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In this case, "L2" applies for data 5 and 6, then at the next address, no label is assigned, just data 7 and 8.

Any data pattern sent:

a) must be matched to the defined data-base B.

b) must be matched to the BIT-allocation of the actual Format used. This means for example, if POD2 has an active bit allocation of:
"*.*.*.*.", then only patterns between 0 and 15 can be sent to P0D2.

c) will be stored according to the actual FORMAT used. This means for example, if POD1 is inactive and (in decimal base) the data: 16, 17, 18, is sent, then 16 will will go to POD2, 17 will go to POD0 and 18 to next address, and POD2

d) will be located at the data-line defined with the last "TSA" command.
(Because "CHD" stores the sent data-patterns, it also increments this address. After "CHD", this position therefore would be the next data-line after the last line written to by "CHD"]

e) may not exceed the address of POD0 in data-line 1023

f) it is possible to leave some data patterns unchanged by leaving out values between the appropriate , ,.

C6: The first timing -value is assigned to the data-line assigned with the last "TSA" command. After "CHT", this position is modified to the next data-line after the last line written to by "CHT".
(It is possible to leave some timing-values unchanged, this is done by not including a value between the appropriate ", ,". For example:
"CHT 0,2us,,9us"
would change timing of line n (specified with "TSA") to 0.2 us,
would leave timing of line (n+1) unchanged,
would change timing of line (n+2) to 9 us.
After this command , the data-line (n+3) would be selected for next transfer]

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Commands of the PROGRAM Page

NOTE: Refer to section 3G-8, Example 11 and 12 to see how to use some of the following commands.

Description/Requirement	COMMAND DETAILS: mnem	data	Unit	Comments ref.
Program Page **Module** Assignment menu	PM	0	-	
Program Page **Trigger Event** assign. menu	PM	1	-	
Delete program module named "Label"	DPM	"Label"		C1
Add program module named "L" after last end	APM	"L","FA","SA",R		C2
Address Single Step	ASS			
Program Single Step	PSS			
Single Step from Start	SSM	0		
Single Step from JMP A	SSM	1		
Single Step from JMP B	SSM	2		
On START executive LABEL	OSTA	"LABEL"	-	C3
On JMP A executive LABEL	OJPA	"LABEL"		C3
On JMP B executive LABEL	OJPB	"LABEL"	-	C3
On CONT execute LABEL	OCON	"LABEL"		C3

Comments:

C1: Only available labels can be used. The delete-operation starts with the prgramm-line assigned to this label and ends with the next "end"-line (so called "programm-module".

C2: Only new labels can be used. "FA" and "SA" stand for "First Address" and "Last Address". Real addresses < 0 <= addr <=1023 (already defined) labels of the Data Page. The repetition of the program line is determined by R (1 <= R <= 255).

It is possible to transfer more than one program line within one command, but it must always be a complete defined line consisting of label, first and last address and repetition. (The label of the first line must be an alpha-label, the labels of the following lines can be skipped either by just sending ", ," or blank-labels. For example "" is sufficiant for sending a blank-label).

C3: Only available labels can be used.

PAGE INDEPENDENT COMMANDS

Description/Requirement	COMMAND DETAILS: mnem	data	Unit	Comments ref.
Cursor left	CL	-	-	C1
Cursor right	CR	-	-	C1
Cursor up	CU	-	-	C1
Cursor down	CD	-	-	C1
Label left	LL	-	-	C1
Label right	LR	-	-	C1
Label up	LU	-	-	C1
Label down	LD	-	-	C1
Roll left	RL	-	-	C1
Roll rigt	RR	-	-	C1
Roll up	RU	-	-	C1

Roll down	RD	-	-	C1
Clear entry	CE	-	-	C1
Update Hardware	UP	-	-	C1
Execute	EX			
Next ()	NX	-	-	C1
Previous	PV	-	-	C1
Decimalpoint	DP	-	-	C1
Don't care	DC	-	-	C1
START	SA	-	-	C1
STOP	ST	-	-	C1
Single Step	SS	-	-	C1
CONTINUE	CO	-	-	C1
PRINT SCREEN	PR	-	-	C1
PRINT ALL	PA	-	-	C1
DISABLE all outputs	DO	-	-	C1
LOCAL	LO	-	-	C1
Cursor Home	CH	-	-	
Display blank	DB	-	-	C2
Display read	DR	-		C3
Display write	DW	-		C4
Send buffered key (Returns Key-Command)	KE	-	-	
Edit Function INSERT	IN	-	-	
Edit Function DELETE	DE	-	-	
Edit Function COPY	CP	-	-	
Edit Function MOVE	MV	-	-	
Edit Function MODIFY	MD	-	-	
Edit Function FUNCTION	FU	-	-	
Power up, defaults all instruments Menus	PU	-	-	
Abort Key	AB			

Comments:

C1: This commands functions as detailed in front panel keys description at beginning of chapter 3.

C2: Display is only useful in special cases. So, before using ensure that Error message is active. Leave this function by calling "SMO" to activate Message-Process again.

C3: SYNTAX: DR <Row>, <Col>, <Byte_Count>
Where Byte_Count has maximum integer value of 1472 (23 Rows * 64 Columns)
Row is integer value with range 1 to 23
Col is integer value with range 1 to 64

C4: SYNTAX: This can be illustrated by the following to examples:
"DW 1,1,(String)" --> normal video
"DWI 1,1,(string) --> inverse video
In both cases, 1,1, are Row and Column data, and I is optional parameter specifying that string be displayed in inverse video.

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ACTION MESSAGES

Description/Requirement	COMMAND DETAILS: mnem	data	Unit	Comments ref.
Reset all parameter and data to standard setting	RST	-	-	
Device Trigger, the same function as START (KEY or POD)	TRG	-	-	
The same action as DW	DSP	ROW,COL, "STR"	-	
Works like DCL or SDC	CLR	-	-	C1

Comments:

C1: CLR reset all Error information related to HP-IB (Status-Byte) and stops the active machine (like ST).

QUERY MESSAGES

These commands are a subset of "HP Common Instrument Capabilities"

Description/Requirement	mnem	data	Unit	COMMAND DETAILS: ref.	Comments
Returns the identification "HP8175A"	IDN?	-	-		C1
Returns Status Byte content	STB?	-	-		C2
Returns Error number	ERR?	-	-		C3
Returns buffered key, the same as KE	KEY?	-	-		
Returns display content, the same as DR	DSP?	ROW,COL,COUNT			-
Returns HP 8175A status information					C4

Comments:

C1: Returns
- -- manufacturor: HP
- -- Model Number: 8175A
- -- serial-number: 0
- -- firmware-level: 1.0
- -- FSCM number: 0
- -- number which identifies installed option like .. FINE TIMING-option: 001

C2: Returns the content of the actual STATUS-BYTE currently stored in the IEC interface-chip (see definition below). Like a SERIAL POLL, this command resets the Status Byte only if the 8175A has set the SRQ.

C3: Returns the actual error-code number of the message displayed in the 8175A.

C4: Returns status-information with the following syntax:
STATUS (DATA ADDRESS, PROGRAM ADDRESS)
with STATUS=0 if stopped, 1 if running
DATA ADDRESS and PROGRAM ADDRESS are only available if the machine is stopped (STATUS =0).

LEARN STRING COMMANDS

Description/Requirement	COMMAND DETAILS: mnem	data	Unit	Comments ref.
Returns the whole Parameter set from defined location	SET?	LOC	-	C1
Accepts the restored parameter set in defined location	SET	LOC,#ALLD...D		C1
Returns DATA/TIMING and PROGRAM set from defined location	TD?	LOC		C2
Accepts the restored DATA/TIMING and PROGRAM set	TD	LOC,#ALLD...D		C2
Returns Flag Data with latched or transparent symbols	TF?	LOC	-	C3
Accepts FLAG DATA	TF	LOC,#ALLD...D		C3
Returns Input Trigger data	TQ?	LOC	-	C4
Accepts Input Qualifier data	TQ	LOC,#ALLD...D		C4

Comments:

C1: The parameter set contains Configuration and the value of all parameters (Standard and option). The location defines the source:

LOC=0 =>ACTUAL PARAMETER SET or
LOC=1 or 2 =>PARAMETER SET stored in location 1 or 2.
Without question mark the set can be restored in the same order.

C2: DATA/TIMING and PROGRAM data must be packed together. HP8175A accepts the whole string . The location defines the source:
LOC=0 => DATA/TIMING + PROGRAM of actual SET
LOC=1 or 2 => DATA/TIMING + PROGRAM of location 1 or 2
LOC3 => DATA/TIMING + PROGRAM of actual SET but preformatted for the **HARDWARE**!
Without question mark the set can be restored in the same order.
CAUTION: You can't restore a set read from location (0..2) into HARDWARE (LOC 3) or vice versa.

C3: Returns the content of OUTPUT FLAG's (and latched or unlatched symbols depending on flag-mode). The location defines the source:
LOC=0 => FLAG's of actual SET
LOC=1 or 2 => FLAG's of location 1 or 2
LOC=3 => FLAG's and TRIGGER of actua SET but preformatted for the **HARDWARE**!
Without question mark the set can be restored in the same order.
CAUTION: You can't restore a set read from location (0..2) into HARDWARE (LOC 3) or vice versa.

C4: Returns the content of INPUT TRIGGER.
The location defines the source:
LOC=0 => TRIGGER of actual SET
LOC=1 or 2 => TRIGGER of location 1 or 2
LOC=3 => FLAG's and TRIGGER of actual SET but preformatted for the **HARDWARE**! (handled identical to TF 3 or TF? 3)
Without question mark the set can be restored in the same order.

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C5: The syntax for the returned Status is: STATUS (,DATA ADDR., PROGRAM ADDR.); STATUS = 0 -> STOPPED, STATUS = 1 -> RUNNING. DATA ADDR and PROGRAM ADDR is only available if machine stopped.

SERVICE REQUEST MESSAGE

Description/Requirement	COMMAND DETAILS: mnem	data	Unit	Comments ref.
Mask Service Request	SRM	NRx	-	C1

Comments:

See section 3G-3 in this manual, for information about programming the SRQ mask.

UNIVERSAL COMMANDS

For all these commands the attention bus line (ATN) must be "true".

GTL	Go to Local
SDC	Selective Device Clear (same as CLR), Clear I/O-Buffer, stop any current Operation
DCL	Device Clear (same as CLR)
GET	Group Executive Trigger (same as TRG)
LLO	Local Lockout
SPE	Serial Poll Enable
SPD	Serial Poll Disable

Appendix A
Error Messages

This appendix comprises two sub-appendices. The first (A-1), explains "power-up self test" detected error messages. The second (A-2), lists the messages and warnings which may be displayed as a result of operator action.

Appendix A-1
Power-up Detected Error Messages

This sub-appendix explains the error messages which may be displayed, following a fault detected during the power-up self test routine. The possible messages are as follows:

ERROR MESSAGES ON POWER-UP

Processor Board ERROR

Clock Board ERROR

Data Board ERROR

In the event of any error message being displayed, it is recommended that the user contact the nearest Hewlett Packard Sales/Service Office. However, the following points should also be noted:

To confirm that an error condition exists, switch the 8175A off and on again. If the error message is again displayed, then you can under certain conditions continue using the 8175A. A choice of whether to continue using the 8175A or not will be given. This is done via the messages:

"cannot continue"
and
"press any key to continue"

Any error message indicates that a fault exists within the instrument, therefore, remember this if you decide to continue.

NOTE: There is in fact, a built in "Extended Self Test" capability which enables the fault to be localised. This is detailed in the Service manual.

Appendix A-2
Operator Action Related Error Messages

This appendix details the Error and Warning messages which may be displayed due to operator action. Almost of the messages are either self-explanatory, or explained in the relevant Menu Map section. Therefore, where an explanation is necessary, genearally a reference is made to the relevant page(s) in the manual. Two lists are include here, the second one includes the numeric error codes corresponding to each message etc. These are the codes returned when the HP-IB command "ERR?" is sent to the 8175A (see Query Messages section in list of HP-IB Commands). They therefore enable the corresponding message to be identified.

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Alphabetic List of Messages

Message	Comments
Address > 1023	
Address Single Step CONT-Mode	see page 3-55
Address Single Step INIT-Mode	see page 3-55
Delete To Remove Channel	
Delete To Remove Field	
Delete To Remove Segment Line	
Difference Display-Generator	see page 3-55
Error Address From > Address To	
Error All Names Must Be Unique	
Error Alpha Character expected	
Error Conflict Between fields	
Error Data Value Too Large	
Error Declare Printer Type	
Error Difference Between Labels	
Error Don't Care Not Allowed	
Error [end] Still Existing	
Error Entire Word Don't Care	
Error Empty Storage Location	
Error Fill Fields Before new Insert	
Error Fix Configuration Problems First	
Error Fix Problems First	
Error Generator Doesn't Fit	
Error Illegal File Name	
Error Invalid Conflict Number	
Error Invalid Duration Value	
Error Label Or Address Required	
Error Memory Exceeds	
Error Min. One 'End' Required	
Error Numeric Entry Required	
Error No '.' Between 0,1 or x	
Error No PRBS Seq. Producable	
Error Out Of Range	
Error Resolution 10ns	
Error Resolution 1us	
Error Resolution 100us	
Error Resolution 100ms	
Error Resolution 1 Cycle	
Error Resolution 0,1 KCycles	
Error Resolution 10 KCycles	
Error Resolution 1 MCycle	
Error Repetition > Avail. Program Steps	
Error Repetition Must Be > 0	
Error Space Between Digits	
Error Use Alphanumeric Keys	
Error Use Graphic-Printer	
Error Use Hex Keys	
Error Use [Next] [Prev] Keys	
Error Use 0 thru 7	
Error Use 0 thru 3	
Error Use 2 thru 4	
Error Use 2 thru 9	

Error Use 0 thru 2
Error Use 0, 1 or '.'
Error Use 0, 1 '.' or Don't Care
Error Use 0, 1 or [Prev] [Next]
Error Use 2 or 1
Error Use 2 or 3
Error Value Is Too Large
Error Value Is Too Low
Error Value Not Allowed
Error Value Out Of Range
Insert To Add Channel
Insert To Add New Segment Line
Invalid Clock Setting
Label Doesn't Exist see page 3-63
Move In Execution
Number Expected
One, * Required
Press Clear Entry To Reset SST
Press EXEC To Active Function
Press EXEC To Start Autocal
Press EXEC To Start FREQ-CAL
Press EXEC To Release Function
Printer Down
Power-up Complete
Program Single Step CONT-Mode see page 3-55
Program Single Step INIT-Mode see page 3-55
Reset Single Step see page 3-58
Roll To Change Configuration
Running Autocal see page 3-31
Running Press Stop Key First
To Continue LOAD, Press EXEC
To Continue, Press EXEC
To Overview, ex, File, Press EXEC
Transfer Failed
Transfer In Process
Use SHIFT-ROLL To Select Channel
Wait File Not Found
Wait Function In Progress
Wait Print In Progress
Warning Actual Setting Destroyed
Warning Address Required
Warning Clock Calibration Failed
Warning Clock Error Press Start
Warning Clock Too Fast
Warning Clock Too Slow
Warning End Of DATA-Setup
Warning Ignored In Slave-Mode
Warning INS/DEL In Pending Line Only
Warning Label Name Required
Warning Maximum Insert's Used
Warning Max. Segment Labels Used
Warning No Binary Channel Available
Warning Segment Name Required
Warning System HP-IB Controlled

