

PCU COMMAND SUMMARY

x03/x04/x06 Version 2.53-2.5x

00	NUL	ignored in sio			64	40	@	GPS Position, Int		
01	SOH				65	41	A	absolute az	Adddd@_	*
02	STX				66	42	B	absolute hdg hard	Bdddd@_	*
03	ETX				67	43	C			
04	EOT				68	44	D	absolute hdg soft	Ddddd@_	*
05	ENQ				69	45	E	absolute el	Edddd@_	*
06	ACK				70	46	F			
07	BEL				71	47	G			
08	BS				72	48	H	read R H	H	msg@_
09	HT				73	49	I	absolute CL	Idddd@_	*
0A	LF				74	4A	J	absolute rel	Jdddd@_	*
0B	VT				75	4B	K			
0C	FF				76	4C	L	echo msg=Ldddd	Ldddd@_	msg*_
0D	CR	cmd terminator	_		77	4D	M			
0E	SO				78	4E	N	set parameters	Ndddd@_	msg*_
0F	SI				79	4F	O	port e output	Ohhhh@_	*
10	DLE				80	50	P	read E A C	P	msg@_
11	DC1				81	51	Q			
12	DC2				82	52	R			
13	DC3				83	53	S	read S (sio)	S	msg@_
14	DC4				84	54	T			
15	NAK				85	55	U			
16	SYN				86	56	V	PCU version	V	msg_
17	ETB				87	57	W			
18	CAN				88	58	X			
19	EM				89	59	Y			
1A	SUB				90	5A	Z	diag test start(res)	Znnnn@_	*
1B	ESC				91	5B	[			
1C	FS				92	5C	\			
1D	GS				93	5D	]			
1E	RS				94	5E	^	utility cmds	^dddd@_	*
1F	US	reserved for conscan pulse			95	5F	_			
20	sp				96	60	`			
21	!				97	61	a	incremental az	ai@_	*
22	"				98	62	b	incremental hdg	bi@_	*
23	#				99	63	c			
24	\$				100	64	d			
25	%				101	65	e	incremental el	ei@_	*
26	&	clear errors	&	*	102	66	f			
27	'				103	67	g	write pol	gdddd@_	*
28	(				104	68	h	write pwm	hdddd@_	*
29	)				105	69	i	differential CL	idddd@_	*
2A	*	reserved for positive command response			106	6A	j	differential LV	jdddd@_	*
2B	+	reset rc in sio	+		107	6B	k	differential AZ	kdddd@_	*
2C	,				108	6C	l	lumped CL,LV,AZ		
2D	-				109	6D	m			
2E	.				110	6E	n	same as N		
2F	/				111	6F	o			
30	0				112	70	p	read EAC in hex	p	msg@_
31	1				113	71	q			
32	2	dec lvtrm ±	2	*	114	72	r			
33	3				115	73	s			
34	4	dec cltrm ±	4	*	116	74	t			
35	5	clr trms ±	5	*	117	75	u	read Pol & aux	u	msg@_
36	6	inc cltrm ±	6	*	118	76	v	read references	v	msg@_
37	7				119	77	w	read QRSS	w	msg@_
38	8	inc lvtrm ±	8	*	120	78	x	read IVCs	x	msg@_
39	9				121	79	y	read TCs	y	msg@_
3A	:				122	7A	z			
3B	;				123	7B	{			
3C	<	null response			124	7C				
3D	=	GPS fine position, .0000 min		msg@_	125	7D	}			
3E	>	null response			126	7E	~			
3F	?	reserved for negative command response			127	7F	DEL			

UTILITIES (.94)			
0	std mode	^0000	
C	Toggle DishScan	^0067	
F	Slow Scan	^0070	
G	Sat Reference	^0071	
V	Cksum off	^0086	
T	Test/Tilt mode	^0084	
W	NV write	^0087	
Z	Reset	^0090	
2	Trim Up	^0002	
4	Trim Left	^0004	
5	Trim Clear	^0005	
6	Trim Right	^0006	
8	Trim Down	^0008	
1nnn	CL DC torque	^1nnn	
2nnn	LV DC torque	^2nnn	
3nnn	AZ DC torque	^3nnn	
Checksum for ^0086 = Alt+0172 (0xAC)			
n / N PARAMETERS (.78) or (.110)			
n / N	Parameter	Format	
0	Stype	n0nnn	N0nnn
1	CL Kp	n1nnn	N1nnn
2	LV Kp	n2nnn	N2nnn
3	AZ Kp	n3nnn	N3nnn
4	CL trim	n4nnn	N4nnn
5	LV trim	n5nnn	N5nnn
6	HF trim	n6nnn	N6nnn
7	DishScan	n7nnn	N7nnn
8	Scan Rate	n8nnn	N8nnn
9	Error Byte	n9nnn	N9nnn
A	System ID	nAnnn	Nannn

System	N0	N1	N2	N3	N7	Index
Size 23, 40:1 Double Reduction Az drive						
4003	33	30	30	30	21	1
2403	2	16	8	16	21	2
Size 23 Double Stack, 10:1 Single Reduction						
reserved	4	0	0	0	0	4
3004	5	24	20	10	29	5
4004	6	24	24	14	25	6
5004	7	50	50	20	29	7
* Odd gain values must remain odd.						
4003a	8	30	30	20	9	8
6003a * **	73	51	51	25	25	9
4096a	74	60	60	40	25	10
5696a *	75	75	75	51	25	11
6004_ *	76	51	51	25	25	12
2403a	16	14	8	16	30	16
2406	17	20	10	12	42	17
4006	20	76	46	26	9	20
4006-10 *	21	51	51	31	25	21
6006 Ku *	22	65	59	25	93	22
6006 C *	23	65	59	25	68	23
4006 A	24	60	20	26	26	24

* Odd gain values must remain odd.
** See xx03 2.6x for 6003a-6 and 6003aL

N7			
Phase	Drive	CL	AZ EL
-45	0	Max	0 0 0
+0	64	1/2	16 4 1
+45	128	1/4	32 8 2
+90	192	1/8	48 12 3

