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Gravity Probe B Relativity Mission

BOARD-LEVEL TUNING PROCEDURE FOR THE GYROSCOPE SUSPENSION SYSTEM (GSS) MUX/OSCILLATOR/CHARGE CTRL (MUX) BOARD

PWA 8A01883 Rev C S/N:

**GP-B Procedure
P0611 Rev A
September 08, 2000**

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PWA Responsible Engineer

Date

Approved by: William Bencze
RE, Gyroscope Suspension System (GSS) Group

Date

Approved by: Dorrene Ross
GP-B Quality Assurance

Date

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1.0 Revision History

Rev Level	Comments/notes	Date	Revised By
-	First release of this test procedure	1-May-00	B. Bencze
A	Modifications based on dry run on GSS gold system cards	7-Sep-00	B. Bencze

2.0 Scope:

This procedure details the board-level electrical functional tests on the GSS MUX/Oscillator/Charge Control (MUX) card. No mechanical or thermal stress testing shall be performed at this time.

This test plan has been written to be run with the GSS “Gold System” test fixture – an electrically and interface equivalent of the GSS flight units. In General, the Device Under Test (DUT) shall be inserted into the Gold System in place of the equivalent Gold System card, any additional electrical connections to the Gold System shall be made, and a set of software-based and possibly manual tests will be run on the board. Upon successful completion of this procedure, this board is considered electrically functional.

All data recorded during this test is recorded in this document; each test of a board will use its own copy of this procedure, and will be identified by serial number on the cover sheet.

3.0 Reference Documents

- 3.1. GSS Gold System Hardware and Software Configuration Standard, P0663
- 3.2. PWA Drawing, GSS MUX board, 8A01883
- 3.3. PWB Drawing, GSS MUX board, 8A01889
- 3.4. PWA schematic, PC610A gold system test card.
- 3.5. PWA schematic, PC620A gold system test card.
- 3.6. Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment, MIL-STD-1686

4.0 Test Facilities

HEPL Room 127, Stanford University

5.0 QA Provisions:

- 5.1. This procedure shall be conducted on a formal basis to its latest approved and released version. The QA Program Engineer (D. Ross) and the ONR representative (E. Ingraham) shall be notified 24 hours prior to the start of this procedure. QA may monitor the execution of all or part of this procedure should they elect to do so.

Date/time: _____
GP-B QA (D. Ross)

Date/time: _____
ONR (E. Ingraham)

- 5.2. Upon completion of this procedure, the GSS manager and the GP-B QA manager shall certify her/his concurrence that the procedure was performed and accomplished in accordance with the prescribed instructions by signing and dating his approval at the end of this procedure.

6.0 Test Personnel

This test procedure is to be conducted only by the following personnel:

- 6.1. William Bencze
- 6.2. Lo Van Ho

7.0 General Instructions

- 7.1. Redlines can be initiated by the test personnel listed in Section 6.0 and must be approved by QA.
- 7.2. Test operators shall read this procedure in its entirety and resolve any apparent ambiguities prior to beginning this test.
- 7.3. Any nonconformance or test anomaly should be reported by a Discrepancy Report. Refer to the Quality Plan, P0108, for guidance. Do not alter or break test configuration if a test failure occurs; notify quality assurance.
- 7.4. Only the following persons have the authority to exit/terminate this test or perform a retest: Test operators listed in Section 6.0 and GP-B QA.
- 7.5. In this document, "Perform Flight S/W system test commands:" means to prepare the test system software as described in P0670 Board-Level Test Software Operational Procedure, and then issue the listed commands according to the procedure described in P0670.

8.0 Hardware Safety Requirements:

- 8.1. This assembly is ESD sensitive; special care shall be exercised per the "Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment", MIL-STD-1686
- 8.2. Ensure that power is removed from cable assemblies before connecting or disconnecting cable connectors.
- 8.3. Examine all mating connectors before attempting to mate them. Remove any foreign particles. Look for any damaged pins or sockets. Do not force the coupling action if excessive resistance is encountered. Ensure that key-ways are aligned when mating connectors.

9.0 Equipment Pretest Requirements:

9.1. The GSS Gold System in which this board is to be tested must have passed successfully the P0663 – Gold System Certification Procedure prior to the start of this test. Record the Gold System serial number and date of its certification, below

GSS Gold System	SN:	
	Date of Certification	
	Configuration (circle one)	Full Partial

10.0 Additional Test Equipment

The following support hardware, test equipment, or software will be used and the applicable information for the instruments shall be recorded below. Hand-written additions to this list may be made in the space provided.

Equipment Description	Make	Model	SN	Cal Due
1. Multimeter	Fluke			
2. Multimeter	Fluke			
3. Multimeter	Fluke			
4. Gain/Phase meter	HP			
5. BNC-to-Pomona mini-clip test cable, 3'	SU fab	NA	NA	NA
6. Signal Generator	SRS			
7. Oscilloscope	Tek			
8. 6 ea 100 kohm tuning pot.	SU	NA	NA	NA
9. 1 ea 200 kohm tuning pot.	SU	NA	NA	NA
10. PC620 gold system test card	SU	Rev A		NA
11. PC610 gold system test card	SU	Rev A		NA
12. Bolt-up FSU enclosure	LMMS	-		NA
13. Gold system Fwd backplane with banana-plug power port	SU PC400		002-GS	NA
14. Triple output power supply	HP			
15. BNC patch cables, as required	Various	NA	NA	NA
16. Meter test leads, as required	Various	NA	NA	NA

11.0 Device Under Test (DUT):

Record the serial number of the Device Under Test, or DUT.

PWA 8A01883 GSS MUX Card	SN:	
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Test Operator:	Name:	
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Start of test:	Date:	
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12.0 Pre-test visual inspection.

Note: All handling of this PWA shall be performed using ESD control methods, as outlined in MIL-STD-1686. Unit shall be inspected at an ESD certified station. Wrist straps and/or heel grounding straps shall be used.

P/F	Test/Activity	Notes
	12.1. Remove PWA from storage container.	
	12.2. Verify that the PWA board revision is C. <i>(Component changes are required to the Rev B design before tuning can begin; see PWA traveller for rework instructions)</i>	
	12.3. Verify that no parts are missing, unless called out in the assembly drawing.	
	12.4. Verify that the following capacitors are installed in the proper orientation: C49, C50, C51	
	12.5. Verify the proper orientation of pin 1 of all DIP packages: (27 Places)	
	12.6. Verify thermal sensor U20 is bonded to the PWB.	
	12.7. Verify proper clocking of transistor cans to PWB silkscreen, JFET1, JFET2	
	12.8. Verify proper installation of diodes ZD1, ZD2.	
	12.9. Verify proper orientation of pin 1 of all SIL resistor packs (RPS1, RPS2)	

13.0 Pre-Insertion Static Electrical Tests:

Note: All handling of this PWA shall be performed using ESD control methods, as outlined in MIL-STD-1686. Unit shall be inspected at an ESD certified station. Wrist straps and/or heel grounding straps shall be used.

13.1. Power circuits isolation check

- A. Set meter to “ohms”, record indicated resistance between the indicated circuit points.
- B. Note orientation of (+) and (-) leads on meter.
- C. Use gold-tipped Pomona test probes for all measurements.
- D. After leads are in contact with the PWA, wait 30 seconds for meter reading to stabilize before recording measurement.

P/F	Test/Activity	Pass Criteria	Measurement
	13.1.1. TP22 (+) to TP25 neg lead (-)	> 100 kohm	Value
	13.1.2. TP23 (+) to TP25 neg lead (-)	> 100 kohm	Value
	13.1.3. TP24 (+) to TP25 neg lead (-)	> 100 kohm	Value

14.0 In-System Testing – Flight Configuration

Note: Tests run in this section are run with the hardware in “flight” configuration: no external test equipment or cables. The tests here use only the onboard diagnostic facilities of the GSS hardware. These will be the equivalent of the on-orbit tests of this system.

15.0 This section not applicable

15.0 In-System Testing – Ground Test Configuration

Note: Tests run in this section require the addition of test cables and external test hardware. They are used to verify the board functioning of the board in fine detail, and are only used at the time of board-level test and acceptance. These may be considered “Engineering Confidence Tests”.

15.1. Gold System Configuration

This board-level test does not require any of the services of the aft GSS unit or many of the services of the forward GSS unit. The gold system will be partially disassembled to facilitate this test.

P/F	Test/Activity	Notes
	15.1.1. Remove all gold system function cards from the forward GSS enclosure; return them to their protective ESD packaging.	
	15.1.2. Install Gold System backplane and PC610/620 test cards into a bolt-up frame GSS forward enclosure. Remove side panel to expose the component side of the DUT when installed.	
	15.1.3. Connect backplane pigtail to power supply.	
	15.1.4. Install DUT into its proper slot in the forward enclosure per P0663. <i>(note: no FSU covers are needed for this test)</i>	

15.2. Configure PC620:

P/F	Test/Activity	Notes
	15.2.1. Connect <i>BNC-to-pomona clip cable</i> to frequency generator.	
	15.2.2. Connect red (+) clip to PC620 TP84 (<i>FSU_CK34K1_A</i>)	
	15.2.3. Connect black (-) clip to PC620 AGND TP	

15.3. Gain/Phase meter setup

P/F	Test/Activity	Notes
	15.3.1. CH A: 2mV-20V setting	
	15.3.2. FREQ RANGE: 10 – 10 kHz	
	15.3.3. AMPLITUDE FNC: A	
	15.3.4. PHASE REF: A	
	15.3.5. CH B: 2mV-20V setting	

15.4. Function generator setup

P/F	Test/Activity	Notes
	15.4.1. Freq: 34.100 kHz	
	15.4.2. Amplitude: 1.0 Vpp	
	15.4.3. Waveform: SIN	

15.5. Power on:

P/F	Test/Activity	Notes
	15.5.1. Apply power to the FSU enclosure.	

15.6. Oscillator Tuning:

P/F	Test/Activity	Notes
	15.6.1. Disconnect frequency generator from PC620	
	15.6.2. Install a 200 kohm tuning on header H3.	
	15.6.3. Install a 100 kohm tuning on header H2.	
	15.6.4. Adjust pot on H3 so that TP7 reads $-3.75\text{ V} \pm 0.05\text{ V}$	
	15.6.5. Adjust pot on H2 so that the frequency at TP1 is 34.1 kHz \pm 100 Hz. (<i>This is done via visual inspection of the signal generator and oscillator waveforms on scope screen</i>)	
	15.6.6. Reconnect frequency generator to PC620	
	15.6.7. Verify signal at TP1 is phase-locked to the input using the scope.	
	15.6.8. Verify that the signal at TP1 remains locked for frequencies $\pm 50\text{ Hz}$ from 34,100 Hz. Adjust the pot on H2 as required to make it so.	
	15.6.9. Remove the pot on H3; record its value; return to the circuit.	Value:
	15.6.10. Subtract 100 kohm from the value on the previous line and record it here for R74.	Value: (R28)
	15.6.11. Remove the pot on H2; record its value; return to the circuit.	Value: (R74)

15.7. Phase Shifter Tuning:

P/F	Test/Activity	Notes
	15.7.1. Install a 100 kohm tuning on header H8.	
	15.7.2. Install a 100 kohm tuning on header H4.	
	15.7.3. Install a 100 kohm tuning on header H7.	
	15.7.4. Install a 100 kohm tuning on header H10.	
	15.7.5. Install a 100 kohm tuning on header H11	
	15.7.6. Adjust pot on H4 so that X_OSC reads 354 ± 0.005 mV RMS. (1 V p-p)	
	15.7.7. Adjust pot on H7 so that Y_OSC reads 354 ± 0.005 mV RMS. (1 V p-p)	
	15.7.8. Using the gain/phase meter, adjust pot on H8 so phase difference between X_OSC (Ch A) and Y_OSC (Ch B) is -120.0 ± 0.5 degrees.	
	15.7.9. Readjust pot on H7 so that X_OSC reads 354 ± 0.005 mV RMS. (1 V p-p)	
	15.7.10. Adjust pot on H10 so that Z_OSC reads 354 ± 0.005 mV RMS. (1 V p-p)	
	15.7.11. Using the gain/phase meter, adjust pot on H8 so phase difference between X_OSC (Ch A) and Z_OSC (Ch B) is +120.0 ± 0.5 degrees.	
	15.7.12. Readjust pot on H10 so that Z_OSC reads 354 ± 0.005 mV RMS. (1 V p-p)	
	15.7.13. Remove the pot on H4; record value:	Value: (R2+R6)
	15.7.14. Remove the pot on H7; record value:	Value: (R20+R24)
	15.7.15. Remove the pot on H8; record value:	Value: (R26+R30)
	15.7.16. Remove the pot on H10; record value:	Value: (R36+R42)
	15.7.17. Remove the pot on H11; record value:	Value: (R46+R47)

15.8. Record tuning values

P/F	Test/Activity	Notes
	15.8.1. Use the Single (Section 17.0) and Dual (Section 18.0) resistor selection tables to choose the appropriate fixed value resistors for the components below. <i>Note, the dual-resistor tables are for series wired resistor values only. (All Rx+Ry types)</i>	

Component	Flight PN	Description	Value transferred from earlier in the procedure
R2	RNC55H_____FS		(R2+R6)
R6	RNC55H_____FS		
R26	RNC55H_____FS		(R26+R30)
R30	RNC55H_____FS		
R20	RNC55H_____FS		(R20+R24)
R24	RNC55H_____FS		
R36	RNC55H_____FS		(R36+R42)
R42	RNC55H_____FS		
R28	RNC55H_____FS		(R28)
R74	RNC55H_____FS		(R74)
R41	open	no component installed	no component installed
R46	RNC55H_____FS		(R46+R47)
R47	RNC55H_____FS		

	15.8.2. Transfer these values to the select and test installation sheet in Appendix A.
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16.0 Completion of Procedure:

	P/F	Notes
16.1. Remove all tuning pots from PWA.		
16.2. Remove PWA from enclosure per P0663 and return to storage container.		
16.3. Return the board to the assembly vendor for installation of the final values of the selected resistors.		

The results obtained in the performance of this test procedure are acceptable.

Test Engineer Date

This is to certify that the information obtained under this test procedure is as represented and the documentation is completed and correct.

