BRIAN
INSTRUMENTS

BRIKON **723**-4M

FDD TESTER/ANALYZER

OPERATION AND USE

MAY 1994

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INTRODUCTION

The BRIKON 723-4M is a stand alone Tester/Analyzer for full analog/digital parametric and functional testing of Flexible Disk Drives. The BRIKON 723-4M is designed for use in laboratory and/or inspection environments. The dominating features of the BRIKON 723-4M are:

HIGH TRANSFER RATE	Supports drives with a transfer rate from 250 KBS. through 1,000 KBS.
BIT JITTER	Measures WINDOW MARGIN and ASYMMETRY with a resolution of 1 nS.
ANALOG/ALIGNMENT	Performs analog performance measurements such as MOTOR START TIME, AMPLITUDE, RESOLUTION, MODULATION and alignment measurements such as TRACK ALIGN, OPTALIGN, AZIMUTH, INDEX TO DATA.
CMOS/TTL INTERFACE	Supports drives with low power CMOS interface or TTL.
EASY TO USE	Simple 5 Row by 16 Column matrix Front Panel with the functions/tests noted on the Front Panel for single button testing.
MINIMUM EYE FATIGUE	Measurements are presented in easy to read number form.

OPTIONS

Attachable options available for the BRIKON 723-4M are:

OPTION R	This ANALOG ATTACHMENT is used to make the precision analog performance and alignment measurements. This capability eliminates the need for scopes, exercisers, charts, graphs, etc. necessary when measuring the analog performance and alignment of the drive. Available in either single or dual channel versions.
ALIGNMENT STANDARDS	The INTELLIGENT SERIES precision analog alignment diskettes are designed specifically for use with the Tester, noticeably extending the measuring range and accuracy compared to previous analog and digital methods.
MULTIPLEXER	This attachment provides eight data testing ports for environments where high volume data testing are required. This option is available in ANALOG/DIGITAL or DIGITAL ONLY configurations.
REMOTE CONTROL	This attachment adds communications capabilities to the Tester through a full duplex, two wire, communications interface. With this, the Tester can be under full program control of the host, including execution of tests, gathering of test results and changing test criteria. In this mode, the Tester can also operate on a stand-alone basis.

SET UP AND FAMILIARIZATION

This section explains how to set up and prepare the Tester for operation.

UNPACKING

Unpack the Tester carefully, thoroughly inspecting the instrument for physical damage that may have occurred during shipment. The Tester carton will include the following documentation:

* BRIKON 723-4M OPERATOR MANUAL AND PRODUCT SPECIFICATIONS
* CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS
* OPERATION *AND* USE OF ANY ORDERED OPTION

FIGURE 1 illustrates the Rear Panel. Storage trays are provided to house the I/O cables. Note the manner in which the 50 and 34 pin I/O cables are stored in the Tester. The rear feet of the Tester are used to store the D.C. and main power cables for easy transportation. When preparing the Tester for storage or shipment, be sure the cables are correctly stored.

CHECKING AND TURNING ON POWER

CAUTION

Before plugging the A.C. power connector into the wall receptacle, first check the label on the rear panel identification plate to verify that the voltage settling of the Tester is correct.

A.C. power is switch selectable between 115 and 230 volts. A switch is located inside the Tester on the Power Control Board that is mounted to the Rear Panel. For 115 volt operation, the switch is in the UP position and in the DOWN position for 230 volt operation.

FRONT PANEL LAYOUT

The Front Panel is comprised of a 5 ROW X 16 COLUMN pushbutton matrix where each intersecting coordinate may house a test function (see FIGURE 2). To select a function, first depress the Row Key where the desired test is located. The selected Row LED blinks, indicating the Row is selected and available. Next, depress the Column Key that intersects the desired Test. If the Tester requires more information about the Test (i.e. test track, etc.) the Tester presents a blinking number in the Display for the operator to change, if desired, and ENTER. If no additional information is required, the selected Test automatically begins.

REAR PANEL LAYOUT
BRIKON 723-4M

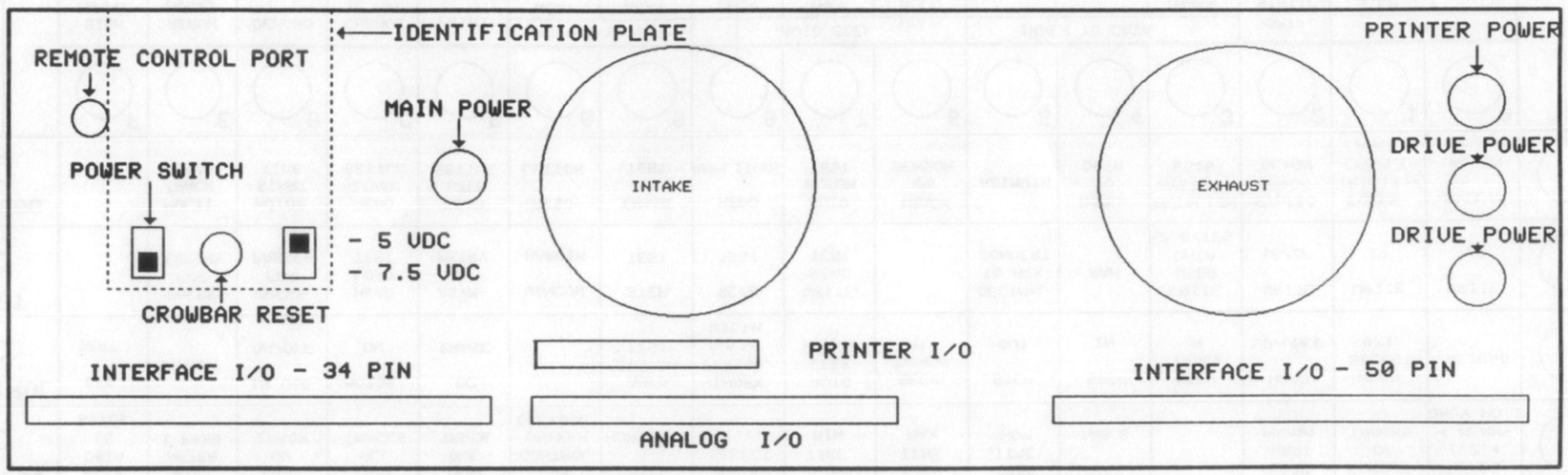

FIGURE 1

BRIAN INSTRUMENTS, INC.

REAR PANEL LAYOUT

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FRONT PANEL LAYOUT
BRIKON 723-4M

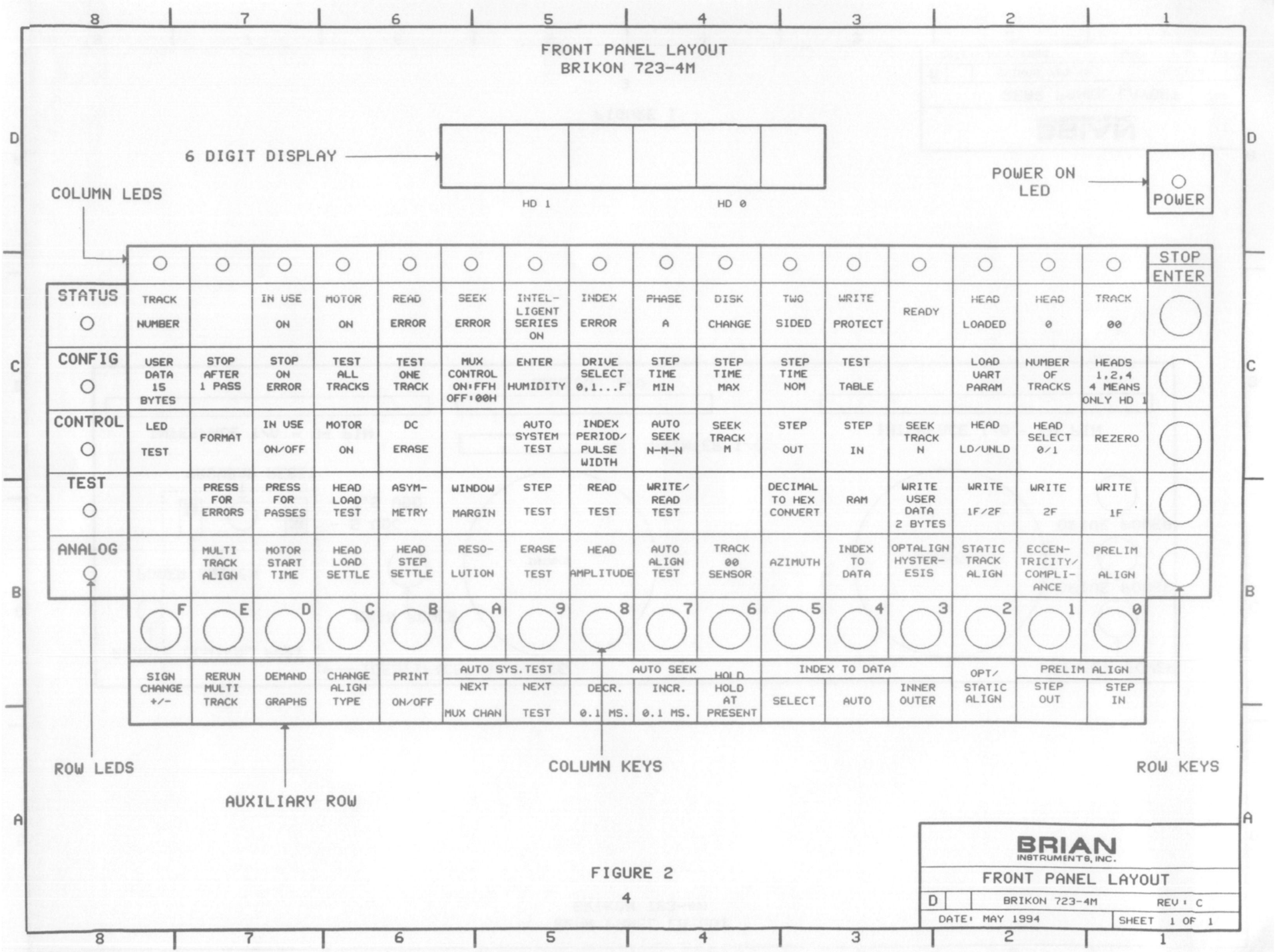

FIGURE 2

BRIAN INSTRUMENTS, INC.

FRONT PANEL LAYOUT

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TEST TABLES

The BRIKON 723-4M has 20 pre — configured TEST TABLES to select from and are numbered 00 - 19. Each TEST TABLE houses the drive configuration and pass/fail criteria for the most popular drive styles. The drive styles for each TEST TABLE are as follows:

TEST TABLE	DRIVE STYLE					
	SIZE INCHES	SPEED RPM	DATA RATE KB$	TRACKS	HEADS	UNFORMATTED CAPACITY
00	8	360	500	77	2	1.6 MB
01	5 1/4	300	250	40	2	0.5 MB
02	5 1/4	300	250	80	2	1.0 MB
03	5 1/4	360	500	80	2	1.6 MB
04	3 1/2	300	250	80	2	1.0 MB
05	3 1/2	300	500	80	2	2.0 MB
06	3 1/2	600	500	80	2	1.0 MB
07	3 1/2	300	1000	80	2	4.0 MB
08	3 1/2	300	500	80	2	3.2 MB
09	3 1/2	300	1000	80	2	4.0 MB
10	3 1/2	300	1000	80	2	4.0 MB
11	3 1/2	300	1000	80	2	4.0 MB
12	3 1/2	300	1000	80	2	4.0 MB
13	3 1/2	300	1000	80	2	4.0 MB
14	3 1/2	300	1000	80	2	4.0 MB
15	3 1/2	300	1000	80	2	4.0 MB
16	3 1/2	300	1000	80	2	4.0 MB
17	3 1/2	300	1000	80	2	4.0 MB
18	3 1/2	300	1000	80	2	4.0 MB
19	3 1/2	300	1000	80	2	SONY 4MEG

Other major Tester configurations are available, suited for applications beyond the commercial audience. Because of this, the TEST TABLE layout may be different than noted above. For details of the Configuration Parameters for each TEST TABLE, refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTION document that comes with the Tester.

When power is first applied, the Tester activates the CONFIGURATION Row (CONFIGURATION Row LED is *On).* STATUS Row LED *4* is blinking, indicating the TEST TABLE function is being presented and the Display is blinking the current TEST TABLE. Use the Column Keys to select the desired TEST TABLE number and depress the ENTER Key. At this point an automatic prompting sequence activates by selecting and presenting the values for the next parameter function (NUMBER OF HEADS) and so on. This prompting sequence may be exited any time by depressing any Row Key except ENTER where the current function is stored and the Tester advances to the selected Row ready for a function to be selected in that Row. When in any Row other than CONFIGURATION is selected, the STATUS Row is active, presenting drive and error status. Following the completion of a Test, the Status Row is also active. To exit a Test, depress any Row Key. The current test stops and advance to the selected Row with the Tester *Idle* (Row LED blinking) in that Row.

CONTROLS AND INDICATORS

CONTROL/INDICATOR	DESCRIPTION
POWER INDICATOR	Illuminates when power is applied to the Tester.
DIGITAL DISPLAY	A six digit alphanumeric display that presents test results, track status, error status and is used when entering operator information. A blinking Display prompts the operator to perform an EDIT/ENTER function. A non-blinking Display means that a test track or test result is being displayed.
COLUMN INDICATORS	The top Row of indicators serve a dual purpose: 1. If the STATUS Row indicator is also ON, drive status is being presented. The STATUS Row indicators will identify the status being presented. 2. When a test is in progress, only one Column indicator will be ON. This will be the one above the test in progress.
ROW INDICATORS	There are five Rows of operation: STATUS, CONFIGURATION, CONTROL, TEST, and ANALOG . A Row indicator has two ON states. 1. A Row indicator will BLINK, indicating that the Row is active and available for a test in that Row to be performed by selecting a test through the Column Keys. 2. When a Row indicator is ON but not blinking, it means that a function in that Row is active as indicated by a Column indicator which is also ON.
COLUMN KEYS	These Keys are located along the bottom of the Front Panel. These Keys are used to select a test when a Row indicator is blinking, or to EDIT/ENTER configuration values or test tracks when the Display is blinking.
ENTER KEY	This Key is the RED Key located in the upper right corner of the Front Panel and is used to store a value. This Key is also used to advance the prompting sequence during the Configuration sequence.
ROW KEYS	These are the four blue Keys located along the right side of the Front Panel. These Keys are used to select a Row of operation. The Row indicator will blink when the Row has been successfully selected. These Keys are also used to exit a test in progress.
AUXILIARY ROW	These utility functions are used as background capabilities while specific Front Panel functions are operating as noted by the bezel strip located below the Column Keys. They are used to enhance and extend the use of Front Panel functions.

PRODUCT SPECIFICATIONS

SPECIFICATION	CHARACTERISTICS
OPERATIONAL	
CONTROL	Z-80 Microprocessor
MEMORY	32K x 8 EPROM 32K x 8 RAM
MTBF	8000 POH
MTTR	0.5 HR.
DESIGN LIFE	Seven years or 20000 hrs.
ENVIRONMENTAL	
TEMPERATURE, OPERATING	+ 10 TO +45 C
TEMPERATURE, STORAGE	-40 TO +70 C
HUMIDITY, OPERATING	0% TO 95% (no condensation)
HUMIDITY, STORAGE	0% TO 95% (no condensation)
PHYSICAL	
HEIGHT	5.5 in. (14.0 cm)
WIDTH	12.0 in. (30.5 cm)
DEPTH	11.6 in. (29.5 cm)
WEIGHT	20 lbs. (6.8 kg)
POWER	
INPUT	115VAC +/- 10%, 47-63HZ,1.5 AMP MAX. 230VAC +/- 10%, 47-63HZ,0.75 AMP MAX. 100VAC +/- 10%, 47-63HZ,2.0 AMP MAX. (OPTIONAL)
OUTPUT	+5VDC, +/- 5%,3.0 AMPS MAX. + 12VDC, +/- 5%,3.0 AMPS (SURGE) 2.0 AMPS (CONTINUOUS)
INTERFACE	
SIGNAL SENSE	LOW TRUE
OUTPUT DRIVERS	OPEN COLLECTOR (7438)
INPUT RECEIVERS	IK to +5VDC.INPUT DEVICE - 74LS367
DRIVE TERMINATION	150-1K OHMS TO +5 OR 220/330 TO +5/GND
** I/O CABLE LENGTH	6 FT.

** Some drives with low power CMOS Interface may not drive this cable length due to restrictions of the drive. The UNIDAPT **4000,** supplied with the Tester is required in these cases.

TESTER INTERFACE PIN ASSIGNMENTS

CONTROL INTERFACE - 34 PIN

PIN	I/O	SIGNAL NAME
2		NOT USED
4	OUT	IN USE
6	OUT	SEL3
8	IN	INDEX
10	OUT	SEL0
12	OUT	SEL 1
14	OUT	SEL2
16	OUT	MOTOR ON
18	OUT	DIRECTION IN
20	OUT	STEP
22	OUT	WRITE DATA
24	OUT	WRITE
26	IN	TRACK 00
28	IN	WRITE PROTECT
30	IN	READ DATA
32	OUT	SIDE 1 SELECT
34		NOT USED

ALL ODD PINS ARE GROUND

CONTROL INTERFACE - 50 PIN

PIN	HQ	SIGNAL NAME
2	OUT	LO CURRENT
4		NOT USED
6		NOT USED
8		NOT USED
10	IN	TWO SIDED
12	IN	DISK CHANGE
14	OUT	SIDE 1 SEL
16	OUT	IN USE
18	OUT	HEAD LOAD
20	IN	INDEX
22	IN	READY
24	IN	SECTOR
26	OUT	SEL0
28	OUT	SEL 1
30	OUT	SEL 2
32	OUT	SEL 3
34	OUT	DIRECTION IN
36	OUT	STEP
38	OUT	WRITE DATA
40	OUT	WRITE
42	IN	TRACK 00
44	IN	WRITE PROTECT
46	IN	READ DATA
48		NOT USED
50		NOT USED

ALL ODD PINS ARE GROUND

INTRODUCTION

The UNIDAPT 4000 is an externally mounted P.C.B. Assembly that is used in conjunction with BRIKON 723 or QUICKLIGN 123 Series of FDD Testers to extend the range of testing to include the following classes of Flexible Disk Drives:

* 3 1/2", 300 RPM, 1,000 KBS transfer rate (4 MEG), requiring two lines of DENSITY SELECT and MEDIA ID
* 3 l/2", 300/600 RPM, 250/500 KBS transfer rate, 40 Pin I/O (power on I/O).
* 3 1/2, 300 RPM, 250/500 KBS transfer rate, 26 Pin I/O (integrated I/O and power).
* 5 1/4", 180 RPM, 500 KBS transfer rate.
* All the above configurations with CMOS/TTL Interface

The UNIDAPT 4000 is attached to the Tester through the 50 Pin I/O and 4 Pin Power provided by the Tester. The 34 Pin drive I/O cable from the UNIDAPT 4000 is provided through a ribbon cable that has both pin style and card edge connectors. The 40 Pin I/O is card edge style only. The 26 Pin I/O is pin style. External drive Power is provided through a 4 Pin, 5 1/4" style connector with 3 1/2" adaptor included to support conventional drives.

SWITCHES

Because many popular drives, particularly *4 MEG,* have additional Interface requirements, the UNIDAPT 4000 includes several switches and are used to support the most popular Interface variations (see FIGURE 3) and are explained below:

S0 DENSITY 0 LEVEL - This switch is used to control the state of Pin 2 on both the *34 Pin* and *40 Pin* Interface.

S1 DENSITY 1 SELECT - This switch is used to control which Interface Pin is used for the DENSITY 1 signal on *4 MEG* drives. Pins 6 or 33 may be selected. When 33 is selected, Pin6 becomes DRIVE SELECT 3. When Pin 6 is selected, Pin 33 may become MEDIA ID 0 based on the setting of S3.

S2 DENSITY 1 LEVEL - This switch is used to control the state of Pins 6 or 33, based on the setting of S1.

S3 MEDIA ID SELECT - This switch is used to control the Interface pair used for MEDIA ID 0/1 on *4 MEG* drives. This switch selects between the pair of 17/27 or 29/33.

S4 READY/DISK CHANGE - This switch is used to match the signal configuration of Pin 34 on the 34 Pin Interface. Drives have this Pin designated either READY or DISK CHANGE and in some cases is jumper selectable on the drive.

JP1 180 RPM CONTROL - This jumper block is used to control the state of Pin 3 of the 34 Pin Interface. When jumpered between Pins 1/2, Pin 3 of the Interface is at Ground. When jumpered between Pins 3/4, Pin 3 of the Interface is open, being pulled up or down by the drive. Some drives use this Pin, instead, as a Density Control Pin.

I/O POWER - Both 26 and 40 Pin I/O's have power applied to the drive through the I/O as follows:

40 PIN INTERFACE	
VOLTAGE	PINS
+5VDC	38
+12VDC	40

26 PIN INTERFACE	
VOLTAGE	PINS
+5VDC	1,3,5,7
+12VDC	NONE

LED 0/1 - These LED's indicate the states of MEDIA ID 0 and MEDIA ID 1 respectively. When the incoming signal is *high* the LED is *On.*

UNIDAPT 4000 LAYOUT

NOMENCLATURES

J1	=	50 PIN I/O FROM TESTER
J2	=	34 PIN I/O TO DRIVE
J3	=	40 PIN I/O TO DRIVE
J4	=	26 PIN I/O TO DRIVE
J5	=	EXTERNAL POWER TO DRIVE
J6	=	POWER FROM TESTER
JP1	=	180 RPM CONTROL
S0	=	DENSITY 0 LEVEL (HI/LO)
S1	=	DENSITY 1 PIN SELECT (6/33)
S2	=	DENSITY 1 LEVEL (HI/LO)
S3	=	MEDIA ID PIN CONTROL (17/27, 29/33)
S4	=	READY/DISK CHANGE CONTROL
LED 0	=	STATE OF MEDIA ID 0
LED 1	=	STATE OF MEDIA ID 1

SIGNALS 34 PIN I/O

2	SEE S0 (DENSITY 0)
4	IN USE
6	SEE S1,S2 (DENSITY 1/SEL 3)
8	INDEX
10	DRIVE SELECT 0
12	DRIVE SELECT 1
14	DRIVE SELECT 2
16	MOTOR ON
18	DIRECTION IN
20	STEP
22	WRITE DATA
24	WRITE GATE
26	TRACK 00
28	WRITE PROTECT
30	READ DATA
32	SIDE 1 SELECT
34	SEE S4 (READY/DISK CHANGE)
3	SEE JP1 (180 RPM CTRL)
17	SEE S3
27	SEE S3
29	SEE S3
33	SEE S1,S3 (DENSITY 1/MEDIA ID 1)

ALL OTHER ODD PINS GROUND

SIGNALS 26 PIN I/O

2	INDEX
4	DRIVE SELECT 0
6	DISK CHANGE
8	READY
10	MOTOR ON
12	DIRECTION IN
14	STEP
16	WRITE DATA
18	WRITE GATE
20	TRACK 00
22	WRITE PROTECT
24	READ DATA
26	SIDE 1 SELECT
1,3,5,7	+5 VDC
9,11	NO CONNECTION

ALL OTHER ODD PINS GROUND

SIGNALS 40 PIN I/O

2	SEE S0 (DENSITY SELECT)
4	READY
6	DRIVE SELECT 3
8	INDEX
10	DRIVE SELECT 0
12	DRIVE SELECT 1
14	DRIVE SELECT 2
16	MOTOR ON
18	DIRECTION IN
20	STEP
22	WRITE DATA
24	WRITE GATE
26	TRACK 00
28	WRITE PROTECT
30	READ DATA
32	SIDE 1 SELECT
34	DISK CHANGE
36	FRAME GROUND
38	+5 VDC
40	+12 VDC
3	NO CONNECTION
35	FRAME GROUND

ALL OTHER ODD PINS GROUND

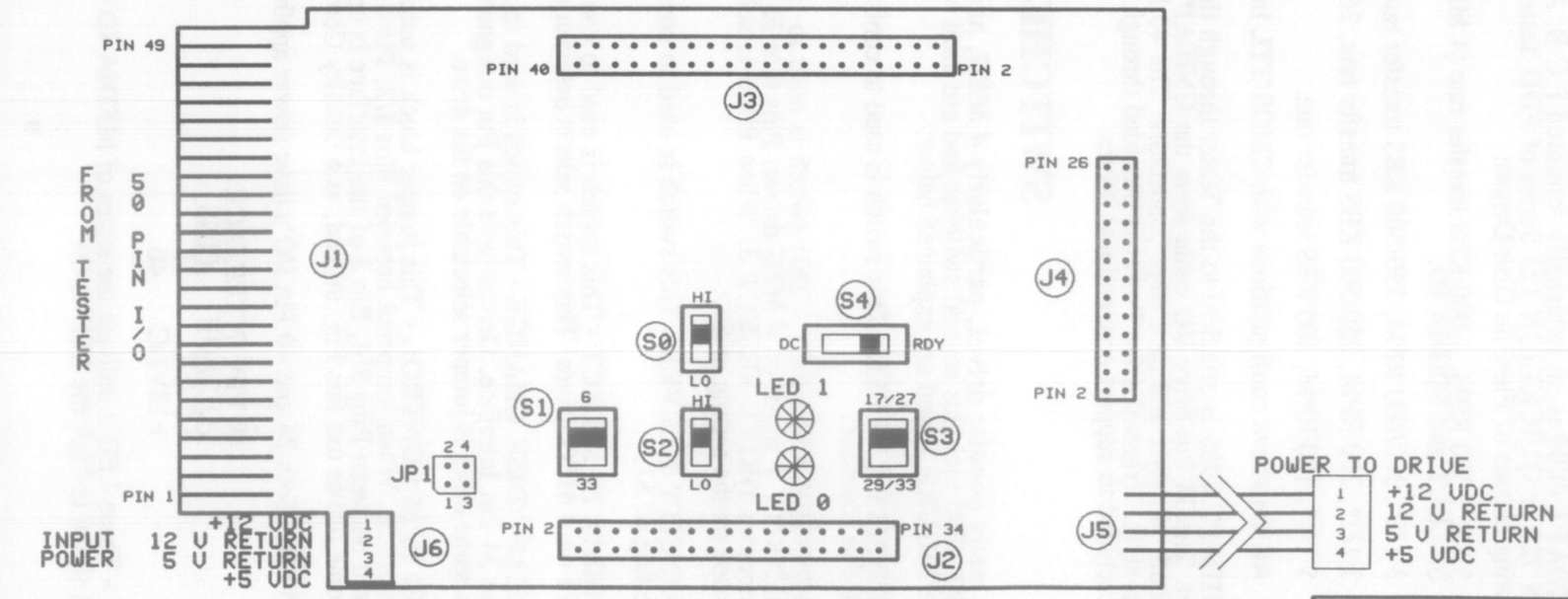

FIGURE 3
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BRIAN INSTRUMENTS, INC.

UNIDAPT 4000 LAYOUT

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STATUS ROW FUNCTIONS

This Row of LED's is used to present drive and error status at the conclusion of a test or when the Tester is in an *Idle* state.

TRACK NUMBER IN DISPLAY (Column F)
Indicates the Display is presenting the current track number.

IN USE ON (Column D)
Indicates the In Use line is active.

MOTOR ON (Column C)

Indicates the Motor On line is active (on 34 pin interface).

READ ERROR (Column B)
Indicates a read error has occurred. This error can occur during the READ, WRITE/READ and AUTO SYSTEM TESTS.
SEEK ERROR (Column A)

Indicates a Seek error has occurred. This error can occur during any Seek Test.

INTELLIGENT SERIES ON (Column 9)

Indicates that the INTELLIGENT SERIES alignment diskette measuring style is active.

INDEX ERROR (Column 8)
Indicates an Index error has occurred. This results when the Pulse Width or the Period is too large. A successful INDEX PERIOD/PULSE WIDTH Test must occur to reset.
MOTOR PHASE A (Column 7)
Indicates that phase A of the drive positioning motor is active. This function is used during the PRELIMINARY TRACK ALIGN Test to verify that Phase A and the Track 00 track of the alignment diskette are in coincidence.
DISK CHANGE (Column 6)

Indicates the Disk Change line is active (on 50 pin interface).

TWO SIDED (Column 5)
Indicates that the Two Sided line is active (on 50 pin interface).
WRITE PROTECT (Column 4)
Indicates the Write Protect line is active.

READY (Column 3)
Indicates the Ready line is active.

HEAD LOADED (Column 2)
Indicates the Head Load line is active.

HEAD **0** (Column 1)
When ON, indicates that Head 0 is active. When OFF, indicates Head 1 is active.

TRACK **00** (Column 0)
Indicates the Track 00 line from the drive is ON.

CONFIGURATION ROW

This Row is used to modify basic drive configuration parameters and to set the style of testing to be performed. The following explains the purpose and operation of each Configuration function.

NUMBER OF HEADS

(KEY 0)

This function is used to select which of the heads are to be tested. If 1 is selected, only the bottom head is tested. If 2 is selected, both bottom and top heads are tested. If 4 is selected, only the top head is tested.

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

Depress Column Key **0.** The Display blinks the current value. Use the Column Keys to select the desired value. The Display responds by blinking the selected value. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Row.

NUMBER OF TRACKS

(KEY 1)

This function is used to select the number of tracks per surface to be tested. The selection range is from 1 through 255. The most popular drive styles have 40, 77 or 80 tracks.

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

Depress Column Key 1. *The* Display responds by blinking the current NUMBER OF TRACKS. Use the Column Keys to select the desired value. The Display responds by blinking the selected value. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Row.

LOAD UART PARAMETERS

(KEY 2)

This function is used to change the programmable settings of the UART functions when using the Remote Control feature (OPTION R/C). The parameters that may be altered are Parity, Number of Data Bits, and Baud Rate. If the UART setting is to be changed, proceed to the RAM function, where the parameter is modified. Then proceed to the LOAD UART PARAMETERS function and ENTER to load the new value for use by the UART. Refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS for RAM location and setting details.

TEST TABLE

(KEY 4)

This function is used to select the style of drive to be tested. The BRIKON 723-4M includes 20 TEST TABLES from which to choose (numbered 00-19). In addition to the general drive control parameters (number of heads, number of tracks, etc.) each TEST TABLE also includes such parameters as test tracks, and pass/fail limits. Please refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS that accompany the Tester. The first page of this document identifies which drive style is assigned to each TEST TABLE. Subsequent pages identify the setting of each modifiable parameter. When power is first applied to the Tester, self diagnostics are performed. If successful, the CONFIGURATION Row is activated and the current TEST TABLE blinks in the Display.

PROCEDURE
Configuration Row Indicator - ON
Column 0 indicator - BLINKING
Display Reading - CURRENT VALUE

Use the Column Keys to select the desired TEST TABLE. The Display responds by blinking the selected value. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Row.

STEP TIME NOMINAL

(KEY 5)

This function is used to select the normal step time of the drive. The selection range is from 0.1 ms. through 99.9 ms..

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

Depress Column Key 5. The Display responds by blinking the current value. Use the Column Keys to select the desired value. The Display responds by blinking the selected value. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Row.

STEP TIME MAXIMUM/MINIMUM

(KEYS 6,7)

These functions are used to set the starting and ending step times for the STEP TEST (TEST Row, Key 9) and AUTO SEEK N-M-N (CONTROL Row, Key 7). The selection range is 0.1 mS. through 99.9 mS.

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

Depress Key 6,7. The Display blinks the current value. Use the Column Keys to select the desired value. The Display responds by blinking the selected value. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Row.

DRIVE SELECT

(KEY 8)

This function is used to match the select code of the Tester and drive to be tested. The setting is entered as a Hexadecimal value to extend the range of the Tester. Please use the following guide:

DRIVE SELECT CODE	TESTER SETTING
0	1
1	2
2	4
3	8
ALL	F

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

Depress Column Key 8. The Display responds by blinking the current SELECT value. Use the Column Keys to select the desired value. The Display responds by blinking the selected value. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Row.