‡ enabled only in test mode
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Status word bit assignments			
Bit	Word 1	Word2	Word 3
7	Spare	El Target	Spare
6	1	1	1
5	SlowScan	Az Target	Sensor Limit
4	Sat Ref	Spare	Stabilization Limit
3	DishScan	Hdg Valid	Az Reference Error
2	Unwrap	Error Flag	Az Torque Limit Error
1	Data in 3	Init	Lv Torque Limit Error
0	Data in 2	Hi Elevation	Cl Torque Limit Error

xx03/xx04 ver 2.53 command set

Software Part Numbers 121449, 122844, 123385, 123091
123091 for Land Mobile adds 0.40 to the version number

PGB 19/Nov/10

PCU COMMAND SUMMARY

x03/x04/x06 Version 2.44-2.45

00	NUL	ignored in sio			64	40	@			
01	SOH				65	41	A	absolute az	Adddd@_	*
02	STX				66	42	B	absolute hdg hard	Bdddd@_	*
03	ETX				67	43	C			
04	EOT				68	44	D	absolute hdg soft	Ddddd@_	*
05	ENQ				69	45	E	absolute el	Edddd@_	*
06	ACK				70	46	F			
07	BEL				71	47	G			
08	BS				72	48	H	read R H	H	msg@_
09	HT				73	49	I	absolute CL	Idddd@_	*
10	LF				74	4A	J	absolute rel	Jdddd@_	*
11	VT				75	4B	K			
12	FF				76	4C	L	echo msg=Ldddd	Ldddd@_	msg*_
13	OD	cmd terminator	_		77	4D	M			
14	OE	SO			78	4E	N	set parameters	Ndddd@_	msg*_
15	OF	SI			79	4F	O	port e output	Ohhhh@_	*
16	10	DLE			80	50	P	read E A C	P	msg@_
17	11	DC1			81	51	Q			
18	12	DC2			82	52	R			
19	13	DC3			83	53	S	read S (sio)	S	msg@_
20	14	DC4			84	54	T			
21	15	NAK			85	55	U			
22	16	SYN			86	56	V	PCU version	V	msg_
23	17	ETB			87	57	W			
24	18	CAN			88	58	X			
25	19	EM			89	59	Y			
26	1A	SUB			90	5A	Z	diag test start(res)	Znnnn@_	*
27	1B	ESC			91	5B	[			
28	1C	FS			92	5C	\			
29	1D	GS			93	5D	]			
30	1E	RS			94	5E	^	utility cmds	^dddd@_	*
31	1F	US	reserved for conscan pulse		95	5F	_			
32	20	sp			96	60	`			
33	21	!			97	61	a	incremental az	ai@_	*
34	22	"			98	62	b	incremental hdg	bi@_	*
35	23	#			99	63	c			
36	24	\$			100	64	d			
37	25	%			101	65	e	incremental el	ei@_	*
38	26	&	clear errors	&	102	66	f			
39	27	'			103	67	g	write pol	gdddd@_	*
40	28	(			104	68	h	write pwm	hdddd@_	*
41	29	)			105	69	i	differential CL	idddd@_	*
42	2A	*	reserved for positive command response		106	6A	j	differential LV	jdddd@_	*
43	2B	+	reset rc in sio	+	107	6B	k	differential AZ	kdddd@_	*
44	2C	,			108	6C	l	lumped CL,LV,AZ		
45	2D	-			109	6D	m			
46	2E	.			110	6E	n	same as N		
47	2F	/			111	6F	o			
48	30	0			112	70	p	read EAC in hex	p	msg@_
49	31	1			113	71	q			
50	32	2	dec lvtrm ‡	2	114	72	r			
51	33	3			115	73	s			
52	34	4	dec cltrm ‡	4	116	74	t			
53	35	5	clr trms ‡	5	117	75	u	read Pol & aux	u	msg@_
54	36	6	inc cltrm ‡	6	118	76	v	read references	v	msg@_
55	37	7			119	77	w	read QRSS	w	msg@_
56	38	8	inc lvtrm ‡	8	120	78	x	read IVCs	x	msg@_
57	39	9			121	79	y	read TCs	y	msg@_
58	3A	:			122	7A	z			
59	3B	;			123	7B	{			
60	3C	<			124	7C				
61	3D	=			125	7D	}			
62	3E	>			126	7E	~			
63	3F	?	reserved for negative command response		127	7F	DEL			

UTILITIES (.94)						
0	std mode	^0000				
C	Toggle DishScan	^0067				
F	Slow Scan	^0070				
G	Sat Reference	^0071				
V	Cksum off	^0086				
T	Test/Tilt mode	^0084				
W	NV write	^0087				
Z	Reset	^0090				
2	Trim Up	^0002				
4	Trim Left	^0004				
5	Trim Clear	^0005				
6	Trim Right	^0006				
8	Trim Down	^0008				
1nnn	CL DC torque	^1nnn				
2nnn	LV DC torque	^2nnn				
3nnn	AZ DC torque	^3nnn				
Checksum for ^0086 = 172 or AC						
n / N PARAMETERS (.78) or (.110)						
n / N	Parameter	Format				
0	Stype	n0nnn	N0nnn			
1	CL Kp	n1nnn	N1nnn			
2	LV Kp	n2nnn	N2nnn			
3	AZ Kp	n3nnn	N3nnn			
4	CL trim	n4nnn	N4nnn			
5	LV trim	n5nnn	N5nnn			
6	HF trim	n6nnn	N6nnn			
7	DishScan	n7nnn	N7nnn			
8	Scan Rate	n8nnn	N8nnn			
9	Error Byte	n9nnn	N9nnn			
A	System ID	nAnnn	Nannn			
System	N0	N1	N2	N3	N7	Index
Size 23, 40:1 Double Reduction Az drive						
4003	33	30	30	30	21	1
2403	2	16	8	16	21	2
Size 23 Double Stack, 10:1 Single Reduction						
reserved	4	0	0	0	0	4
3004	5	24	20	10	29	5
4004	6	24	24	14	25	6
5004 *	7	51	51	21	29	7
4003a	8	30	30	20	9	8
6003a * **	73	51	51	25	25	9
4096a	74	60	60	40	25	10
5696a *	75	75	75	51	25	11
6004_ *	76	51	51	25	25	12
2403a	16	14	8	16	30	16
4006	20	76	46	26	9	20
4006-10 *	20	51	51	31	25	21
6006 Ku *	22	75	65	51	25	22
6006 C * #	23	75	65	51	68	23
* Odd gain values must remain odd.						
** See xx03 2.6x for 6003a-6 and 6003aL						
# Applies to 2.44b or later only						
N7						
Phase		Drive	CL	AZ	EL	
-45	0	Max	0	0	0	
+0	64	1/2	16	4	1	
+45	128	1/4	32	8	2	
+90	192	1/8	48	12	3	

