SUMMAGRID IV™ USER'S GUIDE – PART 3 APPRENDICES

Part 3 provides technical information about Summagrid IV. You'll find the following appendices in Part 3:

Appendix A	Summagrid IV Interfacing Hardware
Appendix B	Summagrid IV DIP Switch Settings
Appendix C	ASCII Conversion Chart
Appendix D	GTCO Format Emulation
Appendix E	CalComp Format Emulation
Appendix F	Summagraphics MM/SummaSketch Format Emulation
Appendix G	Summagrid IV Specifications
Appendix H	Summagrid IV Application Set Up

Appendix A Summagrid IV Interfacing Hardware

A.1 Summagrid IV Interfacing Hardware

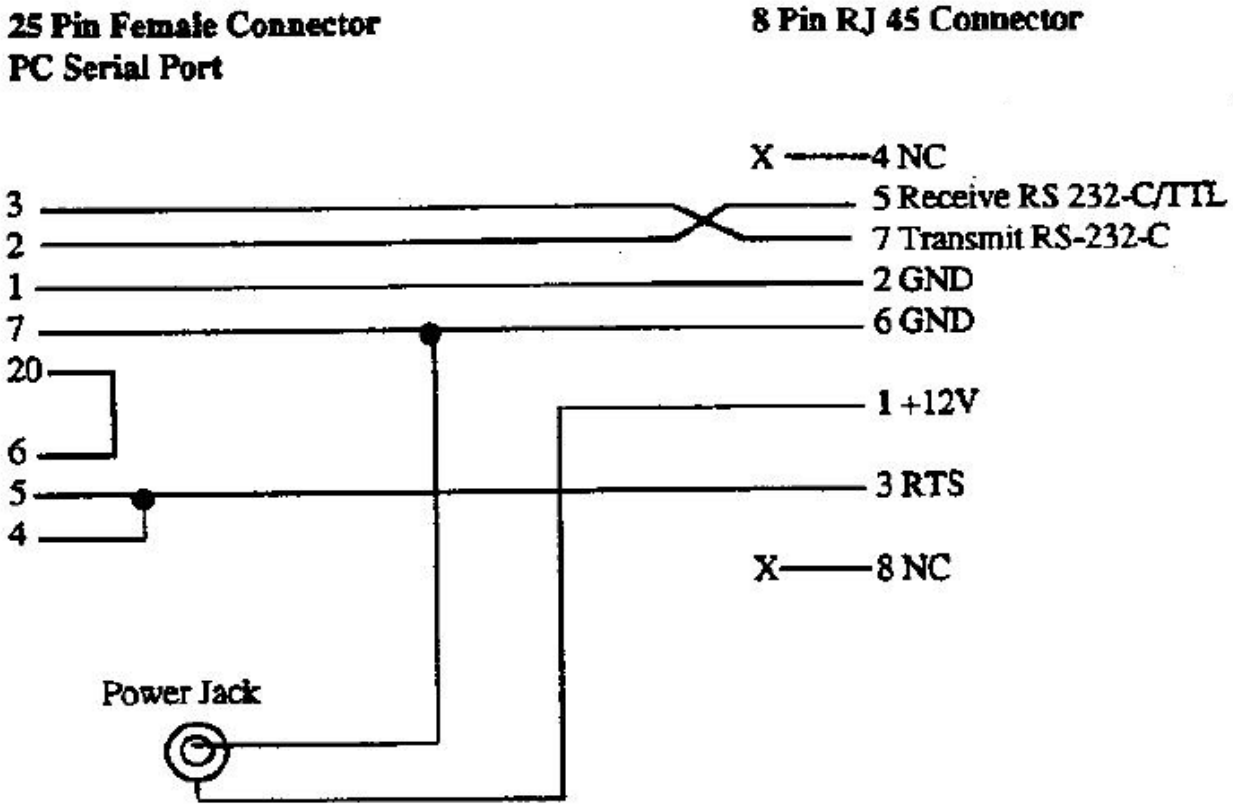
A.1.1 RS-232 Hardware Interface

The Summagrid III's interfacing hardware complies with the EIA (Electronic Industries Association) RS-232C standard. The interface is bidirectional, asynchronous and serial. It is capable of communicating in full duplex and uses the ASCII seven-bit data code.

A.1.2 Cable Diagrams

Below are cable diagrams for the Summagrid IV cables: PC interface cable and 9-pin-to-25 pin AT adapter cable.

PC Interface Cable



9-pin-to-25-pin AT Adapter Cable

9-Pin Female Connector	25-Pin Male Connector
1	8
2	3
3	2
4	20
5	7
6	6
7	4
8	5
9	22

