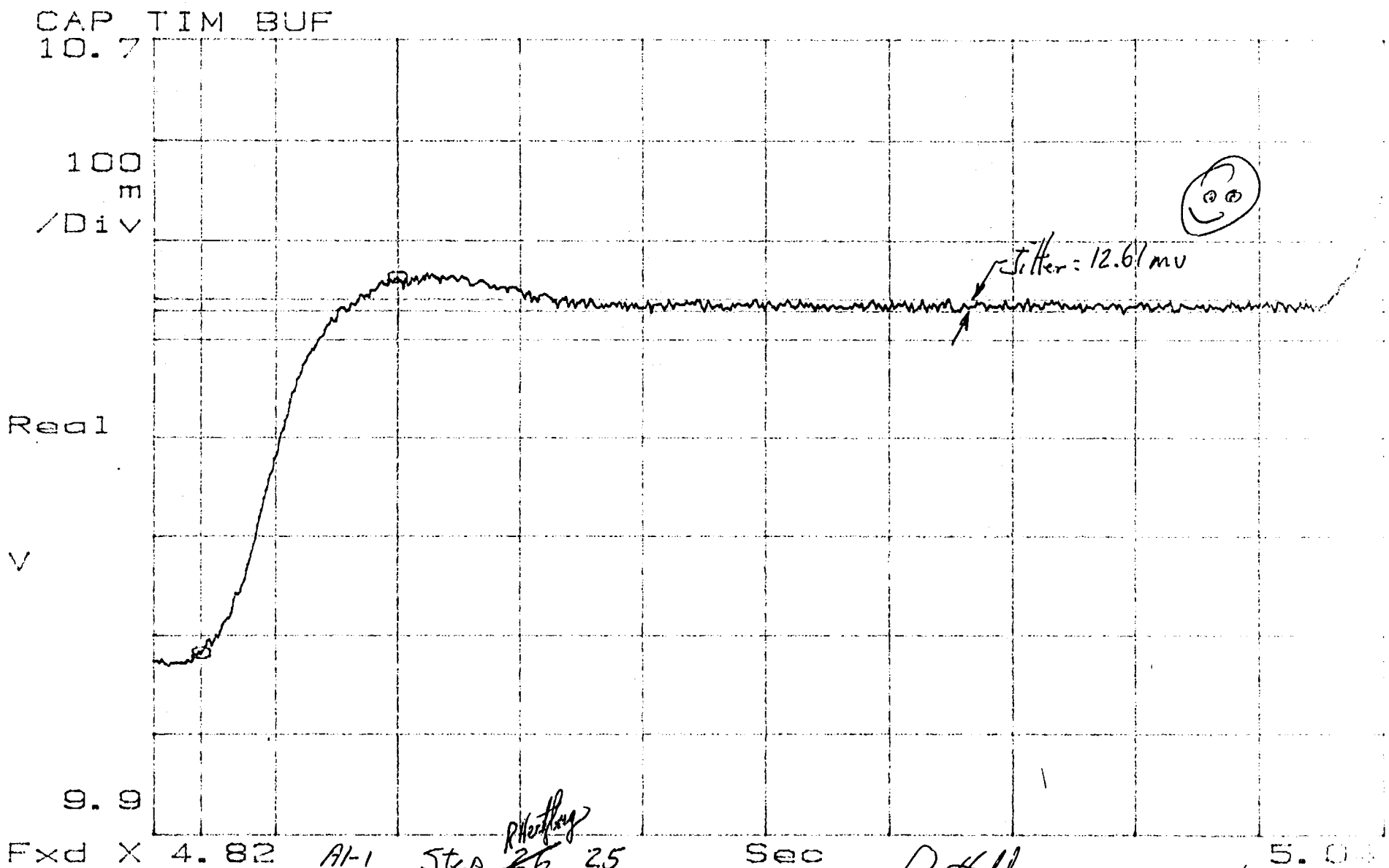
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-12-98

Quality: 7A 190 JUN 15 1998

B25

X=4.831 S ΔX=35.16mS Y=10.4406 ΔY=12.61mV
Ya=10.0813 ΔYa=381.1mV

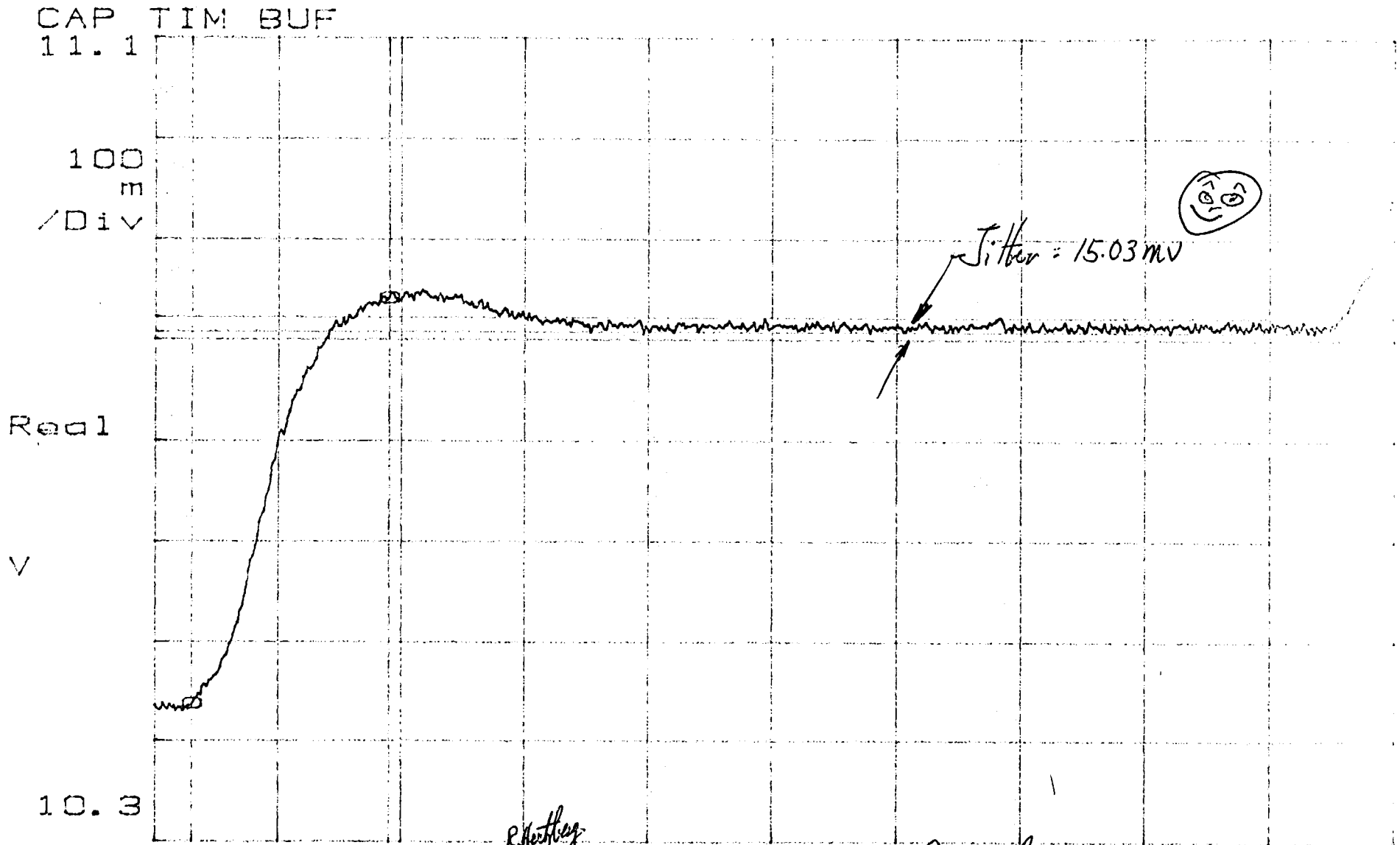


S/O: 436613 3.4.4.5 Test Eng: Ray Hertzberg Date: 6-12-98

P/N: 133720-2-1T SN: 105 Quality:

7A 190 JUN 15 1998

B210



A1-1 Step ~~27~~ 26 R. Hertberg

3.4.4.5

S/O: 436613

P/N: 1331720-2-1T SN: 105

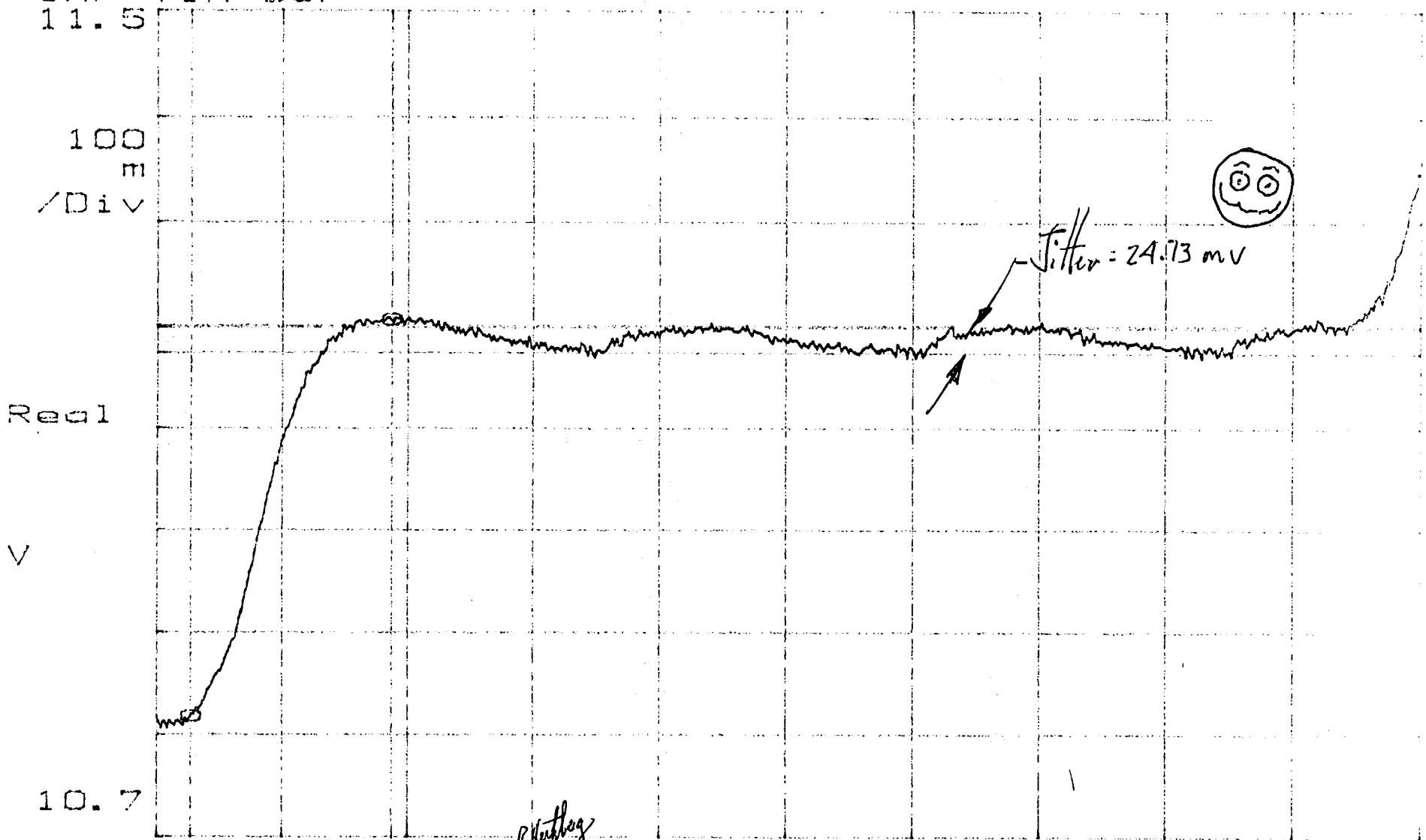
Test Eng: Ray Hertberg Date: 6-12-98

Quality: 7A 190 JUN 15 1998

B27

X=5.236 S ΔX=35.16mS Y=11.1979 ΔY=24.73mV
Ya=10.8176 ΔYa=387.6mV

CAP TIM BUF

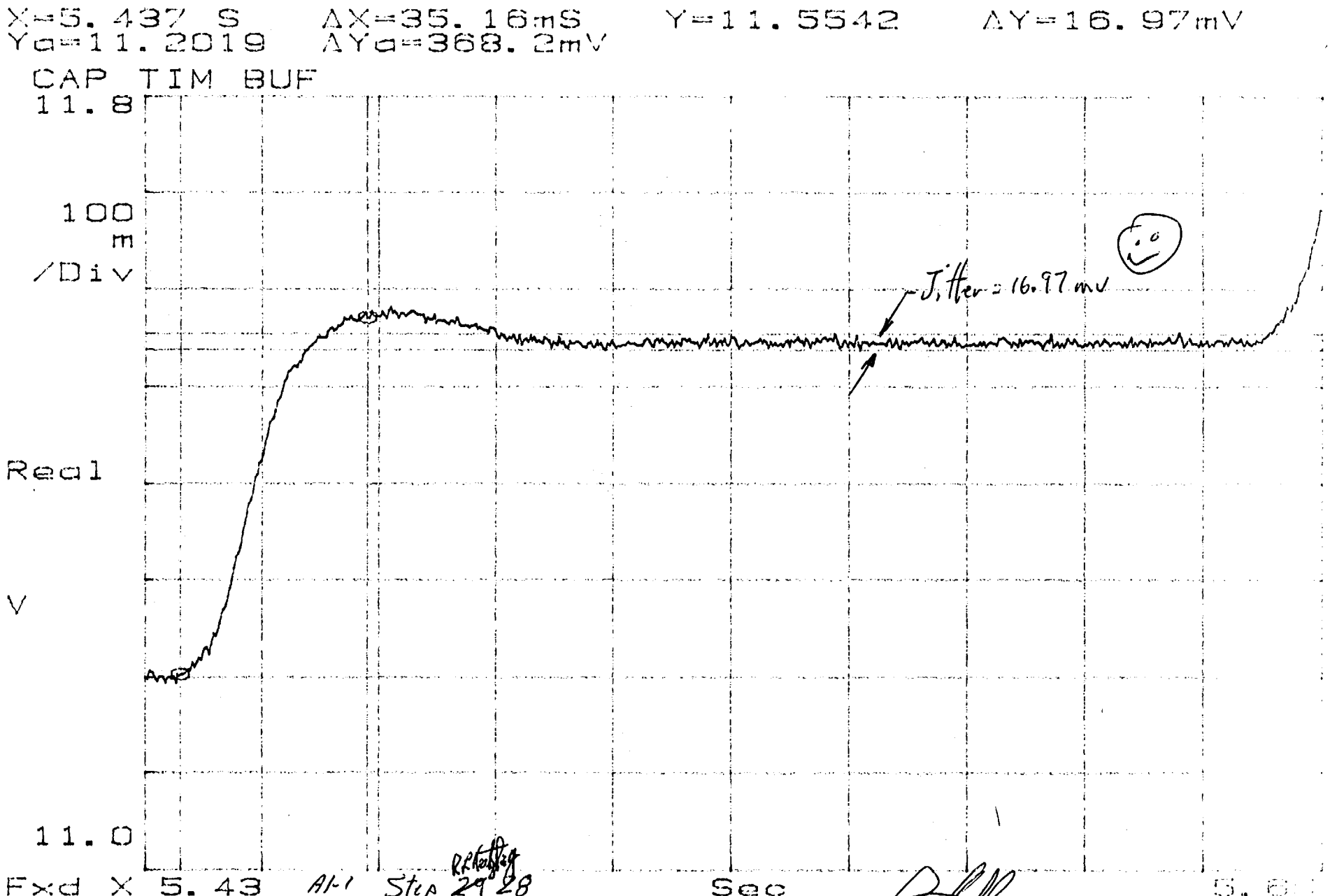


Fxd X 5.23 A1-1 Step ~~28~~ 27 Sec 5.

S/O: 436613 3.4.4.5 Test Eng: [signature] Date: 6-12-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 (7A 190)

B28



A1-1 Step ~~29~~ 28 3.4.4.5

S/O: 436613

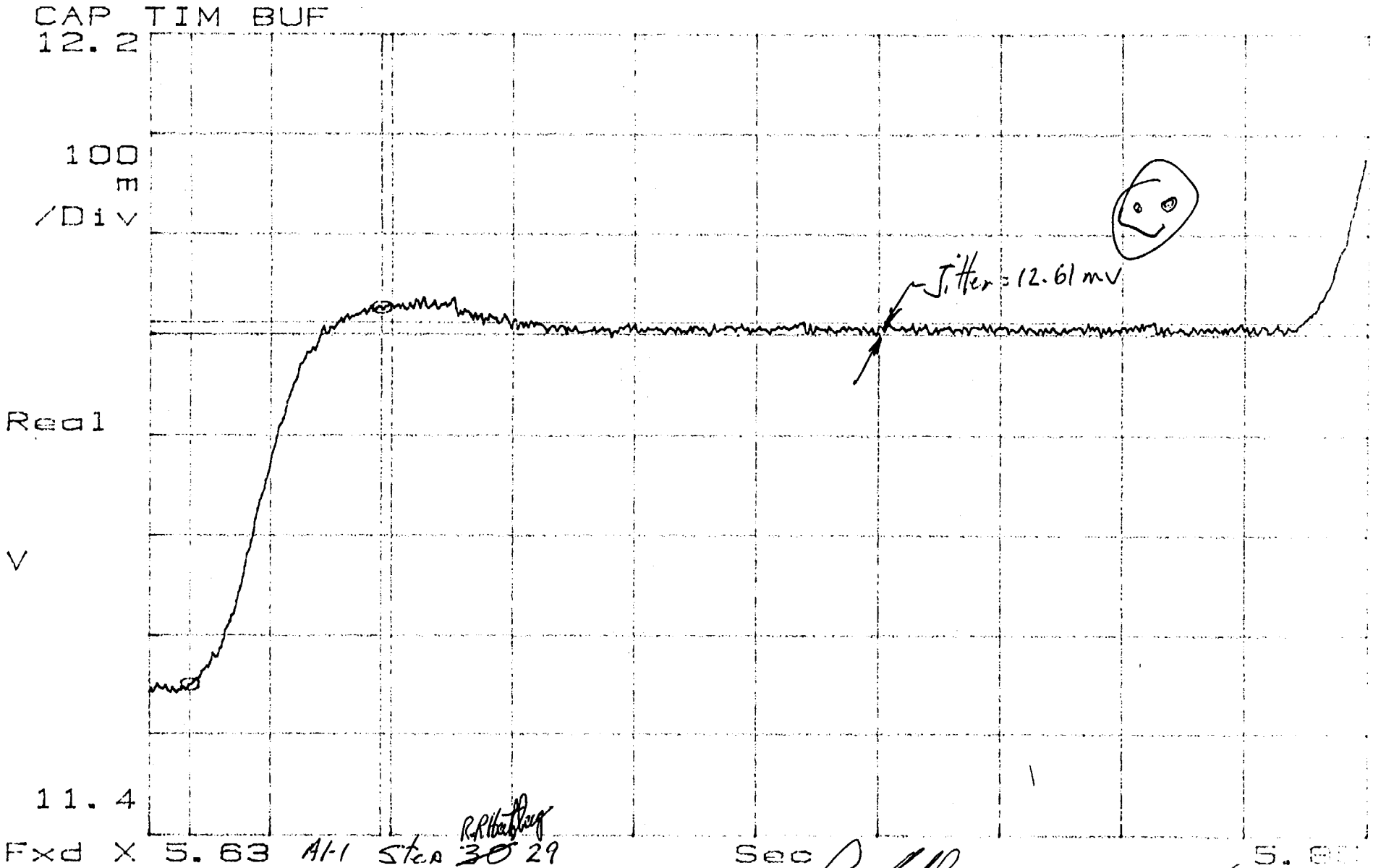
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-[illegible]-98

Quality: 7A 190 JUN 15, 1998

B29

X=5.64 S ΔX=35.16mS Y=11.913 ΔY=12.61mV
Ya=11.549 ΔYa=377.9mV

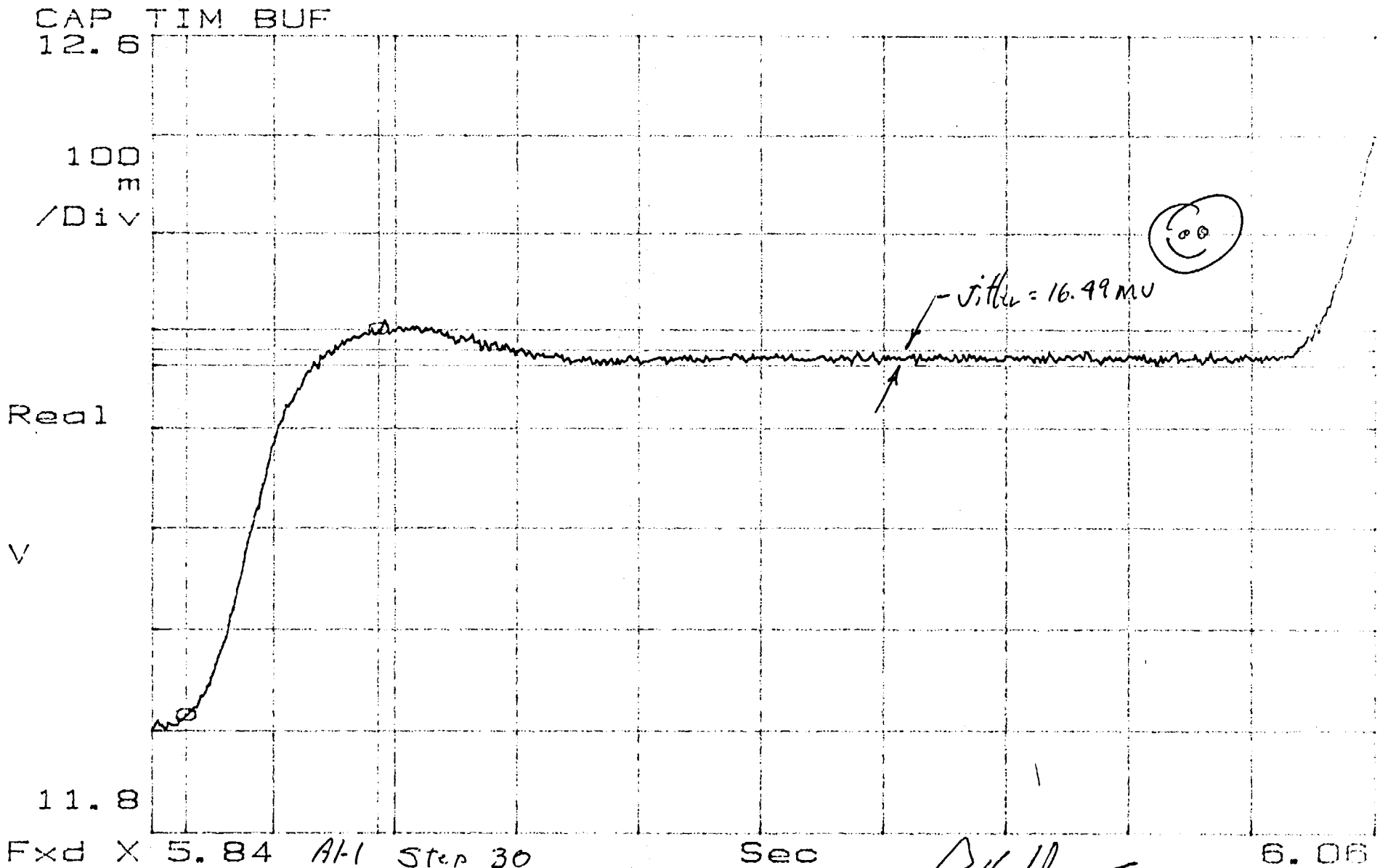


S/O: 436613 3.4.4.5 Test Eng: [signature] Date: 6-1[illegible]-98

P/N: 1331720-2-1T SO: 105 Quality: JUN 15 1998 (7A 190)

B30

X=5.844 S ΔX=35.16mS Y=12.2795 ΔY=16.49mV
Ya=11.9155 ΔYa=384.4mV



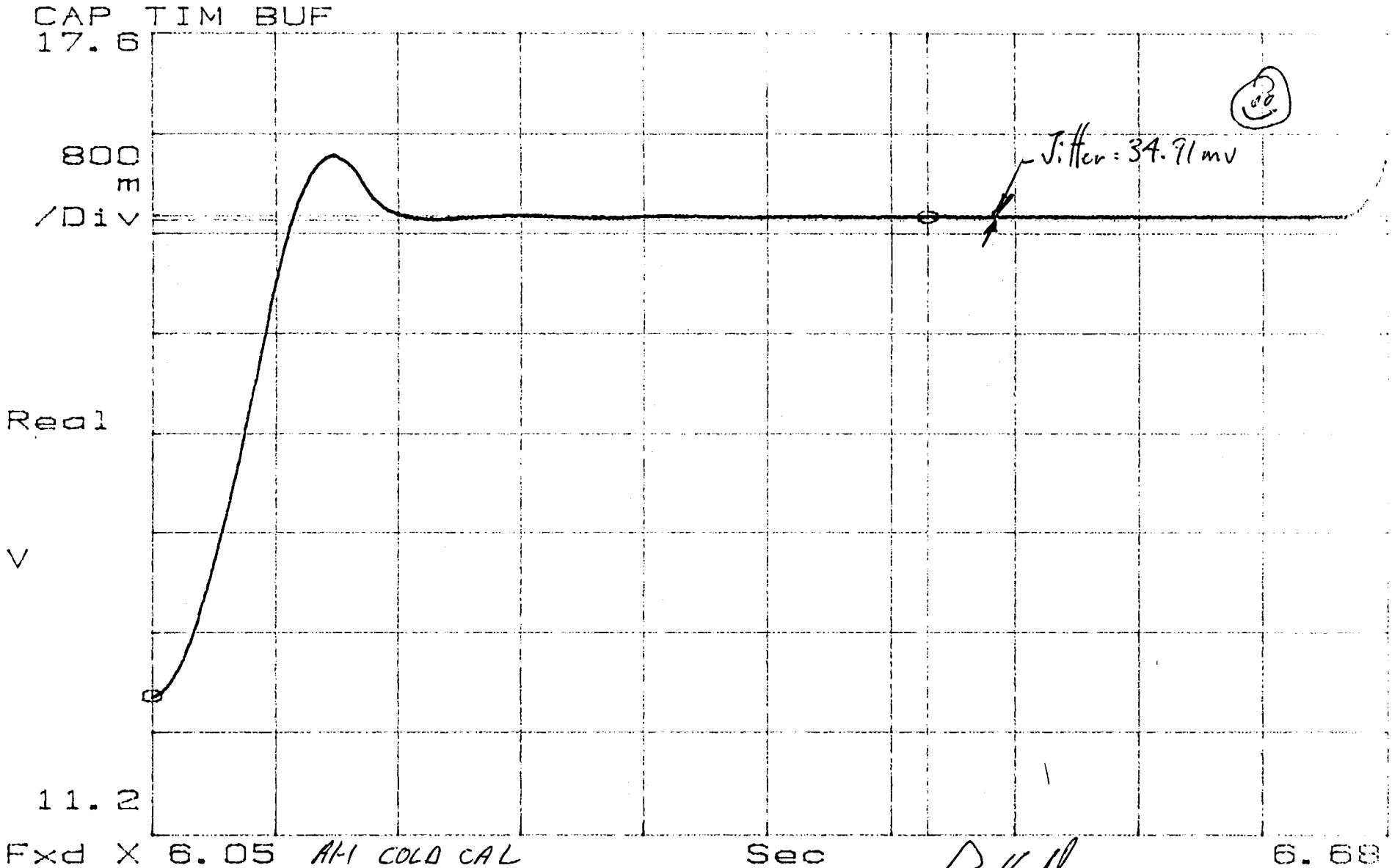
Al-1 Step 30

S/O: 436613 3.4.4.5 Test Eng: Raytheon Date: 6-12-98

P/N: 1331720-2-1T SN: 105 Quality: 7A 190 JUN 15 1998

B31

X=6.046 S ΔX=400.4mS Y=16.0989 ΔY=34.91mV
Ya=12.2788 ΔYa=3.849 V

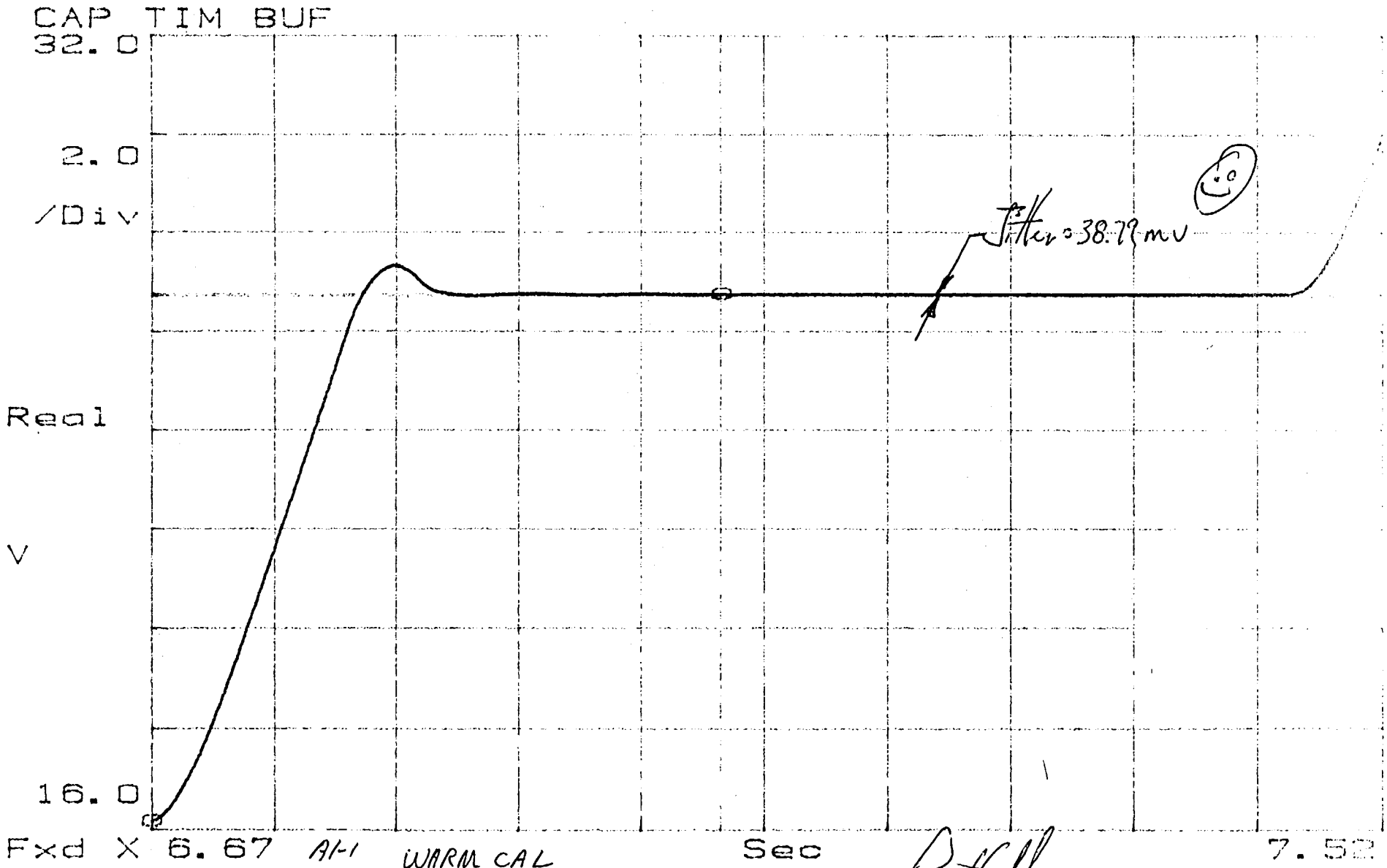


SIO: 436613 3.4.4.5 Test Eng: Raytheon Eng Date: 6-12-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 7A 190