ENTER HUMIDITY

(KEY 9)

This function is used to set the current humidity for use with the INTELLIGENT SERIES alignment diskettes. This is used to correct for movement of the precision alignment signals due to changes in humidity of the testing environment. This function is valid only for those Testers equipped with the INTELLIGENT SERIES alignment diskette controls. This is determined by the Status Row function INTELLIGENT SERIES ON located in the STATUS Row, Column 9. If OFF, the SET HUMIDITY function is inactive and presents NA NA in the Display. If ON, the SET HUMIDITY function blinks 50 %. Use the Column Keys to change the Humidity, using a standard humidity gauge as a reference. The precision of correction is based on the precision of the humidity gauge.

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

Depress Column Key 9. The Display blinks the current Humidity setting. Use the Column Keys to select the desired value. The Display responds by blinking the selected value. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Row.

MUX CONTROL

(KEY A)

This function is used to control the ports of operation for the EIGHT PORT MULTIPLEXER attachment. The value is in HEX and the setting range is from 00 through FF. When 00 is selected, the Mux is turned OFF. When 01 through FF is inserted, the mux ports selected are activated for testing.

00 =0000 0000 in binary (all ports OFF)
FF =1111 1111 in binary (all ports ON)
AA =1010 1010 in binary (odd ports on)

MUX CONTROL (Cont'd)

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

Depress Column Key A. The Display responds by blinking the current MUX CONTROL value (normally 00). Use the Column Keys to select the desired value. The Display responds by blinking the selected value. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Row.

TEST ONE/ALL TRACKS

(KEYS B,C)

These functions are used to control testing style for the WRITE/READ and READ Tests and are alternate action settings (when one is ON, the other is OFF). This function is useful when performing media/head wear testing against data. The active function blinks *brightly.* When testing in the TEST ONE TRACK mode, first position the heads to the desired test Track (SEEK functions in the CONTROL Row). In this mode the number of passes of the test is controlled by the NUMBER OF TRACKS function (CONFIGURATION Row, Key 1). If in the TEST ALL TRACKS mode, each track is tested once in each direction.

Please note that the STOP ON ERROR and STOP AFTER 1 PASS functions are also presented at this time. This is provided as a convenience so that the testing style combinations can be selected simultaneously. See STOP ON ERROR and STOP AFTER 1 PASS details for function explanation.

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

Depress Keys B,C. The LED's above these functions are blinking either *brightly* or *dimly.* Use Column Keys B,C to control the desired function. When *brightly* blinking, the function is ON. Any time the STATUS Row is ON, the state of these functions is presented. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Row.

STOP ON ERROR
STOP AFTER 1 PASS

(KEYS D,E)

These functions, along with TEST ONE/ALL TRACKS are presented simultaneously. When STOP ON ERROR is ON, a Test halts when an error occurs and is printed. When OFF, the error is printed, but the Test continues to completion.

When STOP AFTER ONE PASS is ON, each Test halts after completion. When OFF, a Test halts only after a Row Key is depressed.

STOP AFTER 1 PASS (Cont'd)

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

The ON (blink *brightly)* or OFF (blink *dimly)* state of the each function is determined by the LED above the function. Column Key D controls the state of STOP ON ERROR. Column Key E controls the state of STOP AFTER 1 PASS. Depressing ENTER stores the value and advances the auto prompting Configuration sequence. Depressing any Row Key except ENTER stores the value and advances to the selected Flow.

USER DATA 15 BYTES

(KEY F)

This function is used to activate and select a repeating 15 byte data pattern that is used during the WRITE/READ and WINDOW MARGIN Tests. When this function is activated, the WRITE/READ Test will replace the MFM-1 data bytes with those selected by this function. When WINDOW MARGIN testing is performed under these conditions, the normal bit doublets/triplets are replaced with the selected Hex bytes. It must be noted that the byte scheme selected may normally produce Clock bits. In this manner a specific byte pattern can be analyzed for proper data operation.

The state of the LED above this function determines the ON (blink *brightly)* or OFF (blink *dimly)* state of the function. When OFF, depressing the ENTER Key stores the function state and advances the auto prompting Configuration sequence. When ON, depressing the ENTER Key stores the function state and the Display presents the first three bytes for selection (01.02.03). Use the Column to insert the first three bytes. The Display responds by echoing the selection. Depressing the ENTER Key stores the first three bytes and causes the Display to present the next three bytes (04.05.06) for selection. This process is repeated until the last three bytes (13.14.15) are selected at which time the function exits to the next parameter function or selected Row.

PROCEDURE
Configuration Row Indicator - BLINKING
Display Reading - BLANK

Depress Key F. Use Column Key F to control the ON/OFF state. If ON (blink *brightly),* depressing the (ENTER) Key activates the function and the Display presents the first three bytes for selection. Use the Column Keys to select the bytes and ENTER. The next three bytes are presented. This process is repeated until all 15 bytes are stored at which time the function exits.

CONTROL ROW FUNCTIONS

This Row houses the exerciser and utility control functions.

REZERO

(KEY 0)

This function is used to automatically position the heads to Track 00. The Spindle Motor is turned ON, the Direction line is set to the OUT direction and step pulses (up to 255) are issued at STEP TIME NOM. until the Track 00 Line goes true. The heads are then stepped IN by one track and back OUT until Track 00 is goes true again (this is to accommodate some drives that require this action). If the operation is successful, the Display presents **0** as the track number. If unsuccessful, the Display precedes the zero with dashes (——**0),** indicating that Track 00 was not found. The SEEK ERROR LED in the STATUS Row is ON, verifying the seek error condition. Any seek operations performed under these conditions may fail. A successful REZERO must be performed to clear the error. Whether successful or not, once the function is complete, the Tester automatically goes to an *Idle* state in the CONTROL Row.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Key **0.** The Tester automatically performs the function and reports the successful or unsuccessful STATUS as described above. Upon completion, the Tester is *Idle* in the CONTROL Row, ready for another function to be performed.

HEAD SELECT 0/1

(KEY 1)

This function is used to manually select between Head 0 and Head 1. This is used as a controlling function in conjunction with DC ERASE, WRITE 1F, WRITE 2F, WRITE lF/2F,and WRITE USER DATA. The HEAD **0** LED in the STATUS Row indicates the currently selected Head. If ON, Head 0 is selected; if OFF, Head **1** is selected.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Key **1.** The state of the HEAD **0** Status LED indicates the Head selected as explained above. Once complete, the Tester is *Idle* in the CONTROL Row.

HEAD LOAD/UNLOAD

(KEY 2)

This function is used to independently load and unload the heads on 8" drives that have an independent Head Load interface signal. Each depression of Key 2 alternately loads and unloads the Heads. The HEAD LOADED LED in the STATUS Row indicates the state of the signal. When ON, the Head is loaded.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Key 2. The state of the HEAD LOADED Status LED indicates whether the Head is loaded or unloaded, as explained above.

SEEK TRACK N

(KEY 3)

This function is used to position the heads to a specific Track. The Display blinks the current value. Use the Column Keys to select the desired Track and ENTER. The Spindle Motor is turned ON and the heads are stepped to the desired Track at STEP TIME NOM.. When complete, the Tester is *Idle* in the CONTROL Row and the Display presents the current Track value. If unsuccessful, the Track value is preceded by dashes (---) and the SEEK ERROR Status LED is ON. A successful REZERO is required to clear the dashes and error Status.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Key 3. The Display blinks the current Track value. Use the Column Keys to select the desired value. The Display responds by blinking the selected value. Depressing ENTER stores the value and steps the heads to the selected Track. Upon completion, the Display presents the selected Track, update the STATUS Row and be *Idle* in the CONTROL Row.

STEP IN/STEP OUT

(KEYS **4**,5)

These functions are used to step the heads a single track at a time in either direction. Each depression of the Key steps the heads one track in the direction selected at STEP TIME NOM.. STEP IN is toward the Spindle and STEP OUT is toward Track 00. The Display updates as the heads change tracks. If unsuccessful, dashes precede the Track value and the SEEK ERROR LED in the STATUS Row is ON. A successful REZERO is required to clear the error. Upon completion, the Tester is *Idle* in the CONTROL Row.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Keys **4** or 5. The heads are moved one step in the direction selected. The Display and STATUS Row are updated as explained above. Upon completion, the Tester is *Idle* in the CONTROL Row, ready for another function to be performed.

SEEK TRACK M

(KEY 6)

This function is used to position the heads to a specific track. The Display blinks the current value Use the Column Keys to select the desired Track and ENTER. The Spindle Motor is turned ON and the heads are stepped to the desired Track at STEP TIME NOM.. When complete, the Tester is *Idle* in the CONTROL Row and the Display presents the current Track value. If unsuccessful, the Track value is preceded by dashes (- - -) and the SEEK ERROR Status LED is ON. A successful REZERO is required to clear the dashes and error Status.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Key 6. The Display blinks the current Track value. Use the Column Keys to select the desired value. The Display responds by blinking the selected value. Depressing ENTER stores the value and steps the heads to the selected Track. Upon completion, the Display presents the selected Track, update the STATUS Row and be *Idle* in the CONTROL Row.

AUTO SEEK N-M-N

(KEY 7)

This exerciser function is used to cause the positioning system to continuously seek between two selected Tracks. This function is useful when measuring mechanical resonance and turnaround characteristics of the drive. The Display first blinks the current value for TRACK N. Use the Column Keys to select the desired value and ENTER. The Heads are moved to that Track and the Display now blinks the current value for TRACK M. Use the Column Keys to select the second Track and ENTER. The heads are now alternately stepped, on a continuous basis, between the two selected Tracks at STEP TIME NOM.

The Tester has three AUXILIARY functions that may be selected, once the function is started and are identified as INCREMENT BY 0.1 mS., DECREMENT BY 0.1 mS., HOLD AT PRESENT. They are explained in detail in the AUXILIARY FUNCTION Section. Briefly, the STEP TIME can be automatically incremented or decremented in 0.1 mS. steps after each N-M-N seeks. The upper and lower limits of the increment and decrement are set in STEP TIME MAX. and STEP TIME MIN.. When either of these limits are reached, the Tester automatically changes the increment to decrement and vice versa, keeping the Step Times within the selected band of operation. At any time during this, HOLD AT PRESENT can be activated, at which time the Tester momentarily halts to present the current Step Time in the Display and then continues the N-M-N seek process at that Step Time.

This function operates continuously once started and is stopped by depressing any Row Key. The Tester halts, *Idle* in the selected Row, presenting current STATUS information and updating the Display with the current Track value.

It is recommended that Track 00 be selected as one of the test Tracks. In this manner, seek errors may be detected and presented in the STATUS Row (SEEK ERROR) and Display (---). A REZERO must be successfully performed to clear these error conditions.

INDEX PERIOD/PULSE WIDTH

(KEY 8)

This function measures the PERIOD and PULSE WIDTH of the Index signal produced by the drive. Both measurements are presented in milliseconds and resolved to 0.1 mS. When started, the drive is Selected, the Spindle Motor is turned ON (with a 1 second Motor On delay) at which time the Tester measures and Displays the PERIOD in the right four digits. The printer is ON to record the measurement results. To suppress printing, depress PRINT ON/OFF (AUXILIARY Row, Key B). The Display is updated each revolution so that adjustments may be made conveniently. To Display the PULSE WIDTH, depress Key **8** and the PULSE WIDTH measurement is presented in the right two digits. Each depression of Key **8** alternates the Display information. Regardless of the Display information, the printer outputs both measurements. The measurement range of PERIOD is 0.1 mS. - 999.9 mS.

This measurement has pass/fail parameters that may be modified. Refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS for details.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Key **8.** The measurement automatically begin as explained above at the current Track. Depress Key B to control the print output. Depress Key **8** to alternate the Display information between PERIOD and PULSE WIDTH. The printer output is constructed as follows:

P INDEX PW:002.1P PER:200.1P
F INDEX PW:002.1P PER:181.5F

AUTO SYSTEM TEST

(KEY 9)

This function provides a complete system level digital qualification test by combining data integrity tests together in an automatic test sequence so that drives may be qualified at the system level without operator intervention. The Tests that are performed are:

INDEX PERIOD/PULSE WIDTH TEST
READ TEST
WINDOW MARGIN TEST
STEP TEST
ASYMMETRY TEST
WRITE/READ TEST

As preset from the factory, each Test is performed a certain number of times, yielding high drive confidence and low test times. To add flexibility and versatility, each individual Test may be performed from *0* to *15* times each. In addition, pass/fail limits may also be modified as well as the test Tracks. The results of each Test are recorded on the printer after each pass of a Test, including failure detail. For details of these controls, refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS that accompanies the Tester. The printer is preset to the ON position and printing may not be suppressed. The printer output is constructed as follows.

AUTO SYSTEM TEST (Cont'd)

```
P INDEX PW:1.8P PER:200.4P
P INDEX PW:1.8P PER:200.3P
P INDEX PW:1.8P PER:200.4P

P READ

P WM D0:0650P C0:   P D1:0625P C1:   P
P WM D0:0652P C0:   P D1:0624P C1:   P
P WM D0:0650P C0:   P D1:0625P C1:   P

P STEP 03.0

P ASY 0:0105P   1:0136P
P ASY 0:0102P   1:0133P
P ASY 0:0104P   1:0135P

P W/R
```

At the conclusion of the AUTO SYSTEM TEST, a summary line is printed identifying the pass/fail and the test configuration of the drive. The summary line is constructed as follows:

```
PR004SPPPPPPPP2 080 2 030 035 030 50 =

   P   = PASS AUTO SYSTEM TEST
   R0  = DRIVE SELECT
   04    =TEST TABLE SELECTED
   S   = SYSTEM TESTING (A = ANALOG TESTING)
   P   = PASS INDEX PERIOD PULSE WIDTH
   P   = PASS WRITE/READ TEST
   P   = PASS WINDOW MARGIN
   P   = PASS ASYMMETRY
   P   = PASS STEP TEST
   P   = PASS READ TEST
   P   = NOT USED
   P   = NOT USED
   2   = NUMBER OF HEADS
   080 = NUMBER OF TRACKS
   2   = DENSITY SETTING
   030 = STEP TIME NOMINAL
   035 = STEP TIME MAX (STEP TEST)
   030 = STEP TIME MIN (STEP TEST)
   50  = UPPER BYTE CONTROL (SEE CONFIGURATION
         WORK SHEET AND PROGRAMMING INSTRUCTIONS).
```

DC ERASE

(KEY B)

This function is used to activate the erase structure of the heads without data being passed through the R/W coils. This is useful when preparing a diskette for overwrite testing or analyzing the performance of the erase coils. If the STOP AFTER 1 PASS Configuration function is On, the DC ERASE is performed for one revolution, halts and returns to the CONTROL Row in an *Idle* state. If OFF, the DC ERASE is continuously performed, until a Row Key is depressed. While operating, the Display presents ErASE.

Before operating, position the heads to the desired test Track (SEEK TRACK N,M) and select the desired Head (HEAD SELECT **0/1).**

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Key B. The ERASE function automatically begins at the current Track and on the current Head as described above. At completion, the Tester is *Idle* in the selected Row.

MOTOR ON/OFF

(KEY C)

This function is used to manually control the spindle motor of the drive. Each depression of Key C causes the Spindle Motor to alternately turn ON and OFF. The state of the Motor On Line to the drive is changed each time the Key is depressed. The MOTOR ON Status LED indicates the state of Motor On line. When ON , the Motor is On and vice versa.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Column Key C. The state of the Motor On Line to the drive is changed each time the Key is depressed as described above. The MOTOR ON Status LED indicates the current state of the Motor On Line. Upon completion, the Tester is *Idle* in the CONTROL Row.

IN USE ON/OFF

(KEY D)

This function is used to control the state of the In Use Line to the drive. Each depression of Key D causes the In Use Line to alternately be True or False. The IN USE Status LED indicates the state of the In Use Line. When ON , the In Use Line is True.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Column Key D. The state of the In Use Line to the drive alternates between True and False with each depression of the Key, as explained above. After completion, the Tester remains in the CONTROL Row in an *Idle* condition, ready for another function to be performed.

FORMAT

(KEY E)

This function is used to format the test patterns on the diskette for use in the READ, STEP and AUTO SYSTEM TEST. The Display first blinks a 1, to FORMAT each Track. The number may be changed to 2 to FORMAT every other Track. Depressing the ENTER Key causes the Tester to turn the Spindle Motor ON, perform a REZERO and begin the Formatting process on Head 0 at Track 00. For this function, the Tester uses the MFM-2 data pattern. The Format layout and data structure is detailed in FIGURE **4.** The Tester writes the total Track, including Format and Data Zones on the first revolution and Read/Verify on the second revolution. The heads are advanced to the next Track, written and verified. This process is repeated until all Tracks are Formatted for that Head. The Tester then performs a REZERO, selects the other Head (if required) and repeats the FORMAT process for that Head. The Display presents IN USE while this function is in process. When complete, the Tester halts, *Idle* in the CONTROL Row. To halt during operation, depress any Row Key. The Tester halts and advances to the selected Row in an *Idle* state, ready for another function to be performed.

If a data error occurs, the Tester halts at the failing head/track and prints the failure information which includes Track, Head, byte pattern, byte location, bad byte and correct byte. In this manner, detailed analysis of the failing condition can be performed. The READ ERROR Status LED is also ON. Under these conditions, depressing ENTER cause the Tester to present the error information in the Display (see FIGURE 5). The construction and presentation of the error information is the same for FORMAT, READ, and WRITE/READ Tests. Refer to FIGURE **4** for Format and Data layout.

If other errors, such as Index and Seek, are encountered, the Tester halts, prints the appropriate message and the STATUS Row presents the proper error information.

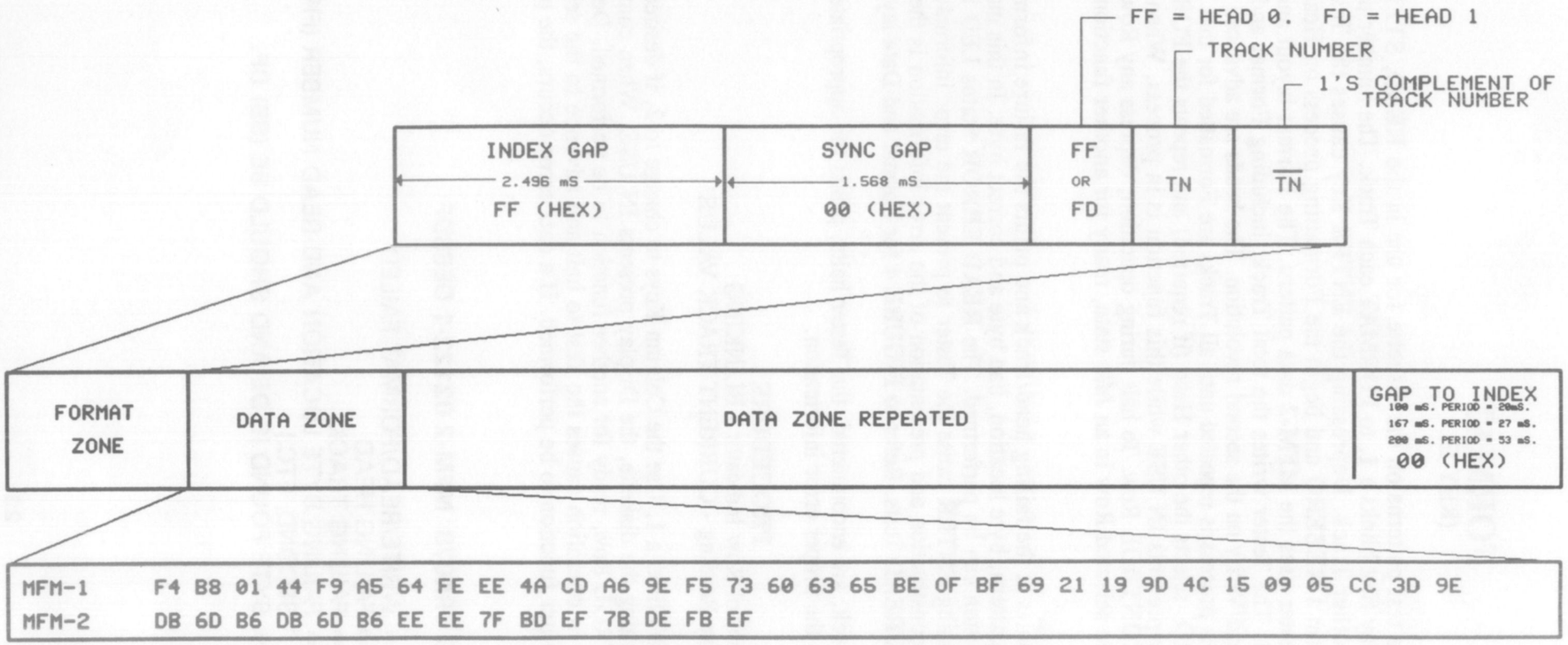
PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Column Key E. The Display blinks a 1. Use the Column Keys to change to 2, if desired, and ENTER. While the Tester is Formatting the diskette, the Display presents IN USE. When complete, the Tester halts, *Idle* in the CONTROL Row, ready for another function to be performed. Depressing any Row Key while the Test is in operation causes the Test to halt and advance to the selected Row in an *Idle* state, ready for another function to be performed. If a data error occurs, the printer outputs the failure detail as follows:

W/RF HD0 TRK078 MFM-2 02122-1 DESBDF

W/RF = WRITE/READ/FORMAT FAILED
HD0 = FAILING HEAD
TRK078 = FAILING TRACK
02122-1 = FAILING BYTE LOCATION AND READ NUMBER (FIRST, SECOND, ETC.)
DESBDF = BYTE FOUND IS DE AND SHOULD BE (SB) DF.

FORMAT AND DATA STRUCTURE
BRIKON 723-4M



TRACK BYTE TOTALS

INDEX PERIOD	DATA TRANSFER RATE	BYTES
333	500 KBS	16750
200	250 KBS	4312
200	500 KBS	8624
200	1,000 KBS	17250
167	500 KBS	8375
100	500 KBS	4062
100	1,000 KBS	8124

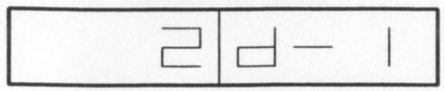
FIGURE 4

BRIAN INSTRUMENTS, INC.
626 S. STATE COLLEGE BLVD. FULLERTON, CA.
FORMAT AND DATA STRUCTURE
D | BRIKON 723-4M | REV: A
DATE: 1 JULY 1990 | SHEET 1 OF 1

DISPLAY MESSAGE

FORMAT...READ...WRITE/READ

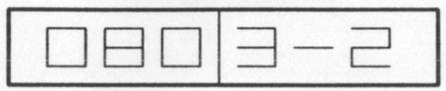
FIRST MESSAGE



2d-1 = MFM-1 PATTERN

2d-2 = MFM-2 PATTERN

SECOND MESSAGE



FIRST OR SECOND READ

BYTE COUNT FROM END OF SYNC GAP

THIRD MESSAGE

HEX BYTE WRITTEN

SHOULD BE

HEX BYTE READ

FIGURE 5

25

BRIAN INSTRUMENTS, INC.

WRITE/READ ERROR MESSAGE

D		BRIKON/QUICKLIGN	REV : A
DATE: 1 JANUARY 1992			SHEET 1 OF 1

LED TEST

(KEY F)

This function is used to verify the correct operation of the Display segments, and Row/Status LED's. All Display segments and LED's are illuminated for 2 seconds for visual verification. Simultaneously, the printer outputs the software version of the Tester. At **the** conclusion, **the** Tester remains in **the** CONTROL Row in an *Idle* condition, ready for another function to be performed.

PROCEDURE
Control Row Indicator - BLINKING
Display Reading - CURRENT TRACK VALUE

Depress Column Key F. All Display segments and Row/Column LED's go ON for two seconds and the printer outputs the software version. At the conclusion the Tester remains in the CONTROL Row in an *Idle* condition. Version Numbers are printed as follows:

723-4M V# 4022 1022 2025 2026 1309

TEST ROW FUNCTIONS

This Row contains the digital Write, Write/Read and Bit Jitter measuring tests used for detailed drive analysis.

WRITE 1F,2F,1F/2F

(KEYS 0,1,2)

These functions are used to Write a 1F, 2F, or 1F/2F to the diskette. For WRITE 1F/2F the Tester writes alternating bytes at the 1F and 2F frequencies. The frequency that is written is defined below. The state of STOP AFTER 1 PASS determines the style of writing. If ON, these functions write for a revolution (approximately 105% of a track) and automatically exit. If OFF, writing is continuous, until the operator exits via a Row Key.

DRIVES RATED MFM DATA TRANSFER RATE	1F FREQUENCY	2F FREQUENCY
250 KBS.	62.5 KHZ	125 KHZ
500 KBS.	125 KHZ	250 KHZ
1000 KBS.	250 KHZ	500 KHZ

These functions operate only with the selected Head. Verify that the desired Head is selected prior to performing these functions. The Display blinks a test Track value (default to Track 10). Use the Column Keys to change as desired. Depressing the ENTER Key executes the function with the Display presenting In USE while writing. Depressing any other Row Key aborts the function in the selected Row.

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Prior to selecting the function, be sure that the desired Head is selected. Use the HEAD SELECT 0/1 function (CONTROL Row, Key 1). Depress Column Key 0,1,2. The Display blinks a test Track value (default to Track 10). Use the Column Keys to change as desired. Depress ENTER to execute the function. The Display presents In USE while the Write is active. Depress any other Row Key to abort the function in the selected Row. If STOP AFTER 1 PASS is ON, the selected function operates for a revolution and automatically exits in the Test Row. If STOP AFTER 1 PASS is OFF, the function operates continuously, until a Row Key is depressed to exit in the selected Row.

WRITE USER DATA (2 BYTES)

(KEY 3)

This function is used to Write a repeatable 2 byte Hex pattern. The Display first blinks the test Track value (default to Track 10). Use the Column Keys to select the desired test Track and ENTER. The Display then blinks **00.00** representing the two user selectable bytes. Use the Column Keys to insert the desired pattern, as desired, and ENTER, causing the function to be executed. The state of STOP AFTER **1** PASS determines the style of writing. If ON, these functions write for a revolution (approximately 105% of a track) and automatically exit. If OFF, writing is continuous, until the operator exits via a Row Key. While writing, the Display presents IN USE. These functions operate only with the selected Head. Verify that the desired Head is selected prior to performing these functions. This function operates only with the selected Head. Verify that the desired Head is selected prior to performing this function. To select the test Head, use the HEAD SELECT **0/1** function prior to activating this function.

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Prior to selecting the function, be sure that the desired Head is selected. Use the HEAD SELECT **0/1** function (CONTROL Row, Key **1).** Depress Column Key 3. The Display blinks a **00.00.** Use the Column Keys to select the desired pattern, and ENTER. The Display then blinks a test Track value. Use the Column Keys to change as desired. Depress ENTER to execute the function. The Display presents In USE while the Write is active. Depress any other Row Key to abort the function in the selected Row. If STOP AFTER **1** PASS is ON, the selected function operates for a revolution and automatically exits in the Test Row. If STOP AFTER **1** PASS is OFF, the function operates continuously, until a Row Key is depressed to exit in the selected Row.

RAM

(KEY 4)

This function is used to make temporary changes to those parameters that are not accessible directly through the Front Panel Keys. This is particularly useful when testing unique specifications or during experimentation. When a TEST TABLE is selected, all of the parameter contents are read from the EPROM into RAM. This RAM function allows addressing the RAM locations where a particular parameter is stored. The contents of the location may be viewed and/or altered. Refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS for the RAM location of the intended parameter to be changed.

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Once the desired TEST TABLE has been selected, depress Column Key **4.** The Display blinks **"0000"** in the left section. Refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS for the RAM location of the intended parameter to be changed. Use the Column Keys to select the location value. The Display responds by blinking the selection. Depress the ENTER Key. The right two digits in the Display blink the Hex value for that location. If a change is desired, again use the Column Keys to select the new value. The Display responds by blinking the selection. To STORE the new value, depress the TEST Row Key. The new value is stored and the next location is automatically displayed with the Hex contents blinking. To EXIT this function, depress the CONTROL Row Key.

DECIMAL TO HEX CONVERT

(KEY 5)

This is a support function is used in conjunction with the RAM function to convert any four digit DECIMAL number to the equivalent HEXADECIMAL value.

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Column Key 5. The Display blinks "0000" in the right section. Use the Column Keys to insert the decimal value to be converted. The Display blinks the selection. Depress the ENTER Key and the resulting hexadecimal value is displayed. To perform chain conversions, depress the ENTER Key after each conversion, and "0000" will again be in the Display for the next conversion. To exit this function, depress the CONTROL Row Key.

WRITE/READ TEST

(KEY 7)

This test is used to verify the data reliability of the drive under data overwrite conditions. In this test, different data patterns are written and read twice. In this manner data errors due to overwrite noise and excessive jitter may be detected. Up to two data pattern configurations may be written for testing (see FIGURE 4). Each of the configurations form a sub-test designated as MFM-1 and MFM-2 and are linked together to perform multiple Writes and Reads of each Track/Head combination. The parameters that may be controlled are :

ACTIVE SUB-TESTS
READ RETRIES
ABBREVIATED MODE (EVERY 4TH TRACK)

Please refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS for details. As shipped standard from the factory, both of these patterns are activated (MFM-1, MFM-2). The MFM-1 pattern is written/read on each test Track, with the heads moving IN. When the inner test Track is reached, each Track is read again on the way back to Track 00. Once this process is complete, the MFM-2 pattern is overwritten/read in the same manner and so on. Once all of the sub-tests selected have been performed, the Test switches heads and repeats the process on the other Head. During this Test, the Display presents all Zeros (000000), counting the number of errors that occur. If a data error occurs, the Display increments the current value by one and the printer prints the error detail. If Retries are invoked, the Tester exhausts these before failing the Test. If the Test reaches conclusion without exceeding the Retry setting, the Test Passes.

The MFM-2 subtest is the same as FORMAT. In this manner, the final sub-test performed (if selected) during WRITE-READ TEST is used to Format the diskette for READ or AUTO SYSTEM TEST.

WRITE/READ TEST (Cont'd)

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key **7.** The Test automatically begins performing Write/Read operations using the first selected data pattern configuration. The Display presents **000000,** counting the number of accumulative errors that occur. Once this is complete, the Test continues, except using the next data pattern configuration. This process continues until all selected data patterns have been performed, as described above, for each Head. For this test, the printer is set to the ON position. To suppress printing, depress the PRINT ON/OFF Key once the Test has started. The printer output is constructed as follows.

```
P W/R
  W/R TRK 030  MFM-2  0046-1  AASBFF
F W/R TRK 030  MFM-2  0046-2  AASBFF

F W/R    =  Failed WRITE/READ Test
TRK 030  =  Error occurred at track 30.
MFM-2    =  Error occurred on MFM pattern 2.
0046-2   =  Error occurred at byte 46 of the second read pass.
AASBFF   =  Error byte is AA and Should Be FF.
```

READ TEST

(KEY 8)

This Test is used to check the basic Read capabilities of the drive. This Test is very useful as a means of data inter-changeability of the drive. Using the FORMAT function in conjunction with the alignment capabilities of the Tester, data offtrack data diskettes can be created. Using these offtrack diskettes in conjunction with the READ Test provides enhanced experimentation capabilities when determining bit error rate compared to amount of misalignment.

Each byte of each Track is read twice; one time in each direction for each head. This Read process begins at Track 00 and each byte is read on each Track until the inner track is reached. Once this is complete, the same Read process is performed again, except starting from the inner Track stepping until Track 00 is reached. Again this entire process is repeated if there are two heads. If an error occurs, both the Display and printer output the failure detail.

