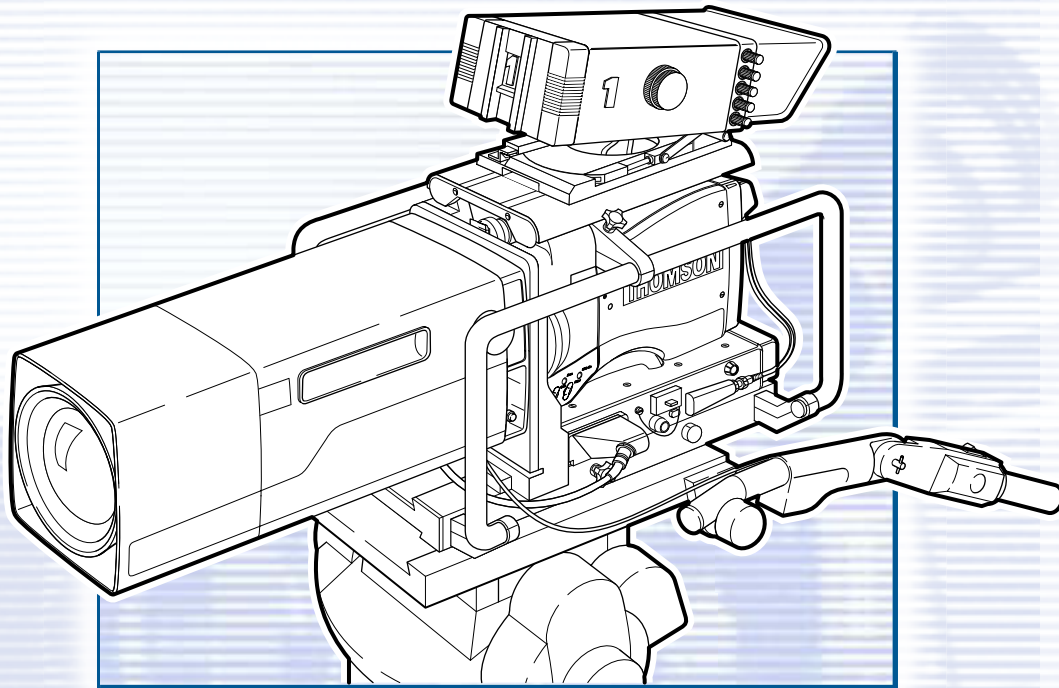


# LDK 23HS MKII

High Speed Camera System



# Technical Manual

3922 496 49021 St.00

## Declaration of Conformity

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We, Thomson Broadcast Solutions Nederland B.V., Kapittelweg 10, 4827 HG Breda, The Netherlands declare under our sole responsibility that this product is in compliance with the following standards:

- EN60065 : Safety
- EN55103-1 : EMC (Emission)
- EN55103-2 : EMC (Immunity)

following the provisions of:

- a. the Safety Directives 73/23/EEC and 93/68/EEC
- b. the EMC Directives 89/336/EEC and 93/68/EEC

## FCC Class A Statement

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This product generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause interference to radio communications.

It has been tested and found to comply with the limits for a class A computing device pursuant to Subpart J of part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this product in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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# LDK 23HS MKII

## Portable EFP - Studio - HS Camera System

### Technical Manual

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## About This Manual

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### Service policy

The LDK23HS MKII is a sophisticated camera system containing state-of-the-art electronic components which are designed to provide long-life operation without the need for maintenance. With this in mind, the service policy of Thomson Multimedia Broadcast Solutions endeavours to ensure that help will be quickly on hand in the unlikely event of anything going wrong. The guiding principles of the Thomson Multimedia Broadcast Solutions first line maintenance philosophy are speed and cost effectiveness. First line maintenance is dedicated to keeping your camera system operational, despite a fault, by module replacement and the replacement of minor mechanical parts by the user.

### Purpose of this manual

The provision of correct information is the first step in ensuring the operational integrity of the camera system. Information on the operation of the camera system is to be found in the Operator's Manual.

This Technical Manual is an integral part of the service policy. It ensures that you will be able to install and set-up your camera system to meet the requirements of your environment. This information on the installation of the camera system is contained in Section 2 of the manual. The remaining sections of the manual provide first line service information so that suitably qualified service personnel can detect and repair faults, normally by module replacement.

Because of the complexity of some of the components, second line service can only be carried out at the specially equipped service centres and information concerning second line maintenance is not supplied in this manual.

### Intended audience

The manual is intended as a guide to those with a working knowledge of camera systems and installation techniques. The first line detection and repair of faults requires a general knowledge of test and measurement techniques.

### Structure of this manual

The manual is divided into eight sections:

#### Section 1: Safety Information.

Contains important safety information and should be read before carrying out any work on the camera system.

#### Section 2: Installation.

Gives instructions on the integration of the camera system into the operating environment and the customization of certain hardware functions

#### Section 3: Replacements.

Gives information on the replacement of components at first line level.

#### Section 4: Adjustments.

Contains the adjustment procedures to be followed to obtain the best performance from the camera system.

#### Section 5: Drawings.

Contains block diagrams of the camera system.

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# Section 1

## Safety Instructions

*This section outlines the precautions that must be taken into account when using the camera system.*

---

### Contents

Safety Summary .....	1-2	Earthing .....	1-3
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This information is intended as a guide for trained and qualified personnel who are aware of the dangers involved in handling potentially hazardous electrical/electronic equipment. It is not intended to contain a complete list of all safety precautions which should be observed by personnel in using this or other electronic equipment.

The installation, maintenance and service of this equipment involves risks both to personnel and equipment and must be performed only by qualified personnel exercising due care.

Personnel engaged in the installation, operation, maintenance or servicing of this equipment are urged to become familiar with First Aid theory and practices.

During installation and operation of this equipment, local building safety and fire protection standards must be observed.

Before connecting the equipment to the power supply of the installation, the proper functioning of the protective earth lead of the installation needs to be verified.

Whenever it is likely that safe operation is impaired, the apparatus must be made inoperative and secured against any unintended operation. The appropriate servicing authority must then be informed. For example, safety is likely to be impaired if the apparatus fails to perform the intended function or shows visible damage.

This product has been designed and tested according to EN60065.

When performing service, be sure to read and comply with the warning and caution notices appearing in the manuals. Warnings indicate danger that requires correct procedures or practices to prevent death or injury to personnel. Cautions indicate procedures or practices that should be followed to prevent damage or destruction to equipment or property.

### **WARNING**

THE CURRENT AND VOLTAGES PRESENT IN THIS EQUIPMENT ARE DANGEROUS. ALL PERSONNEL MUST AT ALL TIMES FOLLOW THE SAFETY REGULATIONS.

ALWAYS DISCONNECT POWER BEFORE REMOVING COVERS OR PANELS.

ALWAYS DISCHARGE HIGH VOLTAGE POINTS BEFORE SERVICING.

NEVER MAKE INTERNAL ADJUSTMENTS, PERFORM MAINTENANCE OR SERVICE WHEN ALONE OR WHEN FATIGUED.

IN CASE OF AN EMERGENCY ENSURE THAT THE POWER IS DISCONNECTED.

ANY INTERRUPTION OF THE PROTECTION CONDUCTOR INSIDE OR OUTSIDE THE APPARATUS, OR DISCONNECTION OF THE PROTECTIVE EARTH TERMINAL, IS LIKELY TO MAKE THE APPARATUS DANGEROUS. INTENTIONAL INTERRUPTION IS PROHIBITED.

FOR SAFETY REASONS THE CPU MUST BE MOUNTED IN A 19-inch RACK WHICH HAS SAFETY COVERS ACCORDING TO IEC65.

WHEN TWO CPUs ARE MOUNTED ABOVE EACH OTHER THE MINIMUM DISTANCE BETWEEN THEM MUST BE 50MM OR THE RACK MUST BE FORCE-AIR COOLED.

USE ONLY FUSES OF THE TYPE AND RATING SPECIFIED.

### **CAUTION**

To prevent risk of overheating, ventilate the product correctly.

Connect the product only to a power source with the specified voltage rating.

Only connect a Triax cable from the LDK 6 camera family to an LDK 6 CPU. Never connect it to any other base station.

Never connect the Triax cable from a camera to a CPU of a different family; never connect the LDK family to the TTV family.

Do not allow system ground currents to exceed 1.5A in the outer shield of the triax cable or 0.2A in other cable shields.

It is strictly prohibited to short circuit the inner and outer shields of a triax cable used to connect a camera to a base station.

# Earthing

Symbol	Colour	Explanation
	Red	High voltage terminal at which a voltage, with respect to an other terminal, exists or may be adjusted to 1000V or more.
	Yellow/Black	Live part.
	Yellow/Black	This marking indicates that the operator must refer to an explanation in the Instruction Manual, or that a specific component must be replaced by the component specified in the documentation for safety reasons.
	White/Black	Protective earth (ground) terminal.

## Cathode ray tubes

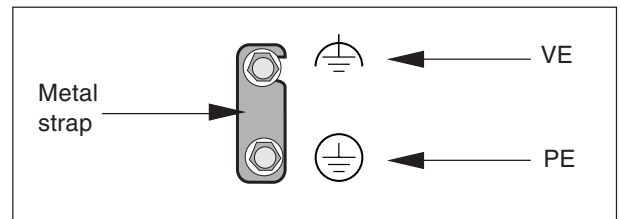
Components marked on the circuit diagram are critical for safety and include those specified to comply with X-ray emission standards for units using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

When servicing units that use cathode ray tubes (CRTs), the cathode ray tubes themselves, the high voltage circuits and related circuits are specifically chosen so that they comply with recognized codes pertaining to X-ray emission.

Consequently, when servicing, replace the cathode ray tubes and other parts with specified parts only. Do not attempt to modify these circuits as any unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

Handle the cathode ray tube only when wearing shatterproof goggles and after discharging the high voltage completely.

The rear of a CPU has two separate screw terminals for protective earth (PE) and video earth (VE).



These are normally connected by a metal strap. The protective earth terminal is internally connected to the protective earth conductor of the power cable. If required, the central earth connection wire of the studio can be connected to terminal PE.

In normal circumstances the connection between the protective earth and the video earth should not be broken.

The metal strap may be removed only if the studio (or OB van) is equipped with separate protective and video earth systems. Under these circumstances the video earth terminal must be connected to the central functional earth potential (video earth) of the studio. This earth potential should have functional protective and noiseless earth (FPE) qualities as stated in the VDE regulation 0800/part2. A low impedance interconnection of both earth conductors must be provided at the central studio earthing point.

## WARNING

THE UNIT MUST ALWAYS BE CONNECTED TO PROTECTIVE EARTH.

## Mains Lead Wiring for UK Users

The wires in the mains lead are coloured in accordance with the following code:

GREEN AND YELLOW	-	EARTH
BLUE	-	NEUTRAL
BROWN	-	LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

- The wire coloured GREEN AND YELLOW must be connected to the terminal on the plug marked with the letter E or by the safety earth symbol or coloured GREEN or GREEN AND YELLOW.
- The wire coloured BROWN must be connected to the terminal marked with the letter L or coloured RED.
- The wire coloured BLUE must be connected to the terminal marked with the letter N or coloured BLACK.

Ensure that your equipment is connected correctly - if you are in any doubt consult a qualified electrician.





---

## Section 2

### Installation

*This section provides information which is relevant when the camera system is to be used for the first time. Packing and unpacking instructions together with information on the integration of the camera system into your studio system are provided. The procedures for the customization of certain hardware functions and connector information is also provided.*

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## Packing/Unpacking

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### Unpacking

Inspect the shipping container for evidence of damage immediately after receipt. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the units have been checked mechanically and electrically.

The shipping container should be placed upright and opened from the top. Remove the cushioning material and lift out the contents.

The contents of the shipment should be checked against the packing list. If the contents are incomplete, if there is mechanical damage or defect, or if the units do not perform correctly when unpacked, notify your Thomson Multimedia Broadcast Solutions sales or service centre within eight days. If the shipping container shows signs of damage or stress, notify the carrier as well.

### Packing

If a unit is being returned to Thomson Multimedia Broadcast Solutions for servicing, try to use the containers and materials of the original packaging. Attach a tag indicating the type of service required, return address, model number, full serial number and the return number which will be supplied by your Thomson Multimedia Broadcast Solutions service centre.

If the original packing can no longer be used, the following general instructions should be used for repacking with commercially available materials:

- a. Wrap unit in heavy paper or plastic.
- b. Use strong shipping container.
- c. Use a layer of shock-absorbing material around all sides of the unit to provide firm cushioning and prevent movement inside container.
- d. Seal shipping container securely.
- e. Mark shipping container FRAGILE to ensure careful handling.

### Storage

The unit may be stored (non-operating condition) in environments within the following limits:

Temperature: -40°C to +70°C

Humidity: Up to 90%

Altitude: 50,000 feet

When stored, the unit should be protected from temperature extremes which may cause condensation, and should also be protected from high levels of dust.

## Hardware Setup and Customization

The camera system is delivered in a ready-to-use state, however, there are occasions when it might be necessary to re-adjust some functions after, for example, fitting a new lens.

A large number of functions can be set-up using the control facilities of the menu system. In addition to this software set-up there are some functions which can be selected or adjusted internally in the camera.

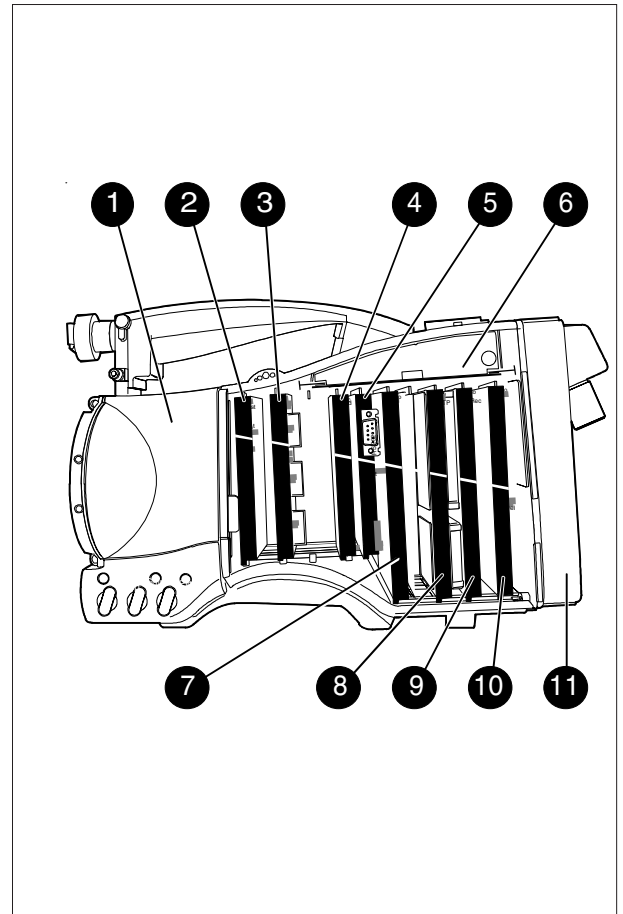
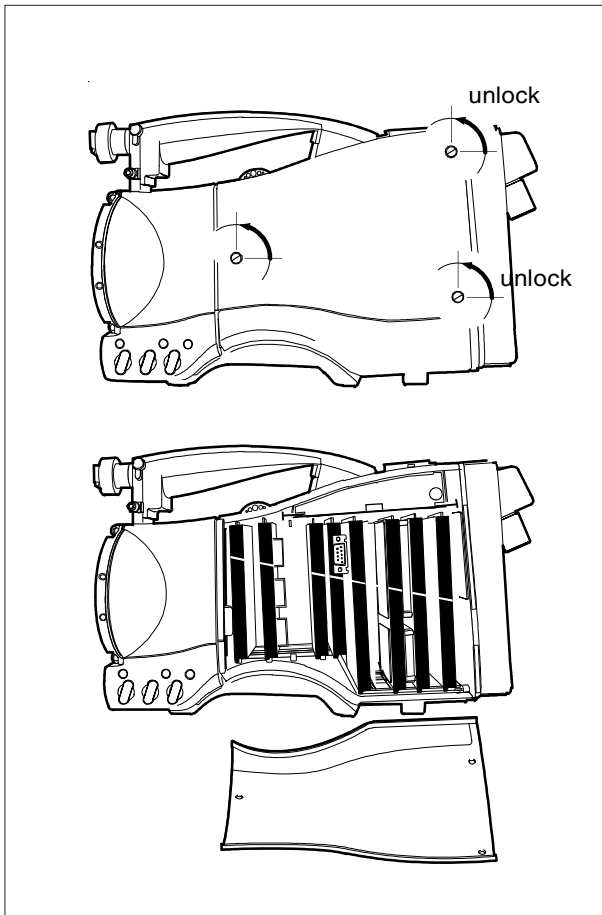
Refer to the next chapters for instructions.

### Location of adjustments

Turn the three screws on the left side panel 90° counterclockwise and remove the cover (see the figure below).

Unless mentioned otherwise the adjustments for hardware setup and customization are located at the side of the following modules:

- 1 Front Module
- 2 Video Processor 1
- 3 Video Processor 2
- 4 Sync. Shading
- 5 Data Processor
- 6 Power
- 7 Video Miscellaneous
- 8 Video Mux Ext-TP Rec
- 9 Audio/Intercom TX-Rec
- 10 Audio/Intercom LF
- 11 Backpanel



## CPU Dimensions

### Camera Processing Unit

The CPU must be mounted in a 19 inch rack for safety reasons. The CPU dimensions are given in figure 2-1.

**WHEN TWO CPU'S ARE MOUNTED ABOVE EACH OTHER THE MINIMUM DISTANCE BETWEEN THEM MUST BE 50mm OR THE RACK MUST BE FORCE-AIR COOLED.**

#### **WARNING**

**THE CPU MUST BE MOUNTED IN A 19 INCH RACK WHICH HAS SAFETY COVERS ACCORDING TO EN 60065.**

**THE AIR INTAKE HOLES IN THE FRONTCOVER MAY NEVER BE COVERED**

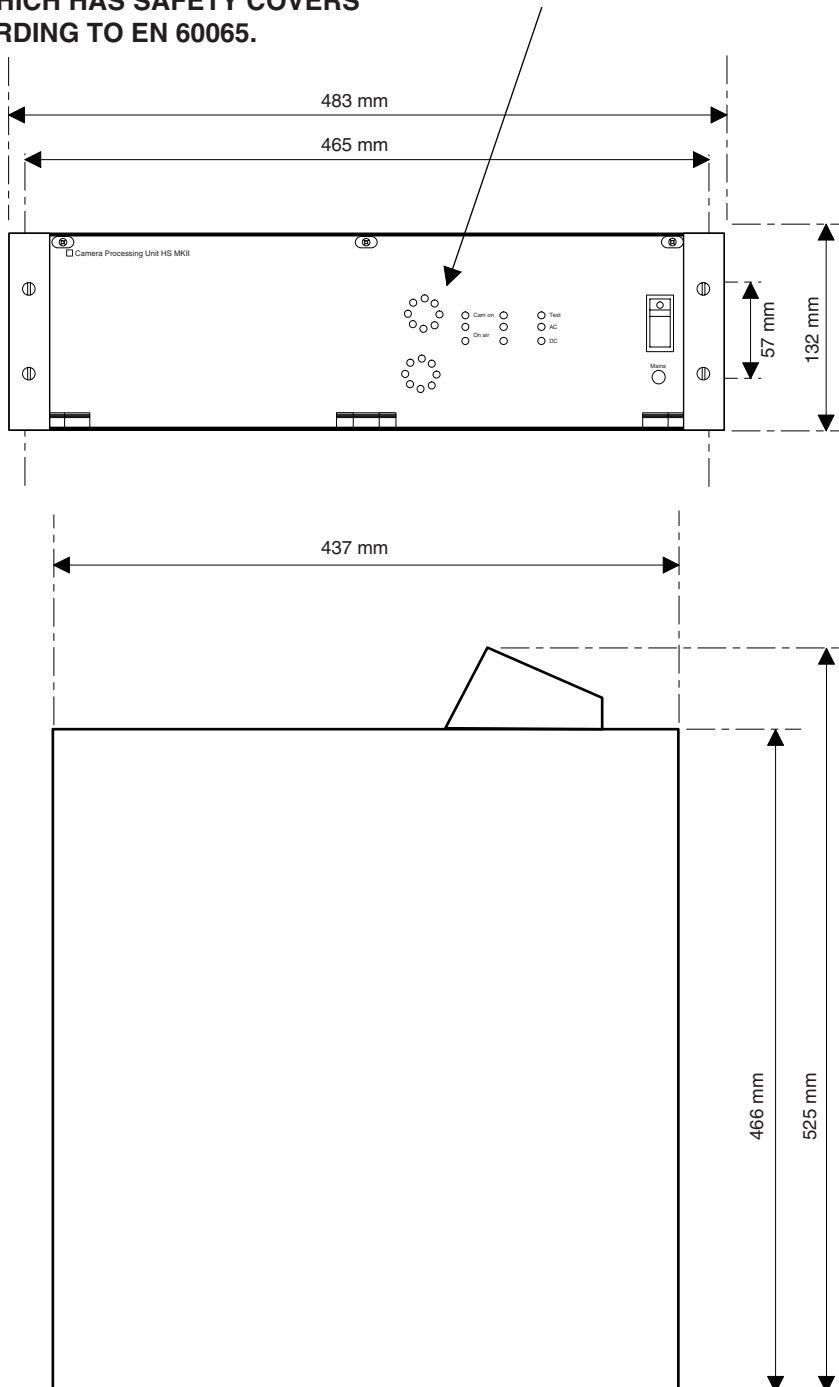


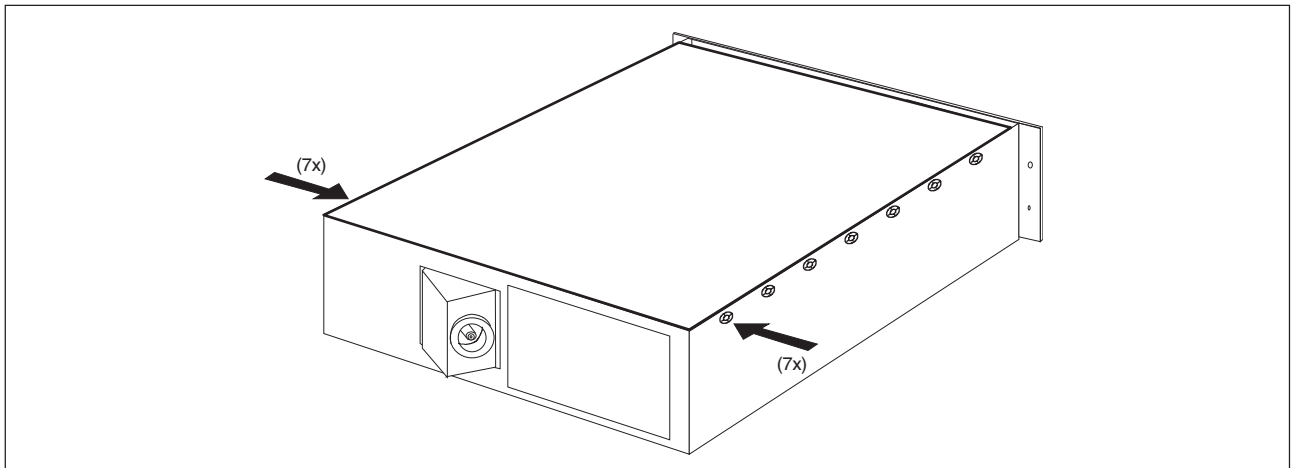
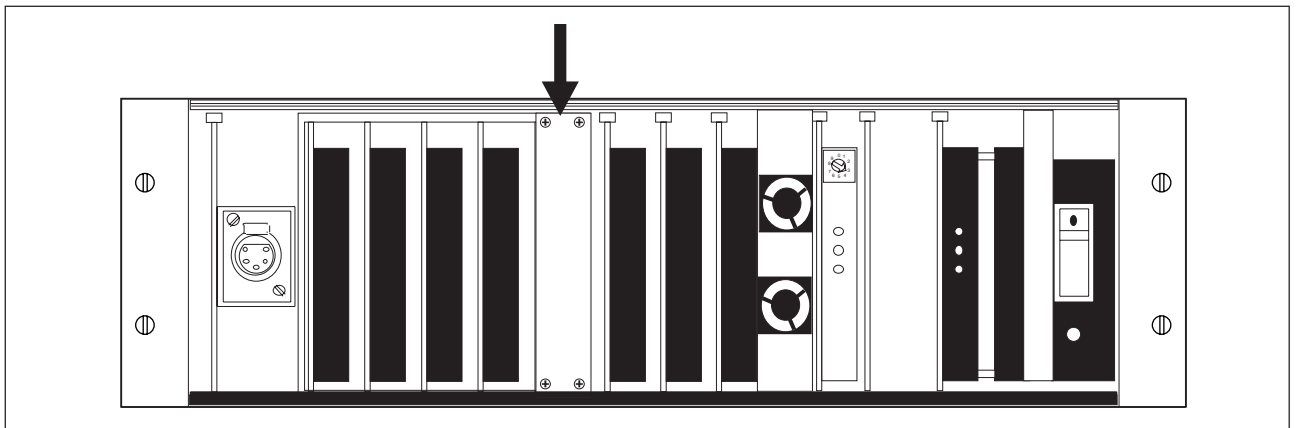
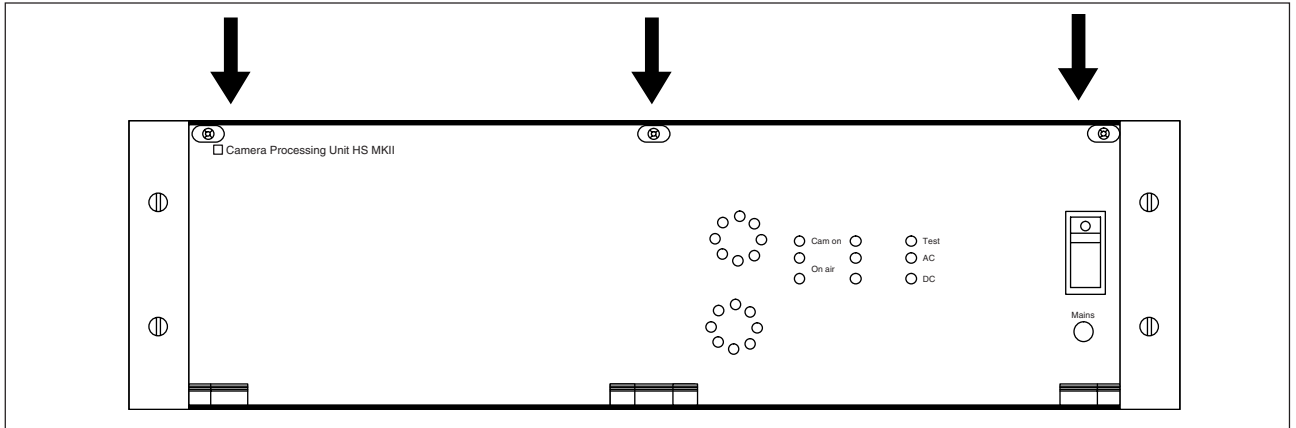
Figure 2-1 CPU Dimensions

## CPU Board Access and Location

### Access and Location

To gain access to the printed circuits boards at the front of the CPU, loosen the three captive screws indicated in figure 2-2 and open down the front cover. For cooling is the Digital Video Processor is covered see figure 2-3. To gain access to the Aux. Receiver

module, the HP/LP Power Filter module, or the Front End Mux. module, unscrew and remove the fourteen screws indicated in figure 2-4 and remove the rear top cover. The locations of the various boards and modules are shown in figure 2-5 on the next page.



## Cpu Board Access and Location

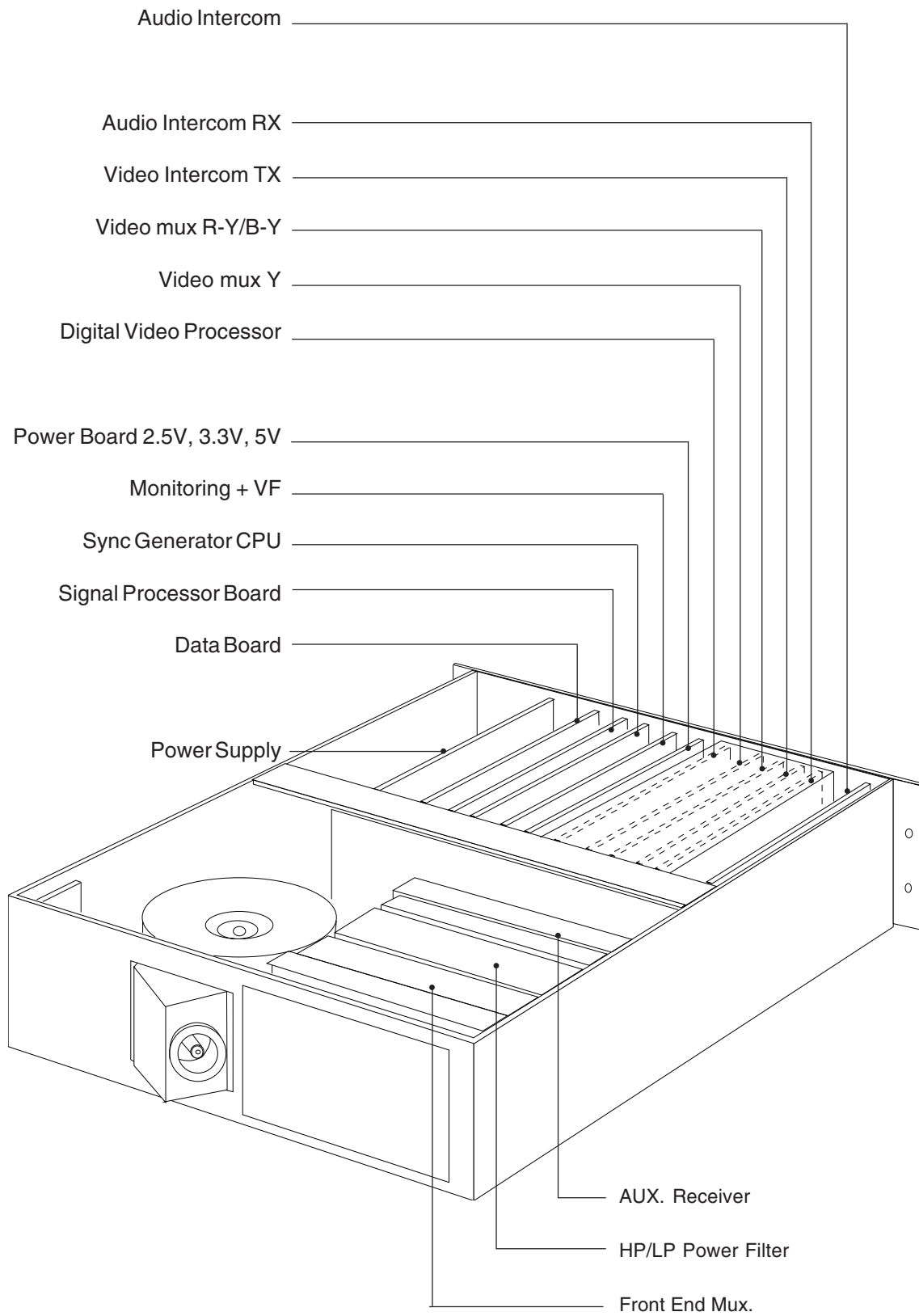


Figure 2-5 Board Location - CPU

A test sawtooth signal is normally only used for adjustment procedures. Jumper X3 on Video processor 1 board provides a choice between two internal signals or an external signal.

**Internal signals**

Set jumper X3 to position BC to get the nominal sawtooth. This is used for checking amplitudes.

Set jumper X3 to position AB to get a small sawtooth (approximately 25% nom.). This small sawtooth is used for checking painting or colour temperature ranges.

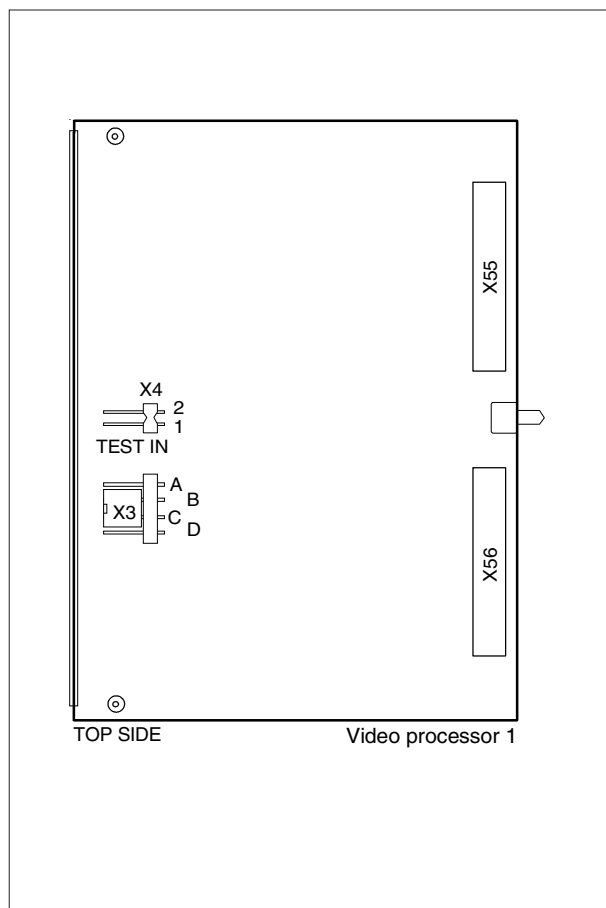
**External signal**

To inject an external test signal first set jumper X3 to position CD (test input). Connect the external test signal to connector X4-1/2. The nominal value of this signal is 700 mV without sync.

The test sawtooth signal is switched on by means of the Operate menu of the camera or the Setup 1 menu of the MCP.

When a camera is supplied with a lens it is not necessary to perform any of the following adjustments as the lens is already matched to the camera. However, if you wish to change to a different type of lens or the lens is not supplied with your camera, back focus, white shading and auto iris adjustment procedures may have to be performed.

- Colour balance.  
If required, perform the gain adjustment of the preprocessor board and/or white shading adjustment procedures, described in section 4.
- Auto Iris Adjustment  
If a different lens either works too slow or overshoots too much with the auto iris control, adjust the potentiometer on the lens to obtain acceptable operation. Refer to the lens documentation.
- Back Focus Adjustment  
To adjust the back focus of the lens refer to the documentation of the lens.



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## Analogue Ch1-Ch2

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## External Aspect Ratio Switch

Two analogue channels (AN 0 and AN 1) are available from the CPU to the camera via the triax cable and can be used to transmit L.F. signals. For example, joystick control or pan and tilt. The input signals are applied to the Auxiliary connector of the CPU. The output signals are available on the Auxiliary connector of the camera. The input signal and output signal voltage is between 0 and 5Vdc.

The AN 1 channel is sometimes used for switching the aspect ratio. This is selected by means of the software. See next chapter for instructions.

The analogue channel 1 (AN 1) input on the CPU can be used to switch the aspect ratio. This allows multiple camera switching.

This function can be selected in the menu system of the MCP.

Apply a voltage at TTL level to the Auxiliary CPU connector.

Input high: aspect ratio 4:3

Input low: aspect ratio 16:9



## Viewfinder Cadre Indication

### Cadre On/Off

Switch ZS1-2 on the Sync./shading board allows the cadre in the viewfinder to be switched on permanently or to be controlled by the menu system.

Position ZS1-2 Off  selects (remote-) menu control


(factory setting); position On  switches the cadre on permanently.

If ZS1-2 is in the remote position then you can select in Menu VF/Lens Cadre On or Off. The cadre is switched to the 4:3 format or to the 16:9 format depending on the position of the aspect ratio switch.

