



OmniScan Bond Tester ECA/ECT Adaptor with MXB Software Basic Operation Manual

DMTA-20023-01EN [U8775251] — Rev. D
September 2022

This instruction manual contains essential information on how to use this Evident product safely and effectively. Before using this product, thoroughly review this instruction manual. Use the product as instructed. Keep this instruction manual in a safe, accessible location.

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This document was prepared with particular attention to usage to ensure the accuracy of the information contained therein, and corresponds to the version of the product manufactured prior to the date appearing on the title page. There could, however, be some differences between the manual and the product if the product was modified thereafter.

The information contained in this document is subject to change without notice.

Part number: DMTA-20023-01EN [U8775251]

Rev. D

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List of Abbreviations

BT	bond testing
ECA	eddy current array
ECT	eddy current testing
EFUP	environment-friendly use period
IP	International Protection (ingress protection)
LED	light-emitting diode

Important Information — Please Read Before Use

Intended Use

The OmniScan Bond Tester is designed to perform nondestructive inspections on industrial and commercial materials.



WARNING

Do not use the OmniScan Bond Tester for any purpose other than its intended use. It must never be used to inspect or examine human or animal body parts.

Instruction Manual

This instruction manual contains essential information on how to use this product safely and effectively. Before using this product, thoroughly review this instruction manual. Use the product as instructed. Keep this instruction manual in a safe, accessible location.

IMPORTANT

Some of the details of components illustrated in this manual may differ from the components installed on your device. However, the operating principles remain the same.

Device Compatibility

Only use this device with the approved ancillary equipment provided by Evident. Equipment provided by Evident and approved for use with this device is described later in this manual.



CAUTION

Always use equipment and accessories that meet Evident specifications. Using incompatible equipment could cause equipment malfunction and/or damage, or human injury.

Repair and Modification

This device does not contain any user-serviceable parts. Opening the device might void the warranty.



CAUTION

In order to prevent human injury and/or equipment damage, do not disassemble, modify, or attempt to repair the device.

Safety Symbols

The following safety symbols might appear on the device and in the instruction manual:



General warning symbol

This symbol is used to alert the user to potential hazards. All safety messages that follow this symbol shall be obeyed to avoid possible harm or material damage.



High voltage warning symbol

This symbol is used to alert the user to potential electric shock hazards greater than 1000 volts. All safety messages that follow this symbol shall be obeyed to avoid possible harm.

Safety Signal Words

The following safety symbols might appear in the documentation of the device:



DANGER

The DANGER signal word indicates an imminently hazardous situation. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, will result in death or serious personal injury. Do not proceed beyond a DANGER signal word until the indicated conditions are fully understood and met.



WARNING

The WARNING signal word indicates a potentially hazardous situation. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in death or serious personal injury. Do not proceed beyond a WARNING signal word until the indicated conditions are fully understood and met.



CAUTION

The CAUTION signal word indicates a potentially hazardous situation. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, may result in minor or moderate personal injury, material damage, particularly to the product, destruction of part or all of the product, or loss of data. Do not proceed beyond a CAUTION signal word until the indicated conditions are fully understood and met.

Note Signal Words

The following note signal words could appear in the documentation of the device:

IMPORTANT

The IMPORTANT signal word calls attention to a note that provides important information, or information essential to the completion of a task.

NOTE

The NOTE signal word calls attention to an operating procedure, practice, or the like, which requires special attention. A note also denotes related parenthetical information that is useful, but not imperative.

TIP

The TIP signal word calls attention to a type of note that helps you apply the techniques and procedures described in the manual to your specific needs, or provides hints on how to effectively use the capabilities of the product.

Safety

Before turning on the device, verify that the correct safety precautions have been taken (see the following warnings). In addition, note the external markings on the device, which are described under “Safety Symbols.”

Warnings



WARNING

General Warnings

- Carefully read the instructions contained in this instruction manual prior to turning on the device.
- Keep this instruction manual in a safe place for further reference.

- Follow the installation and operation procedures.
- It is imperative to respect the safety warnings on the device and in this instruction manual.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment could be impaired.
- Do not install substitute parts or perform any unauthorized modification to the device.
- Service instructions, when applicable, are for trained service personnel. To avoid the risk of electric shock, do not perform any work on the device unless qualified to do so. For any problem or question regarding this device, contact Evident or an authorized Evident representative.
- Do not touch the connectors directly by hand. Otherwise, a malfunction or electric shock may result.
- Do not allow metallic or foreign objects to enter the device through connectors or any other openings. Otherwise, a malfunction or electric shock may result.



WARNING

Electrical Warning

The device must only be connected to a power source corresponding to the type indicated on the rating label.



CAUTION

If a non-approved power supply cord not dedicated to Evident products is used, Evident will not be able to ensure the electrical safety of the equipment.

Battery Precautions



CAUTION

- Before disposing of a battery, check your local laws, rules, and regulations, and follow them accordingly.

- Transportation of lithium-ion batteries is regulated by the United Nations under the United Nations Recommendations on the Transport of Dangerous Goods. It is expected that governments, intergovernmental organizations, and other international organizations shall conform to the principles laid down in these regulations, thus contributing to worldwide harmonization in this field. These international organizations include the International Civil Aviation organization (ICAO), the International Air Transport Association (IATA), the International Maritime Organization (IMO), the US Department of Transportation (USDOT), Transport Canada (TC), and others. Please contact the transporter and confirm current regulations before transportation of lithium-ion batteries.
- For California (USA) only:
The device may contain a CR battery. The CR battery contains perchlorate material, and special handling may be required. Refer to <http://www.dtsc.ca.gov/hazardouswaste/perchlorate>.
- Do not open, crush, or perforate batteries; doing so could cause injury.
- Do not incinerate batteries. Keep batteries away from fire and other sources of extreme heat. Exposing batteries to extreme heat (over 80 °C) could result in an explosion or personal injury.
- Do not drop, hit, or otherwise abuse a battery, as doing so could expose the cell contents, which are corrosive and explosive.
- Do not short-circuit the battery terminals. A short circuit could cause injury and severe damage to a battery making it unusable.
- Do not expose a battery to moisture or rain; doing so could cause an electric shock.
- Only use an external charger approved by Evident to charge the batteries.
- Only use batteries supplied by Evident.
- Do not store batteries that have less than 40 % remaining charge. Recharge batteries to between 40 % and 80 % capacity before storing them.
- During storage, keep the battery charge between 40 % and 80 %.
- Do not leave batteries in the OmniScan Bond Tester unit during device storage.

Regulations for Shipping Products with Lithium-Ion Batteries

IMPORTANT

When shipping a Li-ion battery or batteries, be sure to follow all local transportation regulations.



WARNING

Damaged batteries cannot be shipped through normal routes — DO NOT ship damaged batteries to Evident. Contact your local Evident representative or material disposal professionals.

Equipment Disposal

Before disposing of the OmniScan Bond Tester, check your local laws, rules, and regulations, and follow them accordingly.

BC (Battery Charger - California, USA Community)



The BC marking indicates that this product has been tested and complies with the Appliance Efficiency Regulations as stated in the California Code of Regulations Title 20, Sections 1601 through 1608 for Battery Charger Systems. The internal battery charger within this device has been tested and certified pursuant to the California Energy Commission's (CEC) requirements; this device is listed on the online CEC's (T20) database.

CE (European Community)



This device complies with the requirements of directive 2014/30/EU concerning electromagnetic compatibility, directive 2014/35/EU concerning low voltage, and directive 2015/863 which amends 2011/65/EU concerning restriction of hazardous substances (RoHS). The CE marking is a declaration that this product conforms to all the applicable directives of the European Community.

UKCA (United Kingdom)



This device complies with the requirements of the Electromagnetic Compatibility Regulations 2016, the Electrical Equipment (Safety) Regulations 2016, and the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012. The UKCA marking indicates compliance with the above regulations.

RCM (Australia)



The regulatory compliance mark (RCM) label indicates that the product complies with all applicable standards, and has been registered with the Australian Communications and Media Authority (ACMA) for placement on the Australian market.

