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K100-D/RS232
Serial Data Analyzer

OPERATING AND SERVICE MANUAL

GOULD
Electronics

Part Number 0112-0277-10

K100-D/RS232

SERIAL DATA ANALYZER

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NOTICE

SECTION I

GENERAL INFORMATION

1.1 Certification

Gould Inc. certifies that this instrument was thoroughly tested and inspected and found to meet its published specifications when it was shipped from the factory.

1.2 Warranty

All Gould Inc. products are warranted against defects in materials and workmanship. This warranty applies for one year from the date of delivery, or, in the case of certain major components listed in the operating manual, for the specified period. We will repair or replace products that prove to be defective during the warranty period. If a unit fails within thirty days of delivery, Gould Inc. will pay for all shipping charges relating to the repair of the unit. Units under warranty, but beyond the thirty day period, should be sent to Gould Inc. prepaid and Gould Inc. will return the unit prepaid. Units out of the one year warranty period, the customer will pay all freight charges. IN THE EVENT OF A BREACH OF GOULD INC.'s WARRANTY, GOULD INC. SHALL HAVE THE RIGHT IN ITS DISCRETION EITHER TO REPLACE OR REPAIR THE DEFECTIVE GOODS OR TO REFUND THE PORTION OF THE PURCHASE PRICE APPLICABLE THERETO. THERE SHALL BE NO OTHER REMEDY FOR BREACH OF THE WARRANTY. IN NO EVENT SHALL GOULD INC. BE LIABLE FOR COST OF PROCESSING, LOST PROFITS, INJURY TO GOODWILL, OR ANY SPECIAL OR CONSEQUENTIAL DAMAGES. THE FOREGOING WARRANTY IS EXCLUSIVE OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OF FITNESS FOR A PARTICULAR PURPOSE.

1.3 Description

The Model K100-D/RS232 Serial Data Analyzer (See Figure 1.1) transforms the K100-D Logic Analyzer into an instrument capable of recording RS232 serial data. With simple switch selection, the user can monitor 5, 6, 7, or 8 data bits and UART error flags or 8 TTL signal levels. The K100-D Logic Analyzer and the K100-D/RS232 Serial Data Analyzer combine to form a complete real time analysis for solving RS232 related design, debug, test, and service problems.

Connection is made from the accessory to the K100-D via the front connectors. RS232 serial interface is assured by specially designed probing cables supplied with the accessory. From the Pod to the unit under test, two cables connect to provide RS232 input (channels 0-7) and Input A (channels 8-F) (See Figure 2.1). Additional pertinent signals are accessable through Input A as well as the primary RS232 control signals. Substitution of any TTL level signal is easily accomplished by changing the corresponding switch to the user input position. A convenient transparent probing connection is made through a dedicated "piggy-back" type RS232 input cable that attaches directly to your system. Input A with its flying leads and wirewrap receptacles make connection with most DIP clips and backplane posts simple. In addition, the grabber hooks provided with the K100-D Logic Analyzer simply plug in the flying leads to expand the capabilities of connection.

The control panel of the K100-D/RS232 Serial Data Analyzer is as simple to understand as it is to use. Parity Check, Baud Rate (Internal to 19K Baud, External to 62.5K Baud), Polarity, Word Length, Errors, and Status are easily set by the Pod's easy to read controls. When the correct parameters have been specified for your system, the K100-D/RS232 Serial Data Analyzer performs a serial to parallel conversion of data, and inputs each word to the

first eight channel (0-7) of the K100-D Logic Analyzer.

The formatting capabilities of the K100-D give you Keystroke selection of Binary Octal, Hex, and ASCII. While the format for your application may vary, you are insured a precise and accurate recording for rapid fault diagnosis.

Power for the K100-D/RS232 Serial Data Analyzer is provided by connecting its attached LEMO type receptacle cable to either one of the two matching power jacks located on the rear panel of the K100-D Logic Analyzer.

1.4 Specifications

RS232 Inputs

Six RS232 inputs are monitored:

Input	Identity		K100-D Channel
pin 2	Transmitted Data		0-7*
pin 3	Received Data		0-7*
pin 4	Request to Send	(RTS)	B
pin 5	Clear to Send	(CTS)	C
pin 6	Data Set Ready	(DSR)	D
pin 20	Data Terminal Ready	(DTR)	E

*NOTE: Unused channels are held to low state. Source is identified on channel F; Transmit or Receive.

Impedance: 5.8K Ω typical, 5.1K Ω minimum.

Input Voltage Range: ±30V maximum.

Input Capacitance: 40pf typical, 50 pf maximum.

Threshold Voltage: ±2.0V typical, ±3.0V maximum.

Connection: RS232 inputs are via a 26 pin edge card cable connector with 0.1 inch centers. A 122 cm. (48 inch) cable with a "piggy-back" type connector is supplied to connect to standard RS232 systems.

User Inputs

8 data inputs (channel 8-F on K100-D).

1 external clock input (goes to UART=16X baud rate; 1.0 MHZ maximum).
1 clock qualifier (connected to CQ input on K100-D).

Input Voltage Range: +7V maximum, -0.3V minimum.

Impedance: Data Inputs: I_{IL} = 200 uA maximum (LSTTL).
External Clock: 10K Ω to +5V
Clock Qualifier: I_{IL} = 1.6 MA maximum (TTL).

Input Capacitance due to Cable: 10pf typical, 15 pf maximum.

Input Capacitance due to PCB: 5 pf typical, 6 pf maximum.

Glitch Capture Capability: 10 ns typical 20 ns maximum.

Connection: User inputs are via a 20 pin edge card cable connector with 0.1 inch centers. A 61 cm. (24 inch) cable is supplied for connection to 0.025 inch square posts.

Input Selection

Eight switches on the front panel allow individual selection of either RS232 or user inputs for channels 8-F.

Mode Selection

Data Polarity: Two three-position switches allow independent selection of Position "+", Negative "-", or "OFF" for Transmitted and Received Data.

Parity: May be selected "EVEN", "OFF", or "NONE".

Word Length: 5, 6, 7, or 8 bits.

Baud Rates: Internal: 50, 75, 110, 134.5, 150, 200, 300, 600, 1200, 1800, 2400, 4800, 9600, 19.2K Baud.

External: DC to 62.5K Baud.

Error Detection: The UART will detect these errors:

Error Type	K100-D Channel
OVERRUN ERROR (OE)	A
FRAMING ERROR (FE)	9
PARITY ERROR (PE)	8

Trigger: When using the K100-D/RS232 Serial Data Analyzer in conjunction with the K100-D Logic Analyzer, the user can trigger on a 5, 6, 7, 8 bit word, or one of the three UART error flags which are selectable on the front panel of the Pod.

Sources: Manual or Combinational

Manual -- Via front panel trigger switch.

Combinational -- The unit is triggered when the input data matches the selected combinational states of both the address and data portions of the trigger word.

Arm: Selectable: Manual (via the front panel arm switch), Auto, Auto Stop, or Auto Stop with limits.

Display

There are three display modes for RS232 operation; Status, Data, and Timing.

Status: There are three separate status displays (W, A, and B). Each display shows all the conditions specified by the user for the next, current, and reference recordings.

Data: Data can be displayed in two formats; Binary and Special, or ASCII. By simply pushing the data button followed by either the BIN or Special button, the user can view either of the two data pictures.

Timing: Timing can be displayed by pushing the Timing button. Expansion of the timing picture is obtained by pushing either the X5, X10 or X20 button.

Miscellaneous

Size: 9.2 cm. (3.6 inch) wide x 17.3 cm. (6.8 inch) deep x 2.5 cm. (1.0 inch) thick.

Weight: 0.5 Kg (1.0 lb.).

Power: +5V @ 430 mA, -5.2V @ 360 mA. Power is provided by either one of two rear panel LEMO connectors on the K100-D Logic Analyzer.

Accessories Included: Unit is shipped with one RS232 input cable, one user input cable and an operating service manual.