B32

X=6.665 S ΔX=100.0mS Y=26.6764 ΔY=38.79mV
Ya=16.1599 ΔYa=10.57 V



A1-1 WARM CAL 3.4.4.5

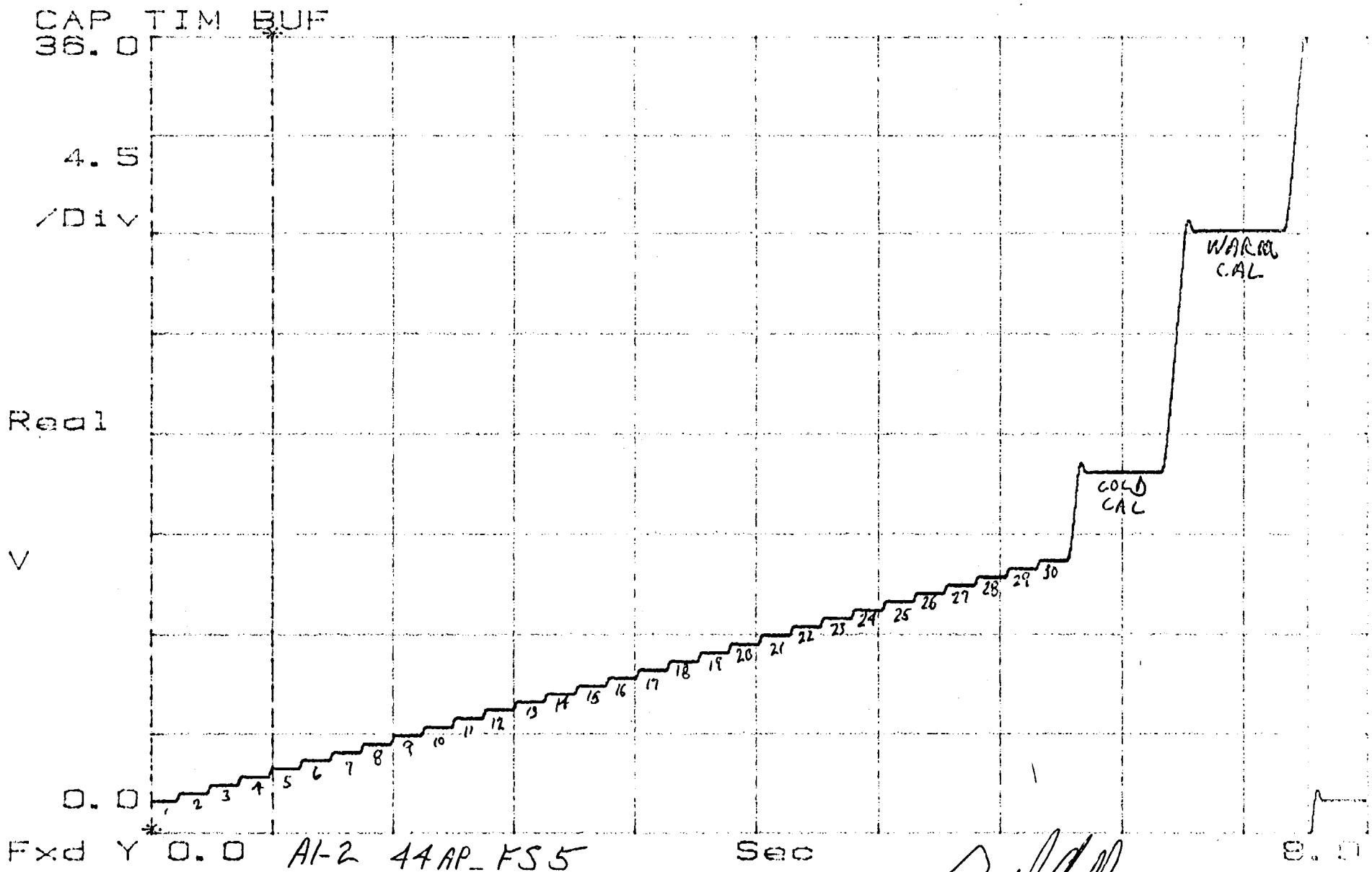
S/O: 436613

P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hufberg Date: 6-12-98

Quality: 7A 190 JUN 15 1998

B33



A1-2 44AP_FS5

3.4.4.5

S/O: 436613

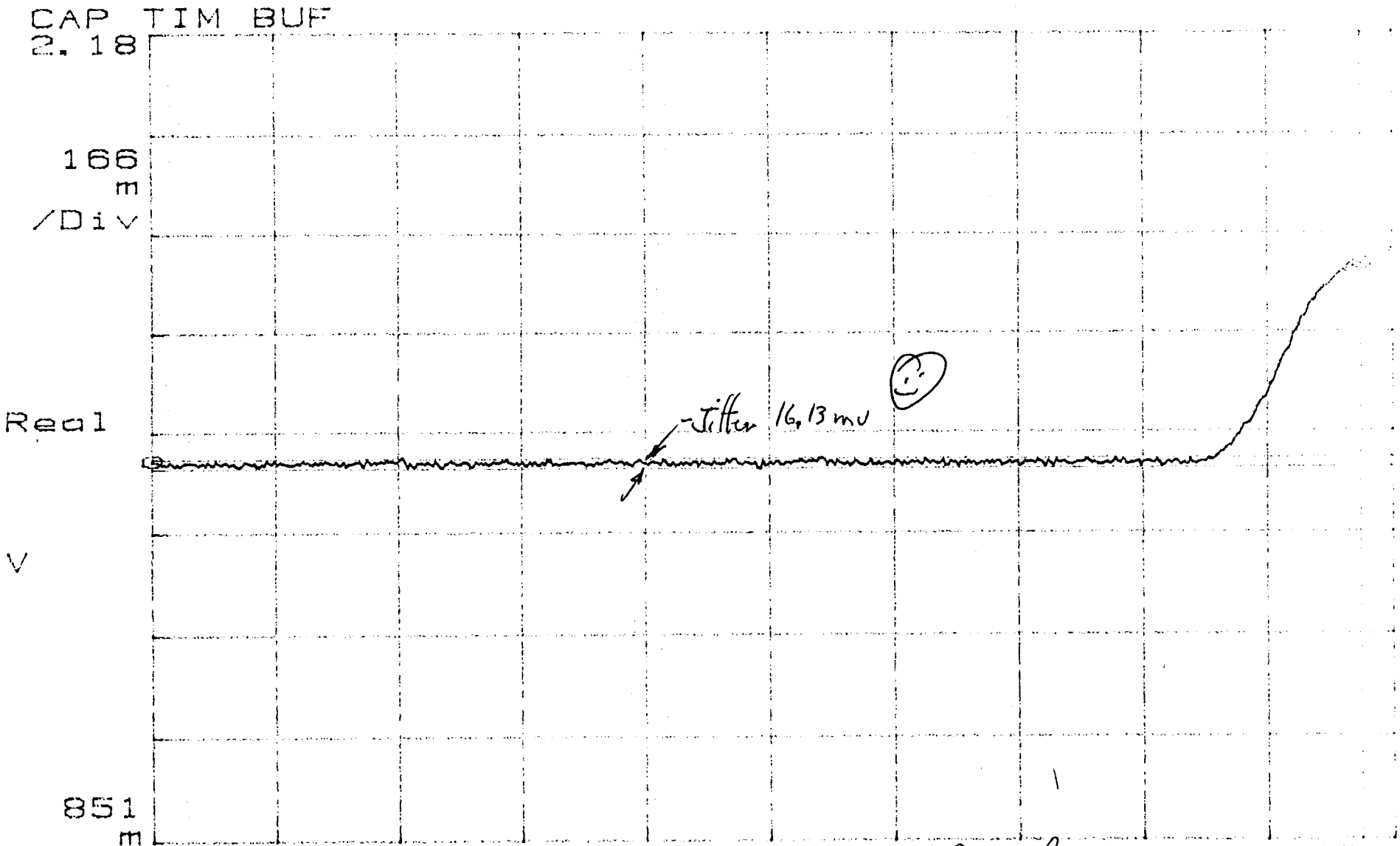
P/N: 1331720-2-1T SN: 105

Test Eng: Raymond Gutierrez Date: 6-12-98

Quality: JUN 15 1998 (7A 190)

B34

X=10.55mS ΔX=184.0mS Y=1.45506 ΔY=16.13mV
Ya=1.46775 ΔYa=327.6mV



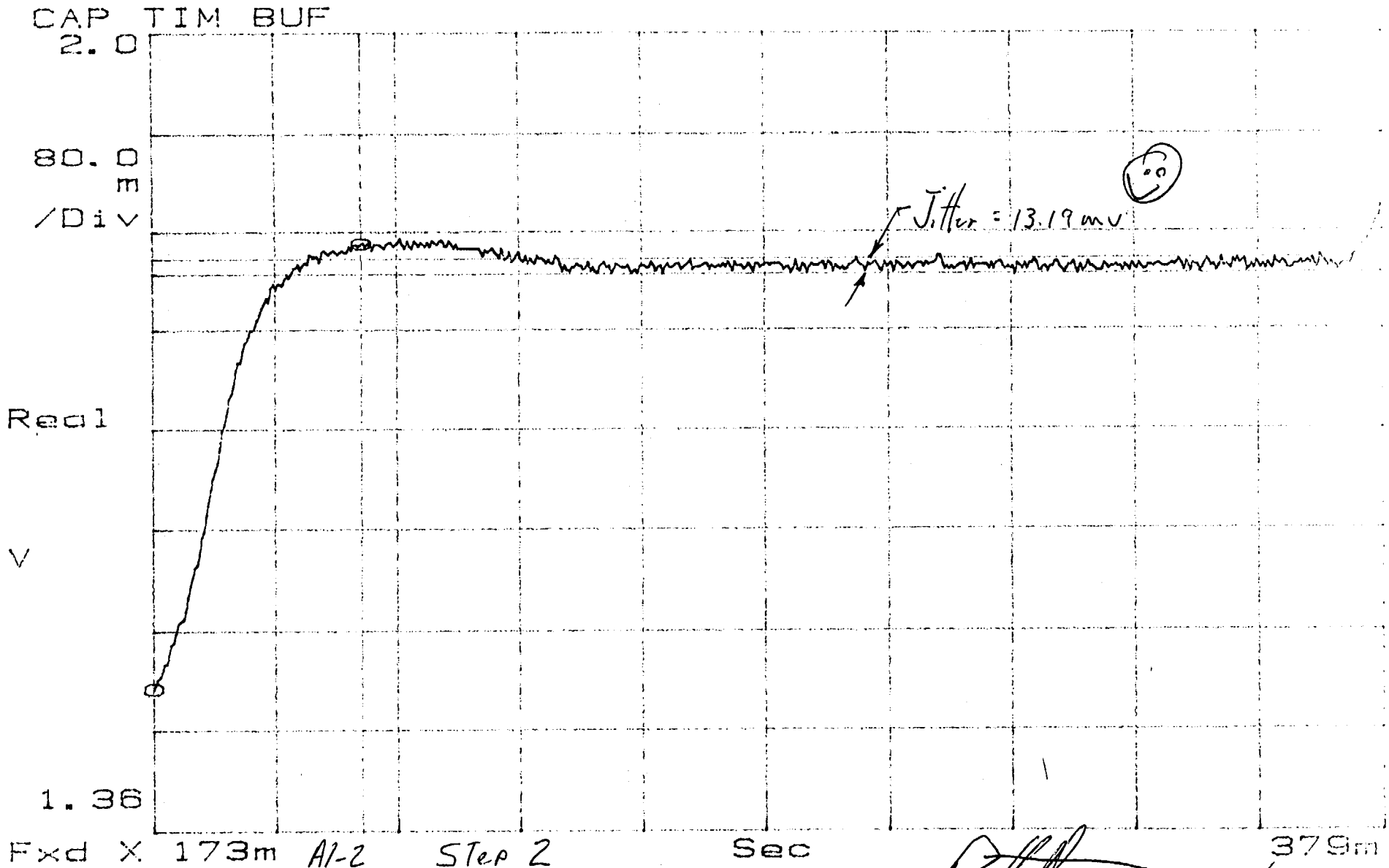
FxdXY 10.5m A1-2 Step 1 Sec 199m

S/O: 936613 3.4.4-5 Test Eng: Ray Duffey Date: 6-12-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998. 7A 190

B35

X=172.7mS ΔX=35.16mS Y=1.8177 ΔY=13.19mV
Ya=1.47262 ΔYa=356.8mV

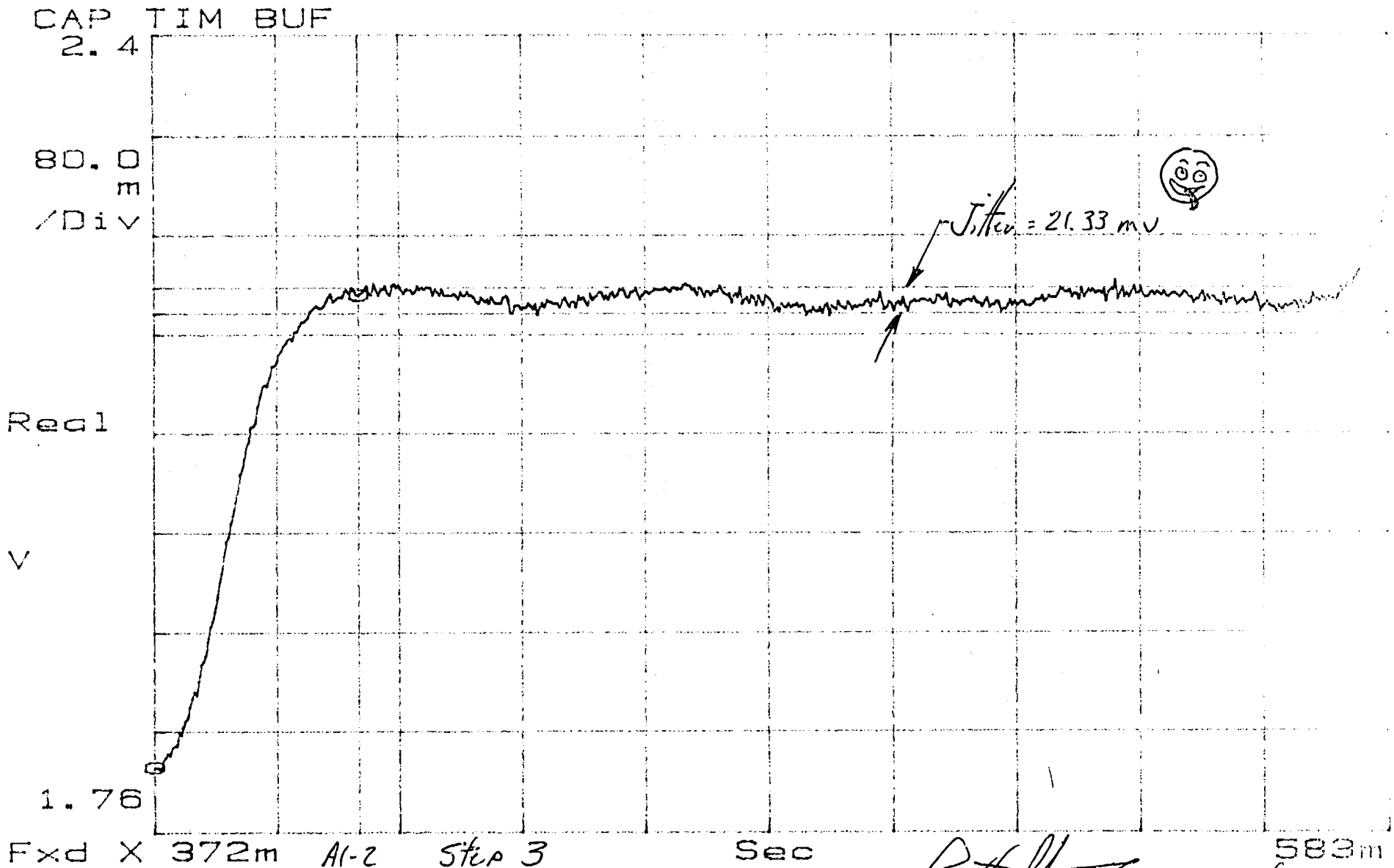


S/O: 436613 3.4.4.5 Test Eng: Date: 6-12-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 7A 190

B36

X=372.3mS ΔX=35.16mS Y=2.19753 ΔY=21.33mV
Ya=1.81158 ΔYa=379.5mV



3.4.1.5

S/O: 436613

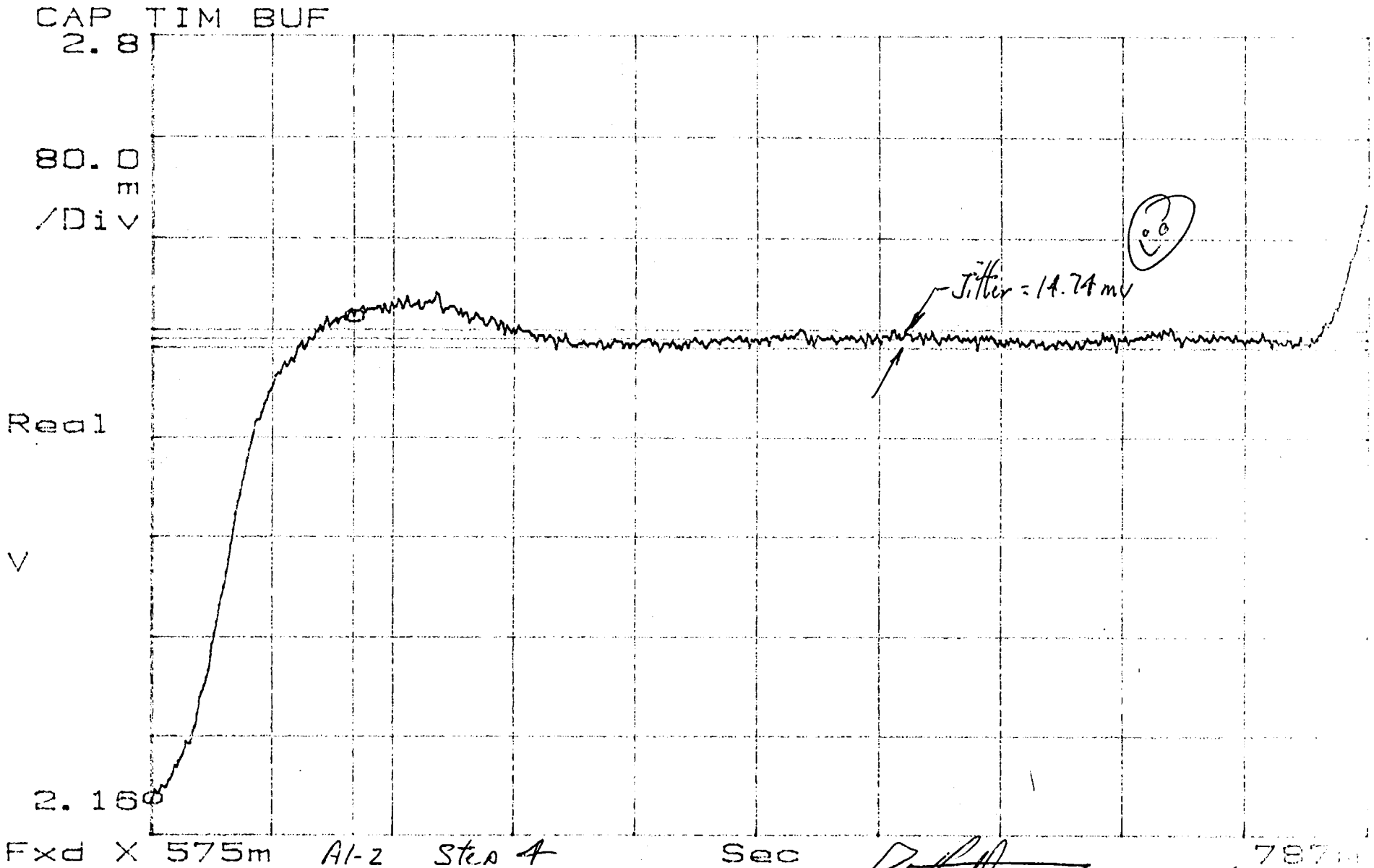
P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hertzberg Date: 6-12-98

Quality: 7A 190 JUN 15 1998

B37

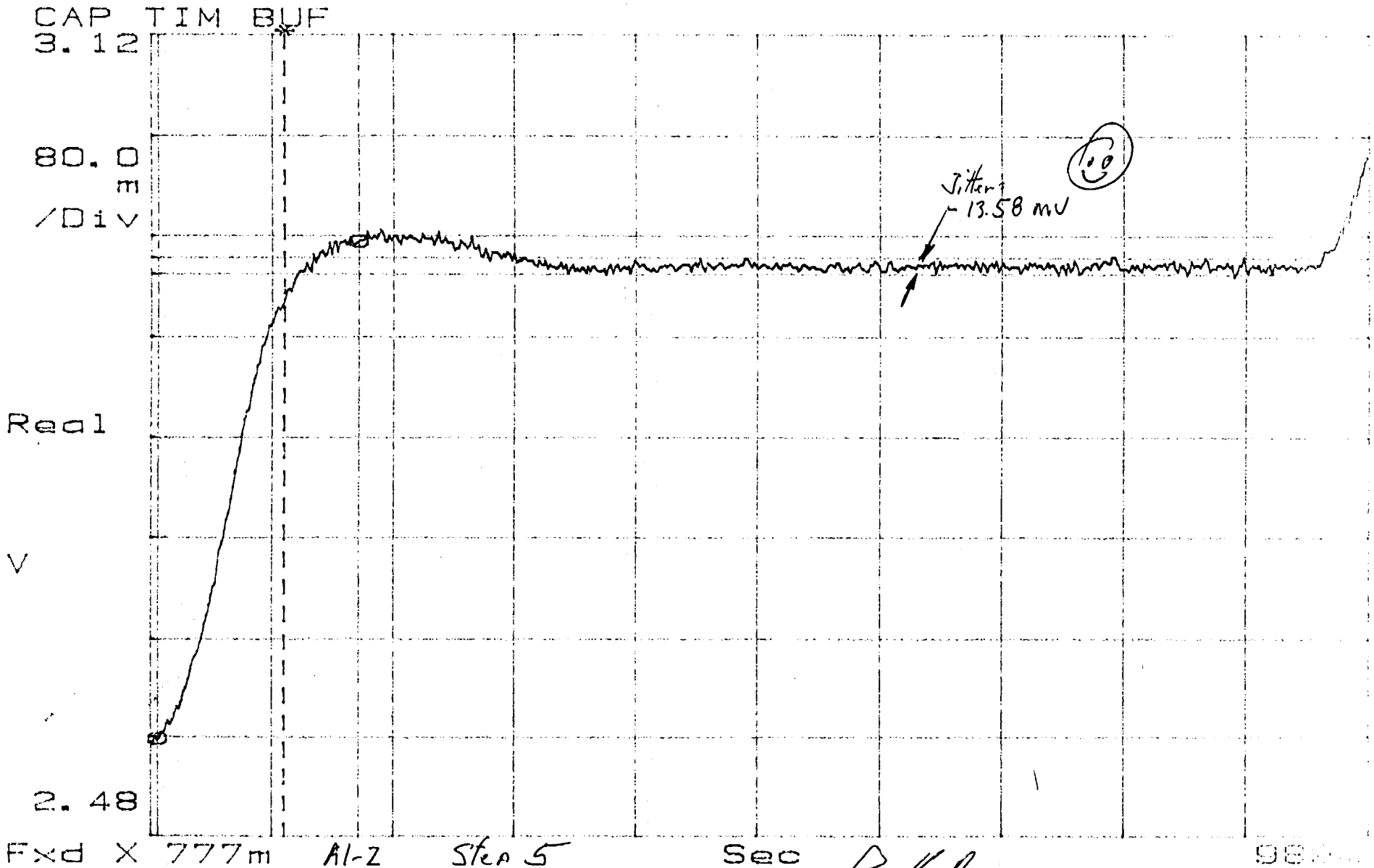
X=575.0mS ΔX=35.16mS Y=2.56688 ΔY=14.74mV
Ya=2.18946 ΔYa=387.6mV



S/O: 436613 3.4.4.5 Test Eng: Date: 6-18-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 (7A 190)

