

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Keysight / Agilent 1630A* at our website: ***Click HERE***

HP 1630A/D LEARN STRING COMMANDS

TC - Transmit Configuration Learn String

The Transmit Configuration Learn String command causes the 1630A/D analyzer to transmit a string containing its configuration data plus two CRC bytes.

SYNTAX: TC;

Learn String Format:

Starting Position In String	Byte Number Of Bytes	Contents
1	2	(A) RC (Receive Configuration Command)
3	2	(I) Binary byte count (refer to Note)
5	4284	CRC STARTS ACCUMULATING WITH NEXT BYTE ( ) Configuration Data
4287	2	CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE (I) CRC bytes

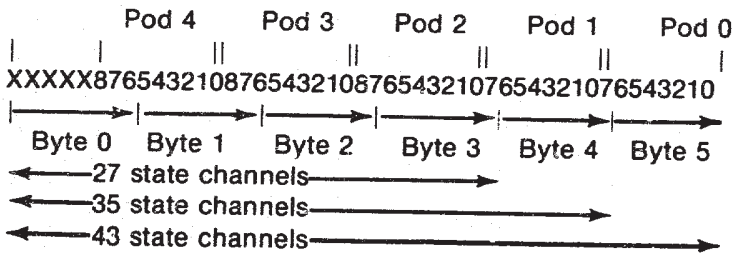
NOTE

The binary value of these bytes is the number of bytes to follow including the CRC bytes. This value is transmitted as MSB first and LSB last. The number of bytes transmitted is 4284.

TS - Transmit State Acquisition Learn String

The Transmit State Acquisition Learn String command causes the 1630A/D analyzer to transmit a string containing its state measurement data plus two CRC bytes. The measurement data consists of state trace data, state label overview data, or time interval overview data.

The actual state data (trace, label overview, or time interval) is transmitted in the following manner. The first five bits of the MSB is internal. The three least significant bits of the MSB correspond to data from Pod 4 bit 8, etc., as shown below.



There are four bytes per state for 27 state channel data, five bytes per state for 35 state channel data, and six bytes for 43 state channel data.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

HP 1630A/D Learn String Format (for State Trace Data):

SYNTAX: TS;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) RS (Receive State Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	7	(I,B) Date/Time information
12	1	Internal
13	1	(I) Type of Data (0 = State Trace Data)
14	1	(I) Number of state channels
15	2	(I) Number of valid states captured
17	2	(I) State Trace Point
19	N	(I) Data Acquired N = (Number of Valid States) * M Where: M = 0 if no state channels. M = 4 if 27 state channels. M = 5 if 35 state channels. M = 6 if 43 state channels.
		CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE
N + 19	2	(I) CRC

Note

The binary value of these bytes is the number of bytes to follow including the CRC bytes. This value is transmitted as MSB first and LSB last. The maximum number of bytes that can be transmitted is 4111 for 27 channels and 5135 for 35 channels.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

HP 1630A/D Learn String Format (for State Label Overview)

SYNTAX: TS;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) RS (Receive State Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	7	(I,B) Date/Time information
12	1	(I) Type of Data (1 = State Label Overview)
13	8	Internal
21	184	(I) Data acquired from 8 state label ranges- fewer bytes if less than 8 ranges
		Each state label range contains:
	2	Internal
	4	(R) Number of samples in this range
	6	(W) End address of this range
	6	(W) Start address of this range
	5	(A) The five character name of this range
205	5	(A) State assignment label (ADDRS, STAT, etc.)
210	6	Internal
226	4	(R) Total number of samples taken (excluding "Other" bucket)
220	4	(R) Number of samples in "Other" bucket
		CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE
222	2	(I) CRC

NOTE

The binary value of these bytes is the number of bytes to follow including the CRC bytes. This value is transmitted as MSB first and LSB last. The maximum byte count is 154.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

HP 1630A/D Learn String Format (for Time Interval Overview)

SYNTAX: TS;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) RS (Receive State Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	7	(I,B) Date/Time information
12	1	(I) Type of Data (2 = State Time Interval)
13	4	(R) Total Number of States
17	4	(R) Total Accumulated Time
21	4	(R) Minimum interval found
25	4	(R) Maximum interval found
29	4	(R) Average time of interval
33	4	(R) Time of last interval acquired
37	8	Internal
45	112	(I) Data acquired from 8 time interval ranges- fewer bytes if less than 8 ranges
		Each time interval range contains:
2		Internal
4		(R) Number of samples in this range
4		(R) End time of this range
4		(R) Start time of this range
157	2	(I) CRC

NOTE

The binary value of these bytes is the number of bytes to follow including the CRC check bytes. This value is transmitted as MSB first and LSB last. The maximum byte count is 154.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TT - Transmit Timing Acquisition Learn String

The transmit timing acquisition learn string command causes the analyzer to transmit a string containing its timing measurement data plus two CRC bytes. Glitch information will also be transmitted if the analyzer is in the glitch mode of operation.

The actual timing data is transmitted as in the following manner:

1 byte per record for 8 timing channels
2 bytes per record for 16 timing channels

```
| Pod 1 || Pod 0 |
7654321076543210
|       ||       |
| Byte 0 || Byte 1 |
|        || 8 Chan |
|   16 Chan       |
```

When the contents of the acquisition is formatted as real data (R), the number refers to number of marks or number of sample period intervals.

HP 1630A/D Learn String Format (for Timing Trace)

SYNTAX: TT;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	RT (Receive Timing Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	1	(I) Number of timing channels
6	2	(I) Number of valid timing states
8	2	(I) Index of the tracepoint state
10	1	(S) Glitch mode on
11	2	(T) Sample period
13	7	(I,B) Date/Time information
20	N	(I) Data File Where N = (Number of records) * M M = 1 byte per record for 8 channels M = 2 bytes per record for 16 channels
		CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE
N + 21	2	(I) CRC

Note

The binary value of these bytes is the number of bytes to follow including the CRC bytes. The maximum binary number, if the memory is full, is 2065 for 16 channels and 1041 for 8 channels.

With partial memories, the binary value of these bytes will include the last word in memory plus two CRC bytes.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TE - Transmit Everything Learn String

The transmit everything learn string command instructs the analyzer to transmit the following data in the listed sequence: (1) configuration learn string, (2) state data acquisition learn string, and (3) timing data acquisition learn string. Refer to the TC, TS, and TT command descriptions for learn string formats. The maximum number of bytes will be the sum of the bytes of the individual commands. The maximum number of bytes (4284) will occur in the combined State/Timing Mode.

DATA TRANSFER TERMINATION

Binary transfers of data are terminated by setting EOI true with the last byte transferred. Non-binary transfers are terminated by sending CR LF with EOI true.

HP1630G LEARN STRING COMMANDS

TC - Transmit Configuration Learn String

The transmit configuration learn string command causes the HP 1630G analyzer to transmit a string containing its configuration data plus two CRC bytes.

HP 1630G Learn String Format for Transmit Configuration

SYNTAX: TC;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) RC (Receive Configuration Command)
3	2	(I) Binary byte count (refer to Note)
5	5476	CRC STARTS ACCUMULATING WITH NEXT BYTE Configuration Data
5476	1	CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE Revision Code
5477	2	(I) CRC bytes

NOTE

The binary value of these bytes is the number of bytes to follow including the CRC bytes. This value is transmitted as MSD first and LSB last. The number of bytes transmitted is 5476.

TS - Transmit State Acquisition Learn String

The transmit state acquisition learn string command causes the HP 1630G analyzer to transmit a string containing its state measurement data plus two CRC bytes. The measurement data consists of state trace data, state label overview data, time interval overview data, time positional data, or linkage overview data.

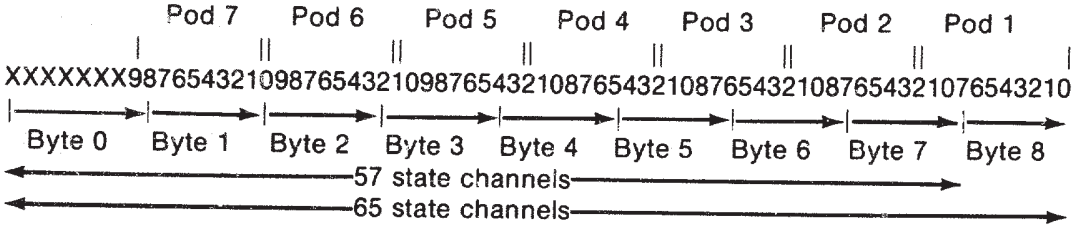
The actual state data (trace, label overview, time interval, time positional, or linkage overview) is transmitted in the following manner. The first seven bits of the MSB are internal. The last two least significant bits of the MSB correspond to data from Pod 7 bit 9, etc., as shown below.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TS - Transmit State Acquisition Learn String

The transmit state acquisition learn string command causes the HP 1630G analyzer to transmit a string containing its state measurement data plus two CRC bytes. The measurement data consists of state trace data, state label overview data, time interval overview data, time positional data, or linkage overview data.

The actual state data (trace, label overview, time interval, time positional, or linkage overview) is transmitted in the following manner. The first seven bits of the MSB are internal. The last two least significant bits of the MSB correspond to data from Pod 7 bit 9, etc., as shown below.



There are nine bytes per state for 57 state channel data, and eight bytes per state for 65 state channel data.

