

Form 64
May 1979
Revision A August 1979
Revision B January 1980
Revision C August 1981

BIT PAD ONE

USERS MANUAL

BY

SUMMAGRAPHS CORPORATION

The contents of this manual are proprietary to Summagraphics Corporation and may not be reproduced or copied in any form without the permission of Summagraphics Corporation.

WARRANTY

SUMMAGRAPHICS warrants to the original purchaser that this equipment, including its components and parts, shall be free from defects in material and workmanship for a period of (90) days from the date of shipment. SUMMAGRAPHICS' obligation under this warranty shall be limited to repair or replacement, at the option of SUMMAGRAPHICS, Fairfield, Connecticut. Return of a repaired instrument shall be f.o.b. SUMMAGRAPHICS, Fairfield, Connecticut. The above warranty is contingent upon normal usage and does not cover products which have been modified without SUMMAGRAPHICS' approval or which have been subjected to unusual physical or electrical stress or on which the original identification marks have been removed or altered. The above warranty will not apply if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electric power air-conditioning, humidity control, transportation or causes other than normal and ordinary usage. To the extent that any of its equipment is furnished by a manufacturer other than SUMMAGRAPHICS, the foregoing warranty shall be applicable only to the extent of the warranty furnished by such other manufacturer. This warranty will not apply to appearance terms, such as knobs, handles, dials or the like, nor to the pen cartridge or refills of the pen cartridge.

"THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF. The foregoing obligations are in lieu of all obligations and liabilities, including all warranties of implied or statutory, and state SUMMAGRAPHICS' entire and exclusive liability and Purchaser's exclusive remedy for any claim of damages in connection with the sale or furnishing of all equipment, including design, suitability for use, operation or installation. In no event shall SUMMAGRAPHICS be liable for any special or consequential damages."

January 1979

"WARNING: This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception."

"This equipment generates and uses radio frequency and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does not cause interference to radio and 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 the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems."

This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock NO. 004-00-00345-4.

Accessories and optional equipment should be purchased from Summagraphics to insure compliance of the Class B emission limits.

TABLE OF CONTENTS

<u>SECTION</u>	<u>TOPIC</u>	<u>PARAGRAPH</u>	<u>PAGE</u>
1	<u>General Description</u>	1	3
	General	A	3
	Operating Modes	B	3
	Interfaces	C	3
	<u>Theory of Operation</u>	2	4
	<u>Accessories & Optional Equipment</u>	3	4
2	<u>Set Up Procedures</u>	1	
	Unpacking	A	5
	Biasing	B	5
	Power Requirements	C	6
	Power-Up Conditions	D	7
	Strappable Options & Switch Settings	E	7
3	<u>Modes of Operation</u>	1	8
	<u>RS-232 Interface</u>	2	9
	General	A	9
	ASCII Data Format (Switch 1 Position 7 OFF)	B	9
	Remote Control Via RS-232	C	11
	Cables and Connectors	D	12
	RS232 Unit Switch Settings and Strap Options for 600 Series Proms	E	12
	<u>IEEE Interface</u>	3	15
	General	A	15
	Data Format	B	15
	Remote Control	C	16
	Output Connector	D	16
	Cables	E	16
	Pin Assignments	F	17
	IEEE Unit Switch Settings for 400 Series Proms	G	17
	Sample IEEE Programs	H	19
	Hewlett Packard HPIB Sample Program	1	19
	Tektronix 4051 Sample Program	2	20
	<u>Parallel Interface</u>	4	21
	General	A	21
	Parallel Binary	B	21
	Parallel Binary Format	C	21
	Parallel BCD	D	22
	Parallel Remote Control	E	23
	Output Connector	F	25
	Parallel Unit Switch Settings and Strap Options for 500 Series Proms	G	26

TABLE OF CONTENTS

(Continued)

<u>SECTION</u>	<u>TOPIC</u>	<u>PARAGRAPH</u>	<u>PAGE</u>
4	<u>Maintenance</u>	1	28
	Internal Diagnostics	A	28
	<u>Calibration</u>	2	28
	<u>Stylus Refill Replacement</u>	3	30
5	<u>Bit Pad One Drawings</u>		31
	RS232/Parallel Logic Diagram (06-0011 Sheet 1 of 3)		32
	RS232 Option (06-0011 Sheet 2 of 3)		33
	Parallel Option (06-0011 Sheet 3 of 3)		34
	IEEE Logic Diagram (06-0005 Sheet 1 of 2)		35
	IEEE Option (06-005 Sheet 2 of 2)		36
	Timing Diagram Parallel		37
	Bit Pad One RS232 Outline Drawing		38
	Bit Pad One IEEE Outline Drawing		39
Bit Pad One Parallel Outline Drawing		40	

This page intentionally left blank

BIT PAD ONE

IMPORTANT NOTICE

Please read this manual carefully before using the Bit Pad One. Particular attention should be given to the unpacking instructions and storage instructions for the biasing device in Section 2.

1. GENERAL DESCRIPTIONA. General

Bit Pad One converts graphic information into digital form suitable for entry into a computer. By merely touching the pen-like stylus to any position on a map, diagram, menu or other graphic presentation, the coordinates of that position are transformed into their digital equivalents. The user may select a marking ball point stylus, a dry non-marking stylus, or a one, four or thirteen button cursor to digitize with the Bit Pad One. The cursor contains a crosshair sight which permits the user to enter data with the full accuracy of the data table.

B. Operating Modes

Bit Pad One modes and sampling rate may be controlled externally under program control, or internally by switches on the logic board. The power-up mode and sampling rate are determined by the positions of the internal switch. Both the mode and sampling rate may be changed under program control from the host computer by sending the Bit Pad One either one ASCII character or one eight bit byte, depending on the resident interface. The following modes are available:

Point Mode--Depression of the stylus on the tablet, or pressing a button on the cursor causes one X, Y coordinate pair (sample) to be output in the appropriate format.

Stream Mode--X, Y coordinate pairs (samples) are generated continuously at the selected sampling rate when the stylus or cursor is in the proximity of the active area of the tablet. Pressing the stylus to the tablet, or depressing a button on the cursor marks the flag character (F) bit in the output string.

Switch Stream Mode--Depression of the stylus, or pressing a button on the cursor causes X, Y coordinate pairs (samples) to be output continuously at the selected sampling rate until the stylus is lifted or cursor button released.

C. Interfaces

Bit Pad One is available with a choice of three output interfaces; RS232, Eight Bit Parallel and IEEE-488. Wide variety of interface capability makes the Bit Pad One compatible with your computer system.

RS232--This interface conforms with the EIA specification for RS232. Transmission is asynchronous, using USASCII seven bit code with strappable options for parity and number of stop bits. Serial data is either TTL or bipolar RS232 compatible. The Bit Pad One is considered a terminal which is transmitting to a modem with switch selectable rate up to 19,200 baud.

IEEE--This interface conforms to IEEE-488-1975 Digital Interface for Programmable Instrumentation standard. Several formats are switch selectable for GPIB (including Tektronix), HP-IB (Hewlett Packard) and Commodore Pet. The device address is switch selectable. The data transfer rate may be a maximum of 125 coordinates per second, depending on the receiving device.

Eight Bit Parallel--Within this interface, two modes, Binary and Binary Coded Decimal (BCD) are switch selectable. In the binary mode, five eight bit bytes are output for each coordinate pair. In the BCD mode, twelve ASCII BCD characters are output for each coordinate pair. The data transfer rate may be a maximum of 200 coordinate pairs per second, depending on the receiving device. The BCD interface is specifically designed to permit the Bit Pad One to be plugged into the Remote Keyboard port on a CRT or micro-computer.

2. THEORY OF OPERATION

The Summagraphics Bit Pad One operates on the magnetostrictive principle. Current is pulsed along a send wire that lies perpendicular to a mesh of magnetostrictive wires laid on a substrate beneath the tablet writing surface. This current pulse changes the dimensions of the magnetostrictive material and a strain wave propagates down all the wires of the axis in one direction simultaneously. The stylus and cursor have "receive" coils in them and sense the passing of the strain wave. The binary counter in the control unit is used to time the delay required for the strain wave to reach the receive coil. This binary count is then formatted by the microprocessor and output as X and Y coordinate data.

3. ACCESSORIES & OPTIONAL EQUIPMENT

<u>Bit Pad One</u> --RS232	Part Number 01-0015-002
IEEE	Part Number 01-0017-002
Parallel	Part Number 01-0016-002

Standard Accessories

Stylus with blue and dry (non-marking) refills, Operator's Manual and Mating Power Connector. - 01-0093-016

Optional Accessories

Power Supply (with regulator, cable and power connector)
36-0004-001
36-0003-001

One Button Cursor C01-0090-001

Four Button Cursor C01-0091-001

Thirteen Button Cursor C01-0118-003

Data Interface Cables

Parallel and RS232	05-0079-001 (10 ft.)
IEEE	78-6001-001 (2 meters)

SECTION 2

1. SET UP PROCEDURES

A. Unpacking

Visually inspect the Bit Pad One package for any signs of physical damage. If any damage is found, do not open the package, contact the carrier immediately. When unpacking, it will be noted that a semi-flexible rubber-base magnet is carefully packaged with the controller and tablet. Please maintain a separation between magnet and tablet in your working area. Do not allow the magnet to rest on top of or near the tablet, except under the controlled conditions described in the tablet biasing section of this manual.

After the system is unpacked and before initial operation, please read the following sections of the manual and immediately follow the instructions for the tablet, referring to the figure on the page for a visual demonstration of the biasing procedure.

B. Biasing

It will be necessary to magnetically bias your Bit Pad One tablet after unpacking. A magnet has been provided for this purpose.

It is very unlikely that the tablet will ever need to be biased again. In case any magnetic materials are laid on the tablet, rebiasing may be necessary. If you discover "holes" or "dead-sports" in the active area, rebiasing should be done.

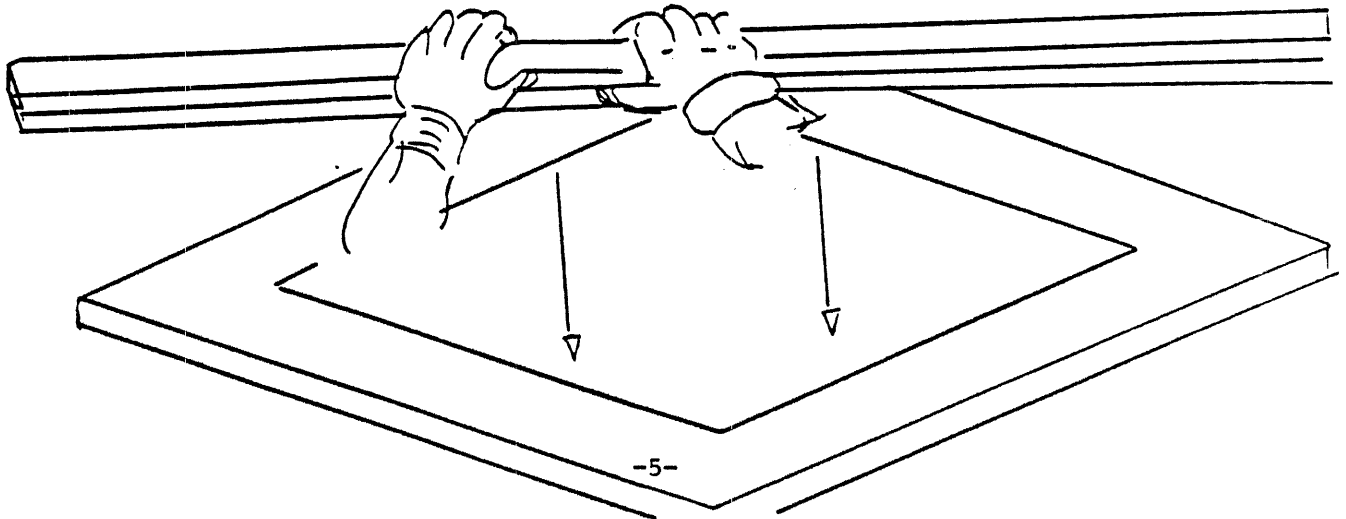
Please be careful to store the biasing magnet away from the Bit Pad and away from all your magnetic diskettes, tapes or cassettes.

TABLET WIPING INSTRUCTIONS

HOLD MAGNET AS SHOWN IN DRAWING. (ARROWS ON LABEL MUST POINT FORWARD - LABEL SIDE OF MAGNET UP). HOLD MAGNET FIRMLY AGAINST SURFACE OF TABLET - WIPE DIAGONALLY FROM UPPER LEFT TO LOWER RIGHT. WIPING MUST BE DONE SLOWLY IN ONE CONTINUOUS MOTION.

TABLET CABLE

DO NOT STORE MAGNET NEAR TABLET.