GSS Representative Date

Quality Assurance Date

17.0 Single Resistor Value Selection Table

For single select and test resistors, find the row that brackets the value of interest between Min and Max; use the specified resistor given in the description and P/N columns. (all values are in ohms)

For values in this range		Choose this resistor:	
Min (ohms)	Max (Ohms)	Description	P/N
1000	1134	Resistor, 1.00K Ohms, $\pm 1\%$	RN55H1001FS
1034	1109	Resistor, 1.07K Ohms, $\pm 1\%$	RN55H1071FS
1109	1194	Resistor, 1.15K Ohms, $\pm 1\%$	RN55H1151FS
1194	1284	Resistor, 1.24K Ohms, $\pm 1\%$	RN55H1241FS
1284	1379	Resistor, 1.33K Ohms, $\pm 1\%$	RN55H1331FS
1379	1484	Resistor, 1.43K Ohms, $\pm 1\%$	RN55H1431FS
1484	1594	Resistor, 1.54K Ohms, $\pm 1\%$	RN55H1541FS
1594	1714	Resistor, 1.65K Ohms, $\pm 1\%$	RN55H1651FS
1714	1844	Resistor, 1.78K Ohms, $\pm 1\%$	RN55H1781FS
1844	1979	Resistor, 1.91K Ohms, $\pm 1\%$	RN55H1911FS
1979	2128	Resistor, 2.05K Ohms, $\pm 1\%$	RN55H2051FS
2128	2289	Resistor, 2.21K Ohms, $\pm 1\%$	RN55H2211FS
2289	2458	Resistor, 2.37K Ohms, $\pm 1\%$	RN55H2371FS
2458	2643	Resistor, 2.55K Ohms, $\pm 1\%$	RN55H2551FS
2643	2838	Resistor, 2.74K Ohms, $\pm 1\%$	RN55H2741FS
2838	3048	Resistor, 2.94K Ohms, $\pm 1\%$	RN55H2941FS
3048	3278	Resistor, 3.16K Ohms, $\pm 1\%$	RN55H3161FS
3278	3523	Resistor, 3.40K Ohms, $\pm 1\%$	RN55H3401FS
3523	3783	Resistor, 3.65K Ohms, $\pm 1\%$	RN55H3651FS
3783	4067	Resistor, 3.92K Ohms, $\pm 1\%$	RN55H3921FS
4067	4372	Resistor, 4.22K Ohms, $\pm 1\%$	RN55H4221FS
4372	4697	Resistor, 4.53K Ohms, $\pm 1\%$	RN55H4531FS
4697	4930	Resistor, 4.87K Ohms, $\pm 1\%$	RN55H4871FS
4930	5109	Resistor, 4.99K Ohms, $\pm 1\%$	RN55H4991FS
5109	5421	Resistor, 5.23K Ohms, $\pm 1\%$	RN55H5231FS
5421	5826	Resistor, 5.62K Ohms, $\pm 1\%$	RN55H5621FS
5826	6261	Resistor, 6.04K Ohms, $\pm 1\%$	RN55H6041FS
6261	6731	Resistor, 6.49K Ohms, $\pm 1\%$	RN55H6491FS
6731	7235	Resistor, 6.98K Ohms, $\pm 1\%$	RN55H6981FS
7235	7775	Resistor, 7.50K Ohms, $\pm 1\%$	RN55H7501FS
7775	8355	Resistor, 8.06K Ohms, $\pm 1\%$	RN55H8061FS
8355	8979	Resistor, 8.66K Ohms, $\pm 1\%$	RN55H8661FS
8979	9649	Resistor, 9.31K Ohms, $\pm 1\%$	RN55H9311FS

Single Resistor Value Selection Table (continued)

For values in this range		Choose this resistor:	
Min (ohms)	Max (Ohms)	Description	P/N
9649	10368	Resistor, 10.0K Ohms, $\pm 1\%$	RN55H1002FS
10368	11143	Resistor, 10.7K Ohms, $\pm 1\%$	RN55H1072FS
11143	11972	Resistor, 11.5K Ohms, $\pm 1\%$	RN55H1152FS
11972	12867	Resistor, 12.4K Ohms, $\pm 1\%$	RN55H1242FS
12867	13826	Resistor, 13.3K Ohms, $\pm 1\%$	RN55H1332FS
13826	14855	Resistor, 14.3K Ohms, $\pm 1\%$	RN55H1432FS
14855	15965	Resistor, 15.4K Ohms, $\pm 1\%$	RN55H1542FS
15965	17154	Resistor, 16.5K Ohms, $\pm 1\%$	RN55H1652FS
17154	18433	Resistor, 17.8K Ohms, $\pm 1\%$	RN55H1782FS
18433	19812	Resistor, 19.1K Ohms, $\pm 1\%$	RN55H1912FS
19812	21291	Resistor, 20.5K Ohms, $\pm 1\%$	RN55H2052FS
21291	22875	Resistor, 22.1K Ohms, $\pm 1\%$	RN55H2212FS
22875	24579	Resistor, 23.7K Ohms, $\pm 1\%$	RN55H2372FS
24579	26413	Resistor, 25.5K Ohms, $\pm 1\%$	RN55H2552FS
26413	28387	Resistor, 27.4K Ohms, $\pm 1\%$	RN55H2742FS
28387	30505	Resistor, 29.4K Ohms, $\pm 1\%$	RN55H2942FS
30505	32779	Resistor, 31.6K Ohms, $\pm 1\%$	RN55H3162FS
32779	35227	Resistor, 34.0K Ohms, $\pm 1\%$	RN55H3402FS
35227	37856	Resistor, 36.5K Ohms, $\pm 1\%$	RN55H3652FS
37856	40679	Resistor, 39.2K Ohms, $\pm 1\%$	RN55H3922FS
40679	43717	Resistor, 42.2K Ohms, $\pm 1\%$	RN55H4222FS
43717	46980	Resistor, 45.3K Ohms, $\pm 1\%$	RN55H4532FS
46980	49296	Resistor, 48.7K Ohms, $\pm 1\%$	RN55H4872FS
49296	51101	Resistor, 49.9K Ohms, $\pm 1\%$	RN55H4992FS
51101	54245	Resistor, 52.3K Ohms, $\pm 1\%$	RN55H5232FS
54245	58292	Resistor, 56.2K Ohms, $\pm 1\%$	RN55H5622FS
58292	62644	Resistor, 60.4K Ohms, $\pm 1\%$	RN55H6042FS
62644	67317	Resistor, 64.9K Ohms, $\pm 1\%$	RN55H6492FS
67317	72338	Resistor, 69.8K Ohms, $\pm 1\%$	RN55H6982FS
72338	77735	Resistor, 75.0K Ohms, $\pm 1\%$	RN55H7502FS
77735	83536	Resistor, 80.6K Ohms, $\pm 1\%$	RN55H8062FS
83536	89772	Resistor, 86.6K Ohms, $\pm 1\%$	RN55H8662FS
89772	96468	Resistor, 93.1K Ohms, $\pm 1\%$	RN55H9312FS
96468	100000	Resistor, 100K Ohms, $\pm 1\%$	RN55H1003FS

18.0 Dual Resistor Selection table:

For series pair of resistors, find the row that brackets the value of interest between Rmin and Rmax; use the two specified resistors R1 and R2 for the pair (all values are in ohms)

Rmin	Rmax	Value	R1	+	R2
------	------	-------	----	---	----

1,000	1,034	1,000	0	+	1000
1,034	1,109	1,070	0	+	1070
1,109	1,194	1,150	0	+	1150
1,194	1,284	1,240	0	+	1240
1,284	1,379	1,330	0	+	1330
1,379	1,484	1,430	0	+	1430
1,484	1,594	1,540	0	+	1540
1,594	1,714	1,650	0	+	1650
1,714	1,844	1,780	0	+	1780
1,844	1,954	1,910	0	+	1910
1,954	2,025	2,000	1000	+	1000
2,025	2,060	2,050	0	+	2050
2,060	2,105	2,070	1000	+	1070
2,105	2,145	2,140	1070	+	1070
2,145	2,180	2,150	1000	+	1150
2,180	2,215	2,210	0	+	2210
2,215	2,230	2,220	1070	+	1150
2,230	2,270	2,240	1000	+	1240
2,270	2,305	2,300	1150	+	1150
2,305	2,320	2,310	1070	+	1240
2,320	2,350	2,330	1000	+	1330
2,350	2,380	2,370	0	+	2370
2,380	2,395	2,390	1150	+	1240
2,395	2,415	2,400	1070	+	1330
2,415	2,455	2,430	1000	+	1430
2,455	2,490	2,480	1150	+	1330
2,490	2,520	2,500	1070	+	1430
2,520	2,545	2,540	1000	+	1540
2,545	2,560	2,550	0	+	2550
2,560	2,575	2,570	1240	+	1330
2,575	2,595	2,580	1150	+	1430
2,595	2,630	2,610	1070	+	1540
2,630	2,655	2,650	1000	+	1650
2,655	2,665	2,660	1330	+	1330
2,665	2,680	2,670	1240	+	1430
2,680	2,705	2,690	1150	+	1540
2,705	2,730	2,720	1070	+	1650
2,730	2,750	2,740	0	+	2740
2,750	2,770	2,760	1330	+	1430
2,770	2,790	2,780	1000	+	1780
2,790	2,825	2,800	1150	+	1650

2,825	2,855	2,850	1070	+	1780
2,855	2,865	2,860	1430	+	1430
2,865	2,880	2,870	1330	+	1540
2,880	2,900	2,890	1240	+	1650
2,900	2,920	2,910	1000	+	1910
2,920	2,935	2,930	1150	+	1780
2,935	2,955	2,940	0	+	2940
2,955	2,975	2,970	1430	+	1540
2,975	3,000	2,980	1070	+	1910
3,000	3,035	3,020	1240	+	1780
3,035	3,055	3,050	1000	+	2050
3,055	3,070	3,060	1150	+	1910
3,070	3,095	3,080	1430	+	1650
3,095	3,115	3,110	1330	+	1780
3,115	3,135	3,120	1070	+	2050
3,135	3,155	3,150	1240	+	1910
3,155	3,175	3,160	0	+	3160
3,175	3,195	3,190	1540	+	1650
3,195	3,205	3,200	1150	+	2050
3,205	3,225	3,210	1000	+	2210
3,225	3,260	3,240	1330	+	1910
3,260	3,285	3,280	1070	+	2210
3,285	3,295	3,290	1240	+	2050
3,295	3,310	3,300	1650	+	1650
3,310	3,330	3,320	1540	+	1780
3,330	3,350	3,340	1430	+	1910
3,350	3,365	3,360	1150	+	2210
3,365	3,375	3,370	1000	+	2370
3,375	3,390	3,380	1330	+	2050
3,390	3,415	3,400	0	+	3400
3,415	3,435	3,430	1650	+	1780
3,435	3,445	3,440	1070	+	2370
3,445	3,465	3,450	1240	+	2210
3,465	3,500	3,480	1430	+	2050
3,500	3,530	3,520	1150	+	2370
3,530	3,545	3,540	1330	+	2210
3,545	3,555	3,550	1000	+	2550
3,555	3,575	3,560	1650	+	1910
3,575	3,600	3,590	1540	+	2050
3,600	3,615	3,610	1240	+	2370
3,615	3,630	3,620	1070	+	2550

3,630	3,645	3,640	1430	+	2210
3,645	3,670	3,650	0	+	3650
3,670	3,695	3,690	1780	+	1910
3,695	3,720	3,700	1150	+	2550
3,720	3,745	3,740	1000	+	2740
3,745	3,770	3,750	1540	+	2210
3,770	3,795	3,790	1240	+	2550
3,795	3,805	3,800	1430	+	2370
3,805	3,815	3,810	1070	+	2740
3,815	3,825	3,820	1910	+	1910
3,825	3,845	3,830	1780	+	2050
3,845	3,870	3,860	1650	+	2210
3,870	3,885	3,880	1330	+	2550
3,885	3,900	3,890	1150	+	2740
3,900	3,915	3,910	1540	+	2370
3,915	3,930	3,920	0	+	3920
3,930	3,950	3,940	1000	+	2940
3,950	3,970	3,960	1910	+	2050
3,970	3,985	3,980	1240	+	2740
3,985	4,000	3,990	1780	+	2210
4,000	4,015	4,010	1070	+	2940
4,015	4,045	4,020	1650	+	2370
4,045	4,080	4,070	1330	+	2740
4,080	4,095	4,090	1150	+	2940
4,095	4,110	4,100	2050	+	2050
4,110	4,135	4,120	1910	+	2210
4,135	4,155	4,150	1780	+	2370
4,155	4,165	4,160	1000	+	3160
4,165	4,175	4,170	1430	+	2740
4,175	4,190	4,180	1240	+	2940
4,190	4,210	4,200	1650	+	2550
4,210	4,225	4,220	0	+	4220
4,225	4,245	4,230	1070	+	3160
4,245	4,265	4,260	2050	+	2210
4,265	4,275	4,270	1330	+	2940
4,275	4,295	4,280	1540	+	2740
4,295	4,320	4,310	1150	+	3160
4,320	4,350	4,330	1780	+	2550
4,350	4,380	4,370	1430	+	2940
4,380	4,395	4,390	1650	+	2740
4,395	4,410	4,400	1000	+	3400

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4,410	4,440	4,420	2050	+	2370
4,440	4,465	4,460	1910	+	2550
4,465	4,475	4,470	1070	+	3400
4,475	4,485	4,480	1540	+	2940
4,485	4,505	4,490	1330	+	3160
4,505	4,525	4,520	1780	+	2740
4,525	4,540	4,530	0	+	4530
4,540	4,565	4,550	1150	+	3400
4,565	4,585	4,580	2210	+	2370
4,585	4,595	4,590	1430	+	3160
4,595	4,620	4,600	2050	+	2550
4,620	4,645	4,640	1240	+	3400
4,645	4,675	4,650	1000	+	3650
4,675	4,710	4,700	1540	+	3160
4,710	4,725	4,720	1070	+	3650
4,725	4,735	4,730	1330	+	3400
4,735	4,750	4,740	2370	+	2370
4,750	4,775	4,760	2210	+	2550
4,775	4,795	4,790	2050	+	2740
4,795	4,805	4,800	1150	+	3650
4,805	4,820	4,810	1650	+	3160
4,820	4,840	4,830	1430	+	3400
4,840	4,860	4,850	1910	+	2940
4,860	4,880	4,870	0	+	4870
4,880	4,905	4,890	1240	+	3650
4,905	4,930	4,920	1000	+	3920
4,930	4,945	4,940	1540	+	3400
4,945	4,965	4,950	2210	+	2740
4,965	4,985	4,980	1330	+	3650
4,985	5,020	4,990	1070	+	3920
5,020	5,060	5,050	1650	+	3400
5,060	5,075	5,070	1150	+	3920
5,075	5,090	5,080	1430	+	3650
5,090	5,105	5,100	2550	+	2550
5,105	5,130	5,110	2370	+	2740
5,130	5,155	5,150	2210	+	2940
5,155	5,170	5,160	1240	+	3920
5,170	5,185	5,180	1780	+	3400
5,185	5,200	5,190	1540	+	3650
5,200	5,215	5,210	2050	+	3160
5,215	5,225	5,220	1000	+	4220
5,225	5,240	5,230	0	+	5230
5,240	5,270	5,250	1330	+	3920
5,270	5,295	5,290	1070	+	4220
5,295	5,305	5,300	1650	+	3650
5,305	5,330	5,310	1910	+	3400
5,330	5,360	5,350	1430	+	3920
5,360	5,400	5,370	1150	+	4220
5,400	5,440	5,430	1780	+	3650