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Error Code/Message Cross Reference

Error Code	Message	
1	Power Up Complete	
2	"_",0	
3	Command ignored	
4	Value Not Allowed	
5	Use [NEXT] [PREV] Keys	
6	Numeric Entry Required	
7	Use Hex Keys	
8	Use Alphanumeric Keys	
9	Press STOP Key First	
10	Fix Problems First	
11	DON'T CARE Not Allowed	
12	Use 0 or 1	
13	Print In Progress	
14	Use 0 thru 7	
15	Printer Down	
16	Use 0 thru 3	
17	Use 2 thru 4	
18	Value is Too Large	
19	Alpha Character Expected	
20	Use 2 or 3	
21	All Names Must Be Unique	
22	ROLL To Change Configuration	
23	Fix Configuration Problem First	
24	INSERT To Add New Label	
25	DELETE To Remove Field	
26	Label Name Reqired	
27	Value Is Too Low	
28	Maximum INSERT's Used	
29	HP-IB Address Conflict	Displayed if either the Disc Drive and/or Printer HP-IB actual addresses not as set on 8175A, and attempt made to store or print etc.
30	Machine Type Changed	Disc Drive related, if configuration to be loaded back to 8175A is different from actual.
31	Value Out Of Range	
32	Press EXECUTE To Start Autocal	
33	AUTOCAL	
34	Use 2 thru 9	
35	Use 0 thru 2	
50	One, * Required	
51	Use 0, 1 or "."	
52	Press EXECUTE to start FREQ-CAL	
53	Space between Digits	
54	Number Expected	
55	Address > 1023	
56	Label doesn't Exist	
57	Value Is Too Large	
58	Min. One 'end' Required	
59	Address Required	

60 Entire Word DON'T CARE
61 Use SHIFT-ROLL To Select Channels
62 Label Or Addr. Required
63 Function In Execution
64 Data Value Too Large
65 Address from > Address to
66 Memory Exceeds
67 End Of DATA-Setup
68 Fill Fields before new INSERT
69 INSERT To Add New Segment Line
70 MOVE In Execusion
71 Range Overlap
72 Invalid Conflict Number
73 Rept. > avail. Program Steps
74 [end] Still Existing
75 Difference Between Labels
76 Disp Scale/Dur. Incompat
77 Press Update First
78 Use 0,1 '.' or DON'T CARE
79 No '.' Between Fields
80 Conflict Between Fields
81 Press EXEC To Release Function
82 Press EXEC To Check Disc
83 Press EXEC To Activate Function
84 Transfer Failed
85 Transfer in Progress
86 Actual Setting Destroyed
87 Empty Storage Location
88 General doesn't Fit
89 Clock Calibration Failed
90 Use 0,1 or [PREV] [NEXT]
91 Max. Segment Labels Used
92 Resolution 10 ns
93 Resolution 1 us
94 Resolution 100 us
95 Resolution 10 ms
96 Resolution 1 Cycle
97 Resolution 0,1 kCycle
98 Resolution 10 kCycles
99 Resolution 1 MCycle
100 Invalid Duration Value
101 Out Of Range
102 No PRBS Seq. Producable
103 Out Of Range
104 Reset Single Step
105 Use Graphics-Printer
106 Declare Printer Type
107 Press CLEAR ENTRY To Reset SST
108 Program Single Step
109 Valid Module Required
110 Max. Segment Labels Used
111 Address Single STep
112 Ignored In Slave-Mode
113 Clock Too Fast

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114 Clock Too Slow
115 Clock Error
116 System HP-IB Controlled
117 INS/DEL In Pending Line Only
118 INSERT To Add Channel
119 DELETE To Remove Channel
120 Segment Name Required
121 DELETE To Remove Segment Line
122 No Binary Channel avail.
123 To Continue LOAD, Press EXEC
124 To Overwrite ex. File. Press EXEC
125 To Confirm, Press EXEC
126 Illegal File Name
127 File Not Found

Appendix B
Using A Printer

Introduction	B-1
Obtaining Hard Copy From A Printer	B-1
Using A Controller To Operate The Generator And Printer	B-2

INTRODUCTION

This appendix describes how to use an HP 2225A Thinkjet graphics printer in conjunction with the 8175A. The generator can be connected through an HP-IB interface cable to such a printer (and other types) that understands the HP-IB command set. The generator can control the printer to obtain hard copies of any its displays, as well as hard copies of the entire content of its data memory. This appendix lists the steps required to connect an HP 2225A to the generator and obtain hard copy.

Note that,a **Graphics** printer enables copies of all displays, including Data Page timing diagrams, to be printed. A **Text** printer will not print any graphics details, including inverse video fields etc. A "Text print" is generally significantly faster than a graphics one. The printer type that you set, determines the code for information transfer from the 8175A to an external printer.

The speed with which you can obtain a copy of a display depends upon which printer you are using. The complexity of the display you want to copy, and whether you are using a text or graphics printer. Use the following information as a guide to estimating the printer speed of your system.

Approximate time required to print the following using an HP 2225A Thinkjet graphics printer (note that the first three examples are for "Text" prints):

Small menu (e.g., Clock menu),	Text	9 sec. approx.
Large menu (e.g., Data Pattern Setup)	Text:	16 sec. approx.
Complete Data Settings (Print all)	Text:	17 min.
Timing Diagram (Waveform Setup)	Graphics:	47 sec.

OBTAINING HARD COPY FROM A PRINTER

The following procedure is written to help you hook up a printer through an HP-IB interface cable, and obtain hard copies of displays.

1. Connect an HP-IB interface cable between the generator rear panel and the printer.

2. Set address switch on the generator rear panel HP-IB System switch to the "8175A is Controller" position (switch element 8 to 0).

3. Set the printer to the "Listen Only" mode.

4. Turn on operating power at the printer.

5. Turn generator LINE power off and then on again. When the generator executes its power-up routine, it will read the position of the address switches. To check this, select the SYSTEM Page **[Peripherals]** menu , and see that the display says, "System Controller: 8175A is controller".

6. On the same menu, set (via the **NEXT[]/PREV[]** keys) a printer in the "Printer connected" field. **[Text]** or **[Graphics]** printers are selectable.

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7. Set up a display on the generator that you would like to copy and press the shift **PRINT** keys. The generator will send the commands required to obtain a complete copy of the display. If you copied a data pattern display, note that the line number which was in inverse-video is underlined in the print using HP-text and in inverse-video using HP-graphics.

9. You can obtain a copy of the data memory beyond the portion shown on the display, if desired. To do this, display the **[Pattern]** menu on screen. Then use the ROLL keys to get the first line of the desired copy on screen (if you want to start your copy at the line 0100, roll the display to the point where line 0100 is the top line on screen).

10. Press the blue shift key and **PRINT ALL** key. The generator will activate the printer and start printing with the top line on screen. It will continue to send print information to the printer until the entire content of the data memory has been printed. It will resend the heading information each time it starts a new page.

11. You can stop the print before the entire 1K memory has been printed, if desired. To do this, press the 8175A **STOP** key. When you press the **STOP** key, the generator will stop sending new information to the printer buffer. The information for the lines on screen will already be in the printer buffer. The print will continue until the last line of the present display is printed. Then it will halt.

USING A CONTROLLER TO OPERATE THE GENERATOR AND PRINTER

The printer can also be controlled via the computer, by sending HP-IB commands. This involves the following procedure:

First reset the generator address switch to the HP-IB CONTROLLED position. Set a suitable address on the printer. (Printer HP-IB address: This defaults to 01, however it can be manually set to any number between 00 and 30 if no other instrument is assigned to that address.)
Cycle the generator LINE power. Check to see that SYSTEM Page **[Peripherals]** menu shows that the generator is controlled and that it lists the printer address.

To program the commands, refer to the following program example which illustrates how to control the printer from the controller. Note that PR or PA can be used depending on the requirement.

Note that, the Status Byte (Bit 1, Print Complete) can be used to tell the controller when the print is complete. Mask Bit as explained in the Programming information section (page 3-85) to achieve this.

```
10   SEND 7;UNL                !UNLISTEN
20   SEND 7;MTA LISTEN 20      !Controller TALKER ADDRESS, 8175A LISTEN ADDRESS=20
30   SEND 7;DATA "PR",13,10    !SEND DATA "PRINT" WITH CR/LF (PR or PA)
40   SEND 7;TALK 20            !8175A TALK ADDRESS=20
50   SEND 7;UNL                !UNLISTEN
60   SEND 7;LISTEN 1           !PRINTER LISTEN ADDRESS=1
70   SEND 7;DATA               !SET ATN TO FALSE
80   END
```

Appendix C
Using The Disc Memory Accessory

CONTENTS

Introduction	C-1
Connecting The Disc Drive	C-1
Setting the 8175A as the Controller	C-2
Inputting the Disc Drive Address to the 8175A	C-2
How to start using the Disc Drive	C-2
The Storage Operations Menu	C-3
How To Load A Disc File	C-4
How To Store A New Disc File	C-4
How To Find A Disc File	C-5
How To Delete A Disc File	C-5
How To Format A Disc	C-5

INTRODUCTION

This appendix describes how to use an HP 9121S/D or 9122S/D Flexible Disc Drive as an accessory to store and load data patterns etc. It includes a shortform description of how to start using the disc drive. This goes through the basic steps necesassary for storing a file on disc.

The Disc Drive can be controlled directly by the 8175A when it (the 8175A) is set to be the HP-IB controller. Various prompts/Warnings and Error messages etc., enable easy control of all functions associated with the Disc·Drive.

If either of the dual type disc drives (D) is used, note that the 8175A can be addressed to only one of the disc units at a time.

CONNECTING THE DISC DRIVE

To connect the disc drive, do the following:

1. Connect power to the disc drive.

2. Connect an HP-IB cable form the signal generator HP-IB output to the disc drive HP-IB connector.

3. Set the HP-IB address switches on the rear panel of the disc drive to the desired operating address. More than one disc drive may be connected to the HP-IB, however, each must have a unique address assignment. Note, if you also want to control a printer at the same time, ensure that all addresses are unique!

4. Apply power to the disc drive. When power is applied to the disc drive it goes through an initialization sequence which causes the indicator lamps to momentarily light.

5. Install one or two (as appropriate) flexible discs into the disc drive by pressing the disc all the way into the disc drive unit.

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SETTING THE 8175A AS THE HP-IB CONTROLLER

To be able to control the dsic drive from the 8175A, the 8175A must be set as the HP-IB controller. This is done by simply setting switch element 8 on the (rear panel mounted) HP-IB System switch to 1. The 8175A checks the status of this switch only during the power on sequence, so you may need to switch the 8175A off and on again.

INPUTTING THE DISC DRIVE ADDRESS TO THE 8175A

The disc drive address, and the identifying number of the specific disc unit to be used, must be manually input to the 8175A. You do this via the corresponding fields on the **SYSTEM** Page [Peripherals] menu.

HOW TO START USING THE DISC DRIVE

This section is intended as a quick "Getting Started" explanation of how to use the disc drive. It describes the basic steps necessary to enable you to start using the disc drive as soon as possible. Detailed descriptions of the **[Storage] [external]** menu and how to Load, Store, Find, Delete and Format, are given after this section. You should refer to them as necessary.

To start using the disc drive (with an unformatted disc), steps 1 to 5 as previously mentioned must first be done. Then access the **SYSTEM** Page **[Storage]** menu and select **[external]** via the **PREV[], NEXT[] keys**. The 8175A will search for the disc and then display the **[Storage] [external]** menu. The basic details of the menu are described in conjunction with Figure C-1.

How to Format a disc
Before storing any settings on a new disc, the disc needs to be formatted to LIF format. This is done by positioning the cursor in the Operation field and selecting **[Format disc]**. Then press **EXEC** and move the cursor into the new setting field which will be displayed. Input a "Y" to confirm. You can now store a file on the disc, as described in the next paragraph.

How to Store a disc file
Select the Store capability of the Operation field. The **[Store]** related menu details are shown in Figure C-1. To store for example, the current display settings, do the following:

set **from Location** to **ACT**
set **File Name** (any name, 1 to 10 characters long, first must be alpha.)
set **File Type** **all**
set **Description** (optional, up to 26 characters)

Then, to actually store the data:

Press **EXEC**, the 8175A will first check the disc, then store the data. When storage is completed, the file information will be displayed under the appropriate File directory headings. If the message "No LIF directory" is displayed, then reformat the disc. (It means either, in the case of a new disc that it was not correctly formatted or, for a used disc, that it was previously formatted in some other non-LIF format)

THE STORAGE OPERATIONS MENU

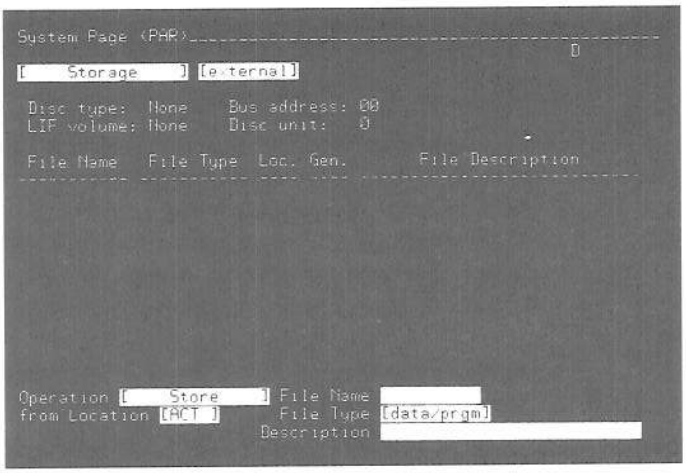


Figure C-1. **[Storage][external]** menu

Figure C-1 shows the menu as in the **[Store]** configuration. The first fields described in the following explanation are all display ones, i.e., no values can be directly set in them by the user. The lower part of the display includes all fields associated with actual storage, loading, formating etc.

DISPLAY CONTROL FIELDS	SETTINGS EXPLANATION
Disc type:	This defaults to None. When a disc is installed in the drive, and the drive has been checked (following: a disc operation such as **[Store]**, **[Delete]** etc.,or a change from **[internal]** to **[external]**, or pressing EXEC when cursor in the **[Storage]** field, then the model number of the particular disc drive will be displayed.
Bus address:	This defaults to the lowest available HP-IB address (i.e., defaults to 2 if the 8175A is set to 0, otherwise will be at address 0). It displays the actual disc drive address (when a disc is installed etc.) as set on the [Peripherals] menu.
LIF volume:	This defaults to None. A "word" will be displayed e.g., L8175A (if the 8175A initialized the disc) when the disc is read. It identifies the instrument which initialized the disc.
Disc unit:	This defaults to 0. It will display the unit number as set on the **[Peripherals]** menu when a disc is installed etc.