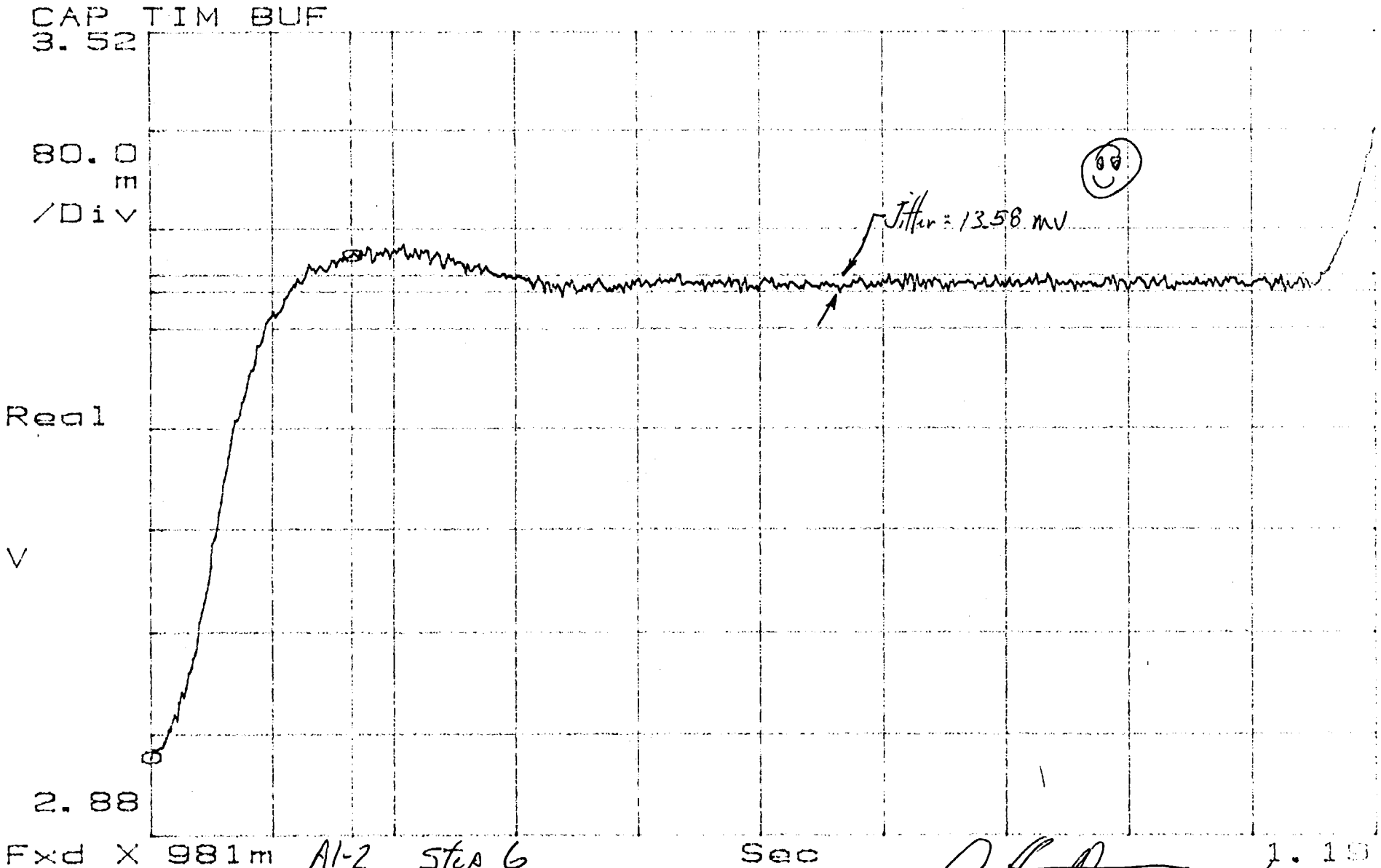
B38



S/O: 436613 3.4.4.5 Test Eng: [signature] Date: 6-[illegible]

P/N: 1331720-2-1T SN: 105 Quality: 7A 190 JUN 15 1998

B39



A1-2 Step 6
3.4.4.5

S/O: 436613

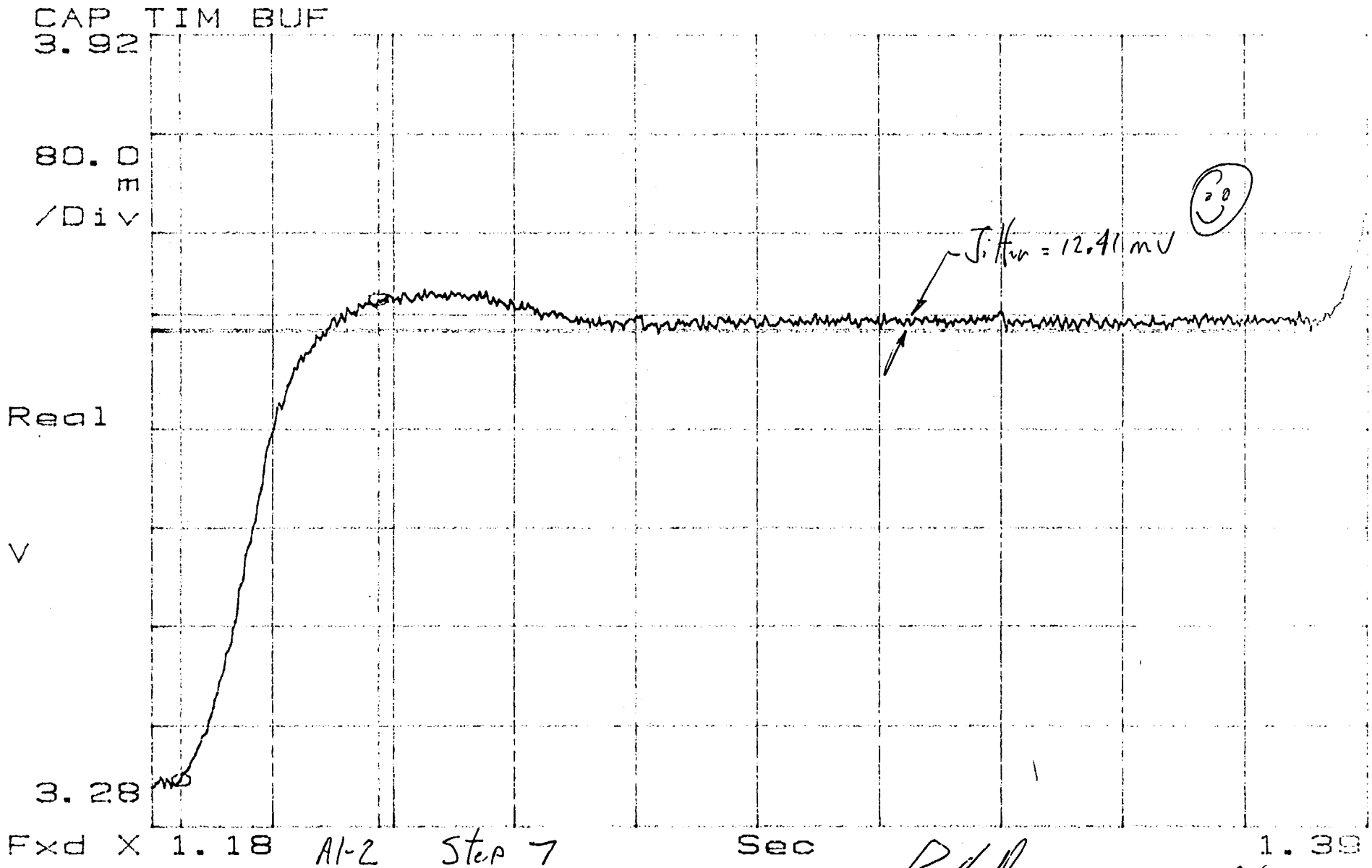
P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hartzberg Date: 6-12-98

Quality: JUN 15 1998 (7A 190)

R40

X=1.184 S ΔX=35.16mS Y=3.69348 ΔY=12.41mV
Ya=3.31663 ΔYa=389.2mV



A1-2 Step 7 3.4.4.5

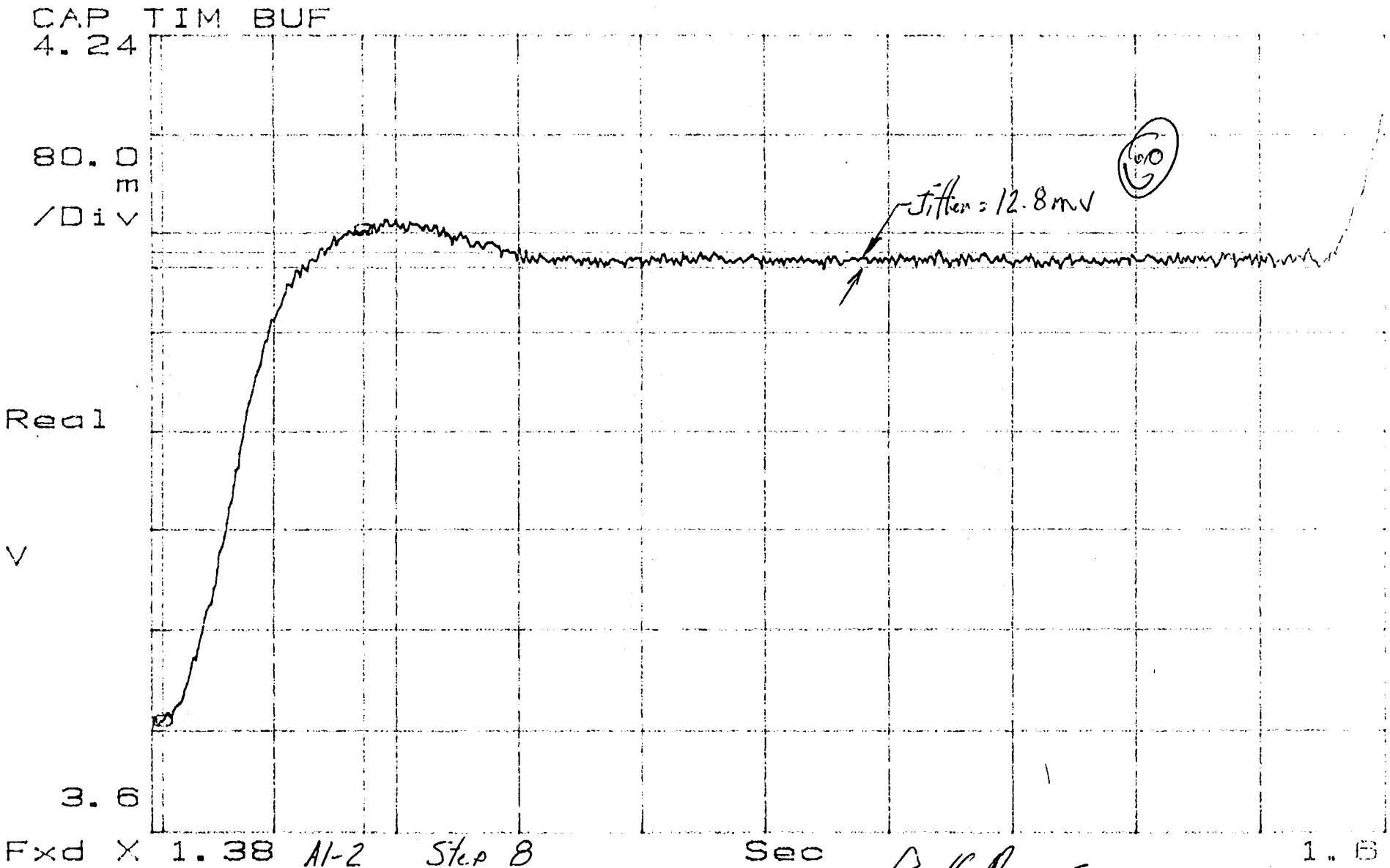
S/O: 436613

P/N: 1331720-2-17 SN: 105

Test Eng: Date: 6-12-98

Quality: 7A 190 JUN 15 1998

B41



A1-2 Step 8

S/O: 436613 3.4.4.5

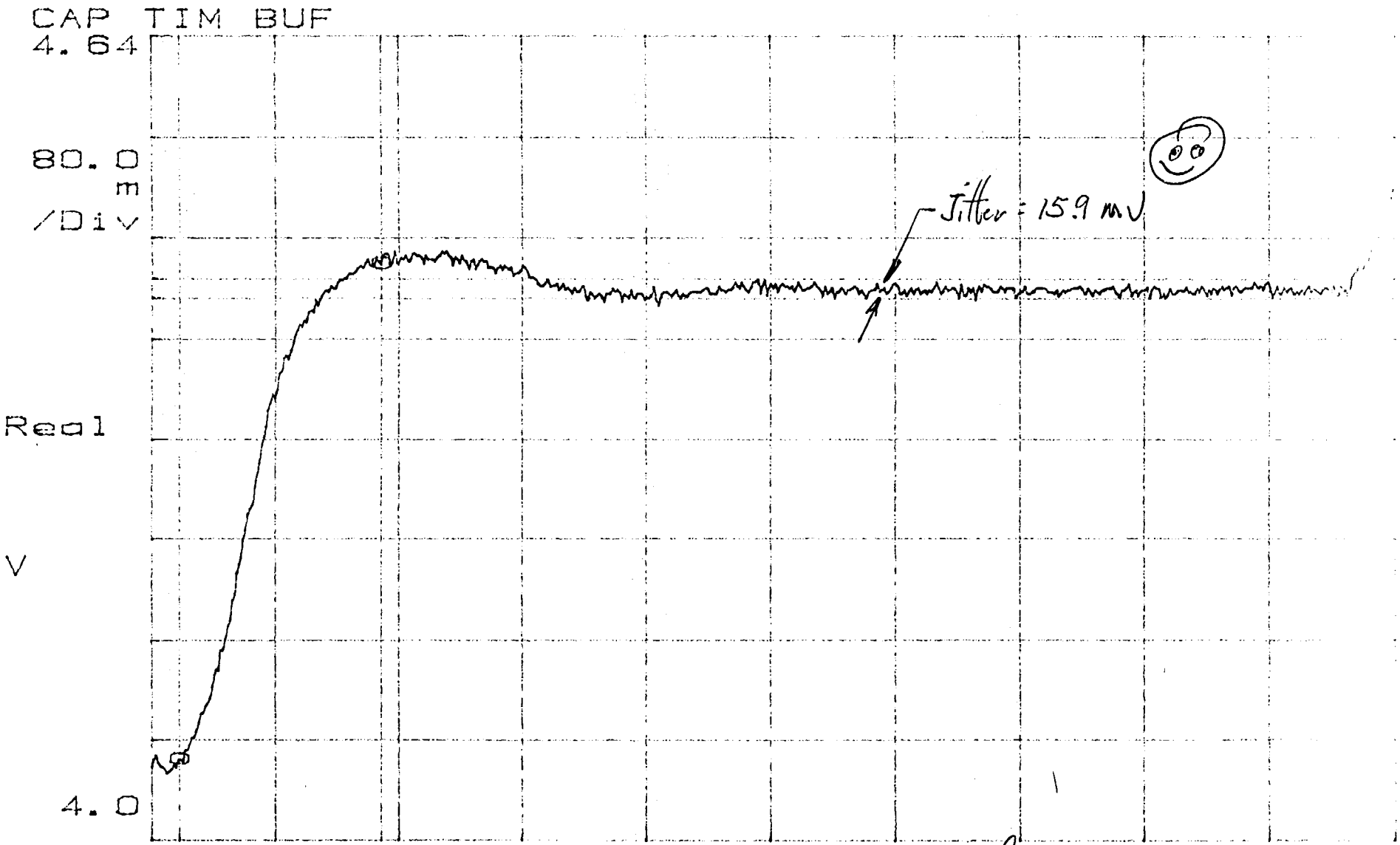
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-12-98

Quality: JUN 15 1998 (7A 190)

B42

X=1.589 S ΔX=35.16mS Y=4.44761 ΔY=15.9mV
Ya=4.06429 ΔYa=395.7mV

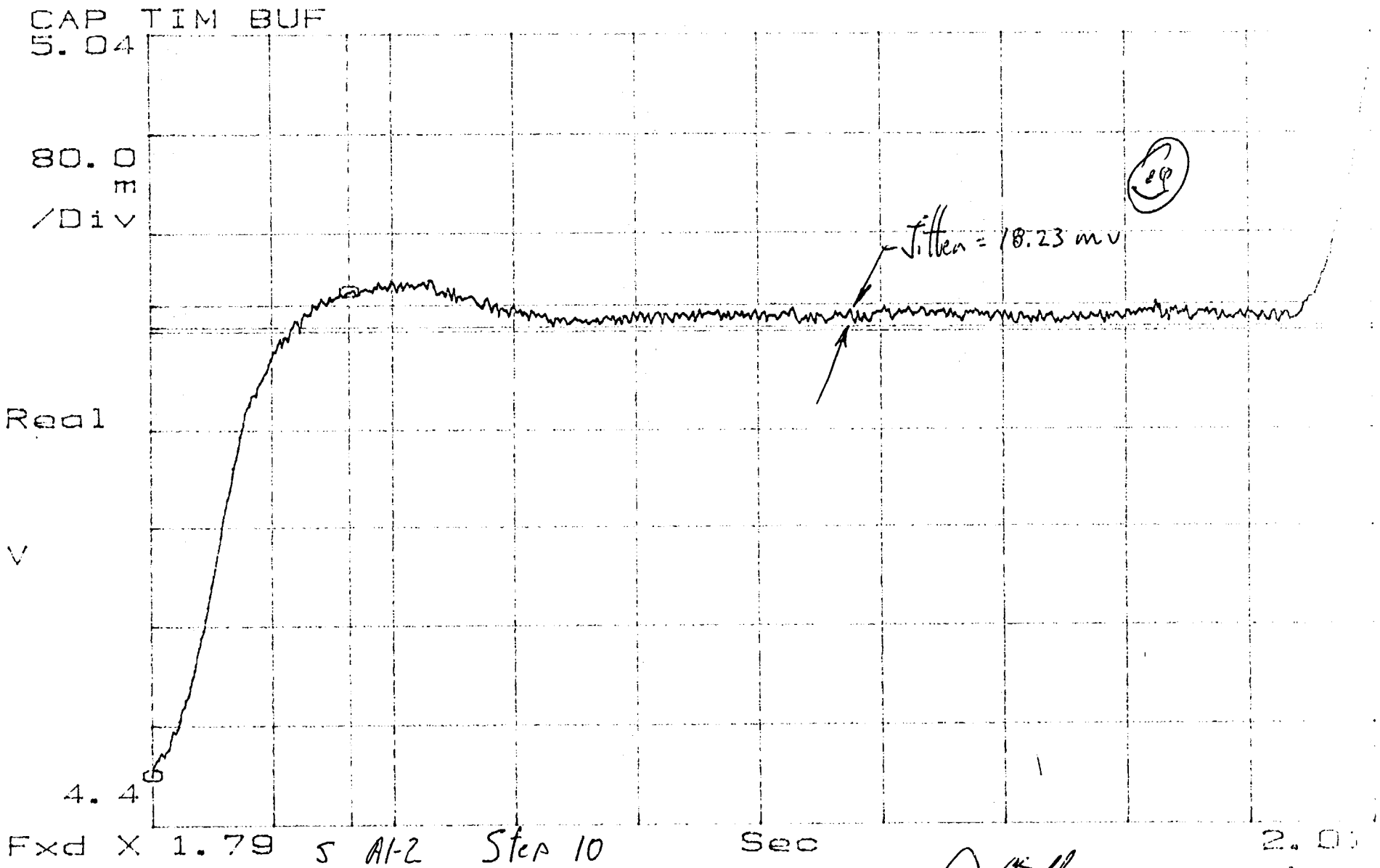


Al-2 Step 9
3.4.4.5

S/O: 436613
P/N: 1331720-2-1T S/O: 105

Test Eng: Ray Hedberg Date: 6-12-98
Quality: JUN 15 1998 (7A 190)

B43



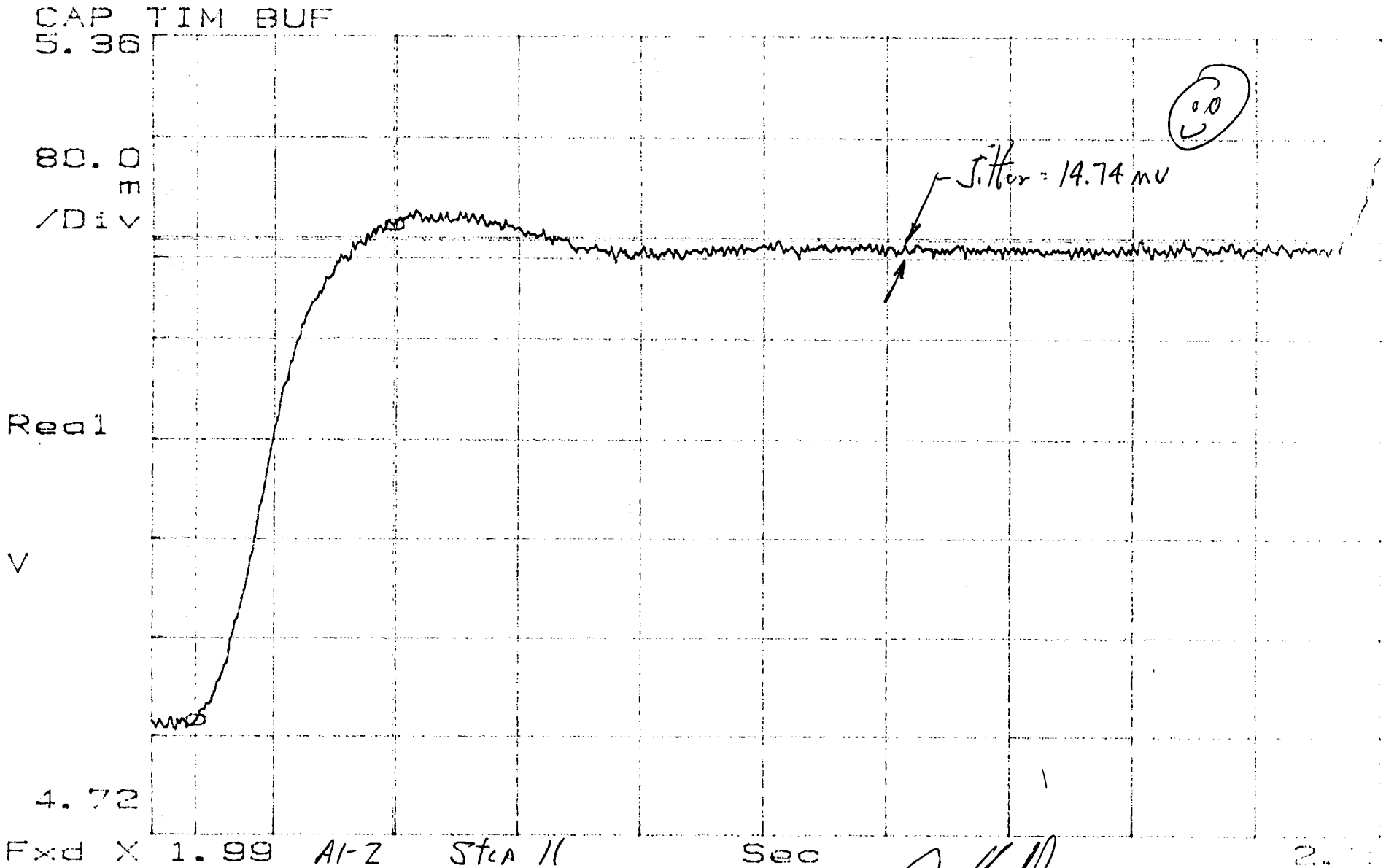
S/O: 436613 3.4.4.5

P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hartberg Date: 6-[illegible]-98

Quality: 7A 190 JUN 15 1998

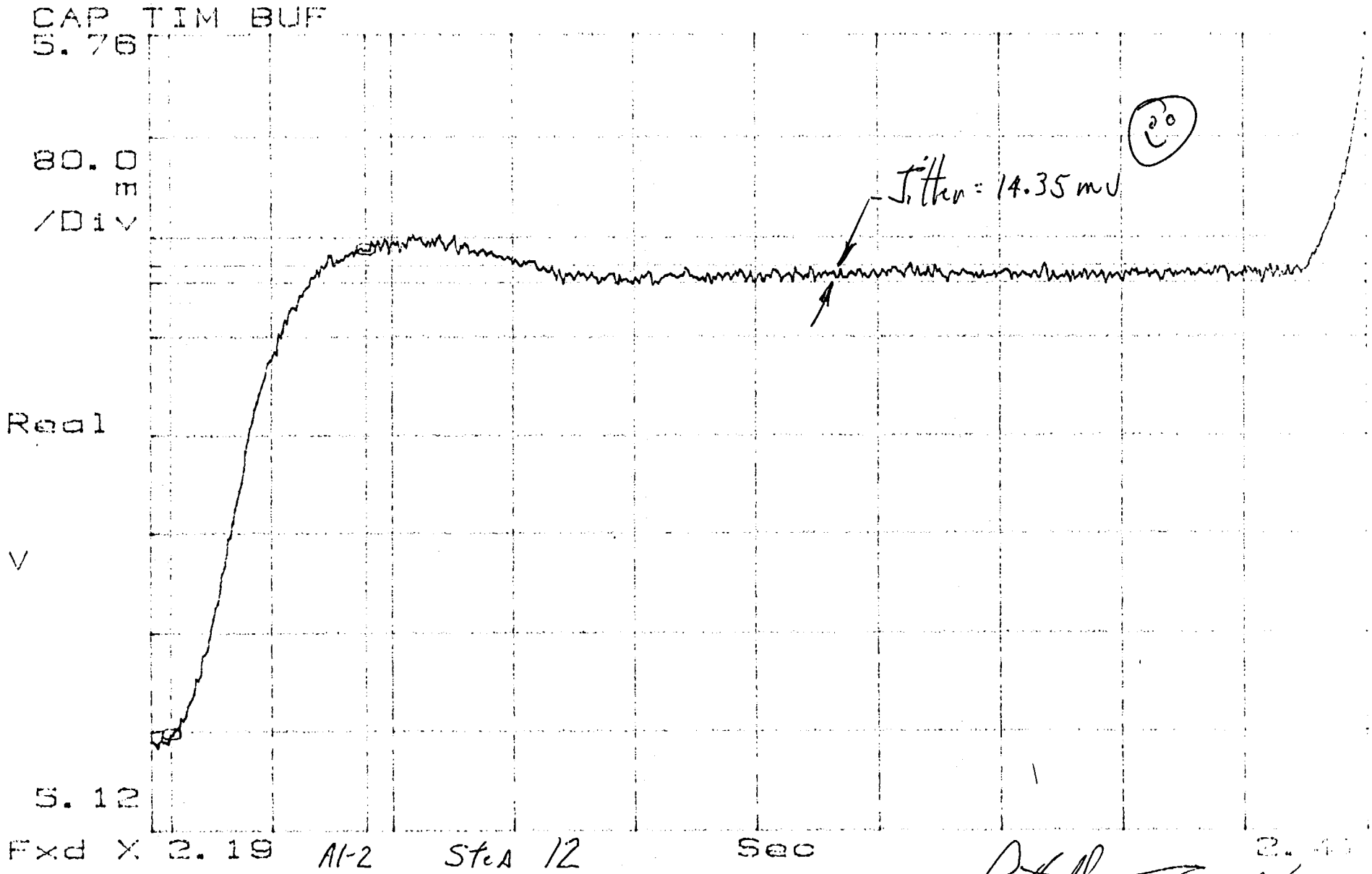
B44



S/O: 436613 3.4.4.5 Test Eng: Ray Heckberg Date: 6-1-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 7A 190

B45



A1-2 Step 12

3.4.4.5

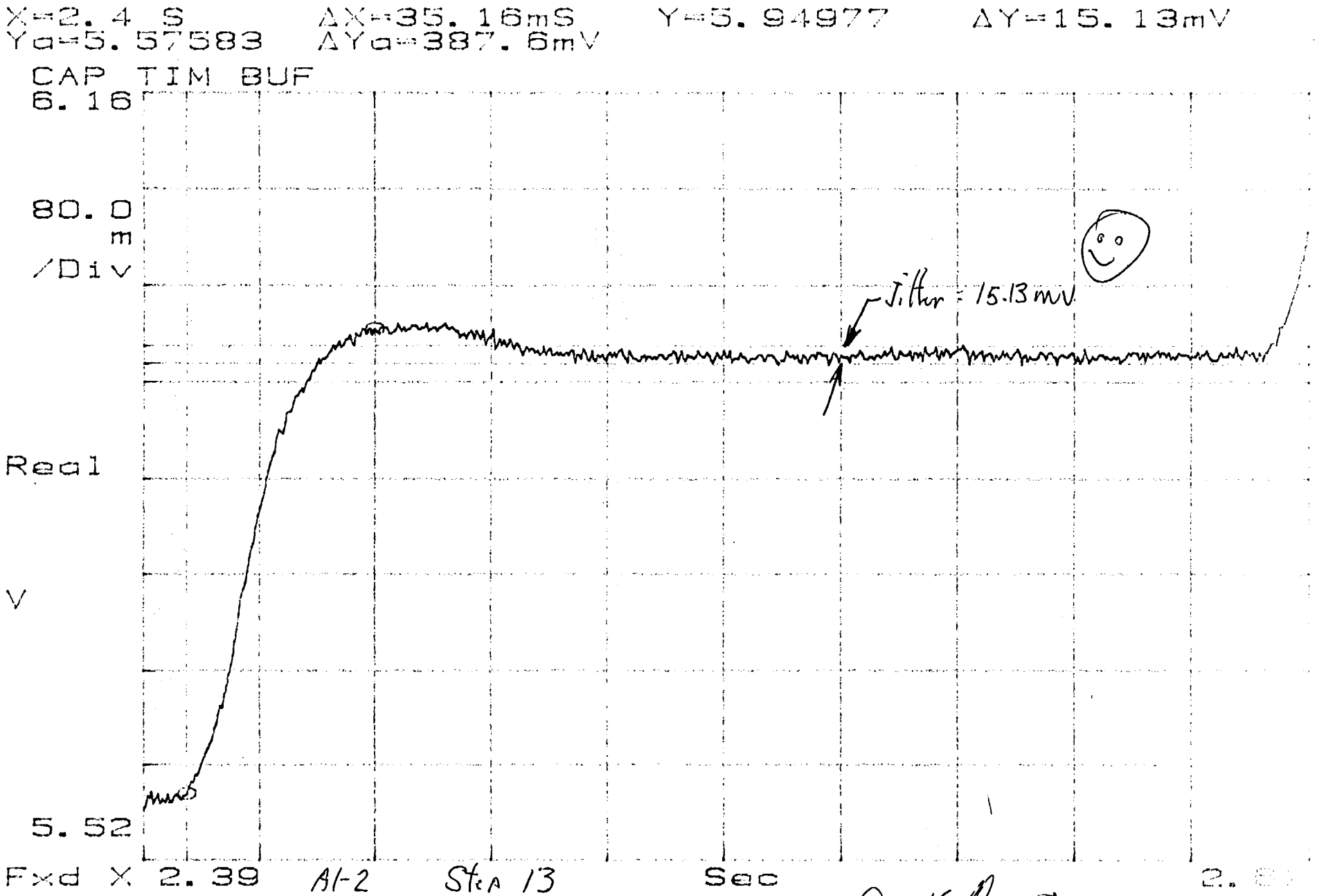
S/O: 436613

P/N: 1331720-2-17

Test Eng: [signature] Date: [illegible]