Accessories Available: The following items may be ordered by contacting your local representative or the Gould Inc., Biomation Division factory.

Item *	Biomation Stock No.
Spare Data Input Cable	0112-0149
Spare 40 pin IC Spring Clip	6000-0324
Extra Operating and Service Manual	0112-0279

*Consult factory for current prices.

SECTION II

INSTALLATION

2.1 Introduction

This section contains information on the unpacking, inspection, storage, shipment, and power connection of the Model K100-D/RS232 Serial Data Analyzer.

2.2 Unpacking and Inspection

Inspect the adapter for shipping damages as soon as it is unpacked. Check for broken wires and loose connectors. Inspect the case for dents and scratches. If the adapter is damaged in any way, or fails to operate properly, notify the carrier immediately. For assistance of any kind, including help with instruments under warranty, contact your local representative or the Gould Inc., Biomation Division factory.

2.3 Storage and Shipment

Should it become necessary to store or ship your adapter, always remember to protect it as well as possible to prevent damage from extreme environmental conditions or abusive handling. To protect this, or any valuable electronic equipment during shipment, always use the best packaging methods available. Contract packaging companies in many cities can provide dependable custom packaging on short notice.

2.4 Power Connection

The K100-D/RS232 Serial Data Analyzer requires $\pm$5 VDC for operation. This power is supplied from two marked LEMO type jacks located on the rear panel of the K100-D Logic Analyzer.

2.5 Preparation for Use

2.5.1 Connect power to the Pod via the $\pm$5V output on the rear panel of the K100-D Logic Analyzer.

2.5.2 Plug in the two provided cables (RS232 Input and Input A) into the RS232 Pod.

2.5.3 Plug in the two cables from the RS232 Pod into the two front panel connectors labeled Input A and Input B on the K100-D Logic Analyzer.

2.5.4 Connect the blue cable labeled RS232 Input 0112-0275 onto the RS232 data bus to be monitored and recorded.

2.5.5 Connect the User Inputs, if desired, to the selected user signal sources.

2.5.6 Put front Pod switches into position for either user input recording, or RS232 data and UART flag recording. Also Baud Rate, Polarity, and Parity must be selected.

The K100-D Logic Analyzer is now ready for use.

SECTION III

OPERATION

3.1 Introduction

This section explains the use of the K100-D/RS232 Serial Data Analyzer used with the K100-D Logic Analyzer. No attempt is made in this manual to explain 16 Channel operation. Interested readers should refer to the standard Model K100-D Operating and Service Manual. Also in this section is a typical application of this Pod to familiarize the user with its operation.

3.2 Front Control Description

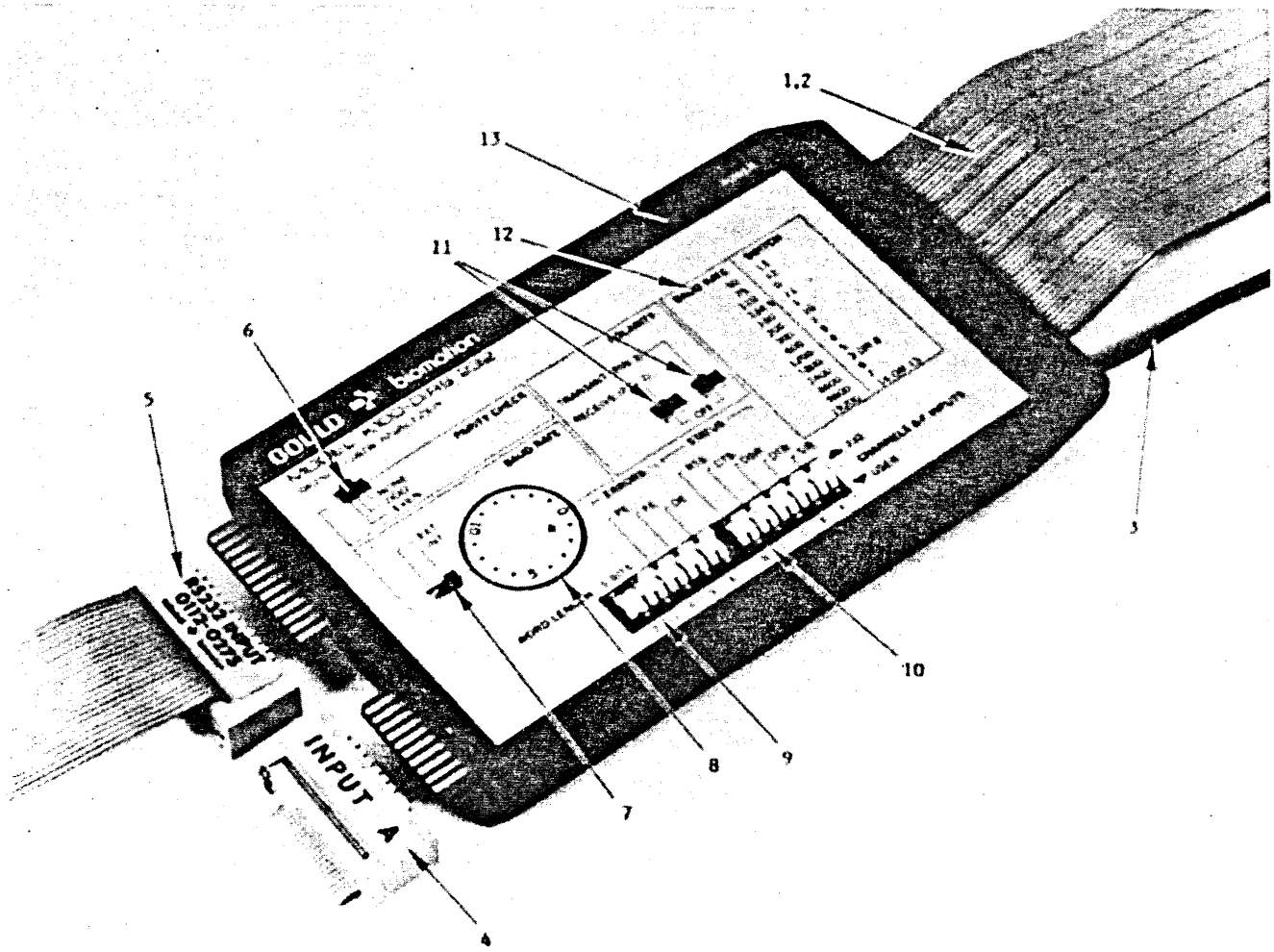


Figure 3.1. K100-D/RS232 Serial Data Analyzer

(1) Input A Cable to front panel of K100-D Logic Analyzer.

(2) Input B Cable to front panel of K100-D Logic Analyzer.

(3) This cable provides power to the Pod. Power consumption of the RS232 Serial Data Analyzer is 430 mA @ 5V and 360 mA @ -5.2V. The power cable is 6 feet long and terminates with a LEMO 3 Pin type connector to the logic analyzer. The power connections are:

pin 1	+5
pin 2	-5
pin 3	GND

(4) This cable is used in conjunction with the channels 8-F inputs. It is used to monitor up to eight TTL level signals. To access this cable all the switches must be down.

(5) This cable is used in conjunction with the channels RS232 inputs. It is used to record 5, 6, 7, or 8 bit word lengths and also UART error flag status such as Parity Error, Framing Error, and Overrun Error. These switches must be up to access those modes of operation.

(6) This switch dictates whether parity is present or not present, or whether it is Even or Odd. Care must be taken by the user to determine what the parity is on the Data to be analyzed.

(7) This switch enables the user to specify the baud rate required for the system under test. In the INT position the user can select the desired baud rate by simply placing the switch in the desired selection. When using the switch in the EXT position the user can use the system clock but care should be taken when used. It is essential that the receive and transmit clock rates are 16X the desired baud rate. If this is not selected correctly, UART error flags will not be seen correctly by the instrument.

