CEREC AF, CEREC AF Connect
CEREC AI, CEREC AI Connect

Operating Instructions
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# Sirona Dental Systems GmbH

Operating Instructions CEREC AF, CEREC AF Connect

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<tr>
<td></td>
<td>10.3.1 Customer Diagnostics &amp; Technician Diagnostics</td>
</tr>
<tr>
<td></td>
<td>10.3.2 Sirona Windows Diagnostics</td>
</tr>
</tbody>
</table>
1 Dear Customer,

Thank you for your purchase of this CEREC AF® / CEREC AI® (CEREC Acquisition Flexible/CEREC Acquisition Integrated) and the Connect variants unit from Sirona.

This device enables you to produce dental restorations, e.g. from ceramic material with a natural appearance (CEramic REConstruction).

Improper use and handling can create hazards and cause damage. Please therefore read and follow these operating instructions carefully. Always keep them within easy reach.

Also pay attention to the safety instructions to prevent personal injury and material damage.

Your
CEREC Team

1.1 Contact information

Customer service center
In the event of technical queries, please use our online contact form at www.sirona.com. In the navigation bar, go to the menu commands "CONTACT" / "Customer Service Center" and then click the "CONTACT FORM FOR TECHNICAL QUESTIONS" button.

Manufacturer's address
Sirona Dental Systems GmbH
Fabrikstrasse 31
64625 Bensheim
Germany
Phone: +49 (0) 6251/16-0
Fax: +49 (0) 6251/16-2591
e-mail: contact@sirona.com
www.sirona.com
2 General data

Please read this document completely and follow the instructions exactly. You should always keep it within reach.

Original language of the present document: German.

2.1 Structure of the document

2.1.1 Identification of the danger levels

To prevent personal injury and material damage, please observe the warning and safety information provided in the present operating instructions. Such information is highlighted as follows:

- **DANGER**
  An imminent danger that could result in serious bodily injury or death.

- **WARNING**
  A possibly dangerous situation that could result in serious bodily injury or death.

- **CAUTION**
  A possibly dangerous situation that could result in slight bodily injury.

- **NOTICE**
  A possibly harmful situation which could lead to damage of the product or an object in its environment.

- **IMPORTANT**
  Application instructions and other important information.

Tip: Information on making work easier.
2.1.2 Formats and symbols used

The formats and symbols used in this document have the following meaning:

<table>
<thead>
<tr>
<th>✓</th>
<th>Prerequisite</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>First action step</td>
</tr>
<tr>
<td>2.</td>
<td>Second action step</td>
</tr>
<tr>
<td>or</td>
<td>Alternative action</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>▼</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>▬</td>
<td>Individual action step</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>See &quot;Formats and symbols used [→ 7]&quot;</th>
<th>Identifies a reference to another text passage and specifies its page number.</th>
</tr>
</thead>
<tbody>
<tr>
<td>•</td>
<td>List</td>
</tr>
<tr>
<td>&quot;Command / menu item&quot;</td>
<td>Indicates commands, menu items or quotations.</td>
</tr>
</tbody>
</table>

2.2 Legend

20XX 

Year of manufacture

Safety labels
Identifies labels/imprints on the unit (see Safety labels).

"Hot surface" symbol

Product disposal symbol (see "Disposal [→ 63]").

Follow the operating instructions.
To ensure safe operation of the unit, the user must follow the operating instructions.

Symbol for 24 volt DC
Symbols on the packaging

Take note of the following symbols on the packaging:

Top

Protect from moisture

Fragile; handle with care

Temperature during storage and transport

Relative humidity during storage and transport

Air pressure during storage and transport
# General description

## 3 Certification

### 3.1 CE mark


**NOTICE**

**CE mark for connected products**

Further products which are connected to this unit must also bear the CE mark.

### Compliance

Anyone creating or changing a medical electrical system through a combination with other devices in accordance with standard EN 60601-1-1:2001 based on 60601-1-1:2000 (specification for the safety of medical electrical systems)/UL 60601-1 Part 1: first edition 2003 is responsible for ensuring that the requirements of these standards are met to the full extent in order to ensure the safety of patients, operators and the environment.

## 3.2 Intended use

In combination with the milling unit, the CEREC AF/CEREC AI/CEREC AF Connect/CEREC AI Connect unit is used to manufacture dental restorations, e.g. from a natural-appearing ceramic material. The unit may be operated only by medically trained and qualified personnel.

This unit must not be used for any other purpose. If the unit is used for any purpose other than the one mentioned above, it may be damaged.

Intended use also includes compliance with these Operating Instructions and the relevant maintenance instructions.

**CAUTION**

If the instructions for operating the unit described in this document are not observed, the intended protection of the user may be impaired.

### For the USA only

**CAUTION:** According to US Federal Law, this product may be sold only to or by instruction of physicians, dentists, or licensed professionals.
4 Safety

4.1 Basic safety information

4.1.1 Prerequisites

**NOTICE**

Important information on building installation

The building installation must be performed by a qualified expert in compliance with the national regulations. DIN VDE 0100-710 applies in Germany.

**WARNING**

Electric shock

In order to prevent the risk of an electric shock, this medical device must only be connected to a supply mains with a ground wire.

**NOTICE**

Restrictions regarding installation site

The system is not intended for operation in areas subject to explosion hazards.

4.1.2 Connecting the unit

Perform connection by following the directions given in the present operating instructions.
### 4.1.3 General safety information

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not damage the monitor</td>
</tr>
<tr>
<td>DO NOT touch the LCD screen with sharp or pointed objects.</td>
</tr>
<tr>
<td>If the LCD monitor is damaged (e.g. the glass screen is broken), prevent any leaking liquid from coming into contact with your skin, mucous membranes (eyes, mouth), or foodstuffs and be careful not to inhale any escaping vapors.</td>
</tr>
<tr>
<td>Rinse any parts of your body or items of clothing already contaminated by the liquid with ample amounts of water and soap.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note on the prevention, recognition, and elimination of unintended electromagnetic effects:</td>
</tr>
<tr>
<td>This system may be operated in a residential area provided that it is used under the responsibility of a medical specialist.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the unit is damaged, it must be decommissioned immediately and remain thus until it has been repaired by a certified engineer.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install only approved software</td>
</tr>
<tr>
<td>To prevent interference with the runtime reliability of the program, only approved software may be installed.</td>
</tr>
<tr>
<td>➢ User version ≥ CEREC SW 4.4 (not for CEREC AF Connect/ CEREC AI Connect)</td>
</tr>
<tr>
<td>➢ Use version ≥ Sirona Connect SW 4.4</td>
</tr>
<tr>
<td>➢ Use version ≥ CEREC Ortho SW 1.1</td>
</tr>
<tr>
<td>➢ Use version ≥ Splashtop Streamer 2.6.5.4</td>
</tr>
</tbody>
</table>
4.1.4 Transporting the camera

**CAUTION**

**Trip/fall hazard**
When transporting the camera, be aware that you might trip over the cable and fall. This is particularly the case if the 50cm camera extension cable is used.

> When transporting the camera, please ensure that the free cable ends are coiled.

The camera can be detached from the storage cradle for use in treatment rooms.

4.1.5 Stability of the unit

**NOTICE**

The CEREC AF/CEREC AF Connect unit could slip and fall off the table

Please ensure that you place the cradle and camera on a flat surface. The round plate upon which the cradle is mounted is equipped with non-slip feet to prevent movement.

4.1.6 Maintenance and repair

As manufacturers of dental instruments and laboratory equipment, we can assume responsibility for the safety properties of the unit only if the following points are observed:

- The maintenance and repair of this unit may be performed only by Sirona or by agencies authorized by Sirona.
- Components which have failed and influence the safety of the unit must be replaced with original (OEM) spare parts.

Please request a certificate whenever you have such work performed. It should include:

- The type and scope of work.
- Any changes made in the rated parameters or working range.
- Date, name of company and signature.

4.1.7 Modifications to the product

Modifications to this product which may affect the safety of the operator, patients or third parties are prohibited by law!

4.1.8 Accessories

In order to ensure product safety, this device may be operated only with original Sirona accessories or third-party accessories expressly approved by Sirona. The user is responsible for any damage resulting from the use of non-approved accessories.
4.2 Safety labels

Plug connections of external PC interfaces

⚠️ CAUTION

Additional devices connected to external interfaces must be tested according to the relevant standards, e.g.:


They must be installed outside of the patient area (a radius of 1.5m surrounding the patient).

⚠️ CAUTION

Low voltages are applied to the coupling box for connecting external interfaces.

➢ Do not touch the pins of the connectors.

NOTICE

The externally connected cables must not be subjected to pulling stress.

⚠️ CAUTION

Trip/fall hazard

When installing the supply cable (the cable between the coupling box and the camera storage cradle) there might be a risk of tripping.

➢ Lay the cable so that there is no risk of tripping.
➢ Attach the supply line so that it remains fixed at all times.

⚠️ CAUTION

To maintain electrical safety, the PC must not be operated within the patient area (a radius of 1.5m surrounding the patient).
4.3 Electrostatic charge

4.3.1 ESD warning labels

**CAUTION**

Risk of burns due to hot surface!
➢ Never touch the heater plate (A)!