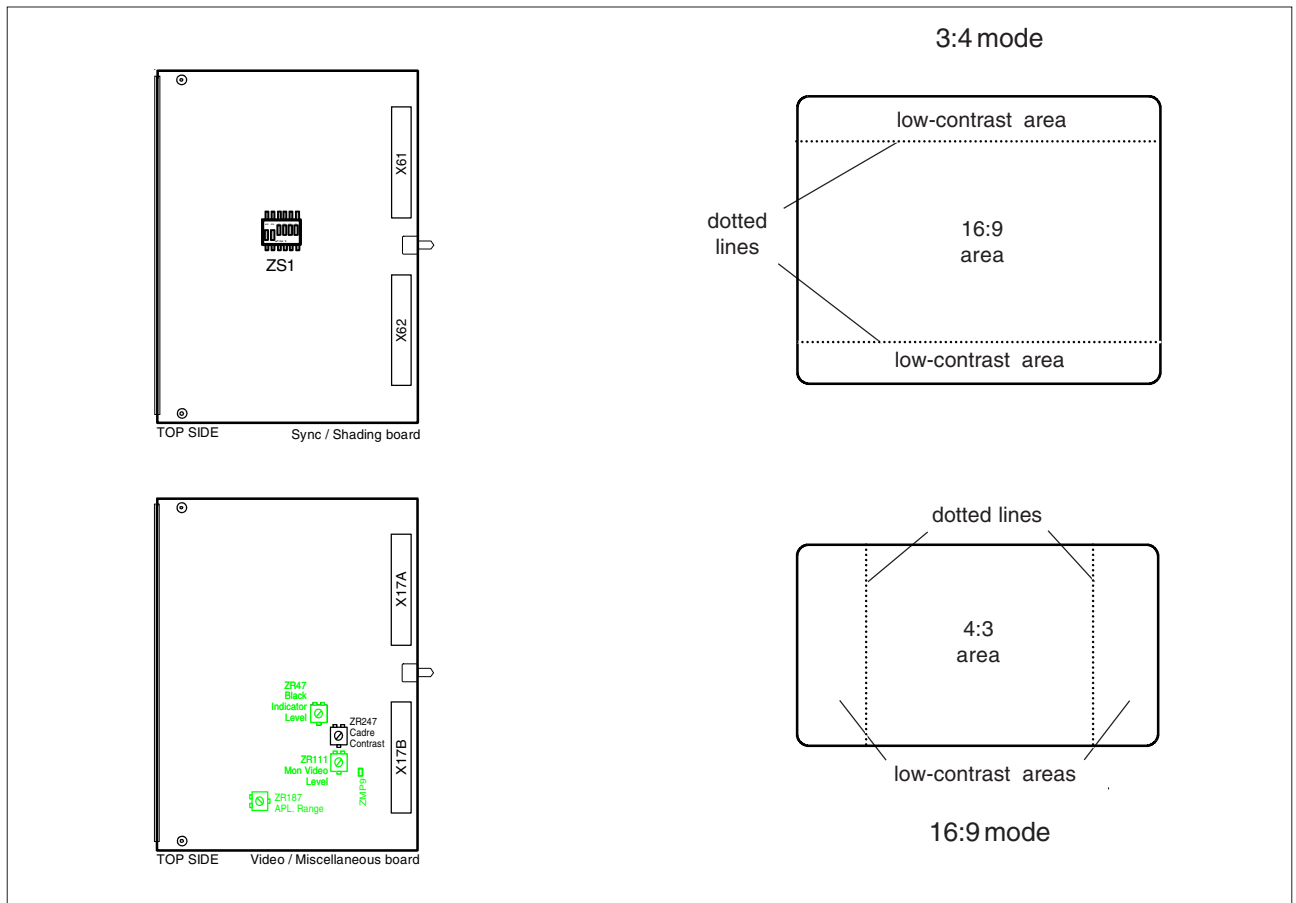
### Cadre appearance

Switch ZS1-5 on the Sync./shading board allows the cadre in the viewfinder to take the form of two dotted lines or two low-contrast areas outside the picture area.

Position Off  selects the dotted lines;

position On  selects the low-contrast areas.

The contrast of the cadre strips is adjusted with potentiometer ZR247 on the Video/Miscellaneous board.



## —Audio / Intercom settings

### Audio microphone signals

The high-pass filters in the audio channels reduce the background noise in the audio microphone signals.

The highpass filters can be set as follows:

Audio 1 S601: AC=on AB=off (factory setting)

Audio 2 S401: AC=on AB=off (factory setting)

The phantom power for different types of microphones can be set as follows:

Audio 1 S600: A1-A2/B1-B2 +12Vdc

A3-A4/B3-B4 Ground\*

A4-A5/B4-B5 +48Vdc

Audio 2 S400: A1-A2/B1-B2 +12Vdc

A3-A4/B3-B4 Ground\*

A4-A5/B4-B5 +48Vdc

(\* factory setting)

### Intercom headset signals

The signal to the headset of the tracker can be selected by S303 on the Audio/Intercom LF board. Position AB (the factory setting) selects the tracker microphone sidetone signal; position AC selects the ENG signal.

### Intercom microphone signals

The gain of the cameraman microphone signal can be set with S101 as follows:

AB= 40db (factory setting) AC=0db

The gain of the tracker microphone signal can be set with S301 as follows:

AB= 40db (factory setting) AC=40db

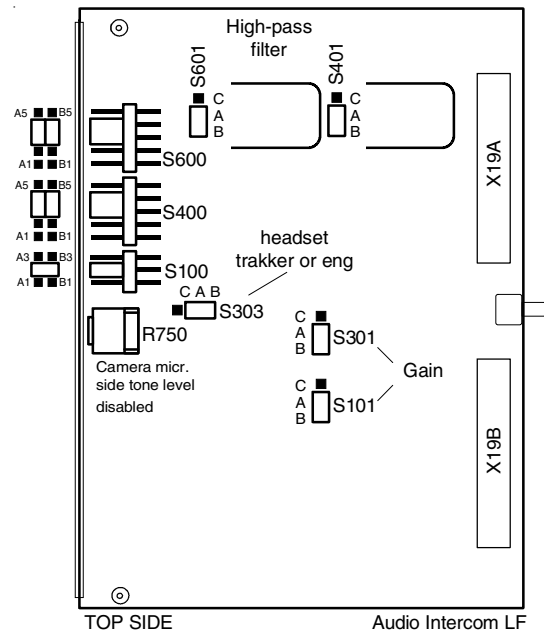
The factory settings are for headsets with a dynamic microphone.

The phantom power for both cameraman and tracker microphones can be set with S100 as follows:

A1-B1 +12Vdc

A2-B2 Ground (factory setting)

A3-B3 -12Vdc



## Private Data

Private data channels can be used for the transmission of serial data via the triax cable. For example, electronic scriptboard or character data for a video display unit can be transmitted to the camera.

The tracker microphone intercom channel is used for the data channel from camera head to CPU. The program intercom channel is used for the data channel from CPU to camera head. The input and output signals are available on the auxiliary connectors of the camera and CPU (for camera see the connectors and cables section). If a channel is used for private data, then of course the original functions are no longer available.

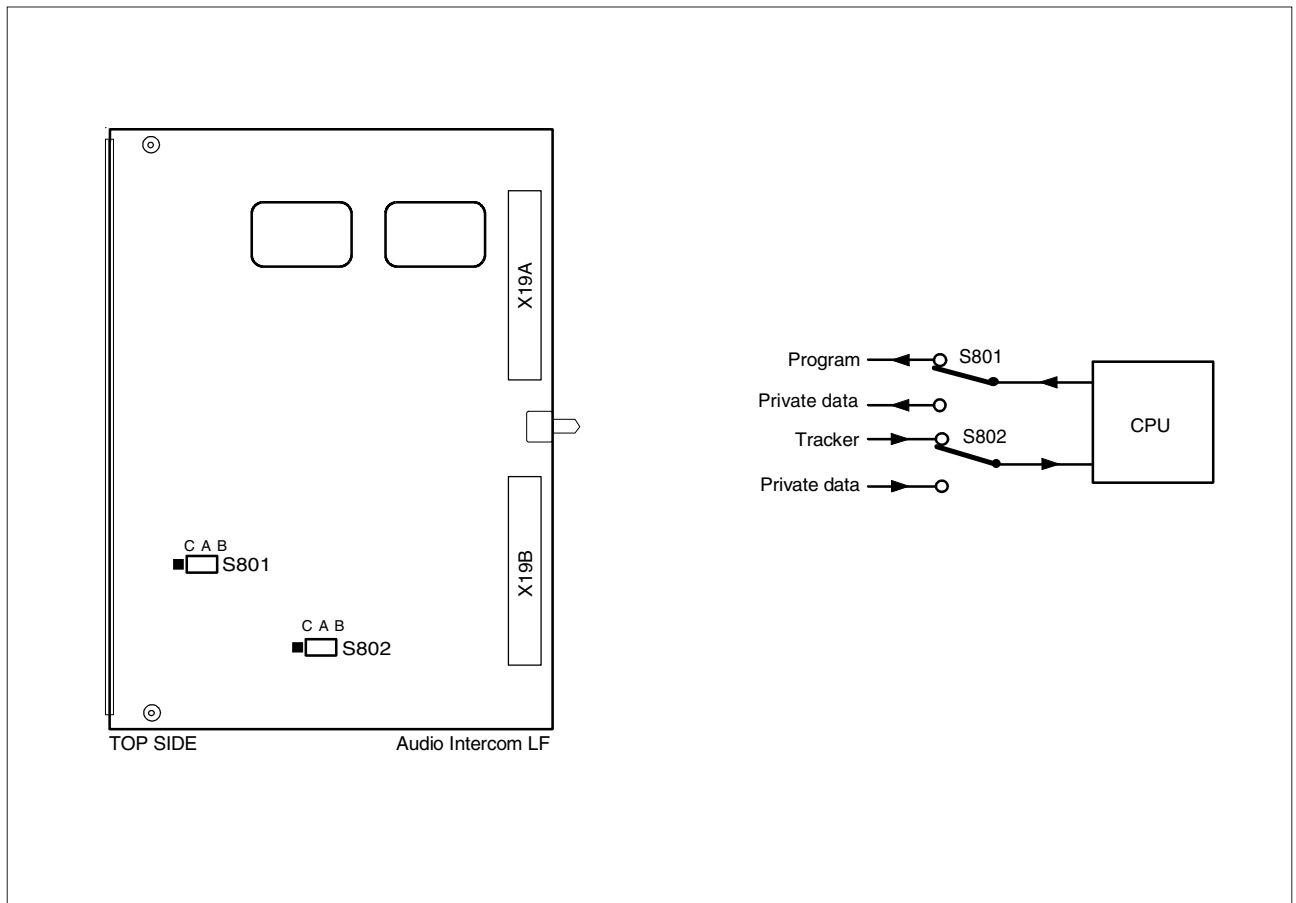
To select the function of the CPU to camera channel use S801 on the Audio/intercom board. Position AB selects the Progr function (factory setting); position AC selects the private data function.

To select the function of the camera to CPU channel use S802 on the Audio/intercom board. Position AB selects the tracker microphone function (factory setting); position AC selects the private data function.

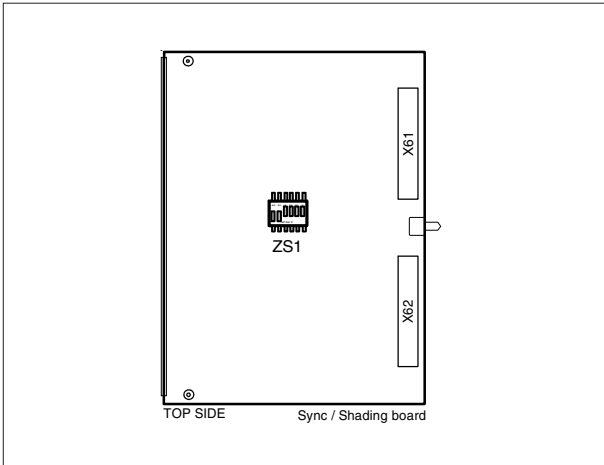
Remember that the propagation-delay times are different for different triax cable lengths, especially if a return signal is involved. At maximum lengths of 2400 metres the total delay is at least 25  $\mu$ sec. and can be more than 30  $\mu$ sec, depending on the type of triax cable.

Data signal specifications:

Baudrate: 2400  
 Input level: TLL, possible RS232  
 Input impedance: 100Kohm  
 Output impedance: ~300 ohm  
 Max load: ~1Kohm



# System Settings



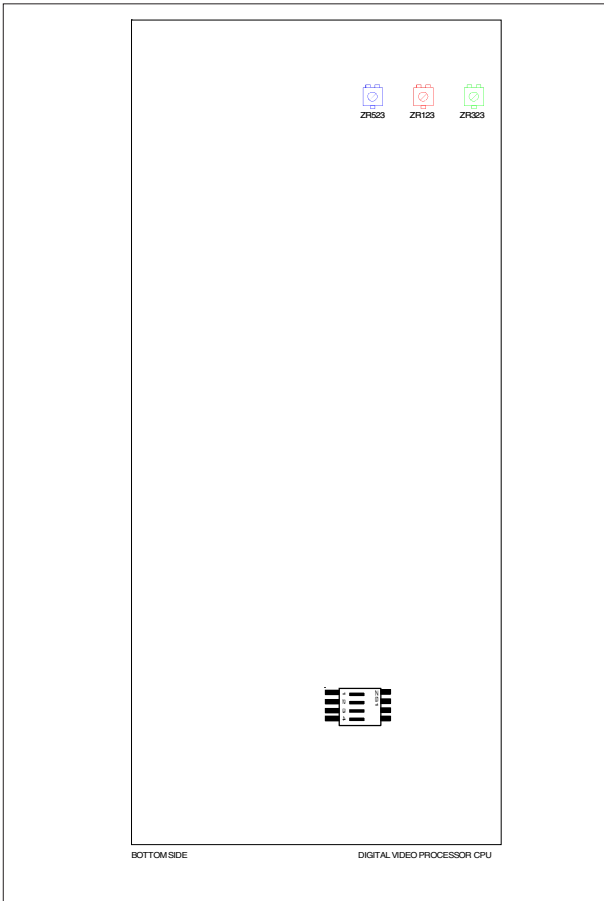
## Sync./Shading Board (Camera)

### 150Hz/180Hz

Switch ZS1-6 on the Sync./shading board allows the camera to be switched between 150Hz(PAL) and 180Hz(NTSC).

ZS1-6 On  is 150Hz(PAL).

ZS1-6 Off  is 180 Hz(NTSC).



## Digital Video Processing Board (CPU)

Switch ZS1-1 on the Digital Video Processing board switches on and off the Leaking Pixel Correction.

ZS1-1 On is LPC On.

ZS1-1 Off is LPC Off.

Switch ZS1-2 on the Digital Video Processing board switches on and off the Video Noise Slicer.

ZS1-2 On is VNS On.

ZS1-2 Off is VNS Off.

### 150Hz/180Hz

Switch ZS1-3 on the Digital Video Processing board allows the CPU to be switched between 150Hz(PAL) and 180Hz(NTSC).

ZS1-3 On  is 150Hz(PAL).

ZS1-3 Off  is 180 Hz(NTSC).

### Output PH2 BNC connector (CPU)

Switch ZS1-4 on the Digital Video Processing board allows the CPU to be switched between inverted field pulse and not inverted field pulse.

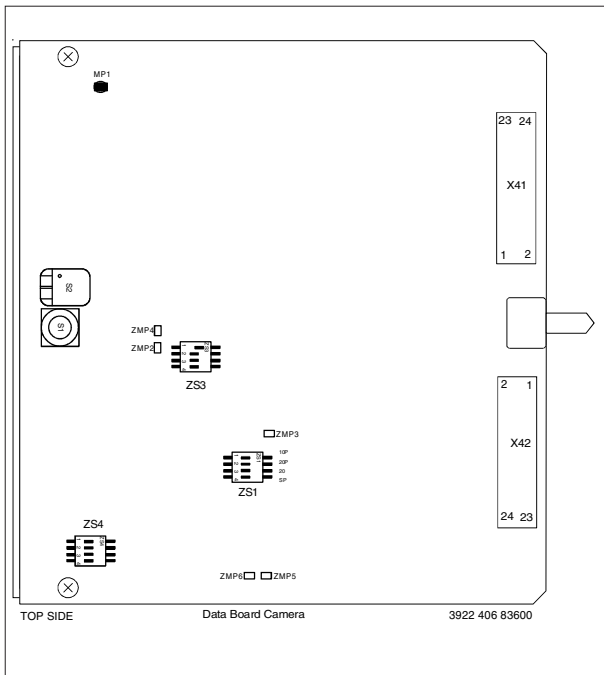
ZS1-4 On  is field pulse inverted. (EVS)

ZS1-4 Off  is field pulse not inverted. (STD)

Depends on the system used by the Slow Motion recorder unit.

For MKII systems ZS1-4 always in the Off position.


# System Settings




## Data Board (Camera)

### Dipswitches:

**ZS1 is only used for indication purposes and indicates which software is loaded on this DATA Board.**

ZS1-1 ON  is LDK10P software.

ZS1-2 ON  is LDK20P software.

ZS1-3 ON  is LDK20 software.

ZS1-4 ON  is Special software.

**S2 is used for test purposes and downloading software.**

S2-1 ON= modem (download software)


S2-2 ON= Test (for factory use only)

Their default position is OFF.

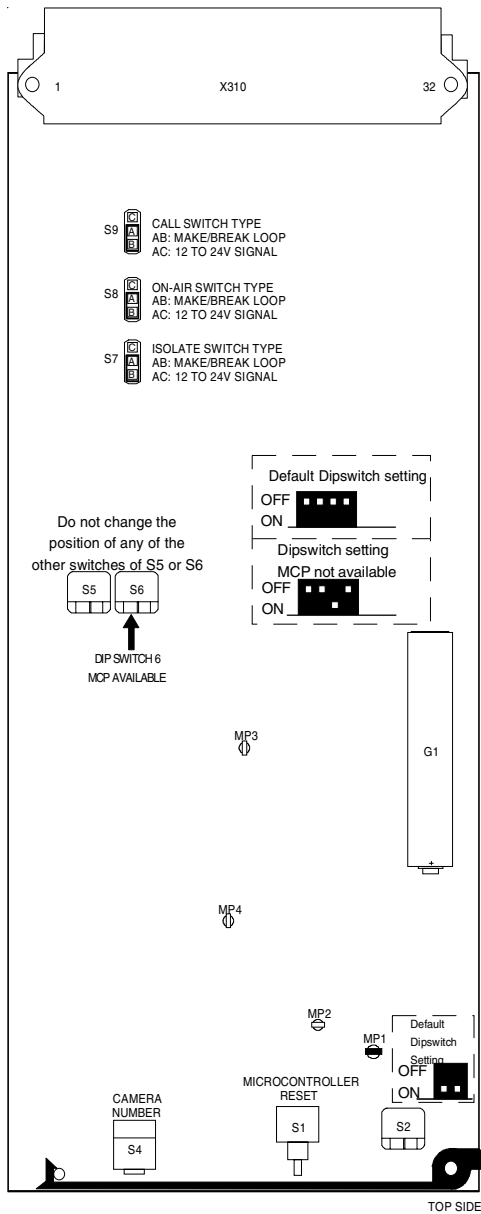
**ZS3 is used to switch on the watchdog and the LED's.**

ZS3-1 ON  is watchdog on.

ZS3-2 and ZS3-3 are spares.

ZS3-4 ON  is LED's on.

**ZS4-1 to 4 is for optional purposes.**



## Data Board (CPU)

### No MCP


When no MCP is available it might occur that some functions are in an undesirable position, for example, a lock on the upper part of the OCP. To prevent this happening, dip switch 2 on the CPU data board can be set when an MCP is not available. Refer to figure 6. The default setting for the dip switch is MCP available. The functions affected by this switch and their state is as follows: (in case the dipswitch is set to "MCP not available")

Variable black stretch .....	YES
Variable gamma .....	YES
Variable Flare .....	YES
Saturation .....	YES
White clipper .....	YES
Knee slope .....	YES
Knee point .....	YES
Iris .....	NORMAL
OCP lock upper/total .....	TOTAL
Intercom .....	SYSTEM
Audio .....	EXTERNAL
Aspect Ratio .....	EXTERNAL
Aspect Ratio .....	3:4
Autolight .....	YES

### Watchdog

Switch S2 on the Data Board (CPU) is to switch on and off the watchdog.


S2 Off  is watchdog off

S2 On  is watchdog on

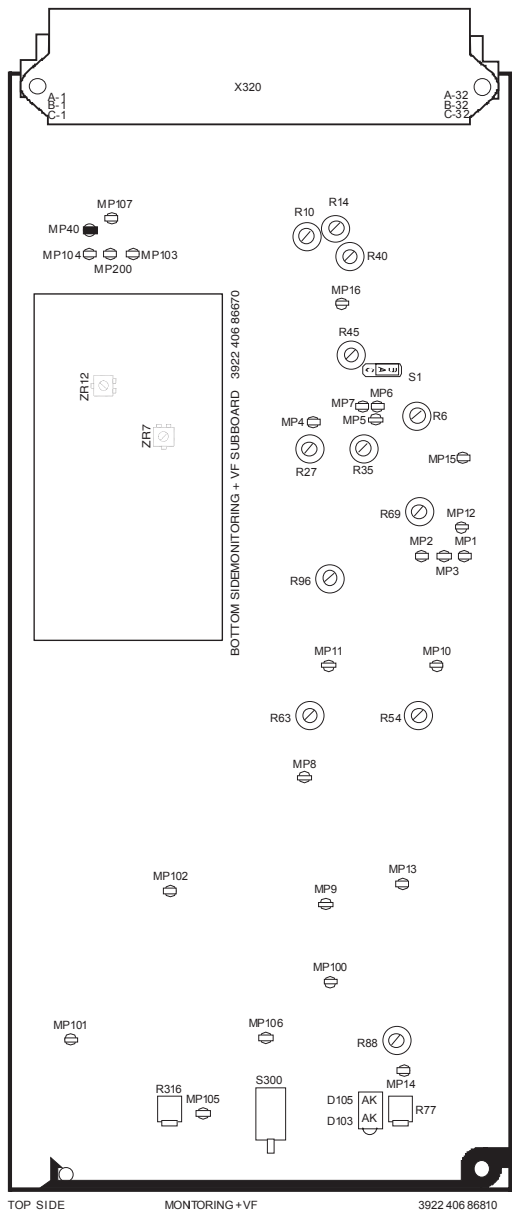
### Remote timing

Switch S2 on the Data Board (CPU) is to switch on and off the remote timing.

S2 Off  is remote timing off

S2 On  is remote timing on

### Monitoring + VF Board (CPU)



### Timing

When on the Data Board (CPU) with S2 the remote timing is set to On, the timing is adjustable on the MCP and on the Camera.

On the MCP in menu Maint 1 and on the Camera in menu Install > Timing.

When on the Data Board (CPU) with S2 the remote timing is set to Off, the timing is adjustable on the Monitoring + VF Board (CPU) as follows.

### H-phase

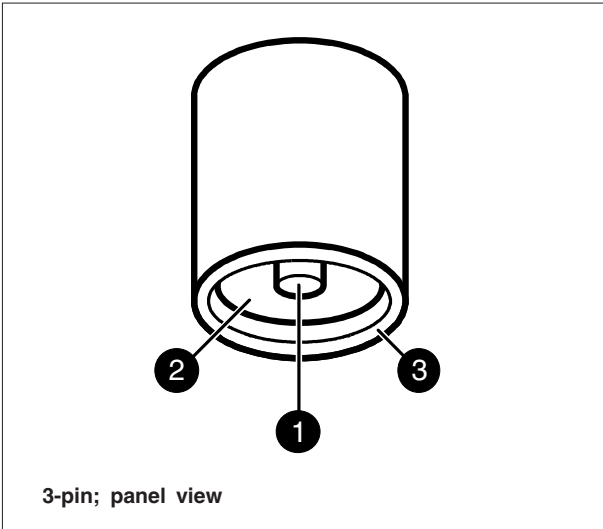
Adjust with R316 the H-phase.

### Subcarrier Phase setting

Adjust with toggle switch S300 the Subcarrier Phase setting. The first two seconds is fine adjustment and



**Triax connector**



**Fischer**

- 1. Inner pin: Signals + power
- 2. Inner shield: Return
- 3. Outer shield: Camera housing

**Trilock**

- 1. Inner pin: Signals + power
- 2. Inner shield: Return
- 3. Outer shield: Camera housing

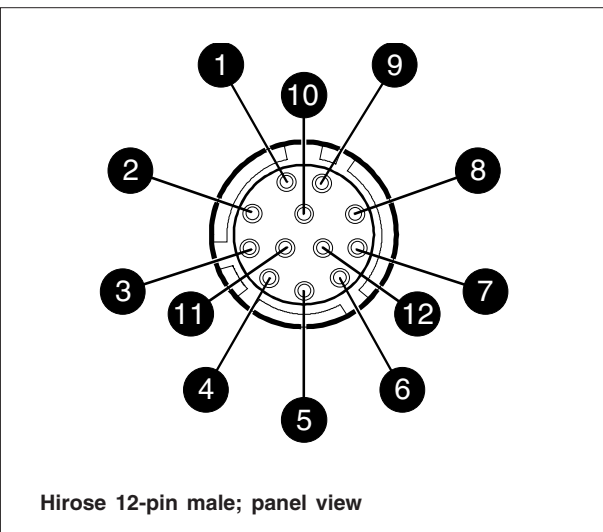
**ARD**

- 1. Inner pin: Signals + power
- 2. Inner shield: Return
- 3. Outer shield: Camera housing

**LEMO**

- 1. Inner pin: Signals + power
- 2. Inner shield: Return
- 3. Outer shield: Camera housing

**Viewfinder connector**



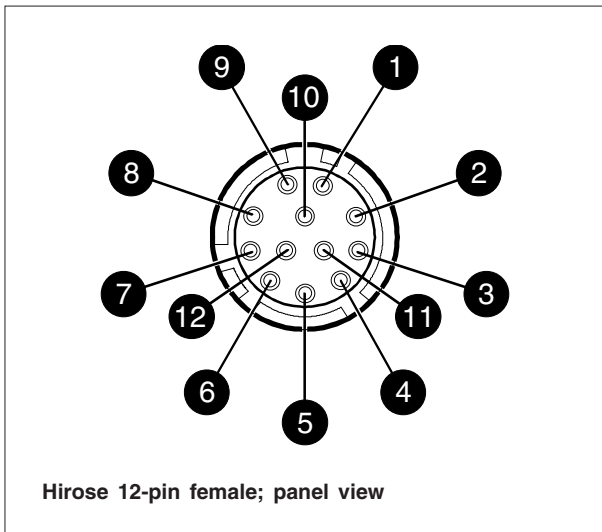
- 1. Shield
- 2. -80 V VF
- 3. Norm
- 4. +13V
- 5. Power save, not used in LDK 10P
- 6. D-SCL
- 7. GND
- 8. D-SDA
- 9. D-INT N
- 10. Spare
- 11. Mon. - Video
- 12. Mon. - Video GND

Shield of cable directly to the connector housing.



## Connectors and Cables Camera Head

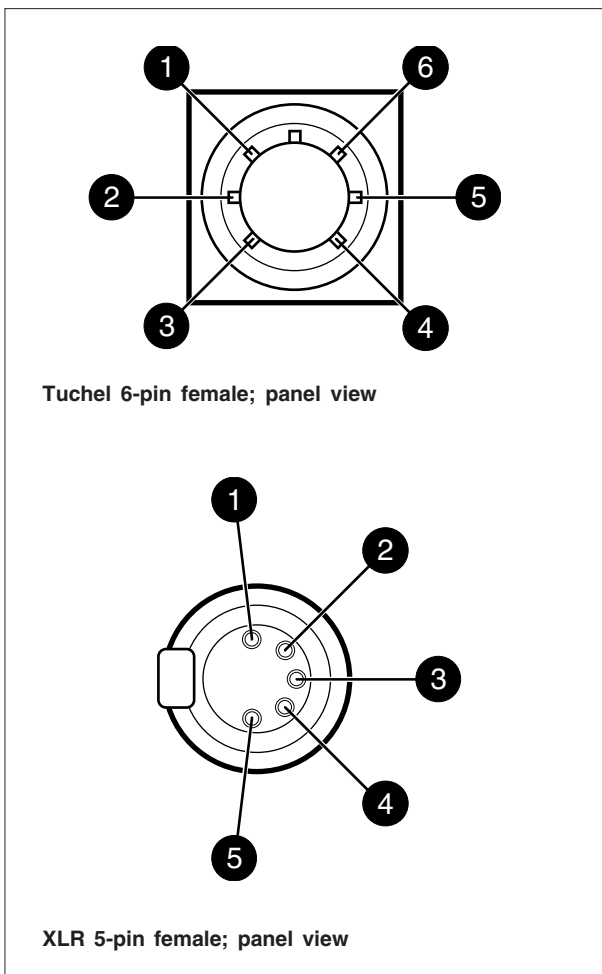
### Lens connector



1. Ext. Video On/Off
2. VTR Trigger Switch
3. - Batt
4. Momentary Iris
5. Servo Control
6. + Batt
7. Iris Follow
8. Lens Servo
9. Range Extender
10. Zoom Follow
11. Focus follow\*
12. Spare

Shield of cable directly to the connector housing.  
\* not standard on lens

### Camera headset connector



1. Telephone left
2. Not connected
3. Microphone
4. Microphone return
5. Telephone right
6. Telephone return

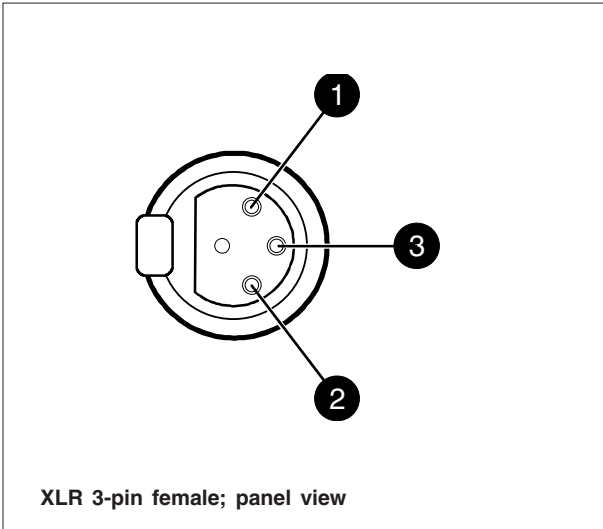
Shield of cable directly to the connector housing.

1. Microphone return
2. Microphone
3. Telephone return
4. Telephone left
5. Telephone right

- Microphone level -58dBm/-20dBm switchable
  - Microphone impedance 200 ohm
  - Telephone level +6dBm nominal
  - Telephone output impedance <10 ohm
- Shield of cable directly to the connector housing.

## Connectors and Cables Camera Head

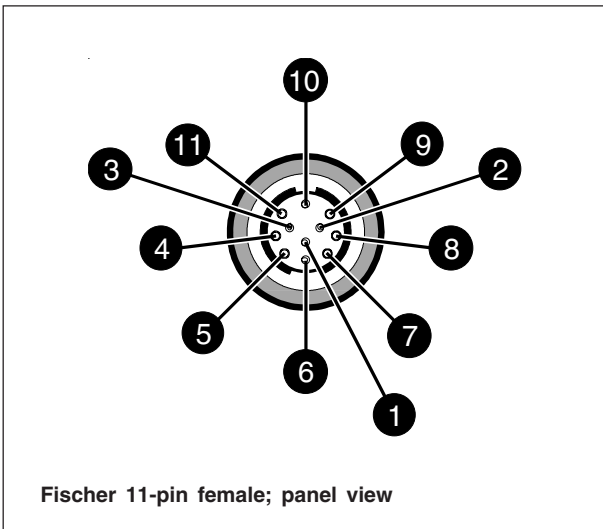
### Audio microphone connectors



1. Audio Screen
2. Audio In
3. Audio Return

- Microphone impedance > 200 ohm
  - Sensitivity remote controlled via CPU:  
range: -70 to -28 dBm  
maximum input = -6 dBm
  - Signal at pin 2 of audio input is in phase with  
signal at pin 2 of audio output on CPU
- Shield of cable directly to the connector housing.

### Auxiliary connector

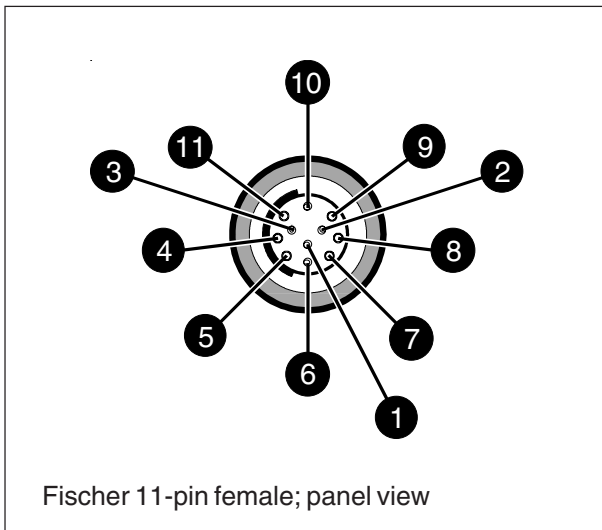


1. +5VL
2. 0VL
3. AN0
4. AN1
5. Spare
6. Not connected
7. Private Data Camera - CPU
8. Ground
9. Private Data CPU - Camera
10. Ground
11. Shield

Shield of cable directly to the connector housing.

## Connectors and Cables Camera Head

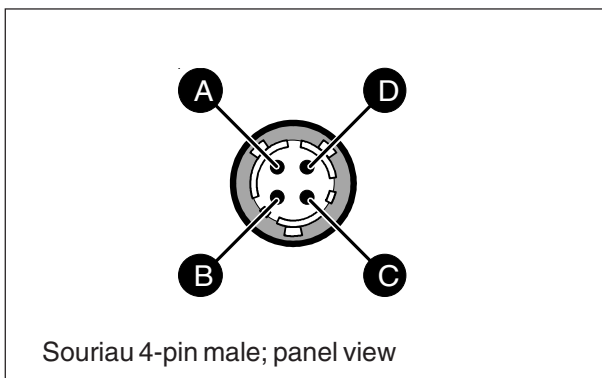
### Tracker communication connector



1. On-air signal return
2. Tracker microphone return
3. Tracker microphone input
4. Production tracker
5. Sidetone tracker
6. Return
7. Program tracker
8. Cameraman microphone
9. Tally control tracker  
(Cmos level, R out = 1k)
10. +12V; I max. = 100mA
11. +12V return

- Microphone level -58dBu/-20dBu switchable
  - Microphone impedance 200 ohm
  - Telephone level + 6dBu
  - Telephone output impedance <10 ohm
- Shield of cable directly to the connector housing.