(8) This rotary switch works in conjunction with the baud rate chart on the Pod. By simply determining the desired baud, and setting the rotary switch in the desired position, the user can make the desired internal baud of the Pod.

(9) The first two switches in this row of ten determine word size. The following is a chart of bit/word selection:

5 bits ---------	both switches up.
6 bits ---------	first switch up, second down.
7 bits ---------	first switch down, second up.
8 bits ---------	both switches down.

(10) The remaining eight switches in this row allow the user to monitor and record either Status and UART error flags, or up to eight TTL signal levels. By putting the switch in the desired position, the user accesses that mode of recording desired.

(11) Polarity must also be selected by the user to record RS232 data. This switch allows the user the option of receive, transmit, or both receive and transmit. These switches must be selected to tell the K100-D Logic Analyzer if it is monitoring or being used as a termination point for RS232 data.

(12) This baud rate chart coincides with the rotary baud rate switch. Proper selection is critical when making a recording. Errors in baud selection can produce Overrun Errors.

3.3 An Application of K100-D/RS232 Serial Data Analyzer

It is assumed that the user of the K100-D/RS232 Serial Data Analyzer is familiar with the concept of RS232 data transfer. No explanation of RS232 theory will be contained in this manual.

The application that will be used in this manual is that of two bus extenders talking back and forth under the control of a controller. The RS232 Serial Data Analyzer will be used to monitor and record the data transmission between the bus extenders. Figure 3.2 in this section is a block diagram of what is required to monitor RS232 for this application. Also used were two K100-D Logic Analyzers to provide transmit and receive capabilities.

It should be noted by the user that this application is just one of many uses the K100-D/RS232 Serial Data Analyzer can be used in monitoring and recording RS232 data transmissions.

On power up, the K100-D Logic Analyzer displays the Status format shown in Figure 3.3.

When setting up Clock for use with the K100-D/RS232 Serial Data Analyzer, the analyzer must be in the EXT mode. The K100-D Logic Analyzer records and monitors RS232 data at the speed of the baud rate selected on the Pod. No difference is made in selecting rising or falling edge. As shown in Figure 3.4 the EXT↓CQX was specified.

The sequence field can also be programmed for specific data display. As shown in Fig. 3.4 channels 0-6 are grouped together for the purpose of Binary to ASCII conversion. This is a good practice to allow easy keyboard programming on the K100-D Logic Analyzer for parameters such as TRIGGER AND ENABLE. Notice also the trigger word of 1001010 has been specified. In the Data display of Special, the user is provided with ASCII coding. By simply pressing the Binary button, conversion is made from ASCII to Binary for the user. The remainder of the channels 7-F are used if the user desires the ability of monitoring up to 8 TTL signal levels.

In this application, an initial recording was made so a trigger word could be specified for recording. In the test program, the ASCII character "J" was used as the trigger word. By scrolling down to the letter "J" and pressing the Binary button, the user will be able to see the Binary code of the ASCII word "J" and program it into the K100-D Logic Analyzer. Figure 3.5 shows the ASCII code for the program and the "T" for trigger next to the memory location that displays the character "J".

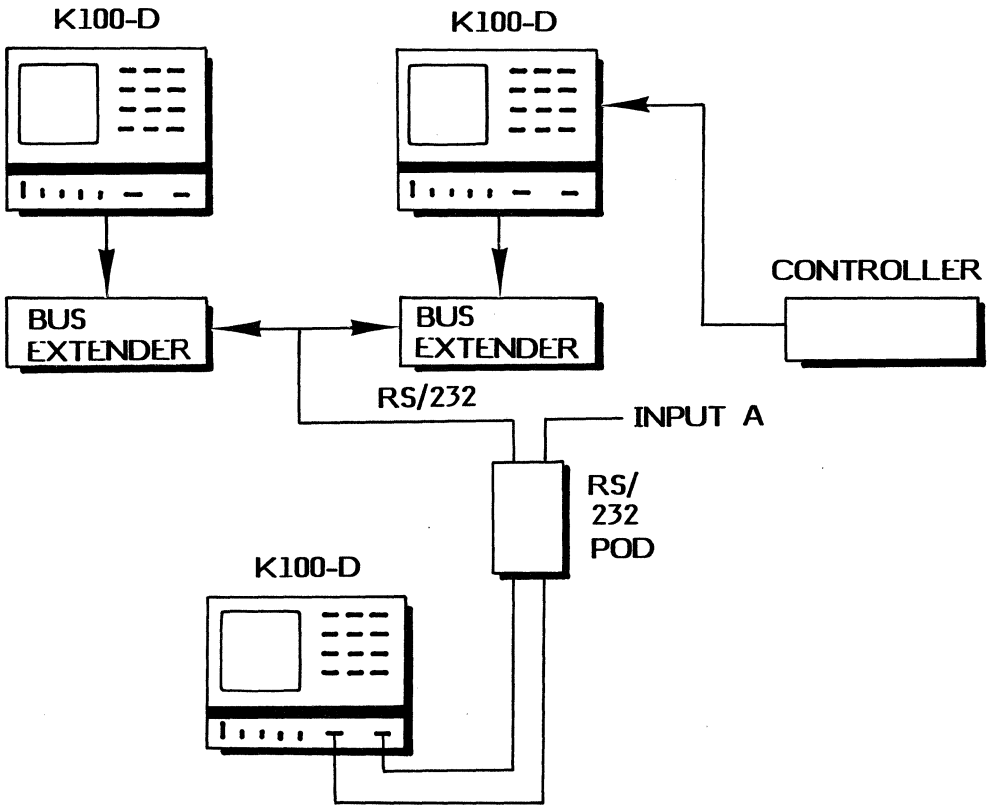

K100-D
K100-D
CONTROLLER
BUS
EXTENDER
BUS
EXTENDER
RS/232
INPUT A
RS/
232
POD
K100-D

Figure 3.2

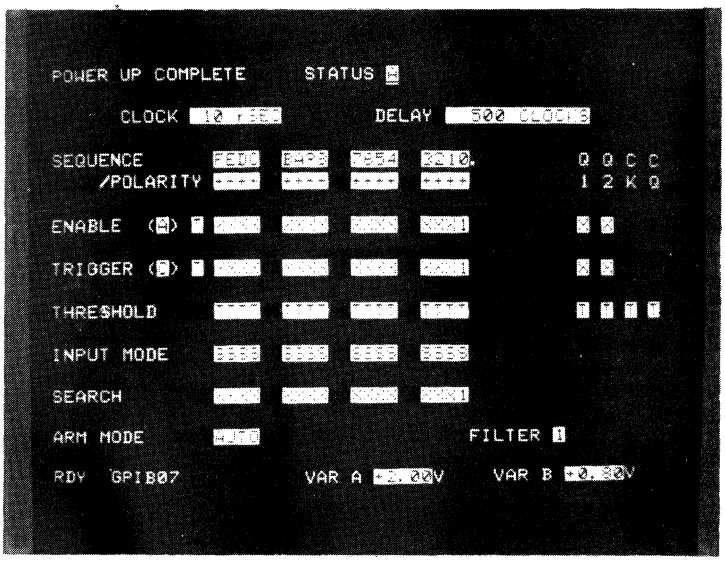


Figure 3.3

The user should then begin selecting the proper Format required for the recording to be made. Figure 3.3 shows the Status Format after modification by the user to record in his application.