Heater plate
4.3.2 ESD protective measures

ESD stands for ElectroStatic Discharge.

ESD protective measures include:

- Procedures for preventing electrostatic charge build-up (e.g. air conditioning, air moistening, conductive floor coverings and non-synthetic clothing)
- Discharging the electrostatic charges of your own body on the frame of the UNIT, the protective ground wire or large metallic objects
- Connecting yourself to ground using a wrist band.

We therefore recommend that all persons working with this system be instructed on the significance of this warning label. Furthermore, they also should receive training in the physics of electrostatic discharges which can occur in the practice and the destruction of electronic components which may result if such components are touched by electrostatically charged USERS.

The content of this training is explained in the Chapter "About the physics of electrostatic charges".

4.3.3 About the physics of electrostatic charges

An electrostatic charge is a voltage field on and in an object (e.g. a human body) which is protected against conductance to ground potential by a nonconductive layer (e.g. a shoe sole).

Electrostatic charges generally build up whenever two bodies are rubbed against each other, e.g. when walking (shoe soles against the floor) or driving a vehicle (tires against the street pavement).
Amount of charge

The amount of charge depends on several factors:

Thus the charge is higher in an environment with low air humidity than in one with high air humidity; it is also higher with synthetic materials than with natural materials (clothing, floor coverings).

Electrostatic discharge must be preceded by electrostatic charging.

The following rule of thumb can be applied to assess the transient voltages resulting from an electrostatic discharge.

An electrostatic discharge is:

- perceptible at 3,000 V or higher
- audible at 5,000 V or higher (cracking, crackling)
- visible at 10,000 V or higher (arc-over)

The transient currents resulting from these discharges have a magnitude of 10 amperes. They are not hazardous for humans because they last for only several nanoseconds.

Background

Integrated circuits (logical circuits and microprocessors) are used to implement a wide variety of functions in dental/X-ray/CAD/CAM systems.

The circuits must be miniaturized to a very high degree in order to include as many functions as possible on these chips. This leads to structure thicknesses as low as a few ten thousandths of a millimeter.

It is obvious that integrated circuits which are connected to plugs leading outside of the unit via cables are sensitive to electrostatic discharge.

Even voltages which are imperceptible to the user can cause breakdown of the structures, thus leading to a discharge current which melts the chip in the affected areas. Damage to individual integrated circuits may cause malfunction or failure of the system.

To prevent this from happening, the ESD warning label next to the plug warns of this hazard. ESD stands for ElectroStatic Discharge.

Connector pins or sockets bearing ESD warning labels must not be touched or interconnected without ESD protective measures.

4.4 Wireless phone interference with equipment

The use of mobile wireless phones in practice or hospital environments must be prohibited to ensure safe operation of the unit.

4.5 Data transmission

Data communication between the CEREC AF/CEREC AI and the milling unit should preferably be via LAN cable.
5 Technical information

5.1 Technical description

CAD system for high-precision intraoral optical impressions

- High-resolution, heated oral camera (3D camera) with removable reflective sleeve (reflective sleeve sterilizable with hot air)
- Integrated image processing
- High processing power due to state-of-the-art processor
- Camera storage cradle can be disinfected by wiping.

High-resolution 3D intraoral camera with control and image processing electronics

- Measuring technique: Triangulation
- Light source: White LED, unpolarized, visible spectral range
- Image acquisition: Image control inside the camera
- Image data transfer: Gigabit Ethernet Standard

PC hardware requirements (V3.4.1)

Special PC with the following equipment:

- Processor: Intel i7 5820K
- Memory: 2 x 8GB, 2133MHz DDR4-RAM
- DVD-R(W)/CD-R(W): SH-224 combi drive
- Hard disk: 1TB 2.5" S-ATA SSHD
- Onboard network: Ethernet 10/100/1000MBit/s
- Network card: Ethernet 10/100/1000MBit/s intel PCIe
- WLAN card: TP-Link TL-WDN4800
- Sound card: Realtek HD Audio onboard
- Graphics card: AMD R9 285

PC software requirements

- Operating system: Windows Embedded Standard 7, 64Bit
- Installation: The operating system is installed at the factory.
  During initial start of the PC, the language selection is made.
5.2 Technical data

Type designation
CEREC AF/CEREC AI/ CEREC AF Connect/ CEREC AI Connect

Rated line voltage
100 - 240 VAC /50 - 60 Hz

Rated current
1.0-0.6 A

Type of protection against electric shock
Class I device

Type of protection against electric shock
Type BF applied part

Degree of protection against ingress of water
Ordinary device (without protection against ingress of water)

Pollution degree
2

Installation category
II

Operating category
Continuous operation

Operating mode
Observe accompanying documents

Temperature
-25°C to 60°C
(-13°F to 140°F)

Relative humidity
10% to 75%

Air pressure
700 hPa to 1060 hPa

Transport and storage conditions

Operating conditions

Ambient temperature
10 °C to 35 °C
(50° F to 95° F)

Relative humidity
30% to 85%

No condensation

Air pressure
700 hPa to 1060 hPa

Operating altitude
≤ 3000 m
Dimensions and weight (CEREC AF, CEREC AF Connect)

Dimensions of the camera cradle, W x H x D
- in mm: 278 x 102.5 x 73
- in inches: 10.4 x 4 x 2.9

Dimensions of the plate, W x H x D
- in mm: 184 (diameter)
- in inches: 7.25 (diameter)

Weight: 610g (1.34 lbs)

Dimensions and weight of the PC

Dimensions of the PC, W x H x D
- in mm: 180 x 435 x 490
- in inches: 7 x 17.1 x 19.3

Weight: 7.5kg (16.53lbs)
Dimensions of CEREC AI/CEREC AI Connect

A Recommended distances from cabinet or wall.

B Center of the floor cut-out/installation area

C Minimum distance with tray and CEREC AI/CEREC AI Connect

D Hazard warning: The lamp installed here, the tray and CEREC AI exposure system/CEREC AI Connect have a swivel range which exceeds the specified distances!

E Support arm with CEREC AI/CEREC AI Connect
5.3 Electromagnetic compatibility

Observance of the following information is necessary to ensure safe operation regarding EMC aspects.

CEREC AF / CEREC AI / CEREC AF Connect / CEREC AI Connect comply with the requirements for electromagnetic compatibility (EMC) according to IEC 60601-1-2:2001 and A1:2004.

CEREC AF / CEREC AI / CEREC AF Connect / CEREC AI Connect is hereinafter referred to as "UNIT".

5.3.1 Electromagnetic emission

The UNIT is intended for operation in the electromagnetic environment specified below.

The customer or user of the UNIT should make sure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Emission measurement</th>
<th>Conformity</th>
<th>Electromagnetic environment - guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF emissions according to CISPR 11</td>
<td>Group 1</td>
<td>The UNIT uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.</td>
</tr>
<tr>
<td>RF emissions according to CISPR 11</td>
<td>Class B</td>
<td>The UNIT is intended for use in all facilities, including residential areas and in any facilities connected directly to a public power supply providing electricity to buildings used for residential purposes.</td>
</tr>
<tr>
<td>Harmonics according to IEC 61000-3-2</td>
<td>Class A</td>
<td></td>
</tr>
<tr>
<td>Voltage fluctuations / flicker according to IEC 61000-3-3</td>
<td>coincides</td>
<td></td>
</tr>
</tbody>
</table>
### 5.3.2 Interference immunity

The **UNIT** is intended for operation in the electromagnetic environment specified below.

The customer or user of the **UNIT** should make sure that it is used in such an environment.

<table>
<thead>
<tr>
<th>Interference immunity tests</th>
<th>IEC 60601-1-2 Test level</th>
<th>Compliance level</th>
<th>Electromagnetic environment – guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrostatic discharge (ESD) according to IEC 61000-4-2</td>
<td>± 6 kV contact ± 8 kV air</td>
<td>± 6 kV contact ± 8 kV air</td>
<td>Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.</td>
</tr>
<tr>
<td>Electrical fast transient/burst according to IEC 61000-4-4</td>
<td>± 1 kV for input and output lines ± 2 kV for power supply lines</td>
<td>± 1 kV for input and output lines ± 2 kV for power supply lines</td>
<td>The quality of the line power supply should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>Surge voltages according to IEC 61000-4-5</td>
<td>± 1 kV differential mode voltage ± 2 kV common mode voltage</td>
<td>± 1 kV differential mode voltage ± 2 kV common mode voltage</td>
<td>The quality of the line power supply should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>Voltage dips, short interruptions and variations of the power supply according to IEC 61000-4-11</td>
<td>&lt;5% $U_T$ for ½ period (&gt;95% dip of $U_T$) 40% $U_T$ for 5 periods (60% dip of $U_T$) 70% $U_T$ for 25 periods (30% dip of $U_T$) &lt;5% $U_T$ for 5sec. (&gt;95% dip of $U_T$)</td>
<td>&lt;5% $U_T$ for ½ period (&gt;95% dip of $U_T$) 40% $U_T$ for 5 periods (60% dip of $U_T$) 70% $U_T$ for 25 periods (30% dip of $U_T$) &lt;5% $U_T$ for 5sec. (&gt;95% dip of $U_T$)</td>
<td>The quality of the line power supply should be that of a typical commercial or hospital environment.</td>
</tr>
<tr>
<td>Magnetic field of power frequencies (50/60 Hz) according to IEC 61000-4-8</td>
<td>3 A/m</td>
<td>3 A/m</td>
<td>Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.</td>
</tr>
</tbody>
</table>

**Remarks:** $U_T$ is the AC supply voltage prior to application of the test level.

Portable and mobile radio equipment must not be used within the recommended working clearance from the **UNIT** and its cables, which is calculated based on the equation suitable for the relevant transmission frequency.