NOTE
BECAUSE THIS IS A READ ONLY TEST, IT IS REQUIRED THAT THE DATA DISKETTE BE PRE — WRITTEN USING THE FORMAT FUNCTION (CONTROL ROW, KEY E) PRIOR TO PERFORMING THIS TEST. IF THE DISKETTE IS WRITTEN USING A DRIVE WITH KNOWN ALIGNMENT CHARACTERISTICS, THIS TEST CAN BE USED FOR INTERCHANGE-ABIL¬ITY TESTING.

READ TEST (Cont'd)

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key 8. The Status indicator above this Test is ON, indicating that this Test is active. The Display is filled with "000000", indicating the number of Read errors encountered. If a data error is encountered, the error count in the Display is increased by one and the error information is logged on the printer with the Test continuing until complete. The printer is set to the ON position to record any errors. To disable printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B). The printer output is presented as follows.

```
P READ
  READ TRK 030  MFM-2 00046-1  AASBFF
F READ TRK 030  MFM-2  00046-2  AASBFF

F READ   = Failed READ Test
TRK 030  = Error occurred at track 30.
MFM-2    = Error occurred on MFM pattern 2.
0046-2   = Error occurred at byte 46 of the second read pass.
AASBFF   = Error byte is AA and Should Be FF.
```

STEP TEST

(KEY 9)

This function tests the integrity of the positioning system under changing step rate conditions. To accomplish this, a series of short and long Seek/Read operations are performed in both directions using combinations of short and long seeks. This Test is very useful to determine and verify the positioning performance across potential mechanical resonance points. The Test begins at STEP TIME MAX. (CONFIGURATION Row, Key 6) where the heads are stepped to the first test Track and the track header is read. If correct, the heads are advanced to the next test Track for header verification. This process continues until all test Tracks are verified. The Tester then reduces the Step Time by 0.5 mS. and repeats the above process. This continues until STEP TIME MIN. (CONFIGURATION Row, Key 7) is tested. This constitutes one pass of the lest. If the lest passes, the passing step time is presented in the Display and printer.

If at any time during this Test, the track header is not found or the wrong track header is found, the Test restarts by adding 0.7 Ms. to the failing step time and the Test process begins from there, except as each series of track seek/reads is successfully completed, the Step Time is reduced by 0.1 mS. until the step error reoccurs. Under these conditions, the failing step time presented in the Display and printer.

The selected test Tracks are generated with an algorithm where N is the inner track as established in NUMBER OF TRACKS (CONFIGURATION Row, Key 1). The algorithm is:

Track 00...N x 0.7...N x 1.0...N x 0.3...

STEP TEST (Cont'd)

NOTE

BECAUSE THIS IS A READ ONLY TEST, IT IS REQUIRED THAT THE DATA DISKETTE BE PRE-WRITTEN USING THE FORMAT FUNCTION (CONTROL ROW, KEY E) PRIOR TO PERFORMING THIS TEST. IF THE DISKETTE IS WRITTEN USING A DRIVE WITH KNOWN ALIGNMENT CHARACTERISTICS, THIS TEST CAN BE USED FOR INTERCHANGEABILITY TESTING.

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key 9. The Test automatically begins by performing the track seek/reads on the pre-selected Tracks at STEP TIME MAX. The Display presents the tested Tracks as they occur. If completed successfully, the Step Rate is reduced and the track seek/reads are repeated again and so on until the target STEP TIME MIN. is reached or the Test fails. The printer and Display present the passing or failing Step Rate at the conclusion of the Test. To exit during the Test, depress any Row Key. To suppress printing, depress the PRINT ON/OFF Key once the Test has started. The printer output is presented as follows.

P STEP 3.0 mS
F STEP 3.7 mS

WINDOW MARGIN

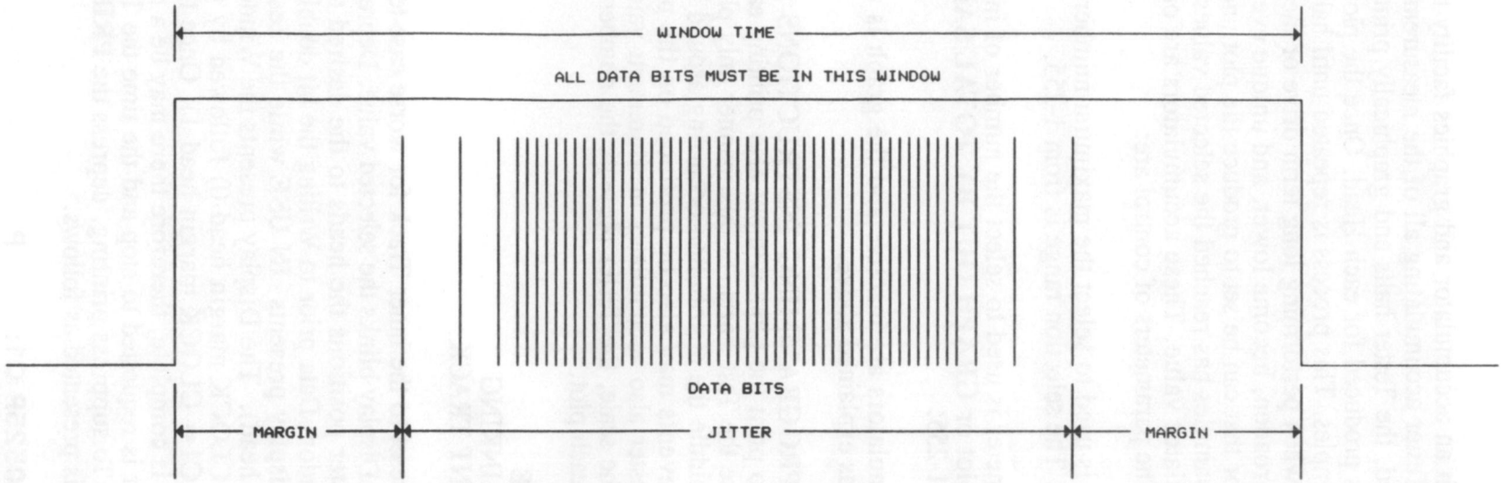
(KEY A)

This Test measures the amount of jitter that is in the data stream due to all jitter components and subtracts this jitter content from the precision window reference, yielding the WINDOW MARGIN, (see FIGURE **6).** To accomplish this, the heads are positioned to the test Track (operator selectable) and the media is pre-conditioned by writing a random data pattern for four revolutions. This is done so that possible overwrite problems can be detected. The Tester then writes the Track with repeated bit doublets to induce maximum bit jitter. Triplet bits are interspersed among the doublets to form flux reversals, assuring all Asymmetry content is included. This bit stream configuration does not produce Clock pulses in MFM. In this manner, the Tester can verify that the data stream jitter does not run into the Clock time. The Tester responds to this by presenting a WINDOW MARGIN *blank* reading in the Display and printer for Clocks.

A precision crystal controlled clock reference is used in conjunction with a Programmable One-Shot to detect the location of each bit within the bit cell. For the purpose of providing fast test time, successive approximation techniques are used, requiring only 24 revolutions of sampling per head to attain a measuring resolution of **1.0 nS..** Once this process is complete, the greatest shifted bits (early and late) are subtracted from the reference Window, yielding the Margin. The WINDOW MARGIN for both Data time and Clock time is measured. Window time references are noted below.

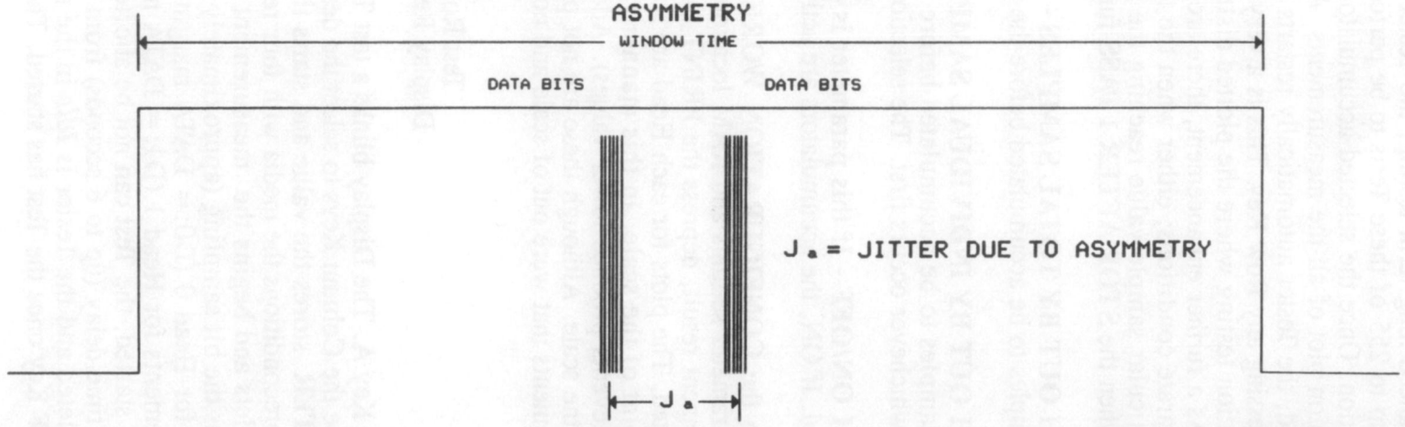
DRIVE DATA RATE	WINDOW REFERENCE
250 KBS.	2000 NS.
500 KBS.	1000 NS.
1,000 KBS.	500 NS.

WINDOW MARGIN



DATA TRANSFER RATE	WINDOW TIMES
250 KBS	2,000 NS
500 KBS	1,000 NS
1,000 KBS	500 NS

ASYMMETRY



ASYMMETRY = 2(J a)

FIGURE 6

BRIAN INSTRUMENTS, INC.

WINDOW MARGIN/ASYMMETRY

D | BRIKON/QUICKLIGN -4M REV : A

DATE: 1 JULY 1990 | SHEET 1 OF 1

WINDOW MARGIN (Cont'd)

For enhanced long term testing, the Tester is equipped with an accumulator and graphics facility that allows up to 255 of these Tests to be performed, with the Tester accumulating all of the measurement information. Once the selected accumulator value is reached, the Tester halts and graphically prints a distribution plot of all the measurements. A separate plot is produced for each Head. Once the plot is produced, the Tester automatically restarts accumulating samples. This process is repeated until halted by depressing any Row Key. This is a very useful function when performing long term drive or media degradation testing where the plotted distribution would broaden, become lower, and unique events occur. As a further enhancement, there are two accumulator that can be set to produce the plot under two separate conditions; either when the total number of samples has reached the selected values or any particular sample value reaching the selected accumulator value. These accumulators are only active when the STOP AFTER **1** PASS function is OFF. The parameters of control are:

GRAPH OUT BY TOTAL SAMPLES - This parameter is used to select the maximum number of total samples to be accumulated before the plot is produced. The selection range is from 1-255.

GRAPH OUT BY INDIVIDUAL SAMPLE - This parameter is used to select the number of individual samples to be accumulated before producing the plot or GRAPH OUT BY TOTAL SAMPLES, whichever occurs first. The selection range is from 1-255.

GRAPH ON/OFF - If this parameter is OFF, the accumulators are inactive and the graph is not produced. If ON, the accumulators are active and operates as explained above.

Refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS for these parameter settings and RAM locations. If it desired to print the plots without also printing each measurement result, depress the PRINT ON/OFF Key once the Test starts. In this manner only plots are printed. The plots for each Head are scaled, with the middle the distribution occurring around the 75% point of the scale. In this manner random unique events may also be produced on the plot (unique events produce lower values). Additionally, the Tester also accumulates measurement values beyond the scale. Although these are not printable within the scale, the Tester presents the number of measurements that were out of scale and notes them below each plot.

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key A. The Display blinks a test Track number (preset to the inner Track for worse case testing). Use the Column Keys to select the desired value. The Display blinks the selected value. Depressing ENTER stores the value and starts the Test. The Tester positions the heads to the desired test Track, preconditions the media with four revolutions of Random Data prior to Writing the bit doublets and triplets and begins the measurement process. The Display presents IN USE while the Tester performs the bit sampling (approximately six seconds per head). The Display presents the Window Margin for Head 0 (DO: = DATA margin head 0. CO: = CLOCK margin head 0) followed by the measurements for Head 1 (D1:= DATA margin head 1. C1= CLOCK margin head 1). Once this Test has started, the Test can not be aborted until the Test is complete, therefore there may be a noticeable time delay (up to 6 seconds) from the time the Test is requested to stop and the time the Test is completed and the Tester is *Idle* in the requested Row. To suppress printing, depress the PRINT ON/OFF Key once the Test has started. The printer output is presented as follows.

If XXXX is printed, this means that bit jitter exceeded 95% of the Window reference. If no values are presented, this means that the reference pattern was not written.

ASYMMETRY

(KEY B)

This Test is used to measure the amount of bit jitter generated due to the asymmetrical magnetic and electronic imbalances of the heads and analog read/write circuitry of the drive (see FIGURE **6).** If the analog signals of a head are not balanced, the data will be shifted within the Data Window. The greater this imbalance, the greater the resulting shift. To measure this, the Tester writes a pure low frequency signal interspersed with bit doublets on the test Track. Under these conditions, all other components of bit jitter, except ASYMMETRY are minimized. The Tester uses the same measuring technique as WINDOW MARGIN to provide the precision (measuring resolution of **1.0** nS.) required to measure this normally small value; values under **100** nS. are common. Under these test conditions, the bits are shifted nominally equal amounts of early and late bits, where every other analog transition is shifted in one direction and the others in the opposite direction. Because small amounts of other bit jitter components will be present, the measurement is made, calculating the mean time between the early bits and late bits, where 75% of the bits are inside and 25% of the bits are outside. The test Track is preset to Track 10 to minimize the effects of non-Asymmetry jitter components. Although Asymmetry jitter is track independent, the other bit jitter components such as *bit crowding* are very sensitive, superimposing additional jitter not due to ASYMMETRY. For this reason, caution must be exercised when performing this Test at the inner track.

The Display blinks a test Track number (preset to Track 10). Use the Column Keys to change, as desired, and ENTER. The heads are positioned to the test Track and the low frequency signal is written. Like WINDOW MARGIN, a precision clock is used in conjunction with a Programmable One-Shot to detect the location of each bit within the bit cell. The track is scanned, using successive approximation techniques, until the mean early and late bit jitter time is derived. The resolution of this measurement is **1.0** nS. The Display presents the values of each head separately. Head 0 is presented first. To exit, depress any Row Key.

For enhanced long term testing, the Tester is equipped with an accumulator and graphics facility that allows many (up to 255) of these Tests to be performed, with the Tester accumulating all of the measurement information. Once the selected accumulator value is reached, the Tester halts and graphically prints a distribution plot of all the measurements. A separate plot is produced for each Head. Once the plot is produced, the Tester automatically restarts accumulating samples. This process is repeated until halted by depressing any Row Key. This is a very useful function when performing long term drive or media degradation testing where the plotted distribution would broaden, become lower, and unique events occur. As a further enhancement, there are two accumulator that can be set to produce the plot under two separate conditions; either when the total number of samples has reached the selected values or any particular sample value reaching the selected accumulator value. These accumulators are only active when the STOP AFTER **1** PASS function is OFF. The parameters of control are:

GRAPH OUT BY TOTAL SAMPLES - This parameter is used to select the maximum number of total samples to be accumulated before the plot is produced. The selection range is from 1-255.

GRAPH OUT BY INDIVIDUAL SAMPLE - This parameter is used to select the number of individual samples to be accumulated before producing the plot or GRAPH OUT BY TOTAL SAMPLES, whichever occurs first. The selection range is from 1-255.

GRAPH ON/OFF - If this parameter is OFF, the accumulators are inactive and the graph is not produced. If ON, the accumulators are active and operates as explained above.

Refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS for these parameter settings and RAM locations. If it desired to print the plots without also printing each measurement result, depress the PRINT ON/OFF Key once the Test starts. In this manner only plots are printed. The plots for each Head are scaled, with the middle the distribution occurring around the

75% point of the scale. In this manner random unique events may also be produced on the plot (unique events produce lower values). Additionally, the Tester also accumulates measurement values beyond the scale. Although these are not printable within the scale, the Tester presents the number of measurements that were out of scale and notes them below each plot.

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key B. The Display blinks a test Track number (preset to Track 10 to minimize other jitter components). Use the Column Keys to select another Track, if desired, and depress ENTER. The heads are positioned to the test Track and the media is written using a pure low frequency pattern. While the measurements are being made, the Display presents IN USE (approximately 6 seconds per head). The Display then presents the measurement for Head 0. The first digit is the head number, followed by a decimal and the next four digits are the ASYMMETRY value in *nanoseconds.* After 2 seconds, the Display presents the measurement for Head 1.

Once this Test has started, the Test can not be aborted until the Test has completed, therefore there may be a noticeable time delay (up to 6 seconds) from the time the Test is requested to stop and the time the Test is completed and the Tester goes IDLE in the requested Row. To suppress printing, depress the PRINT ON/OFF Key once the Test has started. The printer output is presented as follows.

```
P ASY  0:0123P 1: 0144P
F ASY: 0:0751F 1: 0144P
```

HEAD LOAD TEST

(KEY C)

This Test is used to test the effects of drive/media data performance when subjected to repeated head load/unload conditions. *To* accomplish this, the Tester position the heads to the test Track where the MFM-2 pattern is written. The same is repeated for the *four* tracks to either side of the reference test Track (to also test for edge effects). The heads are then positioned to the center track, where the heads perform successive unload/load for 500 cycles. After each cycle, the Tester scans each track, verifying that the original data pattern is intact. If so, the cycle is repeated until the operator stops the Test. If an error occurs, the printer outputs error detail, with the track, byte count and failed data detail.

For additional flexibility, both the number of loads per revolution and number of revolutions between load/unload cycles is controllable. The Tester first blinks the test Track. Use the Column Keys to select and ENTER. The Tester blinks nd 100. The first number digit (1) establishes how many head load/unload cycles per revolution and may be 1 or 2. The other two digits (00) establish how many revolutions delay between head load/unloads and has a range of 00-99.

PROCEDURE
Test Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key C. The Display blinks the current test Track value. Use the Column Keys to change, if desired, and ENTER, the Display blinks nd 100. Use the Column Keys to select the test method desired. Depressing any Row Key will store the value and start the Test.

PRESS FOR PASSES
PRESS FOR ERRORS

(KEYS D,E)

These functions are used to Display the number of Test PASSES performed or number of total data ERRORS encountered during either the READ or WRITE/READ Tests. These are very useful utilities when performing long term data testing, in that the number of Test PASSES and/or ERRORS can be displayed without disturbing the Test in progress. Under these testing conditions, the STOP AFTER **1** PASS function (CONFIGURATION Row, Key E) and STOP ON ERROR functions (configuration Row, Key D) are both OFF. In this manner, the intended Test continually operates, accumulating passes and errors.

PROCEDURE

For this function to operate, either the READ or WRITE/READ Tests are in progress. Depress either Key D or E and the Tester momentarily halts the current Test for the Display to present the number of PASSES completed or ERRORS encountered thus far. This information remains on the Display for **1.0** second and then reverts back to the Test in progress. Once the Test is stopped, these value are reset to zero. When this function is activated when the Tester is *Idle,* the information displayed is for the last WRITE/READ or READ Test performed.

ANALOG ROW FUNCTIONS

This Row is used to perform the analog measurements, including mechanical, signal, and alignment performance of the drive. For operation details concerning this Row, please refer to the OPERATION AND USE OF OPTION R document that accompanies this capability.

AUXILIARY ROW FUNCTIONS

In this Row are located several utility functions that are used while other Tests are in progress, such as printer control and Test manipulation, explained below.

STEP IN/OUT PRELIMINARY ALIGN

(KEYS 0,1)

These are used during the PRELIMINARY ALIGN function to move the heads while searching for the pattern located on Track 00 of the alignment diskette, during initial alignment. Each depression of the Key moves the heads by one step in the direction selected. OUT is toward Track 00.

OPTALIGN/STATIC ALIGN TOGGLE

(KEY 2)

This function is used to alternate between OPTALIGN and STATIC TRACK ALIGN functions without stopping either Test. Once either of these Tests begin, depressing this Key will alternate between the two measurement styles without stopping the Test in progress. This is very useful when making drive alignment adjustments.

INDEX TO DATA CONTROL

(KEYS 3,4,5)

These functions are used to manipulate the measurement style during the INDEX TO DATA Test. Three modes of operation are available and are described below.

SELECT (KEY **5)**

This Key causes the Test to halt and the Display to blink the current test Track value. Use the Column Keys to select the desired Track and ENTER. The heads are positioned to the selected Track and the measurement is made continuously. To exit, depress any Row Key.

IN/OUT (KEY **3)**

This Key causes the measurement to be made at the A and C test Track selections (Tester has up to three tracks to Test, designated A,B,C). Refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS for current settings. Each depression of Key **3** alternates the positioning system between Tracks A and C.

NORMAL (KEY **4)**

This Key causes the Test to operate in the normal mode of automatically measuring all the preset Tracks. This is the mode that the Tester is preset to when the INDEX TO DATA TEST is started.

AUTO SEEK CONTROL

(KEYS 6,7,8)

These functions are used to control the step time during the AUTO SEEK N-M-N Test. When the Test is started, the Step Time is set at STEP TIME NOMINAL.

Depress Key 7 and the step time is decremented by 0.1 ms. after each seek cycle. This continues until STEP TIME MIN is reached, at which time the step time automatically begins to increment until STEP TIME MAX is reached, and so on.

Depress Key **8** and the step time is incremented after each seek cycle and continues as above.

Depress Key **6** and the step time currently active is held. The drive continues the seeking at the present step time. The Display presents the current step time when Key **6** is depressed.

NEXT TEST

(KEY 9)

This function is used, in conjunction with the AUTO SYSTEM TEST to advance to the next Test within the routine. In some environments, this is a useful utility to advance through long test time functions.

NEXT PORT

(KEY A)

This function is used, in conjunction with the MULTIPLEXER, to manually advance testing to the next Mux Port. When MUX CONTROL is ON (CONFIGURATION Row, Key A), this utility function is used to manually advance testing to the next selected port, where the Test begins again. When the MUX CONTROL is OFF, this function is ignored.

PRINT ON/OFF

(KEY B)

This Key is used to activate or suppress printing during a Test that prints results. The printer is preset to ON during Digital testing and OFF during Analog testing. Each depression of this Key alternately changes the ON/OFF state of the printer. This Key is not active during AUTO SYSTEM TEST and AUTO ALIGN TEST.

CHANGE ALIGN TYPE

(KEY C)

This background function is used during the STATIC TRACK ALIGN and OPTALIGN Tests. Once the Test starts, each depression causes the Tester to change states between *cateye* and INTELLIGENT SERIES style measurements. The mode of the Tester must match the diskette style being measured to obtain usable readings.

RERUN MULTI-TRACK ALIGN

(KEY E)

This function is used during the MULTITRACK ALIGN Test. Once the Test is complete, the Tester calculates the track closest to the average misalignment, with the positioning system active. The Display presents the misalignment information. Adjust the positioning system until the reading is 0. The alignment is now set in the middle of the positioning system errors. If Key E is depressed at this time, the Test will be rerun so that all detail alignment information can be presented after final alignment is made.

SIGN CHANGE +/-

(KEY F)

This function is used to change the direction of correction when inserting STATIC TRACK ALIGN correction factors for *cateye* type alignment diskettes. The INTELLIGENT SERIES alignment diskettes are auto correcting and do not require correction factors.

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BRIKON 723-4M/QT

WITH INTELLIGENT SERIES/CATEYE ALIGNMENT SUPPORT

CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS

SEPTEMBER 1994

626 S. State College Blvd., Fullerton, California 92631
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TEST TABLE LAYOUT

The BRIKON 723-4M/QT Tester/Analyzer provides the capability to test commercial configurations of 8", 5 1/4" and 3 1/2" FDD drive styles, including double speed/frequency drives used in SOFTWARE DUPLICATION environments. The TEST TABLES are preset for the most popular drive configurations along with pass/fail limits, test tracks, etc. as shown below.

CONFIGURATION: SOFTWARE DUPLICATION - INTELLIGENT SERIES
VERSION #: 4123 1122 2025 2026 1309

TABLE	DRIVE TYPE						
	SIZE INCHES	SPEED RPM	DATA RATE KBS	TRACKS	HEADS	UNFORMATTED	GENERIC TERM
00	5 1/4	720	1000	80	2	1.6 MB	2XSDS1.2M
01	5 1/4	300	250	40	2	0.5 MB	XT360K
02	5 1/4	300	250	80	2	1.0 MB	XT720K
03	5 1/4	360	500	80	2	1.6 MB	AT1.2MEG
04	3 1/2	300	250	80	CM	1.0 MB	XT720K
05	3 1/2	300	500	80	2	2.0 MB	1.4MEG
06	3 1/2	600	500	80	2	1.0 MB	HYPER720K
07	3 1/2	300	1000	80	2	4.0 MB	4MEG
08	5 1/4	180	500	80	2	3.2 MB	STD
09	3 1/2	720	1000	80	2	1.2 MB	2XSDS/1.2M
10	5 1/4	600	500	40	2	0.5 MB	2XSDS/360K
11	5 1/4	600	500	80	2	1.0 MB	2XSDS/720K
12	5 1/4	360	500	80	2	1.6 MB	1XSDS/1.2M
13	5 1/4	600	833	80	2	1.6 MB	1.7XSDS/1.2M
14	3 1/2	600	500	80	2	1.0 MB	2XSDS/720K
15	3 1/2	300	500	80	2	2.0 MB	1XSDS/1.4M
16	3 1/2	600	1000	80	2	2.0 MB	2XSDS/1.4M
17	3 1/2	300	1000	80	2	4.0 MB	1XSDS/2.8M
18	3 1/2	360	500	80	2	1.6 MB	AT/1.2MEG
19	3 1/2	300	1000	80	2	4.0 MB	4MEG SONY

For Configuration details, please refer to the attached CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS where all parameters for each PARAMETER TABLE are defined.

PROGRAMMING INFORMATION

The BRIKON 723-4M/QT has 20 TEST TABLES that may be altered by the user. This is done by modifying EPROM memory locations as shown in the attached DRIVE CONFIGURATION MAP. All alterable locations are stored in the EPROM (27256) located on the Z-80 Board.

When making temporary changes, using the RAM function, the RAM location for the particular parameter to be modified is also included as part of the address information provided. The DRIVE CONFIGURATION MAP defines the EPROM and RAM locations of each modifiable parameter along with additional notes, if required.

ALL LOCATIONS ARE IN HEXADECIMAL. ALL VALUES IN THESE LOCATIONS ARE PRESENTED AND ENTERED IN HEXADECIMAL. ALL TWO BYTE PARAMETERS ARE ENTERED LSB FIRST.

BRIKON 723-4M/QT - TABLES 00-09

DRIVE CONFIGURATION MAP

PARAMETER	RANGE	RAM	TB00	TB01	TB02	TB03	TB04	TB05	TB06	TB07	TB08	TB09	NOTE
TEST TABLE NUMBER	00-19	N/A	7500	755D	75BA	7617	7674	76D1	772E	778B	77E8	7845	
NUMBER OF HEADS	1,2,4	F08D	7501	755E	75BB	7618	7675	76D2	772F	778C	77E9	7846	2
NUMBER OF TRACKS	1-255	F08E	7502	755F	75BC	7619	7676	76D3	7730	778D	77EA	7847	
DRIVE TYPE	00-FFH	F08F	7503	7560	75BD	761A	7677	76D4	7731	778E	77EB	7848	3
NOMINAL STEP RATE **	1-255	F091	7505	7562	75BF	761C	7679	76D6	7733	7790	77ED	784A	10
MAXIMUM STEP RATE **	1-255	F093	7507	7564	75C1	761E	767B	76D8	7735	7792	77EF	784C	10
MINIMUM STEP RATE **	1-255	F095	7509	7566	75C3	7620	767D	76DA	7737	7794	77F1	784E	10
DRIVE SELECT	0-FH	F097	750B	7568	75C5	7622	767F	76DC	7739	7796	77F3	7850	4
TEST CONTROL BYTE	00-FFH	F098	750C	7569	75C6	7623	7680	76DD	773A	7797	77F4	7851	5
POWER CONTROL	0-FH	F099	750D	756A	75C7	7624	7681	76DE	773B	7798	77F5	7852	6
MUX CONTROL	00-FFH	F09A	750E	756B	75C8	7625	7682	76DF	773C	7799	77F6	7853	7
PRINTER OUTPUT CONTROL	0-FH	F0A2	7516	7573	75D0	762D	768A	76E7	7744	77A1	77FE	785B	13
CONFIGURATION BYTE	00-FFH	F0E2	7556	75B3	7610	766D	76CA	7727	7784	77E1	783E	789B	8
ALIGN MODE	00-02	F0E3	7557	75B4	7611	766E	76CB	7728	7785	77E2	783F	789C	22

SYSTEM TEST MAP

PARAMETER	RANGE	RAM	TB00	TB01	TB02	TB03	TB04	TB05	TB06	TB07	TB08	TB09	NOTE
# OF INDEX TESTS	0-15	F0A4	7518	7575	75D2	762F	768C	76E9	7746	77A3	7800	785D	9
# OF WINDOW MARGIN TESTS	0-15	F0A5	7519	7576	75D3	7630	768D	76EA	7747	77A4	7801	785E	9
# OF ASYMMETRY TESTS	0-15	F0A6	751A	7577	75D4	7631	768E	76EB	7748	77A5	7802	785F	9
# OF WRITE/READ TESTS	0-15	F0A7	751B	7578	75D5	7632	768F	76EC	7749	77A6	7803	7860	9
# OF STEP TESTS	0-15	F0A8	751C	7579	75D6	7633	7690	76ED	774A	77A7	7804	7861	9
# OF READ TESTS	0-15	F0A9	751D	757A	75D7	7634	7691	76EE	774B	77A8	7805	7862	9
INDEX PERIOD LOW **	1-5000	F0B3	7527	7584	75E1	763E	769B	76F8	7755	77B2	780F	786C	10
INDEX PERIOD HIGH **	1-5000	F0B5	7529	7586	75E3	7640	769D	76FA	7757	77B4	7811	786E	10
INDEX PULSE WIDTH LOW	1-255	F0B7	752B	7588	75E5	7642	769F	76FC	7759	77B6	7813	7870	10
INDEX PULSE WIDTH HIGH	1-255	F0B8	752C	7589	75E6	7643	76A0	76FD	775A	77B7	7814	7871	10
DATA MARGIN LOW **	1-4000	F0B9	752D	758A	75E7	7644	76A1	76FE	775B	77B8	7815	7872	11
CLOCK MARGIN LOW **	1-4000	F0BB	752F	758C	75E9	7646	76A3	7700	775D	77BA	7817	7874	11
ASYMMETRY HIGH **	1-4000	F0BD	7531	758E	75EB	7648	76A5	7702	775F	77BC	7819	7876	11
W/R SUBTEST CONTROL	00-FFH	F0BF	7533	7590	75ED	764A	76A7	7704	7761	77BE	781B	7878	12
READ RETRIES + 1	0-FH	F0C0	7534	7591	75EE	764B	76A8	7705	7762	77BF	781C	7879	12

