TEK Operator's Manual

Part No. 070-8235-00
Product Group 21

VM700A
OPTION 20
TELETEXT
MEASUREMENTS

Please Check for
CHANGE INFORMATION
at the Rear of This Manual

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TABLE OF CONTENTS

Section 4 Remote Control Commands and Keywords

Index

Change Page

LIST OF ILLUSTRATIONS

LIST OF TABLES

OPERATOR'S SAFETY SUMMARY

The general safety information in this part of the summary is for both operating and servicing personnel. Specific warnings and cautions will be found throughout the manual where they apply, but may not appear in this summary.

Terms In This Manual

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property or loss of data.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

Terms As Marked on Equipment

CAUTION indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property, including the equipment itself. Refer to the manual for information.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

Protective ground (earth) terminal.

SAFETY INFORMATION

Use the Proper Power Source. This product is intended to operate from a power source that will not apply more than 250 V rms between the supply conductors or between either supply conductor and ground. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

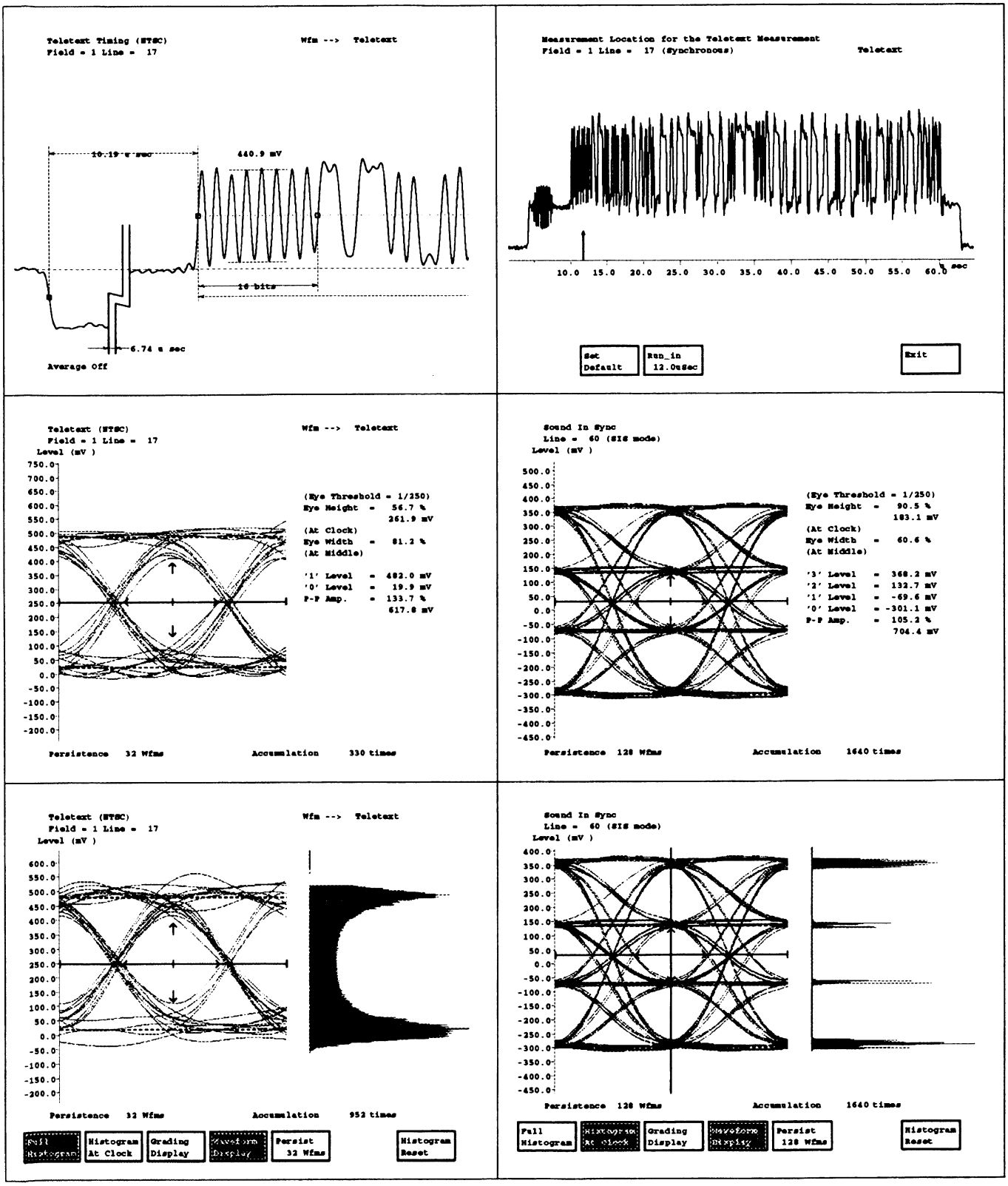
Ground the Product. This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the product input or output terminals. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.

Danger May Arise From Loss of Ground. Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulating) can render an electric shock.

Use the Proper Fuse. To avoid fire hazard, use only the fuse of correct type, voltage rating, and current rating as specified in the parts list for your product. Refer fuse replacement to qualified service personnel.

Do Not Operate in Explosive Atmospheres. To avoid explosion, do not operate this product in an explosive atmosphere.

Do Not Remove Covers. To avoid personal injury, do not remove the product covers or panels. Do not operate the product without the covers and panels properly installed.



VM700A Option 20 Teletext and SoundInSync.

Section 1
INTRODUCTION

The VM700A Option 20 (Teletext) gives you access to two measurements: "Teletext" and "SoundInSync." These measurement applications determine various parameters related to the transmission of digital information in the vertical interval and in the sync pulse, respectively.

The Teletext softkey appears in the Measure Mode's Video Options directory window when Option 20 is installed in your VM700A.

The SoundInSync softkey appears in the Measure Mode's Video Options directory window when Option 20 is installed in your VM700A with PAL or dual-standard software.

To view the Video Options directory window, press the Measure button on the front panel. If the VM700A was in the Video Options directory when you last used Measure Mode, the Video Options directory will be displayed. Otherwise, press the Video Options softkey at the bottom of the display to view the Video Options directory.

REMOTE COMMANDS

With the Teletext option installed, remote commands and keywords are added to perform the option measurements and get measurement results. Remote commands and keywords are found in the section *Remote Commands and Keywords*. Abbreviated instructions for operating the instrument via remote control are also found in that section. For more complete information about remote control, see the*VM700A Programmer's Reference Manual.*

Section 2
CONFIGURING TELETEXT MEASUREMENTS

TELETEXT FILE

The system default files are used to describe the measurement limits and sources for the Teletext and SoundInSync auto measurements. The system default files cannot be altered. If you wish to alter the default parameters you must set up new files which may be edited for your measurement requirements. Configuring is done as described in the *VM700A Video Measurement Set Operator's Manual*. The system default screens for the measurement limits follow. The control knob is used to scroll the choices into view.