14557 N. 82nd St.
Scottsdale, AZ 85260
www.gtcocalcomp.com
866.746.3015 toll free
480.998.1751 fax

Appendix B Summagrid IV DIP Switch Settings

B.1 Summagrid IV DIP Switch Table

B.1.1 Summagrid IV DIP Switch A

Operating Characteristics and Parameters	Factory Setting	Switches and Settings 1	2	3	4	5	6	7	8
BAUD RATE									
19200		OFF	OFF	OFF	-	-	-	-	-
9600	*	ON	OFF	OFF	-	-	-	-	-
4800		OFF	ON	OFF	-	-	-	-	-
2400		ON	ON	OFF	-	-	-	-	-
1200		OFF	OFF	ON	-	-	-	-	-
600		ON	OFF	ON	-	-	-	-	-
300		OFF	ON	ON	-	-	-	-	-
150		ON	ON	ON	-	-	-	-	-
PARITY SETTING									
ODD PARITY		-	-	-	OFF	-	-	-	-
EVEN PARITY	*	-	-	-	ON	-	-	-	-
PARITY DISABLED		-	-	-	-	OFF	-	-	-
PARITY ENABLED	*	-	-	-	-	ON	-	-	-
NUMBER OF STOP BITS									
ONE STOP BIT		-	-	-	-	-	OFF	-	-
TWO STOP BITS	*	-	-	-	-	-	ON	-	-
NUMBER OF DATA BITS									
7 DATA BITS	*	-	-	-	-	-	-	OFF	-
8 DATA BITS		-	-	-	-	-	-	ON	-
REPORT FORMAT									
BINARY FORMAT	*	-	-	-	-	-	-	-	OFF
ASCII FORMAT		-	-	-	-	-	-	-	ON

B.1.2 Summagrid IV DIP Switch B

Operating Characteristics and Parameters		Factory Setting	Switches and Settings 1	2	3	4	5	6	7	8
ASCII REPORTS FORMAT										
ASCII INCHES			OFF	-	-	-	-	-	-	-
ASCII COUNTS		*	ON	-	-	-	-	-	-	-
ASCII DECIMAL POINT										
EXCLUDE		*	-	OFF	-	-	-	-	-	-
INCLUDE			-	ON	-	-	-	-	-	-
ASCII REPORT TERMINATOR										
CR LF			-	-	ON	-	-	-	-	-
CR		*	-	-	OFF	-	-	-	-	-
RESOLUTION										
INCHES		*	-	-	-	OFF	-	-	-	-
MILLIMETERS			-	-	-	ON	-	-	-	-
FIXED RESOLUTION										
INCHES	MILLIMETERS									
200 LPI	10 LPMM		-	-	-	-	ON	OFF	-	-
1000 LPI	40 LPMM	*	-	-	-	-	OFF	ON	-	-
2000 LPI	80 LPMM		-	-	-	-	ON	ON	-	-
FORMAT EMULATION										
MG UIOF		*	-	-	-	-	-	-	OFF	OFF
GTCO			-	-	-	-	-	-	OFF	ON
CALCOMP 9100			-	-	-	-	-	-	ON	OFF
MM/SUMMASKETCH			-	-	-	-	-	-	ON	ON

B.1.3 Summagrid IV DIP Switch C

Operating Characteristics and Parameters	Factory Setting	Switches and Settings 1	2	3	4	5	6	7	8
REPORT MODES									
PROMPT (REMOTE)	*	OFF	OFF	-	-	-	-	-	-
POINT		ON	OFF	-	-	-	-	-	-
SWITCH STREAM		OFF	ON	-	-	-	-	-	-
STREAM		ON	ON	-	-	-	-	-	-
ECHO MODE									
DISABLED	*	-	-	OFF	-	-	-	-	-
ENABLED		-	-	ON	-	-	-	-	-
PROXIMITY TRANSMISSION									
TRANSMIT ONLY IN-PROX	*	-	-	-	OFF	-	-	-	-
ALWAYS TRANSMIT		-	-	-	ON	-	-	-	-
BEEPER									
DISABLED	*	-	-	-	-	OFF	-	-	-
ENABLED		-	-	-	-	ON	-	-	-
TABLET SIZE									
18 X 24		-	-	-	-	-	ON	ON	OFF
36 X 48		-	-	-	-	-	ON	OFF	OFF
24 X 36		-	-	-	-	-	OFF	ON	OFF
44 X 60		-	-	-	-	-	OFF	OFF	OFF

B.2 Summagrid IV vs. Microgrid II Switch Settings

B.2.1 Summagrid IV DIP Switch A

Operating Characteristics and Parameters	Switch Settings Summagrid IV			Microgrid II		
Baud Rate	A-1	A-2	A-3	1-1	1-2	1-3
150	ON	ON	ON	ON	ON	ON
300	OFF	ON	ON	OFF	ON	ON
600	ON	OFF	ON	ON	OFF	ON
1200	OFF	OFF	ON	OFF	OFF	ON
2400	ON	ON	OFF	ON	ON	OFF
4800	OFF	ON	OFF	OFF	ON	OFF
9600	ON	OFF	OFF	ON	OFF	OFF
19200	OFF	OFF	OFF	OFF	OFF	OFF
Parity Setting	A-4			1-4		
Even	ON			ON		
Odd	OFF			OFF		
Parity	A-5			N/A		
Enabled	ON					
Disabled	OFF					
Stop Bits	A-6			1-5		
Two	ON			ON		
One	OFF			OFF		
Data Bits	A-7			N/A		
Eight	ON					
Seven	OFF					
Report Format	A-8			2-4		
ASCII	ON			OFF		
Binary	OFF			ON		

B.2.2 Summagrid IV DIP Switch B

Operating Characteristics and Parameters	Switch Settings Summagrid IV			Microgrid II	
ASCII Counts Report Format	B-1			2-3	
Counts	ON			N/A	
Inches	OFF				
ASCII Decimal Point	B-2			2-6	
Include	ON			ON	
Exclude	OFF			OFF	
ASCII Report Terminator	B-3			2-5	
CR LF	ON			ON	
CR	OFF			OFF	
Resolution	B-4			2-1	
Millimeters	ON			N/A	
Inches	OFF				
Fixed Resolution					
Inches Millimeters	B-5	B-6		2-1	2-2
			200 lpi	OFF	OFF
200 lpi 10 lpmm	ON	OFF	10 lpmm	ON	OFF
1000 lpi 40 lpmm	OFF	ON	1000 lpi	OFF	ON
2000 lpi 80 lpmm	ON	ON	40 lpmm	ON	ON
Emulation	B-7	B-8		N/A	
UIOF	OFF	OFF			
GTCO	OFF	ON			
CALCOMP 9100	ON	OFF			
MM/SUMMASKETCH	ON	ON			

