SIEMENS

VIDEOMED DIC

AX

Troubleshooting Guide

VIDEOMED

Troubleshooting Guide VIDEOMED

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Product-specific Remarks

This document was originally written in German.

General Remarks

- This document includes the Description of Function, the Adjustment Instructions (not IQAP/IQ), Troubleshooting Guide and the Replacement Instructions.
- The power supply (+5.6 / +11.3V) is not part of the VIDEOMED DIC, it is allocated to the system (E-List, Position, etc.).
- The ESD Guidelines must be observed.
- Troubleshooting and adjustment (e.g. of the iris) can/must be performed with the camera housing removed.

Safety Note

If the optics are replaced, one I.I. connection cable must be disconnected and reconnected (through the optics in the I.I.). This cable conducts 30 KV.

Tools and Test Equipment (per the Tools Catalog)

Oszilloscope	
Multimeter (Fluke)	
Hex wrench	1.5 mm, not ball head!

Documents

For adjustments (iris etc.), the corresponding IQAP / IQ Certificate is required.

Abbreviations

AGC — Automatic gain control. When dose control can no longer compensate, in other words when the maximum KV value has been reached, a switch is made from manual amplification (fixed gain) to AGC.

ADC — Automatic dose control. With the VIDEOMED DIC, the actual value for dose control is derived from the image signal. Adjustment of the working point for control is performed by the iris diaphragm opening.

CCD — Charge Coupled Device.

Image sensor that converts the image from the image intensifier to an electrical signal (analog image signal).

GGM — **"G**leitende **G**ewichtete **M**ittelwertbildung" or floating weighted average value calculation to reduce noise. The degree of noise suppression depends on the K-factor.

RBV (I.I.) — **R**adiographic **i**mage **i**ntensifier to convert the radiographic image at the input screen into an optical image at the output screen. Via the lens in the image intensifier and via the TV optics (both optics are designated as tandem optics) the image is projected onto the CCD sensor.

LIH — **L**ast **I**mage **H**old to save and display the last image during fluoroscopy.

XCS — **X**-Ray **C**ommunication **S**ystem to transfer signals that are not time-critical and for system service.

In the XCS network, the individual system components are connected to each other via serial current loops (twisted pair).

XCU — **X**-Ray **C**ontrol **U**nit.

This is the central system controller and is the connection for the Service PC to perform system service.

BAS — **B**lanking **S**ynchronization Signal.

Can be configured to 1 Vpp or 1.3 Vpp (depending on the monitor used).

At 1 V_{pp}

- 650 mV B-signal
- 50 mV A-signal. The A-signal determines the black level, i.e. the difference between the level of the blanking circle (blanking level) and the black level in the image signal
- 300 mV Sync signal

PPG — **P**ulse **P**attern **G**enerator

The PPG is an IC that controls the video synchronous routines in the CCD and in the subsequent steps of video processes.

Introduction

VIDEOMED DIC is a compact camera for the fluoroscopy mode with the following features:

- CCD technology
- Single board camera. With the exception of the power supply, the complete electronics are located on only one board.
- Camera optics with adjustment possibility for focus and adjustment of the iris diaphragm opening. Unlike the VIDEOMED DI, an anamorphotic lens is not used in the VIDEOMED DIC.
- Video output norms:
  - 625 lines / 50 Hz interlaced or
  - 525 lines / 60 Hz interlaced

  The use of different CCD sensors for the 625 line and 525 line norm means there are different Part Numbers for the camera boards.
- Output signal (BAS): configurable to 1 Vpp or 1.3 Vpp
- Control of the routines using a microcontroller
- LIH (Last Image Hold)
- H and V image reversal (also for LIH image)
- GGM (floating weighted average value calculation) for noise suppression.

  Value range of the K-factors: 1 - 16
- Automatic K-factor adaptation possible for AGC (automatic K-factor)
- Externally controllable AGC
- Size of the measuring field for AGC and dose control as a function of the I.I. format and the selected Zoom step.
- Screen saver (low-contrast display of the LIH image)
- Selection of a Gamma curve (of two that are available) by configuration
- Bright actual generator interface for dose control as a function of the image signal.
- XCS interface
- Automatic adjustment of video processing during initialization of the TV system.
- Self tests during initialization.
- Performance of dose-relevant measurements during fluoroscopy pauses in one-minute intervals.
- Generation of test images.
- Service LEDs to indicate operating voltages, error messages, operating statuses and of connection of bright actual signal to the generator.
- Test switches to configure the VIDEOMED DIC and for troubleshooting.

  With the VIDEOMED DIC, service software running on the Service PC is not used (as is the case, for example, with the VIDEOMED DI).