Teletext (NTSC)

System Default Teletext Option Configuration

Locations	Field	Line		
Teletext	1	15		
Limits			**Lower**	**Upper**
'1' Level			482.0	518.0
'0' Level			-18.0	18.0
Eye Height (%)			70.0	100.0
Eye Height (mV)			350.0	500.0
Eye Width (%)			70.0	100.0
P-P Amplitude (%)			100.0	130.0
P-P Amplitude (mV)			500.0	650.0
Run-In Start (u sec)			9.0	11.0
Run-In Bits (bits)			14.0	18.0
Data Line Width (u sec)			52.0	59.0
Data End to Sync (u sec)			1.00	3.00
Run-In Amplitude (mV)			482.0	518.0

Line 22

Showing "/rom/ConfigFiles/Teletext/NTSC/System~Default"

No Change & Exit

Teletext and SoundInSync (PAL)

System Default Teletext Option Configuration

Locations

Teletext Line 17

Limits	Lower	Upper
'1' Level	420.0	504.0
'0' Level	-14.0	14.0
Eye Height (%)	70.0	100.0
Eye Height (mV)	323.0	562.0
Eye Width (%)	70.0	100.0
P-P Amplitude (%)	100.0	130.0
P-P Amplitude (mV)	462.0	600.0
Data Timing (u sec)	11.0	13.0
Run-In Start (u sec)	9.0	11.0
Run-In Bits (bits)	14.0	18.0
Data Line Width (u sec)	52.0	59.0
Data End to Sync (u sec)	1.00	3.00
Run-In Amplitude (mV)	420.0	504.0
Sound In Sync		
'3' Level (mV)	370.0	430.0
'2' Level (mV)	137.0	197.0
'1' Level (mV)	-97.0	-37.0
'0' Level (mV)	-330.0	-220.0
Eye Height (%)	70.0	100.0
Eye Height (mV)	163.0	230.0
Eye Width (%)	70.0	100.0
P-P Amplitude (%)	100.0	130.0
P-P Amplitude (mV)	700.0	910.0

Line 36

Showing "/rom/ConfigFiles/Teletext/PAL/System~Default"

No Change & Exit

Video_Source Files

In the System~Default Video_Source File, choices for the installed options needing video sources are listed. If you must select a source file other than the default file selection, you must create a new file that can be edited. Edit your newly created file to select the appropriate measurement limits file you have created and edited for your measurement requirements.

```
                 Channel Configuration System Default File

  Auto Limits File:                          EndToEnd
  Measure Limits File:                       System~Default
  Measurement Location File:                 System~Default
  Selected Measurement File                  System~Default
  Auto Sync Source                           Locked to Source
  Source Name:                               Locked to Source
  Video Printout Title:                      VM700A Video Measurement Set

Options:

  Echo and Rounding                          System~Default
  Teletext                                   System~Default
  Component                                  System~Default
-----------------------------------------------------------------------
                                             Line 15

  Showing  "/rom/ConfigFiles/Video_Source~Files/NTSC/System~Default"

                                                  No Change
                                                  & Exit
```

Source Channel Selection File

The source channel, A, B, or C, for the video signal is configured in the Source Channel Selection file to accept NTSC or PAL sources as appropriate for the application. If you have created a new Video Source File, you can edit the Video Source File Name parameter in this file to select it. If you have a single standard instrument (Option 01 NTSC or Option 11 PAL only), the Video Source File Name column shows only the video standard installed.

```
          Video  NTSC Video Source File Name   PAL Video Source File Name
          Std.
-------------------------------------------------------------------------
Source A: NTSC       System~Default                System~Default
Source B: PAL        System~Default                System~Default
Source C: NTSC       System~Default                System~Default

Timed Events: System~Default
-------------------------------------------------------------------------
                                             Line 8

Editing  "/nvram0/ConfigFiles/Source_Selection~Video"

                                                  Accept
                                                  Input
```

MEASUREMENT RESULTS FILES

The measurement results for Teletext and SoundInSync (for PAL and dual-standard instruments) are kept in the Measurement Results files. The results of the most recent measurement are stored here and can be viewed by selecting the Teletext or the SoundInSync results file. The following displays show an example of the data contained in the Measurement Results files.

Teletext

```
  Measurement Results          Channel A          Wed Jan 30 16:19:59

Teletext                                          Waveform->Teletext
Field = 1 Line =  15
Accumulation 400 times
Timing Average Off
-------------------------------------------------------------------------
    (Eye Threshold = 1/250)
Eye Height                45.9  %          *        70.0      100.0
                          28.1  IRE        *        49.0       70.0
    (At Clock)
Eye Width                 58.1  %          *        70.0      100.0
    (At Middle)
'1' Level                 66.0  IRE        *        67.5       72.5
'0' Level                  4.7  IRE        *        -2.5        2.5
P-P Amplitude            156.8  %          *       100.0      130.0
                          96.1  IRE        *        70.0       91.0
Run-In Start              9.91  u sec
Run-In Bits               16.0  bits
Data Line Width          50.32  u sec      *       52.00      59.00
Data End to Sync          3.32  u sec      *        1.00       3.00
Run-In Amplitude          52.7  IRE        *        67.5       72.5
-------------------------------------------------------------------------
```

SoundInSync

```
  Measurement Results          Channel A          Wed Jan 30 16:37:29

SoundInSync
Line =  96 (SIS mode)
Accumulation 200 times
-------------------------------------------------------------------------
    (Eye Threshold = 1/250)
Eye Height                86.2  %
                         201.0  mV
    (At Clock)
Eye Width                 77.5  %
    (At Middle)
'3' Level                370.8  mV
'2' Level                147.1  mV
'1' Level                -86.1  mV
'0' Level               -310.9  mV
P-P Amplitude            106.0  %
                         722.5  mV
-------------------------------------------------------------------------
```

Section 3
USING TELETEXT AND SOUNDINSYNC MEASUREMENTS

INTRODUCTION

The Teletext option measures parameters related to the transmission of digital information in the vertical interval. This measurement requires a teletext signal. Running the Teletext measurement writes a file called Teletext into the Measurement Results directory.

SoundInSync measures parameters related to the transmission of digital information in the sync pulse. This measurement requires sound in the sync pulse to guarantee proper operation. Running the SoundInSync Measurement writes a file called SoundInSync into the Measurement Results directory.

TELETEXT TIMING MEASUREMENT DISPLAY

The Teletext Timing Measurement display (Figure 3-1) shows the name of the measurement, the type of waveform being measured, and the field (for NTSC) and line number being measured. The graphical display portion of the screen shows the signal being measured.

For NTSC, a digital readout in the upper left portion of the display shows the amount of time from the 50% point of the leading edge of sync to the 50% point of the start of the run-in bits. For PAL, the same digital readout shows the amount of time from the 50% point of the leading edge of sync to the Data Timing Reference point. This reference point is defined as the time of the peak of the next-to-last '1' bit in the clock run-in sequence.

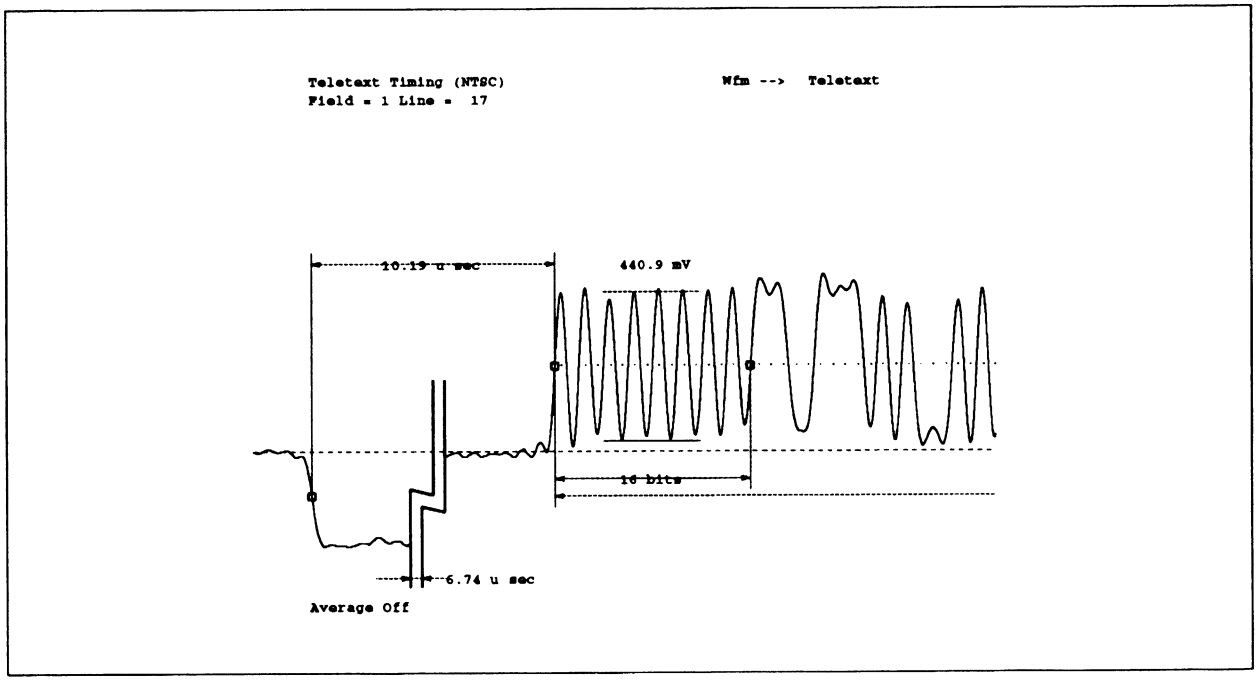


Figure 3-1. Teletext timing display.