ANALOG MAP

PARAMETER	RANGE	RAM	TB00	TB01	TB02	TB03	TB04	TB05	TB06	TB07	TB08	TB09	NOTE
# OF ECCENTRICITY TESTS	0-15	F0AA	751E	757B	75D8	7635	7692	76EF	774C	77A9	7806	7863	14
# OF OPTALIGN HYSTERESIS TESTS	0-15	F0AB	751F	757C	75D9	7636	7693	76F0	774D	77AA	7807	7864	14
# OF INDEX TO DATA TESTS	0-15	F0AC	7520	757D	75DA	7637	7694	76F1	774E	77AB	7808	7865	14
# OF AZIMUTH TESTS	0-15	F0AD	7521	757E	75DB	7638	7695	76F2	774F	77AC	7809	7866	14
# OF RESOLUTION TESTS	0-15	F0AE	7522	757F	75DC	7639	7696	76F3	7750	77AD	780A	7867	14
# OF STEP SETTLE TIME TESTS	0-15	F0AF	7523	7580	75DD	763A	7697	76F4	7751	77AE	780B	7868	14
# OF HEAD LOAD SETTLE TESTS	0-15	F0B0	7524	7581	75DE	763B	7698	76F5	7752	77AF	780C	7869	14
# OF TRACK 00 SENSOR TESTS	0-15	F0B1	7525	7582	75DF	763C	7699	76F6	7753	77B0	780D	786A	14
# HEAD AMPLITUDE TESTS	0-15	F0B2	7526	7583	75E0	763D	769A	76F7	7754	77B1	780E	786B	14
ECCENTRICITY TRACK	0-255	F09B	750F	756C	75C9	7626	7683	76E0	773D	779A	77F7	7854	
ALIGNMENT TRACK	0-255	F09C	7510	756D	75CA	7627	7684	76E1	773E	779B	77F8	7855	
OPTALIGN OFFSET TRACKS	0-255	F09D	7511	756E	75CB	7628	7685	76E2	773F	779C	77F9	7856	
AZIMUTH TRACK	0-255	F09E	7512	756F	75CC	7629	7686	76E3	7740	779D	77FA	7857	
RESOLUTION TRACK FOR 1F	0-255	F09F	7513	7570	75CD	762A	7687	76E4	7741	779E	77FB	7858	
RESOLUTION TRACK FOR 2F	0-255	F0A0	7514	7571	75CE	762B	7688	76E5	7742	779F	77FC	7859	
HEAD SETTLE TRACK	0-255	F0A1	7515	7572	75CF	762C	7689	76E6	7743	77A0	77FD	785A	
INDEX TO DATA TRACK A	0-255	F0C4	7538	7595	75F2	764F	76AC	7709	7766	77C3	7820	787D	16
INDEX TO DATA TRACK B	0-255	F0C5	7539	7596	75F3	7650	76AD	770A	7767	77C4	7821	787E	16
INDEX TO DATA TRACK C	0-255	F0C6	753A	7597	75F4	7651	76AE	770B	7768	77C5	7822	787F	16
INDEX TO DATA HIGH **	0-999	F0C7	753B	7598	75F5	7652	76AF	770C	7769	77C6	7823	7880	
INDEX TO DATA LOW **	0-999	F0C9	753D	759A	75F7	7654	76B1	770E	776B	77C8	7825	7882	
AZIMUTH HIGH - INTELLIGENT	0-255	F0CB	753F	759C	75F9	7656	76B3	7710	776D	77CA	7827	7884	24
RESOLUTION LOW	0-99	F0CC	7540	759D	75FA	7657	76B4	7711	776E	77CB	7828	7885	
STEP SETTLE HIGH	0-255	F0CD	7541	759E	75FB	7658	76B5	7712	776F	77CC	7829	7886	
HEAD LOAD HIGH	0-255	F0CE	7542	759F	75FC	7659	76B6	7713	7770	77CD	782A	7887	
STEP SETTLE THRESHOLD	0-99	F0CF	7543	75A0	75FD	765A	76B7	7714	7771	77CE	782B	7888	17
AMPLITUDE LOW **	0-1800	F0D0	7544	75A1	75FE	765B	76B8	7715	7772	77CF	782C	7889	
MOTOR START HIGH **	0-999	F0D2	7546	75A3	7600	765D	76BA	7717	7774	77D1	782E	788B	
ECCENTRICITY HIGH	0-99	F0C1	7535	7592	75EF	764C	76A9	7706	7763	77C0	781D	787A	
COMPLIANCE HIGH	0-99	F0C2	7536	7593	75F0	764D	76AA	7707	7764	77C1	781E	787B	
ALIGNMENT HIGH - INTELLIGENT	0-255	F0C3	7537	7594	75F1	764E	76AB	7708	7765	77C2	781F	787C	24
TRK 00 FROM TRACK	0-15	F0D4	7548	75A5	7602	765F	76BC	7719	7776	77D3	7830	788D	15
TRK 00 SENSOR LOW LIMIT	0-99	F0D5	7549	75A6	7603	7660	76BD	771A	7777	77D4	7831	788E	18
TRK 00 SENSOR HIGH LIMIT	0-99	F0D6	754A	75A7	7604	7661	76BE	771B	7778	77D5	7832	788F	18
OPTALIGN HIGH - INTELLIGENT	0-255	F0D7	754B	75A8	7605	7662	76BF	771C	7779	77D6	7833	7890	24
ERASE LIMIT	0-99	F0D8	754C	75A9	7606	7663	76C0	771D	777A	77D7	7834	7891	
HEAD WIDTH/2	0-255	F0D9	754D	75AA	7607	7664	76C1	771E	777B	77D8	7835	7892	21
AZIMUTH HIGH CATEYE	0-255	F0E4	7558	75B5	7612	766F	76CC	7729	7786	77E3	7840	789D	24
ALIGNMENT HIGH CATEYE	0-99	F0E5	7559	75B6	7613	7670	76CD	772A	7787	77E4	7841	789E	24
OPTALIGN HIGH CATEYE	0-99	F0E6	755A	75B7	7614	7671	76CE	772B	7788	77E5	7842	789F	24
# MULTITRACK/CONTROL		F0E7	755B	75B8	7615	7672	76CF	772C	7789	77E6	7843	78A0	25
RESERVED 2		F0E8	755C	75B9	7616	7673	76D0	772D	778A	77E7	7844	78A1	

** = TWO BYTE PARAMETERS

SINGLE FUNCTION PARAMETERS

PARAMETER	RANGE	RAM	EPROM	NOTE
TABLE AT POWER UP	01-14H	NA	7D83	1
ONE PASS MUX	0,1	F2CD	74EE	19
UART PRESET	00-FFH	F366	7D84	20
HUMIDITY PRESET	1-99	F367	7D85	
GRAPH OUT BY TOTAL SAMPLES	1-255	F369	7D86	23
GRAPH OUT BY INDIVIDUAL SAMPLE	1-255	F36A	7D87	23
GRAPH ON/OFF	0,1	F36B	7D88	23

BRIKON 723-4M/QT - TABLES 10-19

DRIVE CONFIGURATION MAP

PARAMETER	RANGE	RAM	TB10	TB11	TB12	TB13	TB14	TB15	TB16	TB17	TB18	TB19	NOTE
TEST TABLE NUMBER	0-19	F08C	78A2	78FF	795C	79B9	7A16	7A73	7AD0	7B2D	7B8A	7BE7	
NUMBER OF HEADS	1,2,4	F08D	78A3	7900	795D	79BA	7A17	7A74	7AD1	7B2E	7B8B	7BE8	2
NUMBER OF TRACKS	1-255	F08E	78A4	7901	795E	79BB	7A18	7A75	7AD2	7B2F	7B8C	7BE9	
DRIVE TYPE	00-FFH	F08F	78A5	7902	795F	79BC	7A19	7A76	7AD3	7B30	7B8D	7BEA	3
NOMINAL STEP RATE **	1-999	F091	78A7	7904	7961	79BE	7A1B	7A78	7AD5	7B32	7B8F	7BEC	10
MAXIMUM STEP RATE **	1-999	F093	78A9	7906	7963	79C0	7A1D	7A7A	7AD7	7B34	7B91	7BEE	10
MINIMUM STEP RATE **	1-999	F095	78AB	7908	7965	79C2	7A1F	7A7C	7AD9	7B36	7B93	7BF0	10
DRIVE SELECT	0-FH	F097	78AD	790A	7967	79C4	7A21	7A7E	7ADB	7B38	7B95	7BF2	4
TEST CONTROL BYTE	00-FFH	F098	78AE	790B	7968	79C5	7A22	7A7F	7ADC	7B39	7B96	7BF3	5
POWER CONTROL	0-FH	F099	78AF	790C	7969	79C6	7A23	7A80	7ADD	7B3A	7B97	7BF4	6
MUX CONTROL	00-FFH	F09A	78B0	790D	796A	79C7	7A24	7A81	7ADE	7B3B	7B98	7BF5	7
PRINTER OUTPUT CONTROL	0-FH	F0A2	78B8	7915	7972	79CF	7A2C	7A89	7AE6	7B43	7BA0	7BFD	13
CONFIGURATION BYTE	00-FFH	F0E2	78F8	7955	79B2	7A0F	7A6C	7AC9	7B26	7B83	7BE0	7C3D	8
ALIGN MODE	00-02	F0E3	78F9	7956	79B3	7A10	7A6D	7ACA	7B27	7B84	7BE1	7C3E	22

SYSTEM TEST MAP

PARAMETER	RANGE	RAM	TB10	TB11	TB12	TB13	TB14	TB15	TB16	TB17	TB18	TB19	NOTE
# OF INDEX TESTS	0-15	F0A4	78BA	7917	7974	79D1	7A2E	7A8B	7AE8	7B45	7BA2	7BFF	9
# OF WINDOW MARGIN TESTS	0-15	F0A5	78BB	7918	7975	79D2	7A2F	7A8C	7AE9	7B46	7BA3	7C00	9
# OF ASYMMETRY TESTS	0-15	F0A6	78BC	7919	7976	79D3	7A30	7A8D	7AEA	7B47	7BA4	7C01	9
# OF WRITE/READ TESTS	0-15	F0A7	78BD	791A	7977	79D4	7A31	7A8E	7AEB	7B48	7BA5	7C02	9
# OF STEP TESTS	0-15	F0A8	78BE	791B	7978	79D5	7A32	7A8F	7AEC	7B49	7BA6	7C03	9
# OF READ TESTS	0-15	F0A9	78BF	791C	7979	79D6	7A33	7A90	7AED	7B4A	7BA7	7C04	9
INDEX PERIOD LOW **	1-5000	F0B3	78C9	7926	7983	79E0	7A3D	7A9A	7AF7	7B54	7BB1	7C0E	10
INDEX PERIOD HIGH **	1-5000	F0B5	78CB	7928	7985	79E2	7A3F	7A9C	7AF9	7B56	7BB3	7C10	10
INDEX PULSE WIDTH LOW	1-99	F0B7	78CD	792A	7987	79E4	7A41	7A9E	7AFB	7B58	7BB5	7C12	10
INDEX PULSE WIDTH HIGH	1-99	F0B8	78CE	792B	7988	79E5	7A42	7A9F	7AFC	7B59	7BB6	7C13	10
DATA MARGIN LOW **	1-4000	F0B9	78CF	792C	7989	79E6	7A43	7AA0	7AFD	7B5A	7BB7	7C14	11
CLOCK MARGIN LOW **	1-4000	F0BB	78D1	792E	798B	79E8	7A45	7AA2	7AFF	7B5C	7BB9	7C16	11
ASYMMETRY HIGH **	1-4000	F0BD	78D3	7930	798D	79EA	7A47	7AA4	7B01	7B5E	7BBB	7C18	11
W/R SUBTEST CONTROL	00-FFH	F0BF	78D5	7932	798F	79EC	7A49	7AA6	7B03	7B60	7BBD	7C1A	12
READ RETRIES + 1	0-FH	F0C0	78D6	7933	7990	79ED	7A4A	7AA7	7B04	7B61	7BBE	7C1B	12

ANALOG MAP

PARAMETER	RANGE	RAM	TB10	TB11	TB12	TB13	TB14	TB15	TB16	TB17	TB18	TB19	NOTE
# OF ECCENTRICITY TESTS	0-15	F0AA	78C0	791D	797A	79D7	7A34	7A91	7AEE	7B4B	7BA8	7C05	14
# OF OPTALIGN HYSTERESIS TESTS	0-15	F0AB	78C1	791E	797B	79D8	7A35	7A92	7AEF	7B4C	7BA9	7C06	14
# OF INDEX TO DATA TESTS	0-15	F0AC	78C2	791F	797C	79D9	7A36	7A93	7AF0	7B4D	7BAA	7C07	14
# OF AZIMUTH TESTS	0-15	F0AD	78C3	7920	797D	79DA	7A37	7A94	7AF1	7B4E	7BAB	7C08	14
# OF RESOLUTION TESTS	0-15	F0AE	78C4	7921	797E	79DB	7A38	7A95	7AF2	7B4F	7BAC	7C09	14
# OF STEP SETTLE TIME TESTS	0-15	F0AF	78C5	7922	797F	79DC	7A39	7A96	7AF3	7B50	7BAD	7C0A	14
# OF HEAD LOAD SETTLE TESTS	0-15	F0B0	78C6	7923	7980	79DD	7A3A	7A97	7AF4	7B51	7BAE	7C0B	14
# OF TRACK 00 SENSOR TESTS	0-15	F0B1	78C7	7924	7981	79DE	7A3B	7A98	7AF5	7B52	7BAF	7C0C	14
# HEAD AMPLITUDE TESTS	0-15	F0B2	78C8	7925	7982	79DF	7A3C	7A99	7AF6	7B53	7BB0	7C0D	14
ECCENTRICITY TRACK	0-255	F09B	78B1	790E	796B	79C8	7A25	7A82	7ADF	7B3C	7B99	7BF6	
ALIGNMENT TRACK	0-255	F09C	78B2	790F	796C	79C9	7A26	7A83	7AE0	7B3D	7B9A	7BF7	
OPTALIGN OFFSET TRACKS	0-255	F09D	78B3	7910	796D	79CA	7A27	7A84	7AE1	7B3E	7B9B	7BF8	
AZIMUTH TRACK	0-255	F09E	78B4	7911	796E	79CB	7A28	7A85	7AE2	7B3F	7B9C	7BF9	
RESOLUTION TRACK FOR 1F	0-255	F09F	78B5	7912	796F	79CC	7A29	7A86	7AE3	7B40	7B9D	7BFA	
RESOLUTION TRACK FOR 2F	0-255	F0A0	78B6	7913	7970	79CD	7A2A	7A87	7AE4	7B41	7B9E	7BFB	
HEAD SETTLE TRACK	0-255	F0A1	78B7	7914	7971	79CE	7A2B	7A88	7AE5	7B42	7B9F	7BFC	
INDEX TO DATA TRACK A	0-255	F0C4	78DA	7937	7994	79F1	7A4E	7AAB	7B08	7B65	7BC2	7C1F	16
INDEX TO DATA TRACK B	0-255	F0C5	78DB	7938	7995	79F2	7A4F	7AAC	7B09	7B66	7BC3	7C20	16
INDEX TO DATA TRACK C	0-255	F0C6	78DC	7939	7996	79F3	7A50	7AAD	7B0A	7B67	7BC4	7C21	16
INDEX TO DATA HIGH **	0-999	F0C7	78DD	793A	7997	79F4	7A51	7AAE	7B0B	7B68	7BC5	7C22	
INDEX TO DATA LOW **	0-999	F0C9	78DF	793C	7999	79F6	7A53	7AB0	7B0D	7B6A	7BC7	7C24	
AZIMUTH HIGH - INTELLIGENT	0-99	F0CB	78E1	793E	799B	79F8	7A55	7AB2	7B0F	7B6C	7BC9	7C26	24
RESOLUTION LOW	0-99	F0CC	78E2	793F	799C	79F9	7A56	7AB3	7B10	7B6D	7BCA	7C27	
STEP SETTLE HIGH	0-255	F0CD	78E3	7940	799D	79FA	7A57	7AB4	7B11	7B6E	7BCB	7C28	
HEAD LOAD HIGH	0-255	F0CE	78E4	7941	799E	79FB	7A58	7AB5	7B12	7B6F	7BCC	7C29	
STEP SETTLE THRESHOLD	0-99	F0CF	78E5	7942	799F	79FC	7A59	7AB6	7B13	7B70	7BCD	7C2A	17
AMPLITUDE LOW **	0-1800	F0D0	78E6	7943	79A0	79FD	7A5A	7AB7	7B14	7B71	7BCE	7C2B	
MOTOR START HIGH **	0-999	F0D2	78E8	7945	79A2	79FF	7A5C	7AB9	7B16	7B73	7BD0	7C2D	
ECCENTRICITY HIGH	0-99	F0C1	78D7	7934	7991	79EE	7A4B	7AA8	7B05	7B62	7BBF	7C1C	
COMPLIANCE HIGH	0-99	F0C2	78D8	7935	7992	79EF	7A4C	7AA9	7B06	7B63	7BC0	7C1D	
ALIGNMENT HIGH - INTELLIGENT	0-99	F0C3	78D9	7936	7993	79F0	7A4D	7AAA	7B07	7B64	7BC1	7C1E	
TRK 00 FROM TRACK	0-15	F0D4	78EA	7947	79A4	7A01	7A5E	7ABB	7B18	7B75	7BD2	7C2F	15
TRK 00 SENSOR LOW LIMIT	0-99	F0D5	78EB	7948	79A5	7A02	7A5F	7ABC	7B19	7B76	7BD3	7C30	18
TRK 00 SENSOR HIGH LIMIT	0-99	F0D6	78EC	7949	79A6	7A03	7A60	7ABD	7B1A	7B77	7BD4	7C31	18
OPTALIGN HIGH - INTELLIGENT	0-99	F0D7	78ED	794A	79A7	7A04	7A61	7ABE	7B1B	7B78	7BD5	7C32	
ERASE LIMIT	0-99	F0D8	78EE	794B	79A8	7A05	7A62	7ABF	7B1C	7B79	7BD6	7C33	
HEAD WIDTH/2	0-255	F0D9	78EF	794C	79A9	7A06	7A63	7AC0	7B1D	7B7A	7BD7	7C34	21
AZIMUTH HIGH CATEYE	0-255	F0E4	78FA	7957	79B4	7A11	7A6E	7ACB	7B28	7B85	7BE2	7C3F	24
ALIGNMENT HIGH CATEYE	0-99	F0E5	78FB	7958	79B5	7A12	7A6F	7ACC	7B29	7B86	7BE3	7C40	24
OPTALIGN HIGH CATEYE	0-99	F0E6	78FC	7959	79B6	7A13	7A70	7ACD	7B2A	7B87	7BE4	7C41	24
# MULTITRACK/CONTROL		F0E7	78FD	795A	79B7	7A14	7A71	7ACE	7B2B	7B88	7BE5	7C42	25
RESERVED 2		F0E8	78FE	795B	79B8	7A15	7A72	7ACF	7B2C	7B89	7BE6	7C43	

PROGRAMMING NOTES

ALL LOCATIONS ARE IN HEXADECIMAL. ALL VALUES IN THESE LOCATIONS ARE PRESENTED AND ENTERED IN HEXADECIMAL. ** ARE TWO BYTE PARAMETERS. ALL TWO BYTE PARAMETERS ARE ENTERED LSB FIRST.

NOTE 1

There are 20 TEST TABLES and are numbered 00H - 13H. The value in this location determines the TEST TABLE blinking in the Display when tester power is applied.

NOTE 2

If 01H is specified only Head 0 is tested. If 02H is specified, Head 0 is tested first, followed by Head 1. If 04H is specified, only Head 1 is tested.

NOTE 3

This parameter is used to establish both the combinations of RPM/DATA RATE and INTERFACE PROTOCOL/RPM, which are used by the tester for timing and control. The most significant half byte selects a sub-table based on the combination of RPM/DATA RATE as follows:

HEX VALUE	RPM	BIT RATE
0	360	500 KBS
1	600	500 KBS
2	300	250 KBS
3	300	500 KBS
4	300	1000 KBS
5	180	500 KBS
6	600	1000 KBS
7	600	833 KBS
8	720	1000 KBS
9-F	RESERVED	

The least significant half byte selects a sub-table based on the combination of INTERFACE PROTOCOL/RPM as follows:

HEX VALUE	DRIVE TYPE	RPM
0	8", 5 1/4"	360
1	5 1/4"	300
2	5 1/4, 3 1/2"	600
3	3 1/2"	300
4	5 1/4"	180
5	5 1/4"	720
6	3 1/2"	720
7	3 1/2"	360
8-F	RESERVED	

NOTE 4

This parameter is used to control the individual Select lines. When set to OFH, all Select lines are active. When set to 00H, no Select lines are active. Use the following as a guide:

BIT	DRIVE SELECT LINE
0	DS 0
1	DS 1
2	DS 2
3	DS 3

NOTE 5

This single byte parameter is used to establish the preset condition of the upper eight functions in the CONFIGURATION Row as follows:

BIT	FUNCTION
7	If 1, **USER DATA 15 BYTES** is **ON** and used in place of Random Data in the **WRITE/READ TEST**, and in place of **DB,6D,B6** in **WINDOW MARGIN**. If **0**, **USER DATA 15 BYTES** is **OFF** and not used.
6	If 1, **STOP AFTER ONE PASS** is **ON**. If **0** , it is **OFF**.
5	If 1, **STOP ON ERROR** is **ON**. If **0**, it is **OFF**.
4	If 1, **TEST ALL TRACKS** is **ON**. If **0**, **TEST ONE TRACK** is **ON**.
3	If 1, **TEST ONE TRACK** is **ON**. If **0**, **TEST ALL TRACKS** is **ON**.
2	RESERVED
1	RESERVED
0	RESERVED

NOTE 6

This byte controls monitoring of the D.C. output voltages for the drive. If the Bit is 1 the voltage is monitored, otherwise it is not. The Bits are assigned as follows:

BIT	VOLTAGE
0	+12 VDC
1	+ 5 VDC
2	- 5 VDC
3	+24 VDC
4-7	RESERVED

NOTE 7

Each of the eight bits of this byte control the corresponding Port of operation used with the MULTIPLEXER. If the Bit is 1 the Port is active, if 0, it is inactive. Two examples follow.

FF is Binary 1111 1111:	All Ports are active.
AA is Binary 1010 1010:	Ports 1,3,5,7 are active; Ports 0,2,4,6 are inactive.

NOTE 8

•The Bits of this byte control configuration parameters as follows.

Bits 7 6

0 0: Data Rate is 500KBS
0 1: Data Rate is 1000KBS
1 0: Data Rate is 250KBS
1 1: Data Rate is 833KBS

Bit 5: R E S E R V E D

Bit 4: If 0, do normal READ TEST. If 1, do every 4th track (abbreviated style)

Bit 3: If 1, do Apple 5 1/4". Otherwise do not.

Bit 2: If 0, do MOTOR ON at Pin 16 of 34 pin cable. If 1, do LO I at Pin 2 of 50 pin cable.

Bit 1: If 0, do head unload by turning Off pin 18 of the 50 pin cable; if 1 do head unload by turning OFF all Select lines.

Bit 0: If 1 do INDEX TO DATA for a single Index (5.25 and 3.5 inch drives). If 0 do INDEX TO DATA for 2 Indexes (8 inch drives).

NOTE 9

These parameter values are used to control how many passes of each Test are performed during the two Auto Tests provided by the Tester. The lower half byte controls the number performed during AUTO SYSTEM TEST and the upper half byte controls the number performed during AUTO ALIGN TEST. Each parameter may be set from 0-15. If set to 0, the Test will not be performed. Regardless of the setting, the individual Test is available via the Front Panel Keys.

NOTE 10

The functions STEP TIME NOM./MAX./MIN. and INDEX PERIOD/PULSE WIDTH are in *tenths of milliseconds*. A decimal value of 400 (0190 Hex) will result in a step time of 40.0 milliseconds. The two bytes are stored least significant byte first.

NOTE 11

Both clock and data margin limits may be specified. The data pattern normally used will not generate clock pulses in MFM. FFFF can be used in the clock margin locations to cause the tester to verify that there are no clocks; in this case if there are clocks, the test will fail.

NOTE 12

This byte defines which combination of sub-tests are performed by the WRITE/READ Test. If a Bit is 1, the subtest is performed. If the Bit is 0, it is not. The bits are defined as follows:

BIT	SUBTEST
7	MFM-2
6	MFM-1
5	RESERVED
4	RESERVED
3	RESERVED
2	RESERVED
1	RESERVED
0	RESERVED

NOTE 13

The Bits of this byte control printing as follows:

ML	FUNCTION
0	If 1, test results are printed. If 0, they are not.
1	If 1, a P or F is printed at the front of all tests. If 0, the position is blank for Passing tests. An F is always printed for Failing tests.
2	If 0, exit both AUTO SYSTEM and AUTO ALIGN with *Form Feed.* If 1, exit with *3 Line Feeds.*
3	If 1, the test summary is printed. If 0, it is not.

NOTE 14

These parameter values are used to control how many passes of each Test are performed during the two Auto Tests provided by the Tester. The lower half byte controls the number performed during AUTO SYSTEM TEST and the upper half byte controls the number performed during AUTO ALIGN TEST. Each parameter may be set from 0-15. If set to 0, the Test will not be performed. Regardless of the setting, the individual Test is available via the Front Panel Keys.

NOTE 15

This track number is the higher of the two tracks between which the TRACK 00 SENSOR must change states. It is in the most significant half of the byte. The least significant half byte is the table number.

NOTE 16

There are up to three tracks on which INDEX TO DATA may be measured. If less than three tracks are desired, then use FFH instead of a track number to skip that track.

NOTE 17

In the STEP SETTLE and HEAD LOAD SETTLE Tests a track is written with a uniform pattern and the head is then stepped away, or is unloaded. Then at index the head is stepped back to the track, or is loaded. The amplitude of the head signal is sampled at intervals of 0.5 mS. and the values are saved. Then on a subsequent revolution samples are taken at the same times with respect to index. The two sets of samples are compared. The sample time at which all subsequent samples taken during settling differ from the corresponding samples taken after settling by no more than *X* percent is the Settling Time, and *X* is the value in this byte. The value used is generally a percentage difference of 5 to 20 percent.

NOTE 18

These values are the allowable percentage difference of the time of changing of the Track 00 Sensor as compared to a time of change that is half way between the two tracks. Positive and negative values are allowed and are,entered as 8-bit 2's-complement numbers. Negative numbers are calculated by subtracting the magnitude of the number from 256 and converting to hex. The range is +/- 99%.

NOTE ***19***

This function is used in conjunction with the Multiplexer and controls whether the Multiplexer stops after a pass of all the activated ports or not. If set to 00H, the Multiplexer will continuously advance to the next port (after the highest port is finished, the lowest port will start again). If set to 01H, the Multiplexer will stop after the highest activated port is complete.

NOTE 20

This parameter is used to preset the UART controls for PARITY, NUMBER OF BITS, and BAUD RATE. The construction of the byte is as follows:

Bits 7 6 5	FUNCTION
0 0 0	Even Parity.
0 0 1	Odd Parity.
0 1 0	Parity Bit = 0.
0 1 1	Parity Bit = 1.
Bit 4	If 0, do 7 DATA BITS. If 1, do 8 DATA BITS.
Bits 3 2 1 0	
0 1 0 0	300 BAUD
0 1 1 0	1200 BAUD
1 0 1 1	9600 BAUD
1 1 0 0	19200 BAUD

NOTE 21

This parameter is used to select the width of the target Head when using the INTELLIGENT SERIES Alignment Diskettes. Because the Tester presents the results in uM., it is necessary to know the target Head width to accurately present offtrack values. The value in this parameter is *one half* of the target Head width (plus/minus from center) in *micrometers.*

NOTE 22

This function is used to preset the style of alignment to be used. A choice of three styles are available. When set to 1, the INTELLIGENT SERIES is active, requiring the INTELLIGENT SERIES diskettes to be used for STATIC TRACK ALIGN, OPTALIGN, and AZIMUTH measurements. When set to 0, the *cateye* measuring method is active, requiring a *traditional cateye* type diskette. When set t to 2, the *SONY ED cateye* is active, requiring the Sony Model RZW 406D alignment diskette. Some Tests in the AUTO ALIGN sequence, such as WINDOW MARGIN, ASYMMETRY, and AMPLITUDE do not produce meaningful results when in either of the *cateye* modes and must be considered. The background CONVERT - KEY C is used to correlate between diskette styles as follows.

INTELLIGENT SERIES - Begin in this mode and CONVERT to *traditional cateye* mode.

TRADITIONAL CATEYE - Begin in this mode and CONVERT to INTELLIGENT SERIES mode.

SONY ED CATEYE - Begin in this mode and CONVERT to INTELLIGENT SERIES mode.

NOTE 23

These functions are used to control the conditions of the graphics output when performing WINDOW MARGIN or ASYMMETRY Tests. The graphic output provides measurement distribution for each Head.

The Parameter GRAPH OUT BY TOTAL SAMPLES is used to cause the graph to output after a certain number of total samples have accrued. The range of setting is from 1-255. If set to 1, the graph outputs after each WINDOW MARGIN or ASYMMETRY Test. If set to 255, the graph outputs after 255 Tests have been performed.

The Parameter GRAPH OUT BY INDIVIDUAL SAMPLE is used to cause the graph to output after a certain number repeating measurement values have accrued. The range of setting is from 1-255. If set to 1, the graph outputs after each WINDOW MARGIN or ASYMMETRY Test. If set to 255, the graph outputs after 255 of the same value has accrued or the Parameter GRAPH OUT BY TOTAL SAMPLES is reached, whichever occurs first.

The Parameter GRAPH ON/OFF controls whether the graph is printed. If set to 0, the graph is OFF. If set to 1, the graph is ON. If it is desired to produce the graph without the individual sample values, set the GRAPH ON/OFF parameter to 1 and use the PRINT ON/OFF function (Key B) to turn the printer Off during the measurements. In this manner, the individual measurements are not printed while outputting the graph after each accumulation.

If the Parameters GRAPH OUT BY TOTAL SAMPLES and GRAPH OUT BY INDIVIDUAL SAMPLE are set to 0, the graph is output after 256 Tests have been performed.

This capability is invoked only when the Parameter STOP AFTER ONE PASS is OFF.

NOTE 24

There are individual pass/fail limits for ALIGNMENT, OPTALIGN, and AZIMUTH measurements for both *cateye* and INTELLIGENT SERIES diskettes. Because they present measurement information in different terms, caution must be exercised when setting these limits.

ALIGNMENT HIGH/OPTALIGN HIGH - When in the INTELLIGENT SERIES Mode, alignment error information is in *micrometers.* When in the *cateye* Mode, alignment error information is in *percentage.*

AZIMUTH - When in the INTELLIGENT SERIES Mode, Azimuth error information is presented in *minutes.* When in the *cateye* Mode, the information is presented in *burst ratio.* When in the *Sony RZW406D* Mode, Azimuth error information is presented in *minutes.*

The Tester selects the pass/fail limit based on the current Mode of the Tester. This includes the ALIGN MODE Parameter and the state of the CHANGE ALIGN TYPE function in the AUXILIARY Row.

NOTE 25

This byte controls both the number of times it may be performed during AUTO ALIGN and the method of MULTITRACK Testing.

The upper half byte is used to control the number of times performed during AUTO ALIGN. The range of setting is 0-15. Caution should be observed to consider the Parameter NUMBER OF OPTALIGN/HYSTERESIS TESTS. These are mutually exclusive Tests and each will independently decrement the meter. For inspection environments, it is usually only required to perform MULTI-TRACK ALIGN or OPTALIGN/HYSTERESIS, but not both. Multitrack Testing provides more information. Single Track Testing uses a less expensive diskette.

HEX VALUE	FUNCTION
0-F	If **0**, skip the Test. Any other value is the number of times.

The lower half byte is constructed to provide control of the method of testing as follows.

