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SIVISION 2/3

Service Manual

English

IMPORTANT:

- **In case of faults which you are unable to eliminate with the help of this manual, please contact our Customer Service Center.**

- **It is essential that you take this Service Manual along with you on every customer call.**

Furthermore, you must always have the spare parts list and wiring diagrams with you as well.

You can order additional copies of this Service Manual under the

- Order number **59 07 097** from our department **DZL 1** in Bensheim.
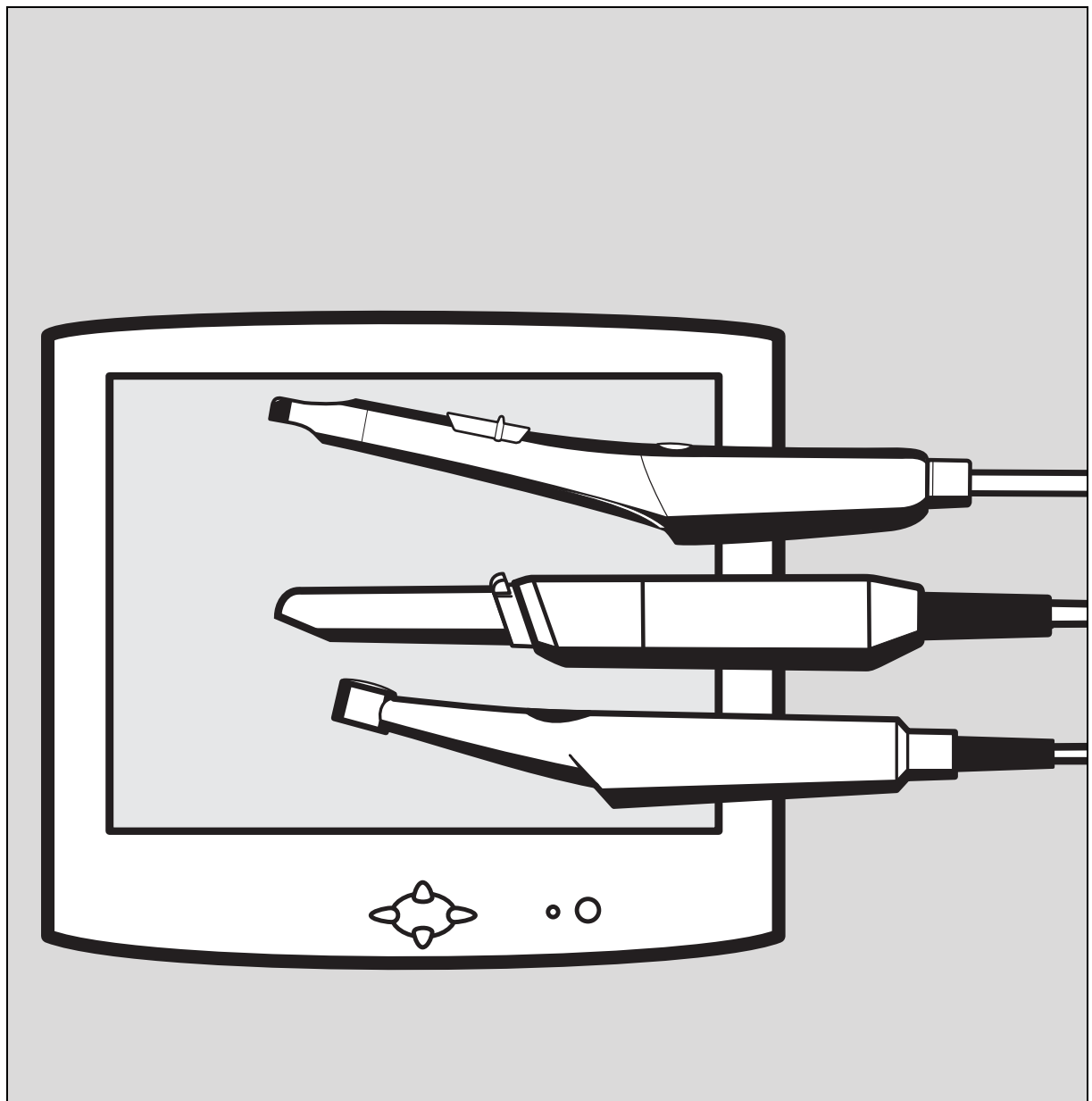
See reverse side of manual for address.

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The Dental Company

SIVISION 2/3

Service Manual

English

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1 **Important information**

1.1 Symbols

C1$^+$ dentist element

C2$^+$ dentist element

C3$^+$ dentist element

C4$^+$ dentist element
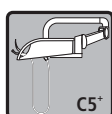
C5$^+$ dentist element

M1$^+$ dentist element
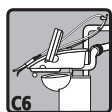
C6 dentist element

C8, C8$^+$ dentist element
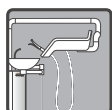
ProFeel dentist element

Assistant element

Patient chair

ProFeel patient chair
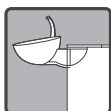
Water unit
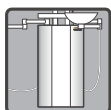
ProFeel water unit
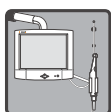
Kompakt

Monitor
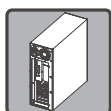
PC connection

1.2 Abbreviations

AE	Dentist element
AK	Connection box
AP	Dentist panel
COM	Serial interface
PCB	Printed circuit board
FS	Pedal (foot switch)
FT	Foot button
GND	Ground
HE	Assistant element
HP	Assistant element control
HW	Hardware
KB	Analog camera PCB
KL	Holder
L	Cable
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MO	Monitor
PC	Personal Computer
RGB	Electrical transmission possibility for video images, i.e. image signal split according to the basic TV colors of red, green and blue.
SDI	Sirona Dental Interface (electrical, pneumatic, hydraulic plug connection)

ST	Patient chair
S video	This is an image signal split into color and brightness. Compared to composite video information, which is sent through a single line, this signal transmission facilitates images with less noise and higher definition. S video images have almost the same image quality as RGB images. The color depth is 16 million colors (True Color).
SW	Software
VGA	In this Service Manual, the RGB connection between PC and treatment center monitor is designated as VGA. It does not represent the resolution of the image signal. Sirona also uses the designation XGA instead of VGA frequently, e.g. XGA cable.
TR	Support arm
VAC	AC voltage
VDC	DC voltage
WE	Water unit
X	Connector
$+V_{iso}$	Galvanically isolated voltage

1.3 Overview

For the sake of completeness, Sivision 1 applications are also described in the table, provided they are installed in C Line and ProFeel systems.
The serial numbers (SNs) refer to the SNs of the dental units.

Overview of SIVISION 2/SIVISION 3/second monitor

	Treatment center version			Version		PC connection		
Device	Camera	Version designation	Camera location	Sivision 1/2/3 or second monitor	Siucom unit selection	COM port (RS-232 cable)	S video connection	VGA connection
C1-96[a]	SIROCAM 3/C		Dentist element	S3	C1	SVC PCB	SVC PCB	SVC retaining plate
C1-96[b]	SIROCAM 2		Dentist element	S3	C1	SVC PCB	SVC PCB	SVC retaining plate
C1-96[a]	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
C1-96[b]	SIROCAM 2	SIVISION 1	Monitor	S1	SIROCAM Box	AK interface	AK interface	AK interface
C1[+a]	SIROCAM 3/C		Dentist element	S3	C1	SVC PCB	SVC PCB	SVC retaining plate
C1[+b]	SIROCAM 2		Dentist element	S3	C1	SVC PCB	SVC PCB	SVC retaining plate
C1[+a]	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
C1[+b]	without	Second monitor	---	sm	C1	SVC PCB	---	SVC retaining plate
C2	SIROCAM 2	SIVISION 1	Monitor	S1	SIROCAM Box	AK interface	AK interface	AK interface
	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
C2[+], SN $\leq$ 69.000	SIROCAM 2		Dentist element	S2	C2	CJ PCB	On retain. plate above 12 V power supply	On retain. plate above 12 V power supply
	SIROCAM 2		Dentist element	S3	C2	CJ PCB	SVI PCB	

Overview of SIVISION 2/SIVISION 3/second monitor

Device	Treatment center version			Version	PC connection			
	Camera	Version designation	Camera location	Sivision 1/2/3 or second monitor	Siucom unit selection	COM port (RS-232 cable)	S video connection	VGA connection
C2⁺, M1⁺	SIROCAM 3/C		Dentist element	S3	C1	SN ≤ 69.999 SVI board, SN ≥ 70.000 SVC board	SN ≤ 69.999 SVI board, SN ≥ 70.000 SVC board	SN ≤ 69.999 SVI retaining plate, SN ≥ 70.000 SVC retaining plate
	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
	without	Second monitor	---	sm	C2	CJ PCB	---	On retain. plate above 12 V power supply
C3	SIROCAM 2	Sivision 1	Monitor	S1	SIROCAM Box	AK interface	AK interface	AK interface
	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
C3⁺	SIROCAM 3/C		Dentist element	S3	C3	CJ PCB	SN ≤ 69.999 SVI board, SN ≥ 70.000 SVC board	SN ≤ 69.999 SVI retaining plate, SN ≥ 70.000 SVC retaining plate
	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
	SIROCAM 3/C		Assistant element	S3	SIROCAM 3/C direct	SVI PCB	SN ≤ 69.999 SVI board, SN ≥ 70.000 SVC board	SN ≤ 69.999 SVI retaining plate, SN ≥ 70.000 SVC retaining plate
	without	Second monitor	---	sm	C3	CJ PCB	---	On retain. plate above 12 V power supply
C4	SIROCAM 2	Sivision 1	Monitor	S1	SIROCAM Box	AK interface	AK interface	AK interface
	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
C4⁺	SIROCAM 3/C		Dentist element	S3	C4	CJ PCB	SN ≤ 69.999 SVI board, SN ≥ 70.000 SVC board	SN ≤ 69.999 SVI retaining plate, SN ≥ 70.000 SVC retaining plate
	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
	SIROCAM 3/C		Assistant element	S3	SIROCAM 3/C direct	SVI PCB	SN ≤ 69.999 SVI board, SN ≥ 70.000 SVC board	SN ≤ 69.999 SVI retaining plate, SN ≥ 70.000 SVC retaining plate
	without	Second monitor	---	sm	C4	CJ PCB	---	On retain. plate above 12 V power supply
C5⁺	SIROCAM 3/C		Dentist element	S3	C4	CJ PCB	KA PCB	KA retaining plate
	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
	SIROCAM 3/C		Assistant element	S3	SIROCAM 3/C direct	SN ≤ 69.999 SVI board, SN ≥ 70.000 SVC board	SN ≤ 69.999 SVI board, SN ≥ 70.000 SVC board	SN ≤ 69.999 SVI retaining plate, SN ≥ 70.000 SVC retaining plate
	without	Second monitor	---	sm	C4	CJ PCB	---	On retain. plate above 12 V power supply

Overview of SIVISION 2/SIVISION 3/second monitor

Device	Camera	Version designation	Camera location	Sivision 1/2/3 or second monitor	Siucom unit selection	COM port (RS-232 cable)	S video connection	VGA connection
C6, C8, C8+	SIROCAM 3/C		Dentist element	S3	SIROCAM 3/C direct	SVI PCB	SVI PCB	SVI retaining plate
	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	KA retaining plate
	without	Second monitor	---	sm	**PC control not possible**	---	---	On retain. plate above 12 V power supply
ProFeel	SIROCAM 2	Video application[c]	Monitor	S1	SIROCAM Box	SIROCAM Box	SIROCAM Box	Monitor
	SIROCAM 3/C		Dentist element	S3	SIROCAM 3/C direct	SVI PCB	SVI PCB	
	SIROCAM 3/C	Kompakt	Monitor	S3	SIROCAM 3/C direct	KA retaining plate	KA PCB	SVI retaining plate
	without	Second monitor	---	sm	**PC control not possible**	---	---	On retain. plate above 12 V power supply
SIRO-CAM Box	SIROCAM 2	SIROCAM Box	SIROCAM Box	S1	SIROCAM Box	SIROCAM Box	SIROCAM Box	Monitor

a   Software prerequisites:
     AK Version 3.2 or higher
     HP Version 2.5 or higher
     AJ Version 2.9 or higher
b   Software prerequisites:
     AK Version 3.0 or higher
     AP Version 2.3 or higher
     AJ Version 2.5 or higher
c   Former ProFeel video application (delivery up to 4/2001)

     The connections for SIROCAM C and SIROCAM 3 are identical.

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T h e   D e n t a l   C o m p a n y

2 SIVISION 2

C2⁺
ProFeel

2.1 **General service aids**

Image quality/image failure

- In case of poor image quality, the "Auto Setting" function of the monitor can bring about an improvement.
- A reduction of the PC graphics card "Refresh rate" setting to 60 Hz can also bring about an improvement in image quality. After display parameters on the PC graphics card have been changed, the "Auto Setting" function of the monitor should be activated once again.
- If no image appears on the monitor, you can connect the plug of the VGA cable of the treatment center located in the junction box to the VGA output of a notebook for test purposes.
- A second possibility of ruling out a possible cable problem is to replace the VGA cable run in the treatment center by a standard VGA cable between the PC/notebook and the monitor.

2.2 C2⁺ with SIROCAM 2 in the dentist element, second monitor C2⁺

2.2.1 Overview of PCBs/modules

MO
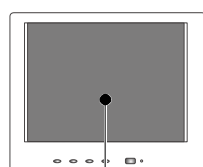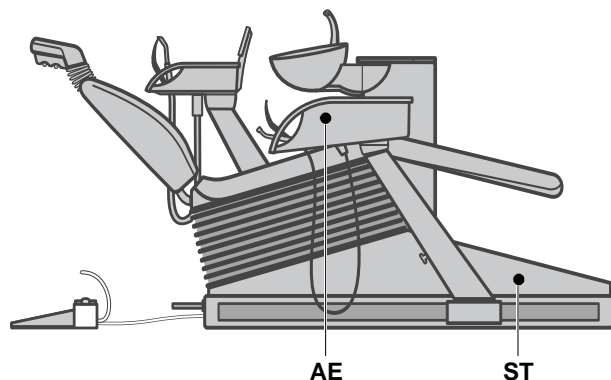
AE　　**ST**

Component	PCB/module	
Dentist element (AE)	ADX	= Unit electronics
	AKV	= Interface between camera unit and unit electronics
	KB	= Camera PCB
	SC2	= SIROCAM 2
Patient chair (ST)	CJ	= Chair PCB
	NM	= Monitor power supply
	VGA	= Video converter

Monitor (MO)

2.2.2 Dentist element with SIROCAM 2

The SIROCAM 2 is characterized by a high-quality optical system. The lighting is located in the dentist element and is run through a fiber-optic cable to the camera head.

SIROCAM

The Sirocam 2 is intended for the smile line range close to the teeth as well as for the full face range. The distance adjustment is continuously variable. The housing is made of titanium and the lens protective sleeve can be removed and sterilized. The image memory is not located in the camera, but on the VGA converter PCB.

To compensate for camera-specific influences on the color settings, data for the analog camera PCB KB is stored in the camera head.

Dentist element control ADX

ADX
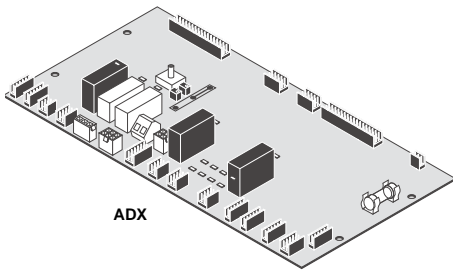
The unit electronics (PCB ADX) detects the presence of the optional camera system in the dentist element from an identifier resistor on PCB AKV. In this case, the camera is treated by the unit electronics in the same way as an instrument.

When removal of the camera is detected by the photoelectric light barrier at the holder, information about the active video system appears on the LCD panel, and the software allows switching between live image, white screen and still image (freeze) by means of the foot switch (or keyboard).

All the other instruments of the dentist element – apart from the Sprayvit – are blocked. If the camera is removed after an instrument has already been removed, it switches directly to live image mode; switching by means of the foot switch is then no longer possible.

Camera PCB KB

KB

LED
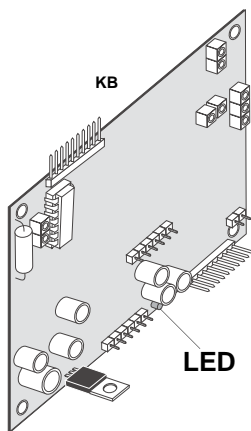
The video signal of the camera is processed to form a standard signal (S video) on PCB KB.

A red LED indicating the status of the communication to the camera head is located on PCB KB:

LED off	Camera OK
LED flashes	Camera head does not respond
LED on	Camera not working correctly or defective

PCB AKV

AKV
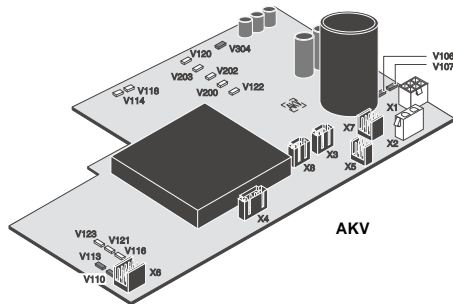
The interface between the camera unit and the unit electronics is PCB AKV, on which the galvanic isolation between patient circuit and the operating and/ or control voltages of the camera system is implemented. The camera/video functions are contacted to protective ground.

Functional units on PCB AKV

- **Switched-mode power supply for halogen lamp and fan:**

  The 16VAC from the transformer in the junction box are rectified on PCB AKV and converted into a supply voltage of approx. 11.5VDC for the fan and the halogen lamp.

  This switched-mode power supply is activated by a control signal from the logic unit of the AKV.

- **Power supply for the camera and its electronics with galvanic isolation:**

  A DC/DC converter with galvanic isolation converts the rectified input voltage of PCB AKV into a supply voltage of approx. 12VDC for the camera and the camera electronics. This converter is activated by a control signal from the logic unit of the AKV.

● **Processing of control signals/status signal of the unit electronics/ camera with galvanic isolation:**

The corresponding control and status signals between the unit electronics and the camera electronics are galvanically isolated from each other by optocouplers.

These signals are supplied to a logic unit, which for instance generates the run-on time of the fan, enabling of the above power supplies for halogen lamp and camera electronics, as well as safety shutdown of the halogen lamp on overtemperature in the lamp box.

● **Power supply for the logic unit:**

With the help of voltage regulators, the necessary supply voltages are generated for the two galvanically isolated logic units (+5 V and +5 Viso).

Description of the basic functions on PCB AKV:

● When the supply voltage is applied, the green LEDs V107 (+5 V) and V106 (+20 V) light up.

● The unit electronics (PCB ADX) sends a control signal to PCB AKV when the camera is removed and active (yellow LED V118 (CamIn) is on), and the power supply for the camera and its electronics is enabled (green LEDs V110 (+12 Viso) and V113 (+5 Viso) are on).

● When the camera is plugged in, the camera electronics send a "Camera OK" status signal back to PCB AKV (yellow LED V114 (StatusOut) is on), through which the switched-mode power supply for the halogen lamp and the fan is activated (green LED V304 (Lamp+) is on).

● With an active temperature sensor (overtemperature case, LED V200 (Temp. sens) is on), the halogen lamp is turned off, but the camera and fan functions remain as they are.

● When the camera unit is deactivated by the unit electronics, the fan continues running for a short time.

● The two control signals Control_1 and Control_2 are currently not used.

2.2.3 Patient chair

The video converter has the task of converting an S video signal into a VGA signal.

VGA video converter

The image memory function (switching between still/live image) as well as the white screen function are controlled through the control inputs on connector X2. If an S video signal is no longer present in live image mode, then the system switches to a black screen.

With a PC connection, the VGA converter is not required! The white screen is generated by the PC.
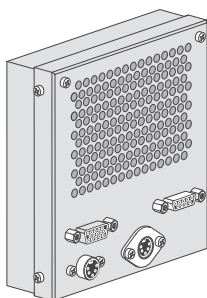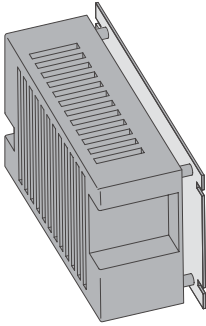
Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor and the VGA converter module.

CJ, chair PCB
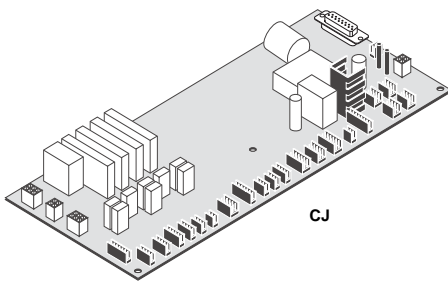
The white screen control as well as switching between still/live image of the converter is performed by PCB CJ (X80).

With a PC connection/second monitor, PCB CJ conducts the function key commands through the RS232 interface (X11) to the PC. The RS232 commands are structured according to the Mouse Systems Protocol, whereby only the first byte is used. Both the control outputs (X80) and the RS232 interface (X11) are galvanically isolated, so that they can be connected directly with the PC or converter.

The transmission parameters are: 9600 baud, 8 data bits, no parity, 1 stop bit. No protocol.

PC connection

PC connection of the video application/second monitor
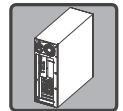
- The VGA cable of the PC is connected with the VGA cable of the monitor and fastened with a retaining clamp on the retaining plate of the monitor power supply unit.
- The RS232 connection is plugged into PCB CJ at position X11. (Check for proper fit, especially after service work in the area of the junction box)
- The grounding cable of the PC is fastened to the proposed grounding point.

For PC connection of the video application only:

- The S video cable of the PC is connected with the S video cable of the video application and fastened to the retaining plate (make sure there is correct contact with the metal parts of the connector).

2.2.4 Monitor

The monitor has two VGA inputs; VGA **input A** should be preferred.

The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

Refer to the operating instructions for operation of the monitor. The LED next to the on/off switch can assume three states:

green	there is a VGA signal present
orange	there is no VGA signal present
off	monitor is switched off or no voltage available

2.2.5 **Video application with PC interfacing**
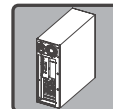
The camera S video signal as well as the control signals generated by the treatment center are sent to the external PC for further processing.

The analog S video signal is digitized on the frame grabber card of the PC and then converted on the graphics card of the PC into an analog VGA signal for display on the treatment center monitor.

When the camera is removed from the dentist element, a live image is transmitted via the S video cable and a removal signal is sent to the PC via the RS232. A window with the live image is automatically opened by the removal signal in the Sidexis/Videxis software.

When the camera is deposited, a control signal sent by the treatment center closes the window with the camera image, and the video signal is switched off.