Recommended working clearance:
### 5.3 Electromagnetic compatibility

#### Remark 1
The higher frequency range applies at 80 MHz and 800 MHz.

#### Remark 2
These guidelines may not be applicable in all cases. The propagation of electromagnetic waves is influenced by their absorption and reflection by buildings, objects and persons.

1. Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM/FM radio and TV broadcasts, cannot be predicted theoretically with accuracy. An investigation of the location is recommended to determine the electromagnetic environment resulting from stationary RF transmitters. If the measured field strength in the location in which the UNIT is used exceeds the applicable RF compliance level specified above, the UNIT should be observed to verify normal operation. If unusual performance characteristics are observed, it may be necessary to take additional measures such as reorientation or repositioning of the UNIT.

2. Over the frequency range 150kHz to 80 MHz, field strengths should be less than 3 V/m.
5.3.3 Working clearances

Recommended working clearances between portable and mobile RF communication devices and the UNIT

The UNIT is intended for operation in an electromagnetic environment, where radiated RF interference is checked. The customer or the user of the UNIT can help prevent electromagnetic interference by duly observing the minimum distances between portable and/or mobile RF communication devices (transmitters) and the UNIT. These values may vary according to the output power of the relevant communication device as specified below.

<table>
<thead>
<tr>
<th>Rated maximum output power of transmitter [W]</th>
<th>Working clearance according to transmission frequency [m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 kHz to 80 MHz</td>
<td>80 MHz to 800 MHz</td>
</tr>
<tr>
<td>d= [1,2] \sqrt{P}</td>
<td>d= [1,2] \sqrt{P}</td>
</tr>
<tr>
<td>0,01</td>
<td>0,12</td>
</tr>
<tr>
<td>0,1</td>
<td>0,38</td>
</tr>
<tr>
<td>1</td>
<td>1,2</td>
</tr>
<tr>
<td>10</td>
<td>3,8</td>
</tr>
<tr>
<td>100</td>
<td>12</td>
</tr>
</tbody>
</table>

For transmitters whose maximum nominal output is not specified in the above table, the recommended working clearance \( d \) in meters (m) can be determined using the equation in the corresponding column, where \( P \) is the maximum nominal output of the transmitter in watts (W) specified by the transmitter manufacturer.

**Remark 1**

An additional factor of \( 10/3 \) is applied when calculating the recommended working clearance between transmitters in the 80 MHz to 2.3 GHz frequency range in order to reduce the probability that a mobile/portable communication device unintentionally brought into the patient area could lead to interference.

**Remark 2**

These guidelines may not be applicable in all cases. The propagation of electromagnetic waves is influenced by their absorption and reflection by buildings, objects and persons.
6 Installation and startup

6.1 Transport and unpacking

All products from Sirona are carefully checked prior to shipment. Please perform an incoming inspection immediately after delivery.

1. Check the delivery note to ensure that the consignment is complete.
2. Check whether the product shows any visible signs of damage.

**NOTICE**

**Damage during transport**

If the product was damaged during transport, please contact your carrying agent.

If return shipment is required, please use the original packaging for shipment.

6.2 Disposal of packaging materials

The packaging must be disposed of in compliance with the relevant national regulations. Please observe the regulations applicable in your country.
6.3 Major components

CEREC AF

The CEREC AF D3652 medical device includes the following main components:

- CEREC Omnicam Camera (for order with camera) 65 34 767 D3652
- Camera cradle 65 26 565 D3652
- Coupling box 65 32 084 D3652
- Medical power supply FSP030-RFAM 65 37 158 D3652
  Technical data for the medical power supply can be checked at http://www.fsp-group.com.tw/pro/5/FSP030-RFAM.pdf

CEREC AF Connect

The CEREC AF Connect D3652 medical device includes the following main components:

- CEREC Omnicam Camera (for order with camera) 65 34 767 D3652
- Camera cradle 65 26 565 D3652
- Connect coupling box 65 57 404 D3652
- Medical power supply FSP030-RFAM 65 37 158 D3652
  Technical data for the medical power supply can be checked at http://www.fsp-group.com.tw/pro/5/FSP030-RFAM.pdf

CEREC AI

The CEREC AI D3652 medical device includes the following main components:

- CEREC Omnicam camera (for order with camera) 65 34 775 D3652
- Support arm with camera cradle 65 32 050 D3652
- Coupling box 65 32 084 D3652
- Medical power supply FSP030-RFAM 65 37 158 D3652
  Technical data for the medical power supply can be checked at http://www.fsp-group.com.tw/pro/5/FSP030-RFAM.pdf
CEREC AI Connect

The CEREC AI Connect D3652 medical device includes the following main components:

- CEREC Omnicam camera (for order with camera)
  65 34 775 D3652

- Support arm with camera cradle
  65 32 050 D3652

- Connect coupling box
  65 57 404 D3652

- Medical power supply FSP030-RFAM
  65 37 158 D3652
  Technical data for the medical power supply can be checked at
### 6.4 Scope of supply

The detailed scope of supply is specified in the document "Checklist".

<table>
<thead>
<tr>
<th>Components included in the scope of supply</th>
<th>CEREC AF with Omnicam</th>
<th>CEREC AF without Omnicam</th>
<th>CEREC AF Connect with Omnicam</th>
<th>CEREC AI with Omnicam</th>
<th>CEREC AI without Omnicam</th>
<th>CEREC AI Connect with Omnicam</th>
</tr>
</thead>
<tbody>
<tr>
<td>The box labelled CEREC AF/AI contains the following:</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CEREC Omnicam (delivered in case for CEREC AF and CEREC AF Connect)</td>
<td>x</td>
<td>-</td>
<td>x</td>
<td>x</td>
<td>-</td>
<td>x</td>
</tr>
<tr>
<td>Calibration set</td>
<td>x</td>
<td>-</td>
<td>x</td>
<td>x</td>
<td>-</td>
<td>x</td>
</tr>
<tr>
<td>Camera cradle with table base (EBS table support)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coupling box (CEREC AF/AI basic unit)</td>
<td>x</td>
<td>x</td>
<td>-</td>
<td>x</td>
<td>x</td>
<td>-</td>
</tr>
<tr>
<td>Connect coupling box (CEREC AF/AI Connect basic unit)</td>
<td>-</td>
<td>-</td>
<td>x</td>
<td>-</td>
<td>-</td>
<td>x</td>
</tr>
<tr>
<td>Tablet (AF/AI display)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Table stand</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Hygienic protective sleeves</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Wireless keyboard (wireless keyboard and mouse set)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Wireless mouse (wireless keyboard and mouse set)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CEREC Software DVD</td>
<td>x</td>
<td>-</td>
<td>-</td>
<td>x</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>License stick (with CEREC Connect license)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Sirona remote software</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>CD with operating instructions</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Connecting cable for camera cradle Selection: 3m (not for CEREC AI), 5m or 10m</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>24 volt medical power supply unit</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>PC LAN cable</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>USB 2.0 cable</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>PC power cable</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Medical power supply cable</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Monitor power cable (optional)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
### Components included in the scope of supply

<table>
<thead>
<tr>
<th>Component</th>
<th>CEREC AF with Omnicam</th>
<th>CEREC AF without Omnicam</th>
<th>CEREC AF Connect with Omnicam</th>
<th>CEREC AI with Omnicam</th>
<th>CEREC AI without Omnicam</th>
<th>CEREC AI Connect with Omnicam</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Optional: 0.5m camera extension cable</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>The box labelled PC CEREC AF/AI contains the following:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Sirona restore solution</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>PC test tool</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Special desktop PC</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><em>Optional: Monitor box contains: Monitor (choice of 24” or 19”)</em></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Box for support arm contains: TENEQ support arm (with mounted camera cradle)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

*The corresponding option is only included in the scope of supply if selected with the order.*

### 6.5 Commissioning

Sirona or a Sirona authorized dealer will install the system as described and ensure that you are well instructed in how to operate the system. This includes a description of how to switch the system on or off.

**IMPORTANT**

Do not install an alternative virus scanner on your PC. Microsoft Security Essentials has been pre-installed.
6.5.1 Controls and functional elements

Camera with cradle

NOTICE

The camera with the camera cradle can be placed inside or outside of the patient environment. It must be ensured that the position of the camera cradle and the camera cable length enable the user to hold the camera in the mouth of the patient.

![Camera with cradle diagram]

<table>
<thead>
<tr>
<th>A</th>
<th>CEREC Omnicam Camera</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Camera cradle</td>
</tr>
<tr>
<td>C</td>
<td>Heater plate</td>
</tr>
<tr>
<td>D</td>
<td>Green LED for power status</td>
</tr>
<tr>
<td>E</td>
<td>Lock (engaged)</td>
</tr>
</tbody>
</table>
PC

NOTICE

The PC and its peripheral components of monitor, keyboard, and mouse must be set up outside of the patient environment.