Another digital readout in the lower left portion of the display shows the amount of time omitted on the display, to allow as much of the "interesting" portion of the signal as possible to be displayed at one time. The omitted portion of the signal is represented by two jagged vertical lines. Moving the display rightward reduces the amount of time omitted. When the amount of time omitted goes to zero, the jagged lines disappear from the display.

Another pair of digital readouts show the amplitude and number of run-in bits that precede the digital information in the teletext signal.

Readouts show the amount of time from the start of the run-in bits to the end of the digital data, and from the end of the digital data to the 50% point of the leading edge of sync for the next line.

A horizontal line of small dots appears at the level of the mean amplitude of the run-in bits. These dots show the position of clock edges for the digital data. These dots can be used to determine whether a '0' or '1' is being transmitted at any point in the digital data sequence.

TELETEXT EYE MEASUREMENT DISPLAY

The Teletext Eye Measurement display (Figure 3-2) also shows the name of the measurement, the type of waveform being measured, and the field (for NTSC) and line number being measured. The graphical display portion of the screen shows the waveforms of the digital data being transmitted. Two clock cycles of digital data are plotted in each waveform on the display, in pairwise sequential fashion, i.e., the first waveform shows cycles 1 and 2, the second waveform shows cycles 2 and 3, the third shows cycles 3 and 4, etc.

Clock edge positions are indicated by vertical lines at the left, center, and right of the x-axis of the Eye Measurement display. The mid-point of each cycle is also indicated by smaller vertical lines on the same axis.

Two vertical arrows on the display show the time at which the eye height measurement is being made. Similarly, two horizontal arrows on the display show the level at which the eye width measurement is being made.

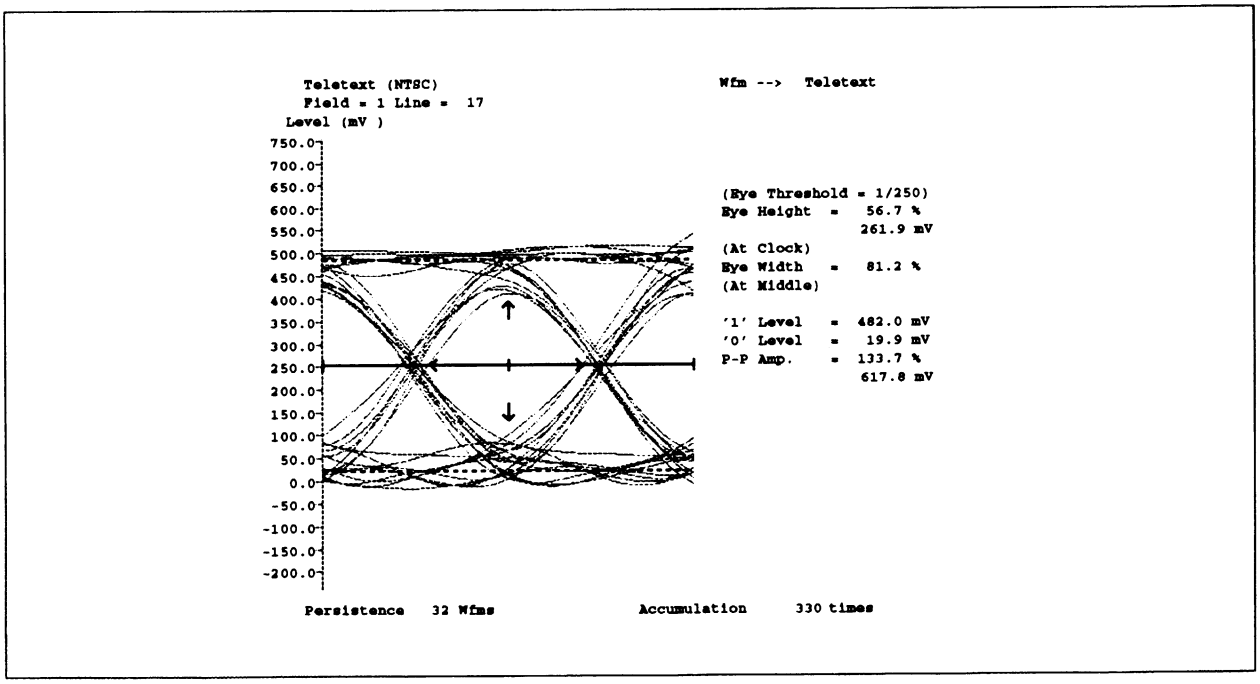


Figure 3-2. Teletext eye display (without histogram).

Digital readouts on the Eye Measurement display give the values of the following:

- **eye threshold:** indicates the proportion of data points being omitted from histogram displays at the extremes of variation in signal level for the eye measurement. This value can be set with the Threshold softkey (path: Eye Meas. → Eye Meas. Param. → Threshold).
- **eye height:** gives the eye height measurement as a percentage of the difference between the '0' and '1' levels. The timing position at which the measurement is taken is also shown.
- **eye width:** gives the eye width measurement as a percentage of the clock cycle time. The signal level at which the measurement is being taken is also shown.
- **'1' level:** gives the nominal signal level for a digital '1' value.
- **'0' level:** gives the nominal signal level for a digital '0' value.

  For PAL-standard signals, the unit of measurement for the readouts listed above is millivolts. For NTSC-standard signals, the unit of measurement is IREs or millivolts, selectable in the Teletext file in the /nvram0/ConfigFiles directory. The default NTSC unit of measurement is IREs.
- **P-P amplitude:** gives the maximum difference between high and low signal levels, as a percentage of the difference between the '0' and '1' levels and in IREs (NTSC) or millivolts (PAL).
- **Persistence:** indicates the number of most recent waveforms displayed on the graph. This value can be set with the Persist softkey (path: Eye Meas. → Display → Persist).
- **Accumulation:** indicates the number of waveforms accumulated for measurement derivation and histogram display.

TELETEXT HISTOGRAM DISPLAY

Pressing the **Display** softkey on the Eye Measurements menu brings up the Histogram display (Figure 3-3).