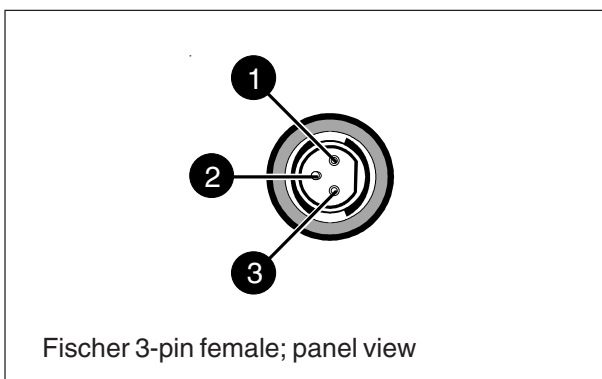
### Data connector



- A. Data
- B. Data not
- C. Not Connected
- D. Not Connected

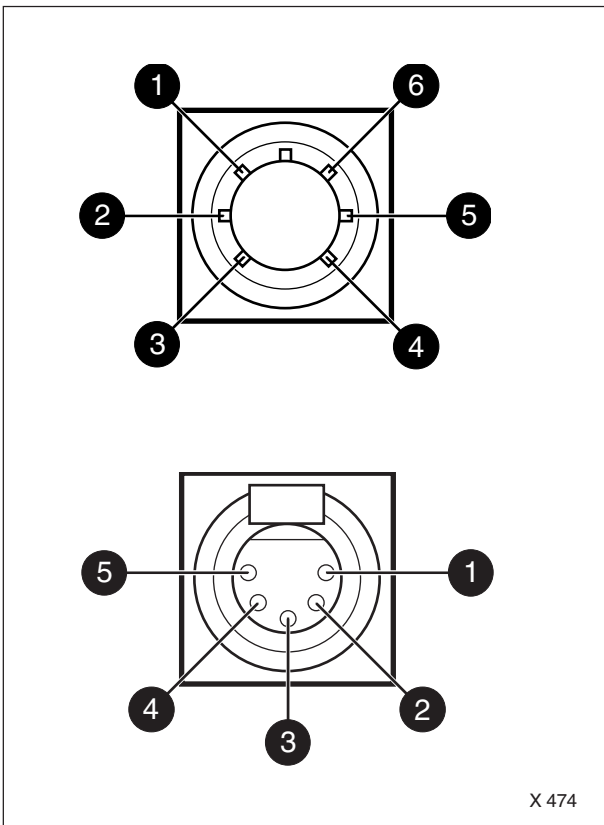
Shield of cable directly to the connector housing.

### Script light connector



1. +12V (Maximum Dissipation 3W)
2. Power Return
3. Shield

Shield of cable directly to the connector housing.



CPU Headset Connector - Panel View

### CPU Panel

#### CPU Headset Connector

Tuchel 6-pin female

1. Telephone left
2. Telephone return
3. Microphone
4. Microphone return
5. Telephone right
6. Telephone return

Shield of cable directly to the connector housing.

XLR 5-pin female

1. Microphone return
2. Microphone
3. Telephone return
4. Telephone left
5. Telephone right

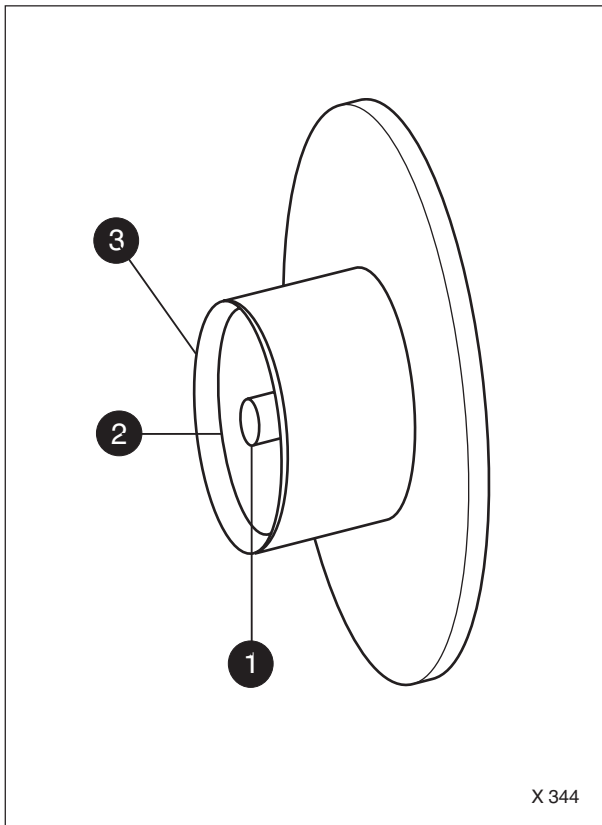
Microphone level -64dBu

Microphone impedance 200 ohm

Telephone level +6dBm nominal

Telephone output impedance <50 ohm

Shield of cable directly to the connector housing.



Triaxial Connector - Panel View

## CPU Rear Panel

### Triaxial Connector

#### Fischer 3-pin

- 1. Inner pin: Signals + power
- 2. Inner shield: Return
- 3. Outer shield: CPU housing

#### Trilock 3-pin

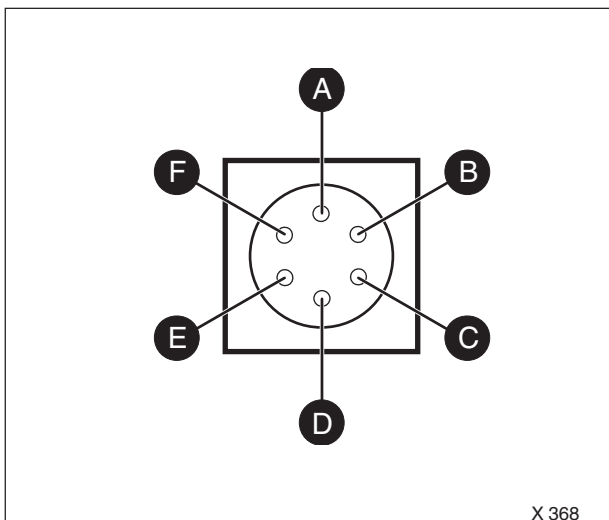
- 1. Inner pin: Signals + power
- 2. Inner shield: Return
- 3. Outer shield: CPU housing

#### ARD 3-pin

- 1. Inner pin: Signals + power
- 2. Inner shield: Return
- 3. Outer shield: CPU housing

#### Lemo 3-pin

- 1. Inner pin: Signals + power
- 2. Inner shield: Return
- 3. Outer shield: CPU housing



WFM Connector - Panel View

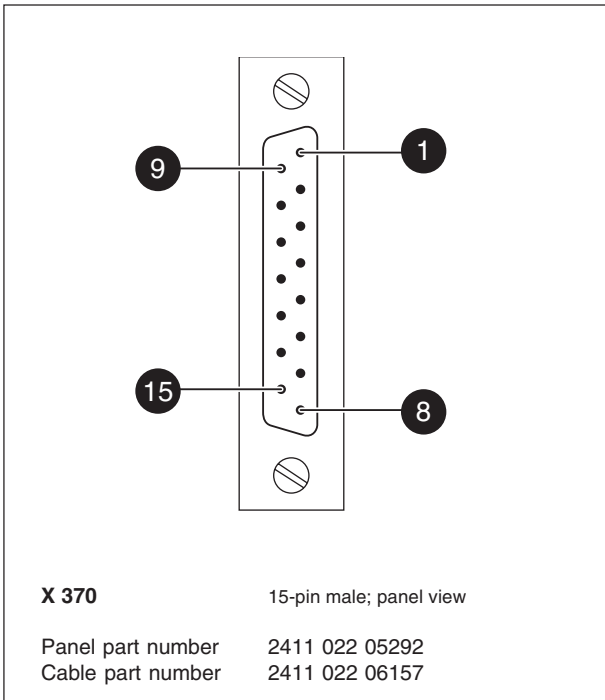
### WFM Connector

#### 6-pin male, shielded cable

- A. Parade
- B. Parade return
- C. Prev Out Ext
- D. Prev Out Ext return
- E. Stair step H/3 (level:+5, 0, -5V; imp.: 100ohm)
- F. Stair step return

Shield of cable directly to the connector housing.

## Signalling Connector - Panel View



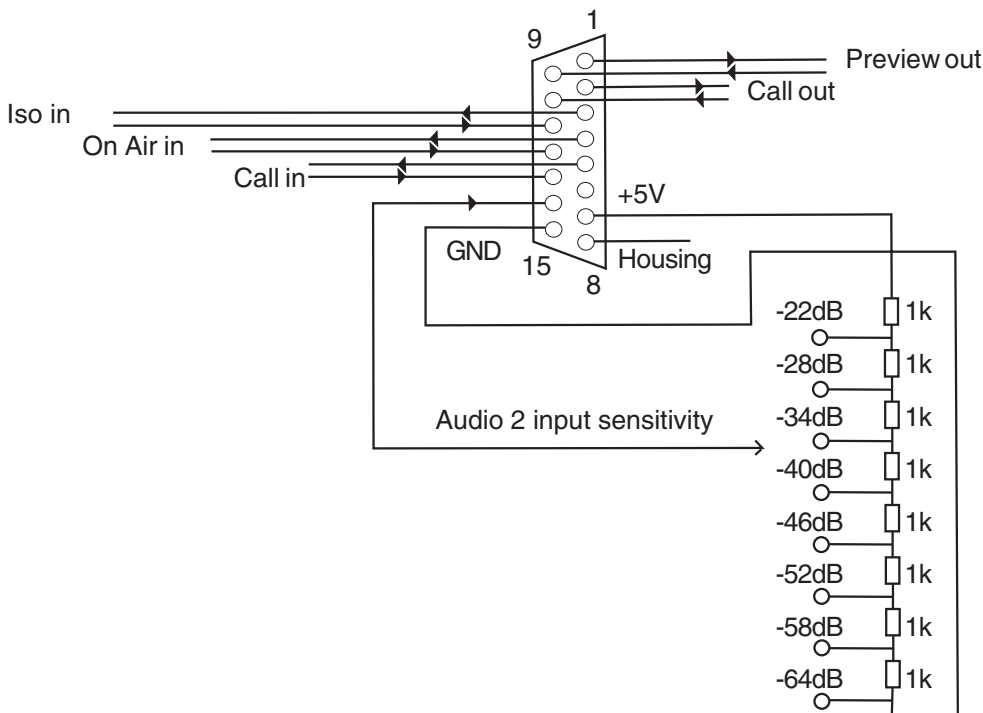
### 15-pin male, shielded cable

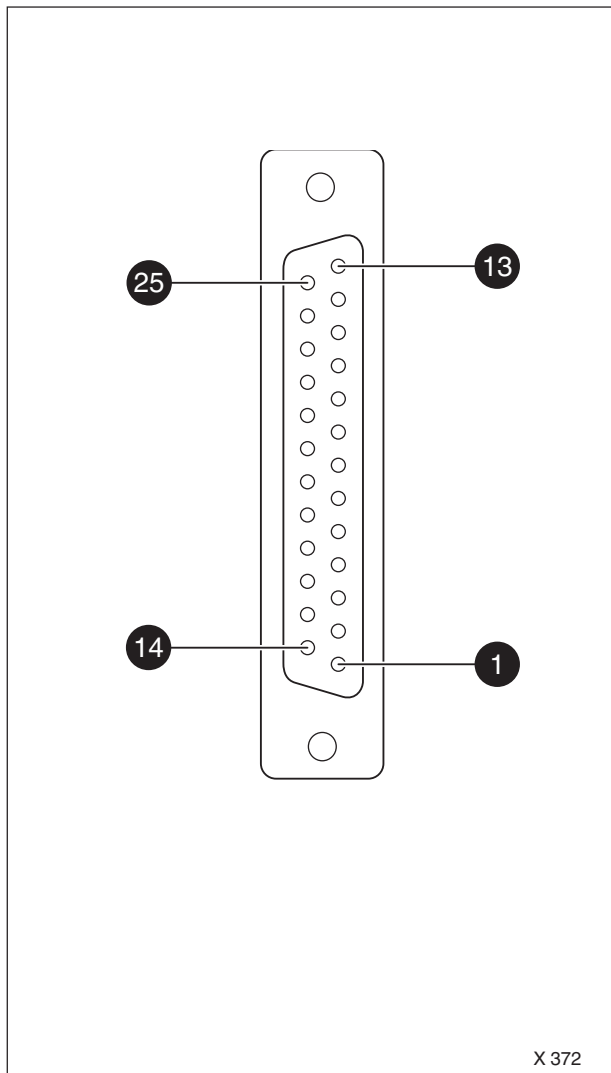
1. Prev. out ext. (relay contact < 10 ohm)
2. Call out ext. (relay contact < 10 ohm)
3. Iso in ext. (12-24V DC or switch contact)
4. On-Air in ext (12-24V DC or switch contact)
5. Call in ext. (12-24V DC or switch contact)
6. Audio 1 level (analogue input voltage 0V to +5V, see figure below)

- 64 dB -----	0V
- 58 dB -----	+0.7V
- 52 dB -----	+1.3V
- 46 dB -----	+1.9V
- 40 dB -----	+2.5V
- 34 dB -----	+3.1V
- 28 dB -----	+3.7V
- 22 dB -----	+4.3V

7. +5 Vdc; OCP
8. Housing
9. Prev. out ext. return
10. Call out ext. return
11. Iso in ext. return
12. On-Air in ext. return
13. Call in ext. return
14. Audio 2 level (see pin 6)
15. GND

Shield of cable to the pin marked housing.





### Operational Control Panel Connector

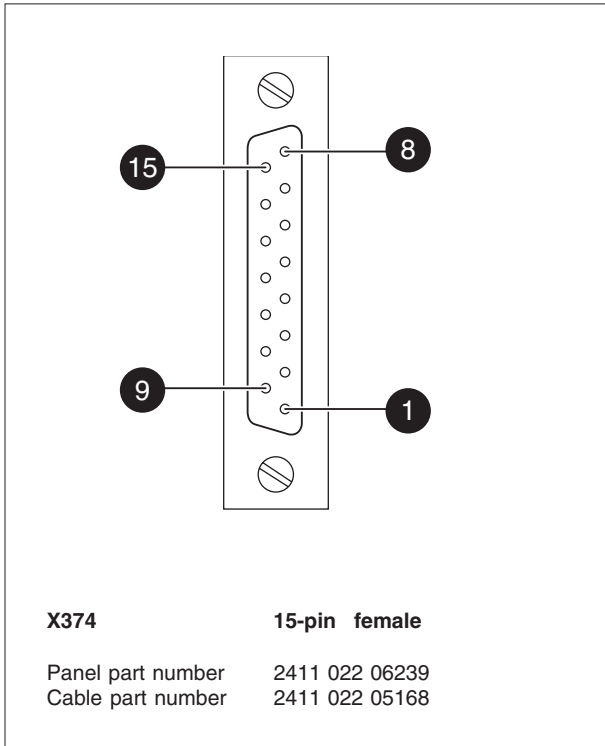
25-pin female, shielded cable

1. +V Ref
  2. +5V OCP
  3. Data out OCP
  4. Clock
  5. OCP not connected
  6. R black
  7. G black
  8. B black
  9. M black
  10. Spare
  11. Housing
  12. 0V OCP
  13. -V Ref
  14. +V Ref
  15. +12V OCP
  16. Data in OCP
  17. Serv. req.
  18. Contours
  19. R gain
  20. G gain
  21. B gain
  22. Iris control
  23. Housing
  24. 0V OCP
  25. -V Ref
- Shield of cable to the pin marked housing.

*Operational Control Panel Connector - Panel View*

# Connectors and Cables CPU

## Intercom Connector - Panel View



15-pin female, shielded cable

1. Prod. out (4-wire out, 2-wire in/out)
2. Prod. in (4-wire only)
3. Prod. in shield (4-wire only)
4. ENG in (4-wire only)
5. ENG out (4-wire out, 2-wire in/out)
6. Progr. in (4-wire only)
7. Progr. in shield (4-wire only)
8. Housing
9. prod. out return (4-wire out, 2-wire in/out)
10. prod. in return (4-wire only)
11. ENG in shield (4-wire only)
12. ENG in return (4-wire only)
13. ENG out return (4-wire out, 2-wire in/out)
14. Progr. in return (4-wire only)
15. Housing

Shield of cable to the pin marked housing.

4-wire:

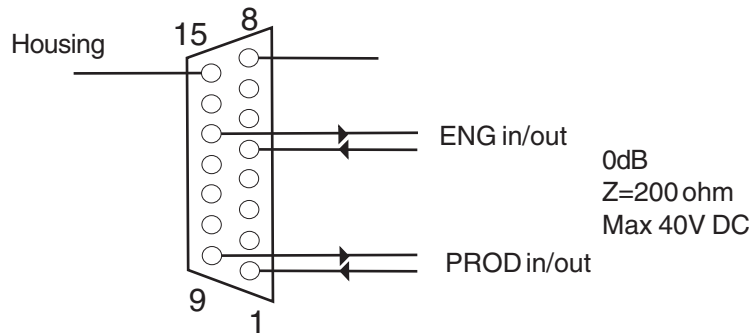
Output signals: level +6dBu or 0dBu selectable output impedance 50 ohm (max), symmetrical

Input signals: level +6dBu or 0dBu selectable impedance 9 Kohm (min), symmetrical

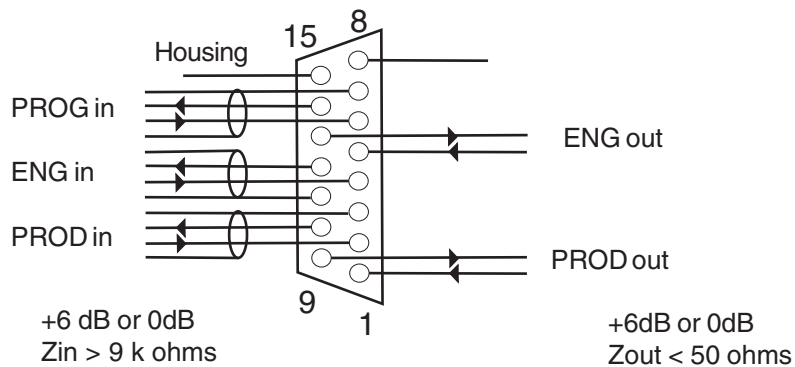
2-wire:

level 0dBu  
load impedance: 200 ohm  
maximum DC level = 40 V

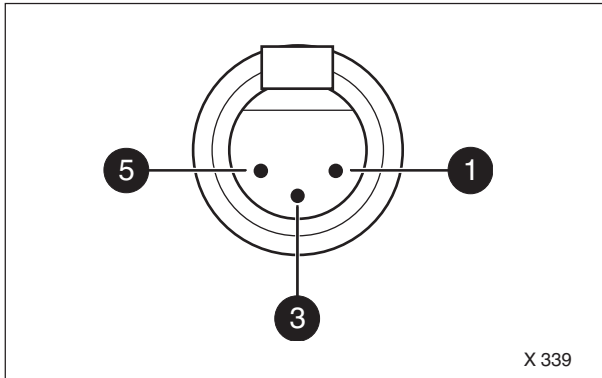
### 2 - WIRE configuration



### 4 - WIRE configuration







*Audio Output Connector - Panel View*

### Audio Output Connector

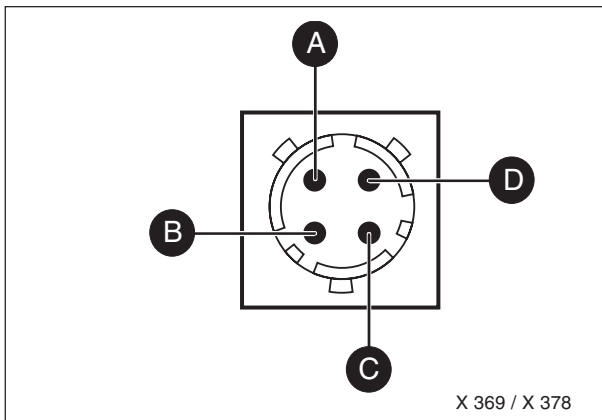
XLR 3-pin male

1. Shield
2. Audio X
3. Audio Y

Level : +6dBu or 0dBu switchable

Load Impedance: > 150 ohm, symmetrical

Shield of cable directly to the connector housing.



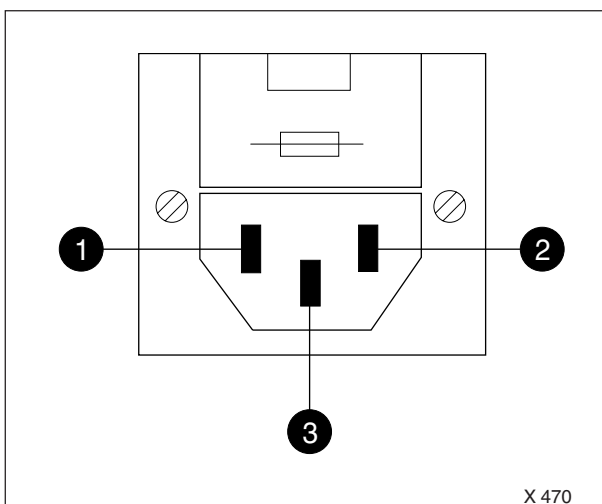
*Data Connector - Panel View*

### Data Connector

4-pin male, shielded cable

- A. Data
- B. Data not
- C. Not connected
- D. Not connected

Shield of cable directly to the connector housing.



*Mains Input Connector - Panel View*

### Mains Input Connector

Eurostyle 3-pin male

1. Neutral
2. Line
3. Earth

Mains input voltage:

220 Vac or 115 Vac

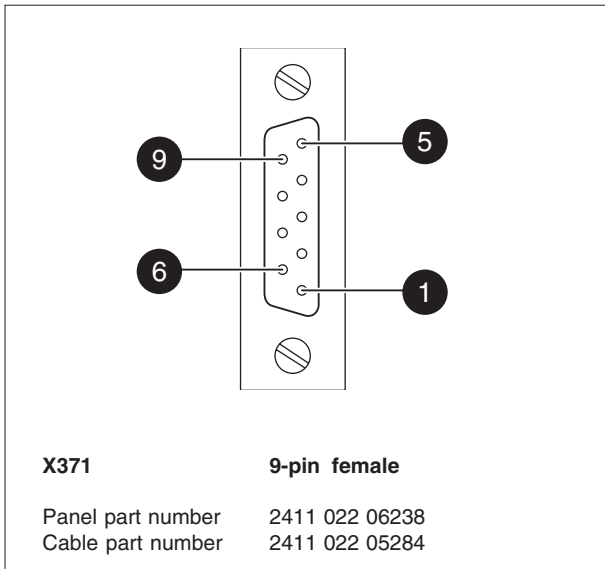
Mains frequency:

47 to 63 Hz

Power consumption:

320 Watt

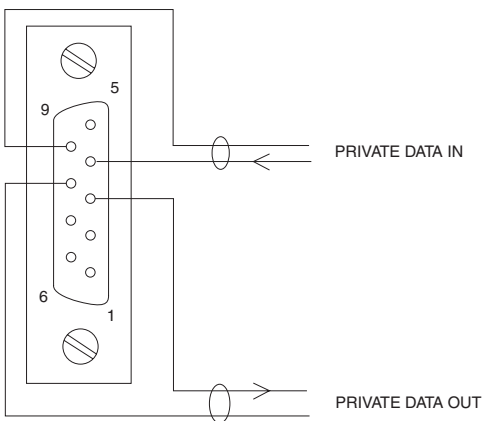
## Auxiliary Connector - Panel View



### 9-pin female, shielded cable

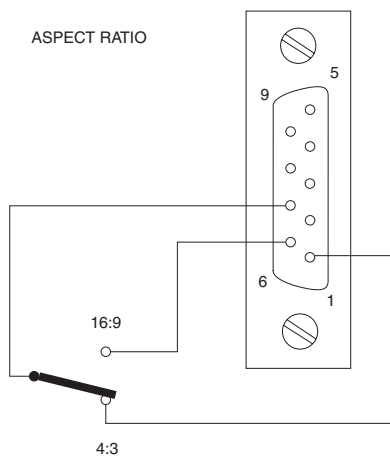
1. +5V
  2. AN 0
  3. PRIVATE DATA OUT
  4. PRIVATE DATA IN
  5. Housing (Shield of cable to this pin)
  6. GND
  7. AN 1
- For aspect ratio switching on wide screen sensor cameras:
- |      |                 |
|------|-----------------|
| 16:9 | -0.5 to +0.8Vdc |
| 4:3  | +2.4 to +5.5Vdc |
8. PRIVATE DATA OUT RET
  9. PRIVATE DATA IN RET

Shield of cable directly to the connector housing.



### AUX (private data BS - CAM)

- : "0" = 0V +/- 0.5V
- : "1" = 5V +/- 0.5V
- Rout = 150 ohm
- Baudrate typ 2400 bits/sec
- max 4800 bits/sec
- Duty cycle difference between input and output is max 5%



## Cable Connector Part Numbers CPU

---

Panel Connector	Type	Male Cable Number	Female Cable Number
Data	4-pin male	—	2411 020 12025
Headset (Tuchel)	6-pin female	2422 026 01712	—
Headset (XLR)	5-pin female	2422 026 03393	—
WFM	6-pin male	—	2411 020 12026
Signalling	15-pin male	--	2411 022 05168
		15-p Cable Hood	2411 021 02465
Control	25-pin female	2411 022 05203	—
		25-p Cable Hood	2411 021 02466
Aux	9-pin female	2411 022 05284	--
		9-p Cable Hood	2411 021 02467
Intercom	15-pin female	2411 022 06157	--
		15-p Cable Hood	2411 021 02465
Audio Output	3-pin male	--	2432 026 00185

---

## Cable Connector Part Numbers Camera Head

Panel Connector Type			Part number	Cable part number
Triax	3-pin	Fischer female	2432 020 00009	LDK 8200/ **
Triax	3-pin	Trilock	3922 040 02682	--
Triax	3-pin	ARD	3922 040 01492	--
Triax	3-pin	Lemo	3922 040 02541	--
Viewfinder	12-pin	Hirose male	3922 406 83311	2422 026 04488 female
Lens	12-pin	Hirose female	3922 026 04355	2422 026 03689 male
Headset	6-pin	Tuchel female	2422 026 02902	--
Headset	5-pin	XLR female	2432 026 00176	--
Audio Mic	3-pin	XLR female	2422 026 02984	--
Auxiliary	11-pin	Fischer female (two slot)	3922 040 02512	2432 026 00254 male
Tracker	11-pin	Fischer female (one slot)	3922 040 02463	2432 026 00252 male
Data	4-pin	Souriau male	2411 020 11367	2411 020 12025 female
Script Light	3-pin	Fischer female	3922 040 02881	2432 026 00253 male
Ext video/Tp	2-pin	Coax female	2422 031 10529	--

\* /02 is 2 m      \*\* /00 for 8 mm cable  
 /05 is 5 m      /10 for 11 mm cable  
 /10 is 10 m     /20 for 14 mm cable

# Specifications

## Camera Head

Power requirements	Triax powered
Power consumption	25 W
Operating temperature	-20°C to 45°C (-4°F to 113°F)
Head dimensions	aprox. 350x210x120mm
Weight	5.5kg (Excluding viewfinder)
Triax cable length	YUV transmission over 800m with 14mm cable, 1000m with minor performance degradation

## Video performance

Pick-up device	3x2/3" switchable DPM™ Frame Transfer CCD's
Picture elements	150Hz: 1000 (H) x 594 (V) 180Hz: 1000 (H) x 498 (V)
Aspect ratio	4:3 / 16:9 switchable
Smear performance	No smear
Sensitivity	2000 lux at F4.0, 89,9% reflection
Minimum illumination	approx.4 lux (F1.4 lens +30dB gain)
Exposure control	down to 1/1000, no Clean scanning
Optical system	F1.4 with quartz filter
Optical filters	Exchangeable filtercassette with remote selectable filterwheel Installed are: clear, 1/4 ND, 1/16 ND, 1/64 ND, 4 point star and 6 point star
Modulation depth	>60% typ. at 5 MHz (in Y signal)
S/N ratio	180 Hz: 62 dB (typical) 150 Hz: 60 dB (typical)
Registration	<0.05% (all three zones, without lens)
Dynamic range	>400%
Gain	-6 dB to +30 dB in 3 dB steps (user defined presets)

## Camera inputs/outputs

Triax	option: Fischer, ARD, Lemo, Trilock
Viewfinder	12 pin
Monitoring (External Video)	BNC (1.0 Vp-p, 75 Ohm), viewfinder signal or ext. video signal (from CPU)
Script light	12 V, 0.25 A, 3 pin Fischer
Lens	12 pin
Head set	option: XLR 5, Tichel (intercom channels: ENG/PROD/PROGR)
Mic	2 x XLR 3, balanced, +48 V
Control input	4p DATA, series 9000 compatible

## Camera Processing Unit LDK 4058 inputs/outputs

Triax	option: Fischer/ARD/Lemo/Trilock
Power	AC-powerconnector, max 330W
Audio out	XLR 3
Intercom	ENG/PROD/PROGR via 15p D-conn.
Signalling	Call/Tally R/Y via 15p D-conn.
CVBS (3x)	1 Vpp; 75 Ohm; BNC
RGB	700 mVpp; 75 Ohm; BNC
Y, R-Y, B-Y	700,525,525 mVpp; 75 Ohm; BNC
PXM	1 Vpp; 75 Ohm; BNC
WFM	1 Vpp; 75 Ohm; BNC
Digital serial triple scan	3 x BNC, SMPTE 259M-C/EBU tech 3267E 270 Mb/s
Digital serial normal scan	3 x BNC, SMPTE 259M-C/EBU tech 3267E 270 Mb/s
Ext 1 and Ext 2	1 Vpp; 75 Ohm; BNC
Genlock in	1 Vpp; 75 Ohm; BNC
Ext. camera control	4p DATA

## SuperXpander LDK 4482 (optional)

Dimensions (lxhwx in mm (inch))	600x350x390 (23.6x13.7x15.5)
Weight (excl camera, lens and VF)	17Kg
Utility power outlet	115/230V ac, max 70VA

## Viewfinder 7" (optional)

CRT	7" monochrome
Resolution	> 700 TV Lines (center)
Weight	7 kg
Power	30 W

## Viewfinder 1.5" (optional)

CRT	1.5" monochrome
Resolution	> 650 TV Lines (center)
Weight	0.75 kg
Power	1.6 W

## Supplied accessories

User manual  
Transport case

These typical specifications are valid for 50Hz and 60Hz systems and are subject to change without prior notice.



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## Section 3

### Replacements

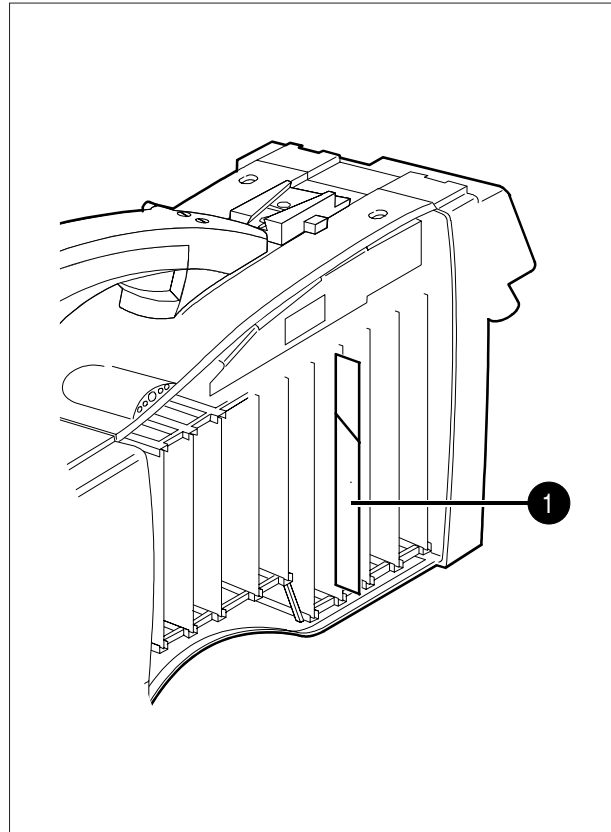
*This section gives information on the procedures to follow when replacing printed circuit boards and mechanical components at first line level.*

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#### Contents

Introduction .....	3-2	Front module .....	3-4
Printed circuit boards .....	3-2	Control unit .....	3-5
Power supply .....	3-3	Back Panel .....	3-5
Handgrip .....	3-3	Filterwheel Cassette .....	3-6

The instructions given in this section are restricted to those modules which can be replaced at the first line level. After a printed circuit board has been replaced it is sometimes necessary to carry out adjustments to match the new boards to your camera and so maintain the performance levels. The relevant adjustment procedures are referenced in section 4. The procedures for removing the modules should be followed in reverse order when remounting the units.

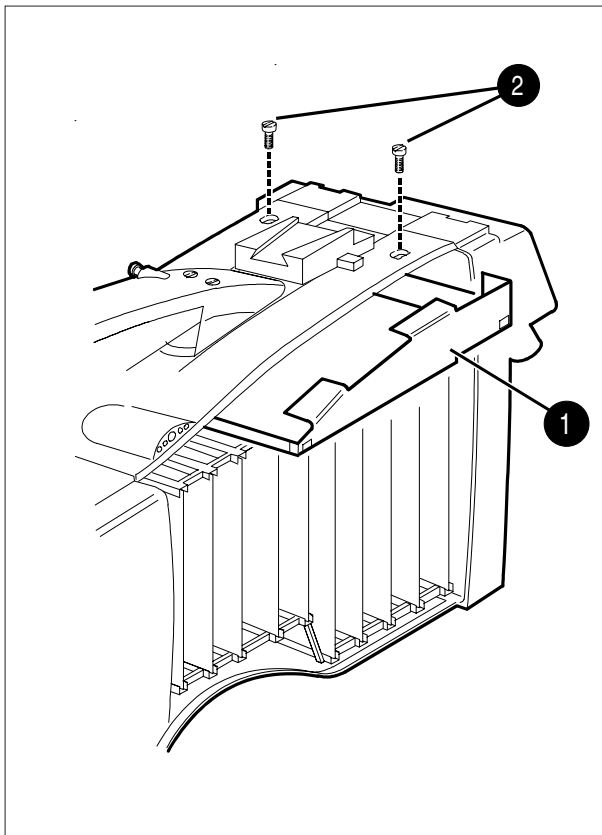


To remove a printed circuit board proceed as follows:

- a. Remove right cover. (see section 2)
- b. Swing the black cover **1** of the printed circuit board open.
- c. Pull horizontally on this cover to free the board from its connector and slide it clear of the camera.

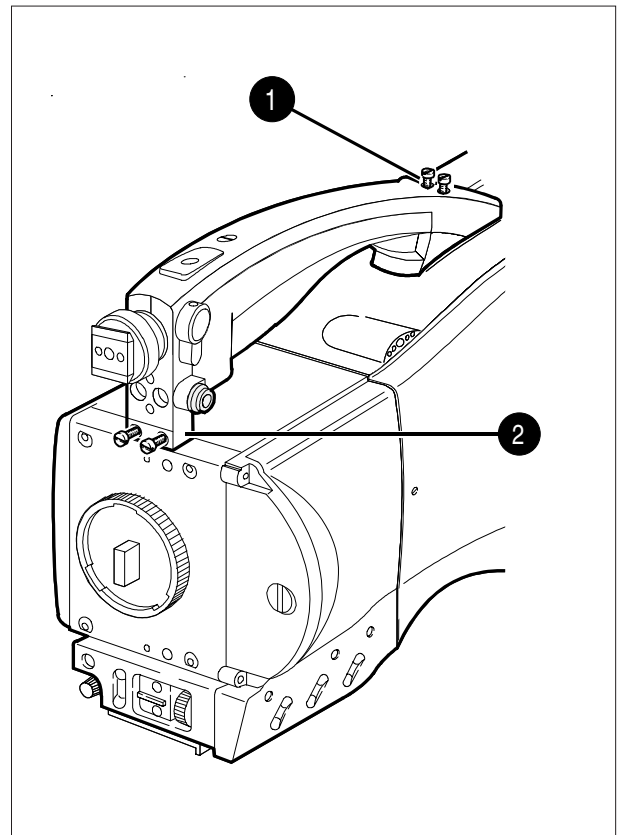


## Power supply



Before removing the power unit **1** unscrew the two screws **2** on the top of the camera which secure the power unit to the camera.

