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** - not available - currently being modified
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SECTION 1
INTRODUCTION

1.1 SCOPE AND PURPOSE OF MANUAL

This manual is a reference for system integrators and maintenance technicians. This document contains all the necessary information required to successfully integrate the Cybertech A922P thermal printer into a system. This includes theory of operation, hardware installation and software specifications.

1.2 GENERAL DESCRIPTION

The Cybertech A922P thermal printer is designed for low operational cost and require no maintenance other than paper replacement. Based on Cybertech's field proven design these printers allow for enhanced performance, small size and economy. The single board controller features an on board power supply with the capability to print the highest density graphics. Uniform print density is maintained by Cybertech's unique digitally controlled pulse width compensation. These printers are ideally suited for imbedded applications where high speed, exceptional print quality and reliability are paramount.
1.3 FEATURES

The Cybertech A922P Series printers support the followings:

1.3.1 HARDWARE FEATURES

- Serial interface
- Onboard DC power supplies
- Full function self test
- Auto paper loading
- LED power/fault indicator (flashes when a fault occurs)
- Paper Output sensor
- Line feeds enabled or disabled (Software selectable)
- Relative print density (Software selectable)
- Serial Handshake Hardware or Software (Software selectable)

1.3.2 SOFTWARE FEATURES

- Full ASCII character set
- Multiple font sizes
- Complete printer status (Via Serial port)
- Programmable Macro stored
- Time/Date stamp
- Embedded Graphics / Logo
- Reprint last record
- Software control of:
  - Print Direction
  - Double High/Wide
  - Font Selection
  - Flow Control – hardware/software
  - 4 quadrant font rotation
  - Font multiplication
  - Barcodes – UPC, EAN8, EAN13, 39,
    128A/B/C, I 2 of 5

1.4 SPECIFICATION SUMMARY

1.4.1 PERFORMANCE SPECIFICATIONS

- Print rate ............ Up to 2 inch per second
- Data rates ............ 300 to 19200 baud (Serial)
- USB .................. Full Speed
- Hand shaking Serial ... Busy/Ready or Xon/Xoff
- Print buffer ............ 4600 bytes
- Data buffer ............32768 bytes
1.4.2 PHYSICAL SPECIFICATIONS

Weight .................... 4.25 lbs.
Depth ..................... 3.62 inches
Height .................... 4.75 inches
Width ..................... 6.00 inches

1.4.3 ENVIRONMENTAL SPECIFICATIONS

Operating temperature ......... 0 to 60 C
Storage temperature .......... -20 to 75 C
Operating humidity .......... 10% to 90%
Storage humidity .......... 5% to 90% (non condensing)

1.4.4 RELIABILITY

MTBF .......................... 20,000 POH

1.4.5 POWER REQUIREMENTS

Quiescent ..................... 24 volts DC @ .5 Amperes
Active  ...................... 24 volts DC @ 3 Amperes Avg., 5 Amperes peak

1.5 FUNCTIONAL CHARACTERISTICS

Store and interpret input data
Sense paper in place
Control position of paper
Control printing of data on paper
Feed paper
Control print head temperature

1.6 PRINTER MODEL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Model Number</th>
<th>A922P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of dots</td>
<td>384</td>
</tr>
<tr>
<td>Dot density DPI</td>
<td>200</td>
</tr>
<tr>
<td>Print width</td>
<td>48mm</td>
</tr>
<tr>
<td>Paper Roll Diameter</td>
<td>50mm</td>
</tr>
<tr>
<td>Paper Roll Width</td>
<td>60mm</td>
</tr>
</tbody>
</table>
SECTION 2
OPERATION

2.1 GENERAL

The Cybertech A922P is a multifunctional, thermal dot matrix printer. Data enters the controller via a serial RS232 port or USB. This data is then converted to characters or commands. The characters are then converted to a bit images, stored in the dot buffer RAM. The contents of this buffer are then serially loaded into the print head one dot row at a time. When the shifting is complete. The print head temperature is measured, paper empty and head position sensors are checked. The dots are then energized for a time proportional to the print head substrate temperature. After the dot row is printed a stepper motor advances the paper one dot row. This completes a print cycle. Printing takes place when a line overflow occurs or a carriage return is received.

The thermal print head is made up of heat generating resistive elements placed on a ceramic substrate. Then when an electrical current is applied to the element, it becomes hot which activates a thermo-sensitive dye on the paper. Thermal printers are extremely durable because there are no moving parts in the print head, unlike the impact dot matrix printers. Making direct thermal one of simplest operations among available printing techniques.
Figure 2.1
2.2 CONTROL PANEL

2.2.1 REPRINT/FEED SWITCH

When this switch is actuated in the REPRINT position after the printer is first powered on a test print will occur. When data is sent to printer containing the Start/Stop character strings, the last cycle will print. To clear the reprint buffer, depress the REPRINT switch and hold for greater than 4 seconds. The LED will flash indicating the reprint buffer is clear. If REPRINT is actuated during power up and pins 2 & 3 on the serial port are shorted, the printer will print the test message until a fault condition occurs. This is used for factory test.

If the switch is actuated into the FEED position paper will be feed by the printer; if equipped the take-up will also attempt to take up paper. If the switch is in the FEED position at power up the printing will be inverted (Non readable)—note this condition stays set, but can be reset by the same FEED switch ‘ON’ at power ‘On’ cycle. The default mode is non-inverted (Readable).

2.2.2 FAULT LED

A flashing LED indicates the printer has a fault condition. The fault may be out of paper, print head in the open position, or the printer is over temperature. The actual fault may be found by a status read of the serial port. In normal operation this LED will be on.

2.3 PAPER LOADING

1. Open front plastic cover and front of printer to access paper compartment.

2. Remove old paper core.

3. Insert the new paper into the paper compartment with loose end of paper exiting front of printer about 6 inches. The front panel LED should be flashing. Refer to Figure 2.2.