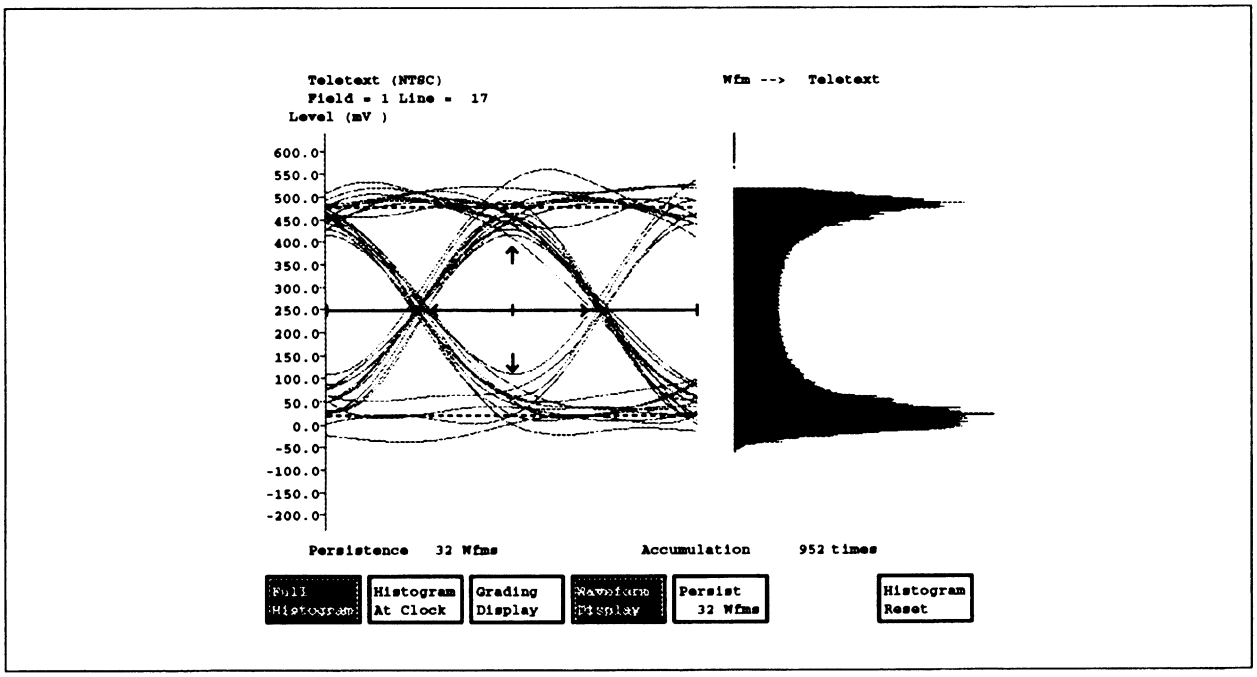


Figure 3-3. Teletext eye display (with histogram).

The left half of the Histogram display shows the same plot of signal level vs. time as the left half of an Eye Measurement display. In the Histogram display, however, the digital readouts of the Eye Measurement display are replaced by a histogram of the number of occurrences of waveforms at various signal levels. All histograms are drawn with 2.55-mV resolution.

When using the Teletext Eye Measurement display, it is important to have a significant number of clock cycles accumulated in order to ensure accuracy. The number accumulated should be at least 200, and preferably 2,000 or more.

TELETEXT MENU

Pressing the Menu button when the Teletext measurement is being run displays the Teletext main menu. The Teletext menu structure is shown in Figure 3-4.

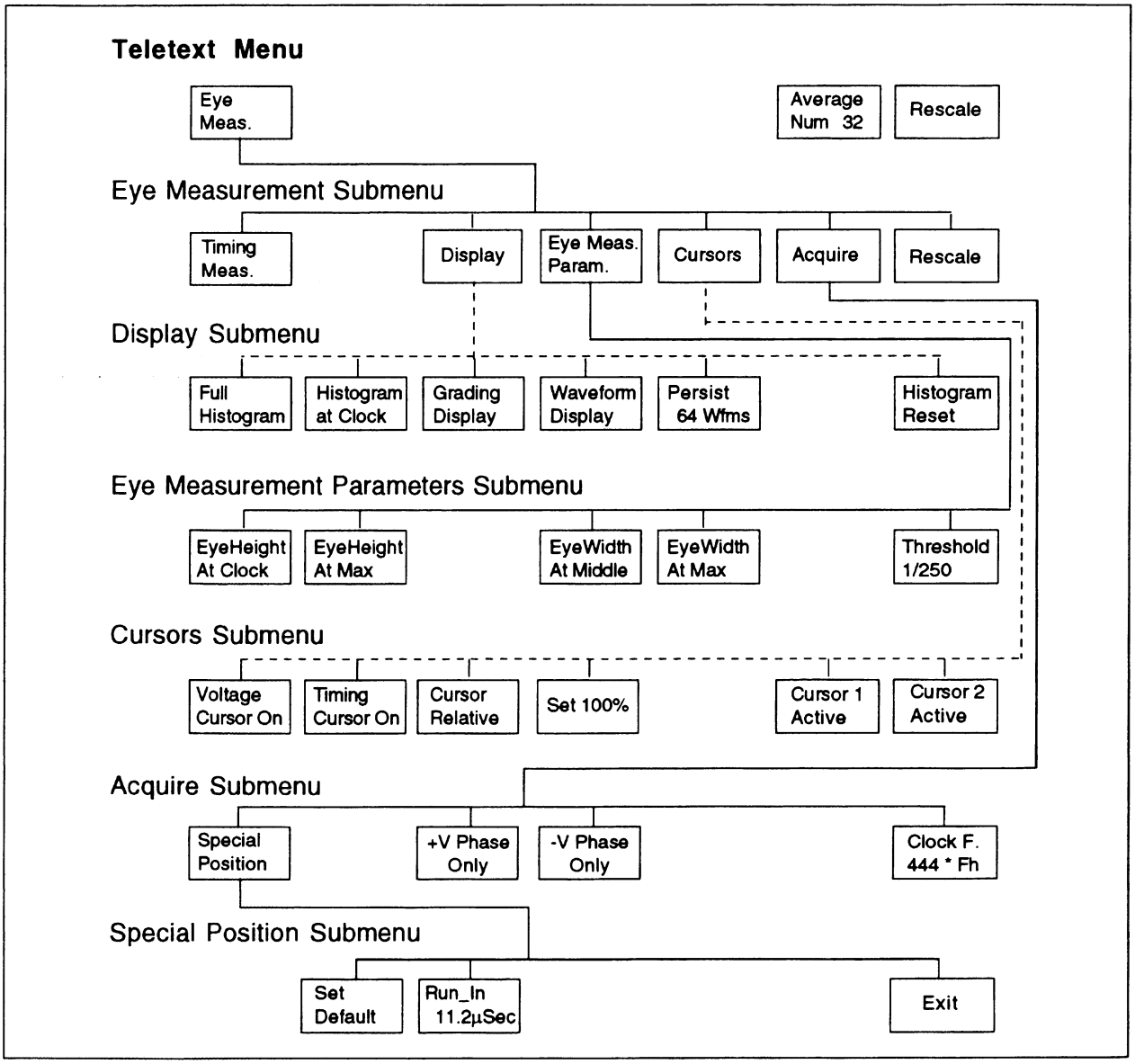


Figure 3-4. Teletext menu tree.

Main Menu

Eye Meas.	**Eye Meas.** starts the Teletext eye measurement, and brings up the Eye Measurement display and the Eye Measurement submenu.
Average Num	**Average Num** specifies the weighting factor to be used for averaging. The Average Num range is 1 to 256. The default value is 32. To change the Average Num value, touch the Average Num softkey to highlight it, rotate the knob until the desired weighting factor appears, then press the Average Num softkey again.
Rescale	**Rescale** sets the expansion factor of the display to an appropriate scaling factor for the Teletext measurement's display graticule. The X- and Y-axes adjust to accommodate the rescaled display.

Eye Measurement Submenu

Timing Meas.	**Timing Meas.** starts the Timing Measurement and brings up the Timing Measurement display and Teletext main menu.
Display	**Display** displays the histogram at the clock point or at all points, and brings up the Display submenu for selecting waveform persistence or choosing between a waveform or grading display.
Eye Meas. Param.	**Eye Meas. Param.** brings up the Eye Measurement Parameters submenu, which provides softkeys for setting such parameters as eye height, eye width, and threshold.
Cursors	**Cursors** brings up the Cursors submenu, which provides softkeys to display and activate the cursors.
Acquire	**Acquire** brings up the Acquire submenu, which controls how the signal is acquired for the Teletext measurement.
Rescale	**Rescale** sets the expansion factor of the display to an appropriate scaling factor for the Teletext measurement's display graticule. The X- and Y-axes adjust to accommodate the rescaled display.

Display Submenu

Full Histogram	**Full Histogram** displays a histogram of all timing points.
Histogram at Clock	**Histogram at Clock/At ±XX%** displays a histogram at a specific timing point. (The position of the clock is default.) To change the position of the timing point, touch and hold the softkey and turn the knob. The position of the timing point is given relative to the clock position, as a percentage of the clock period.
Grading Display	**Grading Display** displays accumulative waveform information. Larger accumulations yield better results.
Waveform Display	**Waveform Display** displays the most recent waveforms, and brings up the Persistence softkey to select the number of waveforms displayed.
Persistence	**Persistence** selects the number of waveforms to be shown in the Waveform display. This value can be varied in powers of two, from 4 to 1024, plus zero (no persistence) and infinite (all waveforms displayed). To change the Persistence value, touch the softkey to highlight it, then turn the knob.
Histogram Reset	**Histogram Reset** clears all accumulated waveforms and re-starts the eye measurement.

