CORDLESS ROLL-UP™ USER'S GUIDE

Table of Contents

Standard Operating Information

Parts Checklist

- ✓ Cordless Roll-Up digitizing tablet
- ✓ Transducer (stylus or 4-button cursor or 16-button cursor)
- ✓ Computer interface cable with 9-pin connector
- ✓ 9- to 25-pin adapter

- ✓ Power supply
- ✓ TabletWorks CD
- ✓ Accessory pouch
- ✓ Deluxe Travel Bag (optional)
- ✓ Cardboard tube, insert and end caps

NOTE: The Deluxe Travel Bag is intended to be used only in conjunction with the heavy gauge cardboard tube, insert and end caps supplied. The Deluxe Travel Bag does not provide complete protection if used alone. The product will be subject to damage, not covered by the warranty, if not protected by the tube, insert and end caps. If you have misplaced or disposed of the items, contact GTCO CalComp by Turning Technologies at 1.866.746.3015 for replacements.

Introduction

The Cordless Roll-Up belongs to a class of computer input devices called **graphic tablets** or **digitizers**. A graphic digitizer consists of a transducer (usually a handheld cursor or stylus) and an electronic tablet work surface. The Cordless Roll-Up converts the position of the transducer into data for computer processing. Data output from the digitizer is in the form of an XY coordinate pair that pinpoints the location of the transducer on the tablet surface.

The Cordless Roll-Up works with a wide variety of graphic application software programs. It can be used to:

- Move a pointer on a display screen.
- Create and manipulate objects in a graphic composition.
- Trace a drawing (or other source material) to create an image on the screen.
- Select commands or functions from a menu of such items placed on the tablet surface.
- Choose items from a pull-down menu on the screen.
- Determine dimensions of objects on drawings and blueprints.

Special features include:

- Cordless transducers
- Flexible, portable tablet
- Dual tablet orientation
- GTCO, CalComp and Summagraphics emulations

What You Will Need to Use Cordless Roll-Up

- PC with an RS-232C serial communication port. (Signal levels must conform to EIA RS2320 specifications.)
- Graphic application software that accepts digitizer input via the computer's RS-232C serial port.

Care and Handling of Cordless Roll-Up

The Cordless Roll-Up was designed to be both portable and durable. As with any product, it requires proper care and handling for reliable operation. By following these recommendations, the Cordless Roll-Up will provide you with many years of service:

- Always use the digitizer on a flat surface.
- Before moving the digitizer, disconnect the transducer and the interface cable.
- Before moving the digitizer, roll it up. The housing along the side of the tablet is designed as a rolling aid and it allows you to easily control rolling action. (See **Transporting Cordless Roll-Up** for specific moving instructions.)
- Do not permanently attach anything to the tablet.
- Do not use sharp instruments on or near the tablet, to avoid scratching or cutting it. Cuts in the tablet will violate the warranty.
- Do not crease, dent or abuse the tablet. Creases can damage the tablet structure. Severe creases or abuse will violate the warranty.
- Clean the tablet with any mild, nonabrasive household cleaner. Rubbing alcohol is recommended. After cleaning, wipe the surface dry to avoid possible digitizing errors.

Transporting Cordless Roll-Up

You **MUST** transport the Cordless Roll-Up with the factory-supplied shipping materials (heavy gauge cardboard tube, insert and end caps). Failure to do so could result in serious damage to the unit and may violate the warranty.

1. Disconnect the transducer and interface cable from the Cordless Roll-Up and the computer. Remove all material from the tablet.

2. Grasp the housing firmly with both hands and roll it toward the opposite side of the tablet. The housing and the printing on the digitizer surface must be on the inside of the roll. The roll diameter should be ***just smaller*** than the inside diameter of the factory-supplied shipping tube. When correctly rolled, only the digitizer's black back will be exposed.

3. Insert the rolled digitizer into the shipping tube and allow it to fully unroll against the inside of the tube. Place the factory-supplied insert into the center of the rolled digitizer for support.

4. Place the accessories in the accessory case and put it inside the hollow insert. Set the factory-supplied end caps on the tube to seal it. Place the tube in the optional Deluxe Travel Bag (optional).

NOTE: The Deluxe Travel Bag is intended to be used only in conjunction with the factory-supplied heavy gauge cardboard tube, insert and end caps. The Deluxe Travel Bag does not provide complete protection if used alone. The product will be subject to damage not covered by the warranty, if not protected by the tube, insert and end caps. If you have misplaced or disposed of these items, contact GTCO CalComp by Turning Technologies (1.866.746.3015) for replacement parts.

Installing Cordless Roll-Up

Follow the instructions below to set up the Cordless Roll-Up.

1. Select a large, flat surface on which to place the Cordless Roll-Up. Clear all items from the surface. Please be cautious that conductive materials on, under or near the Cordless Roll-Up may cause improper operation.

2. Remove the Cordless Roll-Up from its container and unroll it on the selected surface.

3. Plug the power supply into an AC outlet. Connect the power supply to the appropriate jack on the connector panel. The digitizer should product four short tones.

Power Supply
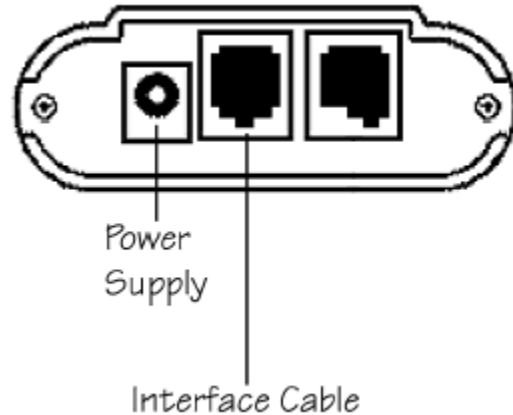
4. Attach the interface cable to the appropriate jack on the connector panel. (The connector is keyed and will fit only the correct jack.)

Interface Cable

5. Connect the 9-pin connector of the interface to the serial port on the computer. If necessary, use the 9- to 25-pin adapter to attach to a PC-compatible (DTE male) port.

	P1 (9-Pin D-Sub Male)		P2 (25-Pos D-Sub Female)
	1	DCD	8
	2	RXD	3
	3	TXD	2
	4	DTR	20
	5	GND	7
	6	DSR	6
	7	RTS	4
	8	CTS	5
	9	RI	22
		CHASSIS GND	1
	SHELL		SHELL
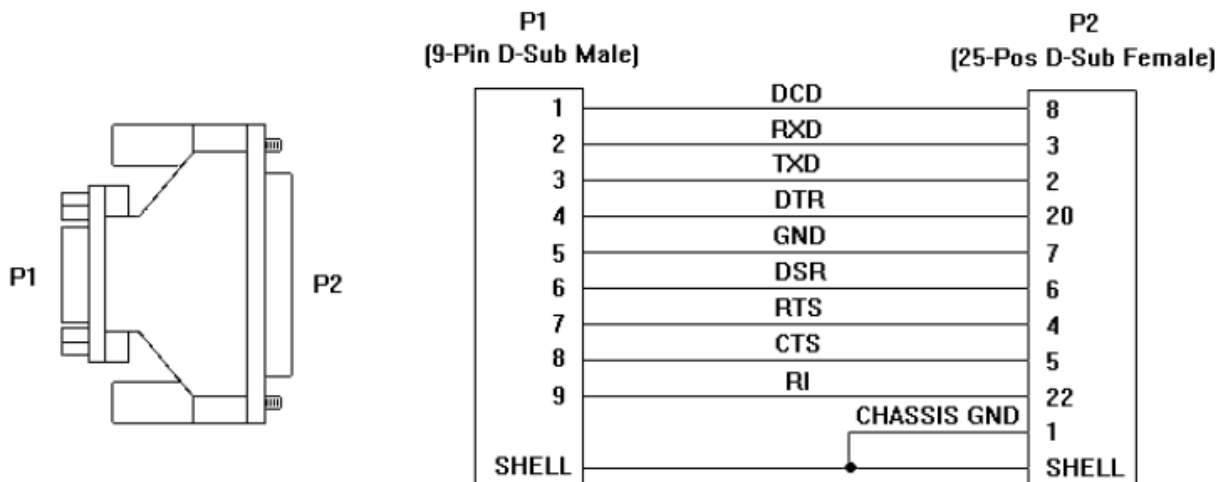
6. Orient the tablet (see **Using the SuperSet Menu** section) as desired.

7. Use the SuperSet Menu to select the two-digit SuperSet Code (shown in Table 1) for the application program.
   - If the application program is not listed in Table 1, find the configuration settings that apply to the application program in Table 2 and use that SuperSet Code.

- If an appropriate SuperSet Code is not listed in Table 2, use the **Custom Configuration Menu** to set up the Cordless Roll-Up.

8. Configure your computer for use with Cordless Roll-Up:
    - Arrange the graphic application software to operate with the Cordless Roll-Up. A wide variety of application programs provide configuration information for specific digitizers. If Cordless Roll-Up digitizer is not listed, use the configuration for GTCO Digi-Pad Type 5 or Type 5A (T5/T5A), CalComp 9100/9500 or Summagraphics Microgrid III or ID Series.
    - If necessary, install the appropriate digitizer driver(s) from the TabletWorks CD supplied (AutoCAD, Windows and mouse drivers are included).

NOTE: Install only the drivers necessary for the Cordless Roll-Up to work with the application software.

9. Begin digitizing.

Using the Transducers

Two types of transducers are available with the Cordless Roll-Up: stylus and cursors. The transducers are cordless and powered by a battery.

- Cursor is similar in appearance to a mouse, except that it has an attached lens with crosshairs for highly accurate digitizing. Cursors are available with 4 or 16 buttons.
- Stylus is comparable in appearance to a ballpoint pen. It has a tip-activated switch, plus two buttons on the barrel.

Sleep Mode

Each transducer goes into a battery-saving **sleep mode** when the buttons or tip switch has not been pressed for two minutes. To reactivate the transducer, press any of its buttons or the tip switch.

Transducer Battery Replacement

The expected life of the transducer battery is approximately 350 hours of continuous use. Battery low tones indicate that the battery should be replaced. The system is designed to continue operating properly for a short time after the battery low alarm starts; however, the battery should be replaced promptly to avoid performance degradation.
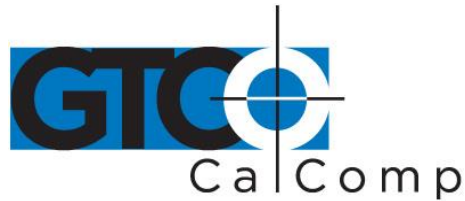
The stylus uses AAA batteries. Contact GTCO CalComp by Turning Technologies at 1.866.746.3015 for cursor batteries. (See *Technical Specifications* for battery type.)

Stylus Battery Replacement

The stylus uses an AAA battery.

1. Push in the clip on the battery cover to remove it.

2. Pull the used battery from its clip. Dispose of the battery promptly.

3. Insert the new AAA battery into the battery compartment, positioning it properly to ensure the correct polarity.

4. Replace the battery cover.
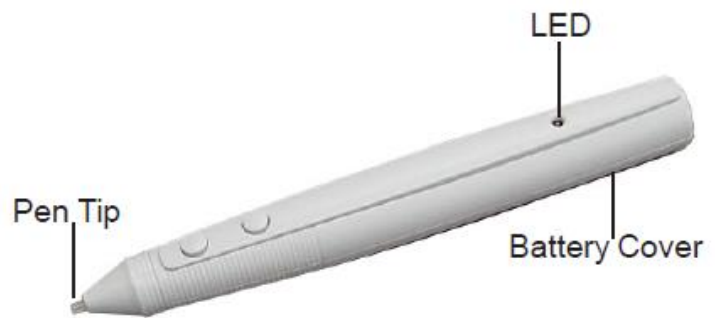
Stylus Sleep Mode:
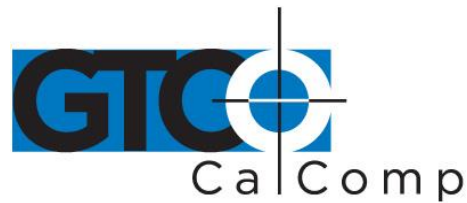
The stylus will enter sleep mode if there is no switch activity for approximately 20 seconds or if any switch is held continuously active for approximately two minutes, to prolong battery life.

Battery LED:

The LED will flash continuously when battery voltage has decayed to 0.9V nom. and the pen is awake. The LED will flash four times when a battery is installed to indicate the pen is ready to use.

Cursor Battery Replacement

Read the following instructions thoroughly before attempting to replace the battery in the cursor. Failure to follow the instructions carefully could result in damage that would render the cursor unusable.

NOTE: The lithium battery used in this device may present a fire, explosion and severe burn hazard if mistreated. Do not recharge, disassemble, heat above 212°F (100°C), incinerate or expose to water.

1. Place the cursor button-side-down on a table. Insert a small flat-blade screwdriver between the *housing* and the *base* in the area shown in the figure. Gently pry the housing off the base, taking care that the screwdriver does not slip and damage internal components.
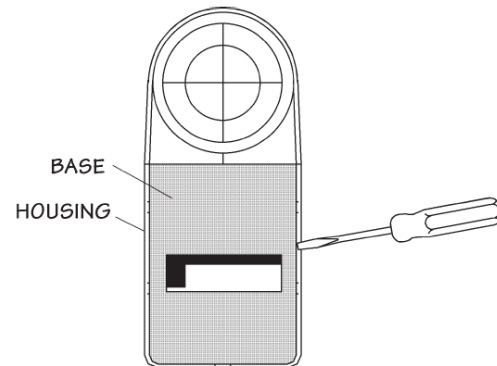
2. Carefully lift the base and place it next to the housing as shown in the figure. Please not the housing and base are connected by two coil wires. Keep the housing and base close together to avoid putting any strain on the wires.
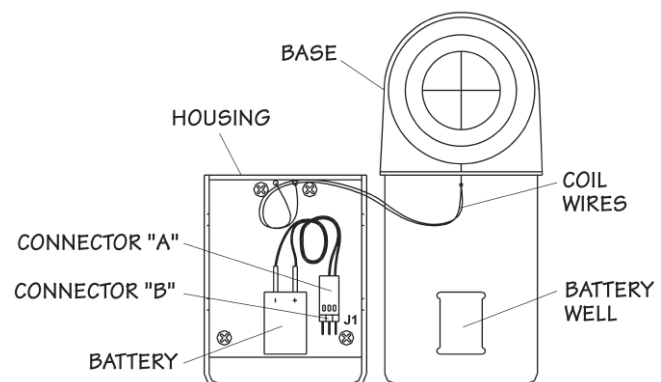
3. Slide *Connector "A"* off *Connector "B".* Dispose of the battery properly.