‡ enabled only in test mode
© checksum

Status word bit assignments

Bit	Word 1	Word2	Word 3
7	Spare	EI Target	Spare
6	1	1	1
5	SlowScan	Az Target	Sensor Limit
4	Sat Ref	Spare	Stabilization Limit
3	DishScan	Hdg Valid	Az Reference Error
2	Unwrap	Error Flag	Az Torque Limit Error
1	Data in 3	Init	Lv Torque Limit Error
0	Data in 2	Hi Elevation	Cl Torque Limit Error

xx03/xx04 ver 2.44 command set

Software Part Numbers 121449, 122844, 123385, 123091
123091 for Land Mobile adds 0.40 to the version number

PCU COMMAND SUMMARY

x03/x04/x06 Version 2.40-2.43

00	NUL	ignored in sio			64	40	@			
01	SOH				65	41	A	absolute az	Adddd@_	*
02	STX				66	42	B	absolute hdg hard	Bdddd@_	*
03	ETX				67	43	C			
04	EOT				68	44	D	absolute hdg soft	Ddddd@_	*
05	ENQ				69	45	E	absolute el	Edddd@_	*
06	ACK				70	46	F			
07	BEL				71	47	G			
08	BS				72	48	H	read R H	H	msg@_
09	HT				73	49	I	absolute CL	Idddd@_	*
10	LF				74	4A	J	absolute rel	Jdddd@_	*
11	VT				75	4B	K			
12	FF				76	4C	L	echo msg=Ldddd	Ldddd@_	msg*_
13	OD	cmd terminator	_		77	4D	M			
14	OE	SO			78	4E	N	set parameters	Ndddd@_	msg*_
15	OF	SI			79	4F	O	port e output	Ohhhh@_	*
16	10	DLE			80	50	P	read E A C	P	msg@_
17	11	DC1			81	51	Q			
18	12	DC2			82	52	R			
19	13	DC3			83	53	S	read S (sio)	S	msg@_
20	14	DC4			84	54	T			
21	15	NAK			85	55	U			
22	16	SYN			86	56	V	PCU version	V	msg_
23	17	ETB			87	57	W			
24	18	CAN			88	58	X			
25	19	EM			89	59	Y			
26	1A	SUB			90	5A	Z	diag test start(res)	Znnnn@_	*
27	1B	ESC			91	5B	[			
28	1C	FS			92	5C	\			
29	1D	GS			93	5D	]			
30	1E	RS			94	5E	^	utility cmds	^dddd@_	*
31	1F	US	reserved for conscan pulse		95	5F	_			
32	20	sp			96	60	`			
33	21	!			97	61	a	incremental az	ai@_	*
34	22	"			98	62	b	incremental hdg	bi@_	*
35	23	#			99	63	c			
36	24	\$			100	64	d			
37	25	%			101	65	e	incremental el	ei@_	*
38	26	&	clear errors	&	102	66	f			
39	27	'			103	67	g	write pol	gdddd@_	*
40	28	(			104	68	h	write pwm	hdddd@_	*
41	29	)			105	69	i	differential CL	idddd@_	*
42	2A	*	reserved for positive command response		106	6A	j	differential LV	jdddd@_	*
43	2B	+	reset rc in sio	+	107	6B	k	differential AZ	kdddd@_	*
44	2C	,			108	6C	l	lumped CL,LV,AZ		
45	2D	-			109	6D	m			
46	2E	.			110	6E	n	same as N		
47	2F	/			111	6F	o			
48	30	0			112	70	p	read EAC in hex	p	msg@_
49	31	1			113	71	q			
50	32	2	dec lvtrm ±	2	114	72	r			
51	33	3			115	73	s			
52	34	4	dec cltrm ±	4	116	74	t			
53	35	5	clr trms ±	5	117	75	u	read Pol & aux	u	msg@_
54	36	6	inc cltrm ±	6	118	76	v	read references	v	msg@_
55	37	7			119	77	w	read QRSS	w	msg@_
56	38	8	inc lvtrm ±	8	120	78	x	read IVCs	x	msg@_
57	39	9			121	79	y	read TCs	y	msg@_
58	3A	:			122	7A	z			
59	3B	;			123	7B	{			
60	3C	<			124	7C				
61	3D	=			125	7D	}			
62	3E	>			126	7E	~			
63	3F	?	reserved for negative command response		127	7F	DEL			