Eye Measurement Parameters Submenu

EyeHeight at Clock	**EyeHeight at Clock/at ±XX%** defines a timing point for the Eye Height measurement relative to the clock position, as a percentage of the clock period. The position of the clock is the default. To change the position of the timing point, touch and hold the softkey and turn the knob.
EyeHeight at Max	**EyeHeight at Max** searches all timing positions and returns the maximum eye height result.
EyeWidth at Middle	**EyeWidth at Middle/at ±XX%** defines a voltage level at which to make the Eye Width measurement, as a percentage of the difference between the '0' and '1' levels. The mid-point between the '0' and '1' levels is the default. To change the voltage level, touch and hold the softkey and turn the knob.
EyeWidth at Max	**EyeWidth at Max** searches all positions and returns the maximum eye width result.
Threshold	**Threshold** selects the number for the threshold to determine eye height and eye width values. The value selected shows the proportion of extreme values omitted from the Histogram display for the eye height and eye width measurements.

Cursors Submenu

Voltage Cursor On	**Voltage Cursor On** displays voltage cursors. Two horizontal cursors appear where they were when voltage cursors were last active.
Timing Cursor On	**Timing Cursor On** displays timing cursors. Two vertical cursors appear where they were when timing cursors were last active.
Cursor Relative	**Cursor Relative** selects relative cursor mode. When highlighted, the cursor delta is displayed as a percentage of a user-definable voltage or timing distance. When not highlighted, the cursor delta is displayed in IREs or millivolts for voltage cursors, and as a percentage of the clock period for timing cursors.
Set 100%	**Set 100%** defines the current cursor delta as the "reference" position for cursor relative measurements.
Cursor 1 Active	**Cursor 1 Active** displays voltage or timing cursors (whichever is highlighted) and causes the knob to move cursor 1.
Cursor 2 Active	**Cursor 2 Active** displays voltage or timing cursors (whichever is highlighted) and causes the knob to move cursor 2.

Acquire Submenu

Special Position	**Special Position** brings up the Special Position display (Figure 3-5) and brings up the Special Position submenu, which provides softkeys to set the measurement locations for the Teletext measurement.
+V Phase Only	**+V Phase Only** (PAL) makes the measurement on only the +V phase part of the signal.
-V Phase Only	**–V Phase Only** (PAL) makes the measurement on only the –V phase part of the signal.
Clock F. 444 * Fh	**Clock F.** specifies the multiple of the horizontal line frequency used for the Teletext measurement. This value can be set to 444 or 397 by turning the knob when the softkey is highlighted. The default is 444.

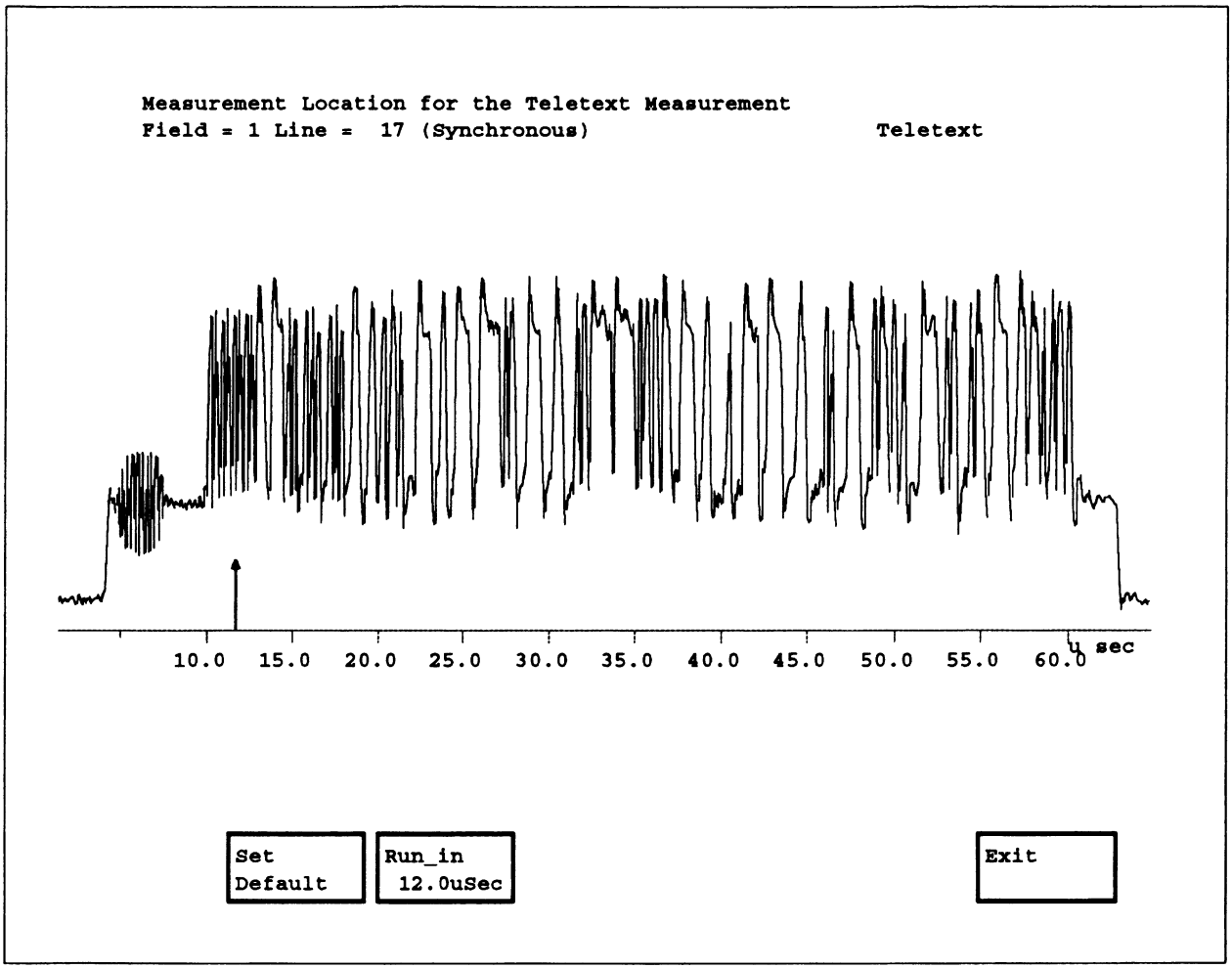


Figure 3-5. Teletext Special Position display.

Special Position Submenu

Set Default	**Set Default** resets the location for the run-in bits to the default position, specified in the current Measurement Locations file.
Run_In	**Run_In** selects the location for the run-in bits.
Exit	**Exit** leaves the Measurement Locations display and returns to the Eye Measurement display.

SOUNDINSYNC EYE MEASUREMENT DISPLAY

The SoundInSync Eye Measurement display (Figure 3-6) appears when the SoundInSync softkey is pressed. This display shows the name of the measurement, the type of waveform being measured, and the line number being measured.