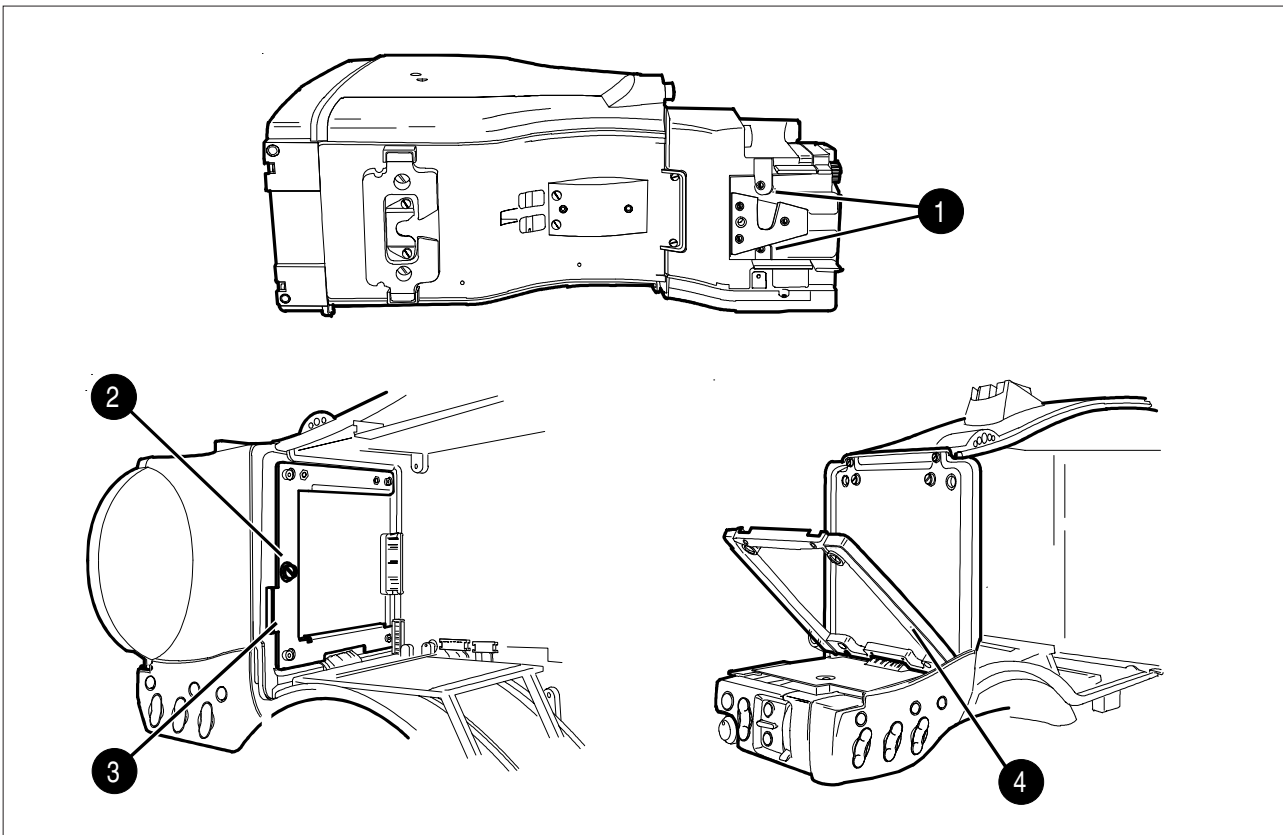
## Handgrip



To remove the handgrip proceed as follows:

- Remove the 1.5 inch viewfinder from its support bracket on the handgrip. (see the User guide under section 2)
- Loosen the two screws **1** securing the handgrip to the top of the camera.
- Loosen the two screws **2** securing the handgrip to the front of the camera's Front Module.

## Front module

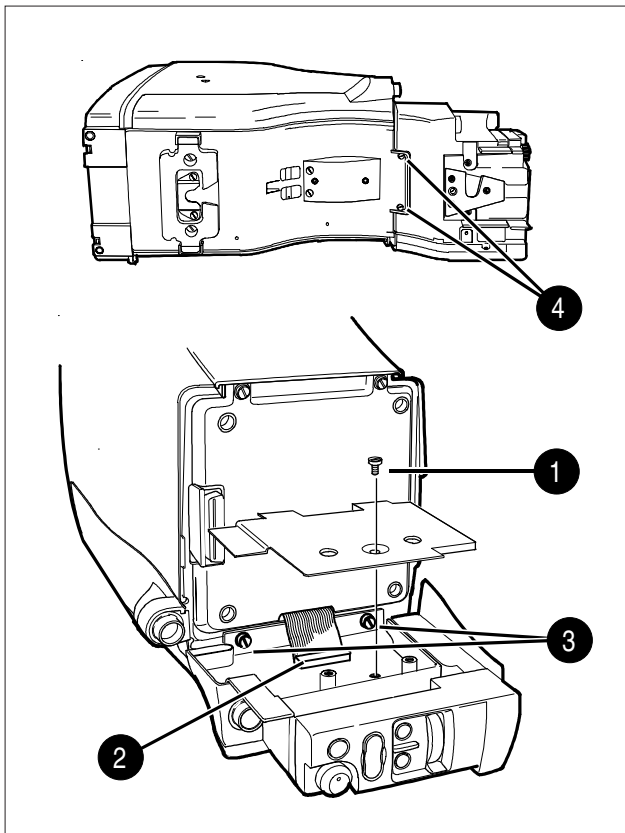


To remove the front module proceed as follows:

- Remove the handgrip from the camera as described previously.
- On the underside of the camera remove the two screws **1** securing the front module.
- Remove the left side cover as described in the section 2 Hardware setup and customization.
- Remove the Video Processor 1 and the video Processor 2 printed circuit boards from the camera.
- Loosen the screw **2** securing the front retaining bracket.
- Pull the lip on the bracket **3** outwards so that the pins of the front module are no longer locked.
- Slide the front module straight out of the camera.

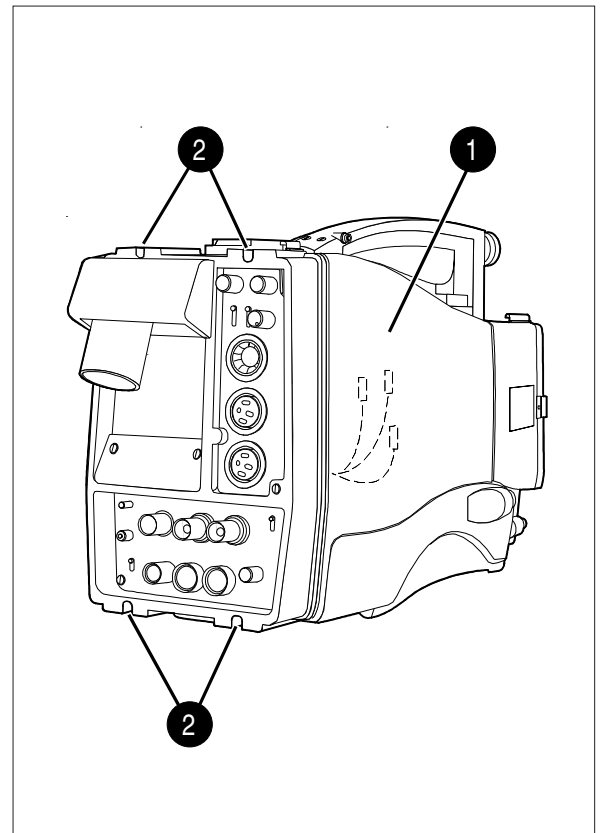
### **Note**

When remounting the front module ensure that the rubber gasket **4** is tucked neatly into the space between the covers and the front of the camera. Also ensure that it is not crooked or deformed when the front module is pushed up against it.



To remove the control unit proceed as follows:

- a. Remove the front module from the camera as described previously.
- b. On the underside of the camera remove the shoulder pad. (see the User guide under section 2)
- c. Remove the screw **1** securing the cover plate to the control unit.
- d. Remove the cover plate from the control unit.
- e. Disconnect the flat cable connector **2** from the control unit.
- f. Remove the two screws **3** securing the control unit to the front of the camera.
- g. On the underside of the camera remove the two screws **4** securing the control unit to the camera.
- h. The control unit is now free.

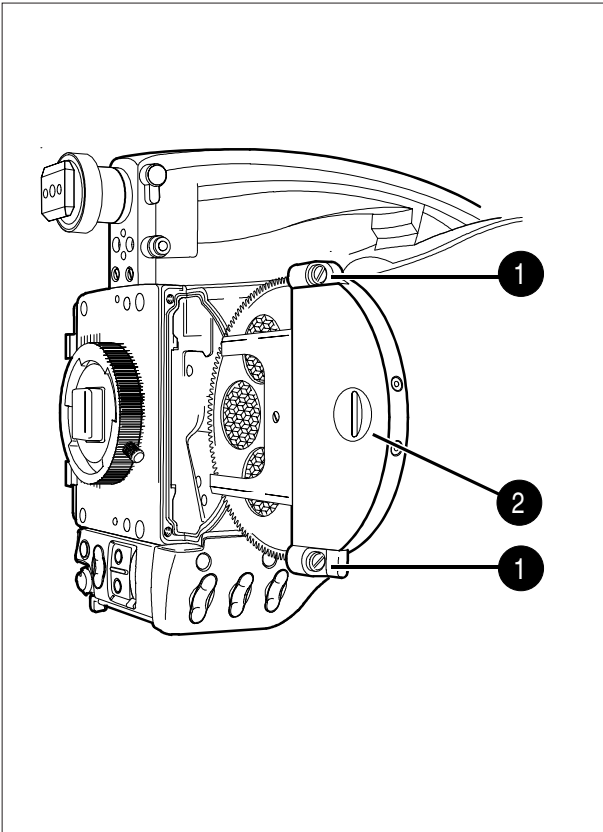


To remove the back panel proceed as follows:

- a. Remove the right side cover from the camera by turning the three screws one quarter turn counterclockwise. (see section 2)
- b. Remove the three coaxial connectors **1** leading out from the motherboard (colour coded white, brown and yellow)
- c. Remove the four screws **2** securing the back panel to the body and carefully disconnect the back panel from the camera.

## Filterwheel Cassette

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To remove the filter wheel cassette proceed as follows:

- a. Loosen the two screws **1** securing the cassette to the body of the camera.
- b. Use the finger clip **2** to pull the cassette horizontally out of the camera.

To replace the filter wheel cassette proceed as follows:

- a. Push the cassette horizontally in the camera.
- a. Tighten the two screws **1** while simultaneously pressing the finger clip **2** with your thumb.

---

## Section 4

### Adjustments

*This section contains the adjustment procedures to be followed to obtain the best performance from the camera system. These procedures need only be used if, following a module replacement, the camera system does not perform according to specifications.*

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## Introduction

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This camera system is factory tested and adjusted for operational use. Under normal circumstances, the internal potentiometers do not need to be adjusted.

If it is discovered that the camera system is misaligned, the following procedures are given as a guide for competent service personnel, who have a thorough knowledge of the camera system and have the use of calibrated equipment, to realign the camera system.

If no improvement can be achieved or an adjustment is out of range, please contact your local supplier or the nearest Thomson Multimedia Broadcast Solutions Service Centre.

The camera head adjustment procedures are designed as separate units. Within a numbered procedure do not change the position of switches or jumpers unless instructed to do so in the procedure.

These adjustment procedures are for the Camera Head and the CPU. The adjustments require the use of a Master Control Panel in combination with an Operational Control Panel if possible. The intercom adjustments are given for a four-wire system.

The following is a list of equipment required to carry out the adjustment procedure:

- Set of board extenders LDK 4830/21
- Oscilloscope (with cursor measurement)
- Spotlight 3200K
- Gamma Test chart 4:3 / 16:9
- Waveform monitor/ vectorscope
- Colour monitor with analogue/SDI input
- Multimeter
- Master Control Panel LDK 4607 / LDK 4609
- Operational Control Panel LDK 4624 / LDK 4628 / LDK 4629
- Audio Analyser
- Waveform monitor with SDI input

Before carrying out any adjustments the following steps are recommended:

- Install the camera on a tripod and install the CPU.
- Attach the lens and the necessary cables.
- Allow the camera and the CPU to warm-up.
- Connect an MCP and OCP to the data connector of the CPU.

**CAUTION:**

**Switch off the power supply to the camera before removing or replacing printed circuit boards.**

**CAUTION:**

**During the whole adjustment procedure the Auto Lighting must be switched OFF. Every time you switch off and on the power supply, Auto Lighting returns to ON.**

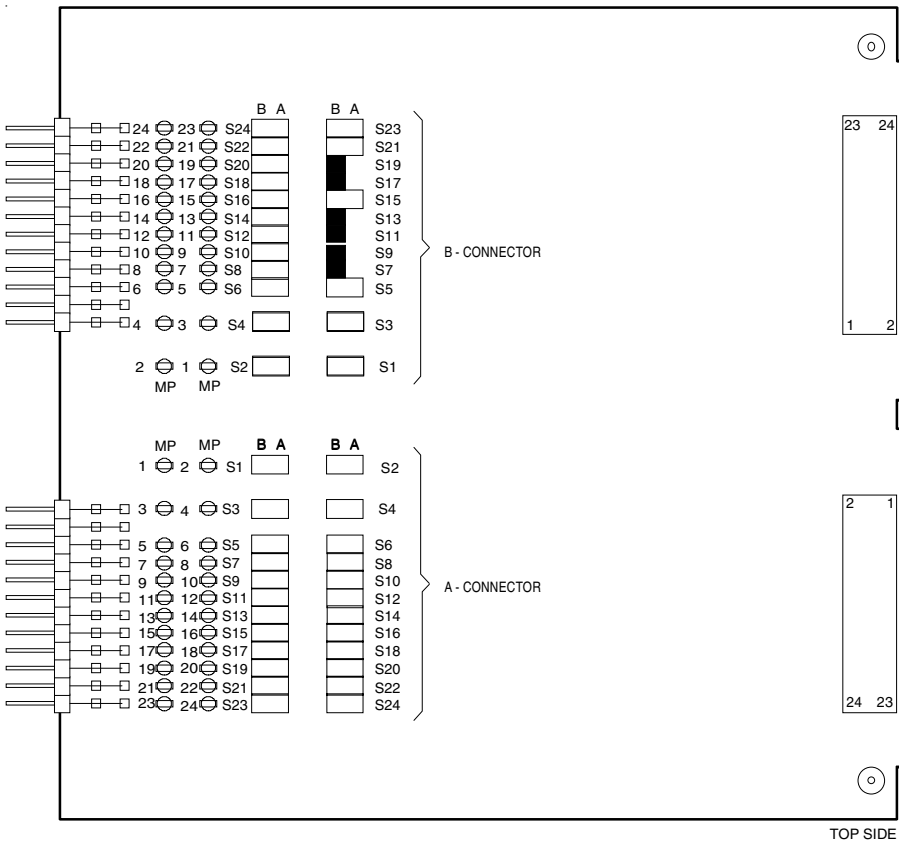
**CAUTION:**

Do not attempt to improve camera performance by adjusting individual potentiometers, jumpers or switches as this may lead to complete misalignment of the camera.

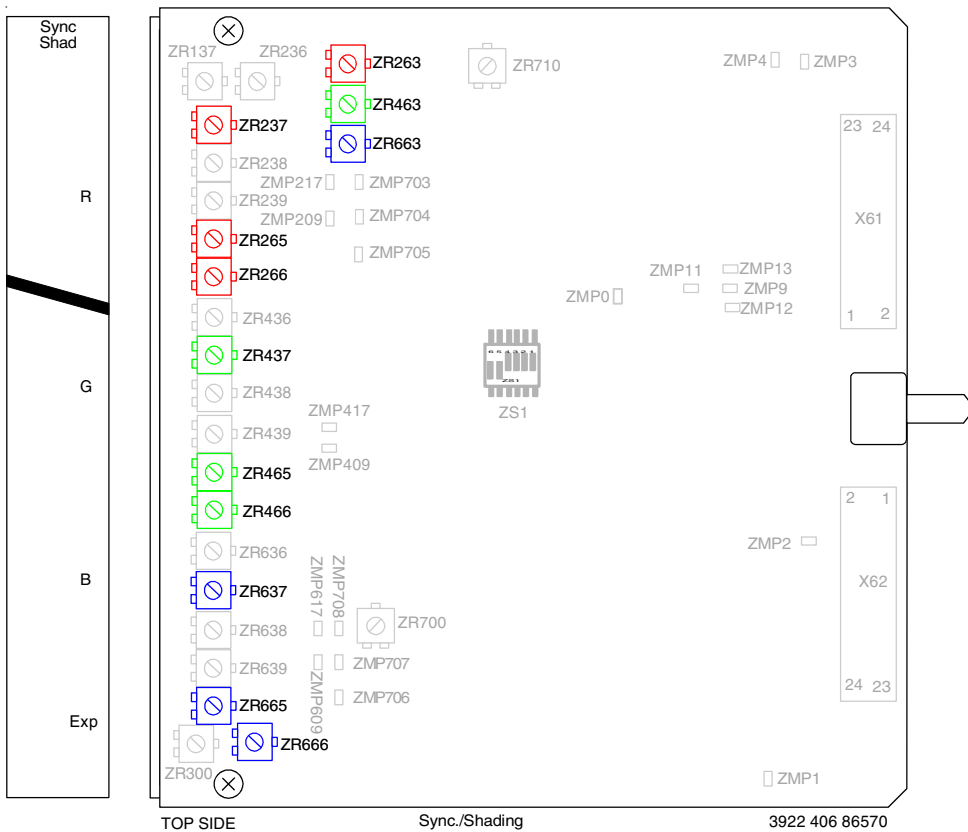
**CAUTION:**

Do not realign individual potentiometers, jumpers or switches not mentioned in this chapter or earlier in this manual. These adjustment points are for factory use only.

## Extender Board



## Sync./Shading Board





# —Video Processor 1 Board—

---

## Setting-up the Camera

### Note:

Video Processor 1 must be adjusted in combination with the Sync./Shading board.

1. Recall Factory Standard File on MCP in the Recall menu or on the OCP by pressing two times the Scene file standard button.

On MCP set:

#### OPERATE MENU

Knee	:	Off
Contour	:	Off
Gamma	:	Lin.
Blk. Str.	:	Off
Filter	:	Cap
Auto Iris	:	Off

#### SETUP 1 MENU

Flare	:	Off
White clip	:	Off
Matrix	:	1

#### SETUP 2 MENU

Soft cont.	:	Off
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#### SETUP 3 MENU

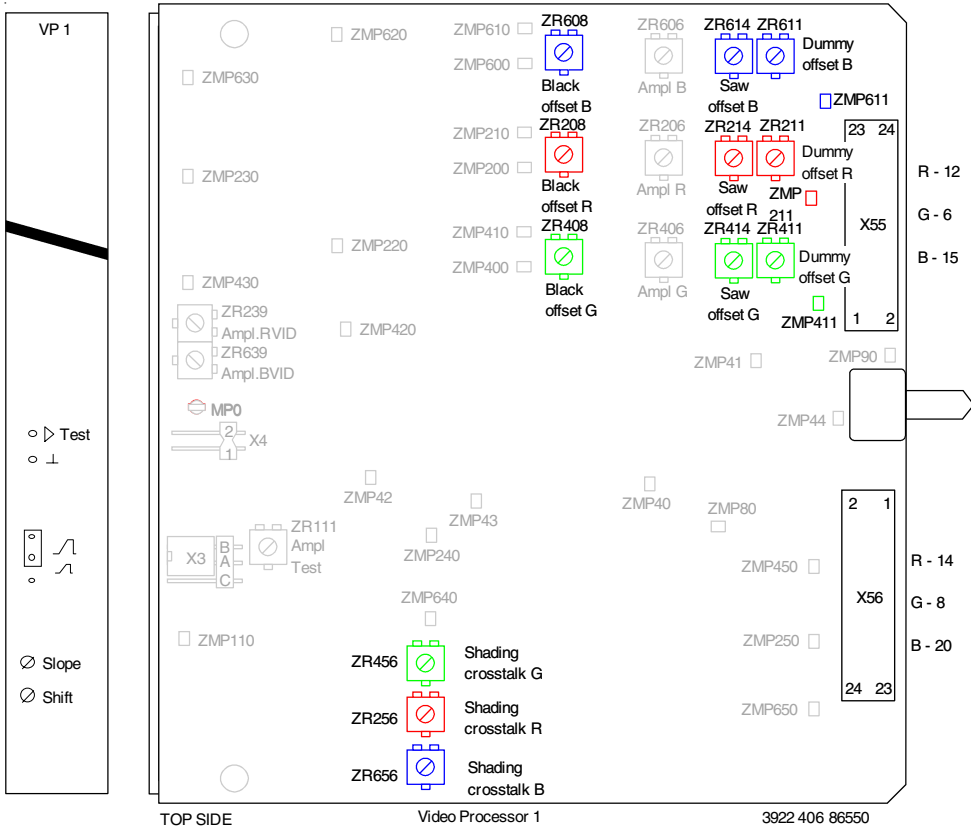
Notch	:	Off
Chroma	:	Off

#### MAINT. 1 MENU

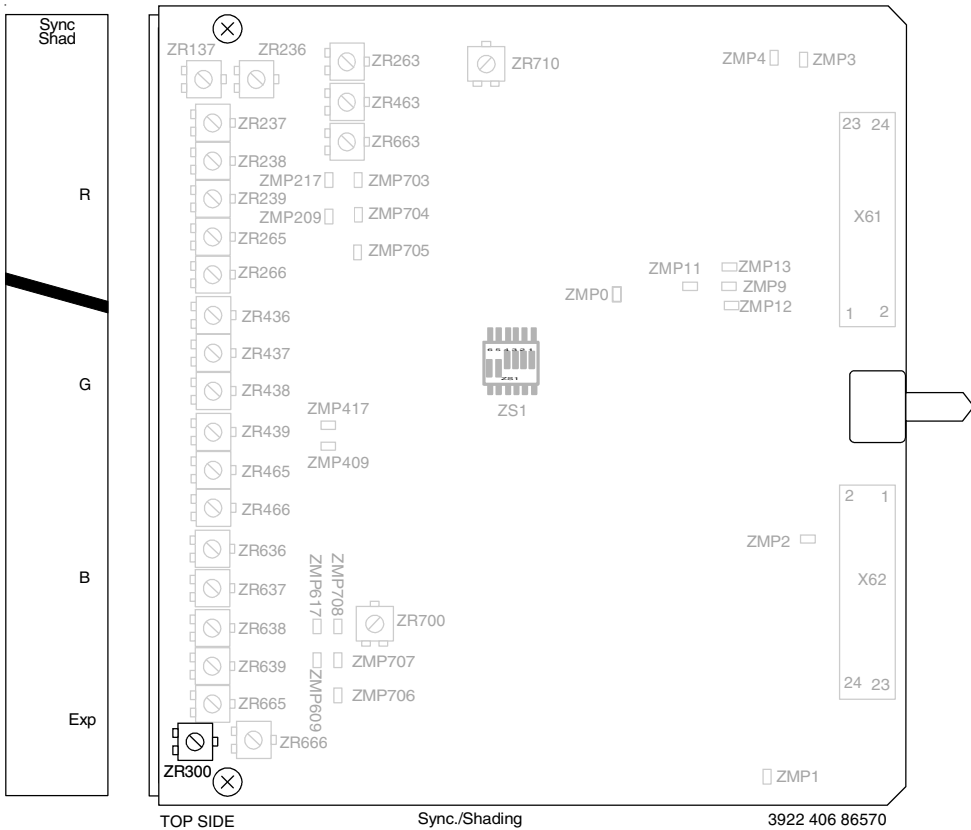
Wh. shading	:	Off
Max user level	:	4

2. Oscilloscope: 10mV/div. probe 10:1
3. Remove jumpers 7, 9, 11, 13, 17 and 19 from connector B of the service extender to interrupt the input from the front.
4. Short circuit the input to video processor 1 by connecting the following jumpers on connector B of the service extender:
  - B7 to B9
  - B11 to B13
  - B17 to B19
5. Put Video Processor 1 on a service extender.
6. Sync./Shading Board Pré settings:
  - Dipswitch positions ZS1
    - 1, 2, 3 and 4 : up
    - 5 : down
    - 6 : down (down= 150Hz, up= 180Hz)
  - Potentiometers settings:
    - Nose correction: ZR263, ZR463 and ZR663, fully **counterclockwise**.
    - Edge clip: ZR237, ZR437 and ZR637, fully **counterclockwise**.
    - Pulse comp: ZR266, ZR466 and ZR666, fully **counterclockwise**.
  
    - DC gain: ZR265, ZR465 and ZR665, fully **clockwise**.

# Video Processor 1 Board



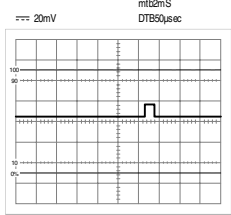
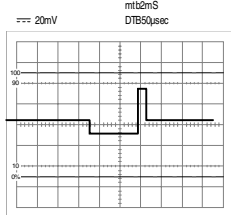
# Sync./Shading Board



# Video Processor 1 Board

## Dummy offset adjustment

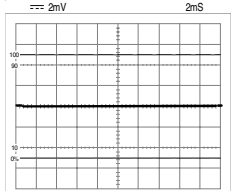
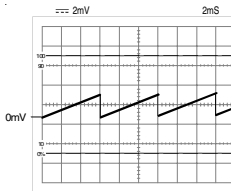
7. On Video Processor 1 Board adjust the offset of the active line to equal the dummy line level.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
VP1 X55-12 (R) X55-6 (G) X55-15 (B)	VP1 ZR211 ZR411 ZR611	Dummy offset		

**Note:** mtb= main time base DTB= delayed time base

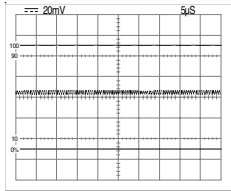
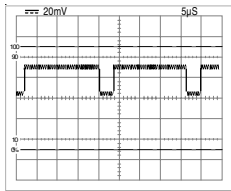
## Vertical sawtooth offset

8. Adjust for no sawtooth information.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
MP211 MP411 MP611	ZR214 ZR414 ZR614			

## Black Preset

9. In the Install/Gain menu set the gain for + to 12dB and for ++ to 21dB (the standard values are 6dB and 12dB).  
10. While switching between 0dB gain and 21dB gain, adjust black level during the active line to the same as the clamp level.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X56-14(R) X56-8(G) X56-20(B)	ZR208 (R) ZR408 (G) ZR608 (B)	0mV (R) 0mV (G) 0mV (B)		

**Note:** When the standard file is recalled the black levels are set as follows: Master = 50, R = 50, G = 50, B = 50.

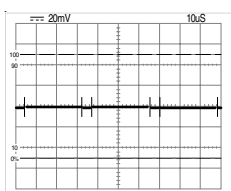
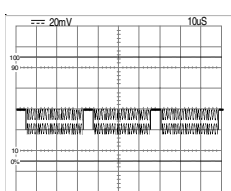
11. In the Install/Gain menu reset the gain for + to 6dB and for ++ to 12dB.

## Shading Crosstalk

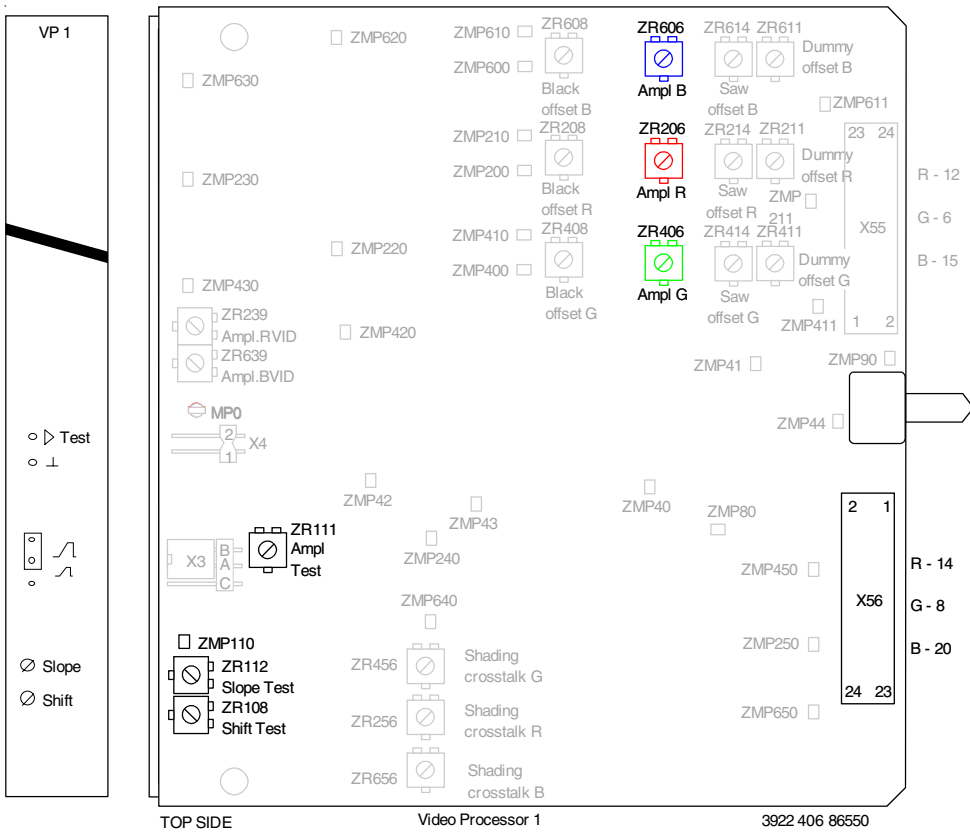
13. Maint. 1 Menu: White Shading On  
Operate Menu: Exp. 1/1000  
Gain 0dB

On Sync./Shading board, set the frame flicker potentiometer (ZR300) fully **clockwise**.

14. Minimise the frame flicker information by adjusting the potentiometers.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X56-14 (R) X56-8 (G) X56-20 (B)	ZR256 (R) ZR456 (G) ZR656 (B)	0mV (R) 0mV (G) 0mV (B)		

# Video Processor 1 Board

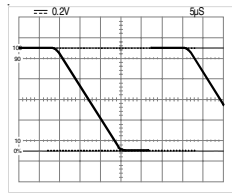


## Video Processor 1 Board

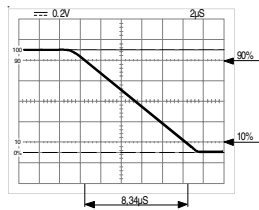
15. Maint. 1 Menu: White Shading Off  
 Operate Menu: Exposure nominal  
 Gain: 0dB  
 Setup 1 Menu: Sawtooth: On

### Test Sawtooth Nominal Settings

16. Sawtooth amplitude

Measure at:	Adjust with:	Required result:	Correct:
ZMP110	ZR111	-1000mV	

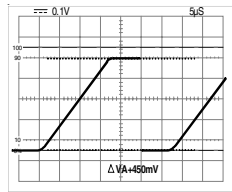
17. Sawtooth slope  
 Measure between 10% and 90% and adjust.

Measure at:	Adjust with:	Required result:	Correct:
ZMP110	R112	8,34 µS	

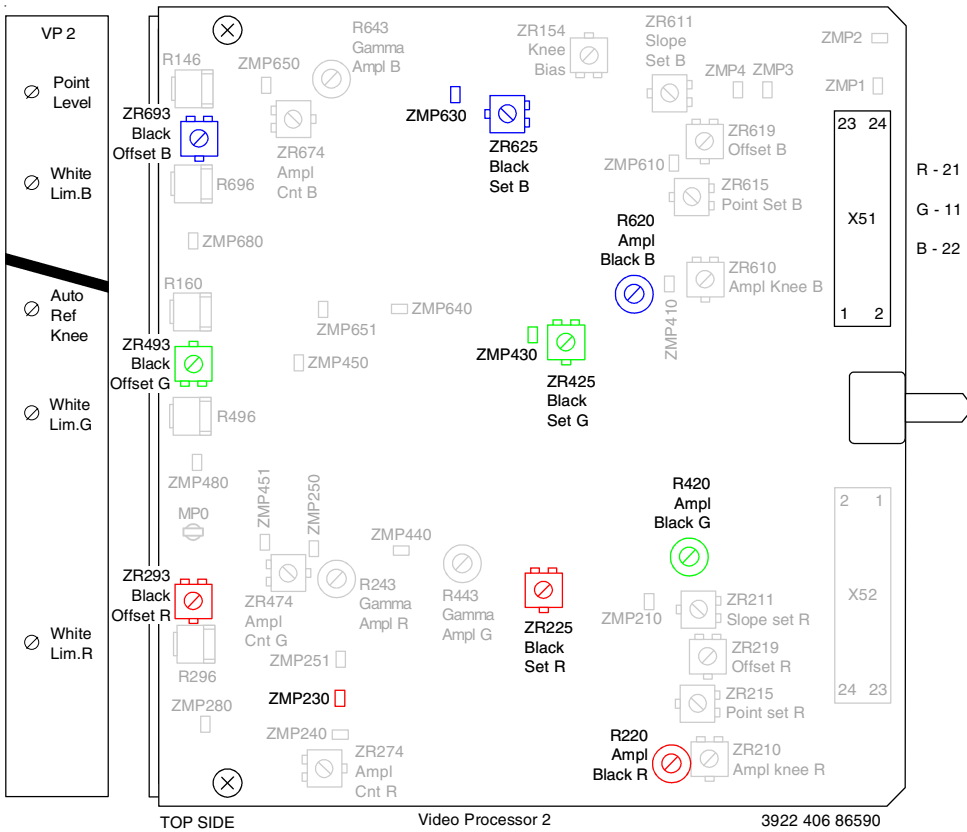
18. Sawtooth horizontal shift  
 Set potentiometer ZR108 in mid-position.

### Video output

19. Adjust the video output amplitude

Measure at:	Adjust with:	Required result:	Correct:
X56-14 (R) X56-8 (G) X56-20 (B)	ZR206 (R) ZR406 (G) ZR606 (B)	450mV (R) 450mV (G) 450mV (B)	

# Video Processor 2 Board

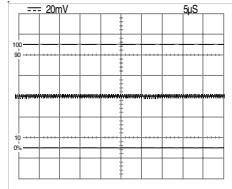
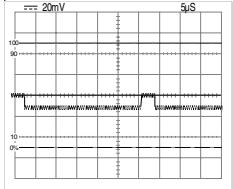


## Video Processor 2 Board

- Place Video Processor 2 on service extender.  
 Operate Menu: Set master black level to 50. Check that individual R, G and B black levels are set to 50.  
 Setup 1 Menu: Switch off test sawtooth.

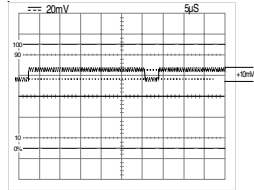
### Black Set Level

- Set active line at 0mV.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
ZMP230 (R) ZMP430 (G) ZMP630 (B)	ZR225 (R) ZR425 (G) ZR625 (B)	0mV (R) 0mV (G) 0mV (B)		

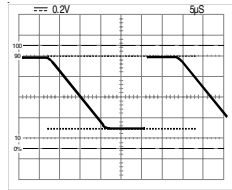
### Black offset limiter sharp.

- Set test sawtooth off.
- Adjust black offset level to +10mV.