HP 1630G Learn String Format (for State Trace Data)

SYNTAX: TS;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) AS (Accept State Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	7	(I,B) Date/Time information
12	1	(S) This is time positional data
13	1	(S) Count all states, not time between states
14	1	(S) Counter values already converted to floating point
15	4	(R) Time positional measurement period in seconds
19	1	(S) Overview was program activity, not all states
20	1	(S) Type of Data (0 = State Trace Data)
21	1	(I) Number of state channels
22	2	(I) Number of valid states acquired
24	2	(I) Index of the tracepoint state
27	N	(I) Data Acquired N = (Number of Valid States) * M Where: M = 0 if no state channels. M = 11 if 57 state channels. M = 12 if 65 state channels.
		CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE
N + 28	2	(I) CRC

Note

The binary value of these bytes is the number of bytes to follow including the CRC bytes. This value is transmitted as MSB first and LSB last. The maximum number of bytes that can be transmitted is 5689 for 57 channels and 6204 for 65 channels.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

HP 1630G Learn String Format (for State Label Overview)

SYNTAX: TS;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) AS (Accept State Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	7	(I,B) Date/Time information
12	1	(S) This is time positional data
13	1	(S) Count all states not time between states
14	1	(S) Counter values already converted to floating point
15	4	(R) Time positional measurement period in seconds
19	1	(S) Overview was program activity, not all states
20	1	(I) Type of Data (1 = State Label Overview)
21	8	Internal
29	184	(I) Data acquired from 8 state label ranges-fewer bytes if less than 8 ranges
		Each state label range contains:
	2	Internal
	4	(R) Number of samples in this range
	6	(W) End address of this range
	6	(W) Start address of this range
	5	(A) The five character name of this range
261	5	(A) State assignment label (ADDRS, STAT, etc.)
266	6	Internal
275	4	(R) Total number of samples taken (excluding "Other" range)
279	4	(R) Number of samples in "Other" range
		CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE
283	2	(I) CRC

NOTE

The binary value of these bytes is the number of bytes to follow including the CRC bytes. This value is transmitted as MSB first and LSB last. The maximum byte count is 280.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

HP 1630G Learn String Format (for Time Interval Overview)

SYNTAX: TS;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) AS (Accept State Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	7	(I,B) Date/Time information
12	1	(S) This is time positional data
13	1	(S) Count all states, not time between states
14	1	(S) Counter values already converted to floating point
15	4	(R) Time positional measurement period in seconds
19	1	(S) Overview was program activity, not all states
20	1	(I) Type of data (2 = State Time Interval)
21	4	(R) Total number of samples
25	4	(R) Total accumulated time
29	4	(R) Minimum interval found
33	4	(R) Maximum interval found
37	4	(R) Average time of interval
41	4	(R) Time of last interval acquired
45	8	Internal
53	112	(I) Data acquired from 8 time interval ranges- fewer bytes if less than 8 ranges
		Each time interval range contains:
	2	Internal
	4	(R) Number of samples in this range
	4	(R) End time of this range
	4	(R) Start time of this range
165	2	(I) CRC

NOTE

The binary value of these bytes is the number of bytes to follow including the CRC check bytes. This value is transmitted as MSB first and LSB last. The maximum byte count is 162.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

HP 1630G Learn String Format (for Time Positional Overview)

SYNTAX: TS;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) AS (Accept State Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	7	(I,B) Date/time information
12	1	(S) This is time positional data
13	1	(S) Count all states, not time between states
14	1	(S) Counter values already converted to floating point
15	4	(R) Time positional measurement period in seconds
19	1	(S) Overview was program activity, not all states
20	1	(I) Type of data (3 = Time Positional Overview)
21	1	(I) Number of state channels
22	2	(I) Number of valid states acquired
24	2	(I) Index of tracepoint state
26	1	(S) Count all states, not time between states
27	N	Data acquired
		CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE
N + 27	2	(I) CRC

NOTE

The binary value of theses bytes is the number of bytes to follow including the CRC bytes. This value is transmitted as MSB first and LSB last. The maximum byte count is 12300.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

HP 1630G Learn String Format (for Linkage Overview)

Syntax: TS;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) AS (Accept State Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	7	(I/B) Date/time information
12	1	(S) This is time positional data
13	1	(S) Count all states, not time between states
14	1	(S) Counter values already converted to floating point
15	4	(R) Time positional measurement period in seconds
19	1	(S) Overview was program activity, not all states
20	1	(I) Type of data (4 = State Linkage Overview)
21	4	(B) Total number of samples taken
25	4	(R) Total number of linkage events found
29	8	Internal
37	N	Data acquired N = (Number of valid states) * M Where: M = Number of linkage events
		Each linkage event contains:
	2	Internal
	4	(R) Number of samples in this linkage event
	5	(A) the name of this linkage event
N + 37	2	CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE (I) CRC

NOTE

The binary value of these bytes is the number of bytes to follow including the CRC check bytes. This value is transmitted as MSB first and LSB last. The maximum byte count is 122.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TT - Transmit Timing Acquisition Learn String

The transmit timing acquisition learn string command causes the HP 1630G analyzer to transmit a string containing its timing measurement data plus two CRC bytes. Glitch information will also be transmitted if the analyzer is in the glitch mode of operation.

The actual timing data is transmitted as in the following manner:

1 byte per record for 8 channels

Pod 0
76543210
Byte 0
8 chan

When the contents of the acquisition is formatted as real data (R), the number refers to number of marks or number of sample period intervals.

HP 1630G Learn String Format (for Timing Trace Learn)

SYNTAX: TT;

Starting Byte Position In String	Number Of Bytes	Contents
1	2	(A) AT (Accept Timing Command)
3	2	(I) Binary byte count (refer to Note)
		CRC STARTS ACCUMULATING WITH NEXT BYTE
5	1	(I) Number of timing channels
6	2	(I) Number of valid timing states
8	2	(I) Index of the tracepoint state
10	1	(S) Glitch mode on
11	2	(T) Sample period
13	7	(I,B) Date/Time information
20	2	(I) Number of units to start trace after trigger
22	1	(I) Units for byte 20 (0=ns, 1=us, 2=ms, 3=s)
23	4	(R) Valid pattern duration
27	1	(S) State was master
28	N	(I) Data File
		Where: N = Number of records
		CRC STOPPED ACCUMULATING WITH PREVIOUS BYTE
N + 28	2	(I) CRC

Note

The binary value of these bytes is the number of bytes to follow including the CRC bytes. The maximum binary number, if the memory is full, is 10491 for 8 channels. With partial memories, the binary value of these bytes will include the last word in memory plus two CRC bytes.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

TE - Transmit Everything Learn String

The transmit everything learn string command instructs the analyzer to transmit the following data in the listed sequence: (1) configuration learn string, (2) state data acquisition learn string, and (3) timing data acquisition learn string. Refer to the TC, TS, and TT command descriptions for learn string formats. The maximum number of bytes will be the sum of the bytes of the individual commands. The maximum number of bytes (5476) will occur in the combined State/Timing Mode.

DATA TRANSFER TERMINATION

Binary transfers of data are terminated by setting EOI true with the last byte transferred. Non-binary transfers are terminated by sending CR LF with EOI true.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix A
Display Messages

This appendix lists and defines each of the status, error, and prompt messages that the analyzer presents on screen.

All names must be unique - This message is displayed when a name has been created that is identical to one of the other names already in use on that menu.

At least 1 clock edge required - This message is displayed when the CLOCK field in the state FORMAT specification is set up so that no clock line is active.

Continuous trace in process - This message is displayed when the analyzer has a continuous trace in process, such as during the execution of an overview measurement.

Data acquired Month, Day, Year, Time - This message indicates when the current trace data was acquired. The initial setting is filled in from the clock set in the system peripherals menu. If the clock was not set when the trace was taken, this message will not be displayed at all.

Delaying - This message pertains to a trace in progress.

Delay too big for sample period - This message is displayed when a trigger delay is selected, in the timing TRACE specification, that is too long for the analyzer to measure using its present sample period selection.

DELETE to remove field - This message is displayed on menus which have all available fields assigned, such as when the state [Assignment] menu of the FORMAT specification has 8 labels assigned. This message prompts to delete fields from a full menu.

DELETE(write) / DEFAULT required - This message is displayed when an entry has been made in the highlighted file description line. Either press the DELETE key to write the instrument configuration to that tape file, or press the DEFAULT key to return the edited line to its previous unedited condition.

Each label must have a name - This message is displayed when INSERT is pressed to create a new label, before making any entry into the field for naming that new label.

ERROR cassette contains non HP1630 data - This message is displayed when the analyzer reads directory information that is not as written by the analyzer. The tape can be erased and reformated if it is still to used with the analyzer.

ERROR configuration too complex - The current state of the analyzer is too complex to be stored in internal storage. Simplify the analyzer configuration before retrying the operation. The power-up configuration is the simplest of all.

ERROR CRC does not match - This message is displayed when the Cyclic Redundancy Check (CRC) value read in during a learn string or down-loaded program did not match the CRC value calculated by the analyzer when it received the data. Could also mean an attempt was made to load an inverse assembler from internal storage that was corrupt.

ERROR directory full - the directory on the currently inserted disc has no more room for entries. Delete unwanted files before attempting to store to this disc.

ERROR disc changed - The disc has been changed since the last INSERT to check for disc was performed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ERROR disc failure - The disc drive logic has failed. Indicates possible problems with the disc drive.

ERROR disc is not LIF disc - The disc inserted in the addressed unit is not in an appropriate format. Discs used by the 1630G must be in LIF (Logical Interchange Format).

ERROR disc is write protected - A write, delete, or format operation was attempted on a write protected disc.

ERROR disc operation aborted - A disc operation was stopped prematurely.

ERROR disc unformatted - The currently inserted disc is unformatted. It must be a LIF (Logical Interchange Format) disc.

ERROR DON'T CARE not allowed - This message is displayed when the DON'T CARE key is pressed and the cursor is in a field where "don't care" entries can not be accepted.

ERROR duplicate HP-iB address - The logic analyzer, printer, and disc must all be assigned unique HP-IB addresses.

ERROR file not found - The desired file was not found on the addressed disc unit.

ERROR format failed - Attempt to format a bad disc medium.