WEEE Directive



In accordance with European Directive 2012/19/EU on Waste Electrical and Electronic Equipment (WEEE), this symbol indicates that the product must not be disposed of as unsorted municipal waste, but should be collected separately. Refer to your local Evident distributor for return and/or collection systems available in your country.



China RoHS

China RoHS is the term used by industry generally to describe legislation implemented by the Ministry of Information Industry (MII) in the People's Republic of China for the control of pollution by electronic information products (EIP).



The China RoHS mark indicates the product's Environment-Friendly Use Period (EFUP). The EFUP is defined as the number of years for which listed controlled substances will not leak or chemically deteriorate while in the product. The EFUP for the OmniScan Bond Tester has been determined to be 15 years.

Note: The Environment-Friendly Use Period (EFUP) is not meant to be interpreted as the period assuring functionality and product performance.



电器电子产品有害
物质限制使用
标志

本标志是根据“电器电子产品有害物质限制使用管理办法”以及“电子电气产品有害物质限制使用标识要求”的规定，适用于在中国销售的电器电子产品上的电器电子产品有害物质使用限制标志。

(注意) 电器电子产品有害物质限制使用标志内的数字为在正常的使用条件下有害物质等不泄漏的期限，不是保证产品功能性能的期间。

产品中有害物质的名称及含量

部件名称		有害物质					
		铅及其化合物 (Pb)	汞及其化合物 (Hg)	镉及其化合物 (Cd)	六价铬及其化合物 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
主体	机构部件	×	○	○	○	○	○
	光学部件	×	○	○	○	○	○
	电气部件	×	○	○	○	○	○

产品中有害物质的名称及含量

部件名称	有害物质					
	铅及其化合物 (Pb)	汞及其化合物 (Hg)	镉及其化合物 (Cd)	六价铬及其化合物 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
附件	×	○	○	○	○	○
本表格依据 SJ/T 11364 的规定编制。 ○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。 ×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T26572 规定的限量要求。						

Korea Communications Commission (KCC)



Seller and user shall be noticed that this equipment is suitable for electromagnetic equipment for office work (class A) and it can be used outside the home. This device complies with the EMC requirements of Korea.

이 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기기로서 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다 .

EMC Directive Compliance

This equipment generates and uses radio-frequency energy and, if not installed and used properly (that is, in strict accordance with the manufacturer's instructions), may cause interference. The OmniScan Bond Tester has been tested and found to comply with the limits for an industrial device in accordance with the specifications of the EMC directive.

FCC (USA) Compliance

NOTE

This product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. This product generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, might cause harmful interference to radio communications. Operation of this product in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

IMPORTANT

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the product.

FCC Supplier's Declaration of Conformity

Hereby declares that the product,

Product name: OmniScan Bond Tester

Model: OmniScan Bond Tester-MR/OmniScan Bond Tester-CW

Conforms to the following specifications:

FCC Part 15, Subpart B, Section 15.107 and Section 15.109.

Supplementary information:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Responsible party name:

EVIDENT CANADA, INC.

Address:

3415, Rue Pierre-Ardouin, Québec (QC) G1P 0B3 Canada

Phone number:

+1 781-419-3900

ICES-001 (Canada) Compliance

This Class A digital apparatus complies with Canadian ICES-001.

Cet appareil numérique de la classe A est conforme à la norme NMB-001 du Canada.

Warranty Information

Evident guarantees your Evident product to be free from defects in materials and workmanship for a specific period, and in accordance with conditions specified in the Terms and Conditions available at <https://www.olympus-ims.com/en/terms/>.

The Evident warranty only covers equipment that has been used in a proper manner, as described in this instruction manual, and that has not been subjected to excessive abuse, attempted unauthorized repair, or modification.

Inspect materials thoroughly on receipt for evidence of external or internal damage that might have occurred during shipment. Immediately notify the carrier making the delivery of any damage, because the carrier is normally liable for damage during shipment. Retain packing materials, waybills, and other shipping documentation needed in order to file a damage claim. After notifying the carrier, contact Evident for assistance with the damage claim and equipment replacement, if necessary.

This instruction manual explains the proper operation of your Evident product. The information contained herein is intended solely as a teaching aid, and shall not be used in any particular application without independent testing and/or verification by the operator or the supervisor. Such independent verification of procedures becomes increasingly important as the criticality of the application increases. For this reason, Evident makes no warranty, expressed or implied, that the techniques, examples, or procedures described herein are consistent with industry standards, nor that they meet the requirements of any particular application.

Evident reserves the right to modify any product without incurring the responsibility for modifying previously manufactured products.

Technical Support

Evident is firmly committed to providing the highest level of customer service and product support. If you experience any difficulties when using our product, or if it fails to operate as described in the documentation, first consult the user's manual, and then, if you are still in need of assistance, contact our After-Sales Service. To locate the nearest service center, visit the Service Centers page on the Evident Scientific Web site.

Introduction

The OmniScan Bond Tester is designed primarily for the aerospace industry's inspection of composite honeycomb structures, laminated composite, or special laminates. The OmniScan Bond Tester displays C-scan data and operates at multiple frequencies. The inspection equipment consists of the OmniScan MX with the ECA or ECT module, the MXB software, a special adaptor, and a standard BondMaster cable and probe for connection to the OmniScan MX.

NOTE

This manual streamlines the inspection-setup process for the OmniScan Bond Tester. However, this manual does not replace the *OmniScan MXE Software User's Manual* (P/N: DMTA-20042-01EN). Thorough knowledge of the instrument and the user's manual are both required in order to proceed with an inspection using the bond testing solution. This manual does not cover OmniScan MXE software. Refer to the *OmniScan MXE Software User's Manual* for a more complete description of the software.

The OmniScan Bond Tester's C-scan imaging improves detection quality and precision. Multiple frequencies (up to eight available) enhance the detection range. The OmniScan Bond Tester incorporates data archiving, pitch-catch mode, an XY display, a phase/amplitude display, and a C-scan/strip chart display. It is compatible with BondMaster probes and XY-type scanners.

1. Overview

This chapter provides an overview of the OmniScan Bond Tester components.

1.1 Equipment Required for Bond Testing

The following equipment is compatible with the OmniScan Bond Tester:

- OmniScan MX and ECA module.
Compatible equipment part numbers are listed in Table 1 on page 23. The OmniScan MX instrument is shown in Figure 1-1 on page 24.

Table 1 Compatible equipment and part numbers

Description	Part number	Order number
OmniScan MX	OMNI-MX	U8100026
ECA module	OMNI-M-ECA4-32	U8100014
ECT module	OMNI-M-ECT4	U8100015
OmniScan MX plus ECA module	OMNI-P-ECA4-32	U8100027
OmniScan MX plus ECT module	OMNI-P-ECT4	U8100028

- BondMaster adaptor (P/N: OMNI-A-OBTC [U8779469]) [see Figure 1-2 on page 24]
- Pitch-catch probes (P/N: S-PC-P14 [U8800601] and SPO-5629-PHV [U8010039])
- Cable (P/N: SBM-CPM-P11 [U8800058])

- Probe holders (see Figure 1-5 on page 26):
 - Probe holder and yoke for the BondMaster S-PC-P14 probe (P/N: ACIX1519 [U8780314]).
 - Probe holder and yoke for the BondMaster SPO-5629-PHV probe (P/N: ACIX1520 [U8780315]).
- Scanners (optional):
 - WING scanner V1 (U8750016). See Figure 1-3 on page 25 and Figure 1-6 on page 26. This is recommended equipment that is not included.
 - Bond testing handheld scanner (see Figure 1-4 on page 25); P/N: HSB-SPCP14 (U8270153) or HSB-01 (U8270154), depending on the desired configuration (for details, see Table 4 on page 60). This is recommended equipment that is not included.
 - The GLIDER scanner (U8750001 for 457 mm × 457 mm [18 in. × 18 in.] size) is shown in Figure 1-5 on page 26. For more details, refer to the *GLIDER Scanner User's Manual*.
- MXB software (included in kit; no separate part number)