![PC diagram]

A  ON/OFF button
B  Air intake

NOTICE

Use only the PC supplied by Sirona!

As of hardware version 3.4.2, the PC for CEREC AF / CEREC AI / CEREC AF Connect / CEREC AI Connect is delivered in a housing that has a considerably smaller depth than the previous housing. This means that it can be installed in most furniture used when operating a PC. One model tested by Sirona is the “B1DTC4” module from A-dec, designed for the American market.

Dimensions of the PC as of hardware version 3.4.2

<table>
<thead>
<tr>
<th></th>
<th>Width</th>
<th>Depth</th>
<th>Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>in mm</td>
<td>180</td>
<td>360</td>
<td>435</td>
</tr>
<tr>
<td>in inches</td>
<td>7</td>
<td>14</td>
<td>17 ¾</td>
</tr>
</tbody>
</table>
The temperature inside the cabinet affects the performance of the PC. Full performance can only be guaranteed up to a temperature of 35°C (95°F) (measured at the air intake of the PC). A drop in performance can become apparent if the scanning process slows down when the temperature rises above 35°C (95°F).

- The cabinet should have an active ventilation or air extraction system; see the sketch for an example.
- It is particularly important to check the temperature inside the cabinet when the ambient temperature is higher (in summer, for example). If necessary, open the door or place the PC somewhere else.
Components of the Omnicam

NOTICE
CEREC Omnicam is calibrated
The CEREC Omnicam is calibrated ex works (see "Calibrating CEREC Omnicam").

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Press detent to release</td>
</tr>
<tr>
<td>B</td>
<td>Mirror sleeve</td>
</tr>
<tr>
<td>C</td>
<td>Sapphire glass (coated)</td>
</tr>
</tbody>
</table>
### 6.5.2 Plug connections

<table>
<thead>
<tr>
<th><strong>NOTICE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Failure of the CEREC Omnicam</strong></td>
</tr>
<tr>
<td>The CEREC Omnicam is a high-precision optoelectronic scanning instrument for non-contact impression taking which requires careful handling. Incorrect handling (impacts, dropping) leads to failure of the CEREC Omnicam.</td>
</tr>
<tr>
<td>➢ Always deposit the sensitive CEREC Omnicam in its cradle!</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>NOTICE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Do not damage cable</strong></td>
</tr>
<tr>
<td>If you pull on the cable itself in order to unplug it or to check the plug connection, you will damage the cable.</td>
</tr>
<tr>
<td>➢ Never pull on the cable.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>NOTICE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positioning coupling box</strong></td>
</tr>
<tr>
<td>The coupling box must be positioned outside of the patient environment. The coupling box must not be placed on the floor. The coupling box must not be positioned in the connection box of the treatment unit (applies to CEREC AI/CEREC AI Connect).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CAUTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positioning camera cradle</strong></td>
</tr>
<tr>
<td>The camera cradle for the CEREC AF/CEREC AF Connect must be placed on a flat, horizontal surface either inside or outside of the patient environment. Ensure that the camera cradle cable does not pose a safety risk. This applies in particular to the use of the optional extension cable between the camera and camera cradle.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>CAUTION</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trip/fall hazard</strong></td>
</tr>
<tr>
<td>When installing the supply cable (the cable between the coupling box and the camera storage cradle) there might be a risk of tripping.</td>
</tr>
<tr>
<td>➢ Lay the cable so that there is no risk of tripping.</td>
</tr>
<tr>
<td>➢ Attach the supply line so that it remains fixed at all times.</td>
</tr>
</tbody>
</table>

1. Connect the PC to the mains voltage with the power cable.
2. Carefully insert the connector of the CEREC Omnicam cable into the coupling on the shorter of both cables at the camera cradle or the support arm cable of the CEREC AI/AI Connect, watching out for the guide nose.

3. **CAUTION! Trip/fall hazard!** Ensure that the supply cable between the coupling box and the camera cradle remains fastened at all times so that the cable cannot pose a trip hazard. Carefully insert the supply cable connector into the coupling of the longer of the two cables of the camera cradle (or, for CEREC AI/AI Connect, into the connection box of the treatment unit to connect to the supply cable on the camera cradle side), watching out for the guide nose. Connect the other end of the supply cable to the coupling box (see image below, connection C).

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>LAN connection for PC LAN cable</td>
<td>C</td>
</tr>
<tr>
<td>B</td>
<td>USB connection for USB 2.0 cable</td>
<td>D</td>
</tr>
</tbody>
</table>

4. Carefully connect the cable stated above (A, B, D).

5. Connect the LAN cable (A) on the PC side with the network connector labeled with Omnicam.

6. Connect the USB cable (B) to a USB port on the rear of the PC.

7. Plug the power cable of the medical supply unit into the power socket.
Extension cable option

The following applies for the optional integration of a 50cm extension cable:

1. Carefully release the connection between the CEREC Omnicam cable and the camera cradle cable.
2. Carefully insert the connector of the CEREC Omnicam cable into the coupling on the extension cable, watching out for the guide nose.
3. Insert the extension cable connector (which is now connected to the CEREC Omnicam cable on the camera side) into the supply cable coupling, watching out for the guide nose, so that the connection with the coupling box cable is re-established.

Notes on network installation

CEREC AF/AI and the milling machine must be connected via LAN cable. Your network operator must ensure that LAN cables and provided and installed so that you can connect the PC to the milling machine.

The network card is installed.

6.5.3 Switching the units on

Prior to initial startup

Prior to initial startup, the wireless keyboard stick must be connected to a USB port on the rear of the PC. As long as Windows has not yet been activated, the USB port to the front of the PC is not detected as such. You can reconnect the stick following activation on the front of the PC.

First startup

1. Switch on the PC for the first time. When activating the Windows settings, you will be prompted to make a language selection. This is a one-off procedure. This selection cannot be reset or changed at a later date.
2. Set the monitor to a resolution of 1920 x 1080.
3. Install the CEREC SW software on the CEREC AF /AI PC. For CEREC AF Connect/AI Connect, download the Sirona Connect SW software from the Sirona homepage. Confirm the firmware update for the CEREC Omnicam with “YES”.
4. Install the Splashtop Streamer. For this purpose, refer to the Sirona Remote DVD and Operating Instructions (Sirona Remote DVD booklet). The Sirona Remote Client is pre-installed on the tablet. Establish a connection between the PC and tablet (see description in the Sirona Remote DVD booklet). For the language setting, refer to “Tablet operating notes [→ 39]”. 
Following initial installation

Follow the following steps for proper operation after initial installation.

1. Switch the PC on with the ON/OFF button.

**NOTICE**

Possible data loss and PC malfunction:
Switching the PC off at the ON/OFF button during operation may cause data loss and PC malfunctions.

➢ Always switch the unit off as described in the chapter "Switching the units off [→ 38]."

2. Switch the monitor on.

➢ When the PC has started up and the coupling box is supplied with voltage, the illuminated green LED on the camera cradle indicates that the camera is ready for use. As long as the PC is switched off, the camera and heater are not supplied with power.

**NOTICE**

The two USB ports on the front of the PC are also supplied with power, if necessary, when the PC is switched off (depending on PC hardware version).

➢ Always connect the coupling box to a USB power on the rear of the PC.

3. Switch the milling unit on (see the Operating Instructions for the milling unit).

4. After loading the operating system, start the “CEREC SW” application by double-clicking on the “CEREC SW” button. Make sure that the CEREC Omnicam is already connected when starting “CEREC SW”. Subsequent disconnection and re-connection is then possible without having to restart the “CEREC SW”.

5. For descriptions of further software actions, online help can be accessed by pressing "F1" or via the Help... menu option.

**NOTICE**

Internet Explorer V 5.0 or higher must be installed on your system in order to use the online help function.

6.5.4 Switching the units off

**NOTICE**

Proper shutdown procedure
The operating system must always be shut down properly to prevent data loss.

1. Exit all programs.
2. Power down the operating system.

**NOTE:** Now you can also switch the milling unit off if necessary.
6.5.5  **Tablet operating notes**

If you received a Samsung Galaxy Tab S as part of the scope of delivery, please observe the notes under “Samsung Galaxy Tab S [→ 39]”.

If you received a Dell Venue 10 Pro 5055 as part of the scope of delivery, please observe the notes under “Dell Venue 10 Pro 5055 [→ 40]”.

6.5.5.1  **Samsung Galaxy Tab S**

The tablet is supplied with English language set as standard. Please observe the following when changing the language:

1. On the start screen, tap the “Settings” button.

2. Tap the “General” tab (A).

3. Touch the “Language and input” button (B) to the left.

4. Touch the “Language” button (C) to the right and select your language of choice.

The Sirona Remote Client is pre-installed on the tablet.
6.5.5.2 Dell Venue 10 Pro 5055

Basic operation of the tablet is explained below. Further notes and tips can be found in the documents accompanying the tablet, and on the manufacturer’s web page.

Keys

The tablet has four keys on the side of the device that are marked according to their function. The on/off switch, the Windows start key and another key to turn the volume up or down.