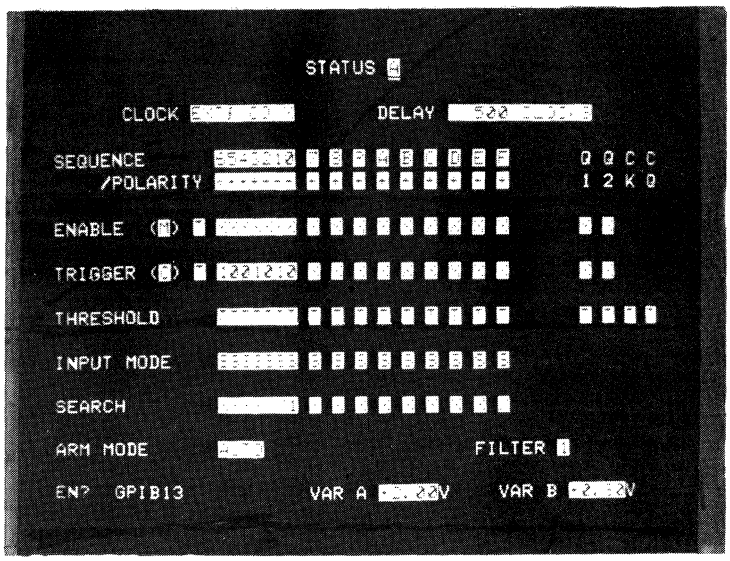


Figure 3.4

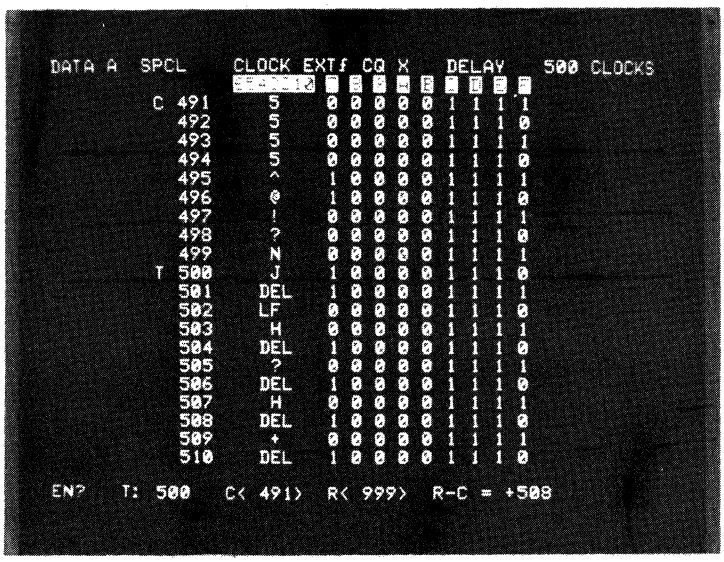


Figure 3.5 ASCII Display

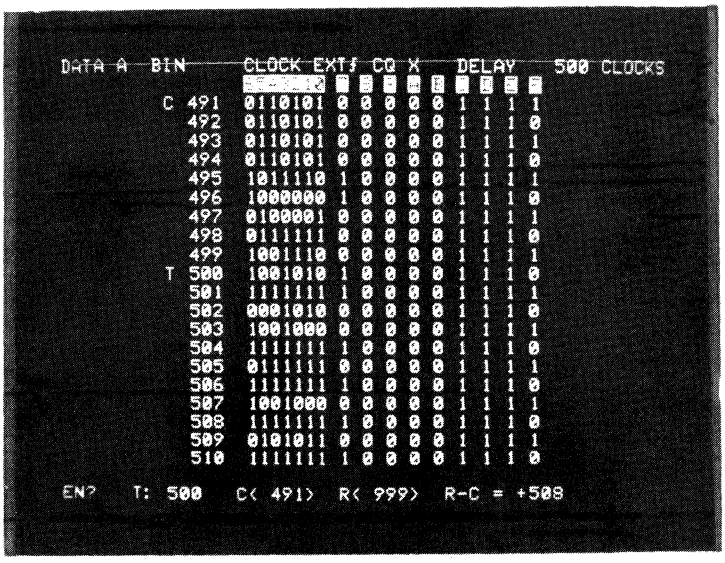


Figure 3.6 Binary Display

You will notice that Figure 3.5 and Figure 3.6 are the same recording but are different types of Data display. By looking at the "T" in Figure 3.5 and Figure 3.6, the user can see the data display change between the ASCII and Binary display. Figure 3.7 is the timing display of the test program. Note where the "T" is signifying trigger word.

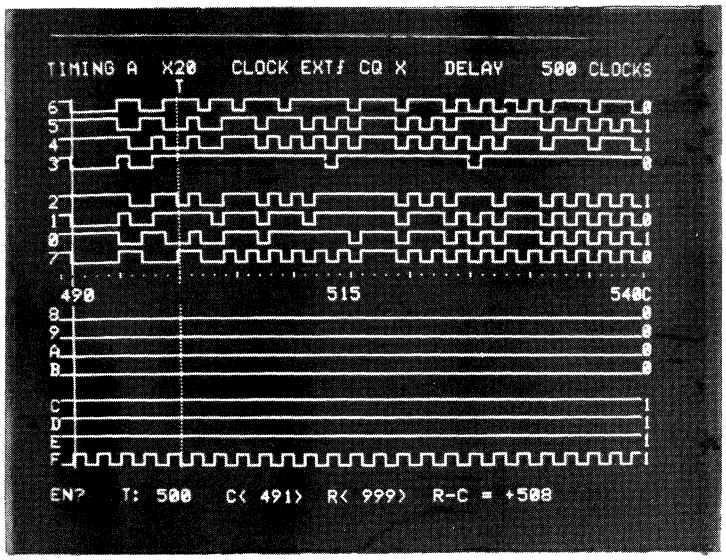


Figure 3.7 Timing Display

Switch selection on the RS232 Pod is also essential for proper recording. For the application shown, the switch setting was as follows:

(1) Parity - ODD
(2) Baud Rate - 300
(3) Bit/word size - 8 bits
(4) All RS232 switches up
(5) Transmit switch to positive
(6) Receive switch to positive

Note: The user can record primary RS232 line and UART error flags or TTL signal levels.

SECTION IV

THEORY OF OPERATION

This section will be forthcoming in the final manual.

SECTION V

CALIBRATION PROCEDURES

5.1 Calibration of Internal Circuits

There is no calibration of the internal circuitry of the K100-D/RS232 Serial Data Analyzer.

SECTION VI

MAINTENANCE

6.1 Introduction

This section covers the K100-D/RS232 Serial Data Analyzer diagnostic routine. Repair of the PC board can be performed with the aid of the technical description in Section IV as well as factory consultation.

The drawings in Section VII have been included to aid service personnel who wish to troubleshoot to the component level. Additional assistance regarding a particular problem can be obtained by contacting the Customer Service Department at the factory: Phone (408) 988-6800, TWX 910-338-0509.

6.2 Functional Checkout

The following procedure is based on the use of the Hewlett Packard 1640A Serial Data Analyzer as a signal source. Any other similar Serial Data Generator may be used with appropriate modifications to the procedure.

Equipment Required

1) K100-D Logic Analyzer.
2) HP-1640A or equivalent Serial Data Analyzer.
3) Squarewave Generator (capable of generating TTL level signals up to 1 MHz).

6.2.1 Set up of 1640A

Patch Panel:	"TX" to Pins 2 and 3. "GND" to Pin 7
Format:	As power up conditions (ASCII, ASYNC, 1200 Baud, No parity)
Mode:	Push "Field Select", "NOT"
TX Entry:	41, 42, 43, 44, 45, 46, 47, 48, 49 (A) (B) (C) (D) (E) (F) (G) (H) (I)

6.2.2 Set up of K100-D

Sequence:	F-E-D-C-B-A-9-8-7-6543210
Clock:	Ext
Trigger:	x-x-x-x-x-x-x-x-x-1000001 (ASCII A)
Cursor:	493
Display:	Data or timing X20 mode as needed
Auto Arm	

6.2.3 Set up of K100-D/RS232 Serial Data Analyzer

Transmit Polarity:	+
Receive Polarity:	+
Word Length:	5 + 2 (ASCII 7)
Channels F→8 Select:	T/R, DTR, DSR, CTS, RTS, OE, FE, PE.
Baud Rate:	1200
Parity:	Anything
Clock:	Internal

6.2.4 Baud Rate Check Out

Push [STOP] preceding each clock frequency change in the following test.
Press [RUN] after the settings have been made.