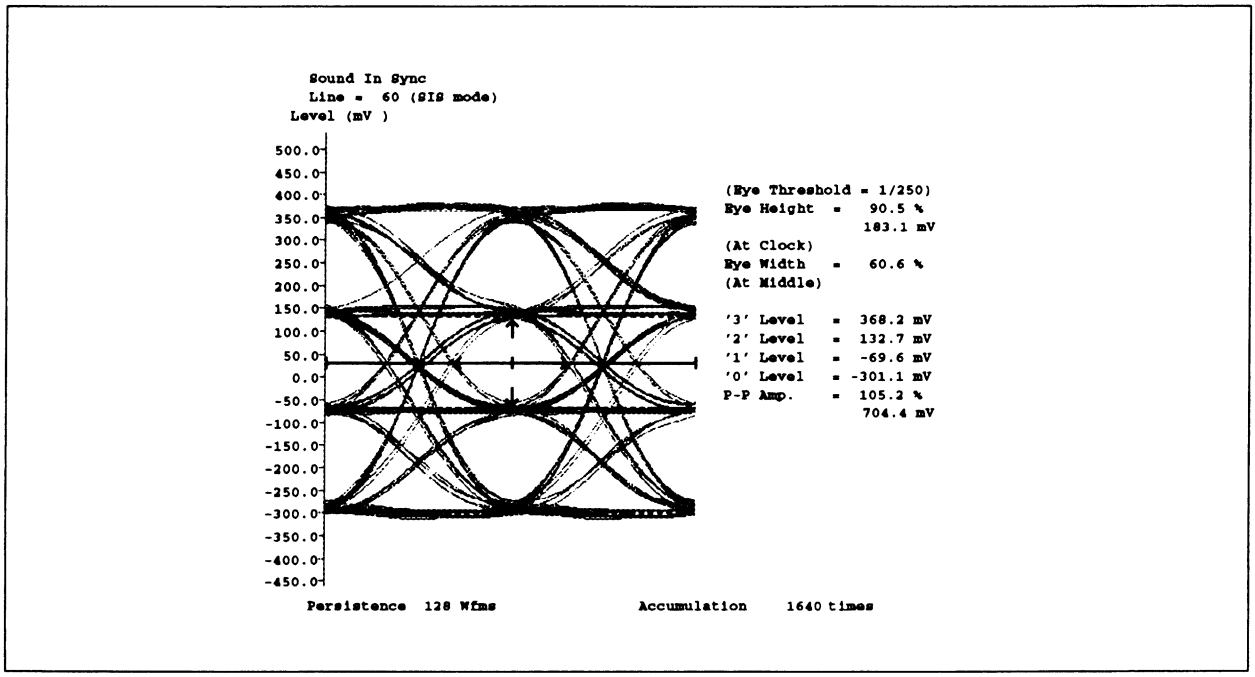


Figure 3-6. SoundInSync Eye Display.

The graphical display portion of the screen shows the waveforms of the digital data being transmitted. Two clock cycles of digital data are plotted in each waveform on the display, in pairwise sequential fashion, i.e., the first waveform shows cycles 1 and 2, the second waveform shows cycles 2 and 3, the third shows cycles 3 and 4, etc. The vertical axis of the display is divided into four sections, corresponding to a digital '0', '1', '2', and '3', respectively.

Clock edge positions are indicated by vertical lines at the left, center, and right of the x-axis of the Eye Measurement display. The mid-point of each cycle is also indicated by smaller vertical lines on the same axis.

Two vertical arrows on the display show the time (along the horizontal axis) and the signal level (along the vertical axis) at which the eye height measurement is being made. To change the signal level whose eye height is being measured, touch the screen anywhere between the signal levels you want to measure, i.e., to measure eye height between the '2' and '3' signal levels, touch the screen anywhere in that region.

Two horizontal arrows on the display show the times (beginning and end) at which the eye width measurement is being made.

Digital readouts on the Eye Measurement display give the values of the following:

- **eye threshold:** indicates the proportion of data points being omitted from histogram displays at the extremes of variation in signal level for the eye measurement. This value can be set with the Threshold softkey (path: Eye Meas. Param. → Threshold).
- **eye height:** gives the eye height measurement as a percentage of the difference between the two signal levels being measured, as well as in millivolts. The timing position at which the measurement is being taken is also shown.
- **eye width:** gives the eye width measurement as a percentage of the clock cycle time. The signal level at which the measurement is being taken is also shown.
- **'3' level:** gives the nominal signal level for a digital '3' value in millivolts.
- **'2' level:** gives the nominal signal level for a digital '2' value in millivolts.

- **'1' level:** gives the nominal signal level for a digital '1' value in millivolts.
- **'0' level:** gives the nominal signal level for a digital '0' value in millivolts.
- **P-P amplitude:** gives the maximum difference between high and low signal levels, expressed both as a percentage of the difference between the '0' and '3' levels and in millivolts.
- **Persistence:** indicates the number of most recent waveforms displayed on the graph. This value can be set with the Persist softkey (path: Display → Persist).
- **Accumulation:** the number of waveforms accumulated in the measurement and the Histogram display.

SOUNDINSYNC HISTOGRAM DISPLAY

Pressing the Display softkey on the Main menu brings up the Histogram display (Figure 3-7). The left half of the Histogram display shows the same plot of signal level vs. time as the left half of an Eye Measurement display. In the Histogram display, however, the digital readouts of the Eye Measurement display are replaced by a histogram of the number of occurrences of waveforms at various signal levels. All histograms are drawn with 2.55-mV resolution.

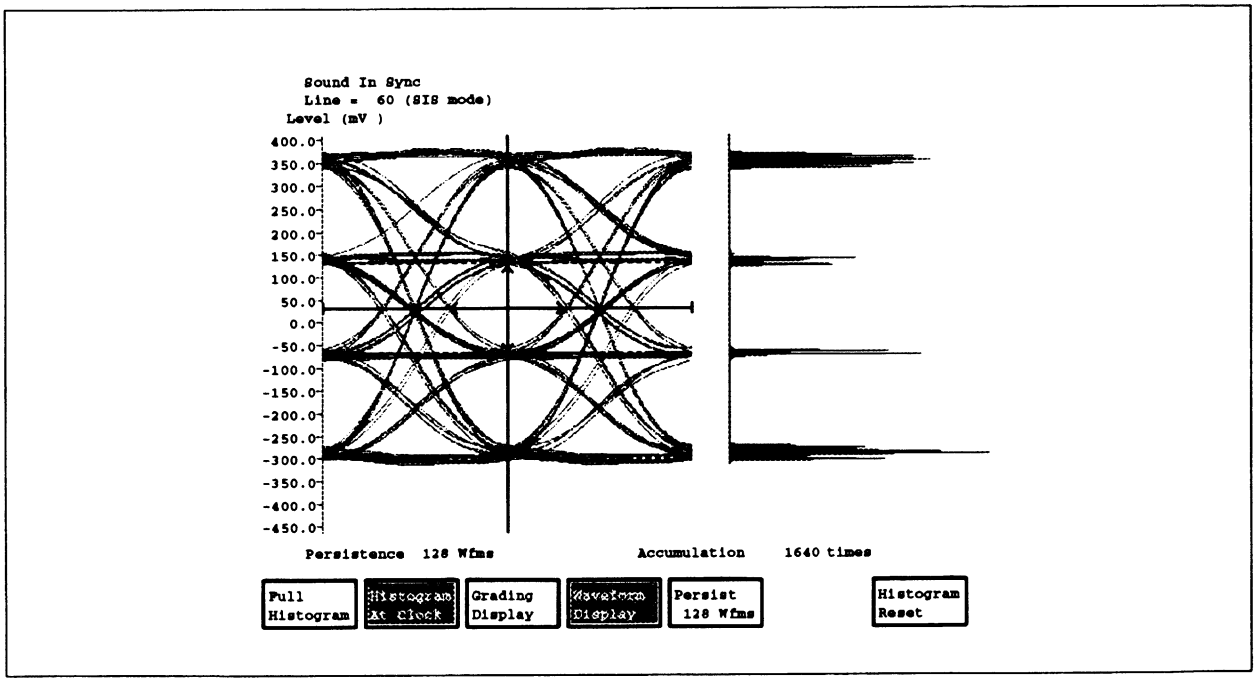


Figure 3-7. SoundInSync Histogram display.

When using the SoundInSync Eye Measurement, it is important to have a significant number of clock cycles accumulated in order to ensure accuracy. The number accumulated should be at least 200, and preferably 2,000 or more

SOUNDINSYNC MENU

Pressing the Menu button when the SoundInSync measurement is being executed brings up the SoundInSync main menu (Figure 3-8).