5,440	5,455	5,450	2050	+	3400
5,455	5,470	5,460	1240	+	4220
5,470	5,485	5,480	2740	+	2740
5,485	5,510	5,490	2550	+	2940
5,510	5,540	5,530	1000	+	4530
5,540	5,555	5,550	1330	+	4220
5,555	5,565	5,560	1910	+	3650
5,565	5,585	5,570	1650	+	3920
5,585	5,605	5,600	1070	+	4530
5,605	5,615	5,610	2210	+	3400
5,615	5,635	5,620	0	+	5620
5,635	5,665	5,650	1430	+	4220
5,665	5,690	5,680	1150	+	4530
5,690	5,705	5,700	1780	+	3920
5,705	5,735	5,710	2550	+	3160
5,735	5,765	5,760	1540	+	4220
5,765	5,800	5,770	1240	+	4530
5,800	5,845	5,830	1910	+	3920
5,845	5,865	5,860	1330	+	4530
5,865	5,875	5,870	1000	+	4870
5,875	5,890	5,880	2940	+	2940
5,890	5,920	5,900	2740	+	3160
5,920	5,945	5,940	1070	+	4870
5,945	5,955	5,950	2550	+	3400
5,955	5,965	5,960	1430	+	4530
5,965	5,985	5,970	2050	+	3920
5,985	6,010	6,000	1780	+	4220
6,010	6,030	6,020	1150	+	4870
6,030	6,055	6,040	0	+	6040
6,055	6,085	6,070	1540	+	4530
6,085	6,105	6,100	2940	+	3160
6,105	6,120	6,110	1240	+	4870
6,120	6,135	6,130	1910	+	4220
6,135	6,160	6,140	2740	+	3400
6,160	6,190	6,180	1650	+	4530
6,190	6,215	6,200	1330	+	4870
6,215	6,250	6,230	1000	+	5230
6,250	6,280	6,270	2050	+	4220
6,280	6,295	6,290	2370	+	3920
6,295	6,305	6,300	1070	+	5230
6,305	6,315	6,310	1780	+	4530
6,315	6,330	6,320	3160	+	3160
6,330	6,360	6,340	2940	+	3400
6,360	6,385	6,380	1150	+	5230
6,385	6,400	6,390	2740	+	3650
6,400	6,420	6,410	1540	+	4870
6,420	6,435	6,430	2210	+	4220
6,435	6,455	6,440	1910	+	4530
6,455	6,480	6,470	1240	+	5230

6,480	6,505	6,490	0	+	6490
6,505	6,540	6,520	1650	+	4870
6,540	6,570	6,560	1330	+	5230
6,570	6,585	6,580	2050	+	4530
6,585	6,605	6,590	2370	+	4220
6,605	6,635	6,620	1000	+	5620
6,635	6,655	6,650	1780	+	4870
6,655	6,675	6,660	1430	+	5230
6,675	6,715	6,690	1070	+	5620
6,715	6,755	6,740	2210	+	4530
6,755	6,775	6,770	1150	+	5620
6,775	6,790	6,780	1910	+	4870
6,790	6,805	6,800	3400	+	3400
6,805	6,835	6,810	3160	+	3650
6,835	6,870	6,860	1240	+	5620
6,870	6,890	6,880	1650	+	5230
6,890	6,910	6,900	2370	+	4530
6,910	6,935	6,920	2050	+	4870
6,935	6,955	6,950	1330	+	5620
6,955	6,970	6,960	2740	+	4220
6,970	6,995	6,980	0	+	6980
6,995	7,025	7,010	1780	+	5230
7,025	7,045	7,040	1000	+	6040
7,045	7,065	7,050	1430	+	5620
7,065	7,095	7,080	2210	+	4870
7,095	7,125	7,110	1070	+	6040
7,125	7,150	7,140	1910	+	5230
7,150	7,175	7,160	1540	+	5620
7,175	7,215	7,190	1150	+	6040
7,215	7,255	7,240	2370	+	4870
7,255	7,275	7,270	1650	+	5620
7,275	7,290	7,280	1240	+	6040
7,290	7,310	7,300	3650	+	3650
7,310	7,345	7,320	3400	+	3920
7,345	7,375	7,370	1330	+	6040
7,375	7,390	7,380	3160	+	4220
7,390	7,410	7,400	1780	+	5620
7,410	7,430	7,420	2550	+	4870
7,430	7,455	7,440	2210	+	5230
7,455	7,480	7,470	1430	+	6040
7,480	7,495	7,490	1000	+	6490
7,495	7,515	7,500	0	+	7500
7,515	7,545	7,530	1910	+	5620
7,545	7,565	7,560	1070	+	6490
7,565	7,575	7,570	3650	+	3920
7,575	7,590	7,580	1540	+	6040
7,590	7,605	7,600	2370	+	5230
7,605	7,615	7,610	2740	+	4870
7,615	7,630	7,620	3400	+	4220

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7,630	7,655	7,640	1150	+	6490
7,655	7,680	7,670	2050	+	5620
7,680	7,710	7,690	1650	+	6040
7,710	7,755	7,730	1240	+	6490
7,755	7,795	7,780	2550	+	5230
7,795	7,815	7,810	2940	+	4870
7,815	7,825	7,820	1330	+	6490
7,825	7,835	7,830	2210	+	5620
7,835	7,855	7,840	3920	+	3920
7,855	7,895	7,870	3650	+	4220
7,895	7,925	7,920	1430	+	6490
7,925	7,940	7,930	3400	+	4530
7,940	7,960	7,950	1910	+	6040
7,960	7,975	7,970	2740	+	5230
7,975	7,985	7,980	1000	+	6980
7,985	8,010	7,990	2370	+	5620
8,010	8,040	8,030	1540	+	6490
8,040	8,055	8,050	1070	+	6980
8,055	8,075	8,060	0	+	8060
8,075	8,110	8,090	2050	+	6040
8,110	8,135	8,130	1150	+	6980
8,135	8,155	8,140	1650	+	6490
8,155	8,175	8,170	2550	+	5620
8,175	8,200	8,180	3650	+	4530
8,200	8,235	8,220	1240	+	6980
8,235	8,260	8,250	2210	+	6040
8,260	8,290	8,270	1780	+	6490
8,290	8,335	8,310	1330	+	6980
8,335	8,375	8,360	2740	+	5620
8,375	8,395	8,390	3160	+	5230
8,395	8,405	8,400	1910	+	6490
8,405	8,425	8,410	1430	+	6980
8,425	8,445	8,440	4220	+	4220
8,445	8,475	8,450	3920	+	4530
8,475	8,510	8,500	1000	+	7500
8,510	8,530	8,520	1540	+	6980
8,530	8,550	8,540	2050	+	6490
8,550	8,565	8,560	2940	+	5620
8,565	8,580	8,570	1070	+	7500
8,580	8,610	8,590	2550	+	6040
8,610	8,640	8,630	1650	+	6980
8,640	8,655	8,650	1150	+	7500
8,655	8,680	8,660	0	+	8660
8,680	8,720	8,700	2210	+	6490
8,720	8,745	8,740	1240	+	7500
8,745	8,755	8,750	4220	+	4530
8,755	8,770	8,760	1780	+	6980
8,770	8,785	8,780	2740	+	6040
8,785	8,810	8,790	3920	+	4870

8,810	8,845	8,830	1330	+	7500
8,845	8,870	8,860	2370	+	6490
8,870	8,885	8,880	3650	+	5230
8,885	8,910	8,890	1910	+	6980
8,910	8,955	8,930	1430	+	7500
8,955	9,000	8,980	2940	+	6040
9,000	9,025	9,020	3400	+	5620
9,025	9,035	9,030	2050	+	6980
9,035	9,050	9,040	1540	+	7500
9,050	9,075	9,060	1000	+	8060
9,075	9,110	9,090	4220	+	4870
9,110	9,140	9,130	1070	+	8060
9,140	9,170	9,150	1650	+	7500
9,170	9,195	9,190	2210	+	6980
9,195	9,205	9,200	3160	+	6040
9,205	9,220	9,210	1150	+	8060
9,220	9,250	9,230	2740	+	6490
9,250	9,275	9,270	3650	+	5620
9,275	9,290	9,280	1780	+	7500
9,290	9,305	9,300	1240	+	8060
9,305	9,330	9,310	0	+	9310
9,330	9,370	9,350	2370	+	6980
9,370	9,395	9,390	1330	+	8060
9,395	9,405	9,400	4530	+	4870
9,405	9,420	9,410	1910	+	7500
9,420	9,435	9,430	2940	+	6490
9,435	9,445	9,440	3400	+	6040
9,445	9,470	9,450	4220	+	5230
9,470	9,510	9,490	1430	+	8060
9,510	9,535	9,530	2550	+	6980
9,535	9,545	9,540	3920	+	5620
9,545	9,575	9,550	2050	+	7500
9,575	9,625	9,600	1540	+	8060
9,625	9,655	9,650	3160	+	6490
9,655	9,675	9,660	1000	+	8660
9,675	9,700	9,690	3650	+	6040
9,700	9,715	9,710	1650	+	8060
9,715	9,725	9,720	2740	+	6980
9,725	9,735	9,730	1070	+	8660
9,735	9,750	9,740	4870	+	4870
9,750	9,785	9,760	4530	+	5230
9,785	9,825	9,810	1150	+	8660
9,825	9,855	9,840	1780	+	8060
9,855	9,880	9,870	2370	+	7500
9,880	9,895	9,890	3400	+	6490
9,895	9,910	9,900	1240	+	8660
9,910	9,940	9,920	2940	+	6980
9,940	9,965	9,960	3920	+	6040
9,965	9,980	9,970	1910	+	8060

9,980	9,995	9,990	1330	+	8660
9,995	10,025	10,000	0	+	10000
10,025	10,070	10,050	2550	+	7500
10,070	10,095	10,090	1430	+	8660
10,095	10,105	10,100	4870	+	5230
10,105	10,125	10,110	2050	+	8060
10,125	10,145	10,140	3160	+	6980
10,145	10,175	10,150	4530	+	5620
10,175	10,220	10,200	1540	+	8660
10,220	10,250	10,240	2740	+	7500
10,250	10,265	10,260	4220	+	6040
10,265	10,290	10,270	2210	+	8060
10,290	10,345	10,310	1000	+	9310
10,345	10,395	10,380	1070	+	9310
10,395	10,420	10,410	3920	+	6490
10,420	10,435	10,430	2370	+	8060
10,435	10,450	10,440	1780	+	8660
10,450	10,475	10,460	1150	+	9310
10,475	10,520	10,490	4870	+	5620
10,520	10,560	10,550	1240	+	9310
10,560	10,590	10,570	1910	+	8660
10,590	10,620	10,610	2550	+	8060
10,620	10,635	10,630	3650	+	6980
10,635	10,650	10,640	1330	+	9310
10,650	10,680	10,660	3160	+	7500
10,680	10,705	10,700	0	+	10700
10,705	10,725	10,710	2050	+	8660
10,725	10,770	10,740	1430	+	9310
10,770	10,825	10,800	2740	+	8060
10,825	10,860	10,850	1540	+	9310
10,860	10,885	10,870	2210	+	8660
10,885	10,905	10,900	3400	+	7500
10,905	10,935	10,910	4870	+	6040
10,935	10,980	10,960	1650	+	9310
10,980	11,010	11,000	1000	+	10000
11,010	11,025	11,020	4530	+	6490
11,025	11,050	11,030	2370	+	8660
11,050	11,080	11,070	1070	+	10000
11,080	11,120	11,090	1780	+	9310
11,120	11,175	11,150	1150	+	10000
11,175	11,205	11,200	4220	+	6980
11,205	11,215	11,210	2550	+	8660
11,215	11,230	11,220	1910	+	9310
11,230	11,255	11,240	1240	+	10000
11,255	11,300	11,270	5230	+	6040
11,300	11,345	11,330	1330	+	10000
11,345	11,380	11,360	2050	+	9310
11,380	11,410	11,400	2740	+	8660
11,410	11,425	11,420	3920	+	7500

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11,425	11,445	11,430	1430	+	10000
11,445	11,480	11,460	3400	+	8060
11,480	11,505	11,500	0	+	11500
11,505	11,515	11,510	4530	+	6980
11,515	11,530	11,520	2210	+	9310
11,530	11,570	11,540	1540	+	10000
11,570	11,625	11,600	2940	+	8660
11,625	11,655	11,650	1650	+	10000
11,655	11,670	11,660	5620	+	6040
11,670	11,690	11,680	2370	+	9310
11,690	11,705	11,700	1000	+	10700
11,705	11,715	11,710	3650	+	8060
11,715	11,745	11,720	4220	+	7500
11,745	11,775	11,770	1070	+	10700
11,775	11,800	11,780	1780	+	10000
11,800	11,835	11,820	3160	+	8660
11,835	11,855	11,850	1150	+	10700
11,855	11,885	11,860	2550	+	9310
11,885	11,925	11,910	1910	+	10000
11,925	11,960	11,940	1240	+	10700
11,960	12,005	11,980	3920	+	8060
12,005	12,040	12,030	1330	+	10700
12,040	12,055	12,050	2050	+	10000
12,055	12,070	12,060	3400	+	8660
12,070	12,095	12,080	6040	+	6040
12,095	12,120	12,110	5620	+	6490
12,120	12,170	12,130	1430	+	10700
12,170	12,225	12,210	2210	+	10000
12,225	12,245	12,240	1540	+	10700
12,245	12,265	12,250	2940	+	9310
12,265	12,295	12,280	4220	+	8060
12,295	12,330	12,310	3650	+	8660
12,330	12,360	12,350	1650	+	10700
12,360	12,385	12,370	2370	+	10000
12,385	12,435	12,400	0	+	12400
12,435	12,475	12,470	3160	+	9310
12,475	12,490	12,480	1780	+	10700
12,490	12,515	12,500	1000	+	11500
12,515	12,540	12,530	6040	+	6490
12,540	12,560	12,550	2550	+	10000
12,560	12,575	12,570	1070	+	11500
12,575	12,585	12,580	3920	+	8660
12,585	12,595	12,590	4530	+	8060
12,595	12,605	12,600	5620	+	6980
12,605	12,630	12,610	1910	+	10700
12,630	12,680	12,650	1150	+	11500
12,680	12,720	12,710	3400	+	9310
12,720	12,735	12,730	5230	+	7500
12,735	12,745	12,740	1240	+	11500