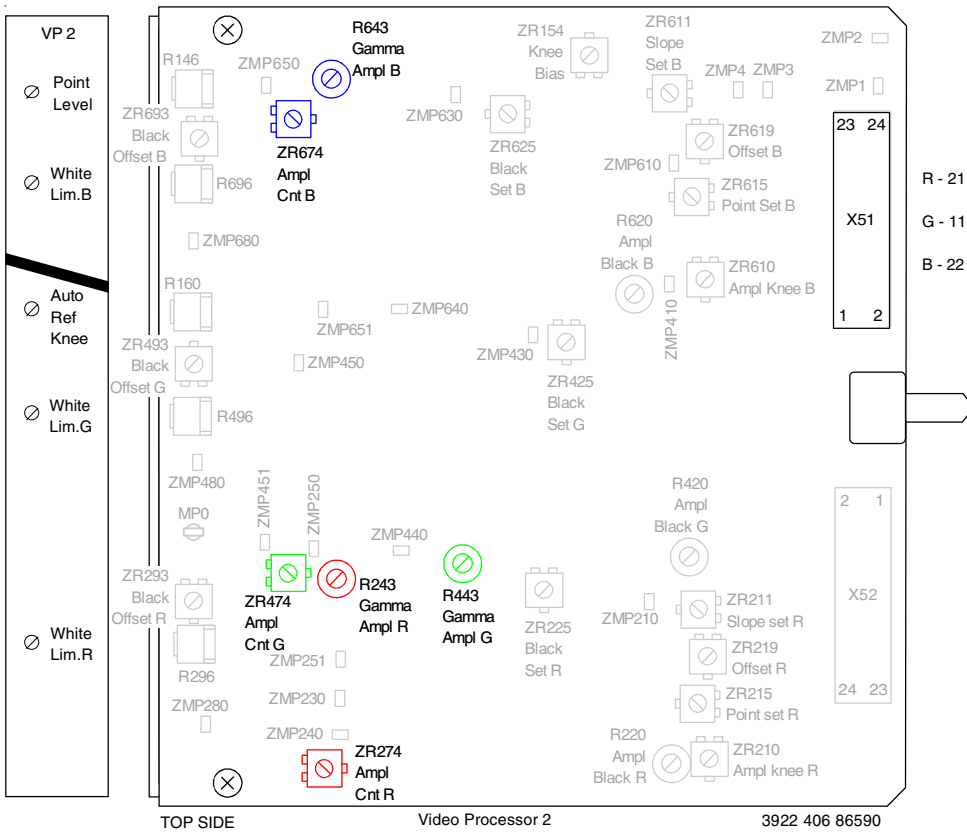
Measure at:	Adjust with:	Required result:	Correct:
X51-21 X51-11 X51-22	ZR293 (R) ZR493 (G) ZR693 (B)	+10mV (R) +10mV (G) +10mV (B)	

### Amplitude Black

- Test sawtooth on.
- Adjust amplitude.

Measure at:	Adjust with:	Required result:	Correct:
ZMP230 (R) ZMP430 (G) ZMP630 (B)	R220 (R) R420 (G) R620 (B)	-736mV (R) -736mV (G) -736mV (B)	

# Video Processor 2 Board

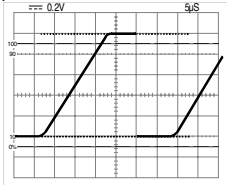




## Video Processor 2 Board

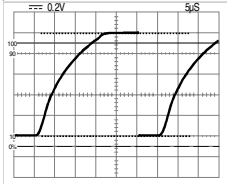
### Output amplitude (linear)

7. Output amplitude (gamma linear)
8. Adjust output amplitude.

Measure at:	Adjust with:	Required result:	Correct:
X51-21 X51-11 X51-22	ZR274 (R) ZR474 (G) ZR674 (B)	+1400mV (R) +1400mV (G) +1400mV (B)	

### Output amplitude (gamma)

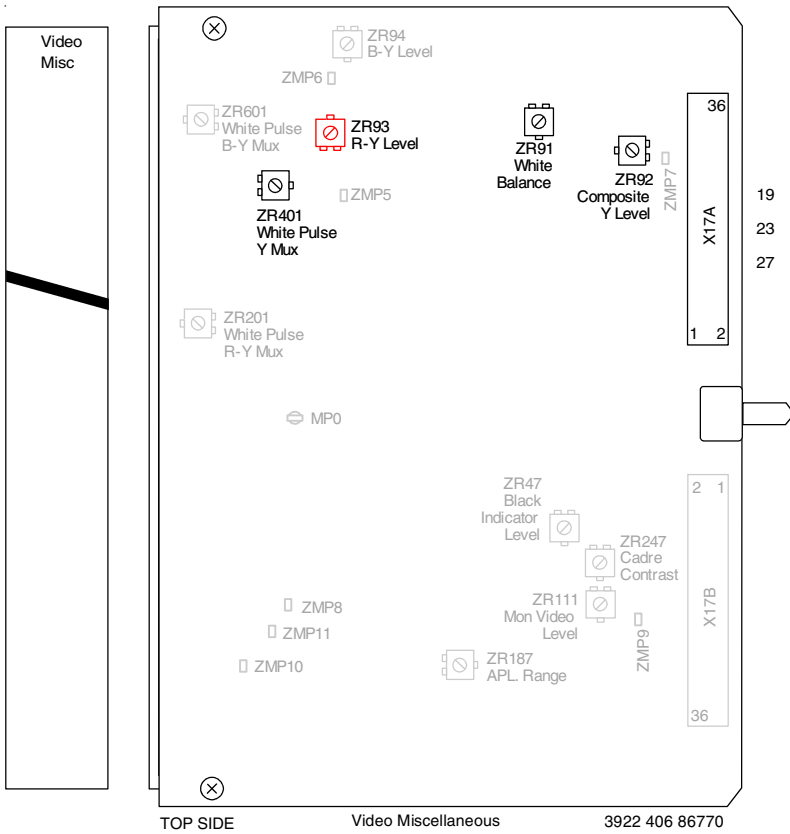
9. Set gamma to 1.
10. On MCP switch between Gamma 1 and LIN and adjust potentiometers so that no difference is visible.

Measure at:	Adjust with:	Required result:	Correct:
X51-21 X51-11 X51-22	R243 (R) R443 (G) R643 (B)	+1400mV (R) +1400mV (G) +1400mV (B)	

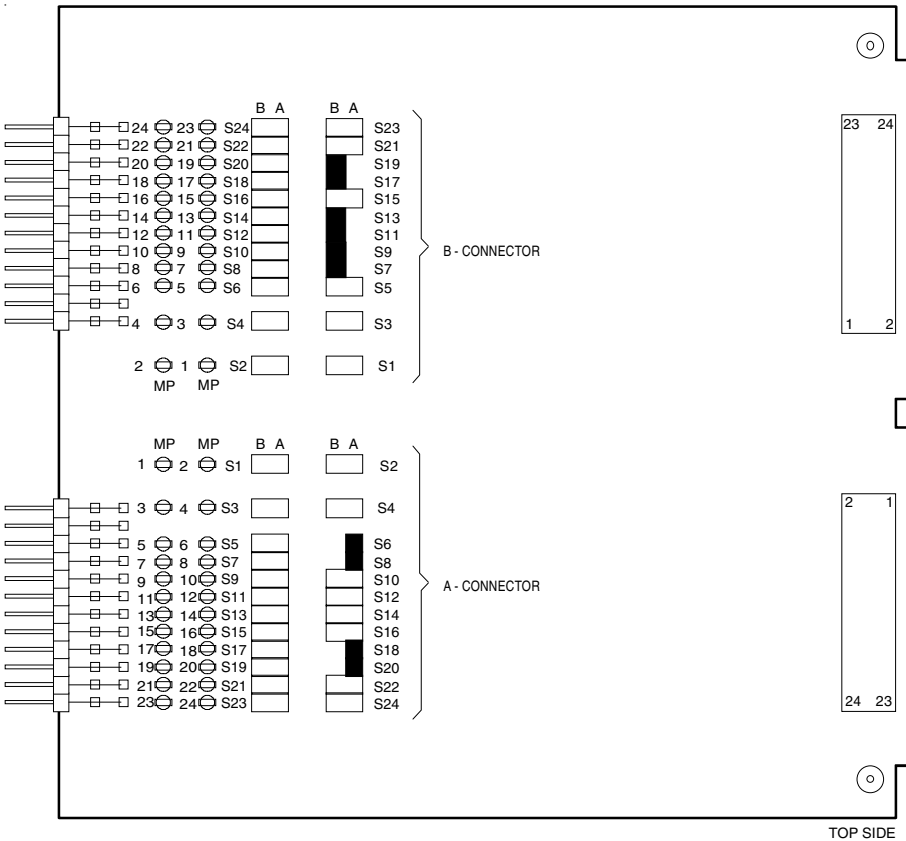
### Note:

Repeat steps 8, 9 and 10 until the best result is obtained.  
Remove Video Processor 2 board from service extender and return it to its position in the camera.

## Video Miscellaneous Board



## Extender Board

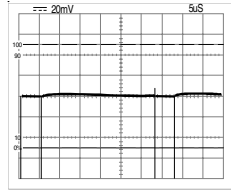
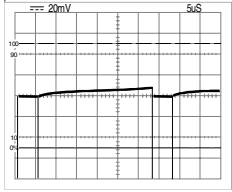


## Video Miscellaneous Board

- Place Video Miscellaneous Board on service extender.

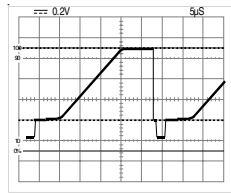
### R-Y / B-Y balance

- Black stretch off.
- Sawtooth on.
- Connect oscilloscope and adjust for a minimum sawtooth information in active line.

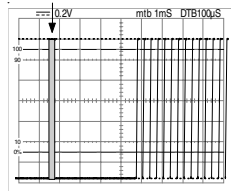
Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X17A-23 or X17A-27	ZR91			

### Y-Mux output

- Adjust Y-Mux output.

Measure at:	Adjust with:	Required result:	Correct:
X17A-19	ZR92	700mV	

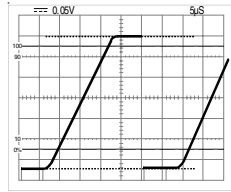
- Adjust the white pulse in line 10 for the Y-Mux output.

Measure at:	Adjust with:	Required result:	Correct:
X17A-19	ZR401	700mV	

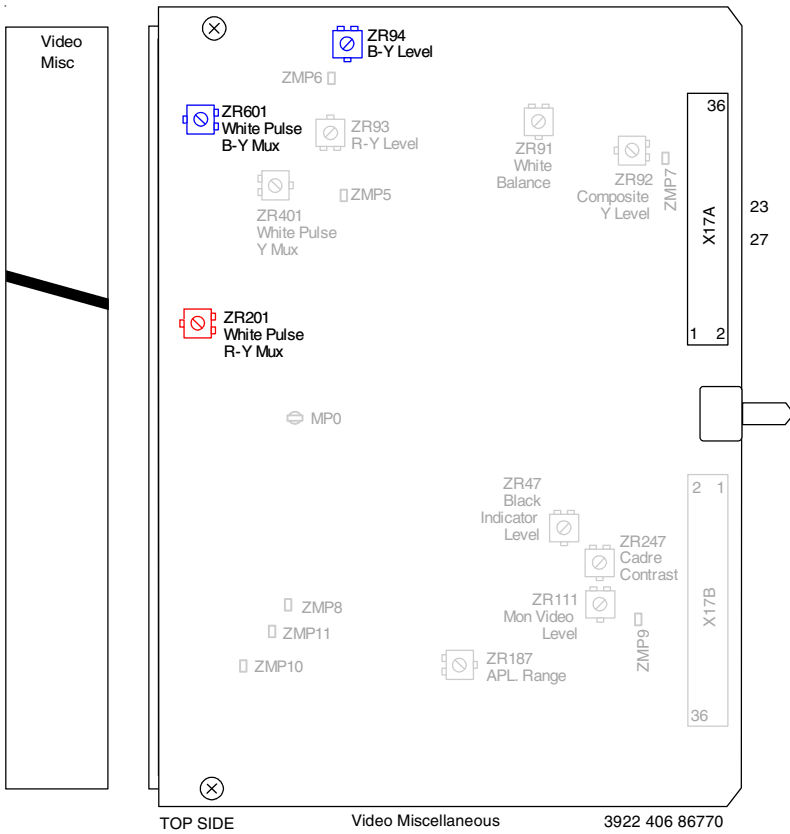
Note: mtb= main time base DTB= delayed time base

### Video R-Y Mux output

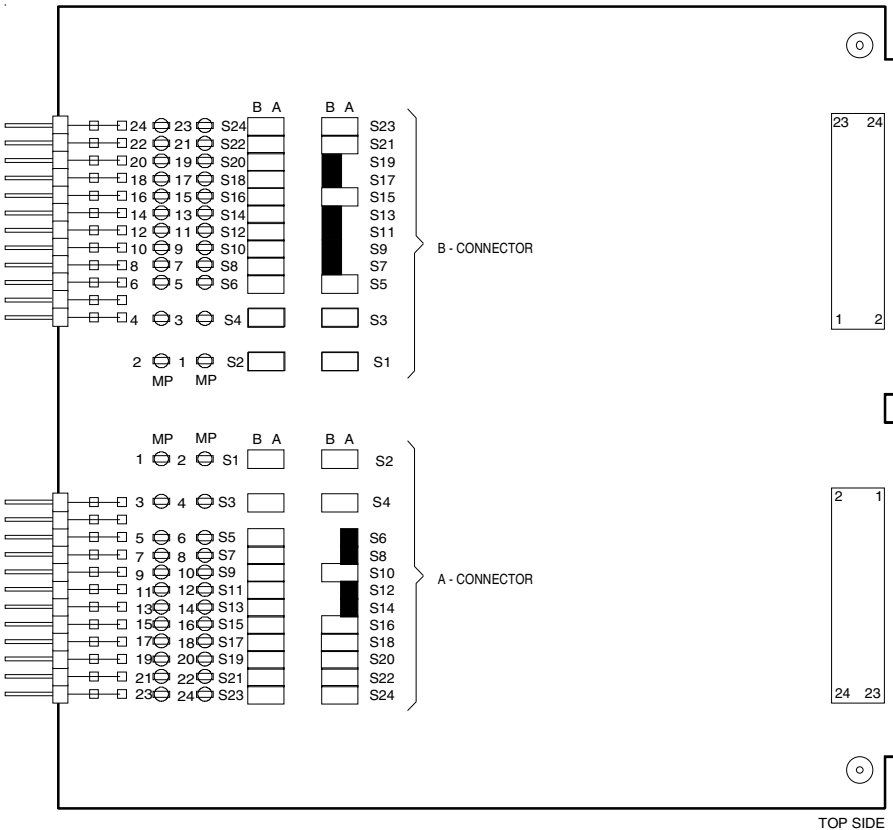
- Test sawtooth on.
- On VP1 extender remove jumper X56-6, 8, 18 and 20.
- Short-circuit X56-6 with X56-8 and X56-18 with X56-20.
- Adjust R-Y Mux output.

Measure at:	Adjust with:	Required result:	Correct:
X17A-27	ZR93	350mV	

## Video Miscellaneous Board



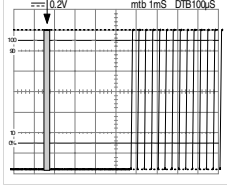
## Extender Board



## Video Miscellaneous Board

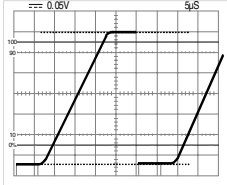
### White pulse R-Y Mux output

11. Adjust the white pulse in line 10 for the R-Y Mux output.

Measure at:	Adjust with:	Required result:	Correct:
X17A-27	ZR201	350mV	

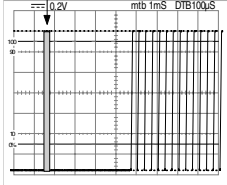
### Video B-Y Mux output

12. Remove short-circuits and replace jumpers on VP1 extender.
13. On VP1 extender remove jumper X56-6, 8, 12 and 14.
14. Short-circuit X56-6 with X56-8 and X56-12 with X56-14.
15. Adjust B-Y Mux output.

Measure at:	Adjust with:	Required result:	Correct:
X17A-23	ZR94	350mV	

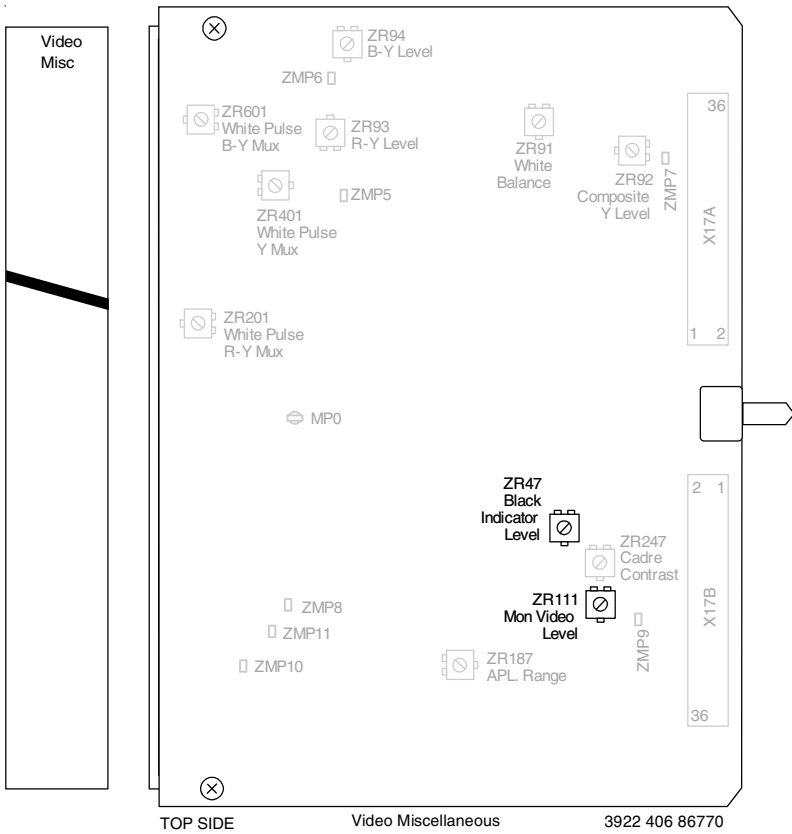
### White pulse B-Y Mux output

16. Adjust the white pulse in line 11 for the B-Y Mux output.

Measure at:	Adjust with:	Required result:	Correct:
X17A-23	ZR601	350mV	

17. Remove short-circuits, X56-6 with X56-8 and X56-18 with X56-20, and replace jumpers on VP1 extender.

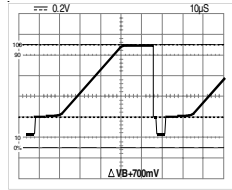
# Video Miscellaneous Board



## Video Miscellaneous Board

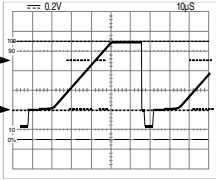
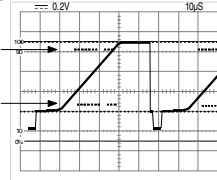
### Mon camera output

18. Use the controls at the front of the camera to set the white indicator level for the monitoring output by navigating through the menu system to Vf/Lens>Vf Inst>VfMon>Y.
19. Connect oscilloscope terminated with 75 Ohm to the VF output of the camera.
20. Adjust the amplitude of the VF output signal.

Measure at:	Adjust with:	Required result:	Correct:
VF output	ZR111	PAL 700mV NTSC 714mV (100IRE)	

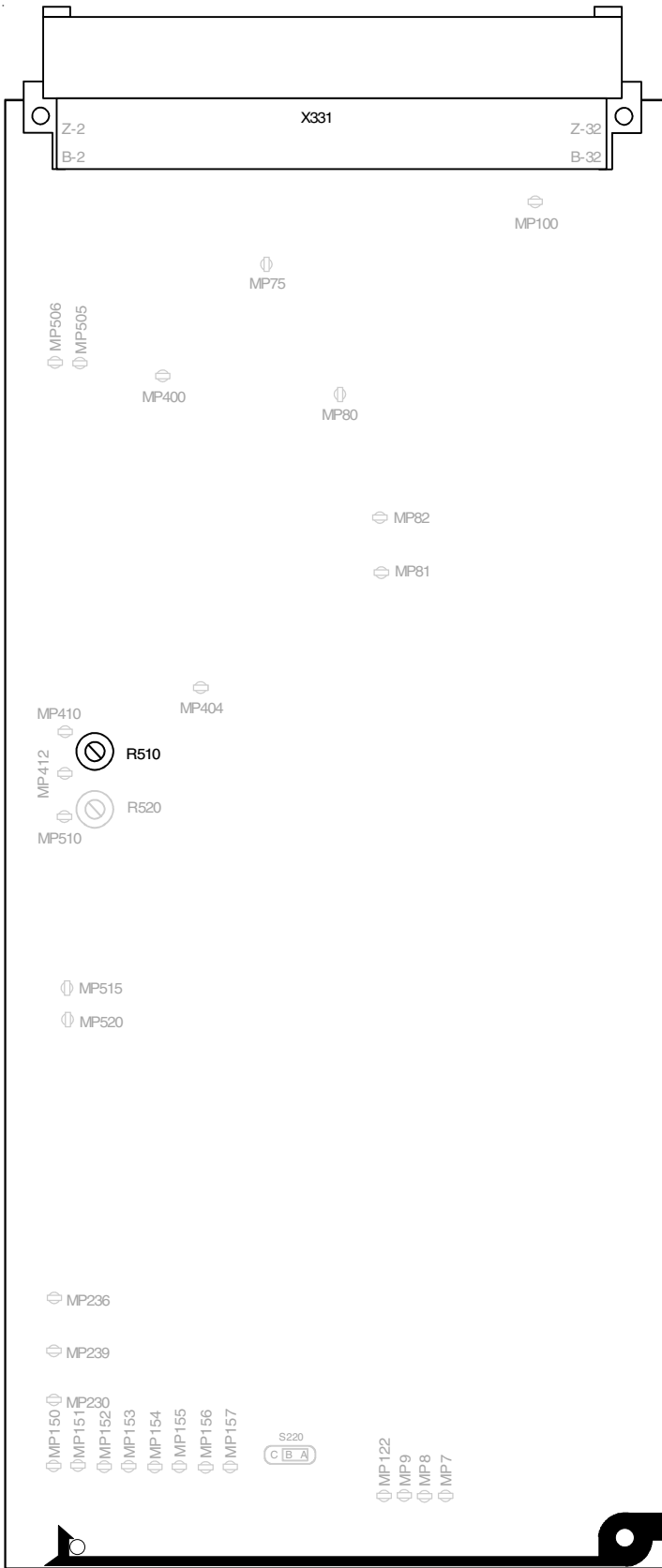
### Black and White indicator level

21. Use the controls at the front of the camera to set the white indicator level for the monitoring output by navigating through the menu.
22. In VF menu select VF/Lens> VF/Install> Markers> White Indicator, and set the value to 20.
23. Connect oscilloscope terminated with 75 Ohm to the VF output of the camera.
24. Adjust the black level of the indicators of the VF output signal to the same level as the blanking with ZR47.
25. Adjust the white level of the indicator of the VF output signal to the same level with the rotary control at the front of the camera.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
VF output white black	ZR47 rotary control ZR47	white indicator black indicator 500mV		

26. Remove Video Miscellaneous Board from service extender and return it to its position in the camera.

# Power Board CPU



TOP SIDE

POWER BOARD CPU

3922 406 80060

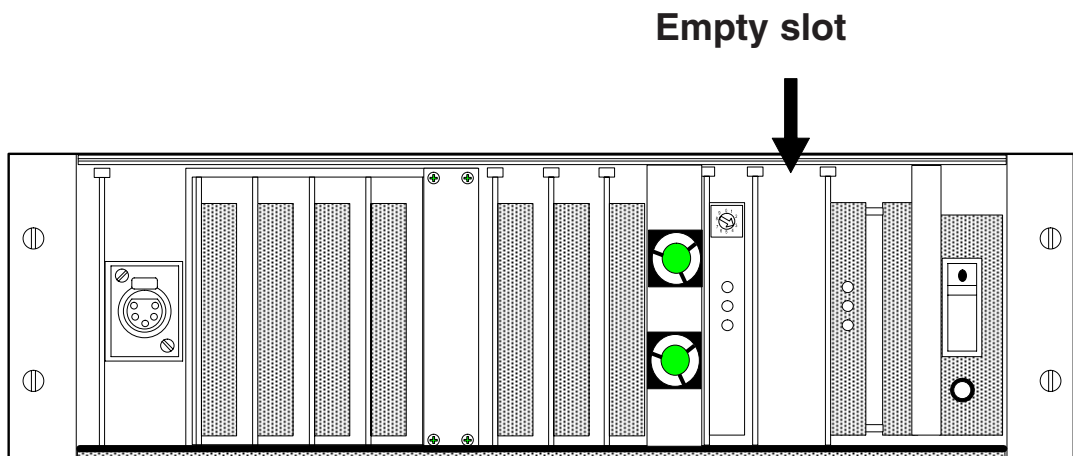


## Power Board CPU

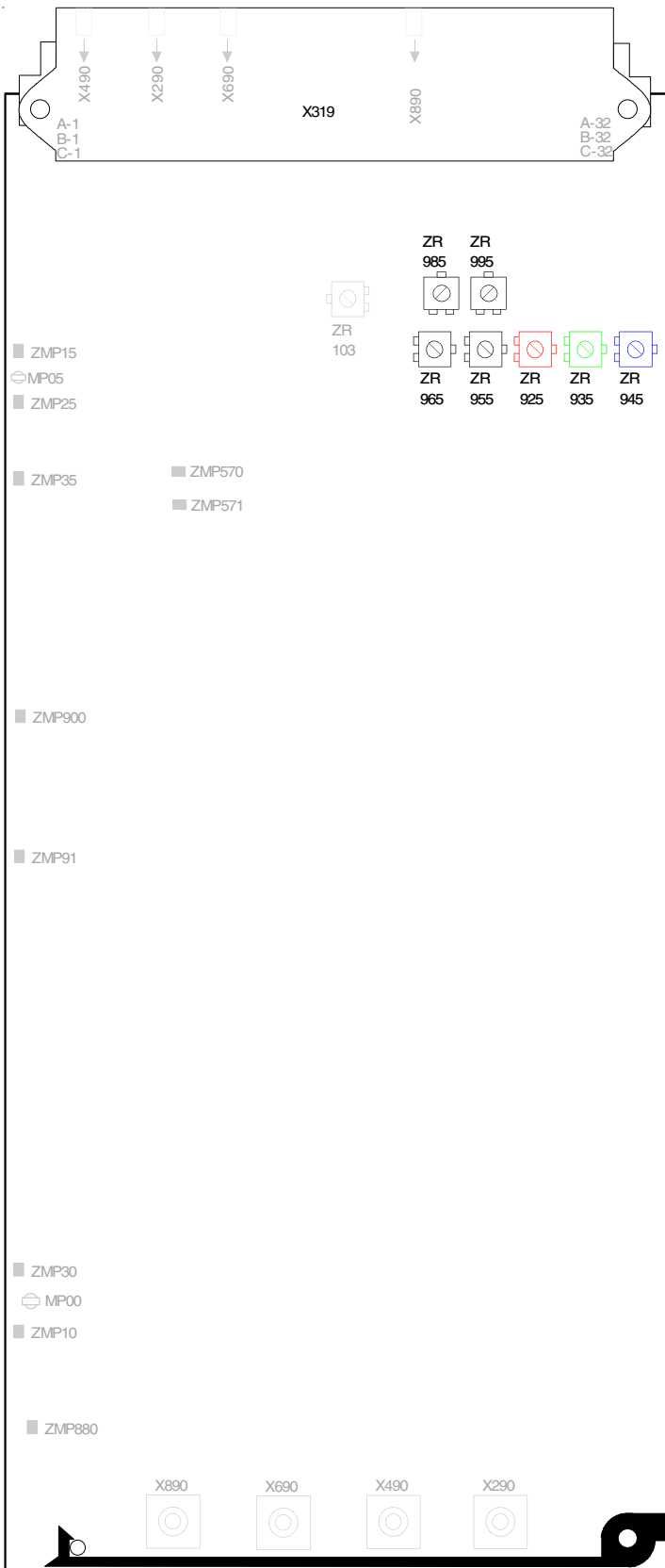
### Power check

1. Before carrying out adjustments on the Digital Video Processor the +5V must be checked.
2. Put an extender board in the empty slot of the CPU as shown on the drawing below.

Measure at:	Adjust with:	Required result:	
X330-ABC14 X330-ABC15/16	R510	5V ⏚	



# Digital Video Processing Board CPU/150Hz



TOP SIDE

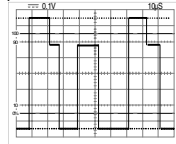
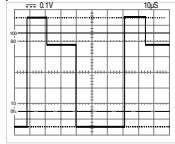
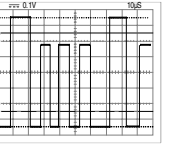
DIGITAL VIDEO PROCESSOR CPU

3922 406 86530

## Digital Video Processing Board CPU/150Hz

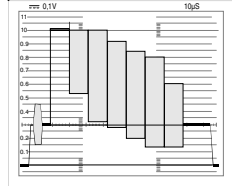
### R, G and B output amplitudes

- Put Digital Video Processor on service extender.
- Colour bar On, Chroma On.
- Adjust output amplitudes measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	R	G	B
R	ZR925	700mV			
G	ZR935	700mV			
B	ZR945	700mV			

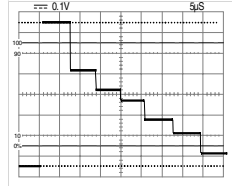
### CVBS output amplitudes

- Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
CVBS (3x)	ZR965	700mV	

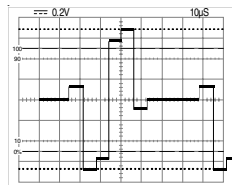
### Y output amplitude

- Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
Y	ZR955	700mV	

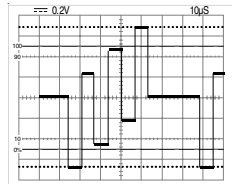
### Pr output amplitude

- Adjust output amplitude measured at BNC connectors on backpanel of CPU.

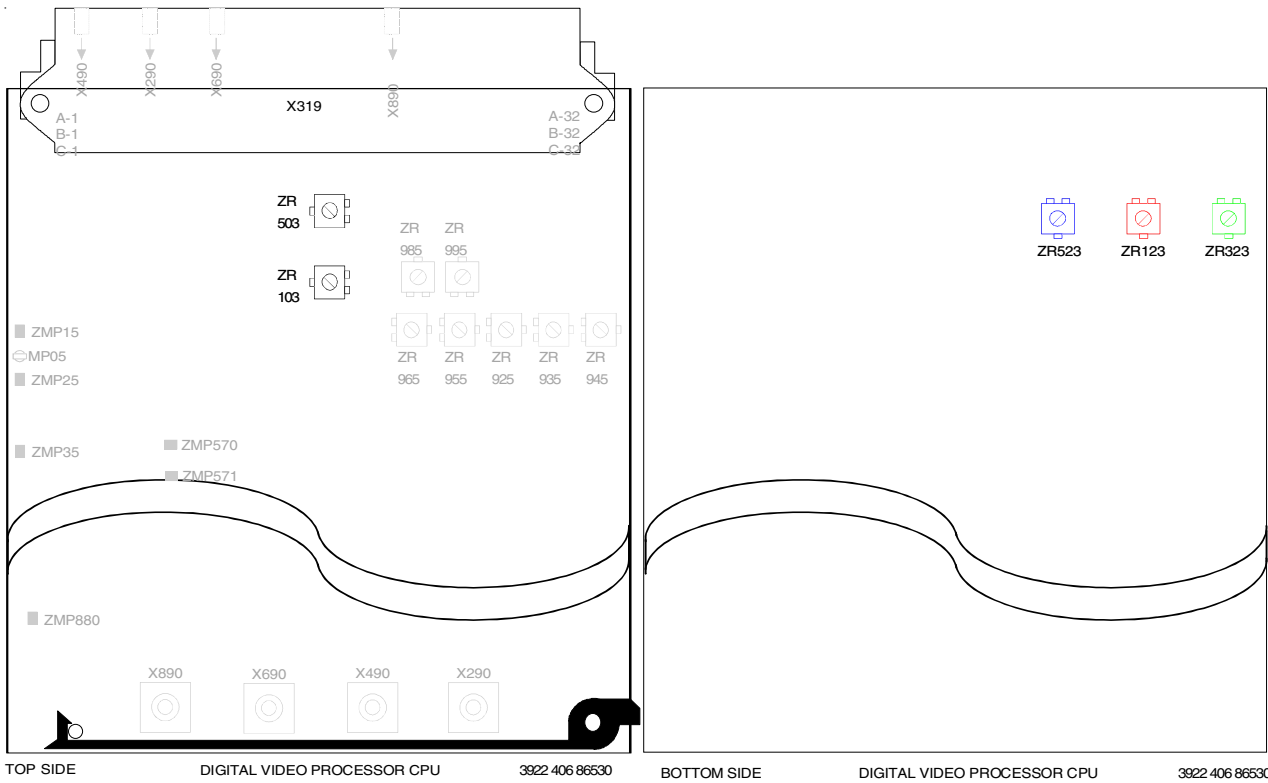
Measure at:	Adjust with:	Required result:	
Pr	ZR985	525mV	

### Pb output amplitude

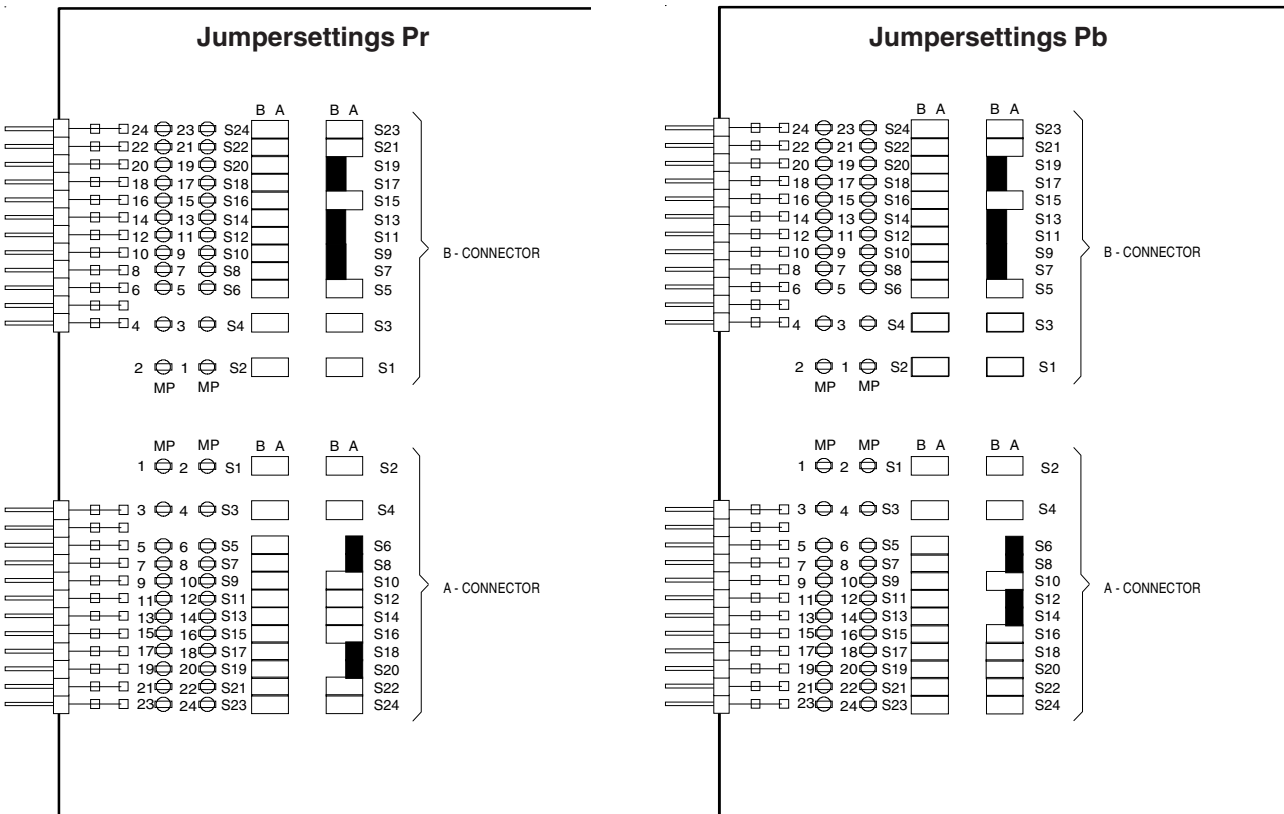
- Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
Pb	ZR995	525mV	

# Digital Video Processing Board CPU/150Hz



## Extender Board

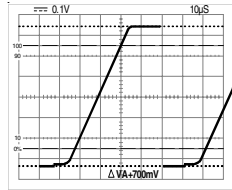


## Digital Video Processing Board CPU/150Hz

### R, G and B output amplitudes

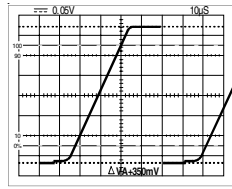
8. Colour bar Off.
9. Sawtooth On.
10. Adjust output amplitudes measured at BNC connectors on backpanel of CPU.