4. Attach *Connector "A"* of the new battery to *Connector "B".*

5. Place the *battery* in the *well* of the base. Position the housing on the base, taking extreme care that
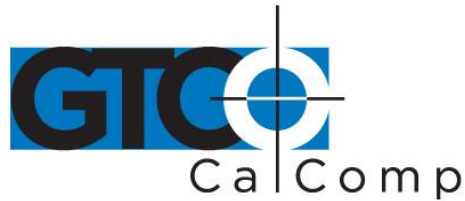
the coil wires do not get pinched between the housing and base.

6. Snap the unit together, making sure that the battery stays in the well.

BASE

HOUSING

COIL WIRES

BATTERY
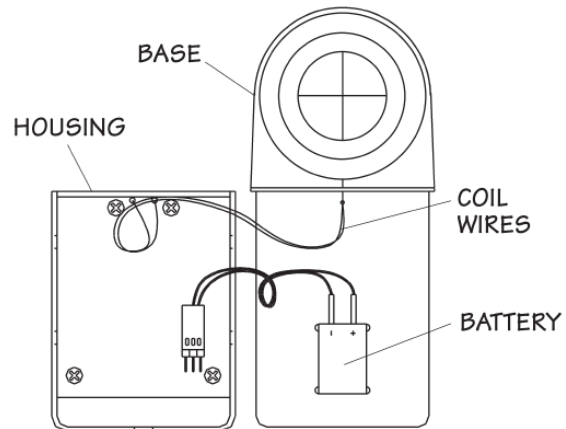
Using the SuperSet Menu

The SuperSet Menu is the column of blocks printed on the tablet.

Use the SuperSet Menu to:

- Change the tablet's orientation
- Configure the Cordless Roll-Up for specific application programs
- Use the Custom Configuration Menu
- Control the alarm
- Reset the Cordless Roll-Up

When using the SuperSet Menu, a tone will sound when selecting

[S], [P] or [◀))], indicating a successful selection.

The number blocks [0] through [9] are active only after selecting [S].

Changing the Tablet's Orientation

The Cordless Roll-Up allows the user to choose between two different tablet orientations: orient the tablet with the housing on the right (factory default) or on the left.
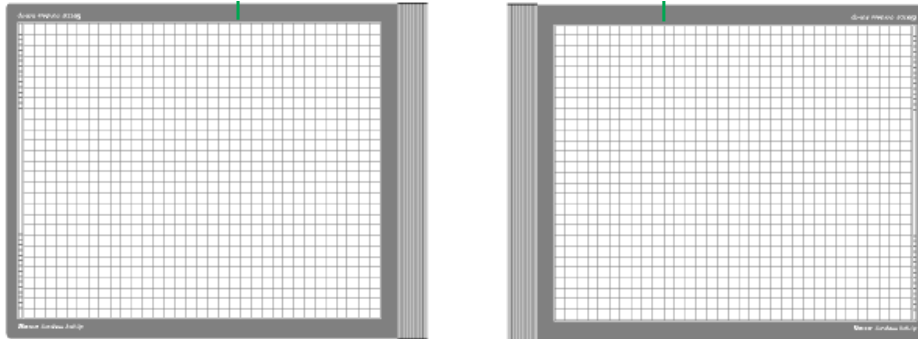
To change the orientation of the tablet:

1. Turn the tablet to the desired orientation.

2. Relocate the origin by selecting the ⬆ block on the lower SuperSet Menu. You should hear four short tones when you do this.

Configuring for Specific Application Programs

To configure Cordless Roll-Up for use with specific application programs:

1. In Table 1, find the application program being used with the Cordless Roll-Up. Note the corresponding SuperSet Code.
   - If the application program is not listed in Table 1, find the configuration settings that apply to the application program in Table 2 and use that SuperSet Code.
   - If an appropriate SuperSet Code is not listed in Table 2, then use the Custom Configuration Menu to set up the Cordless Roll-Up.

2. Select ⓢ on the SuperSet Menu and then choose the two digits of the SuperSet code for the application program.

3. You will hear four short tones after a successful menu configuration. An example of configuring for a specific application program follows.
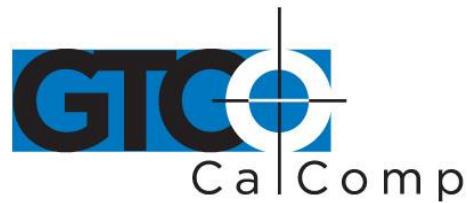
Table 1: SuperSet Menu Codes for Selected Application Programs

Program	Company	SuperSet Code
Access	Bautech	39
Advanced Construction Estim.	Software Shop Systems	28
A.G.E.	CEIA, Inc.	75
AGTEK Earthwork Engineering	AGTEK Development Co.	01
APS	Gunold & Stickma	52
ARC/CAD	ESRI	01
ARC/INFO	ESRI	12
ARCT, ACA		47
ATLAS*DRAW log res	Strategic Locations Planning	07
ATLAS*DRAW high res	Strategic Locations Planning	08
ATLAS GIS	Strategic Mapping	01
AutoCAD	Autodesk, Inc.	01
Autodesk 3D Studio	Autodesk, Inc.	01
AutoSketch	Autodesk, Inc.	01
Autoship	Coastdesign	01
Autoyacht	Coastdesign	01
Autumn	Zenographics	36
Batisoft		46
Best Est II	Bird Construction Software	23
Bid Team	Construction Data Control, Inc.	58
Bidworx for DOS	Vertigraph, Inc.	31
Bidworx for Windows	Vertigraph, Inc.	01
BP-340	Barudan America, Inc.	77
Buildsoft	Buildsoft, Inc.	09
Cadkey low res	Cadkey	18
Cadkey high res	Cadkey	25
Carpet Estimating Systems	Ramco	54
Civilcad	Bloomfield Computer Services	03
CMS Estimating	Contractor Management Systems	29
CNG Survey	CNG Survey	05
Coastal	Oceanographics	42
Cogo-PC Plus	Civilsoft	01
COINS Estimating	Shaker Computer & Management	41
Composer Gold	Building Systems Design	42
Computer Methods Est.	Computer Methods	45
Comquest	Pinnacle Technology	38
Conception 3D	Serbi	22
Construction Link	The Construction Link	04
Contour Plus	Civilsoft	01
Cost Engineer, The	Cost Engineering Technologies	49
Counterpoint	Counterpoint	04
CPS/SP	Radian Corp.	34
Curve Digitizer	West Coast Consultants	33
Cut & Fill	Paydirt Systems, Inc.	31
Cut & Fill/Precision	Paydirt/Timberline	42

Program	Company	SuperSet Code
Datacad	Microtecture	14
DATAMINE	Datamine International	82
Deed Mapping System	US Soft Tech	13
DEEM	Met-Coil, Ltd.	69
Design CAD	American Small Business Computers	01
Designer	Micrografix	02
DigiPlus	Civilsoft	01
DigiPro	Prosoft	66
Digtool	Rocktek Corp.	24
DMS Premiere	Tally Systems	57
DrawPlus	Micrografix	02

Program	Company	SuperSet Code
Earthwork	Civilsoft	01
Easydij EJBIN#4	Geocomp, Ltd.	16
Easydij EJAF#2	Geocomp, Ltd.	35
Easydij EJBIN#30	Geocomp, Ltd.	19
Easy Cad	Easy Cad	01
Edge, The	Advanced Estimating	01
Equinox	Roctek Corp.	64
ESI 6000 Estimating System	McCormick Systems	09
Estimagic	Estimagic	63
Estimate Software	Estimate Software	04
Estimation, Inc.	Estimation, Inc.	89
Execucom	Execucom Systems Corp.	36
Expose	Roctek Corp.	64

Program	Company	SuperSet Code
Fastcad	Evolution Computing	26

Program	Company	SuperSet Code
GAP 1	GTCO Corp.	39
Gemini	Excel	79
Generic CADD	Generic Software, Inc.	01
Geoquest	Softdesk	08
GM-SYS	NW Geophysics Association, Inc.	13
GraphPlus	Micrografix	02
GTCOTEST (default)	GTCO Corp.	44
GTCO WinTab Driver	GTCO Corp.	01

Program	Company	SuperSet Code
HALO products	Media Cybermetics	13
Hotdij	Geocomp, Ltd.	35
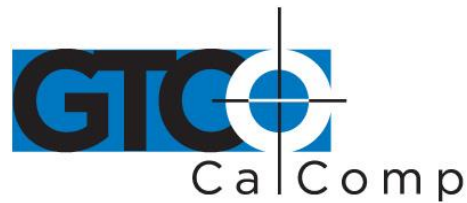
Program	Company	SuperSet Code
IBM GFIS	IBM	55
Ice System, The	MC2	56
IDRISI	Clark University	74
IKE	Comput-Ability, Inc.	72
Imagine 8.X	ERDAS, Inc.	61
Insite Earthwork Estimating	Software Shop Systems	19
Insite 2	Software Shop Systems	28
JAVA	Jandel Scientific	24
Job Boss	Small Systems Design, Inc.	39
Job Power	Job Power	42
Kolvin Pro	Damon, Inc.	01
Landmarke	Cambridge Software, Inc.	23
Lasercad	The Software Machine	01
Logdigi, Planimeter	The Logic Group	12
Lumena	Time Arts, Inc.	10
Mach Lite	Ziatek, Inc.	04
Mach 2	Ziatek, Inc.	04
Mach 4	Ziatek, Inc.	83
MapGrafix	Comgrafix, Inc.	02
Market America	CACI	11
Master Touch	Integrated Measurement Systems	35
Measuremate/Measuring Calc.	Paladin Measuring Systems	64
Measure Master	Estimator's Corner	51
Mechanical Construction Manager	Mechanical Professional Services	73
Melco	Melco	78
Metricom	ADII Dynalog	71
Micro Lynx Plus	Lynx Geosystems	81
Micromine	Micromine Pty., Ltd.	27
Microstation PC	Intergraph Corp.	09
MIKE	Compute-Ability, Inc.	68
Mirage	Zenographics	36
Molitors & Zimmer	Molitors & Zimmer Estimating Syst.	67

Program	Company	SuperSet Code
NCE Estimator 2000	National Computer Est., Inc.	01
Pagemaker	Aldus Corp.	02
PAD	ModaCAD	50
Paydirt Cross-Section	Spectra-Physics Laserplan, Inc.	31
Paydirt Roadwork	Spectra-Physics Laserplan, Inc.	31
Paydirt Sitework	Spectra-Physics Laserplan, Inc.	31
Paydirt Sitework Basic	Spectra-Physics Laserplan, Inc.	31
Paydirt Sitework 3.1 for Windows	Spectra-Physics Laserplan, Inc.	05
Paydirt Sitework 3.2 for Windows	Spectra-Physics Laserplan, Inc.	01
P-CAD	Personal CAD Systems, Inc.	20
PC.BAT		46
PC Paintbrush	Z Soft	10
PC Paintbruch/Windows	Z Soft	02
PC3D	Jandel Scientific	24
PDS/SHADOW	Polygon Software & Technologies	53
PG1	Hirsch International	22
Phoenix Estimator	Phoenix Estimating	87 or 88
Picturemaker	Cubicomp Corp.	15
Piping/DWV Estimating	Esscomate	32
Polynest	Polygon Software	40
Precision	Timberline Software	37
ProBid	Promation	06
Procad	Teksoft	13
Prodesign II	American Small Bus. Comp., Inc.	01
ProExcel	Excel	80
PTO	CDCI	58
QED	Roctek Corp.	64
QuickCalc	Constructive Computing	58
Quickdirt	Constructive Computing	23
Quickdirt II/QuickEst III	Constructive Computing	58
QuickEst	Constructive Computing	43
QuickPen CAD	QuickPen	09
QuickPen Estimating	QuickPen	59
Remodeling Estimator	National Computer Estimating, Inc.	01
Right Hand Man	Johnston & Associates, Inc.	04
Roadeng	Softree Technical Systems, Inc.	27
Roof Cad	True North Estimating	12
Roof Estimator 3000	Essential Technology	65
Robocad, Robosolid	RoboSystems International	21

Program	Company	SuperSet Code
SDP	Civilsoft	01
Sheetmetal/Ductwork	Esscomate	32
SigmaPlot	Jandel Scientific	24
SigmaScan	Jandel Scientific	24
SiteCalc	Eagle Point	01
Smartcam	Point Control Co.	17
Softplan	Softdesk	08
Sonnet CAD	Interworld Electronics	03
Sonnet Gap	Interworld Electronics	20
Subway	Roctek Corp.	64
Super-Duct, Super-Pipe	Wendes Mechanical Consulting	48
Surpac	Surpac Mining Systems	27
Terra Model	Plus 3 Software	09
Terrasoft	Digital Resource Systems	01
Topographics IIID	CEIA, Inc.	75
Tops II Digitizer	Software Shop Systems	28
TOSCA	Clark University	74
Turbo Map CAD	U.S. Softtech	01
Versacad	Versacad Corp.	01
Vision	Bidtek	70
Wall to Wall Estimator	Safeharbor Software, Inc.	11
Wilcom Ltd.	Wilcom Ltd.	76
Windows	Microsoft	01
Winestimator	Winestimator	11
2D CAD	West Coast Consultants	33

Table 2: Configuration Details for SuperSet Menu Codes

NOTE: MAX = 140 coordinates/second
lpi = lines per inch   lpmm = lines per millimeter

Code	Commun.	Output Options	ASCII Options
01	9600,N,8,1	GTCO Binary, 1000 lpi, Cont Max	
02	9600,N,8,1	GTCO Binary, 1000 lpi, Cont Incr	
03	9600,N,8,1	GTCO Binary, 1000 lpi, Cont Max	
04	9600,N,8,1	GTCO Binary, 1000 lpi, Point	
05	9600,N,8,2	GTCO Binary, 1000 lpi, Cont 100	
06	9600,N,8,1	GTCO Binary, 1000 lpi, Point	
07	9600,N,8,1	GTCO Binary, 200 lpi, Cont 100	
08	9600,N,8,1	GTCO Binary, 1000 lpi, Cont 100	
09	9600,N,8,1	GTCO Binary, 1000 lpi, Cont 12	
10	9600,N,8,1	GTCO Binary, 200 lpi, Cont Max	
11	9600,N,8,1	GTCO Binary, 1000 lpi, Cont Max, Alarm	
12	9600,N,8,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
13	9600,N,8,1	GTCO Binary, 1000 lpi, Cont 12	
14	9600,N,8,1	GTCO Binary, 200 lpi, Cont 100	
15	9600,N,8,2	GTCO Binary, 200 lpi, Cont 100	
16	9600,E,7,1	GTCO Binary, 200 lpi, Point	
17	9600,E,7,2	GTCO Binary, 200 lpi, Cont Max	
18	9600,E,7,2	GTCO Binary, 200 lpi, Cont Max	
19	9600,N,8,1	GTCO Binary, 1000 lpi, Point	
20	1200,N,8,1	GTCO Binary, 1000 lpi, Cont 100	
21	4800,N,8,1	GTCO Binary, 40 lpmm, Cont 12	
22	4800,N,8,1	GTCO Binary, 1000 lpi, Cont Max	
23	2400,N,8,1	GTCO Binary, 1000 lpi, Cont 12	
24	9600,N,8,2	GTCO Binary, 1000 lpi, Cont Max	
25	9600,N,8,2	GTCO Binary, 1000 lpi, Cont Max	
26	9600,N,8,2	GTCO Binary, 200 lpi, Point	
27	9600,N,8,1	GTCO ASCII, 40 lpmm, Point	Pb, Sp, LF
28	4800,O,7,2	GTCO ASCII, 100 lpi, Point	Sp, CR, LF
29	1200,O,7,2	GTCO ASCII, 1000 lpi, Point	Pb, CR, LF
30	1200,N,8,1	GTCO Binary, 40 lpmm, Cont 12	