HEX VALUE	FUNCTION
0	Perform in BOTH directions
1	Perform FROM **IN** direction only
2	Perform FROM **OUT** direction only
3	Perform in BOTH directions
4-F	R E S E R V E D

BRIKON MODEL 723-4M/QT - TABLES 00-09 - VERSION# 4123 1122 2025 2026 1309

PARAMETER	--DRIVE CONFIGURATION--									
	TB00	TB01	TB02	TB03	TB04	TB05	TB06	TB07	TB08	TB09
NUMBER OF HEADS	2	2	2	2	2	2	2	2	2	2
NUMBER OF TRACKS	80	40	80	80	80	80	80	80	80	80
DRIVE TYPE	85H	21H	21H	00H	23H	33H	12H	43H	54H	86H
NOMINAL STEP RATE	3.0	6.0	3.0	3.0	3.0	3.0	6.0	3.0	3.0	3.0
MAXIMUM STEP RATE	4.0	7.0	4.0	4.0	4.0	4.0	7.0	4.0	4.0	4.0
MINIMUM STEP RATE	3.0	6.0	3.0	3.0	3.0	3.0	6.0	3.0	3.0	3.0
DRIVE SELECT	03H	03H	03H	03H	03H	03H	03H	03H	03H	03H
TEST CONTROL BYTE	50H	50H	50H	50H	50H	50H	50H	50H	50H	50H
POWER CONTROL	03H	03H	03H	03H	03H	03H	03H	03H	03H	03H
MUX CONTROL	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H
PRINTER OUTPUT CONTROL	0FH	0FH	0FH	0FH	0FH	0FH	0FH	0FH	0FH	0FH
CONFIGURATION BYTE	43H	83H	83H	03H	83H	03H	23H	43H	03H	43H
ALIGN MODE	01H	01H	01H	01H	01H	01H	01H	01H	00H	00H
MEDIA MODEL	00/CAT	01/CAT	02/CAT	03/CAT	04/CAT	05/CAT	14/CAT	07/CAT	CAT	CAT
	--SYSTEM TESTS--									
# OF INDEX TESTS	13H	13H	13H	13H	13H	13H	13H	13H	13H	13H
# OF WINDOW MARGIN TESTS	33H	33H	33H	33H	33H	33H	33H	33H	03H	03H
# OF ASYMMETRY TESTS	33H	33H	33H	33H	33H	33H	33H	33H	03H	03H
# OF WRITE/READ TESTS	01H	01H	01H	01H	01H	01H	01H	01H	01H	01H
# OF STEP TESTS	01H	01H	01H	01H	01H	01H	01H	01H	01H	01H
# OF READ TESTS	01H	01H	01H	01H	01H	01H	01H	01H	01H	01H
INDEX PERIOD LOW	82.5	195.0	195.0	162.5	195.0	195.0	97.5	195.0	328.3	82.5
INDEX PERIOD HIGH	84.5	205.0	205.0	170.9	205.0	205.0	102.5	205.0	338.1	84.5
INDEX PULSE WIDTH LOW	0.1	1.0	1.0	1.0	0.1	0.1	0.1	0.1	0.1	0.1
INDEX PULSE WIDTH HIGH	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	15.0	8.0
DATA MARGIN LOW	300	500	500	250	500	250	250	200	250	300
CLOCK MARGIN LOW	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH
ASYMMETRY HIGH	120	600	600	300	600	300	300	200	250	120
W/R SUBTEST CONTROL	C0H	C0H	C0H	C0H	C0H	C0H	C0H	C0H	C0H	C0H
READ RETRIES + 1	2	2	2	2	2	2	2	2	2	2
	--ALIGNMENT TESTS--									
# OF ECCENTRICITY TESTS	10H	10H	10H	10H	10H	10H	10H	10H	00H	00H
# OF OPTALIGN HYSTERESIS TESTS	30H	30H	30H	30H	30H	30H	30H	30H	30H	30H
# OF INDEX TO DATA TESTS	20H	20H	20H	20H	20H	20H	20H	20H	20H	20H
# OF AZIMUTH TESTS	10H	10H	10H	10H	10H	10H	10H	10H	10H	10H
# OF RESOLUTION TESTS	10H	10H	10H	10H	10H	10H	10H	10H	00H	00H
# OF STEP SETTLE TIME TESTS	10H	10H	10H	10H	10H	10H	10H	10H	10H	10H
# OF HEAD LOAD SETTLE TESTS	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H
# OF TRACK 00 SENSOR TESTS	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H
# HEAD AMPLITUDE TESTS	10H	10H	10H	10H	10H	10H	10H	10H	00H	00H
ECCENTRICITY TRACK	10	10	10	10	10	10	10	10	10	10
ALIGNMENT TRACK	32	16	32	32	40	40	40	40	32	40
OPTALIGN OFFSET TRACKS	5	5	5	5	5	5	5	5	5	5
AZIMUTH TRACK	68	34	68	68	40	40	40	40	68	40
RESOLUTION TRACK FOR 1F	64	32	64	64	75	75	75	75	64	75
RESOLUTION TRACK FOR 2F	64	32	64	64	75	75	75	75	64	75
HEAD SETTLE TRACK	64	32	64	64	75	75	75	75	64	75
INDEX TO DATA TRACK A	2	1	2	2	2	2	2	2	2	2
INDEX TO DATA TRACK B	32	16	32	32	40	40	40	40	FFH	40
INDEX TO DATA TRACK C	68	34	68	68	69	69	69	69	68	69
INDEX TO DATA HIGH	300	300	300	300	900	900	900	900	600	300
INDEX TO DATA LOW	100	100	100	100	50	50	50	50	200	50
AZIMUTH HIGH - INTELLIGENT	9	12	18	18	30	21	30	9	18	9
RESOLUTION LOW	60	60	60	60	60	60	60	55	55	60
STEP SETTLE HIGH	20	20	20	20	20	20	20	20	20	18
HEAD LOAD HIGH	60	40	40	40	60	60	60	60	60	60
STEP SETTLE THRESHOLD	20	20	20	20	20	20	20	20	20	20
AMPLITUDE LOW	100	150	150	150	150	100	100	100	150	100
MOTOR START HIGH	750	500	500	500	500	500	500	500	500	750
ECCENTRICITY HIGH	20	20	20	20	20	20	20	20	20	20
COMPLIANCE HIGH	20	20	20	20	20	20	20	20	20	20
ALIGNMENT HIGH - INTELLIGENT	11	42	21	21	17	17	17	17	21	09
TRK 00 FROM TRACK	3	2	2	2	1	1	1	1	2	1
TRK 00 SENSOR LOW LIMIT	-85	-50	-50	-50	-50	-50	-50	-50	-50	-50
TRK 00 SENSOR HIGH LIMIT	+85	+50	+50	+50	+50	+50	+50	+50	+50	+50
OPTALIGN HIGH - INTELLIGENT	11	42	21	21	17	17	17	17	21	09
ERASE LIMIT	5	5	5	5	5	5	5	5	5	5
HEAD WIDTH/2	84	168	84	84	69	69	69	69	84	69
AZIMUTH HIGH CATEYE	100	100	100	100	100	100	100	100	100	100
ALIGNMENT HIGH CATEYE	10	25	25	25	25	25	25	25	25	10
OPTALIGN HIGH CATEYE	10	25	25	25	25	25	25	25	25	10
# MULTITRACK/CONTROL	02H	00H	00H	00H	00H	00H	00H	00H	00H	00H
RESERVED 2	0	0	0	0	0	0	0	0	0	0

--SINGLE FUNCTION PARAMETERS--

TEST TABLE AT POWER UP	16	ONE PASS MUX	0	UART PRESET	2BH	HUMIDITY PRESET 50
GRAPH BY TOTAL	255	GRAPH BY SAMPLE	255	GRAPH ON/OFF	01	

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PARAMETER	--DRIVE CONFIGURATION--									
	TB10	TB11	TB12	TB13	TB14	TB15	TB16	TB17	TB18	TB19
NUMBER OF HEADS	2	2	2	2	2	2	2	2	2	2
NUMBER OF TRACKS	40	80	80	80	80	80	80	80	80	80
DRIVE TYPE	12H	12H	00H	72H	12H	33H	62H	43H	07H	43H
NOMINAL STEP RATE	6.0	3.0	3.0	3.0	6.0	3.0	3.0	3.0	3.0	3.0
MAXIMUM STEP RATE	7.0	4.0	4.0	4.0	7.0	4.0	4.0	4.0	4.0	4.0
MINIMUM STEP RATE	6.0	3.0	3.0	3.0	6.0	3.0	3.0	3.0	3.0	3.0
DRIVE SELECT	03H	03H	03H	03H	03H	03H	03H	03H	03H	03H
TEST CONTROL BYTE	50H	50H	50H	50H	50H	50H	50H	50H	50H	50H
POWER CONTROL	03H	03H	03H	03H	03H	03H	03H	03H	03H	03H
MUX CONTROL	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H
PRINTER OUTPUT CONTROL	0FH	0FH	0FH	0FH	0FH	0FH	0FH	0FH	0FH	0FH
CONFIGURATION BYTE	03H	03H	03H	C3H	23H	03H	43H	43H	03H	43H
ALIGN MODE	01H	01H	01H	01H	01H	01H	01H	01H	01H	02H
MEDIA MODEL	10/CAT	11/CAT	03/CAT	13/CAT	14/CAT	05/CAT	16/CAT	07/CAT	17/CAT	SONY/07
	--SYSTEM TESTS--									
# OF INDEX TESTS	13H	13H	13H	13H	13H	13H	13H	13H	13H	13H
# OF WINDOW MARGIN TESTS	33H	33H	33H	33H	33H	33H	33H	33H	33H	03H
# OF ASYMMETRY TESTS	33H	33H	33H	33H	33H	33H	33H	33H	33H	03H
# OF WRITE/READ TESTS	01H	01H	01H	01H	01H	01H	01H	01H	01H	01H
# OF STEP TESTS	01H	01H	01H	01H	01H	01H	01H	01H	01H	01H
# OF READ TESTS	01H	01H	01H	01H	01H	01H	01H	01H	01H	01H
INDEX PERIOD LOW	99.0	99.0	164.5	99.0	99.0	198.0	99.0	198.0	162.5	195.0
INDEX PERIOD HIGH	101.0	101.0	168.2	101.0	101.0	202.0	101.0	202.0	170.9	205.0
INDEX PULSE WIDTH LOW	0.1	0.1	1.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
INDEX PULSE WIDTH HIGH	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
DATA MARGIN LOW	500	500	250	350	500	250	200	200	250	200
CLOCK MARGIN LOW	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH	FFFFH
ASYMMETRY HIGH	160	160	160	140	160	160	120	120	300	200
W/R SUBTEST CONTROL	C0H	C0H	C0H	C0H	C0H	C0H	C0H	C0H	C0H	C0H
READ RETRIES + 1	2	2	2	2	2	2	2	2	2	2
	--ALIGNMENT TESTS--									
# OF ECCENTRICITY TESTS	10H	10H	10H	10H	10H	10H	10H	10H	10H	00H
# OF OPTALIGN HYSTERESIS TESTS	30H	30H	30H	30H	30H	30H	30H	30H	30H	30H
# OF INDEX TO DATA TESTS	20H	20H	20H	20H	20H	20H	20H	20H	20H	00H
# OF AZIMUTH TESTS	10H	10H	10H	10H	10H	10H	10H	10H	10H	10H
# OF RESOLUTION TESTS	10H	10H	10H	10H	10H	10H	10H	10H	10H	00H
# OF STEP SETTLE TIME TESTS	10H	10H	10H	10H	10H	10H	10H	10H	10H	00H
# OF HEAD LOAD SETTLE TESTS	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H
# OF TRACK 00 SENSOR TESTS	00H	00H	00H	00H	00H	00H	00H	00H	00H	00H
# HEAD AMPLITUDE TESTS	10H	10H	10H	10H	10H	10H	10H	10H	10H	00H
ECCENTRICITY TRACK	10	10	10	10	10	10	10	10	10	10
ALIGNMENT TRACK	16	32	32	32	40	40	40	40	40	40
OPTALIGN OFFSET TRACKS	5	5	5	5	5	5	5	5	5	5
AZIMUTH TRACK	34	68	68	68	40	40	40	40	40	40
RESOLUTION TRACK FOR 1F	32	64	64	64	75	75	75	75	75	75
RESOLUTION TRACK FOR 2F	32	64	64	64	75	75	75	75	75	75
HEAD SETTLE TRACK	32	64	64	64	75	75	75	75	75	75
INDEX TO DATA TRACK A	1	2	2	2	2	2	2	2	2	FFH
INDEX TO DATA TRACK B	16	32	32	32	40	40	40	40	40	FFH
INDEX TO DATA TRACK C	34	68	68	68	69	69	69	69	69	FFH
INDEX TO DATA HIGH	300	300	300	300	900	900	900	900	900	900
INDEX TO DATA LOW	100	100	100	100	50	50	50	50	50	50
AZIMUTH HIGH - INTELLIGENT	12	18	18	18	30	21	9	9	21	9
RESOLUTION LOW	60	60	60	60	60	60	60	55	55	55
STEP SETTLE HIGH	21	18	18	18	18	18	21	20	20	20
HEAD LOAD HIGH	60	60	60	60	60	60	60	60	60	60
STEP SETTLE THRESHOLD	20	20	20	20	20	20	20	20	20	20
AMPLITUDE LOW	100	100	100	100	100	100	75	75	100	100
MOTOR START HIGH	750	750	500	750	750	500	750	500	500	500
ECCENTRICITY HIGH	20	20	20	20	20	20	20	20	20	20
COMPLIANCE HIGH	20	20	20	20	20	20	20	20	20	20
ALIGNMENT HIGH - INTELLIGENT	21	11	11	11	09	09	09	09	17	15
TRK 00 FROM TRACK	2	2	2	2	1	1	1	1	1	1
TRK 00 SENSOR LOW LIMIT	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
TRK 00 SENSOR HIGH LIMIT	+50	+50	+50	+50	+50	+50	+50	+50	+50	+50
OPTALIGN HIGH - INTELLIGENT	21	11	11	11	09	09	09	09	17	15
ERASE LIMIT	5	5	5	5	5	5	5	5	5	5
HEAD WIDTH/2	168	84	84	84	69	69	69	69	69	58
AZIMUTH HIGH CATEYE	100	100	100	100	100	100	100	100	100	9
ALIGNMENT HIGH CATEYE	10	10	10	10	10	10	10	10	25	25
OPTALIGN HIGH CATEYE	10	10	10	10	10	10	10	10	25	25
# MULTITRACK/CONTROL	02H	02H	02H	02H	02H	02H	02H	00H	00H	00H
RESERVED 2	0	0	0	0	0	0	0	0	0	0

BRIAN
INSTRUMENTS

OPTION R

ANALOG/ALIGNMENT ATTACHMENT

(SINGLE/DUAL CHANNEL)

WITH INTELLIGENT SERIES/CATEYE ALIGNMENT SUPPORT

OPERATION AND USE

1 FEBRUARY 1993

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INTELLIGENT SERIES ALIGNMENT DISKETTES

INTRODUCTION

The INTELLIGENT SERIES precision analog alignment diskettes offered by BRIAN INSTRUMENTS are sub-micron position reference standards that are designed to be used with the Tester to significantly improve accuracy and repeatability compared to conventional *cateye* techniques as described on the following pages.

Because traditional *cateye* style analog diskettes are designed for viewing with an oscilloscope, what can be measured is restricted ana limited by the technique ana scope. Even when these diskettes are used with the BRIAN Testers, there are limiting factors of measurability such as effects due to media Modulation/Eccentricity and Humidity that are eliminated using, the INTELLIGENT SERIES. Because of the expanded measuring signals provided *by* the INTELLIGENT SERIES, the range of measurements is greatly enhanced with results provided in direct units of measurement *(micrometers, minutes of arc* and *microseconds),* eliminating cumbersome conversion charts and/or complicated formulas.

Alignment diskettes are created in controlled temperature/humidity environments. However, in the user environment humidity differences cause the alignment signals to move as the diskette expands/contracts due to increased/decreased moisture content. This error can be a noticeable percent of a Track width, negating the original precision of the diskette. For this reason, an ENTER HUMIDITY function is active, when used with the INTELLIGENT SERIES alignment diskette, that corrects for this error, maintaining the original precision of the diskette. The value for ENTER HUMIDITY is inserted in *%RH* which is easily determined via a conventional humidity gauge. In addition to this, the Tester also provides automatic correcting for errors due to Modulation/Eccentricity. In this manner, virtually all external error producing phenomena is eliminated, keeping the accuracy of the diskette constant throughout the life of the diskette.

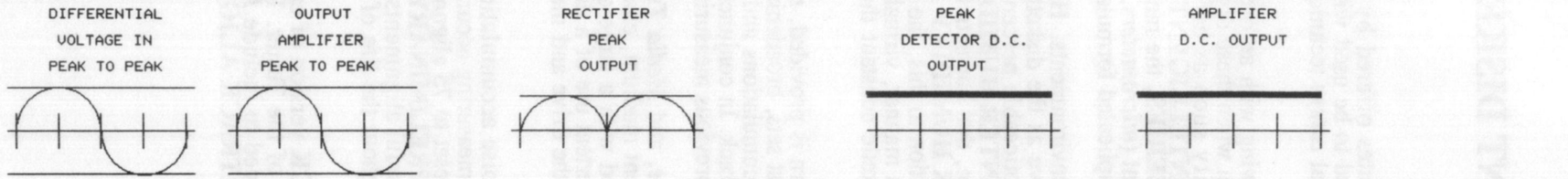
For *cateye* alignment diskettes, typically a single Azimuth burst pattern is provided, restricting the measuring range. The INTELLIGENT SERIES incorporates multiple burst sets, broadening the measurement range ana accuracy considerably. To minimize errors due to noise accumulations and effects of Modulation and Eccentricity, the multiple burst sets are repeated around the Track. In conjunction with the Tester, the measurement range and accuracy are improved significantly over previous measuring techniques.

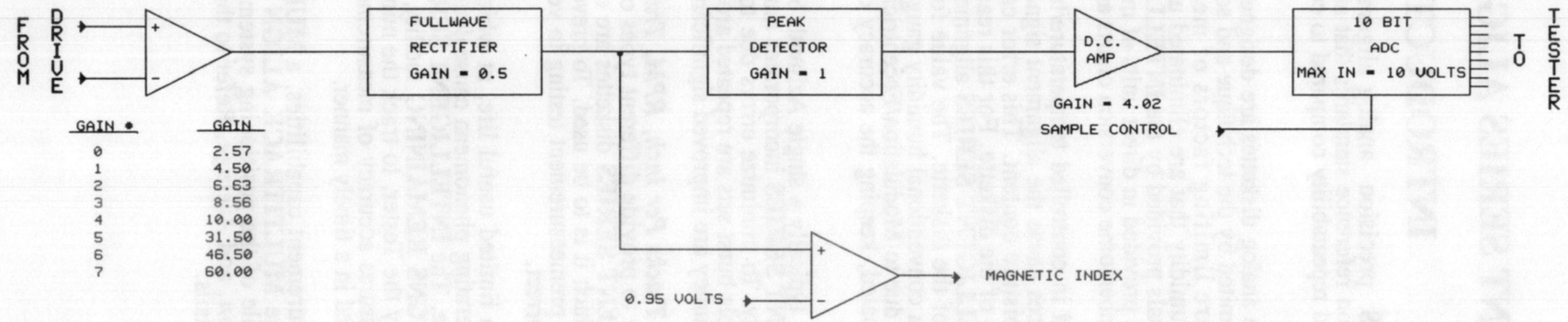
Drives are organized based on *Tracks Per Inch, RPM, Transfer Rate,* and *Media Type* (DD, HD, ED). For this reason, it is necessary to provide different types of alignment medium, characterized for each class of drive. All INTELLIGENT SERIES diskettes are color coded with a large colored dot to assist identifying the drive class in which it is to be used. To prevent inadvertent use of a diskette in the wrong drive class, the Tester provides pre measurement testing to verify that the drive and media match, producing an error message when incorrect.

All alignment diskettes have a limited useful life, at which time noise accumulations due to residual magnetism and other noise generating phenomena cause deteriorating measuring accuracies, distorting the original precision of the diskette. The INTELLIGENT SERIES is preset to 75 alignments and the Tester includes a NUMBER OF ALIGNS REMAINING facility, via the PRELIMINARY ALIGN function, that interrogates the diskette by the Tester, to track the number of useful alignments that are left on the diskette. This protect system assures accuracy of measurement throughout the life of the diskette and so that replacements may 6e ordered in a timely manner.

For even more advanced measurement capabilities, a MULTITRACK version of each diskette type is available and operates with the MULTITRACK ALIGN function of the Tester. Beyond the general alignment information, a profile of the positioning system is produced to include *Runout, Maximum Deviation/Linearity, Separation,* and *Average.* Refer to the MULTITRACK ALIGN TEST located in the ALIGN Row, Key E for details.

ANALOG RECEIVER
BLOCK DIAGRAM





GAIN #	GAIN
0	2.57
1	4.50
2	6.63
3	8.56
4	10.00
5	31.50
6	46.50
7	60.00

GAIN #	P-P INPUT VOLTS FOR MAG INDEX OUT
0	0.78
1	0.45
2	0.31
3	0.24
4	0.12
5	0.064
6	0.043
7	0.034

FIGURE 1

BRIAN INSTRUMENTS, INC.

ANALOG RECEIVER LAYOUT

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ABOUT THE ANALOG RECEIVER

The ANALOG RECEIVER is connected to the rear of the Tester through a 40 pin I/O cable. Included with the ANALOG RECEIVER are six colored probes that are connected to the drive under test for receiving analog and digital information (see FIGURE **1).** Two types of ANALOG RECEIVERS are available; single and dual channel. If equipped with the dual channel (OPTION R/D) receiver, the INDEX IN and INDEX OUT probes are replaced with a *YELLOW* twisted probe pair used for the additional analog channel. In this configuration, the switch under the receiver is used to select between single and dual channel operation. The dual channel analog capability is very useful in SOFTWARE DUPLICATION environments where the analog signals for each Head are separated and not switched on the drive logic. In these environments, the analog is switched by the Tester. The use of each of these probes is described as follows.

READ SIGNAL — These WHITE TWISTED PAIR probes are used to receive the analog signals from the drive. These probes are to be connected to the Analog Read Signal test points of the drive. The recommended connection is between the amplifier and the differentiator circuits. If the only connection available is after the differentiator, the RESOLUTION TEST will present unreliable readings. The gain of the incoming analog signals is under control of the Tester. In this manner a wide range of input signals can be accommodated (50 mV. to 1.8 Volts). These probes are used for all Tests in the ALIGN Row mat require sampling the analog signals from the media. For dual channel applications, an additional set or *YELLOW TWISTED PAIR* probes are provided to capture the signals for Head 1. The switch under the ANALOG RECEIVER is used to switch between single channel (drive switches analog) and dual channel (Tester switches analog) modes.

PHASE A — This RED probe is used for two Tests. During the PRELIMINARY TRACK ALIGN, this probe is used to monitor Phase A of the positioning motor. During this Test, this probe should be connected to the output driver for Phase A of the step motor. When making the PRELIMINARY TRACK ALIGN adjustment, this probe is used to assure that Phase A of the step motor is in coincidence when the Track 00 track of the alignment diskette is found. During this Test, the PHASE A indicator in the Status Row is used to monitor the activity of this signal. Most newer drives styles have automatic circuitry that forces this condition and may not require this connection. Please refer to the particular drive electronics for details. The other application for this probe is during the TRACK 00 SENSOR ADJUST. For this Test, the Red probe is connected to the Track 00 sensor before it is gated with Phase A of the step motor. In most cases, the probe can be connected directly to the sensor output. This adjustment is made so that the Track 00 sensor changes state prior to Phase A of the motor system being activated. Please refer to the drive schematics for the appropriate test point.

INDEX IN/OUT — This *BLUE* and *YELLOW* set of probes are used for Index to Data testing for certain classes of double sided 8 drives. These drives have circuitry that prevents the top head Index signal from the interface connector. In these cases, the probes are used to connect to the top head Index prior to entering this prevent logic (INDEX IN/BLUE) and the other probe (INDEX OUT/YELLOW) is used to connect to the Index signal on the interface connector. In this manner, both Index signals will be at the interface so that the top head Index to Data measurement may be made. A slide switch is provided on the bottom of the ANALOG RECEIVER to change the polarity of this signal in cases where the correct polarity (low true) cannot be found. For dual channel applications, these probes are replaced with an additional *YELLOW TWISTED PAIR* for connection to Head 1 analog signals. The switch under the ANALOG RECEIVER is now used to select between single and dual channel modes.

GROUND — This BLACK probe is used for attaching to logic ground. In most cases this probe is not required. Please refer to the drive schematics for grounding requirements.

INTRODUCTION

This option expands the utilization range of the Tester by providing the ability to test and measure the analog performance of the drive, including mechanical stability and alignment. OPTION R provides fully automatic time base, signal gain and peak detection filter controls, and are adjusted by the Tester for each Test. The cluster of tests and measurements provided with this option are:

PERFORMANCE	ALIGNMENT
ECCENTRICITY/COMPLIANCE	PRELIMINARY TRACK ALIGN
HEAD LOAD SETTLE	STATIC TRACK ALIGN
HEAD STEP SETTLE	OPTALIGN/HYSTERESIS
HEAD RESOLUTION	INDEX TO DATA
MOTOR START TIME	AZIMUTH
HEAD AMPLITUDE	TRACK 00 SENSOR ADJUST
SELF ERASE	MULTITRACK ALIGN
MODULATION	AUTO ALIGN

The analog tests and measurements incorporated are of two types; those that measure the analog performance of the critical components (i.e. AMPLITUDE, RESOLUTION) and those for mechanical adjustment. When using the INTELLIGENT SERIES alignment diskette, both types of measurements can be performed. When using traditional *cateye* alignment diskettes, only the mechanical adjustments can be performed, requiring a data diskette for analog performance testing, thereby slowing the process of measurement. The Tester is equipped to measure using either measuring technique as described below.

SWITCHING BETWEEN ALIGNMENT DISKETTE TYPES

The Tester supports the ability to test and measure both the *cateye* and INTELLIGENT SERIES alignment diskettes. The measurements that can be performed are STATIC TRACK ALIGN, OPTALIGN/HYSTERESIS, and AZIMUTH. All other Tests operate in the same manner regardless of the diskette. The Tester includes a Modifiable Parameter named ALIGN MODE and is included for each TEST TABLE, and is also available via the RAM function. Refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS for the appropriate memory locations. When set to 00 HEX, the Tester begins these Tests in the *cateye* mode. If set to 01 HEX, the Tester begins these Tests in the INTELLIGENT SERIES mode. When set to 02 HEX, the Tests begin in the Sony Model RZW406D Mode.

The Tester includes the STATUS Row function INTELLIGENT SERIES ON. When ON, measurements are made in the INTELLIGENT SERIES Mode. When OFF, measurements are made in the *cateye* Mode.

For added convenience and simplified distribution/correlation, the Tester can also switch between the INTELLIGENT SERIES and *cateye* diskettes while these Tests are operating. Depress Key C while either STATIC TRACK ALIGN, OPTALIGN/HYSTERESIS, or AZIMUTH are operating and the Tester switches between the current Mode to the other Modes as follows. *Please note that the ALIGN MODE must match the diskette type being measured to get accurate results.*

INTELLIGENT SERIES - Begin in this mode and CONVERT to *traditional cateye* mode.

TRADITIONAL CATEYE - Begin in this mode and CONVERT to INTELLIGENT SERIES mode.

SONY ED CATEYE - Begin in this mode and CONVERT to INTELLIGENT SERIES mode.

As noted above, the Tester also measures the *Sony Model RZW406D* ED Media alignment diskette when the ALIGN MODE Parameter is set to 02 HEX and is to be used with 4MB drives supporting ED Media. For this diskette, alignment information is presented in % and Azimuth is presented in *minutes.* When in this Mode, Key C switches between this diskette and the INTELLIGENT SERIES, so that distribution/correlation capabilities are sustained.

Because many Tests performed in this Row are associated with operator adjustments, the Printer is preset to the OFF position. In this manner, Display information is updated at the fastest rate for most convenience during adjustments. The final measurement is printed when the operator exits a Test. If continuous printing is desired, depress PRINT ON/OFF (Key B) once the Test starts.

FEATURE/BENEFIT

FEATURE	BENEFIT
AUTO CORRECTION	This feature allows the Tester to concurrently measure and correct for the effects of Modulation/Eccentricity while performing alignment measurements, significantly increasing accuracy by correcting for these external phenomena.
HUMIDITY CORRECTION	Maintains the original precision of the diskette due to humidity changes of the measuring environment.
MULTIPLE AZIMUTH	Significantly extends the range and accuracy of measurement. The information is presented directly in minutes and updated every revolution of the diskette.
BOTH HEADS	The Tester interrogates and presents the alignment information for both heads, providing the head separation information concurrently for Track Align, Azimuth and Index to Data. This is beyond the ability of scope/exerciser capabilities.
DIRECTORY	In conjunction with the Tester, using the diskette beyond the accurate life of the diskette is avoided, improving overall accuracy.
DIRECT MEASUREMENTS	The units of measurement are direct and absolute (Track Align in *micrometers*, Azimuth angle in *minutes* and Index to Data in *microseconds).*

SPECIFICATIONS

TRACK ALIGNMENT

STYLE: MULTIPLE PULSE - NON ECCENTRIC

ACCURACY:
5 1/4" = +/- 5uM
3 1/2" = +/- 3uM

REPEATABILITY: +/- 1uM

HUMIDITY CORRECTION: IN 1% INCREMENTS (VIA TESTER)

CORRELATION ENVIRONMENT: HUMIDITY: 50% RH, +/- 2% . TEMPERATURE: 70° F, +/- 2°

NUMBER OF SAMPLES (PER REVOLUTION)

TYPE	RPM	SAMPLES
5 1/4"	300	162
5 1/4"	360	156
5 1/4"	600	120
5 1/4"	180	162
3 1/2"	300	156
3 1/2"	360	156
3 1/2"	600	120
3 1/2"	VAR	138

TRACKS:

DRIVE TYPE	SINGLE TRACK	MULTI TRACK
5 1/4", 48TPI	16	5,12,16,21,26,30,37
5 1/4", 96TPI	32	6,12,20,26,32,40,48,54,60,66,72,76
3 1/2", 135TPI	40	5,12,19,26,33,40,47,54,61,68,77

AZIMUTH ANGLE

PATTERN STYLE: TRIPLE ANGLE SET

SENSE ACCURACY: +/- 2'

REPEATABILITY: +/- 0.1'

SETS PER GROUP: 2

GROUPS PER TRACK, SENSE RANGE, AND TEST TRACK

TYPE	RPM	TPI	DATA RATE	SAMPLES	RANGE	TRACK
5 1/4"	300	48	250 KBS	126	29'	34
5 1/4"	600	48	500 KBS	108	29'	34
5 1/4"	300	96	250 KBS	126	35'	68
5 1/4"	360	96	500 KBS	126	27'	68
5 1/4"	600	96	500 KBS	108	26'	68
5 1/4"	720	96	1000 KBS	156	21'	68
5 1/4"	180	96	500 KBS	132	26'	68
3 1/2"	300	135	250 KBS	156	46'	40
3 1/2"	300	135	500 KBS	156	30'	40
3 1/2"	360	135	500 KBS	156	46'	40
3 1/2"	600	135	500 KBS	120	45'	40
3 1/2"	VAR	135	500 KBS	138	45'	40
3 1/2"	300	135	1000 KBS	156	26'	40
3 1/2"	600	135	1000 KBS	120	29'	40

INDEX TO DATA

PATTERN STYLE: LOW FREQUENCY BURST

BURSTS PER SURFACE: 3

MEASURING RANGE: 0 uS TO +999 uS

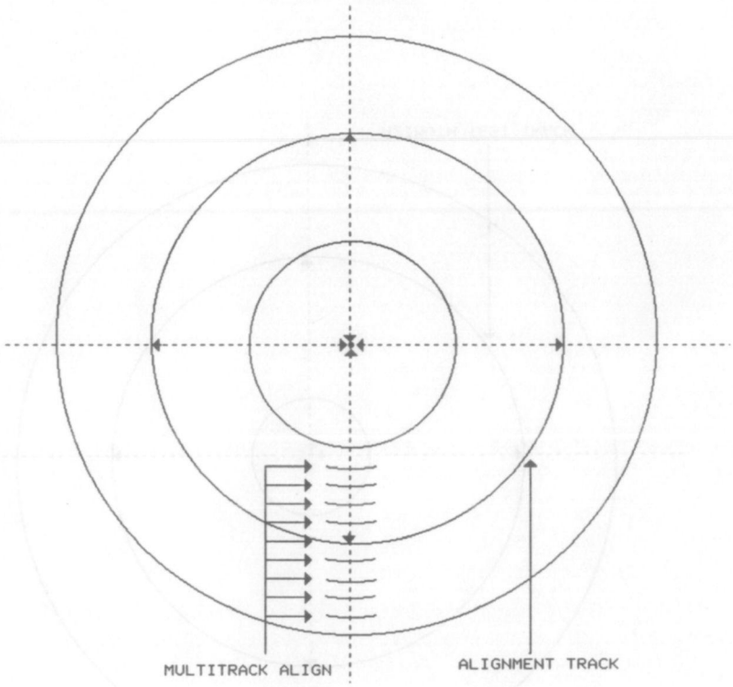
ACCURACY: +/- 50 uS

REPEATABILITY: +/- 1 uS

PATTERN LOCATION:
5 1/4", 48 TPI = TRACKS 1, 16 AND 34
5 1/4", 96 TPI = TRACKS 2, 32 AND 68
3 1/2", 135 TPI = TRACKS 2, 40 AND 69

TRACK ALIGN/OPTALIGN INFORMATION

MEDIA LAYOUT



EXAMPLE TESTER DISPLAY READINGS

POOR ALIGNMENT

CORRECT ALIGNMENT BALANCE
TYPICAL HEAD SEPARATION
TOTAL = 6 uM

CORRECT ALIGNMENT BALANCE
EXCESSIVE HEAD SEPARATION
TOTAL = 54 uM

SPECIFICATIONS

TRACK LOCATIONS:

DRIVE STYLE	SINGLE TRACK	MULTITRACK
5 1/4" - 48 TPI	16	5,12,16,21,26,30,37
5 1/4" - 96 TPI	32	6,12,20,26,32,40,48,54,60,66,72,76
3 1/2"- 135 TPI	40	5,12,19,26,33,40,47,54,61,68,77

SAMPLES PER REVOLUTION:
5 1/4", 300 RPM = 162
5 1/4", 360 RPM = 156
5 1/4", 600 RPM = 120
3 1/2", 300 RPM = 156
3 1/2", 360 RPM = 156
3 1/2", 600 RPM = 120
3 1/2", VARIABLE= 138

ACCURACY: 5 1/4" = +/- 5uM
3 1/2" = +/- 3uM
REPEATABILITY: +/- 1uM
DISPLAY READINGS: IN 1uM INCREMENTS
HUMIDITY CORRECTION: IN 1% INCREMENTS

FIGURE 2

BRIAN INSTRUMENTS, INC.