**Note: the signal reacts slowly on the adjustments.**

Measure at:	Adjust with:	Required result:	
R G B	ZR123 ZR323 ZR523	700mV 700mV 700mV	

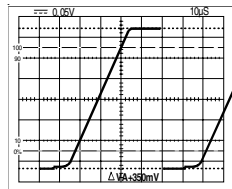
### Pr output amplitude

11. On VP1 extender remove jumper X56-6, 8, 18 and 20.
12. Short-circuit X56-6 with X56-8 and X56-18 with X56-20.
13. Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
Pr	ZR103	350mV	

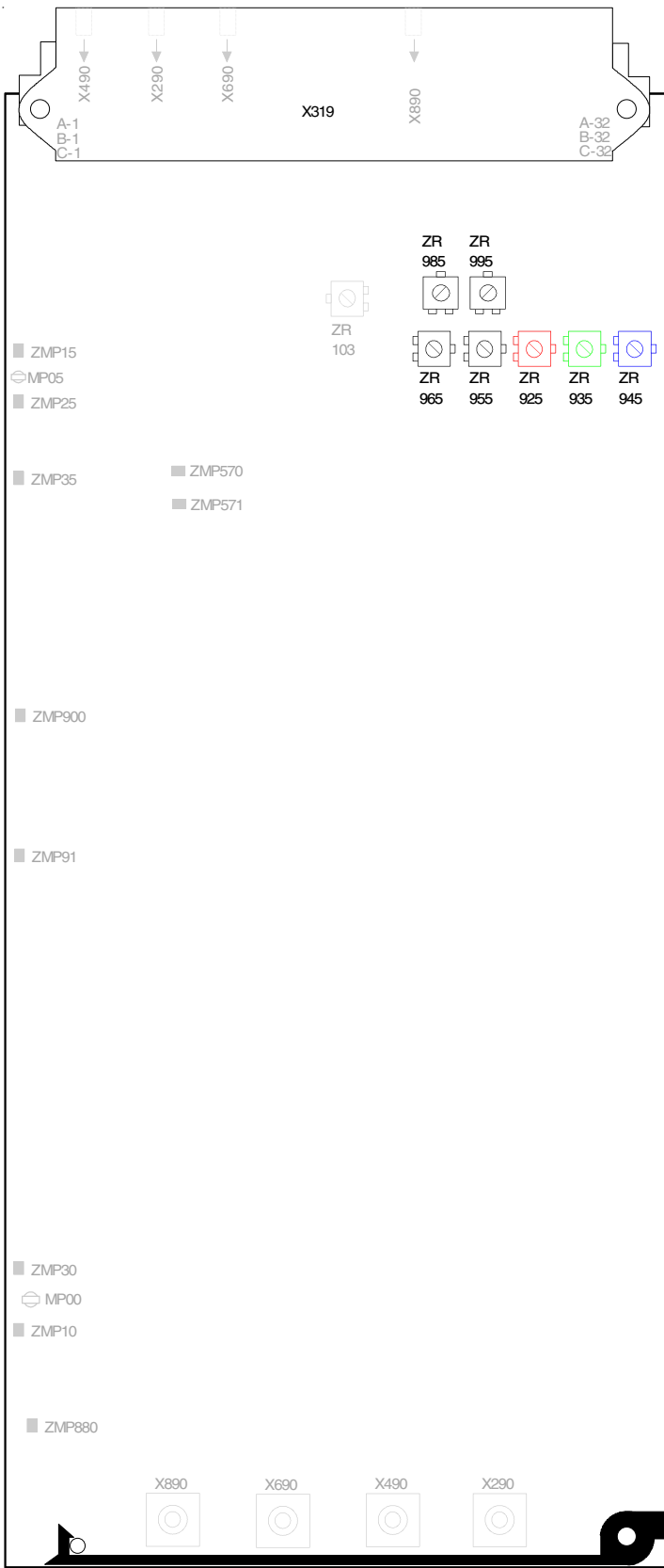
### Pb output amplitude

14. Remove short circuits and replace jumpers.
15. On VP1 extender remove jumper X56-6, 8, 12 and 14.
16. Short-circuit X56-6 with X56-8 and X56-12 with X56-14.
17. Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
Pb	ZR503	350mV	

18. Remove short circuits and replace jumpers.
19. Switch off power CPU and put Digital Video Processing Board back to its place in CPU.

# Digital Video Processing Board CPU/180Hz



TOP SIDE

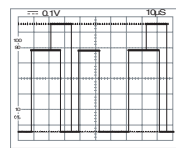
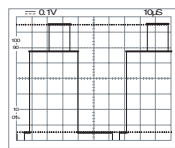
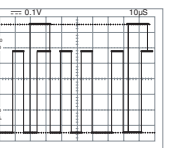
DIGITAL VIDEO PROCESSOR CPU

3922 406 86530

## Digital Video Processing Board CPU/180Hz

### R, G and B output amplitudes

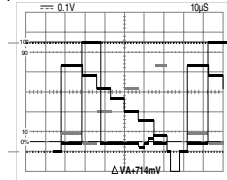
1. Put Digital Video Processor on service extender.
2. Colour bar On, Chroma On.
3. Adjust output amplitudes measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	R	G	B
R G B	ZR925 ZR935 ZR945	700mV 700mV 700mV			

### CVBS output amplitudes

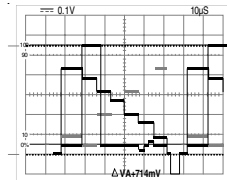
MCP setup menu Chroma OFF

4. Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
CVBS (3x)	ZR965	714mV (100IRE)	

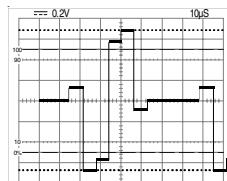
### Y output amplitude

5. Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
Y	ZR955	714mV (100IRE)	

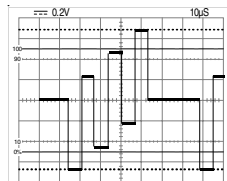
### Pr output amplitude

6. Adjust output amplitude measured at BNC connectors on backpanel of CPU.

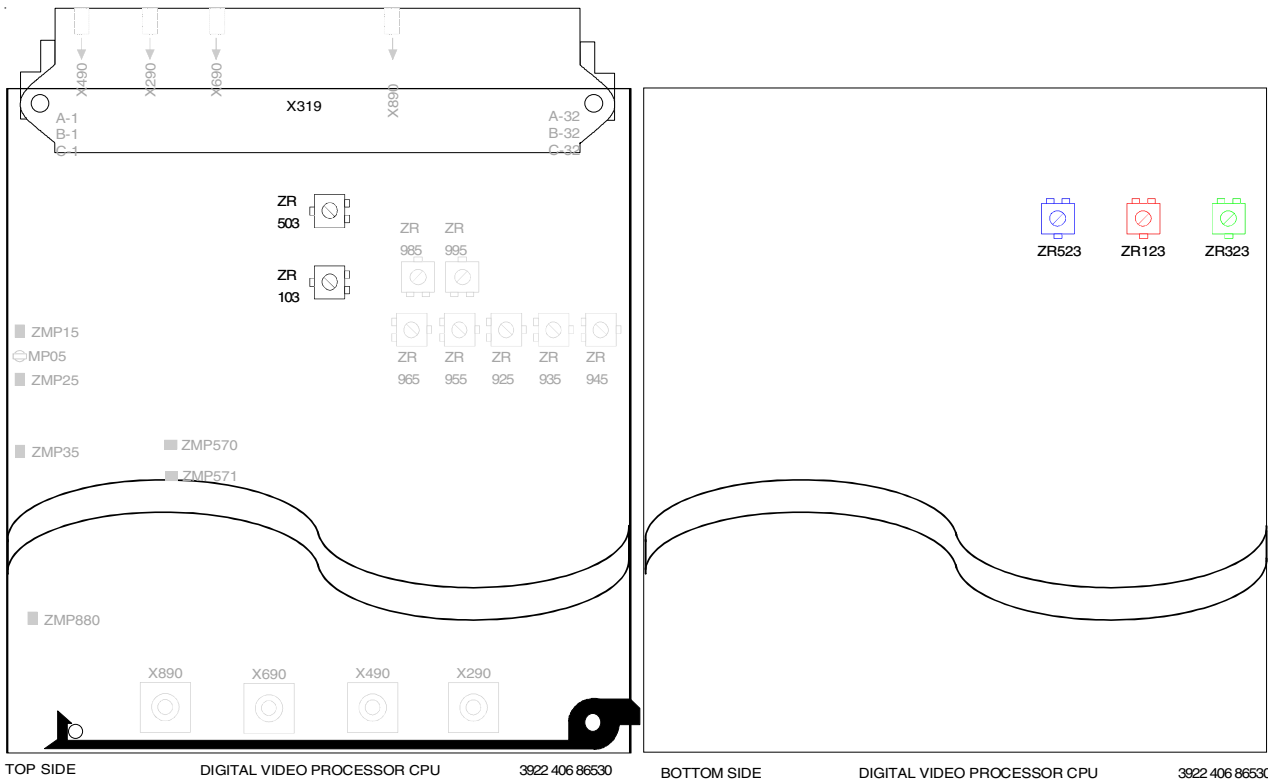
Measure at:	Adjust with:	Required result:	
Pr	ZR985	525mV	

### Pb output amplitude

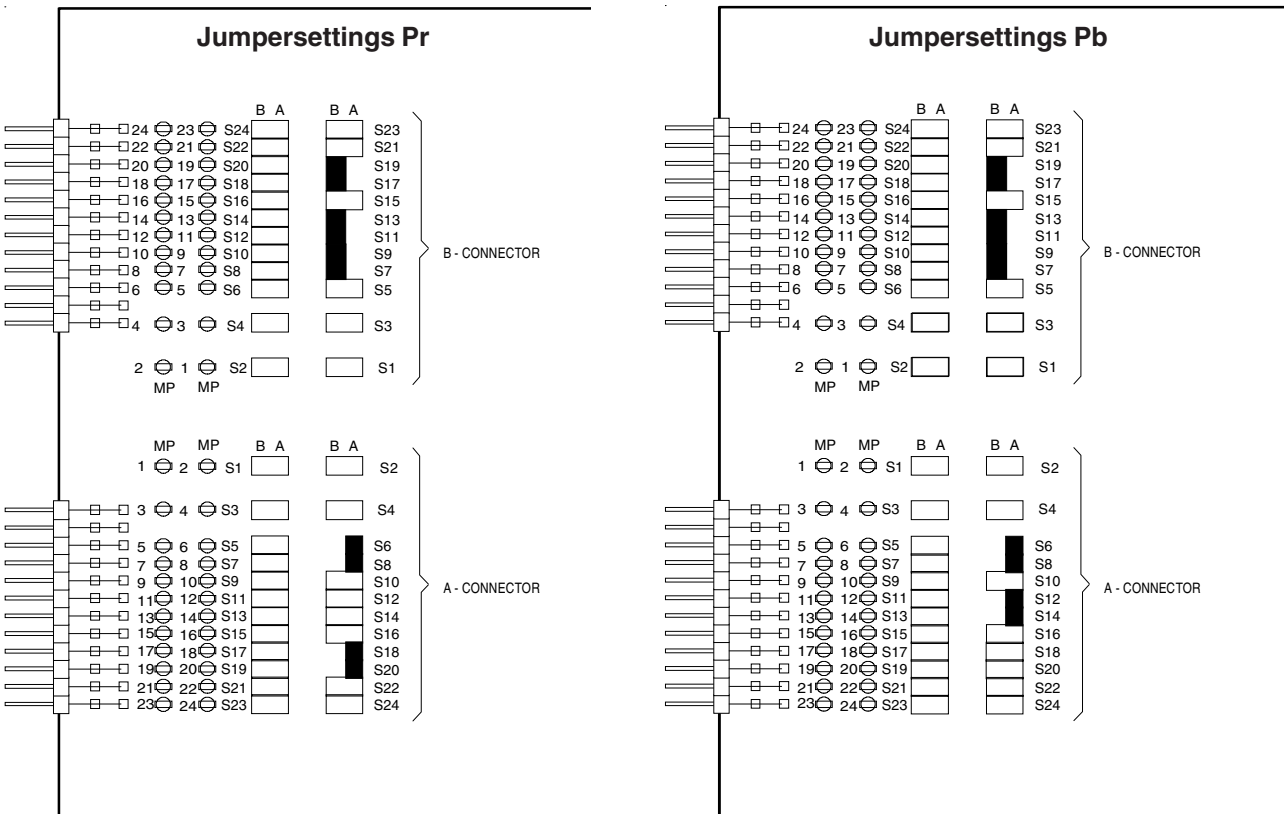
7. Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
Pb	ZR995	525mV	

# Digital Video Processing Board CPU/180Hz



## Extender Board



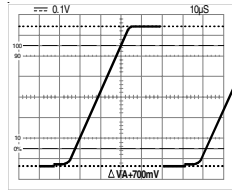


## Digital Video Processing Board CPU/180Hz

### R, G and B output amplitudes

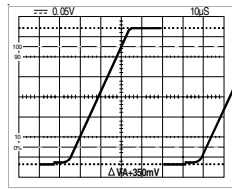
8. Colour bar Off.
9. Sawtooth On.
10. Adjust output amplitudes measured at BNC connectors on backpanel of CPU.

**Note: the signal reacts slowly on the adjustments.**

Measure at:	Adjust with:	Required result:	
R G B	ZR123 ZR323 ZR523	700mV 700mV 700mV	

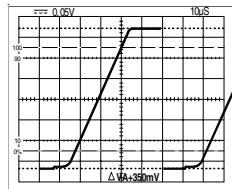
### Pr output amplitude

11. On VP1 extender remove jumper X56-6, 8, 18 and 20.
12. Short-circuit X56-6 with X56-8 and X56-18 with X56-20.
13. Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
Pr	ZR103	350mV	

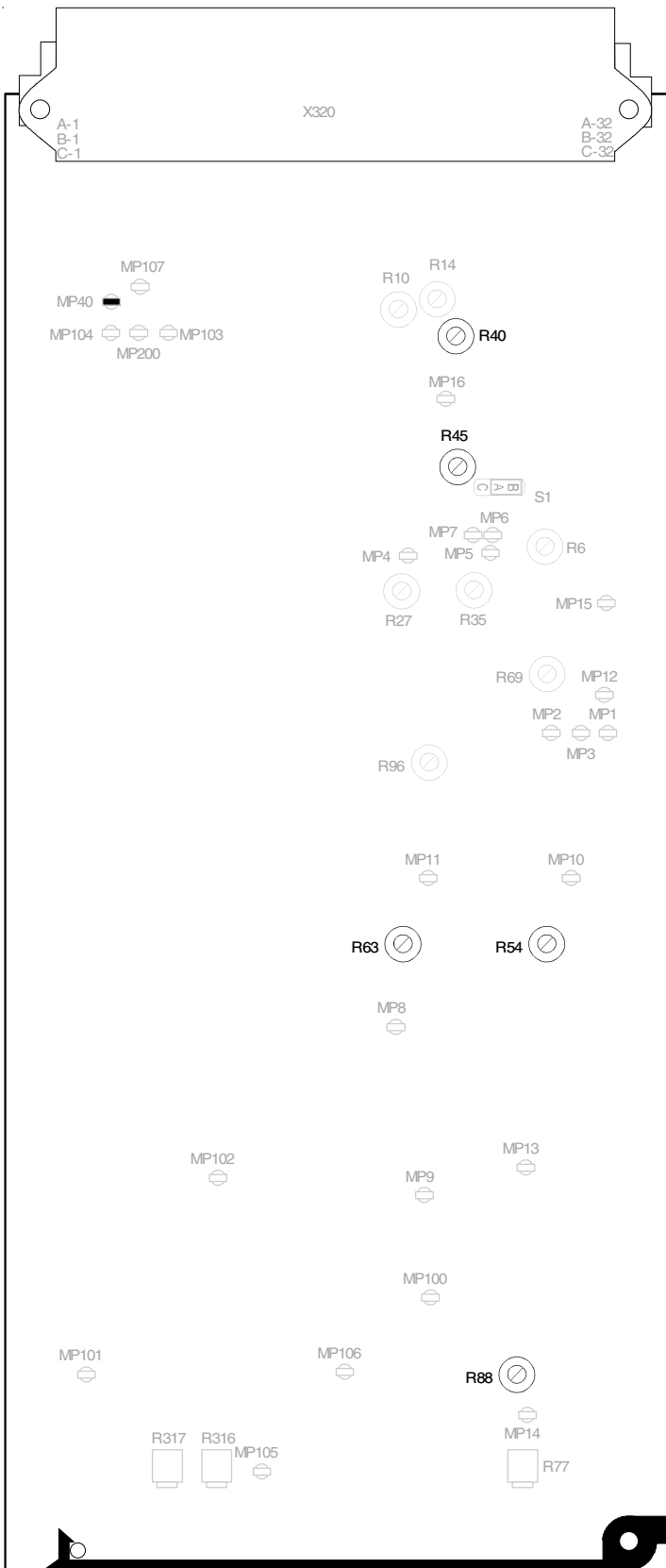
### Pb output amplitude

14. Remove short circuits and replace jumpers.
15. On VP1 extender remove jumper X56-6, 8, 12 and 14.
16. Short-circuit X56-6 with X56-8 and X56-12 with X56-14.
17. Adjust output amplitude measured at BNC connectors on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
Pb	ZR503	350mV	

18. Remove short circuits and replace jumpers.
19. Switch off power CPU and put Digital Video Processing Board back to its place in CPU.

# Monitoring + VF Board CPU/150Hz



TOP SIDE

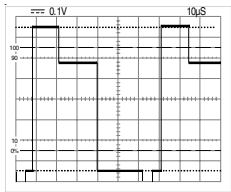
MONITORING + VF

3922 406 86810

## Monitoring + VF Board CPU/150Hz

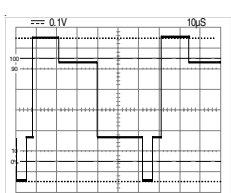
### PXM output amplitude

1. Put Monitoring + VF Board on service extender and switch On CPU power.
2. Colour bar On.
3. Sawtooth Off.
4. Mon: G
5. Adjust output amplitude measured at BNC connector on backpanel of CPU.

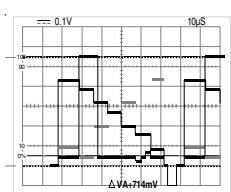
Measure at:	Adjust with:	Required result:	
PXM	R54	700mV	

### WFM output amplitude

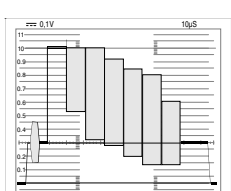
6. Adjust output amplitude measured at BNC connector on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
WFM WFM	R63 R88	700mV 300mV sync	

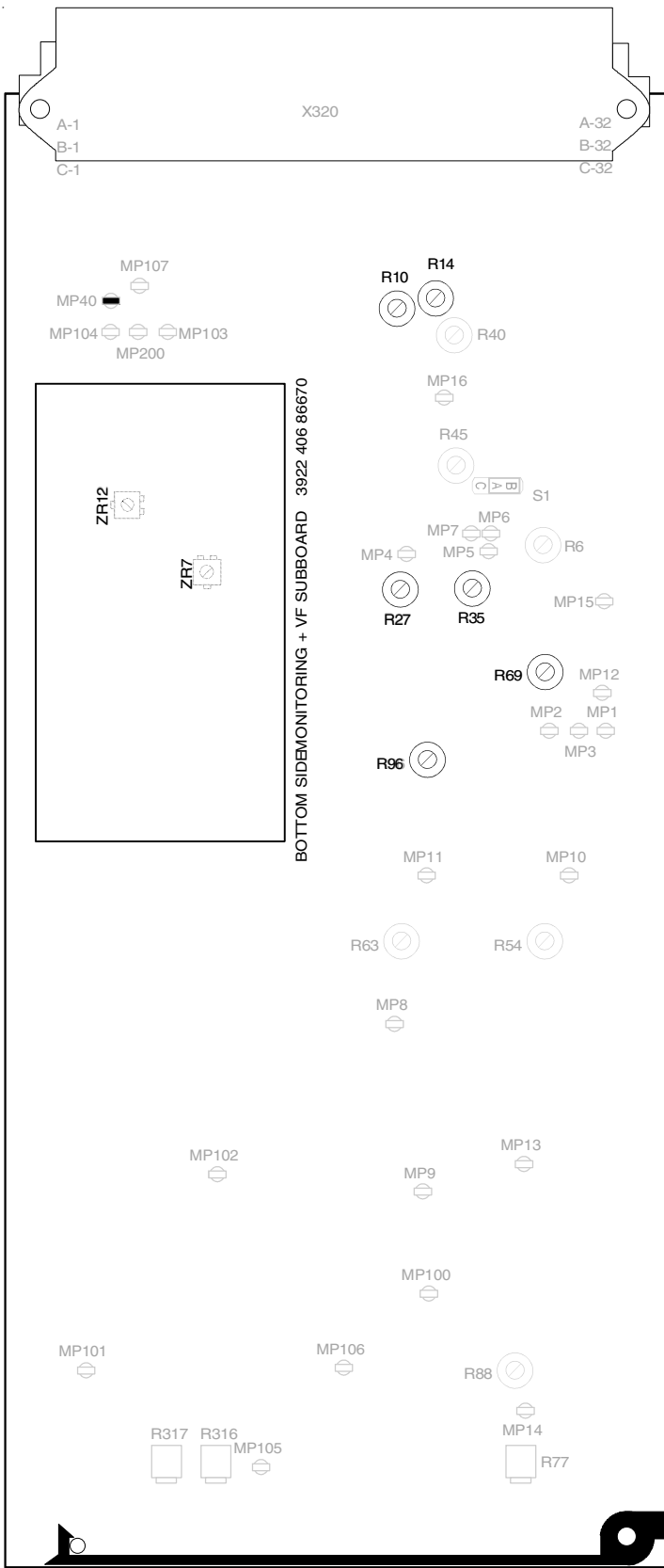
7. Mon: Y
8. Adjust output amplitude measured at BNC connector on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
WFM	R40	714mV (100IRE)	

9. Mon: CVBS
10. Adjust output amplitude measured at BNC connector on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
WFM	R45	714mV (100IRE)	

# Monitoring + VF Board CPU/150Hz

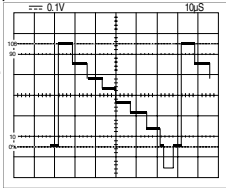


TOP SIDE MONITORING + VF 3922 406 86810

## Monitoring + VF Board CPU/150Hz

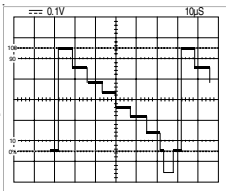
### VF output amplitude

11. Connect Y BNC with EXT 1 BNC on backpanel CPU.
12. On Camera backpanel switch LOCAL/Ext switch to Ext.
13. On Camera backpanel rotary switch to Ext 1.
14. Adjust output amplitude.

Measure at:	Adjust with:	Required result:	
X320-B32	R69	700mV 300mV sync approx.	

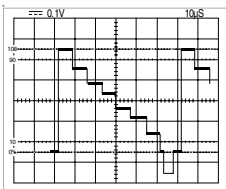
### VF output amplitude

15. On Camera backpanel switch LOCAL/Ext switch to LOCAL.
16. In VF menu select VF/Lens> VF/Install> VF/Mon> Y.
17. Adjust output amplitude.

Measure at:	Adjust with:	Required result:	
Mon + VF X320-B32	PIP subboard ZR7 ZR12	700mV 300mV sync approx.	

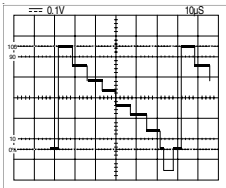
### VF output amplitude

18. On Camera backpanel switch LOCAL/Ext switch to Ext.
19. On Camera backpanel rotary switch to Mix 1.
20. Adjust output video amplitude, setup and sync amplitude.

Measure at:	Adjust with:	Required result:	
Mon + VF X320-B32	R27 R10 R96	700mV Setup 0mV Sync 300mV	

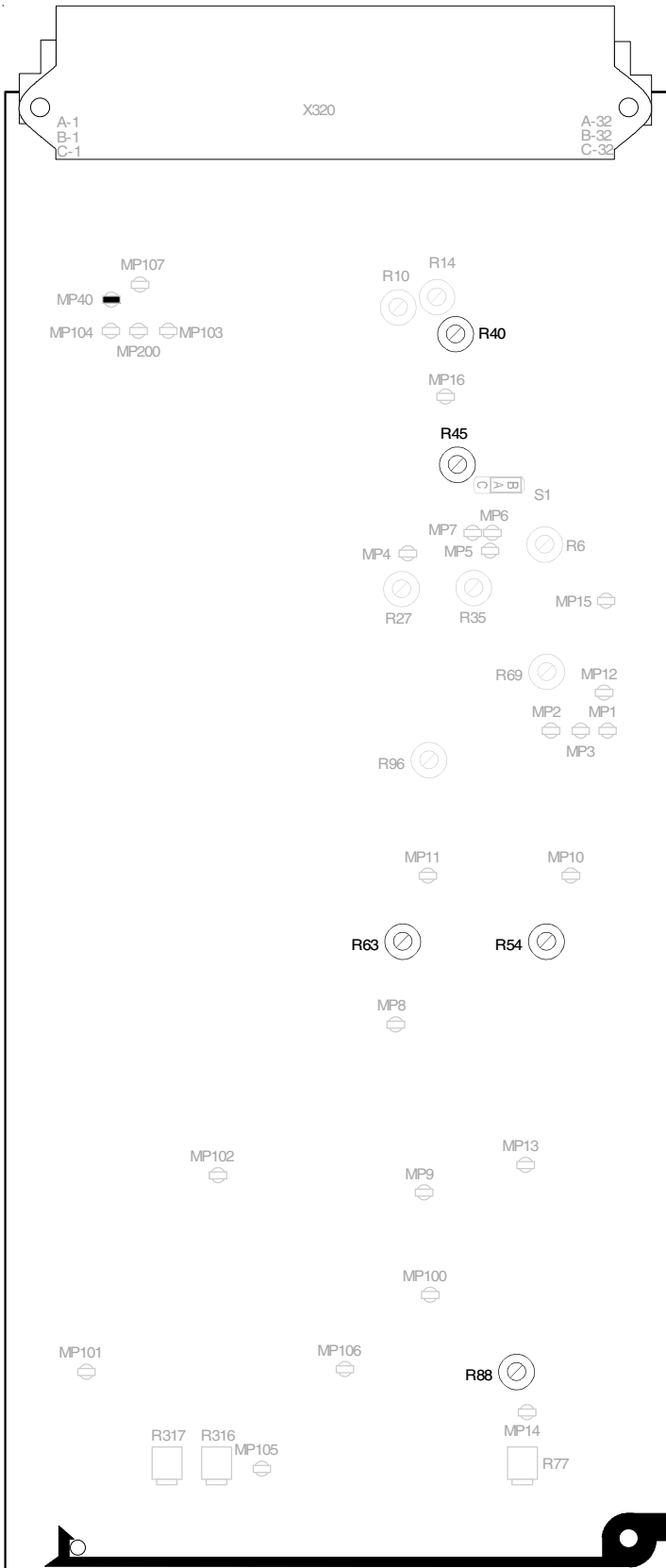
### VF output amplitude

21. Connect Y BNC with EXT 2 BNC on backpanel CPU.
22. On Camera backpanel rotary switch to Mix 2.
23. Adjust output video amplitude and setup.

Measure at:	Adjust with:	Required result:	
Mon + VF X320-B32	R35 R14	700mV Setup 0mV	

24. Remove connection Y-EXT2 and replace Monitoring + VF Board to its place in the CPU.

# Monitoring + VF Board CPU/180Hz



TOP SIDE

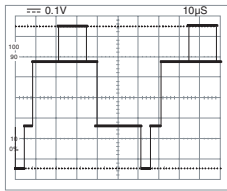
MONITORING + VF

3922 406 86810

## Monitoring + VF Board CPU/180Hz

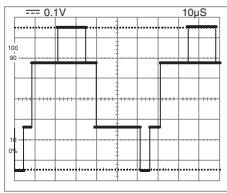
### PXM output amplitude

1. Put Monitoring + VF Board on service extender and switch On CPU power.
2. Colour bar On.
3. Sawtooth Off.
4. Mon: G
5. Adjust output amplitude measured at BNC connector on backpanel of CPU.

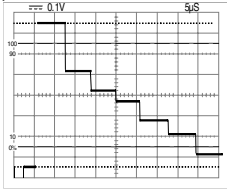
Measure at:	Adjust with:	Required result:	
PXM	R54	700mV	

### WFM output amplitude

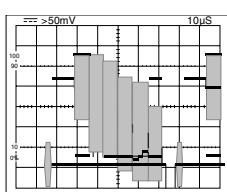
6. Adjust output amplitude measured at BNC connector on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
WFM WFM	R63 R88	700mV 300mV sync	

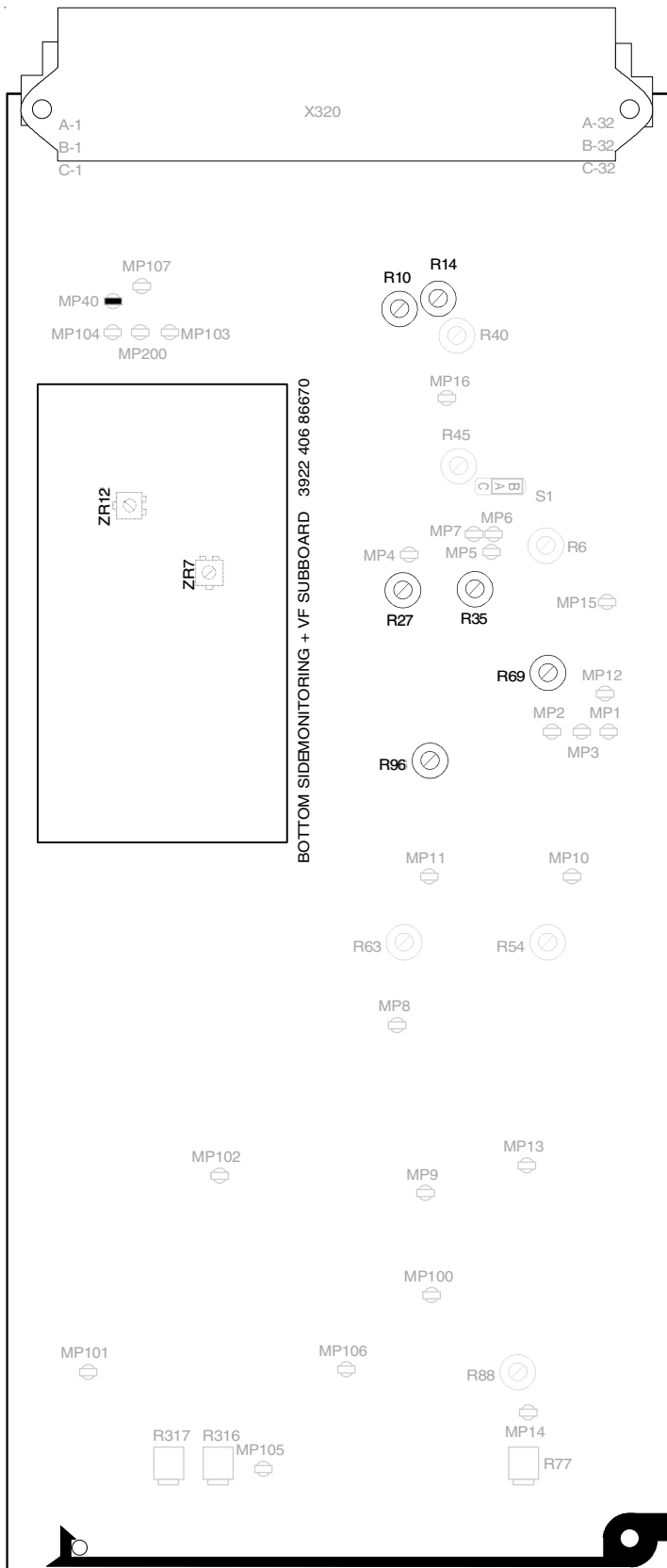
7. Mon: Y
8. Adjust output amplitude measured at BNC connector on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
WFM	R40	714mV (100IRE)	

9. Mon: CVBS
10. Adjust output amplitude measured at BNC connector on backpanel of CPU.

Measure at:	Adjust with:	Required result:	
WFM	R45	714mV (100IRE)	

# Monitoring + VF Board CPU/180Hz



TOP SIDE

MONITORING + VF

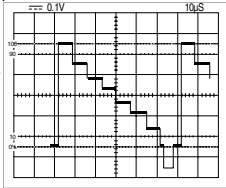
3922 406 86810



## Monitoring + VF Board CPU/180Hz

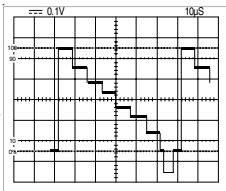
### VF output amplitude

11. Connect Y BNC with EXT 1 BNC on backpanel CPU.
12. On Camera backpanel switch LOCAL/Ext switch to Ext.
13. On Camera backpanel rotary switch to Ext 1.
14. Adjust output amplitude.

Measure at:	Adjust with:	Required result:	
X320-B32	R69	700mV 300mV sync approx.	

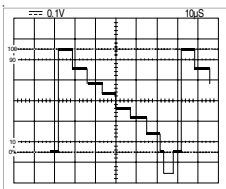
### VF output amplitude

15. On Camera backpanel switch LOCAL/Ext switch to LOCAL.
16. In VF menu select VF/Lens> VF/Install> VF/Mon> Y.
17. Adjust output amplitude.

Measure at:	Adjust with:	Required result:	
Mon + VF X320-B32	PIP subboard ZR7 ZR12	700mV 300mV sync approx.	

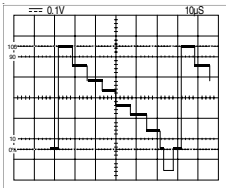
### VF output amplitude

18. On Camera backpanel switch LOCAL/Ext switch to Ext.
19. On Camera backpanel rotary switch to Mix 1.
20. Adjust output video amplitude, setup and sync amplitude.