VIDEOMED-DIC Block Wiring Diagram

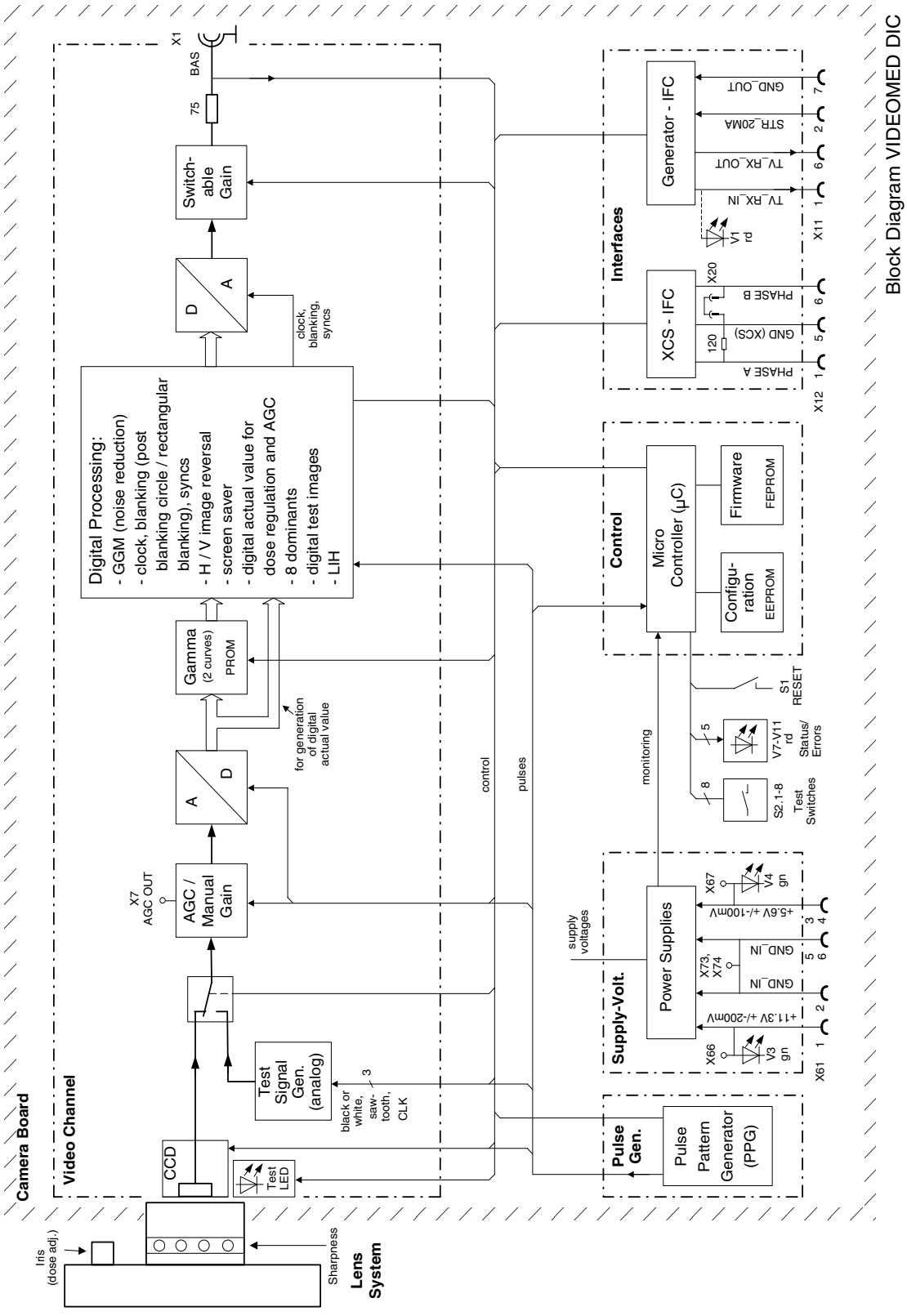

Fig. 1:

Video Channel

TV Lens System

The lens system displays the image intensifier image on the CCD sensor in sharp focus.

The following adjustments are possible using the lens system:

- Adjustment of focus
- Iris diaphragm setting to adjust dose control
- Adjustment (image reversal) of correct H/V and left / right display of the I.I. image.

Fig. 2:

CCD Sensor

Different sensors are used for the 50 and 60 Hz frequencies. Along with this there are different Part Numbers for the camera boards.

A test LED is located on the CCD sensor with which a constant light is shone on the sensor surface. The test LED can be activated using the test switches.

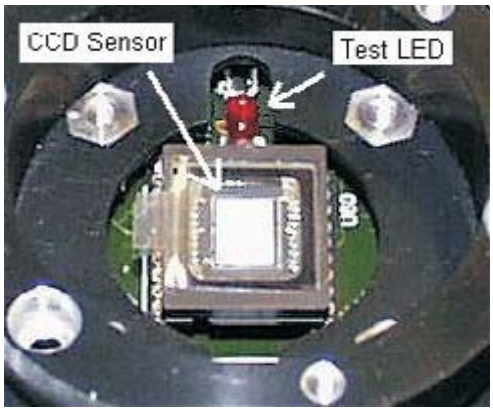

Fig. 3:

Test Signal Generator, Analog

This step supplies two analog test signals:

- Black or white test signal to adjust the black level and manual gain during the initialization phase. These test signals can also be fed into the video channel using the service test switches.
- Sawtooth test signal to test the video channel. The service test switches are used to activate the test signal.

AGC / Manual Gain

This step is adjusted during initialization that the usable CCD signal completely controls the A/D converter. The amplification factor that is determined is defined by the term "manual gain".

As long as the dose rate controller can still compensate, video gain functions with manual gain. If the dose controller reaches the maximum kV value, the generator sends an AGC request and the AGC controls the amplification factor in a range from 4.5 dB to 34.5 dB.

A/D Converter

The A/D converter converts the analog input signal into a digital output signal with a data depth of 10 Bits.

Gamma

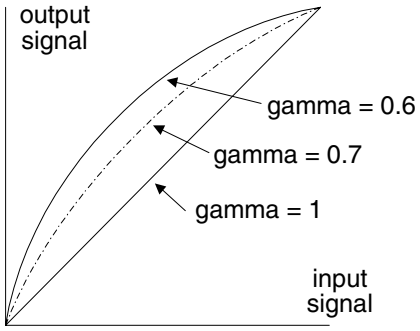

Fig. 4:

Fig. left shows “only” one example of the Gamma function.

In the Gamma step, the weak signal portions are amplified more than the stronger ones.

On the one hand, this causes the darker image portions to have their contrast enhanced, but on the other hand overexposure is reduced.

The lower the Gamma value, the higher the contrast enhancement is of dark objects becomes, i.e. the more the noise is in the image.

The Videomed DIC is operated using Gamma 0.7

Digital Image Processing with the Following Functions:

- **GGM**

  GGM stands for "**G**leitende **G**ewichtete **M**ittelwertbildung" (floating, weighted mean value calculation) and is used to reduce noise.

  This method is also known by the name "Integration" or "time filter".

  With floating, weighted mean value calculation, the image currently being displayed is comprised of the integration of previous images. The number of images that are integrated depends on the K-factor. The greater the K-factor, the greater the number of images that are integrated and thus the lower the noise.

  However, a disadvantage is that with a larger K-factor, the display of movement routines that are caused, e.g. when the tabletop is moved, is not sharp.

  The value range of the K-factor is between 1 and 16. With a K-factor of 1, no integration takes place.

  The basic K-factors for fluoroscopy and SUPERVISION are entered in the configuration.

  In addition, an automatic K-factor adaptation can be configured during AGC. In this instance, the basic K-factor is used as long as the dose control can still compensate; i.e. as long as the TV system still works with manual gain. If dose control can no longer compensate, an appropriate control signal is sent to the VIDEOMED DIC from the generator, which then switches to the AGC mode. At the same time, the K-factor is also increased relative to the amplification factor of the AGC.

  Thus, increased noise caused by the higher amplification factor is prevented.

- **Clock, blanking (postblanking circle / rectangular blanking), syncs**

  These signals are connected to the D/A converter that follows.

  In the normal mode, the postblanking circle pulses and the synchronization signals are added to the image signal in the converter. The postblanking circle can be switched off using the service switches. In this instance, the converter adds blanking pulses with a constant width (rectangular blanking).

- **H / V image reversal**

  Image reversal can be activated prior to, during or after fluoroscopy (LIH image).

- **Screen saver**

  The screen saver can be activated by an XCS telegram. There then follows a low-contrast display of the LIH image on the monitor.

  The screen saver is deactivated by:

  - an XCS telegram
  - the test switches or
  - fluoroscopy

- **Digital actual value for dose regulation and AGC**

  The digital actual value for AGC and dose control is derived from the image signal inside the dominant (measuring field) and is transferred via the serial interface of the microcontroller to the generator interface.

  Both the actual value, also called the "bright actual value", has the designation "TV_RX_IN" and "TV_RX_OUT" at the X11 connector (generator interface) (2 outputs because this is a 20 mA current loop).

- **8 dominants**

  To generate the actual value for AGC and dose control, only the image signal inside the measuring field is used.

  Selection of one of the 8 measuring fields depends on the I.I. model and on the currently selected format (full format or Zoom step).

  The currently active measuring field can be displayed on the monitor using the test switches.

- **Digital test images**

  The digital test images are used to check and adjust the monitor (the test switches are in the "Monitor test" position).

  By pressing the RESET button, the test images are displayed in the following order:

  - Dots
  - Grid with gray bars
  - H-sym
  - V-Sym
  - H&V-Sym
  - Cross hair
  - Dynamic gray wedge
  - Gray image

- **LIH** (Last Image Hold)

  With “Fluoroscopy OFF”, the last image is “frozen” in the memory and is displayed on the monitor.

  Depending on the active K-factor, the image is comprised of the integration of a specific number of previous images.