Code	Commun.	Output Options	ASCII Options
31	9600,O,7,2	GTCO ASCII, 1000 lpi, Point	Pb, CR, LF
32	9600,E,7,2	GTCO ASCII, 1000 lpi, Point	Sp, CR
33	2400,E,7,1	GTCO ASCII, 100 lpi, Cont 12	Pb, Sp, CR, LF
34	9600,E,7,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
35	9600,E,7,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
36	9600,E,7,1	GTCO ASCII, 1000 lpi, Cont 12	Sp, CR, LF
37	2400,N,8,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
38	2400,E,7,2	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
39	1200,O,7,1	GTCO ASCII, 1000 lpi, Cont 12	Pb, CR
40	1200,N,8,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
41	9600,E,7,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR
42	9600,N,8,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
43	1200,E,7,1	GTCO ASCII, 1000 lpi, Point, Alarm	Pb, Sp, CR
44	9600,N,8,1	GTCO ASCII, 1000 lpi, Cont 12, Alarm	Pb, Sp, CR, LF
45	9600,N,8,2	GTCO ASCII, 100 lpi, Point, Alarm	Pb, CR, LF
46	9600,E,7,2	GTCO Binary, 1000 lpi, Cont 100	
47	9600,O,7,2	GTCO ASCII, 1000 lpi, Cont 100	Pb, CR
48	9600,E,7,1	GTCO ASCII, 1000 lpi, Point	CR, LF
49	1200,E,7,1	GTCO ASCII, 1000 lpi, Cont 12	Pb, CR
50	9600,E,8,1	GTCO ASCII, 40 lpmm, Point, Alarm	Pb, Sp, CR, LF
51	1200,N,7,2	GTCO ASCII, 1000 lpi, Point	Pb, CR, LF
52	9600,E,8,1	GTCO Binary, 1000 lpi, Cont 100, Alarm	
53	9600,N,8,1	GTCO ASCII, 1000 lpi, Cont Max	Pb, CR
54	9600,N,8,1	GTCO ASCII, 1000 lpi, Cont 12	Pb, CR
55	9600,O,7,2	GTCO ASCII, 1000 lpi, Cont Max, Alarm	Pb, CR
56	9600,E,7,2	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
57	9600,O,7,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
58	9600,N,8,1	GTCO ASCII, 1000 lpi, Cont 12	Pb, CR, LF
59	1200,E,7,1	GTCO ASCII, 1000 lpi, Point, Alarm	Pb, Sp, CR
60	9600,O,7,1	GTCO ASCII, 1000 lpi, Point, Alarm	Pb
61	4800,N,8,1	GTCO ASCII, 1000 lpi, Point	Pb, CR, LF
62	2400,N,8,1	GTCO ASCII, 1000 lpi, Cont 12	Pb, CR, LF
63	1200,O,7,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
64	9600,N,8,1	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
65	2400,N,8,1	GTCO Binary, 1000 lpi, Cont 100	

Code	Commun.	Output Options	ASCII Options
66	9600,O,7,2	GTCO ASCII, 1000 lpi, Point	Pb, Sp, CR, LF
67	9600,N,8,1	GTCO ASCII, 1000 lpi, Cont 12, Alarm	Pb, CR
68	9600,O,7,2	GTCO ASCII, 100 lpi, Point	Pb, Sp, CR, LF
69	9600,E,7,1	GTCO ASCII, 40 lpmm, Point	CR, LF
70	1200,N,8,1	GTCO ASCII, 100 lpi, Point, Max, Alarm	SP, CR
71	9600,N,8,1	GTCO Binary, 40 lpmm, Cont	Pb
72	1200,O,7,2	GTCO ASCII, 100 lpi, Point	Pb, Sp, CR, LF
73	9600,N,8,1	GTCO ASCII, 1000 lpi, Point	CR, LF
74	9600,N,8,1	GTCO ASCII, 1000 lpi, Cont 100, Alarm	Pb, Sp, CR, LF
75	9600,N,8,1	Calcomp ASCII 3, 1000 lpi, Point	CR
76	9600,N,8,1	Summa ASCII 2, 10 lpmm, Point	CR
77	9600,N,8,1	Summa ASCII 2, 10 lpmm, Cont 100	CR
78	2400,N,8,1	Summa Binary, 10 lpmm, Point	
79	9600,O,7,2	Summa ASCII 1, 10 lpmm, Cont 100	LF
80	9600,O,8,1	Summa Binary, 10 lpmm, Point, Alarm	
81	9600,N,8,1	GTCO ASCII, 40 lpmm, Point	Pb,CR, LF
82	9600,N,8,1	GTCO ASCII, 1000 lpi, Point, Max, Alarm	Pb, Sp, CR, LF
83	9600,N,8,1	GTCO ASCII, 1000 lpi, Cont Incr	Pb, Sp, CR
87	*Special: Science Accessories Emulation; remote function disabled.		
88	*Special: Science Accessories Emulation; remote function enabled.		
89	*Special: Estimation, Inc.		
90-99	User configuration storage locations		

*87-89 require special firmware to activate.

Example: Configuring for Specific Application Programs

To configure the Cordless Roll-Up to operate with Autodesk's AutoCAD application program:

1. Find the entry for AutoCAD in Table 1. The SuperSet code is *01*.

2. Select ⌷S⌷ on the SuperSet Menu. This places the digitizer in **Select Mode**.

3. Choose on the SuperSet Menu. This enters the first digit of the SuperSet code for AutoCAD.

4. Select on the SuperSet Menu. This enters the second digit of the SuperSet code for AutoCAD.

5. You will hear four short tones, indicating that the configuration is complete. The Cordless Roll-Up is now configured to operate with AutoCAD. *Select Mode* is no longer active.

NOTE: After beginning *Select Mode*, you must digitize only in the number blocks to properly enter a SuperSet code. If you digitize in the tablet's active area during *Select Mode*, the sequence will be terminated and the previous configuration will be retained (you will hear three medium-length tones after an aborted sequence). To cancel a sequence if the first digit is entered incorrectly, digitize in the tablet's active area.

Introduction to the Custom Configuration Menu

The Cordless Roll-Up uses the Custom Configuration Menu to control baud rate, data format and other operating characteristics. The Custom Configuration Menu card is stored in one end of the digitizer's housing.

Configuration parameters for the Cordless Roll-Up are divided into three categories:

- Communication Options
- Output Format Options
- Mode Options

Using the Custom Configuration Menu

If the application does not have a SuperSet Menu code, or if a different configuration is required, then use the Custom Configuration Menu card to configure the Cordless Roll-Up. The Custom Configuration Menu replaces the 24 switches that were associated with older GTCO CalComp by Turning Technologies digitizers.

Configurations set up can be stored in any of ten user-definable SuperSet locations (codes 90 through 99) for recall at a later time. This allows the Cordless Roll-Up to be easily switched between applications.

To configure the Cordless Roll-Up using the Custom Configuration Menu:

1. Remove the Custom Configuration Menu card from its storage location in one end of the housing. Place the card in the active area of the tablet (the entire menu must be in the active area). Hold or temporarily tape the card in place to keep it from moving during the configuration process.

2. Select [P] on the SuperSet Menu. The alarm will beep slowly, indicating that the Custom Configuration Menu mode is now ready to receive alignment Point 1.

3. Inform the Controller where the Custom Configuration Menu card is located on the tablet. Choose alignment Point 1 (small blue square) in the lower left corner of the menu area. The alarm will beep rapidly, indicating that the system is waiting to receive alignment Point 2.

4. Pick alignment Point 2 (small blue square) in the lower right corner of the card. After alignment Point 2 is selected, the alarm will sound only of the transducer passes over an active menu block on the card.

NOTE: If invalid alignment points are selected or if the menu card is not entirely in the active area, the menu mode will be aborted. This is indicated by three medium tones from the alarm.

5. Configure the Cordless Roll-Up by selecting the menu blocks that correspond to the settings you want.

6. Review the configuration to ensure that the proper settings have been selected. Pass the transducer down each group of options; the alarm will sound when the transducer is over the active choice.

7. After making your selections, you can save the configuration as a temporary configuration or save the configuration in a user-definable location for later recall,

To save the configuration temporarily:

Select ⎡P⎤ on the SuperSet Menu. You will hear four short tones when you successfully save a configuration. The configuration is saved in a temporary location, where it will be retained even if the unit is powered off or reset. However, if another SuperSet code is entered, this temporary configuration is lost and cannot be recalled without configuring the Cordless Roll-Up again.

To save the configuration in a user-definable location:

Choose ⎡S⎤ and then select a two digit value ranging from 90 to 99 on the SuperSet Menu. You will hear four short tones when you successfully save a configuration. Saved configurations allow you to switch between applications quickly. Locations 90 through 99 retain configurations even if the Cordless Roll-Up is turned off or reset.

8. The configuration setup is now complete. Store the Custom Configuration Menu card in the tablet housing.

Custom Configuration Menu

Click on menu blocks for description of each menu option group:

Custom Configuration Quick Reference

1. Determine the required digitizer settings for your application software.
2. Position this card within the active area of the tablet. Select P in the SuperSet Configuration Menu to activate the Custom Configuration Menu.
3. Set the menu location by clicking the cursor or stylus on Point 1, and then on Point 2.
4. The system will beep when the cursor or stylus is over the current setting in each option group. Depending on options selected, some groups may be inactive. Click on the desired setting to change. To cancel all changes, click in the active area outside the menu.
5. If later recall of the new configuration is required, a SuperSet code can be assigned by selecting S and a two digit number between 90 and 99. If later recall is not required, then select P. You may now resume digitizing.

Communication Options		Output Format Options			Mode Options	
Baud	**Data Bits**	**GTCO**	**CalComp**	**Summa**	**Mode**	**Resolution**
1200	7	Binary	Binary	Binary	Point	100 lpi
2400	8	ASCII	ASCII 1	ASCII 1	Line	200 lpi
4800	**Stop Bits**	**Button**	ASCII 2	ASCII 2	Cont	1000 lpi
9600	1	Include	ASCII 3	Decimal	Line Incr	2000 lpi
19200	2	Exclude	ASCII 4	Include	Cont Incr	10 lpmm
38400	**Parity**	**Space**	**Line Feed**	Exclude	**Rate**	40 lpmm
	Even	Include	Include	**Return**	12	100 lpmm
	Odd	Exclude	Exclude	Include	50	
▪ Point 1	None			Exclude	Max	Point 2 ▪

Custom Configuration Menu Storage

Custom Configuration Quick Reference

1. Determine the required digitizer settings for your application software.
2. Position this card within the active area of the tablet. Select P in the SuperSet Configuration Menu to activate the Custom Configuration Menu.
3. Set the menu location by clicking the cursor or stylus on Point 1, and then on Point 2.
4. The system will beep when the cursor or stylus is over the current setting in each option group. Depending on options selected, some groups may be inactive. Click on the desired setting to change. To cancel all changes, click in the active area outside the menu.
5. If later recall of the new configuration is required, a SuperSet code can be assigned by selecting S and a two digit number between 90 and 99. If later recall is not required, then select P. You may now resume digitizing.

Replacing a Lost Menu Card

If you lose the menu card provided with the Cordless Roll-Up, print and use this page just as you would the original card.

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Custom Configuration Quick Reference

1. Determine the required digitizer settings for your application software.
2. Position this card within the active area of the tablet. Select P in the SuperSet Configuration Menu to activate the Custom Configuration Menu.
3. Set the menu location by clicking the cursor or stylus on Point 1, and then on Point 2.
4. The system will beep when the cursor or stylus is over the current setting in each option group. Depending on options selected, some groups may be inactive. Click on the desired setting to change. To cancel all changes, click in the active area outside the menu.
5. If later recall of the new configuration is required, a SuperSet code can be assigned by selecting S and a two digit number between 90 and 99. If later recall is not required, then select P. You may now resume digitizing.

□ Point 1

Communication Options		Output Format Options			Mode Options	
Baud	Data Bits	GTCO	CalComp	Summa	Mode	Resolution
1200	7	Binary	Binary	Binary	Point	100 lpi
2400	8	ASCII	ASCII 1	ASCII 1	Line	200 lpi
4800	Stop Bits	Button	ASCII 2	ASCII 2	Cont	1000 lpi
9600	1	Include	ASCII 3	Decimal	Line Incr	2000 lpi
19200	2	Exclude	ASCII 4	Include	Cont Incr	10 lpmm
38400	Parity	Space	Line Feed	Exclude	Rate	40 lpmm
	Even	Include	Include	Return	12	100 lpmm
	Odd	Exclude	Exclude	Include	50	
	None			Exclude	Max	

Point 2 □

Communication Options

- **Baud:** The rate, in bits/second, at which characters are transmitted across the RS-232C serial interface. Choices are: 1200, 2400, 4800, 9600, 19200 or 38400.

- **Data Bits:** Data bits represent the actual data being sent from one device to another. Both devices must be set for the same number of data bits. Choices are: Seven (7) or Eight (8).

- **Stop Bits:** Each character has one or two stop bits, which tell the receiving device that a character is complete. The number of stop bits usually does not matter. Setting for two stop bits instead of one may overcome a mismatch in parity or data bits. Choices are: One (1) or Two (2).

- **Parity:** One bit can be allocated for parity (parity is a simple error-detecting scheme). Both devices (sending and receiving) must be set for the same parity – either odd parity or even parity – or they must be set for no parity. Choices are: None (N), Even (E) or Odd (O).

Output Format Options

- **GTCO:** Selects GTCO-compatible formats. See ***Advanced Programing Information*** for greater detail on GTCO format structure. Choices are: Binary or ASCII.

- **CalComp:** Selects CalComp-compatible formats. See ***Advanced Programming Information*** for greater detail on CalComp format structure. Choices are: Binary, ASCII 1, ASCII 2, ASCII 3 or ASCII 4.

- **Summa:** Selects Summagraphics-compatible formats. See ***Advanced Programming Information*** for greater detail on Summagraphic format structure. Choices are: Binary or ASCII.

ASCII formats can be modified by including or excluding a button code, decimal point, carriage return or line feed, depending on whether GTCO, CalComp or Summa formats have been selected.