Figure 1-1 The OmniScan MX instrument



Figure 1-2 The BondMaster adaptor

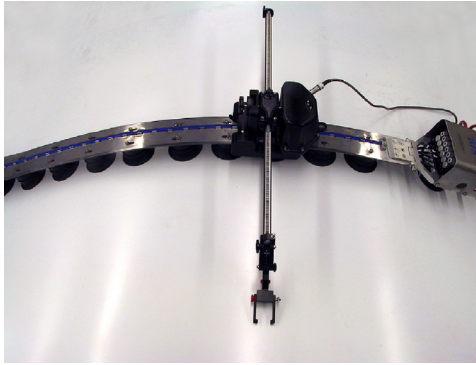


Figure 1-3 The WING scanner



Figure 1-4 The bond-testing handheld scanner

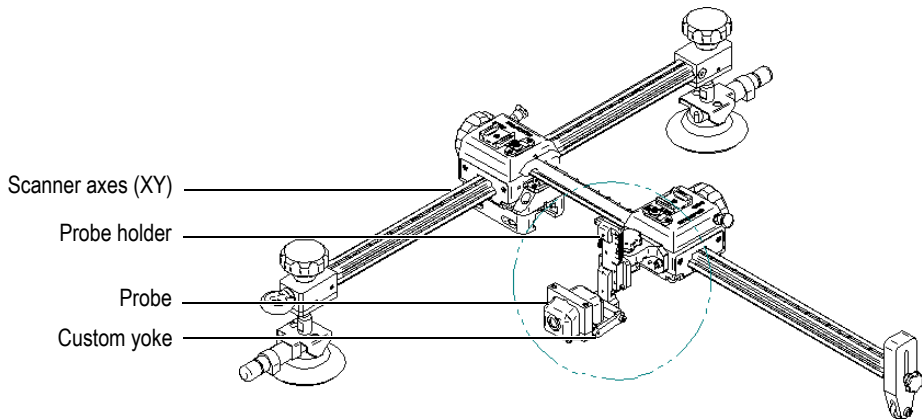


Figure 1-5 The GLIDER scanner

1.2 Component Connections

Figure 1-6 on page 26 contains an example of component connections on a typical inspection setup.

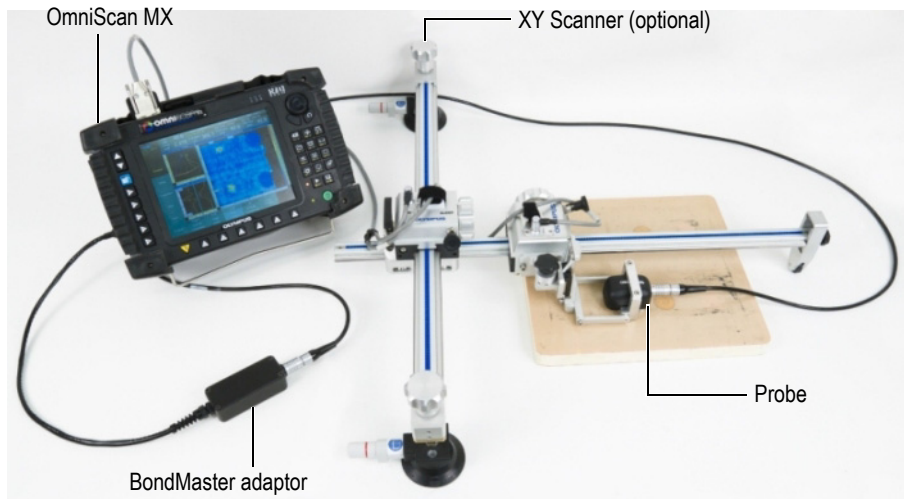


Figure 1-6 The OmniScan Bond Tester's component connections

NOTE

For information about the menus, submenus, and keypad functions of the OmniScan Bond Tester, refer to the *OmniScan MXE Software User's Manual* (P/N: DMT-20042-01EN [U8779846]).

NOTE

For more details concerning the BondMaster adaptor, refer to the *BondMaster Adaptor Getting Started* document (P/N: DMTA-20026-01EN [U8775252]).

1.3 Operating Environment

The OmniScan Bond Tester may be used in harsh environments with temperatures ranging between 5 °C and 50 °C. The OmniScan Bond Tester is designed for IP50.

**CAUTION**

Evident cannot guarantee any level of ingress protection performance if the instrument seals have been manipulated; the protection provided by the equipment could be impaired. You must use sound judgment and take proper precautions before exposing the instrument to harsh environments.

To maintain the original level of ingress protection, you are responsible for the proper care of all routinely exposed membrane seals. Additionally, you are responsible for returning the instrument to an authorized Evident service center each year to ensure that the instrument seals are properly maintained.

2. Component Setup

The OmniScan Bond Tester must be properly set up in order to enable inspections.

2.1 Installing the Bond Testing Components

This section describes how to prepare the probe, scanner, adaptor, and OmniScan for inspections.

To install the bond testing components

1. Install the MXB software on the OmniScan instrument (see “Starting Up the MXB Software” on page 35).
2. Prepare your scanner for inspection.

Assemble the scanner according to the instructions in the *User’s Manual* provided with the scanner kit (for example, an XY scanner such as the WING or GLIDER).
If you are using the handheld scanner, no assembly is required. However, it is possible to adjust the encoder tension with the adjustment screw.
3. If you are using an XY scanner, install the correct yoke and probe holder:
 - a) Install the yoke that is correctly sized for the probe and probe holder you are using (see Figure 2-1 on page 30).
 - b) Install the probe in the probe holder, and secure it into place with the screws.
 - c) Install the assembled probe and holder onto the yoke (see Figure 2-2 on page 30).
4. Connect the probe to the adaptor using the appropriate BondMaster cable, and then connect the adaptor to the OmniScan 4CH connector (see “Connecting the Probe and Adaptor” on page 30 and Figure 2-3 on page 31).

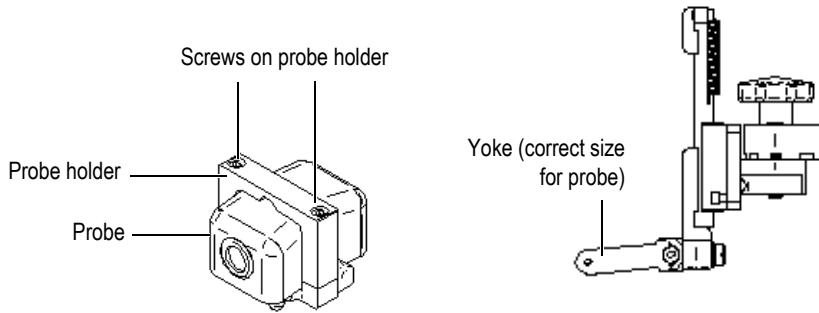


Figure 2-1 The yoke and the probe holder

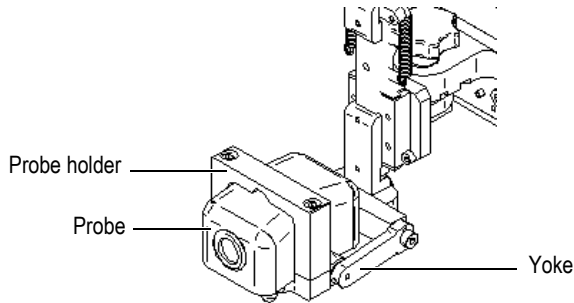


Figure 2-2 Installation of the probe holder onto the yoke

2.2 Connecting the Probe and Adaptor

An example of a probe connection using the adaptor is shown Figure 2-3 on page 31. Refer to the *BondMaster Pitch-Catch Probe Adaptor – Getting Started Guide* (P/N: DMTA-20026-01EN [U8775252]) for more details about connecting the probe adaptor to the OmniScan.