C. Power Requirements

The Bit Pad One may be purchased complete with power supply by ordering the following parts: 01-0019-001 for 115 volts or 01-0019-002 for 220 volts. A plug-in power supply (115V) for use only with RS232 or Parallel units may be purchased by ordering P/N 01-0037-001.

The following power requirements must be met to insure proper operation of the Bit Pad One:

External Power Requirements
(Regulated)

	PARALLEL	RS232	IEEE
-12VDC	70mA	70mA	60mA
+12VDC	90mA	110mA	80mA
+ 5VDC	500mA	500MA	750mA

Ripple Specification

Maximum ripple 15mV RMS, 50mVpp Maximum
50mV RMS

Every Bit Pad One is shipped with a connector which will mate with the power input connector located at the rear of the unit. The following pin assignments apply to this connector:

CAUTION

PLEASE NOTE PIN REVERSAL FROM CABLE TO PC BOARD

Power Input
Cable Connector (P2)

- 1 Spare
- 2 Spare (Key)
- 3 - 12 Volts \pm 5%
- 4 + 12 Volts \pm 5%
- 5 + 5 Volts \pm 5%
- 6 + 5 Volts \pm 5%
- 7 Ground

Power
Cable
Connector

1	7
2 (Key)	6 (Key)
3	5
4	4
5	3
6	2
7	1

PC
Board
Pins

D. Power-Up Conditions

The Bit Pad One will default to a particular power-up condition based on the switch settings (on internal switch 2) or front panel switch settings for mode and rate.

Information on setting these switches is supplied in Section 3-Operation. In addition to mode and rate, several other parameters will be set dependent on the interface used in a particular Bit Pad One. Each of the three parameters will be addressed for the appropriate interface in Section 3 of this manual.

E. Strappable Options & Switch Settings

The following switch settings are preset at the factory. Please refer to Section 3 and to the appropriate Interface paragraph if settings other than standard are desired.

<u>Type of Unit</u>	<u>Standard Settings</u>
All	Stream mode 200 coordinate pairs per second English
Parallel	Binary Data Output Positive Data Strobe Pulse
RS-232	9600 Baud Line Feed Even Parity Two Stop Bits
IEEE	Device 8 address No SRQ GPIB format (Tektronix)

1. MODES OF OPERATION

Bit Pad One modes and sampling rate may be controlled externally under program control, or internally by switches on the logic board. The power-up mode and sampling rate are determined by the positions of the internal switch. Both the mode and sampling rate may be changed under program control from the host computer by sending the Bit Pad One either one ASCII character or eight bit byte, depending on the resident interface. The following modes are available:

Point Mode-- Depression of the stylus on the tablet, or pressing a button on the cursor causes one X, Y coordinate pair (sample) to be output in the appropriate format.

Stream Mode-- X, Y coordinate pairs (samples) are generated continuously at the selected sampling rate when the stylus or cursor is in the proximity of the active area of the tablet. Pressing the stylus to the tablet, or depressing a button on the cursor marks the flag character (F) bit in the output string.

Switch Stream Mode-- Depression of the stylus, or pressing a button on the cursor causes X, Y coordinate pairs (samples) to be output continuously at the selected sampling rate until the stylus is lifted or cursor button released.

Mode and Rate Controls--refer to Section 5, Bit Pad One Drawings for location of switches.

Each Bit Pad One has a 6 position switch which is used to set the mode of operation and the rate at which the coordinate data is output to the processor.

The Mode and Rate Controls on the standard Bit Pad One are mounted on SW 2. Positions 1 and 2 are mode switches and Positions 3, 4, and 5 are rate switches, Switch 6 is not used. The system reset switch is mounted externally on the lower frame.

2. RS232 INTERFACE

A. General

The Bit Pad One conforms to the EIA specification for asynchronous transmission. This means that each character is transmitted as a complete self-contained message consisting of a data character (ASCII) with even or odd parity (POE) preceded by a start bit and followed by one or two stop bits dependent on the strap option selected (HCB). The bit polarity of the transmitted data is low level mark, high level space in the following format:



The Bit Pad One asserts request to send (pin 4) and may be inhibited by the host using clear to send (pin 5). The Bit Pad One is considered a terminal and is configured to transmit or receive data to or from a modem. Direct connection to a processor may require reversal of the transmit and receive data lines.

B. ASCII Data Format (Switch 1 Position 7 OFF)

The serial interface that is available for the Bit Pad is an integral part of the Bit Pad printed circuit card. It outputs either serial data that is TTL compatible or serial data that is bipolar and RS232 compatible.

The output format for the serial data is: XXXX,YYYY,F CRLF*
 *Switch Selectable

X is an ASCII BCD digit of the X coordinate 0000 to 2794 Metric,
 0000 to 2200 English. (origin (0000) is in the lower left corner)

, is an ASCII comma.

Y is an ASCII BCD digit of the Y coordinate 0000 to 2794 Metric,
 0000 to 2000 English.

F is an ASCII Hexadecimal digit which contains the Z Axis and
 flags data.

CR is an ASCII Carriage Return.

LR is an ASCII Line Feed (Switch Selected)

The format for the flag information ASCII character is:

MSB				LSB
ASCII Header	F3	F2	F1	F0

ASCII Flag Characters Generated:

Stylus Switch

- Open ASCII "0"
- Closed ASCII "1"

4 Button Cursor

- No Flags Depressed ASCII "0"
- Flag 0 (Z axis) Depressed ASCII "1"
- Flag 1 Depressed ASCII "2"
- Flag 2 Depressed ASCII "4"
- Flag 3 Depressed ASCII "8"

Binary Data Format (Switch 1, Position 7 ON)

The Binary formatted RS-232 interface is a five byte output that is very much like the Binary Parallel Format. The advantage of the Binary Format over the ASCII format is the reduction of characters transmitted. Thirteen characters are reduced to five characters (a 50% increase in coordinates transmitted).

TABLE 3-1. BINARY FORMAT

	Bit 7	6	5	4	3	2	1	0
Byte								
1	P	1	F3	F2	F1	F0	0	0
2	P	0	X5	X4	X3	X2	X1	X0
3	P	0	X11	X10	X9	X8	X7	X6
4	P	0	Y5	Y4	Y3	Y2	Y1	Y0
5	P	0	Y11	Y10	Y9	Y8	Y7	Y6

C. Remote Control via RS232

A unique feature of the Bit Pad One is that the remote host processor can completely control the operation of the Bit Pad.

Condition for Remote Control

- All internal mode and rate controls (SW 2) must be inactive or in the "OFF" condition.
- Data going to the Bit Pad One must be the same baud as the data transmitted from the Bit Pad One.
- The Bit Pad One command data must be input on J1 Pin 3 with a bit polarity of low level mark high level space.
- One of the 18 ASCII codes below must be selected, all others will be ignored.

TABLE 3-2

Mode	Rate		ASCII Character <u>Must</u> Be Upper Case
	ASCII	Binary	
Stop Point	Idle		S
	200		P
Switched Stream	2	2	@
	4	4	A
	10	10	B
	20	20	C
	35	35	D
	70	70	E
Stream	70	141	F
	70	141	G
	2	2	H
	4	4	I
	10	10	J
	20	20	K
	35	35	L
	70	70	M
	70	141	N
	70	141	O

Rate is coordinate pairs per second at 19,200 baud. All other rates are dependent on baud rates (See page 14, Table 3-4 for baud rates).

Position 8

* ON-Carriage Return Line Feed (CRLF). This adds line feed to the end of output data format. OFF-Carriage Return (CR) only

Position 9

* ON-English (0.005" Resolution)
OFF-Metric (0.1mm Resolution)

Switch 2 (Mode/Rate)

This is a six position switch that controls sampling mode (Point, Switch Stream or Continuous Stream) and sampling rate (X-Y coordinate pairs per second). This switch is factory set in the Continuous Stream Mode at 200 samples per second. To operate under program control (via computer), set all internal switch positions to OFF (Remote Model). If unit has optional Front Panel switches, set all internal switch positions to OFF. Mode and rate may be changed by setting the internal switch positions or depressing Front Panel buttons as shown in the Table below. (For Front Panel switches, ON corresponds to Button In and OFF corresponds to Button Out.)

TABLE 3-3
Switch 2 Mode/Rate Position Settings

	Internal Switch 2	Pos 1	Pos 2	Pos 3	Pos 4	Pos 5	Pos 6
Mode	Front Panel Switch	Mode 2	Mode 1	Rate 4	Rate 2	Rate 1	CLEAR
<u>Remote</u>		OFF	OFF	OFF	OFF	OFF	
<u>Point</u>		ON	ON	OFF	OFF	OFF	
<u>Switch Stream</u>							
200 Samples/Sec		OFF	ON	ON	ON	ON	
150		OFF	ON	ON	ON	OFF	
75		OFF	ON	ON	OFF	ON	
40		OFF	ON	ON	OFF	OFF	
20		OFF	ON	OFF	ON	ON	
10		OFF	ON	OFF	ON	OFF	
5		OFF	ON	OFF	OFF	ON	
1		OFF	ON	OFF	OFF	OFF	
<u>*Continuous Stream</u>							
*200		ON	OFF	ON	ON	ON	
150		ON	OFF	ON	ON	OFF	
75		ON	OFF	ON	OFF	ON	
40		ON	OFF	ON	OFF	OFF	
20		ON	OFF	OFF	ON	ON	
10		ON	OFF	OFF	ON	OFF	
5		ON	OFF	OFF	OFF	ON	
1		ON	OFF	OFF	OFF	OFF	

Position 6 Not Used on Internal Switch.

Due to the limitations of serial baud rate transmit time, the maximum sampling rate will automatically be limited to the sampling rates shown in the table below.

TABLE 3-4

Baud Rate	Maximum Sampling Rate	
	Serial ASCII BCD	Serial Binary
28,800	85	166
19,200	68	141
9,600	46	105
4,800	28	65
2,400	16	37
1,200	9	20
300	2	5

Switch 7 and Pluggable Program Strap BA (Baud Rate)

Selection of the desired baud rate requires setting both Switch 7 and Pluggable Strap BA. One of the ten positions on Switch 7 must be set to ON and the blue Pluggable Strap must be over the center pin and the A pin or over the center pin and the B pin. Note that only one position on Switch 7 may be on at a time. Baud rate is factory set with Position 2 ON on Switch 7 and Pluggable Strap BA over pin B and the center pin. The table below lists the baud rates that may be selected.

<u>Switch 7</u> <u>Position ON</u>	<u>Blue Pluggable Strap BA</u>	
	<u>Strap A</u>	<u>Strap B</u>
1	19,200	19,200
*2	28,880	*9,600
3	14,400	4,800
4	7,200	2,400
5	3,600	1,200
6	1,800	600
7	900	300
8	450	150
9	225	75
10	112.5	--

Poe Strap (Parity)

Parity may be odd or even and is controlled by a wire jumper soldered into the two points on the circuit board labelled POE. The RS232 unit is shipped with no strap and is in the *even parity mode.

HCB Strap (Stop Bits)

There may be one or two stop bits transmitted. The number of bits transmitted is controlled by a wire jumper soldered into the two points on the board labelled HCB. The RS232 unit is shipped with no strap and transmits *two bits.

3. IEEE INTERFACE

A. General

The IEEE-488 1975 INTERFACE outputs the X and Y coordinates as 8 bit parallel, standard ASCII characters, one character at a time in a 12 character message string. The MODE of the Bit Pad can be controlled by the front panel or remotely programmed. The Bit Pad is remotely programmed by transferring an ASCII character over the IEEE bus. The interface conforms to the IEEE-48 1975 Digital interface for Programmable Instrumentation Standard. This permits easy interface of the Bit Pad One to any terminal, calculator or mini computer supporting the IEEE-48 standard. The standard is also known as the General Purpose Interface Bus (GPIB) or Hewlett-Packard Interface Bus (HPIB).

The IEEE (GPIB) interface output connector J1 has 16 data lines. Data is transmitted in 8-bit Bytes over an eight-line data bus. Byte transfer is controlled via a three-line transfer bus. Five other lines are used for interface management.

In operation, X-Y coordinate value are transferred from the Bit Pad One to the IEEE operating device. SW#1 Position 9 selects which basic data output mode (ON English or OFF Metric) is to be used by the Bit Pad One. The Bit Pad One controls all handshaking routines and data formatting.

Output format, transfer mode, and other parameters are selected by the IEEE options SW-3 located on the rear panel (See p. 30, IEEE Outline Dwg.). This switch and its eight sections provide system address information, format variations and transfer mode. Transfer mode may operate via a dedicated line or multiple system line. Selection of SRQ (Service Request) will provide serial poll capability for multi-system lines.