Quality: [illegible] JUN 15 1998

B46



A1-2 Step 13

3.4.4.5

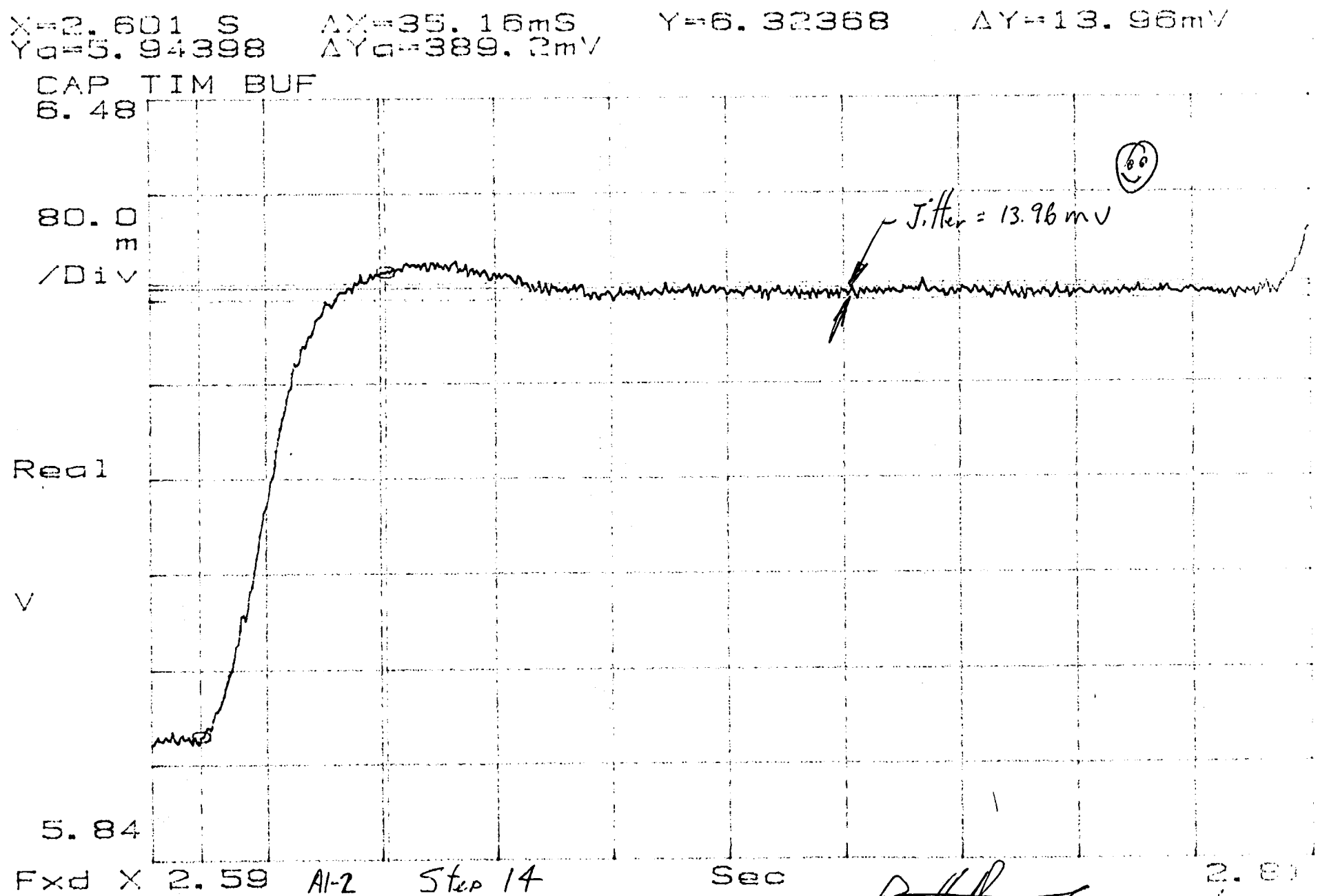
S/O: 436613

P/N: 1331720-2-17 SN: 105

Test Eng: Ray Hirtzberg Date: 6-1-98

Quality: JUN 15 1998 (7A 190)

B47



A1-2 Step 14

3.4.4.5

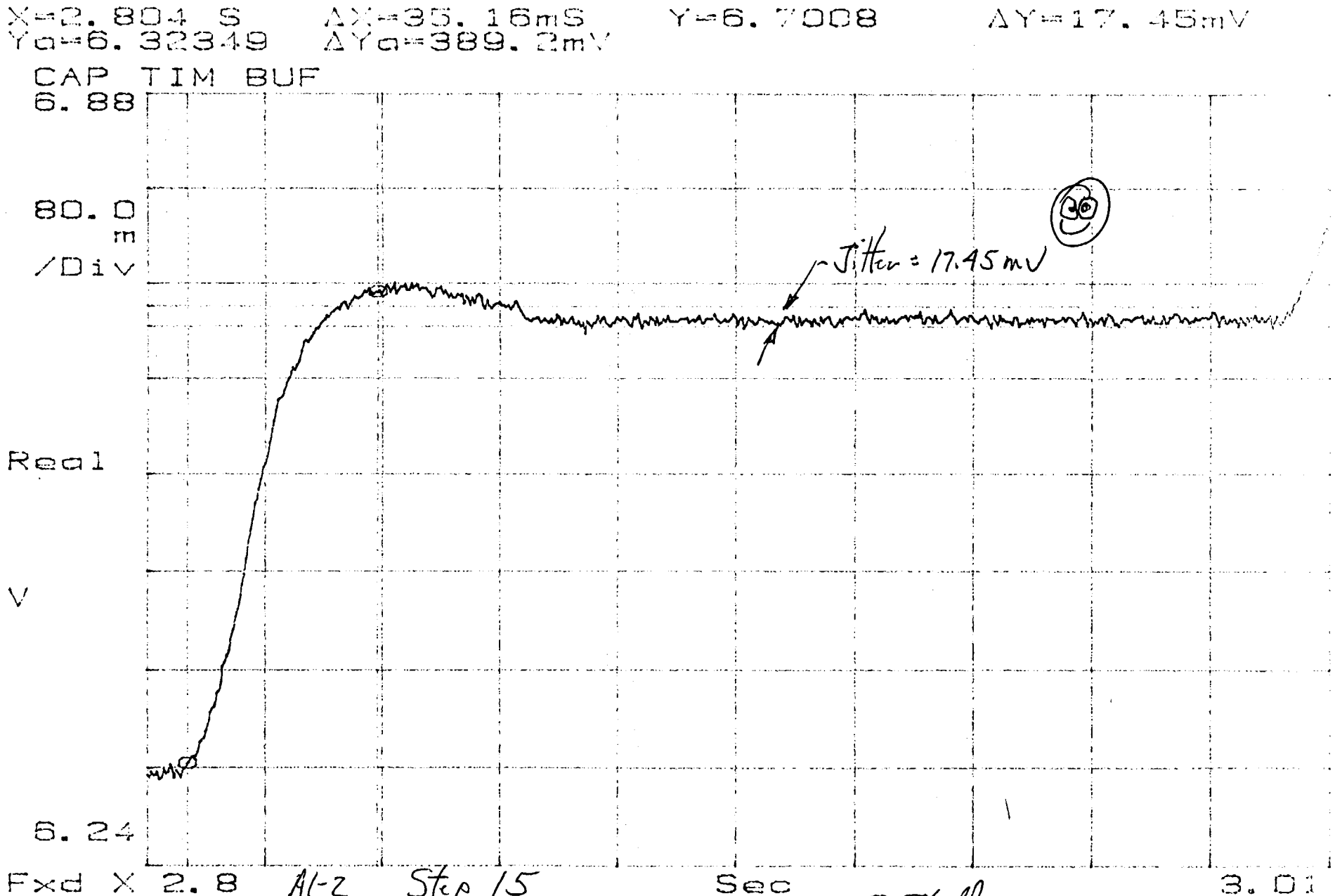
S/O: 436613

P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hufberg Date: 6-[illegible]-9

Quality: 7A 190 JUN 15 1998

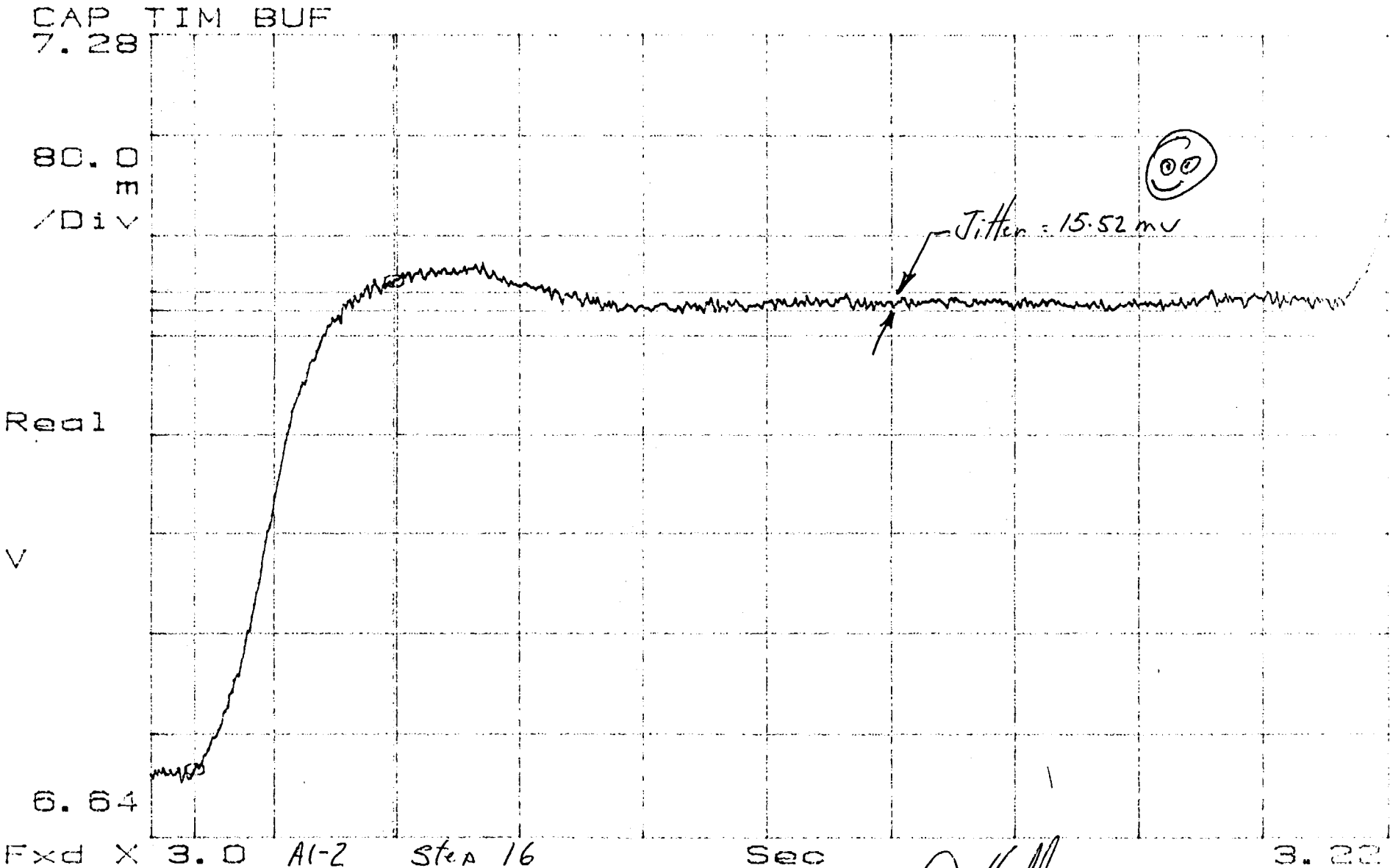
B48



S/O: 436613 3.4.4.5 Test Eng: Ray Hertzberg Date: 6-12-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 (7A 190)

R49



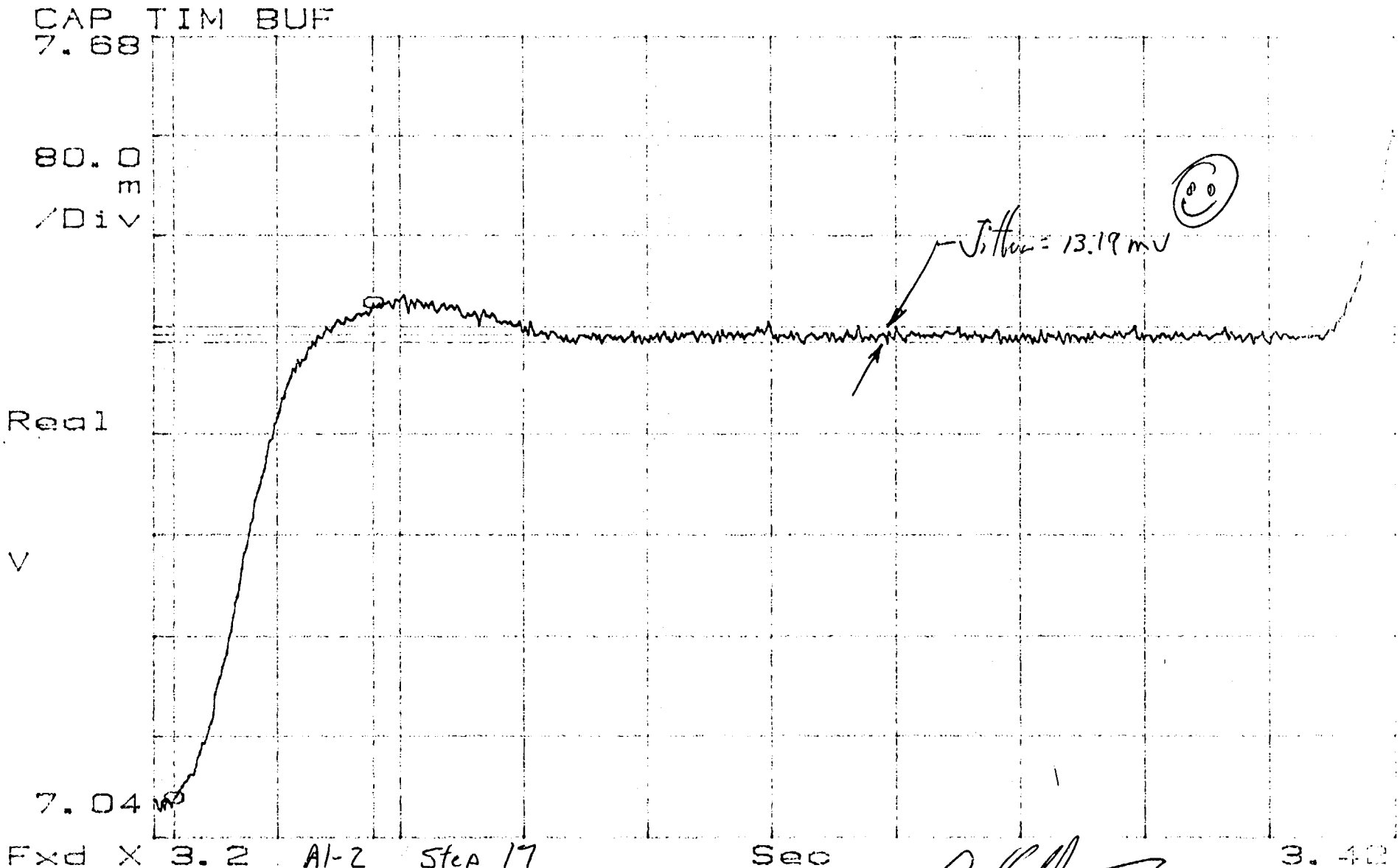
S/O: 436613 3.4.4.5

P/N: 1331720-2-17 SN: 105

Test Eng: Ray Heuzberg Date: 6-12-98

Quality: JUN 15 1998 (7A 190)

B50



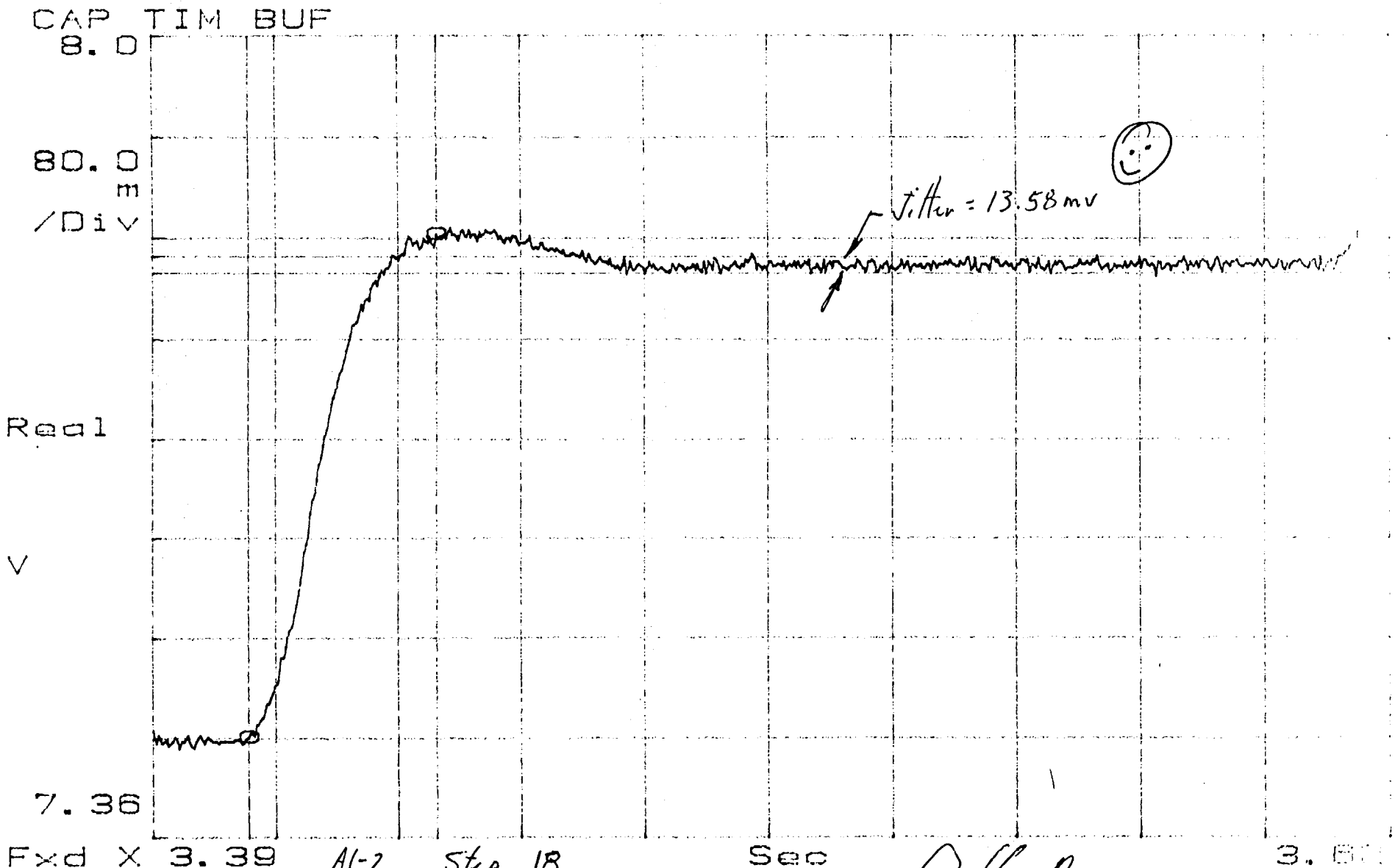
S/O: 436613 3.4.4.5

P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-12-98

Quality: 7A 190 JUN 15 1998

B51



A1-2 Step 18

3.4.4.5

S/O: 436613

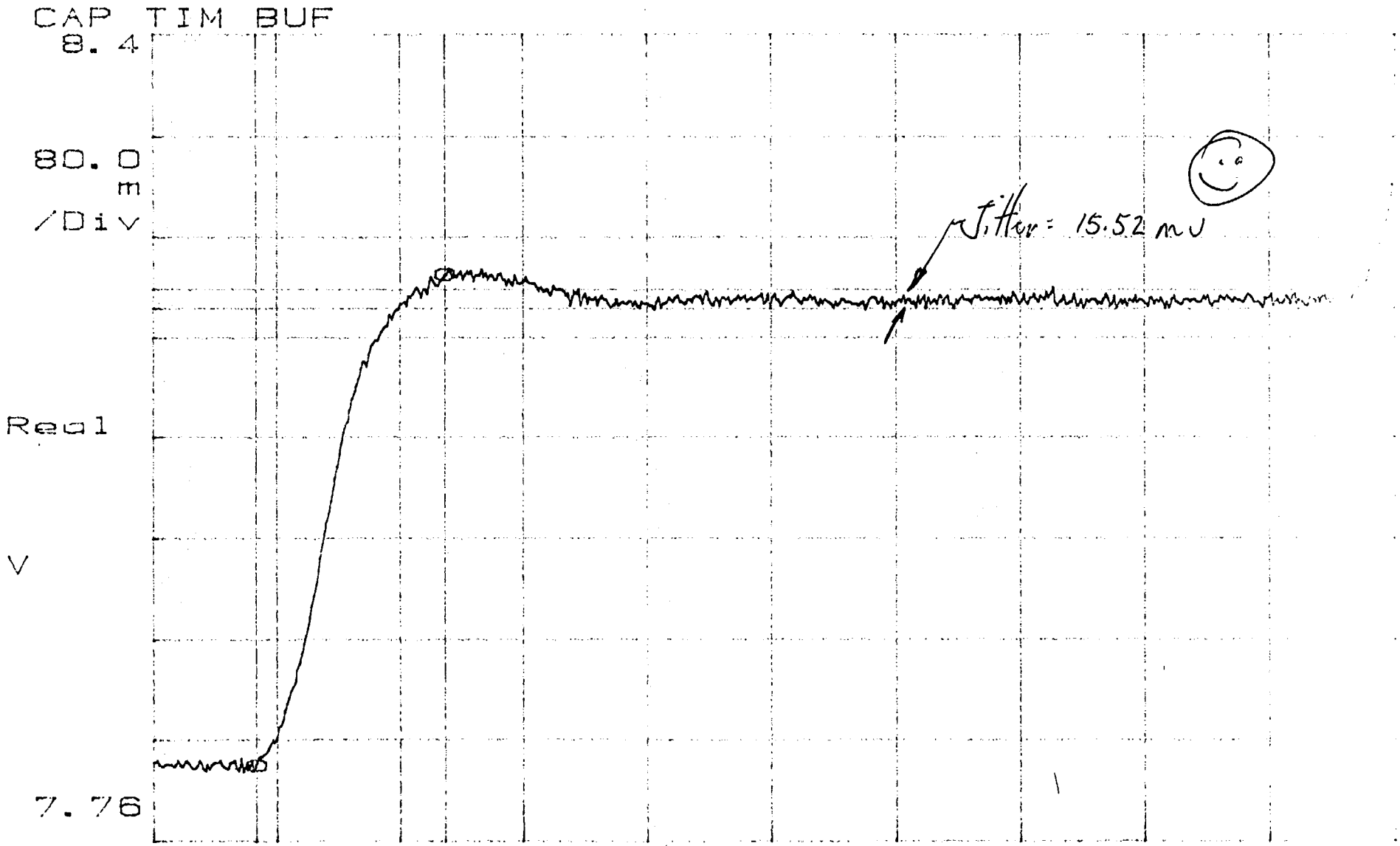
P/N: 1331720-2-1T SN: 105

Test Eng: Ray Herzberg Date: 6-10-98

Quality: JUN 15 1998 (7A 190)