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File Directory Details

The File directory details for each file, depend upon the settings in the corresponding **[Store]** fields. Details are as follows:

Operation: The setting in this field determines which type of operation will be done. Each operation is described within this appendix. The **[Store]** related setting fields and their significance, are as follows:

File Name: An appropriate File name, between 1 and 10 alphanumeric characters long, begining with an alpha character, must be set here.

from Location: Four different source locations for the data are to be stored are available. Use the **NEXT[]/PREV[]** keys to select:
ACT means the current display settings.
ACT* means the hardware (output) settings.
LOC1 means from internal storage LOC1.
LOC2 means from internal storage LOC2.

Note that when **ACT*** data is loaded into the 8175A it will be transferred directly to the hardware.

File Type: Four different file types are available. Only "all" will result in the complete instrument settings being stored. For each of the others, specific types of data and/or parameters will be stored. This means also, that limited updates of the 8175A can be done, leaving for example current data settings unchanged.

data/prog means just settings associated with the DATA and PRGM Pages menus.
flags means only Flag settings.
trigger means only Trigger Word Assignment menu settings.

Description: A description, up to 26 alphanumeric characters long (as from the 8175A alphanumeric keyboard) can be user set.

The following paragraphs explain how to do Load, Store, Find, Delete and Format.

HOW TO LOAD A DISC FILE

1. Display the **[Storage] [external]** menu. This will result in the directory of the files being displayed.

2. Move the cursor into the Operation field and press the **NEXT[]/PREV[]** keys until **[Load]** is displayed. Select an existing file from those displayed. Note that a file with file Type "unknown" cannot be loaded into the 8175A. Enter the file name in the appropriate field and press EXEC to load the file from the disc. You can then select the destination location for the file. Finally, to actually load the file, press EXEC again.

HOW TO STORE A NEW DISC FILE

1. Display the **[Storage] [external]** menu. This will result in the directory of the files being displayed.

2. Move the cursor into the Operation field and press the **NEXT[]/PREV[]** keys until **[Store]** is displayed. Input the data to the various fields as required. This is described under "How to Start Using the Disc Drive" in the the opening sections.

3. Press **EXEC** to store the file on the disc.

HOW TO FIND A DISC FILE

1. Display the **[Storage] [external]** menu. This will result in the directory of the files being displayed.

2. Position the cursor in the Operation field and select **[Find]**.

3. Move the cursor into the File Name field and enter the name of the file that is to be found.

NOTE

If the file cannot be found, the message **"File not found"** will be displayed.

4. Press the EXEC key to actually find the file name in the directory. It will be indicated by a pointer >.

NOTE

The file name is located in the directory, however, the file must be loaded into the 8175A memory in a separate operation. If the file is not found, the directory pointer will be left pointing to the file that is alphabetically following the file that could not be found.

HOW TO DELETE A DISC FILE

1. Display the **[Storage] [external]** menu. This will result in the directory of the files being displayed.

2. Position the cursor in the Operation field and press the **NEXT[]/PREV[]** keys until **[Delete]** is displayed in the field.

3. Move the cursor into the Name field and enter the name of the file to be deleted. Press the EXEC key once, a prompt "To, confirm press EXEC"will be displayed. Press **EXEC** again to actually start the delete operation.

HOW TO FORMAT A DISC

CAUTION

Anything stored on the disc that is being formatted will be erased during the Format Disc operation.

When a disc is formatted the disc directory is set up to contain a maximum of 255 file name entries. The number of data files that can be stored on a disc is determined by amount of data to be stored. Normally it will be impossible to store enough data on the disc to fill the directory. The disc is formatted as follows:

1. Display the **[Storage] [external]** menu. This will result in the directory of the files being displayed.

2. Press **PREV[]/NEXT[]** keys until **[Format disc]** is displayed. No other selections are required.

3. Press the **EXEC** key. The message "Enter "Y" to confirm " will be displayed. The cursor must be moved to the entry field following the >, and a "Y" placed in that field.

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CHAPTER 4
PERFORMANCE TEST

4-1 INTRODUCTION

4-2 The test procedures detailed in this section are for electrical performance of HP 8175A units using the instrument specifications of Table 1-2 as performance standards. Access to the interior of the instruments is not necessary for any of the following tests.

4-3 EQUIPMENT REQUIRED

4-4 Equipment necessary for performance testing is listed in Table 1-1, Recommended Test Equipment. Alternative test equipment may be substituted for recommended models, provided that it satisfies the critical specifications given in the table.

4-5 TEST RECORD

4-6 A tabulated Test Record listing all of the tested specifications and their acceptable limits is provided at the end of the procedures. Test results recorded at incoming inspection will provide a reference for periodic calibration, troubleshooting and after-repair testing.

4-7 PERFORMANCE TEST

4-8 During any performance test, all shields and connecting hardware must be in place. All tests are designed to verify the published specifications. It is recommended that tests be performed in the sequence given, and that all data be recorded on the test record provided at the end of the test procedures.

4-9 Each test is arranged in the order that its specification appears in Table 1-2. Note that the instrument should be given a 30 minute warm-up period before the commencement of any of the following tests.

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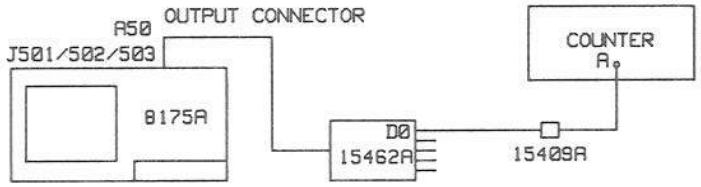
4-10 DATA CAPACITY TEST

Specification	parallel	serial
Number of channels	24	2
Bits per channel	1024	8192
Max. Bit rate per channel	50 Mbits/NRZ	100 Mbits/NRZ

Equipment:

8175A, Output Pod, Counter, 15409A

Test set up:



Procedure:

8175A: Recall Standard Settings
SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] >NEXT = [recall] Standard Settings >
EXEC

SYSTEM > NEXT = [Configuration] > CURSOR↓ = Serial Data-Generator (Ser) >
DATA > NEXT = Data [Pattern] Setup >
blue > DATA = MODIFY > 10101010 10101010 > from Address > 0 to 1023 > EXEC >
DATA > PREV = [Format] > CURSOR↓ = Period 0.02 [us] > 0.1 >
blue > EXEC = UPDATE
OUTPUT = [disabled] > NEXT = [enabled]

Counter:

TRIG LVL A 1.2, TOT A, Z=1 MOhm, GATE MODE, MANUAL

Serial Configuration Test:

1. Connect POD 0 Ch. 0 to the A input of counter and press on 8175A START.
   The counter reading must be = 4096.
   Connect POD 0 Ch. 2 to the counter. Reset counter.
   After pressing 8175A START, counter reading must be = 4096.

2. Set 8175A:
   DATA > NEXT >
   blue > DATA = MODIFY > 01010101 01010101 from Address > 0 to 1023 > EXEC >
   DATA > PREV = [Format] > CURSER↓ = Period > 0.05 [us] >
   blue > EXEC = UPDATE
   Reset counter. After pressing 8175A START, counter reading must be = 4096

3. Connect POD 0 Ch. 0 to the counter. Reset counter.
   After pressing 8175A START, counter reading must be = 4096.
   Set 8175A: Period to 0.01 us UPDATE > START.
   Counter reading must be = 4096.

Parallel Configuration Test: (same test setup)

4. Set 8175A:

   SYSTEM > CURSOR↑ = Parallel Data Generator >
   DATA > NEXT > CURSOR↓ = Address 1023 > CURSOR→ = Used Data Format >
   ROLL↑ > CURSOR→ = POD0 CH7 > 01010101 >
   10101010 10101010 10101010 (Address 0001) >
   blue > TIMING = COPY > Copy Address from > 0000 to > 0001 > 0002 > EXEC >
   blue > TIMING = COPY > Copy Address from > 0000 to > 0003 > 0004 > EXEC >
   blue > TIMING = COPY > Copy Address from > 0000 to > 0007 > 0008 > EXEC >
   blue > TIMING = COPY > Copy Address from > 0000 to > 0015 > 0016 > EXEC >
   blue > TIMING = COPY > Copy Address from > 0000 to > 0031 > 0032 > EXEC >
   blue > TIMING = COPY > Copy Address from > 0000 to > 0063 > 0064 > EXEC >
   blue > TIMING = COPY > Copy Address from > 0000 to > 0127 > 0128 > EXEC >
   blue > TIMING = COPY > Copy Address from > 0000 to > 0255 > 0256 > EXEC >
   blue > TIMING = COPY > Copy Address from > 0000 to > 0511 > 0512 > EXEC >
   blue > EXEC = UPDATE > START

5. Press 8175A START key and check each Channel of POD0, POD 1 and POD 2 for a counter reading of 512 (Pressing 8175A START).

6. Change as shown below:

Address	POD 2	POD 1	POD 0
0000	10101010	10101010	10101010
0001	01010101	01010101	01010101

   and copy it the same way as before.
   Check each Channel of POD 0 , POD 1 and POD 2 for a counter reading of 512 (pressing 8175A START).

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4-11A PATTERN DURATION WITH INTERNAL CLOCK PARALLEL MODE

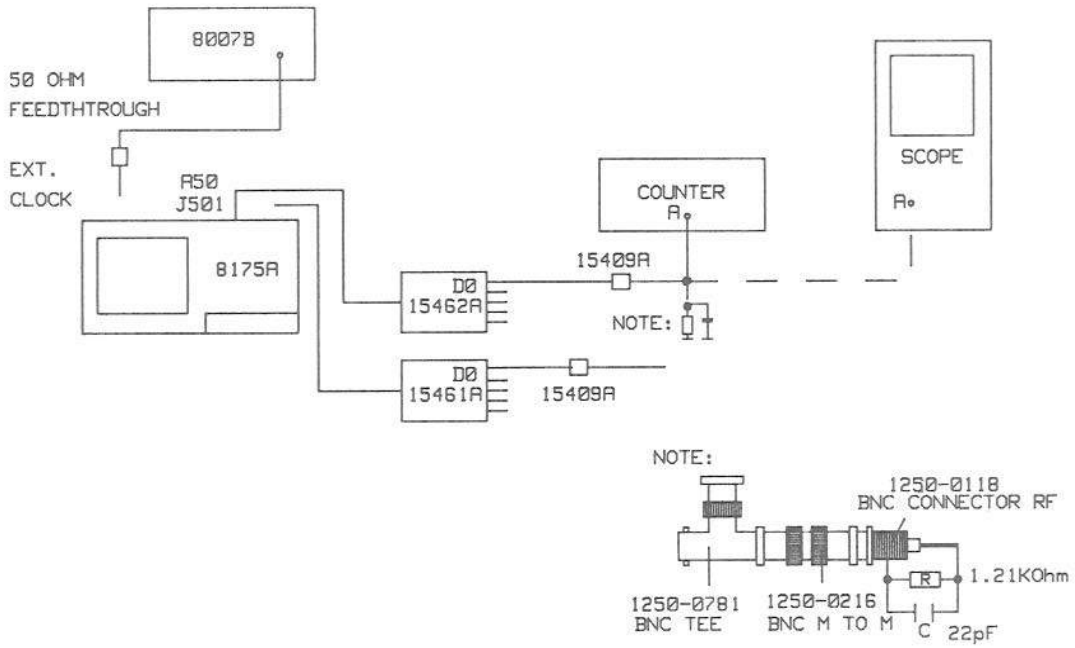
Specification:

Range	Resolution	Accuracy
(10)* 20 ns - 9.99 us	10 ns	± 0.05% of prog. duration ± 2 ns (asynchron startable)
10 us - 999 us	1 us	
1 ms - 99.9 ms	100 us	
100 ms - 9.99 s	10 ms	± 0.5% of prog. duration ± 2 ns (synchr. startable, Clock Calibration)
*10 ns in serial mode with fixed timing		± 3% of prog. duration ± 2 ns (synchr. startable, no Clock
Calibration)		

Equipment:

8175A Output POD, Counter, Time Mark Generator, Oscilloscope, 15409A

Test set up:



Procedure:

8175A: Recall Standard Setting

SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard Settings > EXEC

CNTRL = [Clock] > CURSOR↓ = Mode [Single Cycle] > NEXT = [Auto-Cycle] >
DATA = [Format] > CURSOR↓ = Label A >
blue > SYSTEM = INSERT new Label > B > CURSOR→ = POD 0/Ch 0 > NEXT = * >
DATA > NEXT = Data [Pattern] Set up > CURSOR↓ = Used Format Allocation [A] > NEXT
=[B] > CURSOR↓ = Address 0000 > CURSOR→ = Data 0 > 0 > 1 (Address 0001 = 1) > ROLL
VERNIER↓ 2x = Address 0000 >
PRGM = Module > CURSOR↓ = Segment Name PROG 1 > CURSOR→ = Label or Address
1023 > 0001 >
blue > EXEC = UPDATE >
OUTPUT = [disabled] > NEXT = [enabled] >
SYSTEM > NEXT = [store] in location [LOC1] Description > CURSOR→ = Description > P D
> EXEC > START

Set Counter:

Trigger Level A und B 1.2V
Time A --> B
Auto Trigger OFF
Gate Mode Min
Channel A⎍ and B⎍, Z=1 MOhm, COM A
Statistics Mean

1. Using the time mark generator, check the oscilloscope time base accuracy in the 0.05 usec/Div x 10 Range. Note error and take timebase error into account.
   Connect POD 0 Channel 0 to oscilloscope and check for 20 ns.
   Connect POD 0 Channel 0 to the A input of counter.
   Program counter time offset so that 20.0 ns duration (+- noted error) is displayed.
   E.G. OFFSET > (CHS) > x.x > EEX > CHS > 9 > ENTER.