Further control signals sent from the treatment center to the PC via the RS232 are used for:

- switching over between the live and the still image (by means of the foot switch)
- saving the still image
- switching to white/black screen (white and black screen are generated by the PC)
- as well as further freely configurable PC control functions

2.2.6 Block diagram of C2+ with SIVISION 2 SIROCAM 2 on C2+

Camera in light barrier holder

(Removal detection: ADX)

| Flange | Lamp | Fan | Temp. sensor |

Monitor
LC display

PCB
AKV

Control signal

VGA
converter

S video

12V

S video

Camera module

PCB
KB

Unit control

PCB
ADX

16VAC

CAN

SDI connector

CAN

PCB
CJ

V24

1.5kV

Control signal

RS232

12VDC

12VDC

NM

4kV

Network
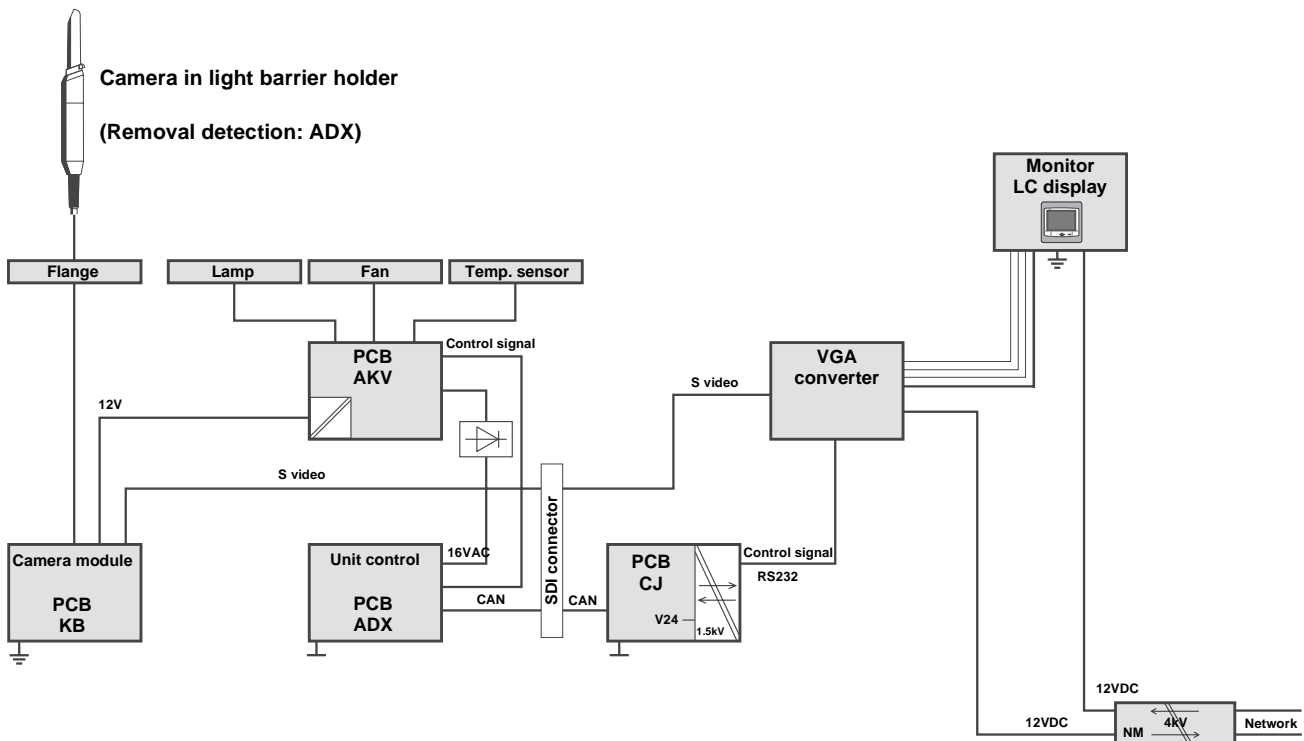
2.2.7 Block diagram of C2+ with SIVISION 2 SIROCAM 2 with PC link to C2+

Camera in light barrier holder

(Removal detection: ADX)

| Flange | Lamp | Fan | Temp. sensor |

Monitor
LC display

Monitor
PC

PCB
AKV

Control signal

VGA

12V

VGA

Graphics card

S video

Frame grabber

S video

Camera module

PCB
KB

Unit control

PCB
ADX

16VAC

CAN

SDI connector

CAN

PCB
CJ

V24

1.5kV

RS232

RS232

IO

PC

12VDC

12VDC

NM

4kV

Network

With a PC connection, the VGA converter is not required!

2.3 ProFeel video application

2.3.1 Overview of PCBs/modules

MO
SC2
SCB
NM
VGA
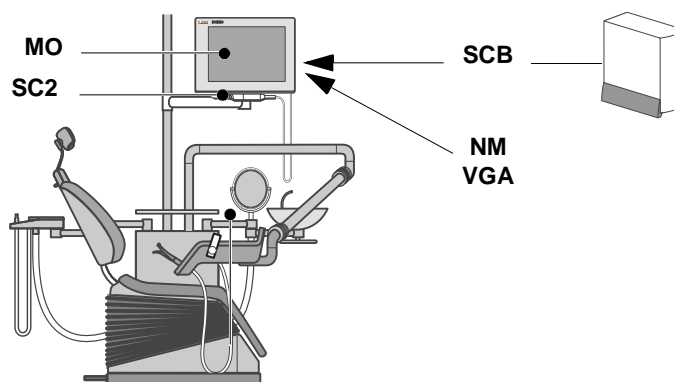
Component	PCB/module	
Lamp support tube	MO	= Monitor
	NM	= Monitor power supply
	SIROCAM 2	
	SCB	= Sirocam 2 box
	VGA	= VGA converter

2.3.2 Compact box on the lamp support

The SIVISION 2 on the ProFeel is a compact camera solution on the lamp support tube, consisting of screen, camera, SIROCAM 2 box, converter and power supply unit.

SIROCAM 2

The SIROCAM 2 is characterized by a high-quality optical system. The lighting is located in the dentist element and is guided through a fiber-optic cable to the camera head.

It is intended for the range close to the teeth plus smile line. The distance adjustment is continuously variable.

The housing is made of titanium. The lens protective sleeve can be removed and sterilized. The image memory is not located in the camera, but on the VGA converter PCB.

A reed contact integrated in the camera enables operation by the holder installed on the monitor. This means that the camera is switched on or off by means of a magnet in the holder.

SIROCAM 2 box
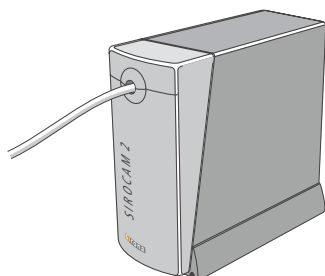
The SIROCAM 2 box is the basis of the SIVISION 2 video solution on the ProFeel (refer also to the SIROCAM 2 Service Manual, Part No.: 58 24 045).

VGA video converter
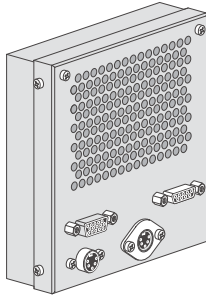
The video converter has the task of converting an S video signal into a VGA signal.

The image memory function (switching between still/live image) as well as the white screen function are controlled through the control inputs on connector X2. If an S video signal is no longer present in live image mode, then the system switches to a black screen. The necessary control signals are fed directly to the converter input X2 by a rocker switch on the chair panel.

With a PC connection, the VGA converter is not required! The white screen is generated by the PC.
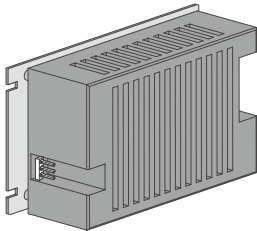
Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor, the VGA converter module and the fan.

2.3.3 Monitor

The monitor has two VGA inputs; VGA **input A** should be preferred.

The 12VDC power supply is made through the 4-pin POWER MINI DIN plug. Refer to the operating instructions for operation of the monitor.

The LED next to the on/off switch can assume three states:

green	there is a VGA signal present
orange	there is no VGA signal present
off	monitor is switched off or no voltage available

2.3.4 Compact box PC connection

PC connection

PC connection of the video application/second monitor
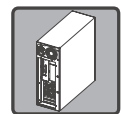
The 4 cables required for the PC connection are run directly from the SIROCAM box (S video and RS232), from the monitor (VGA) and from the grounding point (protective ground wire) through the support arm and the water unit up to the PC.

In the case of the PC connection of the second monitor, the S video & RS232 cables are not present.

2.3.5 Block diagrams ProFeel with SIVISION 2

SIROCAM 2 without PC connection to ProFeel
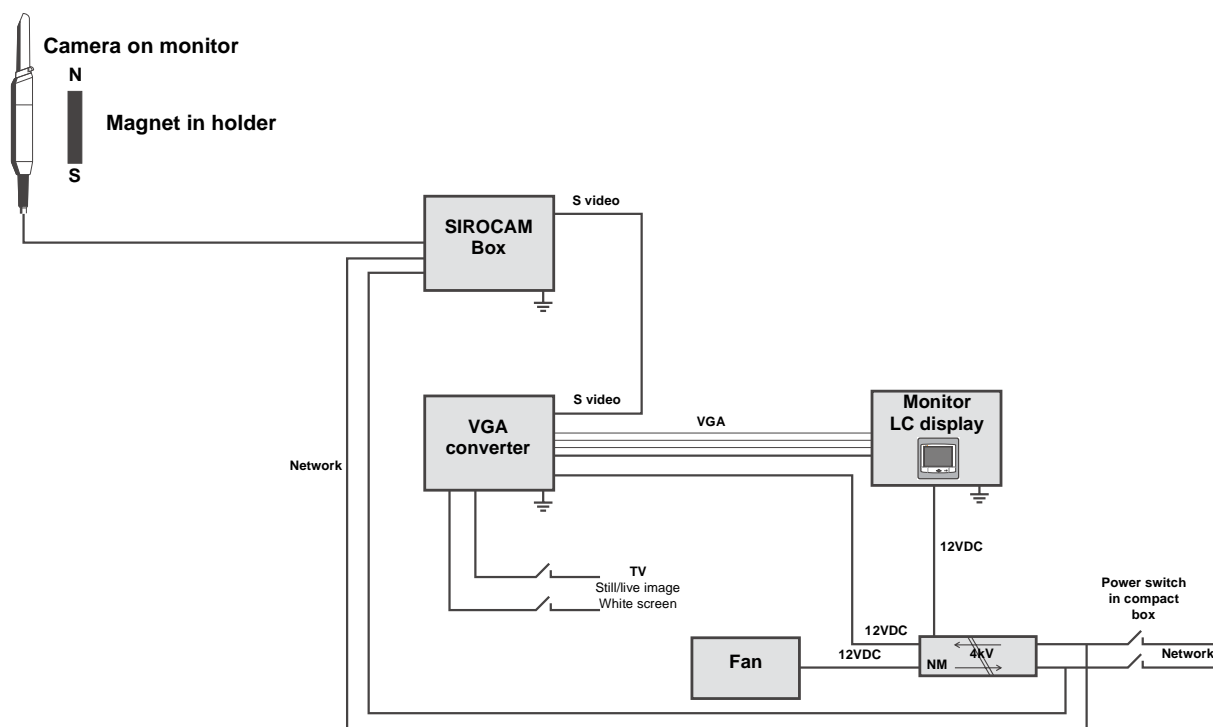
SIROCAM 2 with PC connection to ProFeel
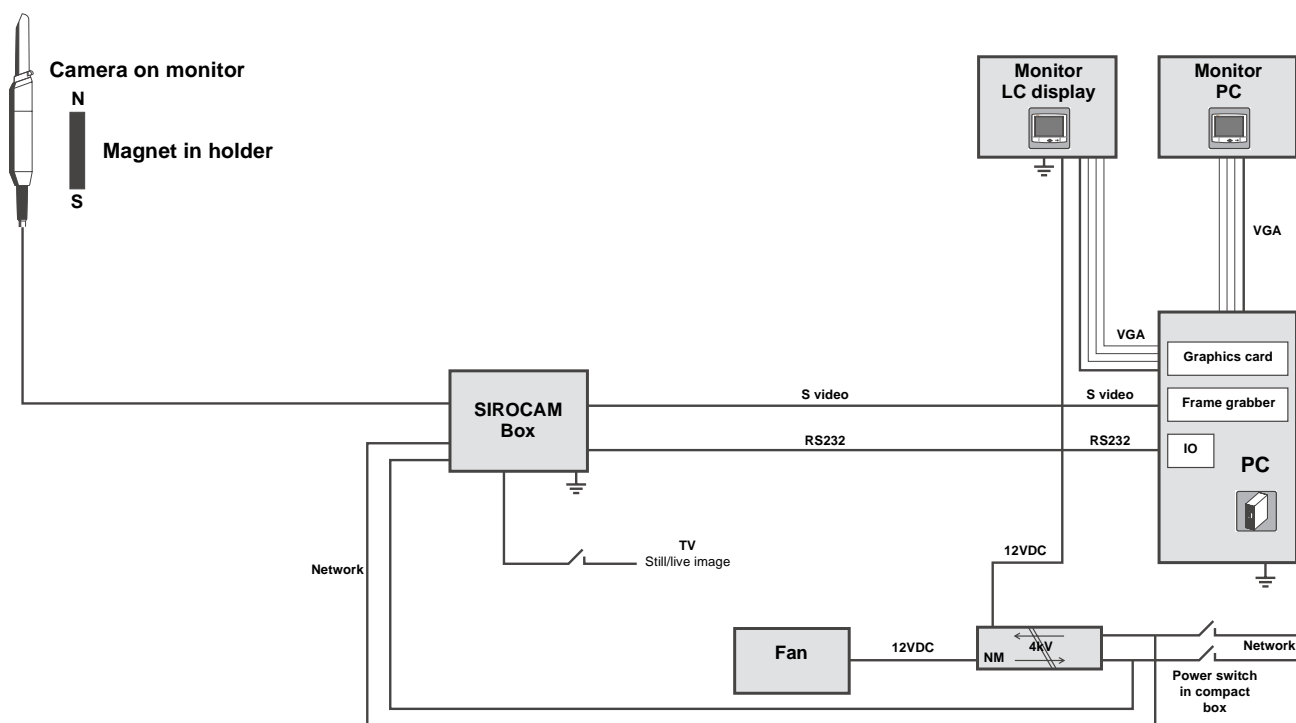
3 SIVISION 3

C1$^+$
C2$^+$
C3$^+$
C4$^+$
C5$^+$
C8$^+$
M1$^+$
Assistant element: C3$^+$/C4$^+$/C5$^+$
C6/C8
ProFeel
SIVISION 3 Kompakt version

3.1 Function of the camera

The SIVISION 3 video application is offered with two camera types:

- The **SIROCAM 3/C** is designed for integration in all units. The C3$^+$/C4$^+$/C5$^+$ can also be integrated in the assistant element. There is also a compact solution with the SIROCAM 3/C, which can be attached to units that are already installed.

- The **SIROCAM 2** was offered for the C1$^+$ and C2$^+$ units until 03/2003.

SIROCAM C

The **SIROCAM C** is an intraoral camera designed especially for the range close to the teeth and the smile line.

SIROCAM 3

The **SIROCAM 3** is the successor to the SIROCAM 2.
The optical system was improved and the electronic concept of the SIROCAM C was adopted. For example, the interface between the SIROCAM 3 and the SIROCAM C is identical.

For the **SIROCAM 3** and the **SIROCAM C**:
The object is illuminated by white LEDs. These LEDs heat up the lens of the camera. This prevents the lens from misting over during treatment.

The camera has an internal quad image memory. The SIROCAM 3/C can be supplied with a direct voltage of 8.5 to 12VDC. The control signals reach the camera from the treatment centers or from the PC via a serial interface.
In treatment centers without a serial interface, the camera can also be controlled through discrete inputs. A reed contact integrated in the camera enables operation through an additional holder mounted on the instrument rack. The camera is switched on or off by a magnet in the instrument holder.

SIROCAM 2 (discontinued 03/03)

The **SIROCAM 2** is characterized by a high-quality optical system. The housing is made of titanium. The lens protective sleeve can be removed and sterilized. The lighting is located in the dentist element and is guided through a fiber-optic cable to the camera head. It is intended for the range close to the teeth, the smile line and the full face range. The distance adjustment is continuously variable.

The quad image memory is not located in the camera, but on the camera module integrated in the dentist element.

A reed contact integrated in the camera enables operation through an additional holder mounted on the instrument rack. The camera is switched on or off by a magnet in the instrument holder.

To compensate for camera-specific influences on the color settings, data is stored in the camera head. With the introduction of SIVISION 3, apart from a data record for the analog camera PCB KB, a separate data record for the digital PCB AD 2 is stored in the camera. These cameras are identified by the suffix "B" at the end of their serial number. An additional data record can be determined and stored with the white balance function, especially when using cameras featuring only an analog data record (without "B" suffix) in SIVISION 3 configurations. Thus it is possible to optimize the color setting on existing SIROCAM 2 cameras in dental practices on treatment centers with SIVISION 3.

This is expedient for instance for:

● using an already available SIROCAM 2

● individual color setting

● after a lens head change

Different color patterns will produce different results with respect to the color display of the SIROCAM 2. For example, a blue color pattern will reduce the amount of blue color in the video image.

After a white balance, the digital factory data record that may be available can be reactivated, but not the analog data record. It will be effective only in connection with the analog camera PCB KB. The white balance can be performed any number of times using the C1$^+$ or C2$^+$ user interfaces.

3.2   Video components

The design of the video system is very similar for all units.

A distinction can be made between the following modules:

● SIROCAM 3/C, SIROCAM 2

● Camera supply with camera control

● S video distribution

● Power supplies

● SIVISION 3 monitor with S video input/VGA input

● PC connections

   The treatment center <--> PC cable kit consists of:

   - S video extension cable

   - RS232 extension cable

   - PE ground wire

   - VGA extension cable

The cables to the PC (10 m each) are adapted in the junction box of the treatment center (for the ProFeel in the water unit) and run to the PC through the building installation.

The unit-specific properties are described separately afterwards.

3.3   General service aids

3.3.1   Automatic signal source switchover

The rules

The automatic signal source switchover of the monitor is subject to the following rules:

● If there is a signal source settings dialog available (can be accessed by pressing the **minus key** on the monitor), it **must** be set to **AUTO**.

   In older monitors there is no settings dialog, the **AUTO** mode is set there by default.

● The S video input has priority.

   If a signal is applied simultaneously to the S video input and to the VGA input, then the system switches to the S video input. If the S video signal is switched off on the SVI, then the monitor changes to the VGA input. If the VGA signal is missing, then the monitor switches automatically to the S video input. If no signal is applied, then the monitor goes into standby.

The LED of the monitor shows whether a change has taken place or if a signal was detected:

LED lights up green	Sync. signal present, the monitor has detected a signal at one of the inputs.
LED lights up orange	No sync. signal present, the monitor has not detected any signal at one of the inputs.

3.3.2　Signal source search

C1$^+$, C2$^+$, C3$^+$, C4$^+$, C5$^+$, M1$^+$

According to the monitor type, there is (as already described above) either automatic signal source switchover available by default or switchover that can be set by menu. The priority sequence is first the S video and then the VGA signal. If the camera in the C1$^+$, C2$^+$, C3$^+$, C4$^+$, C5$^+$, M1$^+$ is configured in the PC mode, then the S video signal on the SVI/SVC PCB of the monitor is switched off. If the PC is not switched on or the VGA signal is not available, then the screen remains black.

Signal check

▶ Switch the camera into the video mode to obtain a signal check.

- On the C1$^+$ with camera removed, press key 5 in the camera dialog -> a monitor symbol appears in the center of the display

- On the C2$^+$,C3$^+$,C4$^+$,C5$^+$, M1$^+$ with the camera removed, press the A/B key -> VIDEO MODE then appears in the bottom line of the LC display

If the camera is active, you should now see an S video signal on the screen. The control LED on the monitor lights up green, a sign that the sync. signal is available. If the sync. signal is missing, then the LED on the monitor remains orange.

▶ Check the **AUTO** setting in the monitor setting menu (depending on the monitor type).

ProFeel, C6, C8, Kompakt or C3$^+$,C4$^+$, C5$^+$ with camera in the assistant element

In the video application on a ProFeel, C6, C8, Kompakt or installation in the assistant element, the automatic signal source search in the monitor (depending on the monitor type) is not enabled.

Here PCB SVI/SVC is installed in such a way that the S video signal is always applied simultaneously at the treatment center monitor and at the PC. The S video signal is not switched off by the treatment center monitor in the PC mode. The control whether the camera is working in the PC or video mode can be performed only from the PC (see SIVISION 3, SIVISION 3 Kompakt Operating Instructions, Part No.: 59 07 865 or 59 12 378).

The correct signal source must be selected manually at the treatment center monitor in the settings dialog (analog or S video port), see SIVISION 3, Operating Instructions for the Flat-Screen Monitor, Part No.: 59 07 147.

3.3.3　Storage and still image

In the video mode (i.e. without PC connection), the images are stored in the quad image memory (in SIROCAM 3/C in the camera, in SIROCAM 2 on PCB AD2). The live image is stored in the quad image memory under the displayed memory location number by means of the foot switch. The quad image memory is a temporary memory and is cleared when the treatment center is shut down.

Images can be stored permanently only in conjunction with a PC connection (PC mode). For this purpose the SIDEXIS/VIDEXIS software must be installed on the PC. A still image is first generated on the PC with the foot switch. To store the image in a patient database, a storage command must be sent.

3.3.4 White/black screen

In the **Video mode** the white/black screen is always generated by the AD2 (C1$^+$/C2$^+$) or camera electronics of the SIROCAM 3/C.

In the **PC mode** the procedure for generating the white/black screen differs according to the treatment center:

C1$^+$/SIROCAM 2	AD2
C2$^+$/SIROCAM 2	AD2
C1$^+$/SIROCAM 3/C	SIROCAM 3/C
C2$^+$, M1$^+$/SIROCAM 3/C	SIROCAM 3/C
C3$^+$	SIROCAM 3/C
C4$^+$/C5$^+$	SIROCAM 3/C
C3$^+$/C4$^+$/C5$^+$ with camera in the assistant element	PC
C6	PC
C8/C8$^+$	PC
SIVISION 3 Kompakt	PC

3.3.5 Image quality

Improving the image quality

In case of poor image quality, the "Auto Setting" function of the monitor can bring about an improvement.

A reduction of the PC graphics card "Refresh rate" setting to 60 Hz can also bring about an improvement in image quality. After display parameters on the PC graphics card have been changed, the "Auto Setting" function of the monitor should be activated once again.

3.3.6 Image failure

Cable problem

If no image appears on the monitor, you can connect the plug of the VGA cable of the treatment center located in the junction box to the VGA output of a notebook for test purposes.
A second possibility of ruling out a possible cable problem is to replace the VGA cable run in the treatment center with a standard VGA cable between the PC/notebook and the monitor.