UTILITIES (.94)						
0	std mode	^0000				
C	Toggle DishScan	^0067				
F	Slow Scan	^0070				
G	Sat Reference	^0071				
V	Cksum off	^0086				
T	Test/Tilt mode	^0084				
W	NV write	^0087				
Z	Reset	^0090				
2	Trim Up	^0002				
4	Trim Left	^0004				
5	Trim Clear	^0005				
6	Trim Right	^0006				
8	Trim Down	^0008				
1nnn	CL DC torque	^1nnn				
2nnn	LV DC torque	^2nnn				
3nnn	AZ DC torque	^3nnn				
Checksum for ^0086 = 172 or AC						
n / N PARAMETERS (.78) or (.110)						
n / N	Parameter	Format				
0	Stype	n0nnn	N0nnn			
1	CL Kp	n1nnn	N1nnn			
2	LV Kp	n2nnn	N2nnn			
3	AZ Kp	n3nnn	N3nnn			
4	CL trim	n4nnn	N4nnn			
5	LV trim	n5nnn	N5nnn			
6	HF trim	n6nnn	N6nnn			
7	DishScan	n7nnn	N7nnn			
8	Scan Rate	n8nnn	N8nnn			
9	Error Byte	n9nnn	N9nnn			
A	System ID	nAnnn	Nannn			
System	N0	N1	N2	N3	N7	Index
Size 23, 40:1 Double Reduction Az drive						
4003	33	30	30	30	21	1
2403	2	16	8	16	21	2
Size 23 Double Stack, 10:1 Single Reduction						
reserved	4	0	0	0	0	4
3004	5	24	20	10	29	5
4004	6	24	24	14	25	6
5004 *	7	51	51	21	29	7
4003a	8	30	30	20	9	8
6003a * **	73	51	51	25	25	9
4096a	74	60	60	40	25	10
5696a *	75	75	75	51	25	11
2403a	16	14	8	16	30	16
4006	20	76	46	26	9	20
4006-10 *	20	51	51	31	25	20

* Odd gain values must remain odd.
 ** See xx03 2.6x for 6003a-6 and 6003aL

N7					
Phase	Drive	CL	AZ	EL	
-45	0	Max	0	0	0
+0	64	1/2	16	4	1
+45	128	1/4	32	8	2
+90	192	1/8	48	12	3

‡ enabled only in test mode
 © checksum

Status word bit assignments			
Bit	Word 1	Word2	Word 3
7	Spare	El Target	Spare
6	1	1	1
5	SlowScan	Az Target	Sensor Limit
4	Sat Ref	Spare	Stabilization Limit
3	DishScan	Hdg Valid	Az Reference Error
2	Unwrap	Error Flag	Az Torque Limit Error
1	Data in 3	Init	Lv Torque Limit Error
0	Data in 2	Hi Elevation	Cl Torque Limit Error

xx03/xx04 ver 2.40 command set

Software Part Numbers 121449, 122844, 123385, 123091
 123091 for Land Mobile adds 0.40 to the version number

PCU COMMAND SUMMARY

xx03/xx04 Version 2.27-2.2x

000	NUL	ignored in sio			6440	@			
101	SOH				6541	A	absolute az	Adddd@_	*
202	STX				6642	B	absolute hdg hard	Bddddd@_	*
303	ETX				6743	C			
404	EOT				6844	D	absolute hdg soft	Dddddd@_	*
505	ENQ				6945	E	absolute el	Eddddd@_	*
606	ACK				7046	F			
707	BEL				7147	G			
808	BS				7248	H	read R H	H	msg@_
909	HT				7349	I	absolute CL	Iddddd@_	*
1010	LF				744A	J	absolute rel	Jddddd@_	*
110B	VT				754B	K			
120C	FF				764C	L	echo msg=Lddddd	Lddddd@_	msg*_
130D	CR	cmd terminator	_		774D	M			
140E	SO				784E	N	set parameters	Nddddd@_	msg*_
150F	SI				794F	O	port e output	Ohhhh@_	*
1610	DLE				8050	P	read E A C	P	msg@_
1711	DC1				8151	Q			
1812	DC2				8252	R			
1913	DC3				8353	S	read S (sio)	S	msg@_
2014	DC4				8454	T			
2115	NAK				8555	U			
2216	SYN				8656	V	PCU version	V	msg_
2317	ETB				8757	W			
2418	CAN				8858	X			
2519	EM				8959	Y			
261A	SUB				905A	Z	diag test start(res)	Znnnn@_	*
271B	ESC				915B	[			
281C	FS				925C	\			
291D	GS				935D	]			
301E	RS				945E	^	utility cmds	^ddddd@_	*
311F	US	reserved for conscan pulse			955F	_			
3220	sp				9660	`			
3321	!				9761	a	incremental az	ai@_	*
3422	"				9862	b	incremental hdg	bi@_	*
3523	#				9963	c			
3624	\$				10064	d			
3725	%				10165	e	incremental el	ei@_	*
3826	&	clear errors	&	*	10266	f			
3927	'				10367	g	write pol	gddddd@_	*
4028	(				10468	h	write pwm	hddddd@_	*
4129	)				10569	i	differential CL	iddddd@_	*
422A	*	reserved for positive command response			1066A	j	differential LV	jddddd@_	*
432B	+	reset rc in sio	+		1076B	k	differential AZ	kddddd@_	*
442C	,				1086C	l	lumped CL,LV,AZ		
452D	-				1096D	m			
462E	.				1106E	n	same as N		
472F	/				1116F	o			
4830	0				11270	p	read EAC in hex	p	msg@_
4931	1				11371	q			
5032	2	dec lvtrm ‡	2	*	11472	r			
5133	3				11573	s			
5234	4	dec cltrm ‡	4	*	11674	t			
5335	5	clr trms ‡	5	*	11775	u	read Pol & aux	u	msg@_
5436	6	inc cltrm ‡	6	*	11876	v	read references	v	msg@_
5537	7				11977	w	read QRSS	w	msg@_
5638	8	inc lvtrm ‡	8	*	12078	x	read IVCs	x	msg@_
5739	9				12179	y	read TCs	y	msg@_
583A	:				1227A	z			
593B	;				1237B	{			
603C	<				1247C				
613D	=				1257D	}			
623E	>				1267E	~			
633F	?	reserved for negative command response			1277F	DEL			