B. Data Format (Bit Pad) Switch 1 position off

X X X X D1 Y Y Y Y D1 F D2

Data Format (ID) Switch 1 position on

X X X X D1 Y Y Y Y D1 F D1 T D2

Note: XXXX are ASCII characters for the x coordinate value
YYYY are ASCII characters for the y coordinate value
(0000 to 2200 English, 0000 to 2794 Metric. Origin is
in the lower left corner of tablet.)
F is an ASCII Hexidecimal character 0-F determined by
the flag button on the cursor or in the stylus
D1 is delimiter selected by switch #3 position 7 & 8
D2 is delimiter selected by switch #3 position 7 & 8
T is a tablet identifier character which is always an
ASCII 1

It is permissible to drop strings from the end of the transmission if the data is not needed.

i.e., INPUT @4:X,Y INSTEAD OF INPUT @4:X,Y,F
i.e., RED 708, X, INSTEAD OF RED 708, X,Y,F

C. Remote Control

The Bit Pad One mode and rate may be remotely programmed by sending the appropriate character from the host processor.

TABLE 3-5

Mode	Rate*	ASCII Character - Upper Case Only
Stop	Idle	S
Point	200	P
Switched	1	@
Stream	5	A
	10	B
	20	C
	40	D
	75	E
	125	F
	125	G
Stream	1	H
	5	I
	10	J
	20	K
	40	L
	75	M
	125	N
	125	O

*Coordinate pairs per second. The transfer rate to the host processor is ultimately controlled by the processor and any other peripherals on the IEEE bus.

D. Output Connector

The output of the IEEE interface appears on the rear panel of the unit at J1. This connector is an IEEE industry standard 24 contact stackable female connector (Amphenol 57 series) and mates with standard IEEE-488 cable.

E. Cables

Any standard IEEE-488 interface cable may be connected to J. These cables are also stackable so that a number may be connected into one connector or end to end. A limitation of 20 meters total cable length for all devices sharing the same line must be observed.

An IEEE interface cable is not supplied with the BP-One, IEEE P/N01-0017-002 and must be ordered separately if desired. Order IEEE interface cable P/N 78-6001-001 (2 meters length) or P/N 78-6001-002 (4 meters length) from the cable price list.

F. Pin Assignments

Refer to IEEE-488 1975 interface specification.

G. IEEE Unit Switch Settings for 400 Series Proms

All units are shipped in a standard setting from the factory. If settings other than standard are desired, refer to the appropriate switch or strap below for change instructions. Standard (factory) settings are denoted by *. (See IEEE Outline Drawing, p. 39, for all switch locations.)

Switch 1 (Format/Calibration)

This is a nine position switch that controls the output data format as follows:

Position 1	}	Do Not Adjust - Factory Set. Refer to Section 4, Calibration, pp. 28-29 if recalibration is required.
2		
3		
4		
5		
Position 6	}	ON = ID Format
7		*OFF= BP Format
8		Not used for IEEE units (Spares)
Position 9		*ON-English (0.005" Resolution) OFF-Metric (0.1mm Resolution)

Switch 2 (Mode/Rate)

This is a six position switch that controls sampling mode (Point, Switch Stream or Continuous Stream) and sampling rate (X-Y coordinate pairs per second). This switch is factory set in the Continuous Stream Mode at 200 samples per second. (NOTE: The maximum repetition rate is dependant upon interface and software timing.) To operate under program control (via computer), set all internal switch position to OFF (Remote Mode). If unit has optional Front Panel switches, set all internal switch positions to OFF. Mode and rate may be changed by setting the internal switch positions or depressing Front Panel buttons as shown in the Table below. (For Front Panel switches, ON corresponds to Button In and Off corresponds to Button Out.)

TABLE 3-6

Switch 2 Mode/Rate Position Settings

	Internal Switch 2	Pos 1	Pos 2	Pos 3	Pos 4	Pos 5	Pos 6
Mode	Front Panel Switch	Mode 2	Mode 1	Rate 4	Rate 2	Rate 1	CLEAR
<u>Remote</u>		OFF	OFF	OFF	OFF	OFF	Position 6 Not Used on Internal Switch.
<u>Point</u>		ON	ON	OFF	OFF	OFF	
<u>Switch Stream</u>							
200 Samples/Sec		OFF	ON	ON	ON	ON	
150		OFF	ON	ON	ON	OFF	
75		OFF	ON	ON	OFF	ON	
40		OFF	ON	ON	OFF	OFF	
20		OFF	ON	OFF	ON	ON	
10		OFF	ON	OFF	ON	OFF	
5		OFF	ON	OFF	OFF	ON	
1		OFF	ON	OFF	OFF	OFF	
<u>*Continuous Stream</u>							
*200		ON	OFF	ON	ON	ON	
150		ON	OFF	ON	ON	OFF	
75		ON	OFF	ON	OFF	ON	
40		ON	OFF	ON	OFF	OFF	
20		ON	OFF	OFF	ON	ON	
10		ON	OFF	OFF	ON	OFF	
5		ON	OFF	OFF	OFF	ON	
1		ON	OFF	OFF	OFF	OFF	

Switch 3 (Format Address)

This is an eight position switch. Using the first five positions, the operator can set up to thirty-one unique device address codes. String delimiters and service request can be set on the other three positions. Switch down is ON and Switch up is OFF. (Factory setting is indicated by *).

Position 1	ON	ADDR1 (1)	(LSB)
Position 2	ON	ADDR2 (2)	
3	ON	ADDR3 (4)	
4	*ON	ADDR4 (8)	
5	ON	ADDR5 (16)	(MSB)
6	ON	Service Request (SRQ)	
7	*ON	Form 1	
8	*ON	Form 2	

When position 6 is ON, a service request will be generated when a coordinate pair is available. When position 6 is OFF, data will be developed and the system will halt until its talk address is received. When positions 7 and 8 are ON, string delimiters may be selected. (See table below.)

TABLE 3-7

<u>Form 1</u>	<u>Form 2</u>	<u>Delimiter 1</u>	<u>Delimiter 2</u>	
*ON	*ON	CR	CR	*Tek GPIB Format
OFF	ON	'	CR	Pet Format
ON	OFF	'	LF	HP HPIB Format

H. SAMPLE IEEE PROGRAMS

1. Hewlett Packard HPIB Sample Programs

A. Program #1

This program will wait for the Bit Pad to develop data, receive and display it. Tablet address is 8.

```
0:  fmt 2f8, 2f2; fxd 3
1:  red 708, X,Y,F; dsp X,Y, F
2:  gto 1
```

B. Program #2

This program will poll two tablets, when data is received it will display it, and identify the source. While waiting for an SRQ, the display will alternately show WAIT, HPIB. Tablet addresses are 4 and 8.

```
0:  fmt 2f8, 2f2; fxd 3
1:  oni 7, "TABLET"
2:  eir 7
3:  dsp "WAIT"; wait 1000
4:  dsp "HPIB"; wait 1000
5:  gto 2
6:  "TABLET": rds (708) --- A
7:  if A- 0; gto 11
8:  red 708, X,Y,F; dsp X,Y,F
9:  wait 1000; dsp "TABLET 8"
10: wait 1000
11: rds (704) --- A
12: if A-0; iret
13: red 704, X,Y,F: dsp X,Y,F
14: wait 1000; dsp "TABLET 4"
15: wait 1000; iret
```

NOTE: An untalk command should be issued after data transfer is complete in serial Poll Mode.

The following program will input tablet data to the HP 9815 stack only:

		<u>REMARKS</u>
0 0 0 0	FIX 3	Number of decimal places
0 0 0 2	0	
0 0 0 3	8	
0 0 0 4	ENTER	Address 8 onto stack
0 0 0 5	READX 5	Input data @ Address 8
0 0 0 7	PRT STK	Print Stack
0 0 0 8	GOTO 0002	Repeat
0 0 0 10	End	

Program step 0000 will vary with output format of the I.D.

2. Tektronix 4051 Sample Programs

A. Program #1

This program inputs coordinate BCD data and prints it out without the use of the service request.

100	INIT
110	PRINT @ 32, 26:2
120	INPUT @ 8: X,Y,F\$
130	PRINT X,Y,F\$
140	GO TO 120
150	STOP

B. Program #2

This program inputs coordinate BCD data and prints it out using the serial poll capability of the TEK 4051. The SRQ switch must be on for interface to operate in this mode.

100	INIT
110	PRINT @ 32, 26:2
120	ON SRQ THEN 160
130	PRINT "WAITING FOR SERVICE REQUEST"
140	WAIT
150	GO TO 130
160	POLL M, N;8
170	GO TO M OF 180
180	INPUT @ 8: X,Y,F\$
190	PRINT X,Y,F\$
200	RETURN
210	STOP

C. Program #3

This program outputs an ASCII character which will remotely program the MODE of the Bit Pad. Address 8 is assumed and point mode is selected.

100	INIT
110	PRINT @ 32, 26:2
120	PRINT @ 8: "p"
130	STOP

4. PARALLEL INTERFACE

A. General

Within this interface, two modes, Binary and Binary Coded Decimal (BCD) are switch selectable. In the Binary mode, five eight bit bytes are output for each coordinate pair. In the BCD mode, twelve ASCII BCD characters are output for each coordinate pair. The data transfer rate may be a maximum of 200 coordinate pairs per second, depending on the receiving device. The BCD interface is specially designed to permit the Bit Pad One to be plugged into the Remote Keyboard port on a CRT or microcomputer.

B. Parallel Binary

Parallel Binary is selected by turning Switch 1 Position 7 to the ON position. This enables the 5 byte parallel binary transfer of data.

There are three control lines that can be used to control the transmission speed of the five bytes of coordinate data. The three control signals are defined as Byte Available, Byte Received and Next Byte. Byte Available signifies that a byte of data is available; Byte Received signifies that the byte of data has been read by the host processor; and Next Byte is used by the host processor to request the next byte of data to be transmitted.

C. Parallel Binary Format -- for each coordinate pair five bytes of data are transmitted as follows:

TABLE 3-8

CONNECTOR J1-Pin Pin Function	22 Out 7	20 Out 6	18 Out 5	16 Out 4	14 Out 3	12 Out 2	10 Out 1	8 Out 0	25 Data* Strobe
Byte 1	1	Byte Avail.	F3	F2	F1	F0	0	0	
Byte 2	0	"	X5	X4	X3	X2	X1	X0	
Byte 3	0	"	X11	X10	X9	X8	X7	X6	
Byte 4	0	"	Y5	Y4	Y3	Y2	Y1	Y0	
Byte 5	0	"	Y11	Y10	Y9	Y8	Y7	Y6	
	MSB								LSB

F0 - Z Axis Switch
 F1, F2, F3 - Flag Byte
 X0 - X11 - 12 bit X coordinate
 Y0 - Y11 - 12 bit Y coordinate

*Data Strobe is a negative or positive pulse strappable using points C and D, which emulates Byte available.

D. Parallel BCD

Parallel ASCII is selected by turning Switch 1 Position 7 to the OFF position. This enables the 12 byte parallel ASCII transfer. There are three control lines that can be used to control the transmission speed of the 12 bytes of coordinate data. The three control signals are defined as Byte Available, Byte Received, and Next Byte. Byte Available signifies that a byte of data is available; Byte Received signifies that the byte of data has been read by the host processor; and Next Byte is used by the host processor to request the next byte for data to be transmitted.

TABLE 3-9 Paralled BCD Format

CONNECTOR J1-Pin Pin Function	22 BYTE Avail.	20	18	16	14	12	10	8	25 Data* Strobe	
BYTE 1		0	1	1	X Coordinate		X3 - BCD			
BYTE 2		0	1	1			X2 - BCD			
BYTE 3		0	1	1			X1 - BCD			
BYTE 4		0	1	1			X0 - BCD			
BYTE 5		0	1	0	1	1	0	0		
BYTE 6		0	1	1	Y Coordinate		Y3 - BCD			
BYTE 7		0	1	1			Y2 - BCD			
BYTE 8		0	1	1			Y1 - BCD			
BYTE 9		0	1	1			Y0 - BCD			
BYTE 10		0	1	0	1	1	0	0		
BYTE 11		F L A G D A T A								
BYTE 12		0	0	0	1	1	0	1		
BYTE 13*		0	0	0	1	0	1	0		
		MSB						LSB		

*Optional Line Feed SW-1, Position 8

BYTES 1 through 4 BCD Digits of X Coordinate XXXX

BYTES 6 through 9 BCD Digits of Y Coordinate YYYY

BYTES 5 and 10 ASCII Comma ,

BYTE 11 Hexadecimal Representation of Cursor Flag

BYTE 12 ASCII Carriage Return

BYTE 13 Optional ASCII Line Feed

XXXX and YYYY are ASCII numbers that range in magnitude from 0000 to 2200 in the English mode or 0000 to 2794 in the Metric mode. Origin (0000) is in the lower left corner of the tablet.

The following Flow diagram (see next page) describes the handshaking and use of interface signals by the Bit Pad One and host processor. Coupled with the timing diagrams, this will provide the necessary information to interface the Bit Pad One to a parallel processor port.

It should be noted that the host processor can be operated in the interrupt mode if desired. To do this, the Data Strobe or Data Strobe line would be connected to the interrupt line on the host processor. The Data Strobe or Data Strobe line is a 1.5 us pulse exercised for every byte of coordinate data.

Additionally, if the host processor is fast enough to receive data at the maximum rate of the Bit Pad, transmission need not be controlled by the host processor. If no connection or control is exercised on the byte received and next byte control lines; the five bytes will be transmitted without handshaking. In summary, there are four basic interfacing modes for the Bit Pad. They are:

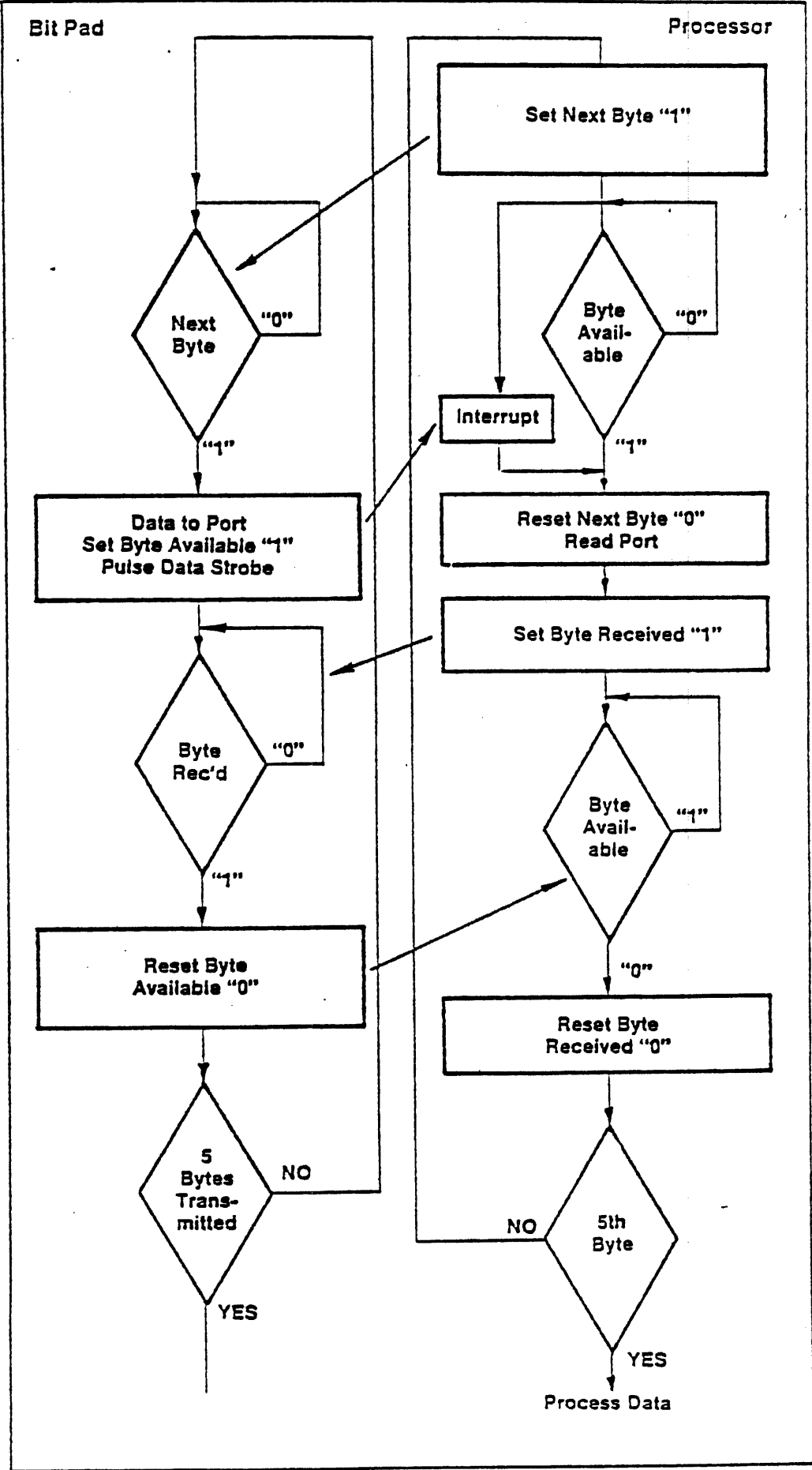
1. Polled - Controlled transmission rate
2. Polled - Uncontrolled (full speed) (consult Signal Timing Diagram--Section 5)
3. Interrupt Driven - Controlled transmission rate
4. Interrupt Driven - Uncontrolled (full speed)

E. Parallel Remote Control

A unique feature of the Bit Pad One is that all mode and rate controls are duplicated on the interface connector so that the host processor can completely control the operation of the Bit Pad. The format of the Command Byte is as follows:

Next Byte	Byte Recv	Mode 2	Mode 1	Rate 4	Rate 2	Rate 1	Status Valid
IN 7 21	IN 6 19	IN 5 17	IN 4 15	IN 3 13	IN 2 11	IN 1 9	IN 0 7

These eight bits are labeled on the connector diagram as IN0 - IN 7, where IN0 is the Status Valid Bit; IN1 is rate 1, etc. The Command Byte, Rate Bits and the Command Byte Mode bits are identical in function to the manual controls. A logical "1" in the Command Byte is equivalent to a switch "out" (off), and a logical "0" in the Command Byte is equivalent to a switch "in" (on). The one exception to this is when both mode bits and status valid are logical "1's" (with one of the manual rate switches active), in which case the Bit Pad One operates in the diagnostic mode which is defined in a later section. These five bits are not latched, that is they must be connected to a latched output port on the host processor. The Status Valid bit informs the Bit Pad that a change is desired to the mode and rate bits. If a Status Valid equals a "1", the Bit Pad will read the Command Byte. If Status Valid equals a "0", the Bit Pad will search either for a front panel switch closure or a remote command with an active status valid. Therefore, whenever the host processor is changing the rate or mode setting of the Command Byte, it should first set Status Valid equal to a "0", then change the desired mode and/or rate setting, and finally return Status Valid to a "1".



The two other bits on the Command Byte, Next Byte and Byte Received, are part of the three wire handshake used to control transmission speed of the Bit Pad and were covered in the previous section.

There is one additional signal line that is an input to the Bit Pad. This line is designated remote reset on the connector diagram. This line allows the host processor to reset the Bit Pad should it become necessary.

TABLE 3-10

CONNECTOR J1-Pin Pin Function		21 IN 7	19 IN 6	17 IN 5	15 IN 4	13 IN 3	11 IN 2	9 IN 1	7 IN 0
MODE	RATE	NEXT BYTE	BYTE REC'V	MODE 2	MODE 1	RATE 4	RATE 3	RATE 2	STATUS VALID
Stop Point Stream	Idle			1	1	1	1	1	
	200			0	0	-	-	-	
	1			0	1	1	1	1	
	5					1	1	0	
	10					1	0	1	
	20					1	0	0	
	40					0	1	1	
	75					0	1	0	
	150					0	0	1	
	200					0	0	0	
Switched Stream	1			1	0	1	1	1	
	5					1	1	0	
	10					1	0	1	
	20					1	0	0	
	40					0	1	1	
	75					0	1	0	
	150					0	0	1	
	200					0	0	0	
		MSB							LSB

*Rate is coordinate pairs per second

F. Output Connector

Parallel

25 pin female
AMPHENOL type 206584-1
mates with DB-25p

Cable

optional RS232 cable
ten feet, part no. 78-6002-001
twenty feet, part no. 78-6002-002
fifty feet, part no. 78-6002-003

Pin Assignments

Output connector J1

<u>Pin</u>	<u>Signal</u>	<u>Pin</u>	<u>Signal</u>
1	Ground	13	in 3
2	Remote Reset	14	out 3
3	Not used	15	in 4
4	Strappable	16	out 4
	+5 Volts (output)	17	in 5
5	Not used	18	out 5
6	Not used	19	in 6
7	in 0	20	out 6
8	out 0	21	in 7
9	in 1	22	out 7
10	out 1	23	Ground
11	in 2	24	Not used
12	out 2	25	Data Strobe

In 0 through In 7 is the binary remote control byte (see page 25, Table 3-10).
 Out 0 through Out 7 is the binary output data byte (see page 21, Table 3-8).

Parallel Unit Switch Settings and Strap Options for 500 Series Proms

All units are shipped in a standard setting from the factory. If settings other than standard are desired, refer to the appropriate switch or strap below for change instructions. Standard (factory) settings are denoted by *. (See Parallel Outline Drawing, p. 40, for all strap and switch locations.)

Switch 1 Format/Calibration)

This is a nine position switch that controls the output data format as follows:

Position 1	}	Do Not Adjust - Factory Set. Refer to Section 4, Calibration, pp. 28-29 if recalibration is required.
2		
3		
4		
5		
Position 6		Not Used (Spare)
Position 7		*ON-Parallel Binary Output (NOTE: No CRLF transmitted when in Parallel Binary - Position 8) OFF-ASCII BCD Output
Position 8		*ON-Carriage Return Line Feed (CRLF). This adds line feed to the end of output data format. OFF-Carriage Return (CR) only.
Position 9		*ON-English (0.005" Resolution) OFF-Metric (0.1mm Resolution)

Switch 2 (Mode/Rate)

This is a six position switch that controls sampling mode (Point, Switch Stream or Continuous Stream) and sampling rate (X-Y coordinate pairs per second). This switch is factory set in the Continuous Stream Mode at 200 samples per second.* To operate under program control (via computer), set all internal switch positions to OFF (Remote Mode). If unit has optional Front Panel switches, set all internal switch positions to OFF. Mode and rate may be changed by setting the internal switch positions or depressing Front Panel buttons as shown in the Table below. (For Front Panel switches, ON corresponds to Button In and OFF corresponds to Button Out.)

TABLE 3-11
Switch 2 Mode/Rate Position Settings

	Internal Switch 2	Pos 1	Pos 2	Pos 3	Pos 4	Pos 5	Pos 6
Mode	Front Panel Switch	Mode 2	Mode 1	Rate 4	Rate 2	Rate 1	CLEAR
<u>Remote</u>		OFF	OFF	OFF	OFF	OFF	Position 6 Not Used on Internal Switch.
<u>Point</u>		ON	ON	OFF	OFF	OFF	
<u>Switch Stream</u>							
200 Samples/Sec		OFF	ON	ON	ON	ON	
150		OFF	ON	ON	ON	OFF	
75		OFF	ON	ON	OFF	ON	
40		OFF	ON	ON	OFF	OFF	
20		OFF	ON	OFF	ON	ON	
10		OFF	ON	OFF	ON	OFF	
5		OFF	ON	OFF	OFF	ON	
1		OFF	ON	OFF	OFF	OFF	
<u>*Continuous Stream</u>							
*200		ON	OFF	ON	ON	ON	
150		ON	OFF	ON	ON	OFF	
75		ON	OFF	ON	OFF	ON	
40		ON	OFF	ON	OFF	OFF	
20		ON	OFF	OFF	ON	ON	
10		ON	OFF	OFF	ON	OFF	
5		ON	OFF	OFF	OFF	ON	
1		ON	OFF	OFF	OFF	OFF	

CD Strap (Polarity of Data Strobe)

The data strobe may be either a positive or negative pulse. If the Pluggable Strap is placed over the center pin and the C pin, the pulse will be positive. If the Pluggable Strap is placed over the center pin and the D pin, the pulse will be negative. The Parallel unit is shipped with Strap in *D position (Negative).

SECTION 4

1. MAINTENANCE

A. Internal Diagnostics

The Bit Pad control unit contains two test functions that can be used to 1) Verify proper operation of most of the Bit Pad electronics and 2) Verify proper connections to the host processor.

Internal Test Mode (D1) - To place the unit in D1 (internal test mode) set switch 2 positions as follows:

1	2	3	4	5	6
off	off	on	off	off	not used

Set the command byte mode bits to logicals one (1). If there is nothing connected to the command byte lines they will normally be at a logical "1". However, if these lines are connected to a port on the host processor, then the processor must output logic "1's" on these lines. The control unit will now attempt to check out all internal circuitry. If everything checks out, it will pulse the First Byte line at a two-second duty cycle (slow enough to be detected by a meter). If all does not check out, the First Byte line will remain a logic high or a logic low.

Interface Test Mode - To place the unit in D2 (interface test mode), set switch 2 positions as follows:

1	2	3	4	5	6
off	off	off	on	off	not used

The Bit Pad One will output a constant pattern which can be used to verify interface operations. All control lines will be operable as if the Bit Pad One were transmitting normally. The data sent will be the five bytes below:

```

Byte 1  1  1  0  0  0  0  0  0
Byte 2  0  1  1  0  1  0  1  0
Byte 3  0  1  0  1  0  1  0  1
Byte 4  0  1  1  0  1  0  1  0
Byte 5  0  1  0  1  0  1  0  1
    
```

2. CALIBRATION

Note: Preset at Factory - It is not necessary to calibrate unless tablets are exchanged with the controllers or a desired change in Metric or English resolution. Necessary equipment for calibration:

1. Tablet Calibration Look-up Table.
2. Accurate measuring device. (Precision Ruler, Precision Grid, etc.)

SELECTION OF RESOLUTION

- SW1 Position 9 ON = English (0.005" Resolution)
- SW1 Position 9 OFF = Metric Resolution .1mm

CALIBRATION PROCEDURE

1. Bias the Tablet.
2. Note the wire speed number located on the tablet corner bracket. (Should fall between 3986 and 4040).
3. By using the tablet calibration look up tablet, find appropriate line in which your wire speed number falls within.
Example: Wire Speed Number - 4007.
Line 9 of the tablet calibration look up table is the line in which your wire speed number falls within 4006 to 4009.
4. Once you have determined the line at which your wire speed number falls within, you can set the Bit Pad One Calibration Switch (Switch 1) with the switch codes that is listed on that line. NOTE: The switch codes given in the table below are approximate and may vary within +5 counts of accuracy at the completion of the absolute accuracy check.

CALIBRATION

The code on the line is used to represent Switch 1 Positions 1-5. A "1" in the code is equivalent to Switch Position ON, a "0" code is equivalent to a Switch Position OFF.

WIRE SPEED

<u>FROM</u>	Switch 1 <u>54321</u>	<u>TO</u>
3986	11101	3989
3990	11100	3993
3994	11011	3994
3995	11011	3997
3998	11010	3999
4000	11010	4001
4002	11001	4004
4005	11001	4005
4006	11000	4009
4010	10111	4013
4014	10110	4014
4015	10110	4017
4018	10101	4019
4020	10101	4021
4022	10100	4024
4025	10100	4025
4026	10011	4029

<u>FROM</u>	Switch 1 <u>54321</u>	<u>TO</u>
4030	10010	4033
4034	10001	4034
4035	10001	4037
4038	10000	4039
4040	10000	4041
4042	01111	4044
4045	01111	4045
4046	01110	4049
4050	01101	4053
4054	01101	4054
4055	01100	4057
4058	01011	4059
4060	01011	4061
4062	01010	4065
4066	01001	4069
4070	01000	4070
4071	01000	4073
4074	00111	4075
4076	00111	4077
4078	00110	4080
4081	00110	4081
4082	00101	4085
4086	00100	4089
4090	00011	4090

ABSOLUTE ACCURACY CHECK

The Absolute Accuracy of the tablet and controller can easily be checked with the use of accurate ruler. Select two (2) points on the X axis, a known distance apart. Digitize the left point first and note the X coordinate as X1; then digitize the right point, note its X coordinate as X2. The results by subtracting X1 from X2 should be within 2 counts of the original known distance. Switch 1 Positions 1 through 5 may be changed to bring the system into calibration. Position 1 represents the smallest change.

3. STYLUS REFILL REPLACEMENT

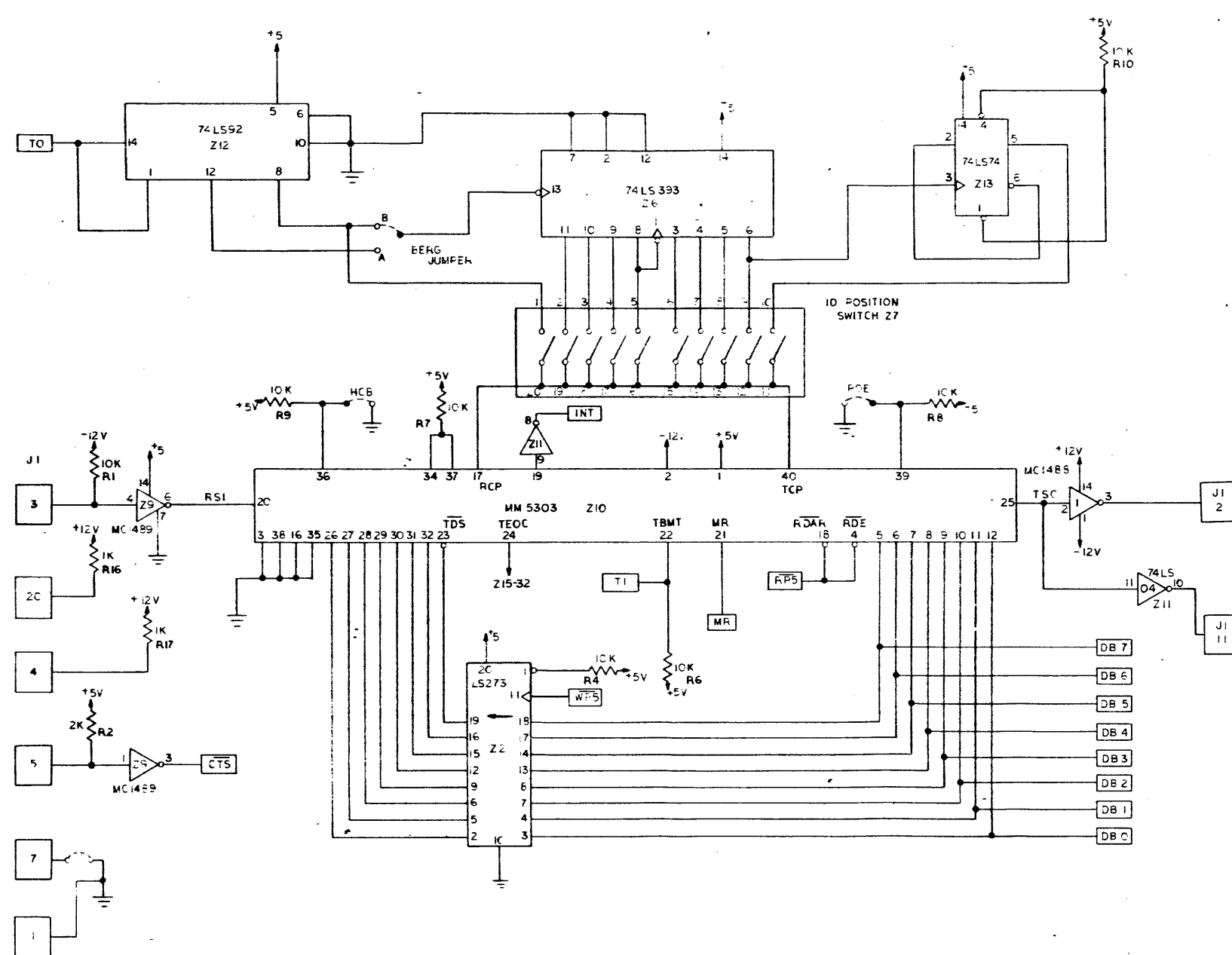
Your Summagraphics stylus has been designed to allow the user to replace the ball point refill (when it becomes dry or to change color). To change or replace refill simply:

1. Unscrew front section of stylus.
2. Grasp internal front section and carefully pull it straight off.
Note: internal front section may come off with outer cover. If this occurs, remove inner section before attempting to reassemble stylus or you may damage the miniature connector.
3. Pull out refill and replace with a new one.
4. Replace front inner section and mate connectors.
5. Replace outer cover.

SECTION 5

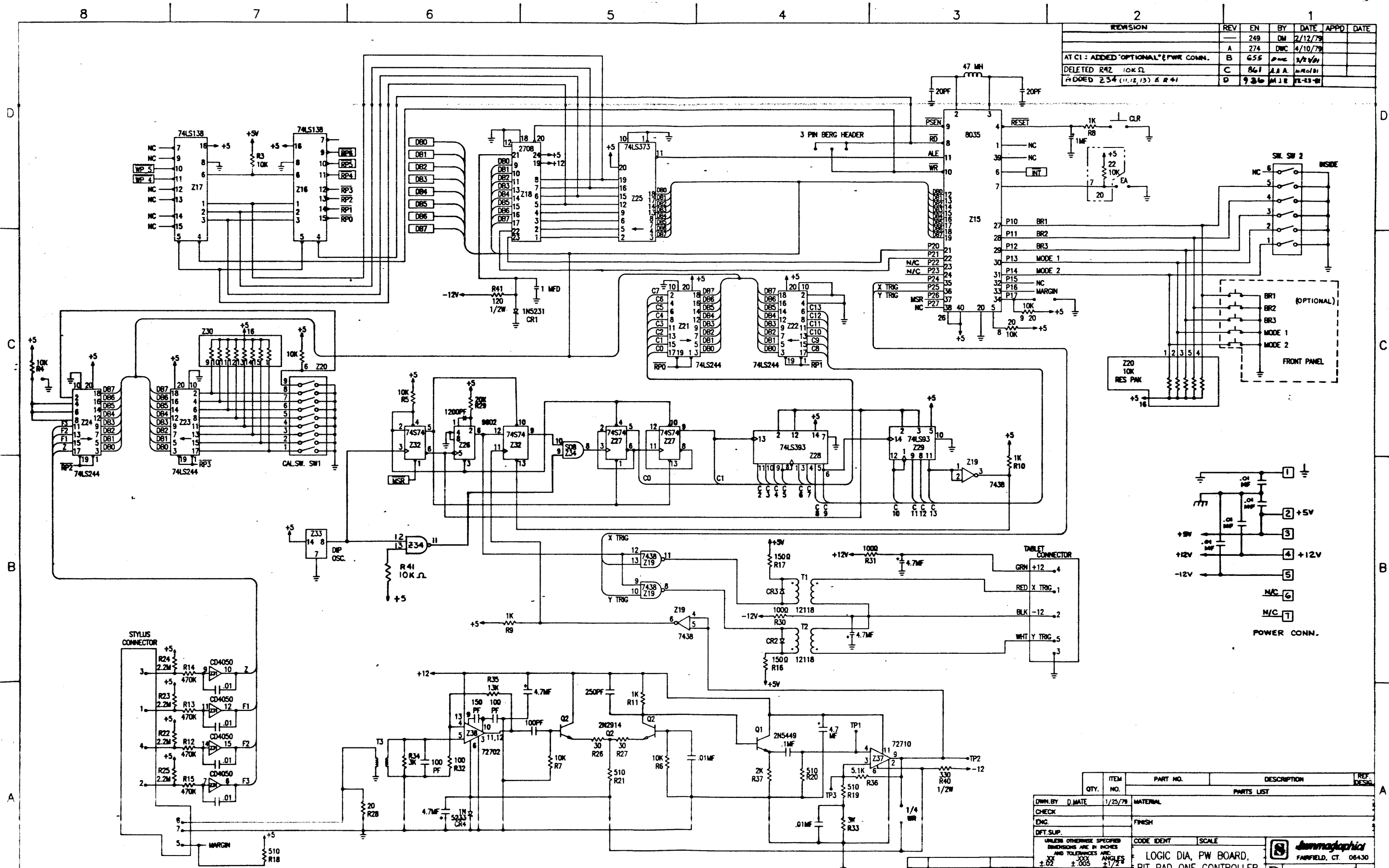
BIT PAD ONE DRAWINGS

REV	EN	BY	DATE	APPR	DATE
-	249	DM	2-12-77		
A	274	DWC	4-16-77		
B	301	DWC	5-31-77		
C	695	P-c	3-23-81		
D	861	AAA	10-22-81		
E	936	MJR	11-23-81		



QTY	ITEM NO.	PART NO.	DESCRIPTION	REF DES
PARTS LIST				
OWN BY	DATE	MATERIAL		
CHECK				
ENG.		FINISH		
DOFT SUP				
UNLESS OTHERWISE SPECIFIED		SCALE	S Summagraphics	
DIMENSIONS ARE IN INCHES			FAIRFIELD CT 06430	
AND TOLERANCES ARE:		LOGIC DIA, P.W. BOARD,		
.XXX ±.005		BIT PAD ONE CONTROLLER		
.XXX ±.005		(RS232 OPTION)		
.XXX ±.005		D 06-0011 E		
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SC		SIZE SHEET 2 OF 3		
DO NOT SCALE DRAWING		REV		

REVISION	REV	EN	BY	DATE	APPD	DATE
		249	DM	2/12/79		
AT C1: ADDED "OPTIONAL" PWR CONN.	A	274	DWC	4/10/79		
DELETED R42 10KΩ	B	655	DMC	3/29/81		
ADDED Z34 (1,2,3) & R41	C	861	AJA	11/10/81		
	D	936	MJE	12-23-81		



D
C
B
A

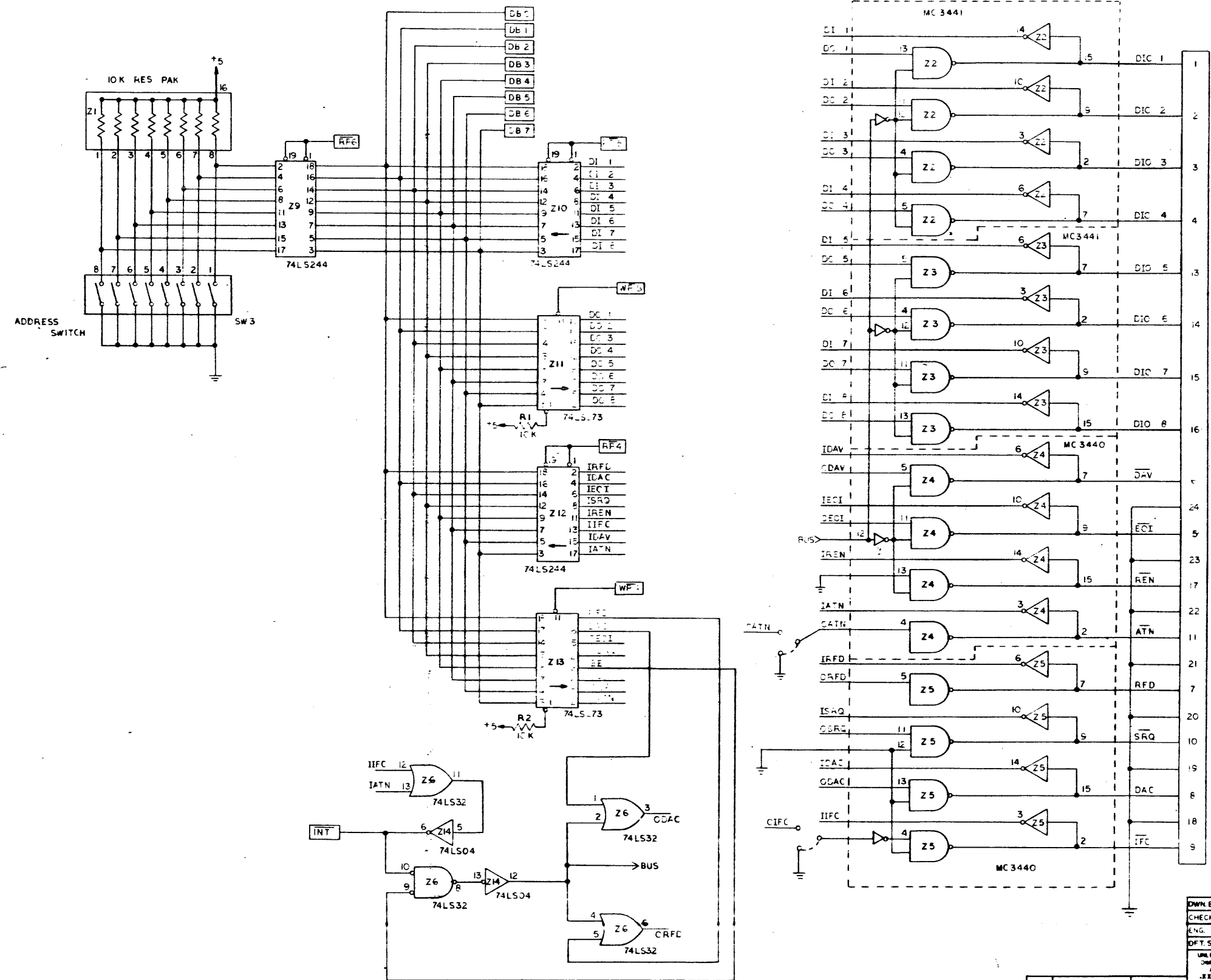
D
C
B
A

QTY.	ITEM NO.	PART NO.	DESCRIPTION	REF. DESIG.
			PARTS LIST	

DRWN. BY	D.MATE	1/25/79	MATERIAL
CHECK			
ENG.			FINISH
DFT. SUP.			
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND TOLERANCES ARE:		SCALE	
.001 - .005 ANGLES			
.002 ± .005 ± .125			
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SC			
DO NOT SCALE DRAWING			

LOGIC DIA, PW BOARD, BIT PAD ONE CONTROLLER (IEEE)	06-0005	D
FAIRFIELD, CT. 06430	SIZE SHEET 1 OF 2	REV.

REVISION	REV	EN	BY	DATE	APPD	DATE
	-	249	DM	2-12-79		
SEE SHEET 1	A	274	DWC	4-10-79		
SEE SHEET 1	B	655	DWC	3-21-81		
SEE SHEET 1	C	861	A.A.A.	10/20/81		
SEE SHEET 1	D	936	MIR	12-23-81		

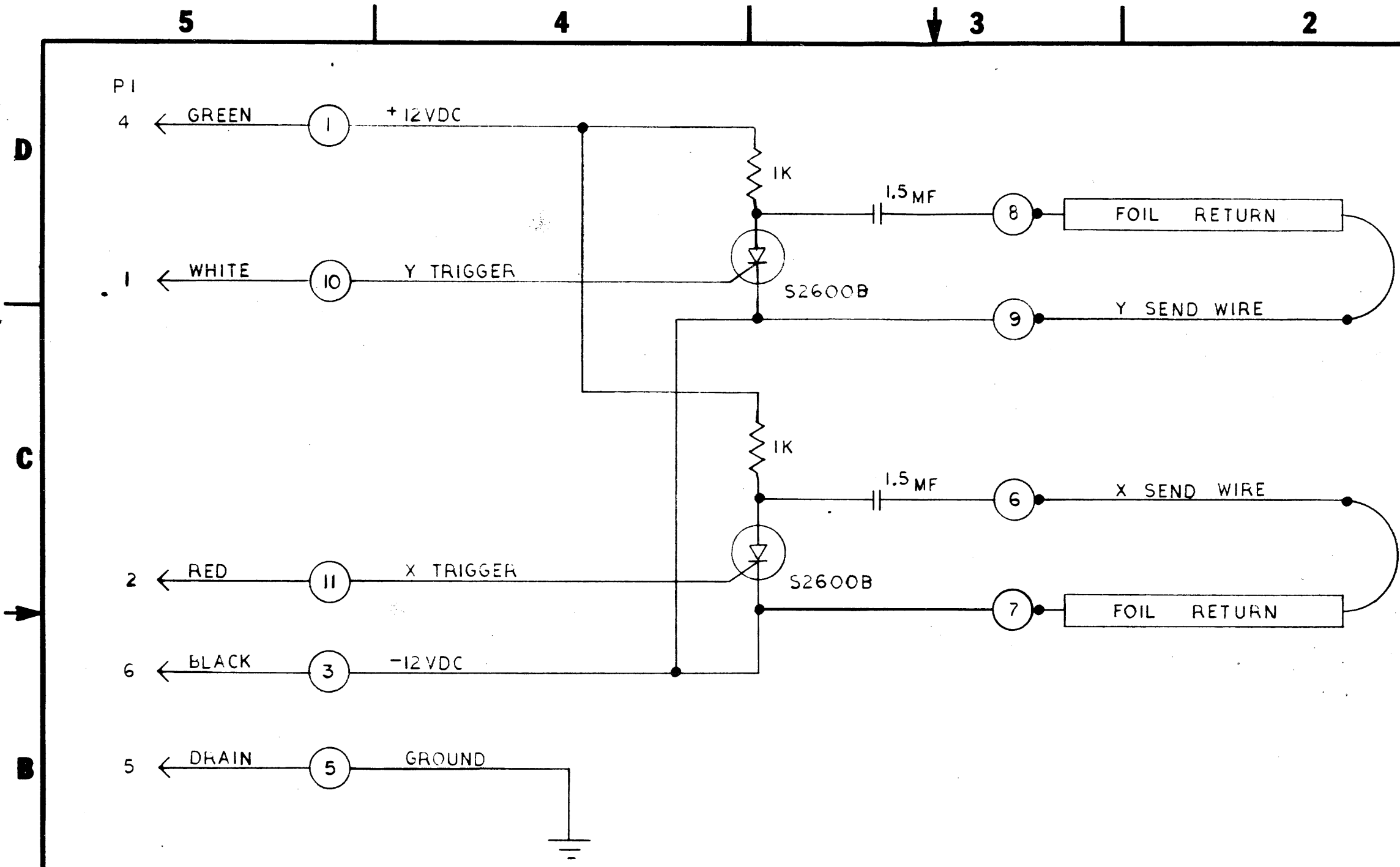


PART NO.	NEXT ASSEMBLY	MODEL	USED ON

QTY	ITEM NO.	PART NO.	DESCRIPTION	REV

DWN BY: <i>J. Malt</i> CHECK ENG. DFT. SUP	DATE: 1-25-79 MATERIAL FINISH
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND TOLERANCES ARE: .XX ±.005 .XXX ±.002 .XXX ±.001	SCALE LOGIC DIA, P.W. BOARD, BIT PAD ONE CONTROLLER (IEEE OPTION)
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO S.C. DO NOT SCALE DRAWING	 FAIRFIELD CT 06430 D 06-0005 SIZE SHEET 2 OF 2

REV	EN	BY	DATE	APPD	DATE
-	415	DWC	11-6-79		



NOTES:
1. FOR ASSY. DWG. SEE B04-0019-002

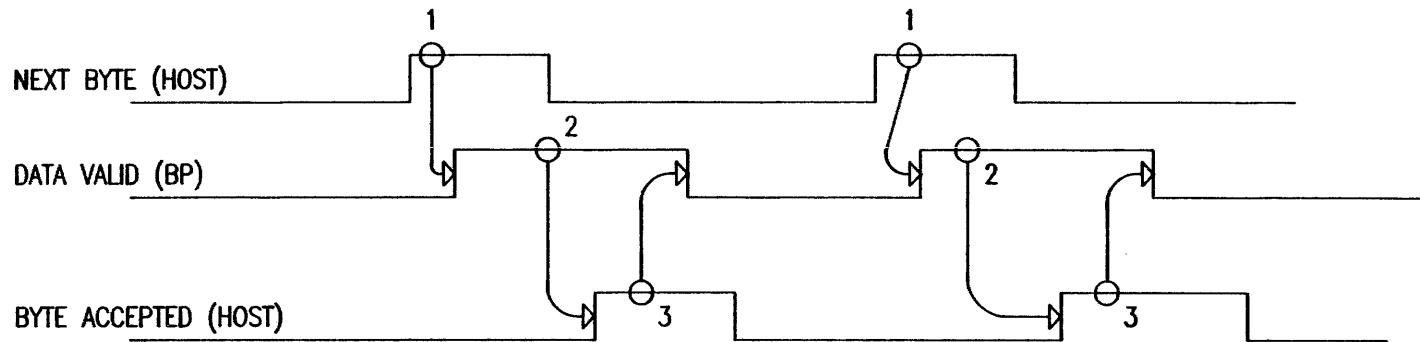
QTY	ITEM NO.	PART NO.	DESCRIPTION	REF DESIG
PARTS LIST				

DWN. BY <i>D. Mate</i>	11-1-79	MATERIAL:
CHECK <i>G. Nicastro</i>	11-5-79	
ENG.		
DFT. SUR. <i>G. Nicastro</i>	11-5-79	FINISH:

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND TOLERANCES ARE: .XX ±.02 .XXX ±.005 ANGLES ±1/2°		CODE IDENT	SCALE <i>H</i>
THIS DRAWING CONTAINS INFORMATION PROPRIETARY TO SC		SCHEMATIC TABLET PULSER	
DO NOT SCALE DRAWING		SIZE B	SHEET 2 OF 2

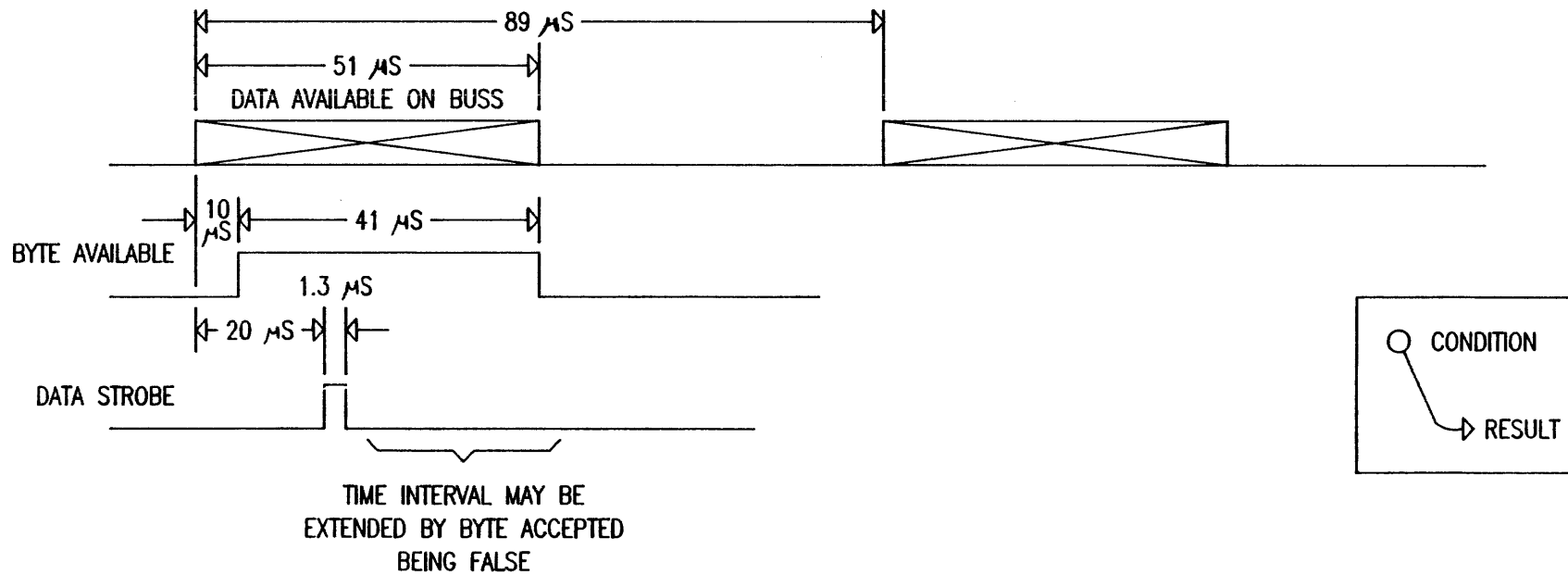
002	04-0019-002	B/P-1 (SUMMAGRAF)
PART NO.	NEXT ASSEMBLY	MODEL
	USED ON	

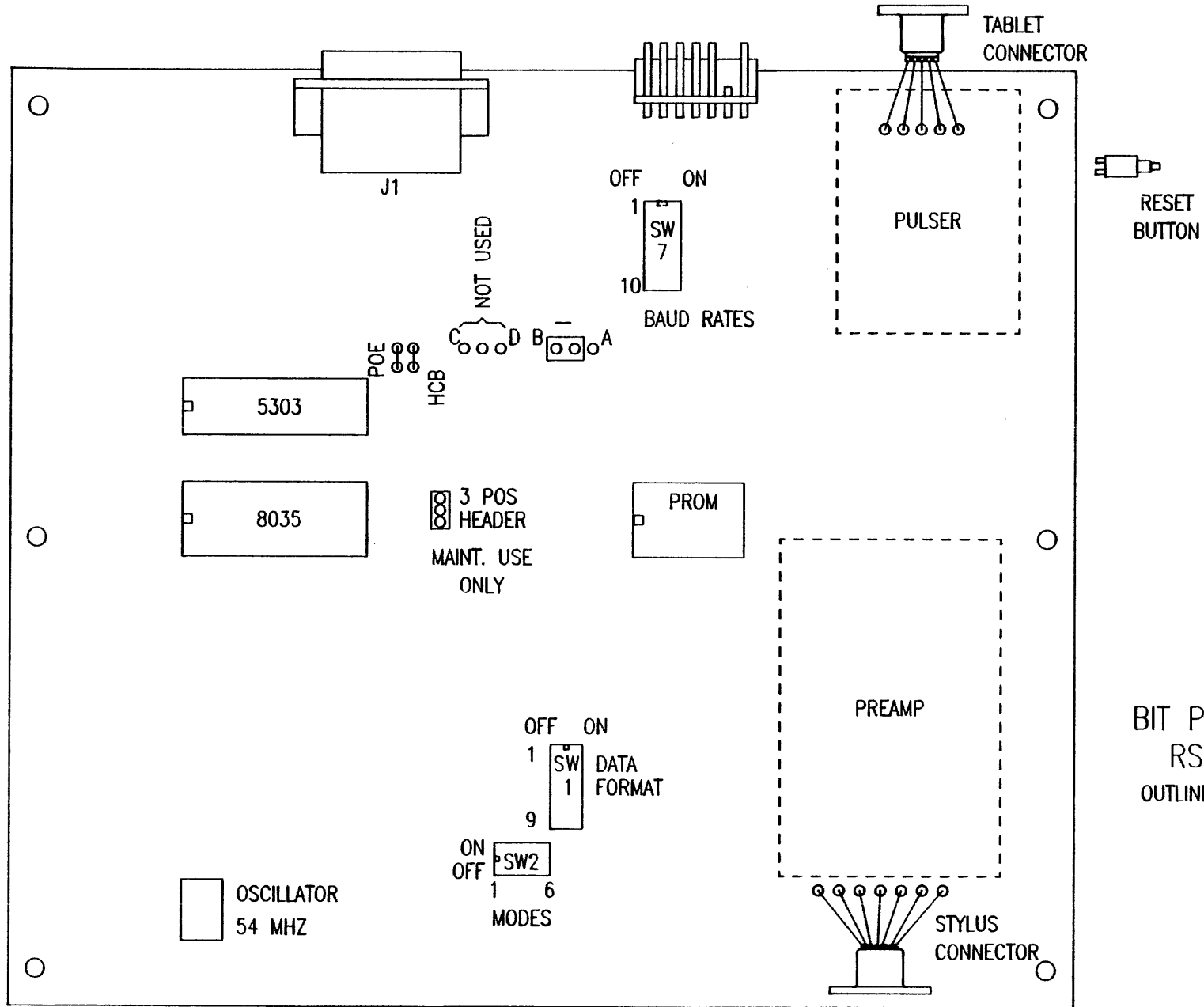
REF DESIG	
SIZE	B
SHEET	2 OF 2
REV	-



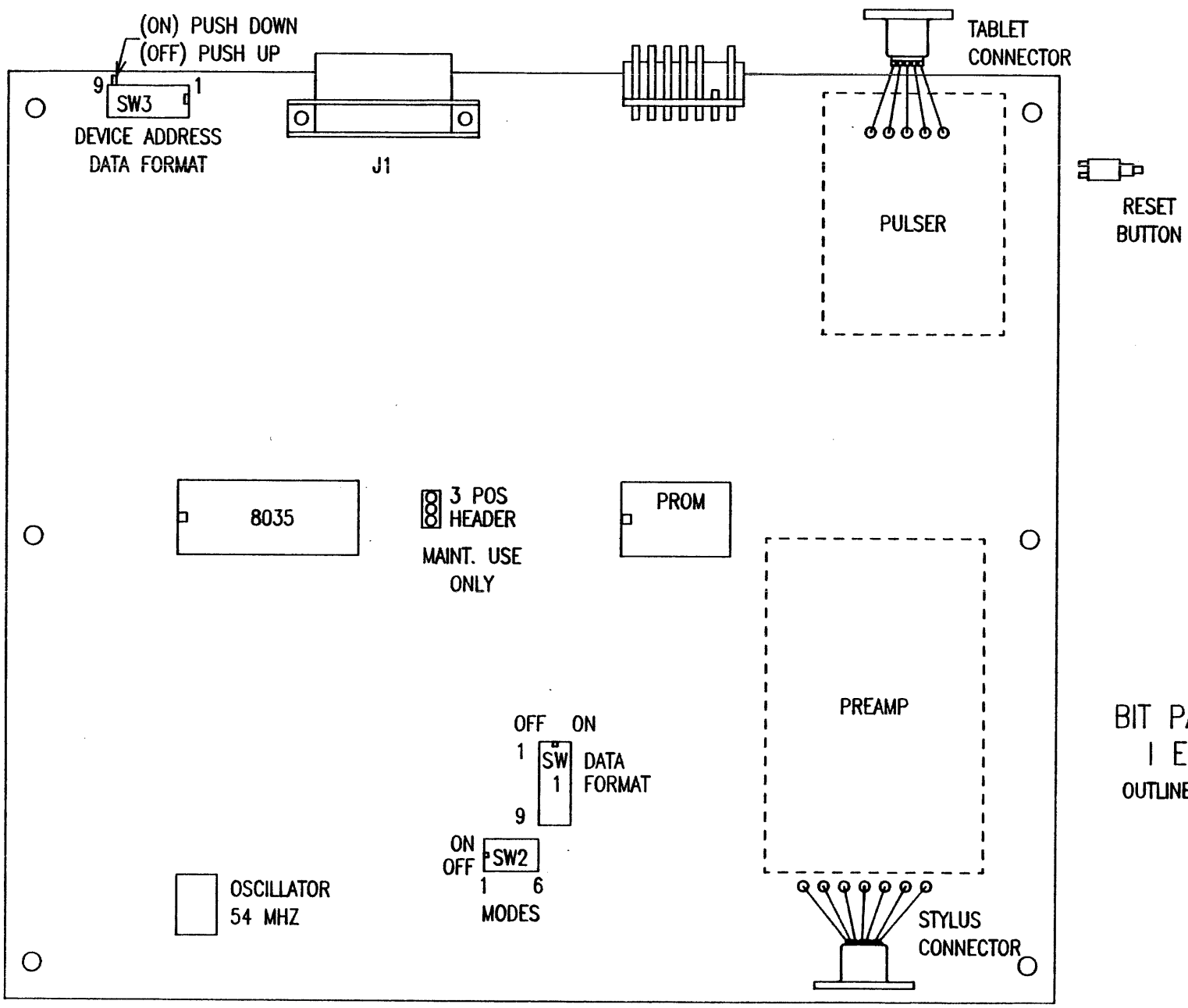
NEXT BYTE AND BYTE ACCEPTED ARE NEVER TRUE. COINCIDENTLY FOR PROPER CONTROL

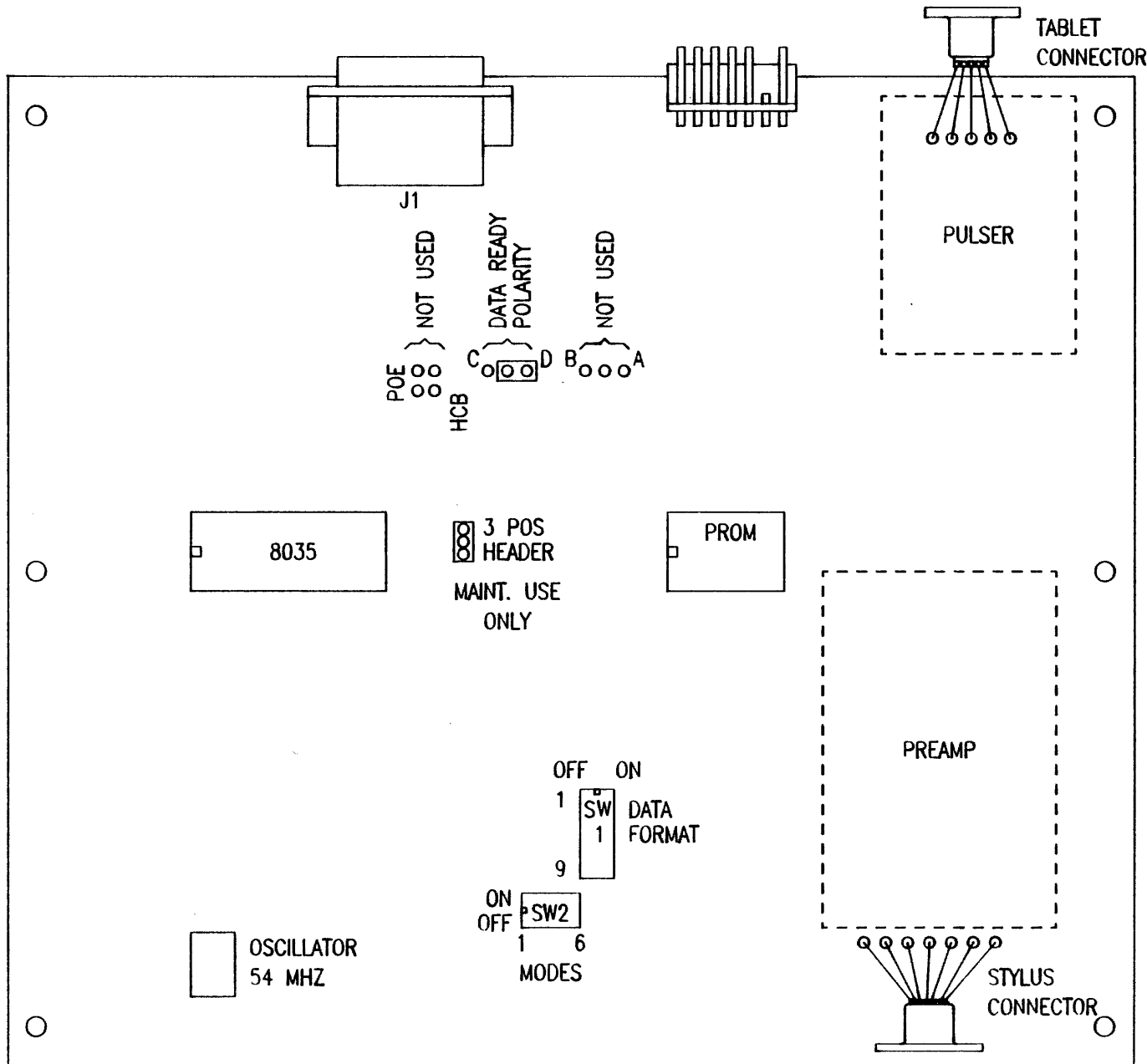
-37-





BIT PAD ONE
RS 232
OUTLINE DRAWING





BIT PAD ONE
PARALLEL
OUTLINE DRAWING



Summagraphics
corporation

35 BRENTWOOD AVE., BOX 781, FAIRFIELD, CONNECTICUT 06430, PHONE 203-384-1344
TELEX 964348

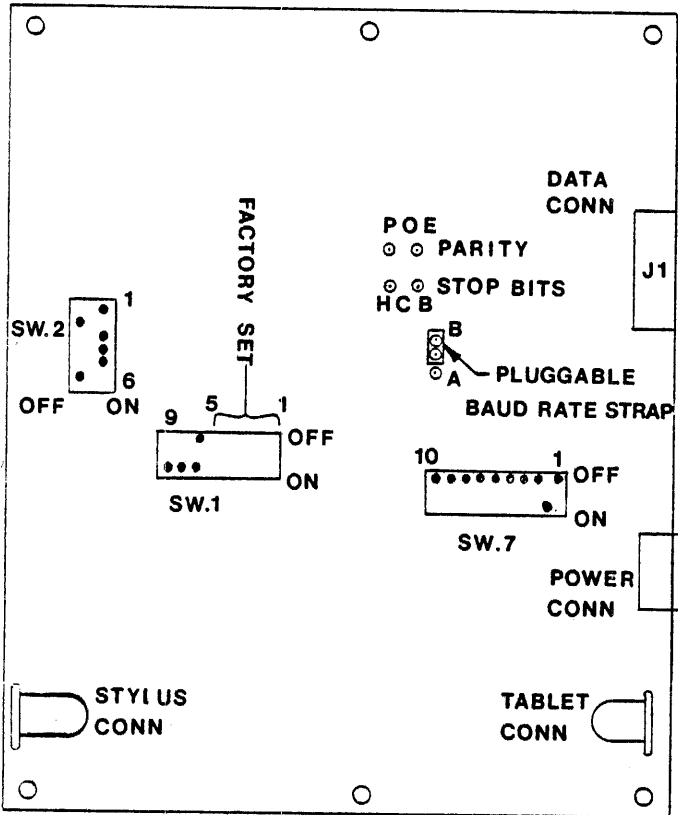
NOTICE

Form #90

BIT PAD ONE

RS232 UNITS SWITCH AND STRAP SETTINGS

Effective October 1, 1979, all Bit Pad One internal switches and straps will be factory set. All RS232 units will be set as follows: in the English mode, with BCD ASCII output, in the continuous stream mode at maximum sampling rate, at 9600 baud, with even parity and two stop bits.



RS 232 LOGIC BOARD OUTLINE

PLUGGABLE BAUD RATE STRAP OPTION A-B
Set in B position. (Strap over center pin and B pin.) Creates 9,600 Baud Rate when SW-7 position 2 is on.

PARITY
Even (No strap in POE Jumper Position)

STOP BITS
Two (No strap in HCB Jumper Position)

See Bit Pad Manual, Form 64, Rev. A 8/79, RS232 Section for complete information on Formats, Modes and Baud Rates available

SW-1 DATA FORMAT

- 1 } Factory Calibration
- 2 } Do Not Adjust
- 3 }
- 4 }
- 5 }
- 6 (Spare - Not Used)
- 7 OFF, BCD ASCII
- 8 ON, Carriage Return Line Feed (CRLF)
- 9 ON, English (0.005" Res.)

METRIC MODE

To set unit in Metric Mode, turn SW-1 Position 9 to OFF.

SW-2 SAMPLING MODE & REP RATE

- 1 ON } Continuous Stream Mode
- 2 OFF }
- 3 ON }
- 4 ON } Maximum Sampling Rate
- 5 ON }
- 6 OFF (Spare - Not Used)

REMOTE MODE

Unit is set in the Continuous Stream Mode at the maximum sampling rate to facilitate easy checkout. To set in Remote Programmable Mode, set SW-2 all position to OFF.

SW-7 BAUD RATE (only one position may be on at a time)

- 1 OFF (19,200 if ON and B strap)
- 2 ON 9,600 Baud & B Strap Position
- 3 OFF (4,800 if ON and B strap)
- 4 OFF (2,400 if ON and B strap)
- 5 OFF (1,200 if ON and B strap)
- 6 OFF (600 if ON and B strap)
- 7 OFF (300 if ON and B strap)
- 8 OFF
- 9 OFF
- 10 OFF

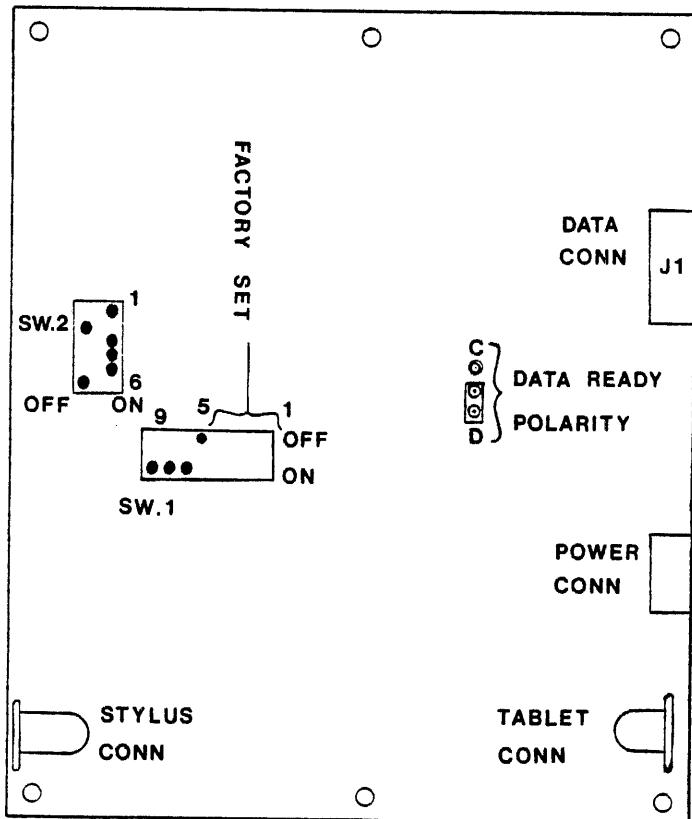


NOTICE
BIT PAD ONE

Form # 91

PARALLEL UNITS SWITCH AND STRAP SETTINGS

Effective October 1, 1979, all Bit Pad One internal switches and straps will be factory set. All Parallel units will be set as follows: in the English mode, with parallel binary output, in the continuous stream mode at a rate of 200 points per second, and with a negative-going data ready pulse.



PARALLEL LOGIC
BOARD OUTLINE

SW-1 DATA FORMAT

- 1 } Factory Calibration
- 2 } Do Not Adjust
- 3 }
- 4 }
- 5 }
- 6 (Spare - Not Used)
- 7 ON, Parallel Binary Output
(No CRLF transmitted when in this position)
- 8 ON, CRLF
- 9 ON, English (0.005" Res.)

METRIC MODE

To set unit in Metric Mode, turn SW-1 Position 9 to OFF.

SW-2 SAMPLING MODE & REP RATE

- 1 ON } Continuous Stream Mode
- 2 OFF }
- 3 ON }
- 4 ON } Maximum Sampling Rate
- 5 ON }
- 6 OFF (Spare - Not Used)

REMOTE MODE

Unit is set in the Continuous Stream Mode at the maximum sampling rate to facilitate easy checkout. To set in the Remote Programmable Mode, set SW-2 all positions to OFF.

POLARITY OF DATA STROBE (CD STRAP)

Unit is set in the D position with a negative-going data ready pulse. To change to positive pulse, place plug-gable strap over center pin and C pin.

Set Bit Pad Manual, Form 64, Rev. A 8/79, Parallel Section for complete information on Formats, Modes and Rates available.



Summagraphics
corporation

35 BRENTWOOD AVE., BOX 781, FAIRFIELD, CONNECTICUT 06430, PHONE 203-384-1344
TELEX 964348

NOTICE
BIT PAD ONE

Form #92

IEEE UNITS SWITCH AND STRAP SETTINGS

Effective October 1, 1979, all Bit Pad One internal switches and straps will be factory set. All IEEE units will be set as follows: in the English mode, in the continuous stream mode at maximum sampling rate, with Device 8-address, no Service Request and Tektronix GPIB format.

SW-1 DATA FORMAT

- 1 } Factory Calibration
- 2 } Do Not Adjust
- 3 } Do Not Adjust
- 4 } Do Not Adjust
- 5 } Do Not Adjust
- 6 } ON = ID Format/*OFF = BP Format
- 7 } (Spares - Not Used)
- 8 } (Spares - Not Used)
- 9 } ON, English (0.005" Res.)

METRIC MODE

To set unit in Metric Mode, turn SW-1 Position 9 to OFF.

SW-2 SAMPLING MODE & REP RATE

- 1 ON } Continuous Stream Mode
- 2 OFF } Continuous Stream Mode
- 3 ON } Maximum Sampling Rate
- 4 ON } Maximum Sampling Rate
- 5 ON } Maximum Sampling Rate
- 6 OFF (Spare - Not Used)

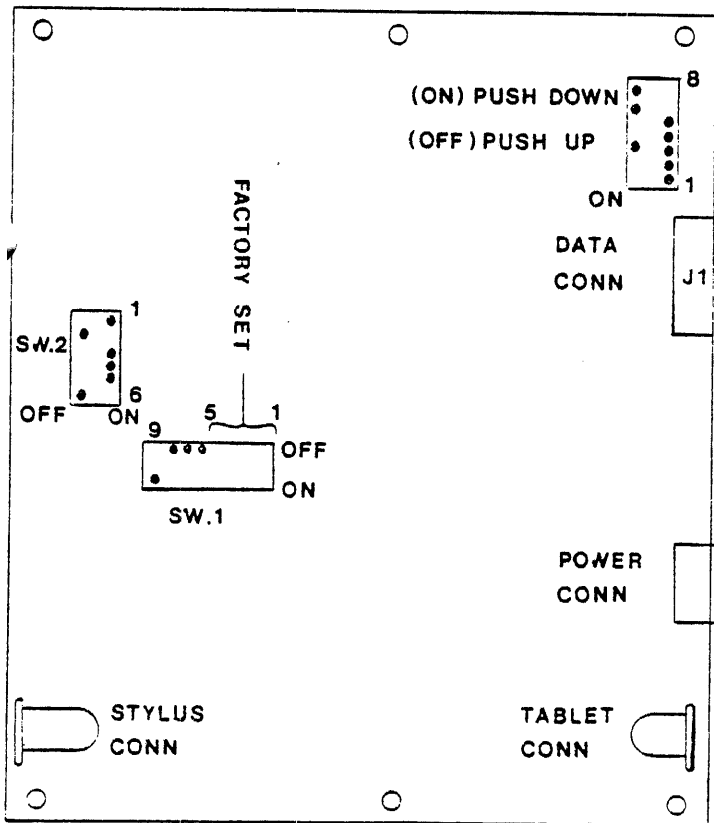
REMOTE MODE

Unit is set in the Continuous Stream Mode at the maximum sampling rate to facilitate easy checkout. To set in Remote Programmable Mode, set SW-2 all positions to OFF.

SW-3 FORMAT ADDRESS

- 1 OFF, ADDR1 (1) LSB
- 2 OFF, ADDR2 (2)
- 3 OFF, ADDR3 (4)
- 4 ON, ADDR4 (8)
- 5 OFF, ADDR5 (16) MSB
- 6 OFF, Service Request (SRQ)
- 7 ON, Form 1
- 8 ON, Form 2

See Bit Pad Manual, Form 64, Rev. B 1/80, IEEE Section for complete information on Formats, Modes and Rates available.



IEEE LOGIC
BOARD OUTLINE

This page intentionally left blank