B.2.3 Summagrid IV DIP Switch C

Operating Characteristics and Parameters	Switch Settings Summagrid IV			Microgrid II	
Report Collection Mode	C-1	C-2		2-7	2-8
Prompt Mode (Remote)	OFF	OFF		OFF	OFF
Point Mode	ON	OFF		OFF	ON
Switched Stream Mode	OFF	ON		ON	OFF
Stream Mode	ON	ON		ON	ON
Echo	C-3			1-6	
On	ON			ON	
Off	OFF			OFF	
Proximity Transmission	C-4			1-7	
transmit in-prox only	OFF			OFF	
always transmit	ON			ON	
BEEPER	C-5				
disabled	OFF			N/A	
enabled	ON				
Tablet Size	C-6	C-7	C-8		
18 X 24	ON	ON	OFF		
36 X 48	ON	OFF	OFF		
24 X 36	OFF	ON	OFF		
44 X 60	OFF	OFF	OFF		

GTCO CalComp
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Appendix C ASCII Conversion Chart

Decimal	Binary 7 6 5 4 3 2 1 0	Octal	Hex	ASCII Character	Control Function or Character Description
0	00000000	000	00	NUL	Null
1	00000001	001	01	SOH	Start of Heading
2	00000010	002	02	STX	Start of Text
3	00000011	003	03	ETX	End of Text
4	00000100	004	04	EOT	End of Transmission
5	00000101	005	05	ENQ	Enquiry
6	00000110	006	06	ACK	Acknowledge
7	00000111	007	07	BEL	Bell
8	00001000	010	08	BS	Backspace
9	00001001	011	09	HT	Horizontal Tab
10	00001010	012	0A	LF or NL	Line Feed or New Line
11	00001011	013	0B	VT	Vertical Tab
12	00001100	014	0C	FF	Form Feed
13	00001101	015	0D	CR or RT	Carriage Return
14	00001110	016	0E	SO	Shift Out
15	00001111	017	0F	SI	Shift In
16	00010000	020	10	DLE	Data Link Escape
17	00010001	021	11	DC1	Device Control 1
18	00010010	022	12	DC2	Device Control 2
19	00010011	023	13	DC3	Device Control 3
20	00010100	024	14	DC4	Device Control 4
21	00010101	025	15	NAK	Negative Acknowledge
22	00010110	026	16	SYN	Synchronous Idle
23	00010111	027	17	ETB	End Transmission Block
24	00011000	030	18	CAN	Cancel
25	00011001	031	19	EM	End of Medium
26	00011010	032	1A	SUB	Substitute
27	00011011	033	1B	ESC	Escape
28	00011100	034	1C	FS	File Separator
29	00011101	035	1D	GS	Group Separator
30	00011110	036	1E	RS	Record Separator
31	00011111	037	1F	US	Unit Separator
32	00100000	040	20	SP	Space
33	00100001	041	21	!	Exclamation Point
34	00100010	042	22	"	Double Quote
35	00100011	043	23	#	Number or Pound
36	00100100	044	24	$	Dollar
37	00100101	045	25	%	Percent
38	00100110	046	26	&	Ampersand
39	00100111	047	27	'	Apostrophe
40	00101000	050	28	(	Left Parenthesis
41	00101001	051	29	)	Right Parenthesis
42	00101010	052	2A	*	Asterisk
43	00101011	053	2B	+	Plus or Addition

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Decimal	Binary 7 6 5 4 3 2 1 0	Octal	Hex	ASCII Character	Control Function or Character Description
44	0 0 1 0 1 1 0 0	054	2C	,	Comma
45	0 0 1 0 1 1 0 1	055	2D	-	Hyphen
46	0 0 1 0 1 1 1 0	056	2E	.	Period
47	0 0 1 0 1 1 1 1	057	2F	/	Slash
48	0 0 1 1 0 0 0 0	060	30	0	
49	0 0 1 1 0 0 0 1	061	31	1	
50	0 0 1 1 0 0 1 0	062	32	2	
51	0 0 1 1 0 0 1 1	063	33	3	
52	0 0 1 1 0 1 0 0	064	34	4	
53	0 0 1 1 0 1 0 1	065	35	5	
54	0 0 1 1 0 1 1 0	066	36	6	
55	0 0 1 1 0 1 1 1	067	37	7	
56	0 0 1 1 1 0 0 0	070	38	8	
57	0 0 1 1 1 0 0 1	071	39	9	
58	0 0 1 1 1 0 1 0	072	3A	:	Colon
59	0 0 1 1 1 0 1 1	073	3B	;	Semicolon
60	0 0 1 1 1 1 0 0	074	3C	<	Less Than
61	0 0 1 1 1 1 0 1	075	3D	=	Equals
62	0 0 1 1 1 1 1 0	076	3E	>	Greater Than
63	0 0 1 1 1 1 1 1	077	3F	?	Question Mark
64	0 1 0 0 0 0 0 0	100	40	@	Commercial At
65	0 1 0 0 0 0 0 1	101	41	A	
66	0 1 0 0 0 0 1 0	102	42	B	
67	0 1 0 0 0 0 1 1	103	43	C	
68	0 1 0 0 0 1 0 0	104	44	D	
69	0 1 0 0 0 1 0 1	105	45	E	
70	0 1 0 0 0 1 1 0	106	46	F	
71	0 1 0 0 0 1 1 1	107	47	G	
72	0 1 0 0 1 0 0 0	110	48	H	
73	0 1 0 0 1 0 0 1	111	49	I	
74	0 1 0 0 1 0 1 0	112	4A	J	
75	0 1 0 0 1 0 1 1	113	4B	K	
76	0 1 0 0 1 1 0 0	114	4C	L	
77	0 1 0 0 1 1 0 1	115	4D	M	
78	0 1 0 0 1 1 1 0	116	4E	N	
79	0 1 0 0 1 1 1 1	117	4F	O	
80	0 1 0 1 0 0 0 0	120	50	P	
81	0 1 0 1 0 0 0 1	121	51	Q	
82	0 1 0 1 0 0 1 0	122	52	R	
83	0 1 0 1 0 0 1 1	123	53	S	
84	0 1 0 1 0 1 0 0	124	54	T	
85	0 1 0 1 0 1 0 1	125	55	U	
86	0 1 0 1 0 1 1 0	126	56	V	
87	0 1 0 1 0 1 1 1	127	57	W	
88	0 1 0 1 1 0 0 0	130	58	X	
89	0 1 0 1 1 0 0 1	131	59	Y	

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Decimal	Binary 7 6 5 4 3 2 1 0	Octal	Hex	ASCII Character	Control Function or Character Description
90	0 1 0 1 1 0 1 0	132	5A	Z	
91	0 1 0 1 1 0 1 1	133	5B	[	Left Square Bracket
92	0 1 0 1 1 1 0 0	134	5C	\	Back Slash
93	0 1 0 1 1 1 0 1	135	5D	]	Right Square Bracket
94	0 1 0 1 1 1 1 0	136	5E	^	Circumflex
95	0 1 0 1 1 1 1 1	137	5F	_	Underscore
96	0 1 1 0 0 0 0 0	140	60	`	Left Single Quote
97	0 1 1 0 0 0 0 1	141	61	a	
98	0 1 1 0 0 0 1 0	142	62	b	
99	0 1 1 0 0 0 1 1	143	63	c	
100	0 1 1 0 0 1 0 0	144	64	d	
101	0 1 1 0 0 1 0 1	145	65	e	
102	0 1 1 0 0 1 1 0	146	66	f	
103	0 1 1 0 0 1 1 1	147	67	g	
104	0 1 1 0 1 0 0 0	150	68	h	
105	0 1 1 0 1 0 0 1	151	69	i	
106	0 1 1 0 1 0 1 0	152	6A	j	
107	0 1 1 0 1 0 1 1	153	6B	k	
108	0 1 1 0 1 1 0 0	154	6C	l	
109	0 1 1 0 1 1 0 1	155	6D	m	
110	0 1 1 0 1 1 1 0	156	6E	n	
111	0 1 1 0 1 1 1 1	157	6F	o	
112	0 1 1 1 0 0 0 0	160	70	p	
113	0 1 1 1 0 0 0 1	161	71	q	
114	0 1 1 1 0 0 1 0	162	72	r	
115	0 1 1 1 0 0 1 1	163	73	s	
116	0 1 1 1 0 1 0 0	164	74	t	
117	0 1 1 1 0 1 0 1	165	75	u	
118	0 1 1 1 0 1 1 0	166	76	v	
119	0 1 1 1 0 1 1 1	167	77	w	
120	0 1 1 1 1 0 0 0	170	78	x	
121	0 1 1 1 1 0 0 1	171	79	y	
122	0 1 1 1 1 0 1 0	172	7A	z	
123	0 1 1 1 1 0 1 1	173	7B	{	Left Curved Bracket
124	0 1 1 1 1 1 0 0	174	7C	|	Vertical Line
125	0 1 1 1 1 1 0 1	175	7D	}	Right Curved Bracket
126	0 1 1 1 1 1 1 0	176	7E	~	Tilde
127	0 1 1 1 1 1 1 1	177	7F	DEL	Delete (rubout)

Appendix D GTCO Format Emulation

The Summagrid IV can emulate the GTCO output format. This chapter provides the binary and ASCII information for the GTCO output format.

D.1 Summagrid IV Interfacing Hardware

D.1.1 Overview

Summagrid IV report formats conform to GTCO 5A standards. To accommodate the emulation needs, choose the GTCO format to be in ASCII or packed binary.

D.1.2 ASCII BCD Report Format

Within the ASCII BCD report format, select:

- Output to be in counts, inches or millimeters.

In units of measure, also choose the format to include a decimal or not. This does not change the value of the coordinate. For example, 10.123 inches can be reported as either 10123 or 10.123.

- Each report to terminate with a <CR><LF> or just a <CR>.

- Delimiter to be any ASCII character. (The default is a comma.)

Refer to the key for definitions of the format characters.

For reports, low resolution is:

FXXXXSYYYY<CR><LF>

For reports, high resolution is:

FXXXXXSYYYYY<CR><LF>

Character	Definition
S	Space (optional)
X	A digit of the X coordinate, where each digit is an ASCII character, 0 through 9
,	The delimiter character. The default is an ASCII comma
Y	A digit of the Y coordinate, where each digit is an ASCII character, 0 through 9
FF	Flag character, identifying the transducer buttons being pressed. The possible combinations are listed in the table below.

3-button Stylus Buttons	4-button Cursor Buttons	16-button Cursor Buttons	ASCII Output
none	none	none	0
tip button	0	1	0
barrel 1	1	2	1
- - -	2	3	2
- - -	- - -	C	3
barrel 2	3	4	4
- - -	- - -	5	5
- - -	- - -	6	6
- - -	- - -	D	7
- - -	4	7	8
- - -	- - -	8	9
- - -	- - -	9	:
- - -	- - -	E	;
- - -	- - -	A	<
- - -	- - -	0	=
- - -	- - -	B	>
- - -	- - -	F	?

NOTE: The cursors are designed for single, not multiple button use. Pressing multiple buttons simultaneously yields unpredictable results.

<CR> ASCII carriage return

<LF> ASCII line feed

Character	**Definition**
LSB	Least significant bit
MSB	Most significant bit
PH	Phasing bit, set for 1
SB	One or two stop bits
PB1-PB5	Flag bit, identifying the transducer buttons being pressed. The possible combinations are listed in the tables below.

Flag Bit Definitions for 16-Button Cursor

16-button Cursor Buttons	Binary Output PB4	PB3	PB2	PB1	PB5
none	0	0	0	0	0
1	0	0	0	0	1
2	0	0	0	1	1
3	0	0	1	0	1
C	0	0	1	1	1
4	0	1	0	0	1
5	0	1	0	1	1
6	0	1	1	0	1
D	0	1	1	1	1
7	1	0	0	0	1
8	1	0	0	1	1
9	1	0	1	0	1
E	1	0	1	1	1
A	1	1	0	0	1
0	1	1	0	1	1
B	1	1	1	0	1
F	1	1	1	1	1

Flag Bit Definitions for Two-Button Stylus and Four-Button Cursor

4-Button Cursor Buttons	3-Button Stylus Buttons	Binary Output PB4	PB3	PB2	PB1	PB5
none	none	0	0	0	0	0
1	tip	0	0	0	1	0
2	barrel 1	0	0	1	0	0
3	barrel 2	0	1	0	0	0
4	- - -	1	0	0	0	0

D.1.3 RS-232 Hardware Interface

The Summagrid IV can emulate two kinds of GTCO binary formats: low and high resolution.

Low Resolution Binary

Stop Bits	MSB 7	6	5	4	3	2	1	LSB 0	Start Bit	Transmission Sequence
SB	P	PH	PB4	PB3	PB2	PB1	PB5	0	0	1st byte
SB	P	0	X5	X4	X3	X2	X1	X0	0	2nd byte
SB	P	0	X11	X10	X9	X8	X7	X6	0	3rd byte
SB	P	0	Y5	Y4	Y3	Y2	Y1	Y0	0	4th byte
SB	P	0	Y11	Y10	Y9	Y8	Y7	Y6	0	5th byte

High Resolution Binary

Stop Bits	MSB 7	6	5	4	3	2	1	LSB 0	Start Bit	Transmission Sequence
SB	PH	PB5	PB4	PB3	PB2	PB1	X15	X14	0	1st byte
SB	0	X13	X12	X11	X10	X9	X8	X7	0	2nd byte
SB	0	X7	X6	X5	X4	X3	X2	X1	0	3rd byte
SB	0	0	0	0	0	0	Y15	Y14	0	4th byte
SB	0	Y13	Y12	Y11	Y10	Y9	Y8	Y7	0	5th byte
SB	0	Y6	Y5	Y4	Y3	Y2	Y1	Y0	0	6th byte

D.1.4 GTCO DIP Switch Settings

When configuring Summagrid IV in the GTCO format, the DIP switches perform the same functions except for the following:

Command Name	Switch Settings - - Dip Switch #B		
	B-1	B-2	B-3
Carriage Return	ON	-	-
No Carriage Return	OFF		
Space	-	ON	-
No Space	-	OFF	-
Line Feed	-	-	ON
No Line Feed	-	-	OFF

Appendix E CalComp Format Emulation

The Summagrid IV can emulate the CalComp 9100 output format. This chapter provides the binary and ASCII information for the CalComp output format.

E.1 CalComp Output Format

E.1.1 Overview

Summagrid IV report formats conform to CalComp 9100 standards. To accommodate the emulation needs, choose from one of four ASCII formats or a packed binary format.

E.1.2 ASCII BCD Report Formats

Within the ASCII BCD report format, select:

- Output to be in counts, inches or millimeters.

In units of measure, also choose the format to include a decimal or not. This does not change the value of the coordinate. For example, 10.123 inches can be reported as either 10123 or 10.123.

- Each report to terminate with a <CR><LF> or just a <CR>.

- Delimiter to be any ASCII character. (The default is a comma.)

Refer to the key for definitions of the format characters.

Format 1 (1000 LPI, 40 LPMM)

<T><M><C>XXXXXYYYYY<CR>

1016 lpi
<T><M><C>XXXXXXYYYYYY<CR>

FORMAT 2 (1000 LPI, 40 LPMM)

XXXXX, YYYYY, <T><M><C><CR>

1016 lpi
XXXXXX, YYYYYY, <T><M><C><CR>

FORMAT 3 (1000 LPI, 40 LPMM)

<C><P>XXXXXYYYYY<CR>

1016 lpi
<C><P><XXXXXX, YYYYYY<CR>

FORMAT 4

1000 LPI

<SP>XX.XXX, <SP>YY.YYY, <T><M><C><CR>

40 LPMM

<SP>XXXXX., <SP>YYYYY., <T><M><C><CR>

Character	Definition
T	Tablet status character
M	Mode status character R = Run U = Line P = Point T = Track I = Increment
P	Pen (cursor) status
X	A digit of the X coordinate, where each digit is an ASCII character, 0 through 9
,	Delimiter character. The default is an ASCII comma.
Y	A digit of the Y coordinate, where each digit is an ASCII comma.
C	Cursor flag character, identifying the transducer buttons being pressed. The possible combinations are listed in the table below. U = no flags depressed.

3-Button Stylus Buttons	4-button Cursor Buttons	16-button Cursor Buttons	ASCII Output
none	none	none	U
tip	1	1	0
first barrel	2	2	1
second barrel	3	3	2
tip & first	4	C	3
tip & second	---	4	4
first & second	---	5	5
all	---	6	6
---	---	D	7
---	---	7	8
---	---	8	9
---	---	9	A
---	---	E	B
---	---	A	C
---	---	0	D
---	---	B	E
---	---	F	F

NOTE: Cursors are designed for single, not multiple, button use. Pressing multiple buttons simultaneously yields unpredictable results.

<CR> ASCII carriage return

<LF> ASCII line feed

E.1.3 Packed Binary Report Format

The Summagrid IV can emulate two types of CalComp binary formats: low and high resolution.

Low Resolution Binary

	MSB 7	6	5	4	3	2	1	LSB 0
BYTE 1	P	1	C3	C2	C1	C0	0	0
BYTE 2	P	0	X5	X4	X3	X2	X1	X0
BYTE 3	P	0	X11	X10	X9	X8	X7	X6
BYTE 4	P	0	Y5	Y4	Y3	Y2	Y1	Y0
BYTE 5	P	0	Y11	Y10	Y9	Y8	Y7	Y6

High Resolution Binary

	MSB 8	7	6	5	4	3	2	1	LSB 0
BYTE 1	P	1	C4	C3	C2	C1	C0	X15	X14
BYTE 2	P	0	X13	X12	X11	X10	X9	X8	X7
BYTE 3	P	0	X6	X5	X4	X3	X2	X1	X0
BYTE 4	P	0	0	0	0	X16	Y16	Y15	Y14
BYTE 5	P	0	Y13	Y12	Y11	Y10	Y9	Y8	Y7
BYTE 6	P	0	Y6	Y5	Y4	Y3	Y2	Y1	Y0

Character	Definition
LSB	Least significant bit
MSB	Most significant bit
P	Parity bit
C0-C4	Flag bit, identifying the transducer buttons being pressed. The Possible combinations are listed in the tables below.

Flag Bit Definitions for the 16-Button Cursor

16-button Cursor Buttons	Binary Output C4	C3	C2	C1	C0
none	0	0	0	0	0
1	1	0	0	0	0
2	1	0	0	0	1
3	1	0	0	1	0
C	1	0	0	1	1
4	1	0	1	0	0
5	1	0	1	0	1
6	1	0	1	1	0
D	1	0	1	1	1
7	1	1	0	0	0
8	1	1	0	0	1
9	1	1	0	1	0
E	1	1	0	1	1
A	1	1	1	0	0
0	1	1	1	0	1
B	1	1	1	1	0
F	1	1	1	1	1

Flag Bit Definitions for the Two-Button Stylus and Four-Button Cursor

3-Button Stylus Buttons	4-Button Cursor Buttons	Binary Output C4	C3	C2	C1	C0
none	none	0	0	0	0	0
tip	1	0	0	0	0	1
first barrel	2	0	0	0	1	0
second barrel	3	0	0	1	0	0
- - -	4	0	1	0	0	0

E.1.4 CalComp DIP Switch Settings

When configuring Summagrid IV in the CalComp format, the DIP switches perform the same functions except for the following:

Command Name	Switch Settings - - Dip Switch B			
	B-1	B-2	B-7	B-8
CalComp 9100 ASCII Format				
1	OFF	OFF	ON	OFF
2	ON	OFF	ON	OFF
3	OFF	ON	ON	OFF
4	ON	ON	ON	OFF
	B-5	B-6	B-7	B-8
CalComp 9100 Binary Format				
200 lpi	OFF	OFF	ON	OFF
1000 lpi (40 lpmm)	OFF	ON	ON	OFF

Appendix F MM/SummaSketch Format Emulation

The Summagrid IV can emulate the Summagraphics MM/SummaSketch output format. This chapter provides the binary and ASCII information for the MM/SummaSketch output format.

F.1 MM/SummaSketch Output Format

F.1.1 Overview

Summagrid IV report formats conform to MM/SummaSketch standards. To accommodate the emulation needs, choose either a binary or an ASCII BCD format. The reports are in counts of resolution.

NOTE: When configuring the Summagrid IV for the default 500 lpi resolution in binary format, the active area size will be limited to 32.766 inches. If you wish to utilize the entire active area, you must set the fixed resolution to 200 lpi.

F.1.2 Binary Report Format

Binary Format for Absolute Coordinates

Transmission Sequence	MSB 7	6	5	4	3	2	1	LSB 0
BYTE 1	PH	PR	T	Sx	Sy	Fc	Fb	Fa
BYTE 2	0	X6	X5	X4	X3	X2	X1	X0
BYTE 3	0	X13	X12	X11	X10	X9	X8	X7
BYTE 4	0	Y6	Y5	Y4	Y3	Y2	Y1	Y0
BYTE 5	0	Y13	Y12	Y11	Y10	Y9	Y8	Y7

Binary Format for Relative Coordinates

Transmission Sequence	MSB 7	6	5	4	3	2	1	LSB 0
BYTE 1	PH	PR	T	Sx	Sy	Fc	Fb	Fb
BYTE 2	0	X6	X5	X4	X3	X2	X1	X0
BYTE 3	0	Y6	Y5	Y4	Y3	Y2	Y1	Y0

F.1.3 ASCII BCD Report Format

The ASCII BCD format depends on the coordinate system and resolution:

Resolution	Format
1 to 508 lpi (20 lpmm)	XXXX,YYYY,F<CR><LF>
1000 lpi (40 lpmm)	XXXXX,YYYYY,F<CR><LF>

Character	Definition
X	X coordinate digit, where each digit is an ASCII character from 0 to 9.
,	ASCII comma
Y	Y coordinate digit, where each digit is an ASCII character from 0 to 9.
F	Stylus and cursor flag character, identifying the button status

Flag Bit Definitions for the Stylus and Four-Button Cursor

Stylus Buttons	Cursor Buttons	F
	none pressed	0
	1 pressed	1
	2 pressed	2
	3 pressed	3
	4 pressed	4
	1+2	3
	1+3	4
	1+4	5
	2+3	5
	2+4	6
	3+4	7
	1+2+3	6
	1+2+4	7
	1+3+4	7
	2+3+4	7
	1+2+3+4	7

Character	Definition
LSB	Least significant bit
MSB	Most significant bit
Fa-Fc	Flag bit, identifying the stylus/cursor buttons being pressed. The possible combinations are listed in the tables below.

Flag Bit Definitions for the Stylus and Four-Button Cursor

Stylus Buttons	Cursor Buttons	Fc	Fb	Fa
	none pressed	0	0	0
	1 pressed	0	0	1
	2 pressed	0	1	0
	3 pressed	0	1	1
	4 pressed	1	0	0
	1+2	0	1	1
	1+3	1	0	0
	1+4	1	0	1
	2+3	1	0	1
	2+4	1	1	0
	3+4	1	1	1
	1+2+3	1	1	0
	1+2+4	1	1	1
	1+3+4	1	1	1
	2+3+4	1	1	1
	1+2+3+4	1	1	1

Sx and Sy — X and Y coordinate signs. 1 is positive and 0 is negative. In absolute coordinates, the sign is always positive. In relative coordinates, the sign can be positive or negative.

T — Tablet identifier. Choice of 1 or 0 and command is controlled.

PR — Proximity bit. 0 is in-prox and 1 is out-of-prox.

PH — Phasing bit, which is always 1.

X0, X1... — X coordinate bits

Y0, Y1.... — Y coordinate bits.

F.1.4 MM/SummaSketch Command Summary

Command	ASCII	Command	ASCII
Axis Update Mode:		Resolution:	
command	G	1 lpi	l
value	<SP> to <DEL>	2 lpi	n
		4 lpi	p
Coordinate System:		100 lpi	d
absolute	F	200 lpi	e
relative	E	10 lpmm	f
		400 lpi	g
Echo	k	500 lpi	h
		20 lpmm	i
Increment Mode:		1000 lpi	j
command	I	40 lpmm	q
increment value	<SP> to <DEL>		
		Resume Transmission	<CTRL>Q
Origin:			
upper left	b	Send Model ID	<ENQ>
lower left	c		
		Send Test Results	w
Report Modes:			
Point Mode	B	Stop Transmission	<CTRL>S
Remote Request Mode:			
mode command	D	Tablet Identifier:	
trigger command	P	zero	0
Stream Mode	@	one	1
Switch Stream Mode	A		
		Z commands:	
Report Rate:		binary report format	zb
90 rps	Q	8 data bits, no parity	z8
73 rps	R	8 data bits, odd parity	z9
22 rps	S	increment confirmation	zi
5.75 rps	T	firmware identification	z?
		transducer identification	zt
Reset	<NUL>	additional filter	zf
		16-button cursor enable	z6
Resolution Definable:			
command	r		
X axis resol., low byte	Hex 00 to FF		
X axis resol., high byte	Hex 00 to 17		
Y axis resol, low byte	Hex 00 to FF		
Y axis resol, high byte	Hex 00 to 17		

F.1.5 MM/SummaSketch DIP Switch Settings

When configuring Summagrid IV in the MM/SummaSketch format, the DIP switches perform the same functions ***except*** in the following situation:

When the tablet is placed in MM binary format, it defaults to 8 data bits, regardless of how DIP switch A-7 (switch bank A, position 7) is set.

Appendix G Summagrid IV Specifications

Physical Specifications

Tablet Size	51.35" x 68.28", 44.5" x 56", 32.5" x 44.5", 26.60" x 32.63"
Active Area	44" x 60", 36" x 48", 24" x 36", 18" x 24"
Un-Boxed Weight (Tablet & Controller)	80 lbs. (44" x 60"), 55 lbs. (36" x 48"), 30 lbs. (24" x 36"), 20 lbs. (18" x 24")
Boxed Weight (Shipping Weight)	100 lbs. (44" x 60"), 80 lbs. (36" x 48"), 50 lbs. (24" x 36"), 33 lbs. (18" x 24")

Performance Specifications

Technology	Electromagnetic
Resolution	Up to 2540 lines per inch
Standard Accuracy	.010"
Proximity	Up to 0.5" (12.7 mm)
Format	Summagraphics Microgrid UIOF, GTCO 5A Series, MM/SummaSketch and CalComp 9100
Baud Rate	150 – 19,200
Data Rate	Up to 150 reports per second (@ 19,200 baud)
Jitter	Cursor: +/-1 count per second Stylus: +/-2 count per second
Repeatability	+/-0.010" or better
Interface	RS-232C 25-pin D female connector for PC, PS/2, XT and compatibles
Power Requirements	12 VAC, 1 amp power supply
Certification	UL, CSA, FCC Class, TUV/VDE and tested for ESD