UTILITIES (.94)			
0	std mode	^0000	
C	Toggle DishScan	^0067	
F	Fast reference	^0070	
G	Sat reference	^0071	
V	Cksum off	^0086	
T	Test/Tilt mode	^0084	
W	NV write	^0087	
Z	Reset	^0090	
2	Trim Up	^0002	
4	Trim Left	^0004	
5	Trim Clear	^0005	
6	Trim Right	^0006	
8	Trim Down	^0008	
1nnn	CL DC torque	^1nnn	
2nnn	LV DC torque	^2nnn	
3nnn	AZ DC torque	^3nnn	
Checksum for ^0086 = 172 or AC			

n / N PARAMETERS (.78) or (.110)			
n / N	Parameter	Format	
0	Stype	n0nnn	N0nnn
1	CL Kp	n1nnn	N1nnn
2	LV Kp	n2nnn	N2nnn
3	AZ Kp	n3nnn	N3nnn
4	CL trim	n4nnn	N4nnn
5	LV trim	n5nnn	N5nnn
6	HF trim	n6nnn	N6nnn
7	DishScan	n7nnn	N7nnn
8	Slew Rate	n8nnn	N8nnn
9	Error Byte	n9nnn	N9nnn
A	System ID	nAnnn	Nannn

System	No	N1	N2	N3	N7	Index
Size 23, 40:1 Double Reduction Az drive						
4003	33	30	30	30	21	1
2403	2	16	8	16	21	2
Size 23 Double Stack, 10:1 Single Reduction						
reserved	4	0	0	0	0	4
3004	5	24	20	10	25	5
4004	6	24	24	14	45	6
5004 *	7	51	51	21	25	7
4003a	8	30	30	20	30	8
6003a * **	73	51	51	25	25	9
4096a	74	60	60	40	25	10
5696a *	75	75	75	51	25	11
2403a	16	14	8	16	30	16
4006	20	76	46	26	25	20
4006-10 *	20	51	51	31	25	20

* Odd gain values must remain odd.
 ** See xx03 2.6x for 6003a-6 and 6003aL

N7			
Phase	Drive	CL	AZ EL
-45 0	Max	0	0 0
+0 64	1/2	16	4 1
+45 128	1/4	32	8 2
+90 192	1/8	48	12 3

‡ enabled only in test mode
 © checksum

Status word bit assignments			
Bit	Word 1	Word2	Word 3
7	Spare	El Target	Spare
6	1	1	1
5	Fast TC	Az Target	Spare
4	Sat Ref	Spare	Stabilization Limit
3	DishScan	Hdg Valid	Az Reference Error
2	Unwrap	Error Flag	Az Torque Limit Error
1	Data in 3	Init	Lv Torque Limit Error
0	Data in 2	Hi Elevation	Cl Torque Limit Error

xx03/xx04 ver 2.27 command set

Software Part Numbers 121449, 122844, 123385, 123091
 123091 for Land Mobile adds 0.40 to the version number

PCU COMMAND SUMMARY

xx03/xx04 Version 2.26

00	NUL	ignored in sio			64	40	@		
01	SOH				65	41	A	absolute az	Adddd@_J *
02	STX				66	42	B	absolute hdg hard	Bdddd@_J *
03	ETX				67	43	C		
04	EOT				68	44	D	absolute hdg soft	Ddddd@_J *
05	ENQ				69	45	E	absolute el	Edddd@_J *
06	ACK				70	46	F		
07	BEL				71	47	G		
08	BS				72	48	H	read R H	H msg@_J
09	HT				73	49	I	absolute CL	Idddd@_J *
10	LF				74	4A	J	absolute rel	Jdddd@_J *
11	VT				75	4B	K		
12	FF				76	4C	L	echo msg=Ldddd	Ldddd@_J msg*_J
13	OD	cmd terminator	_J		77	4D	M		
14	OE	SO			78	4E	N	set parameters	Ndddd@_J msg*_J
15	OF	SI			79	4F	O	port e output	Ohhhh@_J *
16	10	DLE			80	50	P	read E A C	P msg@_J
17	11	DC1			81	51	Q		
18	12	DC2			82	52	R		
19	13	DC3			83	53	S	read S (sio)	S msg@_J
20	14	DC4			84	54	T		
21	15	NAK			85	55	U		
22	16	SYN			86	56	V	PCU version	V msg_J
23	17	ETB			87	57	W		
24	18	CAN			88	58	X		
25	19	EM			89	59	Y		
26	1A	SUB			90	5A	Z	diag test start(res)	Znnnn@_J *
27	1B	ESC			91	5B	[		
28	1C	FS			92	5C	\		
29	1D	GS			93	5D	]		
30	1E	RS			94	5E	^	utility cmds	^dddd@_J *
31	1F	US	reserved for conscan pulse		95	5F			
32	20	sp			96	60	`		
33	21	!			97	61	a	incremental az	ai@_J *
34	22	"			98	62	b	incremental hdg	bi@_J *
35	23	#			99	63	c		
36	24	\$			100	64	d		
37	25	%			101	65	e	incremental el	ei@_J *
38	26	&	clear errors	&	102	66	f		
39	27	'			103	67	g	write pol	gdddd@_J *
40	28	(			104	68	h	write pwm	hdddd@_J *
41	29	)			105	69	i	differential CL	iddddd@_J *
42	2A	*	reserved for positive command response		106	6A	j	differential LV	jdddd@_J *
43	2B	+	reset rc in sio	+	107	6B	k	differential AZ	kdddd@_J *
44	2C	,			108	6C	l	lumped CL,LV,AZ	
45	2D	-			109	6D	m		
46	2E	.			110	6E	n	same as N	
47	2F	/			111	6F	o		
48	30	0			112	70	p	read EAC in hex	p msg@_J
49	31	1			113	71	q		
50	32	2	dec lvtrm ‡	2	114	72	r		
51	33	3			115	73	s		
52	34	4	dec cltrm ‡	4	116	74	t		
53	35	5	clr trms ‡	5	117	75	u	read Pol & aux	u msg@_J
54	36	6	inc cltrm ‡	6	118	76	v	read references	v msg@_J
55	37	7			119	77	w	read QRSS	w msg@_J
56	38	8	inc lvtrm ‡	8	120	78	x	read IVCs	x msg@_J
57	39	9			121	79	y	read TCs	y msg@_J
58	3A	:			122	7A	z		
59	3B	;			123	7B	{		
60	3C	<			124	7C			
61	3D	=			125	7D	}		
62	3E	>			126	7E	~		
63	3F	?	reserved for negative command response		127	7F	DEL		

xx03/xx04 ver 2.26 command set

‡ enabled only in test mode
© checksum

Software Part Numbers

121449, 122844, 123385, 123091

123091 for Land Mobile adds 0.40 to the version number

PGB 2/10/05

* Even gain values must remain even, Odd gain values must remain odd.
Even / odd controls target velocity limits to match antenna inertia.