- **Button:** Defines whether the Pushbutton (Pb) value is included in the ASCII output report. This option is available only with GTCO formats. Choices are: Include or Exclude.

- **Space:** Defines whether the Space (Sp) character (hex 20) is included in the ASCII output report as a delimiter between the X and Y coordinate values. This option is available only in GTCO formats. Choices are: Include or Exclude.

- **Decimal:** Defines whether the period character (hex 2E) is included in the ASCII output report between the units and tenths digits. This option is available only in Summagraphics formats. Choices are: Include or Exclude.

- **Return:** Defines whether the Carriage Return (CR) character (hex 0D) is included in the ASCII output report as a terminator. This option is available in GTCO and Summagraphics formats. Choices are: Include or Exclude.

- **Line Feed:** Defines whether the Line Feed (LF) character (hex 0A) is included in the ASCII output report as a terminator. This option is available in GTCO, CalComp and Summagraphics formats. Choices are: Include or Exclude.

Mode Options

- **Mode:** Defines how output reports are sent from the digitizer. Choices are: Point, Line, Continuous, Line Incremental or Continuous Incremental.

- **Rate:** Determines how fast output reports will be transmitted from the digitizer. Choices are: 12, 50 or 100 reports per second.

- **Resolution:** The smallest reported value returned by the digitizer. Choices are: 1000 lpi, 2000 lpi, 4000 lpi, 40 lpmm, 100 lpmm or 150 lpmm.

See the ***Advanced Programming Information*** section for more details.

Controlling the Alarm

Disable the alarm (for ***transducer pressed***) if you do not want to hear it while using the digitizer. When the alarm is off, you will still hear diagnostic and menu-related tones.

To turn the alarm on and off:

- Select the 🔊 block on the SuperSet Menu.

Resetting the Cordless Roll-Up

There are three ways to reset the Cordless Roll-Up:

- Enter SuperSet code 00
- Unplug and re-plug the power supply
- Send remote commands

When one of these events occurs, the Cordless Roll-Up will revert to the configuration that was last defined. Any remote commands that were active before the reset will be lost.

Cordless Roll-Up Tones

The Cordless Roll-Up produces an ***"alarm"*** in the form of audio tones to inform the user of various events. The table below describes the kinds of tones you may hear while operating the digitizer.

Table 3: Cordless Roll-Up Tones

Length	Number of times	Meaning
Short	Four at power up	Diagnostics passed
Short	Four	Successful end of menu mode
Short	Once	Transducer switch pressed
Short	Ten (every ten minutes)	Battery low
Medium	Three	Menu mode aborted
Medium	Three at power up	Configuration error
Medium, once per second	Continously	Configuration Menu mode; waiting for alignment Point 1
Short, twice per second	Continously	Configuration Menu mode; waiting for alignment Point 2
Long, once per second	Continously	Grid disconnected
Continuously on	At power up	Diagnostics failed

Short = 1/16 second   Medium = 1/4 second   Long = 1/2 second

- **Configuration error** indicates that the Cordless Roll-Up may not be properly configured for the application. If you hear this tone, reselect the appropriate configuration from the SuperSet Menu.

- **Diagnostics failed** and **Grid disconnected** indicates serious problems. If you hear either of these tones, contact GTCO CalComp by Turning Technologies Technical Support Department at 1.866.746.3015.

- **Battery low** indicates that the battery in the transducer should be replaced. The system is designed to continue operating properly for a short time after the battery low alarm starts; however, the battery should be replaced promptly to avoid performance degradation.

NOTE: You might also hear tones produced by the Cordless Roll-Up which are sent by the application program. (Programs can send commands to the digitizer to turn the audio tone generator on and off.) If you hear tones during digitizing and they do not correspond to tones listed in the table above, they are produced by the application program.

Troubleshooting Guide

As with any computer peripheral, Cordless Roll-Up problems sometimes do occur. This troubleshooting guide provides clear instructions for finding and solving all common Cordless Roll-Up issues. In a majority of cases, you will be able to quickly resolve the problem yourself by following the below steps.

1. **Install properly first.**
   This troubleshooting guide assumes you have already correctly installed Cordless Roll-Up according to the detailed instructions in the *Installing the Cordless Roll-Up* section. If you have not followed the step-by-step instructions in that section, do so now.

2. **Work through the troubleshooting flowcharts on the following pages in this troubleshooting guide.**

3. **If your system still does not work.**
   Call GTCO CalComp by Turning Technologies Technical Support Department at 1.866.746.3015. Be prepared to discuss the observations you made while troubleshooting. A Technical Support Specialist will help you resolve the problem as quickly as possible.

NOTE: Refer to Table 3: Cordless Roll-Up Tones table on the previous page while using this guide.

Procedure A: Begin Troubleshooting

```
         ┌─────────────────────┐
         │    Procedure A      │
         └─────────────────────┘
                   │
         ┌─────────────────────┐
         │ Reset Cordless Roll-Up. │
         └─────────────────────┘
                   │
         ┌─────────────────────┐        [To listen to tones again, just
         │   Listen to tones.  │───     reset Cordless Roll-Up again.)
         └─────────────────────┘
                   │
         ┌─────────────────────┐
         │ Compare tones to those in Table 3. │
         └─────────────────────┘
                   │
         ┌─────────────────────┐  Yes   ┌─────────────────────┐
         │ Did you hear four "Success!" tones? │──────│ Go to Procedure B.  │
         └─────────────────────┘        └─────────────────────┘
                   │ No
         ┌─────────────────────┐        (Possible communication problem
         │    Call GTCO.       │        between the Cordless Roll-Up and
         └─────────────────────┘        the computer.)
```
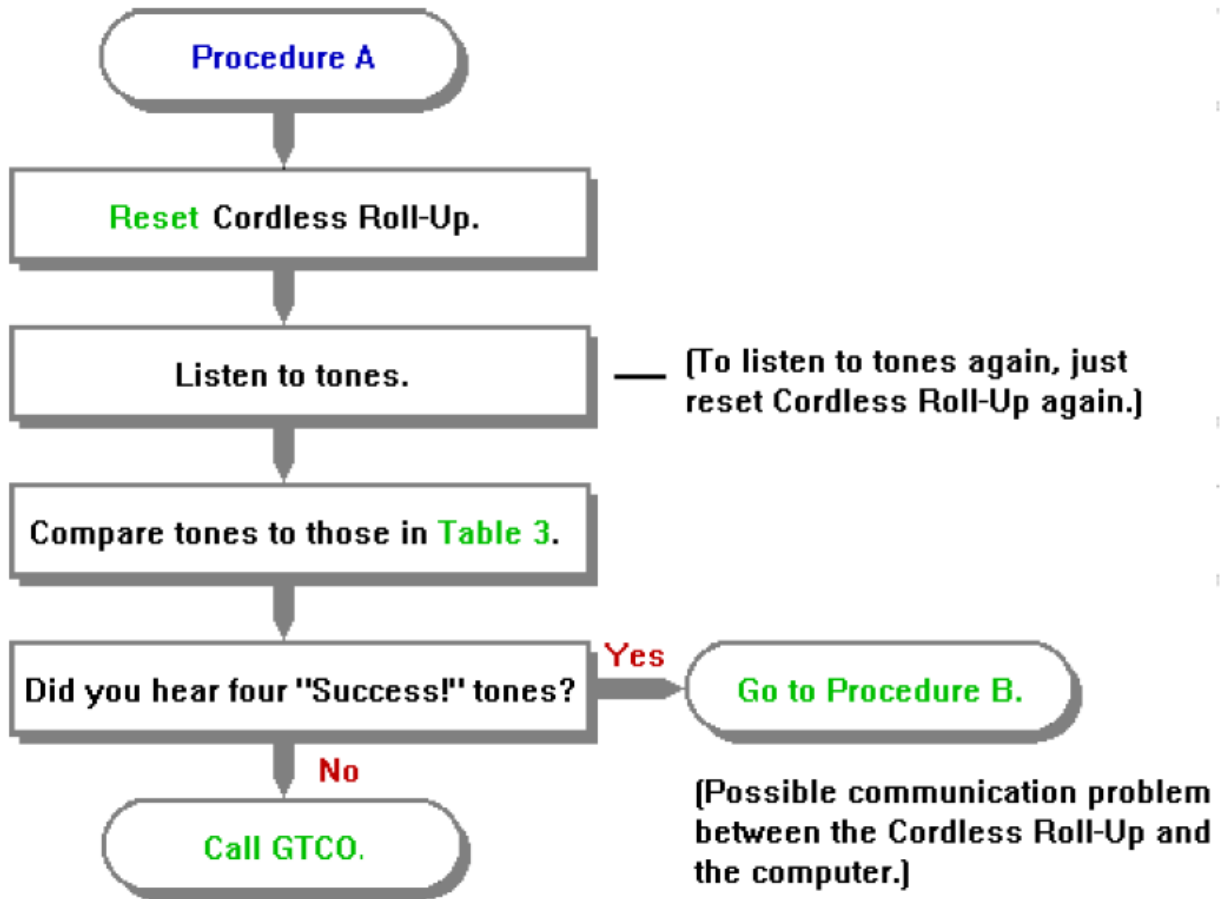
Procedure B: Troubleshooting

Use Procedure B if Cordless Roll-Up sounds "Success!" tones, but doesn't seem to be communicating with the application program.

Procedure B

Is application program set for GTCO Cordless Roll-Up? Are computer communication parameters (baud rate, parity, stop bits, data bits, COM port) set properly?

No → Reconfigure program and/or computer. (If Cordless Roll-Up isn't listed, select GTCO Digi-Pad T5, T5A or Roll-Up.

Does Cordless Roll-Up communicate now?

Yes → **Done**

Yes / No

How are you configuring the Cordless Roll-Up?

With SuperSet Menu → Find SuperSet Code for application program in Table 1

Enter code on SuperSet Menu.

With Configuration Menu → Configure Cordless Roll-Up per settings in application program's manual.

Save setting in SuperSet storage locations 90-99, if desired.

Does Cordless Roll-Up communicate now?

Yes → **Done**

No → **Go to Procedure C.**

Procedure C: Troubleshooting

Procedure C

Move RS232C cable to different serial port on computer.

Does Cordless Roll-Up communicate now? — **Yes** → Done

No

Second time you pass this box, read note.

— **Note:** If you try all possible port-to-port cable combinations, with both your application program and GTCOTEST, and the Cordless Roll-Up still doesn't communicate with the computer, then **call GTCO.**

Run GTCOTEST.

Does Cordless Roll-Up work with GTCOTEST? — **No** → Verify that GTCOTEST is set up properly and that Cordless Roll-Up options are set per instructions for GTCOTEST. Recofigure as needed.

Yes

Install application program again. Configure Cordless Roll-Up to match.

Go to beginning of Procedure C.

Does Cordless Roll-Up communicate now? — **Yes** → Done

Try moving cables again.

No

Go back to Procedure B — Try checking configuration again.

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Using GTCOTEST

GTCOTEST is a program that runs on the PC. It can be used to perform communication and diagnostic tests on an installed Cordless Roll-Up. GTCOTEST is provided on the TabletWorks CD with your system.

1. Select SuperSet Code 01 on Cordless Roll-Up (9600, N, 8, 1, GTCO Binary, 1000 lpi, Cont, 100).
2. To run GTCOTEST, insert the TabletWorks CD in the CD-ROM drive. GTCOTEST will work only if no Wintab drivers are installed. From the directory listing of the CD, switch to the folder that contains the gtcotest.exe files. Type **gtcotest** and follow the on-screen instructions.
3. Once GTCOTEST's third screen has been reached, the pull-down menu headings will read: **Communications**, **Diagnostics**, **Setup** and **Check Output**. Select **Read Switches** in the diagnostics window. Communication has been established if 0's and 1's appear in the display box.
   - If GTCOTEST displays the *Serial input timeout* error message, try selecting another COM port in the Communications window.
   - If GTCOTEST displays the *Cannot open COM port* error message, try selecting another COM port in the Communications window. (Each PC serial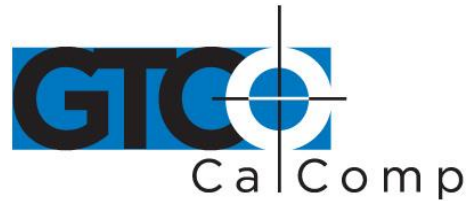 port has a physical address that corresponds to a specific COM port. If there is only one serial port installed in the computer, it will be assigned as COM 1regardless of its physical address. GTCOTEST examines only the physical address.)
4. Once communication is established, select the *Read Tablet Size* and *Read Version* options, making a note of the responses. This can easily be done with your print screen key if a printer is connected to your computer.
5. Select *Check Output* and then choose **High Res Binary**.
6. Place the transducer in the active area on the tablet.
7. If everything is working properly, you should see data displayed on the computer screen in the following format: p   XXXXXX   YYYYYY

P = pushbutton code   XXXXXX = X coordinate data   YYYYYY = Y coordinate data

8. When you move the transducer around the active area, the X and Y coordinate data should change. When you press different cursor buttons, the pushbutton code should change.

9. If GTCOTEST indicates that the digitizer is functioning properly, check your software application setup and SuperSet code for accuracy. If you have any questions about your results or need assistance running GTCOTEST, contact our Technical Support Department.

Cordless Roll-Up Technical Specifications

Dimensions/Weight	Active Area	Footprint	Weight	Avg. Ship Wt.
	30" x 36"	35" x 44"	6 lbs.	17 lbs.
	36" x 48"	41" x 56"	7.25 lbs.	21 lbs.