Windows 8.1

The Windows 8.1 operating system has navigation options that are specially tailored to operate tablets:

Start screen

- You can return to the start screen at any time with the start button. If a keyboard is connected to the tablet, the Windows keyboard fulfills the same function. The usual Windows PC desktop view can be reached here via the button labeled “Desktop”.

- Swipe inward from the right screen margin. The “Charms” menu (Charm bar) opens, where you can operate basic functions by selecting the gear symbol and switch the device off, for example.

- If you swipe inward from the left margin of the screen, you switch to the previous App used (application).
Language setting

The tablet is supplied with English language set as standard. The tablet system language and the layout of the on-screen keyboard can be changed. On delivery, the pre-installed languages are English (US), English (GB), German, French, Italian and Spanish.

1. To change the language, press the start button.
2. On the start screen, press the gear symbol.
3. In the list on the left side, choose the "Time and language" item and then "Region and language".
4. Now you can switch to another language, by selecting this and tapping "Set as primary".
5. In order to activate the new language, you have to log out of Windows and then log in again. To do so, press the Start key, tap on the user shown in the top right, "CEREC", and in the drop down menu, select "Sign out".

Via "Add a language", even more languages that are not pre-installed can be added to the system. Please be advised that an Internet connection is required for this and that the process in this instance takes some time to complete. The connection with a WIFI network is described in the following section.

Establishing a connection with a WIFI network

In the Desktop view, a WIFI connection can be established as normal, via the symbol in the Task bar.

Alternatively, access the Charms menu at any time and the gear symbol displayed there can be used to change the settings for the WIFI connection.
Notes on the Windows update

The tablet displays the content of the CEREC PCs, simplifies system operation during acquisition and can also be used to interact with patients. The tablet does not require an Internet connection for this. Windows updates are disabled in order to cause as little disruption to work as possible.

If you wish to use the tablet to surf the Internet or if your practice network already has an Internet connection, we advise you activate the Windows updates. This is possible via PC settings, which are located at the bottom of the menu item “Update/Recovery” (accessible via the Start key and by selecting the gear icon). However, we recommend operation without an Internet connection and without automatic updates, as otherwise it cannot be guaranteed that the tablet operating system will not install updates during treatment. This can lead to unwanted malfunctions or even a restart during ongoing operation.

Starting Sirona Remote

The Sirona Remote application is pre-installed and can be started via the corresponding symbol or via the desktop (by double-clicking), as well as from the start page (single click).
7 Operation

Make sure that the CEREC Omnicam is already connected when starting "CEREC SW". Subsequent disconnection and re-connection is then possible without having to restart the "CEREC SW".

7.1 Camera warm-up time

When switching on the system, the camera needs to warm up for 15 - 20 minutes. If the coated sapphire glass of the Omnicam is not sufficiently warm, it may steam up during the acquisition. As such, it is not possible to carry out the exposure.

Following use, always position the Omnicam on the heater plate.

You can set the end temperature to which the camera heater warms the Omnicam mirror sleeve.

1. In the software, navigate to the system menu and click on the "Configuration" button.
2. Click on the "Devices" button.
3. Click on the "Omnicam" button.
4. Click on the "Camera Heater Settings" button.
5. Use the slider to adjust the temperature.

7.2 Adjusting the CEREC Omnicam

You can adjust the CEREC Omnicam in the device configuration.

1. In the software, navigate to the system menu, and click on the "Configuration" button.
2. Click on the "Devices" button.
3. Click on the "Omnicam" button.

Accepting settings

➢ Click on the "Ok" button.

Discarding settings

➢ Click on the "Cancel" button.
7.3 Taking acquisitions with the CEREC Omnicam

**CAUTION**

Hot surface!

The output window of the CEREC Omnicam is preheated in the camera cradle. When removing the CEREC Omnicam from its cradle, the surface temperature of the mirror sleeve can be up to 51°C. This may cause an unpleasant heat sensation on contact with a person's skin or mucous membrane. These temperatures will not damage the skin or mucosal membrane.

After removing the CEREC Omnicam from the camera cradle, the temperature of the mirror sleeve drops within a few minutes (< 5 minutes) to less than 43°C. The CEREC Omnicam is therefore suitable for use in the patient's mouth for an unlimited period of time.

At an ambient temperature from 30°C, only select the three lower heater settings.

The surface temperature of the mirror sleeve can reach up to 51°C when the camera has been operating continuously for more than 20 minutes in an ambient temperature of more than 30°C.

**NOTICE**

Image brightness

The image brightness during the acquisition is controlled automatically, so that there is always optimum image brightness, largely independent of the distance between the CEREC AF/CEREC AI/CEREC AF Connect/CEREC AI Connect and the tooth.

The surroundings of the tooth to be scanned should be as weakly illuminated as possible. Avoid any type of external light. Switch off the operating light.

**IMPORTANT**

Do not use cotton rolls in the scan area

Do not use any cotton rolls in the vicinity of the scan area. Should any pieces of cotton roll contaminate this area, the acquisitions will be inaccurate.

- The teeth are blow-dried

1. Change to phase "ACQUISITION".
   - The camera is ready for scanning.
   - A live image appears which can be used to look around the patient's mouth.

2. Remove the CEREC Omnicam from its holder.
   - As soon as the camera is pointed over a tooth or the gums, data acquisition begins. During the continuous data acquisition, a color 3D model is generated automatically on the screen. A white field indicates in which area data will be acquired. If the automatic data flow breaks off, the white field is lost and the audio
signal changes. In this case, move the camera to any area which has already been scanned. The scanning procedure continues.

3. Point the cursor to the Omnicam icon in the bottom left corner to end the acquisition procedure.

**Proceeding with scanning procedure**

1. Click on the Omnicam symbol with the cursor.
   - The scanning procedure begins.

2. Proceed with the scanning procedure as described above.

---

### 7.4 Directing the camera

**CAUTION**

After use, move the camera in its cradle out of the patient environment to avoid any unforeseen damage to the CEREC Omnicam.

---

The CEREC Omnicam acquires images which are used during the ongoing measurement in spatial relation to each other (image registration).

During the acquisition and then during the ongoing registration process, a distinctive sound can be heard. If the registration cannot be implemented, the acquisition flow is suspended. You are informed of this by means of a sound. This is different to the sound emitted during successful acquisition. You can adjust the volume in configuration.

---

**IMPORTANT**

**Registration error**

Should a registration error occur, you must return to another acquired point.

To start with, practice this procedure on the model and then on intraoral areas.

- Move the CEREC Omnicam to a position where a successful acquisition was taken. A point that has already been acquired in the occlusal area is best.
  - You will be able to hear the sound for registered acquisitions.

- Continue the acquisition.
Divide the acquisition into four consecutive sequences:
1. Occlusal
2. Buccal
3. Lingual
4. Proximal

7.4.1 Occlusal scan

**Important:** Ensure that the distance between the output window of the CEREC Omnicam and the scanned surface is observed. The distance must be between 0-15 mm (ideally: 5 mm). The camera does not rest on the teeth or the gums. If the distance is too great, no data will be obtained.

1. Move the CEREC Omnicam to the starting position. For this purpose, the CEREC Omnicam is in the occlusal view of the tooth, which is next to the prepared tooth in the distal direction.
2. Scan in the mesial direction. To do so, slowly move the CEREC Omnicam in the occlusal direction from the distal-positioned tooth over the prepared tooth to the mesial-positioned tooth.

With full jaw acquisitions, the scan sequence is different for the transition to anteriors. Scanning begins with the lingual and labial areas, before moving on to the incisors.
7.4.2 **Buccal scan**

✔ The CEREC Omnicam is on the adjacent tooth, in the mesial direction to the preparation.

1. Rotate the CEREC Omnicam between 45° to maximum 90° toward the buccal.
2. Guide the CEREC Omnicam over the entire buccal distance in the distal direction over the prepared tooth.
   With full jaw acquisitions, limit the buccal scan to no more than a quadrant.

Ensure that the CEREC Omnicam is held like a flute during buccal scans. Do not tilt it vertically to the direction of motion.

**Tip:** Practice guiding the camera between 45° and 90°.

7.4.3 **Lingual scan**

✔ The CEREC Omnicam is on the tooth that is positioned next to the preparation in the distal direction.

1. Rotate the CEREC Omnicam from 90° in the buccal direction to around 45° to maximum 90° in the lingual direction on the other side.
2. Guide the CEREC Omnicam over the entire lingual distance in the mesial direction over the prepared tooth.
7.4.4 Approximal surface scan

Scan the approximal surfaces of the prepared tooth.

➢ Move the CEREC Omnicam in the occlusal direction to the prepared tooth. Acquire the approximal surfaces in the distal and mesial direction by using a wave motion in the occlusal, buccal, and lingual direction over the prepared tooth.

To do so, tilt the surface by 15° in the distal and mesial direction to gain a better view of the approximal contacts.

Notes:

- Remove the soft tissue.
- Cut away the moveable gingivae, so that only 1-2mm gingivae remains around the tooth.
- When performing this activity, be careful not to accidentally cut out any areas that e.g. are located behind the model or are otherwise cut away from the line.
- This cut must be completed during the ACQUISITION phase using the cutter.

7.4.5 Buccal registration

A buccal registration can be used to establish contact with the antagonist.

✔ The jaw with the preparation is scanned.