PCB SVI/SVC defective

If no image appears on the monitor, then the SVI/SVC/KA PCB may be defective. Check this possibility as follows:

▶ Check the supply voltages
   SVI/SVC: LEDs V11/V97
   KA: LEDs V1/V3

▶ Bridge over the SVI/SVC/KA board by plugging the S video cable from the camera directly together with the S video cable to the PC or with the S video cable to the treatment center monitor.
   A female/female adapter is required for this purpose.

3.3.7 Optimum image resolution

We recommend 1024 x 768 pixels for good image resolution.

ℹ NOTE

The image resolution can be adjusted only for the VGA signal.

3.4 C1$^+$ with SIROCAM 2 in the dentist element

3.4.1 Overview of PCBs/modules

MO

AE   **ST**
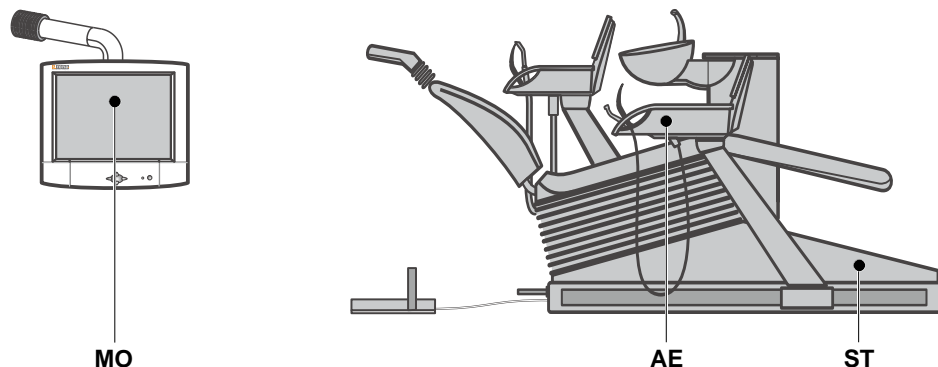
Component	PCB/module
Dentist element (AE)	AD2 = Camera module
	AVL = Supply for lamp
	SIROCAM 2
Patient chair (ST)	NM = Monitor power supply
	SA = Junction box control PCB
	SR = Relay PCB
	SVC = PC/video interface

Monitor (MO)
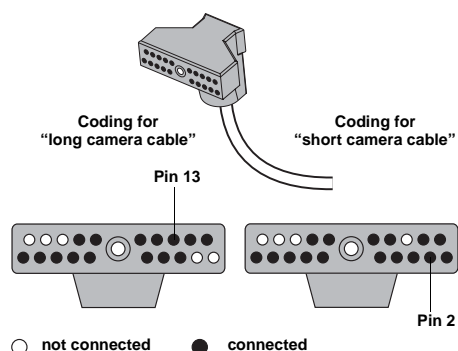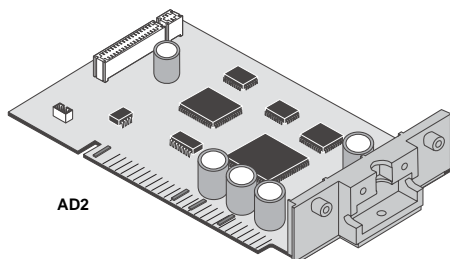
3.4.2 Dentist element with SIROCAM 2

AD2, camera module

PCB AD2 is a digital camera control module and is plugged into the C1$^+$ via module connector X10 in the dentist element.

Since the module is designed for different units, not all connectors are used when it is installed on the C1$^+$. The module contains the camera electronics and the quad image memory; on the C1$^+$ it controls the AVL module (LAMP_ONOFF, FAN_ONOFF).

The AD2 can be used as a complete system only with the SIROCAM 2 and a camera plug coded for a "long" camera cable. If a "short" coded camera cable is used, then there will be no image signal!

The camera module is controlled through the serial interface of PCB AJ. Connector **X6** serves as the output for the S video signal.

AD2

**Coding for
"long camera cable"**

**Coding for
"short camera cable"**

Pin 13

Pin 2

○ **not connected**   ● **connected**

AVL, supply for lamp
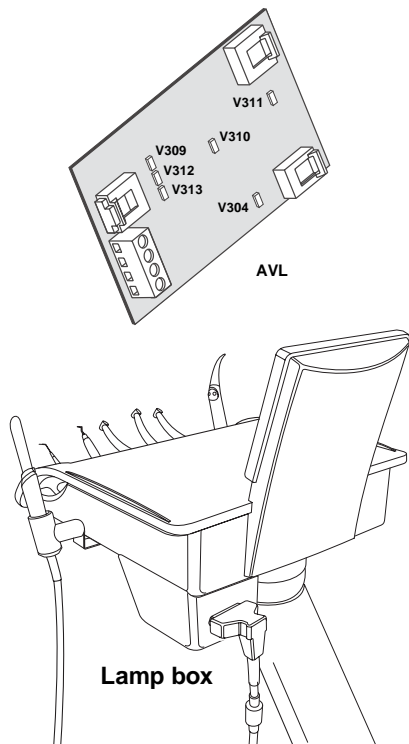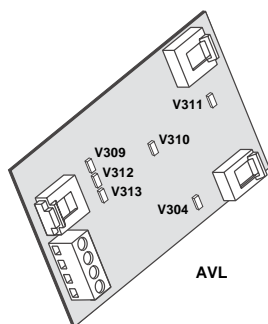
The PCB is located in the lamp box under the dentist element.

Functional units on PCB AVL:

Logic unit

Two digital control signals (from PCB AD2) as well as an additional temperature monitoring signal are available to the PCB for controlling the halogen lamp and fan.

These signals are supplied to a logic unit, which generates a release of the power supply for the halogen lamp and the fan as well as a safety shutdown of the lamp on overtemperature in the lamp box.

Switched-mode power supply for halogen lamp and fan

The switched-mode power supply converts the direct voltage of 16VDC picked off from the motherboard in the dentist element into a supply voltage of approx. 12VDC for the fan and the halogen lamp. This switched-mode power supply is activated by a control signal from the logic unit.

Lamp box

Description of the basic functions on PCB AVL

- When the supply voltage is applied the green LED V309 (16VDC) lights up.
- When the camera is removed, the camera electronics (AD2) sends a "Lamp_onoff" control signal to PCB AVL (yellow LED V313 lights up) and the switched-mode power supply for the halogen lamp and the fan is activated (green LEDs V304 and V310 light up).
- The second "Fan_onoff" control signal of PCB AD2 (yellow LED V312 lights up) serves only to activate the fan so that it continues running and cools down the halogen lamp after the latter has been switched off (green LED V304 lights up).
- With the camera removed and active temperature sensor signal (overtemperature case, yellow LED V311 lights up), the supply voltage of the halogen lamp is switched off, but the fan function is maintained (green LED V304 lights up).

3.4.3 Patient chair

See 3.5.3

3.4.4 Monitor

See 3.5.4

3.4.5 Block diagram of C1⁺ with Sivision SIROCAM 2 with PC connection to the C1⁺

Camera in light barrier holder

(Removal detection: AJ)
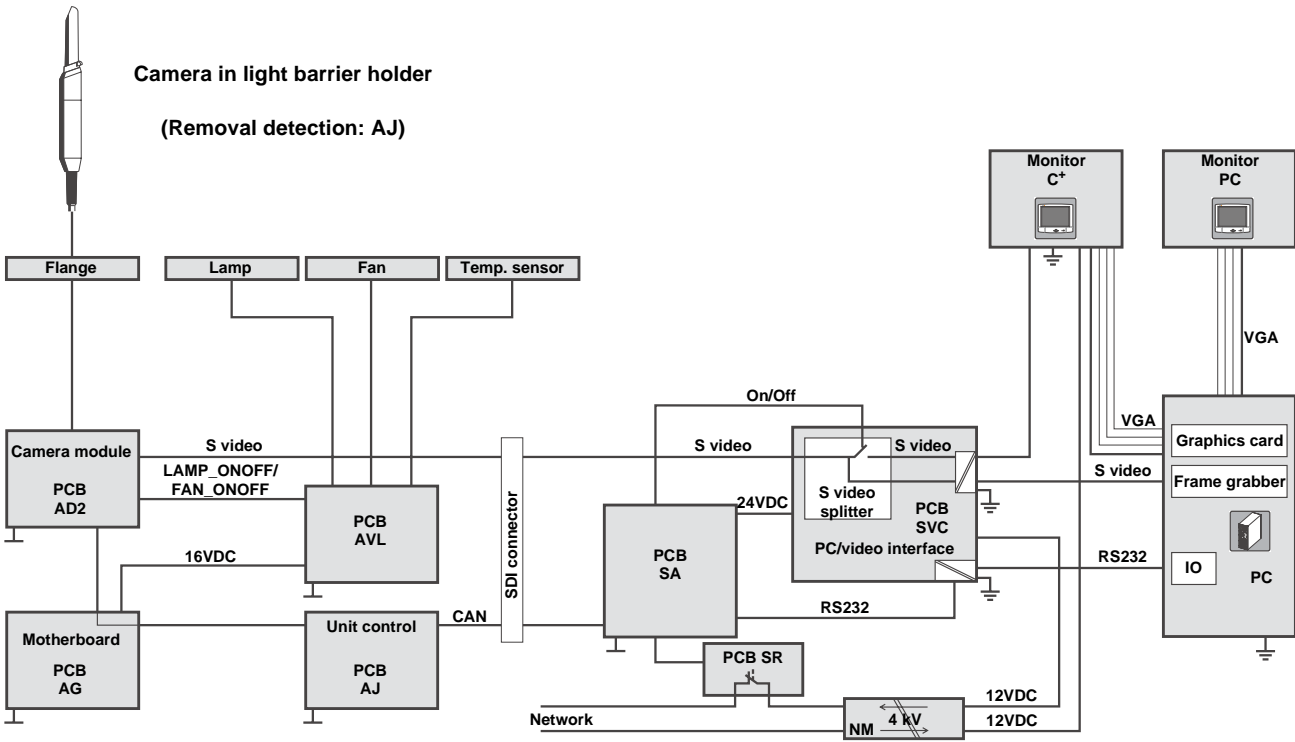
3.5 C1⁺ with SIROCAM 3/C in the dentist element

3.5.1 Overview of PCBs/modules

MO

AE   **ST**
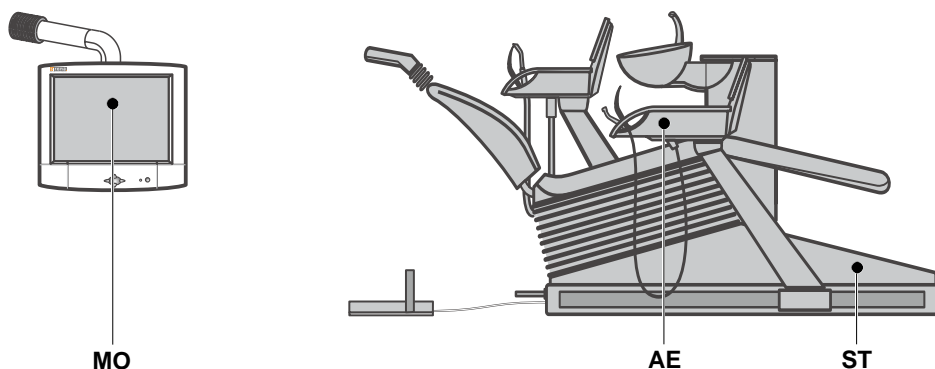
Component	PCB/module
Dentist element (AE)	AC7 = Camera module
	SIROCAM 3/C
Patient chair (ST)	NM = Monitor power supply
	SA = Junction box control PCB
	SR = Relay PCB
	SVC = PC/video interface
Monitor (MO)	

3.5.2 Dentist element with SIROCAM 3/C

In holder 6 removal of the camera is detected by light barrier, in the additional holder by a reed contact in the camera. The magnet is located in the additional holder.

AC7, camera module

V8 **V72**

V7

AC7
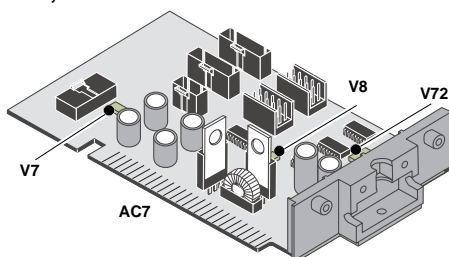
The module is connected to the direct plug connection of PCB AG on the C1⁺. Different circuits link control information and forward it to the camera. The module is designed for different units, therefore not all connectors are used when it is installed on the C1⁺.

LED V 8	indicates the status of the 5 V operating voltage
LED V 7	indicates the status of the 12 V operating voltage
LED V 72	indicates the status of the serial interface on the C2⁺ and the C4⁺

3.5.3 Patient chair

SA, junction box control PCB

SA
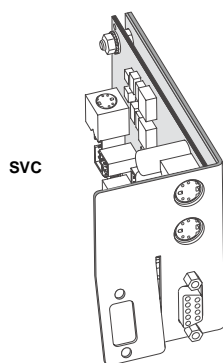
With a PC connection/second monitor, PCB SA transfers the function key commands through the RS232 interface (X11) to the PC (through SVC, see below). The RS232 commands are structured according to the Mouse Systems Protocol, whereby only the first byte is used.

The transmission parameters are:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit
- No protocol

SVC, PC/video interface

SVC

The video switch module (SVC), as opposed to the SVI, contains galvanic isolation of the RS232 interface and galvanic isolation of the S video signals.

The S video signal is divided over two outputs:
- The S video signal to the PC remains always switched through.
- The S video signal to the monitor can be switched off from PCB SA.

It is switched off through the control cable L44 from X24 of PCB SA to X4 of PCB SVC. The video signal is switched off from the monitor by the IMAGE_OFF switching signal. This is indicated by the orange LED V98.

A monitor that automatically finds a source (e.g. SIVISION 3 monitor, Part No.: 58 95 896 D3399) is caused to switch over to the VGA input if a corresponding VGA signal (in case of a PC connection) is present. The PC is controlled through the serial interface X6 of PCB SVC.

LED V11 indicates the presence of the 5VDC and LED V97 of the 12VDC.

For the second monitor option, the SVC module is installed for the galvanic decoupling of the RS232 interface.

Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor and the SVC module.

**SR module
(extension of the relay PCB)**

SR
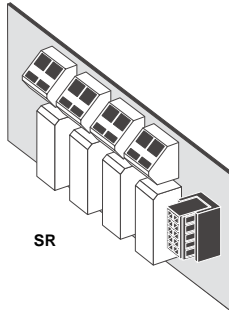
The SR module (relay PCB) has been extended by a further relay. The operating voltage for the monitor and the SVC module can be switched off with this relay.

Simultaneous operation of HF and switched on monitor (irrespective whether white/black screen, still image or other PC application) generates artifacts on the screen. Therefore the monitor is switched off when the HF handpiece is removed, and after the HF handpiece is deposited the monitor is switched on again.

PC connection

PC connection of the video application/second monitor
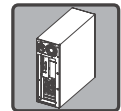
● The VGA cables are plugged together on the installation plate of the SVC module.

● The RS232 connection is made on the SVC module via X6.
The grounding cable of the PC is fastened to the proposed grounding point.

For PC connection of the video application only:

● The S video signal is made available at the lower socket (X10) on the SVC. Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.5.4 Monitor

The C$^+$ monitor, Part No.: 58 95 896 D3399, is used. It is possible to display the S video signal of the AD2 directly without a converter through the S video input.

A VGA input is available additionally for the PC connection/second monitor.

The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

(see Operating Instructions for the monitor)

3.5.5 Block diagram of C1⁺ with Sivision SIROCAM 3/C with PC connection to the C1⁺

**Camera in light barrier holder
or additional holder
(Removal detection: AJ)**

Flange

Camera module
PCB
AC7

S video

V24   12 V   Signal source

Motherboard
PCB
AG

CAN
Signal source
12 V
V24

Unit control
PCB
AJ

CAN

SDI connector

PCB
SA

24VDC

On/Off

S video

S video splitter

S video

PCB
SVC

PC/video interface

RS232

PCB SR

Network

NM   4 kV

12VDC
12VDC

Monitor
C⁺

Monitor
PC

VGA

VGA

S video

Graphics card

Frame grabber

IO   PC

RS232

3.6 C2⁺ with SIROCAM 2 in the dentist element

3.6.1 Overview of PCBs/modules

MO

AE　　　**ST**
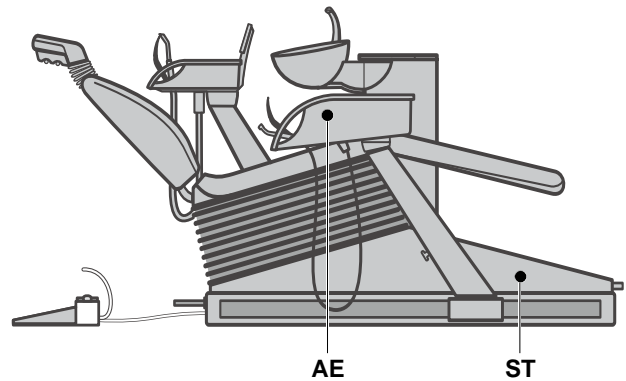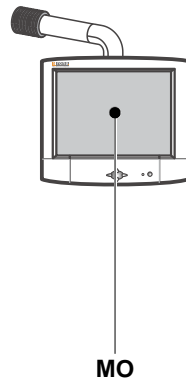
Component	PCB/module
Dentist element (AE)	ADC = Connection PCB to ADX
	AD2 = Camera module
	ANL = Lamp power supply unit
	SIROCAM 2
Patient chair (ST)	CJ = Chair PCB
	SVI = PC/video adapter
	NM = Monitor power supply

Monitor (MO)

3.6.2 Dentist element with SIROCAM 2
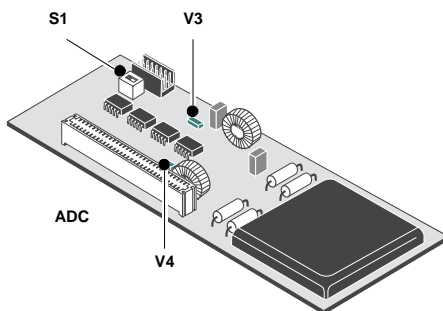
In the dentist element two PCBs are used for the camera supply and one for supplying the camera lamp. Like any other instrument, the camera is switched active on removal.

ADC, connection PCB to the dentist element control ADX

This module supplies the camera module AD2 with operating voltage and control information and also provides the galvanic isolation between the patient circuit and video system.

A DC/DC converter steps down the 24VDC of the ADX (AE) module to 12VDC.

Six optocouplers forward the following signals to the AD2:
- TxD
- RxD
- Image_Stop
- Camera On
- Coding

In addition, several optocouplers are simultaneously used for messages from the camera.

- LED V3, 5 V: Electronic circuit operating voltage
- LED V4, 5 V: Patient circuit operating voltage
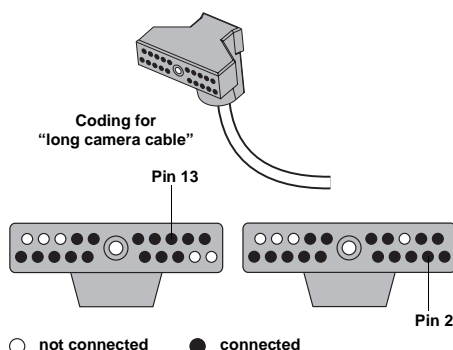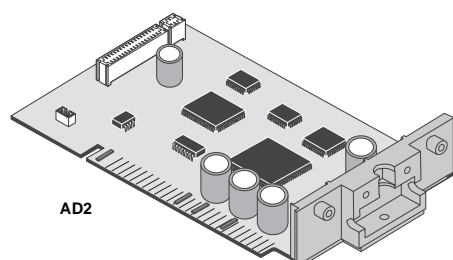
Switch S1 on the ADC determines whether the camera is placed in holder 6 (switch position 1) or in the additional holder (switch position 2). Make sure the setting is correct on repair exchange! In holder 6 removal of the camera is detected by light barrier, in the additional holder by a reed contact in the camera. Since the C2$^+$ is not equipped with an additional holder, the switch must always be set to position 1 for the C2$^+$.

AD2, camera module

AD2

PCB AD2 is a digital camera control module and is connected to the direct plug connection of PCB ADC on the C2$^+$. The module contains the camera electronics and the quad image memory. The module is designed for different units, therefore not all connectors are used when it is installed on the C2$^+$. The AD2 can be used as a complete system only with the SIROCAM 2 and a camera plug coded for a "long" camera cable. If a "short" coded camera cable is used, then there will be no image signal! The camera module is controlled through the serial interface of PCB ADX.

The backward compatibility to PCB AD is guaranteed by the connector X6 that is used as output for the S video signal. The module can be used in both analog and serial mode.

If it has been actuated once through the serial interface, then it reacts only to the serial signals!

Coding for "long camera cable"

Pin 13

Pin 2

○ **not connected**   ● **connected**

ANL, lamp power supply unit

ANL

● The module is a partially-equipped AKV PCB.
● The galvanic isolation is not equipped.
● The module has only one control input for on/off.
● The module switches the camera lamp/fan on and ensures that the fan runs on.