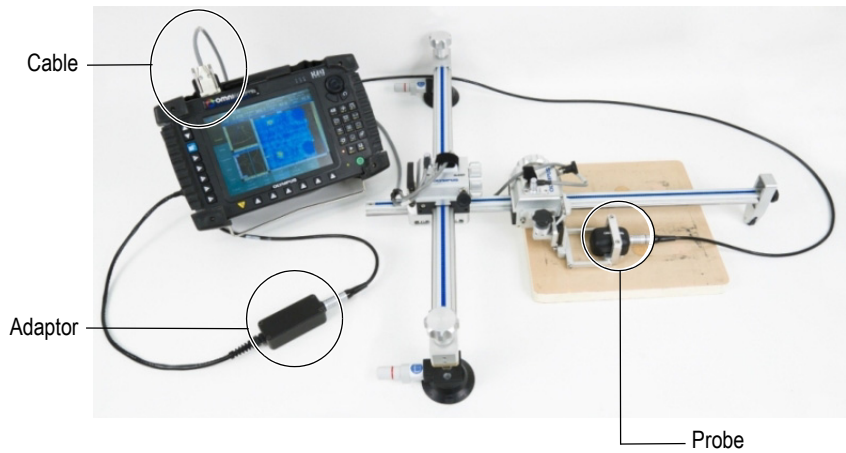


Figure 2-3 Connecting the adaptor and probe to the OmniScan

3. Software Features and Setup

This chapter explains some of the MXB software features, and provides installation and setup instructions.

3.1 C-Scans and Normalization

The OmniScan Bond Tester employs two types of C-scans, and normalization:

Phase C-scan

The color represented by the C-scan is based on the color palette previously chosen by the operator. The color-palette range starts at 0 degrees and ends at 360 degrees (this range can be modified). Depending on the signal direction on the XY plot, the color associated with a particular angle will be displayed on the C-scan. This C-scan is not dependent on the amplitude signal.

Amplitude C-scan

The color represented by the C-scan is based on the color palette previously chosen by the operator. The color palette range starts at 0 V and ends at 14 V (this range can be modified). Depending on the amplitude of the signal on the XY plot, the color associated with a particular amplitude will be displayed on the C-scan. This C-scan is not dependent on the phase signal.

Normalization

Normalization saves time by using only one operation to calibrate all the frequencies. Gain and phase are automatically applied to reach the selected amplitude and phase target values for each frequency. Phase and amplitude values set in the normalization function are applied to previously created frequencies, as well as gain and rotation, to reach the selected value. See Figure 3-1 on page 34 and Figure 3-2 on page 34 for examples before and after

normalization. The normalization example was created with 4 V and 180° parameter values.

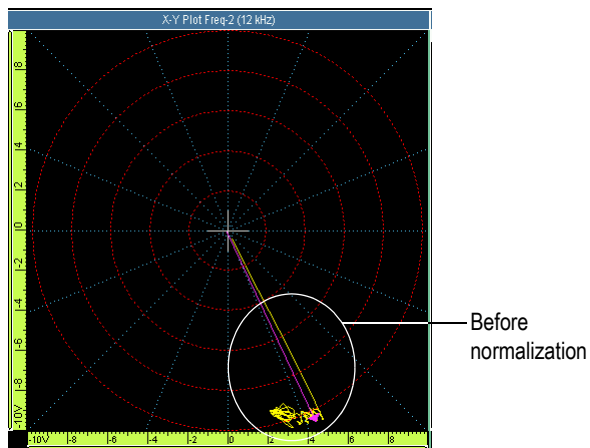


Figure 3-1 Before normalization— amplitude: 10.5 V, phase: 245°

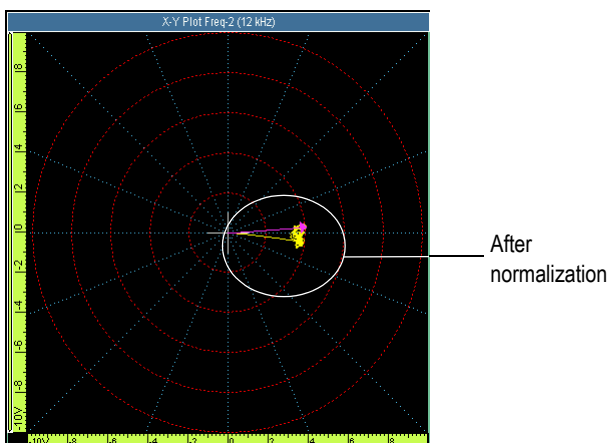



Figure 3-2 After normalization— amplitude: 4 V, phase: 180°

3.2 Starting Up the MXB Software

The MXB software is contained on a CompactFlash card.

To start up the software

1. Insert the MXB CompactFlash card into the appropriate slot located on the upper right-hand side of the OmniScan. Ensure that the card contains the correct software for this application.
2. On the front panel of the OmniScan instrument, press and hold the power button () for one second.

The system starts, performs a memory check, and displays the OmniScan logo and the software version.

NOTE

If more than one application is available on your OmniScan, a series of buttons appear on the splash screen. These buttons can be used to start the available applications.

-
3. Select **MXB**.

TIP

If you always select the same application, you can skip the operating mode selection by selecting the **Auto Startup** button in the lower-right corner of the screen. This function bypasses the program mode selection in future restarts.

To regain the ability to select an inspection application, select **Preferences > Instrument > Category = System**, and from the **Startup Mode** parameter, select **Manual**.

IMPORTANT

Ensure that the scanner has been correctly configured and installed, and that all parameters in the **Scan** menu (**Mode, Encoders, Area, Scan Axis, Index Axis, Resolution**, etc.) have been verified. For more information, see “Bond-Testing Scanner Setup” on page 53.

3.3 Creating a Setup

Prior to performing an inspection, the instrument must be in inspection mode, and a setup must be created (see “Setting the Instrument to Inspection Mode” on page 36 and “Using the Wizard to Create a Setup” on page 37).

NOTE

To create a setup, the OmniScan MX must be in inspection mode. The probes makes a vibrating sound if it is connected.

NOTE

The software has two acquisition modes: inspection mode and live mode. Inspection mode is the default mode. Live mode is used to simulate conventional bond testing equipment, without the use of an XY scanner (such as the WING or GLIDER scanner). When using live mode, the C-scan option is not available.

3.3.1 Setting the Instrument to Inspection Mode

To create a setup and enable inspection, the OmniScan Bond Tester must be in inspection mode.

To set the instrument to inspection mode

1. Select the **Scan** menu from the **Main Menu**.

2. Press **Mode**.
3. Select **Inspection** mode.

Figure 3-3 on page 37 shows the correct menu and submenus.

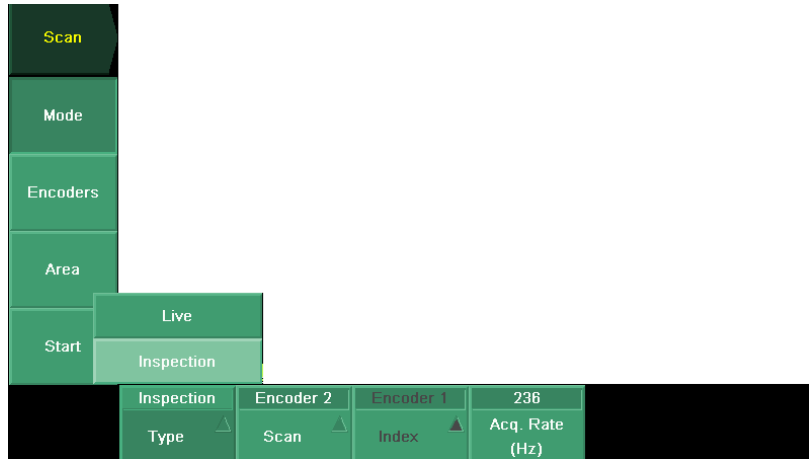


Figure 3-3 The Scan menu

3.3.2 Using the Wizard to Create a Setup

You can use the Wizard to efficiently configure the required inspection parameters.