UTILITIES (.94)

0	std mode	^0000
C	Toggle DishScan	^0067
F	Fast reference	^0070
G	Sat reference	^0071
V	Cksum off	^0086
T	Test/Tilt mode	^0084
W	NV write	^0087
Z	Reset	^0090
2	Trim Up	^0002
4	Trim Left	^0004
5	Trim Clear	^0005
6	Trim Right	^0006
8	Trim Down	^0008
1nnn	CL DC torque	^1nnn
2nnn	LV DC torque	^2nnn
3nnn	AZ DC torque	^3nnn

Checksum for ^0086 = 172 or AC

N PARAMETERS (.78) or n (.110)

0	Stype	N0nnn
1	CL Kp	N1nnn
2	LV Kp	N2nnn
3	AZ Kp	N3nnn
4	CL trim	N4nnn
5	LV trim	N5nnn
6	HF trim	N6nnn
7	DishScan	N7nnn
8	Scan Rate	N8nnn
9	Error Bits	N9nnn

System	N0	N1	N2	N3	N7
w/#23 Double Reduction *					
4003	33	30	30	30	21
2403	2	16	8	16	21

Double Stack Single Reduction *

reserved	4	0	0	0	0
3004	5	24	20	10	25
4004	6	24	24	14	45
5004	7	51	51	21	25
4003a	8	30	30	20	30
6003a ***	73	51	51	25	25
4096a	74	60	60	40	25
5696a	75	75	75	51	25

2403a	16	14	8	16	30
4006	20	76	46	26	25
4006-10	20	51	51	31	25

*** See xx03 2.6x for 6003a-6 and 600

N7					
Phase	Drive	CL	AZ	EL	
-45	0	Max	0	0	0
+0	64	1/2	16	4	1
+45	128	1/4	32	8	2
+90	192	1/8	48	12	3

Status word bit assignments

Word 1		Word2	
7	Spare		El Target
6	1		1
5	Fast TC		Az Target
4	Sat Ref		Spare (Rel Az)
3	DishScan		Hdg Valid
2	Unwrap		Error Flag
1	Data in 3		Init
0	Data in 2		Hi Elevation

Word 3

7	Spare
6	1
5	(Control Shutdown)
4	(Stabilization Limit)
3	Az Reference Error
2	Az Torque Limit Error
1	Lv Torque Limit Error
0	Cl Torque Limit Error

PCU COMMAND SUMMARY

xx03/xx04 Version 2.25

00	NUL	ignored in sio			64 40	@		
01	SOH				65 41	A	absolute az	Addd@.
02	STX				66 42	B	absolute hdg hard	Bddd@.
03	ETX				67 43	C		
04	EOT				68 44	D	absolute hdg soft	Dddd@.
05	ENQ				69 45	E	absolute el	Eddd@.
06	ACK				70 46	F		
07	BEL				71 47	G		
08	BS				72 48	H	read R H	H
09	HT				73 49	I	absolute CL	Iddd@.
10	LF				74 4A	J	absolute rel	Jddd@.
11	VT				75 4B	K		
12	FF				76 4C	L	echo msg=Lddd	Lddd@.
13	CR	cmd terminator	.		77 4D	M		
14	OE	SO			78 4E	N	set parameters	Nddd@.
15	SI				79 4F	O	port e output	Ohhhh@.
16	10	DLE			80 50	P	read E A C	P
17	11	DC1			81 51	Q		
18	12	DC2			82 52	R		
19	13	DC3			83 53	S	read S (sio)	S
20	14	DC4			84 54	T		
21	15	NAK			85 55	U		
22	16	SYN			86 56	V	PCU version	V
23	17	ETB			87 57	W		
24	18	CAN			88 58	X		
25	19	EM			89 59	Y		
26	1A	SUB			90 5A	Z	diag test start(res)	Znnn@.
27	1B	ESC			91 5B	[		
28	1C	FS			92 5C	\		
29	1D	GS			93 5D	]		
30	1E	RS			94 5E	^	utility cmds	^ddd@.
31	1F	US	reserved for conscan pulse		95 5F			
32	20	sp			96 60	`		
33	21	!			97 61	a	incremental az	ai@.
34	22	"			98 62	b	incremental hdg	bi@.
35	23	#			99 63	c		
36	24	\$			100 64	d		
37	25	%			101 65	e	incremental el	ei@.
38	26	&	clear errors	&	102 66	f		
39	27	'			103 67	g	write pol	gddd@.
40	28	(			104 68	h	write pwm	hddd@.
41	29	)			105 69	i	differential CL	idd@.
42	2A	*	reserved for positive command response		106 6A	j	differential LV	jddd@.
43	2B	+	reset rc in sio	+	107 6B	k	differential AZ	kddd@.
44	2C	,			108 6C	l	lumped CL,LV,AZ	
45	2D	-			109 6D	m		
46	2E	.			110 6E	n	same as N	
47	2F	/			111 6F	o		
48	30	0			112 70	p	read EAC in hex	p
49	31	1			113 71	q		
50	32	2	dec ltrm ‡	2	114 72	r		
51	33	3			115 73	s		
52	34	4	dec cltrm ‡	4	116 74	t		
53	35	5	clr trms ‡	5	117 75	u	read Pol & aux	u
54	36	6	inc cltrm ‡	6	118 76	v	read references	v
55	37	7			119 77	w	read QRSS	w
56	38	8	inc ltrm ‡	8	120 78	x	read IVCs	x
57	39	9			121 79	y	read TCs	y
58	3A	:			122 7A	z		
59	3B	;			123 7B	{		
60	3C	<			124 7C			
61	3D	=			125 7D	}		
62	3E	>			126 7E	~		
63	3F	?	reserved for negative command response		127 7F	DEL		

xx03/xx04 ver 2.25 command set

‡ enabled only in test mode
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PGB 2/10/05