Measure at:	Adjust with:	Required result:	
Mon + VF X320-B32	R27 R10 R96	700mV Setup 0mV Sync 300mV	

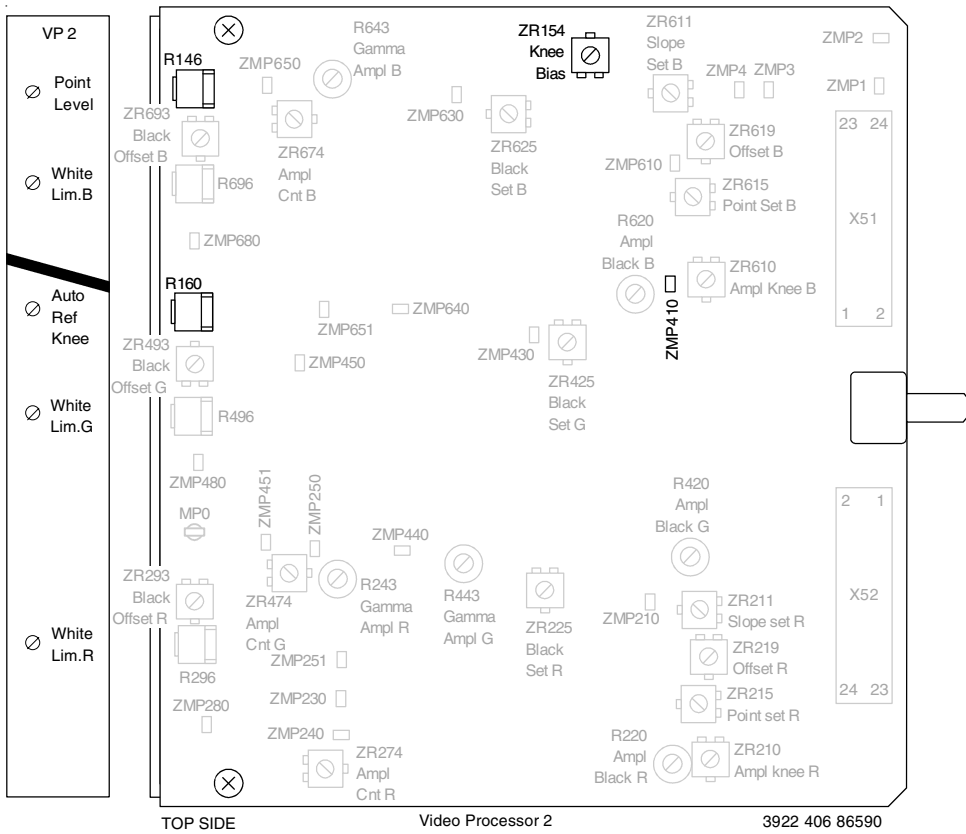
### VF output amplitude

21. Connect Y BNC with EXT 2 BNC on backpanel CPU.
22. On Camera backpanel rotary switch to Mix 2.
23. Adjust output video amplitude and setup.

Measure at:	Adjust with:	Required result:	
Mon + VF X320-B32	R35 R14	700mV Setup 0mV	

24. Remove connection Y-EXT2 and replace Monitoring + VF Board to its place in the CPU.

# Video Processor 2 Board



## Video Processor 2 Board Knee Adjustment

### KNEE ADJUSTMENT

#### Set up

- Switch off power. Place Video Processor 2 Board on service extender. Switch on power. Recall Factory Standard File on MCP or OCP.

On MCP set:

#### OPERATE MENU

Knee : Auto  
 Contour : Off  
 Gamma : Lin.  
 Gain : ++ (=12dB)  
 Auto Iris : Off  
 Colour Temp. : 3200K

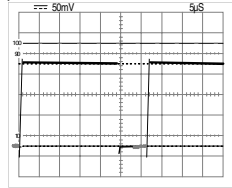
#### SETUP 1 MENU

Matrix : 1  
 Sawtooth : On

- On Video Processor 2 Board set knee bias potentiometer ZR154 fully clockwise. Set auto ref. potentiometer R160 fully counterclockwise.

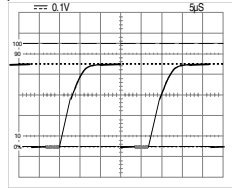
#### Attack level adjustment

- Adjust potentiometer R146 for a flat signal clipping at 200mV.

Measure at:	Adjust with:	Required result:	
ZMP410	R146	200mV Turn fast until signal clips at 200mV.	

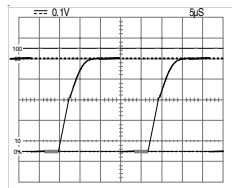
#### Knee bias adjustment

- Adjust with potentiometer ZR154 for a clipping level at 400mV.

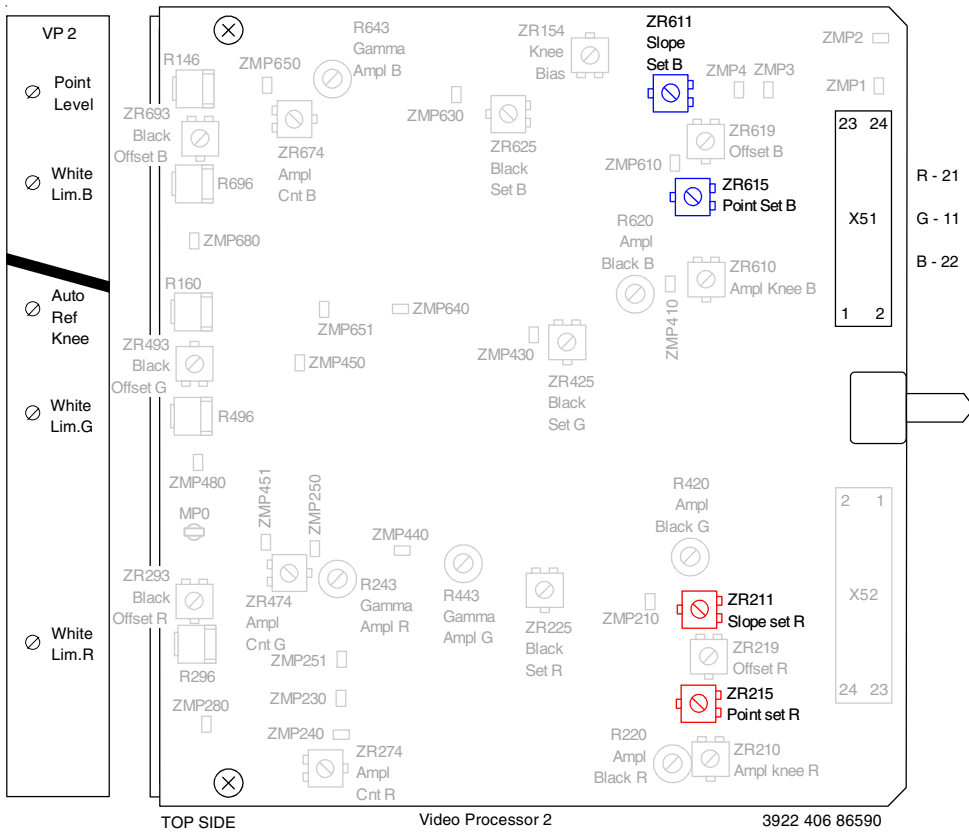
Measure at:	Adjust with:	Required result:	
ZMP410	ZR154	400mV	

#### Knee auto ref. level adjustment

- Adjust with potentiometer R160 for a clipping level at 450mV.

Measure at:	Adjust with:	Required result:	
ZMP410	R160	450mV	

# Video Processor 2 Board



# —Video Processor 2 Board Knee Adjustment—

## VAR. knee adjustments

6. On MCP set: OPERATE MENU

Knee : Var.  
Gain : +6dB  
Master slope : 99  
Master point : 00

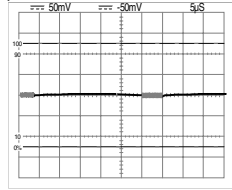
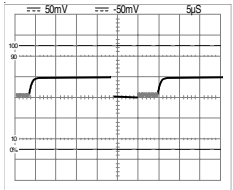
7. Oscilloscope : 50mV/div. Probe 10: 1

Measure with oscilloscope and subtract Channel A from Channel B. Calibrate channel A and B.

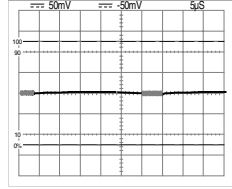
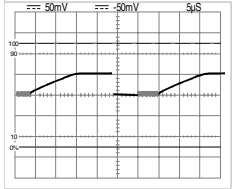
## Point and slope uniformity R/G

8. Measure with probe A on X51-11 (G). Measure with probe B on X51-21 (R).

9. Adjust the knee point level with potentiometer ZR215 for a flat signal.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X51-11 (G) X51-21 (R)	ZR215			

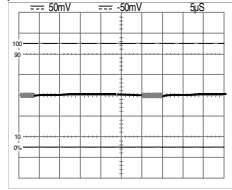
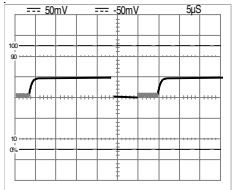
10. Adjust the knee slope level with potentiometer ZR211 for a flat signal.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X51-11 (G) X51-21 (R)	ZR211			

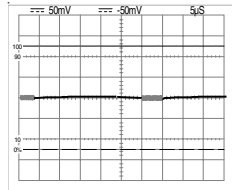
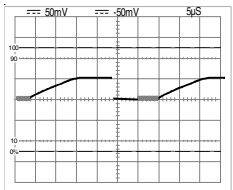
## Point and slope uniformity B/G

11. Measure with probe A on X51-11 (G). Measure with probe B on X51-22 (B).

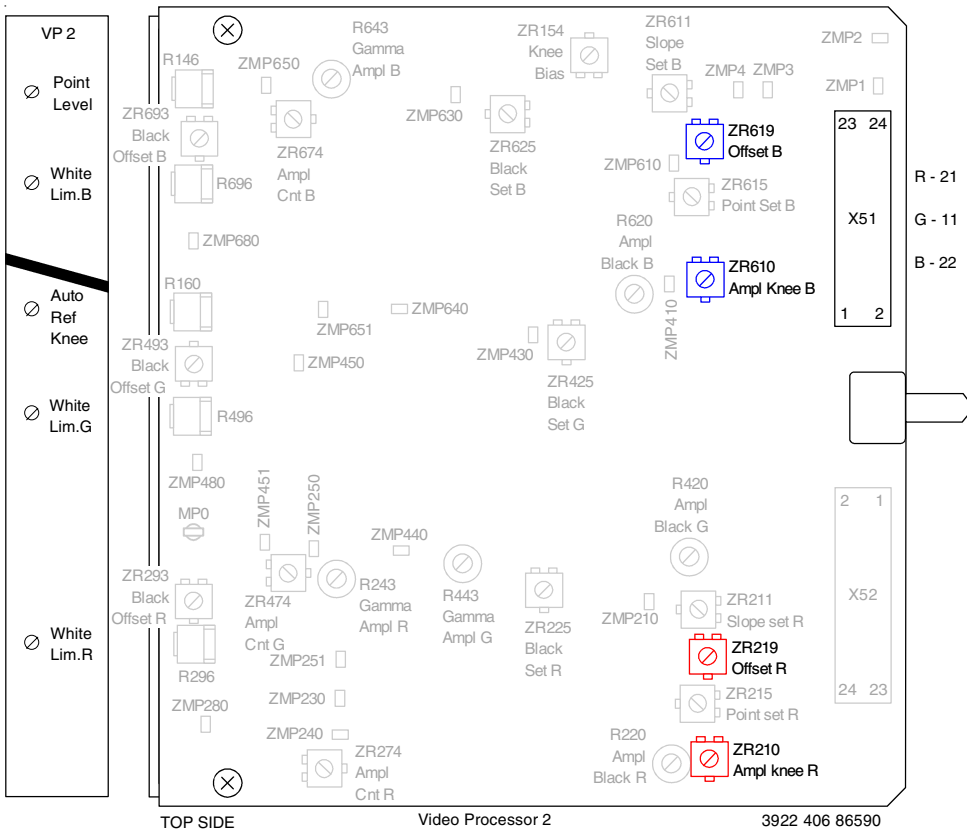
12. Adjust the knee point level with potentiometer ZR615 for a flat signal.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X51-11 (G) X51-22 (B)	ZR615			

13. Adjust the knee slope level with potentiometer ZR611 for a flat signal.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X51-11 (G) X51-22 (B)	ZR611			

# Video Processor 2 Board



## —Video Processor 2 Board Knee Adjustment—

### Knee tracking

14. On MCP set: OPERATE MENU

Master slope : Var.

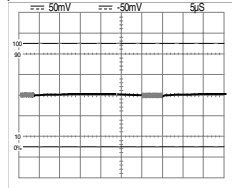
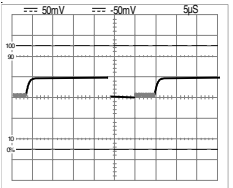
15. Oscilloscope : 50mV/div. Probe 10 : 1

Measure with oscilloscope and subtract Channel A from Channel B. Calibrate channel A and B.

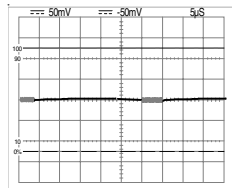
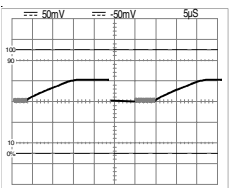
### Knee tracking R/G

16. Measure with probe A on X51-11 (G). Measure with probe B on X51-21 (R).

17. Adjust the knee offset level with potentiometer ZR219 for a flat signal.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X51-11 (G) X51-21 (R)	ZR219			

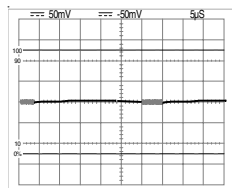
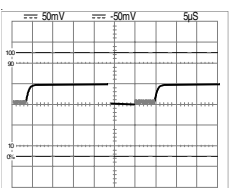
18. While varying the master slope adjust the knee amplitude with potentiometer ZR210 for a flat signal.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X51-11 (G) X51-21 (R)	ZR210			

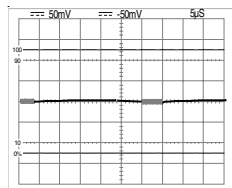
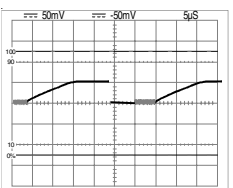
### Knee tracking B/G

19. Measure with probe A on X51-11 (G). Measure with probe B on X51-22 (B).

20. Adjust the knee offset level with potentiometer ZR619 for a flat signal.

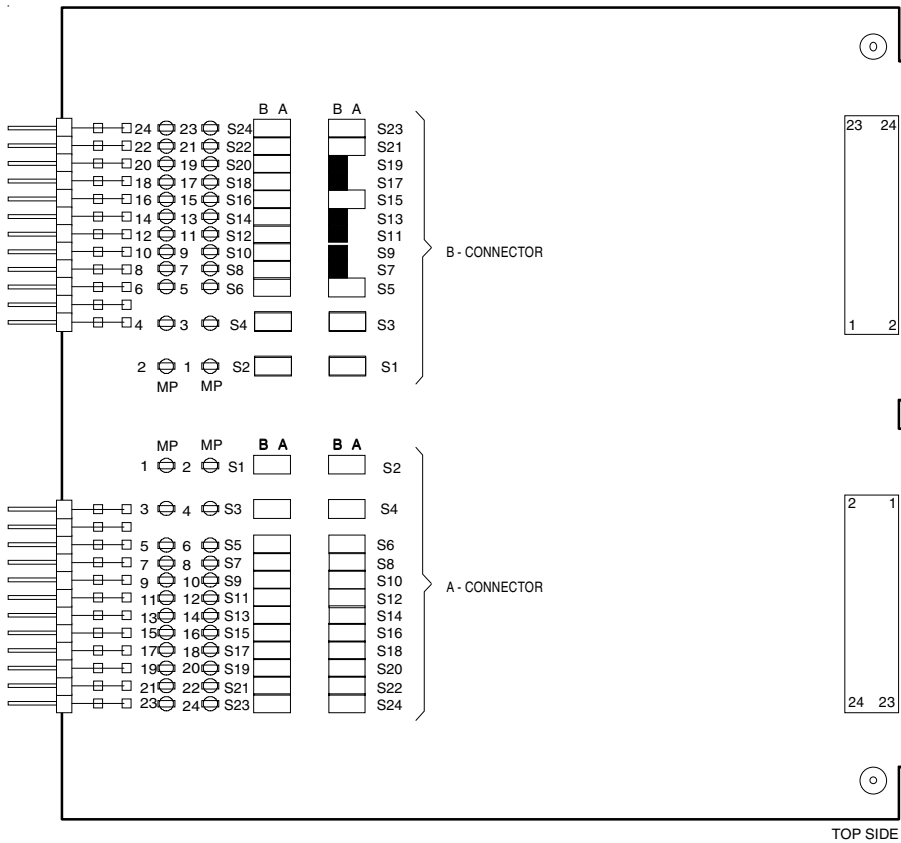
Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X51-11 (G) X51-22 (B)	ZR619			

21. While varying the master slope adjust the knee amplitude with potentiometer ZR610 for a flat signal.

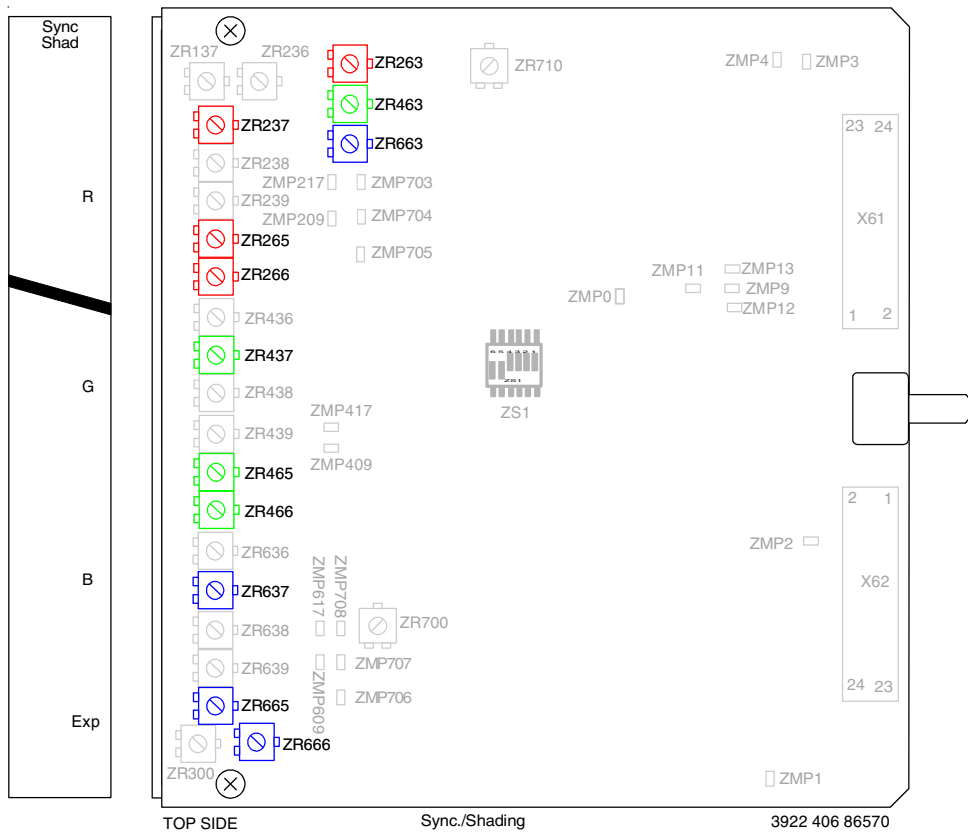
Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X51-11 (G) X51-22 (B)	ZR610			

Return video processor 2 to its place in the camera.

## Extender Board



## Sync./Shading Board





## — Sync./Shading Board —

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### Setting-up the Camera

**Note:**

Video Processor 1 must be adjusted in combination with the Sync./Shading board.

1. Recall Factory Standard File on MCP in the Recall menu or on the OCP by pressing two times the Scene file standard button.

On MCP set:

**OPERATE MENU**

Knee	:	Off
Contour	:	Off
Gamma	:	Lin.
Blk. Str.	:	Off
Filter	:	Cap
Auto Iris	:	Off

**SETUP 1 MENU**

Flare	:	Off
White clip	:	Off
Matrix	:	1

**SETUP 2 MENU**

Soft cont.	:	Off
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**SETUP 3 MENU**

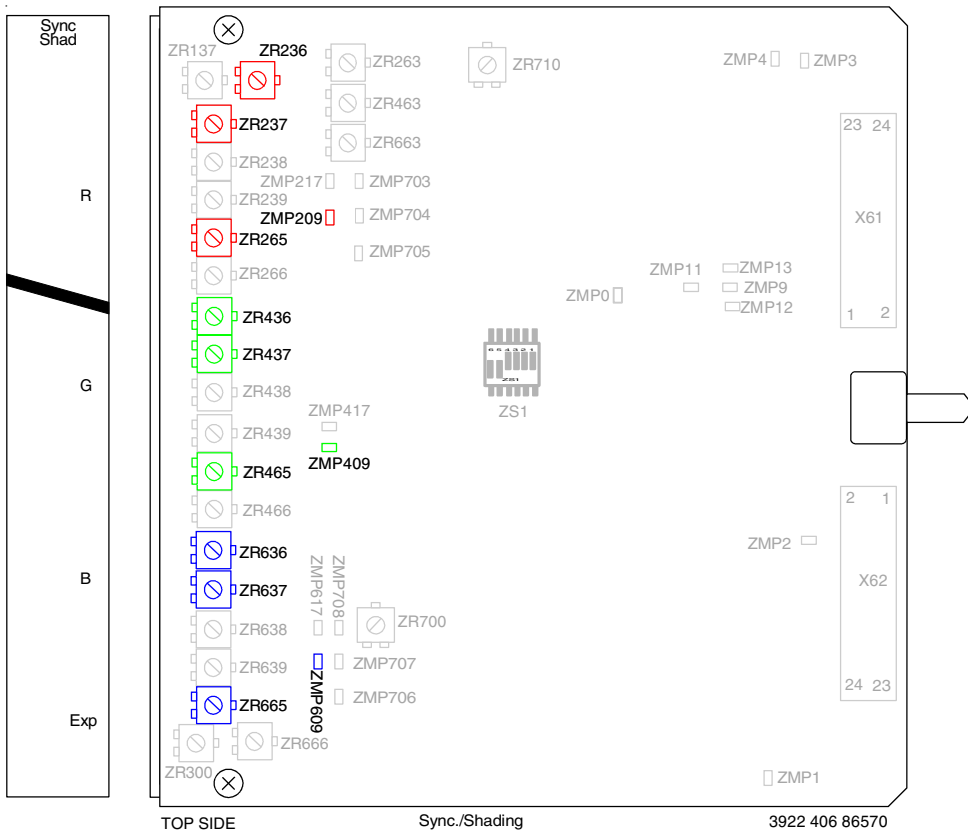
Notch	:	Off
Chroma	:	Off

**MAINT. 1 MENU**

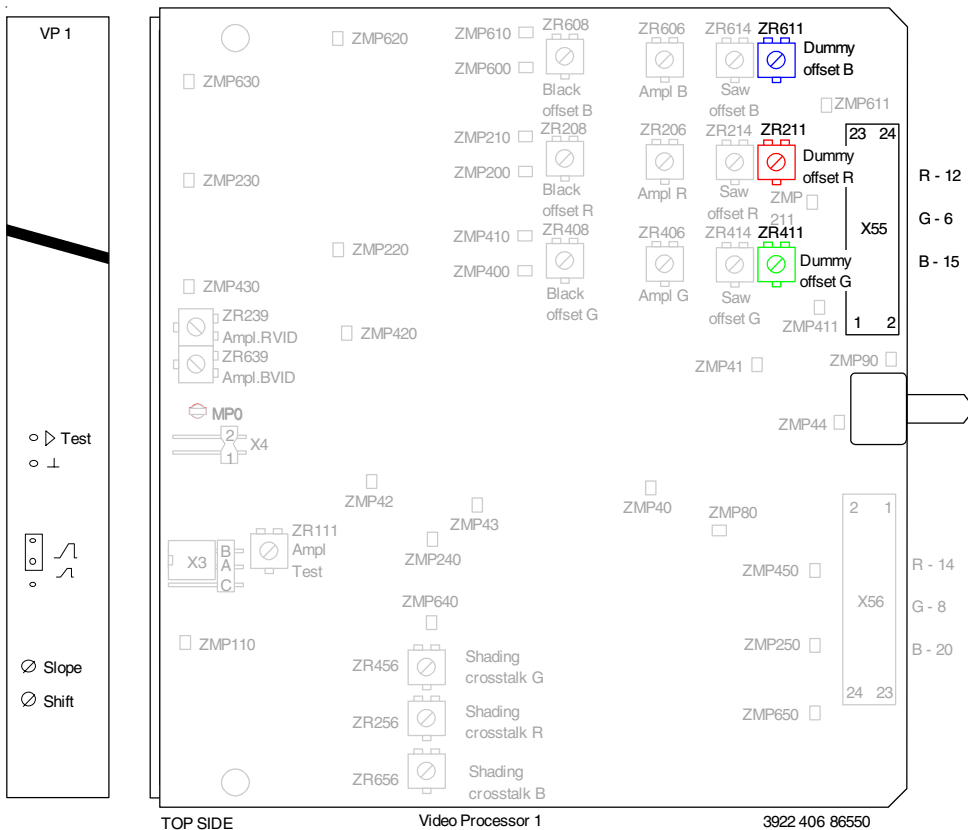
Wh. shading	:	Off
Max user level	:	4

2. Oscilloscope: 10mV/div. probe 10:1
3. Remove jumpers 7, 9, 11, 13, 17 and 19 from connector B of the service extender to interrupt the input from the front.
4. Short circuit the input to video processor 1 by connecting the following jumpers on connector B of the service extender:
  - B7 to B9
  - B11 to B13
  - B17 to B19
5. Put Video Processor 1 on a service extender.
6. Sync./Shading Board Pré settings:
  - Dipswitch positions ZS1
    - 1, 2, 3 and 4 : up
    - 5 : down
    - 6 : down (down= 150Hz, up= 180Hz)
  - Potentiometers settings:
    - Nose correction: ZR263, ZR463 and ZR663, fully **counterclockwise**.
    - Edge clip: ZR237, ZR437 and ZR637, fully **counterclockwise**.
    - Pulse comp: ZR266, ZR466 and ZR666, fully **counterclockwise**.
  
    - DC gain: ZR265, ZR465 and ZR665, fully **clockwise**.

# Sync./Shading Board



# Video Processor 1 Board



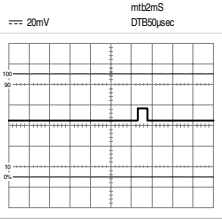
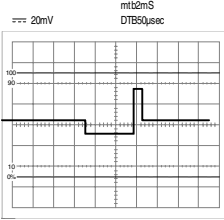
## Sync./Shading Board

### Black Shading Correction

7. Carry out this adjustment in an ambient temperature of 20°C / 25°C.
8. Check of dummy offset of VP1.

### Dummy offset adjustment

9. On Video Processor 1 Board adjust the offset of the active line to equal the dummy line level.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
VP1 X55-12 (R) X55-6 (G) X55-15 (B)	VP1 ZR211 ZR411 ZR611	Dummy offset		

**Note:** mtb= main time base DTB= delayed time base

Return Video Processor 1 to its position in the camera and put sync/shading on a service extender.

**The following adjustment is only necessary when in a temperature range from 20° to 45° a black shading level change is visible. If not continue with point 13.**

### DC gain adjustment

10. The following adjustment is temperature sensitive.  
If an oven is used to adjust at 45°C (the recommended adjustment temperature) ensure that the temperature does not rise above 45°C as this will damage the camera.
11. On Sync./Shading Board adjust the DC level potentiometer (turn slowly).

Measure at:	Adjust with:	Required result:	
ZMP209 (R)	ZR265	-250mVdc at 45°C	
ZMP409 (G)	ZR465	-250mVdc at 45°C	
ZMP609 (B)	ZR665	-250mVdc at 45°C	

12. Remove camera from oven and carry out the following adjustments while the camera is cooling down.

### Horizontal Shading adjustment

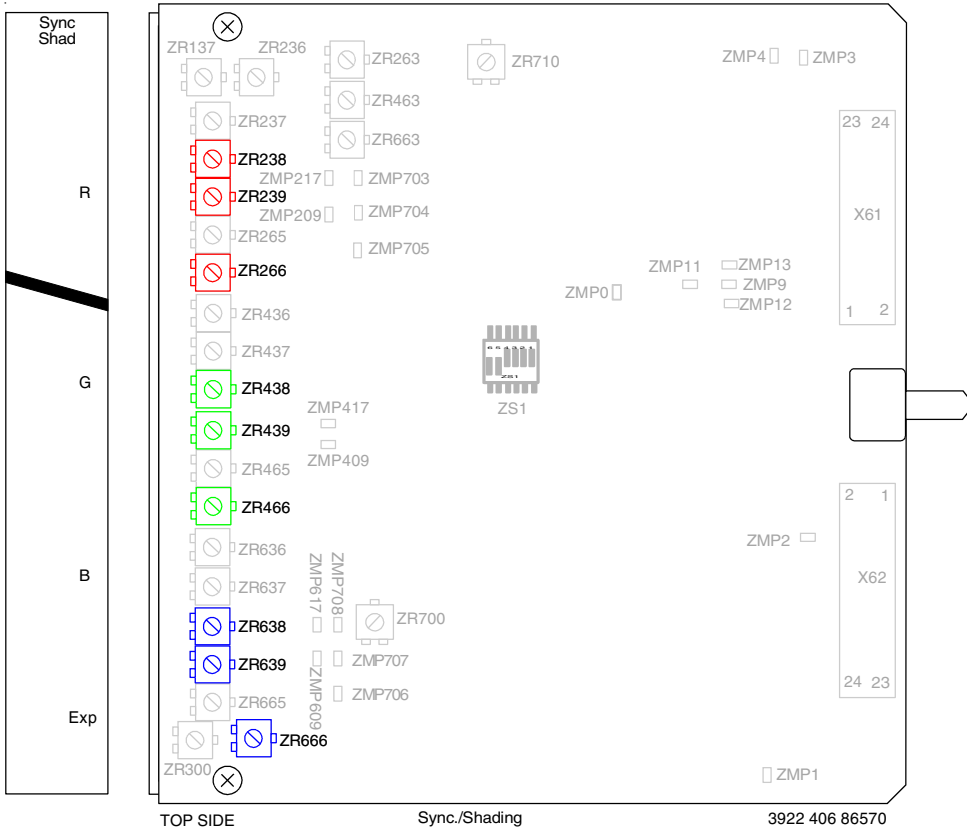
13. Minimise horizontal sawtooth information in active line.

Measure at:	Adjust with:	Required result:	
Sync./Shad. ZMP209 (R) ZMP409 (G) ZMP609 (B)	Sync./Shad. ZR236 (R) ZR436 (G) ZR636 (B)	minimum sawtooth information in active line	

### Edge clip level

14. Set edge clip level potentiometers, ZR237, ZR437 and ZR637, in their mid-position.

# Sync./Shading Board



## Sync./Shading Board

### Edge gain correction

15. On MCP set:

OPERATE MENU

Gain : ++

Exposure : Nom.

16. Adjust the parabola correction potentiometers.

Select R, G, and B on the MCP with Mon select or on the OCP with monitoring selection switch.

Measure at:	Adjust with:	Required result:	
WFM out R	ZR239	Flat shading signal	
WFM out G	ZR439		
WFM out B	ZR639		

17. Adjust the edge gain vertical sawtooth potentiometers for a flat vertical shading signal.

Measure at:	Adjust with:	Required result:	
WFM out R	ZR238	Flat vertical shading signal	
WFM out G	ZR438		
WFM out B	ZR638		

### Pulse compensation

18. In the Install/Gain menu set the gain for + to 12dB and for ++ to 21dB

19. On MCP set:

OPERATE MENU

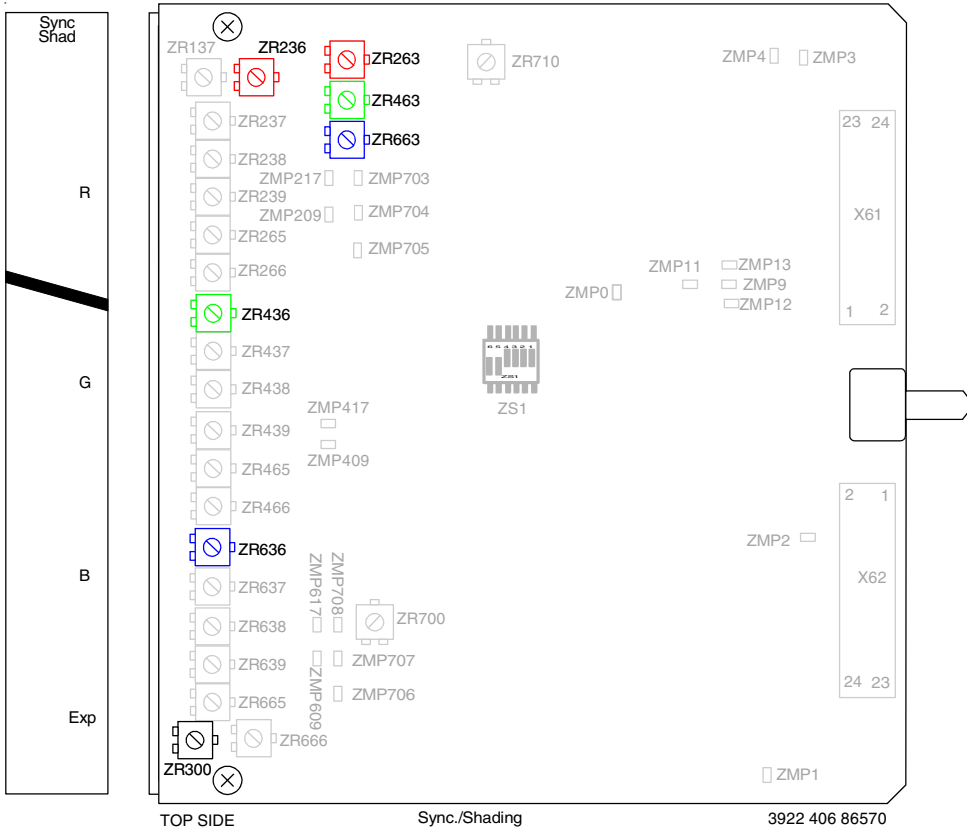
Gamma : 1

Gain : ++ (21dB)

20. While switching between Nom. and 1\1000 exposure time on MCP or OCP adjust for no difference between setup levels (make the adjustment when the switch is in the Nom. position).

Measure at:	Adjust with:	Required result:	
WFM out R	ZR266	No difference in setup level	
WFM out G	ZR466		
WFM out B	ZR666		

# Sync./Shading Board



## Sync./Shading Board

### Hor. sawtooth correction (Nom. Exp.)

21. On Sync./Shading Board adjust the horizontal sawtooth potentiometer for no sawtooth information (Exp. Nom.).

Measure at:	Adjust with:	Required result:	
WFM out R	ZR236	Flat horizontal	
WFM out G	ZR436	shading signal	
WFM out B	ZR636		

### Hor. nose correction (1/1000 Exp.)

22. Set exposure to 1/1000.

23. On Sync./Shading Board adjust the horizontal nose potentiometer for no nose information (Exp. 1/1000).

Measure at:	Adjust with:	Required result:	
WFM out R	ZR263	Flat horizontal	
WFM out G	ZR463	shading signal	
WFM out B	ZR663		

24. In the Install/Gain menu reset the gain for + to 6dB and for ++ to 12dB.

25. Remove VP1 board from service extender and return it to its position in the camera.

26. Remove all short-circuits and replace all jumpers on VP1 extender.

### White shading exposure (frame flicker)

27. On MCP set:

#### OPERATE MENU

Exposure : 1/1000  
Filter : clear  
Gain : 0dB

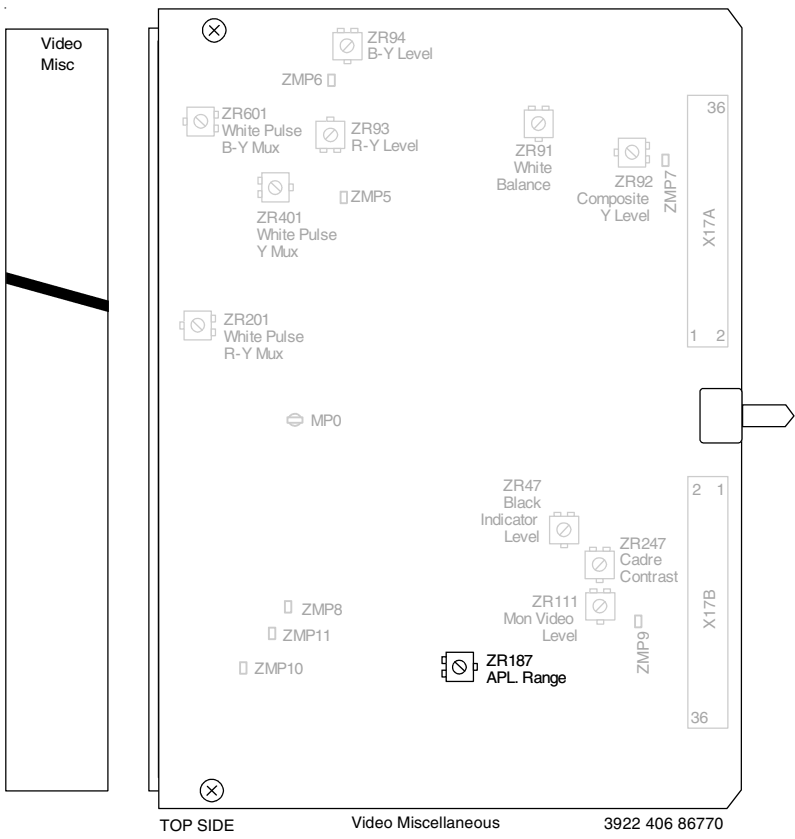
28. Point camera at and fill frame with a white 90% reflecting test chart, illuminated with a 3200K spotlight. Adjust iris for 100% Video output.