ERROR illegal file name - A disc file name must start with a letter, followed by an optional sequence of letters and/or numerals. No spaces, hyphens, or underscores are allowed.

ERROR in controller command - This message is displayed when the analyzer received a command from the controller (HP-IB or HP-IL) and did not recognize the command. A second line shows ....??? with the first character of the unrecognized command in inverse video.

ERROR in HP-IB transfer - The HP-IB interface is not operating properly.

ERROR internal: bad file length - Indicates internal problems with the analyzer. Record events leading up to this message and contact Hewlett- Packard.

ERROR internal: bad file type - Indicates internal problems with the analyzer. Record events leading up to this message and contact Hewlett- Packard.

ERROR internal: bad request - Indicates internal problems with the analyzer. Record events leading up to this message and contact Hewlett- Packard.

ERROR internal: disc error - Indicates internal problems with the analyzer. Record events leading up to this message and contact Hewlett- Packard.

ERROR internal: undefined error - Indicates internal problems with the analyzer. Record events leading up to this message and contact Hewlett- Packard.

ERROR invalid in this trace mode - This message is displayed when a display is requested that is not available in the selected trace mode, such as a trace list when the analyzer is performing an overview measurement.

ERROR inverse assembler too big - An attempt was made to store an inverse assembler in internal storage but it was larger than the available space.

ERROR LIF directory too big - A disc with too many LIF directory entries is in the addressed drive. Use a different disc.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ERROR maximum INSERT's used - This message is displayed when the INSERT key is used to insert an additional field, such as another label in the [Assignment] menu of the FORMAT specification, and the menu already has as many entries of that type as it can accept.

ERROR no cassette in drive - This message is displayed when the door on the cassette is open or no tape is currently in the drive when a read or write operation is attempted.

ERROR no disc drive present - There is no disc drive at the present address.

ERROR no disc media present - There is no disc inserted in the addressed unit.

ERROR no room on disc - The current disc is too full to complete the selected operation.

ERROR not 1630G compatable - The inverse assembler just loaded is not compatable with the 1630G logic analyzer.

ERROR numeric entry required - This message is displayed when a non-numeric key is pressed, such as NEXT[ ], and the cursor is in a field that accepts only numeric entries.

ERROR only bits 0-3 edge trigger - This message is displayed when trying to assign edge triggering to one of the timing bits that does not have edge-trigger capability.

ERROR operation time out - The current HP-IB disc operation was not completed. It was aborted because of a lack of response from the disc.

ERROR reload disc first - The cursor must be positioned on the top line of the Storage Operations menu, then the INSERT key pressed, before the desired operation can be completed.

ERROR requires correction first - This message is displayed when a partial specification has been entered, and before completing it, another analyzer menu is selected, such as when entering the name of a label in the FORMAT specification, and then trying to change to the TRACE specification before assigning a bit for that label.

ERROR requires file description - This message is displayed when an attempt has been made to write a tape file without creating a file description.

ERROR RESUME not allowed - This message is displayed when the RESUME key has been pressed for an operation that the analyzer has completed and cannot resume.

ERROR tape operation aborted - This message is displayed when the STOP key has been pressed during a tape read or write operation, or when a data error has been detected by the analyzer.

ERROR unexpected EOI - The disc drive logic has failed. Indicates possible problems with the disc drive.

ERROR use alphanumeric keys - This message is displayed after pressing the NEXT[ ] or PREV[ ] keys while the cursor is in a field which accepts only alphanumeric entries, such as a module name field in the [User Base] menu of the FORMAT specification.

ERROR use CHS key - This message is displayed when the cursor is on a mathematical sign, and something other than the CHS (change sign) key is pressed.

ERROR use hex keys - This message is displayed when pressing a non-hex key when the cursor is in a field that accepts only hexadecimal entries.

ERROR use NEXT[ ] PREV[ ] keys - This message is displayed when pressing a keyboard letter or number key a field where selections must be made with the NEXT[ ] or PREV[ ] keys.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ERROR use 0 or 1 - This message is displayed when trying to enter a non- binary character in a specification that is set to accept only binary entries.

ERROR use 0, 1, or DON'T CARE - This message is displayed when trying to enter a non-binary character in a specification field that is set up to accept only binary or "don't care" entries.

ERROR use 0 thru 3 - This message is displayed when trying to enter too large a value into a field made up of only two bits, and set to accept a number base other than binary.

ERROR use 0 thru 3 or DON'T CARE - This message is displayed when trying to enter too large a value into a field made up of only two bits, and set to accept either a DON'T CARE, or a number with a non-binary base.

ERROR use 0 thru 7 - This message is displayed when pressing an "8" or "9" key for an entry in a field that accepts only numbers in the octal number base or is made up of only 3 bits.

ERROR use 0 thru 7 or DON'T CARE - This message is displayed when trying to enter a non-octal character in a specification field that is set up to accept only octal or "don't care" entries, or is made up of only 3 bits.

ERROR value is too large - This message is displayed when pressing a numeric key in a numeric field, but the number is too large for the cursor position in the numeric field.

ERROR write protected file - This message is displayed when the highlighted bar is on a file that is write protection enabled and a write operation is attempted.

ERROR 1630A/D learn string - The 1630G has been sent a learn string that was generated for a 1630A or 1630D logic analyzer. Learn strings from other analyzers are not compatable with the 1630G.

INSERT to add compare item - This message is displayed in the state and compare list display. It indicates that a duplicate of the line shown in inverse video can be added to the compare list by pressing the INSERT key.

INSERT to add new label - This message is displayed when the cursor is in the label field of the format [Assignment] menu. It describes what must be done to create a new label in this menu.

INSERT to add new module - This message is displayed when creating code modules on the [Relocation] menu of the FORMAT specification. It describes what must be done to create an additional code module in the map.

INSERT to add new range - This message is displayed when the cursor is in the range field of a menu, and the analyzer has space available in that field for creating additional ranges.

INSERT to add or'd pattern - This message is displayed when the cursor is in the proper position to allow entry of an additional term to be OR'd with the present term in the specification. It describes what must be done to create this additional term.

INSERT to add sequence term - This message is displayed when the cursor is in the proper position to allow entry of a sequence term. It describes what must be done to create a new sequence term in this menu.

INSERT to add traces - This message is displayed in the waveform display when the cursor is in the proper area to add more waveform channels to the display. The message indicates how to add the additional channels.

INSERT to autoscale - This message is displayed in the chart menus. Press INSERT to set the max and min scale values to the maximum and minimum data values currently displayed.

INSERT to correlate x cursor - This message is displayed in the waveform menus of an interactive state/timing measurement if the current trace was state triggers a don't care timing trace. Press INSERT to align (in time) the displayed x cursor (Example: state) with the non-displayed (Example: timing) x cursor.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

INSERT to check for disc - This message is displayed when the cursor is in the top row of the Storage Operations menu. Pressing INSERT will cause the analyzer to see if a disc is present at the assigned HP-IB address and unit.

INSERT to confirm - Before the current operation can continue, INSERT must be pressed to confirm that the selected operation is desired.

INSERT to inverse assemble - This message is displayed in the state list menu when certain inverse assemblers are active. the current inverse assembler cannot accurately determine where the first state of an instruction fetch is. Position the display so that the state aligned with the inverse video line number is the first state of an instruction fetch. Press INSERT to start the inverse assembly from the indicated state.

INSERT to overwrite - A request has been made to overwrite a disc file. Before the old file is destroyed, INSERT must be pressed to overwrite it.

INSERT to start operation - This message is displayed when the cursor is in the bottom row of the Storage Operations menu. Pressing INSERT will cause the analyzer to begin the currently selected operation.

INSERT to store compare image - This message is displayed in the state full compare list menu when viewing the trace data. Press INSERT to store the current trace data as the compare image.

Internal message error - Indicates internal problems with the analyzer. Record events leading up to this message and contact Hewlett-Packard.

Invalid clock setting - This message is displayed when the analyzer clock in the SYSTEM [Peripherals] menu has not been set to a correct date. The clock date must be later than December, 1981.

NOTE: Compare list is empty - This message is displayed when the state Compare traced mode is selected and the list in the compare memory has no entries.

NOTE: Cursor correlation is not available - This message will appear during interactive state/timing measurements if conditions other than State Master and Timing Don't Care are set up. For example if state is master and timing is set to trigger on a pattern or glitch.

NOTE: No stored compared image - This message is displayed when the state Full Compare mode is selected.

NOTE: Trace data has less states than compare image. This message is displayed in the trace compare modes when the trigger is centered on, or ends the trace.

NOTE: Trace data has more states than compare image. This message is displayed in the trace compare modes when the trigger is centered on, or ends the trace.

Max 43 *'s per label - State format labels can have a maximum of 43 bits allocated.

One "*" required for each label - This message is displayed when a name for a new label has been created before assigning the first bit to be identified by that label.

Operation aborted - The current operation has been aborted. Example: occurs when STOP is pressed during a save configuration to internal storage.

Power-up complete - This message is displayed after the analyzer has successfully completed the power-up test routine.

Reading directory - The analyzer is reading the directory on the external mass storage device.

ROLL to change configuration - This message is displayed when in the SYSTEM [Configuration] menu. It prompts use of the ROLL keys to change the distribution of input bits between the state and timing measurement channels.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ROLL to edit file description - This message is displayed in the [Tape Operations] menu. It indicates that the ROLL keys will move the highlighted bar to the file description to be edited.

Single trace in process - This message is displayed while the instrument is making a single trace or is finishing up a trace after the STOP key was pressed during a continuous trace.

Timing trace in process - This message pertains to a trace in progress.

Timing: XXXX secs to completion - This message pertains to a trace in progress.

Trace aborted - This message is displayed after pressing the STOP key during a single trace execution, before that trace has been completed.