4. Close paper compartment with paper exiting printer. LED should now be 'ON' steady.

4. Depress the test switch. If there is no image on the paper the paper is in the printer backwards—reverse it.
2.4 TAKE-UP LOADING

1. Removable core snaps between the two rotating discs (see Figure 2.3). The slot in the removable core must be aligned with the drive pin on the left side disc.

2. This is accomplished by placing the end of the core onto the right side disc hub and applying slight pressure to move the spring loaded disc. Then placing the right end of the core onto the left side disc hub making sure to align the drive pin.

3. Place the loose end of the paper exiting the printer into the slot in the removable core. It helps if the end of the paper Is folded into a 'V' before placing into the slot.

4. Depress the 'Reprint/Feed' switch to the 'Feed' position to Feed and take up the paper. Do this until all the paper slack Is taken up.

2.5 TAKE-UP UNLOADING

1. When it is desired to remove the taken up paper from the printer, tear off the paper at the printer cut bar, if there is still paper in printer.

2. Align finger slots on both right and left side discs.

3. While grasping the paper roll in take-up, push the paper release to the left (indicated by arrow).

4. Simply pull the roll out of the take-up area and if necessary gently move it side to side to clear the hubs on the discs.

5. Retrieve the core by pushing it out of the taken up roll.
SECTION 3
ELECTRICAL INTERFACE

3.1 INTRODUCTION

The electrical interface can be divided into two sections, power and signal.

3.2 DATA INPUT INTERFACE

3.2.1 SERIAL INTERFACE

The serial interface is designed to receive data and transmit printer status asynchronously at RS232C levels (+/- 3 to 15 vdc). Hardware handshaking is provided by the Busy/Ready signal line and software handshaking is controlled by Xon/Xoff. The handshake is a switch selectable option. The polarity for Busy/Ready is -12V busy +12V ready. Only the following pins are used. Pins 4 & 5 are jumpered together. The default serial configuration is 9600 baud, 8 data bits, no parity, and 1 stop bit. Only the baud rate is selectable from rates of 300, 600, 1200, 2400, 4800, 9600 and 19200 - see section 4.2.40.

SERIAL INTERFACE CONNECTOR – 9 PIN D SERIES

<table>
<thead>
<tr>
<th>PIN #</th>
<th>SIGNAL</th>
<th>DIRECTION</th>
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<tbody>
<tr>
<td>1</td>
<td>Chassis gnd.</td>
<td>Input</td>
</tr>
<tr>
<td>2</td>
<td>Data In</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Data Out</td>
<td>Output</td>
</tr>
<tr>
<td>4</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Ground</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>N.C.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>RTS</td>
<td>Busy/Ready Out</td>
</tr>
<tr>
<td>8</td>
<td>CTS</td>
<td>Input-not used</td>
</tr>
<tr>
<td>9</td>
<td>N.C.</td>
<td></td>
</tr>
</tbody>
</table>

Typical Data Cable – Z1024C (6')

<table>
<thead>
<tr>
<th>Printer -       Function          Computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>male 9 pin 'D'</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>7-8</td>
</tr>
</tbody>
</table>
3.3 USB Interface

The USB interface is a mini 4 pin type A connector available through the top of the printer case (optional).

3.4 Power Interface

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>WIRE COLOR</th>
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<tbody>
<tr>
<td>24 V- ground</td>
<td>BLACK</td>
</tr>
<tr>
<td>CHASSIS Ground</td>
<td>CLEAR</td>
</tr>
<tr>
<td>24 V+ +24VDC</td>
<td>RED</td>
</tr>
</tbody>
</table>

EXTERNAL POWER CABLE
SECTION 4
SOFTWARE SPECIFICATIONS Version V 6.0.9(x)

4.1 GENERAL
Before sending any data to the printer, the host should request status via the serial port to verify any possible fault conditions.

4.2 COMMAND DESCRIPTION

In the following sections x is defined as '0' or '1', this is a numeric value where '0' is hex 30 and '1' is hex 31, or whatever the numeric 'x' should be.

4.2 COMMAND DESCRIPTION

Buffer Commands

4.2.1 SET ABSOLUTE HORIZONTAL POSITION (1B 68 x x x x)
When this command is received followed by four ASCII bytes of position, the next block of text, barcode or graphics data will be placed starting at the new Horizontal position. The minimum value is 0000. This will reposition the line pointer to the line start. The maximum value is determined by width of the print head in dots. A horizontal position of zero is always the left hand side of the page.

4.2.2 SET ABSOLUTE VERTICAL POSITION (1B 76 x x x x)
When this command is received followed by four ASCII bytes of position, the next block of text or barcode data will be placed starting at this coordinate. If the new value is larger then the current line or page size, the line or page size will be increased. The minimum value is 0000 this will reposition the line pointer to the page or line top. The maximum value is determined by the following formula. Any value larger then the maximum will be ignored. A vertical position of zero is always the top of the page. If the YCORD is increased to cause a buffer overflow the YOCRD will be reset to 0.

Maximum Line Size = 32768/(NUMBER OF PRINTABLE DOTS / 8)
Maximum Page Size = 65536/(NUMBER OF PRINTABLE DOTS / 8)

4.2.3 SET RELATIVE HORIZONTAL COORDINATE (1B 5B x x x x)
When this command is received followed by four bytes of position, it will be added to the current horizontal coordinate (values are 0000 through the print head width in dots). Any number that sum is greater than the maximum number of dots per line will be ignored. If the position is preceded by a minus sign the value will move backwards in the buffer.
4.2.4 SET RELATIVE VERTICAL COORDINATE (1B 5D x x x x)
This command adds the four position bytes to the current vertical coordinate (values 0000 through Maximum Size). If the position is preceded by a minus sign the value will decrement and the page position will move up.