NOTE: In the slower Baud rates, the K100-D can take some time before recording is finished. The lower left hand corner prompt 0.V, the K100-D's screen should read "CK?" when recording is done.

Baud Rate 1200 (per preliminary setup).

[RUN] on 1640A.

K100-D [DATA] [SPCL] .

Verify "A" in MEM.LOC 500,501.
"B" in MEM.LOC 502,503, et cetera.

[STOP] on 1640A.

[FORMAT] , Cursor [↓], [↓], [FIELD SELECT]

1640A should now show "BITS/SEC = 1800"

Turn K100-D/RS232 rotary selector to match the 1640A's selected Baud Rate.

[RUN] on 1640A.

Same data as before (A, B, C, et cetera).

Repeat for all Baud Rates: 2400, 4800, 9600, 50, 75, 110, 135, 150, 200, 300, 600.

For the remaining tests use Baud 9600 for speed.

6.2.5 Data Inversion Test

Change K100-D/RS232 Receive Data Monitor Switch to OFF.

[RUN] on 1640A.
Data in Channel "F" should be high from MEM.LOC 500 ON.

Change K100-D/RS232 Receive Data Monitor Switch to "-".

[STOP] , [RUN] on 1640A.

Data in Channels 6→0 should be wrong in any memory locations corresponding to Channel "F" being low.

Return Receive Switch to "+". Repeat above two tests with Transmit Switch. Data on Channel "F" will be low for first test, data on Channels 6→0 will be wrong, in second test, whenever Channel "F" is high.

Return both switches to "+".

6.2.6 Parity Test

[FORMAT] the 1640, set parity ("ERROR CHECK") to "ODD PAR". Do the same to the K100-D/RS232 Serial Data Analyzer.

[STOP] , [RUN] . On K100-D use timing X20. Verify Channels 8, 9, and A are low from 500-up.

Change parity to "EVEN" on both the K100-D/RS232 and 1640A.

Repeat the last test again. Channels 8, 9, and A should be low from 500-up.

Reset the parity of the 1640A to "NONE".

6.2.7 "DTR", "DSR", "CTS", "RTS" Line Test

Using the patch panel on the 1640A, alternatively pull pins 4, 5, 6, and 20 to "+12 V" or "-12 V" and verify that the K100-D records the channels corresponding to pins 4, 5, 6, and 20 as high or low respectively.*

PIN	CODE	K100-D CHANNEL
4	RTS	B
5	CTS	C
6	DSR	D
20	DTR	E

* Any pin left floating could be high or low. Disconnect pins when finished.

6.2.8 Internal/Ext Clock Switch Test

Switch K100-D/RS232 clock switch to "EXT".

[STOP] , [RUN] on 1640A. Verify K100-D prompt in lower left corner is "CK?".

Repeat above after connecting "EXT CLOCK" input to a TTL (0→2.5 V) squarewave. The frequency must be as close to 153.6 KHz as possible.

Verify the K100-D's data is correct (A, B, C, et cetera).

Return K100-D/RS232 to internal clock.

6.2.9 Word Length Test

Set 1640A to "DATA CODE" Hex 5 (Format Mode).

Set K100-D/RS232 Serial Data Analyzer to word length "5 + 0" = 5

Press [STOP] , [RUN] on 1640A.

Verify on K100-D that data is:

500	xx01	
501	xx01	
502	xx02	
503	xx02	
504	xx03	
505	xx03	
"	"	(HEX)
"	"	
"	"	
518	xx09	
519	xx09	
520	xx00	
521	xx00	

Change 1640A and K100-D/RS232 Serial Data Analyzer to word length 6 (Hex 6).

Repeat above. Data should be:

500	xx01	
501	xx01	
502	xx02	
503	xx02	
"	"	(HEX)
"	"	
"	"	
520	xx20	
521	xx20	

Change 1640A and K100-D/RS232 Serial Data Analyzer 70 word length 8 (Hex 8, "5 + 1 + 2" = 8)

Repeat above. Data should be:

500	xx41	
501	xx41	
502	xx42	
503	xx42	
"	"	(HEX)
"	"	
"	"	

6.2.10 Channels F→8 Test

With Channels F→8 selected as external on the K100-D/RS232 Serial Data Analyzer, input A 100 Hz squarewave (TTL) to each channel. Use [STOP] , [RUN] to make a recording on K100-D.

Verify in timing X20 mode that the squarewave is present.

Vary the frequency and observe a change on the K100-D's screen.

THIS COMPLETES THE FUNCTIONAL CHECKOUT OF THE K100-D/RS232 SERIAL DATA ANALYZER.

SECTION VII

SCHEMATICS AND ASSEMBLY DRAWINGS

7.1 Introduction

This section contains the schematics and assembly drawings for the K100-D/RS232 Serial Data Analyzer. Parts lists are also included for user convenience.

7.2 List of Drawings

7.3 Parts Lists

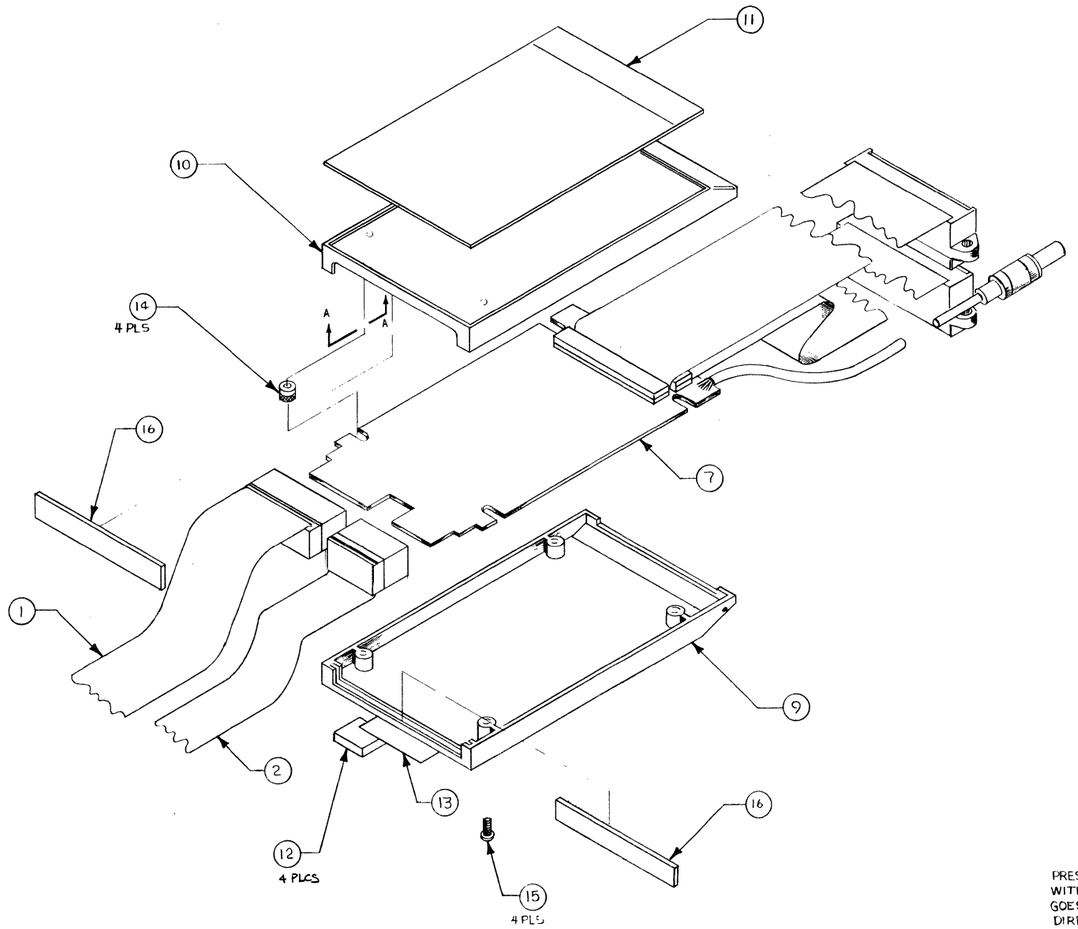
The materials in the following lists are subject to change without Gould Inc.'s prior notification. For list verification, contact the Customer Service Department at the factory: Phone (408) 988-6800, TWX 910-338-0509.

