DAKOTA ULTRASONICS

DFX-244 & 344 FLAW DETECTORS

TECHNOLOGY WITH A PURPOSE

THE DFX-244: TECHNOLOGY WITH A PURPOSE

Features & Highlights:

Broad & Narrow bands, 35MHz Bandwidth, Variable Pulser, 60 foot Range, Large Memory.

The DFX-344 digital ultrasonic flaw detector has been designed to provide superior performance in every application, whether requiring high penetration and low noise for testing attenuative materials, or very high resolution for intricate aerospace work. The latest digital technology has been used to provide innovative features that offer real advantages to the user, such as NOTES for memory labelling, Time Corrected Gain, on screen DAC curves and AUTO_CAL, the easiest and most accurate way to calibrate any flaw detector.

Square Wave Pulser:
The DFX-344 has a variable square wave pulser to optimise the performance of transducers. By varying the pulse width a significant increase in probe

Auto_Cal:
The Auto_Calibration feature provides rapid calibration of the probe zero and velocity. By entering the distance of the first and second echoes, and pressing ACCEPT the DFX-244 automatically calibrates. The function can be used for any transducer and test piece, including delay line and dual types.

Aluminum Case:
The DFX-244 is housed in a rugged and strong cast aluminum case, which provides excellent durability and compliance with European (CE). The DFX-244 will operate in the toughest of environments, providing the user with reliability where and when it matters most.

Display:
The highest contrast, high speed EL display with 320 x 256 pixels provides excellent amplitude and far field resolution unmatched by other portable flaw detectors. All menus are clearly seen without obscuring the A-scan display. Gain settings are continuously displayed in all menus providing instant access.

Flexible Measurement (Two independent monitor gates):
Flexible measurement is essential for difficult, high precision applications. The DFX-244 provides single echo as well as echo to echo measurement using flank or peak triggering. The 0.001" (0.01mm) resolution includes the option to display trigonometry values for beam path length, surface distance, and depth.

Time Corrected Gain (TCG):
The TCG system has a 40db dynamic range, with an unequaled response of greater than 30db per microsecond. The TCG curve is programmed by using up to 10 reference points. The gain curve supports any shape, compensating for near and far field effects with equal precision.

Complete Documentation:
In the Notes feature all stored waveforms and calibrations can be identified by an 8 character alphanumeric label. Test comments and locations may be added to permit easy identification when recalling test set-ups. DFX-244 has the capability of complete on-site documentation with storage for over 2000 thickness readings available. Suitable software support programs are available.

Help Facility:
On screen guidance to enable the operator to familiarize himself without manuals. Full instructions for individual operations clearly displayed. Available in English, German, French, Spanish, Italian, and Portuguese. Other languages also available.

Battery System:
The DFX-244 offers versatility with the choice of Dry Cell, individual NiCad, Sealed NiCad (fast charge 3 hrs) or Line power option. The CH500 charger is powered from a universal line power supply 90-260V AC and operates the DFX-244 from the line power supply. Discharge cycle for NiCad batteries and auto time out as a standard feature provides reliability for the operator.

Interfacing:
A wide variety of interfaces enable easy connection to other equipment. The proportional outputs have digital and analogue interfaces which make the DFX-244 an ideal choice for hand or automatic portable scanning systems. The RS232 computer printer port gives complete control of the flaw detector and may be used for transferring waveforms and thickness readings. The composite video output allows direct video recording, or connection to a remote display, invaluable features for modern day industry requirements.