Technology	Electromagnetic
Resolution	Up to 2000 lpi (lines/inch) or 100 lpmm (lines/millimeter)
Lock Height	0.5 inch (12.7 mm)
Coordinate Origin	Selectable (Factory default: lower left corner)
Recommended Roll Diameter	8 inches (200 mm)
Operating Temperature	41° to 115° F (5° to 46° C)
Storage Temperature	-4° to 158° F (-20° to 70° C)
Humidity Range	0% to 100%, non-condensing
Operating Modes	Point, Line, Continuous, Line Incremental, Continuous Incremental, Remote Request
Baud Rates	1200, 2400, 4800, 9600, 19200 and 38400
Transducer Switches	Rated life over 1 million actuations
Transducer Battery Life	Approximately 350 hours of continuous use
Stylus Battery	AAA Battery
Cursor Battery	3.5V 750mAH lithium (Eagle-Picher LTC-7PN-S4 or equivalent)
Emulations	GTCO T5A, CalComp 9100/9500, Summagraphics Microgrid and ID Series
Power Supply	Output voltage +9VDC at 500mA, Center positive
Interface	RS-232C (See Figure 4)
Adapter	9- to 25-pin (See Figure 5)

Figure 3: Power Supply Connector
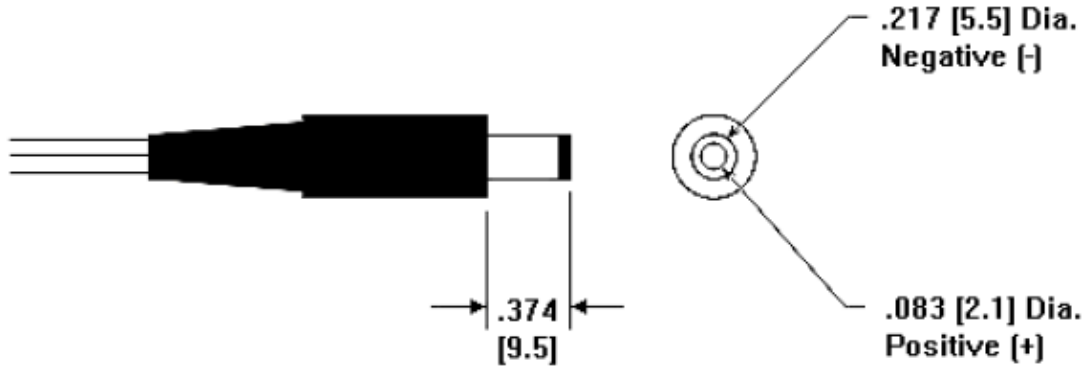
Figure 4: RS-232C Interface
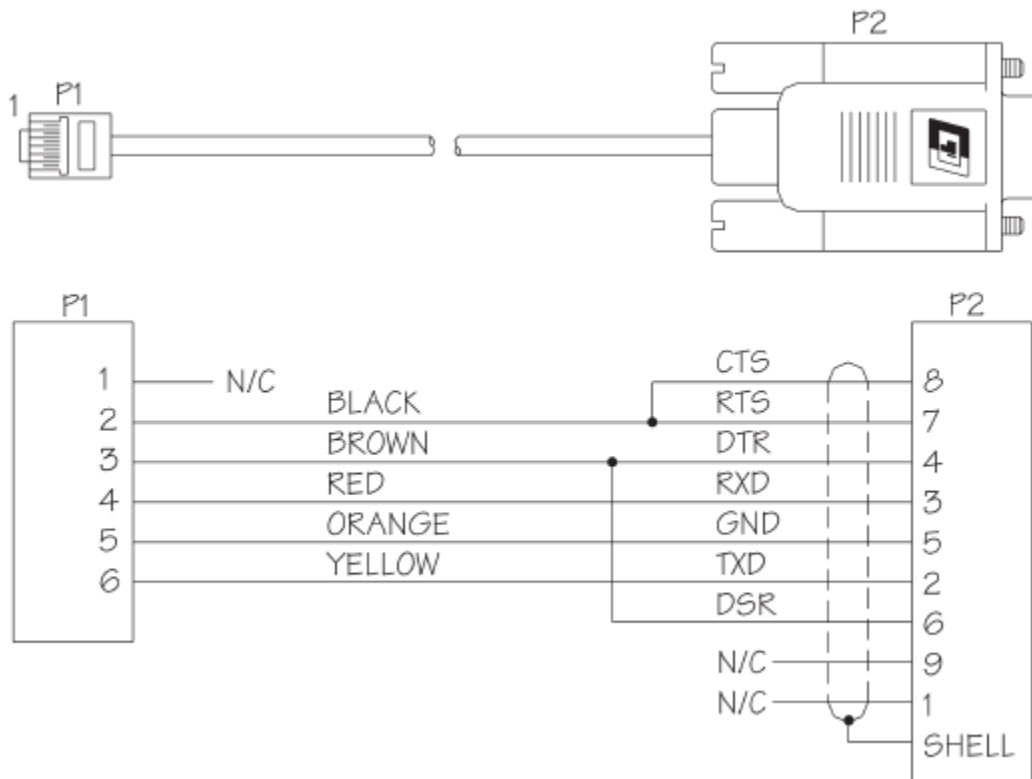
Figure 5: 9- to 25-Pin Adapter
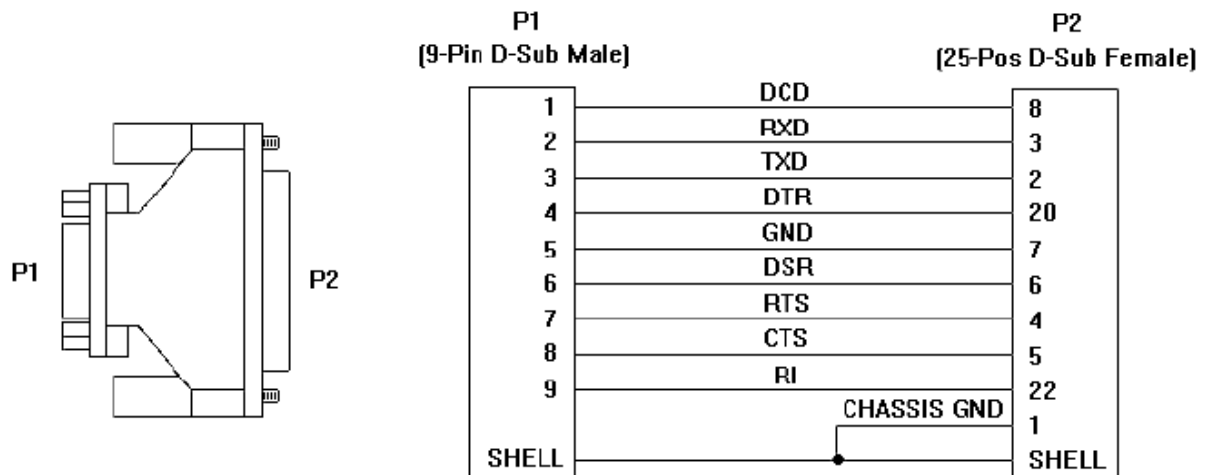
Advanced Operating Information

Cordless Roll-Up Interfacing

The following information is not required for normal Cordless Roll-Up operation.

Connecting the Cordless Roll-Up to a computer is usually a straight forward process (see **Installing Cordless Roll-Up** section in this manual). If you do not have a typical interfacing situation, the information in this section will offer assistance to setting up the Cordless Roll-Up and connect it to another device.

The Cordless Roll-Up is equipped to communication via RS-232C, a widely used serial interface between computers and peripherals. RS-232C is a (more or less) standard interface, and cables and connectors are available from a variety of sources. A majority of computers and peripherals either have an RS-232C interface or can be equipped with one.

A mini-tutorial on RS-232C interfacing

This section provides basic information about RS-232C communications. There are three areas to consider when using RS-232C:

- Character Format and Baud Rate
- Cabling
- Flow Control

Character Format and Baud Rate

Character format and baud rate govern how bits are assembled to form characters and the speed of transmission. Both Cordless Roll-Up and the computer must have identical formats and rates. These are the parameters you must set for both devices:

- **Data Bits:** Data bits represent the actual data being sent from one device to another. Both devices must be set for the same number of data bits. Choices are: Seven (7) or Eight (8). If they are not set the same, some or all of the data may be garbled.

- **Parity:** One bit can be allocated for parity (parity is a simple error-detecting scheme). Both devices (sending and receiving) must be set for the same parity – either odd parity or even parity – or they must be set for no parity. Most digitizing application software does not check for parity.

- **Stop Bits:** Each character has one or two stop bits, which tell the receiving device that a character is complete. The number of stop bits usually does not matter. Setting for two stop bits instead of one may overcome a mismatch in parity or data bits. Choices are: One (1) or Two (2).

- **Baud:** The rate, in bits/second, at which characters are transmitted across the RS-232C serial interface. Choices are: 1200, 2400, 4800, 9600 and 19200 baud (bits per second). The 9600 rate is popular for digitizing.

Cabling

Cabling carries data from one device to the other. The interface cable, shown in Figure 4, supplied with the Cordless Roll-Up is terminated in a 9-pin subminiature D connector. It attaches to a standard AT-compatible RS-232C connector.

The computer may have a 25-pin RS-232C connector, rather than a 9-pin connector. If so, use the 9- to 25-pin adapter, shown in Figure 5, supplied with the Cordless Roll-Up.

Flow Control

Flow control is the process of regulating the traffic or flow of data between two RS-232C devices. Flow control prevents the transmission and subsequent loss of data if the receiver is not ready to accept it. Examples of devices that use flow control are: a printer to signal buffer full; a modem to indicate carrier detect; and a time-shared computer that services multiple users on a time-available basis.

There are two kinds of flow control:

■ **Software flow control** is often used over communication links where only a 3-wire cable is used (Transmit Data, Receive Data, Ground) or over telephone lines. The Cordless Roll-Up is equipped for software flow control. It will immediately stop sending data when it receives an ASCII XOFF character (CTRL-S, hex 13). Transmission will resume when it receives an ASCII XON character (CTRL-Q, hex 11). Character flow control will work with the straight through cable and the null modem cable.

■ **Hardware flow control** (also called modem lead flow control) uses one or more lines in the RS-232C cable to send status signals from one device to another. The Cordless Roll-Up is not equipped for hardware flow control.

Remote Commands

NOTE: The following information is not required for normal Cordless Roll-Up operation.

Cordless Roll-Up can receive commands from other devices through its RS-232C port. Commands cause the Cordless Roll-Up to change the way it operates, to use certain coordinate formats and to do other things directed by you or by an application program.

Commands offer another way to control Cordless Roll-Up operation besides the Custom Configuration Menu. Certain Cordless Roll-Up functions can be carried out only through commands.

If you are developing your own application software, be cautious about using commands in your program. An interruption in power to the Cordless Roll-Up or a Reset will cause it to discard any command changes it has received. This could leave the program confused about what the Cordless Roll-Up is doing. A full system reset would then be needed to get the digitizer and computer coordinated again.

The Cordless Roll-Up responds to three kinds of commands:

- GTCO Cordless Roll-Up Standard Commands (with some omissions and additions)
- CalComp Emulation Commands
- Summagraphics Emulation Commands

GTCO CalComp by Turning Technologies Cordless Roll-Up Command Summary

Functional control commands

Reset	RS
Select Point Mode	PT
Select Line Mode	LN
Select Continuous Mode	CN
Select Line Incremental Mode	IC
Select Continuous Incremental Mode	CL
Select Remote Request Mode	RM
Read Current Coordinate	<Ctrl-B> (hex 02)
Set Increment Value	IV
Send Coordinates 0,0 When Transducer Is Out of Active Area	OP
No Output When Transducer Is Out of Active Area	IP
Set Digitizing Rate	Rx
Change Mode Character	MC
Enable Echo Mode	EM
Disable Echo Mode	<Ctrl-O> hex 0F

Alarm commands

Enable Alarm	AE
Disable Alarm	AD
Tone Pause	T0
Sound Tone	T1
Sound Tone	T2
Sound Tone	T3
Sound Tone	T4

Format selection commands

ASCII Format Output	AS
Binary Format Output	BI
Select English Measurement Scale	IN
Select Metric Measurement Scale	MT
Low Resolution	LR
High Resolution	HR
Highest Resolution	H1
Pushbutton Include	PI
Pushbutton Exclude	PE
Space Include	SI
Space Exclude	SE
Carriage Return Include	CI
Carriage Return Exclude	CE
Line Feed Include	LI
Line Feed Exclude	LE

Diagnostic commands

Transmit Version Number	VR
Display Tablet Active Area Size	SZ
Read Tablet Diodes	RD

Functional Control Commands

Reset   Code: **RS**

The Reset command will reset the Controller to the last known configuration, clearing all previous commands sent to the Controller. If a SuperSet Menu configuration has been selected, the Reset command will reset the Controller to the SuperSet Menu value.

Select Point Mode	Code: **PT**
Select Line Mode	Code: **LN**
Select Continuous Mode	Code: **CN**
Select Line Incremental Mode	Code: **IC**
Select Continuous Incremental Mode	Code: **CL**
Select Remote Request Mode	Code: **RM**

Read Current Coordinate   Code: hex 0**2 (Ctrl-B)**

The Read Current Coordinate causes the Cordless Roll-Up to output a coordinate while it is in Remote Request Mode. This command can be sent to the Cordless Roll-Up only when it is digitizing and only when Remote Request Mode is in Command Mode. Please note that this command is not two ASCII characters. It is the one-byte-long STX character, CTRL-B (hex 02). Cordless Roll-Up responds to the Read Current Coordinate command by transmitting one format.

Set Increment Value   Code: **IV**

In Line Incremental and Continuous Incremental modes, the Cordless Roll-Up outputs a coordinate when the transducer is moved beyond a certain incremental distance in either the X or Y direction. The default increment is 0.01". The Set Increment Value command allows the user to select the distance which the transducer must move to initiate coordinate output. It works as follows:

1. Enter Command Mode by sending a CTRL-A.
2. After receiving the > prompt, send IV and a <CR> (hex 0D).
3. The Controller will respond with a <.
4. After receiving the <, send a three-digit string ranging from 000 to 999. This string represents an increment value of 0.000 to 0.999 inch.
5. When the Controller receives the last character it will respond with a > prompt and await the next command.

Send Coordinates 0,0 When Transducer is Out of Active Area   Code: **OP**
No Output When Transducer is Out of Active Area   Code: **IP**

Certain situations require that the Cordless Roll-Up be able to send a coordinate when the transducer is out of the active area. Command OP permits coordinates to be sent under this condition. Since valid coordinates are not available when the transducer is out of the active area, coordinates 0,0 are substituted in the format. When this command has been executed, digitizing modes operate normally, whether the transducer is in the active area or not. Command IP returns Cordless Roll-Up to the default condition, in which coordinates are sent only when the transducer is in the active area.

Set Digitizing Rate   Code: **Rx**

Coordinates can be sent from the Cordless Roll-Up at rates from 5 to 140 coordinates per second. The second character in this command sets the rate, as shown in the table below. Actual rates are limited by the communication baud rate and coordinate type you have selected. The rates shown here are, therefore, maximum rates.

Rate Commands

Digitizing rate, formats/second	12	100	100	5	10	50
Digitizing rate command	R1	R2	R3	R4	R5	R6

Change Mode Character   Code: **MC**

Some applications may have a predefined meaning for the SOH (CTRL-A) character used to invoke Command Mode. If so, invoking Command Mode may cause your system to do something else. You can set the Cordless Roll-Up so that a character other than SOH is used to begin Command Mode. Here is how to make the substitution:

1. Enter Command Mode.
2. Send MC, followed by a <CR>. Cordless Roll-Up responds with the prompt message: **ENTER NEW COMMAND MODE CHARACTER:**.
3. Enter the desired mode change character. The new mode character can be any character except ESC (CTRL-[, hex 1B), <CR> (CTRL-M, hex 0D), CAN (CTRL-X, hex 18), VT (CTRL-K, hex 0B), XON (CTRL-Q, hex 11) or XOFF (CTRL-S, hex 13).

Now, when you want to enter the Command Mode, send the new character. All other command operations remain unchanged.

Select English Measurement Scale   Code: **IN**
Select Metric Measurement Scale   Code: **MT**

Invoking these commands causes the Cordless Roll-Up to scale coordinates in the desired measurement system. The Cordless Roll-Up measures in only one scale at a time. See *Measurement Scales* for additional information on how scale selection affects coordinate data.