Trace complete - This message is displayed after the analyzer completes a single trace.

WAIT checking directory - This is a disc operation.

WAIT creating directory - This is a disc operation.

WAIT disc operation in process - The analyzer is currently accessing the external mass storage.

WAIT formatting disc - This disc operation can take up to 5 minutes.

Waiting for sequence term - This message pertains to a trace in progress.

Waiting for start term - This message pertains to a trace in progress.

Waiting for state term - This message pertains to a trace in progress.

Waiting for stop term - This message pertains to a trace in progress.

Waiting for timing trigger - This message pertains to a trace in progress.

WAIT loading configuration - This disc operation takes about 15 seconds.

WAIT loading executable - This disc operation takes about 15 seconds.

WAIT loading internal storage - This message is displayed while data is being transfered into the logic analyzers internal storage. Configurations take about 30 seconds. Inverse assemblers can take up to 3 minutes.

WAIT loading inverse assembler - This disc operation takes about 10 seconds.

WAIT loading state data - This disc operation takes about 25 seconds.

WAIT loading timing data - This disc operation takes about 5 seconds.

WAIT PRINT in progress - This message is displayed while the analyzer is sending data to a printer after the PRINT key has been pressed.

WAIT reading cassette file - This message is displayed after the INSERT key is pressed in the [Tape Operations] menu. The analyzer configuration plus data is read from the tape file that is highlighted by the inverse-video bar.

WAIT reading directory - This is a disc operation.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

WAIT saving configuration - This message is displayed while a configuration is being transfered into internal storage. The operation takes about 30 seconds.

WAIT storing configuration - This disc operation takes about 15 seconds.

WAIT storing state data - This disc operation takes about 25 seconds.

WAIT storing timing data - This disc operation takes about 5 seconds.

WAIT writing cassette file - This message is displayed after the DELETE key is pressed in the [Tape Operations] menu. The analyzer configuration plus data is written to the tape file that is highlighted by the inverse-video bar.

WARNING awaiting HP-IB transfer - This message is displayed when the analyzer has been commanded to send data but the HP-IB controller is not accepting transmissions from the analyzer. The message will disappear when data transfer begins.

WARNING awaiting HP-IL transfer - This message is displayed when the analyzer has been commanded to send data but the HP-IL controller is not accepting transmissions from the analyzer. The message will disappear when data transfer begins.

WARNING command ignored - This message is displayed when attempting to execute a command that is invalid for the field that is identified by the position of the cursor, such as trying to INSERT a label in the [Assignment] FORMAT specification when the cursor is in the [Assignment] field.

WARNING contains non-HP1630C data - The analyzer has been sent a learn string that was generated on a 1630 family logic analyzer but not on a 1630G logic analyzer.

WARNING cursor outside data - An attempt to correlate the x cursor was made. The non-displayed x cursor is, with respect to time, outside the currently viewed data.

WARNING new tape inserted - The analyzer rereads the tape directory each time it enters the [Tape Operations] menu. This message is displayed when the directory read does not match the current memory of the [Tape Operations] menu.

WARNING [NEXT/PREV] erases tape - This message appears when the cursor is moved into the Erase & Format Cassette field. If the NEXT[ ] or PREV[ ] keys are pressed the analyzer will automatically erase and reformat the entire tape.

WARNING press STOP key first - This message appears after trying to change a trace parameter during a measurement. The analyzer cannot change trace parameters while a measurement is in process.

WARNING printer down - This message is displayed when the analyzer tries to send data to print a copy of the display on an external printer, and the data transfer is not taking place or has been suspended for approximately one second.

WARNING slow clock - This message is displayed when the repetition rate of the incoming state clock is slower than the minimum rate (< 400 Hz). It usually means that the analyzer is not receiving any clock activity on the line(s) selected to clock data.

WARNING value not allowed - This message is displayed when trying to enter too large a value into a decimal field.

XXXX intervals to completion - This message pertains to a trace in progress. The Xs represent a decimal number that is continuously updated to reflect the current trace status.

XXXX States to completion - This message pertains to a trace in progress. The Xs represent a decimal number that is continuously updated to reflect the current trace status.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix B. An HP-IB Overview

Introduction B-1
HP-IB System Terms B-1
Interface Bus Concepts B-1
Message Concepts B-2
The HP Interface Bus B-3
  HP-IB Lines And Operations B-3
Interface Functions B-5
Bus Messages B-6
HP 1630 HP-IB Implementation B-6

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix B
An HP-IB Overview

INTRODUCTION

The HP Interface Bus (HP-IB) provides an interconnecting channel for data transfer between devices on the HP-IB.

The following list defines the terms and concepts used to describe HP-IB (bus) system operations.

HP-IB SYSTEM TERMS

1. **Addressing** — The characters sent by a controlling device specifying which device sends information on the bus and which device(s) receives the information.

2. **Byte** — A unit of information consisting of 8 binary digits (bits).

3. **Device** — An unit that is compatible with the ANSI/IEEE 488-1978 Standard

4. **Device Dependent** — A response to information sent on the HP-IB that is characteristic of an individual device's design, and may vary from device to device.

5. **Operator** — The person that operates either the system or any device in the system.

6. **Polling** — The process typically used by a controller to locate a device that needs to interact with the controller. There are two types of polling:

   - **Serial Poll** — This method obtains one byte of operational information about an individual device in the system. The process must be repeated for each device from which information is desired.

   - **Parallel Poll** — This method obtains information about a group of devices simultaneously.

INTERFACE BUS CONCEPTS

Devices which communicate along the interface bus can be classified into three basic categories.

1. **Talkers** — Devices which send information on the bus when they have been addressed.

2. **Listeners** — Devices which receive information sent on the bus when they have been addressed.

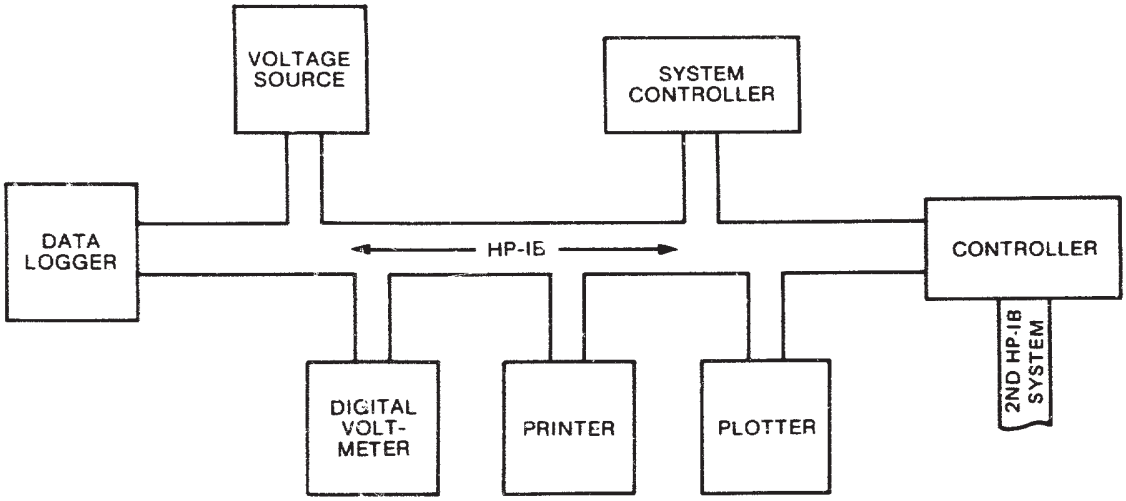
3. **Controllers** — Devices that can specify the talker and listeners for an information transfer. Controllers can be categorized as one of two types:

   - **Active Controller** — The current controlling device on the bus. Only one device can be the active controller at any time.

   - **System Controller** — The only controller that can take priority control of the bus if it is not the current active controller. Although each bus system can have only one system controller, the system can have any number of devices capable of being the active controller.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

A typical HP-IB system is shown below.



9872-A-172-1

MESSAGE CONCEPTS

Devices which communicate along the interface bus are transferring quantities of information. The transfer of information can be from one device to another device, or from one device to more than one device. These quantities of information can easily be thought of as "messages".

In turn, the messages can be classified into twelve types. The list below gives the twelve message types for the HP-IB.

1. **The Data Message** — This in the actual information which is sent from one talker to one or more listeners along the interface bus.
2. **The Trigger Message** — This message causes the listening device(s) to perform a device-dependent action when addressed.
3. **The Clear Message** — This message causes either the listening device(s) or all of the devices on the bus to return to their predefined device-dependent states.
4. **The Remote Message** — This message causes listening devices to switch from local front-panel to remote program control when addressed to listen.
5. **The Local Message** — This message clears the Remote Message from the listening device(s) and returns the device(s) to local front-panel control.
6. **The Local Lockout Message** — This message prevents a device operator from manually inhibiting remote program control.
7. **The Clear Lockout/Local Message** — This message causes all devices on the bus to be removed from Local Lockout and revert to Local. This message also clears the Remote Message for all devices on the bus.
8. **The Require Service Message** — A device can send this message at any time to signify that the device needs some type of interaction with the controller. This message is cleared by sending the device's Status Byte Message if the device no longer requires service.
9. **The Status Byte Message** — A byte that represents the status of a single device on the bus. Bit 6 indicates whether the device sent a Require Service Message, and the remaining bits indicate operational conditions defined by the device. This byte is sent from a talking device in response to a serial poll operation performed by a controller.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

10. **The Status Bit Message** — A byte that represents the operational conditions of a group of devices on the bus. Each device responds on a particular bit of the byte thus identifying a device-dependent condition. This bit is typically sent by devices in response to a parallel poll operation.