Environmental Specifications

Operating Environment	+45 degrees to +100 degrees Fahrenheit +7 degrees to +43 degrees Celsius 8% to 90% relative humidity, non-condensing
Non-Operating	-45 degrees to +145 degrees Fahrenheit -43 degrees to +63 degrees Celsius 8% to 90% relative humidity, non-condensing

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Appendix H Summagrid IV Application Set Up

This appendix provides DIP switch settings for the popular software applications. **The switch settings listed are for the 36 x 48 tablet only.** Use this chart as a quick reference; for more detailed information please refer to the tablet installation procedures in the application's manual.

NOTE: Information provided was supplied by the software manufacturers and may not have been tested by Summagraphics. We assume no responsibility for the accuracy of the information.

GTCO CalComp

by TURNING technologies

Application	Switch A	Switch B	Switch C	Emulation
Advance Estimating Tools	10000011	00110101	10000100	GTCO
Area Works	10000101	10100100	10000100	Microgrid
ARRIS	10001001	10100100	00000100	Microgrid
ATEC CAD/CAM	10011101	11100000	11010100	Microgrid
Atlas Draw	10011100	11100100	11000100	Microgrid
AutoCAD-DOS	10011100	00100100	11000100	Microgrid
Cadkey	10011100	00100100	11000100	Microgrid
CasCAD I, II, III	10011100	11100100	11000100	Microgrid
CEAL	10011000	11100100	11000100	Microgrid
CivilCAD	10011100	00100100	11000100	Microgrid
CO-GO PC Plus	10011101	01100100	11000100	Microgrid
Com Quest	11011101	10100100	10000100	Microgrid
Construction Estimator	10001101	10100101	10000100	GTCO
Contour Plus	10011101	01100100	11000100	Microgrid
CPS/PC	10011100	00100100	11000100	Microgrid
Digi Plus	10011101	01100100	11000100	Microgrid
Digitizing Quantitative	10000011	11100101	10100100	GTCO
DTM 386	10011101	01100100	00010100	Microgrid
Earthwork II and II C	10000101	10100100	10000100	Microgrid
Easy CAD 2	10011100	10100100	11000100	Microgrid
Easy DII	10011101	11100100	11100100	Microgrid
ESP 386	10011101	01100100	00010100	Microgrid
Estimagic	00101001	11100101	10100100	GTCO
FastCAD	10011100	10100100	11000100	Microgrid
Galaxy	10011100	10100100	01000100	Microgrid
Generic CADD	10011100	01100100	11000100	Microgrid
GM-SYS	10011100	01100100	11000100	Microgrid
HDS LOG Analysis	10011100	10100000	10000100	Microgrid
Hotdij	10011101	11100100	11100100	Microgrid
Illustrator 1	10011001	11100100	00010100	Microgrid
INFOCAD	10011100	00100100	11010100	Microgrid

GTCO CalComp

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Application	Switch A	Switch B	Switch C	Emulation
InterCAD 2040	10011001	01100100	00010100	Microgrid
Job Boss	00111001	10000101	10100100	GTCO
Land Trak	11001001	01100100	11000100	Microgrid
LogDigi	10011100	01100100	11000100	Microgrid
MAPDTM	10011101	10100100	11000100	Microgrid
MAPEDT	10011101	10100100	11000100	Microgrid
MAPOVL	10011101	10100100	11000100	Microgrid
MAPROC	10011101	10100100	11000100	Microgrid
Marvin Windows	10011100	00100100	11000100	Microgrid
Mech. Const. Mgr.	10000011	10110101	10000100	GTCO
MegaMODEL	10011100	00100100	11000100	Microgrid
MetaSite	10011100	01000100	00000100	Microgrid
MicroStation	10011100	01100100	11000100	Microgrid
NeoVisuals	10011000	10100100	00010100	Microgrid
PayDirt Estimating	10001101	00100100	10110100	Microgrid
PayDirt Cut And Fill	10001101	11100101	10110010	GTCO
pcARC/INFO	10011000	00100100	01100100	Microgrid
Pella Designer	10011100	00100100	11000100	Microgrid
PEPS	10011100	00100100	11000100	Microgrid
Piping/DWV Estimating	10011100	00001100	01000100	Microgrid
Precision Digitizer	11000011	11100101	10000100	GTCO
Precision Estimating	11000011	11100101	10000100	GTCO
Profit Bid Estimating	00101100	00000100	01000100	Microgrid
QuickEST	10011101	00000100	11000100	Microgrid
QuickDIRT	10011101	00000100	11000100	Microgrid
Quickpen Estimating	00111001	11000101	10000100	GTCO
QuickSurf	10011100	00100100	11000100	Microgrid
RAMCO Estimating Prog.	10000011	10000101	11000100	GTCO
SDP	10011101	01100100	11000100	Microgrid
SmartCAM	10011101	00000100	00000100	Microgrid
The Edge	10000010	01000101	11000100	GTCO

GTCO CalComp

by TURNING technologies

Application	Switch A	Switch B	Switch C	Emulation
The Mc^2 ICE Sys.	10011101	11100101	10000100	Microgrid
The Remodeling Est. Plus	10000010	10100101	11000100	GTCO
VersaCAD	10011100	00100100	11000100	Microgrid

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