12,745	12,790	12,750	2050	+	10700
12,790	12,855	12,830	1330	+	11500
12,855	12,895	12,880	4220	+	8660
12,895	12,920	12,910	2210	+	10700
12,920	12,935	12,930	1430	+	11500
12,935	12,950	12,940	2940	+	10000
12,950	12,970	12,960	3650	+	9310
12,970	13,000	12,980	6490	+	6490
13,000	13,030	13,020	6040	+	6980
13,030	13,055	13,040	1540	+	11500
13,055	13,095	13,070	2370	+	10700
13,095	13,135	13,120	5620	+	7500
13,135	13,155	13,150	1650	+	11500
13,155	13,175	13,160	3160	+	10000
13,175	13,210	13,190	4530	+	8660
13,210	13,240	13,230	3920	+	9310
13,240	13,265	13,250	2550	+	10700
13,265	13,285	13,280	1780	+	11500
13,285	13,295	13,290	5230	+	8060
13,295	13,350	13,300	0	+	13300
13,350	13,405	13,400	1000	+	12400
13,405	13,425	13,410	1910	+	11500
13,425	13,455	13,440	2740	+	10700
13,455	13,500	13,470	1070	+	12400
13,500	13,535	13,530	4220	+	9310
13,535	13,545	13,540	6040	+	7500
13,545	13,595	13,550	1150	+	12400
13,595	13,645	13,640	1240	+	12400
13,645	13,665	13,650	3650	+	10000
13,665	13,695	13,680	5620	+	8060
13,695	13,720	13,710	2210	+	11500
13,720	13,780	13,730	1330	+	12400
13,780	13,835	13,830	1430	+	12400
13,835	13,850	13,840	4530	+	9310
13,850	13,865	13,860	3160	+	10700
13,865	13,880	13,870	2370	+	11500
13,880	13,905	13,890	5230	+	8660
13,905	13,930	13,920	3920	+	10000
13,930	13,950	13,940	1540	+	12400
13,950	13,975	13,960	6980	+	6980
13,975	14,020	13,990	6490	+	7500
14,020	14,075	14,050	1650	+	12400
14,075	14,140	14,100	3400	+	10700
14,140	14,200	14,180	1780	+	12400
14,200	14,230	14,220	4220	+	10000
14,230	14,260	14,240	2740	+	11500
14,260	14,290	14,280	5620	+	8660
14,290	14,305	14,300	0	+	14300
14,305	14,330	14,310	1910	+	12400

14,330	14,360	14,350	3650	+	10700
14,360	14,405	14,370	1070	+	13300
14,405	14,445	14,440	2940	+	11500
14,445	14,465	14,450	1150	+	13300
14,465	14,505	14,480	6980	+	7500
14,505	14,535	14,530	4530	+	10000
14,535	14,545	14,540	1240	+	13300
14,545	14,580	14,550	6490	+	8060
14,580	14,615	14,610	2210	+	12400
14,615	14,625	14,620	3920	+	10700
14,625	14,645	14,630	1330	+	13300
14,645	14,680	14,660	3160	+	11500
14,680	14,715	14,700	6040	+	8660
14,715	14,750	14,730	1430	+	13300
14,750	14,805	14,770	2370	+	12400
14,805	14,855	14,840	1540	+	13300
14,855	14,885	14,870	4870	+	10000
14,885	14,910	14,900	3400	+	11500
14,910	14,925	14,920	4220	+	10700
14,925	14,940	14,930	5620	+	9310
14,940	14,975	14,950	1650	+	13300
14,975	15,020	15,000	7500	+	7500
15,020	15,060	15,040	6980	+	8060
15,060	15,110	15,080	1780	+	13300
15,110	15,145	15,140	2740	+	12400
15,145	15,180	15,150	3650	+	11500
15,180	15,220	15,210	1910	+	13300
15,220	15,265	15,230	4530	+	10700
15,265	15,320	15,300	1000	+	14300
15,320	15,345	15,340	2940	+	12400
15,345	15,360	15,350	2050	+	13300
15,360	15,385	15,370	1070	+	14300
15,385	15,410	15,400	0	+	15400
15,410	15,435	15,420	3920	+	11500
15,435	15,480	15,450	1150	+	14300
15,480	15,525	15,510	2210	+	13300
15,525	15,550	15,540	1240	+	14300
15,550	15,565	15,560	3160	+	12400
15,565	15,595	15,570	4870	+	10700
15,595	15,625	15,620	5620	+	10000
15,625	15,635	15,630	1330	+	14300
15,635	15,655	15,640	6980	+	8660
15,655	15,695	15,670	2370	+	13300
15,695	15,725	15,720	4220	+	11500
15,725	15,765	15,730	1430	+	14300
15,765	15,820	15,800	3400	+	12400
15,820	15,845	15,840	1540	+	14300
15,845	15,890	15,850	2550	+	13300
15,890	15,940	15,930	5230	+	10700

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15,940	15,990	15,950	1650	+	14300
15,990	16,035	16,030	4530	+	11500
16,035	16,045	16,040	2740	+	13300
16,045	16,065	16,050	3650	+	12400
16,065	16,100	16,080	1780	+	14300
16,100	16,140	16,120	8060	+	8060
16,140	16,185	16,160	7500	+	8660
16,185	16,225	16,210	1910	+	14300
16,225	16,265	16,240	2940	+	13300
16,265	16,305	16,290	6980	+	9310
16,305	16,335	16,320	3920	+	12400
16,335	16,360	16,350	2050	+	14300
16,360	16,385	16,370	4870	+	11500
16,385	16,430	16,400	1000	+	15400
16,430	16,465	16,460	3160	+	13300
16,465	16,480	16,470	1070	+	15400
16,480	16,495	16,490	6490	+	10000
16,495	16,505	16,500	0	+	16500
16,505	16,530	16,510	2210	+	14300
16,530	16,585	16,550	1150	+	15400
16,585	16,630	16,620	4220	+	12400
16,630	16,655	16,640	1240	+	15400
16,655	16,685	16,670	2370	+	14300
16,685	16,710	16,700	3400	+	13300
16,710	16,725	16,720	8060	+	8660
16,725	16,735	16,730	1330	+	15400
16,735	16,775	16,740	6040	+	10700
16,775	16,820	16,810	7500	+	9310
16,820	16,840	16,830	1430	+	15400
16,840	16,890	16,850	2550	+	14300
16,890	16,935	16,930	4530	+	12400
16,935	16,945	16,940	1540	+	15400
16,945	16,965	16,950	3650	+	13300
16,965	17,010	16,980	6980	+	10000
17,010	17,045	17,040	2740	+	14300
17,045	17,085	17,050	1650	+	15400
17,085	17,150	17,120	5620	+	11500
17,150	17,185	17,180	1780	+	15400
17,185	17,205	17,190	6490	+	10700
17,205	17,230	17,220	3920	+	13300
17,230	17,255	17,240	2940	+	14300
17,255	17,290	17,270	4870	+	12400
17,290	17,315	17,310	1910	+	15400
17,315	17,345	17,320	8660	+	8660
17,345	17,410	17,370	8060	+	9310
17,410	17,455	17,450	2050	+	15400
17,455	17,480	17,460	3160	+	14300
17,480	17,510	17,500	1000	+	16500
17,510	17,530	17,520	4220	+	13300

17,530	17,555	17,540	6040	+	11500
17,555	17,590	17,570	1070	+	16500
17,590	17,620	17,610	2210	+	15400
17,620	17,640	17,630	5230	+	12400
17,640	17,665	17,650	1150	+	16500
17,665	17,690	17,680	6980	+	10700
17,690	17,720	17,700	3400	+	14300
17,720	17,755	17,740	1240	+	16500
17,755	17,785	17,770	2370	+	15400
17,785	17,815	17,800	0	+	17800
17,815	17,880	17,830	1330	+	16500
17,880	17,940	17,930	1430	+	16500
17,940	17,960	17,950	2550	+	15400
17,960	17,980	17,970	8660	+	9310
17,980	18,005	17,990	6490	+	11500
18,005	18,030	18,020	5620	+	12400
18,030	18,050	18,040	1540	+	16500
18,050	18,100	18,060	8060	+	10000
18,100	18,145	18,140	2740	+	15400
18,145	18,160	18,150	1650	+	16500
18,160	18,185	18,170	4870	+	13300
18,185	18,210	18,200	7500	+	10700
18,210	18,250	18,220	3920	+	14300
18,250	18,310	18,280	1780	+	16500
18,310	18,375	18,340	2940	+	15400
18,375	18,425	18,410	1910	+	16500
18,425	18,460	18,440	6040	+	12400
18,460	18,500	18,480	6980	+	11500
18,500	18,525	18,520	4220	+	14300
18,525	18,540	18,530	5230	+	13300
18,540	18,555	18,550	2050	+	16500
18,555	18,590	18,560	3160	+	15400
18,590	18,640	18,620	9310	+	9310
18,640	18,685	18,660	8660	+	10000
18,685	18,735	18,710	2210	+	16500
18,735	18,780	18,760	8060	+	10700
18,780	18,815	18,800	1000	+	17800
18,815	18,850	18,830	4530	+	14300
18,850	18,880	18,870	1070	+	17800
18,880	18,905	18,890	6490	+	12400
18,905	18,935	18,920	5620	+	13300
18,935	18,975	18,950	1150	+	17800
18,975	19,020	19,000	7500	+	11500
19,020	19,045	19,040	1240	+	17800
19,045	19,075	19,050	2550	+	16500
19,075	19,115	19,100	0	+	19100
19,115	19,150	19,130	1330	+	17800
19,150	19,200	19,170	4870	+	14300
19,200	19,235	19,230	1430	+	17800

19,235	19,275	19,240	2740	+	16500
19,275	19,315	19,310	9310	+	10000
19,315	19,330	19,320	3920	+	15400
19,330	19,350	19,340	1540	+	17800
19,350	19,370	19,360	8660	+	10700
19,370	19,410	19,380	6980	+	12400
19,410	19,445	19,440	2940	+	16500
19,445	19,490	19,450	1650	+	17800
19,490	19,545	19,530	5230	+	14300
19,545	19,570	19,560	8060	+	11500
19,570	19,600	19,580	1780	+	17800
19,600	19,640	19,620	4220	+	15400
19,640	19,685	19,660	3160	+	16500
19,685	19,750	19,710	1910	+	17800
19,750	19,820	19,790	6490	+	13300
19,820	19,875	19,850	2050	+	17800
19,875	19,910	19,900	3400	+	16500
19,910	19,925	19,920	5620	+	14300
19,925	19,965	19,930	4530	+	15400
19,965	20,005	20,000	10000	+	10000
20,005	20,055	20,010	2210	+	17800
20,055	20,125	20,100	1000	+	19100
20,125	20,155	20,150	3650	+	16500
20,155	20,165	20,160	8660	+	11500
20,165	20,210	20,170	1070	+	19100
20,210	20,260	20,250	1150	+	19100
20,260	20,275	20,270	4870	+	15400
20,275	20,310	20,280	6980	+	13300
20,310	20,345	20,340	1240	+	19100
20,345	20,385	20,350	2550	+	17800
20,385	20,425	20,420	3920	+	16500
20,425	20,445	20,430	1330	+	19100
20,445	20,480	20,460	8060	+	12400
20,480	20,515	20,500	0	+	20500
20,515	20,535	20,530	1430	+	19100
20,535	20,585	20,540	2740	+	17800
20,585	20,635	20,630	5230	+	15400
20,635	20,670	20,640	1540	+	19100
20,670	20,710	20,700	10000	+	10700
20,710	20,730	20,720	4220	+	16500
20,730	20,745	20,740	2940	+	17800
20,745	20,770	20,750	1650	+	19100
20,770	20,795	20,790	6490	+	14300
20,795	20,805	20,800	7500	+	13300
20,805	20,845	20,810	9310	+	11500
20,845	20,920	20,880	1780	+	19100
20,920	20,985	20,960	3160	+	17800
20,985	21,015	21,010	1910	+	19100
21,015	21,025	21,020	5620	+	15400

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21,025	21,045	21,030	4530	+	16500
21,045	21,105	21,060	8660	+	12400
21,105	21,175	21,150	2050	+	19100
21,175	21,240	21,200	3400	+	17800
21,240	21,295	21,280	6980	+	14300
21,295	21,335	21,310	2210	+	19100
21,335	21,365	21,360	8060	+	13300
21,365	21,385	21,370	4870	+	16500
21,385	21,420	21,400	10700	+	10700
21,420	21,445	21,440	6040	+	15400
21,445	21,460	21,450	3650	+	17800
21,460	21,485	21,470	2370	+	19100
21,485	21,535	21,500	1000	+	20500
21,535	21,610	21,570	1070	+	20500
21,610	21,680	21,650	1150	+	20500
21,680	21,715	21,710	9310	+	12400
21,715	21,725	21,720	3920	+	17800
21,725	21,735	21,730	5230	+	16500
21,735	21,770	21,740	1240	+	20500
21,770	21,815	21,800	7500	+	14300
21,815	21,835	21,830	1330	+	20500
21,835	21,865	21,840	2740	+	19100
21,865	21,910	21,890	6490	+	15400
21,910	21,945	21,930	1430	+	20500
21,945	21,990	21,960	8660	+	13300
21,990	22,030	22,020	4220	+	17800
22,030	22,070	22,040	1540	+	20500
22,070	22,110	22,100	0	+	22100
22,110	22,135	22,120	5620	+	16500
22,135	22,175	22,150	1650	+	20500
22,175	22,230	22,200	10700	+	11500
22,230	22,270	22,260	3160	+	19100
22,270	22,305	22,280	1780	+	20500
22,305	22,345	22,330	4530	+	17800
22,345	22,370	22,360	8060	+	14300
22,370	22,390	22,380	6980	+	15400
22,390	22,405	22,400	10000	+	12400
22,405	22,455	22,410	1910	+	20500
22,455	22,520	22,500	3400	+	19100
22,520	22,545	22,540	6040	+	16500
22,545	22,580	22,550	2050	+	20500
22,580	22,640	22,610	9310	+	13300
22,640	22,690	22,670	4870	+	17800
22,690	22,730	22,710	2210	+	20500
22,730	22,810	22,750	3650	+	19100
22,810	22,885	22,870	2370	+	20500
22,885	22,930	22,900	7500	+	15400
22,930	22,975	22,960	8660	+	14300
22,975	22,995	22,990	6490	+	16500