    The Status Bit Message can also be used by a controller to specify the particular bit and logic level that a device will respond with when a parallel poll operation is performed. Thus more than one device can respond on the same bit.

11. **The Pass Control Message** — This transfers the bus management responsibilities from the active controller to another controller.

12. **The Abort Message** — The system controller sends this message to unconditionally assume control of the bus from the active controller. This message terminates all bus communications (but does not implement a Clear Message).

These messages represent the full implementation of all HP-IB system capabilities. Each device in a system may be designed to use only the messages that are applicable to its purpose in the system. It is important for you to be aware of the HP-IB functions implemented on each device in your HP-IB system to ensure the operational compatibility of the system.

THE HP INTERFACE BUS

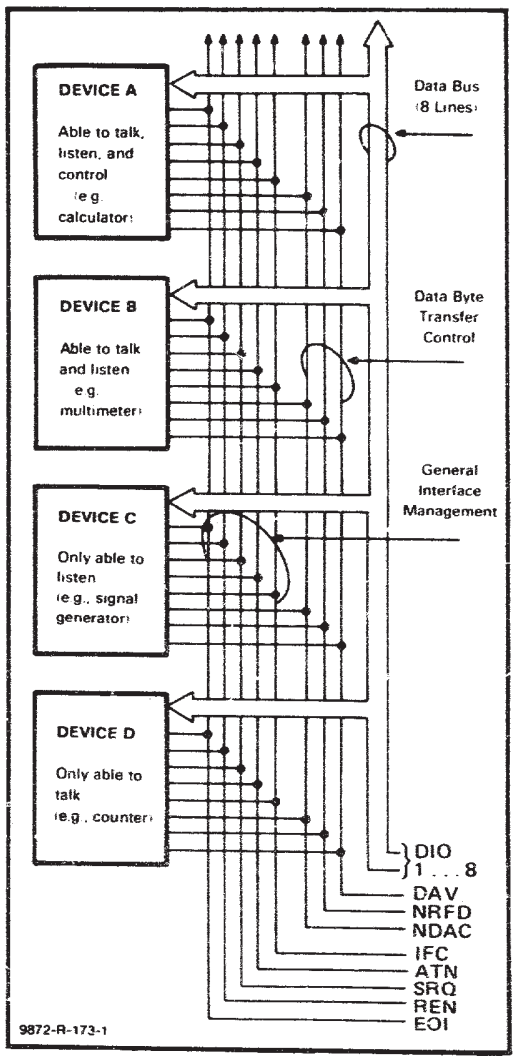
HP-IB Lines And Operations

The HP Interface Bus transfers data and commands between the components of an instrumentation system on 16 signal lines. The interface functions for each system component are performed within the component so only passive cabling is needed to connect the systems. The cables connect all instruments, controllers, and other components of the system in parallel to the signal lines.

The eight Data I/O lines (DI01 through DI08) are reserved for the transfer of data and other messages in a byte-serial, bit-parallel manner. Data and message transfer is asynchronous, coordinated by the three handshake lines: Data Valid (DAV), Not Ready For Data (NRFD), and Not Data Accepted (NDAC). The other five lines are for management of bus activity. See the figure on the right.

Devices connected to the bus may be talkers, listeners, or controllers. The controller dictates the roll of each of the other devices by setting the ATN (attention) line true and sending talk or listen addresses on the data lines. Addresses are set into each device at the time of system configuration either by switches built into the device or by jumpers on a PC board. While the ATN line is true, all devices must listen to the data lines. When the ATN line is false, only devices that have been addressed will actively send or receive data. All others ignore the data lines.

Several listeners can be active simultaneously but only one talker can be active at a time. Whenever a talk address is put on the data lines (while ATN is true), all other talkers will be automatically unaddressed.



HP-IB Signal Lines

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Information is transmitted on the data lines under sequential control of the three handshake lines (DAV, NRFD, and NDAC). No step in the sequence can be initiated until the previous step is completed. Information transfer can proceed as fast as devices can respond, but no faster than allowed by the slowest device presently addressed as active. This permits several devices to receive the same message byte concurrently.

The ATN line is one of the five bus management lines. When ATN is true, addresses and universal commands are transmitted on only seven of the data lines using the ASCII code. When ATN is false, any code of 8 bits or less understood by both talker and listener(s) may be used.

The IFC (interface clear) line places the interface system in a known quiescent state.

The REN (remote enable) line is used with the Remote, Local, and Clear Lockout/Set Local Messages to select either local or remote control of each device.

Any active device can set the SRQ (service request) line true via the Require Service Message. This indicates to the controller that some device on the bus wants attention, such as a counter that has just completed a time-interval measurement and wants to transmit the reading to a printer.

The EOI (end or identify) line is used by a device to indicate the end of a multiple-byte transfer sequence. When a controller sets both the ATN and EOI lines true, each device capable of a parallel poll indicates its current status on the DIO line assigned to it.

In the interest of cost-effectiveness, it is not necessary for every device to be capable of responding to all the lines. Each can be designed to respond only to those lines that are pertinent to its function on the bus.

The operation of the interface is generally controlled by one device equipped to act as controller. The interface transmits a group of commands to direct the other instruments on the bus in carrying out their functions of talking and listening.

The controller has two ways of sending interface messages. Multi-line messages, which cannot exist concurrently with other multi-line messages, are sent over the eight data lines and the three handshake lines. Uni-line messages are transferred over the five individual lines of the management bus.

The commands serve several different purposes:

- Addresses, or talk and listen commands select the instruments that will transmit and accept data. They are all multi-line messages.
- Universal commands cause every instrument equipped to do so to perform a specific interface operation. They include multi-line messages and three uni-line commands: interface clear (IFC), remote enable (REN), and attention (ATN).
- Addressed commands (also referred to as primary commands) are similar to universal commands, except that they affect only those devices that are addressed and are all multi-line commands. An instrument responds to an addressed command, however, only after an address has already told it to be talker or listener.
- Secondary commands are multi-line messages that are always used in series with an address, universal command, or addressed command to form a longer version of each. Thus they extend the code space when necessary.

To address an instrument, the controller uses seven of the eight data-bus lines. This allows instruments using the ASCII 7-bit code to act as controllers. As shown in the table, five bits are available for addresses, and a total of 31 allowable addresses are available in one byte. If all secondary commands are used to extend this into a two-byte addressing capability, 961 addresses become available (31 allowable addresses in the second byte for each of the 31 allowable in the first byte).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Command and Address Codes

Code Form							Meaning
X	0	1	A5	A4	A3	A2	A1	Universal Commands
X	0	1	A5	A4	A3	A2	A1	Listen Addresses
				except			
X	0	1	1	1	1	1	1	Unlisten Command
X	1	0	A5	A4	A3	A2	A1	Talk Address
				except			
X	1	0	1	1	1	1	1	Untalk Command
X	1	1	A5	A4	A3	A2	A1	Secondary Commands
				except			
X	1	1	1	1	1	1	1	Ignored

Code used when attention (ATN) is true (low).
X = don't care

INTERFACE FUNCTIONS

Interface functions provide the physical capability to communicate via HP-IB. These functions are defined in the ANSI/IEEE 488-1978 Standard. This standard, which is the designer's guide to the bus, defines each interface function in terms of state diagrams that express all possible interactions.

Bus capability is grouped under 10 interface functions, for example: Talker, Listener, Controller, Remote/Local. The following table lists the functions, including two special cases of Controller.

HP-IB Interface Functions

Mnemonic	Interface Function Name
SH	Source Handshake
AH	Acceptor Handshake
T	Talker (or TE = Extended Talker)*
L	Listener (or LE = Extended Listener)*
SR	Service Request
RL	Remote Local
PP	Parallel Poll
DC	Device Clear
DT	Device Trigger
C	Any Controller
CN	A Specific Controller (for example: CA, CB . . .)
CS	The System Controller

*Extended Talkers and Listeners use a two-byte address. Otherwise, they are the same as Talker and Listener.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

BUS MESSAGES

Since interface functions are the physical agency through which bus messages are implemented, each device must implement one or more functions to enable it to send or receive a given bus message.

The following table lists the functions required to implement each bus message. Each device's operating manual lists the functions implemented by that device. Some devices, such as the 98034A Interface, list the functions implemented directly on the device.

Functions Used By Each Bus Message

Bus Message	Functions Required sender function - receiver function(s) (support functions)
Data	T - L* (SH, AH)
Trigger	C - DT* (L, SH, AH)
Clear	C - DC* (L, SH, AH)
Remote	CS - RL* (SH, AH)
Local	C - RL* (L, SH, AH)
Local Lockout	C - RL* (SH, AH)
Clear Lockout/Set Local	CS - RL*
Require Service	SR* - C
Status Byte	T - L* (SH, AH)
Status Bit	PP* - C
Pass Control	CA - CB (T, SH, AH)
Abort	CS - T, L*C

*Since more than one decive can receive (or send) this message simultaneously, each device must have the function indicated by an *.

HP 1630 HP-IB IMPLEMENTATION

Functions Implemented (ANSI/IEEE 488-1978)

HP-IB Implementation when 1630 is non-controller

a. Source Handshake (SH1)
b. Acceptor Handshake (AH1)
c. Talker (T6) Serial Poll
d. Talker-Extended (TE0) No
e. Listener (L4)
f. Listener-Extended (LE0) No
g. Service Request (SR1)
h. Remote/Local (RL1) Yes
i. Parallel Poll (PP1)
j. Device Clear (DC1)
k. Device Trigger (DT1)
l. Controller (C0) No
m. Drive Electronics (E2) Tri-state

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix C. Using A Printer

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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix C
Using A Printer

INTRODUCTION

The analyzer can be connected through an HP-IB interface cable to a graphics printer that understands the HP-IB command set, and the analyzer can control the printer to obtain hard copies of any of its displays, as well as hard copies of the entire content of its list memory. This appendix lists the steps required to connect a printer to the analyzer and obtain hard copy.