3.6.3 Patient chair

See 3.7.3

3.6.4 Monitor

See 3.7.4

3.6.5 Block diagram of C2⁺ with Sivision 3 SIROCAM 2 with PC connection to the C2⁺

Camera in light barrier holder

(Removal detection: ADX)
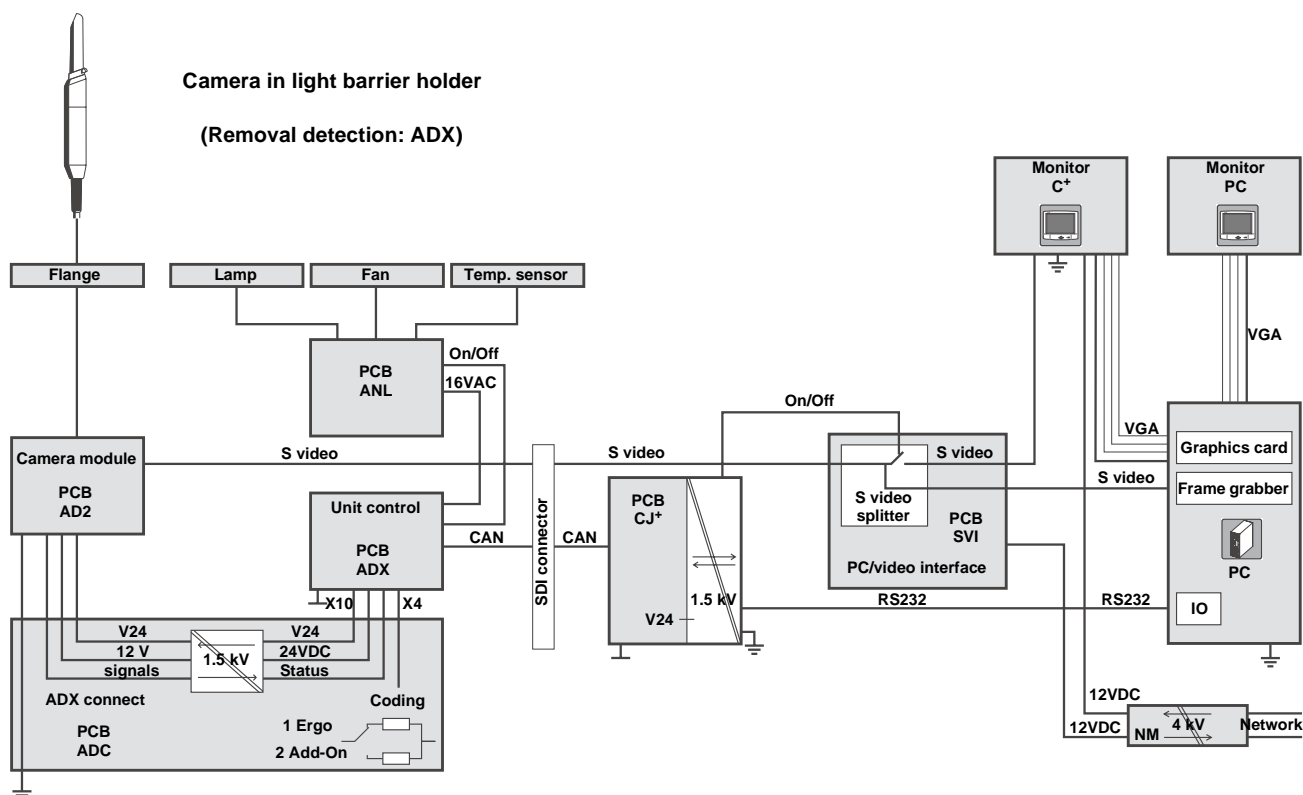
3.7 C2$^+$, C4$^+$, M1$^+$ SN $\leq$ 69.999 with SIROCAM 3/C in the dentist element

3.7.1 Overview of PCBs/modules

MO

AE   ST
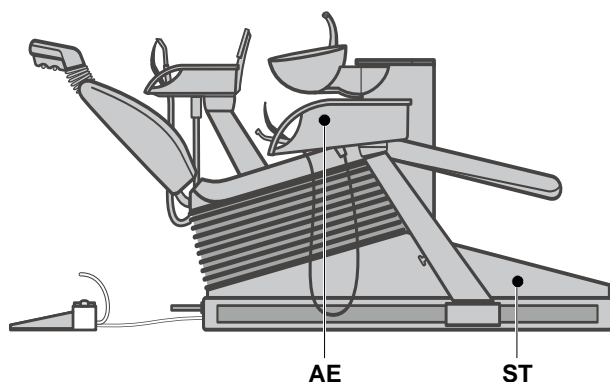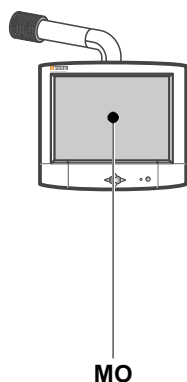
Component	PCB/module
Dentist element (AE)	ADC = Connection PCB to ADX
	AC7 = Camera module
	SIROCAM 3
Patient chair (ST)	CJ = Chair PCB
	SVI = PC/video adapter
	NM = Monitor power supply
Monitor (MO)	

3.7.2 Dentist element with SIROCAM 3/C

Two PCBs are used for the camera power supply in the dentist element. Like any other instrument, the camera is switched active on removal.

This module supplies camera module AC7 with operating voltage and control information, and also provides the galvanic isolation between the patient circuit and video system.


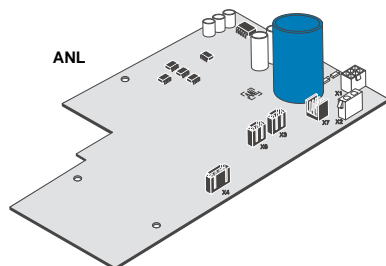**ADC, connection PCB to the dentist element control ADX**
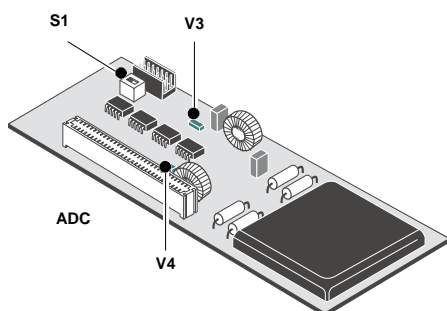
A DC/DC converter steps down the 24VDC of the ADX (AE) module to 12VDC.

Six optocouplers forward the following signals to module AC7:

- TxD
- RxD
- Image_Stop
- Camera On
- Coding

In addition, several optocouplers are simultaneously used for messages from the camera.

- LED V3, 5 V: Electronic circuit operating voltage

● LED V4, 5 V: Patient circuit operating voltage

Switch S1 on the ADC determines whether the camera is placed in holder 6 (switch position 1) or in the additional holder (switch position 2). Make sure the setting is correct on repair exchange! Removal of the camera is detected by light barrier in the holder and by a reed contact in the camera in the additional holder.

AC7, camera module

Module AC7 is connected to the direct plug connection of PCB ADC in the dentist element. Different circuits link control information and forward it to the camera. Since the module is designed for different units, not all connectors are used when it is installed in the C2+, C4+ or M1+.

LED V 8	indicates the status of the 5 V operating voltage
LED V 7	indicates the status of the 12 V operating voltage
LED V 72	indicates the status of the serial interface on the C2+

Holder coding in the C4+

On the C4+ the camera can be placed in holder 5 or in a separate additional holder.

As the camera was located in holder 5, it became necessary that the US handpiece could be placed in holder 4 on the C4+.

When retrofitting optional instruments (especially the camera) the pin assignment of connector X12 (holder detection) on PCB ADX must be observed. Possible changes to the pin assignment of the connector are described in the installation instructions of the relevant retrofit kit.

The reason for this is the following:

Based on the C2+ the camera was connected logically to holder 6 of the ADX. Even if the camera is placed physically in holder 5!

The US handpiece is connected logically to holder 5 of the ADX. Even if the US handpiece is placed physically in holder 4!

The **physical mode of counting** is from the left to the right:
● Holder 1, 2, 3, 4, 5

The **logical internal mode of counting** is from the left to the right:
● Holder 1, 2, 3, 5, 6

This mode of counting applies even if the C3+ or C4+ is delivered without a camera. The disadvantage is that a saline solution pump, which should be assigned to the US in the physical holder 4, must be set to 5 in the MODE dialog!

3.7.3 Patient chair

The tasks of PCB CJ regarding the video application are:

● Controlling the video switch (SVI), see below.

CJ, chair PCB

● With a PC connection/second monitor, PCB CJ conducts the function key commands through the RS232 interface (X11) to the PC. Both the control output (X80) and the RS232 interface (X11) are galvanically isolated, so that they can be connected directly with the PC or SVI.

The RS232 commands are structured according to the Mouse Systems Protocol, whereby only the first byte is used.

The transmission parameters are:

● 9600 baud

● 8 data bits

● No parity

● 1 stop bit

● No protocol

SVI, PC/video interface

The SVI module requires no galvanic isolation of the camera signal, since this is already ensured in the dentist element. The S video signal is divided over two outputs. The S video signal to the PC remains always switched through. The S video signal to the monitor can be switched off from PCB CJ.

It is switched off through the control cable L22 from X80 of PCB CJ to X3 of PCB SVI. The S video signal is switched off from the monitor by the IMAGE_OFF switching signal. This is indicated by the orange LED V98. A monitor that automatically searches for a source (e.g. SIVISION 3 monitor, Part No.: 58 95 896 D3399) is caused to switch over to the VGA input if a corresponding VGA signal (in case of a PC connection) is present.

The galvanic isolation of the control signals is implemented on PCB CJ.

The serial interface X6 of the SVI cannot be used on a C2$^+$. The PC is controlled through the serial interface X11 of PCB CJ.

Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor and the SVI module.

PC connection

PC connection of the video application/second monitor

● The VGA cables are plugged together on the installation plate of the SVI module.

● The RS232 connection is made on the CJ module (X11).

● The grounding cable of the PC is fastened to the proposed grounding point.

For PC connection of the video application only:

● The S video signal is made available at the lower socket (X10) on the SVI. Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.7.4 Monitor

The C$^+$ monitor, Part No.: 58 95 896 D3399, is used. It is possible to display the S video signal of the AD2 directly without a converter through the S video input.

A VGA input is available additionally for the PC connection/second monitor.

The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

(see Operating Instructions for the monitor)

3.7.5 Block diagram of C2$^+$,C4$^+$ and M1$^+$ with Sivision 3
SIROCAM 3/C with PC connection

Camera in light barrier holder or additional holder (Removal detection: ADX)

🛈 *NOTE*

If the dentist element has been converted to SIVISION 3 specifications and the patient chair still contains the components of the SIVISION 2 (converter), cable L34 must be unplugged from connector X80 on PCB CJ.
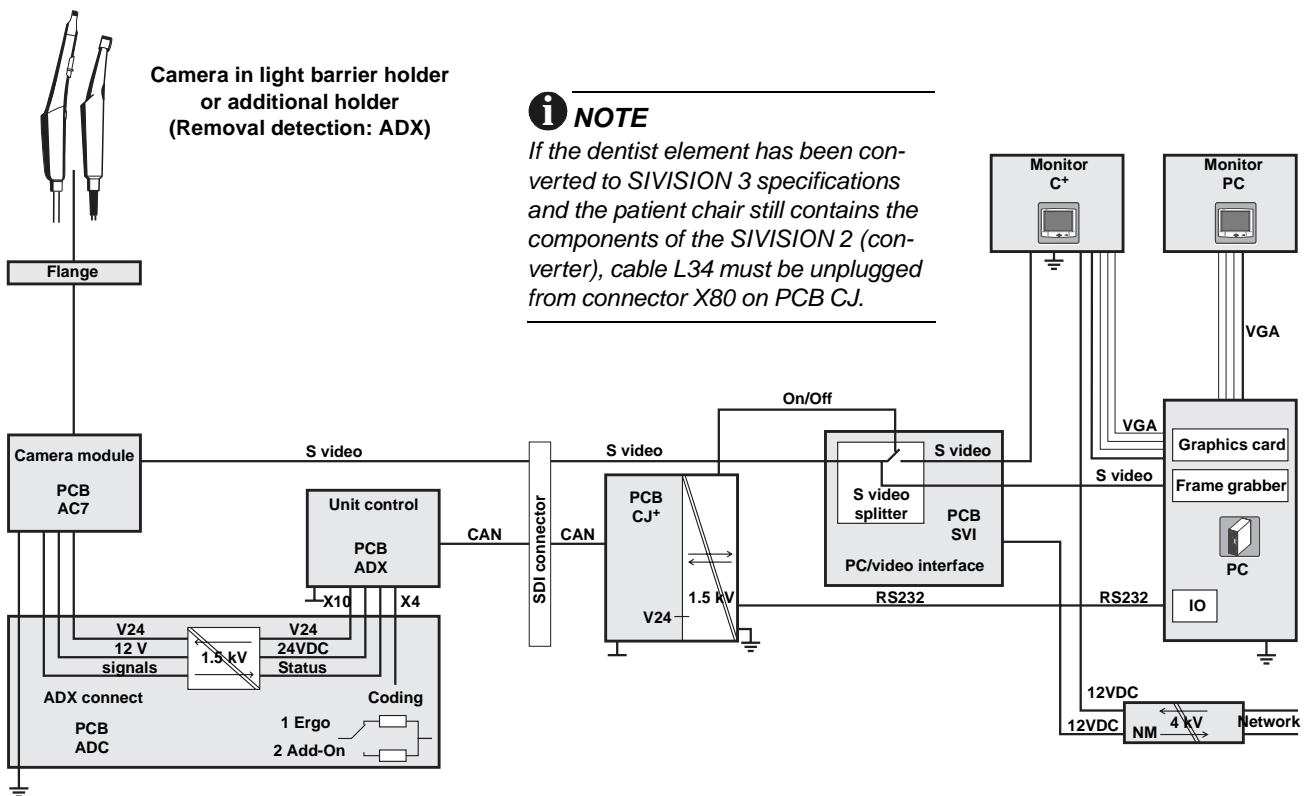
3.8 C2⁺, C4⁺, M1⁺ from SN 70.000 with SIROCAM 3/C in the dentist element

3.8.1 Overview of PCBs/modules
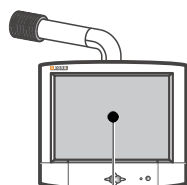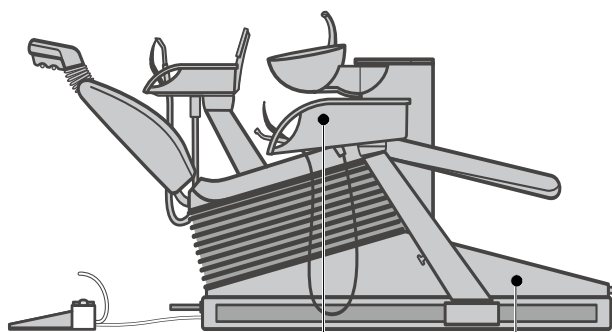
MO

AE   **ST**

Component	PCB/module
Dentist element (AE)	AC7 = Camera module
	SIROCAM 3
Patient chair (ST)	CJ = Chair PCB
	SVC = PC/video adapter
	NM = Monitor power supply

Monitor (MO)

3.8.2 Dentist element with SIROCAM 3/C

AC7, camera supply

S1
V7
V95
V9
V93
V94

AC7
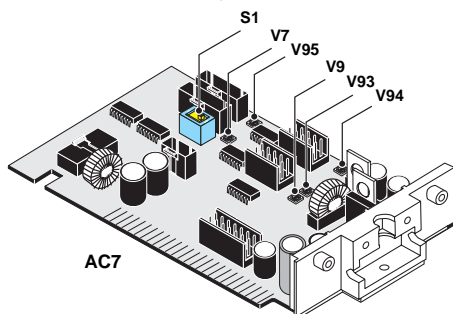
PCB AC7 is used for the camera power supply in the dentist element. Like any other instrument, the camera is switched active on removal.

This module supplies the camera with a 12VDC operating voltage and control information:

- TxD
- RxD
- Image_Stop
- Camera On
- Module coding
- ERGO/ADD-ON

C2⁺

C4⁺

M1⁺

AC7, camera module
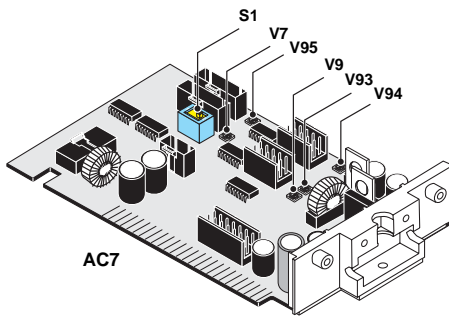
Switch S1 on the AC7 determines whether the camera is placed in holder 6 (switch position 1) or in the additional holder (switch position 2). Make sure the setting is correct on repair exchange! Removal of the camera is detected by light barrier in the holder and by a reed contact in the camera in the additional holder.

Module AC7 is connected to board ADX in the C2$^+$, C4$^+$ and M1$^+$. Different circuits link control information and forward it to the camera. Since the module is designed for different units, not all connectors are used when it is installed in the C2$^+$, C4$^+$ or M1$^+$.

LED V 8	indicates the status of the 5 V operating voltage
LED V 7	indicates the status of the 12 V operating voltage
LED V 72	indicates the status of the serial interface in the C2$^+$.
LED V 93	flashes with incorrect configuration; hence cycl. reset of the ADX (See configuration check)
LED V 94	lights up red if the 5V circuit is interrupted at X2.7 to the ADX (See configuration check)
LED V 95	indicates the status of the 24 V operating voltage

Configuration check:

To prevent misconfiguration, board CJ checks whether a new SVC board is installed in the treatment center and reports this to the AE control via CAN (PCB ADX). The AE control checks whether the current AC7 PCB is installed. The dentist element will function only if a permissible configuration is available. If the configuration is not in order, board AC7 generates a cyclical reset on the ADC PCB by shorting out the 5 V operating voltage. The red "Reset ADX" LED V94 starts flashing.

If the 5 V circuit is interrupted at X2.7 to the ADX, the 12 V and 5 V operating voltages on board AC7 automatically switch off. The camera then also receives no operating voltage and V94 lights up.

Holder coding in the C4$^+$

On the C4$^+$ the camera can be placed in holder 5 or in a separate additional holder.

As the camera was located in holder 5, it became necessary that the US handpiece could be placed in holder 4 on the C4$^+$.

When retrofitting optional instruments (especially the camera) the pin assignment of connector X12 (holder detection) on PCB ADX must be observed. Possible changes to the pin assignment of the connector are described in the installation instructions of the relevant retrofit kit.

The reason for this is the following:

Based on the C2$^+$ the camera was connected logically to holder 6 of the ADX. Even if the camera is placed physically in holder 5!

The US handpiece is connected logically to holder 5 of the ADX. Even if the US handpiece is placed physically in holder 4!

The **physical mode of counting** is from the left to the right:
- Holder 1, 2, 3, 4, 5

The **logical internal mode of counting** is from the left to the right:
- Holder 1, 2, 3, 5, 6

This mode of counting applies even if the C3$^+$ or C4$^+$ is delivered without a camera. The disadvantage is that a saline solution pump, which should be assigned to the US in the physical holder 4, must be set to 5 in the MODE dialog!

3.8.3 Patient chair

The tasks of PCB CJ regarding the video application are:

● Controlling the video switch (SVC), see below.

● With a PC connection/second monitor, PCB CJ forwards the function key commands through the RS232 interface (X81) to PCB SVC.

● Check of SVC HW status and corresponding CAN message to board ADX.

CJ, chair PCB

The RS232 commands are structured according to the Mouse Systems Protocol, whereby only the first byte is used.
The transmission parameters are:

● 9600 baud

● 8 data bits

● No parity

● 1 stop bit

● No protocol

SVC, PC/video interface

The galvanic isolation of the S video signal and the RS232 interface to the PC are ensured on PCB SVC. The S video signal is divided over two outputs. The S video signal to the PC remains always switched through. The S video signal to the monitor can be switched off from PCB CJ.
The cutoff signal is transmitted from X81 on board CJ via control cable L140 to X7 on PCB SVC. The S video signal to the monitor is switched off by the IMAGE_OFF switching signal. This is indicated by orange LED V98. A monitor that automatically searches for a source (e.g. SIVISION 3 monitor) is switched over to the VGA input if a corresponding VGA signal (in case a PC is connected) is present.
The PC is controlled through serial interface X6 on PCB SVC.

Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor and the SVI module.

PC connection

PC connection of the video application/second monitor

● The VGA cables are plugged together on the installation plate of the SVI module.

● The RS232 connection is made on the CJ module (X11).

● The grounding cable of the PC is fastened to the proposed grounding point.

For PC connection of the video application only:

● The S video signal is made available at the lower socket (X10) on the SVC. Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.8.4 Monitor

The C$^+$ monitor is used. It is possible to display the S video signal of the camera directly without a converter through the S video input.

A VGA input is available additionally for the PC connection/second monitor.

The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

(see Operating Instructions for the monitor)

3.8.5 Block diagram of C2$^+$/C4$^+$/M1$^+$ with Sivision 3 SIROCAM 3/C with PC connection
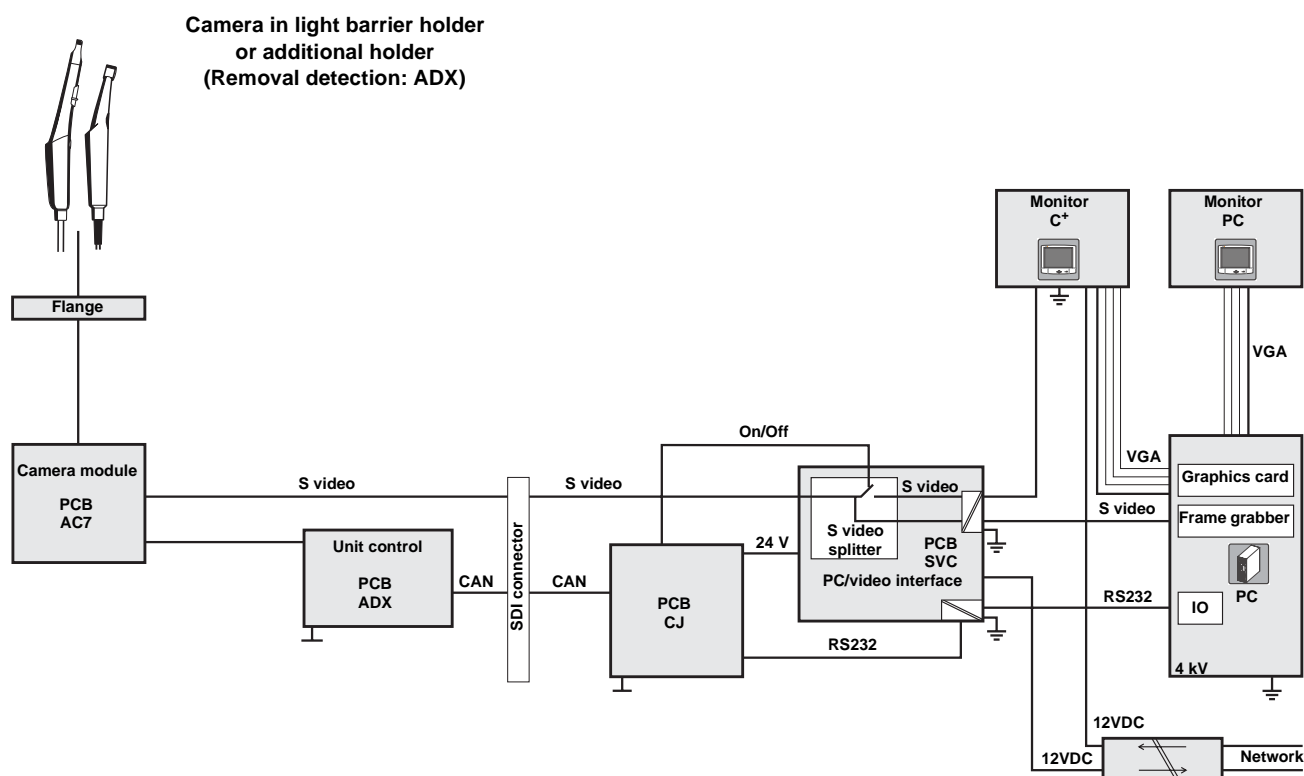
3.9 C3$^+$ with SIROCAM 3/C in the dentist element

3.9.1 Overview of PCBs/modules

MO

AE   **ST**
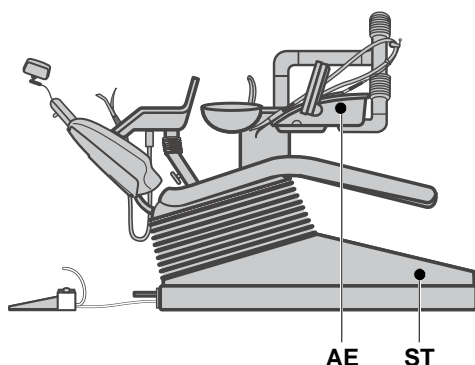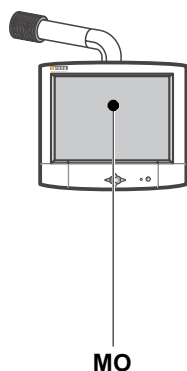
Component	PCB/module
Dentist element (AE)	A7C = Camera module
	SIROCAM 3/C
	CJ = Chair PCB
	NM = Monitor power supply
Serial No. ≤ 69.000	SVI = PC/video adapter
Serial No. ≥ 70.000	SVC = PC/video adapter
Monitor (MO)	

3.9.2 Dentist element with SIROCAM 3/C

On the C3$^+$ the camera can be placed only in holder 5. A camera with a shorter hose length is used.