R52

X=3.613 S ΔX=35.16mS Y=8.1983 ΔY=15.52mV
Ya=7.81881 ΔYa=390.9mV

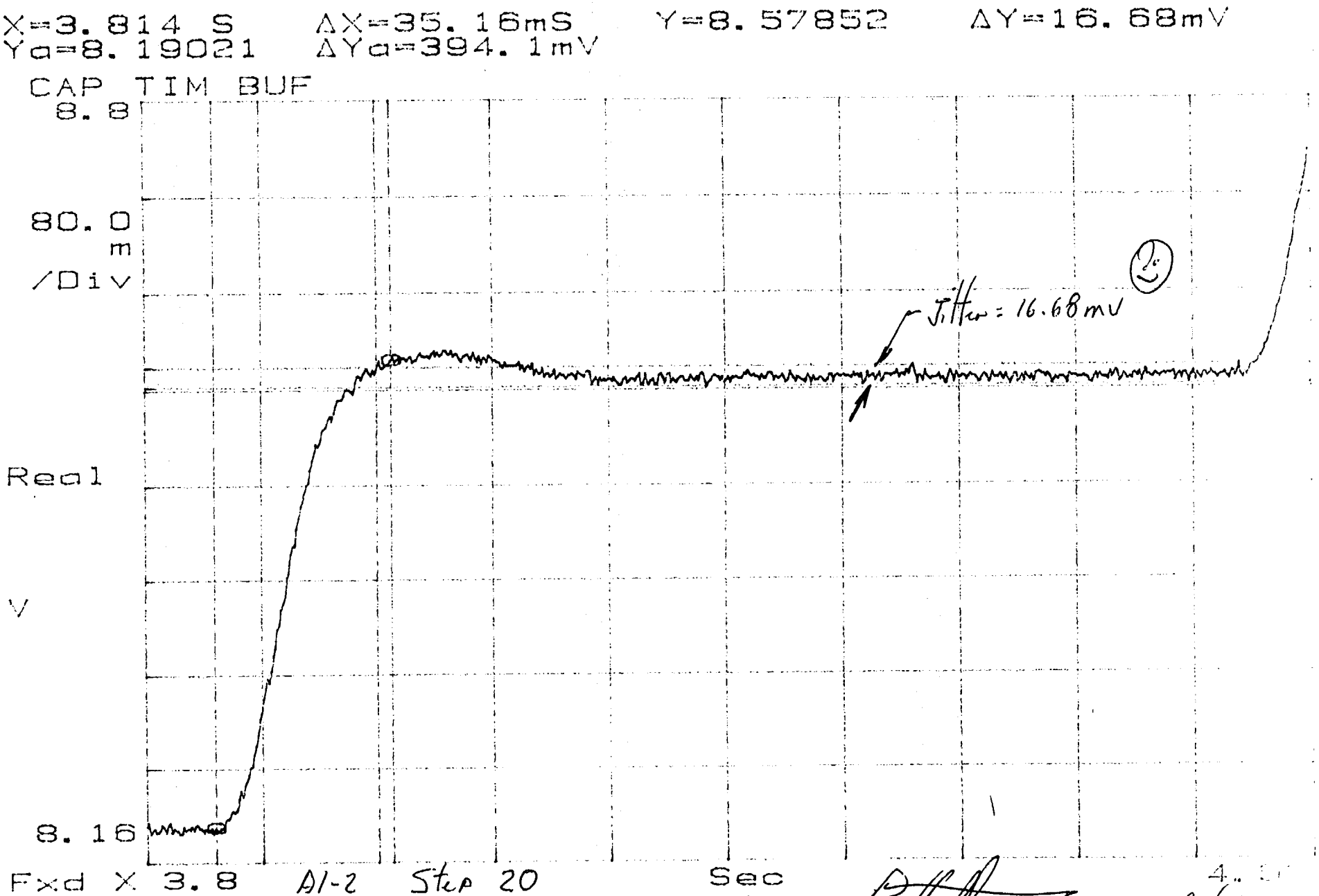


A1-2 Step 19
3.4.4.5

S/O: 436613
P/N: 133172.0-2-1T SN: 105

Test Eng: Raytheon Date: 6-12-98
Quality: QA 190 JUN 15 1998

B53



S/O: 436613

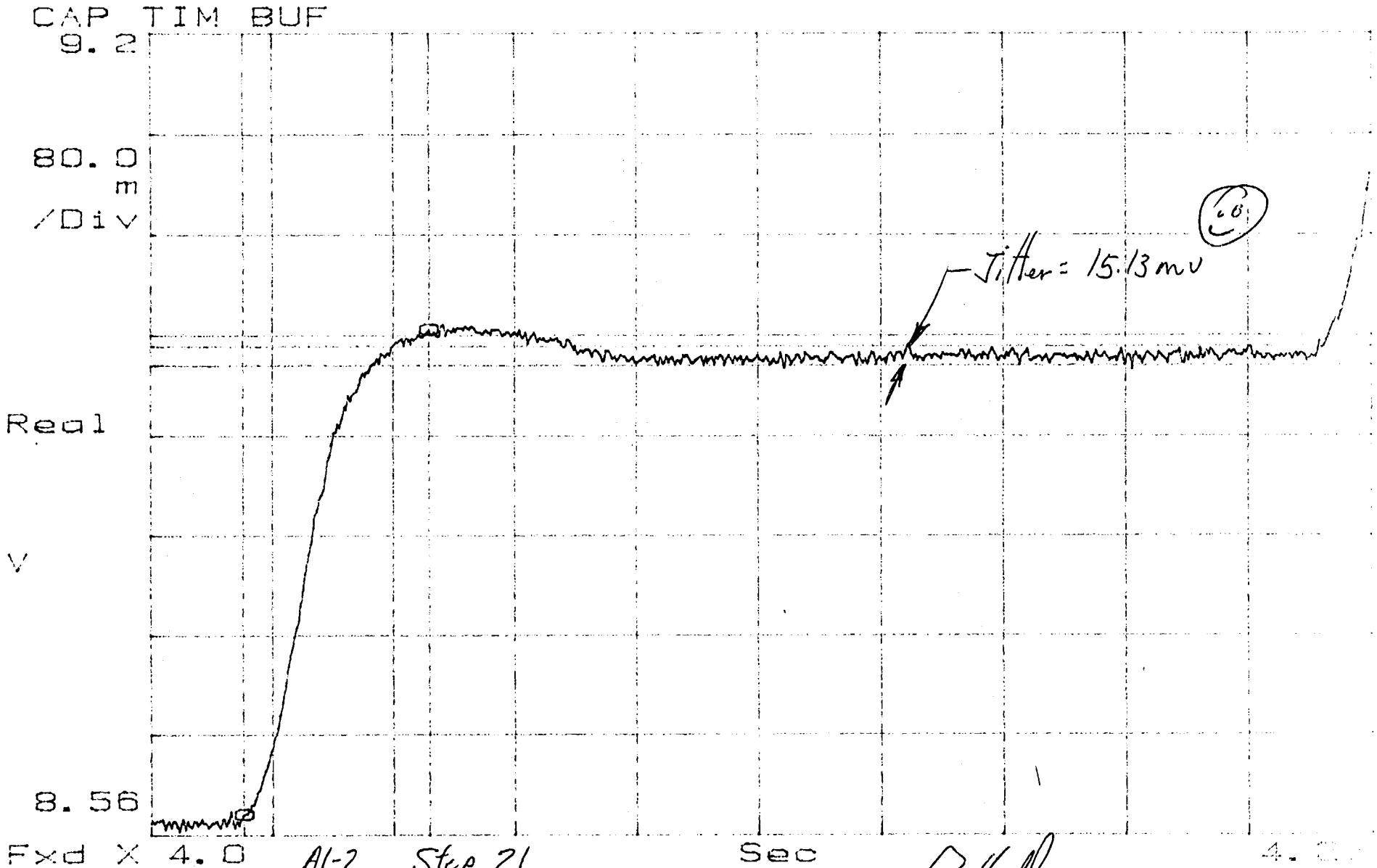
3.4.4.5

P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6 [illegible] 98

Quality: JUN 15 1998 7A 190

B54



A1-2 Step 21
3.4.4.5

S/O: 436613

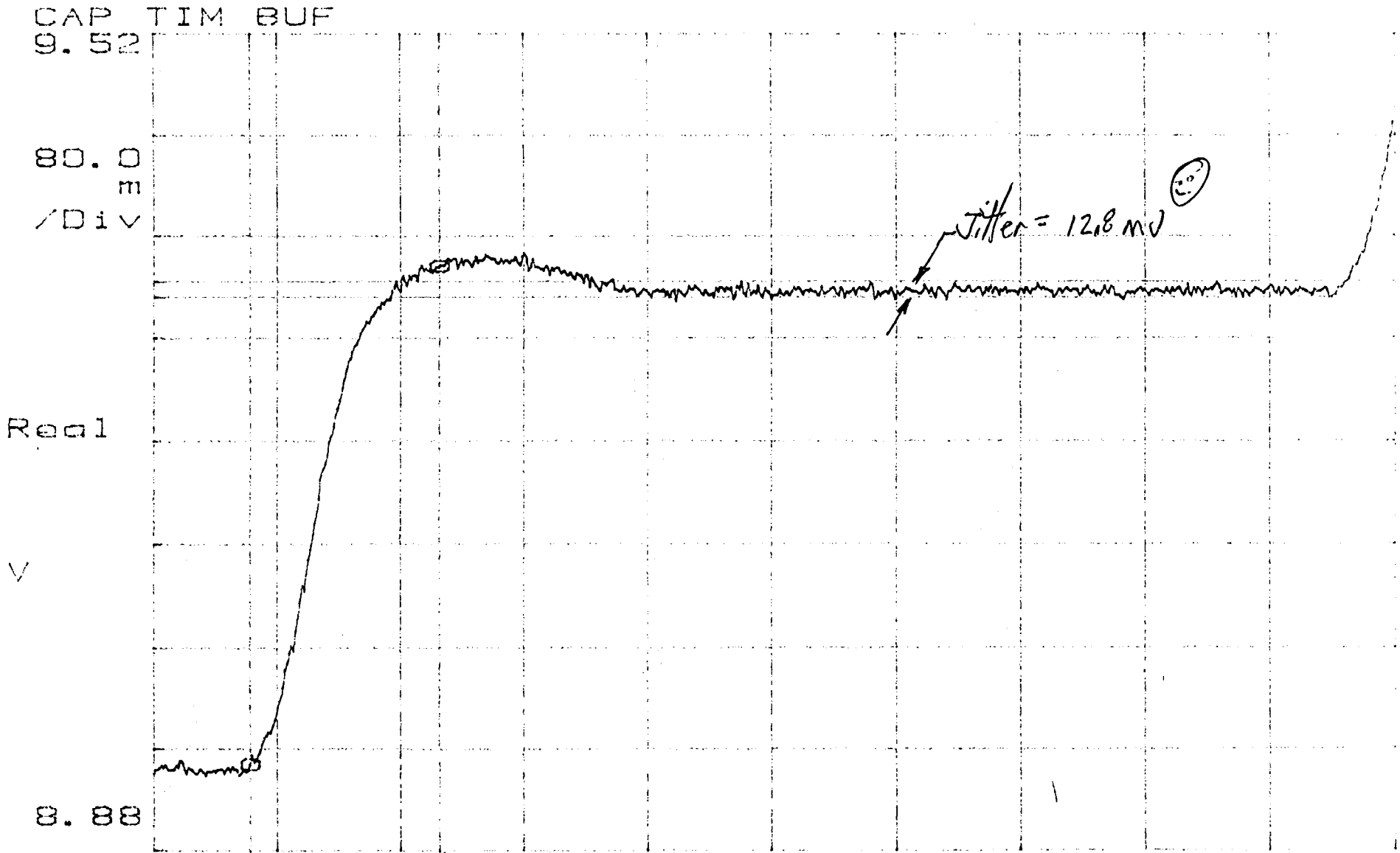
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6 [illegible] 98

Quality: 7A 190 JUN 15 1998

B55

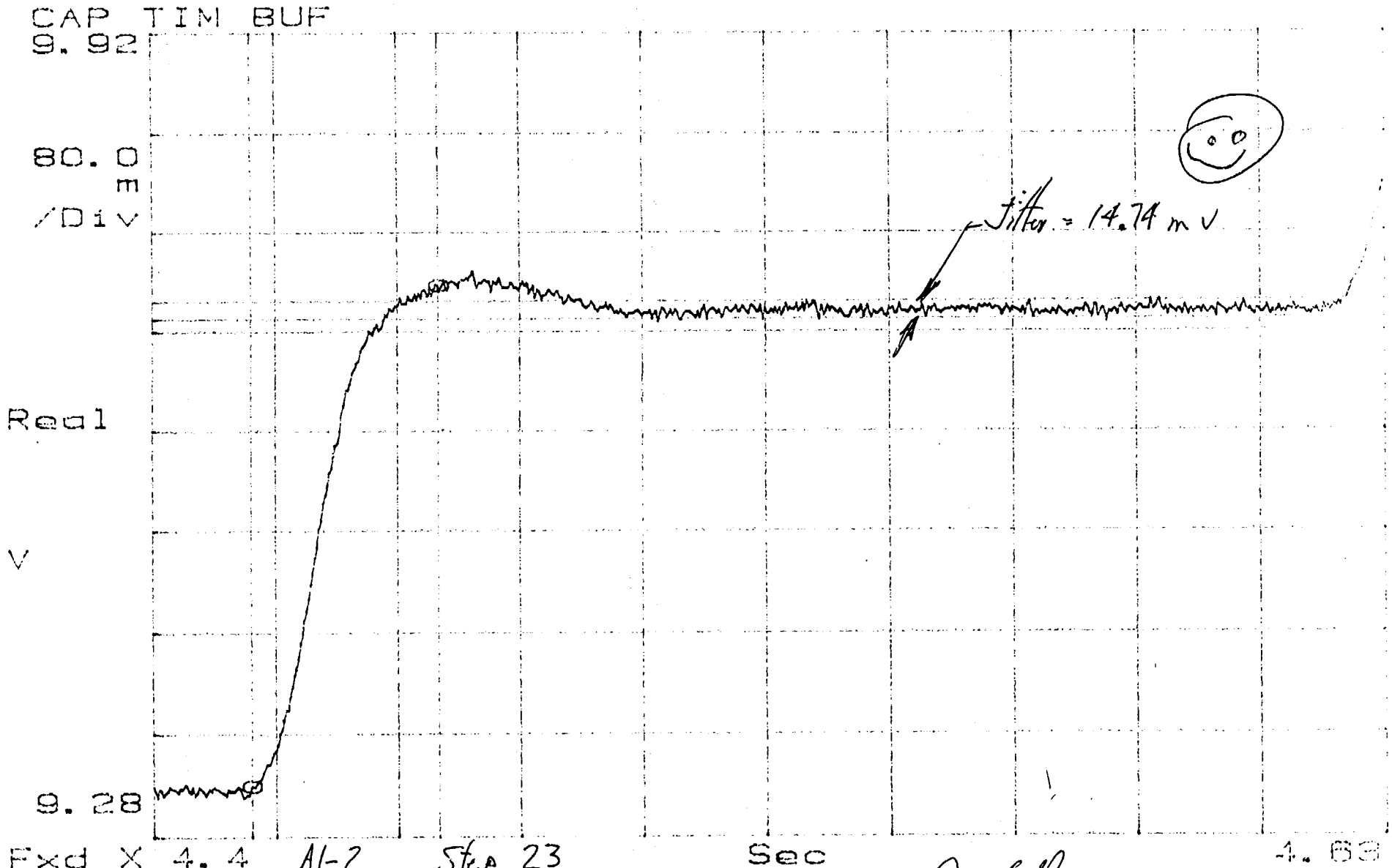
X=4.221 S ΔX=35.16mS Y=9.32373 ΔY=12.8mV
Ya=8.9476 ΔYa=387.6mV



S/O: 436613 3.4.4.5 Test Eng: [signature] Date: 6-[illegible]-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 (TA 190)

B56



A1-2 Step 23

3.4.4.5

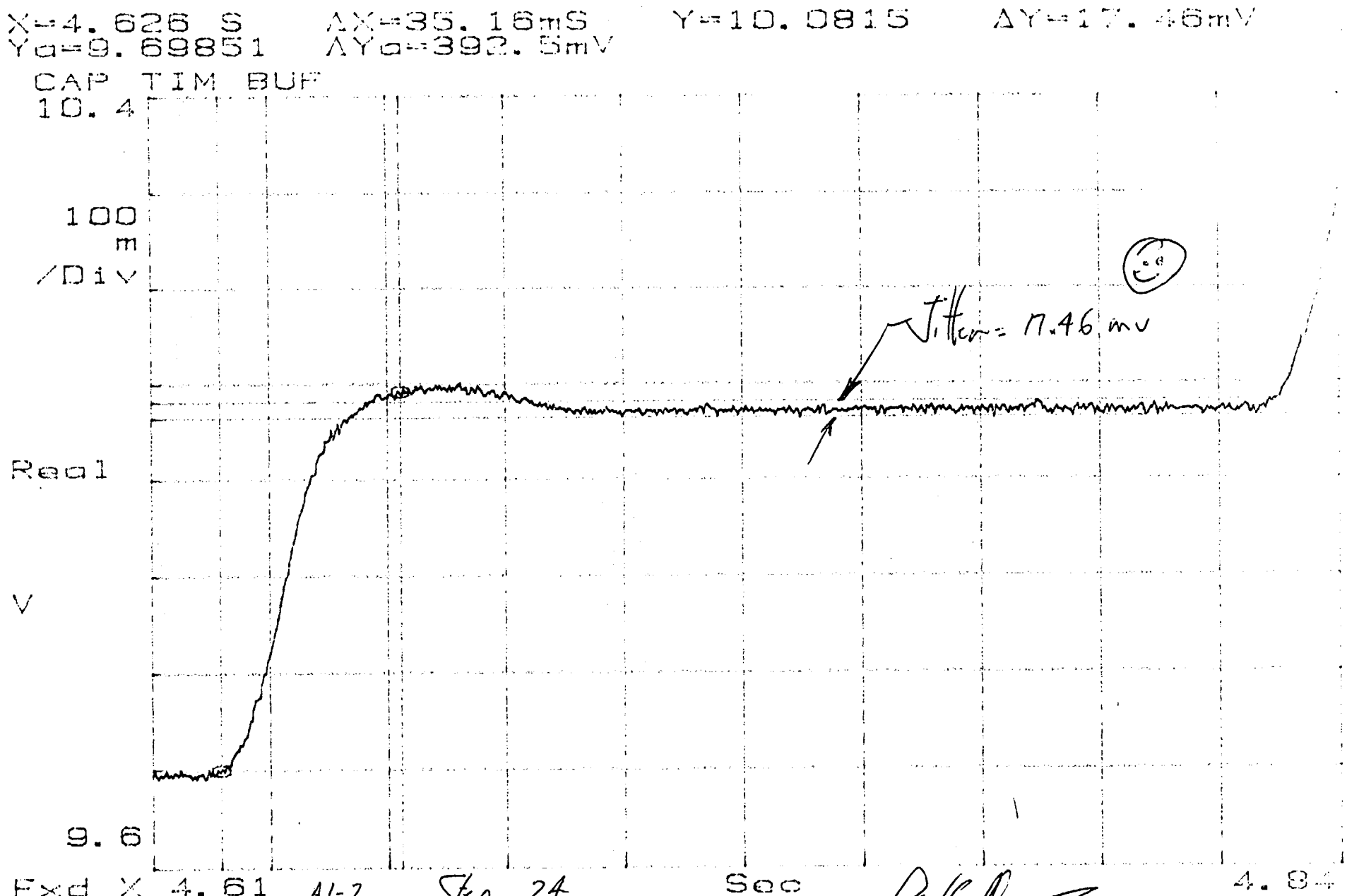
S/O: 436613

P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hartberg Date: 6-12-98

Quality: JUN 15 1998

BS7



A1-2 Step 24

3.4.4.5

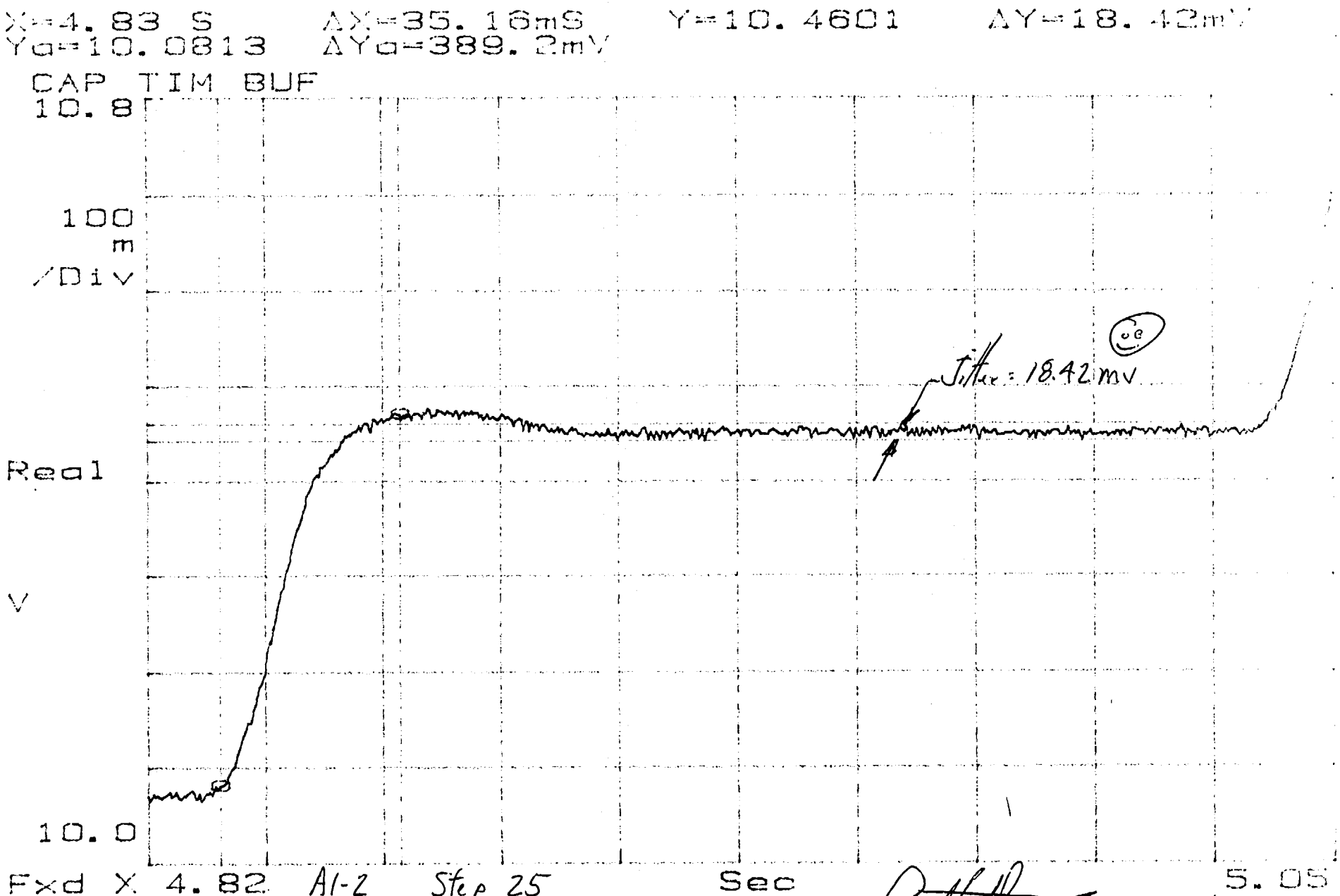
S/O: 436613

P/N: 1331720-2-IT S/N: 105

Test Eng: Date: 6-12-98

Quality: JUN 15 1998 7A 190

B58



A1-2 Step 25 3.4.4.5

S/O: 436613

P/N: 1331720-2-1T SN: 105

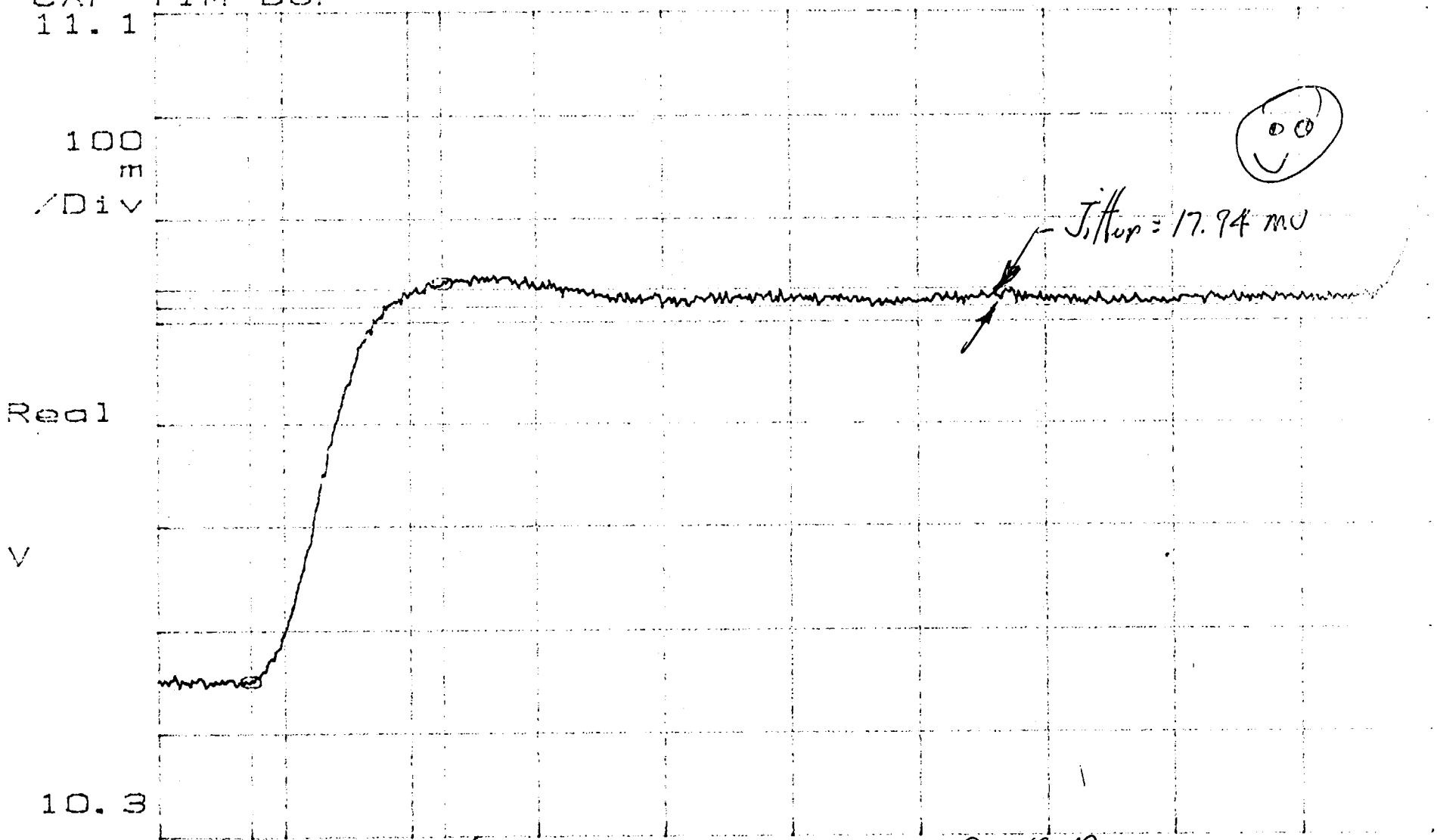
Test Eng: Ray Herzberg Date: 6-12-98

Quality: 7A 190 JUN 15 1998

B59

X=5.03 S ΔX=35.16mS Y=10.8319 ΔY=17.94mV
Ya=10.4494 ΔYa=387.6mV

CAP TIM BUF

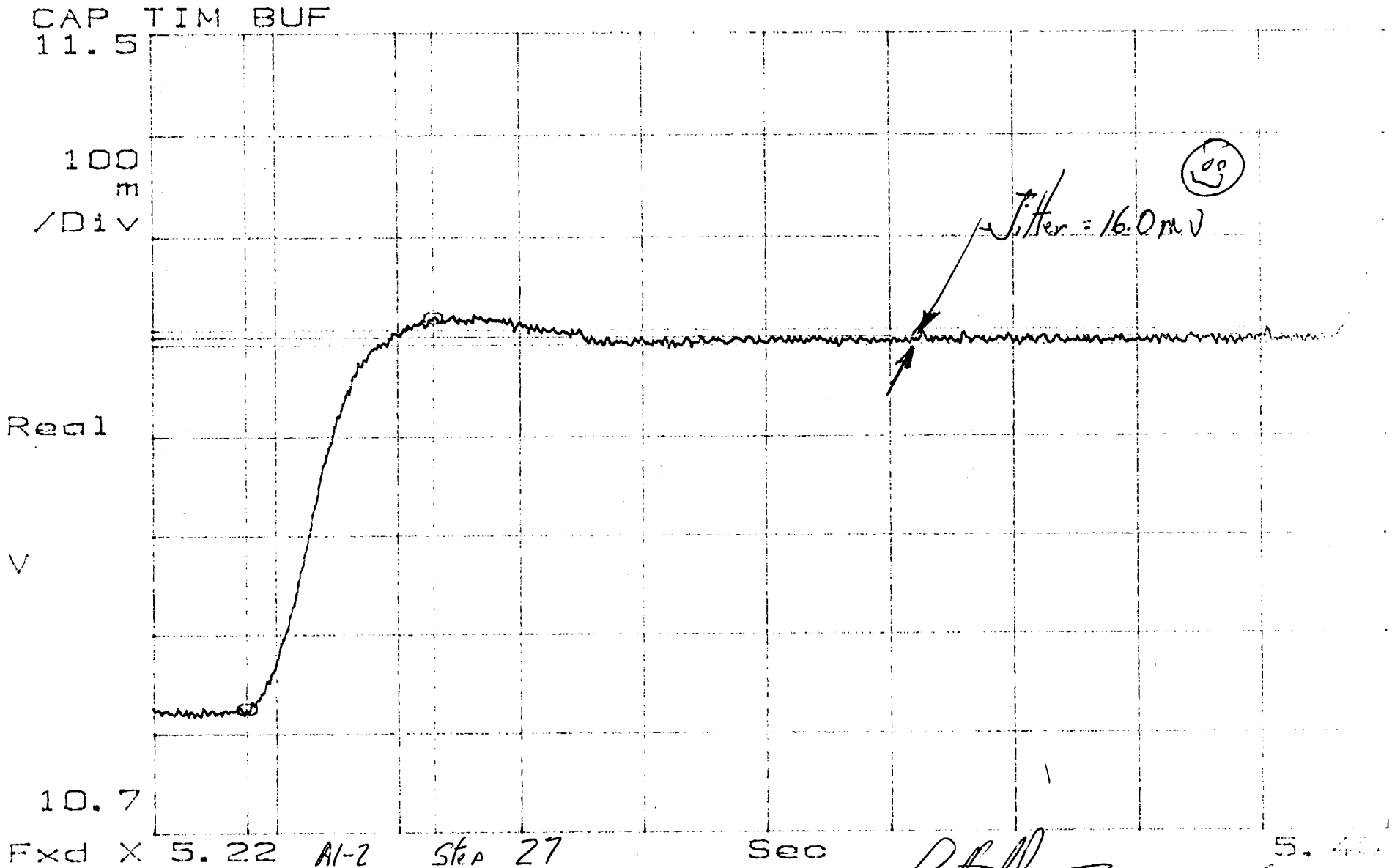


Fxd X 5.01 A1-2 Step 26 Sec 5.0

S/O: 436613 3.4.4.5 Test Eng: Ray Hergburg Date: 6-12-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 (7A 190)

