7854 WAVEFORM CALCULATOR KEYBOARD GUIDE

Waveform Processing, Programming, Calculations, and Solutions

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THE 7854 OSCILLOSCOPE WAVEFORM CALCULATOR*

Take the 7854 Waveform Calculator in your hands, and take control of the 7854 command system.

The calculator opens up a whole new world of precision and automated measurements. It allows you to make traditional measurements with single keystrokes, and venture beyond to more complex calculations and waveform processing. You can even create programs to tackle measurement tasks automatically. All the tools are at your fingertips.

Like your familiar scientific calculator, the 7854 calculator makes use of Reverse Polish Notation, logically grouped keys, and shaded areas for ease of use. For quick access to specific key information, page numbers from the 7854 Operators Manual are provided in parentheses. (xxvi-xxxiv)

PROGRAM ENTRY keys are used to enter and edit programs. You can move to the next line for program entry, back up to previous lines, delete individual lines or the entire program. LNN is for labeling a line with a two digit number. (9-27, 9-31, 9-32)

PROGRAM EXECUTE keys enable execution of a program, routine, or subroutine. Two conditional commands, for decision-making, are also at your disposal. (9-27 to 9-34)

WAVEFORM FUNCTIONS include waveform differentiation, waveform integration, smoothing with an n-point average, and straight line interpolation. ORD and >ORD keys recall or set the vertical value of a specified horizontal location. Waveforms can also be positioned or expanded horizontally using the HPLFT, HPRGT and HXPD keys (9-46 to 9-51)

WAVEFORM SCALING allows you to set the vertical scale, horizontal scale and vertical zero reference from the value in the X register, or to recall their values to the X register. VXPD is used to vertically expand or contract a waveform without changing its value. (9-56 to 9-57)

ERROR indication light prompts the operator to refer to error identification message on the display readout. (9-60)

WAVEFORM ACQUISITION is accomplished using the AQS, AQR and AVG keys, which enable single-shot acquisition, repetitive waveform acquisition, and averaging a waveform, respectively. GND sets the ground reference. With RDOUT you can move a selected realtime readout value to the X register. (9-41 to 9-46)

CRT DISPLAY keys are used to select either the realtime scope display, the stored digital display, or both. (9-15)

VERTICAL POSITION of the operational waveform can be changed by using these keys. (9-40)

STORED WAVEFORM DISPLAY lets you select the stored waveform to be displayed, choosing either a dots format or dots connected by vectors. You can display multiple stored waveforms, or display one waveform versus another in X-Y mode. (9-37 to 9-39)

SHIFT COMMANDS, designated in blue, are selected by first pressing the f key. Shift function is cleared by pressing CLf. (9-35)

NUMERIC ENTRY into the X register is accomplished with the number keys 0-9, decimal point, change sign, and enter exponent. (9-24 to 9-26)

DATA STORAGE keys allow the manipulation of constants, registers, waveforms, or the vertical value of a particular point in a waveform. The number of points per waveform may also be set or recalled. (9-19 to 9-21)

CURSORS, intensified points on the operational waveform, are controlled by these keys. They allow cursor selection, recall of cursor coordinates to the X register, or automatic positioning to the value in the X register. (9-16 to 9-19)

CURSOR POSITION keys are selected to move either of the two cursors right or left. (9-17)

WAVEFORM AND PULSE PARAMETERS of the operational waveform are calculated and stored in the X register at the touch of the appropriate key. When the cursors are on, the parameter applies only to the waveform portion defined by the cursors. (9-52 to 9-55)

STACK commands let you view and manipulate stack contents. Data can be entered or cleared through the X register, or the entire stack contents can be set to 0 with the CLS key. The stack is 5 elements deep. (9-36)

EXTERNAL keys are used to send and receive data via the external GPIB interface. Information can be sent from or read into the X register, or an entire program can be sent to the interface. SWL and SWH are available to set rear panel TTL signal output levels to low and high, respectively. (9-22 to 9-23)