DFX-244 SPECIFICATIONS

Test Range:	0.2in to 400in (5-10,000mm) at steel velocity. Variable in 1,2,5, sequence, or continuously in 0.05in (1mm) increments.
Velocity:	1000m/s to 9,999m/s continuously variable.
Probe Zero:	0 to 999.9999µs, continuously variable.
Delay:	Calibrated delay from 0in to 200in in 0.05in steps at steel velocity (0-5,000mm. in 0.1mm steps).
Gain:	0 to 110dB. Adjustable in 0.5,2,6, 14 and 20dB steps. Direct access to gain control at all times.
Test Modes:	Pulse echo and transmit/receive.
Pulser:	Fixed square-wave pulser of 40ns minimum to 250ns maximum duration. 185V peak amplitude with rise/fall times <20ns into 50 ohms.
P.R.F.	Adjustable maximum of 150, 250, 500, or 1000 Hz.
Update Rate:	60Hz (NTSC Mode), 50Hz (PAL Mode)
Rectification:	Full wave, positive or negative halfwave and unrectified rf.
Frequency Range:	Four (4) narrow bands centered at 1MHz, 2MHz, 5MHz, and 10MHz. Broad band at 1.7MHz to 14MHz (-6dB).
System Linearity:	Vertical ±1% Full Screen Height (FSH). Amplifier accuracy ±0.1dB. Horizontal ±0.4% Full Screen Width (FSW).
Reject:	50% suppressive reject. LED warning light when selected.
Units:	Inches (in), metric (mm) or microseconds. Selected from menu.
Display:	Bright colour TFT LCD panel. A-Scan area 255 x 200 pixels. Total display area 102.7 x 77.0mm, 320 x 256 pixels. Eight (8) colour scheme options. Brightness variable up to 300cd/m^2. No parallax error. Removable screen for easy cleaning.
Gate Monitor:	Two fully independent gates for echo monitoring and thickness measurement. Start and width adjustable over full range of unit, amplitude variable from 0 to 100% FSH. Bar presentation. Positive or negative triggering for each gate with visual and audible alarms.
Measurement Modes:	Mode 1 - Signal monitor. Mode 2 - Depth and amplitude of first signal in gate. Mode 3 - Echo-to-echo distance measurement. Mode 4 - Trigonometric display of beam path, surface distance and depth of indication. Mode 5 - T-Min mode for holding minimum thickness reading. Resolution to 0.01mm (0.001in) for distance measurement, or 1% FSH for amplitude measurement. Large display of measurement at top of A-Scan display. Measurement mode selectable between peak and flank. All measurement functions available in unrectified rf mode.
Gate Expansion:	Expands range to width of Gate 1.
A-Scan Memory:	Maximum of 50 waveforms stored with complete panel settings. Waveforms may be recalled on display, printed or transferred via RS232 serial interface.

Panel Memories:	Twenty (20) stores for retaining calibrations.
Thickness Logging:	Storage for 2,000 thickness readings configured into Block/Location/Number. Calibration settings stored with each Block. Maximum number of Blocks is 14. Unlimited Location/Number values, maximum combination of 2,000 readings. Readings may be reviewed, edited and printed as required.
DAC:	DAC curves may be entered and digitally drawn on the display. Reference, -6dB, -12dB, -14dB curves may be selected. Selection of DAC curve or gate for alarm outputs and height measurement. DAC parameters stored with Panel Memory. Curves comply with ASME and European Standards. The gates are operational in the DAC mode.
TCG	Time Corrected Gain curves may be entered and digitally drawn on the display. The dynamic range of the T.C.G. is 40dB. T.C.G. parameters are stored in panel, A-Log and memory.
AWS	The AWS mode is used when inspecting welds in accordance with the American Welding Society's Structural Welding Code, ANSI/AWS D1.1-94 to automatically calculate the Indication Rating as defined by the code.
Special Functions:	Display freeze for capturing current A-Scan image. Peak memory for echo-dynamic pattern determination in accordance with BS3923. Help key for instant operator guidance on using the DFX-244.
Outputs:	Full bi-directional serial interface to transfer parameters, thickness readings and waveform memories. Composite video, full PAL or NTSC compatibility. Analogue proportional output for connection to X-Y plotter or other external equipment. Proportional outputs programmable to distance or amplitude of signal. Unrectified rf. signal 80mV peak to peak. Synchronization output for start of scan. Gate trigger output on relay contact.
Power	10 'D' size NiCd or alkaline cells. Eight (8) hours duration from fully charged NiCd cells. Battery duration is a function of display brightness chosen, battery condition and ambient temperature. LED indication of low battery status. Recharge time is fourteen (14) hours. A battery pack, which charges in two (2) hours, is available as an option.
Charger:	Universal mains input 85-260 volts A.C. Auto timed charge. Two (2) hour fast charge for special battery pack. Charger operates unit direct from AC mains.
Probe Sockets:	BNC or LEMO (factory option)
Temperature:	Operating: 14 to 131°F (-10 to +55°C) Survivable: -4 to 158°F (-20 to +70°C) Storage: -40 to 167°F (-40 to +75°C)
Size:	9.3 x 5.3 x 7.9in (237 x 135 x 200mm)
Weight:	10.8 lbs (4.9 Kgs) with NiCd Cells 9.4 lbs (4.3Kgs) with Dry Cell Pack

THE DFX-344: TECHNOLOGY WITH A PURPOSE

Features & Highlights:

Broad & Narrow bands, 35MHz Bandwidth, Variable Pulser, 20 Metre Range, Large Memory.