B60



A1-2 Step 27 3.4.4.5

S/O: 436613

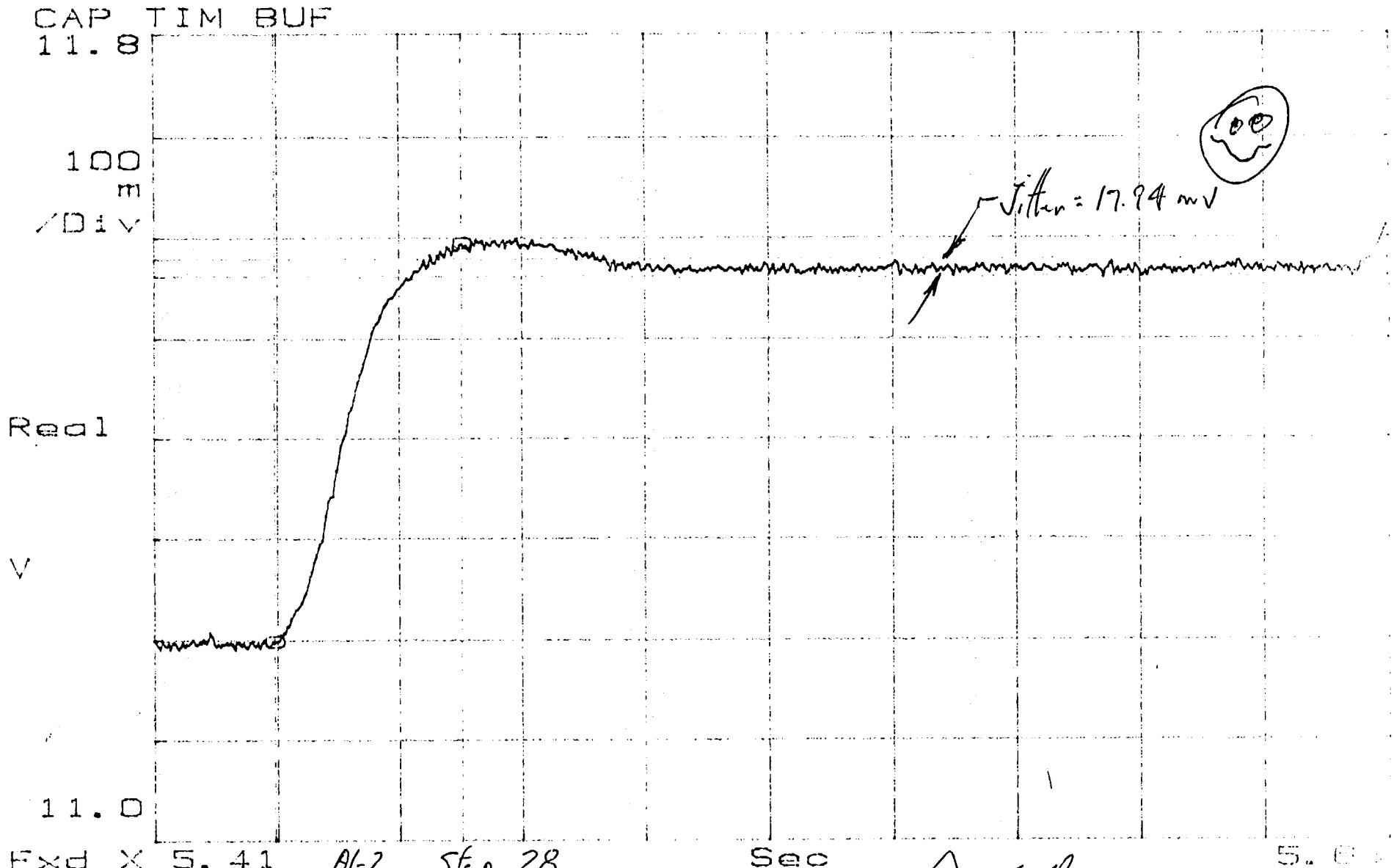
P/N: 1331720-2-1T SN: 105

Test Eng: Ray Herzberg Date: 6-12-98

Quality: JUN 15 1998

B61

X=5.437 S ΔX=35.16mS Y=11.5789 ΔY=17.94mV
Ya=11.1971 ΔYa=397.3mV



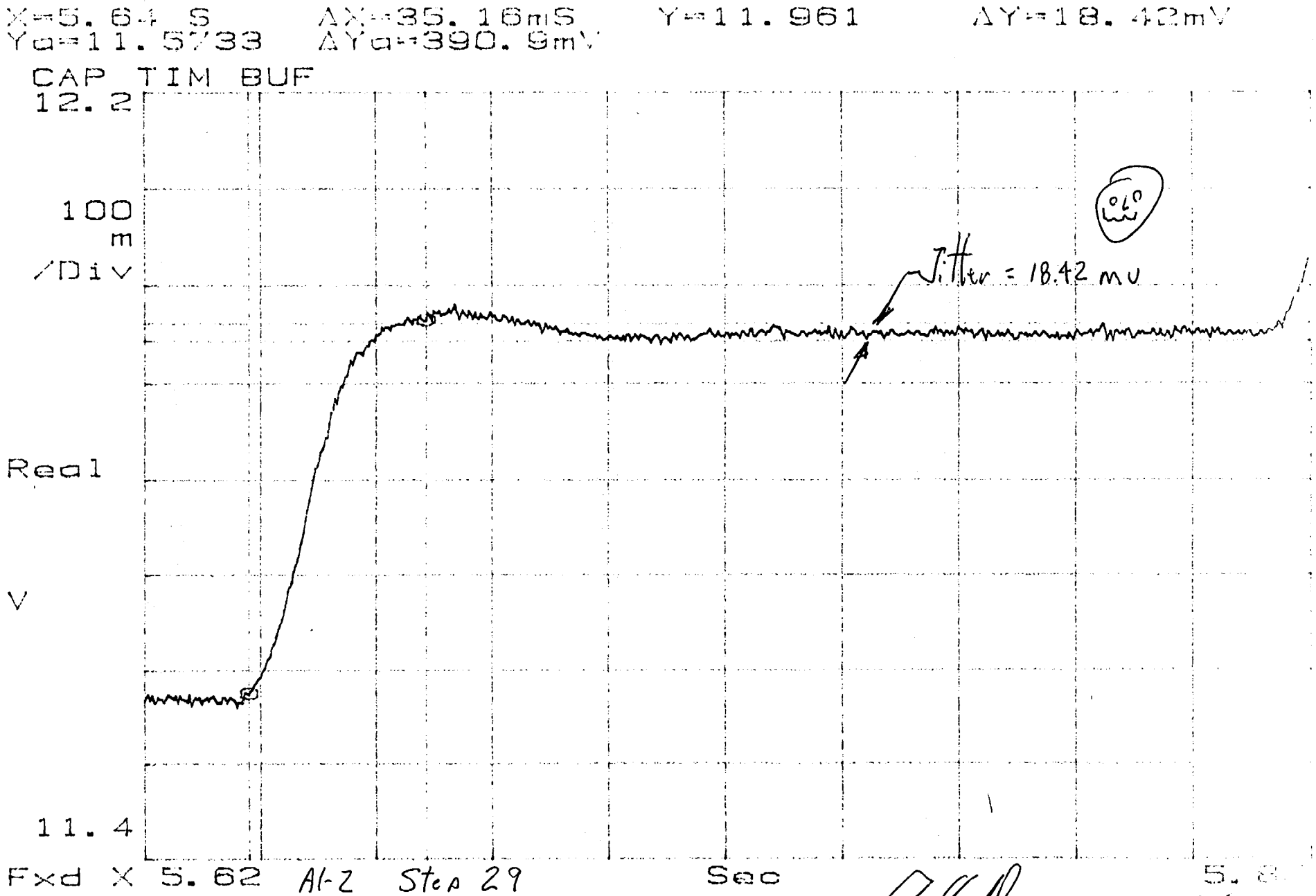
S/o: 436613

P/N: 1331720-2-1T SN: 105

Test Eng: Ray Hughes Date: 6-12-98

Quality: JUN 15 1998 (7A 190)

B62



Al-2 Step 29

S/o: 436613 3.4.4.5

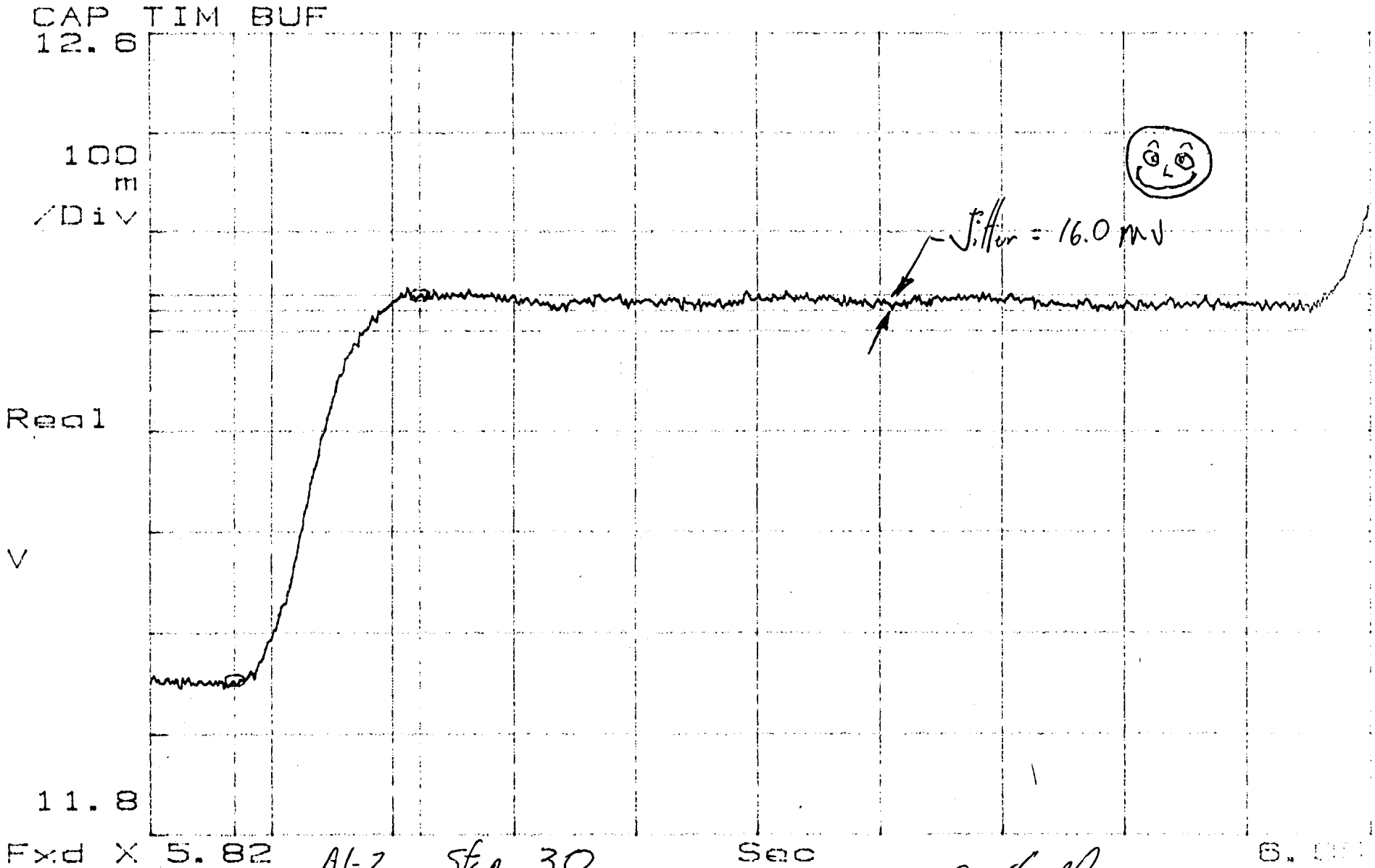
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-[illegible]-98

Quality: 7A 190 JUN 15 1998

B63

X=5.84 S ΔX=35.16mS Y=12.3353 ΔY=16.0mV
Ya=11.9528 ΔYa=381.1mV



A1-2 Step 30
3.4.4.5

S/O: 436613

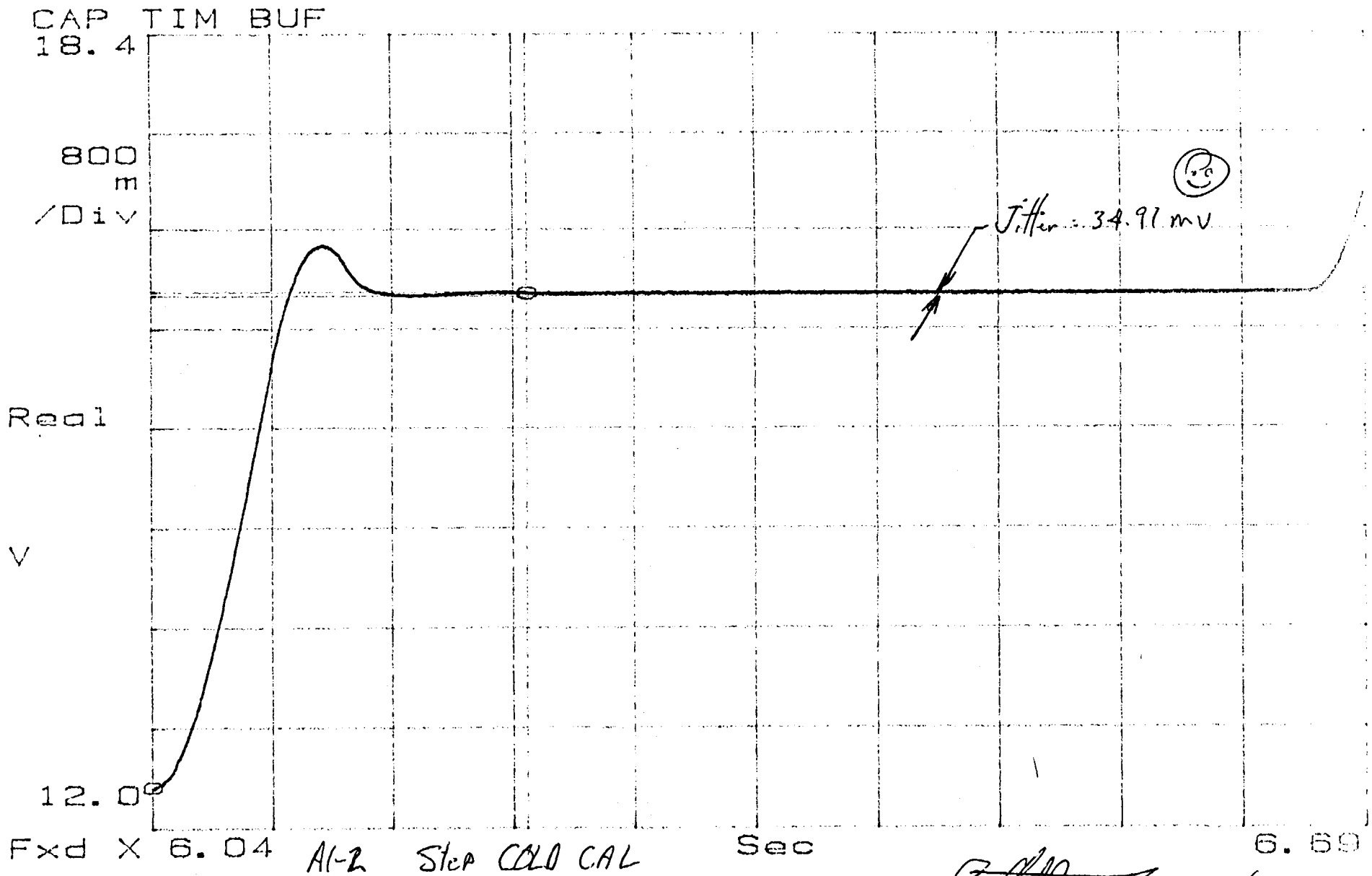
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date:

Quality: JUN 15 1998 (7A 190)

B64

X=6.044 S ΔX=200.4mS Y=16.2899 ΔY=34.91mV
Ya=12.3226 ΔYa=3.954 V



A1-2 Step COLD CAL
3.4.4.5

S/O: 436613

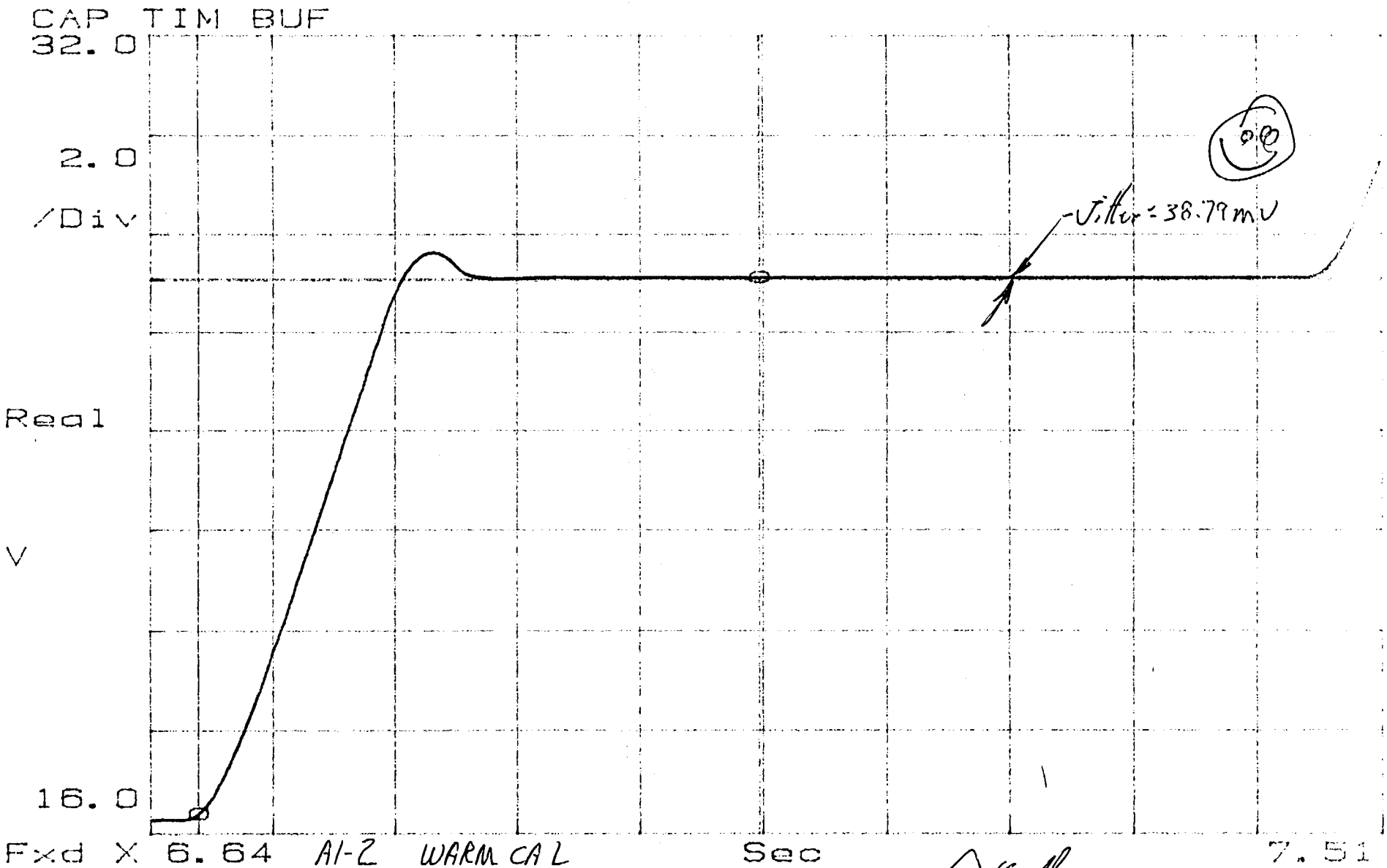
P/N: 133 1720-2-1T SN: 105

Test Eng: [signature] Date: 6-13-98

Quality: [signature] JUN 15 1998

B105

X=6.67 S ΔX=401.2mS Y=27.0933 ΔY=38.79mV
Ya=16.3756 ΔYa=10.74 V



S/o: 436613 3.4.4.5 Test Eng: [signature] Date: 6-12-98

P/N: 1331720-2-1T SN: 105 Quality: JUN 15 1998 (7A 190)

B66

TEST DATA SHEET 7 (Sheet 1 Of 4)
Scan Motion and Jitter Test (A1-1) (Paragraph 3.4.4.5)

Test Setup Verified: [signature] Shop Order No. 436613
Signature

Step No.	Description	Requirement	Test Result	Pass/Fail
7	--	Stepping Slewing <8 sec period per Figure 6	< 8.0 Sec	P
9	Scene 1-2 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
10	Scene 2-3 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
11	Scene 3-4 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
12	Scene 4-5 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
13	Scene 5-6 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
14	Scene 6-7 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
15	Scene 7-8 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
16	Scene 8-9 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

B67A

TEST DATA SHEET 7 (Sheet 2 Of 4)
Scan Motion and Jitter Test (A1-1)

Step No.	Description	Requirement	Test Result	Pass/Fail
17	Scene 9-10 3.33° step	<35 msec rise time per Figure 7	<35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
18	Scene 10-11 3.33° step	<35 msec rise time per Figure 7	<35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
19	Scene 11-12 3.33° step	<35 msec rise time per Figure 7	<35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
20	Scene 12-13 3.33° step	<35 msec rise time per Figure 7	<35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
21	Scene 13-14 3.33° step	<35 msec rise time per Figure 7	<35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
22	Scene 14-15 3.33° step	<35 msec rise time per Figure 7 R. Hartley	~~< ±5%~~ 35 msec ~~< 3%~~	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	~~< ±5%~~ ~~< 3%~~	P
23	Scene 15-16 3.33° step	<35 msec rise time per Figure 7	<35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
24	Scene 16-17 3.33° step	<35 msec rise time per Figure 7	<35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

B67B

TEST DATA SHEET 7 (Sheet 3 Of 4)
Scan Motion and Jitter Test (A1-1)

Step No.	Description	Requirement	Test Result	Pass/Fail
25	Scene 17-18 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
26	Scene 18-19 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
27	Scene 19-20 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
28	Scene 20-21 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
29	Scene 21-22 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
30	Scene 22-23 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
31	Scene 23-24 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
32	Scene 24-25 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

B67C

TEST DATA SHEET 7 (Sheet 4 Of 4)
Scan Motion and Jitter Test (A1-1)

Step No.	Description	Requirement	Test Result	Pass/Fail
33	Scene 25-26 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
34	Scene 26-27 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
35	Scene 27-28 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
36	Scene 28-29 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
37	Scene 29-30 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
38	Scene 30 Cold Cal 35.0° slew	<0.21 sec slew time per Figure 10	< 0.21 sec	P
		< ±0.165° jitter per Figure 11	< ± 0.165°	P
39	Cold Cal - Warm Cal 96.67° slew	<0.40 sec slew time per Figure 12	< 0.40 sec	P
		< ±0.165° jitter per Figure 13	< ± 0.165°	P

Pass = P
Fail = F

Unit: AMSU METSAT A1

Serial No.: 105

Date: 6-12-98

Test Engineer: Ray [illegible] RS JUNE

Quality Assurance: ZA 190 MAY 16 1998

Customer Representative: [illegible]

B67 D

Supplimental Data to Test Data Sheet 7
METSAT A1-1 S/N: 105

Scene Number	Rise Time to Scene	Overshoot %	Jitter ± %
1	N/A	N/A	NDJ
2	25.0	NDO	0.7
3	25.4	NDO	0.5
4	27.7	NDO	1.0
5	25.8	NDO	1.1
6	25.8	NDO	1.3
7	24.6	NDO	1.3
8	25.8	NDO	NDJ
9	25.0	0.8	1.5
10	26.6	NDO	0.8
11	25.8	NDO	0.9
12	26.2	NDO	0.8
13	26.6	NDO	0.9
14	26.2	NDO	0.8
15	25.4	NDO	1.3
16	27.3	NDO	NDJ

Scene Number	Rise Time to Scene	Overshoot %	Jitter ± %
17	25.8	NDO	NDJ
18	25.4	NDO	0.8
19	26.2	NDO	1.0
20	28.5	NDO	0.9
21	25.0	NDO	0.6
22	28.1	NDO	0.5
23	25.4	NDO	1.1
24	24.2	NDO	1.9
25	27.3	NDO	NDJ
26	25.4	NDO	NDJ
27	23.9	NDO	3.0
28	22.3	NDO	NDJ
29	24.6	NDO	NDJ
30	26.2	NDO	0.5
CC	69.1	N/A	2.08
WC	142.6	N/A	1.03

Rise Time measured in ms.
"NDO" - No Discernible Overshoot
"NDJ" - No Discernible Jitter

Test Engineer : _____

Data retrieved from disk file: 7AP_FS51

TEST DATA SHEET 8 (Sheet 1 Of 4)
Scan Motion and Jitter Test (A1-2) (Paragraph 3.4.4.5)

Test Setup Verified: Ray Herzberg Signature Shop Order No. 436613

Step No.	Description	Requirement	Test Result	Pass/Fail
44	--	Stepping Slewing <8 sec period per Figure 6	< 8.0 Sec	P
9	Scene 1-2 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
10	Scene 2-3 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
11	Scene 3-4 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
12	Scene 4-5 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
13	Scene 5-6 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
14	Scene 6-7 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
15	Scene 7-8 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
16	Scene 8-9 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

B68A

SHEET 86 OF
ECN NO. 1828

TEST DATA SHEET 8 (Sheet 2 Of 4)
Scan Motion and Jitter Test (A1-2)

Step No.	Description	Requirement	Test Result	Pass/Fail
17	Scene 9-10 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
18	Scene 10-11 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
19	Scene 11-12 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
20	Scene 12-13 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
21	Scene 13-14 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
22	Scene 14-15 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
23	Scene 15-16 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
24	Scene 16-17 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

B68 B

TEST DATA SHEET 8 (Sheet 3 Of 4)
Scan Motion and Jitter Test (A1-2)

Step No.	Description	Requirement	Test Result	Pass/Fail
25	Scene 17-18 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < +3%	P
26	Scene 18-19 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
27	Scene 19-20 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
28	Scene 20-21 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
29	Scene 21-22 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
30	Scene 22-23 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
31	Scene 23-24 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
32	Scene 24-25 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P

Pass = P
Fail = F

B68C

SHEET 88 OF
ECN NO. 1828

AE-26002/1D
12 Feb 98

TEST DATA SHEET 8 (Sheet 4 Of 4)
Scan Motion and Jitter Test (A1-2)

Step No.	Description	Requirement	Test Result	Pass/Fail
33	Scene 25-26 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
34	Scene 26-27 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
35	Scene 27-28 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
36	Scene 28-29 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
37	Scene 29-30 3.33° step	<35 msec rise time per Figure 7	< 35 msec	P
		< ±5% jitter per Figure 7 < 3% overshoot for 10 msec	< ±5% < 3%	P
38	Scene 30 Cold Cal 35.0° slew	<0.21 sec slew time per Figure 10	< 0.21 sec	P
		< ±0.165° jitter per Figure 11	< ± 0.165°	P
39	Cold Cal - Warm Cal 96.67° slew	<0.40 sec slew time per Figure 12	< 0.40 sec	P
		< ±0.165° jitter per Figure 13	< ±0.165°	P

Pass = P
Fail = F

Unit: AMSU METSAT A1

Serial No.: 105

Date: 6-12-98

Test Engineer: [signature] MAY 16 1998

Quality Assurance: [signature] 7A 190 June

Customer Representative: [signature] 8/19/98

B68D

Supplimental Data to Test Data Sheet 8
METSAT A1-2 S/N: 105

Scene Number	Rise Time to Scene	Overshoot %	Jitter ± %
1	N/A	N/A	NDJ
2	25.4	NDO	0.4
3	28.5	NDO	2.3
4	27.3	NDO	0.9
5	25.0	NDO	0.6
6	25.8	NDO	0.8
7	26.2	NDO	0.7
8	23.8	NDO	NDJ
9	25.8	NDO	1.1
10	26.6	NDO	1.0
11	26.9	NDO	0.7
12	25.8	NDO	0.9
13	25.0	NDO	0.7
14	25.4	NDO	0.6
15	25.4	NDO	0.6
16	26.2	NDO	1.1

Scene Number	Rise Time to Scene	Overshoot %	Jitter ± %
17	25.8	NDO	0.6
18	26.1	NDO	0.7
19	27.3	NDO	0.7
20	26.5	NDO	0.5
21	24.6	NDO	0.6
22	25.8	NDO	NDJ
23	25.4	NDO	0.9
24	25.4	NDO	NDJ
25	25.8	NDO	NDJ
26	26.6	NDO	0.7
27	25.4	NDO	NDJ
28	25.8	NDO	NDJ
29	25.0	NDO	1.0
30	27.3	NDO	0.9
CC	69.5	N/A	0.65
WC	150.4	N/A	NDJ

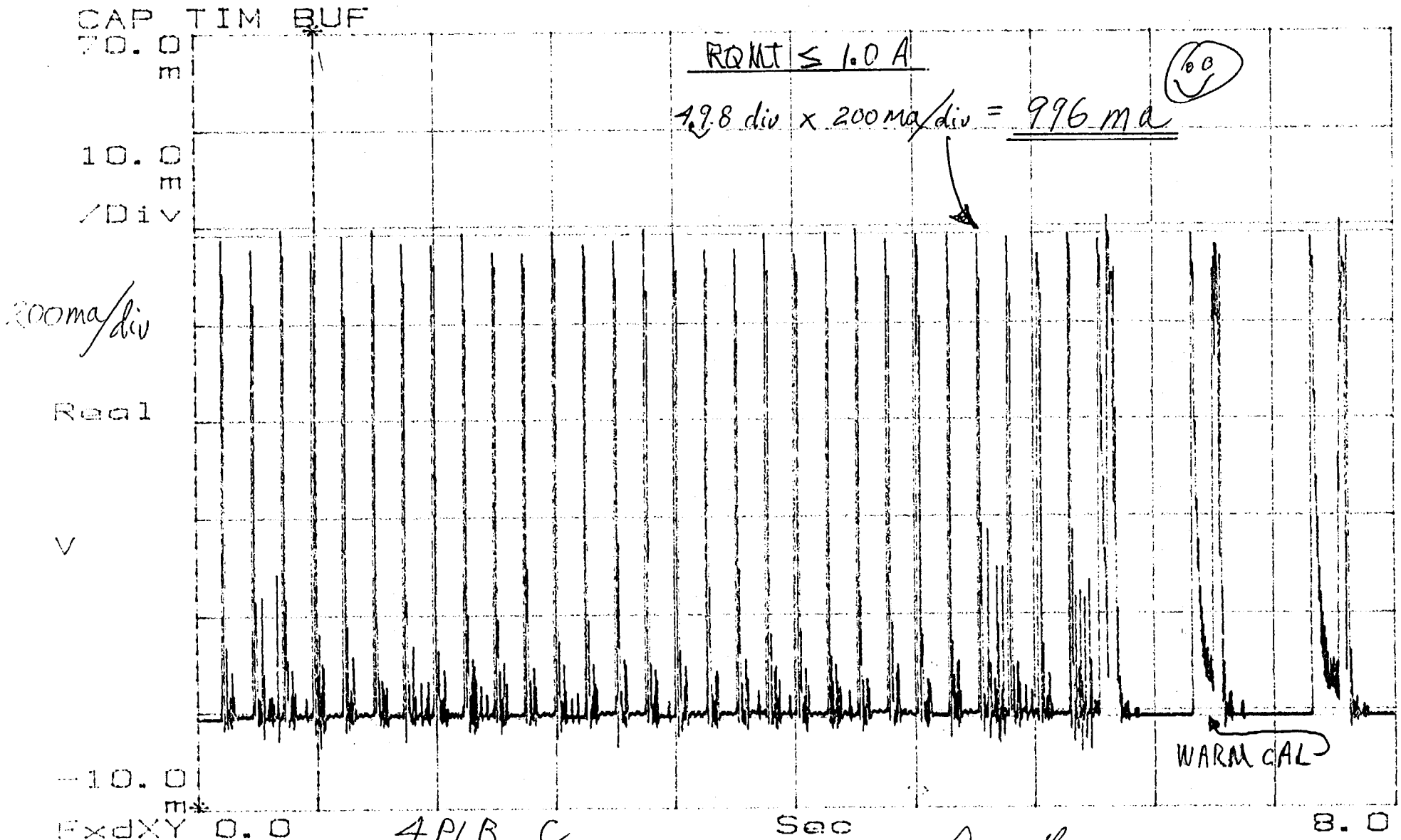
Rise Time measured in ms.
"NDO" - No Discernible Overshoot
"NDJ" - No Discernible Jitter