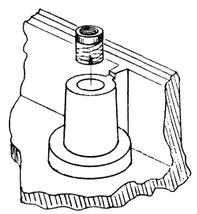
7.3.1 List of Parts Lists

DWG. NO.	SH	REV
0112-0340	1	G

REVISIONS

ZONE	REV	ECO#	DESCRIPTION	DWN	CHKD	DATE
	A		PILOT RUN REL PER ERN#001	DB	TM	1/14/80
	B		REVISED PER EN 1142	DB	TM	4/15/80
	C		REVISED PER EN 1158	DB		4/18/80
	D		REL TO PROD ERN# 0020	DB		
	E	1245	ECO VOIDED. NO CHG.	MB		8/4/80
	F	1310	REVISED PER ECO (NEW CABLE)	MB	JL	8/4/80
	G	1393	REVISED PER ECO	MB	RG	11/9/81





VIEW A-A

PRESS IN 4 INSERTS, TOP OF INSERT TO BE FLUSH WITH PLASTIC. NOTE, SLOTTED END OF INSERT GOES IN FIRST BE SURE TO SUPPORT PLASTIC DIRECTLY BENEATH INSERT.

-50	-40	-30	-20	-10	PART NUMBER	PART NAME	DESCRIPTION/SPECIFICATION	ITEM
								1

DO NOT SCALE DRAWING

REMOVE ALL BURRS AND SHARP EDGES. DIMENSIONS ARE IN INCHES AND APPLY OVER ADDED FINISHES EXCEPT PAINT. SURFACE ROUGHNESS

TOLERANCE

DIMENSIONAL: X ± .1, XX ± .020, XXX ± .010; ANGLES ± 1°; HOLE SIZE 0.599 = .003, 600.999 = .004, 1.000 1.499 = .005

DASH NO.	NUMBER NEXT ASSEMBLY	QTY
-10	0112-0344	1

DRAWN	DS	DATE 7-18-79
CHECKED	T. McCann	1/14/80
PROJ. ENG.	CURT	1/19/80
MANUFACTURING	J. GELLD	4/23/80
QUALITY ASSUR	D STAUFFER	4/23/81
ENG SERV.		DATE 4/23/80

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TITLE: TOP ASSEMBLY RS232 ANALYZER

SCALE	SIZE	PART NUMBER	REV
NONE	D	0112-0340	G

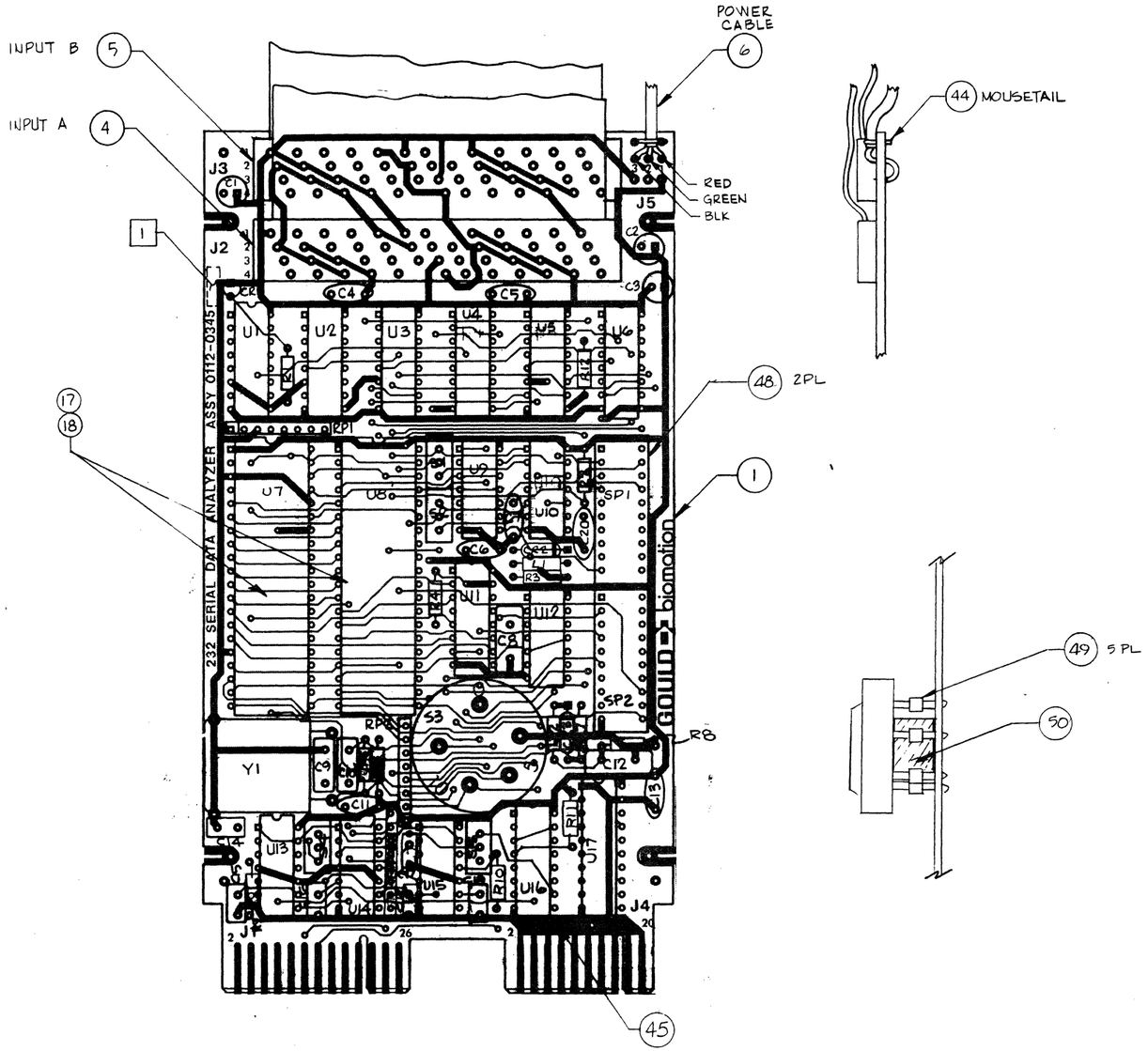
CODE RS 232 SHEET 1 OF 1

KLINGLER K-VEL H

Figure 7.1

DWG. NO. 0112-0345 SH 1 RFV L

REVISIONS						
ZONE	REV	ECO#	DESCRIPTION	DWN	CHKD	DATE
	A		PROTOTYPE	[illegible]		
	B		PILOT RUN REL ERN 0001	[illegible]	TWH	
	C		REVISED PER ERN 1142	[illegible]	TWH	4/6/88
	D		REVISED PER ERN 1148	[illegible]	TWH	—
	E		REVISED PER ERN 1154	[illegible]	TWH	—
	F		REL TO PROD ERN 0020	[illegible]	TWH	9/24/88
	G		REVISED PER ECO 1332	SR	[illegible]	10.27.88
	H		REVISED PER ECO 1349	[illegible]	[illegible]	10-8-88
	J		REVISED PER ECO 1366	SR	[illegible]	10.18.88
	K		REVISED PER ECO 1377	SR	[illegible]	10.18.88
	L		REVISED PER ECO 1385	SR	[illegible]	10.28.88