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 HP-text or HP-graphics (selected in [Peripherals] SYSTEM menu) to transfer information. Use the following information as a guide to estimating the printer speed of your system.

Max. Data Transfer rate: 4k bytes/sec approximately.
Example times for making copies on HP 2671G printer using [Text] language ([Text] is approximately twice as fast as [Graphics]):
Copy small menu: 7 seconds approximately.
Copy large menu: 20 seconds approximately.
Copy complete timing diagram: 30 seconds approximately.
Copy Max width list (8 labels): 85 words/min approximately. Full 1K list can be copied in approximately 12 minutes.

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 analyzer rear panel and the printer.
2. Set the address switches on the analyzer rear panel to the TALK ONLY position (address switches 7 and 8 to 00).
3. Set the printer to the "listen only" mode.
4. Turn on operating power at the printer.
5. Turn analyzer LINE power off and then on again. When the analyzer executes its power-up routine, it will read the position of the address switches. To check this, select the [Peripherals] menu in the SYSTEM menu set, and see that the display says, "System Controller: NONE/TALK ONLY".
6. Set up a display on the analyzer that you would like to copy and press the analyzer PRINT key. The analyzer will send the commands required to obtain a complete copy of the display. If you copied a list 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.
7. You can obtain a copy of the trace memory beyond the portion shown on the display, if desired. To do this, place the list display 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).
8. Press the blue shift key and PRINT ALL key. The analyzer 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 trace memory has been printed. It will resend the heading information each time it starts a new page.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

9. You can stop the print before the entire 1K memory has been printed, if desired. To do this, press the analyzer STOP key. When you press the STOP key, the analyzer 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 ANALYZER AND PRINTER

Reset the analyzer address switches to the HP-IB CONTROLLED or HP-IL CONTROLLED positions, as applicable, and cycle the analyzer LINE power. Check to see that the SYSTEM [Peripherals] menu shows that the analyzer is controlled and that it lists the desired address. Refer to appendix C for the complete list of device-dependent commands for controlling operation of the analyzer.

In the controlled mode, the PRINT key can still be used to obtain hard copy from a printer. If you press the PRINT key (or "PR" sent from controller), the analyzer must be addressed to talk and the printer addressed to listen before the print will occur.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix D. Using The Disc Memory Accessory

Introduction D-1
Connecting The 9121 D/S Flexible Disc Drive D-1
The Storage Operations Menu D-1
How To Read A Disc File D-2
How To Create A New Disc File D-3
How To Find A Disc File D-3
How To Delete A Disc File D-4
How To Load An Inverse Assembler From Disc To Internal Storage D-4
How To Format A Disc D-5

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix D
Using The Disc Memory Accessory

INTRODUCTION

This appendix describes how to use the HP 9121D/S Flexible Disc Drive as an accessory to store and load test setups and captured data.

The HP 9121S is a single 3-1/2 inch flexible disc drive and the 9121D is a dual 3-1/2 inch flexible disc drive. When using the 9121D, the logic analyzer can be addressed to only one of the disc units at a time.

CONNECTING THE 9121 D/S FLEXIBLE DISC DRIVE

To connect the 9121D/S Flexible Disc Drive, the following steps should be followed:

1. Connect power to the 9121D/S disc drive.
2. Connect an HP-IB cable from the logic analyzer HP-IB output to the 9121D/S HP-IB connnector.
3. Set the HP-IB address switches on the rear panel of the 9121D/S 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.
4. Install one or two 3-1/2 inch flexible discs into the 9121 by pressing the disc all the way into the disc drive unit.
5. Apply power to the Flexible Disc Drive. When power is applied to the disc drive it goes through an initialization sequence which causes the indicator lamps to momentarily light.

THE STORAGE OPERATIONS MENU

The [Storage Operations] menu is selected from the SYSTEM menu subset. When the 1630 is powered up, the cursor is flashing in the [Configuration] field. Press PREV[ ], NEXT[ ] keys until the cursor is in the [Storage Operation] field. Refer to figure D-1 for the following explanation.

The [Storage Operations] menu contains the following:

1. Bus Address field — defaults to the lowest available bus address (i.e., the printer is normally Bus Address 1, if the 1630 is at address 0, then the default Bus Address for the disc is 2; if the 1630 is any other address, then the default Bus Address for the disc is 0). Any Bus Address 0 through 7 may be manually entered.
2. Unit field — defaults to zero. A unit number between 0 and 7 may be entered. This is the unit number of the disc to be used. With the 9121D this number may only be 0 or 1.
3. Disc type — defaults to None and contains the model number of the disc drive after a disc is read. This is a response from the disc drive to a request of the 1630.
4. Bus Address — defaults to 0 and is the HP-IB address that the 1630 is using to address the disc. When the INSERT key is pressed this address will be the same as the Bus Address that is contained in the user entry field.
5. LIF volume — defaults to None. Data is entered when the disc is read. Contains an identifier code from the instrument that formatted the disc.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

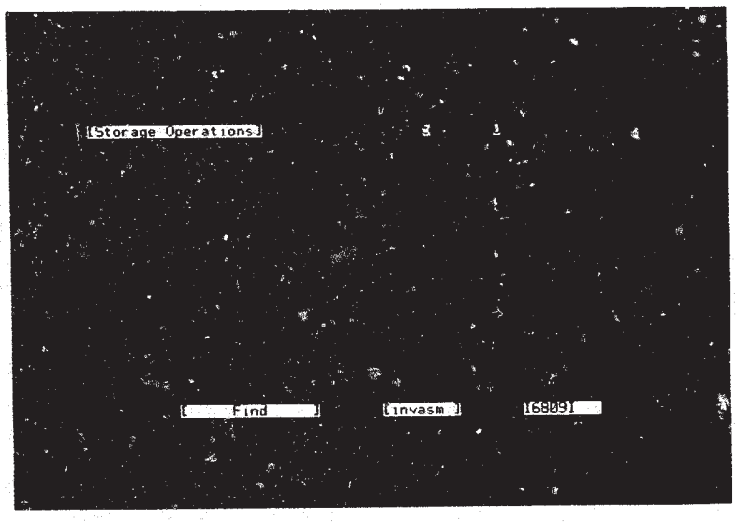


Figure D-1. The [Storage Operations] Menu

6. Disc Unit — defaults to zero and is the unit number of the disc drive the 1630 is using to address the disc.

7. File directory — contains the following information:

   File Name — any name assigned by the originator of the file. The file name must begin with an alpha character, be a maximum of 9 characters and contain only alpha and numeric characters.

   Type — indicates the type of file on the disc. See "How to Store a File" for more information.

   Date/Time — is the date and time that was set on the 1630 when the file was recorded.

   File Description — description as entered by the file orignator of the file. This is not a required entry.

On prerecorded inverse assembler discs all inverse assembler files begin with the letter "I". This is followed by the processor name of the inverse assembler. The last character of the Name field contains an "I" or "P", indicating the inverse assembler is for use with the 10269A/B interface (I) or for General Purpose Probes (P).

The File Description field contains a description of the inverse assembler followed by one or more spaces, then a four digit date code. The date code is changed if the inverse assembler software is changed. The larger number will be the most recent software revision.

HOW TO READ A DISC FILE

1. When the logic analyzer is powered up, the [Configuration] menu will be displayed and the cursor is in the [Configuration] field. Press NEXT[ ], PREV[ ] keys until the [Storage Operations] menu is displayed. Move the cursor to the Bus Address field by pressing the CURSOR right key one time.

2. Enter the unit number of the disc drive to be used by pressing the CURSOR right key once and entering the unit number.

   NOTE

   Unit Number defaults to 0 at power up, therefore if unit 0 is to be the active disc drive no entry need be made.

3. Obtain the directory of the disc files by pressing the INSERT key. When INSERT is pressed, the disc unit selected is read and the disc directory is displayed on the logic analyzer screen. Response time may be up to 4 seconds.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4. Load the desired file from the disc into the logic analyzer memory by placing the file name to be loaded next to the directory pointer (greater than sign; >) by pressing the ROLL keys. Then move the cursor to the Operation field at the bottom of the menu and press NEXT[], PREV[] keys until [Load] is displayed, then press the INSERT key to actually load the file from the disc.

HOW TO CREATE A NEW DISC FILE

1. Place the cursor in the Operation field and press NEXT[], PREV[] keys until [Store] is displayed.
2. Press the CURSOR right key to place the cursor in the Type field and press NEXT[], PREV[] keys until the type of data you wish to store is displayed as follows:
   a. [config] — stores all menu configurations, except Storage Operations on disc. The clock data on the peripherals menu is not stored.
   b. [state] — stores all state data.
   c. [timing] — stores all timing data.
   d. [all] — stores all configuration, state and timing information.
3. Press the CURSOR right key once to place the cursor in the Name field. Enter a Name in the name field.

NOTE

The File Name must begin with an alphabetic character, be a maximum of 9 characters and contain only alpha and numeric characters.

4. Add a description of the file as required, then press the INSERT key to actually store the data. To place a space in the description use the DON'T CARE key. CLEAR will clear the entire description field.

While the data is being stored, the disc drive indicator lamps will be lit. After the disc operation the new file name will appear in the directory of the menu, aligned with the indicator ( ).

HOW TO FIND A DISC FILE

1. Enter the [Storage Operations] menu and load the file directory from the disc.
2. Place the cursor in the Operation field and select [Find].
3. Press the CURSOR right key once and select the proper type of file. The type file [prog] is a file that has been down loaded from another system, and the "prog" type label is displayed. The "unknown" Type file is written by another controller, therefore, the 1630 cannot identify the file type.
4. Move the cursor to the Name field and enter the name of the file that is to be found.