When retrofitting optional instruments (especially the camera) the pin assignment of connector X12 (holder detection) on PCB ADX must be observed. Possible changes to the pin assignment of the connector are described in the installation instructions of the relevant retrofit kit.

The reason for this is the following: Based on the C2$^+$ the camera was connected logically to holder 6 of the ADX. Even if the camera is placed physically in holder 5! The US handpiece is connected logically to holder 5 of the ADX, even if the US handpiece is placed physically in holder 4!

The **physical mode of counting** is from the left to the right:

● Holder 1, 2, 3, 4, 5

The **logical internal mode of counting** is from the left to the right:

● Holder 1, 2, 3, 5, 6

This mode of counting applies even if the C3$^+$ or C4$^+$ is delivered without a camera. The disadvantage is that a saline solution pump, which should be assigned to the US in the physical holder 4, must be set to 5 in the MODE dialog!

A7C camera module
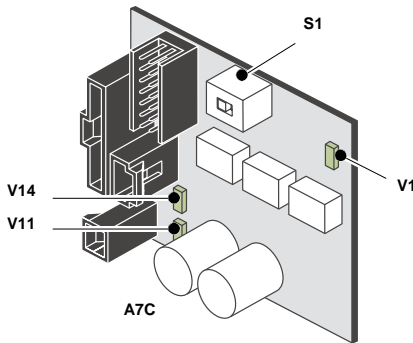
The module assures the galvanic isolation between the patient circuit and the video application. The control information for the camera comes from the serial interface X10 of the ADX module. The power supply on the electronic circuit side is connected to X4 of PCB ADX. The power supply of the camera comes from the switched-mode power supply unit in the junction box.

For the integration in the dentist element the switch S1 must be in position 1. Connector X3 (if present) is not used.

LED V 1	indicates the status of the 5 V operating voltage (patient circuit)
LED V 11	indicates the status of the 5 V operating voltage (electronic circuit)
LED V 14	indicates the status of the 12 V operating voltage (electronic circuit)

3.9.3 Patient chair

An additional power supply unit and video module SVI/SVC are located in the junction box area.

CJ, chair PCB
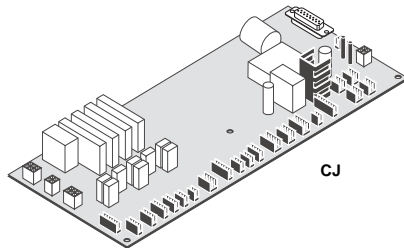
The tasks of PCB CJ regarding the video application are:
- Controlling the video switch (SVI/SVC), see below.
- With a PC connection/second monitor, PCB CJ conducts the function key commands through the RS232 interface (X11) to the PC.

The RS232 commands are structured according to the Mouse Systems Protocol, whereby only the first byte is used.

The transmission parameters are:
- 9600 baud
- 8 data bits
- No parity
- 1 stop bit
- No protocol

SVI/SVC, PC/video adapter
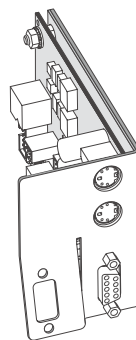
SVI Serial No. $\leq$ 69.000
SVC Serial No. $\geq$ 70.000

The SVI/SVC module requires no galvanic isolation of the camera signal, since this is already ensured in the dentist element.
From Serial No. 70.000 on, the SVC is installed instead of the SVI.
The galvanic isolation of the S video and the RS232 is not effective here.
The S video signal is divided over two outputs. The S video signal to the PC always remains switched through. The S video signal to the monitor can be switched off from PCB CJ.

It is switched off via control cable L22 (Serial No. $\leq$ 69.000);
L139 (Serial No. $\geq$ 70.000) from X80 of CJ to X3/SVI PCB/X4/SVC PCB. The S video signal is switched off from the monitor by the IMAGE_OFF switching signal. This is indicated by the orange LED V98. A monitor that automatically searches for a source (e.g. SIVISION 3 monitor, Part No.: 58 95 896 D3399) is caused to switch over to the VGA input if a corresponding VGA signal (in case of a PC connection) is present.
The galvanic isolation of the control signals is implemented on PCB CJ.

Serial No. $\leq$ 69.000
Serial interface X6 of PCB SVI cannot be used on a C3$^+$. The PC is controlled through the serial interface X11 of PCB CJ.

Serial No. $\geq$ 70.000
Use the serial interface on board SVC.

Power supply unit
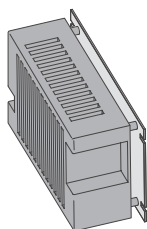
The 12VDC output voltage of the power supply unit is required for the monitor, the A7C and the SVI module.
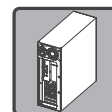
PC connection

PC connection of the video application/second monitor

- The VGA cables are plugged together on the installation plate of the SVI/SVC module.
- The RS232 connection is made on the CJ module (X11).
- The grounding cable of the PC is fastened to the proposed grounding point.
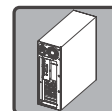
For PC connection of the video application only:

- The S video signal is made available at the lower socket (X10) on the SVI/SVC board. Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.9.4 Monitor

Since the SIROCAM 3/C supplies an S video signal, the monitor was equipped with an S video input. Thus it is possible to display the camera image directly without a converter.

A VGA input is available additionally for the PC connection/second monitor.

The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

(see Operating Instructions for the monitor)

3.9.5 Block diagram of C3$^+$ with Sivision 3 SIROCAM 3/C with PC connection to the C3$^+$ Camera in the dentist element

Camera on the assistant element in light barrier holder - holder 1 or holder 2

(Removal detection: HC)

Flange

*only if camera is installed in holder 1
**only if camera is installed in holder 2

| SVI | Serial No. ≤ 69.000 |
| SVC | Serial No. ≥ 70.000 |

S video

Monitor C$^+$

Monitor PC

VGA

VGA

Graphics card

Frame grabber

S video

PC

Camera module

PCB HC7

1.5 kV

22.1 k

HE control

PCB HP

X6

X4

24VDC
Control signal
Coding

Coding
Control signal/
power supply

S video

PCB SVI/ SVC

12VDC

V24

RS232

PC/video interface

RS232

IO

12VDC

V24

12VDC

NM **4 kV** **Network**

Image stop **FT**

ℹ️ *NOTE*

From Serial No. 70.000:
Galvanic isolation of the SVC PCB is not effective here.

3.10 C5$^+$ with SIROCAM 3/C in the dentist element

3.10.1 Overview of PCBs/modules

MO

AE   **ST**
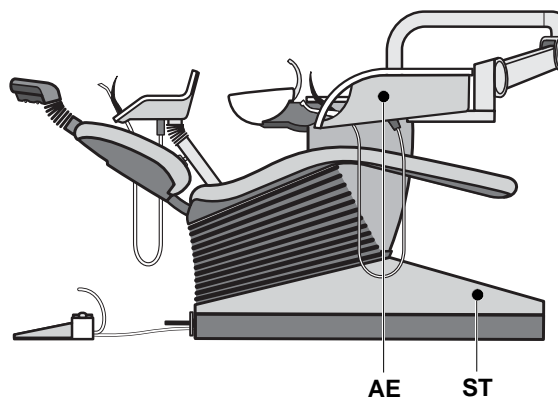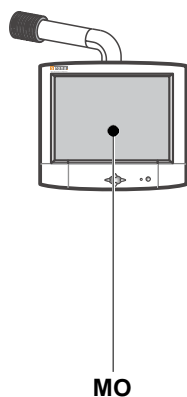
Component	PCB/module
Dentist element (AE)	A7C = Camera module
	SIROCAM 3/C
Patient chair (ST)	CJ = Chair PCB
	KA = PC/video adapter
	NM = Monitor power supply
Monitor (MO)	
Water unit (WE)	WV = WE and video interface

3.10.2 Dentist element with SIROCAM 3/C

On the C5$^+$ the camera can be placed either in holder 5 or in a separate additional holder.
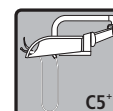
Since the camera was located in holder 5, it became necessary to make it possible for the US handpiece to be deposited in holder 4 on the C5$^+$.

When retrofitting optional instruments (especially the camera) the pin assignment of connector X12 (holder detection) on PCB ADX must be observed. Possible changes to the pin assignment of the connector are described in the installation instructions of the relevant retrofit kit.

The reason for this is the following:

Based on the C2$^+$ the camera was connected logically to holder 6 of the ADX. Even if the camera is placed physically in holder 5!

The US handpiece is connected logically to holder 5 of the ADX. Even if the US handpiece is placed physically in holder 4!

The **physical mode of counting** is from the left to the right:
● Holder 1, 2, 3, 4, 5

The **logical internal mode of counting** is from the left to the right:
● Holder 1, 2, 3, 5, 6

A7C camera module
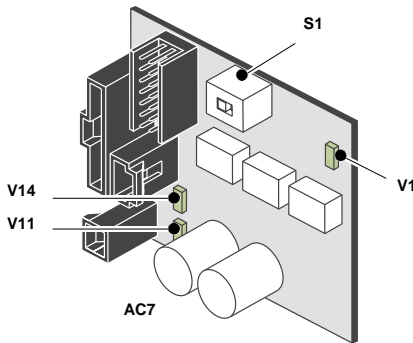
The module assures the galvanic isolation between the patient circuit and the video application. The control information for the camera comes from the serial interface X10 of the ADX module. The power supply on the electronic circuit side is connected to X4 of PCB ADX. The camera power supply is provided via X9.

The +12 V voltage comes from the switched-mode power supply in the junction box and is connected to X1. Connector X3 (if present) is not used.

LED V 1	indicates the status of the 5 V operating voltage (patient circuit)
LED V 11	indicates the status of the 5 V operating voltage (electronic circuit)
LED V 14	indicates the status of the 12 V operating voltage (electronic circuit)

Switch S1 on module A7C determines whether the camera is placed in holder 5 (switch position 1) or in the additional holder (switch position 2). Make sure the setting is correct on repair exchange!

In holder 5 removal of the camera is detected by light barrier, in the additional holder by a reed contact in the camera. The magnet is located in the additional holder.

3.10.3 Patient chair

An additional power supply unit and video module KA are located in the junction box area.

CJ, chair PCB
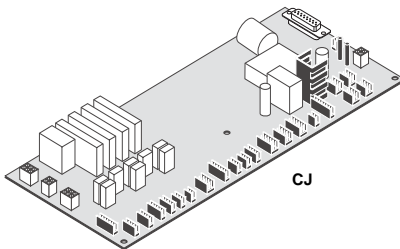
The tasks of PCB CJ regarding the video application are:

- Control of the video switch (WV in the WE).

- With a PC connection/second monitor, PCB CJ transmits the function key commands to the PC* via the RS232 interface (X11).
  Both the control output (X80) and the RS232 interface (X11) are galvanically isolated, so that they can be connected directly to the PC or WV.

* In the C5$^+$, the RS 232 interface leads to the metal plate of board KA via cable L37S.
  Control output X80 leads to board WV in the WE via cable L22S.

The RS232 commands are structured according to the Mouse Systems Protocol, whereby only the first byte is used.

The transmission parameters are:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit
- No protocol

KA module
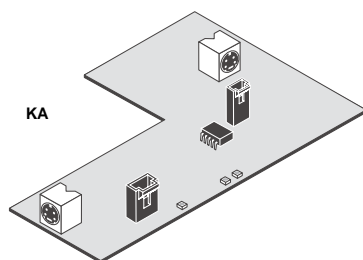
Module KA produces a limited power voltage of +10.5 V from the +12 V.

The KA module requires no galvanic isolation of the camera signal, since this is already ensured in the dentist element. The S video signal to the PC is switched through.

The cutoff is transmitted from X80 on board CJ via control cable L22 to connector X80 on the WV PCB in the WE.

The S video signal is switched off from the monitor by the IMAGE_OFF switching signal. This is indicated by:

- yellow LED V92 on the CJ board and
- yellow LED V3 on the WV board.

A monitor that automatically searches for a source (e.g. SIVISION 3 monitor, Part No.: 58 95 896 D3399) is caused to switch over to the VGA input if a corresponding VGA signal (in case of a PC connection) is present.

The galvanic isolation of the control signals is implemented on PCB CJ.

Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor, board KA and the WV module. The WV board is also supplied with the 10.5 V from board KA. This is indicated by green LED V4 on the WV board.

PC connection
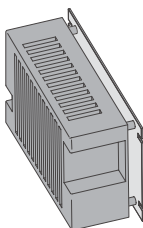
PC connection of the video application/second monitor

- The VGA cables are plugged together on the installation plate of the KA module.
- The RS232 connection is made as shown above (X11).
- The grounding cable of the PC is fastened to the proposed grounding point.
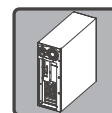
For PC connection of the video application only:

- The S video signal is made available at the lower socket (X10) on the KA. Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.10.4 Monitor

Since the SIROCAM 3/C supplies an S video signal, the monitor was equipped with an S video input. Thus it is possible to display the camera image directly without a converter.

A VGA input is available additionally for the PC connection/second monitor.

The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

(see Operating Instructions for the monitor)

3.10.5 Block diagram of C5$^+$ with Sivision 3 SIROCAM 3/C with PC connection to the C5$^+$ Camera in the dentist element

Camera in light barrier holder

(Removal detection: ADX)
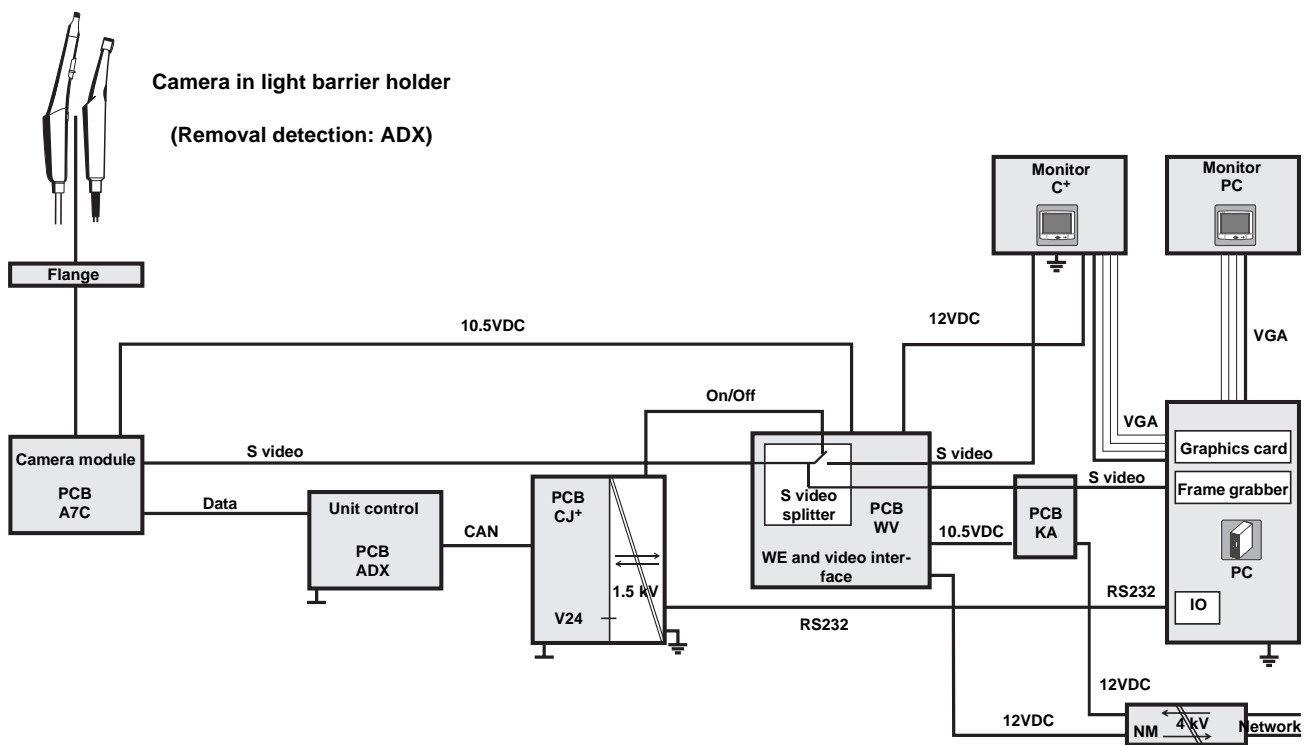
3.11 C3⁺/C4⁺/C5⁺ with SIROCAM 3/C in the assistant element (not for C5⁺ Turn)

3.11.1 Overview of PCBs/modules
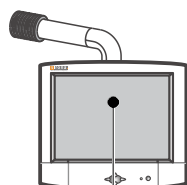
MO
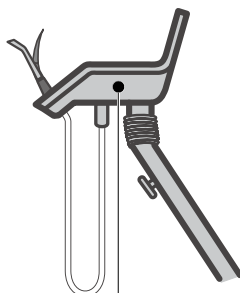
HE

ST

Component	PCB/module
Assistant element (HE)	HC7 = Camera module
	SIROCAM 3/C
Patient chair (ST)	FT = Foot button
Serial No. ≤ 69.000	SVI = PC/video adapter
Serial No. ≥ 70.000	SVC = PC/video adapter
	NM = Monitor power supply

Monitor (MO)

3.11.2 Assistant element with SIROCAM 3/C

The camera can be placed either in holder 1 (SPRAYVIT) or holder 2 (curing light) of the assistant element. In each case there is a special cable kit for the connection to PCB HC.
A PCB is used in the assistant element for the camera supply.

HC7, camera module
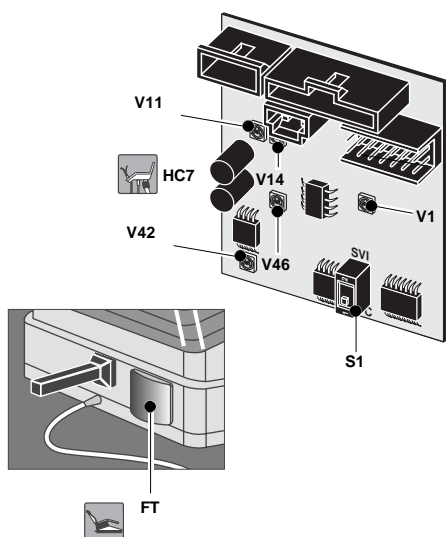
The module assures the galvanic isolation between the patient circuit and the video application. In the assistant element the camera can be installed in the SPRAYVIT or curing light position. Therefore the power supply of the HC7 is either through connector X6 (light voltage of the SPRAYVIT) of PCB HP or connector X4 (24VDC curing light supply) of PCB HP. This voltage comes from the patient circuit and supplies the optocouplers. The camera itself is supplied with 12VDC from the power supply unit in the junction box.
IMAGE STOP is triggered by the foot button connected to X3. If the foot button is actuated, LOW is at X3.2 and HIGH at X9.3. LED V46 lights up when the foot button is activated.

The CAMERA ON signal can come from X2.B3 as well as X2.A4. If the camera is switched by CAM ON/OFF, then the control signal comes from PCB HC. If the camera is controlled by CAM HOLDER, then the light voltage of the SPRAYVIT is responsible. The control signal is terminated with low resistance (50 ohms) in the direction of the camera. Active Camera On is signaled by LED V42.
Since the assistant element does not communicate with the camera through the serial interface, the control information for the camera comes directly from the PC.
Switch S1 for toggling PCBs SVI/SVC is located on the "NEW HC7 board".

V11

HC7 **V14**

V42

V46 **V1**

SVI

S1
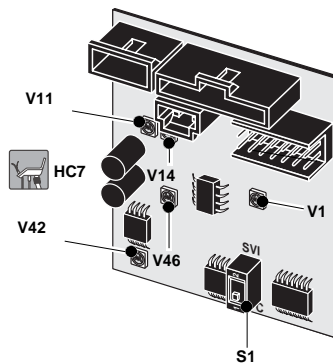
The signals RxD and TxD are conducted non-inverting from the input to the output of PCB HC7. They are connected with the SVI module X5 through connector X1 and cable L57 in the junction box. The serial interface (X6) through which an external PC can be connected is then provided on this PCB. The PC cannot be connected through PCB CJ (X11)!

LED V 1	indicates the status of the 24 V operating voltage on the assistant element side
LED V 11	indicates the status of the 5 V operating voltage on the camera side
LED V 14	indicates the status of the 12 V operating voltage on the camera side
LED V 42	indicates the CAMERA ON status on the camera side
LED V 46	indicates the IMAGE STOP status of the foot button
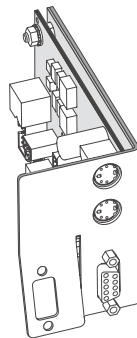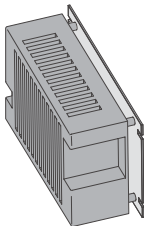
3.11.3 Patient chair

An additional power supply unit (NM) and video module SVI/SVC are located in the junction box area.

SVI/SVC, PC/video adapter

SVI   Serial No. ≤ 69.000
SVC Serial No. ≥ 70.000

The SVI/SVC module requires no galvanic isolation of the camera signal, since this is already ensured in the assistant element.
From Serial No. 70.000 on, the SVC is installed instead of the SVI.
The galvanic isolation of the S video and the RS232 is not effective here.

The S video signal is divided over two outputs. On one hand the monitor is supplied with the S video signal (X9), on the other the signal is conducted to an external PC (X10). Output X9 to the monitor cannot be switched off in this application!

The serial interface coming from the PC (RS232) (at X6) is connected with PCB HC7 converted into V24 (X5).

Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor, the SVI/SVC module and the HC7 module.

PC connection

PC connection of the video application/second monitor

- The VGA cables are plugged together on the installation plate of the SVI/SVC module.

- The RS232 connection is made on the SVI module (X6).

- The grounding cable of the PC is fastened to the proposed grounding point.

- The S video signal is made available on the SVI/SVC module (X10). Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.11.4 Monitor

Since the SIROCAM 3/C supplies an S video signal, the monitor was equipped with an S video input. Thus it is possible to display the camera image directly without a converter.