2. Measure pattern duration in Mode:
   [Auto-Cycle] [asynchron] startable against Table 4-1

   Set 8175A:
   Data Page (PAR)
   Data [Format] Allocation

   After each new Period Setting press STOP > UPDATE > START

   Table 4-1

Period	Counter Reading	
	low limit	high limit
0.05 us	47.975 ns	52.025 ns
0.09 us	87.955 ns	92.045 ns
0.10 us	97.955 ns	102.05 ns
0.5 us	497.75 ns	502.25 ns
0.9 us	897.55 ns	902.45 ns
1.00 us	997.5 ns	1.0025us
5.00 us	4.995 us	5.004 us
9.00 us	8.993 us	9.007 us
50.0 us	49.97 us	50.03 us
100 us	99.95 us	100.05 us
500 us	499.75 us	500.25 us
900 us	899.55 us	900.45 us
10.0 ms	9.995 ms	10.005 ms
1.00 ms	999.5 ms	1.0005ms
9.99 ms	9.985 s	9.995 s

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3. Same test set up:
Measure pattern duration in Mode:
[Auto-Cycle] [synchron] startable. (See Table 4-2).
Set 8175A:
CNTRL > CURSOR→ 2x > NEXT = [Auto-Cycle] [synchron] startable > DATA = Period

After each new Period Setting press STOP > UPDATE > START

Table 4-2

Period	Counter Reading low limit	high limit
0.10 us	95.00 ns	105.00 ns
1 us	968 ns	1.032 ns
9.00 us	8.953 ns	9.047 us
100 us	97 us	103 us
900 us	895.5 us	904.5 us
10 ms	9.7 ms	10.3 us
1 s	970 ms	1.03 s

4. Same test set up:
Measure pattern duration in Mode:
[Auto-Cycle] [synchron] startable with [Clock Calibration]. (See Table 4-3).
Set 8175A:
CNTRL = [Auto-Cycle] [synchron] startable >
Data = Period > 0.1 (after the first Period setting) > STOP > UPDATE >
CNTRL > CURSOR→ = [Clock Calibration] > EXEC > START

After each new Period Setting press STOP > UPDATE > START

Table 4-3

Period	Counter Reading low limit	high limit
0.10 us	97.5 ns	102.5 ns
1 us	993 ns	1.007 us
9.00 us	8.728us	9.272 us
100 us	99.5 us	100.5 us
900 us	873 us	927 us
10 ms	9.95 ms	10.05 ms
1 s	995 ms	1.005 s

4-11B PATTERN DURATION WITH INTERNAL CLOCK SERIAL MODE

5. Same Test set up
Set 8175A:
SYSTEM = [Configuration] > CURSOR↓ = Serial Data Generator (SER)

CNTRL Mode: [Auto-Cycle]
or [Auto-Cycle] [synchron] startable
or [Auto-Cycle] [synchron] startable with [Clock Calibration]

DATA = [Format] >CURSOR↓ = Period > 0.1 [us]

DATA > NEXT = Data [Pattern] Set up > CURSOR→ = Both > NEXT = SER A > CURSOR↓ = BIN > PREV = HEX > CURSOR↓ = ADDRESS 0000 > CURSOR→ = Data 00 > 55 > 55 (Address 0001 = 55) > ROLL VERNIER↓ 2x

DATA > PREV = [Format] > CURSOR↓ = Period > STOP > UPDATE > START

6. Measure serial pattern duration with scope in each mode against Tabel 4-4.
After each new Period setting press STOP > UPDATE > START.

Table 4-4

Period	Counter Reading low high	low high	low high
.10 us	97.95ns 102.05ns	95.00ns 105.00ns	97.5ns 102.5ns
.02 us * .01 us	17.99ns 22.01ns 7.995ns 12.005ns	17.4 ns 22.6 ns 7.70 ns 12.3 ns	17.9ns 22.1 ns 7.95ns 12.05ns
	auto-cycle asynchr. start	auto-cycle synchr. start	** auto-cycle synchr. start with clockcal.

Note:
* Serial Pattern Duration of 0.01 µs only possible with Pod 15461A!
** After changing the Mode (e.g. asynchron, synchron), a new Clock Calibration is necessary.

(Measure slower period settings with counter, specifications see Tables 4-1/ 4-2/4-3.)

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4-11C PATTERN DURATION WITH EXTERNAL CLOCK PARALLEL MODE

7. Same Test set up: and 8007B

   Set 8175A:
   SYSTEM > PREV = [Storage] > CURSOR↓ = [store] > NEXT = [recall] from Location [LOC 1] > EXEC >
   CNTRL > CURSOR↓ = System Clock [internal] > PREV = [external from rear panel BNC] >
   DATA 2x > NEXT = Data [Format] Allocation > CURSOR↓ = Period 2 [Cyc]

   Set 8007B:

   Period 10 ns, Width min, Delay min, TT min, Ampl. +2V, NORM, +, OFFSET OFF

   Connect 8007B output signal via 50 Ohm feed through to the EXT CLOCK BNC input 8175A rear panel.

8. Measure pattern duration of Pod 15462A against Table below:

   Table 4-5

Period (Press START after each new setting!)	Counter Reading approx.
2 [Cyc]	20 ns
50 [Cyc]	500 ns
5 [KCyc]	50 us
5 [MCyc]	50 ms
50 [MCyc]	500 ms

9. On Data Page (PAR) > CURSOR↑ = Duration : [fixed] > NEXT = [variable] > DATA > NEXT = Data [Pattern] setup > CURSOR↓ = Address 0000 > CURSOR→ = Duration 2 > 10 > ROLL↑ > 100 > STOP > blue > EXEC = UPDATE > START

10. Measure on counter 1 us
    Change on counter the trigger slope: Channel A ⟍, Channel B ⟋.
    Counter reading = 100 ns.

4-12 CLOCK TEST

4-12A PERIOD WITH INTERNAL CLOCK

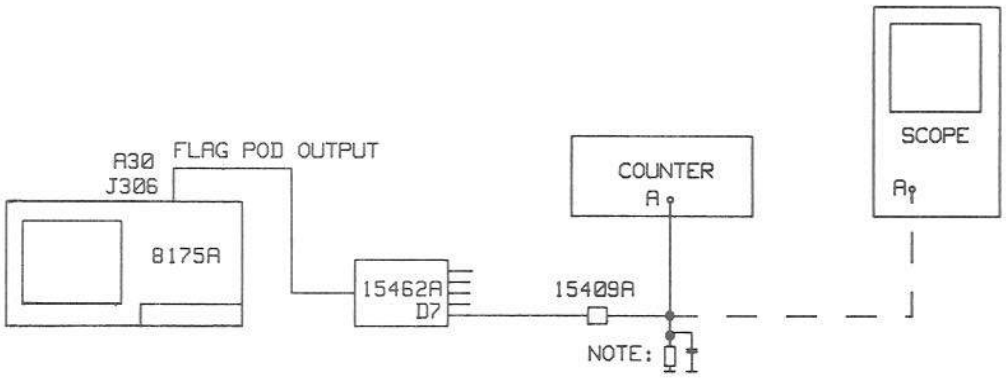
Specification:

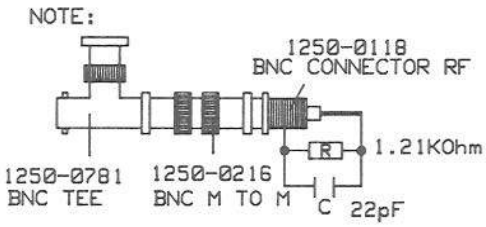
Range	Resolution	Accuracy
20 ns - 9.99 us	10 ns	± 0.05% of progr. value (asynchron startable)
10 us - 999 us	1 us	± 0.5% of progr. value (synchron startable, Clock Calibration)
		± 3% of progr. value (synchron startable, no Clock Calibration)

Equipment:

8175A, Output Pod, Counter, Time Mark Generator, Oscilloscope, 15409A

Test set up:





Procedure:

Set 8175A: Recall Standard Settings

SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard Setting > EXEC

CNTRL > CURSOR↓ = Mode [Single Cycle] > NEXT = [Auto-Cycle] > CURSOR↓ = Clock [off] > NEXT = [on] >
OUTPUT = [disabled] > NEXT = [enabled] > START

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1. Scope and Counter:

   Using the time mark generator, check the oscilloscope time base accuracy in the 0.02 usec/Div x 10 Range. Note error and take time base error into account.
   Connect Flag Pod channel 7 to oscilloscope and check for 20 ns.
   Set counter to PER A, Z = 1 MΩ , TRIG LVLA 1.2.
   Connect Flag Pod Channel 7 to the A Input of counter, and program counter time offset so that 20.0 ns period (+- noted error) is displayed.

2. Measure Clock period in either

   Auto Cycle [asynchron] startable
   or Auto Cycle [synchron] startable
   or Auto Cycle [synchron] startable with [Clock Calibration]
   against Table below.

   Table 4-6

Period of clock	auto-cycle [asynchron] startable		auto-cycle [synchron] startable		auto-cycle [synchr. startable] Clock Cal.	
	Counter Reading					
	low	high	low	high	low	high
* .10us	99.95 ns	100.05 ns	97.0 ns	103.0 ns	99.5 ns	100.5 ns
1.00us	999.5 ns	1.0005 us	970 ns	1.030 us	995 ns	1.005 us
9.00us	8.993 us	9.007 us	8.953us	9.047 us	8.728us	9.272us
**						
100 us	99.95 us	100.05 us	97 us	103 us	99.5 us	100.5us
999 us	998.5 us	999.5 us	969 us	1.029 ms	994 us	1.004ms

* Resolution [10 ns]
** Change Resolution to [1 us]

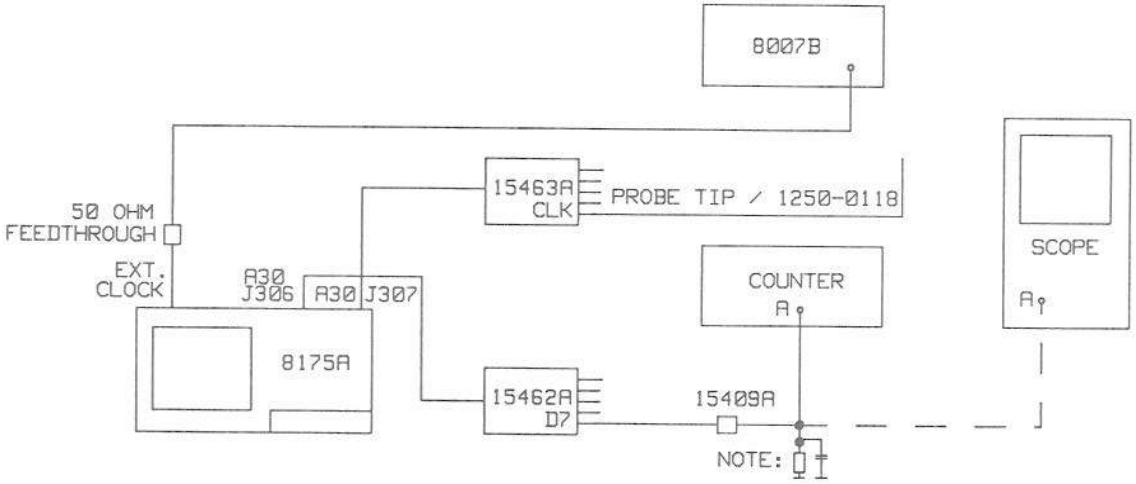
4-12B PERIOD WITH EXTERNAL CLOCK (BNC) / TRIGGER POD

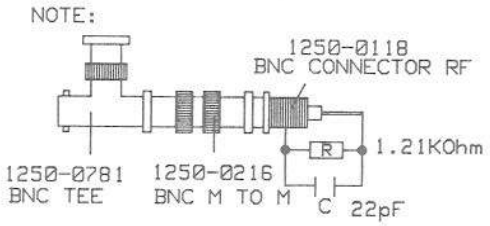
3. **Specification:** Range 2...999 [x1] x period of external clock
2...999 [x100] x period of external clock

Equipment:

Same as before and 8007B

Test set up:





Procedure:

Set 8007B
PER 100 ns, Pulse Width 50 ns, Ampl +2V, NORM, Polarity +, Delay min, Transitiontime min.

Set 8175A: CNTRL = Control Page (PAR)
System Clock: [external from rear panel BNC]

4. Measure 8007B Period for 100.00 ns with counter.
Connect 8007B output via 50 Ω feedthrough to the EXT. CLOCK BNC input 8175A rear panel.
Measure clock period of 8175A against Table 4-7.
Press START after each new setting.

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Table 4-7

8175A Period of clock	Counter Reading
2 [x1]	200.00 ns
10 [x1]	1.00 us
50 [x1]	9.00 us
100 [x1]	10.00 us
500 [x1]	50.00 us
999 [x1]	99.90 us
2 [x100]	20.00 us
10 [x100]	100.00 us
50 [x100]	500.00 us
100 [x100]	1.00 ms
500 [x100]	5.00 ms
999 [x100]	9.99 ms

5. Set 8175A back to 2 [x1] x Period of external clock.
Remove cable with 50 Ω feedthrough from EXT. CLOCK BNC Input.
Connect 8007B output signal via 1250-0118 and probe tip 10230-62101 to the clock input of trigger pod 15463A.

6. Set 8175A: CNTRL = Control Page (PAR)

System Clock: [external from Input POD]

Make the same settings as above and measure 8175A Clock period against Table above.

7. Set 8007B to 25 MHz (Width > 20 ns) measured with counter.(Max. Clock Rate Input).
Connect 8007B output to the Trigger Pod as before and measure at counter 12.5 MHz.

8. Connect 8007B output signal to counter.
Set 8007B to 100 MHz, Pulse Width min.
Set Counter to FRQA.
Measure with Counter the 8007B Rate for 100.0 MHz.

9. Connect 8007B output via 50 Ω feedthrough to the EXT. CLOCK BNC Input 8175A rear panel.
Measure at counter 50.0 MHz.

4-12C CLOCK WITH EXTERNAL REFERENCE (BNC)

10. Set 8007B Period to 1 us, Pulse width 500 nsec.
Set Counter to PER A.
Measure with counter the 8007B Period for 1.000 us and with Scope the Pulse Width for 500 ns.

11. Set 8175A: CNTRL = Control Page (PAR)
System Clock: [internal]
Period of Clock = 0.02 us Resolution [10ns]
START

12. Confirm on counter a reading of 20.000 ns.

13. Connect 8007B output to the EXT REF BNC Input at 8175A rear panel.
Observe on counter a change in reading: approx 20 ns

4-13 External Input (BNC)

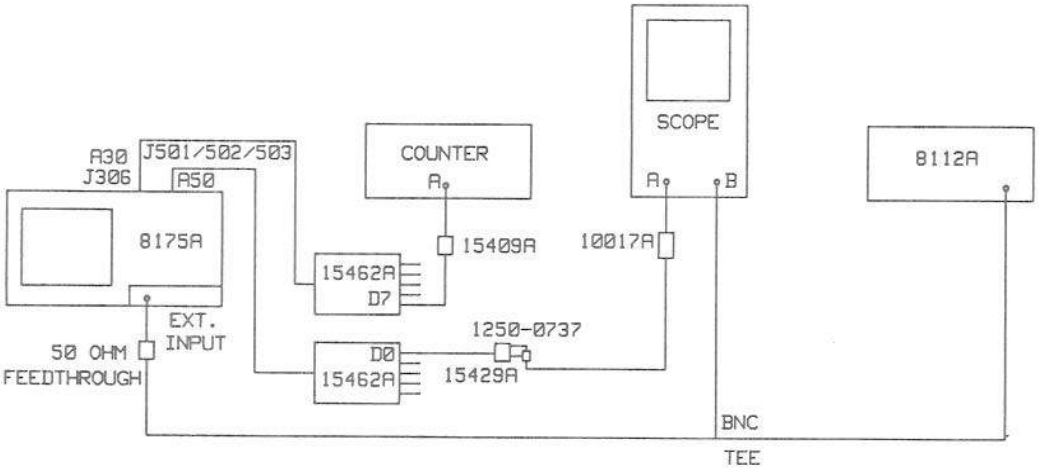
Specification:

Threshold (range / resolution)	- 9.9V to + 9.9V / 100mV
Accuracy	± 5% of progr. value ± 250mV
Min. Swing	600mV (P-P)
Min. Overdrive	250mV or 30% of input amplitude, whichever is greater

Equipment:

8175A, Output Pods, Counter, Scope, 8112A, 10017A, 15409A, 15429A

Test set up



Procedure:

8175A: Recall Standard Settings
SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard Settings > EXEC

CNTRL > CURSOR↓ = Mode > NEXT = [Auto Cycle] >CURSOR↓ = START and/or STOP from > NEXT = [external Input] > CURSOR↓ = Clock > NEXT = [on] >
DATA > CURSOR↓ = Period: > 10 [us] >
DATA > NEXT = Data [Pattern] Setup > CURSOR↓ = Address 0000 > CURSOR→ = POD 2/CH 7 > 1 24x >
PRGM > CURSOR↓ = PROG 1 > CURSOR→ = Label or Address 1023 > 0001 >
blue > EXEC = UPDATE >
OUTPUT = [disabled] > NEXT = [enabled] >
CNTRL 2x > CURSOR→ = external Input [disabled] > NEXT = [enabled] > CURSOR↓ = with START on [↑] Edge

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Set Counter:

TRIG LVLA 1.2V, PERA, Z=1MΩ

Set Scope:

Time/Div = .1 ms
ALT, INT, TRIG B CH A 1V/DIV
CH B .1V/DIV

Set 8112A:

PER 500 us	DTY 50%
HIL +2V	LOL 0V
fix TT	enable OUTPUT
Mode=TRIG	WID 999 ms

1. Observe the scope while pressing the 8112A MAN key once.
   With the positive going edge of the 8112A signal the 8175A will start.
   (On scope you see the 8175A Data signal, on counter the internal clock 20.00 ns).

2. Press the 8175A STOP > NEXT = with START on [↓] Edge.

3. Observe scope while pressing 8112A MAN once.
   With the negativ going edge of 8112A output signal the 8175A will start.
   Counter reading = 20.000 ns.

4. Press 8175A STOP > NEXT = with START on [↕] edge.

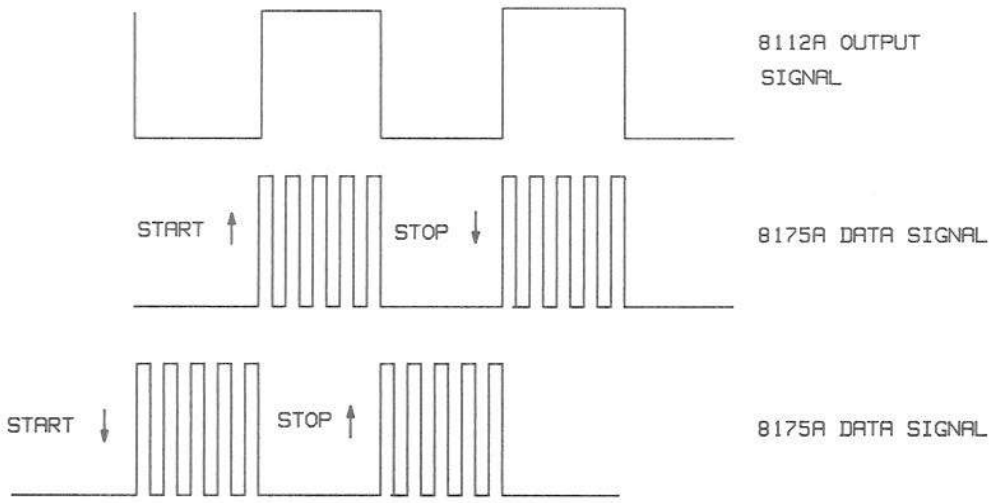
5. Observe scope while pressing 8112A MAN once.
   After the 8175A has started at the positive going edge of 8112A output signal, press the 8175A STOP and observe that 8175A will start again at the negative going edge of the 8112A output signal.

6. Press the 8175A STOP > NEXT = with START ON [↑ and STOP ↓] edge.
   Set 8112A Mode: NORM.

7. Confirm on scope that, during the positive 50% DTY of 8112A output signal the 8175A is started.

8. Press on 8175A NEXT = with START on [↓ and STOP on ↑] edge.

9. Confirm on scope that during the negative 50% DTY of 8112A output signal the 8175A is started.



10. Press 8112A output DISABLE
    Set 8112A: LOL -1.8V HIL -0.8V
    Set 8175A: CURSOR↓ = External Input Threshold [TTL] > NEXT = [ECL]

11. Enable 8112A output signal and observe on scope that, 8175A starts at the negative going edge and stops at the positive going edge in respect to the 8112A output signal.

12. Press 8175A NEXT = [+] 0.0V
    Set 8112A: HIL +0.3V LOL -0.3V

13. Observe on scope that 8175A starts at the negative going edge and stops at the positive going edge in respect to the 8112A output signal.

14. Disconnect 8112A output from 8175A EXT INPUT BNC.
    Disconnect 50 Ω feedthrough.
    Set 8175A: CURSOR→ = [+] 0.0V > 9.9.
    Set 8112A: HIL +5.5V LOL +4.5V.

15. Connect 8112A output to 8175A EXT INPUT BNC and observe on scope that 8175A starts at the negative going edge and stops at the positive going edge in respect to the 8112A output signal.

16. Set 8112A: DISABLE, LOL -5.5V, HIL −4.5V
    Set 8175A: CURSOR← = [+] > NEXT = [-]

17. ENABLE 8112A output and observe on scope that, 8175A starts at the negative going edge and stops at the positive going edge in respect to the 8112A output signal.

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4-14 SKEW

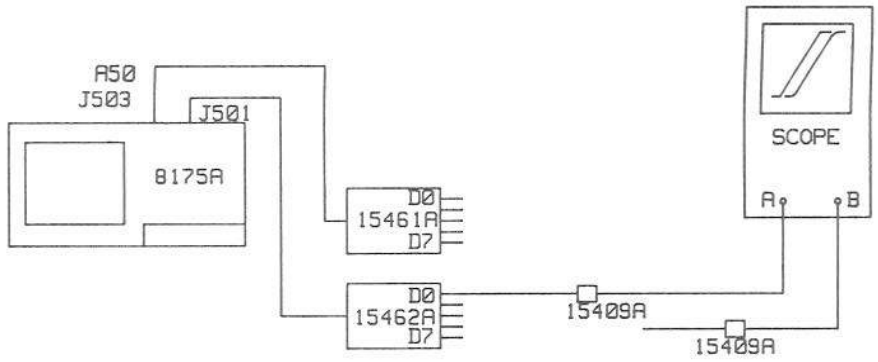
Specification:

ECL Pods:	< = 6 ns; typical < = 3 ns
TTL/CMOS Pods:	< = 7 ns; typical < = 3 ns

Equipment:

8175A, Output Pods, Oscilloscope, Time Mark Generator, 15409A 2x

Test set up:



Procedure:

8175A: Recall Standard Settings:

SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard Settings>
EXEC

CNTRL = [Clock] > CURSOR↓ = Mode > NEXT = [Auto Cycle] >
DATA > NEXT = Data [Pattern] setup > CURSOR↓ = Address 0000 > ROLL VERNIER↑ =
Address 0001 > CURSOR→ = POD 2 > 11111111 (POD 1) 11111111 (POD 0) 11111111 >
PRGM = Module > CURSOR↓ = PROG 1 > CURSOR→ = Label or Address 1023 > 0001 >
OUTPUT > = [disabled] > NEXT = [enable] >
blue > EXEC = UPDATE > START

1. Scope

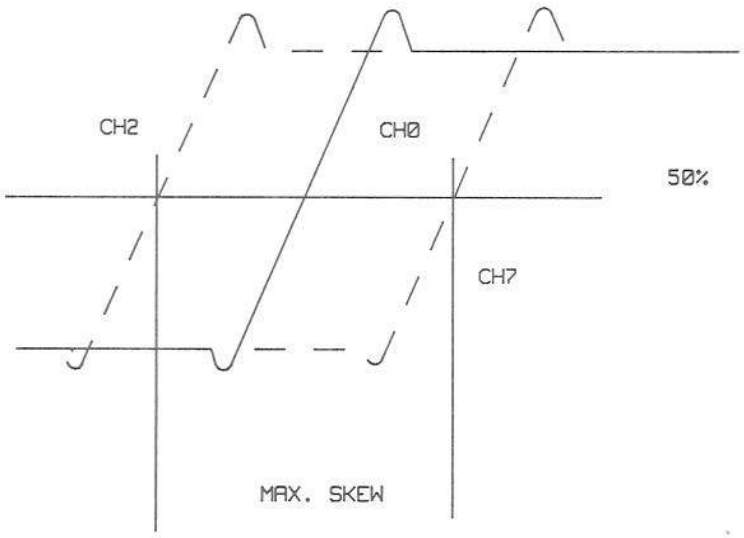
   Using the time mark generator, check the oscilloscope time base accuracy in the 10 nsec/DIV x 10 Range. Note error and take time base error into account.
   Connect POD 0 Channel 0 to oscilloscope input A, internal trigger, trigger channel A. Set scope to alternate, and both channels to DC.
   Connect in turn all other Data Channels of Pod 0 to oscilloscope channel B input.

2. With reference to the positive going edge of Channel 0, measured at 50% of amplitude, check skew for:

   ECL Pod < = 6 ns; typical < = 3 ns
   TTL Pod < = 7 ns; typical < = 3 ns

3. Check also Pod 1 Channel 0 - 7 and
   Pod 2 Channel 0 - 7

   Note: Take possible oscilloscope inter channel delay into account.



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4-15 Fine Timing Option (Delay Mode)

Specification:

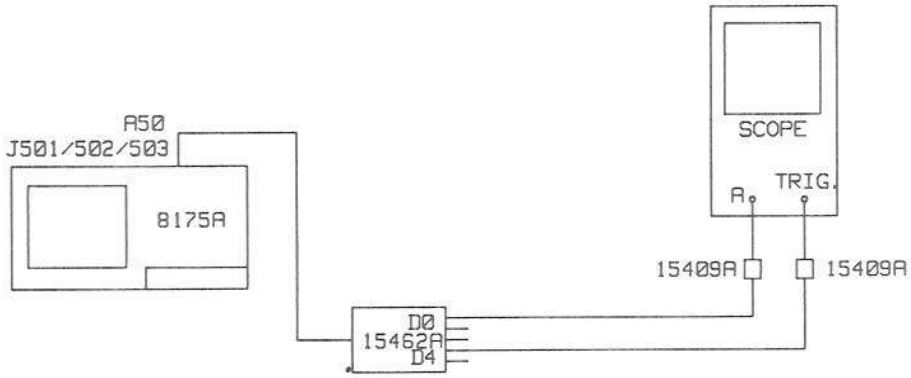
Channels 0, 1, 2 and 3 of Pod 0

Range	Resolution	Accuracy
20 ns - 40 ns	100 ps	± 5% of progr. value ± 1 ns

Equipment:

8175A, Output Pod, Scope, Time Mark Generator, 15409A 2x.

Test setup:



Procedure:

8175A: Recall Standard Settings:

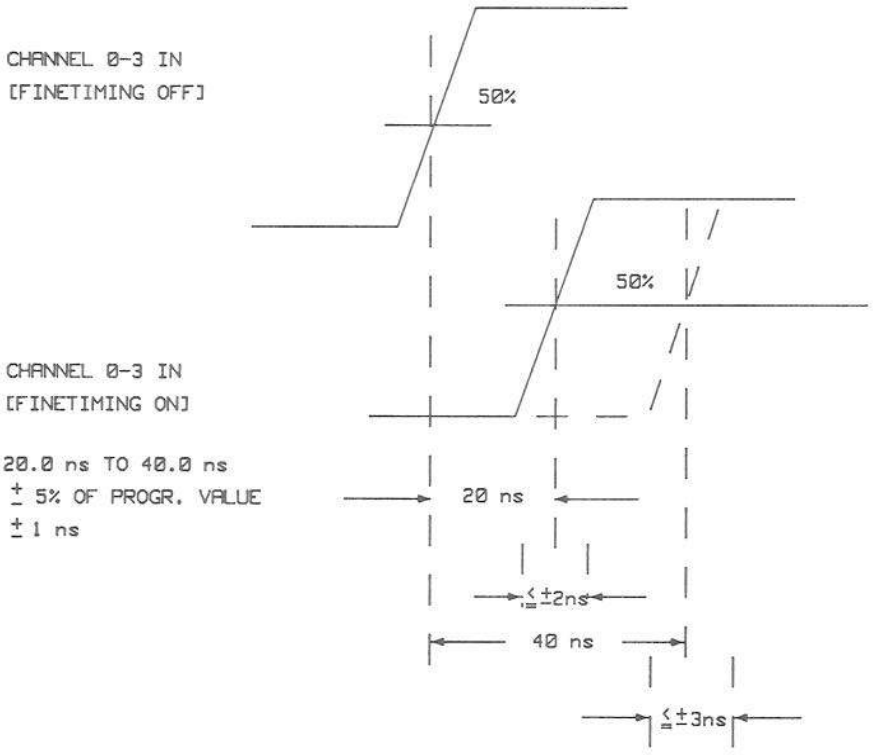
SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard settings > EXEC

CNTRL > CURSOR↓ = Mode [Single Cycle] > NEXT = [Auto Cycle] >
DATA > NEXT = Data [Pattern] Setup > CURSOR↓ = Address 0000 > CURSOR→ = Pod 2/Ch 7 > 1 24x >
DATA > PREV = [Format] > CURSOR↓ = Period: 0.02 [us] > 0.1 >
PRGM > CURSOR↓ = PROG 1 > CURSOR→ = LABEL or Address 1023 > 0001 >
blue > EXEC = UPDATE >
OUTPUT = [disabled] > NEXT = [enabled] >
TIMING > NEXT = [Fine timing on] > START

1. Using the time mark generator, check the oscilloscope time base accuracy in the 50 nsec/DIV x 10 Range. Note error and take timebase error into account.

2. Connect Pod 0 Channel 4 to oscilloscope Ext. Trigger Input. Set scope to external trigger, Mag x 1. Connect Pod 0 Channel 0 to 3 in turn to oscilloscope channel A input.

   With reference to the positive going edge of each channel in [Fine Timing off] mode: Check for a delay of 20 ns ± 2 ns, when 8175A is switched to [Fine Timing on].



3. Check delay of each channel against Table below:

   Table 4-8

8175A setting	Scope Reading low limit	high limit
25 ns	22.75 ns	27.25 ns
30 ns	27.5 ns	32.5 ns
35 ns	32.25 ns	37.75 ns
40 ns	37.00 ns	43.00 ns

4. Set 8175A delay to 20 ns and step with a resolution of 100 ps e.g. VERNIER↑ to 25.9 ns. Confirm that displayed delay increases.

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4-16 Level Test

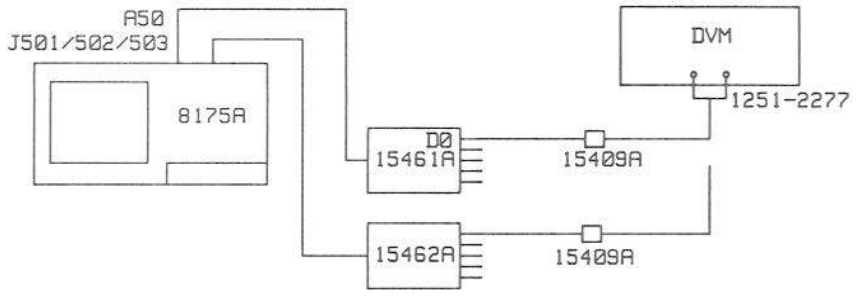
Specification:

	HP 15462A	HP 15461A
High level:	+ 2.4V/-9.9V	⩾ -1.02V
Resolution:	100 mV	
Low level :	⩽ 700 mV	⩽ -1.60V
Accuracy :	5% of progr. value ± 300 mV	

Equipment:

8175A, Output Pods, DVM, 15409A

Test set up:



Procedure:

8175A: Recall Standard Settings

SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard Settings > EXEC

DATA > NEXT = Data [Pattern] setup > CURSOR↓ = Address 0000 > CURSOR→ = Pod 2/ Ch 7 > 1 24x >
PRGM > CURSOR↓ = PROG 1 > CURSOR→ = Label or Address 1023 > 0001 >
blue > EXEC = UPDATE >
OUTPUT = [disable] > NEXT = [enable] > CURSOR↓ = [internal] > CURSOR→ = +2V

1. Measure the high level and low level at all channels of the output pod (depending on the Model) against Table below.
   Use the 8175A SINGLE STEP key to show the levels on DVM.

   Table 4-9

Output Pod	High Level		Low Level
15461A	>=- 1.02V		<=- 1.60V
15462A	low limit	high limit	
+ 2.4 V	+ 1.98 V	+ 2.82 V	>= 0.7 V
+ 3 V	+ 2.55 V	+ 3.45 V	>= 0.7 V
+ 5 V	+ 4.45 V	+ 5.55 V	>= 0.7 V
+ 9.9 V	+ 9.10 V	+10.695V	>= 0.7 V

4-17 Transition times

Specification:

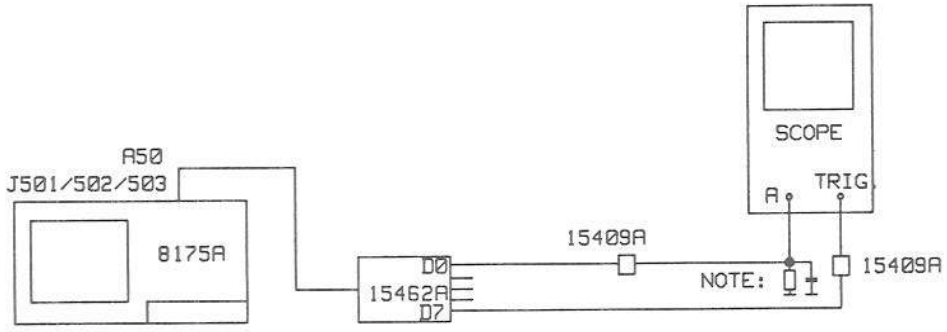
Table 4-10

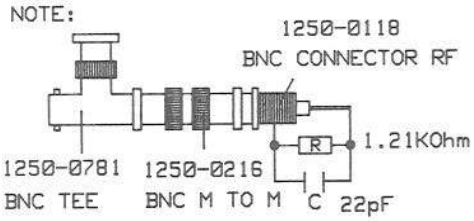
	15462A			15461A
	into open	into 50 pF		into 22pF
TT 10%-90%	<=3 ns + high level x 1.2 ns/V	<=9 ns + high level x 1.8 ns/V	TT 20%-80%	<= 3 ns
overshoot ringing	20% of amplitude into open		overshoot ringing	20% of amplitude

Equipment:

8175A, Output Pod, 10017A, 15409A 2x, 15429A

Test set up for into "50 pF":

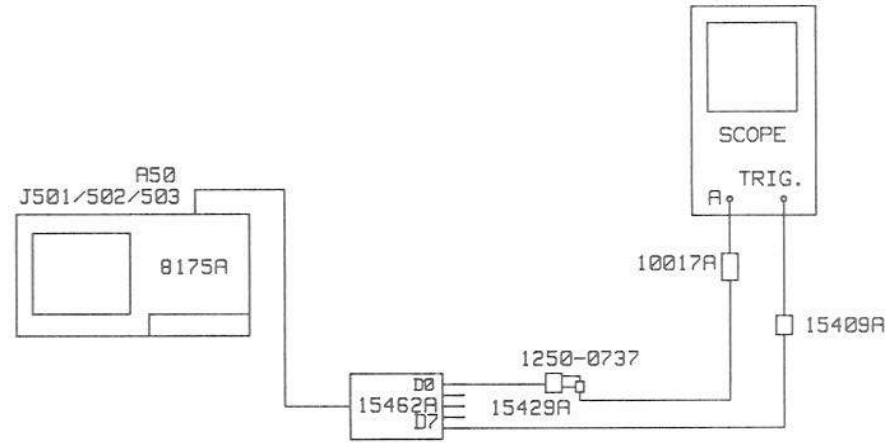


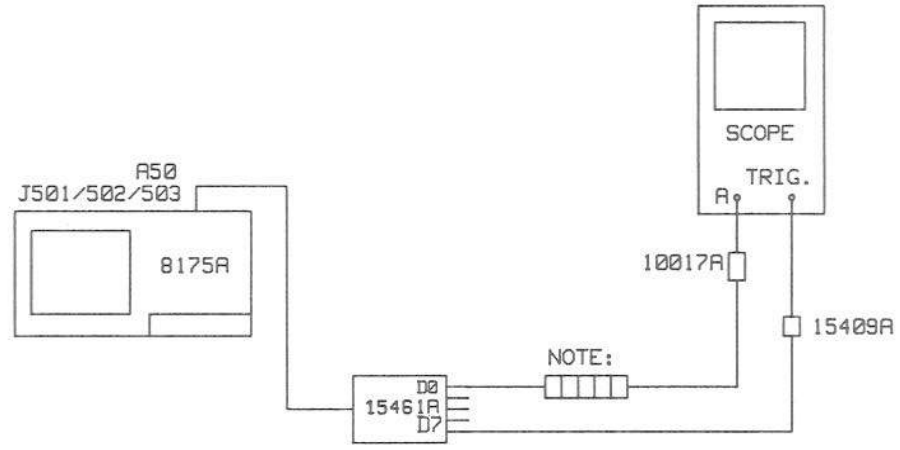


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Test set up for "into open":





NOTE:

15409A/1250-0080/1250-0216/1250-0080/1250-1454

BNC F TO F	BNC M TO M	BNC F TO F	BNC TO PROBE ADAPTER

Procedure:

8175A: Recall Standard Settings

SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard Settings > EXEC

CNTRL > CURSOR↓ = Mode [Single Cycle] > NEXT = [Auto Cycle] >
DATA > NEXT = Data [Pattern] Setup > CURSOR↓ = Address 0000 > CURSOR→ = Pod 2/Ch 7 > 1 24x >
DATA > PREV = Data [Format] Allocation > CURSOR↓ = Period > 0.10 [us] >
PRGM > CURSOR↓ = Label or Address 1023 > 0001 >
blue > EXEC = UPDATE >
OUTPUT = [disable] > NEXT = [enable] > START

Scope: Time / DIV: .02 usec Mag x 10
Trigger: Ext. +, Channel A : AC

1. Using the time mark generator, check the oscilloscope time base accuracy in the 0.02 usec/DIV x 10 Range. Take time base error into account.

2. Connect test set up for "into open".
Measure transition times of all data channels against Tabel below.

Note:
Transition times for the 15462A TTL/CMOS Pod are specifite from 10% to 90% of progr. high level, for the 15461A ECL Pod from 20% to 80% of fixed ECL level.

Table 4-11

8175A TTL/CMOS High Level	15462A	15461A
+2.4 V + 5V +9.9 V	<= 5.88 ns <= 9 ns <= 14.88 ns	<= 3 ns

3. Measure Preshoot, Overshoot and Ringing at all data channels of Pod 15461A and Pod 15462A
for ⩽ 20% of amplitude.

4. Connect Pod 15462A as shown in test set up "into 50 pF".

5. Set 8175A TTL/CMOS high level to +5.0V.
Measure transition times of all data channles for ⩽ 18 ns.

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4-18 TTL Leakage Current

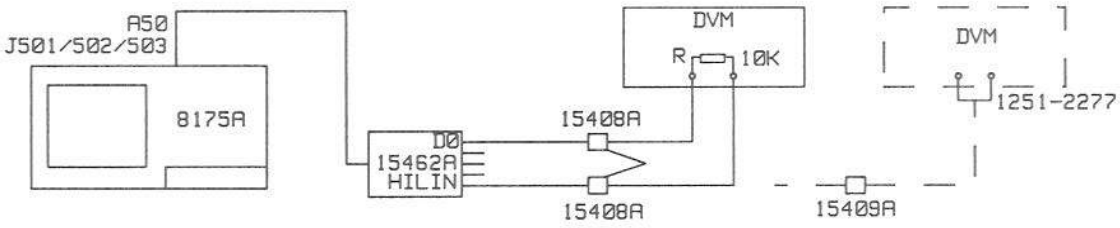
Specification:

Leakage Current ⩽ 20 uA.

Equipment:

8175A, Output Pod, Multimeter, 15408 2x

Test set up:



Procedure:

8175A: Recall Standard Settings:

SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard Settings > EXEC

CNTRL > PREV = [Simulate] Trigger Functions > CURSOR→ = TRIST on > EXEC > OUTPUT = [disable] > NEXT = [enable] > CURSOR↓ > CURSOR→ = +2.0V > 9.9

Set DVM to 20.0 V Range (Input resistance ⩾ 10 MΩ).

1. Measure with a 15409A and a 1251-2277 connected to the HIL IN cable the voltage comming out of the 15462A Pod: approx. +10V.

2. Connect the equipment as shown in test set up.
   Set DVM to 0.1V Range and measure the voltage above the terminated 10kΩ Resistor.
   The leakage current is defined as:

   ILEAKAGE = measured voltage / 10 kΩ ⩽ 20 uA

3. Repeat the above described test for all Pod output channels

4-19 TRIST T(ON), T(OFF) Pod 15462A

Specification:

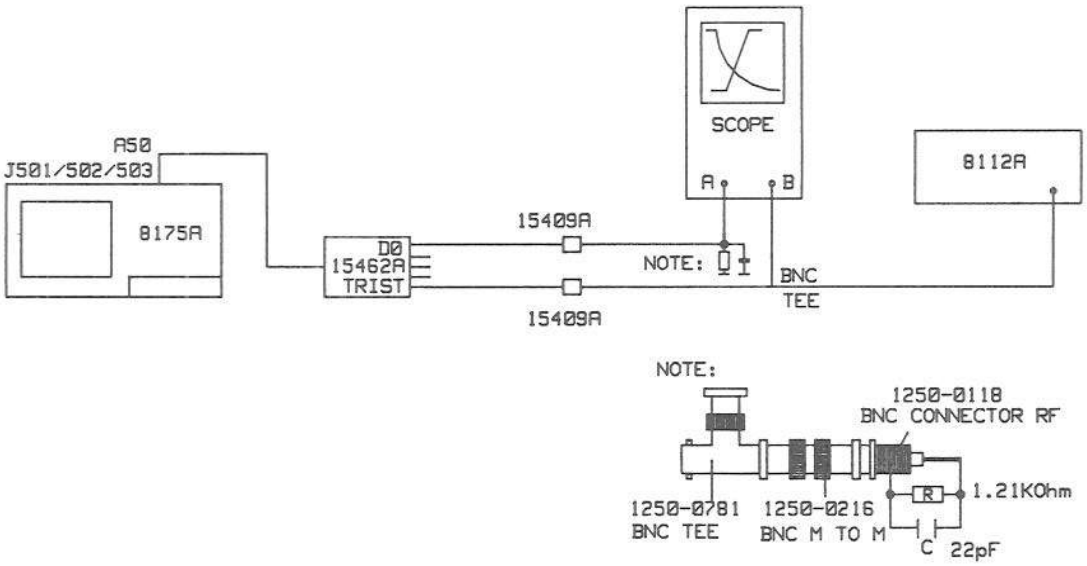
T(ON), T(OFF) ⩽ 30 ns

Time difference between occurence of external ON of OFF signal at an output pod (TRIST) until outputs are disabled or enabled.

Equipment:

8175A, Output Pod, Scope, 8112A, 15409A 2x

Test set up:



Procedure:

8175A: Recall Standard Settings

SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard Settings > EXEC

CNTRL > CURSOR↓ = Mode > NEXT = [Auto Cycle] >
DATA > NEXT = Data [Pattern] Setup > CURSOR↓ = Address 0000 > CURSOR→ = Pod 2/Ch 7 > 1 24x > Address 0001 also all 1 >
PRGM > CURSOR↓ > PROG1 > CURSOR→ = Label or Address 1023 > 0001 >
OUTPUT = [disabled] > NEXT = [enable] > CURSOR↓ > CURSOR→ = +2.0V > 5 >
blue > EXEC = UPDATE > START

8112A:	PERIOD:	2 us
	Delay:	min
	DTY	50%
	TT	fix
	HIL	+5V
	LOL	0V

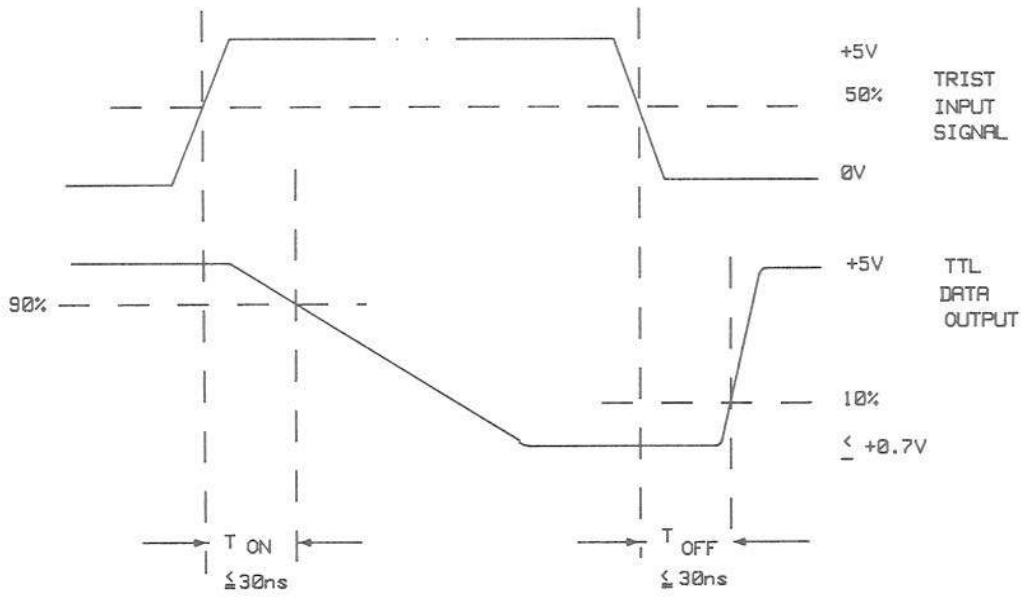
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Scope:

Time/DIV: .01 usec, Trigger INT +, ALT B.
Channel A: 1 V/DIV, DC,
Channel B: 1 V/DIV, 50 Ω.

1. Measure the propagation Delay of the output signal with respect to the TRIST input signal (see Figure). Use Scope Trigger to measure T(OFF).



2. With same test set up measure the threshold level. Vary the TRIST input amplitude slowly down, until the Data Output is no longer stable. This must be at 35% of progr. high level ± 800 mV.

Table 4-12

TTL/CMOS Pod 8175A High Level internal	min. TRIST input LOL 0v HIL
+ 2.4 V + 5.0 V + 9.9 V	+ 0.8V + 800 mV +1.75V +-800 mV +3.46V +-800 mV

3. Repeat the above described test for all Pod output channels.

4-20 $\overline{EN}$ T(ON), T(OFF) Pod 15461A

Specification:

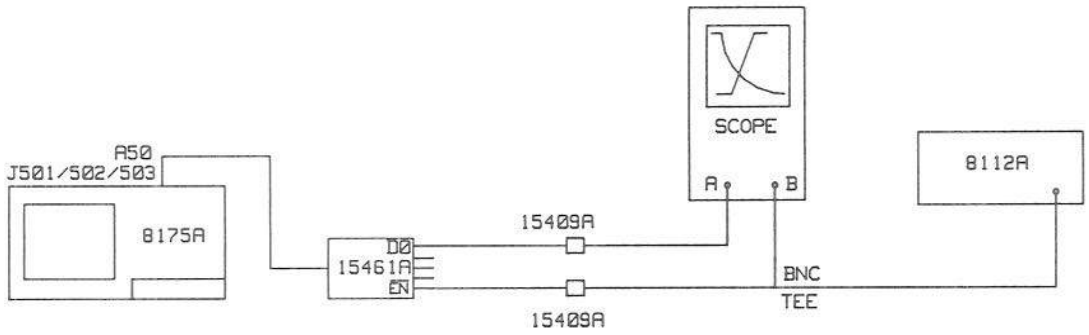
T(ON), T(OFF) ⩽ 15 ns

Time difference between occurence of external ON or OFF signal at an output pod ($\overline{EN}$) until outputs are enabled or disabled.

Equipment:

8175A, Output Pod, Scope, 8112A, 15409A 2x

Test set up:



Procedure:

8175A: same setting as for
Trist. T(ON), T(OFF)

Scope: same setting as for
Trist. T(ON), T(OFF)

8112A: HIL = - .8V
LOL = - 1.8V

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1. Measure the propagation delay of the output signal with respect to the $\overline{EN}$ input signal (see figure below).

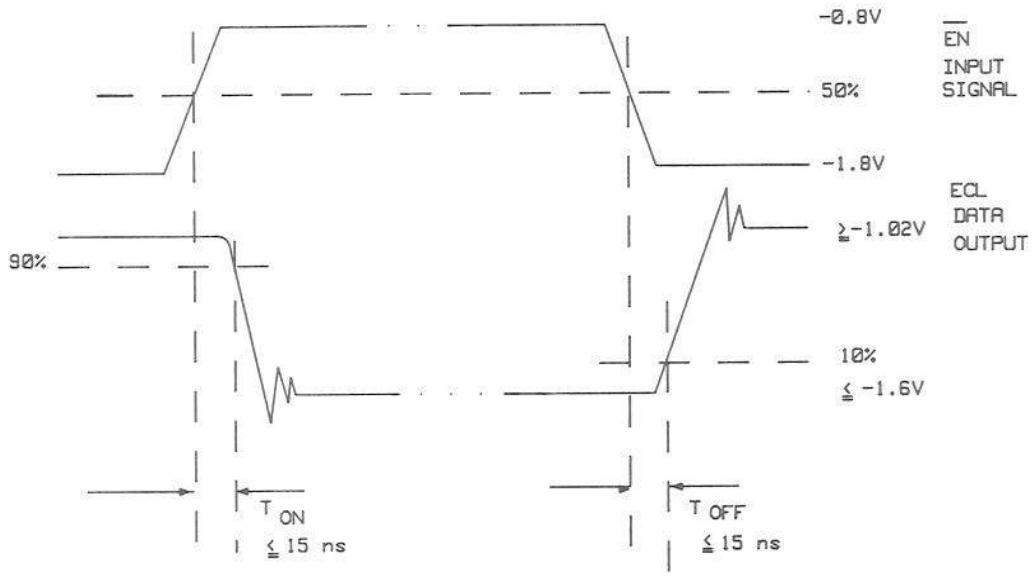


Figure Propagation delay T(ON)/T(OFF) with respect to $\overline{EN}$ input signal

2. Repeat the above described test for all Pod output channels

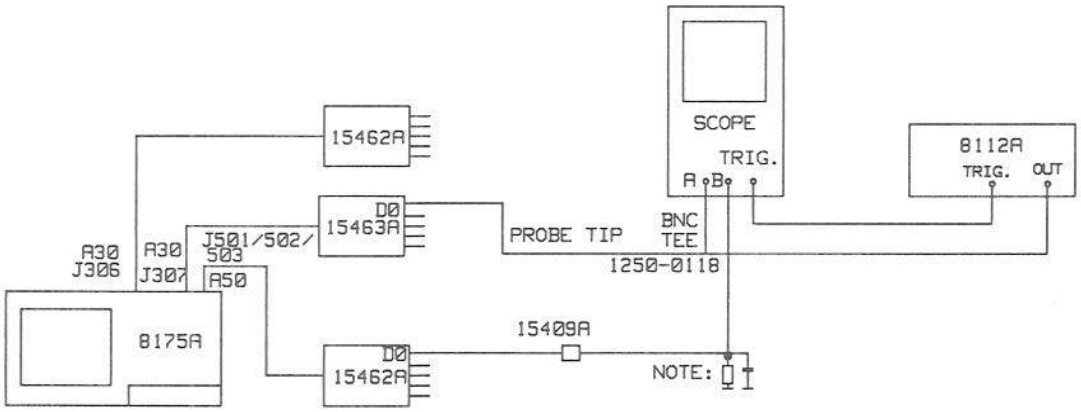
4-21 Trigger Pod

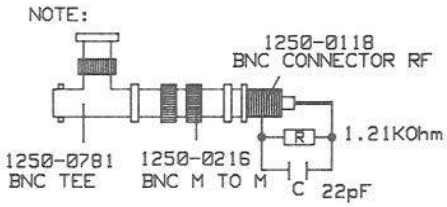
A. Trigger Word
Start/Stop Function

Equipment:

8175A, Output Pod, Trigger Pod, Scope, 15409A, 8112A

Test set up:





Procedure:

8175A: Recall Standard Settings

SYSTEM > NEXT = [Storage] > CURSOR↓ = [store] > NEXT = [recall] Standard Settings > EXEC

CNTRL > CURSOR↓ = Mode > NEXT = [Auto Cycle] > CURSOR↓ = Trigger Pod [disabled] > NEXT = [enabled] > CURSOR↓ = Trigger Pod Threshold: [TTL] > NEXT 2x = [+] 0.0V > CURSOR→ > 1 >
CNTRL > NEXT = [Input] Trigger Word Assignment > CURSOR↓ = Start > DON'T CARE 7x > 1 > DON'T CARE 7x > 0 >
DATA > CURSOR↓ = Period > 1 > NEXT = [ms]
DATA > NEXT = Data [Pattern] setup > CURSOR↓ = Address 0000 > CURSOR→ = Pod 2/Ch 7 > 1 24x >
PRGM > CURSOR↓ = PROG 1 > CURSOR→ = Label or Address 1023 >0001 >
blue > EXEC = UPDATE >
OUTPUT = [disable] > NEXT = [enabled]

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Set 8112A:

Mode	Norm	DTY	50%
PER	50 ms	HIL	+2V
TT	fix	LOL	0V

Set Scope:

Ext. Trigger, CHOP, Time: 5ms/DIV
CHA: 1V/DIV, 50 Ohm CHB: 1V/DIV DC

1. Connect 8112A output signal via BNC TEE, 1250-0118 probe tip to scope and Trigger Pod 15463A.
   Confirm on Scope that during the positive part of 8112A signal, the 8175A produces an output pattern.
   Disable 8112A output signal.

2. Set 8175A:

   CNTRL 2x > NEXT = [Flag] Assignment in [Transparent] Mode > CURSOR↓ = Trigger Word 0000 0000 > CURSOR→= Flag Pattern > 1 8x >
   blue > EXEC = UPDATE

3. Connect the Flag Pod Ch0 to 15409A on scope CHB (instead of Output Pod).

4. Enable 8112A output and confirm on scope that an inverted signal in respect to the 8112A output signal, is produced.

5. Check all Flag Pod channels.

6. Reconnect output Pod Ch0 to Scope.
   Disable 8112A output.

B. Tristate on/off Function

1. Same Equipment and test set up as for A.
   Set 8175A:

   CNTR [Input] Trigger Word Assignment

   CURSOR↓ = Start > . 8x > . 8x (for Stop) > CURSOR↓ = Tristate on > DON'T CARE 7x > 1 > DON'T CARE 7x > 0 (for Tristat off) >
   blue > EXEC = UPDATE > START

2. Enable 8112A output signal and confirm on scope that, during the positive part of 8112A signal the 8175A Data Output is tristated.
   Disable 8112A output.

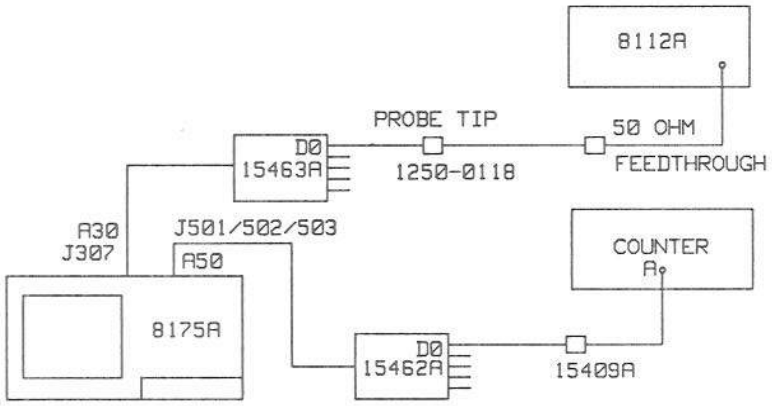
C. Trigger Word

JMPA/JMPB Function

Equipment:

8175A, Output Pod, Trigger Pod, Counter, 8112A

Test set up:



Procedure: 8175A

DATA = Data [Pattern] Setup >
blue > PRGM = FCTN > [INCREMENT] > CURSOR→ = from 1 to 1023 > EXEC >
DATA > PREV = Data [Format] Allocation > CURSOR↓ = Duration [fixed] > NEXT = [variable] > CURSOR↓ = Data Format Label A >
blue > SYSTEM = INSERT > B > CURSOR→ = Pod 0/Ch 0 > NEXT = * >
DATA > NEXT = Data [Pattern] Setup > CURSOR↓ > NEXT = B > CURSOR↓ = Address 1023 > ROLL↑ = Address 2 > CURSOR→ = Location Name > PROG 2 >
blue > DATA = MODIFY > CURSOR→ = Duration > NEXT = 0.02 [us] > 0.1 > CURSOR→ = [us] > NEXT = [ms] > CURSOR→ = from Address > 2 to 512 > EXEC >
ROLL↑ = Address 0513 > CURSOR→ = Location name > PROG 3 >
blue > DATA = MODIFY > CURSOR > NEXT = 0.02 [us] > 0.2 > CURSOR→ > NEXT = [ms] > CURSOR→ = from Address 513 to 1023 > EXEC >
PRGM = [Module] Assingment > CURSOR↓ = PROG 1 > ROLL↑ = [end] >
blue > SYSTEM = INSERT > PROG 2 from 2 to 512 Repetition Times 100 > ROLL↑ = [end] >
blue > SYSTEM > INSERT > PROG 3 from 513 to 1023 Repetition Times 050 >
PRGM > NEXT = [Trigger Event] Assignment > CURSOR↓ = On JMPA execute [PROG 1] > NEXT = [PROG 2] > CURSOR↓ = On JMPB execute > PREV = [PROG 3] >
CNTRL 2x > NEXT = [Input] Trigger Word Assignment > CURSOR↓ = JMPA > DON'T CARE 7x > 1 > DON'T CARE 6x > 1 0 > . 8x > . 8x
blue > EXEC = UPDATE > START

Set Counter:

TRIG LVL both +1.2V
TIME A --> B, COM A, Z=1MΩ
CHANNEL A ⎍, CHANNEL B ⎎

Set 8112A:	Mode	TRIG
	WID	30 ns
	LOL	0V
	HIL	+2V
	TT	⎍ fix
		ENABLE

1. Measure at Counter 20 ns Pattern Duration with the 8112A output signal supplied via 50Ω feedthrough, 1250-0118 and probtip to CH0 of the Trigger Pod.
   Press the 8112A MAN pushbottom once.
   Observe on counter a reading of 100.00 us.
   After a view seconds counter will show again 20 ns.

2. Connect 8112A output signal to CH1 of 15463A.
   Press 8112A MAN again and observe on counter a reading of 200.00 us for a short time.

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D. Valid Trigger Word Duration

1. Set 8175A:

   CNTRL > NEXT = [Clock] > CURSOR↓ = Valid Trigger Wod Duration [20] ns > NEXT = [50] ns.

   Connect 8112A output signal to 15463A CH0.

2. Press 8112A MAN key once, counter reading should show 20 ns.

3. Change 8112A: WID 60 ns
   Press 8112A MAN key once, counter reading should be 100.00 us.
4. Check also [100] [200] and [500] ns Trigger Word Duration, with the supplied 8112A signal width of 100 ns, 200 ns and 500 ns.
   After each new setting press 8112A MAN key once.

E. Pod Input Threshold

Treshold (range/resolution)	-9.9V to +9.9V/100mV
Accuracy	± 2.5% of progr. value ± 120mV
Min. Swing	600mV (P-P)
Min. Overdrive	250 MV or 30% of input amplitude, which ever is greater

Same test set up and settings as before:

1. Set 8112A: LOL -1.8V HIL -0.8V
   Set 8175A:

   CNTRL > = [Clock] > CURSOR↓ = Trigger Pod Threshold [TTL] > NEXT = ECL > START

2. Counter reading is 20 ns. After pressing 8112A MAN key once, counter should show 100 us for a short time.

3. Disconnect 8112A output from 15463A CH0.
   Disconnect 50Ω feedthrough and reconnect 8112A output to CH0.

4. Set 8175A: on Control Page (PAR)
   Pod Input Threshold: [+] 9.9V
   Set 8112A: HIL +5.5V LOL +4.5V

5. Counter reading is 20 ns. After pressing 8112A MAN pushbottom once, counter shows 100 us for a short time.

6. Set 8175A: Pod Input Threshold [-] 9.9V
   Set 8112A: LOL -5.5V HIL -4.5V
   Procedure and Counter readings same as before

7. Set 8175A: Pod Input Threshold [-] 1.0V
   Set 8112A: HIL =0.40V LOL -0.7V
   Procedure and Counter readings same as before.

PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-10	**Data Capacity Test**				
Step 1	Counter Reading				
	POD0-CH0	4096			4096
	POD0-CH2	4096			4096
Step 2	POD0-CH2	4096			4096
Step 3	POD0-CH0	4096			4096
	POD0-CH0	4096			4096
Step 5	POD0-CH0	512			512
	POD0-CH1	512			512
	POD0-CH2	512			512
	POD0-CH3	512			512
	POD0-CH4	512			512
	POD0-CH5	512			512
	POD0-CH6	512			512
	POD0-CH7	512			512
	POD1-CH0	512			512
	POD1-CH1	512			512
	POD1-CH2	512			512
	POD1-CH3	512			512
	POD1-CH4	512			512
	POD1-CH5	512			512
	POD1-CH6	512			512
	POD1-CH7	512			512
	POD2-CH0	512			512
	POD2-CH1	512			512
	POD2-CH1	512			512
	POD2-CH2	512			512
	POD2-CH3	512			512
	POD2-CH4	512			512
	POD2-CH5	512			512
	POD2-CH6	512			512
	POD2-CH7	512			512
Step 6	POD0-CH0	512			512
	POD0-CH1	512			512
	POD0-CH2	512			512
	POD0-CH3	512			512
	POD0-CH4	512			512
	POD0-CH5	512			512
	POD0-CH6	512			512
	POD0-CH7	512			512

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PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
	POD1-CH0	512			512
	POD1-CH1	512			512
	POD1-CH2	512			512
	POD1-CH3	512			512
	POD1-CH4	512			512
	POD1-CH5	512			512
	POD1-CH6	512			512
	POD1-CH7	512			512
	POD2-CH0	512			512
	POD2-CH1	512			512
	POD2-CH2	512			512
	POD2-CH3	512			512
	POD2-CH4	512			512
	POD2-CH5	512			512
	POD2-CH6	512			512
	POD2-CH7	512			512

PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-11A	**Pattern Duration with internal Clock Parallel Mode**				
Step 1	POD0-CH0	17.99ns			22.01ns
Step 2	Auto-Cycle asynchron startable				
	Period				
	0.05us	47.975ns			52.025ns
	0.09us	87.995ns			92.045ns
	0.10us	97.955ns			102.05ns
	0.5 us	497.75ns			502.25ns
	0.9 us	897.55ns			902.45ns
	1.00us	997.5 ns			1.0025us
	5.00us	4.995 us			5.004 us
	9.00us	8.993 us			9.007 us
	50.0us	49.97 us			50.03 us
	100.us	99.95 us			100.05us
	500 us	499.75us			500.25us
	900 us	899.55us			900.45us
	10.0ms	999.5 ms			10.005ms
	1.00ms	9.995 ms			1.0005s
	9.99ms	9.985 s			9.995 s
Step 3	Auto-Cycle synchron startable				
	Period				
	0.10us	95.00ns			105.00ns
	1 us	968 ns			1.032 us
	9.00us	8.953ns			9.047 us
	100 us	97 us			103 us
	900 us	895.5us			904.5 us
	10 ms	9.7 ms			10.3 us
	1 s	970 ms			1.03 s

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PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
Step 4	Auto-Cycle synchron startable with Clock Calibration				
	Period				
	0.10us	97.5 ns			102.5ns
	1 us	993 ns			1.007us
	9.00us	8.728us			9.727us
	100 us	99.5 us			100.5us
	900 us	873 us			927 us
	10 ms	9.95 ms			10.05ms
	1 s	995 ms			1.005s

PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-11B	**Pattern Duration with internal Clock Serial Mode**				
	Auto-Cycle asynchron startable				
	Period				
	.10 us	97.95 ns			102.05ns
	.02 us	17.99 ns			22.01 ns
	.01 us	7.995 ns			12.005ns
	Auto-Cycle synchron startable				
	Period				
	.10 us	95.00 ns			105.00 ns
	.02 us	17.4 ns			22.6 ns
	.01 us	7.7 ns			12.3 ns
	Auto-Cycle synchron startable with Clock Calibration				
	Period				
	.10 us	97.5 ns			102.5 ns
	.02 us	17.9 ns			22.1 ns
	.01 us	7.95 ns			12.05 ns
4-11C	**Pattern Duraton with external Clock**				
Step 8	Period	approx.			approx.
	2 Cyc.	20 ns			20 ns
	50 Cyc.	500 ns			500 ns
	5 KCyc.	50 us			50 us
	5 MCyc.	50 ms			50 ms
	50 MCyc.	500 ms			500 ms
Step 10	variable Duration				
		1 us 100ns			1 us 100ns

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PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-12 **4-12A**	**Clock Test** **internal Clock**				
Step 1	Period of Clock				
	0.02 us	17.99ns			22.01ns
Step 2	Auto-Cycle asynchron startable				
	Period of clock				
	.10 us	99.95ns			100.05ns
	1.00 us	999.5ns			1.0005us
	9.00 us	8.993us			9.007 us
	100 us	99.95us			100.05us
	999 us	998.5us			999.5 us
	Auto-Cycle synchron startable				
	Period of Clock				
	.10 us	97.0 ns			103.0 ns
	1.00 us	970 ns			1.03 us
	9.00 us	8.953us			9.047 us
	100 us	97 us			103 us
	999 us	969 us			1.029 ms
	Auto-Cycle synchron startable				
	Period of Clock				
	.10 us	99.5 ns			100.5 ns
	1.00 us	995 ns			1.005 us
	9.00 us	8.728us			9.272 us
	100 us	99.5 us			100.5 us
	999 us	994 us			1.004 ms

PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-12B	**External Clock BNC**				
Step 4	Period of Clock				
	2 x 1	200.00us			200.00us
	10 x 1	1.00 us			1.00 us
	50 x 1	5.00 us			5.00 us
	100 x 1	10.00 us			10.00 us
	500 x 1	50.00 us			50.00 us
	999 x 1	99.90 us			99.90 us
	2 x 100	20.00 us			20.00 us
	10 x 100	100.00us			100.00us
	50 x 100	500.00us			500.00us
	100 x 100	1.00 ms			1.00 ms
	500 x 100	5.00 ms			5.00 ms
	999 x 100	9.99 ms			9.99 ms
Step 6	External Clock Pod				
	Period of Clock				
	2 x 1	200.00us			200.00us
	10 x 1	1.00 us			1.00 us
	50 x 1	5.00 us			5.00 us
	100 x 1	10.00 us			10.00 us
	500 x 1	50.00 us			50.00 us
	999 x 1	99.90 us			99.90 us
	2 x 100	20.00 us			20.00 us
	10 x 100	100.00us			100.00us
	50 x 100	500.00us			500.00us
	100 x 100	1.00 ms			1.00 ms
	500 x 100	5.00 ms			5.00 ms
	999 x 100	9.99 ms			9.99 ms
Step 7	Max. Clock Rate Input Pod	12.5 Mhz			12.5 MHz
Step 8	Max. Clock Rate	50.0 MHz			50.0 MHz
4-12C	**Clock with external Reference BNC**				
Step 13		approx. 20 ns			approx. 20 ns

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PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-13	**External Input BNC**				
Step 1	START on Edge ↑		Y/N	Y/N	
Step 3	START on Edge ↓		Y/N	Y/N	
Step 5	START on Edge ↕		Y/N	Y/N	
Step 7	START on ↑ STOP on ↓ Edge		Y/N	Y/N	
Step 9	START on ↓ STOP on ↑ Edge		Y/N	Y/N	
Step 11	Threshold ECL		Y/N	Y/N	
Step 13	Threshold 0.0V		Y/N	Y/N	
Step 15	Threshold +9.9V		Y/N	Y/N	
Step 17	Threshold -9.9V		Y/N	Y/N	

PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit TTL/CMOS	High Limit ECL
4-14	**Skew**					
Step 2	POD0-CH0				7ns	6ns
	POD0-CH1				7ns	6ns
	POD0-CH2				7ns	6ns
	POD0-CH3				7ns	6ns
	POD0-CH4				7ns	6ns
	POD0-CH5				7ns	6ns
	POD0-CH6				7ns	6ns
	POD0-CH7				7ns	6ns
Step 3	POD1-CH0				7ns	6ns
	POD1-CH1				7ns	6ns
	POD1-CH2				7ns	6ns
	POD1-CH3				7ns	6ns
	POD1-CH4				7ns	6ns
	POD1-CH5				7ns	6ns
	POD1-CH6				7ns	6ns
	POD1-CH7				7ns	6ns
	POD2-CH0				7ns	6ns
	POD2-CH1				7ns	6ns
	POD2-CH2				7ns	6ns
	POD2-CH3				7ns	6ns
	POD2-CH4				7ns	6ns
	POD2-CH5				7ns	6ns
	POD2-CH6				7ns	6ns
	POD2-CH7				7ns	6ns

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PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-15	**Fine Timing Option**				
Step 2	Delay				
	POD0-CH0	18 ns			22 ns
	POD0-CH1	18 ns			22 ns
	POD0-CH2	18 ns			22 ns
	POD0-CH3	18 ns			22 ns
Step 3	POD0-CH0				
	Delay				
	25 ns	22.75ns			27.25ns
	30 ns	27.50ns			32.5 ns
	35 ns	32.25ns			37.75ns
	40 ns	37.00ns			43.00ns
	POD0-CH1				
	Delay				
	25 ns	22.75ns			27.25ns
	30 ns	27.50ns			32.5 ns
	35 ns	32.25ns			37.75ns
	40 ns	37.00ns			43.00ns
	POD0-CH2				
	Delay				
	25 ns	22.75ns			27.25ns
	30 ns	27.50ns			32.5 ns
	35 ns	32.25ns			37.75ns
	40 ns	37.00ns			43.00ns
	POD0-CH3				
	Delay				
	25 ns	22.75ns			27.25ns
	30 ns	27.50ns			32.5 ns
	35 ns	32.25ns			37.75ns
	40 ns	37.00ns			43.00ns

PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-16	**Level Test**				
	ECL Pod 15461A				
Step 1	High level				
	CH0	-1.02V			
	CH1	-1.02V			
	CH2	-1.02V			
	CH3	-1.02V			
	CH4	-1.02V			
	CH5	-1.02V			
	CH6	-1.02V			
	CH7	-1/02V			
	Low Level				
	CH0				-1.6V
	CH1				-1.6V
	CH2				-1.6V
	CH3				-1.6V
	CH4				-1.6V
	CH5				-1.6V
	CH6				-1.6V
	CH7				-1.6V
	TTL/CMOS Pod 15462A				
Step 1	High Level +2.4V	+1.98V			+2.82V
	Low Level				+0.7 V
	High Level +3V	+2.55V			+3.45V
	Low Level				+0.7V
	High Level +5V	+4.45V			+5.55V
	Low Level				+0.7V
	High Level +9.9V	+9.10V			+10.695V
	Low Level				+0.7V

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PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-17	**Transition Times "into open"**				
Step 2	ECL Pod 15461A 20%-80%				3 ns
	TTL/CMOS Pod 15462A				
	High Level				
	+2.4V				5.88 ns
	+5V				9 ns
	+9.9V				14.88 ns
Step 3	Overshoot, Preshoot and Ringing				20%
Step 5	Transition Time **"into 50 pF"**				
	TTL/CMOS POD 15462A				
	High Level +5V				18 ns
4-18	**TTL Leakage Current**				
Step 3	CH0				20 uA
	CH1				20 uA
	CH2				20 uA
	CH3				20 uA
	CH4				20 uA
	CH5				20 uA
	CH6				20 uA
	CH7				20 uA

PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-19	**TRIST T(ON) T(OFF) Pod 15462A**				
Step 1	T(ON)				
	CH0				30 ns
	CH1				30 ns
	CH2				30 ns
	CH3				30 ns
	CH4				30 ns
	CH5				30 ns
	CH6				30 ns
	CH7				30 ns
	T(OFF)				
	CH0				30 ns
	CH1				30 ns
	CH2				30 ns
	CH3				30 ns
	CH4				30 ns
	CH5				30 ns
	CH6				30 ns
	CH7				30 ns
Step 2	Threshold Level of TRIST input				
	CH0 internal High Level				
	+9.9V	+2.66V			+4.26V
	+5.0V	+0.95V			+2.55V
	+2.4V	+0.8V			+1.6V
	CH1 internal High Level				
	+9.9V	+2.66V			+4.26V
	+5.0V	+0.95V			+2.55V
	+2.4V	+0.8V			+1.6V
	CH2 internal High Level				
	+9.9V	+2.66V			+4.26V
	+5.0V	+0.95V			+2.55V
	+2.4V	+0.8V			+1.6V

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PERFORMANCE TEST RECORD

Hewlett & Packard Model 8175A
Digital Signal Generator
Serial Number

Test Performed By
Date
Reference Temperature

Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
	CH3 internal High Level				
	+9.9V	+2.66V			+4.26V
	+5.0V	+0.95V			+2.55V
	+2.4V	+0.8V			+1.6V
	CH4 internal High Level				
	+9.9V	+2.66V			+4.26V
	+5.0V	+0.95V			+2.55V
	+2.4V	+0.8V			+1.6V
	CH5 internal High Level				
	+9.9V	+2.66V			+4.26V
	+5.0V	+0.95V			+2.55V
	+2.4V	+0.8V			+1.6V
	CH6 internal High Level				
	+9.9V	+2.66V			+4.26V
	+5.0V	+0.95V			+2.55V
	+2.4V	+0.8V			+1.6V
	CH7 internal High Level				
	+9.9V	+2.66V			+4.26V
	+5.0V	+0.95V			+2.55V
	+2.4V	+0.8V			+1.6V

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Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-20	$\overline{EN}$ T(ON) T(OFF) Pod 15461A				
	T(ON)				
	CH0				15 ns
	CH1				15 ns
	CH2				15 ns
	CH3				15 ns
	CH4				15 ns
	CH5				15 ns
	CH6				15 ns
	CH7				15 ns
	T(OFF)				
	CH0				15 ns
	CH1				15 ns
	CH2				15 ns
	CH3				15 ns
	CH4				15 ns
	CH5				15 ns
	CH6				15 ns
	CH7				15 ns

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Test Number	Title	Low Limit	Actual Reading measured	Actual Reading corrected	High Limit
4-21 A	**Trigger Pod START/STOP**				
Step 1			Y/N	Y/N	
Step 4	Flag Pod CH0		Y/N	Y/N	
Step 5	CH1		Y/N	Y/N	
	CH2		Y/N	Y/N	
	CH3		Y/N	Y/N	
	CH4		Y/N	Y/N	
	CH5		Y/N	Y/N	
	CH6		Y/N	Y/N	
	CH7		Y/N	Y/N	
B	**Tristate on/off**				
Step 2			Y/N	Y/N	
C	**Trigger word JMPA/JMPB**				
Step 1			Y/N	Y/N	
Step 2			Y/N	Y/N	
D	**Valid Trigger Word Duration**				
Step 3	Duration 50 ns		Y/N	Y/N	
Step 4	Duration				
	100 ns		Y/N	Y/N	
	200 ns		Y/N	Y/N	
	500 ns		Y/N	Y/N	
E	**Pod Input Threshold**				
Step 2	ECL		Y/N	Y/N	
Step 5	+9.9V		Y/N	Y/N	
Step 6	-9.9V		Y/N	Y/N	
Step 7	-1.0V		Y/N	Y/N	



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