1. Scan the occlusal, buccal and lingual view of the antagonist (see the section “Occlusal scan [→ 46]”, “Buccal scan [→ 47]” and “Lingual scan [→ 47]”).

2. Perform a buccal scan of the bite block prior to completing the registration. This buccal scan should be carried out close-up to the preparation. To acquire sufficient geometry, capture the teeth of the upper and lower jaw as well as 5 mm of the respective gingival areas.
7.4.6 **Scanning the quadrant and jaw**

The following scan regulation applies for the acquisition of a complete quadrant or jaw arch.

The first (fourth) quadrant is scanned up to the opposite second front tooth by moving the camera in parallel along the jaw arch.

**Start the scanning process**

➢ Position the camera occlusally above the last tooth on the right, to start the scanning process.
1. **Start as indicated above, on the occlusal surface of the right terminal tooth**, and scan it occlusally. Tilt the camera by 45° in a palatinal direction (oral) and guide it from the distal to the mesial.

2. Tilt the camera another 45° in a palatinal direction (oral) and move it in a distal direction.

3. Tilt the camera by 90° on to the occlusal surface and move it in a mesial direction.

4. Tilt the camera in a 45° buccal direction and move it back towards the distal.

5. Then tilt the camera a further 45° in a buccal direction to a total of 90° and move it in a mesial direction again.
The following scan sequence is implemented for the opposite second (third) quadrant:

1. **Start by placing the device on the occlusal surface of a premolar, that has already been scanned**, and guide the camera palatally (orally) at a mesial tilt of up to 90° across the lingual surface of the front teeth in a distal direction towards the terminal tooth.

2. Slight tilt the camera by 45°, so that the camera is only tilted by 45° in a palatinal direction (oral) moving from the distal and back to the mesial to the front teeth.

3. Once you have reached the area of the front tooth, guide the camera 45° to the buccal side and tilt the camera by 45° from the mesial to the distal direction.

4. Once you have reached the distal, tilt the camera by another 45° (total of 90°) further towards the buccal and guide the camera from the distal back to the mesial direction.

5. Once you have reached the area of the front tooth, tilt the camera in an occlusal direction and guide the camera mesially to the occlusal surfaces right to the back distal molars.

Notes:
- Remove the soft tissue.
- Cut away the moveable gingivae, so that only 1-2mm gingivae remains around the tooth.
7.5 Software for the CEREC Omnicam

7.5.1 Cut out model areas

With the "Cut" function, you can should be able to cut out model areas. These can be areas in which parts of cotton rolls or cheeks were unintentionally acquired.

When performing this activity, be careful not to accidentally cut out any areas that e.g. are located behind the model or are otherwise cut away from the line.

You can execute another scan of the area which you have cut out using the crop function. To do so, close the tool window, by clicking on the top right corner. You can refill the area with another acquisition.

Undoing and resetting

Using the "Undo" button in the tools, you can undo the last change.

With the "Reset" button in the tools you can reset changes that were made with the tool.

NOTICE

Snapping in the lock

When putting the camera back, ensure that the cradle lock is engaged (see "Controls and functional elements [→ 31]" Point E).

7.5 Software for the CEREC Omnicam

Further information on using the CEREC SW can be found in the operator's manual (REF: 63 61 120).

In the "Adjusting the CEREC Omnicam" section in these Operating Instructions, you can find additional information on adjusting the CEREC Omnicam.
7.5.2 **Acquisition assistance**

The acquisition assistance provides help during the acquisition process.

**Activate acquisition assistance**

1. Open the "Configuration" > "Devices" > "Omnacam" dialog.
2. Check "Acquisition Hints".
3. To deactivate the acquisition assistant, remove the check mark.

**Function**

The acquisition assistant shows the areas which have not been linked sufficiently. In extreme cases, this can lead to inaccuracies. The acquisition assistant does not identify data gaps in the model.

You can find further information about the acquisition assistant in the software user handbook.
8 Service

IMPORTANT

If the PC, CEREC Omnicam, or other components are damaged, the system must be immediately decommissioned. Contact the customer service department for your dealer.

NOTICE

Regular inspection

Some countries have legal regulations which require regular safety inspections of electrical devices or systems by the operator.

Sirona would like to draw your attention to the fact that a so-called "retest" (repeat test) must be carried out for the CEREC acquisition unit every three years at the latest. In addition, this retest also must be performed following every repair or retrofit of components such as the PC, the PC power supply, the camera and the camera cable.

NOTICE

Annual maintenance performed by trained technical personnel is recommended.

8.1 Care, cleaning agents, and disinfectants

NOTICE

Approved care, cleaning, and disinfecting agents

Use only care, cleaning and disinfecting agents approved by Sirona!

Authorized care, cleaning agents, and disinfectants

NOTICE

Not for LCD monitors

Do not use the agents listed in the following for the LCD monitor!

You can use these agents for all other surfaces, including the camera.

Not approved in the USA

| Alpro   | • Minuten Spray classic  |
|         | • Minuten Wipes          |
|         | • Plasti Sept            |
|         | • Plasti Sept Wipes      |
| Merz    | • Pursept-A              |
| Dürr    | • FD 312                 |
8.2 Care and cleaning of the monitor screen

Cleaning

The monitor screen can be wiped off with a soft cloth.

**NOTICE**

Never spray the monitor screen with a disinfectant or cleaning agent!

8.3 Surfaces (without monitor)

Surfaces include the camera, the camera cradle, and the keyboard.

**NOTICE**

Use only care, cleaning agents, and disinfectants which have been approved by Sirona (see Care, cleaning agents and disinfectants)!

Cleaning

**NOTICE**

Never use corrosive cleaning agents, wax or solvents.

Remove any dirt and disinfectant residues regularly using a mild commercial cleaning agent.

Do not use any colored cloths for cleaning, since they may cause discoloration of the surfaces, e.g. in combination with disinfectants!

**Protection against medicaments**

Due to their high concentrations and the substances they contain, many medicaments can dissolve, etch, bleach or discolor surfaces.

**NOTICE**

The only way to prevent damage is to wipe off medicaments immediately with a damp cloth and a cleaning agent!
8.4 Tablet

**CAUTION**

The tablet must not be connected during use or when it is within the patient environment. It must not be charged during this time.

When using the tablet, please ensure that the charge level is sufficient to complete an entire CEREC application. During the treatment, the tablet must not be charged in the vicinity of the patient in the treatment unit.

**CAUTION**

Using protective sleeve

Please ensure that the tablet is covered with a protective cover during treatment.

Protective covers help to keep blood, saliva, or dirt away from the surface of the tablet. Crosstex is one of the suppliers of protective covers under the name iBarrier (see www.crosstex.com). Protective sleeves from the manufacturer are included with CEREC AF/AI.

**NOTICE**

If a tablet is used, position it so that there is no risk of damage occurring, for example on a flat surface.

8.5 Calibrating CEREC Omnicam

The measurement procedure used by the system requires the use of a calibrated CEREC Omnicam. The CEREC Omnicam is factory-calibrated. The calibration set supplied with the CEREC Omnicam is available for the calibration process.

Recalibrate the CEREC Omnicam in the following cases:

- following transport (shaking stress) or during first commissioning,
- after storage in unheated or un-air-conditioned rooms (temperature differences exceeding 30°C)
- with temperature differences of over 15°C between the last calibration and operation
- In general, carrying out a calibration is the correct process in the event of errors in the acquisition process (such as poor image quality or the lack of a 3D preview). In many cases, the errors can be corrected in doing so.
Starting calibration

1. In the software, navigate to the system menu and click on the “Configuration” button.
2. Click on the “Devices” button.
3. Click on the “Omnicam” button.
4. Click on the “Calibrate” button.
   - The camera view is displayed in one window.
5. Enter the 8-digit Sirona ID. You can find this ID on the sticker on the calibration set.

Calibrate the camera

1. Remove the protective cap from the calibration set.
2. Mount the calibration set on the tip of the camera until it locks into place.
3. Secure the CEREC Omnicam in the calibration set using one hand. Ensure that the external calibration set screw is fully screwed in a clockwise motion until it gently locks into place.
4. Click on the “OK” button.
   - The measuring process starts.
   - The software prompts you to proceed to the next latching.
5. Turn the screw counter-clockwise until you reach the next latching point.
6. Click on the “OK” button. In doing so, ensure that the CEREC Omnicam does not move.
   - The software confirms the calibration process.
   - The software prompts you to proceed to the next latching.
7. Execute steps 5 and 6 a total of 11 times.
   - The software provides status updates on the calibration and informs you once the procedure is complete.
   - You will be prompted to measure the position of the exit window.
Measuring the position of the exit window

1. Mount the bottom side of the calibration set to the tip of the camera.
2. Click on the "OK" button.
   - The calibration process is continued.
   - Once the calibration is complete, a message is displayed indicating this.
3. Confirm the message by clicking the "OK" button.
   - The CEREC Omnicam is calibrated.

Error message during calibration

The software indicates if an error occurs during calibration. If the calibration process resulted in errors, restart the process.