Enable Echo Mode   Code: **EM**
Disable Echo Mode   Code: hex 0**F (Ctrl-O)**

These commands control echoing by the Cordless Roll-Up. When enabled, echoing transmits each received character back to the sending device.

Format Selection Commands

ASCII Format Output   Code: **AS**
Command causes coordinates to be transmitted in ASCII. ASCII coordinates can be modified by the Low/High/Highest Resolution, Pushbutton, Space, Carriage Return and Line Feed commands and by menu settings.

Binary Format Output   Code: **BI**
Command causes coordinates to be transmitted in binary format. Binary coordinates can be modified by the Low/High/Highest Resolution commands and by menu settings.

Low Resolution   Code: **LR**
Command modifies ASCII and binary formats. If ASCII formats have been selected, the Low Resolution command causes the least significant digit to represent 0.001 inch or 0.025 millimeter, depending on whether English or metric scale has been selected. Both X and Y portions of each ASCII format will be four digits long if in English scale or five digits long if in metric scale.

If the binary format is selected, the least significant bits represent 0.001 inch or 0.025 millimeter, depending on whether English or metric scale has been selected.

High Resolution   Code: **HR**
Command modifies ASCII and binary formats. If ASCII formats have been selected, the High Resolution command causes the least significant digits to represent 0.00025 inch or 0.0067 millimeter, depending on whether English or metric scale has been selected. Both X and Y portions of each ASCII format will be six digits long.

If binary formats have been selected, the least significant bits represent 0.001 inch or 0.025 millimeter, depending on whether English or metric scale has been selected.

Format Selection Commands, Cont.

Pushbutton Include   Code: **PI**
Pushbutton Exclude   Code: **PE**

Space Include   Code: **SI**
Space Exclude   Code: **SE**

Carriage Return Include   Code: **CI**
Carriage Return Exclude   Code: **CE**

Line Feed Include   Code: **LI**
Line Feed Exclude   Code: **LE**

These commands control the presence of the corresponding characters in ASCII formats. Pushbutton codes and where they appear in coordinates are described in the ***Advanced Programming Information*** section. When included, the space is an additional character separating the X and Y components of the coordinate data. When included, the LINE FEED is an additional character following the <CR>.

Alarm Commands

Enable Alarm   Code: **AE**
Disable Alarm   Code: **AD**
These commands enable or disable the audible alarm. When enabled, a short tone will sound when a transducer switch is pressed. When disabled, the alarm will not sound in response to transducer switch presses, but it may be sounded by remote commands and will be active during diagnostics and in the menu modes.

Sound Tone   Code: **T1**
Tone Pause   Code: **T0**
The Sound Tone command allows a remote device to sound the Cordless Roll-Up's audible alarm. Tone Pause provides a pause between tones. Tones and pauses are in 0.25 second intervals. Tone commands are not affected by the Disable Alarm command.

Diagnostic Commands

Transmit Version Number   Code: **VR**
Command causes Cordless Roll-Up to determine and transmit the version number of the firmware currently installed.

Display Tablet Active Area Size   Code: **SZ**
Cordless Roll-Up automatically determines the size of the attached tablet's active area when it is turned on or reset. This command can be used to send the information to another device. The size is encoded as four digits: two digits representing vertical size in inches followed by two digits representing horizontal size in inches. For example, the 36" x 48" Cordless Roll-Up sends the digits 3648 in response to this command.

Read Tablet Diodes   Code: **RD**
Diagnostic command causes the Cordless Roll-Up to examine the attached tablet and send the results to another device for display. A "1" means a diode is present and a "0" represents a diode is missing.

CalComp Emulation Commands

The Cordless Roll-Up recognizes a subset of the CalComp 9500 command set. Space does not permit a detailed description of CalComp commands. However, most of the commands in this subset have equivalent Cordless Roll-Up commands. For further information about the operation of those commands, please refer to the Cordless Roll-Up command or function description in the ***GTCO CalComp by Turning Technologies Cordless Roll-up Command Summary***.

NOTE: CalComp commands must be terminated with a <CR>, which is not shown in the codes listed here. Commands can be strung together by substituting an @ character for the <ESC>% sequence after the first command and postponing the <CR> until the end of the multiple command string.

Disable/Enable Echo   Code: **ESC%En**
Where n = 0 to 3 (0 and 2 disable echo, 1 and 3 enable echo). If n is not included in the command, echo is toggled on or off from its previous state.

(Equivalent to Enable Echo Mode, EM, and Disable Echo Mode, hex 0F.)

Set Increment Run Mode   Code: **ESC%IR**
(Similar to Select Continuous Incremental Mode, CL, except that one coordinate format is sent when the transducer button is pressed or released.)

Set Incremental Track Mode   Code: **ESC%IT**
(Equivalent to Select Line Incremental Mode, IC.)

Set Incremental Line Mode   Code: **ESC%IU**
(Similar to Select Line Incremental Mode, IC, except that one additional coordinate format is sent when the cursor pushbutton is released.)

Set Resolution (English)   Code: **ESC%JRn1,n2**
Set Resolution (Metric)   Code: **ESC%JMn1,n2**
Where n1 = 1 to 2540 lpi or 1 to 100 lpmm; and n2 = 0 to 6, representing location of decimal point in format 4 (0 implies decimal point to right of least significant digit; 1 to 6 designate number of digits to right of decimal point). Not meaningful in other formats.

(Similar to Low Resolution, LR; High Resolution, HR; Highest Resolution, H1; Select English Measurement Scale, IN; Select Metric Measurement Scale, MT.)

Set Origin   Code: **ESC%Jh**
Where h = location of origin selected from this list: LL = lower left; LR = lower right; UL = upper left; UR = upper right; C = center.

Set Line Feed   Code: **ESC%Ln**

Where n = 0 to 3 (0 or 2 excludes Line Feed, 1 or 3 includes Line Feed). If n is not included in command, Line Feed is toggled on or off from its previous status.

(Equivalent to Line Feed Include, LI; Line Feed Exclude, LE.)

Set Point Mode   Code: **ESC%P**

(Equivalent to Select Point Mode, PT.)

Set Prompt   Code: **ESC%Qh1h2**

Where h1 = prompt character and h2 = optional resend character.

(Similar to Select Remote Request Mode, RM, and the Read Current Coordinate command, hex 02.)

Cancel Prompt   Code: **ESC%Q**

Cancels prompt mode. (Same as selecting any digitizing mode except Remote Request.)

Set Run Mode   Code: **ESC%R**

(Equivalent to Select Continuous Mode, CN)

Set Track Mode   Code: **ESC%T**

(Equivalent to Select Line Mode, LN.)

Set Line Mode   Code: **ESC%U**

(Similar to Select Line Mode, LN, except that one additional coordinate format is sent when the cursor pushbutton is released.)

Set Cursor LED #2 and #3   Code: **ESC%Vn**

Where n = 0 to 3 (0 and 1 turn green LED off and on respectively, 2 and 3 turn yellow LED off and on respectively; for Illuminated Cursor, 2 and 3 turn cursor lamps off and on respectively).

(Similar to Turn Status Indicator On, ON, and Turn Status Indicator Off, OF.)

Reset   Code: **ESC%VR**

(Equivalent to Reset, RS.)

Send Tablet Size   Code: **ESC%VS**

(Similar to Display Tablet Active Area Size, SZ; response is upper right corner coordinate based on current resolution and origin.)

Set Data Rate   Code: **ESC%Wn**

Where n = 1 to 100, representing number of coordinates per second, subject to baud rate limitations.

(Equivalent to Set Digitizing Rate commands R1 through R6.)

Set X Increment Value   Code: **ESC%Xn**
Set Y Increment Value   Code: **ESC%Yn**
Where n = 0 to 65,535, the increment expressed in terms of the number of counts at the current resolution.

(Similar to Set Increment Value, IV, which expresses the increment in 0.001 inches.)

Set Data Proximity   Code: **ESC%Zn**
Where n = 0 for output when out of proximity and 1 for no output when out of proximity.

(Similar to Send Coordinate 0,0 When Transducer Is Out Of Active Area, OP, and No Output When Transducer Is Out Of Active Area, IP, except that the last valid coordinate is sent.)

Change Format   Code: **ESC%^n**
Where n = 4, 5, 6, 7 or 23:

    n = 4, 5, 6, 7 for CalComp ASCII formats 1, 2, 3, 4 respectively

    n = 23 for CalComp binary format

(Equivalent to selection of CalComp format options on the Custom Configuration Menu.)

Tone   Code: **CTRL-G** (hex **07**)
(Equivalent to Sound Tone, T1.)

Summagraphics Emulation Commands

The Cordless Roll-Up recognizes a subset of the Summagraphics UIOF command set. Space does not permit a detailed description of Summagraphics commands. However, most of the commands in this subset have equivalent Cordless Roll-Up commands. For further information about the operation of those commands, please refer to the Cordless Roll-Up command or function description in the ***GTCO CalComp by Turning Technologies Cordless Roll-Up Command Summary***.

NOTE: Summagraphics commands do not require a terminator.

Reset   Code: **ESCZ**
(Equivalent to Reset, RS.)

Binary Format   Code: **ESCMB**
(Equivalent to Binary Format Output, BI.)

ASCII Format   Code: **ESCMA**
(Equivalent to ASCII Format Output, AS.)

Line Feed Toggle   Code: **ESCML**
(Similar to Line Feed Include/Exclude, LI/LE.)

Decimal Point Include   Code: **ESCd1**
Decimal Point Exclude   Code: **ESCd0**

Set Delimiter   Code: **ESCDn**
Where n = new delimiter character for ASCII formats; default is ",".

Stream Mode   Code: **ESCM0**
(Equivalent to Select Continuous Mode, CN.)

Point Mode   Code: **ESCM1**
(Equivalent to Select Point Mode, PT.)

Switch Stream Mode   Code: **ESCM2**
(Equivalent to Select Line Mode, LN.)

Prompt Mode   Code: **ESCM3**
(Equivalent to Select Remote Request Mode, RM.)

Send New Report   Code: **ESCG**
(Equivalent to Read Current Coordinate, hex 02.)

Resend Last Report   Code: **ESCg**

Increment Mode   Code: **ESCInnn**
Where n = 000 to 255, representing increment size in counts.

(Similar to Select Continuous Incremental Mode, CL, followed by Set Increment Value, IV.)

Set Report Rate   Code: **ESCRn**
Where n = 0 to 9 (0 = 1, 1 = 2, 2 = 5, 3 = 10, 4 = 30, 5 = 60, 6 = 85, 7 = 100, 8 = 100, 9 = 100 coordinates per second, subject to baud rate limitations).

(Equivalent to Set Digitizing Rate, R1 to R6.)

Proximity Transmission   Code: **ESCW0**
(Equivalent to No Output When Transducer Is Out Of Active Area, OP.)

Proximity Transmission   Code: **ESCW1**
(Similar to Send Coordinate 0,0 When Transducer Is Out Of Active Area, IP, except that the last valid coordinate is sent.)

Sound Annunciator   Code: **ESCA**
Sound Annunciator   Code: **ESCYn**
Where n= 1 to 4 (1 = low tone, 4 = highest tone, but AccuTab has only one tone).

(Equivalent to Sound Tone, T1.)

Relocate Origin   Code: **ESCFn**
Where n = 0 to 5 (0 = lower left, 2 = center, 3 = upper left, 4 = lower right, 5 = upper right).

Resolution   Code: **ESCCn**
Where n = 0 to 6 (0 = 200 lpi, 2 = 1000 lpi, 4 = 2000 lpi, 1 = 10 lpmm, 3 = 40 lpmm, 5 = 80 lpmm, 6 = double set resolution).

(Similar to combinations of Low Resolution, LR; High Resolution, HR; Highest Resolution, H1; English, IN; Metric, MT.)

Variable Resolution   Code: **ESCPab**
Where a = X or Y (axis) and b = 0001 to 1016 (resolution in lpi).

Confirm Resolution   Code: **ESCa**
(Similar to Display Tablet Active Area Size, SZ; response is upper right corner coordinate based on current resolution in current format.)

Command Mode Basics

To enter GTCO CalComp by Turning Technologies Command Mode:

Send an ASCII CTRL-A (hex 01) character to the Cordless Roll-Up. When the Cordless Roll-Up receives the CTRL-A, two things happen:

- Digitizing stops and new coordinates are not generated. If Command Mode is invoked during transmission of a coordinate, that coordinate transmission will be completed.

- Cordless Roll-Up sends a ">" (hex 3E) as a prompt to the commanding device. The Cordless Roll-Up is now ready to accept commands.

A **command** consists of two *upper case* ASCII letters or numbers followed by a delimiter. The delimiter lets the Cordless Roll-Up know the command is complete. There are two kinds of delimiters:

- <CR> (carriage return, hex 0D): indicates end of current command and more commands will follow. If the command just sent is valid, it will be carried out. The Cordless Roll-Up then sends another > prompt and awaits the next command.

- <ESC> (escape, hex 1B): indicates end of current command and no more commands will follow. If the command is valid, it will be carried out. Then the Cordless Roll-Up will exit Command Mode and return to Digitizing Mode.

If you are entering several commands, end each one with a carriage return delimiter. After each <CR>, the Cordless Roll-Up carries out the command and sends a new command prompt. After the last command or if you are entering only one command, use an <ESC>. The Escape delimiter takes you directly back to Digitizing Mode.

If the command entered is not recognized as a valid command, it will be ignored and Cordless Roll-Up will send a "?" (question mark). If the delimiter following an invalid command was an <ESC> (indicating your desire to leave Command Mode), Cordless Roll-Up stays in the Command Mode, awaiting a valid command.

A command may be aborted before entering a delimiter by sending a CTRL-X (hex 18). The Cordless Roll-Up then ignores the preceding one or two characters and responds with a new prompt.

To Leave Command Mode:

Send an <ESC> (hex 1B). The <ESC> may follow a command code or it can be sent in response to the Cordless Roll-Up's prompt. Cordless Roll-Up returns to digitizing, now operating according to the commands sent to it.

A Hint for Programmers

Here is the most efficient method for sending commands:

1. Send the CTRL-A and wait until the Controller responds with the prompt >. A loop that retrieves one byte at a time from the serial port and checks for the > is best.

2. Send the command one character at a time. The Controller will respond by echoing each character. Waiting for the character to be echoed will ensure that the Controller has received the character and is waiting for the next one.

3. Once the command is complete, send a <CR> or <ESC> (hex 1B) to exit command mode.

4. If you send a <CR>, go into a loop and grab one byte at a time until a > prompt is received. Then continue sending commands as described in step 2.

Programming Example: To Send Version Command and Display Results

The QBASIC program interacts with the Cordless Roll-Up in Command Mode. In this example, the program activates Command Mode, sends the VR command and displays the resulting firmware version transmitted by the Cordless Roll-Up.