TRACK ALIGN/OPTALIGN

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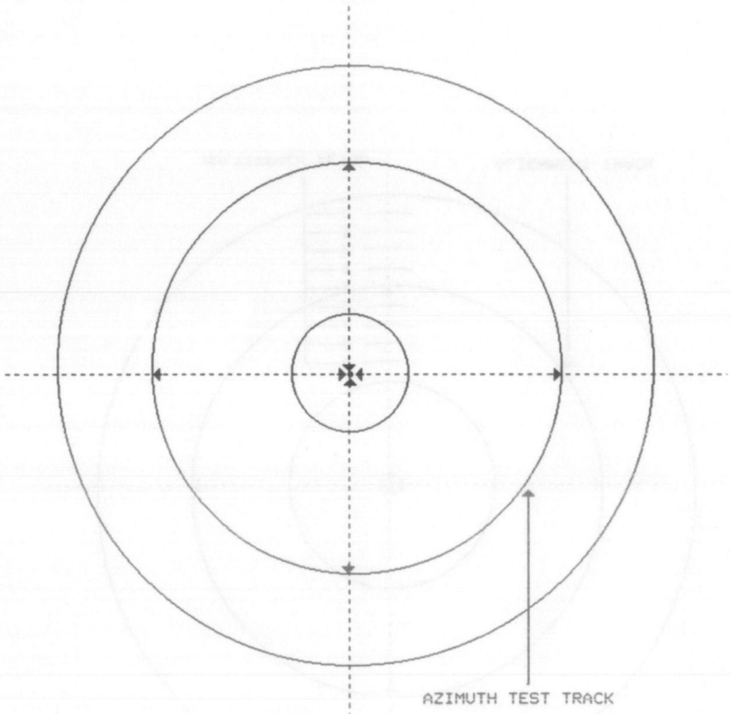
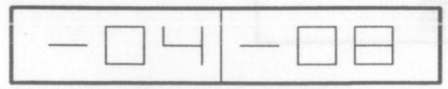
AZIMUTH INFORMATION

MEDIA LAYOUT



EXAMPLE TESTER DISPLY READINGS

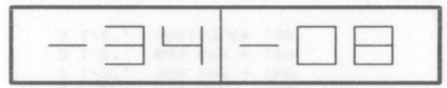


NORMAL
AZIMUTH ERROR

VALUES DIRECTLY IN MINUTES OF ARC ERROR

MINUS VALUES ARE COUNTERCLOCKWISE

PLUS VALUES ARE CLOCKWISE



EXCESSIVE
AZIMUTH ERROR

SPECIFICATIONS

AZIMUTH STYLE:	TRIPLE ANGLE SET
SETS PER GROUP:	2
GROUPS/SAMPLES PER TRACK:	5 1/4", 300 RPM = 63/126
	5 1/4", 360 RPM = 63/126
	5 1/4", 600 RPM = 54/108
	3 1/2", 300 RPM = 78/156
	3 1/2", 360 RPM = 78/156
	3 1/2", 600 RPM = 60/120
	3 1/2", VARIABLE = 69/138

SENSE RANGE: DRIVE STYLE/DATA RATE (KBS)	RANGE
5 1/4", 300 RPM, 48 TPI/250	29'
5 1/4", 600 RPM, 48 TPI/500	29'
5 1/4", 300 RPM, 96 TPI/250	35'
5 1/4", 360 RPM, 96 TPI/500	27'
5 1/4", 600 RPM, 96 TPI/500	26'
3 1/2", 300 RPM, 135 TPI/250	46'
3 1/2", 300 RPM, 135 TPI/500	30'
3 1/2", 360 RPM, 135 TPI/500	46'
3 1/2", 600 RPM, 135 TPI/500	45'
3 1/2", VARIABLE, 135 TPI/500	45'
3 1/2", 300 RPM, 135 TPI/1000	26'
3 1/2", 600 RPM, 135 TPI/1000	29'

DISPLAY READING:	IN 0.1 MINUTE INCREMENTS
SENSE ACCURACY:	+/- 2 MINUTES
REPEATABILITY:	+/- 1 MINUTE
TRACK LOCATIONS:	5 1/4", 48 TPI = 34
	5 1/4", 96 TPI = 68
	3 1/2", 135 TPI = 40

BRIAN INSTRUMENTS, INC.

AZIMUTH

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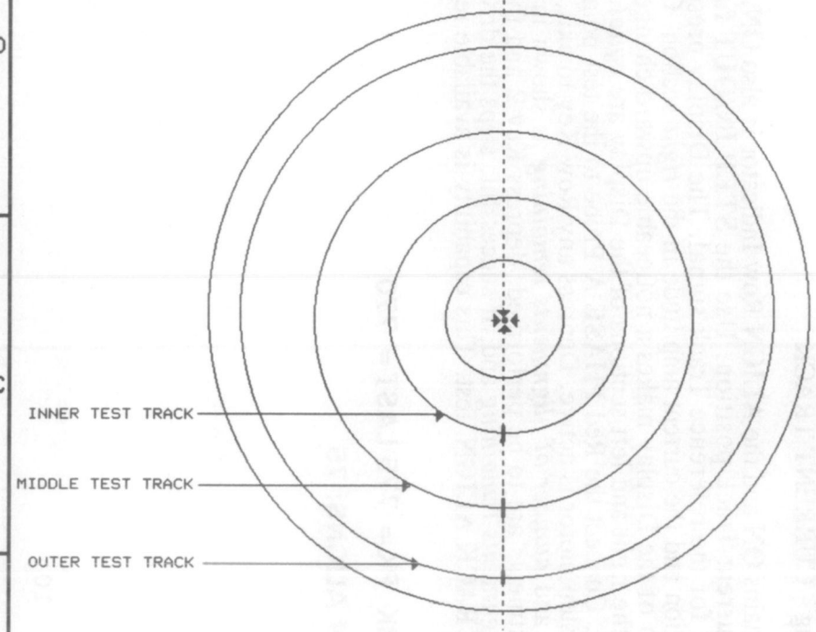
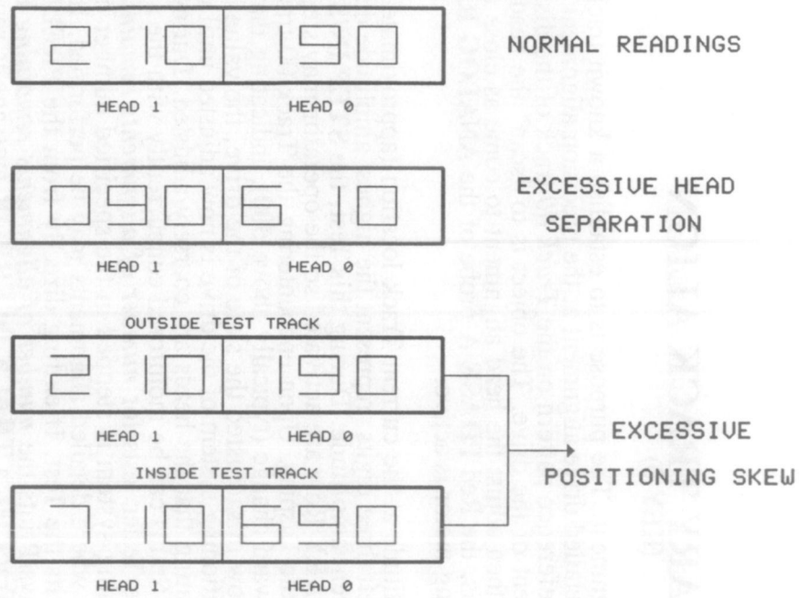
FIGURE 3

INDEX TO DATA INFORMATION

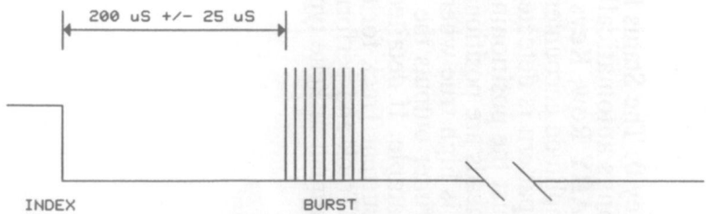
MEDIA LAYOUT



EXAMPLE TESTER DISPLAY READINGS



TIMING



SPECIFICATIONS

NUMBER OF BURSTS:	3 PER HEAD
LOCATION FROM INDEX:	200 MICROSECONDS
ACCURACY:	+/- 50 MICROSECONDS
REPEATABILITY:	+/- 1 MICROSECOND
TRACK LOCATIONS:	5 1/4", 48 TPI = 1/16/34 5 1/4", 96 TPI = 2/32/68 3 1/2", 135 TPI = 2/40/69

FIGURE 4

BRIAN INSTRUMENTS, INC.

INDEX TO DATA

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PRELIMINARY TRACK ALIGN

(KEY 0)

This function is used during initial head alignment. The purpose is to establish a known track reference and step motor phasing prior to making the detailed drive alignment at the precision alignment Track (See FIGURE 5). The alignment diskette has a reference pattern on the *Track 00* track of the diskette. This pattern is used to establish the coarse alignment of the drive. The object is to "scan" the head across the Track to find the maximum amplitude, and then adjust the head alignment to come as close to the peak amplitude as possible. In conjunction with this, the Red PHASE A probe of the ANALOG RECEIVER is used to verify that *Phase A* of the positioning motor is active.

The Tester begins by reading the signal amplitude at the current Track location (approximately Track 3) and the Display presents two readings. The left three digits represent the highest amplitude detected thus far. The right three digits represent the current amplitude. During this Test, the STEP IN/STEP OUT (Keys 0/1) functions located in the AUXILIARY Row are activated so the operator may step the heads toward the Track 00 track while monitoring the Display. Upon encountering the Track 00 track, the left section of the Display makes a noticeable upward change (typically above 500), indicating that the reference Track has been found. Depending on now misadjusted the state of the drive, the value in the right section of the Display may be lower. The positioning system of the drive is now adjusted until the left and right sections of the Display are equal, indicating that the heads are coarsely adjusted. During this Test, the STATUS Row is active so that Interface Status can be monitored concurrently with the adjustment. The operator may now depress Key 2 and the Tester tests for *number of alignments remaining.* If successful (Heads are on Track 00) the positioning system is stepped in the specified number or tracks to perform the STATIC TRACK ALIGN Test, where detailed alignments may be performed. If not, or at the conclusion, depressing any Row Key exits the Test. If exiting directly from the PRELIMINARY ALIGN Test, the Tester automatically Displays/Prints the *number of alignments remaining* if Track 00 has been achieved. If the Heads are not on Track 00. a TRACK 00 ERROR message is reported. The above procedure may be performed using a *cateye* diskette, except the *number of aligns remaining* is not performed.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key 0. The Status Row Indicator remains ON and the ALIGN Row Indicator is also ON. Amplitude readings automatically begin at the current Track position. Use the STEP IN/OUT functions (AUXILIARY Row, Keys 0/1) to "search" for the reference Track signal. The Display presents the highest amplitude encountered in the *left* section and the current amplitude in the *right* section. Once the reference pattern is detected, the left section of the Display makes a noticeable upward change (above 500). Adjust the positioning system so that the right and left sections of the Display are *equal.* At this point the heads are positioned over *Track 00.* Connect the Red PHASE A Probe to the test point on the drive that is high true when Phase A of the step motor is active. Depress any Row Key to exit, and the Display/Printer outputs the final information and *number of alignments remaining* as shown in the following example. If detailed alignment adjustments are to be performed, depress Key 2 and the Tester reads the current Track for the *number of alignments remaining* and, if successful, steps the drive to the alignment Track and performs the STATIC TRACK ALIGN Test. This capability is available regardless of the alignment diskette type being used.

P PRELIM TRK PK= 775 LAST= 770

 # ALIGNS: 75

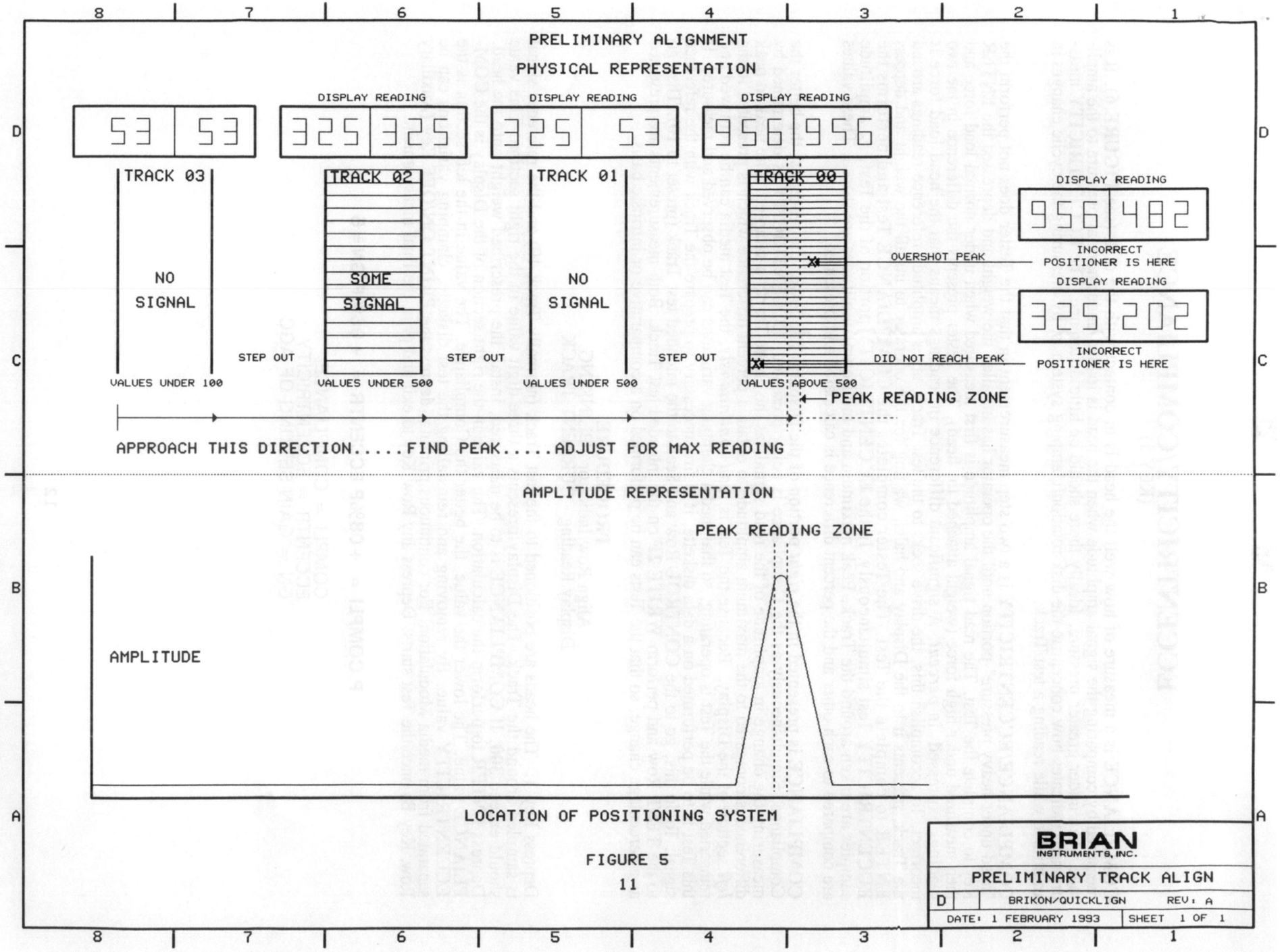

FIGURE 5

BRIAN INSTRUMENTS, INC.

PRELIMINARY TRACK ALIGN

D | BRIKON/QUICKLIGN | REV: A

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ECCENTRICITY/COMPLIANCE

(KEY 1)

COMPLIANCE is a measure of how well the head is in contact with the disk (see FIGURE 6). It is measure by comparing the signal amplitude when the head is loaded under normal pressure to the amplitude when under greater pressure. Ideally there should be little difference. The ECCENTRICITY measurement indicates now concentric the disk rotation/clamping system is, by measuring the cyclic changes in amplitude while reading a test Track.

COMPLIANCE/ECCENTRICITY is a two step measurement in that the Tester does not perform the "head under heavy pressure" portion until the operator has installed the weight and depressed the ENTER Key to complete the Test. The read signal amplitude is first measured when under normal load force and *then measured* under high force (weight attached to head). The Tester presents the difference in the two readings expressed in *percent.* A significant difference in readings means that the head load force is incorrect. To accomplish this, the drive seeks to the test Track, takes amplitude reference readings around the Track, presents it to the Display and halts, waiting for the operator to install the weight and depress ENTER to complete the Test. The Tester completes the COMPLIANCE Test and performs the ECCENTRICITY Test simultaneously. In the ECCENTRICITY portion of the Test. *32* amplitude samples are taken around the Track. Peak maximum and minimum amplitudes are stored. These values are compared to each other and the percent difference is calculated and presented.

COMPLIANCE is presented in the *right* portion of the Display. The lower the readings, the better the Compliance. Simultaneously as the Compliance is being presented, ECCENTRICITY is determined by measuring the change in amplitude of the read signals as the entire Track is sampled. The peak to peak difference is compared to the maximum amplitude to obtain a percent difference which is presented in the *left* section of the Display. Because the Test is *read continuously,* the Test media can be removed and reinserted while the Test is operating, so that media clamping variations can be observed and measured. If this Test is to be performed on a data diskette, it is first necessary to prepare the Track with the reference signal. To do this, go to the CONTROL Row and Seek to the intended test Track (preset to 10). Then go to the TEST Row and perform WRITE 2F on the intended test Track. Both measurements are presented as a percentage change, so that the Tests can be performed on a comparative or intrinsic basis.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

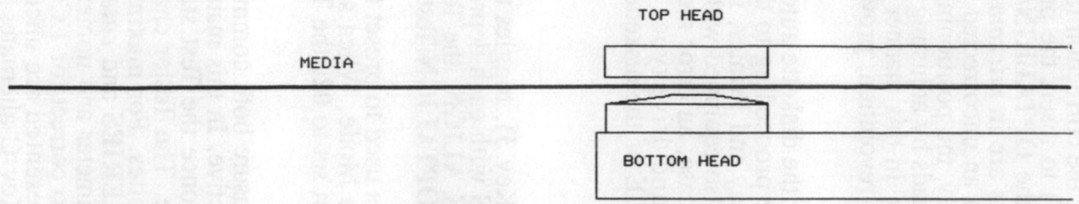
Depress Key 1. The heads are positioned to the test Track (normally Track 10) and the reference signal is sampled around the Track. The Display presents a three digit value in the right section. This value should exceed 300. If COMPLIANCE is to be measured, install the prescribed weight onto the head. Depress ENTER to perform the calculation. The value in the right section of the Display is the COMPLIANCE value. The lower the value, the better the Compliance. The value in the left section is the ECCENTRICITY value. By removing and reinstalling the test diskette, clamping variations can be separated from media Modulation. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit and print the final measurement.

P COMPLI = +08%P ECCENTR = +06%P GN = 5

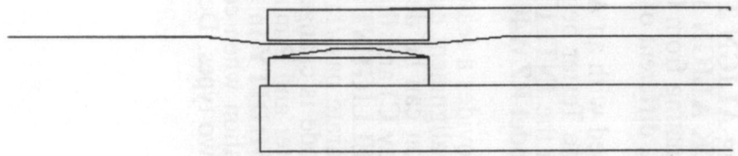
COMPLI = COMPLIANCE
ECCENTR = ECCENTRICITY
GN = GAIN SETTING OF AGC

COMPLIANCE

CORRECT



INCORRECT



INCORRECT

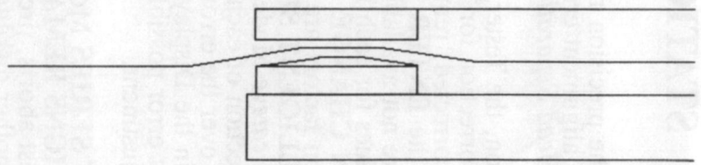


FIGURE 6

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BRIAN INSTRUMENTS, INC.

COMPLIANCE

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STATIC TRACK ALIGN

(KEY 2)

This Test is used to perform the precision radial alignment measurement of the drive positioning system (see FIGURE 7). Because the alignment error and direction (a minus error is toward Track 00) for each Head is presented separately, *Head Separation* is determined directly.

To provide the greatest precision, the Tester, in conjunction with the INTELLIGENT SERIES alignment diskette, performs automatic correction for ECCENTRICITY and MODULATION. In this manner, the alignment measurements are corrected, removing these unwanted variables. In addition, corrections for Humidity are also made via the ENTER HUMIDITY function (CONFIGURATION Row, Key 9). These automatic corrections are not available when used in a *cateye* Mode. When in a *cateye* Mode, the Display presents correction values for each Head for the operator to insert if the correction factors for the diskette are known. Use SIGN CHANGE +/- (AUXILIARY Row, Key F) to insert the proper correction direction. These correction factors are also applied when performing the OPTALIGN/HYSTERESIS Test. When in th resolution of *luM.* When in a *cateye* Mode, the values are in *percent,* with an uncorrected resolution of 1%. Because the error and direction of each Head is presented simultaneously, the positioning system can be adjusted to achieve balance over the error between the top and bottom Heads by adjusting the positioning system so that the values in the Display are equal, but opposite polarity. In this manner the effective error is reduced to the smallest error possible. The Display is updated eveny revolution, providing a practical and efficient means of adjustment.

When in the INTELLIGENT SERIES Mode, the Tester first interrogates the diskette automatically to verify the NUMBER OF ALIGNS REMAINING is greater than *0* before proceeding to the test Track for measurement. If *0,* the Test aborts, presenting a message to the Display and Printer, indicating no more alignments remain and another diskette should be used. The Tester is also equipped with error traps, should an improper diskette type be used for the drive being tested. In this case, an error message is also presented, notifying the operator a conflict exists between the diskette and drive type. The Display presents the TEST TABLE selected in the left section and the TEST TABLE of the diskette in the right section. The Printer outputs the following example.

F PARAM:04 DISK:05

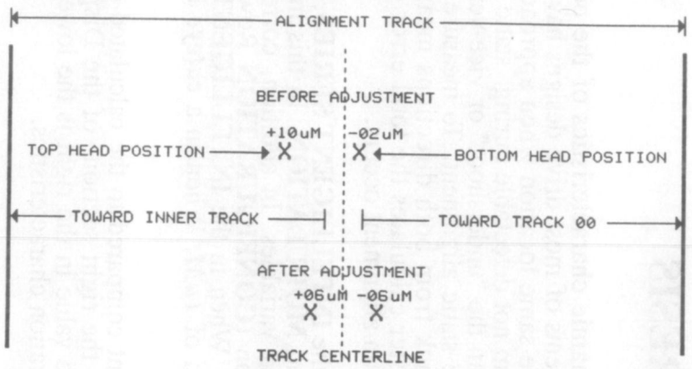
Once the Test starts, depressing ALIGN TOGGLE (AUXILIARY Row, Key 3), toggles the measurement between STATIC TRACK ALIGN and OPTALIGN/HYSTERESIS with each depression of the Key *(please NOTE;* when alternating from OPTALIGN to STATIC TRACK ALIGN, the Tester uses the currently set offtrack value. If a different offtrack value is desired, start the OPTALIGN Test first).

Each TEST TABLE is equipped with an ALIGN MODE Parameter and is used to preset the measurement style. When set to 00, the Tester begins measurements in the *cateye* Mode, when set to 01, the Tester begins measurements in the INTELLIGENT SERIES Mode. When set to 02, the Tester begins measurements in the Sony Model RZW406D Mode.

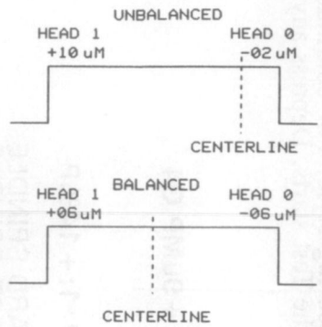
For convenience, the Tester provides a feature that allows the Tester to measure both commercial *cateye* and INTELLIGENT SERIES alignment diskettes while the Test remains active. In this manner, convenient distribution and correlation can be determined. To accomplish this, once the Test starts, depress CHANGE ALIGN TYPE (Key C) and then insert the other type diskette. The Tester changes analog sampling Mode between INTELLIGENT SERIES and *cateye* style diskettes. For maximum convenience, the Tester provides separate pass/fail limits for INTELLIGENT SERIES and *cateye* measurements. Whenever the Align Mode is changed, the appropriate pass/fail parameter and nomenclature (uM or %) are presented by the Tester and Printer. Because there is no method to correct for ECCENTRICITY, MODULATION or HUMIDITY in *cateye* diskettes, the values presented are uncorrected and should be taken into consideration when correlating. Each depression or Key C alternates the measurement technique between these two types. Depress any Row Key to exit and print the final measurement.

STATIC TRACK ALIGN

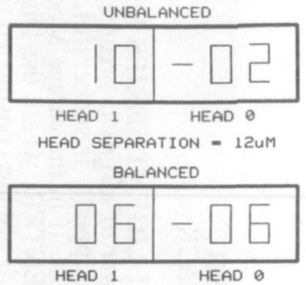
PHYSICAL



GRAPHIC

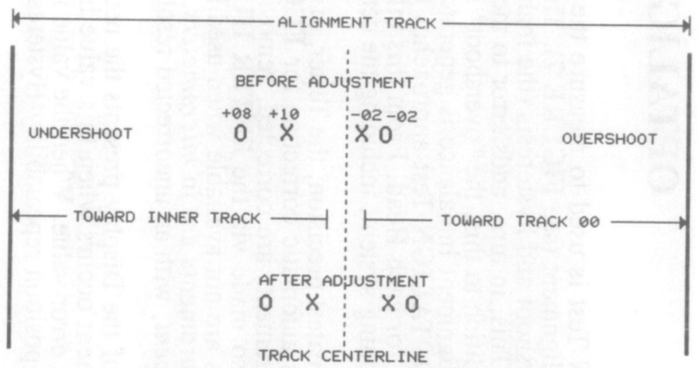


TESTER DISPLAY READING

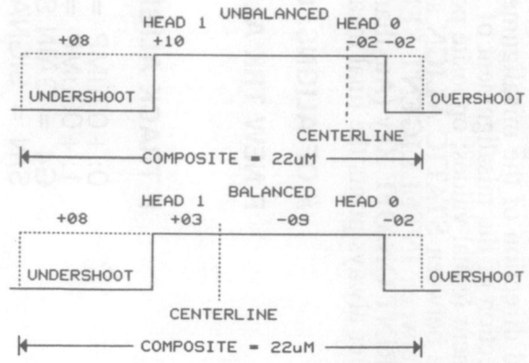


OPTALIGN

PHYSICAL



GRAPHIC



TESTER DISPLAY READING

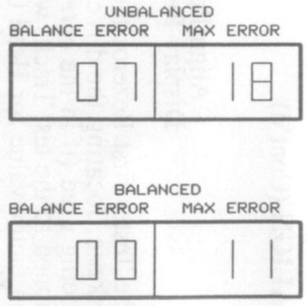


FIGURE 7

BRIAN INSTRUMENTS, INC.

STATIC TRACK ALIGN/OPTALIGN

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STATIC TRACK ALIGN (Cont'd)

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key **2.** The Tester first Rezeros the drive. If in the INTELLIGENT SERIES Mode, the Tester interrogates the diskette, locating the directory to verify the *number of aligns* is greater than **0** and the proper diskette is being used (if in the *cateye* Mode, this step is skipped). If successful, the Heads are automatically positioned to the test Track, where measurements begin. If in the *cateye* Mode, the Display blinks the correction factor value for Head **0.** Insert the value and ENTER, where the Display blinks the correction value for Head **1.** Insert the value and ENTER. The Heads are then positioned to the alignment Track where measurements begin. The left section of the Display presents the value of misalignment (in *uM* or %) and direction of the misalignment for Head **1.** The right section of the Display presents the value and direction of the misalignment of Head 0**.** The positioning system may now be adjusted for the desired alignment (equal values; opposite polarity). Depressing the ALIGN TOGGLE (Key **2)** causes the Test to change between STATIC ALIGN and OPTALIGN. Depressing CHANGE ALIGN TYPE (Key C) changes between INTELLIGENT SERIES and *cateye* measuring style. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit. The printer always prints the final measurement.

 # OF ALIGNS: 075

P NEW TRK ALI 0: +07uMP G4 1: + 9uMPG4

OR

P TRACK ALIGN SN006 0: + 11 %P 1: + 14%P

0:+07uMP = 7uM ERROR TOWARD SPINDLE
1:+09uMP = 9uM ERROR TOWARD SPINDLE
G4 = GAIN SETTING OF A.G.C.
S/N = SIGNAL TO NOISE VALUE

OPTALIGN/HYSTERESIS

(KEY 3)

The OPTALIGN Test is used to measure the effect of the dynamic characteristics of the positioning system to drive alignment (see FIGURE **7).** The positioning systems of most drive designs have inherent overshoot, undershoot and hysteresis (the inability to stop at the same location when approached from both directions). This, in turn, adds error to the positioning system not detectable during static alignment conditions. In addition to this, the "overshoot" may be greater than the "undershoot" or vice-versa. When this occurs, an alignment imbalance is generated that distorts the static alignment. To measure this error and effect, the OPTALIGN Test approaches the alignment Track from both directions measuring the alignment errors for each Head. From this information, the Tester calculates the total error due to the heads and positioning system, including the center, where optimum alignment occurs.