UTILITIES (.94)					
0	std mode	^0000			
C	Toggle DishScan	^0067			
F	Fast reference	^0070			
G	Sat reference	^0071			
V	Cksum off	^0086			
T	Test/Tilt mode	^0084			
W	NV write	^0087			
Z	Reset	^0090			
2	Trim Up	^0002			
4	Trim Left	^0004			
5	Trim Clear	^0005			
6	Trim Right	^0006			
8	Trim Down	^0008			
1nnn	CL DC torque	^1nnn			
2nnn	LV DC torque	^2nnn			
3nnn	AZ DC torque	^3nnn			
Checksum for ^0086 = 172 or AC					
N PARAMETERS (.78) or n (.110)					
0	Stype	N0nnn			
1	CL Kp	N1nnn			
2	LV Kp	N2nnn			
3	AZ Kp	N3nnn			
4	CL trim	N4nnn			
5	LV trim	N5nnn			
6	HF trim	N6nnn			
7	DishScan	N7nnn			
8	Scan Rate	N8nnn			
9	Error Bits	N9nnn			
System					
N0		N1	N2	N3	N7
w/#23 Double Reduction *					
4003	33	30	30	30	21
6003	34	25	25	24	21
Double Stack Single Reduction					
2403 obs	4	15	8	16	30
3004	5	25	20	10	25
4004	6	25	23	14	45
5004	7	50	50	20	25
4003a	8	30	30	20	21
6003a	73	50	50	24	25
4096a	74	60	60	34	25
5696a	75	75	75	51	25
*** See xx03 2.6x for 6003a-6 and 600					
N7					
Phase		Drive	CL	AZ	EL
-45	0	Max	0	0	0
+0	64	1/2	16	4	1
+45	128	1/4	32	8	2
+90	192	1/8	48	12	3
Status word bit assignments					
Word 1			Word2		
7	Spare		EI Target		
6	1		1		
5	Fast TC		Az Target		
4	Sat Ref		Spare (Rel AZ)		
3	DishScan		Hdg Valid		
2	Unwrap		Error Flag		
1	Data in 3		Init		
0	Data in 2		Hi Elevation		
Word 3					
7	Spare				
6	1				
5	(Control Shutdown)				
4	(Stabilization Limit)				
3	Az Reference Error				
2	Az Torque Limit Error				
1	Lv Torque Limit Error				
0	Cl Torque Limit Error				

PCU COMMAND SUMMARY

xx03/xx04 Version 2.21-2.24

00	NUL	ignored in sio			64 40	@			
101	SOH				65 41	A	absolute az	Addd@.	*
202	STX				66 42	B	absolute hdg hard	Bddd@.	*
303	ETX				67 43	C			
404	EOT				68 44	D	absolute hdg soft	Dddd@.	*
505	ENQ				69 45	E	absolute el	Eddd@.	*
606	ACK				70 46	F			
707	BEL				71 47	G			
808	BS				72 48	H	read R H	H	msg@.
909	HT				73 49	I	absolute CL	Iddd@.	*
100A	LF				74 4A	J	absolute rel	Jddd@.	*
110B	VT				75 4B	K			
120C	FF				76 4C	L	echo msg=Lddd	Lddd@.	msg*.
130D	CR	cmd terminator	.		77 4D	M			
140E	SO				78 4E	N	set parameters	Nddd@.	msg*.
150F	SI				79 4F	O	port e output	Ohhhh@.	*
1610	DLE				80 50	P	read E A C	P	msg@.
1711	DC1				81 51	Q			
1812	DC2				82 52	R			
1913	DC3				83 53	S	read S (sio)	S	msg@.
2014	DC4				84 54	T			
2115	NAK				85 55	U			
2216	SYN				86 56	V	PCU version	V	msg.
2317	ETB				87 57	W			
2418	CAN				88 58	X			
2519	EM				89 59	Y			
261A	SUB				90 5A	Z	diag test start(res)	Znnn@.	*
271B	ESC				91 5B	[			
281C	FS				92 5C	\			
291D	GS				93 5D	]			
301E	RS				94 5E	^	utility cmds	^ddd@.	*
311F	US	reserved for conscan pulse			95 5F				
3220	sp				96 60	`			
3321	!				97 61	a	incremental az	ai@.	*
3422	"				98 62	b	incremental hdg	bi@.	*
3523	#				99 63	c			
3624	\$				100 64	d			
3725	%				101 65	e	incremental el	ei@.	*
3826	&	clear errors	&	*	102 66	f			
3927	'				103 67	g	write pol	gddd@.	*
4028	(				104 68	h	write pwm	hddd@.	*
4129	)				105 69	i	differential CL	idd@.	*
422A	*	reserved for positive command response			106 6A	j	differential LV	jddd@.	*
432B	+	reset rc in sio	+		107 6B	k	differential AZ	kddd@.	*
442C	,				108 6C	l	lumped CL, LV, AZ		
452D	-				109 6D	m			
462E	.				110 6E	n	same as N		
472F	/				111 6F	o			
4830	0				112 70	p	read EAC in hex	p	msg@.
4931	1				113 71	q			
5032	2	dec lvtrm ‡	2	*	114 72	r			
5133	3				115 73	s			
5234	4	dec cltrm ‡	4	*	116 74	t			
5335	5	clr trms ‡	5	*	117 75	u	read Pol & aux	u	msg@.
5436	6	inc cltrm ‡	6	*	118 76	v	read references	v	msg@.
5537	7				119 77	w	read QRSS	w	msg@.
5638	8	inc lvtrm ‡	8	*	120 78	x	read IVCs	x	msg@.
5739	9				121 79	y	read TCs	y	msg@.
583A	:				122 7A	z			
593B	;				123 7B	{			
603C	<				124 7C				
613D	=				125 7D	}			
623E	>				126 7E	~			
633F	?	reserved for negative command response			127 7F	DEL			

xx03/xx04 ver 2.21-2.24 command set

‡ enabled only in test mode
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PGB 2/10/2005