22,995	23,010	23,000	11500	+	11500
23,010	23,025	23,020	3920	+	19100
23,025	23,040	23,030	5230	+	17800
23,040	23,075	23,050	2550	+	20500
23,075	23,135	23,100	1000	+	22100
23,135	23,205	23,170	1070	+	22100
23,205	23,245	23,240	2740	+	20500
23,245	23,275	23,250	1150	+	22100
23,275	23,310	23,300	10000	+	13300
23,310	23,330	23,320	4220	+	19100
23,330	23,380	23,340	1240	+	22100
23,380	23,425	23,420	5620	+	17800
23,425	23,435	23,430	1330	+	22100
23,435	23,450	23,440	2940	+	20500
23,450	23,470	23,460	8060	+	15400
23,470	23,505	23,480	6980	+	16500
23,505	23,570	23,530	1430	+	22100
23,570	23,620	23,610	9310	+	14300
23,620	23,635	23,630	4530	+	19100
23,635	23,650	23,640	1540	+	22100
23,650	23,680	23,660	3160	+	20500
23,680	23,725	23,700	0	+	23700
23,725	23,795	23,750	1650	+	22100
23,795	23,860	23,840	6040	+	17800
23,860	23,890	23,880	1780	+	22100
23,890	23,935	23,900	3400	+	20500
23,935	23,985	23,970	4870	+	19100
23,985	24,005	24,000	7500	+	16500
24,005	24,035	24,010	1910	+	22100
24,035	24,105	24,060	8660	+	15400
24,105	24,220	24,150	2050	+	22100
24,220	24,295	24,290	6490	+	17800
24,295	24,305	24,300	10000	+	14300
24,305	24,320	24,310	2210	+	22100
24,320	24,375	24,330	5230	+	19100
24,375	24,445	24,420	3920	+	20500
24,445	24,515	24,470	2370	+	22100
24,515	24,605	24,560	8060	+	16500
24,605	24,675	24,650	2550	+	22100
24,675	24,705	24,700	1000	+	23700
24,705	24,715	24,710	9310	+	15400
24,715	24,745	24,720	4220	+	20500
24,745	24,775	24,770	1070	+	23700
24,775	24,790	24,780	6980	+	17800
24,790	24,820	24,800	11500	+	13300
24,820	24,845	24,840	2740	+	22100
24,845	24,895	24,850	1150	+	23700
24,895	24,970	24,940	1240	+	23700
24,970	25,015	25,000	10700	+	14300

25,015	25,035	25,030	1330	+	23700
25,035	25,085	25,040	2940	+	22100
25,085	25,135	25,130	1430	+	23700
25,135	25,150	25,140	6040	+	19100
25,150	25,200	25,160	8660	+	16500
25,200	25,250	25,240	1540	+	23700
25,250	25,280	25,260	3160	+	22100
25,280	25,325	25,300	7500	+	17800
25,325	25,360	25,350	1650	+	23700
25,360	25,385	25,370	4870	+	20500
25,385	25,440	25,400	10000	+	15400
25,440	25,490	25,480	1780	+	23700
25,490	25,545	25,500	0	+	25500
25,545	25,600	25,590	6490	+	19100
25,600	25,655	25,610	1910	+	23700
25,655	25,715	25,700	12400	+	13300
25,715	25,740	25,730	5230	+	20500
25,740	25,775	25,750	2050	+	23700
25,775	25,805	25,800	11500	+	14300
25,805	25,835	25,810	9310	+	16500
25,835	25,885	25,860	8060	+	17800
25,885	25,965	25,910	2210	+	23700
25,965	26,045	26,020	3920	+	22100
26,045	26,075	26,070	2370	+	23700
26,075	26,090	26,080	6980	+	19100
26,090	26,110	26,100	10700	+	15400
26,110	26,185	26,120	5620	+	20500
26,185	26,285	26,250	2550	+	23700
26,285	26,380	26,320	4220	+	22100
26,380	26,450	26,440	2740	+	23700
26,450	26,480	26,460	8660	+	17800
26,480	26,520	26,500	1000	+	25500
26,520	26,555	26,540	6040	+	20500
26,555	26,585	26,570	1070	+	25500
26,585	26,615	26,600	7500	+	19100
26,615	26,635	26,630	4530	+	22100
26,635	26,645	26,640	2940	+	23700
26,645	26,675	26,650	1150	+	25500
26,675	26,720	26,700	12400	+	14300
26,720	26,785	26,740	1240	+	25500
26,785	26,845	26,830	1330	+	25500
26,845	26,880	26,860	3160	+	23700
26,880	26,915	26,900	11500	+	15400
26,915	26,950	26,930	1430	+	25500
26,950	26,980	26,970	4870	+	22100
26,980	27,015	26,990	6490	+	20500
27,015	27,070	27,040	1540	+	25500
27,070	27,105	27,100	3400	+	23700
27,105	27,130	27,110	9310	+	17800

Board-level tuning procedure P0611A
 GSS MUX card, PWA 8A01883

27,130	27,155	27,150	1650	+	25500
27,155	27,180	27,160	8060	+	19100
27,180	27,240	27,200	10700	+	16500
27,240	27,305	27,280	1780	+	25500
27,305	27,340	27,330	5230	+	22100
27,340	27,375	27,350	3650	+	23700
27,375	27,405	27,400	0	+	27400
27,405	27,445	27,410	1910	+	25500
27,445	27,515	27,480	6980	+	20500
27,515	27,575	27,550	2050	+	25500
27,575	27,610	27,600	13300	+	14300
27,610	27,665	27,620	3920	+	23700
27,665	27,715	27,710	2210	+	25500
27,715	27,740	27,720	5620	+	22100
27,740	27,780	27,760	8660	+	19100
27,780	27,835	27,800	10000	+	17800
27,835	27,895	27,870	2370	+	25500
27,895	27,960	27,920	4220	+	23700
27,960	28,025	28,000	7500	+	20500
28,025	28,095	28,050	2550	+	25500
28,095	28,185	28,140	6040	+	22100
28,185	28,235	28,230	4530	+	23700
28,235	28,320	28,240	2740	+	25500
28,320	28,405	28,400	1000	+	27400
28,405	28,425	28,410	9310	+	19100
28,425	28,455	28,440	2940	+	25500
28,455	28,485	28,470	1070	+	27400
28,485	28,525	28,500	10700	+	17800
28,525	28,555	28,550	1150	+	27400
28,555	28,565	28,560	8060	+	20500
28,565	28,580	28,570	4870	+	23700
28,580	28,595	28,590	6490	+	22100
28,595	28,620	28,600	14300	+	14300
28,620	28,650	28,640	1240	+	27400
28,650	28,680	28,660	3160	+	25500
28,680	28,715	28,700	13300	+	15400
28,715	28,780	28,730	1330	+	27400
28,780	28,865	28,830	1430	+	27400
28,865	28,915	28,900	3400	+	25500
28,915	28,935	28,930	5230	+	23700
28,935	28,995	28,940	1540	+	27400
28,995	29,065	29,050	1650	+	27400
29,065	29,090	29,080	6980	+	22100
29,090	29,125	29,100	10000	+	19100
29,125	29,155	29,150	3650	+	25500
29,155	29,170	29,160	8660	+	20500
29,170	29,240	29,180	1780	+	27400
29,240	29,305	29,300	11500	+	17800
29,305	29,315	29,310	1910	+	27400

29,315	29,360	29,320	5620	+	23700
29,360	29,410	29,400	0	+	29400
29,410	29,435	29,420	3920	+	25500
29,435	29,525	29,450	2050	+	27400
29,525	29,605	29,600	7500	+	22100
29,605	29,655	29,610	2210	+	27400
29,655	29,710	29,700	14300	+	15400
29,710	29,730	29,720	4220	+	25500
29,730	29,755	29,740	6040	+	23700
29,755	29,785	29,770	2370	+	27400
29,785	29,805	29,800	10700	+	19100
29,805	29,880	29,810	9310	+	20500
29,880	29,990	29,950	2550	+	27400
29,990	30,085	30,030	4530	+	25500
30,085	30,150	30,140	2740	+	27400
30,150	30,175	30,160	8060	+	22100
30,175	30,195	30,190	6490	+	23700
30,195	30,270	30,200	12400	+	17800
30,270	30,355	30,340	2940	+	27400
30,355	30,385	30,370	4870	+	25500
30,385	30,435	30,400	1000	+	29400
30,435	30,485	30,470	1070	+	29400
30,485	30,525	30,500	10000	+	20500
30,525	30,555	30,550	1150	+	29400
30,555	30,580	30,560	3160	+	27400
30,580	30,620	30,600	11500	+	19100
30,620	30,660	30,640	1240	+	29400
30,660	30,705	30,680	6980	+	23700
30,705	30,745	30,730	1330	+	29400
30,745	30,780	30,760	8660	+	22100
30,780	30,815	30,800	3400	+	27400
30,815	30,885	30,830	1430	+	29400
30,885	30,995	30,940	1540	+	29400
30,995	31,075	31,050	1650	+	29400
31,075	31,110	31,100	13300	+	17800
31,110	31,150	31,120	5620	+	25500
31,150	31,190	31,180	1780	+	29400
31,190	31,255	31,200	7500	+	23700
31,255	31,315	31,310	1910	+	29400
31,315	31,365	31,320	3920	+	27400
31,365	31,430	31,410	9310	+	22100
31,430	31,475	31,450	2050	+	29400
31,475	31,520	31,500	12400	+	19100
31,520	31,570	31,540	6040	+	25500
31,570	31,605	31,600	0	+	31600
31,605	31,615	31,610	2210	+	29400
31,615	31,690	31,620	4220	+	27400
31,690	31,765	31,760	8060	+	23700
31,765	31,835	31,770	2370	+	29400

31,835	31,915	31,900	15400	+	16500
31,915	31,940	31,930	4530	+	27400
31,940	31,970	31,950	2550	+	29400
31,970	31,995	31,990	6490	+	25500
31,995	32,050	32,000	11500	+	20500
32,050	32,120	32,100	10000	+	22100
32,120	32,205	32,140	2740	+	29400
32,205	32,305	32,270	4870	+	27400
32,305	32,350	32,340	2940	+	29400
32,350	32,380	32,360	8660	+	23700
32,380	32,440	32,400	13300	+	19100
32,440	32,520	32,480	6980	+	25500
32,520	32,580	32,560	3160	+	29400
32,580	32,615	32,600	1000	+	31600
32,615	32,650	32,630	5230	+	27400
32,650	32,710	32,670	1070	+	31600
32,710	32,775	32,750	1150	+	31600
32,775	32,820	32,800	3400	+	29400
32,820	32,870	32,840	1240	+	31600
32,870	32,915	32,900	12400	+	20500
32,915	32,965	32,930	1330	+	31600
32,965	33,005	33,000	7500	+	25500
33,005	33,015	33,010	9310	+	23700
33,015	33,025	33,020	5620	+	27400
33,025	33,040	33,030	1430	+	31600
33,040	33,095	33,050	3650	+	29400
33,095	33,170	33,140	1540	+	31600
33,170	33,225	33,200	15400	+	17800
33,225	33,285	33,250	1650	+	31600
33,285	33,350	33,320	3920	+	29400
33,350	33,390	33,380	1780	+	31600
33,390	33,420	33,400	14300	+	19100
33,420	33,475	33,440	6040	+	27400
33,475	33,535	33,510	1910	+	31600
33,535	33,580	33,560	8060	+	25500
33,580	33,610	33,600	11500	+	22100
33,610	33,635	33,620	4220	+	29400
33,635	33,675	33,650	2050	+	31600
33,675	33,750	33,700	10000	+	23700
33,750	33,805	33,800	13300	+	20500
33,805	33,850	33,810	2210	+	31600
33,850	33,910	33,890	6490	+	27400
33,910	33,950	33,930	4530	+	29400
33,950	33,985	33,970	2370	+	31600
33,985	34,075	34,000	0	+	34000
34,075	34,155	34,150	2550	+	31600
34,155	34,215	34,160	8660	+	25500
34,215	34,285	34,270	4870	+	29400
34,285	34,320	34,300	16500	+	17800

Board-level tuning procedure P0611A
GSS MUX card, PWA 8A01883

34,320	34,360	34,340	2740	+	31600
34,360	34,390	34,380	6980	+	27400
34,390	34,450	34,400	10700	+	23700
34,450	34,520	34,500	12400	+	22100
34,520	34,585	34,540	2940	+	31600
34,585	34,695	34,630	5230	+	29400
34,695	34,780	34,760	3160	+	31600
34,780	34,805	34,800	14300	+	20500
34,805	34,855	34,810	9310	+	25500
34,855	34,950	34,900	7500	+	27400
34,950	35,010	35,000	1000	+	34000
35,010	35,045	35,020	5620	+	29400
35,045	35,110	35,070	1070	+	34000
35,110	35,175	35,150	1150	+	34000
35,175	35,220	35,200	11500	+	23700
35,220	35,245	35,240	1240	+	34000
35,245	35,290	35,250	3650	+	31600
35,290	35,365	35,330	1330	+	34000
35,365	35,415	35,400	13300	+	22100
35,415	35,435	35,430	1430	+	34000
35,435	35,450	35,440	6040	+	29400
35,450	35,480	35,460	8060	+	27400
35,480	35,510	35,500	10000	+	25500
35,510	35,530	35,520	3920	+	31600
35,530	35,570	35,540	1540	+	34000
35,570	35,625	35,600	16500	+	19100
35,625	35,715	35,650	1650	+	34000
35,715	35,800	35,780	1780	+	34000
35,800	35,855	35,820	4220	+	31600
35,855	35,895	35,890	6490	+	29400
35,895	35,905	35,900	15400	+	20500
35,905	35,980	35,910	1910	+	34000
35,980	36,055	36,050	2050	+	34000
36,055	36,080	36,060	8660	+	27400
36,080	36,115	36,100	12400	+	23700
36,115	36,165	36,130	4530	+	31600
36,165	36,205	36,200	10700	+	25500
36,205	36,290	36,210	2210	+	34000
36,290	36,375	36,370	2370	+	34000
36,375	36,390	36,380	6980	+	29400
36,390	36,435	36,400	14300	+	22100
36,435	36,485	36,470	4870	+	31600
36,485	36,525	36,500	0	+	36500
36,525	36,630	36,550	2550	+	34000
36,630	36,725	36,710	9310	+	27400
36,725	36,785	36,740	2740	+	34000
36,785	36,865	36,830	5230	+	31600
36,865	36,920	36,900	7500	+	29400
36,920	36,970	36,940	2940	+	34000