The DFX-344 digital ultrasonic flaw detector has been designed to provide superior performance in every application, whether requiring high penetration and low noise for testing attenuative materials, or very high resolution for intricate aerospace work. The latest digital technology has been used to provide innovative features that offer real advantages to the user, such as NOTES for memory labelling, Time Corrected Gain, on screen DAC curves and AUTO_CAL, the easiest and most accurate way to calibrate any flaw detector.

Square Wave Pulser:
The DFX-344 has a variable square wave pulser to optimise the performance of transducers. By varying the pulse width a significant increase in probe sensitivity, or signal resolution can be achieved compared to traditional Spike pulsers of much higher voltage. Controllable damping provided the ability to match transducers to transmitter impedance.

Auto_Cal:
The Auto_Calibration feature provides rapid calibration of the probe zero and velocity. By entering the distance of the first and second echoes, and pressing ACCEPT the DFX-344 automatically calibrates. The function can be used for any transducer and test piece, including delay line and dual types.

Aluminum Case:
The DFX-344 is housed in a rugged and strong cast aluminum case, which provides excellent durability and compliance with European (CE). The DFX-344 will operate in the toughest of environments, providing the user with reliability where and when it matters most.

Display:
The highest contrast, high speed EL display with 320 x 256 pixels provides excellent amplitude and far field resolution unmatched by other portable flaw detectors. All menus are clearly seen without obscuring the A-scan display. Gain settings are continuously displayed in all menus providing instant access.

Flexible Measurement (Two independent monitor gates):
Flexible measurement is essential for difficult, high precision applications. The DFX-344 provides single echo as well as echo to echo measurement using flank or peak triggering. The 0.001" (0.01mm) resolution includes the option to display trigonometry values for beam path length, surface distance, and depth.

Near Surface Resolution:
Near surface resolution is an important aspect of DFX-344 design. A 0-1mm minimum range, high bandwidth and a unique rectifier design enable easy identification of very small near surface defects.

High Power and Low Noise:
When testing large forgings and castings low noise and high power are essential. The DFX-344 square wave pulser ensures maximum output from the transducer, and the low

noise allows smaller defects to be detected. The 20 metre range and calibrated delaymake testing of long shafts simple and extremely accurate, while the ability to recall 100 previous waveforms enables quick evaluation of defect growth. The optional 0.5MHz filter band enhances performance for very low frequency work such as concrete testing.

Time Corrected Gain (TCG):
The TCG system has a 40db dynamic range, with an unequaled response of greater than 30db per microsecond. The TCG curve is programmed by using up to 10 reference points. The gain curve supports any shape, compensating for near and far field effects with equal precision.

Flexible Measurement:
Flexible measurement is essential for difficult, high precision applications. The DFX-344 provides single echo as well as echo to echo measurement, using flank or peak triggering. The 0.01mm(0.001") resolution, and high frequency capability produce a powerful thickness measuring instrument.

Complete Documentation:
In the Notes feature all stored waveforms and calibrations can be identified by an 8 character alphanumeric label. Test comments and locations may be added to permit easy identification when recalling test set-ups. DFX-344 has the capability of complete on-site documentation with storage for over 2000 thickness readings available. Suitable software support programs are available.

Help Facility:
On screen guidance to enable the operator to familiarize himself without manuals. Full instructions for individual operations clearly displayed. Available in English, German, French, Spanish, Italian, and Portuguese. Other languages also available.

Battery System:
The DFX-344 offers versatility with the choice of Dry Cell, individual NiCad, Sealed NiCad (fast charge 3 hrs) or Line power option. The CH500 charger is powered from a universal line power supply 90-260V AC and operates the DFX-344 from the line power supply. Discharge cycle for NiCad batteries and auto time out as a standard feature provides reliability for the operator.

Interfacing:
A wide variety of interfaces enable easy connection to other equipment. The proportional outputs have digital and analogue interfaces which make the DFX-344 an ideal choice for hand or automatic portable scanning systems. The RS232 computer printer port gives complete control of the flaw detector and may be used for transferring waveforms and thickness readings. The composite video output allows direct video recording, or connection to a remote display, invaluable features for modern day industry requirements.