Test Engineer: _____

Data retrieved from disk file: 44AP_FS5

APPENDIX C

PULSE LOAD CURRENT WAVEFORM AND TEST DATA SHEET



4PLB_C

3.4.4.6

S.O. 436613

M.I. 1331720-2-1T SN: 105

Test Eng: Ray Hirtberg Date: 6-15-98

Quality: JUN 15 1998 7A 190

C1

TEST DATA SHEET 9

28V Bus Peak Current and Rise Time Test (Paragraph 3.4.4.6)

Test Setup Verified: Ray Hurlburg
Signature

Shop Order No. 436613

Step No.	Requirement	Test Result	Pass/Fail
4	< 1 A peak any place in the scan	996 ma	P
5	> 35 µsec rise time, 3.33° step	1.172 msec	P
6	> 35 µsec rise time, start of WC slew	1.172 msec	P
6	> 35 µsec rise time, end of WC slew	5.469 msec	P

Pass = P
Fail = F

Unit: AMSU METSAT A1

Serial No.: 105

Test Engineer: Ray Hurlburg JUNE

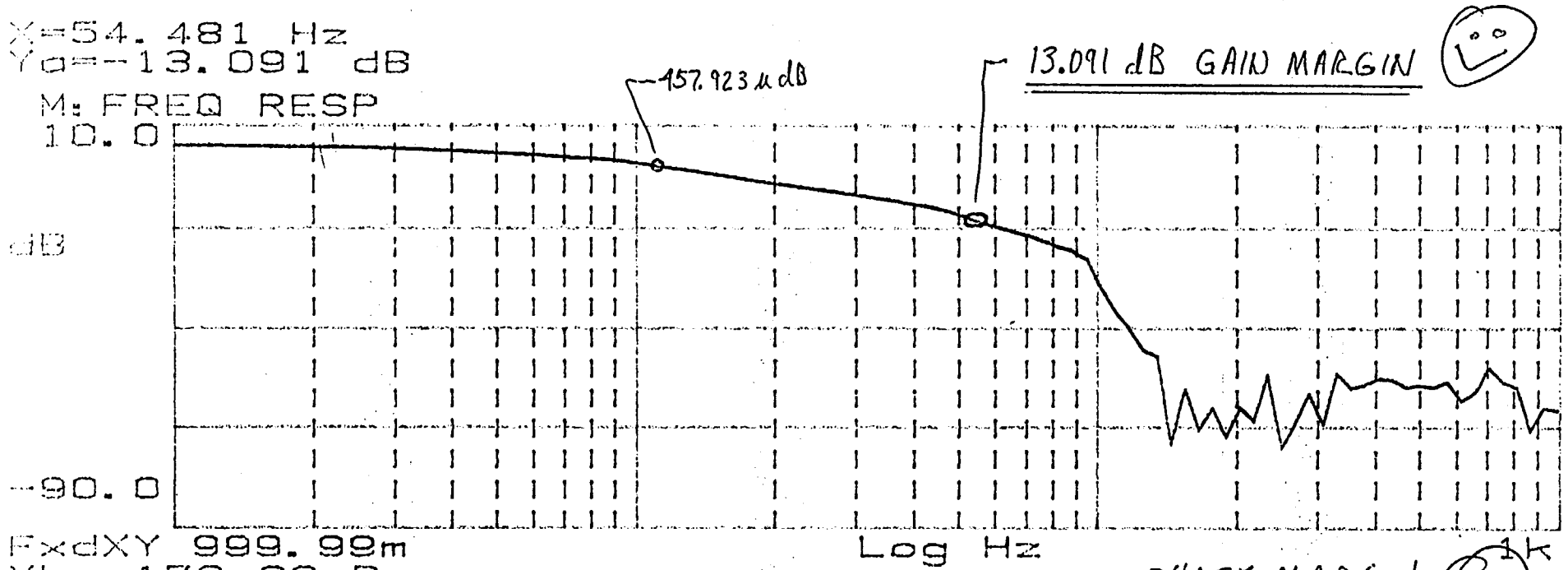
Quality Assurance: 7A 190 MAY 16 1998

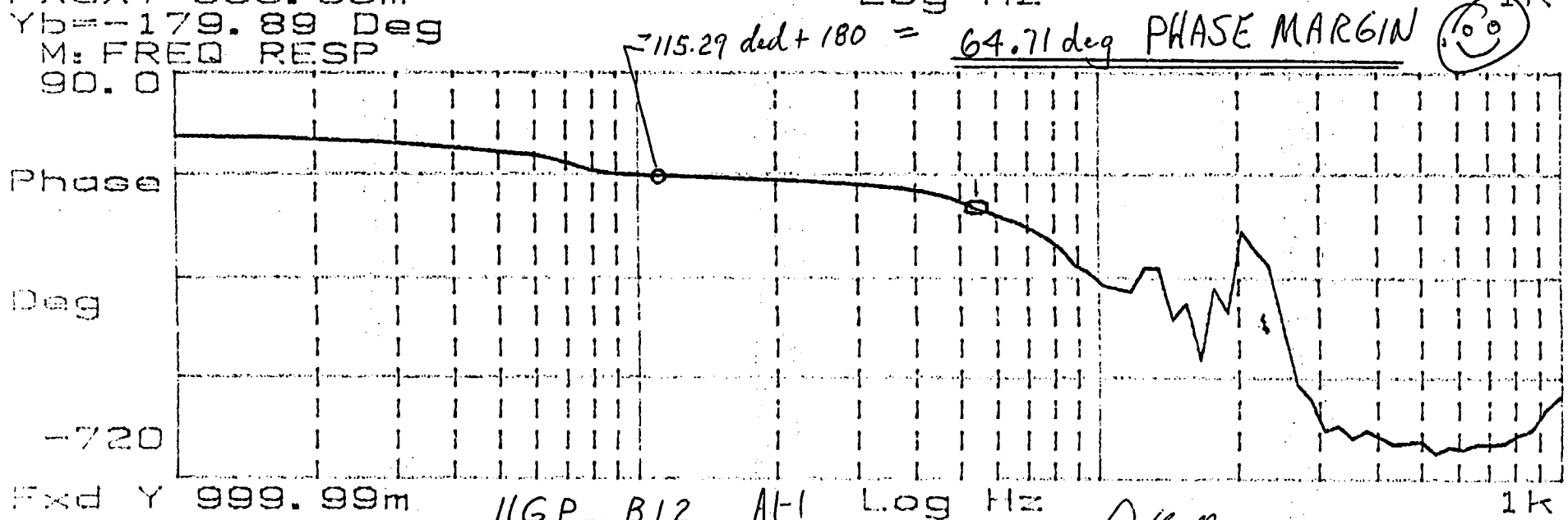
Date: 6-15-98

C2

APPENDIX D

GAIN AND PHASE MARGIN PLOTS AND TEST DATA SHEETS





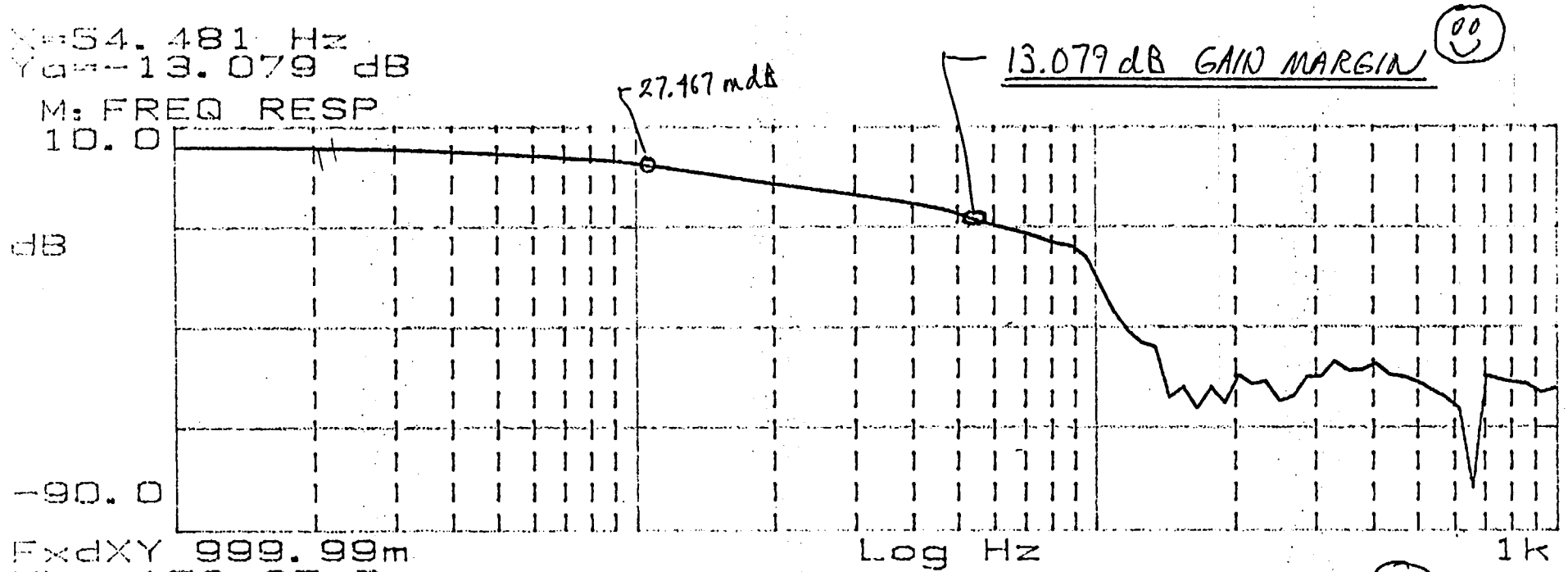
11GP_B12 A1-1

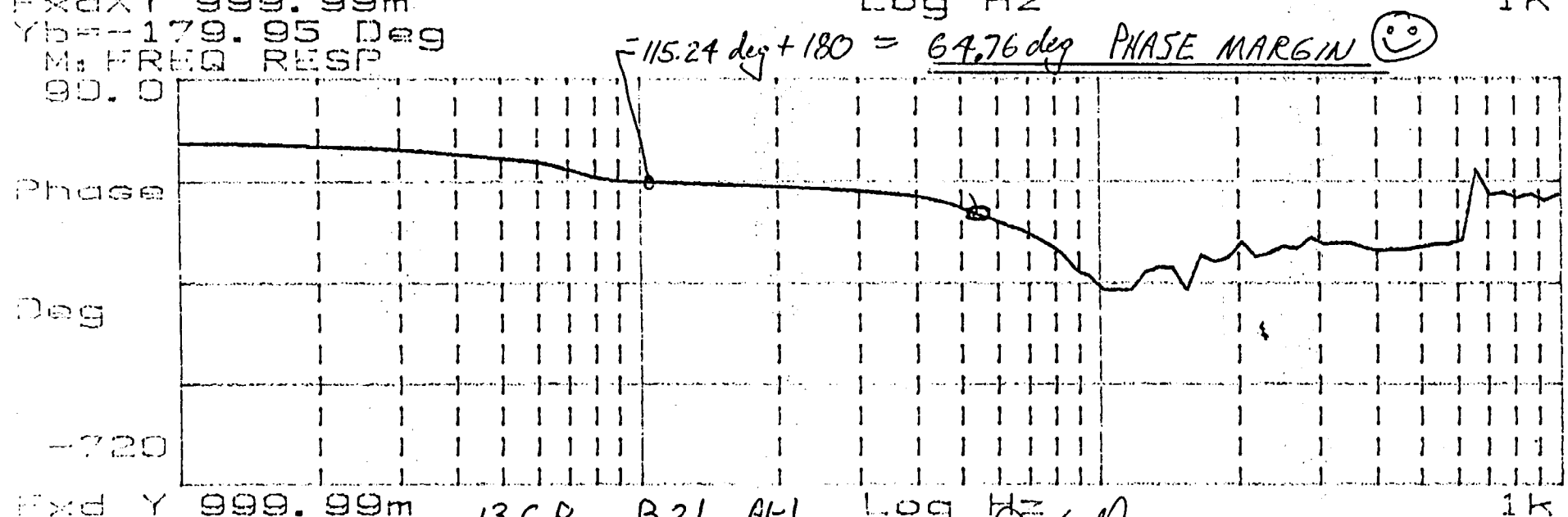
436613

3.4.4.B

Test Eng: Date: 6-16-98

D1





13GP_B21 A1-1

3.4.4.8

136613

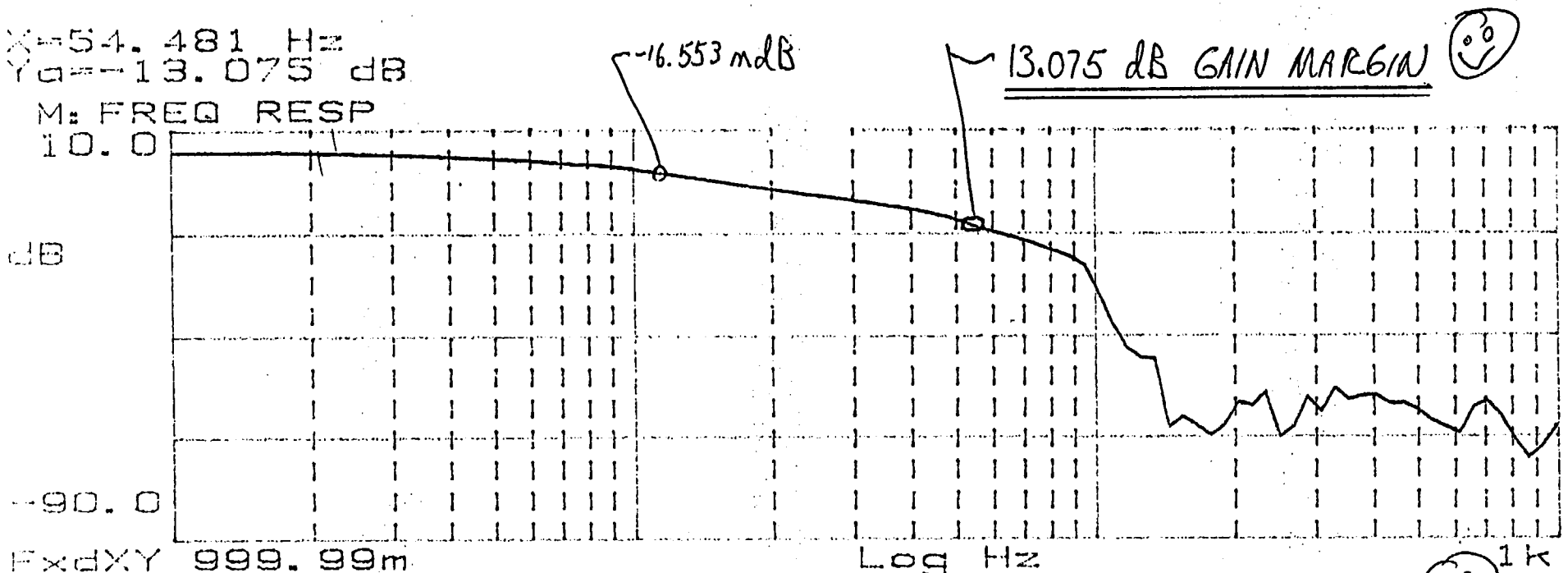
1331720-2-1T SN: 105

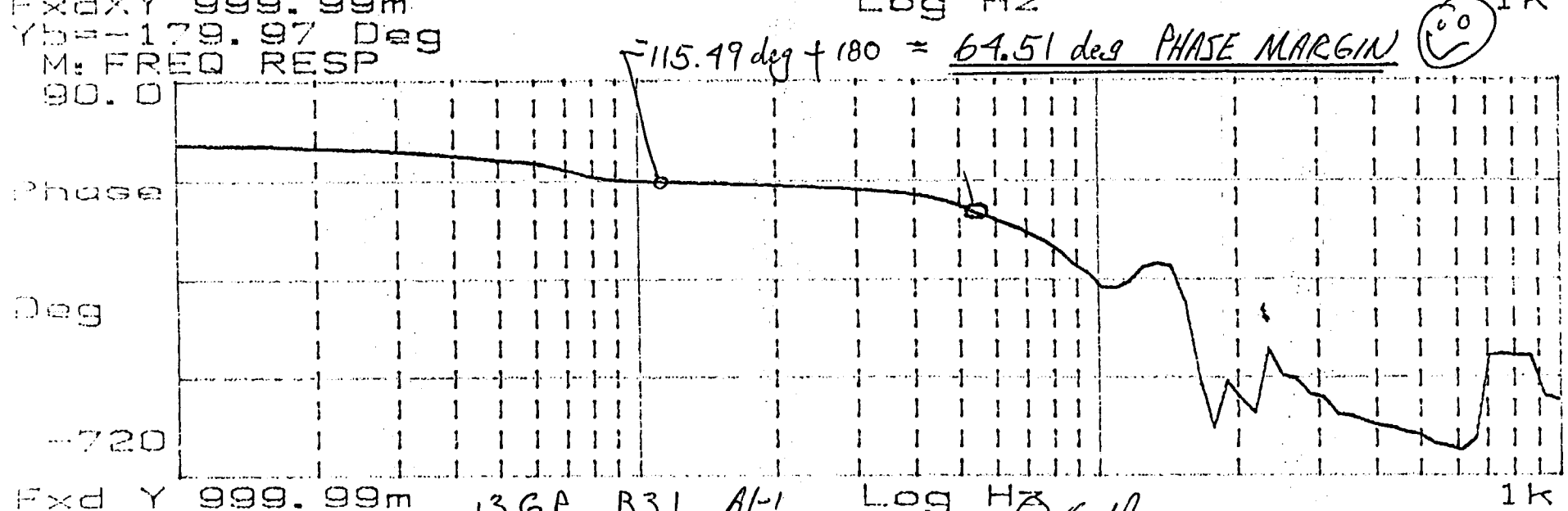
Test Eng: Ray Hedberg Date: 6-16-98

Quality:

7A 190 JUN 24 98

D2



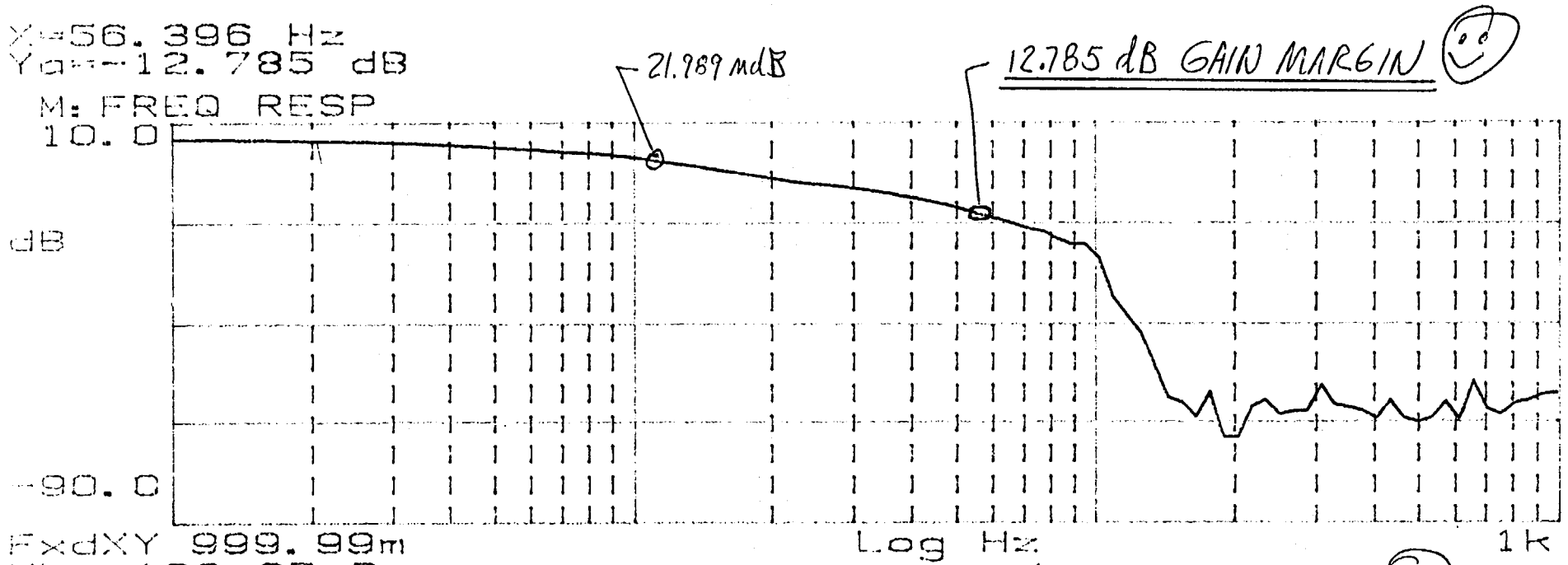


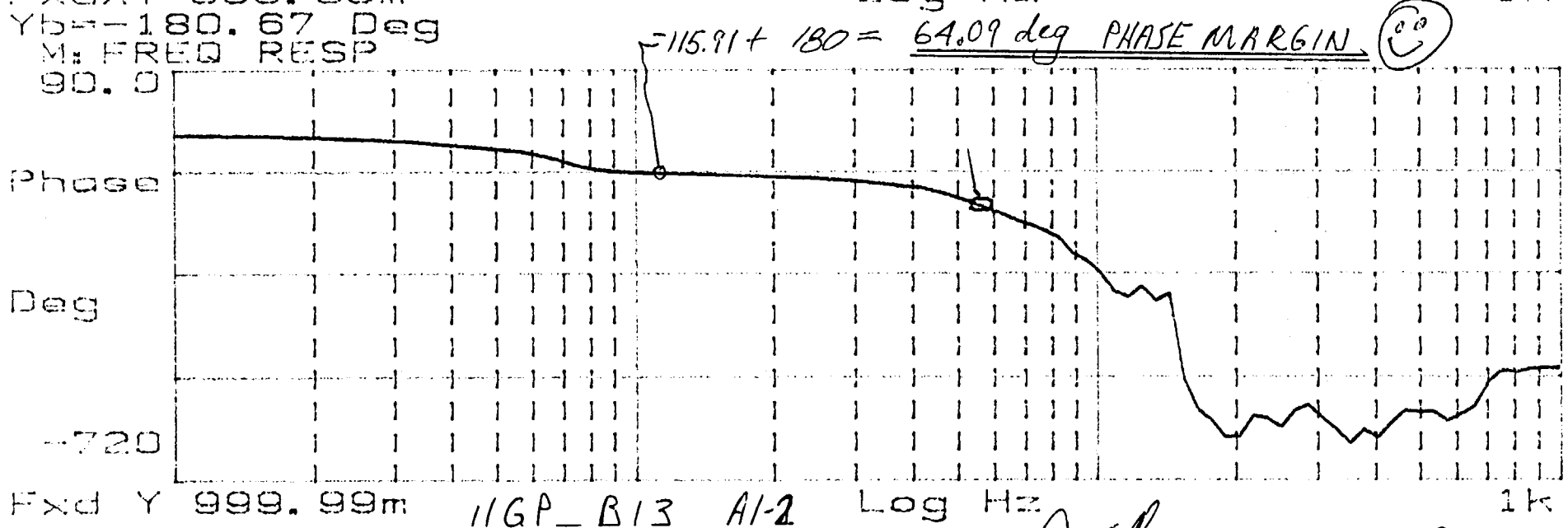
13GP_B31 A1-1

Test Eng: [signature] Date: 6-16-98

436613 344.8

D3





11GP_B13 A1-2

S/O: 436613

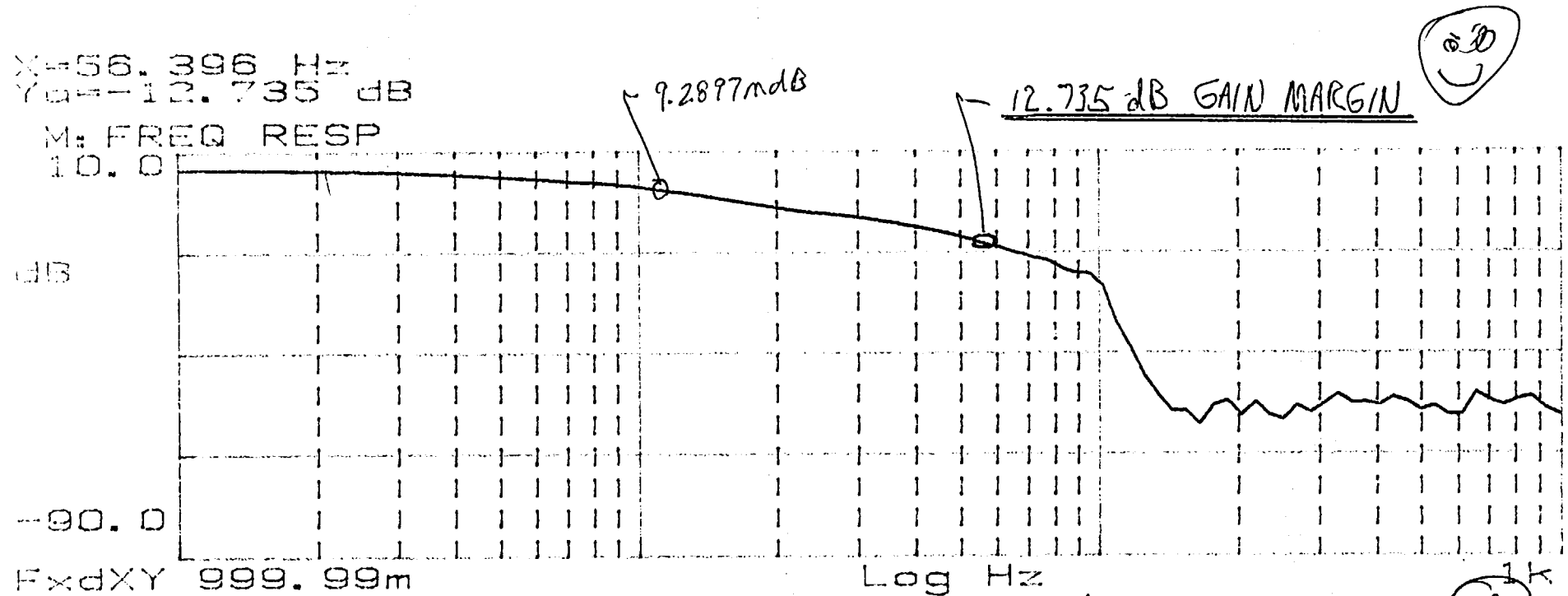
3.4.4.8

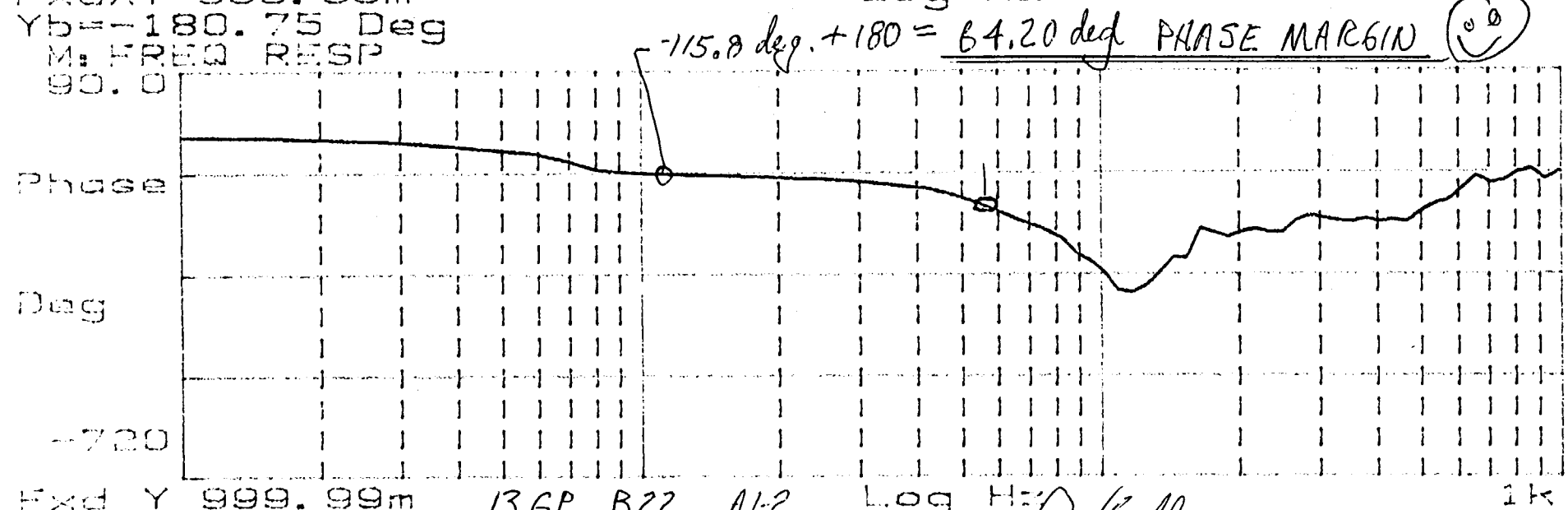
Test Eng: [signature] Date: 6-16-98

Qualit:

