



INTRODUCTION..... 1

FIRST THINGS..... 3

When Your Waverunner is Delivered... 3

 CHECK THAT YOU HAVE EVERYTHING 3


 BE SURE TO READ THIS WARRANTY 3

 TAKE ADVANTAGE OF MAINTENANCE AGREEMENTS 4

 OBTAIN ASSISTANCE 4

 RETURN A PRODUCT FOR SERVICE OR REPAIR 4

 STAY UP-TO-DATE 4

Safety First  6

 OPERATE IN A SAFE ENVIRONMENT 6

 GET TO KNOW THE WARNING SYMBOLS..... 6

 CHOOSE THE CORRECT POWER SOURCE 7

 MAINTAIN POWER GROUND 7

 REPLACE WITH THE CORRECT FUSES 8

 CLEAN YOUR WAVERUNNER (BUT LET US MAINTAIN IT)..... 8

Up and Running 9

 GET TO KNOW WAVERUNNER — FRONT PANEL 9

 INSTALL AND POWER UP..... 9

 GET TO KNOW WAVERUNNER — BACK PANEL 10

 INITIALIZE 12

 CHECK YOUR WAVERUNNER SYSTEM 12

 ADD AN OPTION? 13

 UPDATE TO THE LATEST FIRMWARE? 13

 SAVE THE SCREEN (AND ENERGY) 13

 DO YOU PREFER YOUR CONTROLS WITH SOUND AND AUTO-REPEAT? 14

PART ONE: GETTING STARTED 15

CHAPTER ONE: CATCH A NEW WAVE 17

View Your Waveform 17

 USE TIME/DIV TO ADJUST THE TIMEBASE 19

 ADJUST SENSITIVITY AND POSITION 20

 ZOOM AND SCROLL AUTOMATICALLY 20

 USE THE POSITION AND ZOOM CONTROLS..... 22

 SET UP THE TIMEBASE 23

TABLE OF CONTENTS

SET THE COUPLING.....	24
SET UP FOR CAL AND BNC SIGNALS.....	25
CHAPTER TWO: <i>SIMPLY TRIGGER</i>.....	29
Edge Trigger on Simple Signals.....	29
CONTROL TRIGGERING.....	29
SET UP AN EDGE TRIGGER.....	30
USE WINDOW TRIGGER.....	33
TRIGGER SOURCE.....	34
OBTAIN A TRIGGER STATUS SUMMARY.....	35
CHAPTER THREE: <i>DISPLAY YOUR SIGNAL</i>.....	37
Display Persistence.....	37
VIEW SIGNAL CHANGES OVER TIME.....	37
SET UP YOUR DISPLAY.....	38
SET UP FOR PERSISTENCE.....	39
CHOOSE A GRID STYLE.....	40
Save and Recall Your Panel Setups.....	42
SAVE PANEL SETUPS.....	42
RECALL PANEL SETUPS.....	43
CHAPTER FOUR: <i>CHOOSE A MEASURE TOOL</i>.....	45
Measure with Cursors.....	45
CONTROL THE TIME CURSORS.....	45
CONTROL THE AMPLITUDE CURSORS.....	46
Measure Automatically with Parameters.....	50
CHOOSE A STANDARD PARAMETER.....	51
TURN OFF CURSORS AND PARAMETERS.....	52
CHAPTER FIVE: <i>USE MATH TOOLS</i>.....	55
Make Math Easy.....	55
SET UP TO DO WAVEFORM MATHEMATICS.....	56
USE A MATH TOOL.....	57
PERFORM AN FFT OPERATION.....	58
DO SUMMED AVERAGING.....	61
Save and Recall Waveforms.....	63
OBTAIN A WAVEFORM OR MEMORY STATUS REPORT.....	65
CHAPTER SIX: <i>DOCUMENT YOUR WORK</i>.....	67
Make a Hard Copy.....	67
PRINT, PLOT OR COPY.....	68
Manage Floppy or Card Files.....	69
CUSTOMIZE FILE NAMES.....	70
ADD A NEW DIRECTORY.....	71

COPY FILES	72
PART TWO: LOOKING DEEPER.....	75
CHAPTER SEVEN: A QUESTION OF TIMEBASE.....	77
Choose a Sampling Mode.....	77
SINGLE-SHOT — WAVERUNNER'S BASIC CAPTURE TECHNIQUE	77
RIS — FOR HIGHER SAMPLE RATES.....	78
ROLL — DISPLAY IN REAL-TIME.....	78
SEQUENCE — WORKING WITH SEGMENTS.....	79
PAIRING CHANNELS	80
Use a Sampling Mode.....	81
SET UP FOR SINGLE-SHOT OR RIS	81
SET UP FOR SEQUENCE CAPTURE	82
OBTAIN A SEQUENCE STATUS SUMMARY.....	83
OR SAMPLE EXTERNALLY.....	84
CHAPTER EIGHT: TRIGGER SMART.....	87
Hold Off by Time or Events	87
HOLD OFF BY TIME	87
HOLD OFF BY EVENTS	88
Trigger SMART	89
CATCH A GLITCH.....	89
CAPTURE RARE PHENOMENA	93
TRIGGER ON INTERVALS	96
QUALIFY A SIGNAL	100
TRIGGER ON LOST SIGNALS	103
TRIGGER ON TV SIGNALS.....	106
TRIGGER PATTERN	108
CHAPTER NINE: DISPLAY MORE	113
Transform Your Vision	113
“Paint” Your Display	116
CHANGE YOUR PALETTE	117
Set Up XY Display.....	120
CHAPTER TEN: USE ADVANCED MATH TOOLS.....	125
Compute Extrema Waveforms.....	125
Rescale and Assign Units	127
Enhance Resolution	128
Do More with FFT	132
DO FFT AVERAGE	132
DO ADDITIONAL PROCESSING.....	132

TABLE OF CONTENTS

USE CURSORS WITH FFT	132
SET FFT SPAN	135
Use an Advanced Math Function.....	137
Resample to Deskew.....	138
Plot Trends.....	139
READ TRENDS.....	141
CHAPTER ELEVEN: ANALYZE WITH PARAMETERS.....	145
Use Custom Parameters.....	145
CUSTOMIZE A PARAMETER	146
Test for Pass and Fail.....	147
SET UP A PASS/ FAIL TEST.....	147
PASS/ FAIL TEST ON A MASK	148
MAKE A WAVEFORM MASK	149
CHANGE A TEST ACTION.....	149
Choose a Parameter.....	153
CHAPTER TWELVE: USE WEVERUNNER WITH PC.....	161
Transfer Data and Images to PC.....	161
EXPLORE YOUR SCOPE	162
MONITOR YOUR REMOTE CONTROL OPERATIONS.....	163
Save Waveforms in ASCII.....	164
SAVE IN AN ASCII FORMAT.....	165
Use ASCII Formats.....	167
SAVE TO SPREADSHEET.....	167
PLOT A WAVEFORM IN SPREADSHEET	170
USE MATHCAD	171
USE MATLAB	173
PART THREE: WAVA OPTION	175
CHAPTER THIRTEEN: PARAMETERS.....	177
A Valuable Tool for Waveform Analysis.....	177
SET UP FOR HISTOGRAMS	177
PARAMETER MATH.....	185
CHAPTER FOURTEEN: MAKING HISTOGRAMS.....	191
Create and View a Histogram.....	191
SETTING BINNING AND SCALE.....	196
CHOOSING HISTOGRAM PARAMETERS.....	200
USING MEASUREMENT CURSORS	201
ZOOMING SEGMENTED TRACES.....	203
CHAPTER FIFTEEN: HOW HISTOGRAMS WORK.....	205
Theory of Operation.....	205



DSO PROCESS.....	206
PARAMETER BUFFER	206
CAPTURE OF PARAMETER EVENTS	207
HISTOGRAM PARAMETERS	207
ZOOM TRACES AND SEGMENTED WAVEFORMS	208
HISTOGRAM PEAKS.....	208
BINNING AND MEASUREMENT ACCURACY.....	209
CHAPTER SIXTEEN : HISTOGRAM PARAMETERS	211
avg	211
fwhm.....	212
fwxx.....	213
hampl.....	214
H base	215
high.....	216
hmedian.....	217
hrms.....	218
htop.....	219
low	220
maxp.....	221
mode	222
pctl.....	223
pks	224
range.....	226
sigma	227
totp.....	228
xapk.....	229
APPENDIX: ARCHITECTURE AND SPECIFICATIONS.....	231
Instrument Architecture Overview.....	231
PROCESSORS.....	231
ADCs	231
MEMORIES.....	231
RIS.....	231
TRIGGER SYSTEM	231
AUTOMATIC CALIBRATION	232
DISPLAY SYSTEM	232
INTERFACE AND PANEL SETUPS.....	232
REMOTE CONTROL	232
Specifications.....	234
MODELS.....	234
 ACQUISITION SYSTEM	234
TIMEBASE SYSTEM.....	235

TABLE OF CONTENTS

TRIGGERING SYSTEM.....	236
SMART TRIGGER TYPES.....	236
AUTOSETUP.....	237
PROBES.....	237
COLOR WAVEFORM DISPLAY.....	237
ANALOG PERSISTENCE DISPLAY.....	237
ZOOM EXPANSION TRACES.....	237
RAPID SIGNAL PROCESSING.....	238
INTERNAL WAVEFORM MEMORY.....	238
SETUP STORAGE.....	238
MATH TOOLS.....	238
MEASURE TOOLS.....	239
EXTENDED MATH AND MEASUREMENTS OPTION.....	239
WAVEANALYZER OPTION.....	239
SPECIAL APPLICATION SOLUTIONS.....	239
INTERFACE.....	240
OUTPUTS.....	240
 GENERAL.....	240
<i>GLOSSARY OF TECHNICAL TERMS.....</i>	243