To provide the greatest precision, the Tester, in conjunction with the INTELLIGENT SERIES, alignment diskette performs automatic correction for ECCENTRICITY and MODULATION. In this manner, the alignment measurements are corrected, removing these unwanted variables. In addition, corrections for Humidity are also made via the ENTER HUMIDITY function (CONFIGURATION Row, Key **9).** These corrections are not available when used in a *cateye* Mode. When in the INTELLIGENT SERIES Mode, the measurements are in *micrometers,* with a resolution of *luM.* When in a *cateye* Mode, the values are in *percent,* with an uncorrected resolution of **1 %.**

The left section of the Display presents the net error of alignment compared to the calculated centerline. Optimum alignment occurs when this value is **0.** The value in the right section of the Display is the largest alignment error value. When the value in the left is **0,** the value in the right is the lowest possible with the existing position repeatability/Hysteresis and Head Separation characteristics.

OPTALIGN/HYSTERESIS (Cont'd)

Each TEST TABLE is equipped with an ALIGN MODE Parameter and is used to preset the measurement style. When set to 00, the Tester begins measurements in the *cateye* Mode, when set to 01, the Tester begins measurements in the INTELLIGENT SERIES Mode. When set to 02, the Tester begins measurements in the Sony Model RZW406D Mode.

For convenience, the Tester provides a feature that allows the Tester to measure both commercial *cateye* and INTELLIGENT SERIES alignment diskettes while the Test remains active. In this manner, convenient distribution and correlation can be determined. To accomplish this, once the Test starts, depress CHANGE ALIGN TYPE (Key C) and then insert the other type diskette. The Tester changes analog sampling Mode between INTELLIGENT SERIES and *cateye* style diskettes. For maximum convenience, the Tester provides separate pass/fail limits for INTELLIGENT SERIES and *cateye* measurements. Whenever the Align Mode is changed, the appropriate pass/fail parameter and nomenclature (uM or %) are presented by the Tester and Printer. Because there is no method to correct for ECCENTRICITY, MODULATION or HUMIDITY in *cateye* diskettes, the values presented are uncorrected and should be taken into consideration when correlating. If in the *cateye* Mode, the correction factors inserted in the STATIC TRACK ALIGN Test are used. Each depression of Key C alternates the measurement technique between these two types. Depress any Row Key to exit and print the final measurement.

When in the INTELLIGENT SERIES Mode, the Tester first interrogates the diskette automatically to verify the NUMBER OF ALIGNS REMAINING is greater than *0* before proceeding to the test Track for measurement (if in the *cateye* Mode, this step is skipped). If 0, the Test aborts, presenting a message to the Display ana Printer, indicating no more alignments remain and another diskette should be used. If successful, the *number of aligns* is Displayed and Printed. The Display blinks the *track offset* value (normally set to 5). In this case, the Heads are stepped 5 tracks to either side of the alignment Track. The Tester is also equipped with error traps, should an improper diskette type be used for the drive being tested. An error message is also presented, notifying the operator a conflict exists between the diskette and drive type. The Display presents the TEST TABLE selected in the left section and the TEST TABLE of the diskette in the right section. The Printer outputs the following example.

F PARAM:04 DISK:05

Once the Test starts, depressing ALIGN TOGGLE (AUXILIARY Row, Key **3),** toggles the measurement between STATIC TRACK ALIGN and OPTALIGN/HYSTERESIS with each depression of the Key *(please NOTE;* when alternating from OPTALIGN to STATIC TRACK ALIGN, the Tester uses the currently set offtrack value. If a different offtrack value is desired, start the OPTALIGN Test first).

For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test has started. Depress any Row Key to exit and print the final measurement.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key **3.** If in the INTELLIGENT SERIES Mode, the Tester first interrogates the diskette, locating the directory to verify the *number of aligns* is greater than 0 and the proper diskette is being used (if in the *cateye* Mode, this step is skipped). If successful, the Display blinks the *track offset* value. Depress the ENTER Key and the Heads are positioned and measurements begin.

The left section of the Display presents the net error of alignment compared to the calculated centerline. Optimum alignment occurs when this value is 0. The value in the right section of the Display is the largest alignment error value. When the value in the left is 0, the value in the right is the lowest possible with the existing position repeatability/Hysteresis and Head Separation characteristics. Some caution needs to be exercised when making adjustments during this Test, because the Display is updated at a slower rate, due to the positioning times involved, causing a delay between hand motion and Display update.

OPTALIGN/HYSTERESIS (Cont'd)

Depressing the ALIGN TOGGLE (Key 2) causes the Test to change between STATIC ALIGN and OPTALIGN. Depressing CHANGE ALIGN TYPE (Key C) changes between INTELLIGENT SERIES and *cateye* measuring style. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit. The printer always prints the final measurement.

BEFORE OPTIMIZATION

P **NHY** uM +07P 0> -02P < +10P 1 > -04P < +18P*

AFTER OPTIMIZATION

P **NHY** uM +00P 0> -09P < +03P 1 > +03P < +11P*

PRINTER DETAIL

+07P = **Error from optimal positioning.**
0> -02P = **Hd** 0 **error, lo track to hi track.**
< +10P = **Hd** 0 **error, hi track to lo track.**
1 > -04P = **Hd** 1 **error, lo track to hi track.**
< +18P = **Hd** 1 **error, hi track to lo track. * = highest reading**

INDEX TO DATA

(KEY 4)

This Test measures the number of *microseconds* between the *Index Sensor* and the *Magnetic Index Mark* that is located on the alignment diskette (See FIGURE 8). The Tester has the ability to test up to three Tracks (most *cateye* diskettes provide only an outer and inner test Track. The INTELLIGENT SERIES provides three). The heads are automatically positioned to the outer test Track (Track A) and measurements begin in the NORMAL mode (auto seeking to all Index to Data Tracks) and then automatically to the middle test Track (Track B) and then the inner test Track (Track C) where the measurement process is repeated and Displayed. This constitutes one pass of the Test. The Display readings are in *microseconds.* This is continuously repeated until halted by the operator. To add flexibility, there are two additional modes that may be selected once the Test has started. These added testing modes are located in the AUXILIARY Row, at Keys 4, 5, and 6.

Key 4 is designated INNER/OUTER. When this function is selected, the Test will be operated alternately between the outer and inner test Track with each depression of Key 4. Key 6 is designated SELECT. When this function is selected, the Test halts, and the Display blinks the current test Track value. Use the

Column Keys to select the desired test Track and ENTER. The heads are positioned to the requested test Track and readings begin. For all of these auxiliary methods, depress any Row Key to exit the Test. The range of measurement is from *0 - 999 microseconds* with a resolution or *1 uS.* This Test operates in the same manner, regardless of the ALIGN MODE setting.

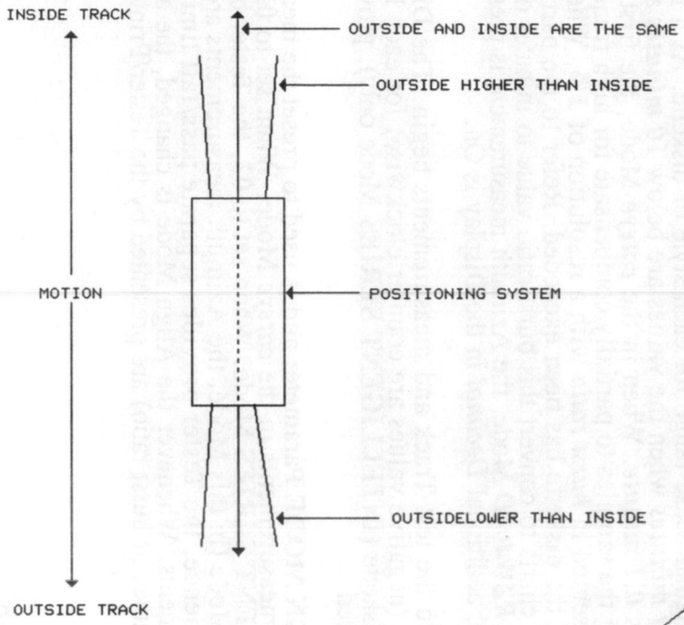
NOTE

Some 8" double sided drives do not provide for testing of the Index associated with the top head due to an interlock circuit that prevents the Index associated with the top head from being presented to the interface. For these situations, a pair of probes is provided (Blue and Yellow), to generate this signal. The Blue (INDEX IN) probe is connected to a point where the Index signal associated with Head I is available. The Yellow (INDEX OUT) is connected to the Index Output on the interface of the drive. A switch is provided which is located under the Blue Analog Receiver that will invert the signal on the Yellow probe so that both Index pulses have the same true negative output. This facility is not available in dual channel analog configurations and is replaced by a pair of *YELLOW* probes for Head 1 analog.

INDEX TO DATA

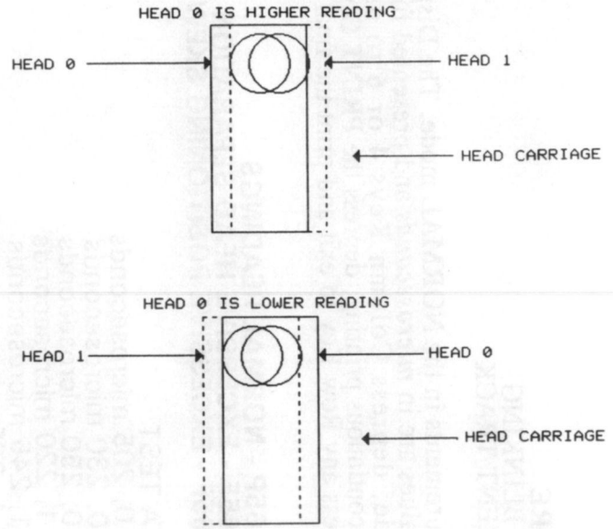
POSITIONING SYSTEM LINEARITY

DIFFERENCE BETWEEN OUTSIDE AND INSIDE READINGS



Y AXIS DISPLACEMENT

DIFFERENCE BETWEEN HEAD 0 AND HEAD 1 READINGS



MEDIA LAYOUT

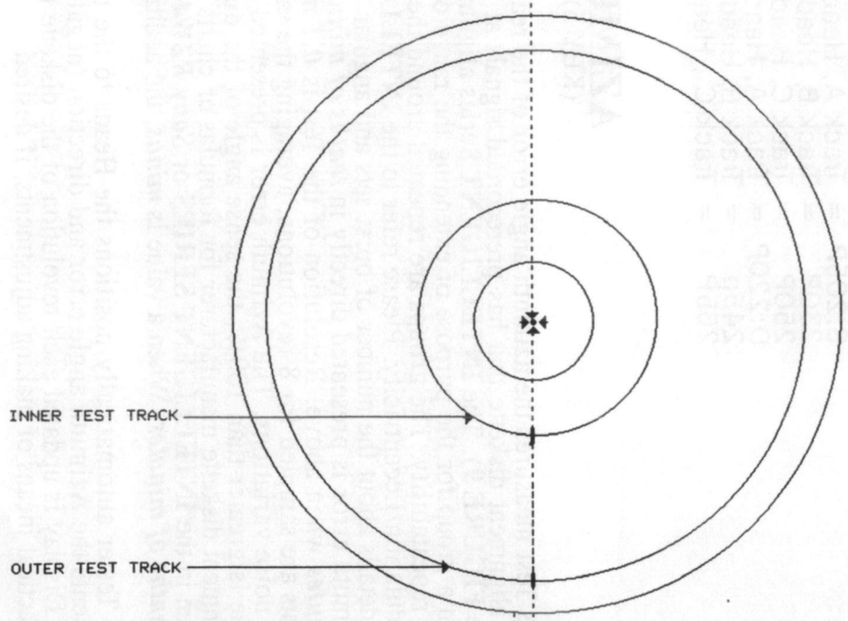


FIGURE 8

BRIAN INSTRUMENTS, INC.

INDEX TO DATA

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PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key 4. The Tester automatically begins measurements in the NORMAL mode. The Display is updated as each of the test Tracks is measured. The values are in *microseconds* and presented for each head concurrently. If adjustments are to be made, depress Column Keys 4 or 6 to use the INNER/OUTER or SELECT modes respectively. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit and print the final measurement.

P I/D S: 205P 230P 250P D: 220P 245P 265P - NORMAL READINGS
F I/D S: 205P 230P 250P D: 820F 845F 865F - EXCESSIVE HEAD SEPARATION
F I/D S: 205P 530F 850F D: 220P 545F 865F - EXCESSIVE POSITIONING SKEW

I/D	INDEX TO DATA TEST
S:205P	Track A, Head 0, 205 microseconds
230P	Track B, Head 0, 230 microseconds
250P	Track C, Head 0, 250 microseconds
D:220P	Track A, Head 1, 220 microseconds
245p	Track B, Head 1, 245 microseconds
265P	Track C . Head 1, 265 microseconds

AZIMUTH

(KEY 5)

This Test measures the azimuth angle error of the read/write heads by sampling a special test Track on the alignment diskette that has prerecorded signals at precision angles for measurement and comparison (see FIGURE 9). The INTELLIGENT Series alignment diskette utilizes multiple angle signal pairs to form a group for the purpose of extending the range of measurement and noticeably improving accuracy and repeatability. The groups are repeated around the Track many times to Auto Correct the effects of Modulation/Eccentricity. Please refer to the INTELLIGENT Series Alignment Diskette Specifications for details about the number of burst sets and angular sense range for each style of diskette. As a result, Azimuth error is presented directly in *tenths of minutes* when the values are below *10 minutes* and in *minutes* when above. Resolution of the Test is *0.1 minute.* When in the *cateye* Mode, the first quad bursts are sampled for 8 revolutions, averaging the samples to partially compensate for high frequency and noise variations. The Azimuth error is presented in *hurst ratio* with a resolution of *1%.* When the value is greater than 100%, the sense angle of the diskette has been exceeded. Refer to the particular alignment diskette manufacturer for formulas or charts to convert this burst ratio value to minutes of arc. When in the INTELLIGENT SERIES or *Sony RZW406D* Mode, the Azimuth measurement is presented in *tenths of minutes.* When a value is *minus,* the additional *Decimal* in the Display is On.

The Tester automatically positions the Heads to the test Track and measurements begin. The Display presents the Azimuth angle error and direction (negative values are counter clockwise) for each Head. The Display is updated each revolution of the diskette (INTELLIGENT SERIES Mode only), providing a practical means of making adjustments, if desired.

Each TEST TABLE is equipped with an ALIGN MODE Parameter and is used to preset the measurement style. When set to 00, the Tester begins measurements in the *cateye* Mode. When set to 01, the Tester begins measurements in the INTELLIGENT SERIES Mode. When set to 02, the Tester begins measurements in the Sony Model RZW406D Mode (in this Mode, the Azimuth measurements are also presented in *minutes).* For maximum convenience, the Tester provides separate pass/fail limits for INTELLIGENT SERIES, and *cateye* measurements. Whenever the Align Mode is changed, the appropriate pass/fail parameter and nomenclature (minutes or burst ratio) are presented by the Tester/Printer.

AZIMUTH (Cont'd)

For convenience, the Tester provides a feature that allows the Tester to measure both commercial *cateye* and INTELLIGENT SERIES alignment diskettes while the Test remains active. In this manner, convenient distribution and correlation can be determined. To accomplish this, once the Test starts, depress CHANGE ALIGN TYPE (Key C) and then insert the other type diskette. The Tester changes analog sampling Mode between INTELLIGENT SERIES and *cateye* style diskettes. For maximum convenience, the Tester provides separate pass/fail limits for INTELLIGENT SERIES and *cateye* measurements. Whenever the Align Mode is changed, the appropriate pass/fail parameter and nomenclature (uM or %) are presented by the Tester and Printer. Because there is no method to correct for ECCENTRICITY, MODULATION or HUMIDITY in *cateye* diskettes, the values presented are uncorrected and should be taken into consideration when correlating. Each depression or Key C alternates the measurement technique between these two types. Depress any Row Key to exit and print the final measurement.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key 5. The heads are automatically positioned to the test Track and measurement begin. The Azimuth angle error is presented for both heads (in *minutes* or *burst ratio* %). Depressing CHANGE ALIGN TYPE (Key C) changes between INTELLIGENT SERIES and *cateye* measuring style. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit. The printer always prints the final measurement.

```
BRI AZIMUTH 0:-11.2'P G3  1:+33.1'F G3

CAT AZ SN044 0:-78%P G3 1:+107%F G3

SONYAZ SN019  0:-11.2'P G3  1:+33.1'F G3

BRIAZI    = AZIMUTH TEST, INTELLIGENT SERIES
0:-11.2'P   =Head 0 Azimuth angle error - Pass
1:+33.1'F   =Head 1 Azimuth angle error - Fail
G3          = A.G.C. level of Analog Receiver
```

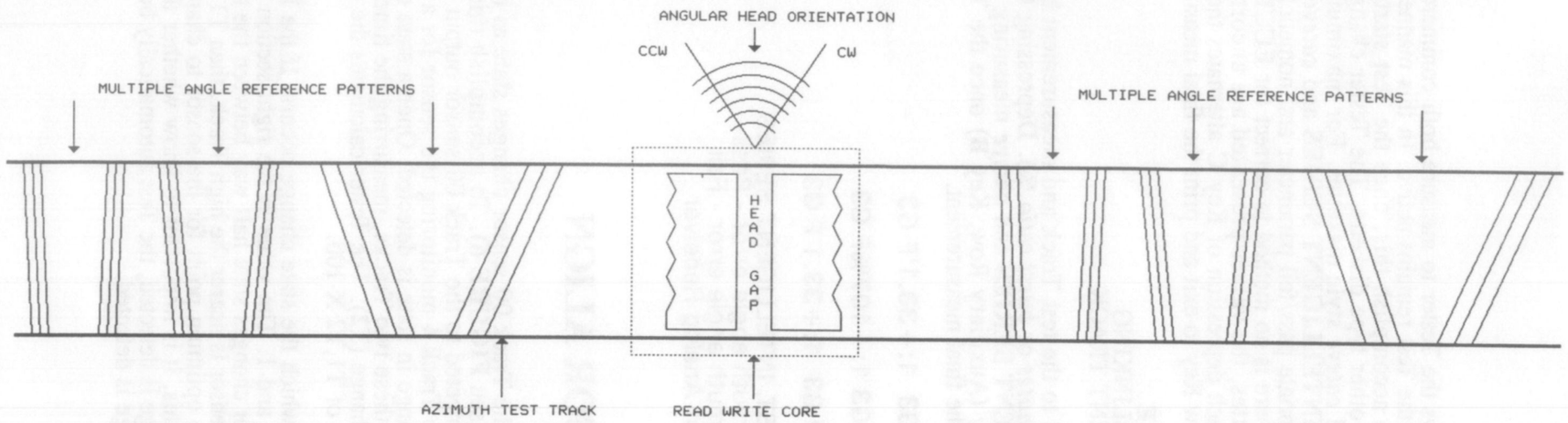
TRACK 00 SENSOR ALIGN

(KEY 6)

This Test measures the time from the Step pulse until the Track 00 sensor changes state as the head is stepped back and forth between two adjacent tracks (see FIGURE 6). To accomplish this, the Red PHASE A probe of the ANALOG RECEIVER is connected to the Track 00 sensor output test point. The Tester begins the Test at Track 5 and steps *OUT* to Track 4 monitoring the sensor for a change in state. The drive continues to be stepped OUT until a change in state is detected. Once a state change has been detected, the Tester steps back and forth between these two Tracks, measuring the time from step OUT to the state change (Tl) and step IN to the state change (T2). The Tester calculates the percentage difference of Tl ,T2 using the formula: Tl - T2/larger of Tl ,T2 X 100.

The left section of the Display presents the Track from which the state change occurs. If the left section displays 2, the sensor is changing state between Track 2 and 1. The value in the right section is the percentage difference from the calculated center. If the sensor changes state half way between the two tracks, then Tl = T2 and the percentage difference is 0. If the sensor is nearer the high Track, then Tl > T2 and the percentage difference is positive and vice versa. The optimum point for the sensor to change state is halfway between Phase A's of the position motor. For this, it is important to know whether the position motor is of 2,3 or 4 phase configuration. If no state change is detected, the Test automatically begins again at Track 5, repeating the above process until a state change is detected.

AZIMUTH



TRACK 00 SENSOR

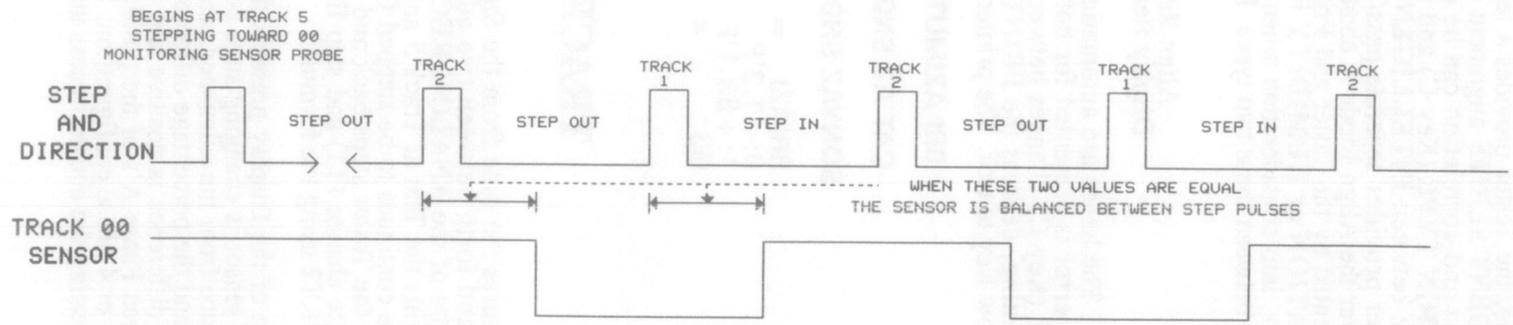


FIGURE 9

BRIAN INSTRUMENTS, INC.

AZIMUTH/TRACK 00 SENSOR

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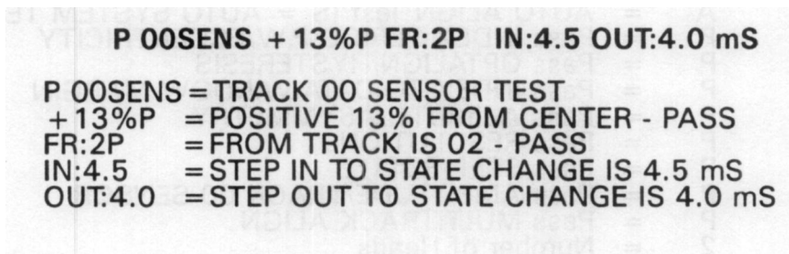
PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Make sure the RED probe is on the correct test point. Depress Key 6. The positioning system is stepped to Track 5. The positioning system is then stepped OUT to Track 4 while monitoring the Red Probe which is connected to the Track 00 sensor test point on the drive. If the sensor does not change state, the heads step to Track 3 and so on, until the sensor changes state. Once this state change has been detected, the positioning system seeks between the two Tracks, measuring the time difference between Step and sensor state change. The Display shows the "FROM" Track in the left section, and the percentage error from center in the right section. Adjust to the desired value. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test is activated. Depress any Row Key to exit and print the final measurement.



AUTO ALIGN

(KEY 7)

This Test provides the ability to perform the following functions, linked together, to form a comprehensive single button inspection Test.

INDEX TO DATA BURST TIMING
TRACK 00 SENSOR ALIGN
HEAD STEP SETTLE TIME
OPTALIGN/HYSTERESIS
MULTITRACK ALIGN
HEAD AMPLITUDE
WINDOW MARGIN
ECCENTRICITY
RESOLUTION
ASYMMETRY
AZIMUTH

The user has the ability to change which Tests and the number of times each Test is performed in the linked program along with the Pass/Fail limits of each Test. In this manner, a single button test can be constructed to the specific test environment desired. The INTELLIGENT SERIES diskette is used to measure the alignment related characteristics (OPTALIGN, AZIMUTH, INDEX TO DATA) of the drive, the mechanical performance measurements (STEP SETTLE, RESOLUTION, etc.) and bit jitter characteristics in a single pass Test without having to change diskette, which is required when using a *cateye* diskette. This Test is preset to perform the key measuring functions to assure accuracy and consistency with minimal test time. Refer to the CONFIGURATION WORKSHEET AND PROGRAMMING INSTRUCTIONS that accompany the Tester for the preset configuration.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key 7. The Tester automatically begins testing by performing a series of analog performance and alignment Tests, followed by the bit jitter Tests (INTELLIGENT SERIES only). Both the Display and printer present the Test measurements along with Pass/Fail. The printer, for this Test, is automatically ON to record the Test information. Depress any Row Key to exit. At the conclusion of the Test, a single Summary line is printed, identifying the Pass/Fail and preset test Tracks as follows.

P R304APPPPPPPP2 + 00 + 000100400504007507 50
P = Passed AUTO ALIGN Test
R3 = Drive Select Code/Port Number if MUX is active.
04 = **TEST TABLE Number**
A = AUTO ALIGN Test (S = AUTO SYSTEM TEST)
P = Pass INDEX PERIOD-P.W/ECCENTRICITY
P = Pass OPTALIGN/HYSTERESIS
P = Pass INDEX TO DATA/WINDOW MARGIN
P = Pass AZIMUTH/ASYMMETRY
P = Pass RESOLUTION
P = Pass STEP SETTLE
P = Pass AMPLITUDE/TRACK 00 **SENSOR**
P = Pass MULTITRACK ALIGN
2 = **Number of Heads**
+ 00 = **Correction Factor, Head** 0 **(Cateye type only)**
+ 00 = **Correction Factor, Head** 1 **(Cateye type only)**
010 = **ECCENTRICITY/COMPLIANCE Track**
040 = **ALIGN TRACK**
05 = **HYSTERESIS Offset**
040 = **AZIMUTH Track**
075 = **RESOLUTION Track for** 1F **pattern**
075 = **RESOLUTION Track for** 2F **pattern**

HEAD AMPLITUDE

(KEY 8)

This Test measures the analog read amplitude of the heads. The Display blinks a test Track value (preset to the inner Track for worse case testing). Use the Column Keys to change and ENTER. The heads are positioned to the test Track and a *2F* signal is written. The amplitude is then measured and presented in the Display. The amplitude for Head 1 is presented in the left three digits and the amplitude for Head 0 is presented in the right three digits. These measurements are in *millivolts* unless the value exceeds *1 volt,* at which time the measurement is presented in *volts,* resolved to *10 millivolts* using the decimal point in the Display. This process repeats until a Row Key is depressed to exit. For continuous printing, depress the PRINT ON/OFF Key (AUXILIARY Row, Key B) once the Test starts. Depress any Row Key to exit and print the final measurement.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Column Key **8.** The Display blinks the test Track value. Use the Column Keys to change and ENTER. The heads are automatically positioned to the test Track and measurements begin. The Display presents the amplitude measurements for each Head. The Display is updated each revolution of the diskette, providing a practical means of making adjustments, if desired. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit and print the final measurement.

```
P AMP TRK079 G=3,3 0:642 PmV 1:625 PmV
P AMP TRK079 G=3,3 0:1.26 PV 1:1.17 PV
F AMP TRK079 G=3,6 0:642 PmV 1:098 FmV

P AMP      =  PASS AMPLITUDE TEST
TRK079     =  TEST TRACK
G=5,5      =  GAIN SETTING OF TEST FOR HEAD 0,1
0:642 PmV  =  MEASUREMENT FOR HEAD 0
1:625 PmV  =  MEASUREMENT FOR HEAD 1
```

SELF ERASE TEST

(KEY 9)

This Test is used to measure the amount of signal erasure and verify that the Erase coils of the Head are turning OFF when the Write signal is OFF. This is also very useful to determine if there is excessive residual magnetism within the Head structure due to Head contamination or poor erase efficiency. To accomplish this, the Heads are positioned to a test Track and a 2F signal is written and measured for reference. The tester then turns the Write control Off and cycles the Heads across the test Track several times. The Heads are then repositioned to the reference test Track, remeasured and compared to the original reference measurement, presenting the difference expressed as a percent in the Display for each Head. It is normal for the readings to be *5%* or less. This is due to small amounts of mispositioning and residual magnetism in the Heads. Excessive residual magnetism due to contamination typically causes the erasure value to be between 5% and 10%. Values above this typically mean that the Erase coils are active while the positioning system is in motion across the signal Track, in which case noticeable erasure of the signal Track occurs. As an added convenience, this Test operates in a *write once/read continuously* mode. In this manner, accumulative erasure can be measured over multiple passes of the Test. For continuous printing, depress PRINT ON/OFF (Key B) once the Test starts.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Column Key **9.** The tester automatically positions the Heads to the test Track and writes the reference signal and "begins measurement. The Display presents the amount of erasure that occurred in the Display, expressed as a percent. A reading of *5%* or less is normal. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit and print the final measurement as shown below.

```
P ERASE  G=4,4 0:-03% P 1:-04% P
F ERASE  G=4,6 0:-03% P 1:-22% F

G = A.G.C. setting for Head 0,1
```

HEAD RESOLUTION

(KEY A)

This Test measures the relative frequency response of the head to high frequency and low frequency signals. The Display blinks the 1F test Track. Use the Column Keys to change and ENTER. The Display now blinks the 2F test Track. Use the Column Keys to change and ENTER. The heads are positioned to the 1F Track and the signal is written and sampled by the Analog for each Head. The Heads are then positioned to the 2F Track and the signal written and sampled by the Analog. There are *32 samples* taken around the Track for analysis. The 1F and 2F amplitudes are compared to each other, yielding a ratio expressed as percent, using the formula (2F/1F X 100 = RESOLUTION IN PERCENT). This process is repeated continuously, updating the Display each pass of the Test. In order to perform this test accurately, the READ SIGNAL Probes of the ANALOG RECEIVER must be connected to the drive prior to the differentiator circuit (preferably at the filter). Otherwise the readings are forced to 99%.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key A. The Display blinks the 1F test Track. Use the Column Keys to change and ENTER. The Display now blinks the 2F test Track. Again, use the Column Keys to change and ENTER. The heads are positioned to the 1F test Track and the signal written, measured and stored. The heads are then positioned to the 2F test Track and the signal written, measured and stored. The Display presents the calculated value for each Head. The Display is updated each pass of the Test. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit and print the final measurement.

P HEAD RESOL G0 = 4 0: + 82%P G1 =4 1: + 79%P
F HEAD RESOL G0 = 4 0: + 82%P G1 =6 1: + 27%F

HEAD RESOL	**= HEAD RESOLUTION TEST**
G0 = 4	**=GAIN SETTING OF TESTER FOR HEAD 0**
0:+82%P	**=HEAD 0 RESOLUTION MEASUREMENT**
G1 =4	**=GAIN SETTING OF TESTER FOR HEAD 1**
1: + 79%	**=HEAD 1 RESOLUTION MEASUREMENT**

HEAD STEP SETTLE

(KEY B)

This Test measures the time it takes the Heads to leave a Track, step to an adjacent Track and have the read signal amplitude settled to within 80% of full amplitude (see FIGURE 10). The Display blinks the test Track value. Use the Column Keys to change and ENTER. The heads are positioned to the test Track where a reference 2F signal is written. The heads are then stepped OUT by a Track and then IN, taking analog samples every *500 microseconds.* The samples are then compared to the reference, beginning with the *last* sample first. The STEP SETTLE Time is the first sample encountered that goes below the threshold setting (80%). The measurements are in *milliseconds* resolved to *0.5 mS.* The measuring accuracy and repeatability are *0.5 mS.* To enhance testing, the measurements are made when approaching the test Track from both directions. If Track 00 is selected as the test Track, the measurement is made only in the *OUT* direction. The reference signal is written only one time, and all subsequent measurements are based on that reference. In this manner, on line experiments may be performed while monitoring the effects.