UTILITIES (.94)																																			
0	std mode	^0000																																	
C	Toggle DishScan	^0067																																	
F	Fast reference	^0070																																	
G	Sat reference	^0071																																	
V	Cksum off	^0086																																	
T	Test/Tilt mode	^0084																																	
W	NV write	^0087																																	
Z	Reset	^0090																																	
2	Trim Up	^0002																																	
4	Trim Left	^0004																																	
5	Trim Clear	^0005																																	
6	Trim Right	^0006																																	
8	Trim Down	^0008																																	
1nnn	CL DC torque	^1nnn																																	
2nnn	LV DC torque	^2nnn																																	
3nnn	AZ DC torque	^3nnn																																	
Checksum for ^0086 = 172 or AC																																			
N PARAMETERS (.78) or n (.110)																																			
0	Stype	N0nnn																																	
1	CL Kp	N1nnn																																	
2	LV Kp	N2nnn																																	
3	AZ Kp	N3nnn																																	
4	CL trim	N4nnn																																	
5	LV trim	N5nnn																																	
6	HF trim	N6nnn																																	
7	DishScan	N7nnn																																	
8	Scan Rate	N8nnn	(2.24 only)																																
9	Error Bits	N9nnn	(2.24 only)																																
System																																			
	N0	N1	N2	N3	N7																														
w/#23 Double Reduction *																																			
4003	33	30	30	30	21																														
6003	34	25	25	25	21																														
Double Stack Single Reduction																																			
2403 obs	4	15	8	15	30																														
3004	5	25	20	10	25																														
4004	6	25	23	13	45																														
5004	7	50	50	20	25																														
4003a	8	30	30	20	21																														
6003a	73	50	50	25	25																														
*** See xx03 2.6x for 6003a-6 and 6003aL																																			
N7																																			
<table border="1"> <tr><th>Phase</th><th>0</th><th>Drive</th><th>CL</th><th>AZ</th><th>EL</th></tr> <tr><td>-45</td><td>0</td><td>Max</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>+0</td><td>64</td><td>1/2</td><td>16</td><td>4</td><td>1</td></tr> <tr><td>+45</td><td>128</td><td>1/4</td><td>32</td><td>8</td><td>2</td></tr> <tr><td>+90</td><td>192</td><td>1/8</td><td>48</td><td>12</td><td>3</td></tr> </table>						Phase	0	Drive	CL	AZ	EL	-45	0	Max	0	0	0	+0	64	1/2	16	4	1	+45	128	1/4	32	8	2	+90	192	1/8	48	12	3
Phase	0	Drive	CL	AZ	EL																														
-45	0	Max	0	0	0																														
+0	64	1/2	16	4	1																														
+45	128	1/4	32	8	2																														
+90	192	1/8	48	12	3																														
Status word bit assignments																																			
Word 1																																			
7	Spare																																		
6	1																																		
5	Spare																																		
4	Spare																																		
3	Az Reference Error																																		
2	Az Torque Limit Error																																		
1	Lv Torque Limit Error																																		
0	Cl Torque Limit Error																																		
Word 2																																			
7	Spare																																		
6	1																																		
5	Fast TC																																		
4	Sat Ref																																		
3	DishScan																																		
2	Unwrap																																		
1	Data in 3																																		
0	Data in 2																																		
Word 3																																			
7	Spare																																		
6	1																																		
5	Spare																																		
4	Spare																																		
3	Az Reference Error																																		
2	Az Torque Limit Error																																		
1	Lv Torque Limit Error																																		
0	Cl Torque Limit Error																																		

SeaTel 03/04 PCU

STATUS WORD DECODING TABLE

WORD 1										WORD2									
DishScan	---	+	---	---	---	---	---	---	---	Unwrap	---	+	---	---	---	---	---	---	---
Sat Ref	---	+	---	---	---	---	---	---	---	DataIn3	---	+	---	---	---	---	---	---	---
Fast TC	---	+	---	---	---	---	---	---	---	Data In2	---	+	---	---	---	---	---	---	---
@	000000										100000								
A	000001										100001								
B	000010										100010								
C	000011										100011								
D	000100										100100								
E	000101										100101								
F	000110										100110								
G	000111										100111								
H	001000										101000								
I	001001										101001								
J	001010										101010								
K	001011										101011								
L	001100										101100								
M	001101										101101								
N	001110										101110								
O	001111										101111								
P	010000										110000								
Q	010001										110001								
R	010010										110010								
S	010011										110011								
T	010100										110100								
U	010101										110101								
V	010110										110110								
W	010111										110111								
X	011000										111000								
Y	011001										111001								
Z	011010										111010								
[	011011										111011								
\	011100										111100								
]	011101										111101								
^	011110										111110								
_	011111										111111								

WORD 3 PCU Errors

Az Ref	---	+	---	---	---	---	---	---	---	Az TC Lim	---	+	---	---	---	---	---	---	---
StabLim	---	+	---	---	---	---	---	---	---	Lv TC Lim	---	+	---	---	---	---	---	---	---
ShutDwn	---	+	---	---	---	---	---	---	---	Cl TC Lim	---	+	---	---	---	---	---	---	---
@	000000									P	010000								
A	000001									Q	010001								
B	000010									R	010010								
C	000011									S	010011								
D	000100									T	010100								
E	000101									U	010101								
F	000110									V	010110								
G	000111									W	010111								
H	001000									X	011000								
I	001001									Y	011001								
J	001010									Z	011010								
K	001011									[	011011								
L	001100									\	011100								
M	001101									]	011101								
N	001110									^	011110								
O	001111									_	011111								

Typical PCU STATUS code read at ACU is SYH@* which decodes as:

Sat Ref, DishScan, Data In2, Heading Valid, No errors