NOTES: UNLESS OTHERWISE SPECIFIED

1. MARK APPROPRIATE ASSEMBLY DASH NO. IN THIS AREA.

DASH NO.	NUMBER	QTY
-10	0112-0340	1
	NEXT ASSEMBLY	

DO NOT SCALE DRAWING

REMOVE ALL BURRS AND SHARP EDGES. DIMENSIONS ARE IN INCHES AND APPLY OVER ADDED FINISHES EXCEPT PAINT. SURFACE ROUGHNESS

TOLERANCE

DIMENSIONAL: X ± .1 ANGLES; XX ± .020 ± 1°; XXX ± .010
HOLE SIZE: .0-.599 ± .003; .600-.999 ± .004; 1.000-1.499 ± .005

ENG. SERV. RG DATE 4/25/80

-50	40	-30	-20	-10	PART NUMBER	PART NAME	DESCRIPTION/SPECIFICATION	ITEM
								1

DRAWN [illegible] DATE 4.8.79
CHECKED [illegible] 4/23/80
PROJ. ENG. [illegible] 11/4/20
MANUFACTURING [illegible] 4/23/80
QUALITY ASSUR [illegible] 4/23/80

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TITLE ASSEMBLY
232 SERIAL DATA ANALYZER

SCALE	SIZE	PART NUMBER	REV
2:1	D	0112-0345	L

CODE SHEET 1 OF 1

BISHOP GRAPHICS/ACCUPRO® REORDER NO. A4429

Figure 7.2

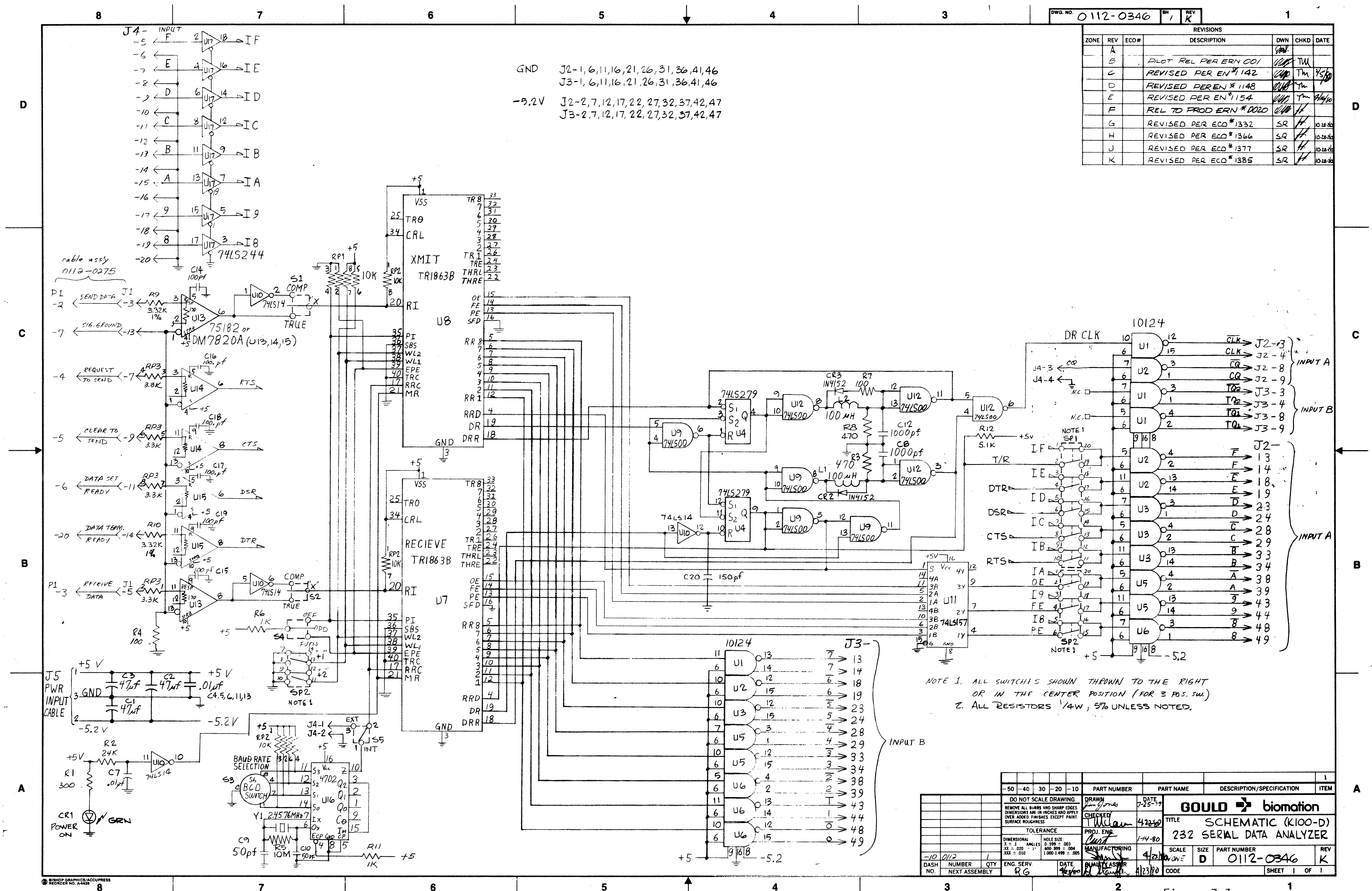
DWG. NO. 0112-0346 SH 1 REV. K
REVISIONS
A
B PILOT REL PER ERN 001
C REVISED PER EN# 1142
D REVISED PER EN# 1148
E REVISED PER EN# 1154
F REL TO PROD ERN # D020
G REVISED PER ECO# 1332 SR 10-28-80
H REVISED PER ECO# 1366 SR 10-28-80
J REVISED PER ECO# 1377 SR 10-28-80
K REVISED PER ECO# 1385 SR 10-28-80
GND J2-1,6,11,16,21,26,31,36,41,46
J3-1,6,11,16,21,26,31,36,41,46
-5.2V J2-2,7,12,17,22,27,32,37,42,47
J3-2,7,12,17,22,27,32,37,42,47
J4- INPUT
74LS244
cable assy 0112-0275
SEND DATA
SIG. GROUND
75182 or DM7820A (U13,14,15)
REQUEST TO SEND
CLEAR TO SEND
DATA SET READY
DATA TERM. READY
RECEIVE DATA
XMIT TR1863B U8
RECIEVE TR1863B U7
74LS279
74LS00
74LS157
10124
DR CLK
INPUT A
INPUT B
J5 PWR INPUT CABLE
+5 V
-5.2 V
BAUD RATE SELECTION
BCD SWITCH
4702
Y1 2.4576MHz
CR1 POWER ON GRN
NOTE 1. ALL SWITCHES SHOWN THROWN TO THE RIGHT OR IN THE CENTER POSITION (FOR 3 POS. SW.)
2. ALL RESISTORS 1/4W, 5% UNLESS NOTED.
DO NOT SCALE DRAWING
GOULD biomation
TITLE SCHEMATIC (K100-D) 232 SERIAL DATA ANALYZER
SIZE D
PART NUMBER 0112-0346
REV K
SHEET 1 OF 1
BISHOP GRAPHICS/ACCUPRESS REORDER NO. A-4429

Figure 7.3

COMMENTS		TOTAL COST	UNIT COST

ASSEMBLY TIME	COMPONENT LEAD SPACING

ITEM	QUANTITY PER ASSEMBLY -60	-50	-40	-30	-20	-10	PART NUMBER	PART NAME	REF. DESIGNATION	VENDOR NO.	DESCRIPTION	TYPE
1						1	0112-0275	CABLE, RS232 INPUT				LM
2						1	0112-0365-30	CABLE, USER INPUT				LM
3												
4												
5												
6												
7						1	0112-0345	PCB ASSY				LM
8												
9						1	0112-0224-01	CASE, BOT				
10						1	0112-0300	CASE, TOP				
11						1	0112-0341	TOP PANEL				
12						4	7000-0243	FOOT				
13						1	0610-0032	SERIAL TAG				
14						4	7000-0269	INSERT				
15						4	7000-0384	SCREW, RH				
16						2	0112-0141	FRONT PNL				
17												
18												