4.2.5 HORIZONTAL TAB (1B 57 x)
This will cause the horizontal (XCORD) position to move right by 8 * number of bytes. This command can be used to set the horizontal position at any time.

4.2.6 VERTICAL TAB (1B 56)
When a Vertical tab command is received any graphic lines buffered will be printed and the paper will slew n number of dot positions. The slew input is only one byte. Valid values are 0x0 to 0xFF (hexadecimal).

4.2.7 DOUBLE HIGH LINE ON (1B,64 or 0E)
When Double High is on all printable data will be expanded to twice the height. This is true for barcodes, buffered PCX graphics, non-buffered PCX graphics and text. This command goes active at the start of a graphic print or when a carriage return is received (current line and all following lines will be double high). This does a vertical doubling in the print routine and not the buffer routines. Vertical doubling reduces the buffer formatting time.

4.2.8 DOUBLE HIGH LINE OFF (1B,65 or 0F)
When Double High is set off it will be deactivated at the start of a graphic print cycle (Page Mode) or a carriage return (Line Mode).

4.2.9 CLEAR PRINTING BUFFER (1B 6B X)
This commands by default is set to clear a dot line after that line is shifted to the print head. This command is useful if the user wants multiple copies of a form. These must be created in page mode. If the form is setup utilizing the field command. These field(s) may be used to overlay variable data in the respective field. To enable clearing x = ASCII 0 while to disable x = ASCII 1

4.2.10 SET MARGIN (1B 6D x x x)
This command will reduce the horizontal buffer width by the input value divided by 8. This effectively reduces the number of dots across the print head and center justifies the buffer. Example the print head is 640 dots (80mm) and we want to change the effective head width to 608 dots, should be a multiple of eight. Then we will send (640-608)/2 or 16 this will add a white space margin to both the right and left sides of 2 bytes.
Clock Commands

4.2.11 PRINT TIME (05)
When this command is received the time will be printed at the current dot buffer position if the RTC is installed.

4.2.12 PRINT DATE (06)
When this command is received the date will be printed at the current dot buffer position if the RTC is installed.

4.2.13 PRINT DAY OF WEEK (18)
When the CAN character is received the printer will print at the current X & Y coordinate the day of the week as follows: Sun, Mon, Tue, Wed, Thu, Fri or Sat. In order for the correct day of week to be printed the date must have been set.

4.2.14 SEND DATE FROM PRINTER TO HOST (1B,44)
The printer will send its current date to the host when this command is received. For packet structure, see command summary. See Appendix A-6 for data structure.

4.2.15 SEND TIME FROM PRINTER TO HOST (1B,54)
The printer will send its current time to the host when this command is received. For packet structure, see command summary. This command only works for printers equipped with a serial port.

4.2.16 SET DATE FROM HOST (1B,6A,MM-DD-YY)
This will update the printer date registers of the Real Time Clock. The clock will also automatically compensate for leap year and advance the day of the month through 29 in February of a leap year. The calendar does not compensate for leap century and will always make 00 a leap year.

4.2.17 SET TIME FROM HOST (1B,63, HH:MM)
This will update the printer time registers if Real Time Clock option is installed. If there is no clock, data will be stored in ram. In order for the printer to differentiate AM from PM, the time must be in 24 hour format - 00:00 to 23:59. This will however be displayed in 12 hour format with AM and PM.
Font & Barcode Commands

4.2.18 SELECT FONT  (1B 53 x )
This command will select any one of the printer's resident fonts. Multiple character sizes may be placed within a line by using the positioning commands. Line wrap will occur automatically if the character width exceeds the maximum horizontal coordinate or the end of the page when rotation is being used. Font selection values are 1 through 3.

4.2.19 ROTATE CURRENT FONT  (1B 53 52 x )
This command when in page mode will rotate the current font 90, 180, 270 or 0(normal print) degrees and place any succeeding character in its correct position. When rotating 270 degrees the buffer will start in the lower left position and set the buffer length to maximum unless set with the vertical positioning command. Valid input is R or 1 for normal printing (left to right), D or 2 for 90 degree rotation the Y coordinate will automatically increment, L or 3 for 180 degrees or upside down printing a newline will bias the cursor to the right hand side of the page and U or 4 for printing 270 degrees a newline will force the full length of the buffer with printing going from the bottom up.

4.2.20 SELECT DOUBLE WIDE PRINT ON  (1B 53 57)
Double wide character printing is selected.

4.2.21 SELECT DOUBLE WIDE PRINT OFF  (1B 53 4E)
Double wide character printing is deselected.

4.2.22 VERTICALLY SCALE FONT  (1B 53 56 x )
Fonts may be vertically scaled up 6 times. Valid scale factors are 1 (normal) to 6 (eight times normal height).

4.2.23 HORIZONTALLY SCALE FONT  (1B 53 48 x )
Fonts may be horizontally multiplied 6 times. Valid scale factors are 1 (normal) through 6 (eight times normal width).

4.2.24 SCALE CURRENT FONT  (1B 53 4D x )
This command will scale a font in both the horizontal and vertical directions. Valid values are 1 (normal) through 8.

4.2.25 PROPORTIONAL PRINTING  (1B 53 50 x )
The default for the standard fonts is proportional printing on. Fonts may be forced to mono-spaced which will result in all characters being equal in width, to the widest character in the font. Note that some fonts are mono-space only. This command has no effect if the selected font is a mono-space font. To enable mono-spacing send an ASCII "0" and to enable proportional spacing send an ASCII "1".
4.2.26 **SET KERNING** (1B 53 4B x)
This set the inter-character spacing in dots. Valid values are ASCII 0 through 8.

4.2.27 **SET BARCODE** (1B 42 x x x x x x data 0D or 1B)
When the printer receives the barcode command it expects 7 bytes of barcode parameters, followed by the barcode data and terminated by either a carriage return or escape character.

The first parameter is the barcode type. Eight barcodes are currently supported: **Code 128B (#1)**, **Interleave 2 of 5 (#2)**, **Code 39 (#3)**, **UPC (#4)**, **EAN8 (#5)**, **EAN13 (#6)**, **Code 128A (#7)** and **Code 128C (#8)**

The second parameter is for placement of the human readable code; (T) for on top, (B) for bottom or (N) for none.

The third parameter is the thin or minimum bar width; Valid widths are 1 through 8 dots.

The fourth parameter is barcode ratio of thin to thick bars 2:1(A), 2.5:1(B) and 3:1(C). Use only 2.5:1 on a thin bar width of 4.

The fifth parameter is bar height; valid values are 001 to 999 dots. This will allow for a barcode greater than 2” in length.

UPC, EAN8, EAN13 and Interleave 2 of 5 are numeric only and Interleave 2 of 5 must have an even number of digits. Barcodes may terminate by either a CR or an Escape character. UPC will terminate if more than 11 digits are input, EAN8 will terminate input at seven and EAN13 at twelve.

Code 128 variants may be switched within a barcode by using the appropriate barcode control characters.

The Barcode character size is the currently selected font. The printer will try to fit the interpretation within the barcode bars.
Graphics Commands

4.2.28 LOAD PCX RUN LENGTH ENCODED GRAPHIC DATA (1B, 67, 58)

When the printer has received this command lead-in, the printer will expect to receive two bytes of graphic byte count (most significant byte first this count is not used by the 9000 series printers and is for back compatibility will the 900 series (a value of 0 may be used), followed by the graphic data in PCX run length encoded format including PCX header. Be sure the graphic line width is less or equal to the number of dots across the print head, if not the image will be truncated. The graphic image width may be less then the printhead width and will default to left justification, unless the X coordinate has been set to another value. The graphics image will fall on a byte boundary (number of dots divisible by 8). When the X coordinate is set to other then zero the graphic origin will be set to this point. If the graphic image will fit but the X coordinate is incorrect the image will be right justified (modulo 8). The PCX run length decode algorithm is as follows:

IF (the 2 high order bits are set then)
  COUNT = COUNT & $C0
  REPEAT next byte for COUNT times
ELSE
  BYTE = DATA

4.2.29 LOAD RASTER GRAPHIC DATA (1B, 67, 4C)

When the printer has received the above lead-in command, the printer will expect to receive two bytes of graphic byte count (most significant byte first, each byte is a hexadecimal character) followed by the graphic data. If a timeout condition should occur (an inter-character time greater then .5 seconds), the command will be aborted; otherwise the data will be placed into the dot buffer. When building the image, be sure the image width is equal to the head width in bytes, or unpredictable results will occur. The graphic image should not be longer then the maximum number of dot lines.

4.2.30 PRINT PCX GRAPHICS (1B, 67, 43)

When the printer has received the above command, the printer will expect to receive two bytes of graphic file size this count is not used in series controller and may be set to zero, followed by the graphic data in PCX run length encoded format. As a complete line is received, that line will be printed. At low baud rates there will be a slight degradation in print quality due to the data vs. print rate. This allows the dots to cool between print lines. For higher quality printing use the buffered graphics mode.
4.2.31 PRINT GRAPHIC BUFFER (1B, 67, 50)
When a hex code 1B, 47, 50 is received the contents of the graphic buffer is printed and the printer returns to line mode. This command is used in conjunction with buffered raster or PCX graphics. This uses the same buffer as text. If a line of text is received the graphic data may be overwritten.

4.2.32 LOAD n GRAPHIC BYTES (1B 67 72 x data)
When this command lead-in is received followed by a byte of the number of graphic bytes (0 to 255) and then the graphic data, this data will be placed on the current graphic line. If a line overflow should occur that data will be truncated. The data will start at the current XCORD (modulo 8) to force a byte boundary.

4.2.33 LOAD n ENCODED BYTES (1B 67 58 x data)
When this command is received followed by a byte count then the graphic data. This data will be placed on the current graphic line. If a line overflow should occur that data will be truncated. The data will start at the current XCORD (modulo 8) to force a byte boundary. The Encoded data is a modified PCX format.

4.2.34 PRINT ONE GRAPHIC LINE (1D)
When this command is received the current graphics line counter is incremented by one count. If a buffer overflow occurs or a vertical tab command is received the graphic buffer will print.

4.2.35 GET RESIDENT GRAPHIC (1B, 67, 52)
This sequence is used to retrieve the resident graphic from memory and load it into the print buffer.
**Miscellaneous Commands**

4.2.36 **Print Current Font** (1B 1B)
This will print the entire character set of the currently selected font.

4.2.37 **Print software revision** (1B 31 0D)
This command prints the current software on the printer.

4.2.38 **Print Configuration** (1B 32)
This will print the printer’s current configured parameters. A test print will also do the same.

4.2.39 **Set Printer Defaults** (1B 33 1B)
This forces the printer to the factory defaults.

4.2.40 **Set Printer Serial Baud Rate** (1B 62 x)
This will set the printer’s baud rate to the value of x. The current host baud rate must be the same as the printer. The printer’s current baud rate can be verified by a test print.

\[ X = \text{ASCII } '0'-'7' \]

\[ 0 = 1200 \]
\[ 1 = 2400 \]
\[ 2 = 4800 \]
\[ 3 = 9600 \]
\[ 4 = 19200 \]
\[ 5 = 38400 \]
\[ 6 = 57600 \]
\[ 7 = 115200 \]

4.2.41 **Set Character Timeout** (1B 45 x x x x)
This sets the timeout value when receiving commands or data. This keeps the printer from hanging if the data source is interrupted. The timeout value is in milliseconds valid values are 0000 to 3000.

x = an ASCII numeric character

4.2.42 **SET INVERSE(Non-Readable) PRINT ON** (1B 76)
This will enable inverted(Non-Readable) printing where data appears upside down with reference to the operator.

4.2.43 **SET INVERSE(Readable) PRINT OFF** (1B 69)
This will disable inverted(Readable) printing. Data appears right side up with reference to the operator. This is the default mode.

4.2.44 **SET LINE FEED ENABLE** (1B 4B x)
When this sequence is received a line feed is added/not added to receipt of a CR. When x = hex 30 , line feeds are enabled, when x = hex 31 line feeds are not enabled. This is a semi-permanent stored byte internal to the microprocessor's RAM. This stays set at power off.
4.2.45 DOUBLE HIGH ON (1B, 64 or 0E)
   When Double High is on all printable data will be expanded to twice the height.

4.2.46 DOUBLE HIGH OFF (1B, 65 or 0F)
   When Double High is set off it will be deactivated at the start of a carriage return.

4.2.47 SET HANDSHAKE TYPE (1B 48 x)
   If this sequence is received the handshake can be changed. If a hex 30 is received the unit is set to Hardware handshake, if a hex 31 is received the unit is set to Software handshake. This is a semi permanent stored byte internal to the microprocessor's RAM.
Printing Commands

4.2.48 NEW LINE (0D)
This character forces either a print in line mode or sets the X coordinate to zero and increments the Y coordinate by the current line size.

4.2.49 LINE FEED (0A)
This causes the paper to advance one line if the line feed enable is active, if line feed enable is disabled this command is ignored.

4.2.50 SET MINIMUM PAPER LENGTH (1B 4C x x x x)
This command sets the minimum length before a cut occurs. The minimum range is 3" (600 dots @ 200 DPI) or to 20". This is useful for fixed format data and for fixed coupon or receipt length.

4.2.51 SET PRINT BUFFER LENGTH (1B 41 xxx)
This command sets the absolute buffer length in vertical dots. The command structure is as follows; 1B 41 33 30 30 will set the buffer size to 300 vertical lines. If the number of lines used is larger then the new length, the buffer will be clipped and graphics or extraneous text may end up in one of the line buffers when switched to Line Mode or the next line is printed. This mode is useful for mixing small blocks of text and graphics on a line or page with a predefined length.

4.2.52 SET PRINT DENSITY (1B 4A 0-7)
The Printer defaults at power on to the print density last set or the printer default 4. This may be changed via software control. This gives the programmer wide latitude in setting print quality, such as change of paper quality, dense graphics at high speed, light or darker print for a specific line of data. Valid input values are 0 for the lightest and 7 for the darkest (default = 4).
4.2.53 SET PRINT RATE (1B 70 0-7)
The Print rate may be controlled via software to optimize the printing and data rate. A higher rate may be used if the internal fonts are used and print rates of greater than three inches per second (IPS) are possible. A slower rate may be desired when printing graphics to obtain the highest possible quality. The print rate should be set so the printer prints as smoothly as possible to prevent compressed dot rows caused by disruption in data flow. USB or high serial baud rates are preferred. If the printer is to be used in a low temperature environment slower print speeds are recommended.

<table>
<thead>
<tr>
<th>Value</th>
<th>Print Speed IPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>1</td>
<td>1.19</td>
</tr>
<tr>
<td>2</td>
<td>1.37</td>
</tr>
<tr>
<td>3</td>
<td>1.51</td>
</tr>
<tr>
<td>4</td>
<td>1.67</td>
</tr>
<tr>
<td>5</td>
<td>1.77</td>
</tr>
<tr>
<td>6</td>
<td>1.92</td>
</tr>
<tr>
<td>7</td>
<td>2.00</td>
</tr>
</tbody>
</table>

4.2.54 PRINT TEST MESSAGE (1B 49)
Upon receiving this command the printer will print the internal test message with printer’s settings.
Status Commands

4.2.55 SEND STATUS BYTE TO HOST (09)
When this command is received the printer will transmit the current printer status (Serial version only).

Bit 0 not used
Bit 1 if set, printer has a Temperature fault
Bit 2 if set, the print head is in the open position
Bit 3 not used
Bit 4 if set, a paper out conditions exists
Bit 5 not used
Bit 6 not used
Bit 7 if set, the battery for the Real Time Clock and RAM is low and the macro's & configuration may be corrupt

4.2.56 SEND PRINTER ID (1B 71)
Sends ‘A922’ back to host for printer type/id.

4.2.57 SEND PRINTER FIRMWARE VERSION (1B 51)
When the firmware version is requested an ASCII string of the version is transmitted out the serial port. The data sent is the version number in ASCII followed by a carriage return.
Reprint Commands

4.2.58 SET NEW START CODE FOR REPRINT (1B 73 x x 00)
This command changes the lead in code for the reprint block. This defaults to STX(hex 02) for start. The maximum number of characters (x) is 17.

4.2.59 SET NEW STOP FOR CODE REPRINT (1B 74 X X 00)
This command changes the stop code for the reprint block. This defaults to ETX(hex 03) for stop. The maximum number of characters (x) is 17.

4.2.60 SOFTWARE REPRINT (1B,72)
This command will duplicate the reprint manual switch action of causing a buffer reprint.

4.2.61 REPRINT METHOD
The printer has available a reprint feature. This is available to the user any time. On the front panel there is a two position switch. If the switch is actuated towards the ‘FEED’ position the print feeds paper. If the switch is actuated towards the ‘REPRINT’ position the printer to print a test message. This test print can be obtained until a block of data containing the START/STOP is received. Subsequently depressing the Test/Feed switch will cause a reprint of the stored block of data. The format of the block to be stored is:

STX x x x x x x x x x x x x x x x x x x x ETX

The STX and ETX codes can be replaced as above. ‘x’ can be any printable (or control character) up to the input buffer size (i.e. 28000 characters)
This is a feature using the serial port to set up certain parameters and to interrogate the settings within the printers’ memory. Using a non-standard data cable (example in section 3) connect the printer to a PC. A 24 volt Power supply is also needed, connect this to the power connection described in section 3. Use HyperTerminal® or another similar “dumb” terminal program on the PC to communicate with the printer.

To enter the internal maintenance program type “Ctrl” + “s”. To exit this mode type “Esc”.

The settings are as follows:
1. Set time & date – enter time in 24 hour format, that is, if the time is 2:30pm – enter 14:30. If the date is August 8, 2008, it would entered as 08-08-08. Always include leading zero’s in both time and date. The “:” in time, and the “-” in date setting are also needed.
2. Display time will show the existing internal settings.
3. Display reprint information – displays the “Start” and “Stop” sequences, as well as whether a valid message appears in memory.
4. Display PC board serial number – allows view of factory set pcb number (usually matches printer serial number).
5. Display manufacturing date – displays factory set date of test, usually matches ship date.
6. Invert print – allows inversion of printing.
7. Default mode – a factory set value.
8. Display status – allows current status of the printer errors for debug purposes.
SECTION 5 LOCATION OF CONTROLS / CONNECTORS

5.1 Data – top of unit 9 pin “D” series female serial data connector. RS232 – Default setting to 9600 Baud, one stop bit, no parity, 8 bit.

5.2 Power – cable exiting top of unit – 24VAC/24VDC (this can connect to an 24VDC power source).

5.3 Fault/ power lamp – bottom left. Lamp is on continuous if printer status is ok, flashes if fault. Possible faults are paper out, over temperature in print head, or front cover open.

5.4 Reprint/ Feed switch – upper left – Push up for paper feed, push down for test/reprint (See Section 2.2.1 for details).

5.5 USB – data interface is a mini 4 pin type A connector available through the top of the case near the serial 9 pin “D”.
<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>No printer action at all- No paper motion</td>
<td>No AC Power</td>
<td>Apply power to unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check fuse on Power Supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replace A922P controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replace Power Supply</td>
</tr>
<tr>
<td>No paper motion</td>
<td>Printer cover open</td>
<td>reset printer to closed position</td>
</tr>
<tr>
<td></td>
<td>Paper jammed</td>
<td>clear jam (see next page)</td>
</tr>
<tr>
<td></td>
<td>Bad controller</td>
<td>replace A922P controller</td>
</tr>
<tr>
<td></td>
<td>Bad stepper motor</td>
<td>replace print mechanism</td>
</tr>
<tr>
<td>Paper moves but does not print</td>
<td>Incorrect paper</td>
<td>use thermal paper</td>
</tr>
<tr>
<td></td>
<td></td>
<td>see appendix A-15 - coated side out</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replace print mechanism</td>
</tr>
<tr>
<td></td>
<td>Bad print head/ cable</td>
<td>replace A922P controller</td>
</tr>
<tr>
<td></td>
<td>Bad controller</td>
<td>replace data cable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>replace A922P controller</td>
</tr>
<tr>
<td>Prints only with Test push button</td>
<td>Bad data cable</td>
<td>replace printer mechanism</td>
</tr>
<tr>
<td></td>
<td>Bad Controller</td>
<td>replace A922P controller</td>
</tr>
<tr>
<td>Print missing parts of information</td>
<td>Bad print head/ cable</td>
<td>replace A922P controller</td>
</tr>
<tr>
<td></td>
<td>Bad controller</td>
<td>replace A922P controller</td>
</tr>
<tr>
<td>Light printing</td>
<td>+7.0 Volt not good -</td>
<td>replace print mechanism</td>
</tr>
<tr>
<td></td>
<td>Bad controller</td>
<td>replace A922P controller</td>
</tr>
<tr>
<td></td>
<td>Bad print head</td>
<td>replace with high sensitivity paper – see appendix A-15</td>
</tr>
<tr>
<td></td>
<td>Incorrect paper grade</td>
<td>replace A922P controller</td>
</tr>
<tr>
<td>Incorrect data</td>
<td>Bad controller</td>
<td>reprogram with correct command codes &amp; data</td>
</tr>
<tr>
<td></td>
<td>Incorrectly programmed</td>
<td>replace A922P controller</td>
</tr>
</tbody>
</table>
# APPENDIX A-1
## CYBERTECH A922P SERIES ORION CONTROLLER
### STANDARD COMMAND SUMMARY V6.0.9(x)

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>ASCII</th>
<th>HEX CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Buffer Commands:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set absolute horz cord</td>
<td>ESC,h,llll</td>
<td>1B,68,xxxx</td>
</tr>
<tr>
<td>Set absolute vert cord</td>
<td>ESC,w,hhhh</td>
<td>1B,77,xxxx</td>
</tr>
<tr>
<td>Set relative horz cord</td>
<td>ESC,[,llll</td>
<td>1B,5B,xxxx</td>
</tr>
<tr>
<td>Set relative vert cord</td>
<td>ESC,],hhhh</td>
<td>1B,5D,xxxx</td>
</tr>
<tr>
<td>Move n Horizontal Bytes</td>
<td>ESC,h,llll</td>
<td>1B,68,xxxx</td>
</tr>
<tr>
<td>Slew paper n Dot lines</td>
<td>ESC,v,hhhh</td>
<td>1B,76,xxxx</td>
</tr>
<tr>
<td>Double High Line/Buffer On</td>
<td>SO</td>
<td>0E</td>
</tr>
<tr>
<td>Double High Line/Buffer Off</td>
<td>SI</td>
<td>0F</td>
</tr>
<tr>
<td>Clear Printing Buffer</td>
<td>ESC,k,(0/1)</td>
<td>1B,6B,30/31</td>
</tr>
<tr>
<td>Set Margin</td>
<td>ESC,n,xxx</td>
<td>1B,6E,xxx</td>
</tr>
<tr>
<td><strong>Clock Commands</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Print time</td>
<td>ENQ</td>
<td>05</td>
</tr>
<tr>
<td>Print date</td>
<td>ACK</td>
<td>06</td>
</tr>
<tr>
<td>Print Day of Week</td>
<td>CAN</td>
<td>18</td>
</tr>
<tr>
<td>Send date</td>
<td>ESC,D</td>
<td>1B,44</td>
</tr>
<tr>
<td>Send time</td>
<td>ESC,T</td>
<td>1B,54</td>
</tr>
<tr>
<td>Set date</td>
<td>ESC,j MM-DD-YY</td>
<td>1B,64</td>
</tr>
<tr>
<td>Set time</td>
<td>ESC,c HH:MM</td>
<td>1B,74</td>
</tr>
<tr>
<td><strong>Font &amp; Barcode Commands:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set Font and attributes</td>
<td>ESC,S,xxx</td>
<td>1B,53</td>
</tr>
<tr>
<td>Set Barcode</td>
<td>ESC,B,x,x,x,x,x,x,Dat</td>
<td>1B,42</td>
</tr>
<tr>
<td><strong>Graphics Commands</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Load encoded PCX data</td>
<td>ESC,G,X,xxxx</td>
<td>1B,47,58</td>
</tr>
<tr>
<td>Load non encoded data</td>
<td>ESC,G,L,xxxx</td>
<td>1B,47,4C</td>
</tr>
<tr>
<td>Load raster @ x/y</td>
<td>ESC,G,r,x,xxxx</td>
<td>1B,47,72</td>
</tr>
<tr>
<td>Print PCX graphics</td>
<td>ESC,G,C,xxxx</td>
<td>1B,47,43</td>
</tr>
<tr>
<td>Load Resident graphic</td>
<td>ESC,G,R</td>
<td>1B,47,52</td>
</tr>
<tr>
<td>Print Graphic Buffer</td>
<td>ESC,G,P</td>
<td>1B,47,50</td>
</tr>
<tr>
<td>Print raster Graphics</td>
<td>ESC,G,G</td>
<td>1B,47,47</td>
</tr>
<tr>
<td>Save PCX Graphic</td>
<td>ESC,G,S</td>
<td>1B,47,53</td>
</tr>
</tbody>
</table>
**Misc Commands:**

- Print Selected Font: `ESC, ESC`  
  1B, 1B  
- Print Software Revision: `ESC, 1`  
  1B, 31  
- Print Configuration: `ESC, 2`  
  1B, 32  
- Set Printer Defaults: `ESC, 3, ESC`  
  1B, 33, 1B  
- Set Baud Rate: `ESC, R, x`  
  1B, 52, x  
- Set Character Timeout: `ESC, E, xxxx`  
  1B, 45, xxxx  
- Set Inverse print On: `ESC, v`  
  1B, 76  
- Set Inverse print Off: `ESC, i`  
  1B, 69  
- Set LineFeed Enable/Disable: `ESC, K, x`  
  1B, 4B, 30/31  
  where x=30=Enable, x=31=Disable  
- Set Double High On: `ESC, d`  
  1B, 64  
- Set Double High Off: `ESC, e`  
  1B, 65  
- Set Handshake Type: `ESC, H, x`  
  1B, 48, 30/31  
  where x=30=DTR, x=31=Xon/off

**Printing Commands:**

- Newline: `CR`  
  0D  
- Line Feed: `LF`  
  0A  
- Set minimum paper length: `ESC, L, xxxx`  
  1B, 4C  
- Set Print Buffer Length: `ESC, A, xxx`  
  1B, 41  
- Set Print Density: `ESC, J, (0-7)`  
  1B, 4A, x  
- Set Print Rate: `ESC, P, (0-7)`  
  1B, 70, x  
- Print Test Message: `ESC, I`  
  1B, 49  
- Reprint Stored Message: `ESC, r`  
  1B, 72

**Status Commands:**

- Send status: `TAB`  
  09  
- Test Printer: `ESC, I`  
  1B, 49  
- Send Firmware Version: `ESC, Q`  
  1B, 51

**Reprint Commands:**

- Set new Start code for reprint: `ESC, s, x...x, 0`  
  1B, 73, x...x, 0
- Set new Stop code for reprint: `ESC, t, x...x, 0`  
  1B, 74, x...x, 0

**Maintenance mode:**

- `<ctrl>s`  
  13

**Note:**

- `count, num_line & num_bytes` is a one byte value with a range of 0 to 255 decimal or 0 to FF Hexadecimal.
- `x = One ASCII character`
- `l = length, h = height w= width (values are ASCII 0 through 9)`
- `p = 16 bit Hex Pattern`
- `n = number of bits in pattern to use (MSB) justified`
APPENDIX A-2
FONT SELECTION AND ATTRIBUTES

SELECT FONT and FONT ATTRIBUTES

Attribute command___________________________

1 size 1
2 size 2
3 size 3
R to Rotate

Direction for Rotation
R 1* Print Direction 1 (right)
D 2* Print Direction 2 (down)
L 3* Print Direction 3 (left)
U 4* Print Direction 4 (up)

V to vertically scale font ________________
H to horizontally scale font
Scaling vertically or horizontally
1 through 8

W to double horizontally set ‘ON’
N to cancel double horizontally ‘OFF’

P to set proportional printing
Enable/ disable proportional print_______
1 for proportional printing
0 for mono-spaced printing

K to set kerning value
Set kerning value_____________________ 
0 to 8
APPENDIX A-3

PRINTER STATUS BYTE

$09........ SEND PRINTER STATUS BYTE

<table>
<thead>
<tr>
<th>Bit Number</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temp Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Up Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper Empty</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not used</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX A-4

BARCODE COMMAND

BARCODE ...... ESC B x x x xxx data <CR> or <ESC>

<table>
<thead>
<tr>
<th>BC Type</th>
<th>1 Code 128B</th>
<th>2 I 2 of 5</th>
<th>3 Code 3 of 9</th>
<th>4 UPC</th>
<th>5 EAN8</th>
<th>6 EAN13</th>
<th>7 Code 128C</th>
<th>8 Code 128A</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Inter line</th>
<th>T Top</th>
<th>B Bottom</th>
<th>N None</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Thin Bar Width</th>
<th>1 through 8</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Ratio of Thin Bar to Thick</th>
<th>A = 2:1</th>
<th>B = 2.5:1</th>
<th>C = 3:1</th>
</tr>
</thead>
</table>

| Bar Height in dots | 001 through 999 |
APPENDIX A-6

Time Packet

Preamble ________ |     |        |        |
Month ________________ |    |
Day ____________________________ |    |
Year ______________________________________|

1B 4D 30 33 2D 31 35 2D 39 36 = 03-15-96

Preamble ________ |     |        |
Hour ______________________ |
Min ____________________________ |

1B 54 30 39 3A 33 30 = 09:30

Preamble ________ |     |
Hour ______________________ |
Min ____________________________ |
In order to use this printer controller with Windows and use the resident fonts. Use the "Generic/Text only" printer driver. This will allow the application program to pass control characters to the printer, even though the driver indicates text only. No graphic data will be sent. In order to be WYSIWYG use the Cybertech printer driver.

To setup the "Generic/Text only" driver:

1. From the "Program Manager", Double click on "Main".
2. Double click on "Control Panel".
3. Double click on "Printers".
4. Add "Generic/Text only" printer driver.
4. Double click on "Setup".
6. Set Paper size for "Letter" and "Feed" for "Continuous".
7. Double click on modify and setup parameters accordingly.
   a. Reset Leave Blank
   b. 10 cpi <ESC>SF2
   c. 12 cpi <ESC>SF1
   d. 16 cpi <ESC>SF0
   e. Begin Double Width <ESC>SH2
   f. End Double Width <ESC>SH1
8. Double click on "OK".
9. Set "Generic/Text only" as the default printer.

The application program with it's embedded control characters will now be processed by the printer. This will allow any printer command to passed through Windows.
APPENDIX A-11

Setting up the Cybertech Windows 9x Printer Driver

1. Boot up Windows 95
2. Click on the "START" icon.
3. Go to "Settings"
4. Click on "Printer"
5. Click on "Add Printers"
6. Click on "Next"
7. Click on "Have Disk"
8. Insert a Copy of the Cybertech Windows Printer drivers in Floppy Drive "A".
9. At the prompt: "Copy Manufacture's files from" change the default if required" then click on "OK".
10. Click on the Model you wish to install example: "Cybertech 9450".
11. Click on "Next"
12. Click on "Next" Prompt: "Do you want Windows based programs to use this printer as the default" Click on "Yes".
13. Click on "Next"
14. Prompt: "Would you like to print a test page " click on "No".
15. Click on "Finish".
16. Click on "Cybertech 9x50".
17. Click on the Properties icon (hand on top of page).
18. Click on "Details".
19. Click on "Spool settings"
20. Click on "Print directly to the printer"
21. Click on "OK"
22. Click on "Port Settings".
   be sure there is no mark in the box "Spool MS-DOS print jobs".
   be sure there is a mark in the box "Check port state before printing"
23. Click on "OK"
24. Click on "Ok"
24. Click on "x" or "Ctrl & F4" to exit printer setup

*Windows 95* is a trademark of Microsoft Corp.
APPENDIX A-12

Setting up the Cybertech Windows 2000,XP Printer Driver
The USB Driver should be installed first see A-14

1. Boot up Windows
2. Click on the "START" icon.
3. Goto "Settings"
4. Click on "Printer"
5. Click on "Add Printers"
6. Click on "Next"
7. Click on "Have Disk"
8. Insert a Copy of the Cybertech Windows Printer drivers in Floppy Drive "A".
9. At the prompt: "Copy Manufacture's files from" change the default if required" then click on "OK".
10. Click on the Model you wish to install example: "Cybertech 922".
11. Click on "Next"
12. Click on "Next" Prompt: "Do you want Windows based programs to use this printer as the default" Click on "Yes".
13. Click on "Next"
14. Prompt: "Would you like to print a test page " click on "No".
15. Click on "Finish".
16. “Digital Signature not found” select “Yes”.

The driver should now install
Installing the Cybertech USB Driver

1. Power on both the printer & computer (don’t attach USB cable at this time”)
2. Insert the driver CD, you may install the files on the local hard drive, etc.
3. Install the USB cable
4. “Welcome to the Found New Hardware Wizard” will display
5. Select “No, not at this time”
6. Select “Next”
7. “Install from a list or Specific Location (Advanced)”
8. Select “Browse”
10. Move to the CD or drive where the drivers are located.
11. Example: “G:USB Software Driver”
12. Select “OK”
13. Select “Next”
14. “Cybertech USB Printer Port” will display
15. “Driver not digitally signed”, Select “Continue Anyway”
16. Select “Finish”
17. Right mouse click “My Computer”
18. Select “Properties”
19. Select “Hardware”
20. Select “Device Manager”
21. Select “Ports (COM & LPT)”
22. Note the location of “Cybertech USB Printer Port COMx”
23. Close Device Manager
24. Close System Properties
25. Install the Windows driver @ COMx where x = port number
## ASCII CHARACTER SET 7 BIT CODE

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APPENDIX A-15
Supplies & spare parts

Thermal Paper Roll Part No. A1328P
Take-up Core Z1326A

One of each of the above is supplied with each printer purchased.