NOTE

If the file type or file name is not correct the file will not be found and the error message "ERROR file not found" will be displayed.

5. Press the INSERT key to actually find the file name in the directory.

NOTE

The file name is located in the directory, however, the file must be loaded to the 1630 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.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

HOW TO DELETE A DISC FILE

1. Enter the [Storage Operations] menu and display the disc directory.
2. Place the cursor in the Operation field and press NEXT[ ], PREV[ ] keys until [Delete] is displayed in this field.
3. Press the CURSOR right key once to place the cursor in the Type field and press NEXT[ ], PREV[ ] keys until the proper type of file is displayed.
4. Press the CURSOR right key once to place the cursor in the Name field and enter the name of the file to be deleted. Press the INSERT key once, the advisory "Insert to confirm" will be displayed, press the INSERT key again to actually start the delete operation.

NOTE

If type is set to [all] then [config], [state] and [timing] files with that file name will be deleted.

While the data is being deleted the disc indicator lamps will be lit. After the disc operation is complete, the name of the deleted file is gone and the directory pointer will indicate the file that was just preceeding the deleted file.

HOW TO LOAD AN INVERSE ASSEMBLER FROM DISC TO INTERNAL STORAGE

1. Enter the [Storage Operations] menu and display the directory for the disc files.
2. Place the cursor in the Operation field and press PREV[ ], NEXT[ ] keys until [IA to internal] is displayed.
3. Press the cursor right key twice to place the cursor in the Name field, then enter the name of the inverse assembler to be loaded.

NOTE

The Type field can be entered by the cursor, however, it cannot be changed in this mode.

4. Press the INSERT key to load the inverse assembler from the disc to internal storage. The inverse assembler is also loaded into the analyzer RAM to make it active and sets the "Autoload inverse assembler from internal storage" to yes, so at the next power up the inverse is automatically loaded.

Several disc operations are required to transfer the entire inverse assembler to internal storage.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

HOW TO FORMAT A DISC

When a disc is formatted any data on the disc is erased and the disc directory is set up to contain a maximum of 256 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. Enter the [Storage Operation] field and place the cursor in the Operation field and press PREV[ ], NEXT[ ] keys until [Format disc] is displayed. No other selections are required. Press the INSERT key. The message "Enter "Y" to confirm >_" is displayed. The cursor must be moved to the entry field following the > and a "y" placed in that field.

CAUTION

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

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix E. Using The Tape Memory Accessory

Introduction E-1
How To Use Tape Memory Accessory E-1
How To Create A New File E-4
How To Read A File E-4
How To Copy An Existing File From One Tape To Another E-4

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix E
Using The Tape Memory Accessory

INTRODUCTION

This appendix describes how to use the HP 82161A Digital Cassette Drive as an accessory to store and load test setups and captured data for the analyzer. It also describes how to copy files from one tape cassette to another.

The digital cassette drive obtains its operating power from its internal battery pack (charged from its power connector). When operating the digital cassette drive with a connection to 110V, use the ON position of the power switch. Use the STANDBY position when operating the digital cassette drive from its internal battery pack without a connection to 110V. The 110V connection provides maximum charge to the battery pack when the power switch is OFF.

When the digital cassette drive is connected to the analyzer, you can obtain the [Tape Operations] menu shown in figure E-1 (part of the set of SYSTEM menus).

HOW TO USE TAPE MEMORY ACCESSORY

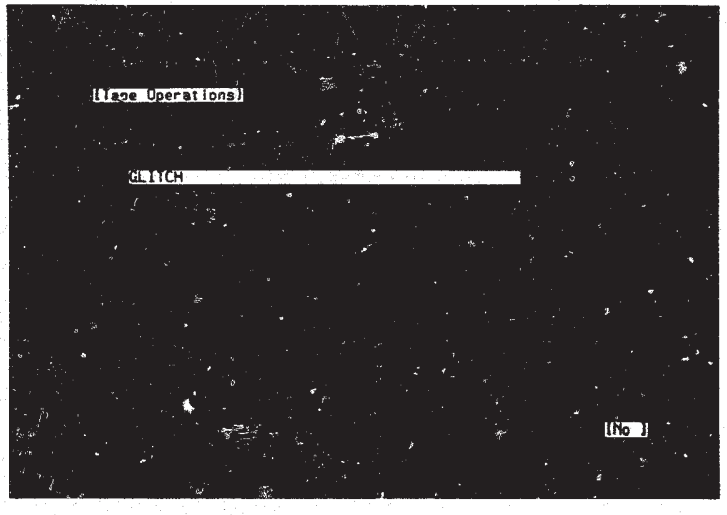
The following procedure will help you become familiar with how to use the tape memory accessory, if you have the HP 82161A Digital Cassette Drive accessory for your analyzer.

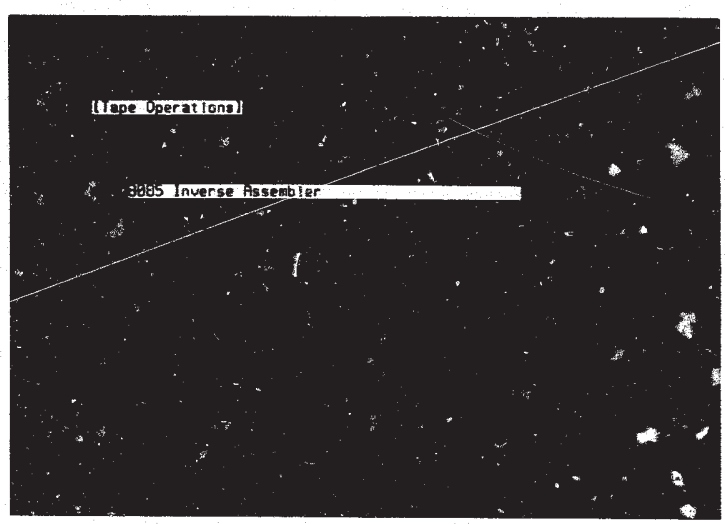
1. Connect the operating power cord to the digital cassette drive and to a source of operating power.
2. Connect the two HP-IL interface cables to the analyzer rear panel and to the digital cassette drive. Note the different shapes of the two HP-IL connectors.
3. Turn on operating power on the panel of the digital cassette drive.
4. Press the OPEN button on the digital cassette drive, install a blank tape cassette, and close the cassette door.
5. Press the SYSTEM key on the analyzer keyboard.
6. Press the NEXT[] key to obtain the [Tape Operations] menu. The analyzer will only display this menu when it has the tape memory accessory connected. See figure E-1.

NOTE

Figure E-1 shows all of the possible entries for the [Tape Operations] menu. File 1 is an HP-supplied inverse-assembler file. File 2 is a user-generated file with the date and time of its creation. File 10 is a copyfile; it allows copying of write protected files from one tape to another. The remaining files have no data stored.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com





Files

Number of files:	10 files fixed. Selected using ROLL Keys.
User File Names:	all upper case.
HP-supplied file names:	file name is preceded by an asterisk. These files are write-protected and cannot be reformatted.
File contents:	configurations for menus (System, Trace, and Format), contents of trace memory (List, Waveform, X-Y Chart, and histogram chart displays, including data and time if clock was set).

Display Control Fields

File Description:	bright bar (moved with ROLL keys) indicates file that will be read with INSERT and written to with DELETE.
Erase & Format Cassette:	[Yes] automatically erases entire tape and reformats to 10 blank files. When using a cassette with one or more write-protected files, the erase function is not available and the field is not displayed.

Figure E-1. Tape Operations System Menu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

7. Move the cursor down into the Erase & Format Cassette field and change it to [Yes]. This will immediately cause the analyzer to erase everything on the tape and format ten blank files. This operation takes approximately 5 minutes. All other functions of the analyzer can be used while it is formatting the tape.

NOTE

You cannot erase and format a tape that has any write-protected files.

8. When tape formatting is complete, the display will show No Data for each file. Move the cursor into the bright bar in the File Description column, and Type in the letter A. This assigns file name A to the associated file space. Now you can save the setups of the FORMAT and TRACE menus, and the content of the trace memory on tape in file A.

9. The analyzer would identify the date and time that it saved your setup and data, and make this information available to you if you had set the analyzer clock, but it is not set.

10. Try going to the [Peripherals] menu to set the clock. The ERROR message indicates that you cannot leave this file until you store information in it. Since you don't want to store the instrument setup until you can identify the date and time of storage, press the blue SHIFT key and press DEFAULT. This returns the file to the undefined state.

11. Move the cursor up into the [Tape Operations] field and change it to [Peripherals].

12. Move the cursor down into the "Clock Set:" field and enter the month, day, year, and time (hour:minute:second).

13. Press the TRACE key, and change the trace mode field to read [Continuous].

14. Press the RUN key and then the STOP key. This obtains data in memory.

15. Press the SYSTEM key and obtain the [Tape Operations] menu.

16. Move the cursor into the bright bar in the File Description column and type in the letter A. This assigns file A to store the instrument setup and acquired data at the indicated location on the tape.

17. Press the blue SHIFT key and DELETE to write your present instrument setup on the tape. The message WAIT Writing Cassette File will be on screen while the analyzer is writing the setup and data.

18. After tape storage is complete and the tape has been rewound, cycle the LINE power switch off and back on. The System Specification [Configuration] menu will be on screen. The analyzer will loose its clock set.

19. Press the TRACE key. See that the [Single] trace mode is in effect. This is the default mode set up during power-up.

20. Press the LIST key. See that the trace list memory is blank.

21. Press the SYSTEM key and change [Configuration] to [Tape Operations]. See that your file A is identified on screen, along with the date and time it was stored. The bright bar in the File Description column should be on your file A. Use ROLL keys to move bright bar, if necessary.