To create a setup using the Wizard

1. Select **Wizard > Setup** (see Figure 3-4 on page 38).



Figure 3-4 The Wizard menu

2. In the **Nbr. Freq.** parameter field, enter the number of frequencies to set up. A maximum of eight frequencies are available (see Figure 3-5 on page 38).
3. Press **Start**.
4. Enter the value for each frequency.

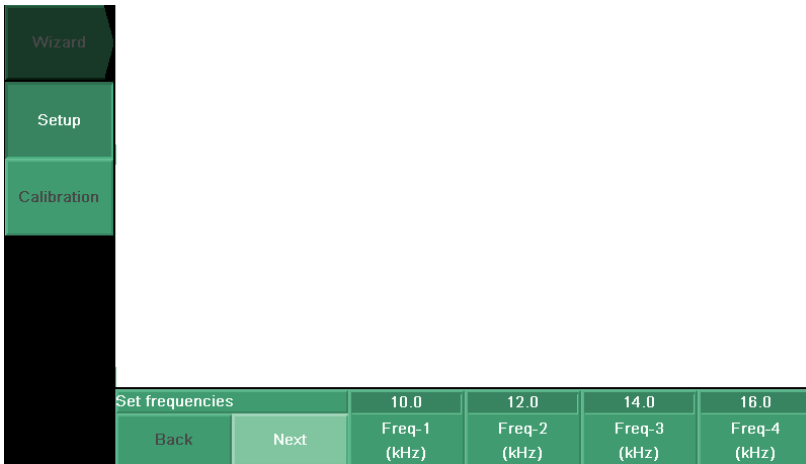


Figure 3-5 Setting the frequencies

5. Press **Next** in each dialog box until you reach the last one, and then click **Finish**.
The **Configuring Frequencies** progression bar appears. When the frequencies are completely configured, the progression bar disappears and the screen goes back to the beginning of the setup process.
6. Verify the number of frequencies by selecting **BT Settings > Frequencies** (see Figure 3-6 on page 39).

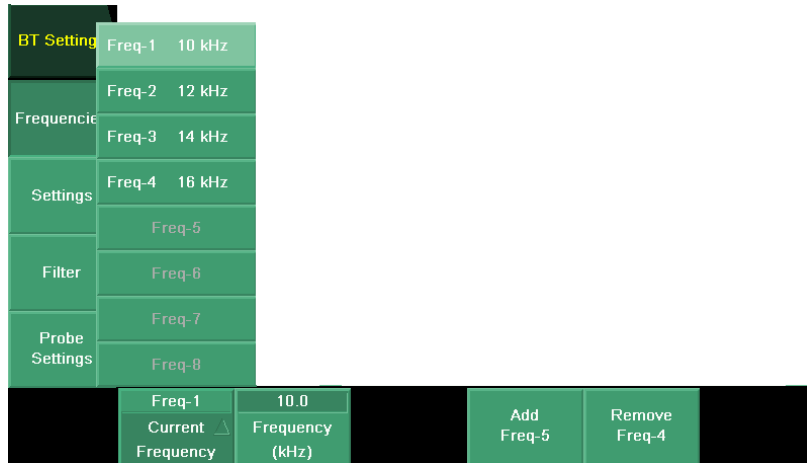


Figure 3-6 Checking frequencies

To add or remove a frequency

- ◆ If the number of frequencies or the values must be changed, repeat the Wizard setup.

4. Probe Calibration

Before inspection, the probe must be calibrated. Probe calibration consists of balancing and normalizing.

4.1 Balancing a Probe

To balance a probe

1. Select **BT Settings**, and then select **Probe Settings** (see Figure 4-1 on page 41).

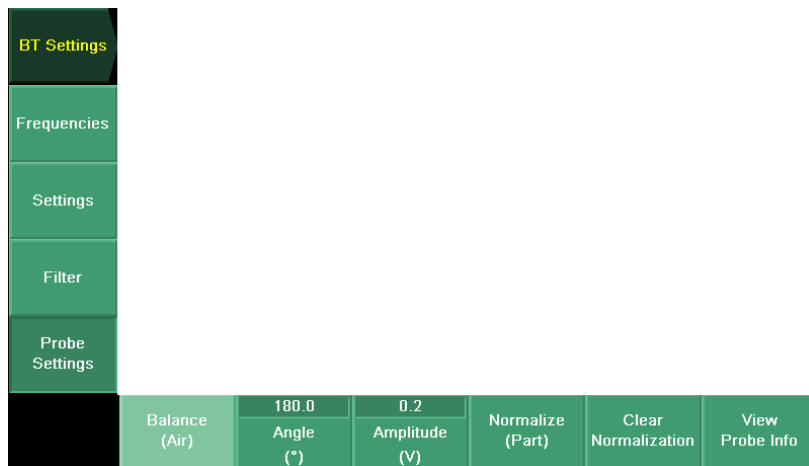



Figure 4-1 BT Settings menu

NOTE

Alternatively, you can press the Balance shortcut button () to obtain the **BT Settings** menu.

2. Lift the probe into the air, away from the calibration surface.
3. Select **Balance (Air)**, and continue to hold the probe in the air.
4. Wait for several seconds until the probe balancing process is complete.
5. Bring the probe back to the calibration surface.
6. Verify that the balance icon (scale) in the upper-left corner of the screen is green.

4.2 Normalizing the Probe Channels

To normalize the channels

1. Select **BT Settings**, and then select **Probe Settings**.
-

IMPORTANT

Before proceeding with the next step, make sure that the **Angle** and **Amplitude** values are correct. The **Angle** and **Amplitude** parameters have the following default values:

- 180° angle
 - 0.2 V amplitude
-

2. Select **Normalize**.
 3. When the message “**Move probe to normalize**” appears, start moving the probe along the calibration sample.
The probe must remain in an undamaged area of the calibration sample surface, and the probe tip must make good contact with the surface.
 4. Move the probe over an area large enough and long enough for the acquisition to obtain several points for comparison.
-

When normalization has been successfully completed, the menu disappears and the icon (two green triangles) appears on the upper-left side of the screen.

NOTE

Adding, changing, or removing a frequency clears the normalization (a message box appears to confirm the action).

NOTE

If you change your materials or inspection area, you can simply push the **Balance** button instead of rebalancing the probe in the air. This action normalizes the probe.

5. Inspection

Inspection involves precise probe movements across the inspection surface. The collected inspection data can then be evaluated in analysis mode. If necessary, the display's color palette can be adjusted to better reveal defects.

5.1 Performing an Inspection

To perform an inspection, the OmniScan Bond Tester's components must be correctly connected, the parameters must be configured, and the probe must be calibrated, as detailed in "Component Setup" on page 29, "Software Features and Setup" on page 33, and "Probe Calibration" on page 41.

To perform an inspection

1. Place the probe in the start position.
2. Begin the inspection by pushing the **Play** button, which resets the encoder position.
3. Move the probe from left to right and vice versa on the surface in order to record data.

Orient the probe tip forwards while scanning across the inspection area. At the end of each scanning movement, increment the probe along the index axis, and repeat the scanning movements and increments to fully cover the inspection area (see Figure 5-1 on page 46).

If you are using the handheld scanner, perform the scanning movement by rolling the scanner wheels along the scan axis. Press the scanner index switch at the end of each scanning movement.