A VGA input is available additionally for the PC connection. The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

In this configuration the monitor is always supplied with both signals (S video & VGA). This means that in the PC mode the S video signal is also present at the input of the monitor. Switching over between VGA input (analog port) and S video input (S video port) must therefore be performed manually on the monitor.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

(see Operating Instructions for the monitor)

3.11.5 Block diagram of C3⁺/C4⁺/C5⁺ with Sivision 3 SIROCAM 3/C with PC connection and camera on the assistant element

**Camera on the assistant element
in light barrier holder - holder 1 or holder 2**

(Removal detection: HC)

*only if camera is installed in holder 1
**only if camera is installed in holder 2

SVI   Serial No. ≤ 69.000
SVC   Serial No. ≥ 70.000

ℹ️ NOTE

From Serial No. 70.000:
Galvanic isolation of the SVC PCB is not effective here.

3.12 C6 with SIROCAM 3/C in the dentist element

3.12.1 Overview of PCBs/modules
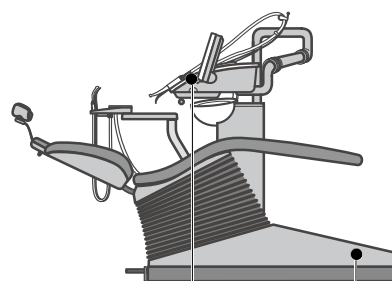
MO   AE   ST

Component	PCB/module
Dentist element (AE)	AC7 = Camera module
	SIROCAM 3/C
Patient chair (ST)	SVI = PC/video adapter
	NM = Monitor power supply
Monitor (MO)	

3.12.2 Dentist element with SIROCAM 3/C

A PCB is used in the dentist element for the camera supply. The camera can be installed only in holder 4.

AC7, camera module
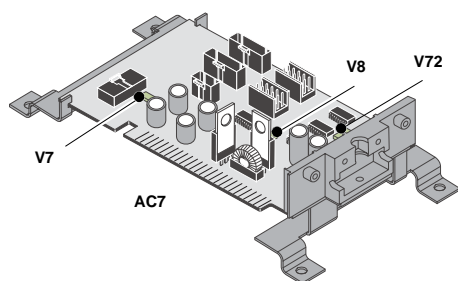
On the C6 the module is neither operated in the patient circuit nor supplied from it. The power supply is provided from PCB AUB. Cable L12 is looped through PCB AC7 for this purpose. The voltages for the camera and AC7 are generated on the AC7.

For controlling the holder and for freezing the image, the connection between PCB AB and PCB AZ is looped through the camera module. Since the C6 has no serial interface of its own, the control signals of the camera are forwarded through a serial connection of PCB AC7 to PCB SVI.

Different circuits link control information and forward it to the camera. The module is designed for different units, therefore not all connectors are used on the C6.

LED V 8	indicates the status of the 5 V operating voltage
LED V 7	indicates the status of the 12 V operating voltage
LED V 72	indicates the status of the serial interface on the C6

3.12.3 Patient chair

A power supply unit and the video module are located in the junction box area.

SVI, PC/video adapter

SVI

The SVI module does not require any galvanic isolation, since this is already assured in the dentist element.
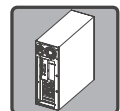
The S video signal is divided over two outputs. On one hand the monitor is supplied with the S video signal (X9), on the other the signal is conducted to an external PC (X10). Output (X9) to the monitor cannot be switched off in this application!

The serial interface coming from the PC (RS232) (at X6) is connected with PCB AC7 converted into V24 (X5).

Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor and the SVI module.

PC connection

PC connection of the video application/second monitor

● The VGA cables are plugged together on the installation plate of the SVI module.

For PC connection of the video application only:

● The RS232 connection is made on the SVI module (X6).

● The grounding cable of the PC is fastened to the proposed grounding point.

● The S video signal is made available on the SVI (X10). Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.12.4 Monitor

Since the SIROCAM 3/C supplies an S video signal, the monitor was equipped with an S video input. Thus it is possible to display the camera image directly without a converter. A VGA input is available additionally for the PC connection.

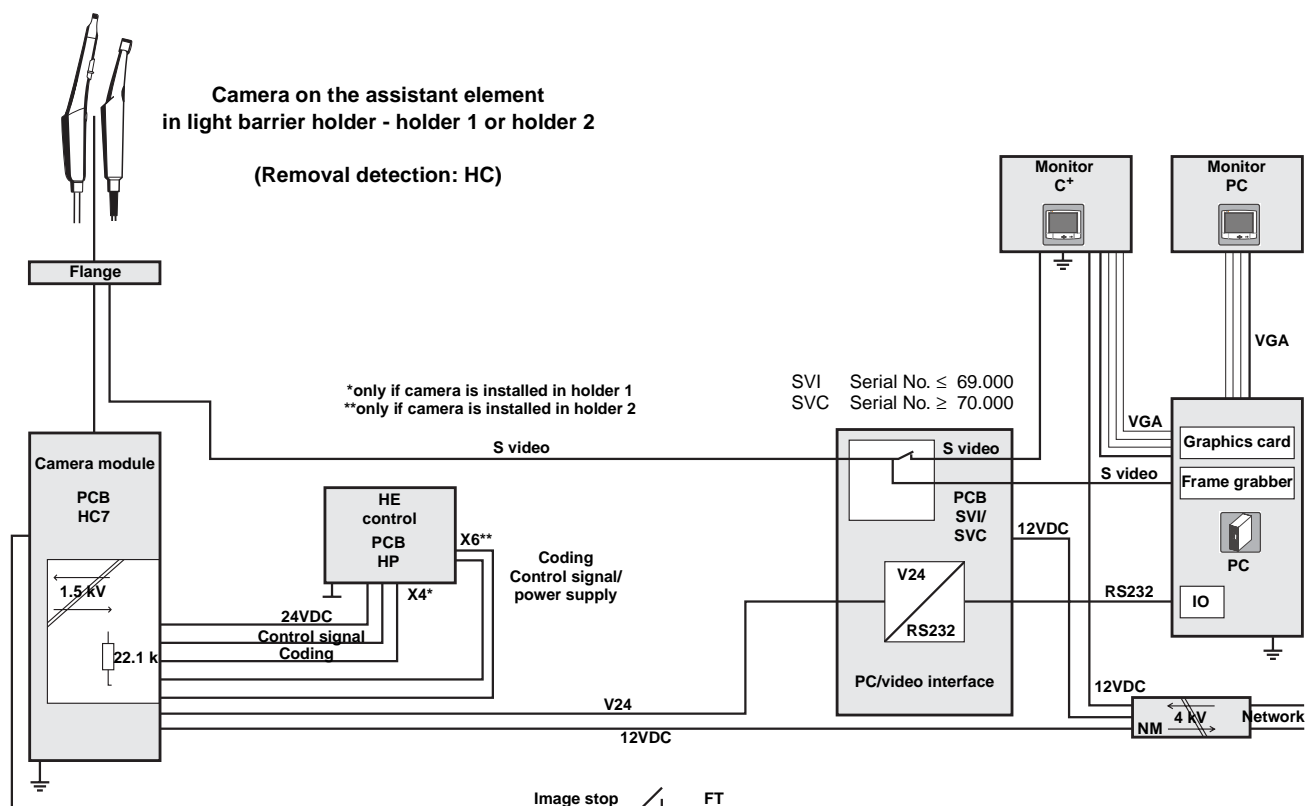The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

In this configuration the monitor is always supplied with both signals (S video & VGA). This means that in the PC mode the S video signal is also present at the input of the monitor. Switching over between VGA input (analog port) and S video input (S video port) must therefore be performed manually on the monitor.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

(see Operating Instructions for the monitor)

3.12.5 Block diagram of C6 with Sivision 3 SIROCAM 3/C with PC connection to the C6

Camera is enabled only by the system and controls PC with Videxis software. Camera not in the patient circuit. No galvanic isolation necessary.

3.13 C8 with SIROCAM 3/C in the dentist element

3.13.1 Overview of PCBs/modules

MO   AE   ST

Component	PCB/module
Dentist element (AE)	AC7 = Camera module
	SIROCAM 3/C
Patient chair (ST)	SVI = PC/video adapter
	NM = Monitor power supply
Monitor (MO)	

3.13.2 Dentist element with SIROCAM 3/C

A PCB is used in the dentist element for the camera supply. The camera can be installed only in holder 4.

AC7, camera module

On the C8 the module is neither operated in the patient circuit nor supplied from it. The power supply is provided from PCB AUB. Cable L12 is looped through PCB AC7 for this purpose. The voltages for the camera and AC7 are generated on the AC7.

For controlling the holder and for freezing the image, the connection between PCB AB and PCB AZ is looped through the camera module.

Since the C8 has no serial interface of its own, the control signals of the camera are forwarded through a serial connection of PCB AC7 to PCB SVI.

Different circuits link control information and forward it to the camera. The module is designed for different units, therefore not all connectors are used on the C8.

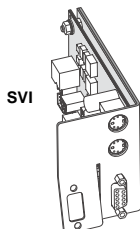|	
LED V 8	indicates the status of the 5 V operating voltage
LED V 7	indicates the status of the 12 V operating voltage
LED V 72	indicates the status of the serial interface on the C8

3.13.3 **Patient chair**

An additional power supply unit and the video module SVI are located in the junction box area.

SVI, PC/video adapter

SVI
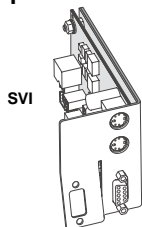
Power supply unit
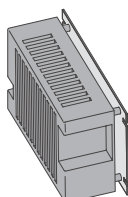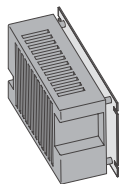
PC connection

The SVI module does not require any galvanic isolation, since this is already assured in the dentist element.

The S video signal is divided over two outputs. On one hand the monitor is supplied with the S video signal (X9), on the other the signal is conducted to an external PC (X10). Output (X9) to the monitor cannot be switched off in this application!

The serial interface coming from the PC (RS232) (at X6) is connected with PCB AC7 converted into V24 (X5).
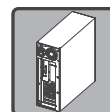
The 12VDC output voltage of the power supply unit is required for the monitor and the SVI module.

PC connection of the video application/second monitor
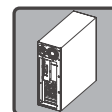
● The VGA cables are plugged together on the installation plate of the SVI module.

For PC connection of the video application only:
● The RS232 connection is made on the SVI module (X6).
● The grounding cable of the PC is fastened to the proposed grounding point.
● The S video signal is made available on the SVI (X10). Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.13.4 **Monitor**

Since the SIROCAM 3/C supplies an S video signal, the monitor was equipped with an S video input. Thus it is possible to display the camera image directly without a converter.

An additional VGA input is available for connecting the PC.
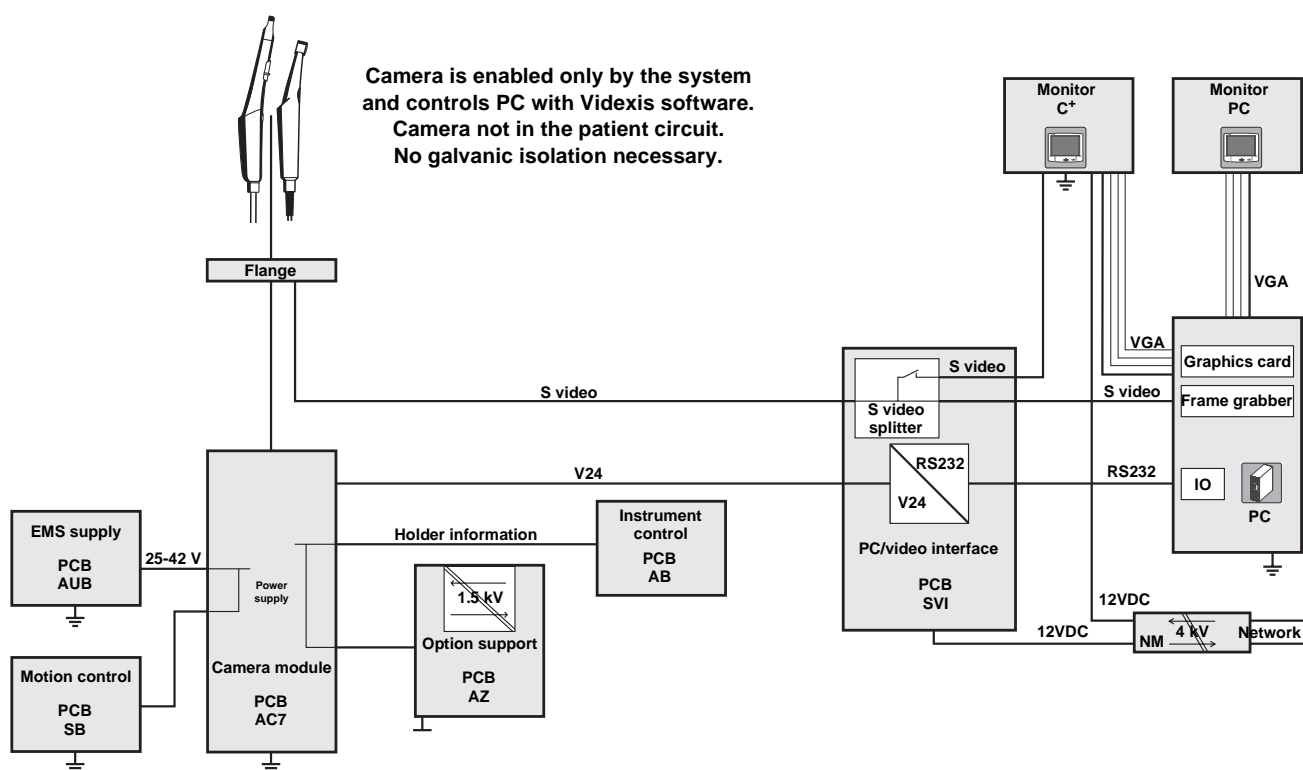The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

In this configuration the monitor is always supplied with both signals (S video & VGA). This means that in the PC mode the S video signal is also present at the input of the monitor. Switching over between VGA input (analog port) and S video input (S video port) must therefore be performed manually on the monitor.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

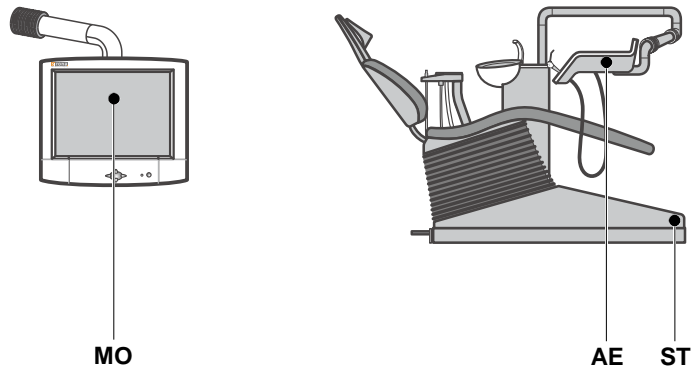(see Operating Instructions for the monitor)

3.13.5 Block diagram of C8 with Sivision 3 SIROCAM 3/C with PC connection to the C8

Camera is enabled only by the system and controls PC with Videxis software. Camera not in the patient circuit. No galvanic isolation necessary.

Flange

Monitor C⁺

Monitor PC

VGA

S video

S video

S video splitter

VGA

Graphics card

Frame grabber

IO

PC

V24

RS232

RS232

EMS supply

PCB AUB

25-42 V

Power supply

Holder information

Instrument control

PCB AB

V24

PC/video interface

PCB SVI

12VDC

12VDC

1.5 kV

NM 4 kV Network

Option support

PCB AZ

Motion control

PCB SB

Camera module

PCB AC7

3.14 C8$^+$ with SIROCAM 3/C in the dentist element

3.14.1 Overview of PCBs/modules

MO   **AE   ST**

Component	PCB/module
Dentist element (AE)	AC7 = Camera module
	SIROCAM 3/C
Patient chair (ST)	SVI = PC/video adapter
	NM = Monitor power supply
Monitor (MO)	

3.14.2 Dentist element with SIROCAM 3/C

A PCB is used in the dentist element for the camera supply. The camera can be installed only in holder 4.

AC7, camera module

V72
V7
V8

AC7
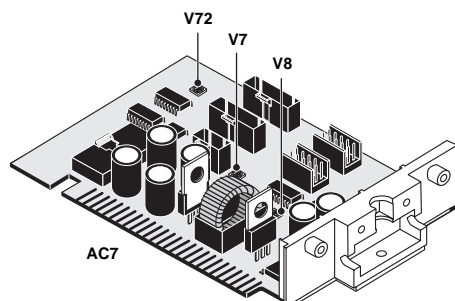
On the C8$^+$ the module is neither operated in the patient circuit nor supplied from it. The power supply is provided from PCB SB. The voltages for the camera and AC7 are generated on the AC7.

For controlling the holder and for freezing the image, the connection between PCB AB and PCB AZ2 is looped through the camera module.

Since the C8$^+$ has no serial interface of its own, the control signals of the camera are forwarded through a serial connection from PCB AC7 to PCB SVI.

Different circuits link control information and forward it to the camera. Since the module is designed for different units, not all connectors are used on the C8$^+$.

|	
LED V 8	indicates the status of the 5 V operating voltage
LED V 7	indicates the status of the 12 V operating voltage
LED V 72	indicates the status of the serial interface on the C8

3.14.3 **Patient chair**

An additional power supply unit and the video module SVI are located in the junction box area.

SVI, PC/video adapter

SVI

The SVI module does not require any galvanic isolation, since this is already assured in the dentist element.

The S video signal is divided over two outputs. On one hand the monitor is supplied with the S video signal (X9), on the other the signal is conducted to an external PC (X10). Output (X9) to the monitor cannot be switched off in this application!

The serial interface coming from the PC (RS232) (at X6) is connected with PCB AC7 converted into V24 (X5).

Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor and the SVI module.

PC connection

PC connection of the video application/second monitor

● The VGA cables are plugged together on the installation plate of the SVI module.

For PC connection of the video application only:
● The RS232 connection is made on the SVI module (X6).
● The grounding cable of the PC is fastened to the proposed grounding point.
● The S video signal is made available on the SVI (X10). Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.14.4 **Monitor**

Since the SIROCAM 3/C supplies an S video signal, the monitor was equipped with an S video input. Thus it is possible to display the camera image directly without a converter.

An additional VGA input is available for connecting the PC.
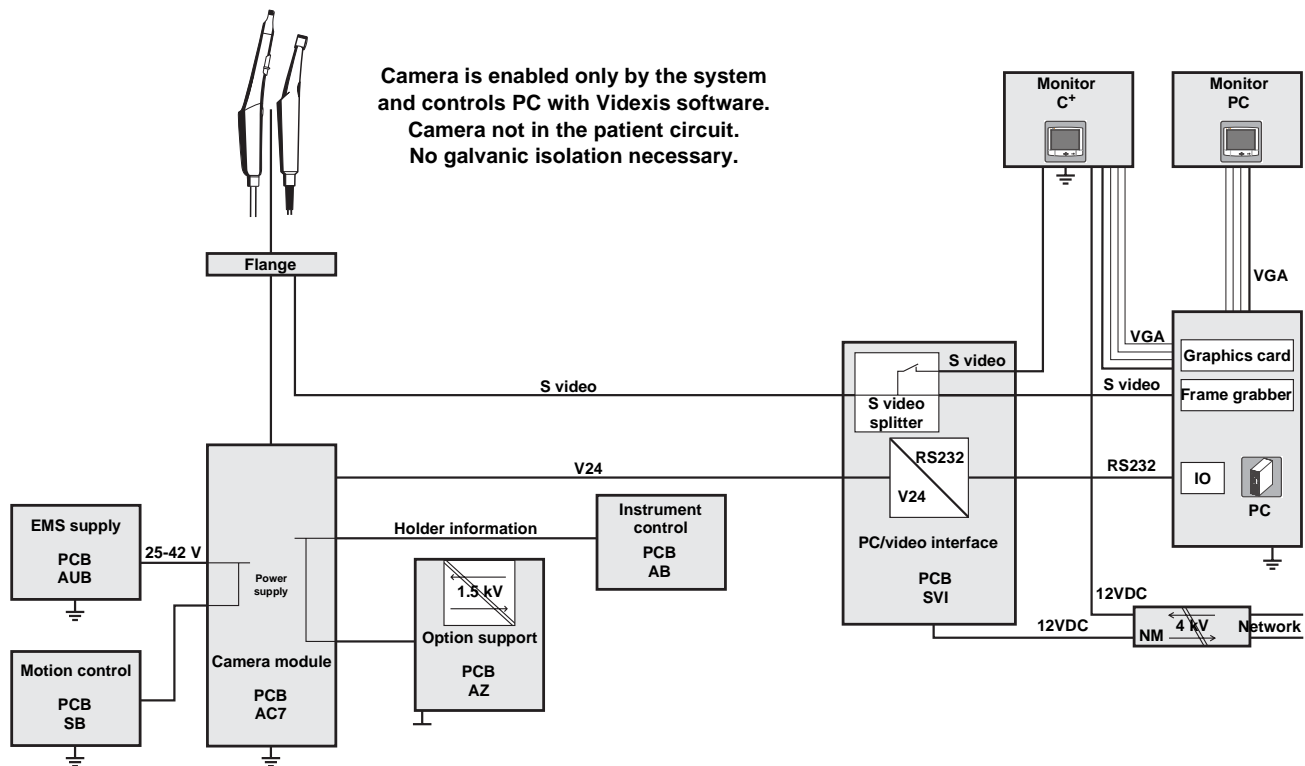The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

In this configuration the monitor is always supplied with both signals (S video & VGA). This means that in the PC mode the S video signal is also present at the input of the monitor. Switching over between VGA input (analog port) and S video input (S video port) must therefore be performed manually on the monitor.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

(see Operating Instructions for the monitor)

3.14.5 Block diagram of C8⁺ with Sivision 3 SIROCAM 3/C with PC connection to the C8⁺

Camera is enabled only by the system and controls PC with Videxis software. Camera not in the patient circuit. No galvanic isolation necessary.

Monitor C⁺

Monitor PC

Flange

VGA

VGA

S video

Graphics card

Frame grabber

S video

S video splitter

S video

RS232

RS232

IO

V24

V24

PC

PC/video interface

PCB SVI

Camera module

Holder information

Holder information

PCB AB

PCB AZ2 Option support

25-42 V

1.5 kV

Power supply

12VDC

12VDC

NM 4 kV

Network

Motion control

PCB SB

PCB AC7

3.15 ProFeel with SIROCAM 3/C in the dentist element

3.15.1 Overview of PCBs/modules

MO   **ST**   **WE**   **AE**

Component	PCB/module
Dentist element (AE)	AC7 = Camera module
	SIROCAM 3/C
Patient chair (ST)	SVI = PC/video adapter
	NM = Monitor power supply
Monitor (MO)	

3.15.2 Dentist element with SIROCAM 3/C

A PCB is used in the dentist element for the camera supply. The camera can be installed only in holder 4.