Main Menu

Display	**Display** displays the histogram at the clock point or at all points, and brings up the Display submenu for selecting waveform persistence or choosing between a waveform or grading display.
Eye Meas. Param.	**Eye Meas. Param.** brings up the Eye Measurement Parameters submenu, which provides softkeys for setting such parameters as eye height, eye width, and threshold.
Cursors	**Cursors** brings up the Cursors submenu, which provides softkeys to display and activate the cursors.
Rescale	**Rescale** sets the expansion factor of the display to an appropriate scaling factor for the SoundInSync measurement's display graticule. The X- and Y-axes adjust to accommodate the rescaled display.

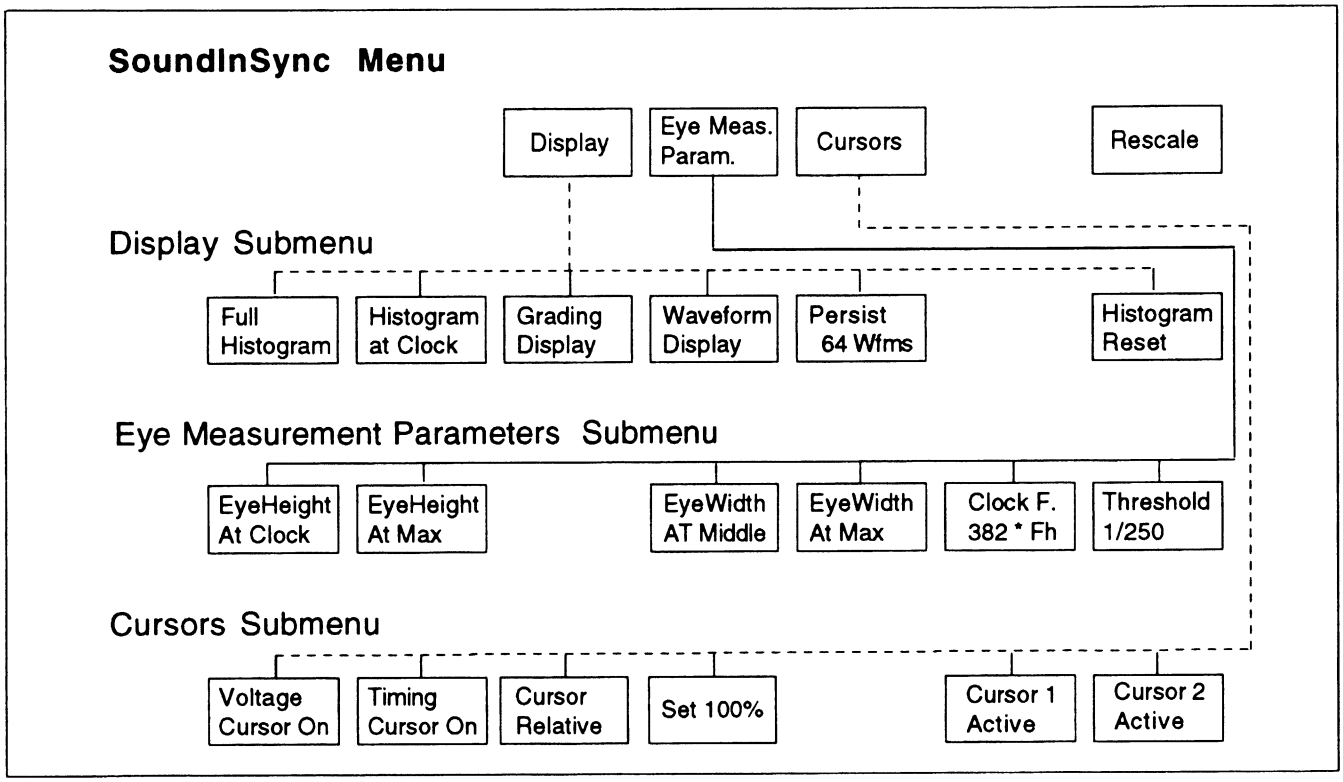


Figure 3-8. SoundInSync Menu Tree.

Display Submenu

Full Histogram	**Full Histogram** displays a histogram of all timing points.
Histogram at Clock	**Histogram at Clock/At ±XX%** displays a histogram at a specific timing point. (The position of the clock is default.) To change the position of the timing point, touch and hold the softkey and turn the knob. The position of the timing point is given relative to the clock position, as a percentage of the clock period.
Grading Display	**Grading Display** displays accumulative waveform information. Larger accumulations yield better results.
Waveform Display	**Waveform Display** displays the most recent waveforms, and brings up the Persistence softkey to select the number of waveforms displayed.
Persistence	**Persistence** selects the number of waveforms to be shown in the Waveform display. This value can be varied in powers of two, from 4 to 1024, plus zero (no persistence) and infinite (all waveforms displayed). To change the Persistence value, touch the softkey to highlight it, then turn the knob.
Histogram Reset	**Histogram Reset** clears all accumulated waveforms and re-starts the eye measurement.

Eye Measurement Parameters Submenu

EyeHeight at Clock	**EyeHeight at Clock/at ±XX%** defines a timing point for the Eye Height measurement. (The position of the clock is the default.) To change the position of the timing point, touch and hold the softkey and turn the knob. The position of the timing point is given relative to the clock position, as a percentage of the clock period.
EyeHeight at Max	**EyeHeight at Max** searches all timing positions and returns the maximum eye height result.
EyeWidth at Middle	**EyeWidth at Middle/at ±XX%** defines a voltage level at which to make the Eye Width measurement. (The mid-point between the '0' and '1' levels is the default.) To change the voltage level at which the measurement is made, touch and hold the softkey and turn the knob. The position of the voltage level is given as a percentage of the difference between the '0' and '1' levels.
EyeWidth at Max	**EyeWidth at Max** searches all positions and returns the maximum eye width result.
Clock F. 382 * Fh	**Clock F.** selects the clock frequency (352 or 382 times the line frequency).

Eye Measurement Parameters Submenu (cont)

Threshold	**Threshold** selects the number for the threshold to determine eye height and eye width values. The value selected shows the proportion of extreme values that will be omitted from the Histogram displays for the eye height and eye width measurements.

Cursors Submenu

Voltage Cursor On	**Voltage Cursor On** displays voltage cursors. Two horizontal cursors appear in the positions they were in the last time voltage cursors were active.
Timing Cursor On	**Timing Cursor On** displays timing cursors. Two vertical cursors appear in the positions they were in the last time timing cursors were active.
Cursor Relative	**Cursor Relative** selects relative cursor mode. When this softkey is highlighted, the cursor delta is displayed as a percentage of a user-definable voltage or timing distance. When this softkey is not highlighted, the cursor delta is displayed in millivolts for voltage cursors, and as a percentage of the clock period for timing cursors.
Set 100%	**Set 100%** defines the current cursor delta as the "reference" position for cursor relative measurements.
Cursor 1 Active	**Cursor 1 Active** displays voltage or timing cursors (whichever is highlighted) and causes the knob to move cursor 1.
Cursor 2 Active	**Cursor 2 Active** displays voltage or timing cursors (whichever is highlighted) and causes the knob to move cursor 2.

Section 4
REMOTE COMMANDS AND KEYWORDS

INTRODUCTION

Like other VM700A video functions, remote control of Teletext measurement functions is performed via the serial (RS-232C) ports on the VM700A rear panel. Using the remote control functions requires that you connect a terminal or computer to the VM700A via the RS-232C port with a correctly wired interconnect cable. If you use a computer, you will also need a suitable VM700A terminal program. Application programs such as the Tektronix application VMT offer a choice of either menu selection or command-line entry of VM700A remote commands (VMT runs on IBM-PC-based computer systems).

For information about configuring the VM700A serial ports for remote operation, see the *VM700A Programmer's Reference Manual*. The *Programmer's Reference Manual* discusses the VM700A's RS-232C port requirements in detail and shows typical cable wiring configurations.