1. Configure Cordless Roll-Up for 9600, N, 8, 1, GTCO ASCII, Point (SuperSet 42).
2. Enter and run this QBASIC program:

```
'**********************************************************************
'*         SEND VERSION COMMAND (VR) AND DISPLAY RESULTS              *
'*              BY GTCO CORPORATION                                   *
'**********************************************************************
    CLS                                      'CLEAR SCREEN
    OPEN "COM1:9600,N,8,1" FOR RANDOM AS #1'CONFIGURE & OPEN COM1
    PRINT #1, CHR$(1);                       'SEND <CTRL A> WITHOUT <CR>
      DO
         D$ = INPUT$(1, #1)                  'GET CHARACTER FROM COMPORT
      LOOP UNTIL D$ = ">"                    'WAIT FOR ">" PROMPT
      PRINT #1, "V";                         'SEND "V" WITHOUT <CR>
      D$ = INPUT$(1, #1)                     'WAIT FOR "V" TO BE ECHOED
      PRINT #1, "R"                          'SEND "R" WITH <CR>
      D$ = INPUT$(2, #1)                     'WAIT FOR "R" AND <CR> TO BE ECHOED
      LINE INPUT #1, VR$                     'GET STRING FROM COMPORT
      PRINT VR$                              'PRINT STRING
      PRINT #1, CHR$(27);                    'SEND <ESC> WITHOUT <CR>
    END
```

This program will produce a line on the screen similar to this:

GTCO STANDARD FIRMWARE VERSION AHX.X

Advanced Programming Information

NOTE: The following information is not required for normal Cordless Roll-Up operation.

If you are programming for the Cordless Roll-Up product line, the topics listed below will be useful:

- Coordinate Formats
- Measurement Scales
- Digitizing Modes
- Controlling the Alarm Using Remote Commands
- Programming Examples

These topics refer to commands that put Cordless Roll-Up in a different operating state. The previous **Remote Commands** section contains detailed information about remote commands.

Command emulations for CalComp and Summagraphics digitizer SuperSet menu selection. Only Cordless Roll-Up commands, however, are referenced in this section.

Coordinate Formats

Coordinate format refers to the way the Cordless Roll-Up encodes XY coordinate information before it sends the data out through a communication interface. The Cordless Roll-Up and your application program must speak the same coordinate "language" for information to be properly transferred.

You have three basic format choices to make:

- GTCO versus CalComp or Summagraphics emulation
- Binary versus ASCII coordinates
- Coordinate resolution

The topics below describe the formats available and show you how to select them. If you are developing your own software, these sections will also help you choose a format that suits your needs.

Binary Formats

Binary formats encode coordinate information compactly. Binary coordinate formats are shorter than ASCII formats, transmit faster and take up less space if stored. On the other

hand, binary formats cannot be directly displayed on a terminal or printed-they must be converted first into displayable characters.

Binary formats use the high order bit in each byte as a synchronization bit. The first byte in each format has its high order bit set to 1. The remaining bytes have their high order bits set to 0. The application program must examine the high order bit of each byte to determine when a format begins.

The Cordless Roll-Up can produce two kinds of binary formats: one is compatible with GTCO Cordless Roll-Up and CalComp digitizers, and the other is compatible with Summagraphics digitizers. They are quite different and are described separately in the following topics.

GTCO/CalComp Binary Format

This six-byte format is compatible with the GTCO Cordless Roll-Up high resolution binary format. It also emulates the CalComp binary format. Table 4 shows the structure of this format at the bit level.

Table 4: GTCO/CalComp High Resolution Binary Format

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Sync	Cursor	button code				X data high order bits	
Byte 1	1	C4	C3	C2	C1	C0	X15	X14
		X data mid order bits						
Byte 2	0	X13	X12	X11	X10	X9	X8	X7
		X data low order bi						
Byte 3	0	X6	X5	X4	X3	X2	X1	X0
			Proximity	X and Y highest order bits			Y data high order bits	
Byte 4	0	X17	0=in	Y17	X16	Y16	Y15	Y14
		Y data mid order bits						
Byte 5	0	Y13	Y12	Y11	Y10	Y9	Y8	Y7
		Y data low order bits						
Byte 6	0	Y6	Y5	Y4	Y3	Y2	Y1	Y0

To set up the GTCO/CalComp Binary Format:

Custom Configuration Menu:

1. Select GTCO Binary or CalComp Binary (under Output Format Options).
2. Choose the desired resolution (under Mode Options).

GTCO Commands:

1. Send command **BI** for Binary format.
2. Send command **IN** for English or command **MT** for metric measurements.
3. Send command **HR** for 1000 lpi/40 lpmm or command **H1** for 2000 lpi/100 lpmm resolution.

Summagraphics Binary Format

This eight-byte format is compatible with the Summagraphics 2000 lpi UIOF format. Table 5 shows the structure of this format at the bit level.

To set up the Summagraphics Binary Format:

Custom Configuration Menu:

1. Select Summa Binary (under Output Format Options).
2. Choose the desired resolution (under Mode Options).

Table 5: Summagraphics Binary Format

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Parity	Sync					(Tablet ID)	Proximity
Byte 1		1	0	0	0	0	0	0 = in
				Cursor button code				
Byte 2		0	0	C4	C3	C2	C1	C0
				X data low order bits				
Byte 3		0	X5	X4	X3	X2	X1	X0
				X data mid order bits				
Byte 4		0	X11	X10	X9	X8	X7	X6
			Sign X	*X data high order bits*				
Byte 5		0	Sx	X16	X15	X14	X13	X12
				Y data low order bits				
Byte 6		0	Y5	Y4	Y3	Y2	Y1	Y0
				Y data mid order bits				
Byte 7		0	Y11	Y10	Y9	Y8	Y7	Y6
			Sign Y	*Y data high order bits*				
Byte 8		0	Sy	Y16	Y15	Y14	Y13	Y12

Low Resolution Binary Format

Low resolution binary format conforms to an existing industry standard method of encoding small digitizer coordinate data. It is a fast, efficient and commonly used format. Low resolution binary formats are appropriate for applications needing low precision and using tablets up to 20" x 20". This format is five bytes long and is frequently transmitted at 9600 baud. It is used whenever the system resolution is set to 100 lpi, 200 lpi or 10 lpmm. Table 6 shows the structure of this format at the bit level.

Table 6: GTCO Low Resolution Binary Format

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Parity	Sync	Button code				Not used	
Byte 1		1	C3	C2	C1	C0	C40	
			X data low order bits					
Byte 2		0	X5	X4	X3	X2	X1	X0
			X data high order bits					
Byte 3		0	X11	X10	X9	X8	X7	X6
			Y data low order bits					
Byte 4		0	Y5	Y4	Y3	Y2	Y1	Y0
			Y data high order bits					
Byte 5		0	Y11	Y10	Y9	Y8	Y7	Y6

Cursor Button Codes in Binary Formats

Cursor button codes are always included in binary formats. You can define certain pushbuttons on your transducer to represent information that is relevant to your task. For example, the buttons on a 4-button cursor could represent four line widths or four colors. By examining the button code in the format, the application program can use this information appropriately.

Binary formats include five bits which encode the button. The bits transmitted in the format depend on the button pressed. Table 7 and Table 8 show which bits will be sent.

Table 7: Cursor Button Codes for 4-Button Cursor

Button pressed	GTCO		CalComp		Summagraphics		
	Binary	ASCII	Binary	ASCII	Binary	ASCII1	ASCII2
None	00000	0	00000	U	000000	00	0
Yellow	00001	1	00001	0	000001	01	1
White	00010	2	00010	1	000010	02	8
Green	00100	4	00100	2	000100	04	2
Blue	01000	8	01000	3	000011	03	4

Table 8: Cursor Button Codes for 16-Button Cursors

Button pressed	GTCO		CalComp		Summagraphics	
	Binary	ASCII	Binary	ASCII	Binary	ASCII
None	00000	0	00000	U	00000	00
0	10000	0	10000	0	01110	14
1	10001	1	10001	1	00001	01
2	10010	2	10010	2	00010	02
3	10011	3	10011	3	00011	03
4	10100	4	10100	4	00101	05
5	10101	5	10101	5	00110	06
6	10110	6	10110	6	00111	07
7	10111	7	10111	7	01001	09
8	11000	8	11000	8	01010	10
9	11001	9	11001	9	01011	11
A	11010	:	11010	A	01101	13
B	11011	;	11011	B	01111	15
C	11100	<	11100	C	00100	04
D	11101	=	11101	D	01000	08
E	11110	>	11110	E	01100	12
F	11111	?	11111	F	10000	16

ASCII Formats

ASCII is a commonly used method for encoding text. ASCII coordinate formats can be directly displayed on most printers and terminals, and can be easily handled by QBASIC programs. On the other hand, ASCII coordinate formats are longer than binary ones, so they take longer to transmit and they occupy more space when stored in memory.

Table 9, Table 10 and Table 11 show the range of ASCII formats available on the Cordless Roll-Up. Besides the GTCO formats, emulations are provided for CalComp (in four variations) and Summagraphics ASCII formats. All the formats are influenced by the resolution currently in effect (higher resolutions require an additional digit of X and an additional digit of Y). Depending on the format, you can also choose to include or exclude certain optional characters (cursor button code, space, decimal point, carriage return and line feed).

To set up basic ASCII Formats:

Custom Configuration Menu:

1. Select GTCO ASCII, CalComp ASCII 1-4 or Summagraphics ASCII (under Output Format Options).
2. Select an English or metric resolution (under Mode Options).

GTCO Commands:

1. Send command **AS** for ASCII format.
2. Send command **IN** for English or command **MT** for metric measurements.
3. Send command **LR** for 100 lpi/10 lpmm, command **HR** for 1000 lpi/40 lpmm or command **H1** for 2000 lpi/100 lpmm resolution.

Then, you still have more decisions to make regarding the optional characters. Each of the optional characters can be selected by using the **Custom Configuration Menu** or by **Remote Command**. Check the tables under cursor button codes in ASCII formats to determine which optional characters can be included in the format you have selected.

To include a Cursor Button Code, Space, Decimal Point or Line Feed in an ASCII Format (where permitted):

Custom Configuration Menu: Select the "Include" option for the corresponding character.

GTCO Commands:

- Send command **PI** to include the Cursor Button Code character.
- Send command **SI** to include the Space character.
- Send command **CI** to include the Carriage Return character.
- Send command **LI** to include the Line Feed character.

To remove a Cursor Button Code, Space, Decimal Point or Line Feed in an ASCII Format (where present):

Custom Configuration Menu: Select the "Exclude" option for the corresponding character.

GTCO Commands:

- Send command **PE** to exclude the Cursor Button Code character.
- Send command **SE** to exclude the Space character.
- Send command **CE** to exclude the Carriage Return character.
- Send command **LE** to exclude the Line Feed character.

Table 9: GTCO ASCII Formats

```
100 LPI      C X X X X <SP> Y Y Y Y <CR> <LF>
< = 1016 lpi C X X X X X <SP> Y Y Y Y Y <CR> <LF>
> 1016 lpi   C X X X X X X <SP> Y Y Y Y Y Y <CR> <LF>
```

C = Optional cursor button code   <SP> = Optional space
X = X coordinate   <CR> = Optional carriage return
Y = Y coordinate   <LF> = Optional line feed

Table 10: CalComp ASCII Formats

ASCII1	< = 1016 lpi	T M C X X X X X Y Y Y Y Y <CR> <LF>
-	> 1016 lpi	T M C X X X X X X Y Y Y Y Y Y <CR> <LF>
ASCII2	< = 1016 lpi	X X X X X , Y Y Y Y Y , T M C <CR> <LF>
-	> 1016 lpi	X X X X X X , Y Y Y Y Y Y , T M C <CR> <LF
ASCII3	< = 1016 lpi	C P X X X X X Y Y Y Y Y <CR> <LF>
-	> 1016 lpi	C P X X X X X X Y Y Y Y Y Y <CR> <LF>
ASCII4	1000 lpi	<SP> X X . X X X , <SP> Y Y . Y Y Y , T M C <CR> <LF>
-	100 lpmm	<SP> X X X X . X X , <SP> Y Y Y Y . Y Y , T M C <CR> <LF>
-	10 lpmm	<SP> X X X X . X , <SP> Y Y Y Y . Y , T M C <CR> <LF>
-	Other	<SP> X X X X X . , <SP> Y Y Y Y Y . , T M C <CR> <LF>

T = Tablet status (always "A")   <CR> = Carriage return
C = Cursor button character   <LF> = Optional line feed
X = X coordinate   <SP> = Space
Y = Y coordinate
P = Pen character ("U" = up, "D" = down)
M = Mode status character ("I" = incremental, "U" = line, "R" = run-continuous, "T" = track, "P" = point)

Table 11: Summagraphics ASCII Formats

Format 1	< = 1016 lpi	S X X X X X , S Y Y Y Y Y , C C , T <CR> <LF>
.. _	> 1016 lpi	S X X X X X X , S Y Y Y Y Y Y , C C , T <CR> <LF>
Format 2	1000 lpi	S X X . X X X , S Y Y . Y Y Y , C C , T <CR> <LF>
.. _	40 lpmm	S X X X X . X X X , S Y Y Y Y . Y Y Y , C C , T <CR> <LF>
.. _	10 lpmm	S X X X X . X , S Y Y Y Y . Y Y , C C , T <CR> <LF>
.. _	Other	[defaults to Format 1]

S = Sign   <CR> = Carriage return
X = X coordinate   <LF> = Optional line feed
Y = Y coordinate   C C = 2-character cursor button code
T = Tablet ID (always "0")   .   = Optional period

Cursor Button Codes in ASCII Formats

When the cursor button code is included in an ASCII format, the character transmitted in the format depends on the button pressed. Table 7 and Table 8 show which character will be sent. Instructions in the previous sections show how to include or exclude the cursor button character in certain of the ASCII formats.

Measurement Scales

You can choose either English or metric scaling for the coordinates you digitize. Cordless Roll-Up applies the required conversion factor before constructing a coordinate format for output.

The numbers appearing in coordinate formats depend on resolution. Table 12 shows how the resolution settings affect the data in coordinate formats.

To set the measurement scale:

Custom Configuration Menu: Select a resolution in the "Resolution" column of Mode Options.

GTCO Commands:

1. Send command **IN** for English or command **MT** for metric measurements.
2. Send command **LR** for 100 lpi/200 LPI/10 lpmm, command **HR** for 1000 lpi/40 lpmm or command **H1** for 2000 lpi/100 lpmm resolution.

Metric example: The distance between two points is 2032 counts in the 40 lpmm binary format. Each count represents 0.025 mm (from Table 12). Then, 2032 counts x 0.025 mm/count = 50.8 mm.