36,970	37,080	37,000	11500	+	25500
37,080	37,190	37,160	3160	+	34000
37,190	37,310	37,220	5620	+	31600
37,310	37,430	37,400	3400	+	34000
37,430	37,480	37,460	8060	+	29400
37,480	37,535	37,500	1000	+	36500
37,535	37,605	37,570	1070	+	36500
37,605	37,645	37,640	6040	+	31600
37,645	37,695	37,650	1150	+	36500
37,695	37,785	37,740	1240	+	36500
37,785	37,865	37,830	1330	+	36500
37,865	37,910	37,900	12400	+	25500
37,910	37,925	37,920	3920	+	34000
37,925	37,965	37,930	1430	+	36500
37,965	38,020	38,000	14300	+	23700
38,020	38,050	38,040	1540	+	36500
38,050	38,075	38,060	8660	+	29400
38,075	38,095	38,090	6490	+	31600
38,095	38,125	38,100	10700	+	27400
38,125	38,175	38,150	1650	+	36500
38,175	38,210	38,200	19100	+	19100
38,210	38,250	38,220	4220	+	34000
38,250	38,290	38,280	1780	+	36500
38,290	38,355	38,300	17800	+	20500
38,355	38,470	38,410	1910	+	36500
38,470	38,540	38,530	4530	+	34000
38,540	38,565	38,550	2050	+	36500
38,565	38,590	38,580	6980	+	31600
38,590	38,655	38,600	16500	+	22100
38,655	38,755	38,710	2210	+	36500
38,755	38,835	38,800	13300	+	25500
38,835	38,885	38,870	2370	+	36500
38,885	38,975	38,900	11500	+	27400
38,975	39,075	39,050	2550	+	36500
39,075	39,150	39,100	7500	+	31600
39,150	39,215	39,200	0	+	39200
39,215	39,235	39,230	5230	+	34000
39,235	39,320	39,240	2740	+	36500
39,320	39,420	39,400	10000	+	29400
39,420	39,520	39,440	2940	+	36500
39,520	39,610	39,600	19100	+	20500
39,610	39,640	39,620	5620	+	34000
39,640	39,730	39,660	3160	+	36500
39,730	39,850	39,800	12400	+	27400
39,850	39,970	39,900	3400	+	36500
39,970	40,070	40,040	6040	+	34000
40,070	40,125	40,100	10700	+	29400
40,125	40,175	40,150	3650	+	36500
40,175	40,230	40,200	1000	+	39200

40,230	40,265	40,260	8660	+	31600
40,265	40,310	40,270	1070	+	39200
40,310	40,385	40,350	1150	+	39200
40,385	40,430	40,420	3920	+	36500
40,430	40,465	40,440	1240	+	39200
40,465	40,510	40,490	6490	+	34000
40,510	40,580	40,530	1330	+	39200
40,580	40,665	40,630	1430	+	39200
40,665	40,710	40,700	13300	+	27400
40,710	40,730	40,720	4220	+	36500
40,730	40,795	40,740	1540	+	39200
40,795	40,875	40,850	1650	+	39200
40,875	40,905	40,900	11500	+	29400
40,905	40,945	40,910	9310	+	31600
40,945	40,990	40,980	1780	+	39200
40,990	41,015	41,000	20500	+	20500
41,015	41,070	41,030	4530	+	36500
41,070	41,155	41,110	1910	+	39200
41,155	41,225	41,200	19100	+	22100
41,225	41,310	41,250	2050	+	39200
41,310	41,390	41,370	4870	+	36500
41,390	41,455	41,410	2210	+	39200
41,455	41,535	41,500	7500	+	34000
41,535	41,585	41,570	2370	+	39200
41,585	41,650	41,600	10000	+	31600
41,650	41,715	41,700	14300	+	27400
41,715	41,740	41,730	5230	+	36500
41,740	41,775	41,750	2550	+	39200
41,775	41,870	41,800	12400	+	29400
41,870	41,970	41,940	2740	+	39200
41,970	42,030	42,000	16500	+	25500
42,030	42,090	42,060	8060	+	34000
42,090	42,130	42,120	5620	+	36500
42,130	42,170	42,140	2940	+	39200
42,170	42,250	42,200	0	+	42200
42,250	42,330	42,300	10700	+	31600
42,330	42,450	42,360	3160	+	39200
42,450	42,570	42,540	6040	+	36500
42,570	42,630	42,600	3400	+	39200
42,630	42,680	42,660	8660	+	34000
42,680	42,750	42,700	13300	+	29400
42,750	42,825	42,800	15400	+	27400
42,825	42,920	42,850	3650	+	39200
42,920	43,045	42,990	6490	+	36500
43,045	43,110	43,100	11500	+	31600
43,110	43,160	43,120	3920	+	39200
43,160	43,235	43,200	1000	+	42200
43,235	43,285	43,270	1070	+	42200
43,285	43,305	43,300	17800	+	25500

Board-level tuning procedure P0611A
 GSS MUX card, PWA 8A01883

43,305	43,330	43,310	9310	+	34000
43,330	43,385	43,350	1150	+	42200
43,385	43,430	43,420	4220	+	39200
43,430	43,460	43,440	1240	+	42200
43,460	43,505	43,480	6980	+	36500
43,505	43,580	43,530	1330	+	42200
43,580	43,665	43,630	1430	+	42200
43,665	43,715	43,700	14300	+	29400
43,715	43,735	43,730	4530	+	39200
43,735	43,795	43,740	1540	+	42200
43,795	43,875	43,850	1650	+	42200
43,875	43,940	43,900	16500	+	27400
43,940	43,990	43,980	1780	+	42200
43,990	44,035	44,000	7500	+	36500
44,035	44,090	44,070	4870	+	39200
44,090	44,155	44,110	1910	+	42200
44,155	44,225	44,200	20500	+	23700
44,225	44,330	44,250	2050	+	42200
44,330	44,420	44,410	2210	+	42200
44,420	44,495	44,430	5230	+	39200
44,495	44,565	44,560	8060	+	36500
44,565	44,585	44,570	2370	+	42200
44,585	44,650	44,600	19100	+	25500
44,650	44,725	44,700	10700	+	34000
44,725	44,775	44,750	2550	+	42200
44,775	44,810	44,800	15400	+	29400
44,810	44,860	44,820	5620	+	39200
44,860	44,920	44,900	13300	+	31600
44,920	45,040	44,940	2740	+	42200
45,040	45,150	45,140	2940	+	42200
45,150	45,180	45,160	8660	+	36500
45,180	45,220	45,200	17800	+	27400
45,220	45,270	45,240	6040	+	39200
45,270	45,330	45,300	0	+	45300
45,330	45,430	45,360	3160	+	42200
45,430	45,550	45,500	11500	+	34000
45,550	45,645	45,600	3400	+	42200
45,645	45,745	45,690	6490	+	39200
45,745	45,805	45,800	22100	+	23700
45,805	45,830	45,810	9310	+	36500
45,830	45,875	45,850	3650	+	42200
45,875	45,950	45,900	14300	+	31600
45,950	46,060	46,000	20500	+	25500
46,060	46,150	46,120	3920	+	42200
46,150	46,240	46,180	6980	+	39200
46,240	46,335	46,300	1000	+	45300
46,335	46,385	46,370	1070	+	45300
46,385	46,410	46,400	12400	+	34000
46,410	46,435	46,420	4220	+	42200

46,435	46,475	46,450	1150	+	45300
46,475	46,520	46,500	10000	+	36500
46,520	46,585	46,540	1240	+	45300
46,585	46,665	46,630	1330	+	45300
46,665	46,715	46,700	7500	+	39200
46,715	46,785	46,730	1430	+	45300
46,785	46,895	46,840	1540	+	45300
46,895	46,975	46,950	1650	+	45300
46,975	47,035	47,000	15400	+	31600
47,035	47,075	47,070	4870	+	42200
47,075	47,140	47,080	1780	+	45300
47,140	47,205	47,200	10700	+	36500
47,205	47,235	47,210	1910	+	45300
47,235	47,280	47,260	8060	+	39200
47,280	47,325	47,300	13300	+	34000
47,325	47,375	47,350	2050	+	45300
47,375	47,415	47,400	23700	+	23700
47,415	47,470	47,430	5230	+	42200
47,470	47,555	47,510	2210	+	45300
47,555	47,635	47,600	22100	+	25500
47,635	47,745	47,670	2370	+	45300
47,745	47,835	47,820	5620	+	42200
47,835	47,855	47,850	2550	+	45300
47,855	47,880	47,860	8660	+	39200
47,880	47,950	47,900	20500	+	27400
47,950	48,020	48,000	11500	+	36500
48,020	48,070	48,040	2740	+	45300
48,070	48,170	48,100	16500	+	31600
48,170	48,270	48,240	2940	+	45300
48,270	48,380	48,300	14300	+	34000
48,380	48,480	48,460	3160	+	45300
48,480	48,505	48,500	19100	+	29400
48,505	48,600	48,510	9310	+	39200
48,600	48,695	48,690	6490	+	42200
48,695	48,800	48,700	0	+	48700
48,800	48,925	48,900	12400	+	36500
48,925	49,065	48,950	3650	+	45300
49,065	49,190	49,180	6980	+	42200
49,190	49,210	49,200	10000	+	39200
49,210	49,310	49,220	3920	+	45300
49,310	49,450	49,400	15400	+	34000
49,450	49,510	49,500	22100	+	27400
49,510	49,610	49,520	4220	+	45300
49,610	49,735	49,700	1000	+	48700
49,735	49,785	49,770	1070	+	48700
49,785	49,815	49,800	13300	+	36500
49,815	49,840	49,830	4530	+	45300
49,840	49,875	49,850	1150	+	48700
49,875	49,920	49,900	10700	+	39200

49,920	49,985	49,940	1240	+	48700
49,985	50,080	50,030	1330	+	48700
50,080	50,150	50,130	1430	+	48700
50,150	50,205	50,170	4870	+	45300
50,205	50,250	50,240	1540	+	48700
50,250	50,305	50,260	8060	+	42200
50,305	50,415	50,350	1650	+	48700
50,415	50,490	50,480	1780	+	48700
50,490	50,515	50,500	16500	+	34000
50,515	50,570	50,530	5230	+	45300
50,570	50,655	50,610	1910	+	48700
50,655	50,725	50,700	11500	+	39200
50,725	50,775	50,750	2050	+	48700
50,775	50,830	50,800	14300	+	36500
50,830	50,885	50,860	8660	+	42200
50,885	50,915	50,910	2210	+	48700
50,915	50,960	50,920	5620	+	45300
50,960	51,035	51,000	25500	+	25500
51,035	51,085	51,070	2370	+	48700
51,085	51,175	51,100	23700	+	27400
51,175	51,295	51,250	2550	+	48700
51,295	51,390	51,340	6040	+	45300
51,390	51,470	51,440	2740	+	48700
51,470	51,505	51,500	22100	+	29400
51,505	51,555	51,510	9310	+	42200
51,555	51,620	51,600	12400	+	39200
51,620	51,715	51,640	2940	+	48700
51,715	51,795	51,790	6490	+	45300
51,795	51,830	51,800	17800	+	34000
51,830	51,880	51,860	3160	+	48700
51,880	52,000	51,900	15400	+	36500
52,000	52,150	52,100	3400	+	48700
52,150	52,240	52,200	10000	+	42200
52,240	52,290	52,280	6980	+	45300
52,290	52,325	52,300	0	+	52300
52,325	52,425	52,350	3650	+	48700
52,425	52,560	52,500	13300	+	39200
52,560	52,710	52,620	3920	+	48700
52,710	52,850	52,800	7500	+	45300
52,850	52,910	52,900	10700	+	42200
52,910	52,960	52,920	4220	+	48700
52,960	53,050	53,000	16500	+	36500
53,050	53,165	53,100	19100	+	34000
53,165	53,265	53,230	4530	+	48700
53,265	53,330	53,300	1000	+	52300
53,330	53,365	53,360	8060	+	45300
53,365	53,410	53,370	1070	+	52300
53,410	53,475	53,450	1150	+	52300
53,475	53,520	53,500	14300	+	39200

Board-level tuning procedure P0611A
 GSS MUX card, PWA 8A01883

53,520	53,555	53,540	1240	+	52300
53,555	53,600	53,570	4870	+	48700
53,600	53,665	53,630	1330	+	52300
53,665	53,715	53,700	11500	+	42200
53,715	53,785	53,730	1430	+	52300
53,785	53,885	53,840	1540	+	52300
53,885	53,940	53,930	5230	+	48700
53,940	53,955	53,950	1650	+	52300
53,955	54,020	53,960	8660	+	45300
54,020	54,145	54,080	1780	+	52300
54,145	54,255	54,210	1910	+	52300
54,255	54,310	54,300	17800	+	36500
54,310	54,335	54,320	5620	+	48700
54,335	54,425	54,350	2050	+	52300
54,425	54,505	54,500	20500	+	34000
54,505	54,555	54,510	2210	+	52300
54,555	54,605	54,600	12400	+	42200
54,605	54,640	54,610	9310	+	45300
54,640	54,705	54,670	2370	+	52300
54,705	54,770	54,740	6040	+	48700
54,770	54,825	54,800	27400	+	27400
54,825	54,875	54,850	2550	+	52300
54,875	54,970	54,900	25500	+	29400
54,970	55,115	55,040	2740	+	52300
55,115	55,215	55,190	6490	+	48700
55,215	55,270	55,240	2940	+	52300
55,270	55,380	55,300	10000	+	45300
55,380	55,480	55,460	3160	+	52300
55,480	55,550	55,500	13300	+	42200
55,550	55,640	55,600	19100	+	36500
55,640	55,690	55,680	6980	+	48700
55,690	55,825	55,700	3400	+	52300
55,825	55,975	55,950	3650	+	52300
55,975	56,050	56,000	10700	+	45300
56,050	56,150	56,100	22100	+	34000
56,150	56,210	56,200	0	+	56200
56,210	56,360	56,220	3920	+	52300
56,360	56,510	56,500	14300	+	42200
56,510	56,640	56,520	4220	+	52300
56,640	56,780	56,760	8060	+	48700
56,780	56,815	56,800	11500	+	45300
56,815	56,915	56,830	4530	+	52300
56,915	57,050	57,000	17800	+	39200
57,050	57,135	57,100	25500	+	31600
57,135	57,185	57,170	4870	+	52300
57,185	57,235	57,200	1000	+	56200
57,235	57,310	57,270	1070	+	56200
57,310	57,355	57,350	1150	+	56200
57,355	57,400	57,360	8660	+	48700

57,400	57,485	57,440	1240	+	56200
57,485	57,565	57,530	1330	+	56200
57,565	57,615	57,600	15400	+	42200
57,615	57,665	57,630	1430	+	56200
57,665	57,720	57,700	12400	+	45300
57,720	57,795	57,740	1540	+	56200
57,795	57,885	57,850	1650	+	56200
57,885	57,950	57,920	5620	+	52300
57,950	57,995	57,980	1780	+	56200
57,995	58,060	58,010	9310	+	48700
58,060	58,180	58,110	1910	+	56200
58,180	58,275	58,250	2050	+	56200
58,275	58,320	58,300	19100	+	39200
58,320	58,375	58,340	6040	+	52300
58,375	58,490	58,410	2210	+	56200
58,490	58,585	58,570	2370	+	56200
58,585	58,650	58,600	13300	+	45300
58,650	58,725	58,700	10000	+	48700
58,725	58,770	58,750	2550	+	56200
58,770	58,795	58,790	6490	+	52300
58,795	58,870	58,800	29400	+	29400
58,870	58,970	58,940	2740	+	56200
58,970	59,070	59,000	27400	+	31600
59,070	59,210	59,140	2940	+	56200
59,210	59,320	59,280	6980	+	52300
59,320	59,380	59,360	3160	+	56200
59,380	59,450	59,400	10700	+	48700
59,450	59,550	59,500	25500	+	34000
59,550	59,650	59,600	3400	+	56200
59,650	59,750	59,700	20500	+	39200
59,750	59,825	59,800	7500	+	52300
59,825	59,925	59,850	3650	+	56200
59,925	60,060	60,000	17800	+	42200
60,060	60,160	60,120	3920	+	56200
60,160	60,280	60,200	11500	+	48700
60,280	60,380	60,360	8060	+	52300
60,380	60,410	60,400	0	+	60400
60,410	60,560	60,420	4220	+	56200
60,560	60,715	60,700	15400	+	45300
60,715	60,845	60,730	4530	+	56200
60,845	60,980	60,960	8660	+	52300
60,980	61,035	61,000	29400	+	31600
61,035	61,085	61,070	4870	+	56200
61,085	61,200	61,100	12400	+	48700
61,200	61,350	61,300	19100	+	42200
61,350	61,415	61,400	1000	+	60400
61,415	61,450	61,430	5230	+	56200
61,450	61,510	61,470	1070	+	60400
61,510	61,580	61,550	1150	+	60400

61,580	61,625	61,610	9310	+	52300
61,625	61,685	61,640	1240	+	60400
61,685	61,765	61,730	1330	+	60400
61,765	61,810	61,800	16500	+	45300
61,810	61,825	61,820	5620	+	56200
61,825	61,885	61,830	1430	+	60400
61,885	61,970	61,940	1540	+	60400
61,970	62,025	62,000	13300	+	48700
62,025	62,115	62,050	1650	+	60400
62,115	62,210	62,180	1780	+	60400
62,210	62,270	62,240	6040	+	56200
62,270	62,305	62,300	10000	+	52300
62,305	62,380	62,310	1910	+	60400
62,380	62,530	62,450	2050	+	60400
62,530	62,650	62,610	2210	+	60400
62,650	62,695	62,690	6490	+	56200
62,695	62,735	62,700	20500	+	42200
62,735	62,835	62,770	2370	+	60400
62,835	62,925	62,900	23700	+	39200
62,925	62,975	62,950	2550	+	60400
62,975	63,050	63,000	10700	+	52300
63,050	63,120	63,100	17800	+	45300
63,120	63,160	63,140	2740	+	60400
63,160	63,190	63,180	6980	+	56200
63,190	63,270	63,200	31600	+	31600
63,270	63,370	63,340	2940	+	60400
63,370	63,480	63,400	29400	+	34000
63,480	63,630	63,560	3160	+	60400
63,630	63,750	63,700	7500	+	56200
63,750	63,850	63,800	3400	+	60400
63,850	63,975	63,900	27400	+	36500
63,975	64,075	64,050	3650	+	60400
64,075	64,180	64,100	15400	+	48700
64,180	64,280	64,260	8060	+	56200
64,280	64,310	64,300	22100	+	42200
64,310	64,360	64,320	3920	+	60400
64,360	64,510	64,400	19100	+	45300
64,510	64,660	64,620	4220	+	60400
64,660	64,780	64,700	12400	+	52300
64,780	64,880	64,860	8660	+	56200
64,880	64,915	64,900	0	+	64900
64,915	65,065	64,930	4530	+	60400
65,065	65,235	65,200	16500	+	48700
65,235	65,390	65,270	4870	+	60400
65,390	65,555	65,510	9310	+	56200
65,555	65,615	65,600	13300	+	52300
65,615	65,715	65,630	5230	+	60400
65,715	65,850	65,800	20500	+	45300
65,850	65,935	65,900	1000	+	64900

Board-level tuning procedure P0611A
GSS MUX card, PWA 8A01883

65,935	65,995	65,970	1070	+	64900
65,995	66,035	66,020	5620	+	60400
66,035	66,095	66,050	1150	+	64900
66,095	66,170	66,140	1240	+	64900
66,170	66,215	66,200	10000	+	56200
66,215	66,280	66,230	1330	+	64900
66,280	66,385	66,330	1430	+	64900
66,385	66,470	66,440	1540	+	64900
66,470	66,525	66,500	17800	+	48700
66,525	66,575	66,550	1650	+	64900
66,575	66,640	66,600	14300	+	52300
66,640	66,745	66,680	1780	+	64900
66,745	66,850	66,810	1910	+	64900
66,850	66,895	66,890	6490	+	60400
66,895	66,925	66,900	10700	+	56200
66,925	67,030	66,950	2050	+	64900
67,030	67,190	67,110	2210	+	64900
67,190	67,325	67,270	2370	+	64900
67,325	67,390	67,380	6980	+	60400
67,390	67,425	67,400	22100	+	45300
67,425	67,545	67,450	2550	+	64900
67,545	67,670	67,640	2740	+	64900
67,670	67,750	67,700	11500	+	56200
67,750	67,820	67,800	19100	+	48700
67,820	67,870	67,840	2940	+	64900
67,870	67,950	67,900	7500	+	60400
67,950	68,030	68,000	34000	+	34000
68,030	68,080	68,060	3160	+	64900
68,080	68,200	68,100	31600	+	36500
68,200	68,380	68,300	3400	+	64900
68,380	68,505	68,460	8060	+	60400
68,505	68,575	68,550	3650	+	64900
68,575	68,700	68,600	12400	+	56200
68,700	68,810	68,800	16500	+	52300
68,810	68,910	68,820	3920	+	64900
68,910	69,030	69,000	23700	+	45300
69,030	69,090	69,060	8660	+	60400
69,090	69,160	69,120	4220	+	64900
69,160	69,315	69,200	20500	+	48700
69,315	69,465	69,430	4530	+	64900
69,465	69,550	69,500	13300	+	56200
69,550	69,655	69,600	27400	+	42200
69,655	69,740	69,710	9310	+	60400
69,740	69,785	69,770	4870	+	64900
69,785	69,950	69,800	0	+	69800
69,950	70,115	70,100	17800	+	52300
70,115	70,265	70,130	5230	+	64900
70,265	70,450	70,400	10000	+	60400
70,450	70,510	70,500	14300	+	56200

70,510	70,660	70,520	5620	+	64900
70,660	70,835	70,800	1000	+	69800
70,835	70,905	70,870	1070	+	69800
70,905	70,945	70,940	6040	+	64900
70,945	70,995	70,950	1150	+	69800
70,995	71,070	71,040	1240	+	69800
71,070	71,115	71,100	10700	+	60400
71,115	71,180	71,130	1330	+	69800
71,180	71,285	71,230	1430	+	69800
71,285	71,365	71,340	1540	+	69800
71,365	71,395	71,390	6490	+	64900
71,395	71,425	71,400	19100	+	52300
71,425	71,515	71,450	1650	+	69800
71,515	71,590	71,580	1780	+	69800
71,590	71,655	71,600	15400	+	56200
71,655	71,780	71,710	1910	+	69800
71,780	71,865	71,850	2050	+	69800
71,865	71,890	71,880	6980	+	64900
71,890	71,955	71,900	11500	+	60400
71,955	72,090	72,010	2210	+	69800
72,090	72,260	72,170	2370	+	69800
72,260	72,375	72,350	2550	+	69800
72,375	72,470	72,400	7500	+	64900
72,470	72,620	72,540	2740	+	69800
72,620	72,720	72,700	16500	+	56200
72,720	72,770	72,740	2940	+	69800
72,770	72,880	72,800	12400	+	60400
72,880	72,980	72,960	3160	+	69800
72,980	73,100	73,000	36500	+	36500
73,100	73,325	73,200	3400	+	69800
73,325	73,505	73,450	3650	+	69800
73,505	73,630	73,560	8660	+	64900
73,630	73,710	73,700	13300	+	60400
73,710	73,760	73,720	3920	+	69800
73,760	73,900	73,800	31600	+	42200
73,900	74,010	74,000	17800	+	56200
74,010	74,110	74,020	4220	+	69800
74,110	74,205	74,200	25500	+	48700
74,205	74,270	74,210	9310	+	64900
74,270	74,365	74,330	4530	+	69800
74,365	74,535	74,400	22100	+	52300
74,535	74,685	74,670	4870	+	69800
74,685	74,800	74,700	14300	+	60400
74,800	74,950	74,900	10000	+	64900
74,950	75,015	75,000	0	+	75000
75,015	75,165	75,030	5230	+	69800
75,165	75,360	75,300	19100	+	56200
75,360	75,510	75,420	5620	+	69800
75,510	75,650	75,600	10700	+	64900

75,650	75,750	75,700	36500	+	39200
75,750	75,820	75,800	15400	+	60400
75,820	75,920	75,840	6040	+	69800
75,920	76,035	76,000	1000	+	75000
76,035	76,085	76,070	1070	+	75000
76,085	76,125	76,100	27400	+	48700
76,125	76,175	76,150	1150	+	75000
76,175	76,220	76,200	34000	+	42200
76,220	76,265	76,240	1240	+	75000
76,265	76,310	76,290	6490	+	69800
76,310	76,365	76,330	1330	+	75000
76,365	76,415	76,400	11500	+	64900
76,415	76,485	76,430	1430	+	75000
76,485	76,595	76,540	1540	+	75000
76,595	76,675	76,650	1650	+	75000
76,675	76,740	76,700	20500	+	56200
76,740	76,840	76,780	1780	+	75000
76,840	76,905	76,900	16500	+	60400
76,905	76,980	76,910	1910	+	75000
76,980	77,130	77,050	2050	+	75000
77,130	77,255	77,210	2210	+	75000
77,255	77,335	77,300	7500	+	69800
77,335	77,460	77,370	2370	+	75000
77,460	77,645	77,550	2550	+	75000
77,645	77,770	77,740	2740	+	75000
77,770	77,830	77,800	25500	+	52300
77,830	77,900	77,860	8060	+	69800
77,900	78,020	77,940	2940	+	75000
78,020	78,130	78,100	29400	+	48700
78,130	78,180	78,160	3160	+	75000
78,180	78,250	78,200	13300	+	64900
78,250	78,350	78,300	22100	+	56200
78,350	78,430	78,400	3400	+	75000
78,430	78,555	78,460	8660	+	69800
78,555	78,675	78,650	3650	+	75000
78,675	78,810	78,700	36500	+	42200
78,810	79,015	78,920	3920	+	75000
79,015	79,155	79,110	9310	+	69800
79,155	79,210	79,200	14300	+	64900
79,210	79,260	79,220	4220	+	75000
79,260	79,400	79,300	34000	+	45300
79,400	79,515	79,500	19100	+	60400
79,515	79,615	79,530	4530	+	75000
79,615	79,750	79,700	27400	+	52300
79,750	79,835	79,800	10000	+	69800
79,835	79,885	79,870	4870	+	75000
79,885	80,065	79,900	23700	+	56200
80,065	80,265	80,230	5230	+	75000
80,265	80,400	80,300	15400	+	64900

Board-level tuning procedure P0611A
GSS MUX card, PWA 8A01883

80,400	80,550	80,500	10700	+	69800
80,550	80,610	80,600	0	+	80600
80,610	80,760	80,620	5620	+	75000
80,760	80,970	80,900	20500	+	60400
80,970	81,170	81,040	6040	+	75000
81,170	81,350	81,300	11500	+	69800
81,350	81,445	81,400	16500	+	64900
81,445	81,545	81,490	6490	+	75000
81,545	81,635	81,600	1000	+	80600
81,635	81,685	81,670	1070	+	80600
81,685	81,725	81,700	25500	+	56200
81,725	81,775	81,750	1150	+	80600
81,775	81,820	81,800	36500	+	45300
81,820	81,885	81,840	1240	+	80600
81,885	81,955	81,930	1330	+	80600
81,955	82,005	81,980	6980	+	75000
82,005	82,085	82,030	1430	+	80600
82,085	82,170	82,140	1540	+	80600
82,170	82,225	82,200	12400	+	69800
82,225	82,315	82,250	1650	+	80600
82,315	82,440	82,380	1780	+	80600
82,440	82,505	82,500	7500	+	75000
82,505	82,580	82,510	1910	+	80600
82,580	82,675	82,650	2050	+	80600
82,675	82,755	82,700	17800	+	64900
82,755	82,890	82,810	2210	+	80600
82,890	83,015	82,970	2370	+	80600
83,015	83,080	83,060	8060	+	75000
83,080	83,125	83,100	13300	+	69800
83,125	83,245	83,150	2550	+	80600
83,245	83,440	83,340	2740	+	80600
83,440	83,570	83,540	2940	+	80600
83,570	83,630	83,600	27400	+	56200
83,630	83,710	83,660	8660	+	75000
83,710	83,830	83,760	3160	+	80600
83,830	83,950	83,900	31600	+	52300
83,950	84,050	84,000	3400	+	80600
84,050	84,175	84,100	14300	+	69800
84,175	84,280	84,250	3650	+	80600
84,280	84,355	84,310	9310	+	75000
84,355	84,450	84,400	42200	+	42200
84,450	84,510	84,500	39200	+	45300
84,510	84,670	84,520	3920	+	80600
84,670	84,910	84,820	4220	+	80600
84,910	85,065	85,000	10000	+	75000
85,065	85,165	85,130	4530	+	80600
85,165	85,300	85,200	15400	+	69800
85,300	85,435	85,400	20500	+	64900
85,435	85,535	85,470	4870	+	80600

85,535	85,650	85,600	29400	+	56200
85,650	85,765	85,700	10700	+	75000
85,765	85,865	85,830	5230	+	80600
85,865	86,060	85,900	25500	+	60400
86,060	86,260	86,220	5620	+	80600
86,260	86,400	86,300	16500	+	69800
86,400	86,550	86,500	11500	+	75000
86,550	86,620	86,600	0	+	86600
86,620	86,820	86,640	6040	+	80600
86,820	87,045	87,000	22100	+	64900
87,045	87,245	87,090	6490	+	80600
87,245	87,450	87,400	12400	+	75000
87,450	87,540	87,500	42200	+	45300
87,540	87,590	87,580	6980	+	80600
87,590	87,635	87,600	1000	+	86600
87,635	87,710	87,670	1070	+	86600
87,710	87,775	87,750	1150	+	86600
87,775	87,820	87,800	27400	+	60400
87,820	87,870	87,840	1240	+	86600
87,870	87,915	87,900	39200	+	48700
87,915	87,980	87,930	1330	+	86600
87,980	88,065	88,030	1430	+	86600
88,065	88,120	88,100	7500	+	80600
88,120	88,195	88,140	1540	+	86600
88,195	88,275	88,250	1650	+	86600
88,275	88,340	88,300	13300	+	75000
88,340	88,445	88,380	1780	+	86600
88,445	88,555	88,510	1910	+	86600
88,555	88,625	88,600	23700	+	64900
88,625	88,655	88,650	2050	+	86600
88,655	88,730	88,660	8060	+	80600
88,730	88,805	88,800	36500	+	52300
88,805	88,855	88,810	2210	+	86600
88,855	88,935	88,900	19100	+	69800
88,935	89,060	88,970	2370	+	86600
89,060	89,205	89,150	2550	+	86600
89,205	89,280	89,260	8660	+	80600
89,280	89,320	89,300	14300	+	75000
89,320	89,440	89,340	2740	+	86600
89,440	89,650	89,540	2940	+	86600
89,650	89,780	89,760	3160	+	86600
89,780	89,855	89,800	29400	+	60400
89,855	89,955	89,910	9310	+	80600
89,955	90,100	90,000	3400	+	86600
90,100	90,225	90,200	34000	+	56200
90,225	90,275	90,250	3650	+	86600
90,275	90,350	90,300	20500	+	69800
90,350	90,460	90,400	15400	+	75000
90,460	90,560	90,520	3920	+	86600