26. Observe the CVBS output on the waveform monitor and adjust the frame flicker potentiometer for minimum flicker between odd and even fields.

Measure at:	Adjust with:	Required result:	
CVBS out	ZR300	Minimum variation between fields	

27. Remove sync/shading board from service extender and return it to its position in the camera.

# Video Miscellaneous Board





## Video Miscellaneous Board

### Auto iris

Put Video Miscellaneous on a service extender

1. Point camera at and fill frame with a white 90% reflecting test chart, illuminated with a 3200K spotlight. Set iris to F5.6.

Measure at:	Adjust with:	Required result:	
CVBS out		Waveform monitor 100% video level.	

2. On OCP, ensure that the IRIS CENTRE control is turned fully counterclockwise and the IRIS RANGE control is turned fully clockwise. Move iris control first fully up and then fully down. Then set iris control to its mid-position.
3. On OCP, switch AUTO IRIS to AUTO.
4. Observe waveform monitor and adjust auto iris level on camera control panel for 70% white with setpoint potentiometer, in camera menu: Vf/Lens> Iris> Setpoint.

Measure at:	Adjust with:	Required result:	
CVBS out	Setpoint pos. = 42	70% white (490mV)	

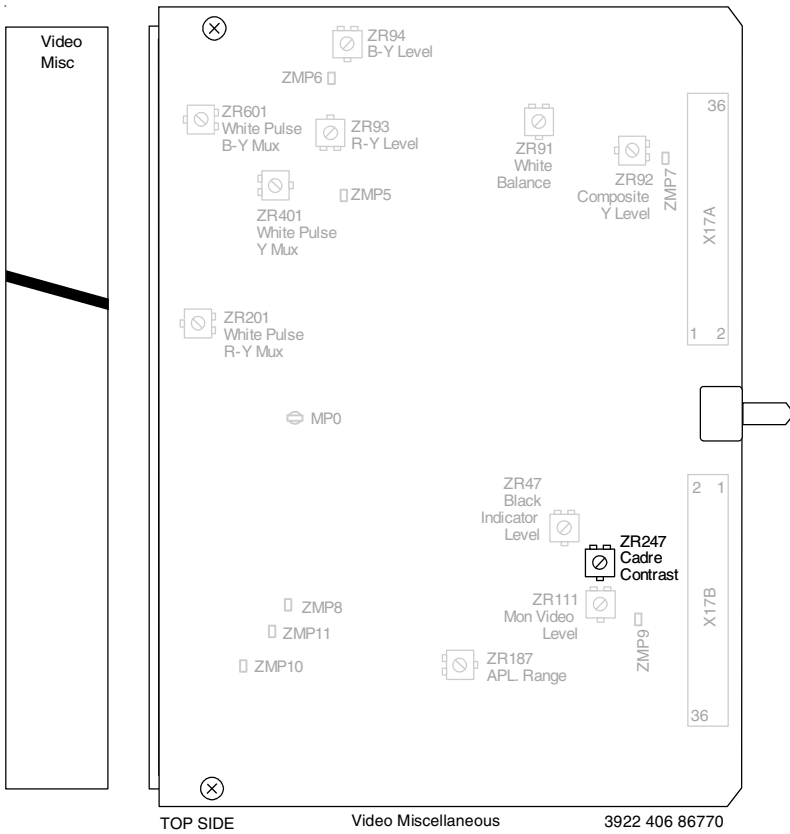
5. On OCP, set COLOUR TEMP. switch to position AW1.
6. Press AW button once so that the AW window is visible in the viewfinder and on the PXM monitor.
7. Press the AW button a second time to start the automatic white process.
8. During the automatic white process observe the waveform monitor. The mom. iris should be 70% white.

Measure at:	Adjust with:	Required result:	
CVBS out		70% white (490mV)	

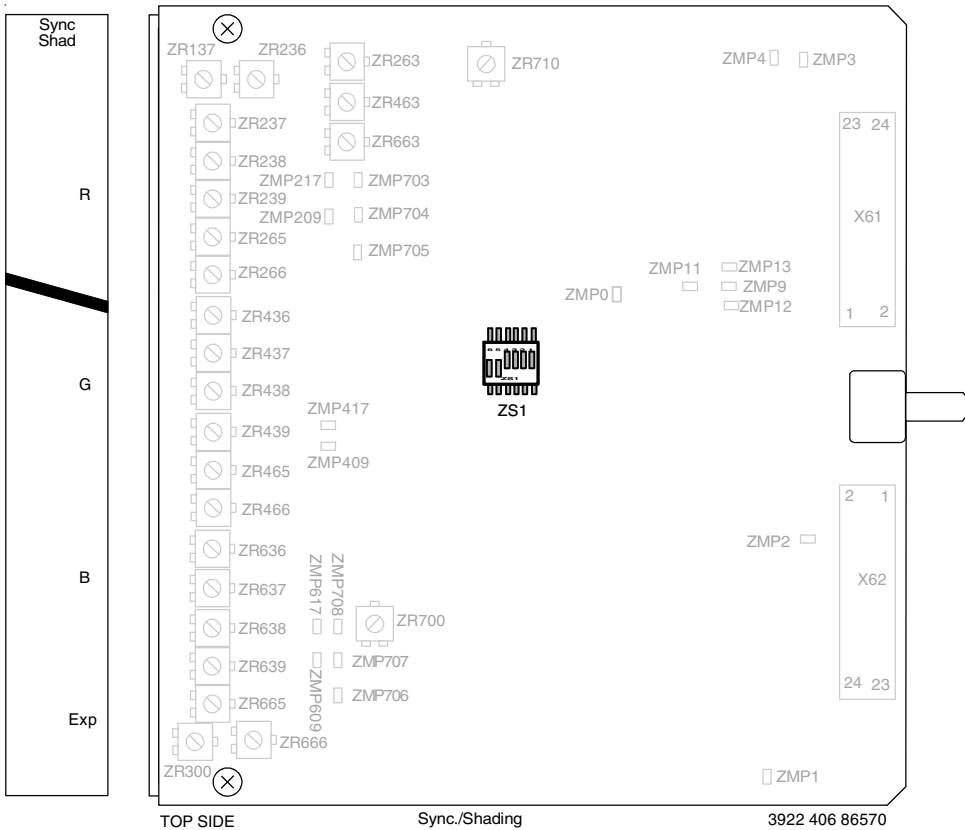
9. Point camera at gamma test chart illuminated with a 3200K spotlight.
10. Observe waveform monitor and with the peak/average value set to 50 on the camera menu: Vf/Lens> Iris> Peak average, adjust the peak/average potentiometer on the video miscellaneous board for 90% white.

Measure at:	Adjust with:	Required result:	
CVBS out	ZR187	90% white (630mV)	

## Video Miscellaneous Board



## Sync./Shading Board



## Video Miscellaneous Board

### Cadre Contrast

11. Switch Camera off and put Sync./Shading and Video Miscellaneous on service extenders.
12. Switch Camera on.
13. Point camera at and fill frame with a white 90% reflecting test chart, illuminated with a 3200K spotlight. Set iris to 100% video output.
14. In VF menu select VF/Lens > VF Install > VF/Mon Y.

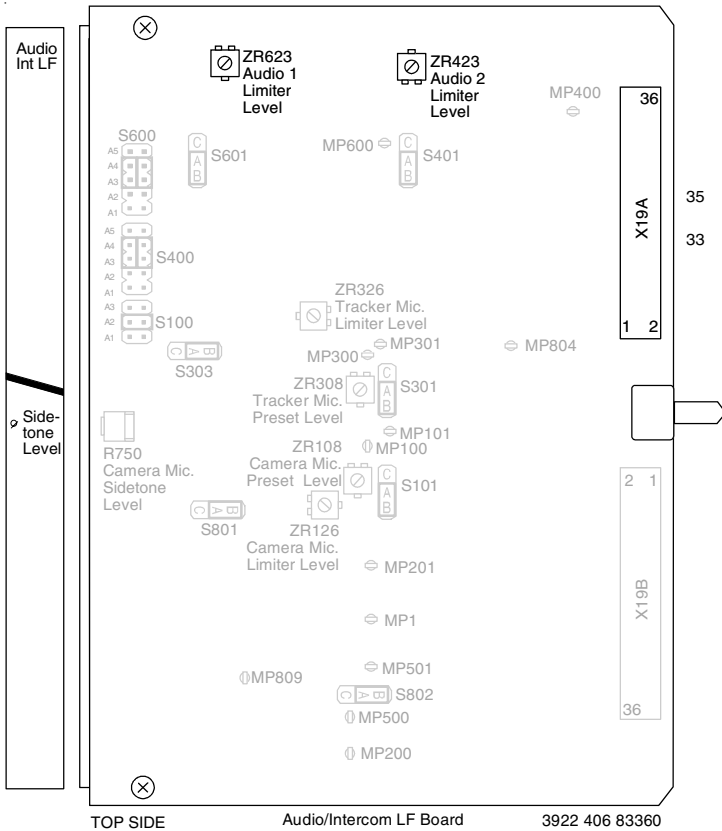
Measure at:	Adjust with:	Required result:	
VF-out	Iris	Waveform monitor 100% video level 700mV	

15. Switch cadre contrast on with ZS1-5 on the Sync./Shading Board.
16. In VF menu select Viewfinder > VF Mon > Markers > Cadre on.
17. Adjust Cadre level.

Measure at:	Adjust with:	Required result:	
VF	ZR247	70% video level 490mV	

15. Switch cadre contrast off.
16. Switch off camera.
17. Return Sync./Shading and Video Miscellaneous back to their position in the camera.
18. Switch on camera.

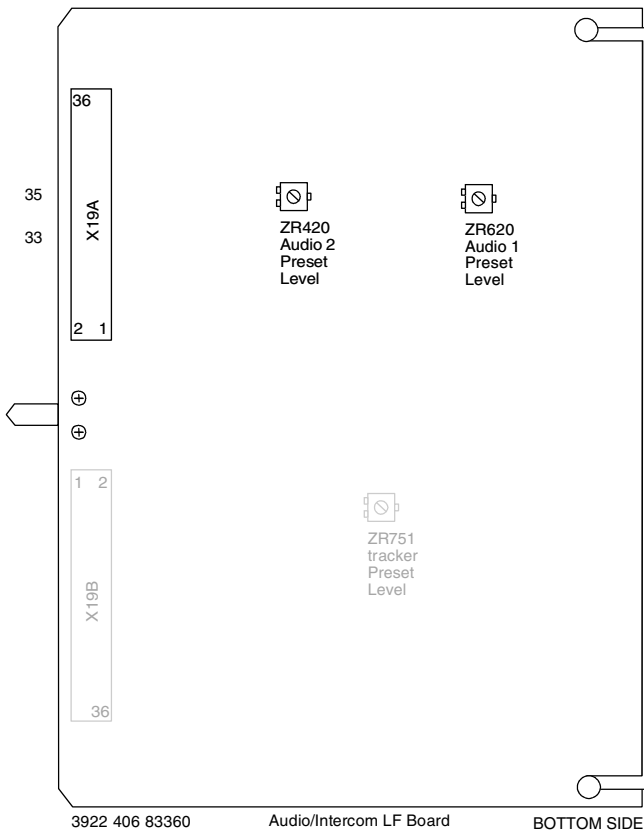
## Audio/Intercom LF Board



### Jumper settings:

<b>S100</b>	<b>S101</b>
Cam. + Tracker Mic. Phantom Power	Cam. Mic. Gain
A1-B1: +12V A2-B2: Gnd A3-B3: -12V	AB: 40dB AC: 0dB
<b>S301</b>	<b>S303</b>
Tracker Mic. Gain	Signal Choice
AB: 40dB AC: 0dB	AB: Sidetone AC: ENG
<b>S400</b>	<b>S401</b>
Audio 2 Phantom Power	Audio 2 High Pass Filter
A3-A4/B3-B4: Gnd A4-A5/B4-B5: +48V A1-A2/B1-B2: +12V	AB: Off AC: On
<b>S600</b>	<b>S601</b>
Audio 1 Phantom Power	Audio 1 High Pass Filter
A3-A4/B3-B4: Gnd A4-A5/B4-B5: +48V A1-A2/B1-B2: +12V	AB: Off AC: On
<b>S801</b>	<b>S802</b>
Channel Choice	Channel Choice
AB: Tracker Mic. AC: Private Data	AB: Progr. AC: Private Data

## Audio/Intercom LF Board



## —Audio/Intercom LF Board—

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### Setup

1. Set up camera in triax mode. Switch off power.  
Place audio/intercom LF board on service extender. Switch on power.

### Audio 1 level

2. Select an audio 1 level of -58dBu.
3. Apply a 1kHz test signal at -58dBu symmetrical to the audio 1 input of the camera
4. Adjust the audio preset potentiometer for a 1kHz signal at -12dBu on the audio 1 output pin.

Measure at:	Adjust with:	Required result:	
X19A-35	ZR620	-12dBu	

### Audio 1 limiter

5. Apply a 1kHz test signal at -40dBu to the audio 1 input of the camera.
6. Adjust the limiter potentiometer for a 1kHz signal at 0dB on audio 1 output pin.

Measure at:	Adjust with:	Required result:	
X19A-35	ZR623	0dBu	

### Audio 2 level

7. Select an audio 2 level of -58dBu.
8. Apply a 1kHz test signal at -58dBu symmetrical to the audio 2 input of the camera
9. Adjust the audio preset potentiometer for a 1kHz signal at -12dBu on the audio 2 output pin.

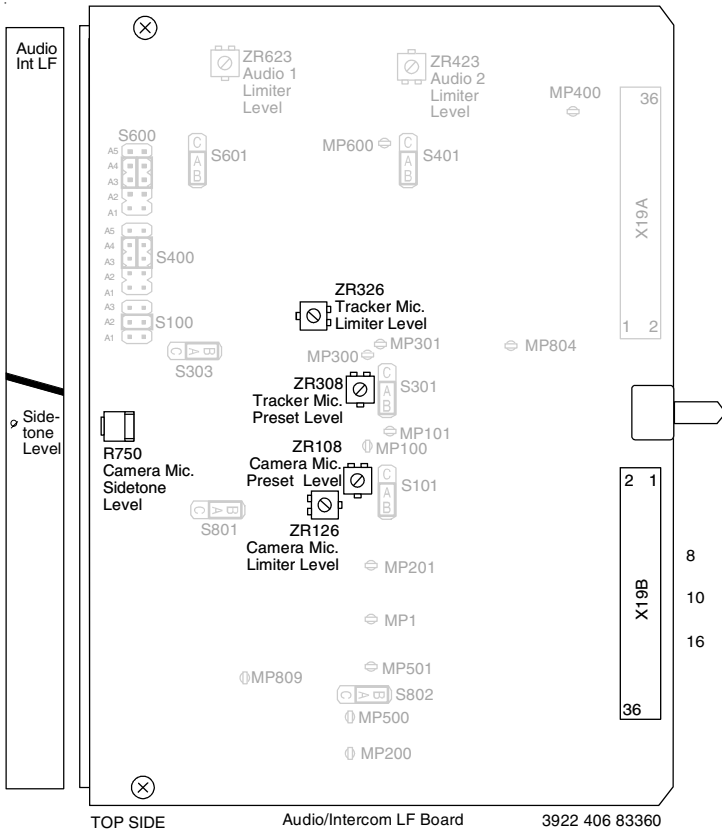
Measure at:	Adjust with:	Required result:	
X19A-33	ZR420	-12dBu	

### Audio 2 limiter

10. Apply a 1kHz test signal at -40dBu to the audio 2 input of the camera.
11. Adjust the limiter potentiometer for a 1kHz signal at 0dB on audio 2 output pin.

Measure at:	Adjust with:	Required result:	
X19A-33	ZR423	0dBu	

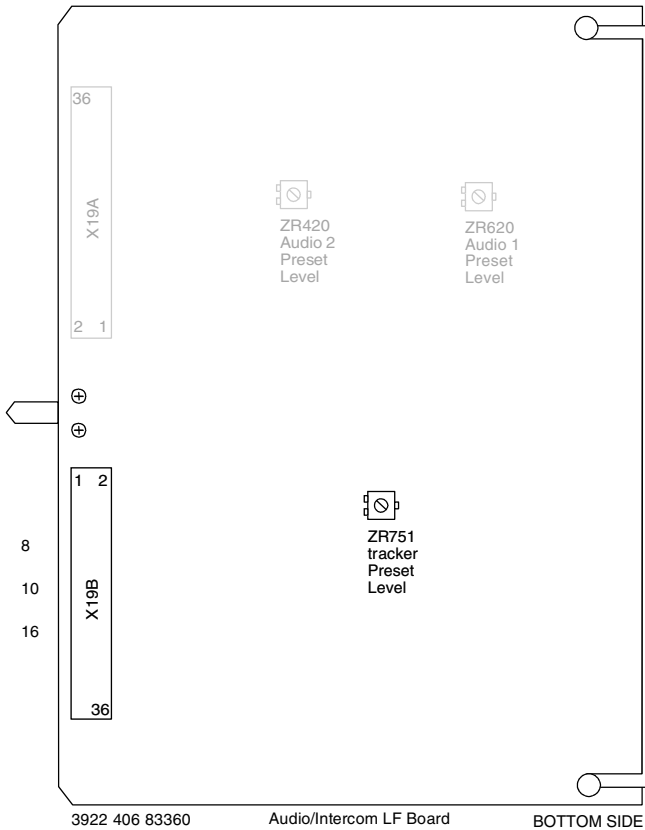
## Audio/Intercom LF Board



### Jumper settings:

<b>S100</b>	<b>S101</b>
Cam. + Tracker Mic. Phantom Power	Cam. Mic. Gain
A1-B1: +12V A2-B2: Gnd A3-B3: -12V	AB: 40dB AC: 0dB
<b>S301</b>	<b>S303</b>
Tracker Mic. Gain	Signal Choice
AB: 40dB AC: 0dB	AB: Sidetone AC: ENG
<b>S400</b>	<b>S401</b>
Audio 2 Phantom Power	Audio 2 High Pass Filter
A3-A4/B3-B4: Gnd A4-A5/B4-B5: +48V A1-A2/B1-B2: +12V	AB: Off AC: On
<b>S600</b>	<b>S601</b>
Audio 1 Phantom Power	Audio 1 High Pass Filter
A3-A4/B3-B4: Gnd A4-A5/B4-B5: +48V A1-A2/B1-B2: +12V	AB: Off AC: On
<b>S801</b>	<b>S802</b>
Channel Choice	Channel Choice
AB: Tracker Mic. AC: Private Data	AB: Progr. AC: Private Data

## Audio/Intercom LF Board



## Audio/Intercom LF Board

### Cameraman intercom microphone

- Apply a 1kHz test signal at -64dBu to the cam. intercom mic. input of Audio/Intercom LF Board (X19A-25).
- Adjust the cam. mic. preset potentiometer for a 1kHz signal at -6dBu on the microphone output pin of the board.

Measure at:	Adjust with:	Required result:	
X19B-10	ZR108	-6dBu	

- Adjust the side tone potentiometer for a 1kHz signal at 0dBu on the telephone output pin.

Measure at:	Adjust with:	Required result:	
X19B-16	R750	0dBu	

### Limiter level

- Apply a 1kHz test signal at -52dBu to the cam. intercom mic. input of Audio/Intercom LF Board (X19A-25).
- Adjust the cam. mic. limiter level potentiometer for a 1kHz signal at 0dB the microphone output pin of the board.

Measure at:	Adjust with:	Required result:	
X19B-10	ZR126	0dBu	

### Tracker intercom microphone

- Apply a 1kHz test signal at -64dBu to the tracker intercom mic. input of Audio/Intercom LF board (X19A-13).
- Adjust the tracker mic. preset potentiometer for a 1kHz signal at -6dBu on the mic. output pin of the board.

Measure at:	Adjust with:	Required result:	
X19B-8	ZR308	-6dBu	

- Adjust the side tone potentiometer for a 1kHz signal at 0dBu on the telephone cam. output pin.

Measure at:	Adjust with:	Required result:	
X19B-16	ZR751	0dBu	

### Limiter level

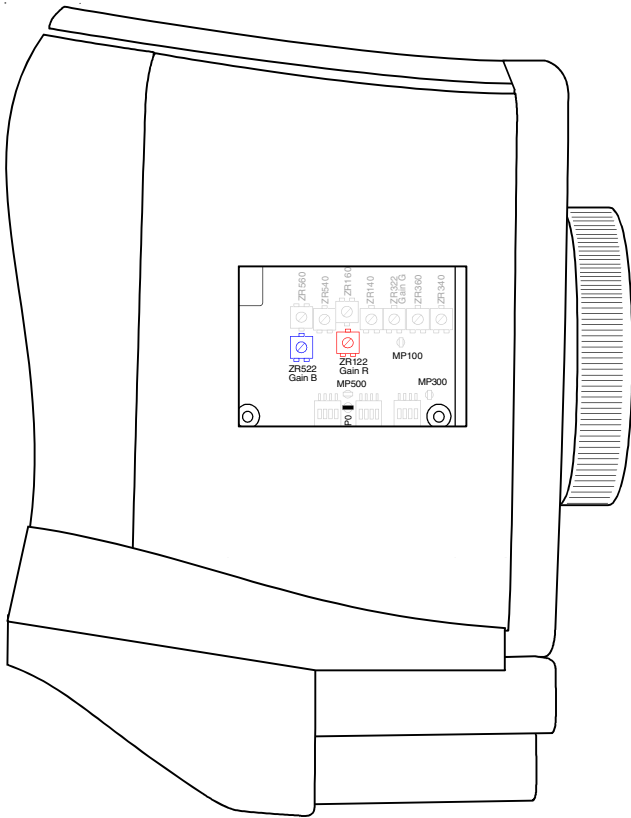
- Apply a 1kHz test signal at -52dBu to the tracker intercom mic. input of Audio/Intercom LF board (X19A-13).
- Adjust the tracker mic. limiter level potentiometer for a 1kHz signal at 0dB the microphone output pin of the board.

Measure at:	Adjust with:	Required result:	Correct:	Incorrect:
X19B-8	ZR326	0dBu		

- Switch off power. Return Audio/Intercom LF Board to its position in the camera.

# Pre Processor Board

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## Pre Processor Board

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### Gain Adjustment

1. Recall Factory Standard File on MCP or OCP.

On MCP set:

**OPERATE MENU**

Knee : Off  
Auto Iris : Off

**SETUP 1 MENU**

Matrix : 1(=Off)  
Wh. Clip : Off  
Gamma: Lin.

Light conditions: 3200K

2000lux

Test Chart

reflection factor ref white 90%

2. Remove side panel on right side of front module of the camera.  
Open Iris at the lens to obtain 700mV at X17 point 19 of Video Processor 2 Board (Green)

Measure at:	Adjust with:	Required result:	
<u>VP2</u>	<u>Pre-Proc.</u>		
X17-23 (B)	ZR522	700mV	
X17-27 (R)	ZR122	700mV	

**Remark: Observe the picture on CVBS output after this adjustment, the picture must be colourless.**

3. Replace side panel on right side of front module of the camera.
4. Recall Factory Standard File on MCP or OCP.



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## Section 5

### Drawings

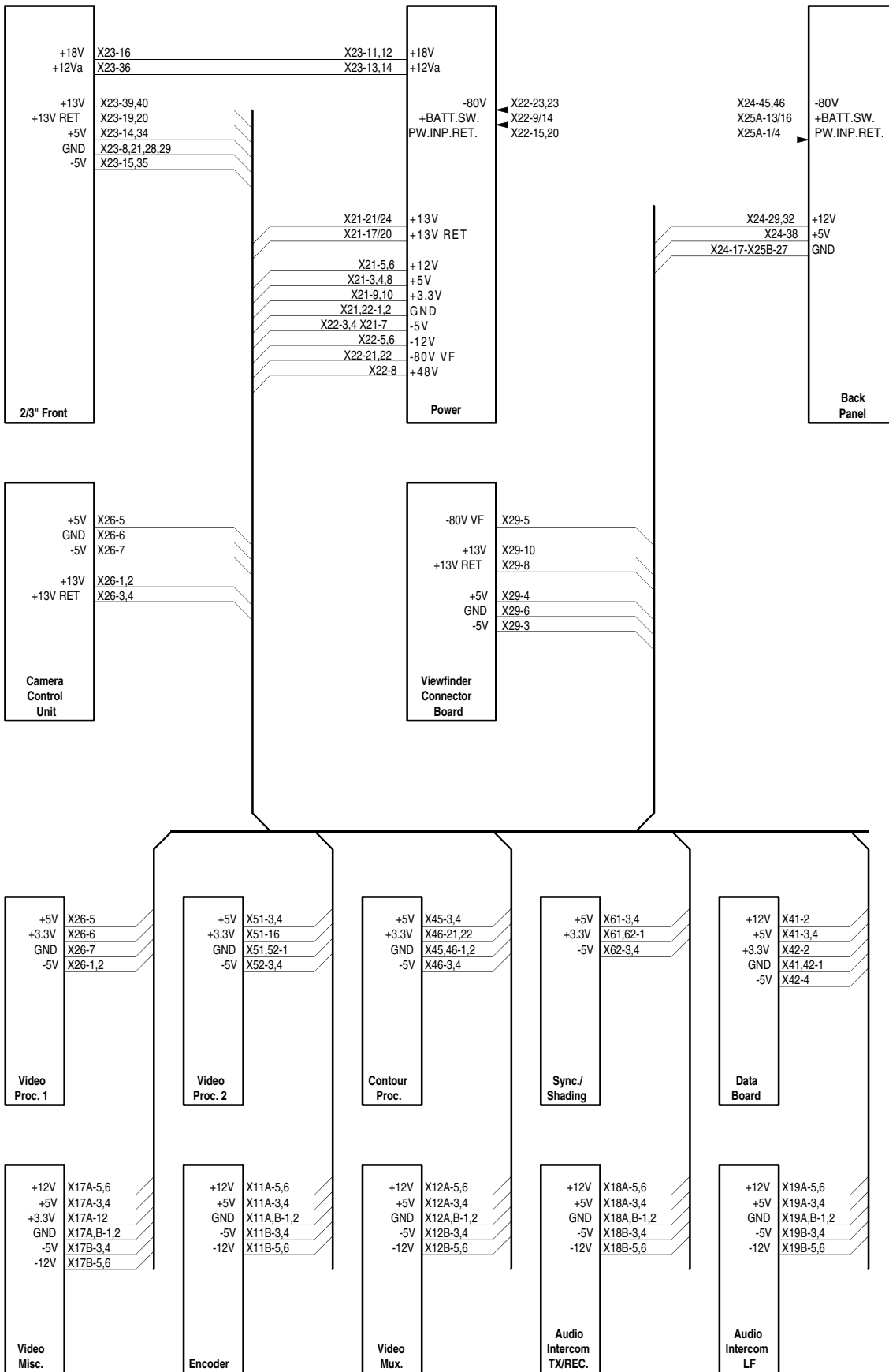
*This section contains block diagrams of the camera system. The block diagrams are a useful help for tracing signals when fault finding.*

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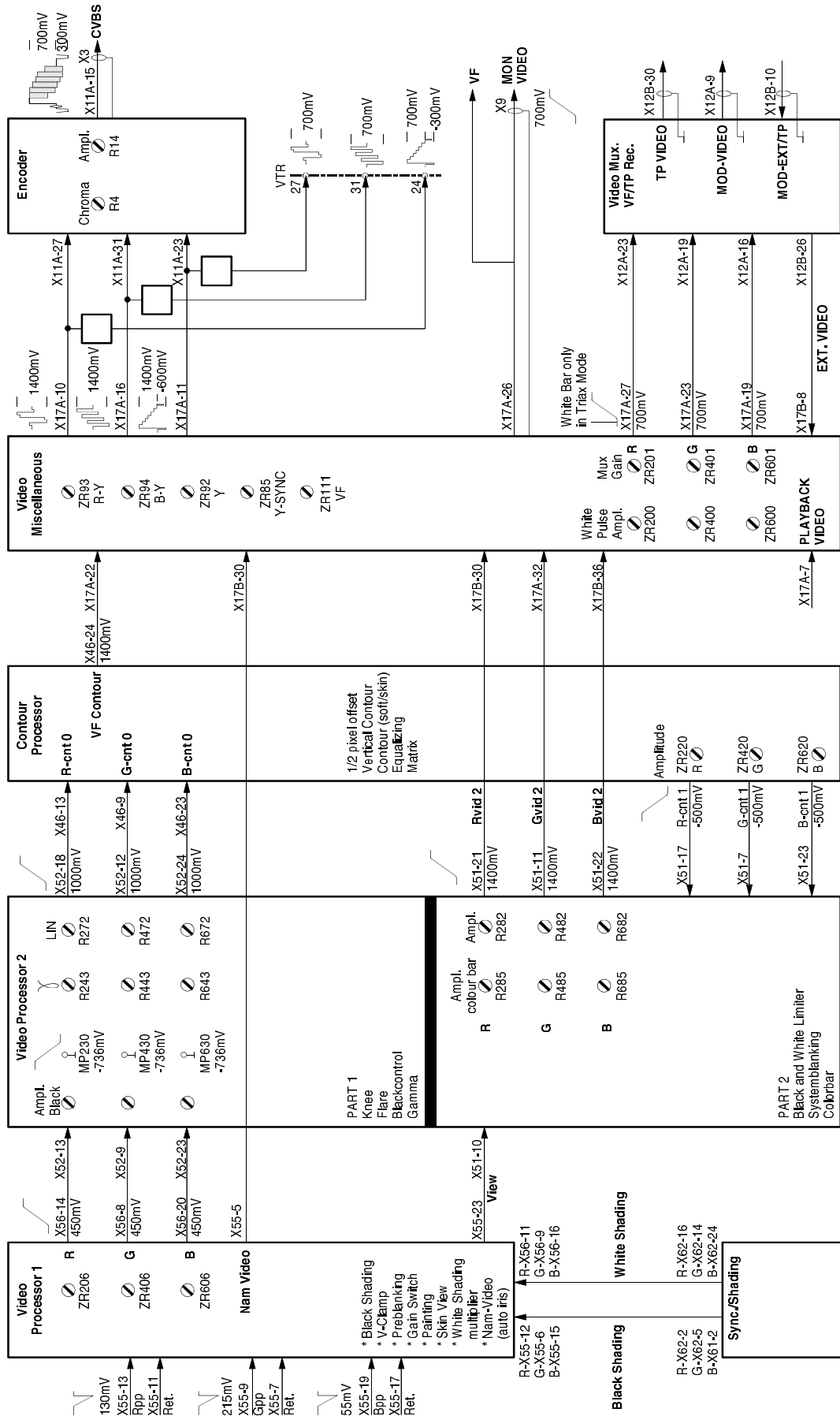
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Block Diagram Power Signals .....	5-2	Block Diagram Transmission Signals .....	5-4
Block Diagram Video Signals .....	5-3	Block Diagram Control Signals .....	5-5

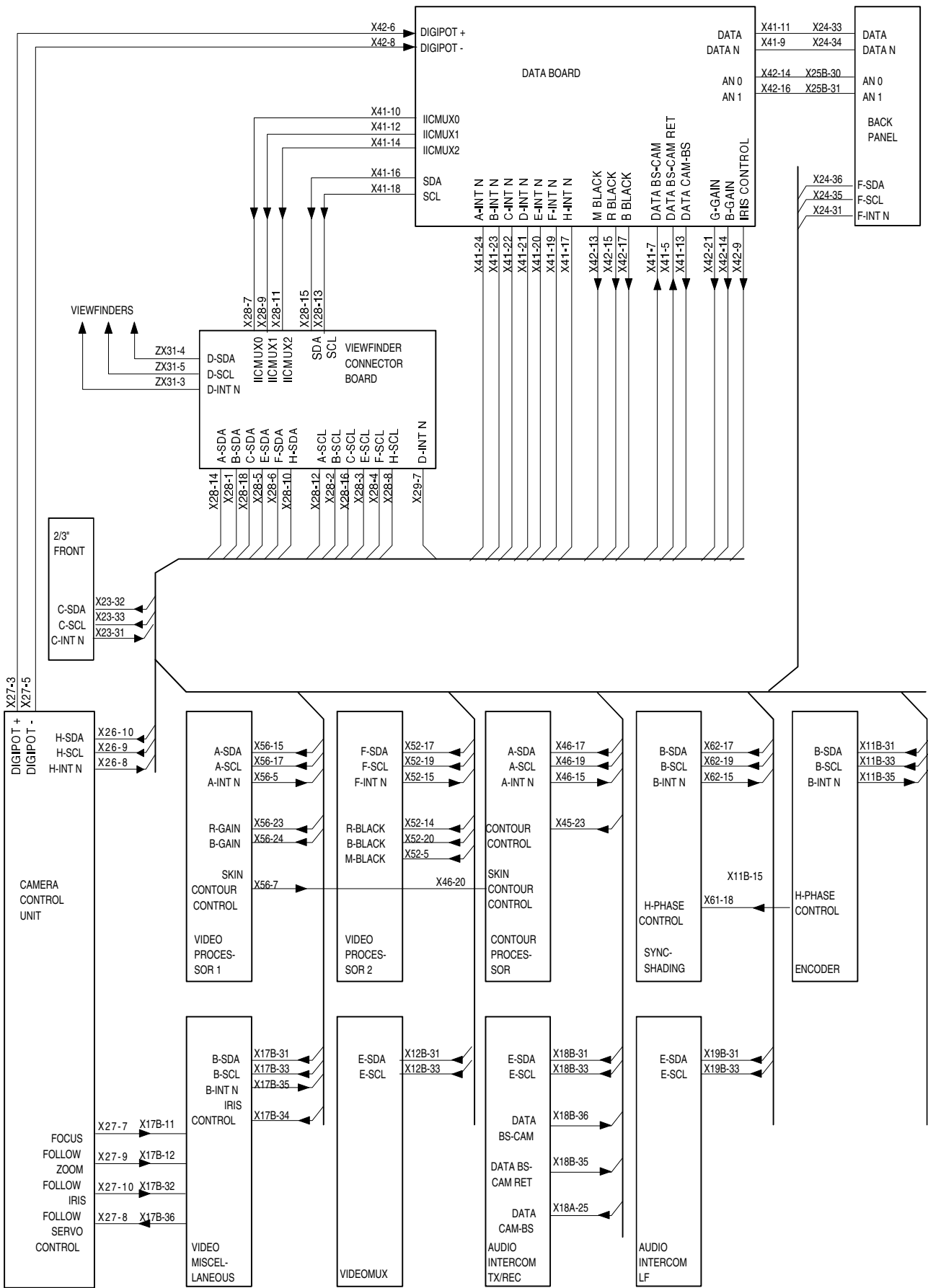
# Block Diagram Power Signals



# Block Diagram Video Signals



# Block Diagram Transmission Signals



# Block Diagram Control Signals