ARITHMETIC COMMANDS are used for performing operations on stack contents, which can be either waveforms or constants. Special functions included are square root, natural logarithm, exponentiation, signum, and absolute value. (9-11 to 9-14)
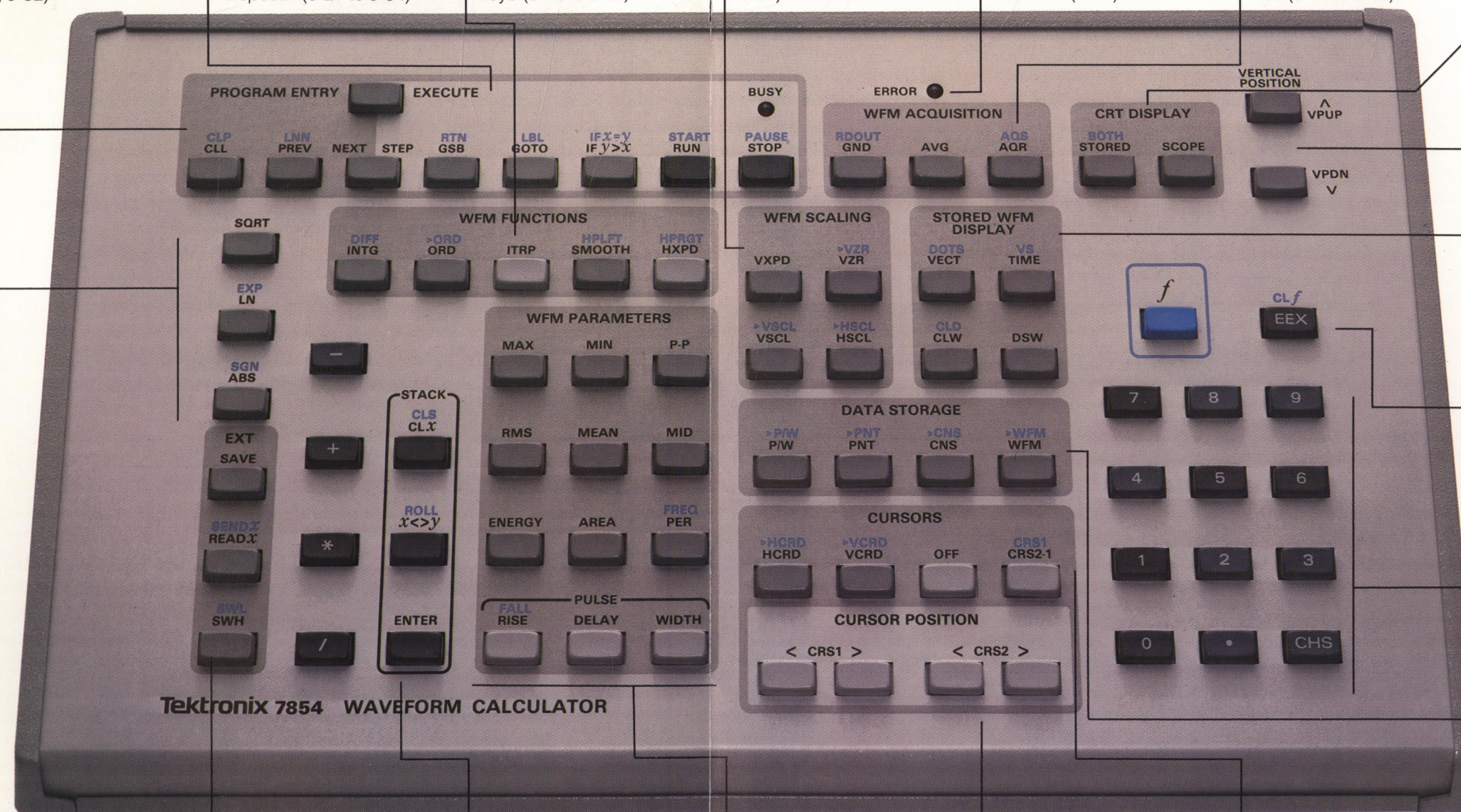
Description of Keys