AC7, camera module

V8   **V72**

V7

AC7
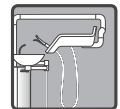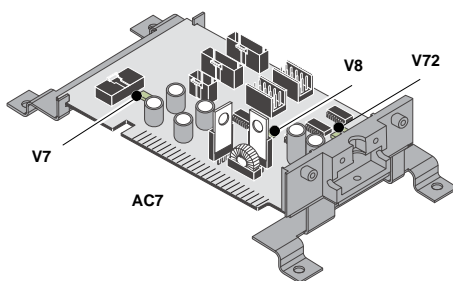
On the ProFeel the module is neither operated in the patient circuit nor supplied from it. The power supply is provided from PCB AUB. Cable L12 is looped through PCB AC7 for this purpose. The voltages for the camera and AC7 are generated on the AC7.

For controlling the holder and for freezing the image, the connection between PCB AB and PCB AZ is looped through the camera module. Since the ProFeel has no serial interface of its own, the control signals of the camera are forwarded through a serial connection of PCB AC7 to PCB SVI.

Different circuits link control information and forward it to the camera. The module is designed for different units, therefore not all connectors are used on the ProFeel.

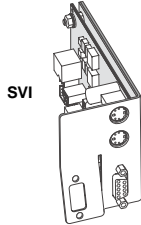|	
LED V 8	indicates the status of the 5 V operating voltage
LED V 7	indicates the status of the 12 V operating voltage
LED V 72	indicates the status of the serial interface on the ProFeel

3.15.3 Water unit

A power supply unit and the video module SVI are located in the water unit.

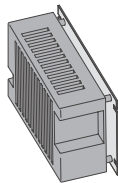**SVI, PC/video adapter/power supply unit**

SVI

The SVI module does not require any galvanic isolation, since this is already assured in the dentist element.

The S video signal is divided over two outputs. On one hand the monitor is supplied with the S video signal (X9), on the other the signal is conducted to an external PC (X10). Output (X9) to the monitor cannot be switched off in this application!

The serial interface coming from the PC (RS232) (at X6) is connected with PCB AC7 converted into V24 (X5).
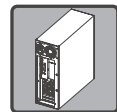
Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor and the SVI module.

SVI

Power supply unit

PC connection

PC connection of the video application/second monitor

● The VGA cables are plugged together on the installation plate of the SVI module.

● **For PC connection of the video application only:**
The RS232 connection is made on the SVI module (X6).
The grounding cable of the PC is fastened to the proposed grounding point.

● The S video signal is made available on the SVI (X10). Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.15.4 Monitor

Since the SIROCAM 3/C supplies an S video signal, the monitor was equipped with an S video input. Thus it is possible to display the camera image directly without a converter.

An additional VGA input is available for connecting the PC.
The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

In this configuration the monitor is always supplied with both signals (S video & VGA). This means that in the PC mode the S video signal is also present at the input of the monitor. Switching over between VGA input (analog port) and S video input (S video port) must therefore be performed manually on the monitor.
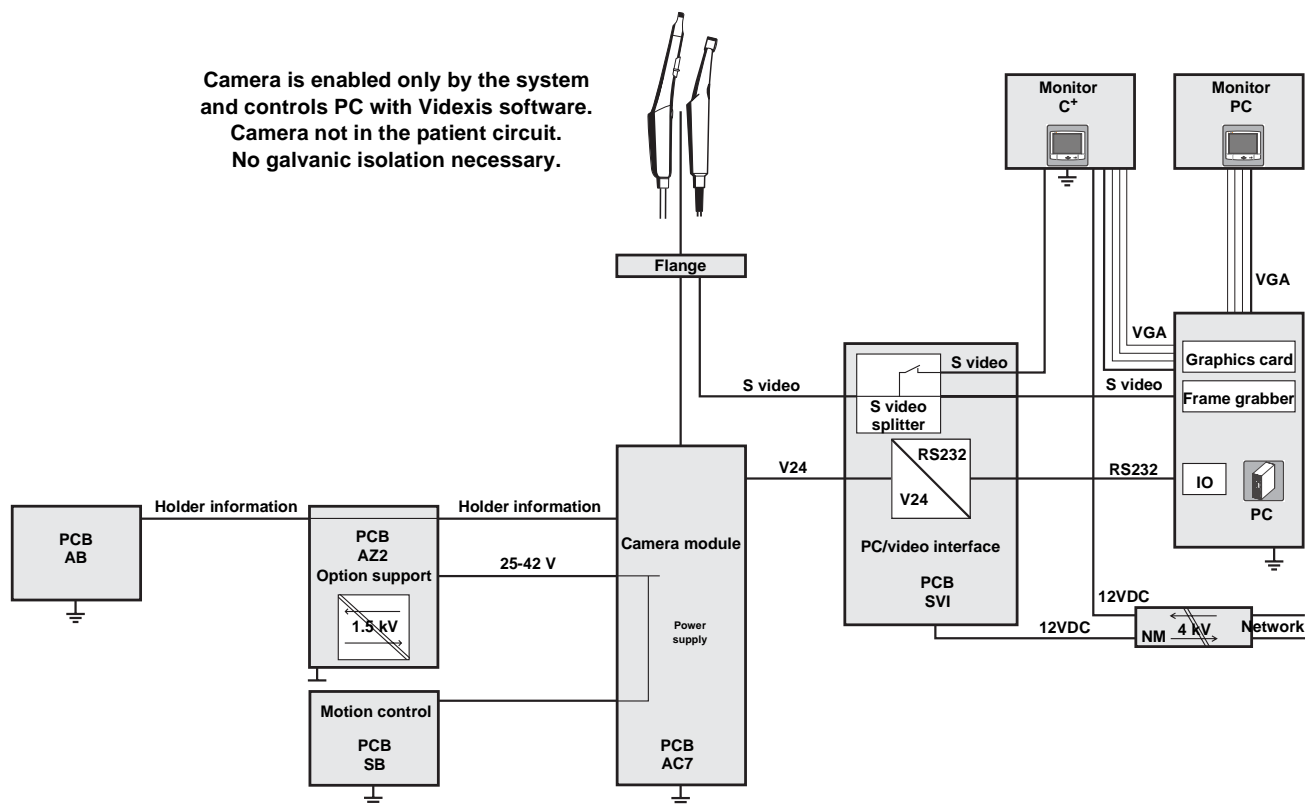
The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

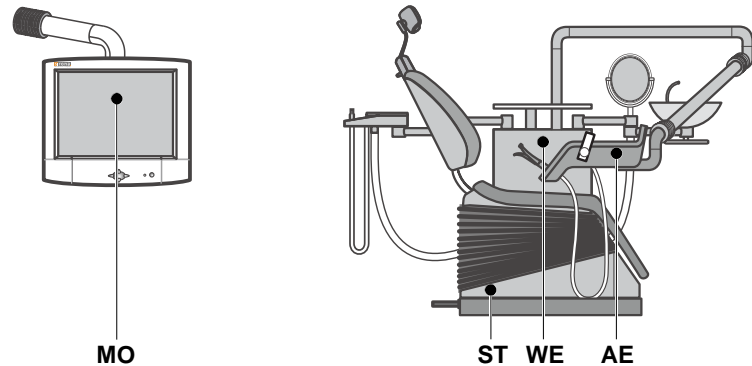(see Operating Instructions for the monitor)

3.15.5 Block diagram of ProFeel with Sivision 3 SIROCAM 3/C with PC connection to the ProFeel

Camera is enabled only by the system and controls PC with Videxis software. Camera not in the patient circuit. No galvanic isolation necessary.

Flange

Monitor C+

Monitor PC

VGA

Graphics card

Frame grabber

VGA

S video

S video splitter

S video

S video

RS232

V24

RS232

IO

PC

PC/video interface

PCB SVI

EMS supply

PCB AUB

25-42 V

Power supply

Holder information

Instrument control

PCB AB

1.5 kV

Option control

PCB AZ

V24

Motion control

PCB SB

Camera module

PCB AC7

12VDC

12VDC

NM 4 kV Network

3.16 Kompakt with SIROCAM 3/C

3.16.1 Overview of PCBs/modules
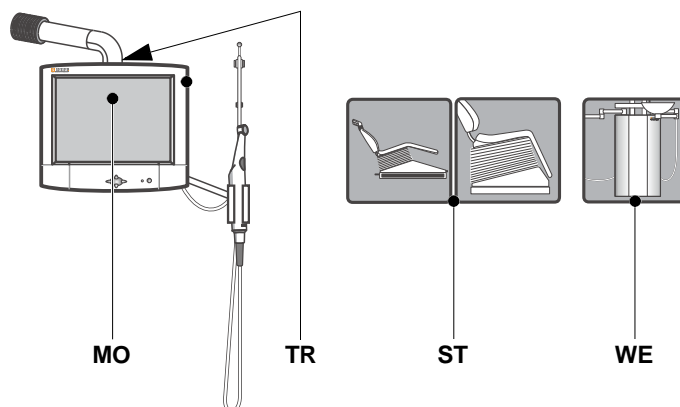
Component	PCB/module	
Support arm (TR)	KC7	= Compact electronics
	SIROCAM 3/C	
Patient chair (ST)	KA	= Module
	NM	= Monitor power supply
	FT	= Foot button
Water unit (WE) ProFeel	KA	= Module
	NM	= Monitor power supply

Monitor (MO)

3.16.2 Kompakt with SIROCAM 3/C

The Kompakt solution is a Sivision version working on its own without requiring an electrical connection to the treatment center.
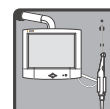
KC7 module
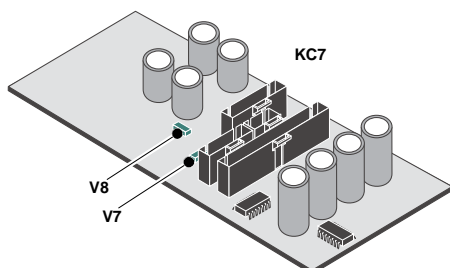
PCB KC7 is used for controlling the SIROCAM 3/C. No other components of the treatment center are required for this. The KC7 is installed on the lamp support tube (or on the tray) behind the monitor. The SIROCAM 3/C is deposited in a magnetic holder provided for it on the side of the monitor. When it is removed the camera is started automatically by the no longer existing magnetic field (Camera On).

PCB KC7 is supplied through connector X4 from the 12VDC switched-mode power supply in the junction box (LED V7).

The SIROCAM 3/C is supplied with power via PCB KC7.

An auxiliary voltage VCC 5VDC is also generated for the logic and indicated by LED V8.

The signals RxD and TxD are conducted non-inverting from the input to the output of PCB KC7. They are fed through connector X4 to the PC and connector X9 to the camera.

IMAGE STOP is triggered by the foot button connected to X4. If the foot button is actuated, LOW is at X4.5 and HIGH at X9.3.

The S video signal from the camera is fed in at X2. Y and C are terminated there with 75 ohms. The signals are duplicated through a capacitive coupling and decoupled with the aid of four video OPs. Termination on the output side is with 75 ohms in series.

The two independent S video signals are brought out at X5 (for the monitor) and X4 (for the PC).

A still image is generated by actuating the Compact's own foot switch FT.

C1⁺ - C5⁺, C1 - C4   **C6, C8, ProFeel**
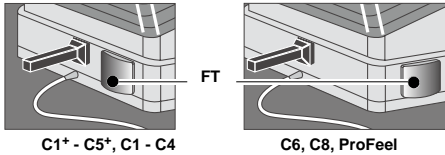
3.16.3 Patient chair/water unit

Up to two modules for the video application are installed in the junction box. In the ProFeel the modules are in the water unit.
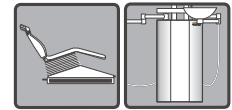
There are two construction versions of the Compact camera:
- without KA module
- with KA module

Without KA module

Only the monitor power supply unit is installed in the patient chair/water unit. It is connected directly to the camera. In the case of a PC connection, the connection cables of the PC are connected in the junction box directly with the corresponding cables for PCB KC7.

KA module
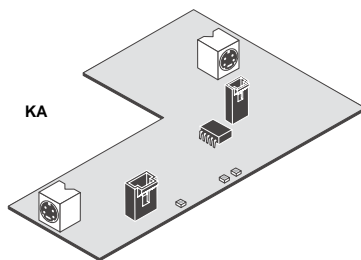
This module contains a circuit for limiting the output power of the 12VDC input voltage to 15 W (UL approval). The consequence is a reduction of the output voltage to 10.5 VDC (LED V2), which is in the operating voltage range of the camera. The output voltage is brought down in case of a short circuit. If there is a short circuit, LED V3 lights up. This circuit is fed by the power supply unit (LED V1 12VDC) which also supplies the monitor.

To achieve better coupling of the signal grounds to the system ground in case of a PC connection, the S video signals are looped through PCB KA. The ground of the Y and C signal is connected to the system ground through the screw union of the PCB.

The S video signal comes from PCB KC7 (X8) and is connected with the PC through X10.

Power supply unit

The 12VDC output voltage of the power supply unit is required for the monitor and the KA module.

C1⁺ - C5⁺,
C1 - C4,
C6, C8   **ProFeel**
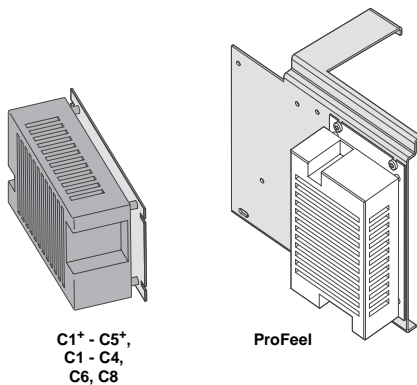
PC connection with KA module

PC connection of the video application

- The VGA and RS232 cables are plugged together on the installation plate of the KA module.
- The grounding cable of the PC is fastened to the proposed grounding point.
- The S video signal is connected with the PC through PCB KA (X10) as described above. Depending on the wiring in the practice, a PIN/PIN adapter may be required here.

3.16.4 Monitor

Since the SIROCAM 3/C supplies an S video signal, the monitor was equipped with an S video input. Thus it is possible to display the camera image directly without a converter.

A VGA input is available additionally for the PC connection.

The 12VDC power supply is made through the 4-pin POWER MINI DIN plug.

In this configuration the monitor is always supplied with both signals (S video & VGA). This means that in the PC mode the S video signal is also present at the input of the monitor. Switching over between VGA input (analog port) and S video input (S video port) must therefore be performed manually on the monitor.

The LED next to the on/off switch can assume three states:

green:	there is a VGA/S video signal present
orange:	there is no VGA/S video signal present or the input is wrongly selected
off:	monitor is switched off or no voltage available

(see Operating Instructions for the monitor)

3.16.5 Block diagram - Sivision 3 Kompakt (KA module) SIROCAM 3/C with PC connection Kompakt with KA module

Camera not in the patient circuit.
No galvanic isolation necessary.

N

Magnet in holder

S

Flange

Monitor
C+

Monitor
PC

VGA

S video

VGA

Graphics card

S video

RS232

IO

S video

Frame grabber

V24   RS232

PC

Image stop   Additional
FT

Kompakt connection

**PCB
KA**

12VDC

12VDC

**10.5VDC
max. 15 W**   **12VDC**

NM 4 kV **Network**

Kompakt module

**PCB
KC7**
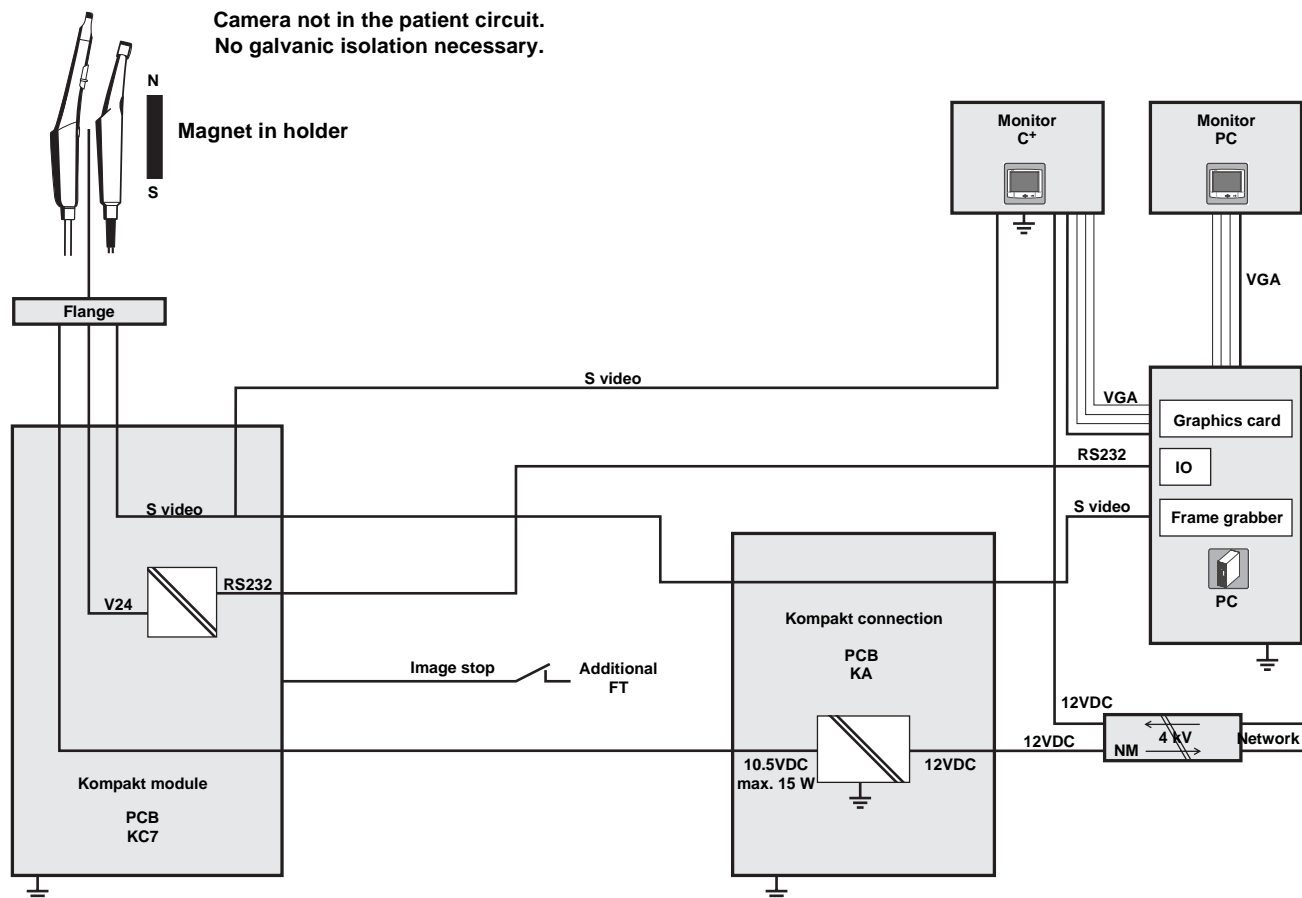
3.16.6 Block diagram - Sivision 3 Kompakt SIROCAM 3/C with PC connection Kompakt Without KA module

Camera not in the patient circuit.
No galvanic isolation necessary.

N

Magnet in holder

S

Flange

Monitor C+

Monitor PC

VGA

S video

VGA

Graphics card

S video

RS232

IO

S video

Frame grabber

V24

RS232

PC

Image stop   **Additional FT**

12VDC

12VDC   4 kV   Network

NM

Kompakt module

PCB KC7
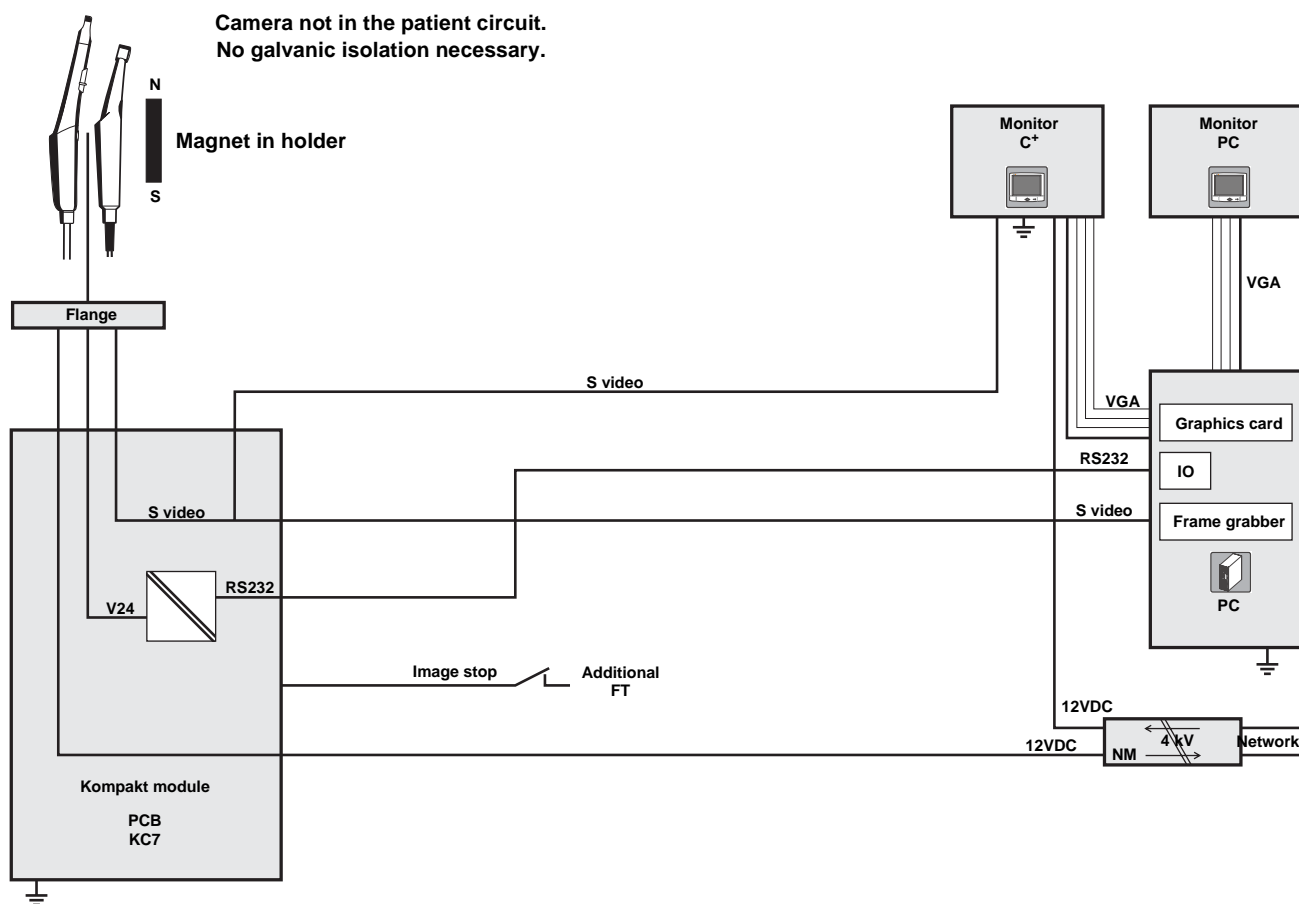
3.17 Retrofitting the C1, C2, C3, C4 treatment centers
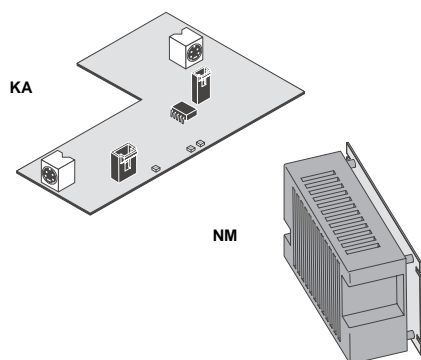
For these treatment centers it is possible to retrofit the Kompakt video application as well as the second monitor. The Kompakt video application is equipped with the components of the Sivision 3 Kompakt solution with KA module described in Chapter 3.16.