Capabilities available while operating the VM700A from a remote location include:

- Make a specific manual measurement or Auto mode series of measurements
- Execute and interrupt a function (Function Key)
- Temporarily change the configuration of a channel: limit files, selected measurement files, and measurement location files; printer type and port for each type of output (**Copy**, **Report**, **Log**); specify an "End of File" character for printer output

The remote commands used to access the Teletext measurement functions are the same as those used for other VM700A functions. The command arguments are listed and described below. The information in this section assumes that you are familiar with manual operation of the VM700A and understand the principles of remote VM700A operation. For information on working with VM700A remote control commands, see the *VM700A Programmer's Manual*.

NOTE

Rather than being a complete discussion, the following material is an abbreviated explanation of the remote commands. It assumes that you understand the principles of remote VM700A operation and have access to the VM700A Programmer's Reference Manual.

COMMAND FORMAT

The VM700A remote control commands use this form:

```
command [argument(s)]
```

The *command* is the actual command name. Literal command input is shown in **boldface** type. Variable values are shown in *italic*. Optional arguments are enclosed with [ ]. A discussion of command usage and arguments follows the command header.

Note that **VM700>** is a prompt (which you can change), not an input.

TELETEXT MEASUREMENT REMOTE COMMANDS

The following VM700A remote commands can be used with the Teletext measurement option.

execute *application*

The **execute** command starts the specified VM700A application. An application is one of the executable files (with exceptions noted below) found in the Instrument~Operations, VM700~Diagnostics, Video~Measurements, or Audio~Measurements directories in the Executable~Files directory. Selecting an operational mode application, such as Vector, is equivalent to pressing the front-panel button: the LED on the selected button is lit. Selecting a measurement or diagnostic application is equivalent to touching the desired softkey.

Example:

```
VM700A> execute SoundInSync
```

You may run these Teletext measurement applications under remote control. Be sure to use the same capitalization and tildes (~) as shown:

Teletext

SoundInSync

get *keyword* [*channel-letter*]

The **get** command returns the configuration file value specified by *keyword* on the channel specified by *channel_letter*. The keywords available are listed in the following section. The channel_letters available are **A**, **B**, or **C**.

Example:

```
VM700A> get J0LV A
```

The above example returns the '0' level, in millivolts, for channel A.

getresults

The getresults command stores Measure or Auto mode measurement results in default files in the Measurement~Results directory. In Measure mode, entering **getresults** with no argument(s) stores the measurement results for the current measurement. If no measurement is currently being executed, the message "Request not supported" is returned. If a measurement is being executed, the message "Results in file: *filename*" is returned. Use the **show filename** command to view the results.

Example:

```
VM700A> getresults
Results in file: Teletext
```

hardkey *button_name*

The **hardkey** command indicates the press and release of the specified front panel button, *button_name*. **hardkey** is equivalent to entering **hardpress** and **hardrelease**; however, in general **hardkey** should be used instead of these commands.

Example:

```
VM700A> hardkey Menu
```

Front-panel button names are listed in Table 4-1.

Table 4-1
Front Panel Button Names

A	Display	Picture
Auto	Freeze	SelectLine
Average	Graticule	Vector
B	Help	Waveform
C	Menu	XY (Arrow selector)
Copy	MoveExpand	

NOTE

The Configure, Function, and Measure buttons cannot be selected via remote.

set *keyword* [*channel_letter*] *value1* [*value2 ...*]

The **set** command defines the configuration values to be used during the remote session. The keywords available to use with **set** are listed in Tables 4-1, 4-2, and 4-3. The *channel_letter* can be **A**, **B**, or **C**. The configuration values changed with **set** remain in effect until they are restored to their original (pre-remote) values with the **restoreconfig** command, or power to the instrument is switched off and back on. Note that the system line and other global variables can be changed with **set** but are not restored with **restoreconfig**.

Example:

```
VM700A> set JPPP A 110.00 190.00
```

The above example changes the NTSC Teletext p-p amplitude for channel A from its previous values to 110.00 to 190.00 percent.

show *filename*

The **show** command returns the contents of the specified filename. The default path is the Measurement~Results directory, but other files can be specified with a full pathname or a path relative to the Measurement~Results directory.

Example:

```
VM700A> show /nvram0/ConfigFiles/Source_Selection~Video
       Video NTSC Video Source File Name     PAL Video Source File Name
-------------------------------------------------------------------------
Source A: NTSC System~Default                System~Default
Source B: PAL  System~Default                System~Default
Source C: NTSC System~Default                System~Default
Timed Events: System~Default
```

softkey *softkey_name*

The **softkey** command indicates the press and release of a specified softkey, such as Cursors. softkey is equivalent to entering **softpress** and **softrelease**; however, in general, **softkey** should be used instead of these commands.

Example:

```
VM700A> softkey Select_Graph
```

With a few exceptions, the general rule for forming a *softkey_name* is to take the spelling and capitalization from the softkey name on the display, omit the variable part and join the words with _ (underscore). For example, the *softkey_name* for the Noise 15.03 dB softkey is `Noise_dB`, and for 1H Display it is `H_Display`.

For softkeys that perform toggle operations (such as on/off), the *softkey-name* is followed by a colon (:). For example, `Plot: ON` or `Freq: LINEAR`. The softkey displays the current status of the toggle. The convention for naming toggle keys is to use the function name, with appropriate capitalization, up to (but not including) the colon.

"GET" AND "SET" KEYWORDS

This section documents the Teletext measurement keywords used with the **get** and **set** commands. For each **get/set** keyword, it gives the syntax of the **set** command and the **get** result, a description of what the keyword does and the upper and lower limits of its range.

For information on working with VM700A remote control commands, see the *VM700A Programmer's Reference Manual*.

"J" Group: Teletext Configuration (NTSC)

"J" keywords report on or set the values of Teletext Option Configuration parameters. These keywords can only be used on NTSC-standard VM700A's equipped with Option 20 (Teletext).

Get commands used with the "J" keywords have the form

```
get <keyword> <channel-letter>
```

Set commands used with "J" group keywords take different arguments, depending on the keyword.

Table 4-2
"J" Keywords: Teletext Configuration (NTSC)

Keyword	Description	Keyword	Description
J0LV	'0' Level (mV)	JPPM	P-P Amplitude (mV)
J1LV	'1' Level (mV)	JPPP	P-P Amplitude (%)
JDES	Data End to Sync (µsec)	JRIA	Run In Amplitude (mV)
JDLW	Data Line Width (µsec)	JRIB	Run In Bits (bits)
JEHM	Eye Height (mV)	JRIS	Run In Start (µsec)
JEHP	Eye Height (%)	JTTL	Teletext field and line
JEWP	Eye Width (%)	JTUN	Timing Unit

"K" Group: Teletext Configuration (PAL)

"K" keywords report on or set the values of Teletext Option Configuration parameters. These keywords can only be used on PAL-standard VM700A's equipped with Option 20 (Teletext).

Get commands used with the "K" keywords have the form

```
get <keyword> <channel-letter>
```

Set commands used with "K" group keywords take different arguments, depending on the keyword.

Table 4-3
"K" Keywords: Teletext Configuration (PAL)

Keyword	Description	Keyword	Description
K0LV	'0' Level (mV)	KRIS	Run In Start (µsec)
K1LV	'1' Level (mV)	KS0L	SoundInSync '0' Level (mV)
KDES	Data End to Sync (µsec)	KS1L	SoundInSync '1' Level (mV)
KDLW	Data Line Width (µsec)	KS2L	SoundInSync '2' Level (mV)
KDTM	Data Timing (µsec)	KS3L	SoundInSync '3' Level (mV)
KEHM	Eye Height (mV)	KSHM	SoundInSync Eye Height (mV)
KEHP	Eye Height (%)	KSHP	SoundInSync Eye Height (%)
KEWP	Eye Width (%)	KSPM	SoundInSync P-P Amplitude (mV)
KPPM	P-P Amplitude (mV)	KSPP	SoundInSync P-P Amplitude (%)
KPPP	P-P Amplitude (%)	KSWP	SoundInSync Eye Width (%)
KRIA	Run In Amplitude (mV)	KTTL	Teletext line
KRIB	Run In Bits (bits)		

INDEX

K

M

N

P

R

S

T

U

V

VM700A OPT 20 Problem Report Form

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