REF. DRAWINGS

REV	DESCRIPTION	DATE	DWN	CKD	APPD
A	REL TO PILOT RUN PER ERN 001	1/10/80	DB	TWL	
B	CHG DWG Nº EN#1142	3/4/80	DB	TWL	
C	REVISED PER EN#1158	4/14/80	DB	TWL	
D	REL TO PROD ERN 0020	9/23/80	DB	TWL	
E	ECO 1245 VOIDED. NO CHG.	8.9.80	MB		
F	ECO 1310. NEW CABLE ASSY.	8.9.80	MB		
G	ECO#1393 REVISED PER ECO.	11/9/81	MB	RG	

DASH NO.	NUMBER	QTY
-10	0112-0344	1
	NEXT ASSEMBLY	

DRAWN	C Rasmussen	7-17-79
CHECKED	Phil Lamm	2-12-80
ENGINEER	Curt	1-14-80
MANUFACTURING	[illegible]	4/23/80
QUALITY ASSURANCE	[illegible]	4/23/80

LIST OF MATERIAL

TOP ASSEMBLY

RS232 ANALYZER

MODEL KIOOD.

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B	0112-0340	REV G
CODE		SHEET 1 OF 1

Figure 7.4

COMMENTS		TOTAL COST	UNIT COST

ASSEMBLY TIME	COMPONENT LEAD SPACING
	RES .4 INDUCTOR .4 DIODE .4

ITEM	QUANTITY PER ASSEMBLY -60	-50	-40	-30	-20	-10	PART NUMBER	PART NAME	REF. DESIGNATION	VENDOR NO.	DESCRIPTION	TYPE
1						1	0112-0347	PCB				
2												
3												
4						1	0112-0131-10	CABLE	INPUT A			LM
5						1	0112-0131-20	CABLE	INPUT B			LM
6						1	0010-0055	CABLE, POWER				
7												
8						1	3000-5101	RESISTOR	R12		5.1K, 1/4W, 5%	
9						2	1800-0105	I.C.	U9,12		74LS00	
10						1	1800-0123		U10		74LS14	
11						1	1800-0194		U4		74LS279	
12						1	1800-0213		U11		74LS157	
13						1	1800-0240		U17		74LS244	
14						5	1850-0021		U1,2,3,5,6		1012A	
15						1	1820-0070		U16		F4702	
16						3	1800-0314		U13,14,15		75182	
17						2	1800-0313	I.C.	U7,8		TR1863B	
18						2	6100-0123	SOCKET	XU7, XU8		40PIN	

REF. DRAWINGS

REV	DESCRIPTION	DATE	DWN	CKD	APPD
A	PROTOTYPE	8-7-79			
B	PILOT RUN RELEASE PER ERN*001	9/1/80			
C	REVISED PER EN 1142	11/10/81			
D	REVISED PER EN*1148	4/15/82		TM	
E	REVISED PER EN*1154	4/7/82		TM	
F	REL TO PROD ERN*0020	4-23-82		TM	
G	REVISED PER ECO*1332	10-28-86	SR		

DASH NO.	NUMBER	QTY
-10	0112-0340	1
	NEXT ASSEMBLY	

		DATE
DRAWN		8-7-79
CHECKED		2-12-80
ENGINEER		1-14-80
MANUFACTURING		4/23/80
QUALITY ASSURANCE		4/23/80

LIST OF MATERIAL
232 SERIAL DATA ANALYZER

MODEL K100-D

biomation

B	0112-0345	REV L

CODE

SHEET 1 OF 3

Figure 7.5 1 of 3

COMMENTS		TOTAL COST	UNIT COST

ASSEMBLY TIME	COMPONENT LEAD SPACING

ITEM	QUANTITY PER ASSEMBLY -60	-50	-40	-30	-20	-10	PART NUMBER	PART NAME	REF. DESIGNATION	VENDOR NO.	DESCRIPTION	TYPE
19						2	3000-1000	RESISTOR	R4,7		100Ω, 1/4W, 5%	
20						1	3000-3000	RESISTOR	R1		300Ω, 1/4W, 5%	
21						2	3000-4700	RESISTOR	R3,8		470Ω, 1/4W, 5%	
22						2	3000-1001	RESISTOR	R6,11		1KΩ, 1/4W, 5%	
23						1	3000-1005	RESISTOR	R5		10MΩ, 1/4W, 5%	
24						1	3000-2402	RESISTOR	R2		24KΩ, 1/4W, 5%	
25						1	3700-0051	RES PACK	RP1		10K, 8PIN, 4RES	
26						1	3700-0015	RES PACK	RP2		10K, 8PIN, 7 RES	
27						2	3100-3321	RESISTOR	R9,10		3.32K, 1/8W, 1%	
28						1	3700-0063	RES PACK	RP3		3.3K 8PIN SIP	
29						3	4300-0025	CAPACITOR	C1,2,3		47uf, 6V	
30						6	4000-0005	CAPACITOR	C5,6,7,11,13,4		.01uf	
31						2	4100-0019	CAPACITOR	C9,10		50pf	
32						6	4100-0001	CAPACITOR	C14,15,16,17,18,19		100pf	
33						2	4100-0015	CAPACITOR	C8,12		1000 pf	
34						1	4100-0011	CAPACITOR	C20		150 pf	
35						2	1000-0002	DIODE	CR2,3		IN4152	
36						2	2100-0004	INDUCTOR	L1,2		100uh	

REF. DRAWINGS

REV	DESCRIPTION	DATE	DWN	CKD	APPD
H	REVISED PER ECO # 1349	10.8.80	JOO		
J	REVISED PER ECO # 1366	10.28.80	SR		
K	REVISED PER ECO # 1377	10.28.80	SR		
L	REVISED PER ECO # 1385	10.28.80	SR		

DASH NO.	NUMBER	QTY
	NEXT ASSEMBLY	

	DRAWN	DATE
	CHECKED	
	ENGINEER	
	MANUFACTURING	
	QUALITY ASSURANCE	

LIST OF MATERIAL
232 SERIAL DATA ANALYZER

MODEL

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B	0112-0345	REV L

CODE

SHEET 2 OF 3

Figure 7.5 2 of 3

COMMENTS		TOTAL COST	UNIT COST

ASSEMBLY TIME	COMPONENT LEAD SPACING

ITEM	QUANTITY PER ASSEMBLY -60	-50	-40	-30	-20	-10	PART NUMBER	PART NAME	REF. DESIGNATION	VENDOR NO.	DESCRIPTION	TYPE
37						1	5100-0015	CRYSTAL	Y1		2.4576 MHZ	
38												
39						1	6900-0030	SWITCH	S3		16 POS, CIR. DIAL	
40						3	6700-0014	SWITCH	S1,2,4		3POS	
41						1	6700-0016	SWITCH	S5		2 POS	
42						2	6600-0115	SWITCH	SP1, 2		DPDT, 5 POS. DIP	
43												
44						1	7200-0025	MOUSETAIL				
45						1	9000-0054	BUS WIRE, FORMED				
46												
47						1	6A00-0041	DIODE, LED	CR1		GREEN	
48						2	6100-0121	SOCKET	(SP1, 2)			
49						5	6200-0046	SOLDER TERM				
50						1	0112-0360	SPACER			.30 THK X 3/8 DIA	
51												
52												
53												
54												

REF. DRAWINGS	REV	DESCRIPTION	DATE	DWN	CKD	APPD

DASH NO.	NUMBER	QTY
	NEXT ASSEMBLY	

	DRAWN	DATE
	CHECKED	
	ENGINEER	
	MANUFACTURING	
	QUALITY ASSURANCE	

LIST OF MATERIAL
232 SERIAL DATA ANALYZER

MODEL

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B | 0112-0345 | REV L

CODE | SHEET 3 OF 3

Figure 7.5 3 of 3

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