Table 12: Measurement Scales

English resolution	100 lpi	200 lpi	1000 lpi	2000 lpi
Least significant digit equals	0.01 inch	0.005 inch	0.001 inch	0.0005 inch
Metric resolution		10 lpmm	40 lpmm	100 lpmm
Least significant digit equals		0.1 mm	0.025 mm	0.01 mm

lpi = lines/inch   lpmm = lines/millimeter

Digitizing Modes

Digitizing mode refers to the method Cordless Roll-Up uses to determine when to output a coordinate format. Six digitizing modes are available, but only one can be used at a time:

- Point Mode
- Line Mode (sometimes called Switched Stream Mode)
- Continuous Mode (sometimes called Stream Mode)
- Line Incremental Mode
- Continuous Incremental Mode
- Remote Request Mode

Table 14 will help you compare digitizing modes.

Table 13: Rate Commands

Digitizing rate, formats/second	12	Max	100	5	10	50
Digitizing rate command	R1	R2	R3	R4	R5	R6

Max ≈ 140 coordinates/second

Table 14: Results of Active Area and Pushbutton Changes in Digitizing Modes

Digitizing mode	Action caused by entering active area	In active area: Action action caused by pushbutton		caused by leaving active area	Other action	Command
		Off to on	On to off			
Point	No action	Send one format	No action	No action		PT
Line	No action	Send many formats	Stop sending formats	No action		LN
Continuous	Send many formats	Causes no change: send many formats		Stop sending formats		CN
Line incremental	No action	Send one format	No action	No action	Send one format at increment if button pressed	IC
Continuous incremental	Send one format	Send one format	No action	No action	Send one format at increment	CL
Remote request	No action	No action	No action	No action	Send one format on request	RM

Point Mode

In Point Mode, one coordinate is sent when a transducer button is pressed. Output occurs only when the transducer is in the active area.

To select Point Mode:

Custom Configuration Menu: Select the Point option under Mode.

GTCO Commands: Send command **PT**.

Line Mode

In Line Mode, coordinates are sent as long as a transducer button is pressed. Output occurs only when the transducer is in the active area.

To select Line Mode:

Custom Configuration Menu: Select Line Mode.

GTCO Commands: Send command **LN**.

To set the rate at which coordinates are sent in Line Mode:

Custom Configuration Menu: Select 12, 50 or 100 under Rate.

GTCO Commands: Send command **Rx** (where x = 1-6), as shown in Table 13.

Note that digitizing rate is also dependent on the communication baud rate and format type you have selected. The rates shown in Table 13 are therefore maximum rates.

Surprisingly, if your system seems to respond slowly to digitizer input, it may be because the digitizer coordinate output rate is set too high. This may occur when a program buffers excess coordinate data, thus causing a time delay.

Continuous Mode

In Continuous Mode, coordinates are sent continuously, at the specified output rate. Output occurs only when the transducer is in the active area. Output occurs continuously, whether or not a transducer button is pressed.

To select Continuous Mode:

Custom Configuration Menu: Select the "Cont" option under Mode; select 12, 50 or 100 under Rate.

GTCO Commands: Send command **CN**; to select a rate, send command **Rx** (where x = 1-6), as shown in Table 13.

Line Incremental Mode

In Line Incremental Mode, one coordinate is sent when the transducer is moved farther than a preset increment and a transducer button is pressed. Default increment is 0.01". Output occurs only when the transducer is in the active area.

To select Line Incremental Mode:

Custom Configuration Menu: Select the "Line Incr" option under Mode.

GTCO Commands: Send command **IC**; to set a new increment value, send command **IV** and at the prompt, send three digits representing the new increment in units of 0.001".

Continuous Incremental Mode

In Continuous Incremental Mode, one coordinate is sent when the transducer is moved farther than a preset increment or a transducer button is pressed or released. Default increment is 0.01". Output occurs only when the transducer is in the active area.

To select Continuous Incremental Mode:

Custom Configuration Menu: Select the "Cont Incr" option under Mode.

GTCO Commands: Send command CL; to set a new increment value, send command IV and at the prompt, send three digits representing the new increment in units of 0.001".

Remote Request Mode

In Remote Request Mode, one coordinate is sent when the Controller receives a Read Current Coordinate command (CTRL-B).

To select Remote Request Mode:

Custom Configuration Menu: Not available.

GTCO Commands: Send command **RM**.

Programming Example: To Ready and Display Cordless Roll-Up Formats

The following example QBASIC programs will allow users to experiment with reading and displaying Cordless Roll-Up formats:

- **To read and display ASCII formats**
- **To read and display high resolution binary formats**
- **To send version command and display results**

Programming Example: To Read ASCII Formats

1. Configure the Cordless Roll-Up for 9600, N, 8, 1, GTCO ASCII, Continuous (SuperSet 74).
2. Enter and run this QBASIC program:

```
'*****************************************************************
'*                  READ AND DISPLAY ASCII FORMAT              *
'*                     BY GTCO CORPORATION                     *
'*****************************************************************
CLS                                    'CLEAR SCREEN
OPEN "COM1:9600,N,8,1" FOR RANDOM AS #1  'CONFIGURE & OPEN COM1
DO
 LINE INPUT #1, D$                     'GET FORMAT
PRINT D$;                              'PRINT FORMAT
LOOP
```

Programming Example: To Read High Resolution Binary Formats

1. Configure the Cordless Roll-Up for 9600, N, 8, 1, GTCO Binary, Continuous (SuperSet 01).
2. Enter and run this QBASIC program:

```
'***********************************************************************
'*            READ AND DISPLAY HIGH RESOLUTION BINARY FORMAT          *
'*                        BY GTCO CORPORATION                         *
'***********************************************************************
CLS                                         'CLEAR SCREEN
OPEN "COM1:9600,N,8,1" FOR RANDOM AS #1        'CONFIGURE & OPEN COM1
DO
 D$ = INPUT$(1, #1)                         'GET ONE BYTE
 IF ((ASC(D$) AND 128) >= 128) THEN             'WAIT FOR SYNC BIT
    PB = (ASC(D$) AND 60) / 4                'EXTRACT PUSHBUTTON CODE
    XHIGH1 = (ASC(D$) AND 3) * 16384         'EXTRACT X HIGH ORDER BITS
    XHIGH = (ASC(INPUT$(1, #1)) AND 127) * 128  'EXTRACT X MID ORDER BITS
    XLOW = (ASC(INPUT$(1, #1)) AND 127)      'EXTRACT X LOW ORDER BITS
    XDATA = XHIGH1 + XHIGH + XLOW            'FINAL DECIMAL X DATA
    YHIGH1 = (ASC(INPUT$(1, #1)) AND 3) * 16384 'EXTRACT Y HIGH ORDER BITS
    YHIGH = (ASC(INPUT$(1, #1)) AND 127) * 128  'EXTRACT Y MID ORDER BITS
    YLOW = (ASC(INPUT$(1, #1)) AND 127)      'EXTRACT Y LOW ORDER BITS
    YDATA = YHIGH1 + YHIGH + YLOW            'FINAL DECIMAL Y DATA
    PRINT PB, XDATA / 1000, YDATA / 1000     'PRINT RESULTS
 END IF
LOOP
```

Programming Example: To Send Version Command and Display Results

This QBASIC program interacts with the Cordless Roll-Up in Command Mode. In this example, the program activates Command Mode, sends the VR command and displays the resulting firmware version transmitted by the Cordless Roll-Up.

1. Configure the Cordless Roll-Up for 9600, N, 8, 1, GTCO ASCII, Point (SuperSet 42).
2. Enter and run this QBASIC program:

```
'*****************************************************************************
'*          SEND VERSION COMMAND (VR) AND DISPLAY RESULTS                    *
'*               BY GTCO CORPORATION                                         *
'*****************************************************************************
      CLS                                     'CLEAR SCREEN
      OPEN "COM1:9600,N,8,1" FOR RANDOM AS #1 'CONFIGURE & OPEN COM1
      PRINT #1, CHR$(1);                       'SEND <CTRL A> WITHOUT <CR>
         DO
            D$ = INPUT$(1, #1)                 'GET CHARACTER FROM COMPORT
         LOOP UNTIL D$ = ">"                   'WAIT FOR ">" PROMPT
         PRINT #1, "V";                        'SEND "V" WITHOUT <CR>
         D$ = INPUT$(1, #1)                    'WAIT FOR "V" TO BE ECHOED
         PRINT #1, "R"                         'SEND "R" WITH <CR>
         D$ = INPUT$(2, #1)                    'WAIT FOR "R" AND <CR> TO BE ECHOED
         LINE INPUT #1, VR$                    'GET STRING FROM COMPORT
         PRINT VR$                             'PRINT STRING
         PRINT #1, CHR$(27);                   'SEND <ESC> WITHOUT <CR>
      END
```

This program will produce a line on the screen similar to this:

GTCO STANDARD FIRMWARE VERSION AHX.X

General Product Information

Radio and Television Interference

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Reorient or coil cables.
- Consult the dealer or an experienced Radio/TV technician for help.

NOTE: Any cables the user adds to the device must be shielded to be in compliance with the FCC standards. Any unauthorized modification to this device could result in the revocation of the end user's authority to operate this device.

Bescheinigung des Herstellers/Importeurs

Heirmit wird bescheinigt, dass der/die/das

3036R

(Geraet, Typ, Bezeichnung)

im Uebereinstimmung mit den Bestimmungen der

Vfg 1046/1984

(Amtsblattverfuegung)

Funk-Entstort ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Geraetes angezeigt und die Berechtigung zur Ueberpruefung der Serie auf Einhaltung der Bestimmungen eingeraumt.

GTCO CalComp by Turning Technologies, Inc.
(Name des Herstellers/Importeurs)

Dieses Geraet wurde einzeln sowohl als auch in einer Anlage, die einen normalen Anwendungsfall nachbildet, auf die Einhaltung der Funkentstoerbestimmungen geprueft. Es ist jodoch moeglich, dass die Funkentstoerbestimmungen unter unguenstigen Umstaenden bei anderen Geraetekombinationen nicht eingehalten werden. Fuer die Einhaltung der Funk-entstoerbestimmungen seiner gesamten Anlage, in der dieses Geraet betrieben wird, ist der Betrieber verantwortlich. Einhaltung mit betreffenden Bestimmungen kommt darauf an, dass geschirmte Ausfuhrungen gebraucht werden. Fuer die beschaffung richtiger Ausfuhrungen ist der Betrieber verantwirtlich.

Limited Warranty for Cordless Roll-Up

GTCO CalComp by Turning Technologies, Inc. warrants these products to be free from defects in material and workmanship under the following terms. Complete and return the enclosed warranty registration card to ensure that your products are covered with this warranty.

Coverage

Parts and labor are warranted for two (2) years from the date of the first consumer purchase for the digitizer tablet, controller, transducers and tablet accessories. Power supply and cables are also warranted for two (2) years. This warranty applies to the **original consumer purchaser only**.

Within the European Union, the warranty period is two (2) years, as mandated by the EU. Contact your local dealer or distributor for additional warranty information.

Warranty is only valid if original consumer's purchase or lease date is less than or equal to six months from the original GTCO CalComp by Turning Technologies sale date. This information will be captured by the system serial number and confirmed by the reseller's purchase order.

A nominal Warranty Handling Fee will be charged after the first 90 days of use and calculated from the date of original consumer purchase. This payment may be made by Visa, MasterCard or American Express. A copy of the sales receipt or invoice will be required for warranty verification.

Conditions

Except as specified below, this warranty covers all defects in material or workmanship in the products. The following are not covered by the warranty:

1. Any product on which the serial number has been defaced, modified or removed (if applicable).
2. Damage, deterioration or malfunction resulting from:
   a. Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature, unauthorized modification for any purpose, unauthorized product modification, or failure to follow instructions supplied with the product.
   b. Repair or attempted repair by anyone not authorized by GTCO CalComp by Turning Technologies.
   c. Any damage in shipment of the product (claims must be presented to the carrier).
   d. Any other cause which does not relate to a manufacturing defect.
3. Any product not sold or leased to a consumer within six months of GTCO CALCOMP BY TURNING TECHNOLOGIES original sale date.

GTCO CalComp by Turning Technologies will pay all labor and material expenses for covered items, but will not pay for the following:

1. Removal or installation charges.

2. Costs for initial technical adjustments (setup), including adjustment of user controls.
3. Certain shipping charges. (Payment of shipping charges is discussed in the next section of this warranty.)
4. Packaging costs. (Customers should keep their boxes.)

Warranty Service Procedures
1. To obtain service on your GTCO CalComp by Turning Technologies product, contact the Technical Support Department to receive a Return Material Authorization Number (RMA#) and shipping instructions by calling: 1-866-746-3015.
2. Ship the product to GTCO CalComp by Turning Technologies with the RMA# marked clearly on the outside of the box. Without a clearly marked RMA# on the shipping box, GTCO CalComp by Turning Technologies reserves the right to refuse the shipment.
3. Although you must pay any shipping charges to ship the product to GTCO CalComp by Turning Technologies for warranty service, GTCO CalComp by Turning Technologies will pay the return shipping charges for ground shipment. Other shipping options are available at an additional fee.
4. Whenever warranty service is required, the original dated sales invoice (or a copy) must be presented as proof of warranty coverage and should be included in shipment of the product. Please also include your name, address, telephone number, fax number, email address and a description of the problem.
5. If GTCO CalComp by Turning Technologies determines that the unit is not defective within the terms of the warranty, the consumer shall pay the cost of all freight charges, as well as any repair charges.

Technical Support
Web-based Technical Support is available free of charge at: www.gtcocalcomp.com, where current driver releases, as well as comprehensive technical support, troubleshooting, Technical Bulletins and FAQs can be found.

Telephone Technical Support is available free of charge to the original consumer for a period of 90 days from the date of purchase of the product. Please contact our Technical Support Department at: 1-866-746-3015 or fax your request to: 480.998.1751.

Disclaimer of Unstated Warranties
The warranty printed above is the only warranty applicable to this purchase. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. Assuming the warranty above stated is otherwise applicable, it is expressly understood and agreed that GTCO CalComp by Turning Technologies sole liability whether in contract, tort, under any warranty, in negligence or other shall be for the repair or replacement of the defective parts and under no circumstances shall GTCO CalComp by Turning Technologies be liable for special, indirect or

consequential damages. The price stated and paid for the equipment is a consideration in limiting GTCO CalComp by Turning Technologies liability.

Notice
Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you. This warranty gives you specific legal rights, and you may have other rights, which vary from state to state, or province to province.

To obtain service on your GTCO CalComp by Turning Technologies product, call our Technical Support Department at: 1-866-746-3015 or fax us at (480) 998-1751. We can also be contacted through our website at www.gtcocalcomp.com (in US); at EUOffice@gtcocalcomp.com (in Germany); at infos@calcomp.fr (in France).

Important!
All products returned to GTCO CalComp by Turning Technologies for service must have prior approval in the form of a Return Merchandise Authorization Number (RMA#), which can be obtained by calling the Technical Support Department.

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CORDLESS ROLL-UP™