End calibration

✓ The software indicates that the calibration was completed successfully.
➢ Click on the "OK" button.
   - The CEREC Omnicam is calibrated.
8.6 CEREC Omnicam - maintenance and care

Components of the Omnicam

<table>
<thead>
<tr>
<th>A</th>
<th>Press detent to release</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Mirror sleeve</td>
</tr>
<tr>
<td>C</td>
<td>Sapphire glass (coated)</td>
</tr>
<tr>
<td>D</td>
<td>Camera window</td>
</tr>
<tr>
<td>E</td>
<td>Calibration set</td>
</tr>
</tbody>
</table>

The CEREC Omnicam is a very sensitive optical device and must therefore be handled with the utmost care. Protect the coated sapphire glass and the camera window against scratches and clean them with a lint-free cloth and ethanol (commercially available cleaning alcohol).

Removing the mirror sleeve

1. Press the mirror sleeve against the camera body.
2. Press detent A.

**NOTICE**

Risk of damaging the camera window or the coated sapphire glass.

Push the mirror sleeve straight toward the front; do not tilt it.

3. Pull off the mirror sleeve.

Disinfecting

**NOTICE**

Do not spray the CEREC Omnicam or immerse it in cleaning agents or disinfectants!

Disinfect the CEREC Omnicam (including mirror sleeve) with a cloth soaked in a cleaning agent, as specified in section "Care, cleaning agents, and disinfectants [→ 54]".
Sterilizing

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the CEREC Omnicam accidentally falls down, check to make sure that the camera window and coated sapphire glass are not damaged. If the CEREC Omnicam has been damaged, it must no longer be used on patients. The CEREC Omnicam must be recalibrated.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not sterilizable! Do not under any circumstances sterilize the CEREC Omnicam or the video cable!</td>
</tr>
</tbody>
</table>

The mirror sleeve can be sterilized with hot air (180°C, 30 min) (not in the autoclave!).

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>For markets where the RKI* guidelines are to be observed The mirror sleeve is classified as a &quot;semicritical medical device A&quot; according to RKI guidelines and therefore does not have to be autoclavable. *RKI=Robert Koch Institute, Berlin (Germany).</td>
</tr>
</tbody>
</table>

Refitting the mirror sleeve

<table>
<thead>
<tr>
<th>NOTICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk of damaging the camera window or the coated sapphire glass. ➢ The mirror sleeve must not come into contact with the camera window. ➢ Push the mirror sleeve straight toward the camera body; do not tilt it. ➢ Carefully refit the mirror sleeve until it locks in place.</td>
</tr>
</tbody>
</table>
8.7 Hot air sterilization

**NOTICE**

Hot air sterilization and high-level disinfection must not be combined. Make sure that no water gets into the camera when rinsing the mirror sleeve.

The process for hot air sterilization is as follows:

1. Cleaning process after using the CEREC Omnicam Camera: Wipe the camera with the appropriate mirror sleeve so that the superficial impurities cannot harden and stick to the surface of the mirror sleeve. Use a lint-free cloth which has first been soaked in one of the cleaning products listed in the “Care, cleaning agents, and disinfectants [→ 54]” section. Rinse the exterior of the mirror sleeve.

2. Remove the mirror sleeve from the CEREC Omnicam. See section “CEREC Omnicam - maintenance and care [→ 59]”.

3. The mirror sleeve can be sterilized using hot air (180 °C, 30 min). Please ask your dealer for deals on hot air sterilizers. Place the mirror sleeves in the hot air sterilizer and follow the manufacturer’s instructions.

4. Carefully re-attach the mirror sleeve and allow it to lock in place. See section “CEREC Omnicam - maintenance and care [→ 59]”. 
8.8 High-level disinfection

NOTICE

Hot air sterilization and high-level disinfection must not be combined. Make sure that no water gets into the camera when rinsing the mirror sleeve.

The complete process for high-level disinfection (HLD) is as follows:

1. Cleaning process after using the CEREC Omnicam Camera: Wipe the camera with the appropriate mirror sleeve so that the superficial impurities cannot harden and stick to the surface of the mirror sleeve. Use a lint-free cloth which has first been soaked in one of the cleaning products listed in the "Care, cleaning agents, and disinfectants [→ 54]" section. Rinse the exterior of the mirror sleeve.

2. Remove the mirror sleeve from the CEREC Omnicam. See section "CEREC Omnicam - maintenance and care [→ 59]."

3. Ensure that no particle contamination or fluids penetrate the inside of the mirror sleeve.

4. Use the following disinfectants for the high-level disinfection:
   ProCide-D® Plus or CIDEX® OPA.

CAUTION

Disinfectants: ProCide-D Plus or CIDEX® OPA – Observe the manufacturers' safety indications!

5. Place the mirror sleeve upright in the solution and ensure that no fluid penetrates the inside of the mirror sleeve. Immerse the mirror sleeve for 90 minutes in ProCide-D® Plus solution or alternatively 12 minutes in 0.55% CIDEX® OPA solution.

NOTICE

Ensure that the mirror sleeve is placed upright in the disinfectant so that the solution cannot penetrate the inside.

6. Rinse the exterior of the mirror sleeve (also observe the directions for use of disinfectant). Ensure that no water penetrates the mirror sleeve.

7. Dry the mirror sleeve using a soft, lint-free cloth.

8. Carefully re-attach the mirror sleeve and allow it to lock in place. See section "CEREC Omnicam - maintenance and care [→ 59]."

Please refer to the additional information in the relevant literature.

A HLD set to support the HLD processes can be ordered from Sirona with REF 63 46 907.

To use the HLD set follow the instructions in the "Operating Instructions for CEREC Bluecam and CEREC Omnicam, care and HLD (high-level disinfection)" available at our online portal for Technical Documentation (http://www.sirona.com/manuals).

- REF 63 09 863 (USA only)
- REF 62 82 839 (not for USA)
9 Disposal

In accordance with Directive 2012/19/EU and national disposal regulations regarding old electrical and electronic devices, please be advised that such items must be disposed of in a special way within the European Union (EU). These regulations require environmental friendly usage/disposal of old electrical and electronic devices. Such items must not be disposed of as domestic refuse. This has been expressed using the icon of the “crossed out trash can” since March 24, 2006, amongst other methods.

Disposal procedure

We feel responsible for our products from the first idea to their disposal. For this reason, we give you an option to return our old electronic and electrical devices.

If you wish to dispose of your devices, please proceed as follows:

In Germany

To initiate return of the electrical device, please send a disposal request to enretec GmbH. You have the following options here:

- Use the “Returning an electrical device” button under the “eom” menu item on the enretec GmbH homepage (www.enretec.de).
- Alternatively, you can also contact enretec GmbH directly.

enretec GmbH
Kanalstraße 17
16727 Velten
Tel.: +49 3304 3919-500
E-Mail: eom@enretec.de

In accordance with the national disposal regulations regarding old electrical and electronic devices (ElektroG), as the manufacturer, we assume the costs for disposing of the electrical and electronic devices in question. Disassembly, transport and packaging costs shall be borne by the owner/operator.

Prior to disassembly / disposal of the product, it must be fully prepared (cleaned / disinfected / sterilized).

If your unit is not permanently installed, it will be collected from the practice. If it is permanently installed, it will be picked up curbside at your address by appointment.

Other countries

For country-specific information on disposal, contact your local dental dealers.
10 PC Diagnostic Tool

10.1 Start diagnostic tool

<table>
<thead>
<tr>
<th>Test</th>
<th>Suitable for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Diagnostics</td>
<td>Suitable for the user, in order to check the PC components.</td>
</tr>
<tr>
<td>Technician Diagnostics</td>
<td>Suitable for the technician, in order to check the PC components.</td>
</tr>
<tr>
<td>Sirona Windows Diagnostics</td>
<td>Windows Stress Test, in order to test the PC at permanent load.</td>
</tr>
</tbody>
</table>

Tip: If one of the following steps does not work, further steps can be found in the Service Manual.

✔ The PC is switched off.

1. Switch on the PC.
2. Repeatedly press the "F11" or "F8" button (in V2.2.1 - V2.2.3) until the PC switches to the boot menu.
3. Insert the diagnostics tool CD into the drive.
4. Select the "P3: TSSTcorp CDDVDW ..." menu option.
5. Confirm your selection with the “Return” key on the keyboard.
   Tip: After one minute, if none of the arrow keys have been pressed, the “Customer Diagnostics” test starts automatically.
6. Select the test using the arrow keys.
7. Confirm your selection with the “Return” key on the keyboard.
   The test starts.
10.2 Test procedure

10.2.1 Customer Diagnostics

✔ You have started the "Customer Diagnostics" test and the system configuration is displayed.

1. Using the information in the system configuration, check whether the system corresponds to the default settings. You can scroll up and down using the arrow keys.
   Tip: The test starts automatically after 3 minutes if you do not press an arrow key.
2. Press the "Esc" key on the keyboard.

✔ The test starts. The entire test run takes approx. 30 minutes.
1. Perform the separate test for the supply board.
2. Perform an image restore with the restore set for troubleshooting.
3. Check the service instructions for other possible fault sources.

Test result: Fail

An error was found on the PC-specific hardware. Replacing the PC component or the PC may be required.
An image restore is not advisable.
1. Check to find out which components did not pass the test.
2. Write down the defective test number and, if available, the error code and inform the technician of this as soon as possible.
3. Carry out the appropriate steps in the chapter entitled Troubleshooting [→ 70].