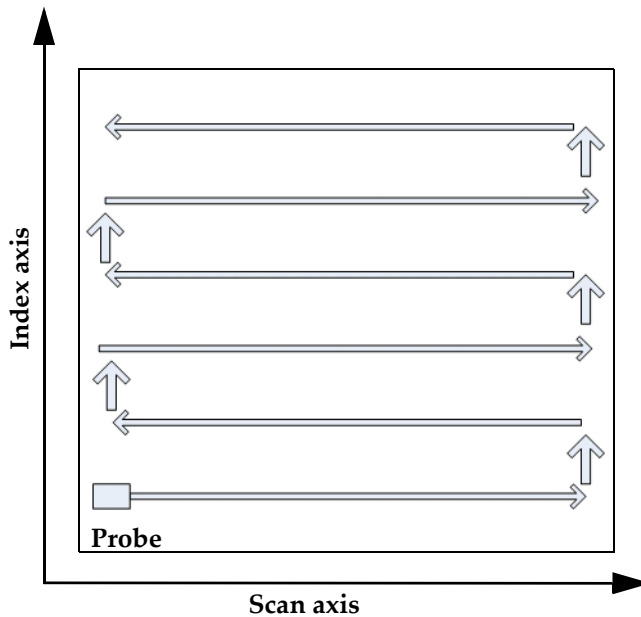


Figure 5-1 Scanning movement with probe

NOTE

Black lines in the colored areas on the screen indicate that the areas have not been properly inspected. Vertical black lines indicate that the area was scanned too rapidly. Horizontal black lines indicate that the inspection line was missed. If black lines are present, repeat the inspection movements over the same area at a slower speed while observing the screen. Make sure that all areas are inspected, and that there are no black lines. An example of a correct scanning pattern is shown in Figure 5-3 on page 48.

TIP

To optimize the inspection results, you can try an alternative method that takes longer but improves the results: Scan the part from left to right, then return to the starting point, and scan the same line without moving the probe up or down along the index axis. Next, increment to the next inspection line (by an amount equal to half the distance between the probe tips), and then scan the next line. Each inspection line is scanned twice (forward and backward) [see Figure 5-2 on page 47].

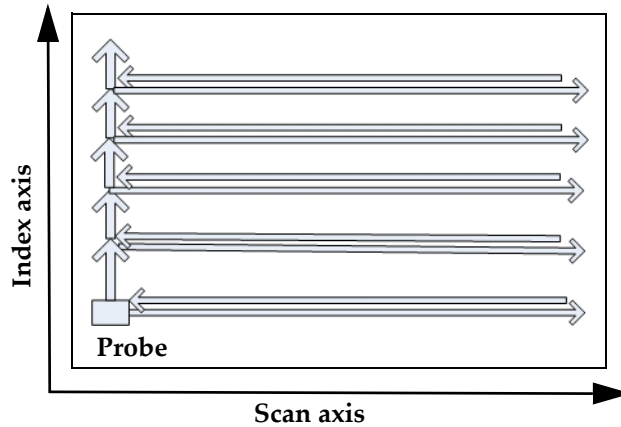
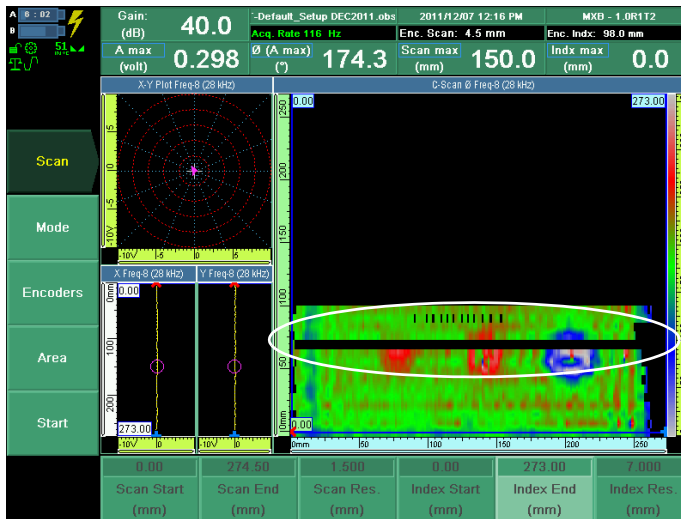


Figure 5-2 Alternative scanning method



Example of a poor scan: Black horizontal line and several small vertical spots indicate a scan problem.

Figure 5-3 Example of a poor scan


NOTE

After completing a scan, it is possible that defects are not visible if the screen color palette is not adequately adjusted for the frequency being used. This can be resolved by adjusting the color palette range in the C-scan view. For more information, see “Changing the Color Palette” on page 50.

5.2 Analyzing Data

After an inspection, you can analyze your inspection data.

To analyze data


1. Press  to change to analysis mode.

The cursors are now visible on the screen, zooming (in and out) is enabled, and the LED (next to the power button) is flashing.

2. Select **Display > C-Scan > C-Scan Component**.
3. Select **Amplitude** mode.
4. Check each frequency in amplitude mode.

NOTE



You can toggle between the various frequencies by pressing the Select () button.

5. If necessary, adjust the color palette to make the defects visible in the material.
For more information on changing the color palette, see “Changing the Color Palette” on page 50.

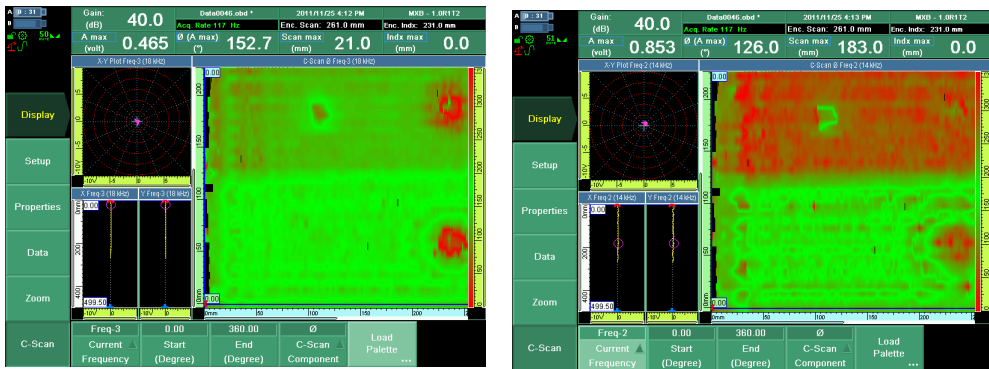


Figure 5-4 Identical inspection scans at two different frequencies

6. Select **Phase** mode.
7. Check each frequency in phase mode.
8. If necessary, select **File > Save > Save Setup As** to save your setup.

5.3 Changing the Color Palette

By changing the color palette, you may reveal defects at various preselected frequencies in C-scan phase mode, and improve the C-scan result. If you do not see any defects, change the color palette to ensure that there are no visible defects at any other frequency.

To change the color palette

1. Select **Display > C-Scan > Load Palette**.

The following window appears, enabling you to select a new palette (see Figure 5-5 on page 50).

2. Select the appropriate color palette from the list on the left-hand side.

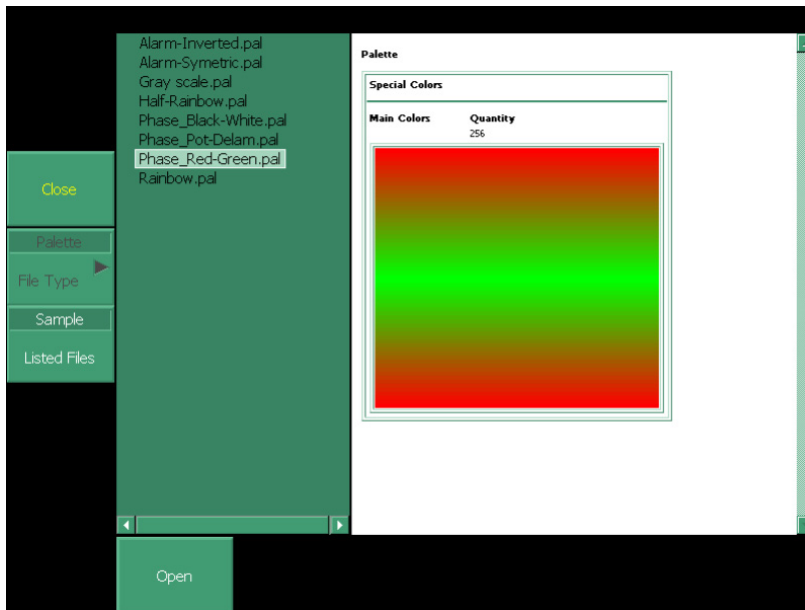


Figure 5-5 Choosing a new color palette

3. Select **Open**.

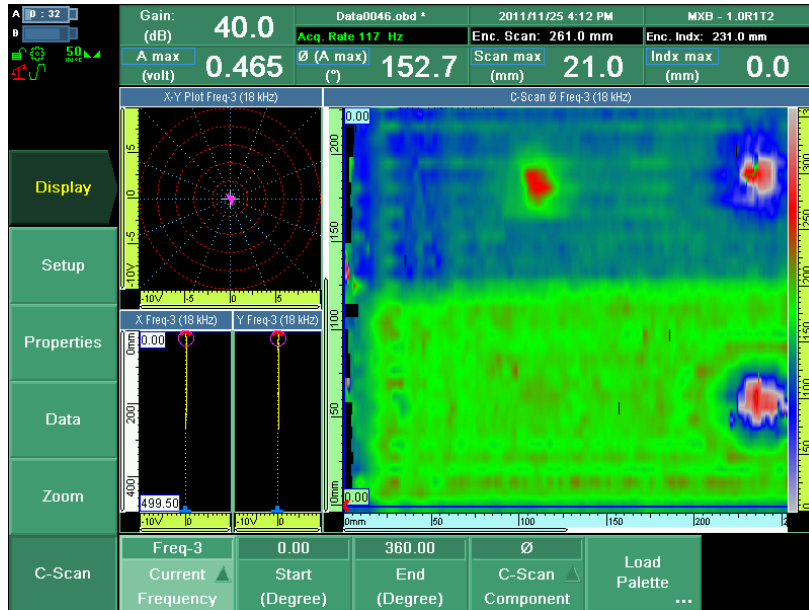


Figure 5-6 An example of a color palette

Figure 5-6 on page 51 provides a good example of a typical scan using a color palette in which defects can easily be identified. If defects are difficult to identify, it may be necessary to change the color palette between inspections (for example, as shown in Figure 5-4 on page 49). Any defect should be easy to find on your display.

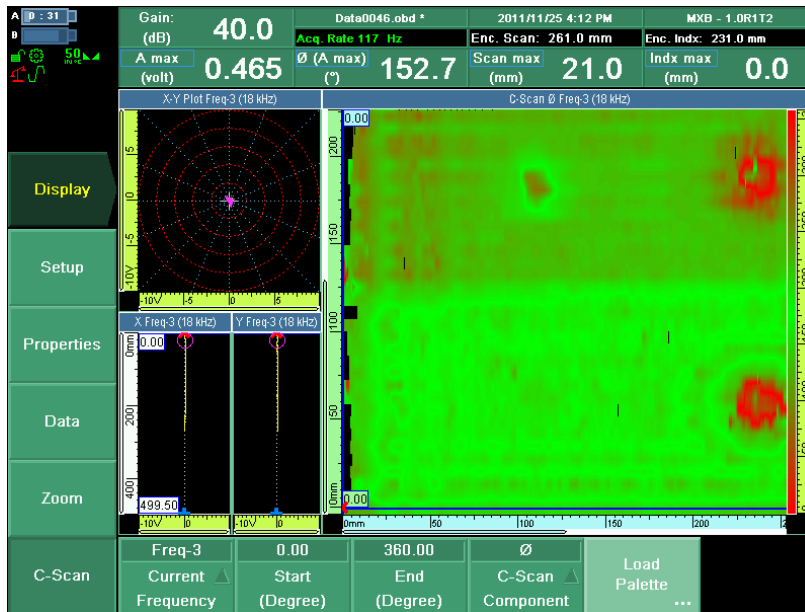


Figure 5-7 New color palette displayed

NOTE

There are two types of color palettes: the phase mode palette and the amplitude mode palette. These palettes have been specifically created for this application to improve the readings of the inspection results. For example, the color palettes for the C-scan in phase mode begin with the word “Phase_” in the list of files (see Figure 5-5 on page 50.)

TIP

In case of doubt about the voltage value, use 1 V as the color palette’s end value.

Appendix A: Bond-Testing Scanner Setup

A bond-testing scanner provides the correct probe position during the OmniScan instrument's inspection process. A properly installed scanner ensures reliable data. Scanner examples are shown in Figure A-1 on page 54 and in Figure A-2 on page 54. Typical resolution values for several types of scanners are provided in Table 2 on page 53.

Table 2 Encoder resolutions for bond-testing scanners

Scanner type	X-axis resolution (steps/mm)	Y-axis resolution (steps/mm)
GLIDER	13	13
WING	20.5	20.5
Handheld scanner	12	Determined by Clicker setup

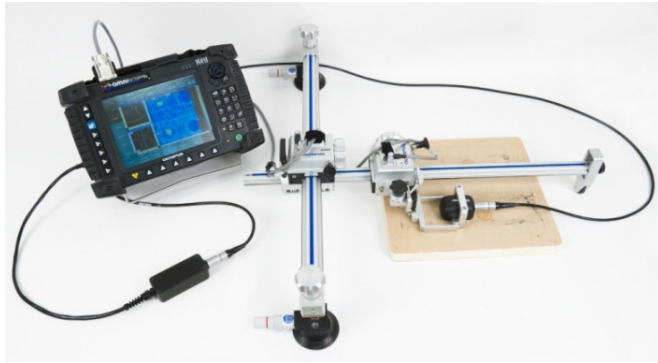


Figure A-1 Scanner setup with the OmniScan



Figure A-2 Bond-testing handheld scanner

A.1 Configuring the WING or GLIDER Scanner Parameters

To set up the parameters for the WING scanner or the GLIDER scanner on the **Scan** menu, you must activate two encoders and enter the appropriate **Resolution** parameter value for each encoder.

To configure the WING or GLIDER scanner parameters

1. Select **Scan > Mode > Type = Inspection** (see Figure A-3 on page 55).

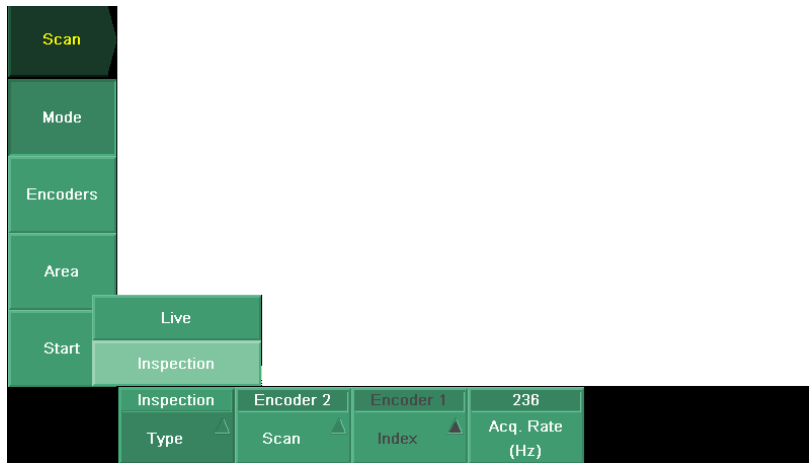


Figure A-3 Scan > Mode submenu

2. Select **Encoders > Encoder = 1**.
3. Select **Encoders > Encoder > Resolution**, and then enter the appropriate value for the x-axis resolution, depending on the scanner in use (see Figure A-4 on page 56):
 - For the GLIDER scanner, enter **13 steps/mm (330.2 steps/in.)**.
 - For the WING Scanner, enter **20.5 steps/mm (520.7 steps/in.)**.