DFX-344 SPECIFICATIONS

Test Range:	1mm to 20,000mm (0.05-800in) at steel velocity. Variable in 1,2,5, sequence, or continuously in 1mm (0.05in) increments.
Velocity:	256m/s to 16,000m/s continuously variable.
Probe Zero:	0 to 9999µs, continuously variable.
Delay:	Calibrated delay from 0mm to l0,000mm in 0.1mm steps at steel velocity (0-400in. in 0.O5in steps).
Gain:	0 to 110dB. Adjustable in 0.5,2,6, 14 and 20dB steps. Direct access to gain control at all times.
Test Modes:	Pulse echo and transmit/receive.
Pulser:	Variable square-wave pulse from 40ns to 500ns duration. 200V peak amplitude with rise/fall times <10ns into 50 ohms.
Damping:	Selectable between 50, 100, 180, 400 ohms.
P.R.F.	Selectable 35-1,000Hz.
Update Rate:	60Hz (NTSC Mode)
Rectification:	Full wave, positive or negative halfwave and unrectified rf.
Frequency Range:	Five (5) narrow bands centered at 1MHz, 2.25MHz, 5MHz, 10MHz, and 15MHz. Broad band at 2MHz to 22MHz (-6dB) and 1MHz to 35MHz (-20dB).
System Linearity:	Vertical ±1% Full Screen Height (FSH). Amplifier accuracy ±0.1dB. Horizontal ±0.4% Full Screen Width (FSW).
Reject:	80% linear reject. LED warning light when selected.
Units:	Metric (mm), inches (in) or microseconds. Selected from menu.
Display:	High brightness colour TFT LCD panel. A-Scan area 255 x 200 pixels. Total display area 102.7 x 77.0mm, 320 x 240 pixels. Eight (8) colour scheme options. Brightness variable up to 300cd/m^2
Gate Monitor:	Two fully independent gates for echo monitoring and thickness measurement. Start and width adjustable over full range of unit, amplitude variable from 0 to 100% FSH. Bar presentation. Positive or negative triggering for each gate with visual and audible alarms.
Measurement Modes:	Mode 1 - Signal monitor. Mode 2 - Depth and amplitude of first signal in gate. Mode 3 - Echo-to-echo distance measurement. Mode 4 - Trigonometric display of beam path, surface distance and depth of indication. Mode 5 - T-Min mode for holding minimum thickness reading. Resolution to 0.01mm (0.001in) for distance measurement, or 1% FSH for amplitude measurement. Large display of measurement at top of A-Scan display. Measurement mode selectable between peak and flank. All measurement functions available in unrectified rf mode.
Gate Expansion:	Expands range to width of Gate 1.

A-Scan Memory:	Maximum of 100 waveforms stored with complete panel settings. Waveforms may be recalled on display, printed or transferred via RS232 serial interface.
Panel Memories:	Twenty (20) stores for retaining calibrations.
Thickness Logging:	Storage for 2,000 thickness readings configured into Block/Location/Number. Calibration settings stored with each Block. Maximum number of Blocks is 14. Unlimited Location/Number values, maximum combination of 2,000 readings. Readings may be reviewed, edited and printed as required.
DAC:	DAC curves may be entered and digitally drawn on the display. Reference, -6dB, -12dB, -14dB curves may be selected. DAC curve selected acts as gate for alarm outputs and height measurement in DAC+dB. DAC parameters stored with Panel Memory. Curves comply with ASME and European Standards.
TCG	Time Corrected Gain curves may be entered and digitally drawn on the display. The dynamic range of the T.C.G. is 40dB. T.C.G. parameters are stored in panel, A-Log and memory.
Special Functions:	Display freeze for capturing current A-Scan image. Peak memory for echo-dynamic pattern determination in accordance with BS3923. Help key for instant operator guidance on using the DFX-344.
Outputs:	Full bi-directional serial interface to transfer parameters, thickness readings and waveform memories. Composite video, full PAL or NTSC compatibility. Analogue proportional output for connection to X-Y plotter or other external equipment. Proportional outputs programmable to distance or amplitude of signal. Unrectified rf. signal 80mV peak to peak. Synchronization output for start of scan. Gate trigger output on relay contact.
Power	10 'D' size NiCd or alkaline cells. Eight (8) hours duration from fully charged NiCd cells. Battery duration is a function of display brightness chosen (colour model), battery condition and ambient temperature. LED indication of low battery status. Recharge time is fourteen (14) hours. A battery pack, which charges in two (2) hours, is available as an option.
Charger:	Universal mains input 85-260 volts A.C. Auto timed charge. Two (2) hour fast charge for special battery pack. Charger operates unit direct from AC mains.
Probe Sockets:	BNC or LEMO (factory option)
Temperature:	Operating: -10 to +55°C (14 to 131°F) Survivable: -20 to +70°C (-4 to 158°F) Storage: -40 to +75°C (-40 to 167°F)
Size:	237 x 135 x 200mm (9.3x5.3x7.9in)
Weight:	4.9 Kgs (10.8 lbs) with NiCd Cells 4.3Kgs (9.4 lbs) with Dry Cell Pack

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