22. Press the INSERT key. The message WAIT Reading Cassette File will be on the display. Allow several seconds for the analyzer to read the file and set up the menus. When the reading of the file is complete, the SYSTEM [Configuration] menu will be on screen.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

23. Press the TRACE key. See that the trace specification is set up to perform in the [Continuous] trace mode. This is the measurement mode you recorded on tape.

24. Press the LIST key. See that the trace memory is loaded with activity. This is the activity that was in the trace memory when you recorded the setup.

HOW TO CREATE A NEW FILE

1. Place the cursor in the bright bar under File Description.

2. Use the ROLL keys to move the bright bar to the desired location for the new file.

3. On the keyboard, type in a file name using any of the alphanumeric characters. After the name of a file has been typed, you cannot access any other part of the analyzer until you store an instrument setup plus data in that file. If you have to leave that file location before storing the setup and data, press the blue SHIFT key and DEFAULT.

4. Press the blue SHIFT key and DELETE to write the analyzer setup and data to the selected tape file. This takes from 30 to 70 seconds, approximately.

NOTE

For ease of creating a file description similar to one already on screen, move the bright bar into the present file name and type just the first letter of that name. Then ROLL the bright bar to the location where you want to create the new name. A copy of the entire line will follow the bright bar. You can edit the copy to obtain the File Description you want.

HOW TO READ A FILE

1. Use the ROLL keys to move the bright bar to the location of the file you want to read.

2. Press the INSERT key. The message WAIT Reading Cassette File will appear on screen. The read takes from 20 to 60 seconds, approximately. When the read is complete, the [Configuration] System Specification will appear on screen.

HOW TO COPY AN EXISTING FILE FROM ONE TAPE TO ANOTHER

You can make as many copies of your user files as desired by following the procedures described in this appendix. First load your file into the analyzer as described in "How To Read A File". Then write the analyzer setup to as many other cassettes as desired, as described in "How To Create A New File".

HOW TO COPY AN HP WRITE-PROTECTED INVERSE-ASSEMBLER FILE INTO A USER FILE

All tape cassettes have a finite life. You should make user copies of your cassettes that have HP-supplied inverse-assembler files. Then store the original tapes; use them only when making new user copies. The following procedure will help you create user copies of HP-supplied inverse-assembler files.

1. Install the tape cassette that has the HP write-protect inverse-assembler file into the digital cassette drive.

2. Obtain the [Tape Operations] menu. Each cassette with an HP-supplied inverse-assembler file will have an additional file labeled, "COPYFILE: Duplicates cassette files". This contains the routines that read an HP-supplied inverse-assembler, and copy it to other cassettes.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3. Move the highlighted bar to the "COPYFILE" line.

4. Press the INSERT key. This causes the analyzer to read the COPYFILE program. When finished, the analyzer will place the following messages on screen: "COPYFILE: Press INSERT to copy highlighted file" at the bottom of the menu, and "Press STOP to exit COPYFILE" at the top of the menu.

5. Move the highlighted bar to the write-protected inverse-assembler file you want to copy.

6. Press the INSERT key. This reads the inverse-assembler file into the analyzer along with the copyfile program. When finished, the message at the bottom of the menu will change to "COPYFILE: Press DELETE to store copy in highlighted file".

7. Now open the digital cassette drive, remove the tape cassette, and install the new cassette that you want to contain your user file. The analyzer will display the directory of the new tape.

8. Move the highlighted bar to the location where you want to store the inverse-assembler routine.

9. Press the DELETE key. The analyzer will write the inverse-assembler routine to the tape at the location you selected. All attributes of the source file will be transferred. Because the source file was write-protected, your user file will also be write-protected.

10. You can now repeat steps 7 through 9 to create as many cassettes with inverse-assembler routines as desired.

11. Press the STOP key. This exits the COPYFILE program and returns the analyzer to normal program execution.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

INDEX

A

Accessories 1-4
Accessory power 2-2
Address switch 2-1
[Assignment] menu 4-4
Assignments
  Clock 4-5
  Labels 4-6
  Threshold 4-5
  Polarity 4-6

B

Blue shift key 3-0,4-3
Bus, HP-IB ..... Appendix B

C

Capturing state flow 4-1
Clock assignments 4-5
Clock set 8-1, 8-2
Compare trace modes
  [Compare/Edit Compare] 4-27
  [Full Compare] 4-29
[Configuration] menu 4-2, 6-2, 7-2
Configuration, Physical 1-4
Connections
  to target system 2-1
  through probe interface 2-
  directly to system .....
  operating power .....
[Continuous] trace mode 4-15
  in compare modes 4-27
  in overview modes 5-1
Control
  front panel 3-0
  HP-IB 9-1
  HP-IL 9-1
Count
  [states] or [time] 4-16
CURSOR 3-0

D

Display messages ..... Appendix A
Display messages, power-up 2-4
DON'T CARE triggering 4-18

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

E

Error messages ..... Appendix A

F

Free-run trace 4-1
FORMAT Specification, State
description 1-3
[Assignment] 4-7
[Relocation] 4-10
[User Base] 4-13
FORMAT Specification, Timing
[Assignment] 6-7
[User Base] 6-8

G

Glitches 6-1
Glitch mode 6-9

H

Hardcopy, printer C-1
Histogram 5-1
state label overview 5-4
state time interval overview 5-6
state time position overview 5-8
state linkage overview 5-12
HP-IB ..... Appendix B
HP Model 5036A 4-1
HP Model 9121D/S ..... 1-4, Appendix D
HP Model 10269A/B 1-4, 2-2
HP Model 10271A 1-4
HP Model 10272A 1-4
HP Model 10273A 1-4
HP Model 82161A ..... 1-4, Appendix E

I

Interactive state/timing 7-1
triggering 7-1
FORMAT 7-3
TRACE 7-3
Interface
HP-IB or HP-IL 9-1
Probe 1-4, 2-2
Internal storage
description 1-3
storing to 8-4
resetting 2-3
Inverse Assemblers 4-15

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

L

Labels
moving on display 4-3
state 4-6
timing 6-7
Learn string commands
TC, transmit configuration 9-5
TE, transmit everthing 9-9
TS, transmit state acquisition 9-6
TT, transmit timing acquistion 9-8
LIST displays
state 4-31
timing 7-5
[Linkage] overview measurement 5-10

M

Magnification 6-4
Magnify about "x" 6-3
Master field 7-4
Memory
description 1-4
tape ..... Appendix E
disc ..... 8-2, Appendix D
Menu map 3-2
Messages
ERROR ..... Appendix A
WARNING ..... Appendix A
WAIT ..... Appendix A
power-up 2-4
Mnemonics 9-1
Multiple labels for bits 4-9

N

[next to] 4-23

O

Operating characteristics 1-7
[Overview] measurements 5-1
[State Label] 5-1
[Time Interval] 5-4
[Time Position] 5-6
[Linkage] 5-10

P

Performance analysis, software 5-1
Peripherals
tape memory ..... Appendix E
disc memory ..... Appendix D
printer ..... Appendix C

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

P (Continued)

[Peripherals] menu
1630A/D 8-1
1630G 8-2
Pod threshold 2-2, 4-5
PORT, rear panel 8-2, 8-3
PRINT 3-0
Printer ..... 1-4, Appendix E
Probe Interface 1-4, 2-2

R

[Relocation] menu 4-10
Resource terms 4-19
sequence restart 4-24
store qualifiers 4-25
[then] 4-22
trigger [center] 4-21
trigger [end] 4-21
trigger [start] 4-19
[next to] 4-23
Restart, sequence 4-24
RESUME 3-0
RETURN TO LOCAL 3-0
RUN 3-0,4-1

S

Sample period 6-10
Self-test 2-2
1630A/D 2-3
1630G 2-3
Sequence triggering 4-22
sequence restart 4-24
store qualifiers 4-25
[then] 4-22
trigger [center] 4-21
trigger [end] 4-21
trigger [start] 4-19
[next to]
Service 2-2
[Single] trace mode 4-15
Specifications 1-5
State Analysis Functions 1-2
State DISPLAYS
LIST 4-31
WFORM 4-33
CHART 4-34
State FORMAT Specification 4-4
[Assignment] 4-6
[Relocation] 4-10
[User Base] 4-13

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

S (Continued)

State Label Overview Measurement 5-1
State TRACE Specification 4-15
[Single] 4-15
[Continuous] 4-15, 4-27, 4-30
[Compare/Edit Compare] 4-27
[Full Compare] 4-30
[Overview] 5-1
Time tagging 4-16
[Storage Operations] menu D-1
Store qualifiers 4-25
SYSTEM Specification, description 1-3
SYSTEM menus
[Configuration] 4-2
[Peripherals] 8-1
[Storage Operations] ..... Appendix D
[Tape Operations] ..... Appendix E

T

TALK ONLY mode C-1
Tape memory ..... Appendix E
[Tape Operations] menu ..... Appendix E
Target system 4-1
Termination of transfer 9-9
[Time Interval] overview measurement 5-4
[Time Positional] overview measurement 5-6
Time tagging 4-16
Timing Analysis Functions 1-2
Timing DISPLAYS
WFORM 6-10
LIST 6-11
CHART 6-12
Timing FORMAT Specification 6-7
[Assignment] 6-7
[User Base] 6-8
Timing measurements 6-1, 7-1
Timing TRACE Specification 6-9
[Single] 6-9
[Continuous] 6-9
Transfer termination 9-9
Trigger [center] trace 4-21
Trigger edge 6-5
Trigger [end] trace 4-19
Trigger, DON'T CARE 4-18
Trigger [start] trace 4-19
Trigger terms 4-19

U

[User base] menu 4-13

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

W

Waveform Displays
State 4-33
Timing 6-10

X

XY Chart Displays
State 4-34
Timing 6-12

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP