MIL 1018 REV 963

R. Larson

AC SPARK PLUG DIVISION General Motors Corporation Milwaukee, Wisconsin	XDE 34-T-33
	ENGINEERING DESIGN INFORMATION EXHIBIT
PSA ADAPTOR BOX PERFORMANCE REQUIREMENTS (SERIES 100 GSE)	By F. Zarse / Date Feb. 2, 1965

The attached sheets constitute the preliminary performance requirements for the PSA Adaptor Box. The requirements are specified in two sections. The first section defines the requirements of the buffer and driver amps housed within the unit. The second section defines the attenuation and measurement characteristics of the signal test points (including measurement correction or multiplying factors). This document must be used in conjunction with SK 47462 .

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The following amplifiers are required in the AB (Adaptor Box).

Type	Description	
A1	CDU 16X Resolver Error Signal Amp	3 each
A2	General Purpose AC Probe Amp	1 each
A3	Fast Rise Time Pulse Probe Amp	1 each
A4	Narrow Band Pass Amplifier	1 each

Type A1 (CDU Buffer Amplifier)

1. Center Frequency (Signal) 800 CPS
2. Bandwidth $\pm$ 200 CPS (minimum) -3db maximum (WRT) 800 CPS
3. Gain (at 800 CPS) .990 V/V $\pm$ 1.5% with .5V rms input
4. Gain Deviation $\pm$ 1% 50 mv to 3V rms input
5. Maximum Undistorted Output (2% HD) 6.0V rms (minimum) at +28 VDC B+
6. Output Impedance $<$ 25 ohms
7. Signal Source Impedance 10K ohms (constant)
8. Load Impedance 50K ohms (R) +50 ft. 2 w shielded cable
9. Phase Shift (10K input to output load) (simulated) 3° maximum
10. Input Impedance - No requirement
11. Maximum Input Voltage 28V rms 800$\sim$, + 120 VDC
12. Operating Power +28 VDC A/B $\pm$ 5 VDC Hi Only
13. Operating Power Low shall be returned through signal source low
14. Operating Temperature $+65^{\circ}$F to + 120°F

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Type A2 (General Purpose)

1. Signal Frequencies 800 ∿ , 3.2 KC, 25.6 KC
2. Frequency Response (WRT 800 ∿) 3.2 KC -.1db, 600 ∿ (-3db Max), 26 KC (-2db Max)
3. Gain (at 800 ∿) .980 V/V ± 2% with .5 V Rms input
4. Gain Deviation ± 1% 50 Mv to 3 V Rms input
5. Maximum Undistorted Output (2% HD) - 6.0 V Rms (800, 3200 CPS); 3.0 V Rms (25.6 KC) Minimum at +28 VDC B+
6. Output Impedance < 25 Ohms
7. Signal Source Impedance 30 K ohms maximum, 2 K minimum
8. Load Impedance 50 K ohms (R) + 50 ft. 2 wires shielded cable
9. Phase Shift (800 ∿) 30 K input to output load (simulated) 3° max.
10. Phase Shift (3200 ∿) 10 K input to output load (simulated) 3° max.
11. Input Impedance Sufficient to meet the gain requirements when driven from a source impedance specified in 7 above
12. Maximum Input Voltage 28 V Rms 800 ∿ , 120 VDC
13. Operating Power +28 VDC A/B ± 5 VDC Hi Only
14. Operating Power Low shall be returned through signal source low.
15. Operating Temperature + 65°F to + 120°F

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A3 (Pulse Amplifier)

1. Gain .5 V/V ± 20% peak to peak
2. Rise Time 150 n sec. maximum
3. Input Signal a. + 9V pp 3 u sec pulse width (maximum values)
   b. - 26V pp 3 u sec pulse width (maximum values)
   c. - 9V pp 3 u sec pulse width (maximum values)
4. Output Impedance 50 Ω . Amplifier must match and drive a 50 Ω co-axial cable terminated with 50 Ω .
5. Output Voltage Wave Shape: Amplifier shall repeat wave shapes without saturating or altering wave form (with the exception of amplitude attentuation) to a minimum amplitude level of ± 3.5 V pp. (input).
6. Source Impedance , 2 K ohms (± 9V pulses), 3.3 K ohms (-26 V pulses)
7. Droop 10% maximum
8. Overshoot and Undershoot 10% maximum
9. Operating Power +28 VDC A/B ± 5 VDC Hi Only
10. Operating Power Low shall be returned through signal source low.
11. Operating Temperature +65°F to +120°F

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Type A4 (Narrow Band Pass Amplifier)

1. Input Voltage 10 mv to 100 mv peak to peak
2. Fork Frequency 550 $\pm$ 1 CPS
3. Center Frequency 550 CPS
4. Bandwidth $\pm$ 20 CPS WRT Center Frequency (max.)
5. Z Source 2500 ohms
6. Output Voltage DC (For Strip Recording)
   AC (For Fork Frequency & rms level measurement)
7. Gain Linearity $\pm$ 2% over E_{IN} Range (AC)
8. Gain 100 V/V $\pm$ 5%
9. Operating Temperature +65°F to +120°F

PSA FRONT PANEL SIGNAL PARAMETERS A/B AND GSE VIA BUFFER AMPLIFIERS AND WIRE*
(SERIES 100 GSE AND SERIES 0 A/B)

TRAY 1

	Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
1.	2V, 1% 3200 CPS Monitor	3.2V-4.2V	51K	5.6K	.32V-.42V	Sine	< 1°	X10	34-26	AC Probe
2.	IG MG, OG Error Signal Monitor	.1V-10V	51K	5.6K	.01V-1V	Sine	< 1°	X10	7-14 6-14 13-14	AC Probe
3.	3200 CPS Drive Monitor	1V	51K	5.6K	.1V	Sine	< 1°	X10	11-26	AC Probe
4.	3200 CPS 20V ØA, ØB	20 V/Ø	1K	None	20 V/Ø	Square	4 u sec lag	X1	3-4 12-4	Wired
5.	IG, MG, OG, CDU 1X Resolver Error	.04V-28V	100K	17K	.01V-4V	Sine	< 2°	X6.9	20-21 27-28 35-36	AC Probe
6.	- 28 VDC	-28V	20K	200K (MPL)	-25.4	DC		X1.1	33-32	Wired
7.	DC IG, MG, OG TDA Output	.5V-28V	51K	None	.5V-28V	DC		X1	2-1 9-1 10-1	DC Probe
8.	Comp. 3200 PPS in Ø Sync. Set	+6V pp	2K	None	+6V pp	Pulse	150 n s	X1	17-26	Pulse Probe
9.	Comp. 3200 PPS out of Ø Sync. (Reset)	+6V pp	2K	None	+6V pp	Pulse	150 n s	X1	18-26	Pulse Probe

TRAY 2

1.	800 CPS 1% Monitor (/0°)	28V	10K	1.1K	.6V	Sine	< 1°	X46.5	10-1	AC Probe

* Wired signals may also be probed with the appropriate probes.
AC Probe Monitored at X-Bar 199
DC Probe Monitored at X-Bar 299

TRAY 2 (Continued)

	Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TBA Probe Hi-Lo	Probe Type
2.	800 CPS 5% ∠-90° Monitor	28V	51K	1.1K	.6V	Sine	< 1°	X46.5	17-1	AC Probe
3.	800 CPS 28V IMU Wheels ØA 5%	28V	51K	1.1K	.6V	Sine	< 1°	X46.5	18-1	AC Probe
4.	800 CPS Motor Drive (IMU)	2V	51K	51K	1V	Sine	< 1.5°	X2	9-1	AC Probe
5.	120 VDC Monitor (IRIG)	+120V	.33 Div.	None	+40V	DC		X3	13-20	DC & AC
6.	12 VDC Monitor (IRIG)	+12V	2K	None	+12V	DC		X1	14-20	DC & AC
7.	32 VDC (IRIG)	+32V	5.1K	None	+32V	DC		X1	15-21	DC & AC
8.	25.6 KC IMU Monitor (2V)	2V	51K	None	2V	Sine	< 9°	X1	36-35	AC Probe
9.	25.6 KC Optics Monitor (2V)	2V	51K	None	2V	Sine	< 9°	X1	28-27	AC Probe
10.	Comp. 800 PPS in Ø Sync. (Set)	+6V pp	2K	None	+6V pp	Pulse	150 ns Rise Time	X1	2-1	Pulse Probe
11.	Comp. 800 PPS Out of Ø Sync. (Reset)	+6V pp	2K	None	+6V pp	Pulse	150 ns Rise Time	X1	11-1	Pulse Probe
12.	Comp. 25.6 KPPS in Ø Sync. (Set)	+6V pp	2K	None	+6V pp	Pulse	150 ns Rise Time	X1	3-35	Pulse Probe
13.	Comp. 25.6 KPPS Out of Ø Sync. (Reset)	+6V pp	2K	None	+6V pp	Pulse	150 ns Rise Time	X1	12-35	Pulse Probe

TRAY 3

1.	X, Y PIPA AC Amp Out (3.2 KC)	.02V-5V	10K	None	.02V-5V	Sine	< 3°	X1	2-1 3-1	AC Probe
2.	X PIPA P and N Pulses	-26V pp	30K	3.3K	-2.6V pp	Pulse	1 us	X10	23-1 31-1	Pulse Probe

Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
TRAY 3 (Continued)									
3. Y PIPA P and N Pulses	-26V pp	30K	3.3K	-2.6V pp	Pulse	1 us	X10	24-1 32-1	Pulse Probe
TRAY 4									
1. Z PIPA AC Amp Out (3.2 KC)	.02V-5V	10K	None	.02V-5V	Sine	< 3°	X1	2-1	AC Probe
2. Z PIPA P and N Pulses	-26V pp	30K	3.3K	-2.6 pp	Pulse	1 us	X10	23-1 31-1	Pulse Probe
TRAY 5									
1. X,Z Gyro Error Signal	.1V-10V	51K	5.6K	.01V-1V	Sine	< 1°	X10	9-1 17-1	AC Probe
2. IG, MG, OG CDU DAC Error (800 ∿)	.025V-9V pp	5.1K	None	.025V-9V	AC Square	< 1°	X1	20-21 27-28 35-36	Wired
3. IG, MG, OG ± Δ θ Unconditioned Square Waves	0 or 27V	5.1K	None	0 or 27V	DC Level Changes		X1	23-1 31-1 24-1 32-1 25-1 33-1	Wired
4. ± Δ Vx, ± Δ Vy, ± Δ Vz (PIPA Pulses)	X - 9V Y, Z - 3V	2K	None		Pulses	150 μ s	X1	2-1 10-1 3-1 11-1 4-1 12-1	Pulse Probe
TRAY 6									
1. Optics 800 CPS Drive (Power Supply)	2V	51K	51K	1V	Sine	< 1.5°	X2	2-1	AC Probe

TRAY 6 (Continued)

	Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
2.	Optics 800 CPS 1% (∠0° Power Supply)	28V	51K	1.1K	.6V	Sine	< 1°	X46.5	9-1	AC Probe
3.	Optics 800 CPS 5% ∠-90° (Power Supply)	28V	51K	1.1K	.6V	Sine	< 1°	X46.5	10-1	AC Probe
4.	IG, MG, OG CDU Failure Ind.	0-9V pp	15K	None	0-9V pp	≈ Square		X1	26-34 25-34 23-34	Wired
5.	IG, MG, OG CDU 16X Error Sig. (Resolver)	.02V-28V	10K	None	.02V-28V	Sine	< 1°	X1.01	20-21 27-28 35-36	Buffer Amps

TRAY 7

1.	Roll Error Body Offset Axis (800 ∿ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	27-28	AC Probe
2.	Yaw Error Body Offset Axis (800 ∿ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	35-36	AC Probe
3.	Roll Error Body Axis (800 ∿ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	14-15	AC Probe
4.	Pitch Error Body & Body Offset Axis (800 ∿ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	20-21	AC Probe
5.	Yaw Error Body Axis (800 ∿ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	7-8	AC Probe
6.	+120 VDC PIPA Supply Monitor	+120 VDC	.329 Div.	None	+39.4	DC		X3.04	2-1	DC Probe
7.	+32 VDC Monitor (PIPA)	+32 VDC	5.1K	None	+32V	DC		X1	10-9	DC Probe
8.	Temp. Control Amp Out (IMU)	0-20 VDC	1K	None	0-20V	DC		X1	31-17	Wired
9.	Accel. Temp. Ind. Bridge	0-5VDC	0	None	0-5V	DC		X1	25-26	Wired
10.	IRIG Temp. Ind. Bridge	0-5 VDC	0	None	0-5V	DC		X1	32-33	Wired
11.	Heater Current (IMU)	0-5 VDC	4020 Ω	None	0-5V	DC		X1	23-34	DC Probe
12.	Blower Current (IMU)	0-5 VDC	4020 Ω	None	0-5V	DC		X1	24-34	DC Probe

TRAY 7 (Continued) Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
13. Temp. Control Bridge Excit. T.P.	22 VDC ± 6%	10K	None	22V	DC		X1	18-17	Wired
14. Accel Temp.	0-5 VDC	5020 Ω	None	0-5V	DC		X1	11-34	DC Probe
15. IRIG Temp.	0-5 VDC	5020 Ω	None	0-5V	DC		X1	19-34	DC Probe
16. ± Δ θ Trun., Shaft Enc T.P. (Uncoded Sq. Waves)	0 or 27V	5.1K	None	0 or 27V	DC		X1	5-13 6-13 3-12 4-12	Wired
TRAY 8									
1. Trunnion, Shaft CDU MDA Out (800 CPS)	0-20V	2.5K Buffer Amp	None	0-6.8V*	Sine	< 3°	X2.94	2-1 3-12	AC Probe
2. Trunnion, Shaft CDU Tach Out (800 CPS)	0-10V	2.5K Buffer Amp	None	0-10V	Sine	< 3°	X1.03	17-24 18-19	Wired
3. Direct Trunnion, Shaft Controller (800 ∼)	0-10V	2.5K Buffer Amp	None	0-10V	Sine	< 3°	X1.03	9-23 10-11	AC Probe
4. Trunnion, Shaft CDU DAC Error	.025V-9V pp	5.1K	None	.025-9V	AC ≈ Square	< 1°	X1	26-25 34-33	AC Probe
TRAY 9									
1. SXT Trun., Shaft MDA Out	0-20V	2.5K Buffer Amp	None	0-6.8V*	Sine	< 3°	X2.94	2-1 3-12	AC Probe
2. Trunnion, Shaft CDU 16X Error	0-26V	2.5K Buffer Amp	None	0-26V	Sine	< 3°	X1.03	17-24 18-19	Wired
3. SCT Trunnion 1X Error	0-26V	2.5K Buffer Amp	None	0-26V	Sine	< 3°	X1.03	9-23	Wired
4. SCT Shaft 1/2X Error	0-26V	2.5K Buffer Amp	None	0-26V	Sine	< 3°	X1.03	10-11	Wired

* Attenuation of PSA Buffer Amplifiers

TRAY 10

	Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probes Hi-Lo	Probe Type
1.	IMU 800 CPS 28V 5% ∠-90° (Blower Supply)	28V	51K	1.1K	.6V	Sine	1°	X46.5	34-26	AC Probe
2.	IMU MG RSVR 1X Cos (800 ∿)	0-26V	Hi & Lo 40K	None	0-10.4	Sine	1°	X2.5	27-28	AC Probe
3.	IMU, AGC, Optics Operate 28 VDC	+28 VDC	30K	None	+28V	DC		X1	17-23 2-1 32-31	DC Probe
4.	IMU Standby 28 VDC	+28 VDC	30K	None	+28V	DC		X1	24-23	DC Probe
5.	Conditioning +20 VDC (Power Supply)	+20 VDC	30K	None	+20V	DC		X1	6-5	DC Probe
6.	Conditioning +2.5 VDC (Power Supply)	+2.5 VDC	Hi & Lo 3K	None		DC		X1	13-14	DC Probe
7.	AGC + 13 VDC (Logic Pwr)	+13 VDC	2K	None	+13V	DC		X1	10-1	DC Probe
8.	AGC +3 VDC (Logic Pwr)	+3 VDC	2K	None	+3V	DC		X1	11-1	DC Probe
9.	AGC Temp. Monitor 1, 2 & 3		0	None		DC		X1	3-1 4-1 12-1	DC Probe
10.	IMU Pressure Monitor	0-5 VDC	0	None	0-28V	DC		X1	35-36	DC Probe
11.	Pressure Transducer + 28 VDC Supply	+ 28 VDC	Hi & Lo 3K	None	+28V	DC		X1	7-8	DC Probe

AC SPARK PLUG DIVISION
General Motors Corporation
Milwaukee, Wisconsin

XDE 34-T-33

ENGINEERING DESIGN INFORMATION EXHIBIT

PSA ADAPTOR BOX PERFORMANCE REQUIREMENTS

(SERIES 100 GSE)

By F. Zarse

Date Feb. 2, 1965

(SERIES 100 GSE & SERIES 0 or 100 A/B)

Triax Connector and Selector Switch (Precision Current Monitor)
Tray 3 and 4

Switch Position

1. X PIPA PVR (Precision Voltage Reference)
2. X PIPA Torque Current Monitor
3. X PIPA Scale Factor
4. Y PIPA PVR
5. Y PIPA Torque Current Monitor
6. Y PIPA Scale Factor
7. Z PIPA PVR
8. Z PIPA Torque Current Monitor
9. Z PIPA Scale Factor
10. X Gyro PVR
11. X Gyro Torque Current Monitor
12. X Gyro Scale Factor
13. Y Gyro PVR
14. Y Gyro Torque Current Monitor
15. Y Gyro Scale Factor
16. Z Gyro PVR
17. Z Gyro Torque Current Monitor
18. Z Gyro Scale Factor

GSE BUFFER INPUT SWITCH

Switch Position	Signal Routing
ISS	(1) MG CDU 16X Error to CDU 16X Amplifier to X-Bar 228 & Rec. CH 2-5 (2) OG CDU 16X Error to CDU 16X Amplifier to X-Bar 227 & Rec. CH 3-5AC
OPT	(1) Y Tracker Error to CDU 16X Amplifier to X-Bar 213 & CH ~~2-8~~ 3.4-8AC (2) X Tracker Error to CDU 16X Amplifier to X-Bar 113 & CH 3-8 AC

PSA FRONT PANEL SIGNAL PARAMETERS A/B AND GSE VIA BUFFER AMPLIFIERS AND WIRE*

(SERIES 100 GSE AND SERIES 100 A/B)

	Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
TRAY 1										
1.	2V, 1% 3200 CPS Monitor	3.2V-4.2V	51K	5.6K	.32V-.42V	Sine	< 1°	X10	34-26	AC Probe
2.	IG, MG, OG Error Signal Monitor	.1V-10V	51K	5.6K	.01V-1V	Sine	< 1°	X10	7-14 6-14 13-14	AC Probe
3.	3200 CPS Drive Monitor	1V	51K	5.6K	.1V	Sine	< 1°	X10	11-26	AC Probe
4.	3200 CPS 20V ØA, ØB	20 V/Ø	1K	None	20V/Ø	Square	4 u sec lag	X1	3-4 12-4	Wired
5.	IG, MG, OG CDU 1X Resolver Error	.04V-28V	51K	17K	.01V-7V	Sine	< 2°	X4	20-21 27-28 35-36	AC Probe
6.	- 28 VDC	-28V	20K	200K (MPL)	-25.4	DC		X1.1	33-32	Wired
7.	DC IG, MG, OG TDA Output	.5V-28V	51K	None	.5V-28V	DC		X1	2-1 9-1 10-1	DC Probe
8.	Comp. 3200 PPS in Ø Sync Set	+6V pp	2K	None	+6V pp	Pulse	150 n s	X1	17-26	Pulse Probe
9.	Comp. 3200 PPS Out of Ø Sync (Reset)	+6V pp	2K	None	+6V pp	Pulse	150 n s	X1	18-26	Pulse Probe
TRAY 2										
1.	800 CPS 1% Monitor (∠0°)	28V	10K	1.1K	2.8V	Sine	< 1°	X10	10-1	AC Probe
2.	800 CPS 5% ∠-90° Monitor	28V	10K	1.1K	2.8V	Sine	< 1°	X10	17-1	AC Probe

* Wired signals may also be probed with the appropriate probes.
AC Probe monitored at X-Bar 199
DC Probe monitored at X-Bar 299

TRAY 2 (Continued)

	Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
3.	800 CPS 28V IMU Wheels Ø A 5%	28V	10K	1.1K	2.8V	Sine	< 1°	X10	18-1	AC Probe
4.	800 CPS Motor Drive (IMU)	2V	51K	51K	1V	Sine	< 1.5°	X2	9-1	AC Probe
5.	120 VDC Monitor (IRIG)	+120V	.33 Div	None	+40V	DC		X3	13-21	DC & AC
6.	12 VDC Monitor (IRIG)	+12V	2K	None	+12V	DC		X1	14-21	DC & AC
7.	32 VDC (IRIG)	+32V	5.1K	None	+32V	DC		X1	15-21	DC & AC
8.	25.6 KC IMU Monitor (2V)	2V	51K	None	2V	Sine	< 9°	X1	36-35	AC Probe
9.	25.6 KC OPtics Monitor (2V)	2V	51K	None	2V	Sine	< 9°	X1	28-27	AC Probe
10.	Comp. 800 PPS in Ø Sync (Set)	+6V pp	2K	None	+6V pp	Pulse	150 ns Rise Time	X1	2-1	Pulse Probe
11.	Comp. 800 PPS Out of Ø Sync (Reset)	+6V pp	2K	None	+6V pp	Pulse	150 ns Rise Time	X1	11-1	Pulse Probe
12.	Comp. 25.6 KPPS in Ø Sync (Set)	+6V pp	2K	None	+6V pp	Pulse	150 ns Rise Time	X1	3-35	Pulse Probe
13.	Comp. 25.6 KPPS Out of Ø Sync (Reset)	+6V pp	2K	None	+6V pp	Pulse	150 ns Rise Time	X1	12-35	Pulse Probe

TRAY 3

1.	X, Y PIPA AC Amp Out (3.2 KC)	.02V-5V	10K	None	.02V-5V	Sine	< 3°	X1	2-1 3-1	AC Probe
2.	X PIPA P and N Pulses	-26V pp	30K	3.3K	-2.6V pp	Pulse	1 us	X10	23-1 31-1	Pulse Probe
3.	Y PIPA P and N Pulses	-26V pp	30K	3.3K	-2.6V pp	Pulse	1 us	X10	24-1 32-1	Pulse Probe

Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
TRAY 4									
1. Z PIPA AC Amp Out (3.2 KC)	.02V-5V	10K	None	.02V-5V	Sine	$< 3^{\circ}$	X1	2-1	AC Probe
2. Z PIPA P and N Pulses	-26V pp	30K	3.3K	-2.6 pp	Pulse	1 us	X10	23-21 31-1	Pulse Probe
TRAY 5									
1. X, Z Gyro Error Sig.	.1V-10V	51K	5.6K	.01V-1V	Sine	$< 1^{\circ}$	X10	9-1 17-1	AC Probe
2. IG, MG, OG CDU DAC Error (800 ∿)	.025V-9V pp	5.1K	None	.025V-9V	AC Square	$< 1^{\circ}$	X1	20-21 27-28 35-36	Wired
3. IG, MG, OG ± Δθ Unconditioned Sq. Waves	0 or 27V	5.1K	None	0 or 27V	DC Level Changes		X1	23-1 31-1 24-1 32-1 25-1 33-1	Wired
4. ± ΔVx, ± ΔVy ± ΔVz (PIPA Pulses)		2K	None		Pulses	150 ns	X1	2-1 10-1 3-1 11-1 4-1 12-1	Pulse Probe
TRAY 6									
1. Optics 800 CPS Drive (Power Supply)	2V	51K	51K	1V	Sine	$< 1.5^{\circ}$	X2	2-1	AC Probe
2. Optics 800 CPS 1% ($\angle 0^{\circ}$ Power Supply)	28V	10K	1.1K	2.8V	Sine	$< 1^{\circ}$	X10	9-1	AC Probe
3. Optics 800 CPS 5% $\angle -90^{\circ}$ (Power Supply)	28V	10K	1.1K	2.8V	Sine	$< 1^{\circ}$	X10	10-1	AC Probe

	Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
TRAY 6 (Continued)										
4.	IG, MG, OG CDU Failure Ind	0-9V pp	15K	None	0-9V pp	≈ Square		X1	~~26-34~~ 25-34 23-34	Wired
5.	IG, MG, OG CDU 16X Error Sig. (Resolver)	.02V-28V	10K	None	.02V-28V	Sine	< 1°	X1.01	20-21 27-28 35-36	Buffer Amps
TRAY 7										
1.	Roll Error Body Offset Axis (800 ~ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	27-28	AC Probe
2.	Yaw Error Body Offset Axis (800 ~ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	35-36	AC Probe
3.	Roll Error Body Axis (800 ~ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	14-15	AC Probe
4.	Pitch Error Body & Body Offset Axis (800 ~ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	20-21	AC Probe
5.	Yaw Error Body Axis (800 ~ SCS)	.02V-20V	25K	None	.02V-20V	Sine	< 1°	X1	7-8	AC Probe
6.	+120 VDC PIPA Supply Monitor	+120 VDC	.329 Div	None	+39.4	DC		X3.04	2-1	DC Probe
7.	+32 VDC Monitor (PIPA)	+32 VDC	5.1K	None	+32 V	DC		X1	10-9	DC Probe
8.	Temp. Control Amp Out (IMU)	0-20 VDC	1K	None	0-20V	DC		X1	31-17	Wired
9.	Accel. Temp. Ind. Bridge	0-5 VDC	0	None	0-5V	DC		X1	25-26	Wired
10.	IRIG Temp. Ind. Bridge	0-5 VDC	0	None	0-5V	DC		X1	32-33	Wired
11.	Heater Current (IMU)	0-5 VDC	4020 Ω	None	0-5V	DC		X1	23-34	DC Probe
12.	Blower Current (IMU)	0-5 VDC	4020 Ω	None	0-5V	DC		X1	24-34	DC Probe
13.	Temp. Control Bridge Excit. T.P.	22 VDC ±6%	10K	None	22V	DC		X1	18-17	Wired

TRAY 7 (Continued)

	Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
14.	Accel. Temp.	0-5 VDC	5020 Ω	None	0-5V	DC		X1	11-34	DC Probe
15.	IRIG Temp.	0-5 VDC	5020 Ω	None	0-5V	DC		X1	19-34	DC Probe
16.	± Δ θ Trunnion, Shaft Enc T.P. (Uncoded Sq. Waves)	0 or 27V	5.1K	None	0 or 27V	DC		X1	5-13 6-13 3-12 4-12	Wired

TRAY 8

1.	SXT Shaft MDA Output ∅ 2	0-40V	4.7K	None	0-40V	Sine		X1	27-28	Wired
2.	SCT Shaft MDA Output ∅ 2	0-40V	4.7K	None	0-40V	Sine		X1	35-36	AC Probe
3.	Tracker Preamp Output			None		Sine		X1	8-15	AC Probe
4.	SXT Trun. MDA Input	0-10V		None	0-10V	Sine		X1	2-1	AC Probe
5.	SCT Shaft 1X Error	0-25V		None	0-25V	Sine		X1	3-12	AC Probe
6.	SXT Shaft MDA Input	0-10V		None	0-10V	Sine		X1	9-23	AC Probe
7.	SXT Trun. Tach. Feedback	0-10V		None	0-10V	Sine		X1	10-11	AC Probe
8.	SXT Trun. MDA Output ∅2	0-40V	4.7K	None	0-40V	Sine		X1	20-21	Wired
9.	Tracker X Drive T.P.	1.5-3.5V		None	1.5-3.5V	Sine		X1	6-13	AC Probe
10.	Tracker Y Drive T.P.	1.5-3.5V		None	1.5-3.5V	Sine		X1	7-14	AC Probe
11.	SXT Shaft Tach. Feedback	0-10V		None	0-10V	Sine		X1	17-24	Wired
12.	SCT Shaft Tach Feedback	0-10V		None	0-10V	Sine		X1	18-19	Wired

	Signal	Level	A/B Source Zo	GSE Shunt ≈ Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
TRAY 9										
1.	SCT Trun. MDA Output ∅2	0-40V	4.7K	None	0-40V	Sine		X1	13-14	Wired
2.	Shaft CDU MDA Output ∅2	0-40V	4.7K	None	0-40V	Sine		X1	27-28	AC Probe
3.	Trun. CDU 16X Error	0-5V		None	0-5V	Sine		X1	17-24	Wired
4.	Shaft CDU 16X Error	0-5V		None	0-5V	Sine		X1	18-19	Wired
5.	Shaft CDU Tach Feedback	0-10V		None	0-10V	Sine		X1	2-1	AC Probe
6.	SCT Trun. Tach Feedback	0-10V		None	0-10V	Sine		X1	3-12	AC Probe
7.	Trun. CDU MDA Output ∅2	0-40V	4.7K	None	0-40V	Sine		X1	20-21	AC Probe
8.	SCT Trun. 1X Error	0-25V		None	0-25V	Sine		X1	9-23	Wired
9.	CDU Trun. Tach Feedback	0-10V		None	0-10V	Sine		X1	10-11	Wired
10.	Y Tracker Error	.002-.5V	1K	None	.002-.5V	Sine		X1	5-6	Wired
11.	X Tracker Error	.002-.5V	1K	None	.002-.5V	Sine		X1	7-8	Wired
TRAY 10										
1.	IMU 800 CPS 28V 5% ∠-90° (Blower Supply)	28V	10K	1.1K	2.8V	Sine	< 1°	X10	34-26	AC Probe
2.	Photometer Preamp Output	.01-.1 pp	2.5K	None	1-10	Sine		X1	20-21	Buffer Amp
3.	IMU, AGC, Optics Operate 28VDC	+28 VDC	30K	None	+28V	DC		X1	17-23 2-1 32-31	DC Probe
4.	IMU Standby 28 VDC	+28 VDC	30K	None	+28V	DC		X1	24-23	DC Probe
5.	Conditioning +20 VDC (Power Supply)	+20 VDC	30K	None	+20V	DC		X1	6-5	DC Probe

TRAY 10 (Continued)

	Signal	Level	A/B Source Zo	GSE Shunt Zs	Measured Voltage	Form	Phase Shift	Correction Factor	TPA Probe Hi-Lo	Probe Type
6.	Conditioning +2.5 VDC (Power Supply)	+2.5 VDC	Hi & Lo 3K	None		DC		X1	13-14	DC Probe
7.	AGC +13 VDC (Logic Power)	+13 VDC	2K	None	+13V	DC		X1	10-1	DC Probe
8.	AGC +3 VDC (Logic Power)	+3 VDC	2K	None	+3V	DC		X1	11-1	DC Probe
9.	IMU Pressure Monitor	0-5 VDC	0	None	0-28V	DC		X1	35-36	DC Probe
10.	Pressure Transducer +28 VDC Supply	+28 VDC	Hi & Lo 3K	None	+28V	DC		X1	7-8	DC Probe
11.	+28 VDC IMU Operate Buss A Monitor	+28 VDC		None	+28V	DC		X1	18-23	DC Probe
12.	+28 VDC IMU Operate Buss B Monitor	+28 VDC		None	+28V	DC		X1	19-23	DC Probe