D/A Converter

This is where the conversion of the 8-bit deep image data to an analog image signal takes place. By addition of the blanking signal (blanking) and synchronization signals, the BAS signal is present at the output of the converter.

Switchable Gain

In this step, adaptation to the monitor takes place. Depending on the type of monitor, the BAS output signal can be configured to 1 Vpp or 1.3 Vpp using the test switches.

BAS Output

The BAS signal is present over the 75 Ohm output resistor at the X1 BNC socket. The socket is also a critical test point to oscillograph the output signal.

NOTE	**A monitor must be connected to X1, i.e. a terminal resistor must be installed. Otherwise there will be an error message!**

The return of the BAS signals after the 75 Ohm resistor to the microcontroller is used to check the output level.

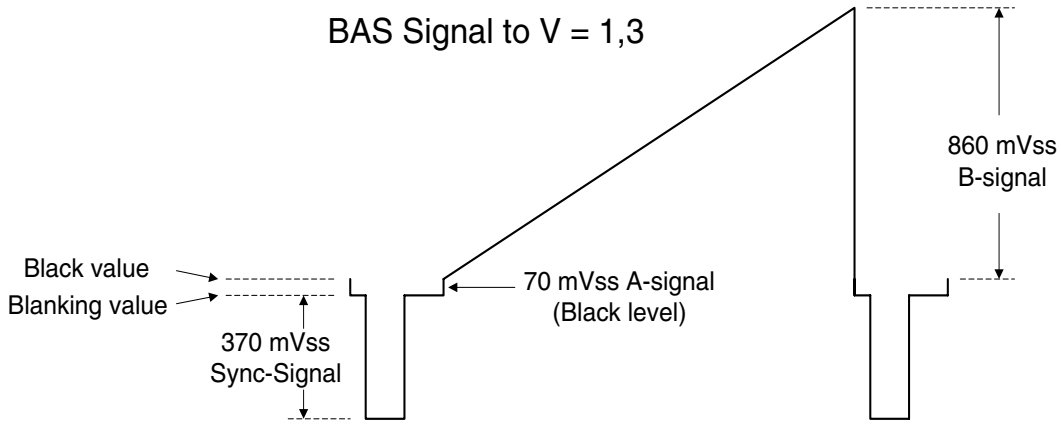

Fig. 5:

NOTE	**When amplification is switched to V=1, correspondingly lower values result for the entire BAS signal.**

Pulse Generation (Pulse Pattern Generator, PPG)

The PPG is a chip that generates the video-synchronous control signal for the CCD and the other steps in the video channel.

Supply Voltages

The camera must be supplied with two voltages:

- Voltage + 5,6 V +200/-100mV,
  LED V4 green Test point: X67
- Voltage + 11.3 V ± 200 mV,
  LED V3, green Test point: X66

The various operation voltages for the camera are generated from the two input voltages in the power supplies step. During initialization of the VIDEOMED DIC, a test of the power supply voltages is performed. If a tolerance is exceeded, an error message is sent to the XCU and the service LEDs are controlled according to the error number.

Control

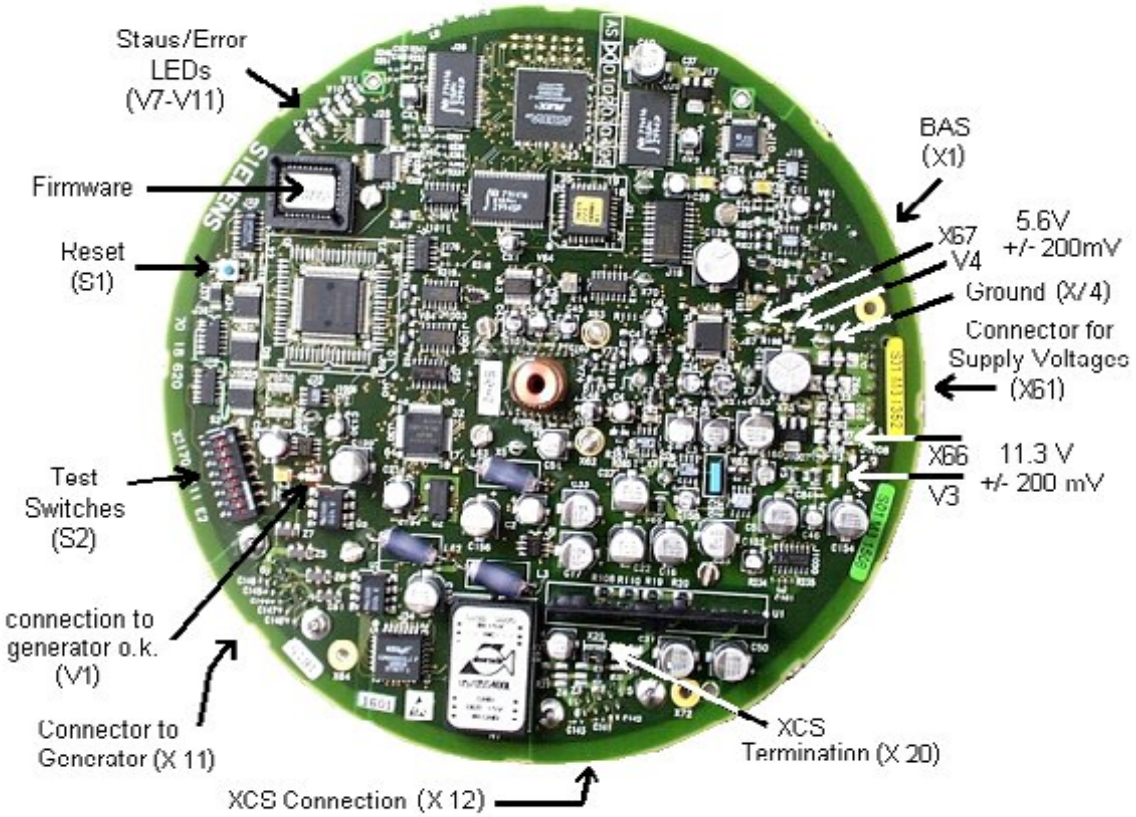

Fig. 6:

Micro Controller

The routines in the camera, with the exception of the video synchronous routines clocked by the PPG, are controlled by the microcontroller.

Firmware (FEPROM)

The VIDEOMED DIC firmware is contained in a Flash PROM (FEPROM).

In an error situation, with firmware upgrades or firmware updates, the Flash-PROM must be replaced. Then an initial download must be performed using the test switches. When this is done, all configuration parameters are set to default values.

Configuration (EEPROM)

The configuration parameters are contained on an EEPROM.

The camera will not boot up without a user configuration. For this reason, a default configuration (initial download of the EEPROMs = Initial Load) must be performed using the test switches.

Test Switches, LEDs, Reset Button

Service on the VIDEMED DIC is performed using test switches, LEDs and the reset button. Error messages are only indicated by the LEDs, but are also sent to the XCU.

Interfaces

XCS Interface

XCS stands for **X**-Ray **C**ommunication **S**ystem.

In the XCS network, the individual system components are connected to each other via serial current loops (twisted pair). The XCX network can be connected via the X20 (the terminal resistor must be connected to the last station in the XCS network). The control signals that are not time-critical are transferred via the XCS. Such control signals are, e.g. "Fluoroscopy On", "ZOOM 1 selected", "H-image reversal" and "V-image reversal".