The second monitor option is equipped with the C$^+$ monitor and the NM monitor power supply unit.

sirona.

T h e   D e n t a l   C o m p a n y

4 PC connection

sirona.

T h e   D e n t a l   C o m p a n y

4.1 Product features of the PC connection

A PC connection exists if a Sirona treatment center is connected with a PC for use by the practice personnel.

The PC connection enables the user to display PC applications at the treatment center. Depending on the treatment center, control of the PC from the treatment center is possible.

Video images of a Sirocam integrated in the treatment center can be processed on the PC and displayed on the treatment center monitor.

4.2 Function description

There are 2 different expansion stages of the PC connection:

- Sivision with SIROCAM

    Camera integrated in the treatment center, integrated monitor with signal supply by the PC and the possibility of triggering PC control functions from the treatment center.

- Second monitor function

    Monitor integrated in the treatment center with signal supply by the PC.

    The C1, C1$^+$, C2$^+$, C3$^+$, C4$^+$, C5$^+$ and M1$^+$ treatment centers offer the additional possibility of triggering the PC control functions from the treatment center.

The expansion stages differ on the PC side only by the presence or absence of individual components. The individual components are identical for all treatment centers.

4.2.1 **PC block diagram**

Dental treatment center

Treatment center Monitor

PC Monitor

PC

Interfaces treatment center/PC

Ground wire

RS232   S video   VGA   VGA

Hardware
- COM port
- Frame grabber card
- Graphics card

Drivers
- COM standard driver
- Drivers Frame grabber card
- Drivers Graphics card

Software Application programs
- SIUCOM
- Video application (Sidexis/Videxis)
- SCREEN (White screen/black screen)
- Other Programs

= not required for pure second monitor operation

= not required for pure second monitor operation without PC control function

= optional

4.2.2 **Functional sequences**

A few typical functions are described here. Since Siucom can be configured very flexibly, the characteristics of the factory settings are described here.

A main function of the PC connection is displaying a video image of the camera integrated in the treatment center (not available in second monitor function without camera).

When the camera integrated in the treatment center is removed, the following happens:

- The treatment center detects the camera removal and generates a corresponding serial data package that is output through the RS232 connection.

- At the same time the video live image taken by the camera is available at the S video connection from now on.

- The Siucom program, which monitors the COM port indicated in the Siucom setting, detects an arriving data package and interprets it as camera removal.

- The Siucom program then informs the Sidexis program that the camera is removed.

- The Sidexis program opens a window frame and informs the frame grabber driver that the video live image has to be displayed inside this frame.
- The frame grabber card digitizes the video live image and transfers the image contents to the graphics card.
- The graphics card outputs the Sidexis/Videxis window together with the video live image through the VGA cable to the monitor, where it is displayed.
- When a white screen is displayed on the PC the following happens:
- The operator presses the white screen key (e.g. X-ray image viewer key on the C2$^+$). In this way the treatment center generates a corresponding serial data package that is output through the RS232 connection.
- The Siucom program, which monitors the COM port indicated in the Siucom setting, detects an arriving data package and interprets it, according to the key configuration, as white screen. TOGGLE is set in the configuration. Siucom now checks all programs running in Windows.

  Three further procedures are possible:
  - Siucom determines that the white screen (screen program with the "white" parameter) has not been started. Siucom then starts the white screen.
  - Siucom determines that the white screen is already started and is running in the foreground. Siucom then closes the white screen.
  - Siucom determines that the white screen is already started and is running in the background (another application is running in the foreground). Siucom then places the white screen in the foreground.
- The corresponding display is output through the graphics card to the monitor.

The next image in SIDEXIS/VIDEXIS can be selected from the treatment center, e.g. C2$^+$, by pressing the counterclockwise rotation key (provided several images are opened).

The following happens when the counterclockwise rotation key is pressed:
- The treatment center detects the key activation and generates a corresponding serial data package that is output through the RS232 connection.
- The Siucom program, which monitors the COM port indicated in the Siucom setting, detects an arriving data package and interprets it, according to the key configuration, as command for activating the next image in the SIDEXIS/VIDEXIS program.
- Siucom places SIDEXIS in the foreground (if Sidexis/Videxis is not already running in the foreground) and informs SIDEXIS/VIDEXIS that the next image should be selected.
- Sidexis selects the next image.
- The corresponding display is output through the graphics card to the monitor.

4.3 Function description of individual components

4.3.1 Treatment center/PC interfaces

This section describes the function and connections of the connection cables between treatment center and PC.

RS-232 cable

Function

This cable is used for serial data transmission. The keys with PC control function and events (camera removal and replacement, foot switch) described in the operating instructions of the corresponding treatment center always trigger a data package five bytes in length.

In SIVISION 3 the PC mode must be set on the treatment center.

With the "SIROCAM 3/C direct" device selection in Siucom, the PC sends a data package four bytes in length to the treatment center; in this way the camera can be switched from video to PC mode and back.

Transmission direction

With "SIROCAM 3/C direct" the data flow is bidirectional; in all other treatment centers data is transferred only to the PC.

S video cable

Function

The video signal is transmitted through this cable according to the PAL S standard.

Transmission direction

From the treatment center to the PC.

VGA cable[1]

Function

The monitor image (PC desktop) is transmitted through this cable.

Because of the long cable lengths and the high mechanical loads in the support arm, a special cable not supporting the plug-and-play functionality is used (see also section "Known errors and limitations").

Transmission direction

From the PC to the treatment center.

Ground wire

Function

This wire serves for equipotential bonding between treatment center and PC. Equipotential bonding serves for the safety of operators and patients and is legally prescribed.

4.3.2 Hardware and drivers

This section describes the hardware components relevant for the PC connection and the drivers required for this. Refer to the publication "Installation Instructions and System Requirements for PC Configuration" (Part No.: 59 11 321) for information on recommended hardware and installation instructions.

---

1. also called RGB cable or XGA cable

COM port

The COM port is a standard interface of the PC, the standard driver required for its control is not of importance here. It is only important that a driver is at all installed, which, however, occurs automatically during the Windows installation without the user having to do anything.

Frame grabber card

The frame grabber card digitizes the analog S video signal so that it can be processed and displayed by the PC.

Drivers

Hardware drivers (not for Windows NT4)

The presence of the hardware driver and the device status can be checked under Start, Settings, Control Panel, System (in Windows 2000 Hardware tab), Device Manager.

With the "View devices by type" setting, the frame grabber card is displayed in the "Image processing devices" or "Other recognized devices" group.

Software drivers

The correct presence of the software driver can be checked as follows:

Make sure that Sidexis is not open. Open the following program in the Explorer: "C:\LVSDS_??\Links\Camera Editor" (?? = according to operating system).

If a "Camera Editor" window opens, then the driver installation is usually correct.

For Windows 2000: Please note that Windows 2000 is supported only as from Version 1.91 and that the BIOS entry "Plug+Play O/S" (Advanced or possibly also Boot tab) must be set to Disabled or No.

Should it be necessary to check which driver version is installed, the "C:\LVSDS_??\Bin\prvphlib.log" file can be opened with the Windows Editor. The driver version appears in the 7th line of the file.

Functional test

If an image display in SIDEXIS is not possible, the function of the frame grabber card or whether a S video signal from the treatment center is available can be checked by means of the Leutron Camera Editor. Sidexis must not be opened in this case.

Start "C:\LVSDS_??\Links\Camera Editor" (?? = according to operating system). If the start fails, there is a frame grabber card error, or hardware or software drivers are not correctly installed.

The Camera Editor window appears:

Select the "PAL_S" entry in the left selection list and press the "Try" button.

The following window appears:
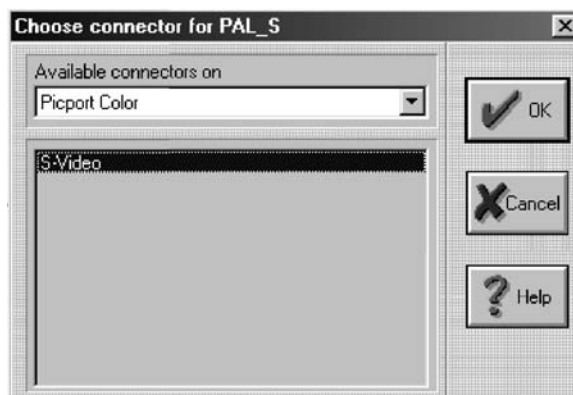
Remove the camera at the treatment center and select the "S-Video" entry in the above window and press the "OK" button. If the error message "The camera cannot be detected. ..." appears, no S video signal from the treatment center is present at the PC.

The following window appears:
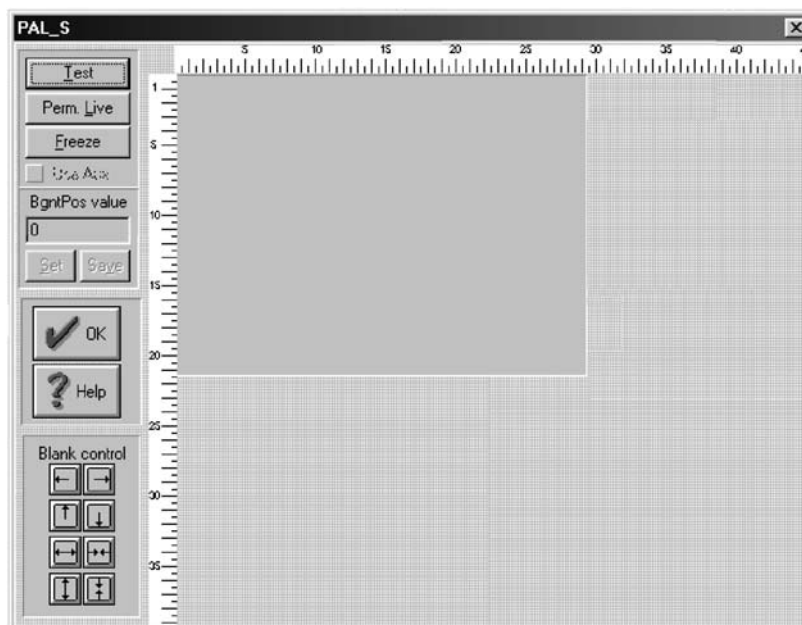
A live image that freezes after approx. 5 seconds is displayed with the "Test" button. Live" button displays a permanent live image, which can be frozen with "Freeze".

If an image display is possible in the window, the S video signal is reaching the PC from the treatment center and the frame grabber card is working correctly.

ℹ️ *NOTE*

If a black screen is displayed, a black screen signal is coming from the treatment center.

Configuration:

In the previously described "PAL_S" window, the image detail displayed in Sidexis/Videxis can also be changed with the aid of the "Blank control" arrow buttons. To do this, actuate "Perm. Live" and expand the window frame so far that the entire live image can be seen completely in the window. The displayed image detail can now be changed with the arrow buttons; the settings made here also act on Sidexis/Videxis.

Graphics card

The graphics card converts the image information into analog output signals and supplies the connected monitor(s) with analog image signals.

The following DualHead functions of the recommended graphics card are recommended:

● **DualHead multiple display:**

This function controls both monitors separately, so that the Desktop area becomes twice as large. Different windows can be displayed on the two monitors. Program windows can be shifted conveniently from one monitor to the other by means of key shortcuts (e.g. Ctrl+F2) (not with Windows NT4).

Except with Windows NT4, the resolutions and color depths can be adjusted separately for the two monitors in the display settings, and the monitors can be arranged as desired. In Windows 2000 activate the "Separate

resolutions and color depths for both displays" function, even if both monitors should be operated with the same values.

Windows NT4 is basically not multimonitor-capable. Therefore the system does not generate two separate screens in this case, but only one which is either twice as high or twice as wide as customary.

● **DualHead clone:**

In this function, both monitors show the same display.
The clone mode can be switched on and off by assigning a key shortcut (e.g. Ctrl+F3) (not with Windows NT4).

If only one monitor is connected, the graphics card can naturally also be operated in single monitor mode.

Monitor driver

A setup information file is helpful for adapting the graphics card to the connected monitors. It contains information about the settings compatible with the monitor, so that only the values compatible with the monitor are available in the Windows display settings. Windows NT4 does not support this settings file.

4.3.3 **PC application programs**

Siucom

Function:

The Siucom program fulfills a central function for transferring the PC control functions. It monitors the set COM port for arriving data and sends control commands to other application programs corresponding to the respective configuration.

These control commands can start and end other programs, bring them to the foreground or execute functions in these programs.

Siucom can be configured very flexibly. Therefore basically only the factory settings are discussed in this service description.
Further configuration possibilities and the procedures required for these are described in the Sivision Operator's Manual (Part No.: 59 11 719).

With Sirocam 3/C direct, it is determined in Siucom whether the SIROCAM 3/C camera is running in the PC mode (= PC_MODE_ON) or in the video mode (= PC_MODE_OFF).

Starting and ending Siucom

The program can be operated either in connection with Sidexis/Videxis or standalone. The Siucom symbol in the Systray on the task bar shows you whether Siucom is running (Siucom symbol present) or not (no Siucom symbol present).

In connection with Sidexis/Videxis, Siucom is installed in the Sidexis folder and started and ended from Sidexis/Videxis. In this case, Sidexis transfers special parameters that are necessary for the function to Siucom.

As standalone version, Siucom must be started manually by the user or via the Windows Startup folder.

COM settings

The transmission parameters are automatically set by Siucom correctly according to the configuration and therefore usually do not have to be changed manually.

The COM port settings are configured in the Siucom program.

You can set the COM port number (from COM1 to COM8) and the transmission parameters. The following settings are necessary for the selectable treatment centers:

Device selection Treatment centers	COM settings
C1[+]	COMx:9600,n,8,1
C2[+]	COMx:9600,n,8,1
C3[+]	COMx:9600,n,8,1
C4[+]	COMx:9600,n,8,1
C5[+]	COMx:9600,n,8,1
Sirona C direct	COMx:9600,n,8,1
SIROCAM Box	COMx:1200,n,8,1

x = used COM port no.

Please note for system selection that for PC technical reasons we have omitted the "[+]" after the C line system name. Example: The option "C2" in Siucom applies to the "C2[+]" treatment center, but not to the "C2" treatment center!

Program version

The version number that is displayed when opening the "About Siucom" popup menu in Siucom is the version of the siucom.exe program. The Siucom version number is not identical with the version number of the "PC-Software Sivision" floppy disk, which is a higher-order information about the entire software package stored on the floppy disk. The floppy disk version number is not stored as electronic information on the floppy disk or the PC.

File structure

The following files, all of which must be in the same folder, are necessary for operating Siucom:

Files	Description
SIUCOM.EXE	Program file
C1.CFG C2.CFG C3.CFG C4.CFG SIROCAM-BOX.CFG SIROCAM 3/C DIREKT.CFG	Configuration files; the system-specific keys and events available for control functions are stored in these files. Only one of these six files is always used; the file name is identical with the treatment center selected in the "SIUCOM configuration" window. The file contents are displayed in the "Command configuration" window in the "Key/event" selection list.
MESSAGES.CFG	Configuration file; the Sidexis/Videxis functions to be controlled are stored in this file. The file contents are displayed in the "Command configuration" window in the "Message selection" selection list.
SIUCOM.HLP	Online help file. It is displayed when you select the "Help" function of Siucom.
SIUCOM.INI	Configuration setting file; all settings made in the "SIUCOM configuration" window are stored in this file. In its as-delivered state, the factory settings are stored here.

Language selection during installation

The installation program automatically detects the language version to be installed from the Windows Regional Settings. The user can select a language himself only if a language which is not supported has been set there.

If a language other than the automatically selected one should be installed, another language can be set for the duration of the installation under Start, Settings, Control Panel, Regional Settings.

Screen (white screen/black screen)

This program generates the full-screen white and black screens.

The program is normally called up from Siucom with the call parameter "white" or "black". The screen.exe program file is installed automatically during the installation of Siucom in the same folder.

For the C1$^+$, C3$^+$, C4$^+$ and C5$^+$ treatment centers, no white/black screen is generated via Siucom and Screen in the factory settings, since white and black screens are already generated in the camera itself. With the second monitor function, white and black screen must be configured manually according to the manual.

In the setting window (white screen monitor selection; applies also for black screen), you can determine on which monitor a white/black screen should be displayed. This setting has an effect only if two differently controlled monitors are present (*see graphics card: DualHead multiple display*). In DualHead multiple display with Windows NT4, "Display window title bar" must be activated, so that the white/black screen appears on one monitor only. In all other operating systems, this is not necessary.

If the monitor arrangement is changed in the multiple display mode, the white screen monitor selection may have to be repeated.

Sidexis/Videxis

Video images are displayed and stored in Sidexis/Videxis. SIXEXIS/VIDEXIS receives all control commands of the treatment center that are executed in SIDEXIS/VIDEXIS from Siucom.

However, it must be observed without fail that SIDEXI/VIDEXIS can execute Siucom control commands correctly only if Siucom was started simultaneously with Sidexis/Videxis, since additional parameters are then transferred. If Siucom is already running and SIDEXIS/VIDEXIS is started afterwards, then the control functions do not work. It is also useless to start Siucom later on manually if Sidexis/Videxis has not done this itself.

To have Siucom automatically started simultaneously, the "SIROCAM available" function must be activated during the installation of Sidexis/Videxis or in the Service menu. The signal source is PAL. Refer also to the SIDEXIS/VIDEXIS documentation, Part No.: 58 73 208.

A new video image is opened only if an S video signal is present.

Other programs

All other PC applications are summarized in the block diagram under "Other programs". These can be started, ended or activated from Siucom and displayed on the monitors.

4.4 Service information

4.4.1 Installation

Refer to the documentation "Installation Instructions and System Requirements for PC Configuration" (Part No.: 59 11 321) for details on installation.

4.4.2 **Known errors and limitations**

Effect	System environment	Solution
Various buttons in dialog boxes ("Owner Drawn Buttons", e.g. tooth buttons) are not displayed on the secondary monitor in the Sidexis/ Videxis program.	Matrox Millennium G400 Dual Head or Matrox Millennium G450 Dual Head Operating systems WIN 98 SE WIN ME WIN 2000	Right-click the Desktop area, Properties menu item, Settings tab, select Monitor 1: Reduce color depth from 32 bit to 24 bit.
The magnifier function of Sidexis/ Videxis displays only sections of the primary monitor.	WIN 98 SE WIN ME WIN 2000 Sidexis/Videxis < 5.5 on secondary monitor	Update to Sidexis/Videxis version 5.5 or higher. An immediate measure is also possible alternatively: Swap the monitor connection cables at the output of the graphics card, so that the treatment center monitor is the primary monitor.
In Sidexis/Videxis the button symbols are displayed so large that the lower symbols lie outside the visible screen area.	WIN NT4 Matrox Millennium G400 Dual Head or Matrox Millennium G450 Dual Head in multimonitor mode, monitors above one another	Right-click the Desktop area, Properties menu item, Settings tab, set the two monitors next to one another (instead of above one another).
... as above	WIN 98 SE, WIN ME, WIN 2000 Matrox Millennium G400 Dual Head or Matrox Millennium G450 Dual Head in multimonitor mode, monitors with different resolution	Right-click into the Desktop area, Properties menu item, Settings tab, set the same resolution for both monitors.
The monitor connected to the secondary output of the graphics card is not recognized.	WIN NT4 Matrox Millennium G400 Dual Head or Matrox Millennium G450 Dual Head	Swap the monitor connection cables at the output of the graphics card, so that the monitor at the treatment center is connected to the monitor connection 1 of the graphics card.
Switching from still image to live image and saving the still image in Sidexis/Videxis using the unit foot switch do not function with Sivision 1.	Sivision 1 Siucom V 3.2 or lower	Update to Siucom V3.2.1 (= PC Software Sivision V3.2)
In moving live images the image quality is clearly worse than in static live images.	Leutron frame grabber card	In the BIOS set "PCI Latency Timer" to Auto or 32, if available.
The live image vibrates or appears blurred with the camera held steadily. The still image is OK, in the video mode the live image is also OK.	Leutron frame grabber card	Replace the Leutron frame grabber card.

4.4.3 **Hints for troubleshooting**

1)   Error description: In Sidexis/Videxis no live image opens when the camera is removed.

▶   To narrow down the cause, try to open a video image using the "Video image" button. If this works, then the video cable is in order; the error lies in the area of the RS-232 cable or Siucom (see error description 3). If no video image appears, then the error lies in the S video area (see error description 4).

2)   Error description: In Sidexis/Videxis the error message 1944 (general error of the video overlay channel) appears when the camera is removed.

▶   To narrow down the cause, check whether a video image can be displayed in the Leutron Camera Editor. If this does not work either, then the error lies in the area of the frame grabber card or its driver.

3)   Error description: The PC does not react to control functions (camera removal or function keys) of the treatment center.

▶   **Check** that the COM port to which the RS232 cable coming from the treatment center is connected is set in Siucom. **Attention:** Even if there is only one single COM port on the PC, this does not necessarily have to be COM1.

▶   **Check** that the RS232 cable is connected to the treatment center at the correct output.

▶   **Check** the connectors (especially on PCB AK on the $C2^+$/$C3^+$/$C4^+$/$C5^+$) for proper fit.

▶   **(only for Sivision 3): Check** that "PC Mode" is set at the treatment center; with "Video Mode" setting, the treatment center sends no data (switch to PC mode with A/B key or for C1 in the Video menu).

For SIROCAM 3/C direct, the corresponding setting is made in the Siucom popup menu; the "PC-MODE-ON" option must be checked there, otherwise the camera also does not send any serial data.

On treatment centers supporting error read-out by means of a terminal program, the function of the serial data transmission can be checked in this way.

4)   Error description: No VGA/S video signal arrives at the PC.

▶   Check that the S video cable is connected to the treatment center at the correct output. With Sivision 3, it is very important that the S video cable is plugged into the S video socket which is located closer to the RS232 socket, since in some treatment centers the signal is switched off on the other socket in PC mode.

We reserve the right to make any alterations which may be required due to technical improvements.

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