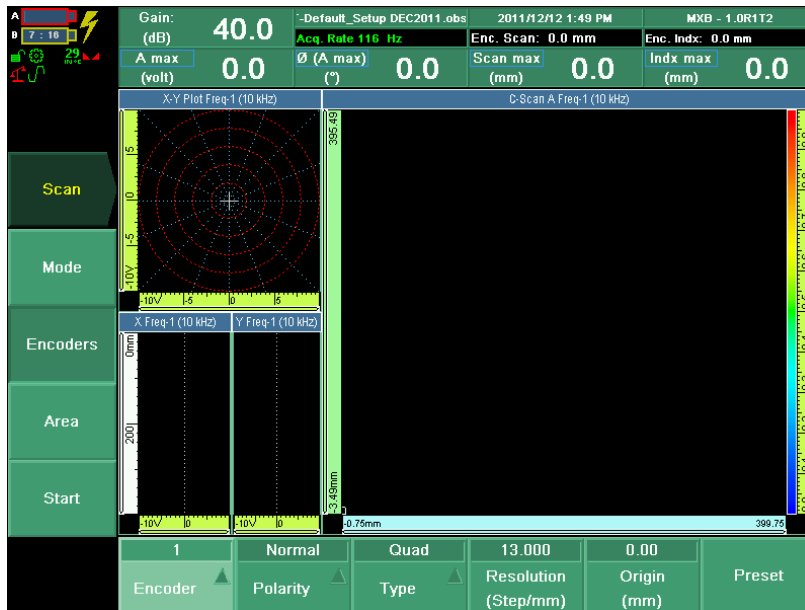



Figure A-4 Encoders submenu with Encoder and Resolution parameters

4. Verify the polarity by moving the x-axis encoder. Verify on-screen that the position of the x-axis increases or decreases.
5. Select **Encoders > Encoder = 2**.
6. Select **Encoders > Encoder > Resolution**, and then enter the appropriate value for the y-axis resolution, depending on the scanner in use:
 - For the GLIDER scanner, enter **13** steps/mm (**330.2** steps/in.).
 - For the WING Scanner, enter **20.5** steps/mm (**520.7** steps/in.).
7. Verify the polarity by moving the y-axis encoder. Verify on-screen that the position of the y-axis increases or decreases.
8. Select **Scan > Mode > Type = Inspection** and make sure that the acquisition rate is at the maximum possible value.

For example, you can enter an arbitrary high value of 2000 Hz for the **Acq. Rate**

parameter, and then press the Accept key ().

The software automatically sets the value as high as possible within the system parameters. This ensures that the value is set high enough to accommodate the

compensation of the OmniScan. The typical value of the operating frequency is in the range of 150 Hz to 200 Hz.

A.2 Configuring the Handheld Scanner Parameters

The handheld scanner is configured using a setup file.

To configure the handheld scanner parameters

- ◆ Load the **HS Default Setup** file.

This file automatically sets up the scanner parameters, and no other configuration steps are required.

A.3 Defining the Scan Area for Any Type of Scanner

After the encoders are configured, the scan area can be defined. The following procedure applies to all scanner types.

To define the scan area for a scanner using scan and index lengths

1. Select **Scan > Area** (see Figure A-5 on page 58).

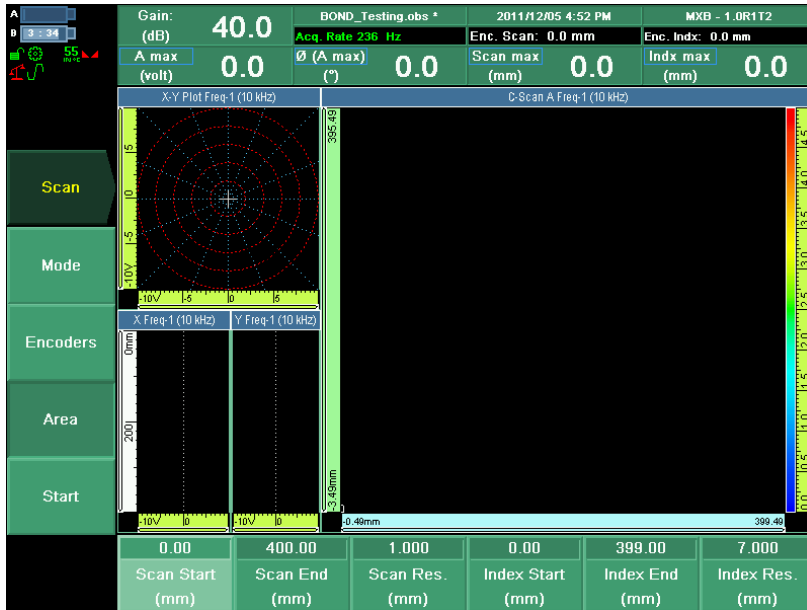


Figure A-5 The Area submenu

2. Select **Area** > **Scan End**, and then enter the required length for the scan axis.
3. Select **Area** > **Index End**, and then enter the required length for the index axis.
4. Select **Area** > **Scan Res.**, and then enter the required resolution for the scan axis.
5. Select **Area** > **Index Res.**, and then enter the required resolution for the index axis.

Appendix B: Handheld Scanner Specifications and Maintenance

The general specifications of the handheld scanner are provided in Table 3 on page 59. Specifications are also provided for the probe interface connector and the encoder connector.

Table 3 Handheld scanner general specifications

Parameter	Value
Altitude	Up to 2000 m
Operating temperature	5 °C to 50 °C
Storage temperature	-30 °C to 60 °C
Relative humidity (RH)	Maximum 85 %, noncondensing
Wet locations	No
Pollution level	2
Ingress protection	Designed for IP50
Tested for	5J impact test
Power ratings	Mini-encoder: 5 VDC 25 mA maximum
	BondMaster OMNI-A-OBTC probe adaptor: ±10 VDC 25 mA maximum
Frequency of mini-encoder	0 kHz to 1.5 kHz
Maximum displacement velocity of mini-encoder	10 cm/s (4 in./s)

The handheld scanner is available in two configurations (see Table 4 on page 60).

Table 4 Handheld scanner configurations

Configuration	Part number
Handheld scanner with cable and encoder (S-PC-P14 probe NOT included)	HSB-01 [U8270154]
HSB-01 handheld scanner with S-PC-P14 probe, cable, and encoder	HSB-SPCP14 [U8270153]

B.1 Probe Interface Connector

Description

11-pin, male connector

Manufacturer, number

Fischer, 0420951.00

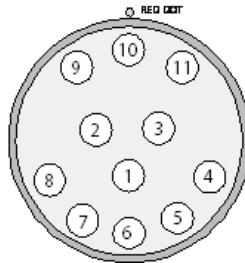


Figure B-1 The probe connector (Fischer 0420951.00)

Table 5 Pinout for the probe connector

Pin	Description
1	Not used
2	Alarm LED (not used)

Table 5 Pinout for the probe connector (continued)

Pin	Description
3	ID chip (not used)
4	Ground
5	Not used
6	Probe drive
7	VDC (not used)
8	Digital ground (not used)
9	Shield
10	Probe receive
11	Overall shield

B.2 Encoder Connector

Description

DE-15, male connector

Manufacturer, number

Mode Electronics, 30-810-0

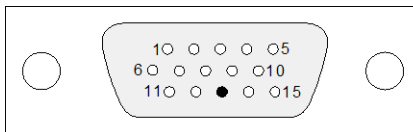


Figure B-2 The encoder connector

Table 6 Pinout for the encoder connector

Pin	Signal	Description
1	DIN 1	Index switch
3	+5V	+5 VDC
5	N.C.	Anchorage
6	N.C.	Anchorage
9	PHA 1	Index switch
11	PHA 2	Encoder wheel phase A
12	PHB 2	Encoder wheel phase B
15	GND	Signal ground
CASE	GND	Chassis ground

B.3 Maintenance

The service requirements of the handheld scanner are minimal. Depending on operating conditions, the parts might need periodic cleaning.

B.3.1 Preventive Maintenance

The handheld scanner does not have many moving parts, and therefore only requires minimal preventive maintenance. Only a regular inspection of the product is recommended to ensure that it functions correctly.

B.3.2 Unit Cleaning

The handheld scanner's external surfaces can be cleaned when needed.

To clean the unit

1. Ensure the unit is turned off by removing the source of power.
2. Disconnect all cables.

3. To bring the unit back to its original finish, clean the housing with a soft cloth.
4. To remove persistent stains, use a damp cloth with a soft, soapy solution. Do not use abrasive products or powerful solvents that could damage the finish.
5. Wait until the unit dries completely before reconnecting the cables.

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