The primary component in the XCS network is the XCU (X-Ray Control Unit). It comprises the central system controller and is the connection for the Service PC to perform system service. System service as regards the VIDEOMED DIC consists only in reading of error messages. The configuration and the tests of the VIDEMED DIC are performed exclusively using the test switches on the camera board.

Generator Interface

This is a galvanically separated interface for the bright actual value and the radiation ON signal. The signals are sent in the form of a 20mA current loop.

- Bright actual value

  The actual value derived from the image signal is used in the generator for dose rate control.

  The bright actual value is transferred by the "TV_RX_IN" and "TV_RX_OUT" signals to the generator. The transfer method is digital and serial.

  The bright actual value is the "digital actual value for dose regulation and AGC" that is generated in the step "Digital Processing" from the image signal inside the dominant and is transferred via the microcontroller serial interface to the generator interface.

- Radiation **ON**

  When this signal is received and when the fluoroscopy **ON** telegram is received via the XCS, the VIDEOMED DIC switches from fluoro pause to fluoroscopy mode.

  Another task of the radiation **ON** signal is save control with fluoroscopy **OFF** for the LIH function.

  The signal designations for the radiation **ON** signal are:

  "STR_20MA" and "GND_OUT".

Initialization of the VIDEOMED DIC

Initialization is started by power-on, by pressing the reset key or by a reset telegram from the XCU.

Initialization takes place as follows:

- Checksum test of the EEPROM and FEPROM
- Parametering of the steps in the video channel per the configuration data
- Display of the status of initialization up to this point:
  - If incorrect:
    there is an error display and initialization stops
  - If o.k.:
    display of the digital test image "H&V-symmmetry" up to the end of the initialization.
- Test of the power supplies.
- Initialization of the serial interface of the microcontroller for transfer of the bright actual value.
- Inquiry of the service switches.
- Balance of the black level, manual gain and sawtooth signal.
- Establishment of the XCS connection.

After initialization is completed, a blank image (a relative dark gray value inside the blanking circle) is activated as the LIH image. The K-factor here is equal to 1.

If initialization fails, the error is indicated by the 4 service LEDs.

Fluoroscopy

When the fluoroscopy **ON** telegram is received by the XCS and the hardware signal STR_20MA/GND_OUT arrives at the X11 connector, the VIDEOMED DIC switches from fluoro pause or end of initialization to fluoroscopy mode.

Receipt of the hardware signal is indicated by LED V7.

The operating parameters for fluoroscopy are defined by the configuration and by the XCS telegrams.

During exposure, the actual value of the image signal (RX_TV_IN/RX_TV_OUT) is sent out via the generator interface (X11 connector). The actual value is used in the generator for dose rate control.

NOTE **Dose adjustment is made by the adjustment of the iris diaphragm opening for the camera optics.**

When fluorocopy is **OFF**, the current image is save during “Digital Processing” for the LIH function.

Fluoroscopy Pause

Following fluoroscopy, the monitor connected to the VIDEOMED DIC displays the LIH image.

After a time period that can be configured, the screen saver can be activated by an XCS telegram. The screen save is implemented by a low-contrast LIH image display.

In addition, the hardware for the actual value for dose regulation and AGC is checked during the fluoro pause. The first check takes place after 10 seconds following fluoro OFF; then in one-minute intervals.

SUPERVISION

SUPERVISION is a special fluoroscopy operating mode to reduce the dose or to reduce noise.

With SUPERVISION, operation is with continuous radiation; however, in the TV camera read-out is not every V-period, but every 2nd V-period of the CCD sensor. For this reason, the term pulsed TV mode is also used.

Read-out every 2nd V-period provides the following benefits:

- Either half the dose rate compared to normal fluoroscopy because the same signal amplitude is read by integrating two images on the CCD chip, i.e., the same as with normal fluoroscopy,

  or

- Improved signal-to-noise ratio, because now operation is no longer with half dose but with the same dose as for normal fluoroscopy.

Overview of Service

LEDs

To display the operating voltages, the "light = actual value" connection to the generator, of the statuses of the VIDEOMED DIC and of errors.

Error Messages

Error messages are indicated on LEDs and transferred to the XCU.

Test Points

- Test points for operating voltages

- Test point for the BAS output signal

Adjustments

- Focus adjustment in the camera optics
- Iris diaphragm adjustment (dose rate adjustment)
- Display of the I.I. image on the monitor with sides correctly displayed and correct horizontal and vertical representation (the camera board can be turned by loosening the mounts on the optics).

Configuration

The configuration parameters are entered using the test switches.

Test Signals

Various test signals can be fed in using the test switches.

Replacement of the Firmware

The VIDEOMED DIC firmware is contained in a Flash PROM (FEPROM).

In a malfunction situation, with firmware upgrades or firmware updates, the Flash PROM must be replaced. Then an initial download using the test switches must be performed. When this is done, all configuration parameters are set to default values.

Replacement of Hardware

Described in the Replacement Instructions (Replacement Instructions / p. 23)

NOTE	**For the VIDEOMED DIC, separate service software is used!**

Detailed descriptions of adjustments, configuration, troubleshooting, replacement of hardware and software, LED displays and error messages are described in the corresponding instructions.

General Remarks

No electrical adjustments need to be performed.

Configurations are performed using "only" DIP switches.

Adjustments that can / must be performed are:

- Mechanical position (rotation) of the camera head versus the I.I. output image.
- Optical focus, for adjustment values (see the System IQAP/IQ Certificate).
- Iris adjustment: for adjustment values, see the CB-DOC / Installation / Polydoros ... / Startup Instructions.
- Configuration of the DIP switches.

Adjustment of the Position

- Loosen the "mounting for DIC" (DI C Optics / Iris / p. 29) screw.
- Turn the camera head so that the I.I. display on the monitor is correct for both the H / V and left/right orientation.
- Retighten the loosened screw.

Adjustment of the Optics

- Loosen the locking screw for the optics (DI C Optics / Iris / p. 29).
- Set the optics adjustment to the maximum resolution (for the minimum resolution value as well as the resolution test, see the System IQAP/IQ Certificate).
- Retighten the loosened locking screw.

Adjustment of the Iris

NOTE

During the adjustment, the service mode may not be selected (S1 to S8 set to Off).

- Loosen the "Iris locking" (DI C Optics / Iris / p. 29) screw.
- For adjustments (such as measurements/ adjustment value) see the CB-DOC / Installation / Polydoros ... / Startup Instructions.
- Using a 1.5 mm hex wrench, adjust the iris to the default value per the IQAP/IQ by turning the rotary switch (DI C Optics / Iris / p. 29).
- Retighten the loosened screw.

General Remarks

- During the bootup phase, an initialization test is performed; as a rule, camera head errors are detected and are indicated by LED‘s (Error Messages / p. 33).
- Error messages are also saved in the “system error log” via the XCS.
- XCS connection: **LED V11** blinks approx. every 10 sec. approx. 8x faster; at this time, the DIC attempts to establish a connection to the XCS.

  In this status, there is no connection of the DIC to the XCS system.

  At the same time, an error message (LED) is initiated (Error Messages / p. 33).
- Activity display: In standby, **LED V11** blinks approx. every 1second. This means: no error message of DIC standby.
- Radiation ON display[1]: **LED V7** goes on with the **Hardware** request, Radiation ON.