ACQUISITION
AQR	Acquire repetitive signals
AQS	Acquire single shot signals
AVG	Signal average
GND	Acquire ground reference
RDOUT	Acquire plug-ins readout

WAVEFORM PARAMETERS
DELAY	Delay time
WIDTH	Pulse width
RISE	Rise time
FALL	Fall time
PER	Period
FREQ	Frequency
MAX	Maximum
MIN	Minimum
P-P	Peak-to-Peak
MID	Vertical mid-point
RMS	Root mean square
MEAN	Average value
AREA	Area under curve
ENERGY	Energy

CURSORS
CRS1	One cursor
CRS2-1	Delta cursors
OFF	Cursor(s) off
VCRD	Recall vertical coordinate
>VCRD	Move to vertical coordinate
HCRD	Recall horizontal coordinate
>HCRD	Move to horizontal coordinate

WAVEFORM FUNCTIONS
SMOOTH	Smooth
INTG	Integrate
DIFF	Differentiate
ITRP	Interpolate
ORD	Recall Ordinate
>ORD	Change Ordinate

*ARITHMETIC FUNCTIONS
SQRT	Square Root
LN	Natural log
EXP	Exponential
ABS	Absolute value
SGN	Signum either +1.0 or −1

STACK CONTROL
ENTER	Pushes stack
ROLL	Circulates stack
X < > Y	Interchange X and Y
CLS	Clears all stack registers
CLX	Pops stack

*ARITHMETIC OPERATORS
−	Subtract X from Y
+	Add X to Y
⋆	Multiply X by Y
/	Divide Y by X

PROGRAM ENTRY
PROG	Switch to program entry mode
CLL	Delete program line
CLP	Deletes all program lines
NEXT	Advance to next line
PREV	Back up to previous line
EXEC	Return to execute mode

EXECUTE CONTROL
STEP	Executes a single line
*IFY>X	Test if Y is greater than X
*IFX=Y	Test if X is equal to Y
LBL	Line label
GOTO	Unconditional jump
START	Begins execution at line Ø Ø Ø
RUN	Begins execution at next command
GSB	Go to subroutine
RTN	Return from subroutine

CRT DISPLAY
SCOPE	Conventional scope display
STORED	Stored data display
BOTH	Stored data plus real time waveforms

WAVEFORM DISPLAY
DOT	Discrete dot display
VECT	Continuous vectored display
DSW	Display waveform
VS	Waveform versus waveform display
TIME	waveform versus time display
CLW	Clears one waveform from display
CLD	Clears all waveforms from display

DATA STORAGE
WFM	Recall waveform
>WFM	Store waveform
PNT	Recall waveform point
>PNT	Store waveform point
CNS	Recall constant
>CNS	Store constant

EXPANSION
VXPD	Vertical expand
HXPD	Horizontal expand

SCALE FACTORS
VSCL	Recall vertical scale
>VSCL	Change vertical scale
HSCL	Recall horizontal scale
>HSCL	Change horizontal scale

WAVEFORM POSITIONING
VZR	Recall vertical zero
>VZR	Change vertical zero
VPUP	Vertical position up
VPDN	Vertical position down
HPRGT	Horizontal position right
HPLFT	Horizontal position left

GPIB INTERFACE I/O
SAVE	Transmit user program
SENDIX	Transmit waveform or constants
READX	Receive waveforms and constants
TEXT	Transmit all alphanumerics as displayed in SCOPE, STORED, or BOTH
>TEXT	Receive text

TTL OUTPUT
SWL	Set level to TTL low
SWH	Set level to TTL high

NUMBER ENTRY
.	Decimal point
0-9	Digit keys
EEX	Enter exponent

SIGN CHS
CHS	Change Sign

*Note Operate on waveforms as well as on constants

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