7A 190 JUN 24 98

D4





13GP_B22 A1-2
3.4.4.8

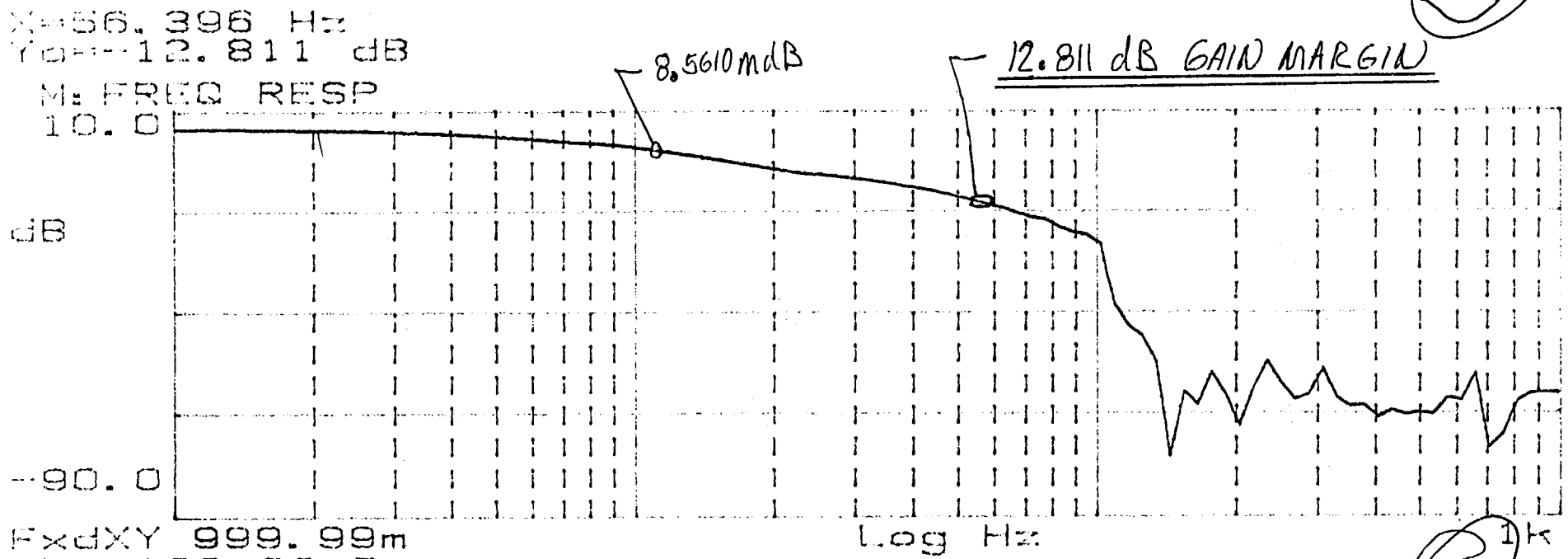
S/O: 436613

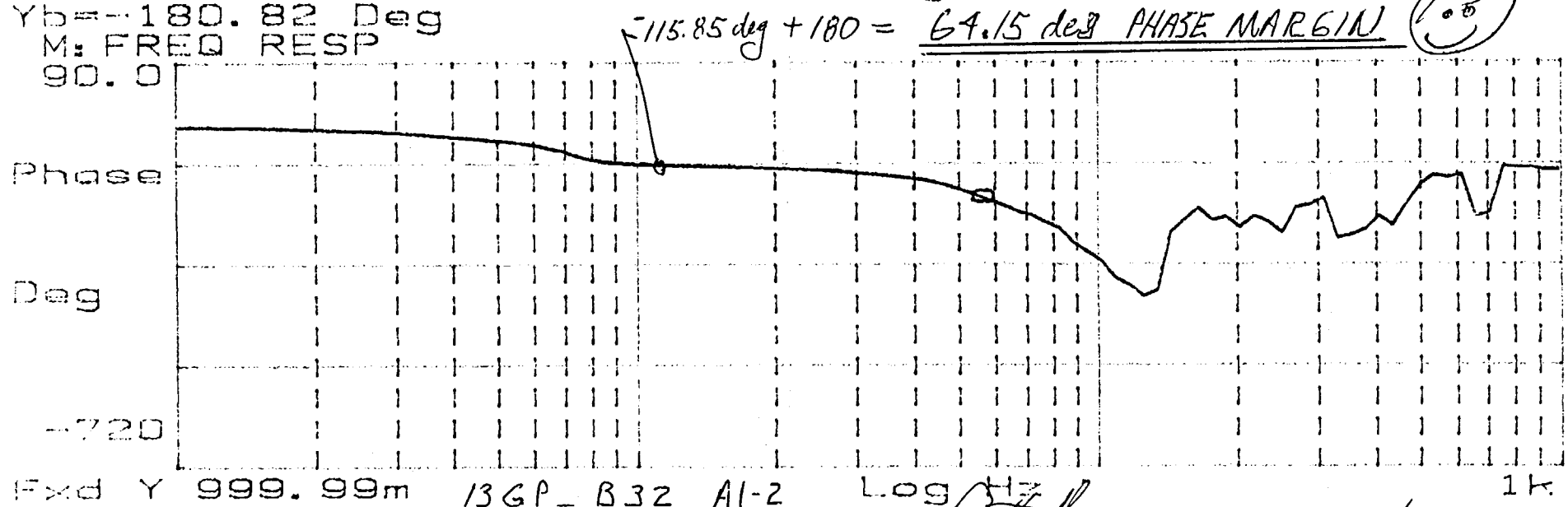
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-16-98

Quality: 7A 190 JUN 24 98

D5





13GP_B32 A1-2

S/O: 136613 3.4.4.8 Test Eng: Raytheon Date: 6-16-98

P/N: 133720-2-1T SN: 105 Quality: QA 190 JUN 24 98

D6

TEST DATA SHEET 10

Gain/Phase Margin (A1-1) (Paragraph 3.4.4.8)

Test Setup Verified: Ray Hertzberg
Signature

Shop Order No. 436613

Temperature: 71.5 °F

Requirement		Test Result	Pass/Fail
9.2 dB minimum	1	13.095 dB	P
	2	13.079 dB	P
	3	13.075 dB	P
	4		
	5		
25 degrees minimum	1	64.71 deg	P
	2	64.76 deg	P
	3	64.51 deg	P
	4		
	5		

Deleted Per Customer Request
R Hertzberg
QC 223 21-98

Pass = P
Fail = F

Unit: ANSU METSAT A1

Serial No.: 105

Date: 6-16-98

Test Engineer: Ray Hertzberg

Quality Assurance: 7A 190 JUN 24 98

Customer Representative: R Durand 8/12/98

D7

AE-26002/1D
12 Feb 98

SHEET 91 OF ____
ECR NO. 1828

TEST DATA SHEET 11
Gain/Phase Margin (A1-2) (Paragraph 3.4.4.8)

Test Setup Verified: Ray Hertzberg Signature Shop Order No. 436613

Temperature: 71.4 °F °C

Requirement		Test Result	Pass/Fail
9.2 dB minimum	1	12.785 dB	P
	2	12.735 dB	P
	3	12.811 dB	P
	4		
	5		
25 degrees minimum	1	64.09 deg	P
	2	64.20 deg	P
	3	64.15 deg	P
	4		
	5		

- Deleted Per Customer Request R. Hertzberg 9-21-98 QC 223 QC 103

Pass = P
Fail = F

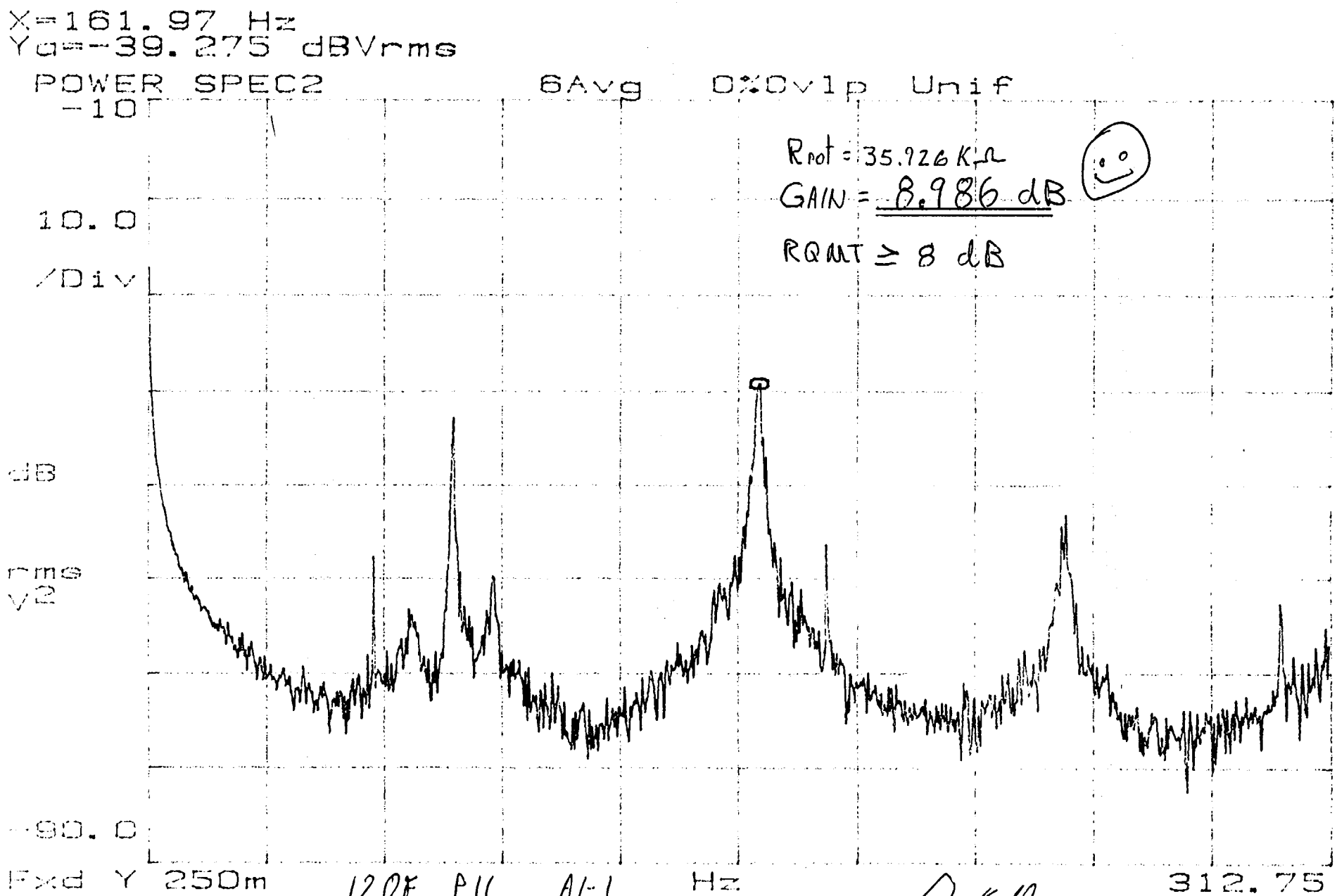
Unit: AMSU METSAT A1
Serial No.: 105
Date: 6-16-98

Test Engineer: Ray Hertzberg
Quality Assurance: 7A 190 JUL 24 98
Customer Representative: R. Brown 8/19/98

D8

APPENDIX E

OPERATIONAL GAIN MARGIN POWER SPECTRUM PLOTS AND TEST DATA SHEETS



12OF_P11 A1-1

3.4.4.9

S/N: 436613

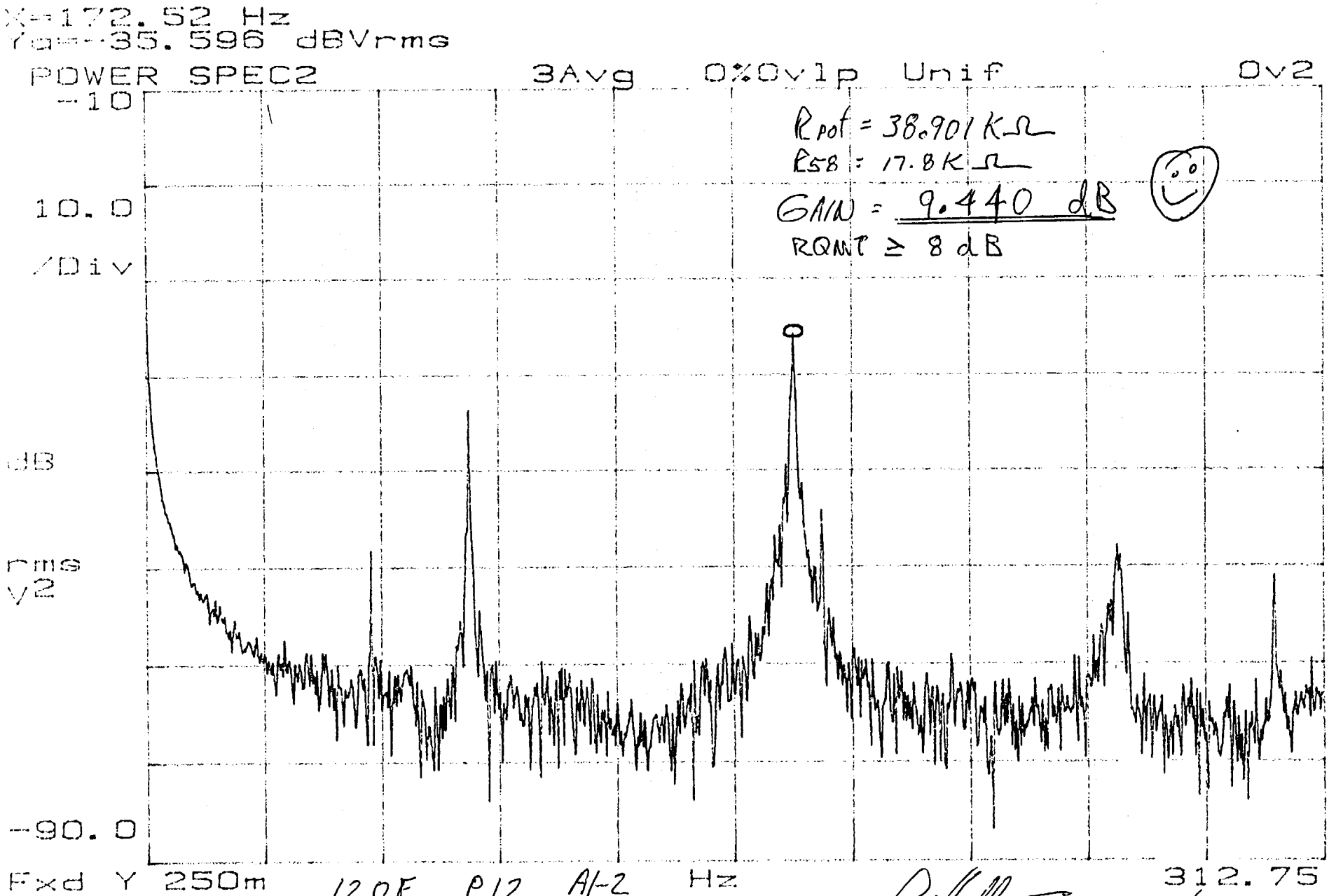
P/N: 1331720-2-1T SN: 105

Test Eng: [signature] Date: 6-16-98

Qualit:

7A 190 JUN 24 98

E1



120F_P12 A1-2

3.4.4.9

S/O: 436613

Test Eng: [signature] Date: 6-17-98

[illegible] 133172D-2-1T SN: 105

Q.A.: JUN 24 98 7A 190

E2

TEST DATA SHEET 12

Operational Gain Margin (A1-1) (Paragraph 3.4.4.9)

Test Setup Verified: Ray Hertzberg
Signature

Shop Order No. 436613

Temperature: 71.4 °F

Step No.	Requirement		Test Result	Pass/Fail
11	R58 Resistance (kohms)			P
	Test Pot Resistance (kohms)	1	35.926 KΩ	
		2	37.34 KΩ	
		3	37.394 KΩ	
12	Oscillation Frequency (Hz)	1	161.97 Hz	P
		2	160.41 Hz	
		3	160.41 Hz	
16	Gain Margin, 8 dB minimum	1	8.986 dB	P
		2	9.205 dB	
		3	9.213 dB	

Pass = P
Fail = F

Unit: AMSAT METSAT A1

Serial No.: 105

Test Engineer: Ray Hertzberg

Quality Assurance: QA 190 JUN 24 98

Date: 6-17-98

E3

TEST DATA SHEET 13
Operational Gain Margin (A1-2) (Paragraph 3.4.4.9)

Test Setup Verified: Ray Hurlburg Signature Shop Order No. 436613

Temperature: 76.4 °C

Step No.	Requirement		Test Result	Pass/Fail
11	R58 Resistance (kohms)			P
	Test Pot Resistance (kohms)	1	38.901 KΩ	
		2	37.56 KΩ	
		3	37.61 KΩ	
12	Oscillation Frequency (Hz)	1	172.52 Hz	P
		2	172.52 Hz	
		3	172.12 Hz	
16	Gain Margin, 8 dB minimum	1	9.44 dB	P
		2	9.238 dB	
		3	9.246 dB	

Pass = P
Fail = F

Unit: AMSU METSAT A1

Serial No.: 105

Test Engineer: Ray Hurlburg

Quality Assurance: 7A 190 JUN 17 98

Date: 6-17-98

E4

NASA
National Aeronautics and Space Administration

Report Documentation Page

1. Report No. ---	2. Government Accession No. ---	3. Recipient's Catalog No. ---
4. Title and Subtitle: Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report		5. Report Date: September 1998
		6. Performing Organization Code: ---
7. Author(s): A. Nieto		8. Performing Organization Report No.: 11220
		10. Work Unit No.: ---
9. Performing Organization Name and Address: Aerojet, 1100 W. Hollyvale, Azusa, CA 91702		11. Contract or Grant No.: NAS 5-32314
12. Sponsoring Agency Name and Address: NASA, Goddard Space Flight Center, Greenbelt, Maryland 20771		13. Type of Report and Period Covered: Final
		14. Sponsoring Agency Code: ---

15. Supplementary Notes

---

16. ABSTRACT (*Maximum 200 words*)

This is the Performance Verification Report, Subassembly and Complete Instrument Assembly, AMSU-A1 Antenna Drive Subsystem, P/N 1331720-2, S/N 105 For The EOS/AMSU-A1 for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

17. Key Words (Suggested by Author(s)): EOS, Microwave System	18. Distribution Statement: Unclassified — Unlimited

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of pages	22. Price
Unclassified	Unclassified		---

NASA FORM 1626 OCT 86

PREPARATION OF THE REPORT DOCUMENTATION PAGE

The last page of a report facing the third cover is the Report Documentation Page, RDP. Information presented on this page is used in announcing and cataloging reports as well as preparing the cover and title page. Thus, it is important that the information be correct. Instructions for filing in each block of the form are as follows:

Block 1. Report No. NASA report series number, if preassigned.

Block 2. Government Accession No. Leave blank.

Block 3. Recipient's Catalog No.. Reserved for use by each report recipient.

Block 4. Title and Subtitle. Typed in caps and lower case with dash or period separating subtitle from title.

Block 5. Report Date. Approximate month and year the report will be published.

Block 6. Performing Organization Code . Leave blank.

Block 7. Authors. Provide full names exactly as they are to appear on the title page. If applicable, the word editor should follow a name.

Block 8. Performing Organization Report No. NASA installation report control number and, if desired, the non-NASA performing organization report control number.

Block 9. Performing Organization Name and Address. Provide affiliation (NASA program office, NASA installation, or contractor name) of authors.

Block 10. Work Unit No. Provide Research and Technology Objectives and Plants (RTOP) number.

Block 11. Contract or Grant No. Provide when applicable.

Block 12. Sponsoring Agency Name and Address. National Aeronautics and Space Administration, Washington, D.C. 20546-0001. If contractor report, add NASA installation or HQ program office.

Block 13. Type of Report and Period Covered. NASA formal report series; for Contractor Report also list type (interim, final) and period covered when applicable.

Block 14. Sponsoring Agency Code. Leave blank.

Block 15. Supplementary Notes. Information not included elsewhere: affiliation of authors if additional space is required for Block 9, notice of work sponsored by another agency, monitor of contract, information about supplements (file, data tapes, etc.) meeting site and date for presented papers, journal to which an article has been submitted, note of a report made from a thesis, appendix by author other than shown in Block 7.

Block 16. Abstract. The abstract should be informative rather than descriptive and should state the objectives of the investigation, the methods employed (e.g., simulation, experiment, or remote sensing), the results obtained, and the conclusions reached.

Block 17. Key Words. Identifying words or phrases to be used in cataloging the report.

Block 18. Distribution Statement. Indicate whether report is available to public or not. If not to be controlled, use "Unclassified-Unlimited." If controlled availability is required, list the category approved on the Document Availability Authorization Form (see NHB 2200.2, Form FF427). Also specify subject category (see "Table of Contents" in a current issue of STAR) in which report is to be distributed.

Block 19. Security Classification (of the report). Self-explanatory.

Block 20. Security Classification (of this page). Self-explanatory.

Block 21. No. of Pages. Count front matter pages beginning with iii, text pages including internal blank pages, and the RDP, but not the title page or the back of the title page.

Block 22. Price Code. If Block 18 shows "Unclassified-Unlimited," provide the NTIS price code (see "NTIS Price Schedules" in a current issue of STAR) and at the bottom of the form add either "For sale by the National Technical Information Service, Springfield, VA 22161-2171" or "For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402-0001," whichever is appropriate.

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188). Washington, DC 20503.

1. AGENCY USE ONLY (*Leave blank*)

2. REPORT DATE

3. REPORT TYPE AND DATES COVERED

4. TITLE AND SUBTITLE

Integrated Advanced Microwave Sounding Unit-A (AMSU-A), Performance Verification Report

5. FUNDING NUMBERS

NAS 5-32314

6. AUTHOR(S)

A. Nieto

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Aerojet
1100 W. Hollyvale
Azusa, CA 91702

8. PERFORMING ORGANIZATION REPORT NUMBER

11220
September 1998

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

NASA
Goddard Space Flight Center
Greenbelt, Maryland 20771

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

---

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

12b. DISTRIBUTION CODE

---

13. ABSTRACT (*Maximum 200 words*)

This is the Performance Verification Report, Subassembly and Complete Instrument Assembly, AMSU-A1 Antenna Drive Subsystem, P/N 1331720-2, S/N 105 For The EOS/AMSU-A1 for the Integrated Advanced Microwave Sounding Unit-A (AMSU-A).

14. SUBJECT TERMS

EOS
Microwave System

15. NUMBER OF PAGES

16. PRICE CODE

---

17. SECURITY CLASSIFICATION OF REPORT

Unclassified

18. SECURITY CLASSIFICATION OF THIS PAGE

Unclassified

19. SECURITY CLASSIFICATION OF ABSTRACT

Unclassified

20. LIMITATION OF ABSTRACT

SAR

GENERAL INSTRUCTIONS FOR COMPLETING SF 298

The Report Documentation Page (RDP) is used in announcing and cataloging reports. It is important that this information be consistent with the rest of the report, particularly the cover and title page. Instructions for filing in each block of the form follow. It is important to stay within the lines to meet optical scanning requirements.

Block 1. Agency Use Only *(Leave blank)*

Block 2. Report Date. Full publication date including day, month, and year, if available (e.g., 1 Jan 88). Must cite at least the year.

Block 3. Type of Report and Dates Covered. State whether report is interim, final, etc. If applicable, enter inclusive report dates (e.g., 10 Jun 87 - 30 Jun 88).

Block 4. Title and Subtitle. A title is taken from the part of the report that provides the most meaningful and complete information. When a report is prepared in more than one volume, repeat the primary title, add volume number and include subtitle for the specific volume. On classified documents enter the title classification in parentheses.

Block 5. Funding Numbers. To include contract and grant numbers; may include program element number(s), project number(s), tasks number(s), and work unit number(s). Use the following labels:

C	-	Contract	PR	-	Project
G	-	Grant	TA	-	Task
PE	-	Program Element	WU	-	Work Unit Accession No.

Block 6. Author(s). Name(s) of person(s) responsible for writing the report, performing the research, or credited with the content of the report. If editor or compiler, this should follow the name(s).

Block 7. Performing Organization Name(s) and Address(es). Self-explanatory.

Block 8. Performing Organization Report Number. Enter the unique alphanumeric report number(s) assigned by the organization performing the report.

Block 9. Sponsoring/Monitoring Agency Name(s) and Address(es). Self-explanatory.

Block 10. Sponsoring/Monitoring Agency Reports Number. *(if known)*.

Block 11. Supplementary Notes. Enter information not included elsewhere such as: Prepared in cooperation with ...; Trans. of ...; To be published in ... When a report is revised, include a statement whether the new report supersedes or supplements the older report.

Block 12.a Distribution/Availability Statement. Denotes public availability or limitations. Cite any availability to the public. Enter additional limitations or special markings in all capitals (e.g., NOFORN, REL, ITAR).

DOD - See DoDD 5230.24 *Distribution Statement on Technical Documents*
DOE - See authorities.
NASA - See Handbook NHB 2200.2.
NTIS - Leave blank.

Block 12.b Distribution Code.

DOD - Leave blank.
DOE - Enter DOE distribution categories from the standard Distribution for Unclassified Scientific and Technical Reports.
NASA - Leave blank.
NTIS - Leave blank.

Block 13. Abstract. Include a brief *(Maximum 200 words)* factual summary of the most significant information contained in the report.

Block 14. Subject Terms. Keywords or phases identifying major subjects in the report.

Block 15. Number of Pages. Enter the total number of pages.

Block 16. Price Code. Enter appropriate price code *(NTIS only)*.

Block 17 - 19. Security Classifications. Self-explanatory. Enter U.S. Security Classification in accordance with U.S. Security Regulations (i.e., UNCLASSIFIED). If form contains classified information, stamp classification on the top and bottom of the page.

Block 20. Limitation of Abstract. This block must be completed to assign a limitation to the abstract. Enter either UL (unlimited) or SAR (same as report). An entry in this block is necessary if the abstract is to be limited. If blank, the abstract is assumed to be unlimited.

Standard Form 298 Back (Rev. 2-89)

DOCUMENT APPROVAL SHEET

GENCORP AEROJET

TITLE	DOCUMENT NO.
Performance Verification Report Subassembly and Complete Instrument Assembly, AMSU-A1Antenna Drive Subsystem, P/N 1331720-2, S/N 105	Report 11220 September 1998

INPUT FROM: DATE	CDRL:	SPECIFICATION ENGINEER: DATE
A. Nieto	208	

CHECKED BY: DATE	JOB NUMBER: DATE

APPROVED SIGNATURES	DEPT. NO.	DATE
Product Team Leader (A. Nieto)	8341	9/22/98
Systems Engineer (R. Platt)	8311	9/22/98
Design Assurance (E. Lorenz)	8331	9/23/98
Quality Assurance (R. Taylor) FOR	7831	9/23/98
Technical Director/PMO (R. Hauerwaas)	4001	9/23/98
Configuration Management (J. Cavanaugh)	8361	9/23/98

By my signature, I certify the above document has been reviewed by me and concurs with the technical requirements related to my area of responsibility.

RELEASE (Data Center) FINAL

Please return this sheet and the reproducible master to Jim Kirk (Bldg. 1/Dept. 8631), ext. 2081.