1. The LIH function is controlled by the ‘Radiation ON’ hardware request.

NOTE **To set the DIC to Fluoro ON, the “Radiation ON” XCS telegram is also required.**

- Dose-relevant measurements are performed in the standby mode approx. 1x / minute and approx. 10 sec. following radiation. This can be seen from the brief blinking of the V8 LED.
- **IMPORTANT:**

  A monitor must be connected at the BAS output (X1); if the terminal resistor is missing, an error message is output during the self test (via XCS = 831 or 833; LED‘s 01100 - BAS - Setup Error).
- LED displays in the bootup phase of the DIC, with power on or a reset:
  - After approx.10 sec., V8 goes on and V11 blinks.
  - Approx.40 sec. after start: V8 goes off and V11 blinks more quickly (XCS connection established).
  - DIC in standby.

The Troubleshooting Instructions are organized as follows:

- Generator regulating correctly (dose okay), no image or image quality poor (Generator regulating correctly, indirect dose measurement per IQAP is okay and no image / p. 21)
- Generator incorrectly regulating (indirect dose measurement incorrect) (Generator regulating incorrectly; indirect dose measurement per IQAP incorrect / p. 22).

Generator regulating correctly, indirect dose measurement per IQAP is okay and no image

- An error is indicated by the status LED's (LED Display (Errors) / Images / Test Config Switch / p. 27).

Yes

1. With errors **868 to 874**, also perform a check of the external operating voltages.
2. With error **831 or 833**, check the termination at the BAS output (cable and monitor. A 75 Ohm terminal resistor must be present).
3. With every other error and if the external operating voltages are okay, replace the DIC (board) (Replacement Instructions / p. 23), (LED Display (Errors) / Images / Test Config Switch / p. 27).

No

1. To assure that the monitor is not the cause, the BAS signal can be checked at the monitor input: call up a test image (e.g. sawtooth) (LED Display (Errors) / Images / Test Config Switch / p. 27).At the monitor BAS input, a synch signal of at least > = 280 mV and a BAS of approx. 1 V or 1.3 V must be measured. => If the BAS signal is present, but is not visible on the monitor, replace the monitor. => If there is no BAS signal present, or if the signal that is present is also visible on the monitor, replace the e DIC (board) (Replacement Instructions / p. 23).
2. **Check of the external operating voltages:**

   Fluke: ground X74; plus X66

   +11.3 V ± 200 mV

   Fluke: ground X74; plus X67

   +5.6 V +200/-100mV

   Operating voltage incorrect - power supply or cable error (see System Instructions)

   (the power supply or the power cable is not part of the VIDEOMED DIC).

Generator regulating incorrectly; indirect dose measurement per IQAP incorrect

- An error is indicated by the status LED‘s (LED Display (Errors) / Images / Test Config Switch / p. 27)?

Yes

1. With error **868 to 874**, also perform a check of the external operating voltages.
2. With every other error and if the external operating voltages are okay, replace the DIC (board) (LED Display (Errors) / Images / Test Config Switch / p. 27) (Replacement Instructions / p. 23)

Check of the external operating voltages:

Fluke: ground X74; plus X66

+11.3 V ± 200 mV

Fluke: ground X74; plus X67

+5.6 V ± 100 mV

If the operating voltage is incorrect, there is a power supply or cable error (see the System Instructions)

(the power supply or power cable is not part of the VIDEOMED DIC).

No

When the X11 terminal is disconnected (signal cable), LED V1 must go on darker or the brightness of the LED must change when the signal cable is disconnected.

- Yes

99.9% not a DIC error; the cable to the generator is also okay.

- No

Possible errors:

- The signal cable to the generator is disconnected.
- The signal input to the generator is defective.
- The DIC output is defective, however this is highly unlikely.

Replacing the VIDEOMED DIC (Board)

⚠WARNING

Increased risk of injury!

If power is not switched off to the system, 30kV are present on the anode cable.

➪ **Switch power off to the system, wait at least 3 minutes for the anode voltage to dissipate.**

- Remove the defective board.
- Take the FW Prom from the "defective" board and install it on the replacement board.
- The replacement board is shipped with a protective film over the CCD sensor; this must be removed prior to installing the board.

NOTE

The test LED, i.e., the red LED on the CCD sensor, may not be bent. If the LED is bent, Error 827 will be displayed.

If this happens, there is no error (the LED light to illuminate the CCD sensor is missing).

To adjust the LED (Fig. 7 / p. 27).

- Install the replacement board.
- Connect all connectors and contacts.

  Do not switch on power before connecting the monitor (BNC connection). If were done, an error message would be displayed!
- Perform an initial download:
  - Switch on power
  - All 5 LEDs (V7 - 11) blink, the “BMW” symbol spins on the monitor.
  - S2: 1 / 3 / 5 / 7 set to ON; 2 / 4 / 6 / 8 Off
  - Press the reset button.
  - The “good” blinking must be visible (V7/11 and V8/9/10 blink alternately).
  - Set all switches to OFF.
  - Press the reset button.
  - If OK, the V11 LED must blink following normal bootup.

NOTE

All EEPROM parameters are set to default values by the initial download. The default values following initial download correspond to the parameters used in the ICONOS R100 system with the 2844376 monitor.

- Check centering of the camera to the I.I. (check only!).

  We assume that as a rule, no adjustment is required.

  To check:

- Select special operating modes - center the edge of the I.I. (Function of the Test/Config Switches / p. 31).
- Under radiation, check whether the position is centered to the edge of the I.I.

  If okay:

  (set all switches back to OFF, press the reset button), continue with camera rotation.

  If not okay: (Adjustment of the Position / p. 19)

- Check the camera rotation (Adjustment of the Position / p. 19)
- Check the iris (Adjustment of the Iris / p. 19)
- Check the resolution:

  Check the resolution per the IQAP / IQ Certificate.

  If Okay: continue with the TV dynamic test.

  If not okay: (Adjustment of the Optics / p. 19)
- Check the IQ using the TV dynamic test.

Replacing the Compact Optics 23 / 33 cm I.I.

⚠WARNING

Increased risk of injury!

If power is not switched off to the system, 30kV are present on the anode cable.

➪ **Switch power off to the system, wait at least 3 minutes for the anode voltage to dissipate.**

- Remove the VIDEOMED DIC (board), be careful of the CCD sensor (dirt).
- Remove the Compact optics (Fig. 8 / p. 29). The sample exposure is representative of a 23 cm I.I.
- Install the new Compact optics - be careful not to get them dirty.
- Reinstall the VIDEOMED DIC (board).
- Readjust the iris (Adjustment of the Iris / p. 19).
- Adjust the focus (Adjustment of the Optics / p. 19).
- Check the IQ using the TV dynamic test.

Replacing the Firmware

- Switch off the VIDEOMED DIC line power.
- Replace the FW.
  - Switch on power
  - If a “different” SW version is downloaded, this will be indicated until the “initial download” as follows: All 5 LED‘s (V7 to V11) will blink, the BMW logo will rotate on the monitor.

- Perform initial download:
  - S2: 1 / 3 / 5 / 7 set to ON; 2 / 4 / 6 / 8 Off.
  - Press the Reset button.
  - A good blink must be visible (V7/11 and V8/9/10 blink alternately).
  - Set all switches to OFF.
  - Press the Reset button.
  - OK: following normal bootup, LED V11 must blink.

NOTE

=> All EEPROM parameters are set to default values by the initial download. The default values following initial download correspond to the parameters used in the ICONOS R100 system with the 2844376 monitor. Under normal circumstances, no changes need to be made.

=> To change the parameters, see (Changing the EEPROM Values / p. 25).

Changing the EEPROM Values

NOTE

=> The default values following initial download correspond to the parameters used in the ICONOS R100 system with the 2844376 monitor. Under normal circumstances, no changes need to be made.

=> Using the procedure described below, only one EEPROM value at a time can be changed; the procedure must be repeated for each value if you wish to change more than one value.

=> Reading out the current EEPROM data is not possible.

- Step 1
  - S2: 2 / 4 / 6 / 8 set to ON; 1 / 3 / 5 / 7 Off
  - Perform a reset using the Reset button.
- Step 2
  - Press the Reset button until the desired function is reached (one press of the Reset button switches one function higher). Selectable functions (EEPROM Parameters / p. 35).
- Step 3
  - Using the Test/Config switches, make the particular setting (switch position (EEPROM Parameters / p. 35)).

    Important with Step 3: Once the switch has been pressed, the setting must be concluded within 10 sec., otherwise, see the note “Time Limit”.

NOTE

=> Do not perform a reset!

=> Once a change has been made, assuming the "new" values are within the valid range, a "good blink" appears on the status LED‘s.

A good blink means: LED V7 /V11 switch with V8/V9/V10 (external LED‘s) to internal LED‘s.

- Step 4
  - Test/Config switches in the "Normal positon" (all set to "Off").
  - Perform a reset; the new parameter is accepted when there is a bootup (following “normal” bootup, LED V11 must blink).

NOTE

Time limit

If the time limit is exceeded, the following can occur:

- A value “different” from the good value is accepted. In this instance, the good display will already be blinking during input.

- A new value will not be accepted. The good blink will not take place..

In both instances, the procedure must be repeated following Step 1!

DI C Layout

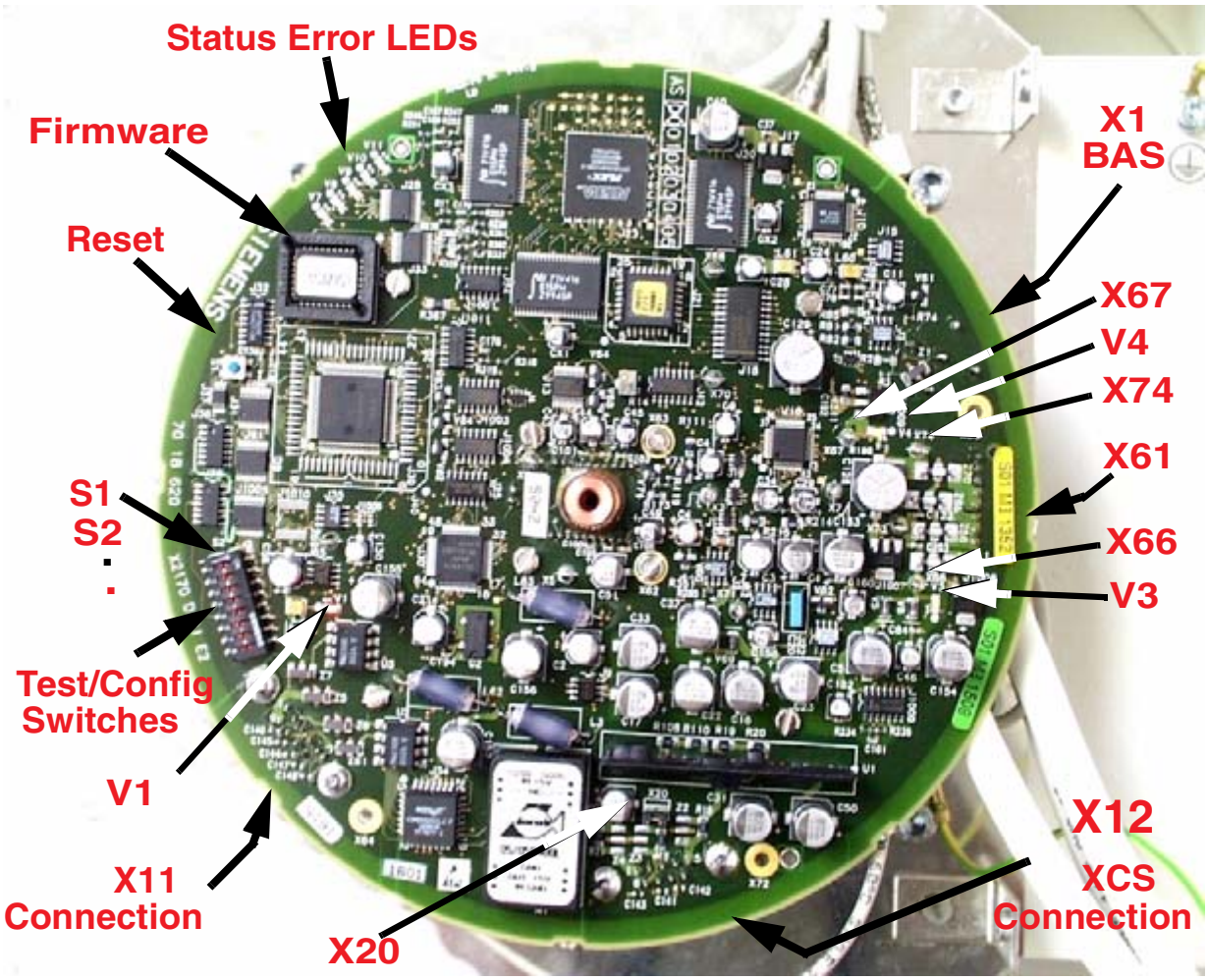

Fig. 7:

NOTE	**The potentiometers are factory set and may not be changed!**

X1	BNC socket (BAS output)
X11	To the generator
X12	XCS connection
X61	Input of operating voltages
X66	+11.3 V ± 200 mV
X67	+5.6 V ± 100 mV
X74	Ground
X20	XCS connection (always plugged in!)

V1	Connection to generator (on = OK, this corresponds approx. to the brightness of V7; darker or off = connection broken).
V3	+11.3 V
V4	+5.6 V
V7 to 11	(Status LED's) error and function display

DI C Optics / Iris

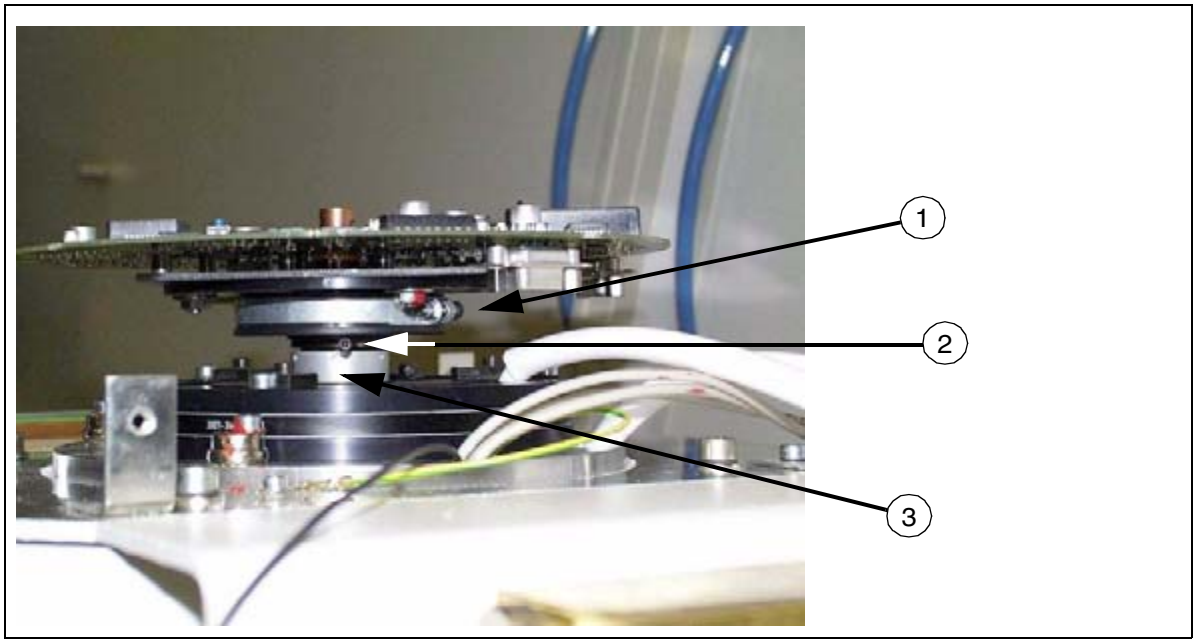

Fig. 8:

Pos. 1 DIC Mounting
Pos. 2 Locking of the optics
Pos. 3 Adjustment of the optics

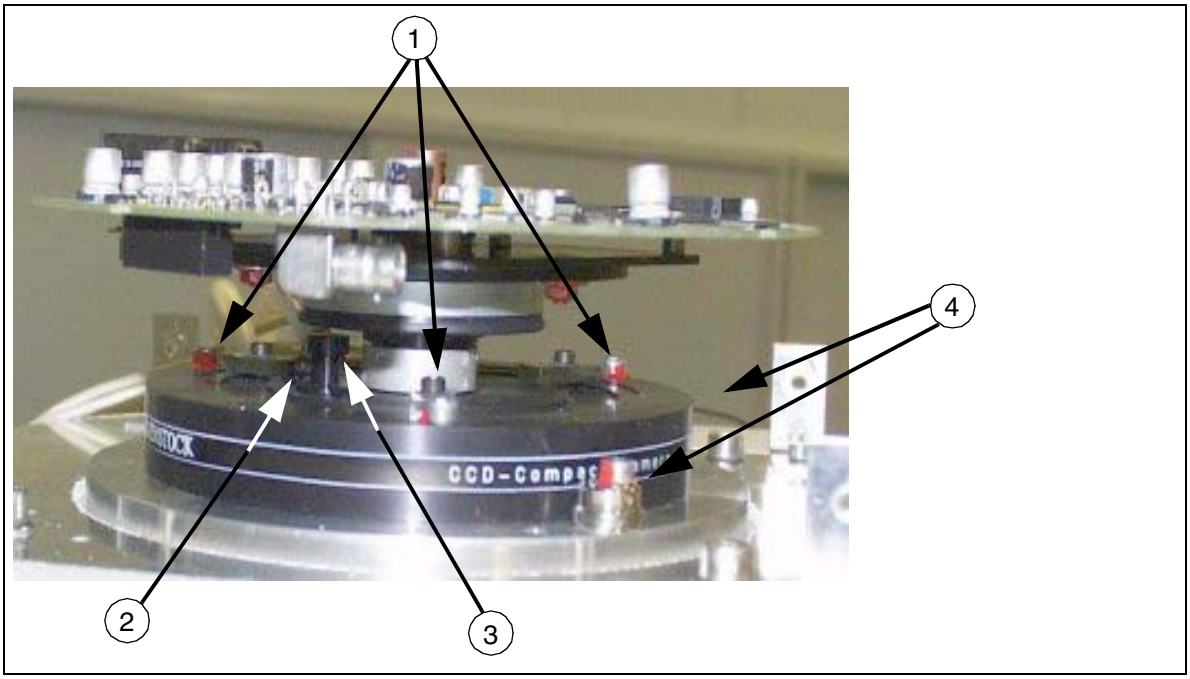

Fig. 9:

Pos. 1 Adjustment screw for I.I. optics
Pos. 2 Locking of the iris
Pos. 3 Iris adjustment
Pos. 4 Adjustment screw for centering

DI C LED

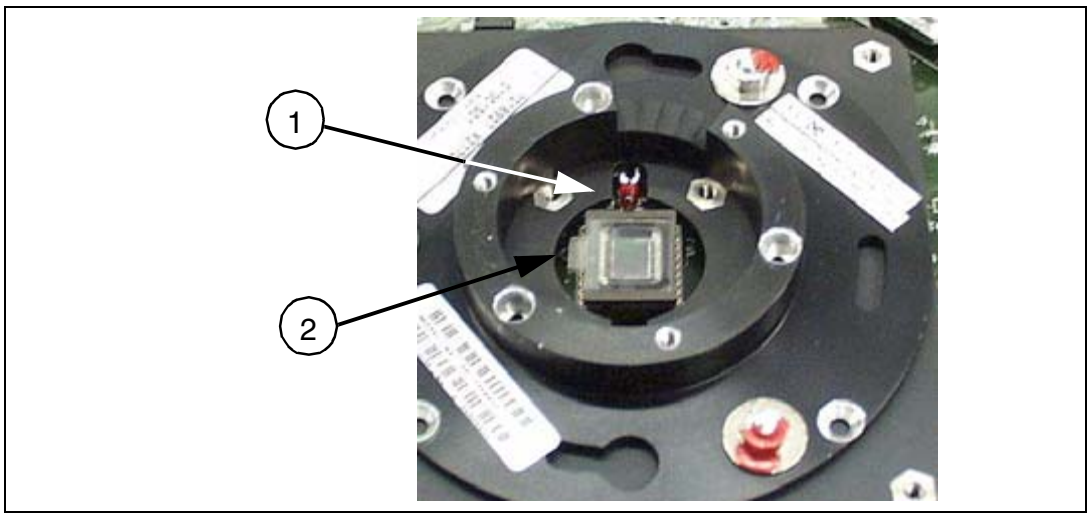

Fig. 10:

Pos. 1 Test LED

Pos. 2 Protective film

Function of the Test/Config Switches

Position (Fig. 7 / p. 27)

Function of S2	1	2	3	4	5	6	7	8
***6** Test switches inactive/normal mode	off	off	off	off	off	off	off	off
***1** Blanking circle OFF	off	off	**ON**	off	off	off	off	off
***1** LIH Mode OFF	off	off	off	**ON**	off	off	off	off
***1** H - image reversal	off	off	off	off	**ON**	off	off	off
***1** V - image reversal	off	off	off	off	off	**ON**	off	off
***1** K -Factor = 1	off	off	off	off	off	off	**ON**	off
***1** AVR - EIN	off	off	off	off	off	off	off	**ON**
***1** Sawtooth - ON	off	**ON**	off	**ON**	off	off	off	off
***1** White signal - ON (bright monitor)	**ON**	**ON**	off	**ON**	off	off	off	off
***1** Current measuring field (visible measuring field corresponds to the one above the XCS selected measuring field).	**ON**	off	off	**ON**	off	off	off	off
Special operating modes:								
***2** Initialize EEPROM (default values are downloaded)	**ON**	off	**ON**	off	**ON**	off	**ON**	off
***2** Change the EEPROM	off	**ON**	off	**ON**	off	**ON**	off	**ON**
***2** Switch on the test - LED	**ON**	off	off	**ON**	**ON**	off	off	**ON**
***2/*5** Center the edge of the I.I.	**ON**	**ON**	off	off	off	off	**ON**	**ON**
***2/*3** Display of monitor test patterns	off	off	**ON**	**ON**	**ON**	**ON**	off	off
***2/*4** Display of current measuring field	**ON**	**ON**	**ON**	off	off	**ON**	**ON**	**ON**
***2/*4** Display of the centering cross	**ON**	off	**ON**	off	off	**ON**	off	**ON**

***1** The Videomed DIC must boot up “normally”. Select the particular function using the switch, the function is active immediately. A reset does not have to be performed.

Several functions can also be selected simultaneously (e.g. AGC set to ON and H-image reversal).

***2** The VIDEOMED DIC must boot up "normally". Select the particular operating mode using the service switches, press the Reset button to accept the new status!

***3** The various monitor test patterns can be selected using the Reset button (dots; grid with brightness/contrast test; S/W horizontal; S/W vertical; BMW; digital sawtooth (dynamic); dark image).

***4** In these modes, a half image of the live image and a half image of the selected measuring field or centering cross is displayed.

***5** The blanking circle is displayed transparent (1 half image without, 1 half image with the circle), it flickers.

***6** Normal mode means:

Service mode not active. The EEPROM values or the values from the XCS controller for the system are active.

Error Messages

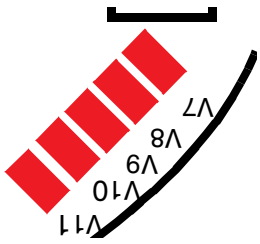

Fig. 11:

Error	XCS Error code	Error code LED's V11---V10---V9---V8---V7				
***6** Checksum Error Flash-Prom	875	**ON**	**ON**	**ON**	**ON**	**ON**
***7** Checksum Error EEPROM	876	**ON**	**ON**	**ON**	**ON**	off
***4** Faulty power supply 5V_L	868	**ON**	off	off	off	off
***5** Faulty power supply 5V_ADC	869	**ON**	off	off	off	**ON**
***5** Faulty power supply 5V_UC	870	**ON**	off	off	**ON**	off
***5** Faulty power supply 5V_VCC	871	**ON**	off	off	**ON**	**ON**
***5** Faulty power supply 3,3V	872	**ON**	off	**ON**	off	off
***4** Faulty power supply 15V	873	**ON**	off	**ON**	off	**ON**
***4** Faulty power supply N_9V	874	**ON**	off	**ON**	**ON**	off
***9** Config Error (internal Error)	877	off	off	off	**ON**	**ON**
***7** EEPROM Error	878	off	off	**ON**	**ON**	off
***9** Actual value Error	826	off	off	**ON**	off	off
***9** Blanking level adjustment Error	828	off	**ON**	off	off	off
***9** Gain adjustment Error	829	off	**ON**	off	off	**ON**
***9** Test signal error	830	off	**ON**	off	**ON**	off
***2** Ramp signal error	864	off	**ON**	off	**ON**	**ON**
***3** BAS setup error 1 (Gain = 1)	831	off	**ON**	**ON**	off	off
***3** BAS amplitude Error 1 (Gain = 1)	832	off	**ON**	**ON**	off	**ON**
***3** BAS setup Error 2 (Gain = 1,3)	833	off	**ON**	**ON**	**ON**	off
***3** BAS amplitude Error 2 (Gain = 1,3)	834	off	**ON**	**ON**	**ON**	**ON**
***8** CCD Error	827	off	off	**ON**	off	**ON**
***1** No XCS connection	---	blin king	off	**ON**	**ON**	**ON**

***1** Blinks sporadically (when it attempts to establish contact with the XCS network).

***2** Relevant only for service (no effect on "normal" operation).=> if required, => perform initial download.=> error still present => replace board.

***3** Terminal resistor (75 Ohm) on X1 malfunctioning (possibly monitor not connected?) => check termination => if okay, replace board.

***4** Generated from the external 11.3 V. => check => if okay, replace board.

***5** Generated from the external 5.5 V. => check => if okay, replace board.

***6** Perform initial download => error still present => replace board => error still present => replace flash Prom.

***7** Perform initial download => error still present => replace board.

***8** Check LED in front of sensor.=> LED okay => replace board.

***9** Replace board.

EEPROM Parameters

NOTE

The default values following initial download correspond to the parameters used in the ICONOS R100 system with the 2844376 monitor. As a rule, no changes need to be made!

Parameter	LED display (in HEX)	Select using S2	Default values with FW VA 01.. (following initial down-load)
H - image reversal	V11 V10 V9 V8 V7 *Fig. 12:*	revers norm 1 2 3 4 5 6 7 8 on off *Fig. 13:*	“norm”
V - image reversal	V11 V10 V9 V8 V7 *Fig. 14:*	revers norm 1 2 3 4 5 6 7 8 on off *Fig. 15:*	“reverse”
Gamma selection	V11 V10 V9 V8 V7 *Fig. 16:*	Gamma 1 Gamma 0,7 1 2 3 4 5 6 7 8 on off *Fig. 17:*	Gamma 0.7
K-factor Automatic	V11 V10 V9 V8 V7 *Fig. 18:*	aktiv inaktiv 1 2 3 4 5 6 7 8 on off *Fig. 19:*	active

Parameter	LED display (in HEX)	Select using S2	Default values with FW VA 01.. (following initial down-load)
Output gain	V11 V10 V9 V8 V7 *Fig. 20:*	1,3 V BAS on off 1 2 3 4 5 6 7 8 1,0 V BAS on off 1 2 3 4 5 6 7 8 *Fig. 21:*	1.3 V BAS
***1** LITHOSTAR	V11 V10 V9 V8 V7 *Fig. 22:*	Lithostar on off 1 2 3 4 5 6 7 8 kein Lithostar on off 1 2 3 4 5 6 7 8 *Fig. 23:*	No Lithostar
BAS in 50/60 Hz or in 100/120 Hz	V11 V10 V9 V8 V7 *Fig. 24:*	100/120Hz on off 1 2 3 4 5 6 7 8 50/60Hz on off 1 2 3 4 5 6 7 8 *Fig. 25:*	50/60 Hz

Good blink (input okay, within the valid range):

- V7; V11 switch with V8; V9; V10

Error blink (incorrect input, out of range):

- All LED's V7; V8; V9; V10; V11 blink.

Warning blink (maximum value set):

- V7; V8 switch with V10; V11
  - Possible only with max K-factor

***1** If the LITHOSTAR is selected, the smallest measuring field is always selected following bootup. A different measuring field is/can be selected via the XCS.

Complete rewrite of the document.