HEAD STEP SETTLE (Cont'd)

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key B. The Display blinks the test Track value. Use the Column Keys to change and ENTER. The heads are positioned to the selected test Track and the reference signal is written, sampled and stored for comparison. The Display presents the measured values for each Head and each direction with the Display being updated whenever a change in measurement occurs.

For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit and print the final measurement.

```
P HDSTP 44 0>12.5P <13.0P 1>12.5P <13.0P
F HDSTP 44 0>12.5P <25.0F 1>12.5P <25.0F

HDSTP    = HEAD STEP SETTLE TEST
4,4      = GAIN SETTING OF TESTER HEAD 0,1
0>12.5P  = HEAD 0 MEASUREMENT, HI TO LO TRACK
<13.0P   = HEAD 0 MEASUREMENT, LO TO HI TRACK
1>12.5P  = HEAD 1 MEASUREMENT, HI TO LO TRACK
<13.0P   = HEAD 1 MEASUREMENT, LO TO HI TRACK
```

HEAD LOAD SETTLE TIME

(KEY C)

This Test is used to measure the time it takes the heads to load and the read data amplitude settled enough to achieve 80% of the reference amplitude for 8" drives. The measurements is preceded by selecting the test Track. The heads are positioned to the test Track and a reference signal is written, sampled and stored for comparison. The heads are then UNLOADED. At the next Index the heads are LOADED and amplitude samples are made every 500 microseconds for each head. Amplitude comparisons are made, beginning with the *last* sample. The first sample that falls below the threshold setting is the HEAD LOAD SETTLE Time. The reference pattern is written only one time, and all subsequent measurements are based on that reference. The Display is updated every revolution of the diskette. The measured values are in *milliseconds,* resolved to 0.5 mS. The accuracy and repeatability are 0.5 mS.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Column Key C. The Display blinks the test Track value. Use the Column Keys to change and ENTER. The heads are positioned to the test Track and the reference signal is written, sampled and stored. The heads are then UNLOADED and LOADED during the measurement. The Display presents the measurements for both heads and the readings are in milliseconds. For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit and print the final measurement.

```
P LOAD SETTLE  0:13.5P 1:16.0P
F LOAD SETTLE  0:13.5P 1:58.5F

LOAD SETTLE = HEAD LOAD SETTLE TEST
0:13.5P     = MEASURED VALUE FOR HEAD 0
1:16.0P     = MEASURED VALUE FOR HEAD 1
```

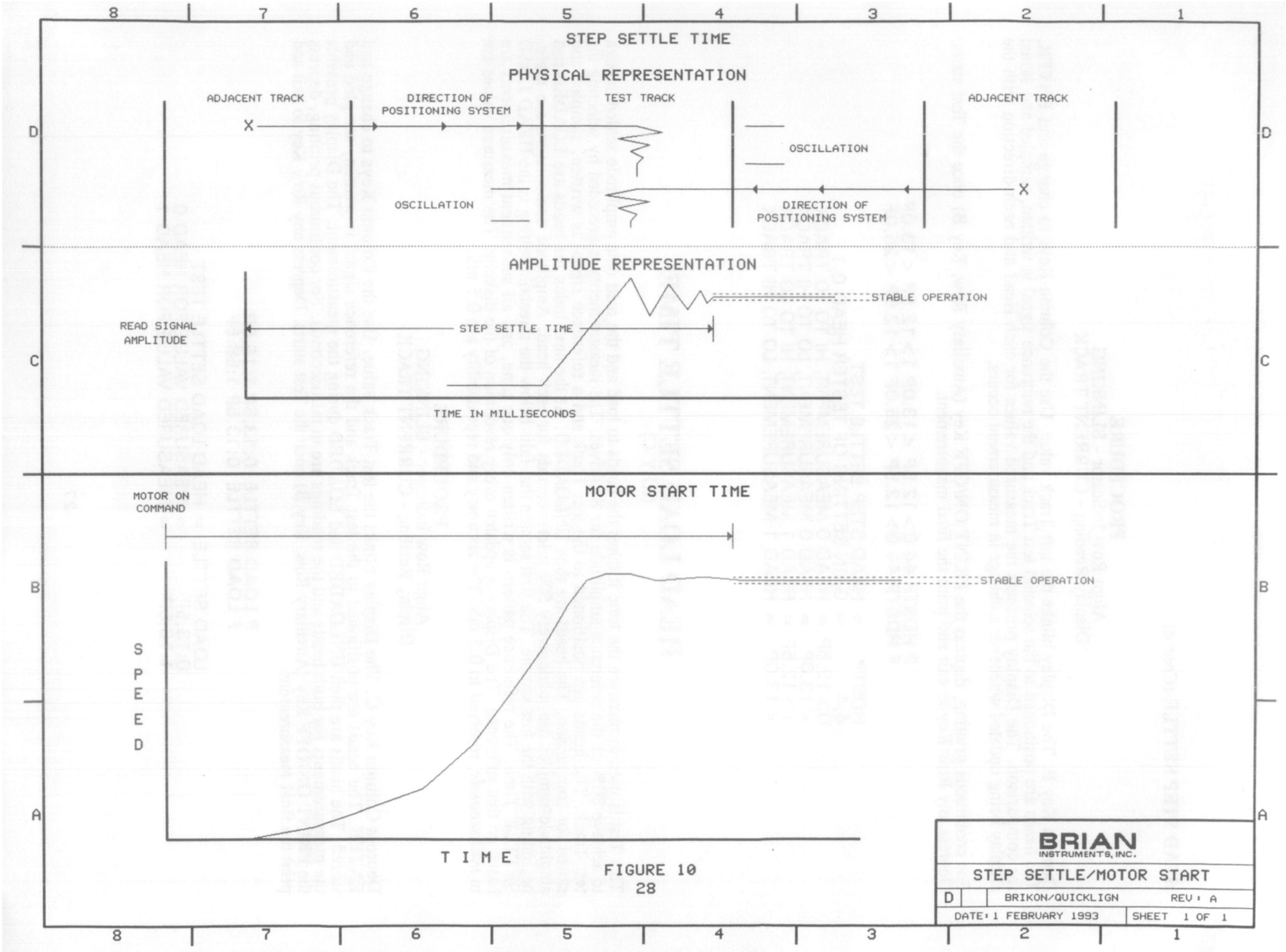

STEP SETTLE TIME
PHYSICAL REPRESENTATION
ADJACENT TRACK
DIRECTION OF POSITIONING SYSTEM
TEST TRACK
ADJACENT TRACK
X
OSCILLATION
OSCILLATION
X
DIRECTION OF POSITIONING SYSTEM
AMPLITUDE REPRESENTATION
READ SIGNAL AMPLITUDE
STEP SETTLE TIME
STABLE OPERATION
TIME IN MILLISECONDS
MOTOR START TIME
MOTOR ON COMMAND
STABLE OPERATION
S P E E D
T I M E
BRIAN INSTRUMENTS, INC.
STEP SETTLE/MOTOR START
D
BRIKON/QUICKLIGN
REV : A
DATE: 1 FEBRUARY 1993
SHEET 1 OF 1

FIGURE 10

MOTOR START TIME

(KEY D)

This Test is used to measure how many *milliseconds* it takes for the spindle motor to come up to full and stable rotation speed (see FIGURE 10) and is very useful to determine if there is any binding of the spindle system, causing the time to be high or inconsistent. The Test automatically positions the heads to the test Track, where reference signal bursts are written. The spindle motor is then turned OFF, with a 6 second Motor Off delay. The Motor is then turned ON and sampling begins where the measured duration of each burst is compared to the reference. The measurement includes any over/under shoot of the spindle system. The Display presents the measured value in the right section. The value is in *milliseconds,* resolved to 1 *mS.* The accuracy and repeatability is +/- *4 mS.* The measuring range is 999.9 ms. The reference signal is written only one time, and all subsequent measurements are based on that reference.

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Column Key D. The Test automatically positions the heads to the test Track and writes the reference signals. The Display presents the measured value in the right section. The Test repeats continuously, updating the Display after each measurement (about 6 seconds). For continuous printing, depress the PRINT ON/OFF Key (Auxiliary Row, Key B) once the Test starts. Depress any Row Key to exit and print the final measurement.

P MOTOR START 307 P mS
F MOTOR START 865 F mS

MULTITRACK ALIGN TEST

(KEY E)

The Multitrack version of INTELLIGENT SERIES Alignment Diskettes are designed to expand the measurement capabilities of the Tester/Diskette combination by providing multiple alignment test Tracks for measurement and subsequent analysis. This is a very useful facility for characterizing the positioning system profile for runout and linearity. The diskette has alignment information at up to 11 locations and is used in conjunction with the MULTITRACK ALIGN Test in the ALIGN Row at Key E of the Tester. For added performance, the Test may be perform with the positioning system approaching the track from either or both directions. The MULTITRACK ALIGN function performs the following measurements:

1. Automatically measure each alignment Track for Head 0, Printing each measurement. Measure Head 1 at the center location, Printing the measurement and the calculated *Head Separation.* The Display presents the measured values while this portion of the Test is in progress. All measurements are in *micrometers.* Positive values are toward the Spindle and negative values are toward Track 00.

2. Print the calculated *Maximum Deviation* from all Head 0 measured values in *micrometers.*

3. Print the calculated *Runout,* using the deviation between outside and inside measurements for Head 0. The value is in *micrometers* and includes direction.

4. Perform dynamic alignment on the Track/Head/Direction combination that is closest to the total average error measurements. The final value in the Display is the error between the actual measurement and the computed average. Adjusting the alignment until the value is 0 centers the alignment over the composite of all measured values.

The Diskette/Tester combination provides Auto Correction for Eccentricity/Modulation. This occurs concurrently while measuring each alignment Track. Correction for Humidity is performed via the ENTER HUMIDITY function on the Tester Front Panel. As with all INTELLIGENT SERIES Diskettes, metering of **75** Alignments is built in to maintain consistent measuring accuracy throughout the usable life of the diskette. This avoids measurement errors due to external characteristics such as residual magnetism and noise accumulations. When the Diskette meter reaches **0,** the Test aborts and notifies the operator through the Display and Printer outputs that no alignments are available on the diskette and a replacement diskette is required. For greatest convenience in multiple discipline environments, the Test may be performed in 3 modes; IN DIRECTION ONLY, OUT DIRECTION ONLY, or BOTH DIRECTIONS (to include Hysteresis) and is selectable via RAM.

DISKETTE SELECTION

These diskettes are distinguishable from the single Track versions by both the labeled information and the halved Colored Dot. See below for detailed information.

MODEL	TYPE	TPI	RPM	MEDIA	COLOR	TERM	ALIGN TRACKS
00	5 1/4	96	720	2HD	PINK	2XSDS/1.2MEG	6,12,20,26,32,40,48,54,60,66,72,76
01	5 1/4	48	300	2DD	BLUE	XT/360K	5,12,16,21,26,30,37
02	5 1/4	96	300	2DD	RED	XT/720K	6,12,20,26,32,40,48,54,60,66,72,76
03	5 1/4	96	360	2HD	BLACK	AT/1.2MEG	6,12,20,26,32,40,48,54,60,66,72,76
04	3 1/2	135	300	2DD	RED	XT/720K	5,12,19,26,33,40,47,54,61,68,77
05	3 1/2	135	300	2HD	BLACK	PS2/1.4MEG	5,12,19,26,33,40,47,54,61,68,77
07	3 1/2	135	300	2ED	BROWN	4MEG/2.88	5,12,19,26,33,40,47,54,61,68,77
10	5 1/4	48	600	2DD	GREEN	2XSDS/360K	5,12,16,21,26,30,37
11	5 1/4	96	600	2DD	ORANGE	2XSDS/720K	6,12,20,26,32,40,48,54,60,66,72,76
13	5 1/4	96	600	2HD	GOLD	1.7XSDS/1.2MEG	6,12,20,26,32,40,48,54,60,66,72,76
14	3 1/2	135	600	2DD	ORANGE	2XSDS/720K	5,12,19,26,33,40,47,54,61,68,77
16	3 1/2	135	600	2HD	GREEN	2XSDS/1.4MEG	5,12,19,26,33,40,47,54,61,68,77
17	3 1/2	135	360	2HD	BLUE	AT/1.2MEG	5,12,19,26,33,40,47,54,61,68,77

PROCEDURE
Align Row Indicator - BLINKING
Display Reading - CURRENT TRACK

Depress Key E. The Test automatically begins by performing a Seek to Track 00, verifying that the diskette type is correct and the *Number of Aligns* is greater than **0.** Beginning at the center Track, both Heads are measured from each direction (depends on mode). Then, starting from the outer test Track, each alignment Track is measured from both directions (depends on mode) until the inner test Track is reached. The Track offset is two tracks so that all test Tracks are measured under the same positioning system conditions. The Display and Printer outputs the measured alignment information for each Track. All of these values are in *micrometers.* Next, the *Head Separation* value is Printed. When this value is positive, Head 1 is positive compared to Head 0 and vice versa. This value is in *micrometers.* The Printer then outputs the calculated *Maximum Deviation.* This value is in *micrometers.* The Printer then outputs the calculated *Runout.* This value is in *micrometers.* Positive values mean the Runout is positive (or long) and vice versa.

The Tester places the positioning system at the Track/Head/Direction combination that is closest to the calculated average error measurements. The value in the Display is the error direction and distance (in *micrometers)* from this balance point. Positive values are toward the Spindle and negative values are toward Track 00. For optimal alignment adjust the drive until the value is **0.** For maximum convenience, depressing Key E when the AVERAGE value is in the Display causes the Test to restart (# ALIGNS does not decrement). This feature is used to make sure all Tracks Pass after the adjustment is made. Depress any Row Key to exit and Print the final adjustment as follows.

MULTITRACK ALIGN: uM

		HD0:IN	HD0:OUT	HD1:IN	HD1:OUT
P	TRK 040	+06 P	+04 P	+04 P	+02 P
P	TRK 005	+02 P	+00 P	P	P
P	TRK 012	+04 P	+02 P	——— P	——— P
P	TRK 019	+04 P	+02 P	——— P	——— P
P	TRK 026	+05 P	+02 P	——— P	——— P
P	TRK 033	+05 P	+02 P	——— P	——— P
P	TRK 047	+07 P	+02 P	——— P	——— P
P	TRK 054	+08 P	+02 P	——— P	——— P
P	TRK 061	+09 P	+02 P	——— P	——— P
P	TRK 068	+09 P	+02 P	——— P	——— P
P	TRK 077	+10 P	+08 P	——— P	——— P

SEPARATION: -02 uM
MAXDEV: 08 uM
RUNOUT: +08 uM
P AVTRK 040,0: < +06 uM

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BRIAN
INSTRUMENTS

UNIDAPT 450L

OPERATION AND USE

15 FEBRUARY 1990

626 S. State College Boulevard, Fullerton, California 92631
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INTRODUCTION

The UNIDAPT **450L** is an externally mounted P.C.B. Assembly that is used in conjunction with the BRIKON **723** or **QUICKLIGN 123** Series of FDD testers to extend the range of testing to include the following classes of Flexible Disk Drives:

* 5 1/4", 300/360 R.P.M., 250/300/500 KBS transfer rate.
* 3 1/2", 300/600 R.P.M., 250/500 KBS transfer rate, 34 Pin I/O.
* 3 1/2", 300/600 R.P.M., 250/500 KBS transfer rate, 34 Pin I/O (power on I/O).
* 3 1/2", 300 R.P.M, 500 KBS transfer rate, 40 Pin I/O (integrated I/O and power).
* 3 1/2", 300 R.P.M., 250/500 KBS transfer rate, 26 Pin I/O (integrated I/O and power).
* All the above configurations with CMOS/TTL Interface

The UNIDAPT **450L** is attached to the tester through the 50 Pin I/O and 4 Pin Power provided by the tester. The 34 Pin drive I/O cable from the UNIDAPT **450** is provided through a ribbon cable that has both pin style and card edge connectors. The 40 Pin I/O is card edge style only. The 26 Pin I/O is pin style and requires no cable (provided by drive). Drive Power is provided through a 4 Pin, 5 1/4" style connector with 3 1/2" adaptor included to support conventional drives.

SWITCHES

The UNIDAPT **450L** has three switches to extend the range of operation (see Figure 1) and are explained below:

S1 POWER ON/OFF - This switch is used to direct +5VDC and +12VDC (if required) to the I/O of the 26, 34 and 40 Pin interfaces. When ON, power is through the I/O on the pins as noted in Figure 1. When OFF, power is conventional through **J6** and not supplied to the I/O. The pins affected are as follows:

34 PIN INTERFACE		**40** PIN INTERFACE		**26** PIN INTERFACE	
VOLTAGE	PINS	VOLTAGE	PINS	VOLTAGE	PINS
+5VDC	5,7,9,11	+5VDC	38	+5VDC	1,3,5,7
+12VDC	29,31,33	+12VDC	40		

S2 PIN 2/9 CONTROL - This switch is used to switch the state of Pin 2 of the 34 and 40 Pin interfaces or Pin 9 of the 26 Pin interface. When in the OPEN position, these Pins will be held HIGH via the drive interface pullup resistor. When in the GND position, these Pins will be held to Ground.Drives make use of this pin to control whether high or low density (250/500 KBS), and in some cases to control spindle speed.

S3 PIN 3/11 CONTROL - This switch is used to change the state of Pin 3 of the 34 Pin interface and Pin 11 of the 26 Pin interface. In conjunction with S2, this switch is used to control the spindle motor speed on tri-speed drives (180,300,360 RPM) that have a 34 Pin interface (refer to Figure 1 for speed control settings). Some 26 Pin interfaces use this Pin for density control (see the attached page for switch settings. When in the OPEN position, these Pins will be held HIGH via the drive interface pullup resistor. When in the GND position, these Pins will be held to Ground.

SWITCH SETTINGS - 26 PIN INTERFACE

LAPTOP MODEL	FDD MODEL	FORMATTED CAPACITY	SWITCH SETTINGS S1	S2	S3
T1600	CITIZEN	720	ON	GND	OPEN
	ZA0778P02	1.44	ON	OPEN	OPEN
T1000	TOSHIBA FDD4271A0W	720	ON	OPEN	OPEN
T3200	TOSHIBA FDD4666G52	1.44	ON	OPEN	OPEN
T5100	TOSHIBA FDD4272G9Y	720	ON	OPEN	OPEN
T1200	TOSHIBA FDD4266A8W	720	ON	OPEN	OPEN
T1100	TOSHIBA BR602930-4	720	ON	OPEN	OPEN

UNIDAPT 450L LATOUT

NOMENCLATURES

J1	=	50 PIN I/O FROM TESTER
J2	=	34 PIN I/O TO DRIVE
J3	=	40 PIN I/O TO DRIVE
J4	=	26 PIN I/O TO DRIVE
J5	=	4 PIN POWER FROM TESTER
J6	=	4 PIN POWER TO DRIVE
S1	=	POWER CONTROL TO DRIVE
S2	=	PIN 2/9 CONTROL
S3	=	PIN 3/11 CONTROL

SIGNALS 34 PIN I/O

PIN	SIGNAL NAME
2	NOT USED
4	IN USE
6	DRIVE SELECT 4
8	INDEX
10	DRIVE SELECT 1
12	DRIVE SELECT 2
14	DRIVE SELECT 3
16	MOTOR ON
18	DIRECTION IN
20	STEP
22	WRITE DATA
24	WRITE GATE
26	TRACK 00
28	WRITE PROTECT
30	READ DATA
32	SIDE 1 SELECT
34	READY
5,7,9,11	GND/+5VDC (SEE S1)
29,31,33	GND/+12VDC (SEE S1)

ALL OTHER ODD PINS ARE GROUND

SIGNALS 26 PIN I/O

PIN	SIGNAL NAME
1,3,5,7	+5VDC
2	INDEX
4	DRIVE SELECT 1
6	DISK CHANGE
8	READY
9	+5VDC/GND (SEE S2)
10	MOTOR ON
11	+5VDC/GND (SEE S3)
12	DIRECTION IN
14	STEP
16	WRITE DATA
18	WRITE GATE
20	TRACK 00
22	WRITE PROTECT
24	READ DATA
26	SIDE 1 SELECT
13,15,17,19, 21,23,25	GROUND

SIGNALS 40 PIN I/O

PIN	SIGNAL NAME
2	DENSITY SELECT
4	READY
6	SELECT 3
8	INDEX
10	SELECT 0
12	SELECT 1
14	SELECT 2
16	MOTOR ON
18	DIRECTION IN
20	STEP
22	WRITE DATA
24	WRITE GATE
26	TRACK 00
28	WRITE PROTECT
30	READ DATA
32	SIDE 1 SELECT
34	DISK CHANGE
36	FRAME GROUND
38	+5 VDC
40	+12 VDC

ALL ODD PINS ARE GROUND

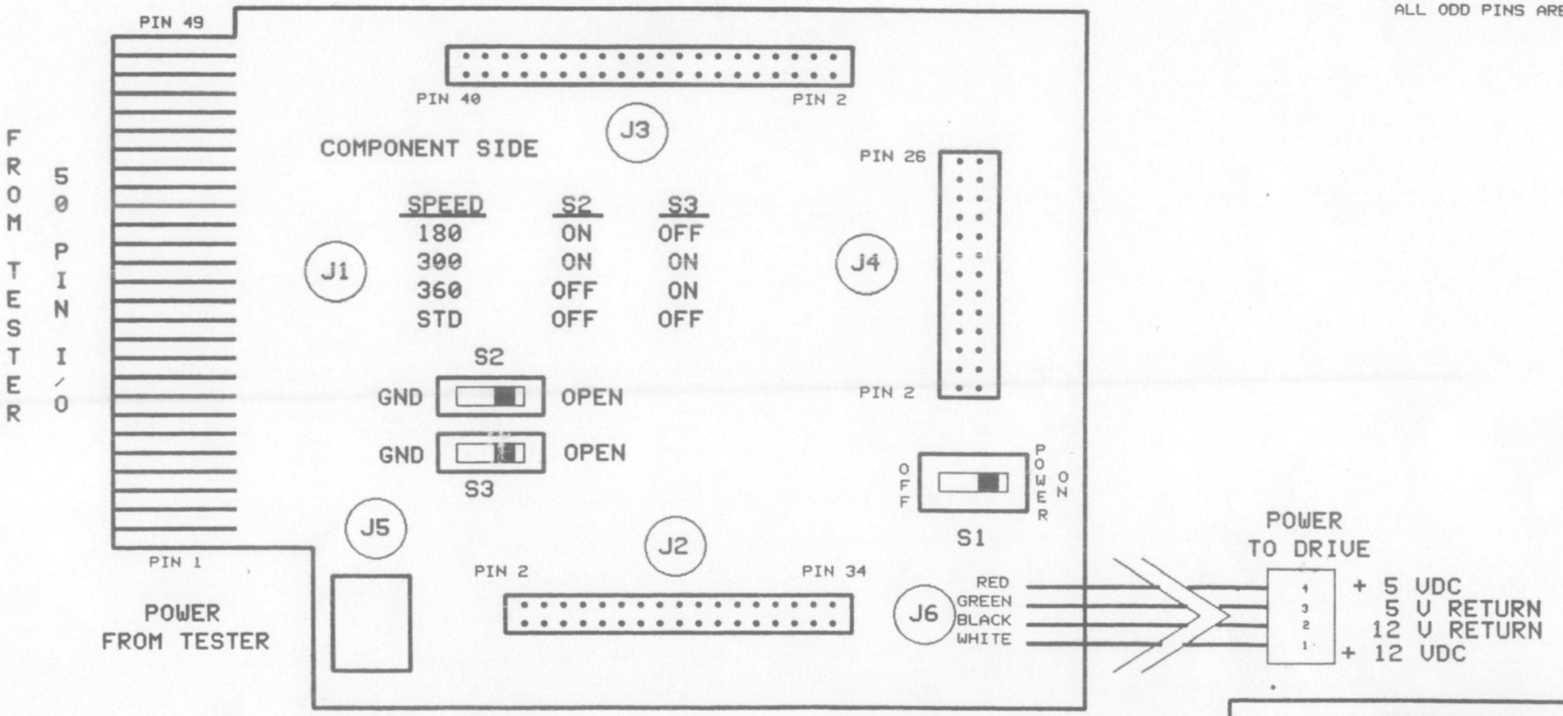

FIGURE 1

BRIAN INSTRUMENTS, INC.

UNIDAPT 450L LAYOUT

D		UNIDAPT 450L	REV : B
DATE: 1 JULY 1990			SHEET 1 OF 1

BRIAN
INSTRUMENTS

SINGLE/DUAL CHANNEL ANALOG ATTACHMENT

INSTALLATION INSTRUCTIONS

1 MARCH 1992

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INTRODUCTION

The ANALOG ATTACHMENT is comprised of a BUSS INTERFACE Board that is inside the Tester and is used to translate digital samples of the analog information for the Tester microprocessor to calculate. An ANALOG POD is supplied, which is external to the Tester and receives the analog and control signals necessary to properly perform the analog measurements provided with this option (see FIGURE 1).

INSTALLATION

1. Assure that main power to the Tester is OFF.

2. Remove the four philips screws (2 on each side) that attach the Front Bezel to the Tester. Slide the bezel forward for removal.

3. Remove the top cover by lifting *Up* at the *Front* of the unit until it clears the Front Panel. Slide *Forward* to remove.

4. Remove the READ CONTROLLER/POS Board set. It is not necessary to remove any of the power wiring from the Board. Lay the Board outside the Front of the Tester.

5. Disconnect the 20 Pin Printer I/O cable from the Z-80 Board (rear of the Board).

6. Remove the **Z-80** Board from the Tester. ~~Install any firmware provided with this Kit.~~

7. Install the 40 Pin Interconnect ribbon to the **ANALOG/PRINT I/O** Board located at the rear of the Tester. The ***Red*** stripe of the cable is toward the ***Right*** and the orientation of the cable is ***Up***, causing the other end of the cable to point to the ***Left*** and the fold of the cable to face ***Forward***.

8. ~~The Tester comes equipped with an extra twisted triplet wire set that are tie wrapped together. Remove the tie wrap. These wires are used to power the **BUSS INTERFACE**.~~
POWER MAY REMAIN CONNECTED TO Z80 BOARD OR BE TRANSFERED TO BUSS INTER-

9. Connect the triplet wires (from Step **8**) to the **BUSS INTERFACE** Board. ***Red*** (-18 V) is toward the ***Front***, ***Black*** (Ground) in the ***Middle*** and ***Green*** (+18 V) toward the ***Rear***.
FACE BOARD. POWER IS BUSSED THROUGH FRONT PANEL.

10. Install the **BUSS INTERFACE** at the left most Front Panel connector. Components face toward the ***Right***. Be sure that the connector pins are properly aligned into the connector.

11. Connect the 40 Pin interconnect cable to the BUSS INTERFACE. *Pin 1* (Red stripe) is on To*p.* Assure that the Pins are properly aligned.

12. Install the Z-80 Board in it's original location.

13. Install the READ CONTROLLER/POS in it's original location.

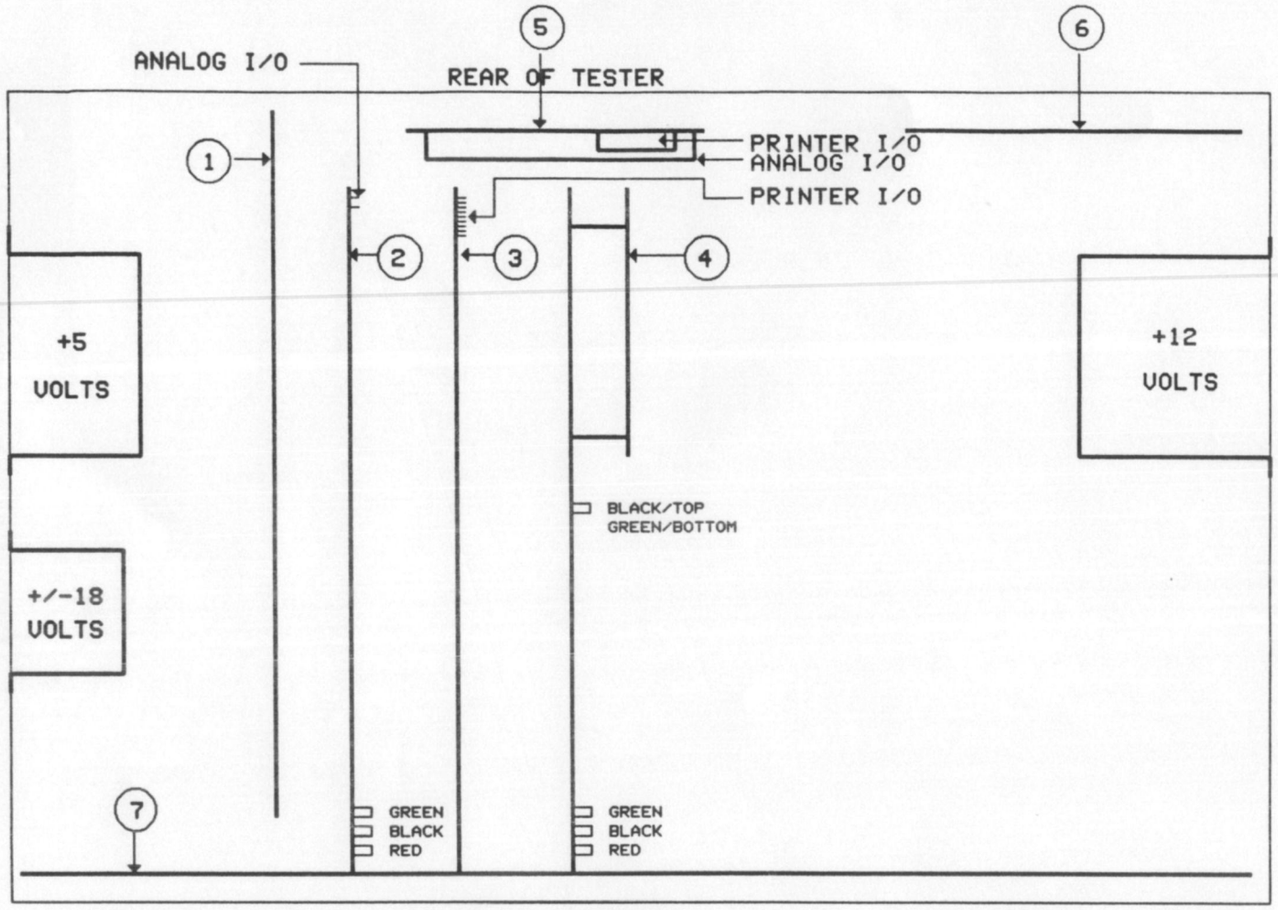
14. Connect the ANALOG RECEIVER to the 40 Pin connector outside the *Rear* of the Tester.

15. Perform Steps 2 and 3 in reverse order to install the Top Cover and Bezel.

16. Refer to the OPTION R Manual for detailed operation and use.

TESTER INSIDE LAYOUT

BRIKON/QUICKLIGN



1. POWER SUPPLY
2. ANALOG BUSS CONTROLLER
3. Z-80 BOARD
4. READ CONTROL/P-ONE SHOT
5. PRINTER/ANALOG I/O
6. POWER CONTROL
7. FRONT PANEL

FIGURE 1

BRIAN INSTRUMENTS, INC.

BRIKON/QUICKLIGN

D | | INSIDE LAYOUT | REV: A

DATE: 1 MARCH 1992 | SHEET 1 OF 1

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