End "Customer Diagnostics" test

1. Remove the PC diagnostic tool CD from the drive.
2. Switch the PC off by briefly pressing the on/off key.
10.2.2 Technician Diagnostics

✔ You have started the "Technician Diagnostics" test and the system configuration is displayed.

1. Using the information in the system configuration, check whether the system corresponds to the default settings. You can scroll up and down using the arrow keys.
   **Tip:** The test starts automatically after 3 minutes if you do not press an arrow key.

2. Press the "Esc" key on the keyboard.

✔ The test starts. The entire test run takes approx. 30 minutes.

✔ The result, i.e. "Pass" or "Fail", appears at the end of the test (see sections entitled "Test result: Pass" or "Test result: Fail").
3. On completion of the test, press any key to go on to the test dialog. **Tip:** You can scroll to the individual test steps using the arrow keys. The corresponding result is shown in front of each test step.

4. To end the test, restart the PC.

**Test result: Pass**

No errors were found on the PC-specific hardware. Replacing the PC component or the PC is not advisable.

1. Perform the separate test for the supply board.
2. Perform an image restore with the restore set for troubleshooting.
3. Check the service instructions for other possible fault sources.

![Test result: Pass](image)

**Test result: Fail**

An error was found on the PC-specific hardware. Replacing the PC component or the PC may be required.

An image restore is not advisable.

1. Check to find out which components did not pass the test.
2. Carry out the appropriate steps in the chapter entitled Troubleshooting [→ 70].
3. Note the number of the failed test and the error code if available. Attach this information to the returned PC when replacing a PC.

**End "Technician Diagnostics" test**

1. Remove the PC diagnostic tool CD from the drive.
2. Switch the PC off by briefly pressing the on/off key.
10.2.3 Sirona Windows Diagnostics

General

The “Sirona Windows Diagnostics” test loads the PC-specific components simultaneously over a long period of time. This period of time is determined by the user.

As a result of this load

- the temperature in the PC is significantly increased compared with normal operation.
  A temperature malfunction or any existing faults are thereby detected.

- Thanks to the temporal, unlimited test phase, sporadically occurring faults are more likely to be detected.

Tip: Only conduct the test if at least one of the “Customer Diagnostics” or “Technician Diagnostics” tests has been completed with a “pass” and without errors.

Performing the test

Tip: Allow the “Sirona Windows Diagnostics” test to run for at least 1 hour. For optimum results, allow the test to run overnight.

✔ You have started the “Sirona Windows Diagnostics” test and Windows starts in the test environment. The “Sirona Windows Diagnostics” test starts automatically.
➤ Check the result in the "Windows Stress Test" window.
   Tip: You may have to rearrange the windows to be able to see the "Windows Stress Test" window.

Test result: Pass
No errors were found on the PC-specific hardware. Replacing the PC component or the PC is not advisable.

Test result: Fail
An error was found on the PC-specific hardware. Replacing the PC component or the PC may be required. An image restore is not advisable.
1. Check the "Windows Stress Test" window for those components that did not pass the test.
2. Carry out the appropriate steps in the chapter entitled Troubleshooting [→ 70].

Ending the "Sirona Windows Diagnostics" test
➤ Click the "Stop" button.
   ◁ The individual test windows close.
   ◁ The PC is switched off.

10.3 Troubleshooting
The recommended procedure is as follows. If troubleshooting and/or a component replacement cannot eliminate the fault, replace the PC.
In this case, specify which test was defective when returning the defective PC.
## 10.3.1 Customer Diagnostics & Technician Diagnostics

<table>
<thead>
<tr>
<th>Test</th>
<th>Test description / condition</th>
<th>Action if problems occur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Script</td>
<td>Control command without a test function</td>
<td>n.a.</td>
</tr>
<tr>
<td>Activity is rotating cursor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test CPU-1</td>
<td>The CPU test checks the control, address, data, and flag register of the system processor.</td>
<td>➢ Replace the PC.</td>
</tr>
<tr>
<td>Test CPU-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test NPU-1</td>
<td>When testing the floating point unit (NPU, Numeric Processing Unit) the system's mathematics processor and the interface between the two functions are checked.</td>
<td></td>
</tr>
<tr>
<td>Test NPU-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Timer</td>
<td>In this test a number is loaded into the three timer channels and then a check is made on whether the countdown takes place at the right speed in the individual channels (not too fast or too slow).</td>
<td>➢ Replace the PC.</td>
</tr>
<tr>
<td>Test Keyboard Controller</td>
<td></td>
<td>➢ Replace the PC.</td>
</tr>
<tr>
<td>Test INT #1</td>
<td>The test tool checks the system interrupt controller. These controllers contain the interrupt mask register, in-service register, interrupt request register, and all of the interrupt request lines. All channels on the interrupt controllers are checked for problematic, incorrect, or defective interrupts.</td>
<td>➢ Replace the PC.</td>
</tr>
<tr>
<td>Test INT #2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test DMA #1</td>
<td>During the test all of the registers and status ports of the two DMA controllers are checked. The DMA controller is extremely important for system operation, as it has separate channels which the E/A devices can use to directly access the system RAM. This enables high data transfer rates without using the microprocessor.</td>
<td>➢ Replace the PC.</td>
</tr>
<tr>
<td>Test DMA #2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test SM Bus</td>
<td>This test checks the SMBus. This bus is mainly used in systems to manage the battery and sensor. The SMBus is also used to access the SPD data on the memory modules.</td>
<td>➢ Replace the PC.</td>
</tr>
<tr>
<td>Test</td>
<td>Test description / condition</td>
<td>Action if problems occur</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Test WDC_TYP HDD Short Self-Test                | A range of destruction-free tests on the hard drives installed in a system are conducted with these functions. Controller search and read tests are conducted to check the overall condition of a drive. | 1. For the CEREC AF / CEREC AI / CEREC AF Connect / CEREC AI Connect with Omnicam check the setting of the ASM1061 Storage Controller.  
2. Check the hard disk's SATA line.  
3. Check the hard disk's power supply.  
4. Exchange the hard drive including the hard drive cable. |
| Test 3 Minute(s) Drive #1 Size of HDD RndRd      | Use this function to test the installed CD-ROM-/CDR/W-/DVD drive. The test checks the test ROM directly; no software drivers have to be loaded. The test medium is the CD test tool. | 1. Check the CD for scratches or other dirt.  
2. Check the SATA line between the PC and DVD drive.  
3. Check the power supply line between the PC and DVD drive.  
4. Replace the DVD drive.  
5. Check the SATA connection from the mainboard to the SATA slot sheet in the PC.  
6. Check the connection of the power supply from the mains power unit to the SATA Slot sheet in the PC. |
<p>| Test ATAPI #1 00000000-000050000                  | USB test (at least 1 USB human device must be connected; for the AC this is usually a keyboard, trackball, camera, and UPS mains supply). | ➢ Replace the PC. |
| Test NET #1 SelfTest                             | This test provides an internal check on all of the network cards.                           | ➢ Replace the PC. |
| Test Base Memory                                 | The &quot;Base RAM Test&quot; provides a check on the base RAM on the system board (up to 640 KB).   | ➢ Remove the memory and then re-insert it. |
| Test Cache Memory                                | This function provides a test on the low-level memory data and the low-level addresses in the external system cache in order to check its function. |                                                                 |
| Test Extended Memory                             | The &quot;Extended RAM Test&quot; provides a check on the extended RAM between 1 MB and 4 GB.        |                                                                 |
| Test Above 4 GB memory                           | The &quot;Above 4 GB Memory Test&quot; enables you to check the extended RAM in the range above 4 GB. |                                                                 |</p>
<table>
<thead>
<tr>
<th>Test</th>
<th>Test description / condition</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Test VGA RAM</td>
<td>This test checks the graphics memory installed in the graphics card that is currently active.</td>
<td>➢ Replace the graphics card.</td>
</tr>
<tr>
<td>Test VESA RAM</td>
<td>This test enables you to check the text and graphics modes supported by a VESA compatible graphics card.</td>
<td>➢ Replace the graphics card.</td>
</tr>
</tbody>
</table>
## 10.3.2 Sirona Windows Diagnostics

<table>
<thead>
<tr>
<th>Test</th>
<th>Test Description</th>
<th>Action if problems occur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor(s)</td>
<td>Continuous load and inspection of processor cores</td>
<td>➢ Replace the PC.</td>
</tr>
<tr>
<td>Motherboard testing</td>
<td>Continuous load and inspection of the motherboard functions</td>
<td>➢ Replace the PC.</td>
</tr>
</tbody>
</table>
| Stress test drive  | Continuous load and inspection of the hard disk                                   | 1. Check the hard disk's SATA line.  
2. Check the hard disk's power supply.  
3. Exchange the hard drive including the hard drive cable. |
| Memory testing     | Continuous load and inspection of the memory                                      | ➢ Remove the memory and then re-insert it.      |
| 2D test            | Continuous load and inspection of 2D properties of the graphics card               | ➢ Replace the graphics card.                    |
| Multimedia testing | Continuous load and inspection of 3D properties of the graphics card               | ➢ Replace the graphics card.                    |
| USB testing        | USB test (at least one USB human device must be connected, such as a keyboard, trackball, camera, or UPS mains supply) | ➢ Replace the PC.                               |