90,560	90,710	90,600	10000	+	80600
90,710	90,860	90,820	4220	+	86600
90,860	91,015	90,900	42200	+	48700
91,015	91,215	91,130	4530	+	86600
91,215	91,385	91,300	10700	+	80600
91,385	91,485	91,470	4870	+	86600
91,485	91,665	91,500	16500	+	75000
91,665	91,865	91,830	5230	+	86600
91,865	91,950	91,900	22100	+	69800
91,950	92,050	92,000	31600	+	60400
92,050	92,160	92,100	11500	+	80600
92,160	92,260	92,220	5620	+	86600
92,260	92,470	92,300	27400	+	64900
92,470	92,670	92,640	6040	+	86600
92,670	92,750	92,700	36500	+	56200
92,750	92,900	92,800	17800	+	75000
92,900	93,045	93,000	12400	+	80600
93,045	93,095	93,090	6490	+	86600
93,095	93,300	93,100	0	+	93100
93,300	93,540	93,500	23700	+	69800
93,540	93,740	93,580	6980	+	86600
93,740	93,950	93,900	13300	+	80600
93,950	94,050	94,000	45300	+	48700
94,050	94,135	94,100	1000	+	93100
94,135	94,210	94,170	1070	+	93100
94,210	94,275	94,250	1150	+	93100
94,275	94,320	94,300	29400	+	64900
94,320	94,370	94,340	1240	+	93100
94,370	94,415	94,400	34000	+	60400
94,415	94,465	94,430	1330	+	93100
94,465	94,515	94,500	42200	+	52300
94,515	94,585	94,530	1430	+	93100
94,585	94,650	94,640	1540	+	93100
94,650	94,705	94,660	8060	+	86600
94,705	94,815	94,750	1650	+	93100
94,815	94,890	94,880	1780	+	93100
94,890	94,955	94,900	14300	+	80600
94,955	95,080	95,010	1910	+	93100
95,080	95,205	95,150	2050	+	93100
95,205	95,280	95,260	8660	+	86600
95,280	95,305	95,300	25500	+	69800
95,305	95,355	95,310	2210	+	93100
95,355	95,435	95,400	39200	+	56200
95,435	95,485	95,470	2370	+	93100
95,485	95,575	95,500	20500	+	75000
95,575	95,745	95,650	2550	+	93100
95,745	95,875	95,840	2740	+	93100
95,875	95,955	95,910	9310	+	86600
95,955	96,020	96,000	15400	+	80600

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96,020	96,150	96,040	2940	+	93100
96,150	96,380	96,260	3160	+	93100
96,380	96,550	96,500	3400	+	93100
96,550	96,675	96,600	10000	+	86600
96,675	96,825	96,750	3650	+	93100
96,825	96,960	96,900	36500	+	60400
96,960	97,060	97,020	3920	+	93100
97,060	97,150	97,100	16500	+	80600
97,150	97,250	97,200	27400	+	69800
97,250	97,310	97,300	10700	+	86600
97,310	97,360	97,320	4220	+	93100
97,360	97,500	97,400	48700	+	48700
97,500	97,615	97,600	45300	+	52300
97,615	97,800	97,630	4530	+	93100
97,800	98,035	97,970	4870	+	93100
98,035	98,215	98,100	11500	+	86600
98,215	98,365	98,330	5230	+	93100
98,365	98,550	98,400	17800	+	80600
98,550	98,710	98,700	23700	+	75000
98,710	98,810	98,720	5620	+	93100
98,810	98,950	98,900	34000	+	64900
98,950	99,070	99,000	12400	+	86600
99,070	99,170	99,140	6040	+	93100
99,170	99,395	99,200	29400	+	69800
99,395	99,595	99,590	6490	+	93100
99,595	99,650	99,600	39200	+	60400
99,650	99,800	99,700	19100	+	80600
99,800	99,950	99,900	13300	+	86600
99,950	100,040	100,000	0	+	100000
100,040	100,290	100,080	6980	+	93100
100,290	100,550	100,500	25500	+	75000
100,550	100,750	100,600	7500	+	93100
100,750	100,950	100,900	14300	+	86600
100,950	101,035	101,000	1000	+	100000
101,035	101,085	101,070	1070	+	100000
101,085	101,125	101,100	20500	+	80600
101,125	101,155	101,150	1150	+	100000
101,155	101,200	101,160	8060	+	93100
101,200	101,285	101,240	1240	+	100000
101,285	101,365	101,330	1330	+	100000
101,365	101,415	101,400	31600	+	69800
101,415	101,465	101,430	1430	+	100000
101,465	101,520	101,500	45300	+	56200
101,520	101,595	101,540	1540	+	100000
101,595	101,705	101,650	1650	+	100000
101,705	101,770	101,760	8660	+	93100
101,770	101,845	101,780	1780	+	100000
101,845	101,955	101,910	1910	+	100000
101,955	102,025	102,000	15400	+	86600

102,025	102,130	102,050	2050	+	100000
102,130	102,290	102,210	2210	+	100000
102,290	102,385	102,370	2370	+	100000
102,385	102,405	102,400	27400	+	75000
102,405	102,480	102,410	9310	+	93100
102,480	102,575	102,550	2550	+	100000
102,575	102,650	102,600	42200	+	60400
102,650	102,720	102,700	22100	+	80600
102,720	102,840	102,740	2740	+	100000
102,840	103,020	102,940	2940	+	100000
103,020	103,130	103,100	10000	+	93100
103,130	103,280	103,160	3160	+	100000
103,280	103,525	103,400	3400	+	100000
103,525	103,725	103,650	3650	+	100000
103,725	103,860	103,800	10700	+	93100
103,860	104,010	103,920	3920	+	100000
104,010	104,160	104,100	39200	+	64900
104,160	104,260	104,220	4220	+	100000
104,260	104,350	104,300	23700	+	80600
104,350	104,465	104,400	17800	+	86600
104,465	104,565	104,530	4530	+	100000
104,565	104,735	104,600	11500	+	93100
104,735	104,885	104,870	4870	+	100000
104,885	105,065	104,900	48700	+	56200
105,065	105,365	105,230	5230	+	100000
105,365	105,560	105,500	12400	+	93100
105,560	105,660	105,620	5620	+	100000
105,660	105,870	105,700	19100	+	86600
105,870	106,070	106,040	6040	+	100000
106,070	106,200	106,100	25500	+	80600
106,200	106,350	106,300	36500	+	69800
106,350	106,445	106,400	13300	+	93100
106,445	106,545	106,490	6490	+	100000
106,545	106,790	106,600	31600	+	75000
106,790	107,040	106,980	6980	+	100000
107,040	107,250	107,100	20500	+	86600
107,250	107,450	107,400	14300	+	93100
107,450	107,750	107,500	7500	+	100000
107,750	108,030	108,000	27400	+	80600
108,030	108,280	108,060	8060	+	100000
108,280	108,580	108,500	15400	+	93100
108,580	108,680	108,660	8660	+	100000
108,680	108,850	108,700	22100	+	86600
108,850	109,050	109,000	34000	+	75000
109,050	109,205	109,100	48700	+	60400
109,205	109,455	109,310	9310	+	100000
109,455	109,800	109,600	16500	+	93100
109,800	110,100	110,000	10000	+	100000
110,100	110,250	110,200	45300	+	64900

110,250	110,500	110,300	23700	+	86600
110,500	110,800	110,700	10700	+	100000
110,800	111,200	110,900	17800	+	93100
111,200	111,750	111,500	11500	+	100000
111,750	112,050	112,000	42200	+	69800
112,050	112,150	112,100	25500	+	86600
112,150	112,300	112,200	19100	+	93100
112,300	112,550	112,400	12400	+	100000
112,550	113,000	112,700	52300	+	60400
113,000	113,450	113,300	13300	+	100000
113,450	113,800	113,600	20500	+	93100
113,800	114,100	114,000	27400	+	86600
114,100	114,250	114,200	39200	+	75000
114,250	114,450	114,300	14300	+	100000
114,450	114,850	114,600	34000	+	80600
114,850	115,150	115,100	45300	+	69800
115,150	115,300	115,200	22100	+	93100
115,300	115,700	115,400	15400	+	100000
115,700	116,250	116,000	29400	+	86600
116,250	116,550	116,500	16500	+	100000
116,550	116,700	116,600	56200	+	60400
116,700	116,950	116,800	23700	+	93100
116,950	117,150	117,100	36500	+	80600
117,150	117,500	117,200	42200	+	75000
117,500	118,000	117,800	17800	+	100000
118,000	118,350	118,200	31600	+	86600
118,350	118,550	118,500	48700	+	69800
118,550	118,850	118,600	25500	+	93100
118,850	119,449	119,100	19100	+	100000
119,449	120,050	119,800	39200	+	80600
120,050	120,400	120,300	45300	+	75000
120,400	120,550	120,500	20500	+	100000
120,550	120,700	120,600	34000	+	86600
120,700	120,950	120,800	60400	+	60400
120,950	121,599	121,100	56200	+	64900
121,599	122,300	122,100	22100	+	100000
122,300	122,650	122,500	29400	+	93100
122,650	122,950	122,800	42200	+	80600
122,950	123,400	123,100	36500	+	86600
123,400	124,199	123,700	23700	+	100000
124,199	125,000	124,700	31600	+	93100
125,000	125,400	125,300	60400	+	64900
125,400	125,650	125,500	25500	+	100000
125,650	125,850	125,800	39200	+	86600
125,850	125,950	125,900	45300	+	80600
125,950	126,549	126,000	56200	+	69800
126,549	127,200	127,100	34000	+	93100
127,200	127,350	127,300	52300	+	75000
127,350	128,098	127,400	27400	+	100000

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128,098	129,050	128,800	42200	+	86600
129,050	129,350	129,300	48700	+	80600
129,350	129,500	129,400	29400	+	100000
129,500	129,700	129,600	36500	+	93100
129,700	130,000	129,800	64900	+	64900
130,000	130,699	130,200	60400	+	69800
130,699	131,400	131,200	56200	+	75000
131,400	131,750	131,600	31600	+	100000
131,750	132,100	131,900	45300	+	86600
132,100	132,600	132,300	39200	+	93100
132,600	133,449	132,900	52300	+	80600
133,449	134,350	134,000	34000	+	100000
134,350	135,000	134,700	64900	+	69800
135,000	135,350	135,300	42200	+	93100
135,350	135,949	135,400	60400	+	75000
135,949	136,650	136,500	36500	+	100000
136,650	137,598	136,800	56200	+	80600
137,598	138,650	138,400	45300	+	93100
138,650	139,050	138,900	52300	+	86600
139,050	139,400	139,200	39200	+	100000
139,400	139,750	139,600	69800	+	69800
139,750	140,449	139,900	64900	+	75000
140,449	141,399	141,000	60400	+	80600
141,399	142,000	141,800	48700	+	93100
142,000	142,500	142,200	42200	+	100000
142,500	143,797	142,800	56200	+	86600
143,797	145,050	144,800	69800	+	75000
145,050	145,350	145,300	45300	+	100000
145,350	145,450	145,400	52300	+	93100
145,450	146,248	145,500	64900	+	80600
146,248	147,848	147,000	60400	+	86600
147,848	149,000	148,700	48700	+	100000
149,000	149,650	149,300	56200	+	93100
149,650	150,200	150,000	75000	+	75000
150,200	150,949	150,400	69800	+	80600
150,949	151,899	151,500	64900	+	86600
151,899	152,899	152,300	52300	+	100000
152,899	154,546	153,500	60400	+	93100
154,546	155,900	155,600	75000	+	80600
155,900	156,300	156,200	56200	+	100000
156,300	157,198	156,400	69800	+	86600
157,198	159,195	158,000	64900	+	93100
159,195	160,800	160,400	60400	+	100000
160,800	161,400	161,200	80600	+	80600
161,400	162,249	161,600	75000	+	86600
162,249	163,897	162,900	69800	+	93100
163,897	166,046	164,900	64900	+	100000
166,046	167,649	167,200	80600	+	86600
167,649	168,948	168,100	75000	+	93100

168,948	171,492	169,800	69800	+	100000
171,492	173,450	173,200	86600	+	86600
173,450	174,349	173,700	80600	+	93100
174,349	177,334	175,000	75000	+	100000
177,334	180,149	179,700	86600	+	93100
180,149	183,379	180,600	80600	+	100000
183,379	186,400	186,200	93100	+	93100
186,400	189,822	186,600	86600	+	100000
189,822	196,520	193,100	93100	+	100000
196,520	200,000	200,000	100000	+	100000



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Gravity Probe B Relativity Mission

P0611A APPENDIX A
SELECT AND TEST COMPONENT INSTALLATION
INSTRUCTION SHEET: GSS MUX PWA

PWA 8A01883 Rev C

S/N:

From the findings of procedure P0611 "BOARD-LEVEL TUNING PROCEDURE FOR THE GYROSCOPE SUSPENSION SYSTEM (GSS) MUX/OSCILLATOR/CHARGE CTRL (MUX) BOARD", install the following select-and-test components as indicated below:

★NOTE: See 8A01883 Rev C note 27 for installation of R26, R30, R46, R47.

Component	Flight PN	Description	Mfgr	LDC
R2	RNC55H_____FS			
R6	RNC55H_____FS			
R26 ★	RNC55H_____FS			
R30 ★	RNC55H_____FS			
R20	RNC55H_____FS			
R24	RNC55H_____FS			
R36	RNC55H_____FS			
R42	RNC55H_____FS			
R28	RNC55H_____FS			
R74	RNC55H_____FS			

(continued)

R41	open	no component installed		
R46 ★	RNC55H_____FS			
R47 ★	RNC55H_____FS			

Approved:

GSS Representative	<input type="text"/>	Date	<input type="text"/>
Quality Assurance	<input type="text"/>	Date	<input type="text"/>